OVERVIEW

The purpose of this manual is to provide you with the information to install, use, and understand the z/OS version of FDR/UPSTREAM referred to throughout this manual as FDR/UPSTREAM z/OS Storage Server.

FDR/UPSTREAM™ is a trademark of INNOVATION DATA PROCESSING and is registered with the US patent office.

FDR/UPSTREAM™ is a proprietary program product of:

INNOVATION DATA PROCESSING
Innovation Plaza
275 Paterson Avenue
Little Falls, New Jersey 07424-1658

and is available for license exclusively from INNOVATION DATA PROCESSING.

Reproduction of this User Manual is prohibited except for licensed users for their internal use.

A copy of this manual is available in Adobe PDF format on the INNOVATION DATA PROCESSING Documentation CD-ROM and on the INNOVATION DATA PROCESSING FTP site for online use and local printing.

© Copyright 2000, 2016
INNOVATION DATA PROCESSING
### USA Contacts

<table>
<thead>
<tr>
<th>Corporate Headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice: 973-890-7300</td>
</tr>
<tr>
<td>Fax: 973-890-7147</td>
</tr>
<tr>
<td>Home page: <a href="http://www.innovationdp.fdr.com">http://www.innovationdp.fdr.com</a></td>
</tr>
</tbody>
</table>

### European Offices

<table>
<thead>
<tr>
<th>France</th>
<th>Netherlands (&amp; Nordic Countries)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INNOVATION DATA PROCESSING</strong></td>
<td><strong>INNOVATION DATA PROCESSING</strong></td>
</tr>
<tr>
<td>191 Avenue Aristide Briand</td>
<td>Brouwerstraat 8</td>
</tr>
<tr>
<td>94230 Cachan</td>
<td>1315 BP Almere</td>
</tr>
<tr>
<td>Tel: (33) 1 49 69 94 02</td>
<td>Tel: 036-534 1660</td>
</tr>
<tr>
<td>Fax: (33) 1 49 69 90 98</td>
<td>Fax: 036-533 7308</td>
</tr>
<tr>
<td><a href="mailto:frsales@fdrinnovation.com">frsales@fdrinnovation.com</a></td>
<td><a href="mailto:nlsales@fdrinnovation.com">nlsales@fdrinnovation.com</a></td>
</tr>
<tr>
<td><a href="mailto:frsupport@fdrinnovation.com">frsupport@fdrinnovation.com</a></td>
<td><a href="mailto:nlsupport@fdrinnovation.com">nlsupport@fdrinnovation.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Germany</th>
<th>United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INNOVATION DATA PROCESSING International Ltd.</strong></td>
<td><strong>INNOVATION DATA PROCESSING Ltd.</strong></td>
</tr>
<tr>
<td>Orleansstraße 4a</td>
<td>Clarendon House</td>
</tr>
<tr>
<td>D-81669 München</td>
<td>125 Shenley Road</td>
</tr>
<tr>
<td>Tel: 089-489 0210</td>
<td>Tel: 0208-905 1266</td>
</tr>
<tr>
<td>Fax: 089-489 1355</td>
<td>Fax: 0208-905 1428</td>
</tr>
<tr>
<td><a href="mailto:desales@fdrinnovation.com">desales@fdrinnovation.com</a></td>
<td><a href="mailto:uksales@fdrinnovation.com">uksales@fdrinnovation.com</a></td>
</tr>
<tr>
<td><a href="mailto:desupport@fdrinnovation.com">desupport@fdrinnovation.com</a></td>
<td><a href="mailto:uksupport@fdrinnovation.com">uksupport@fdrinnovation.com</a></td>
</tr>
</tbody>
</table>
# Table of Contents

## FDR/UPSTREAM z/OS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVERVIEW</strong></td>
<td>III</td>
</tr>
<tr>
<td><strong>SUMMARY OF MODIFICATIONS</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 SUMMARY OF MODIFICATIONS FOR FDR/UPSTREAM z/OS V3.9.0</td>
<td>1-1</td>
</tr>
<tr>
<td>1.2 SUMMARY OF MODIFICATIONS FOR FDR/UPSTREAM z/OS V3.8.0</td>
<td>1-2</td>
</tr>
<tr>
<td><strong>SYSTEM OVERVIEW</strong></td>
<td></td>
</tr>
<tr>
<td>2.1 AN INTRODUCTION TO FDR/UPSTREAM</td>
<td>2-1</td>
</tr>
<tr>
<td>2.2 FDR/UPSTREAM BACKUP FUNDAMENTALS</td>
<td>2-6</td>
</tr>
<tr>
<td>2.3 FDR/UPSTREAM SYSTEM COMPONENTS</td>
<td>2-21</td>
</tr>
<tr>
<td>2.4 BACKUP UTILITIES AND MAINTENANCE</td>
<td>2-23</td>
</tr>
<tr>
<td>2.5 FDR/UPSTREAM REPORTING TOOLS</td>
<td>2-24</td>
</tr>
<tr>
<td><strong>INSTALLATION AND CONFIGURATION</strong></td>
<td></td>
</tr>
<tr>
<td>3.1 OVERVIEW AND INSTALLATION CHECKLIST</td>
<td>3-1</td>
</tr>
<tr>
<td>3.2 INSTALLATION CHECKLIST</td>
<td>3-2</td>
</tr>
<tr>
<td>3.3 UPGRADING AND REPLACING A TRIAL VERSION</td>
<td>3-3</td>
</tr>
<tr>
<td>3.4 ELECTRONIC INSTALLATION</td>
<td>3-5</td>
</tr>
<tr>
<td>3.5 INSTALLATION ISPF DIALOG</td>
<td>3-11</td>
</tr>
<tr>
<td>3.6 APF AUTHORIZE THE FDR/UPSTREAM LOAD LIBRARY</td>
<td>3-13</td>
</tr>
<tr>
<td>3.7 START THE FDR/UPSTREAM ISPF INTERFACE</td>
<td>3-14</td>
</tr>
<tr>
<td>3.8 DEFINE THE FDR/UPSTREAM SYSTEM DATA SET</td>
<td>3-15</td>
</tr>
<tr>
<td>3.9 DEFINE THE &quot;CONFIG&quot; CONFIGURATION FILE</td>
<td>3-16</td>
</tr>
<tr>
<td>3.10 DEFINE THE &quot;CATALOG&quot; REPOSITORY DATA SET</td>
<td>3-17</td>
</tr>
<tr>
<td>3.11 DEFINE THE &quot;FILEINFO&quot; REPOSITORY DATA SET</td>
<td>3-18</td>
</tr>
<tr>
<td>3.12 DEFINE THE &quot;FILEDATA&quot; REPOSITORY DATA SET</td>
<td>3-19</td>
</tr>
<tr>
<td>3.13 GENERATE THE JCL</td>
<td>3-20</td>
</tr>
<tr>
<td>3.14 DEFINE REQUIRED VTAM SYSTEM RESOURCES</td>
<td>3-21</td>
</tr>
<tr>
<td>3.15 DEFINE OPTIONAL TCP/IP SYSTEM RESOURCES</td>
<td>3-22</td>
</tr>
<tr>
<td>3.16 CONFIGURE THE MAIN OPTIONS</td>
<td>3-23</td>
</tr>
<tr>
<td>3.17 MAKE THE FDR/UPSTREAM ISPF DIALOGS EASILY AVAILABLE</td>
<td>3-28</td>
</tr>
<tr>
<td>3.18 AUTHORIZE FDR/UPSTREAM ISPF PROGRAMS TO TSO/E</td>
<td>3-29</td>
</tr>
<tr>
<td>3.19 DEFINE THE FDR/UPSTREAM STARTED TASK PROC</td>
<td>3-30</td>
</tr>
<tr>
<td>3.20 DEFINE THE USTTAPEM STARTED TASK PROC (OPTIONAL)</td>
<td>3-33</td>
</tr>
<tr>
<td>3.21 EXTEND AN FDR/UPSTREAM TRIAL (OPTIONAL)</td>
<td>3-35</td>
</tr>
<tr>
<td>3.22 WHAT’S NEXT?</td>
<td>3-36</td>
</tr>
<tr>
<td>3.23 DVD INSTALLATION</td>
<td>3-37</td>
</tr>
<tr>
<td><strong>SECURITY</strong></td>
<td></td>
</tr>
<tr>
<td>4.1 INTRODUCTION</td>
<td>4-1</td>
</tr>
<tr>
<td>4.2 FDR/UPSTREAM SECURITY PARAMETERS</td>
<td>4-2</td>
</tr>
<tr>
<td>4.3 IMPLEMENTING FDR/UPSTREAM SECURITY</td>
<td>4-4</td>
</tr>
<tr>
<td>4.4 USTBATCH SECURITY CHECKING</td>
<td>4-7</td>
</tr>
<tr>
<td>4.5 IBM RACF CONSIDERATIONS</td>
<td>4-8</td>
</tr>
<tr>
<td>4.6 CA TOP SECRET CONSIDERATIONS</td>
<td>4-9</td>
</tr>
<tr>
<td>4.7 CA ACF2 CONSIDERATIONS</td>
<td>4-10</td>
</tr>
<tr>
<td>4.8 z/OS DATA SET SECURITY</td>
<td>4-11</td>
</tr>
<tr>
<td>4.9 FDR/UPSTREAM DATA ENCRYPTION</td>
<td>4-12</td>
</tr>
<tr>
<td>4.10 z/OS INITIATED RUN JOB FUNCTIONS WITH SECLVL=2</td>
<td>4-14</td>
</tr>
</tbody>
</table>
# Table of Contents

## 5 FDR/UPSTREAM Profiles
- 5.1 Introduction to FDR/UPSTREAM Profiles ........................................ 5-1
- 5.2 The Global Profile ................................................................. 5-6
- 5.3 Backup Profiles ........................................................................... 5-7
- 5.4 Utility Profiles (USTVTXX, USTMIGXX, USTMERXX) ....................... 5-13
- 5.5 FDR/UPSTREAM Repository Re-organization Profiles ......................... 5-23
- 5.6 File Transfer Profiles .................................................................... 5-26
- 5.7 Client File Migration Profiles ....................................................... 5-29

## 6 The FDR/UPSTREAM Repository
- 6.1 Introduction .................................................................................. 6-1
- 6.2 Choosing the Repository File Format ............................................. 6-2
- 6.3 The Catalog (USTCATLG) File ...................................................... 6-7
- 6.4 The FileInfo (USTFILEI) File .......................................................... 6-9
- 6.5 Repository Utilization Statistics ..................................................... 6-10
- 6.6 Repository File Interrelationships ................................................... 6-11
- 6.7 Repository Maintenance ................................................................. 6-12
- 6.8 Retaining the Re-organization "Backup Files" .................................. 6-16
- 6.9 Making a Sequential Copy of a Repository File ................................. 6-17
- 6.10 Updating the Repository with USTREGEN ...................................... 6-18
- 6.11 Increasing the Size of the FileInfo Repository File ........................... 6-19

## 7 Performing a Backup
- 7.1 Overview ..................................................................................... 7-1
- 7.2 Before You Begin ........................................................................... 7-2
- 7.3 Building the USTBATCH Job ........................................................... 7-3
- 7.4 What’s Next? ................................................................................ 7-11

## 8 Performing a Restore
- 8.1 Building the USTBATCH Job ........................................................... 8-2
- 8.2 Restoring from Encrypted Copies of Your Backups ............................. 8-8

## 9 Copying Backups with USTVAULT
- 9.1 USTVAULT Overview ................................................................. 9-1
- 9.2 USTVAULT Configuration .............................................................. 9-2
- 9.3 USTVAULT Segregation ............................................................... 9-3
- 9.4 USTVAULT Workflow ................................................................. 9-4
- 9.5 USTMIGRT and USTMERGE Considerations .................................. 9-5
- 9.6 Creating Long-Term Retention Backups ......................................... 9-6
- 9.7 Initiating USTVAULT ................................................................. 9-7
- 9.8 Terminating USTVAULT ............................................................. 9-11
- 9.9 Recovering from a Failed USTVAULT ........................................... 9-12
- 9.10 USTVAULT Reporting ............................................................... 9-13
- 9.11 Restoring from Vaulted Backups .................................................. 9-15

## 10 Migrating Backups from Disk to Tape
- 10.1 USTMIGRT Overview ............................................................... 10-1
- 10.2 USTMIGRT Configuration ............................................................ 10-2
- 10.3 USTMIGRT Segregation .............................................................. 10-3
- 10.4 USTMIGRT Workflow ............................................................... 10-4
- 10.5 USTMIGRT with USTVAULT and USTMERGE .............................. 10-6
- 10.6 Initiating USTMIGRT ............................................................... 10-7
- 10.7 Terminating USTMIGRT ............................................................. 10-11
- 10.8 Recovering from a Failed USTMIGRT .......................................... 10-12
# Table of Contents

## 11 Completing Deferred Merge Backups
- 11.1 USTMERGE Overview ............................................ 11-1
- 11.2 USTMERGE Configuration ...................................... 11-2
- 11.3 USTMERGE Segregation ........................................ 11-3
- 11.4 USTMERGE Workflow ........................................... 11-4
- 11.5 Coordination with USTMIGRT .................................. 11-5
- 11.6 USTVAULT and USTMIGRT Considerations .................... 11-6
- 11.7 Delaying USTMERGE Processing ............................... 11-7
- 11.8 Initiating USTMERGE ........................................... 11-8
- 11.9 Terminating USTMERGE .......................................... 11-12
- 11.10 Recovering from a Failed USTMERGE ....................... 11-13
- 11.11 USTMERGE Reporting ......................................... 11-14

## 12 Updating the Repository
- 12.1 USTREGEN Overview ............................................ 12-1
- 12.2 Executing USTREGEN ............................................ 12-2

## 13 Managing Your Backups
- 13.1 Introduction ................................................... 13-1
- 13.2 Available Functions ........................................... 13-2
- 13.3 Initiating the Backup Management Functions ................ 13-3

## 14 File Transfer
- 14.1 Introduction ................................................... 14-1
- 14.2 Implementation ................................................. 14-2
- 14.3 File Transfer Profiles ......................................... 14-3
- 14.4 Client-to-Host Transfers ...................................... 14-4
- 14.5 Host-to-Client Transfers ...................................... 14-5
- 14.6 Maintaining Records of Your Client-to-Host Transfers ...... 14-6
- 14.7 Deleting the Input File ....................................... 14-7
- 14.8 z/OS Security .................................................. 14-8
- 14.9 Initiating File Transfers ...................................... 14-9

## 15 FDR/UPSTREAM Client File Migration
- 15.1 Introduction ................................................... 15-1
- 15.2 Implementation ................................................. 15-2
- 15.3 File Migration Profiles ........................................ 15-3
- 15.4 Migration During Backup ..................................... 15-4
- 15.5 Migration Types ............................................... 15-5
- 15.6 Recommendations ............................................. 15-6
- 15.7 Migration Retention .......................................... 15-7
- 15.8 Error Recovery ................................................ 15-8
- 15.9 Making Secondary Copies with USTVAULT ................... 15-9
- 15.10 Initiating FDR/UPSTREAM Client File Migration .......... 15-10

## 16 Running an FDR/UPSTREAM Client User Process
- 16.1 Introduction ................................................... 16-1
- 16.2 Building the USTBATCH Job .................................. 16-2
# Table of Contents

## 17 FDR/UPSTREAM Operation
17.1 Overview ....................................................... 17-1
17.2 Start the FDR/UPSTREAM z/OS Storage Server ................. 17-2
17.3 Stop the FDR/UPSTREAM z/OS Storage Server ................. 17-4
17.4 Status Display (Modify Command) ................................ 17-6
17.5 Status Display (TSO/ISPF) .................................... 17-7
17.6 Controlling FDR/UPSTREAM Sub-Tasks ......................... 17-8
17.7 Controlling Multiple FDR/UPSTREAM Started Tasks .......... 17-9
17.8 FDR/UPSTREAM Diagnostics ................................... 17-10
17.9 Log Handling ................................................ 17-12
17.10 FDR/UPSTREAM Configuration Maintenance .................. 17-13
17.11 Adjusting FDR/UPSTREAM Main Configuration Options ...... 17-14
17.12 Initiating Commands with USTCMD ......................... 17-15

## 18 Z/OS Initiation with USTBATCH
18.1 Overview ....................................................... 18-1
18.2 Automation with USTBATCH .................................... 18-2
18.3 USTBATCH Work-Flow ......................................... 18-3
18.4 Creating Your USTBATCH Jobs ................................ 18-5
18.5 USTBATCH JCL Parameters .................................... 18-6
18.6 USTBATCH Input Parameters .................................. 18-7
18.7 USTBATCH “FDR/UPSTREAM Client Override” Parameters .... 18-16
18.8 USTBATCH Examples ........................................... 18-33
18.9 Controlling USTBATCH ........................................ 18-38
18.10 USTBATCH Security .......................................... 18-39

## 19 FDR/UPSTREAM Scheduler
19.1 USTSCHED Overview .......................................... 19-1
19.2 USTSCHED Schedules .......................................... 19-2
19.3 USTSCHED TSO/ISPF Dialog .................................. 19-3
19.4 Specifying the Schedules ..................................... 19-4
19.5 Schedule Exclusions .......................................... 19-6
19.6 Saving the Schedule .......................................... 19-7
19.7 Operation and Startup ........................................ 19-8
19.8 USTSCHED Task Control ...................................... 19-9
19.9 USTSCHED in Status Displays ................................. 19-10

## 20 Registered Name Service
20.1 Overview ....................................................... 20-1
20.2 Registered Names ............................................. 20-2
20.3 Automatic Software Ugrades .................................. 20-5
# Table of Contents

## 21 FDR/UPSTREAM Configurator

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.1</td>
<td>USTCONFG INTRODUCTION</td>
<td>21-1</td>
</tr>
<tr>
<td>21.2</td>
<td>CONFIGURATION FILE CONTENTS</td>
<td>21-2</td>
</tr>
<tr>
<td>21.3</td>
<td>MAINTAINING THE CONFIGURATION FILE</td>
<td>21-3</td>
</tr>
<tr>
<td>21.4</td>
<td>THE USTCONFG PROGRAM</td>
<td>21-4</td>
</tr>
<tr>
<td>21.5</td>
<td>ACTIVATING THE NEW/MODIFIED CONFIGURATION</td>
<td>21-5</td>
</tr>
<tr>
<td>21.6</td>
<td>USTCONFG JCL STATEMENTS</td>
<td>21-6</td>
</tr>
<tr>
<td>21.7</td>
<td>USTCONFG CONTROL STATEMENTS</td>
<td>21-7</td>
</tr>
<tr>
<td>21.8</td>
<td>MAIN STATEMENT</td>
<td>21-8</td>
</tr>
<tr>
<td>21.9</td>
<td>DEFINE, MODIFY, AND COPY STATEMENTS</td>
<td>21-12</td>
</tr>
<tr>
<td>21.10</td>
<td>DELETE STATEMENT</td>
<td>21-24</td>
</tr>
<tr>
<td>21.11</td>
<td>PRINT STATEMENT</td>
<td>21-25</td>
</tr>
<tr>
<td>21.12</td>
<td>SAMPLE USTCONFG JCL</td>
<td>21-26</td>
</tr>
<tr>
<td>21.13</td>
<td>SAMPLE USTCONFG CONFIGURATION</td>
<td>21-27</td>
</tr>
</tbody>
</table>

## 22 Reporting with USTRPORT

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.1</td>
<td>INTRODUCTION</td>
<td>22-1</td>
</tr>
<tr>
<td>22.2</td>
<td>USTRPORT OVERVIEW</td>
<td>22-2</td>
</tr>
<tr>
<td>22.3</td>
<td>RUNNING USTRPORT</td>
<td>22-3</td>
</tr>
<tr>
<td>22.4</td>
<td>USTRPORT REPORT TYPES</td>
<td>22-4</td>
</tr>
<tr>
<td>22.5</td>
<td>USTRPORT CONTROL STATEMENTS</td>
<td>22-5</td>
</tr>
<tr>
<td>22.6</td>
<td>TITLE STATEMENT</td>
<td>22-6</td>
</tr>
<tr>
<td>22.7</td>
<td>HEADING STATEMENT</td>
<td>22-7</td>
</tr>
<tr>
<td>22.8</td>
<td>DEFAULT STATEMENT</td>
<td>22-8</td>
</tr>
<tr>
<td>22.9</td>
<td>SELECT AND EXCLUDE STATEMENTS</td>
<td>22-12</td>
</tr>
<tr>
<td>22.10</td>
<td>REPORT STATEMENT</td>
<td>22-17</td>
</tr>
<tr>
<td>22.11</td>
<td>PRINT STATEMENT</td>
<td>22-19</td>
</tr>
<tr>
<td>22.12</td>
<td>CANCEL STATEMENT</td>
<td>22-20</td>
</tr>
<tr>
<td>22.13</td>
<td>USTRPORT INITIATION</td>
<td>22-21</td>
</tr>
<tr>
<td>22.14</td>
<td>USTRPORT BATCH EXAMPLES</td>
<td>22-22</td>
</tr>
</tbody>
</table>

## 23 Reporting with USTBKprt

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.1</td>
<td>INTRODUCTION</td>
<td>23-1</td>
</tr>
<tr>
<td>23.2</td>
<td>EXECUTING USTBKprt</td>
<td>23-2</td>
</tr>
<tr>
<td>23.3</td>
<td>USTBKprt EXAMPLE</td>
<td>23-3</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

## 24 FDR/UPSTREAM Data Encryption

- **24.1 Overview** .................................................. 24-1
- **24.2 Encryption Algorithms** .................................. 24-2
- **24.3 Cipher Block Chaining** .................................... 24-4
- **24.4 Compression and Encryption** ............................. 24-5
- **24.5 FDR/UPSTREAM Encryption Key Management** .......... 24-6
- **24.6 Enabling and Configuring Data Encryption** .......... 24-10
- **24.7 Add an USTCRYPT DD Statement to the Startup Proc** .......................................................... 24-11
- **24.8 USTCRYPT DD Control Statements** ...................... 24-12
- **24.9 Setting the FDR/UPSTREAM Encryption Options** ...... 24-17
- **24.10 Configure the Backup Profiles** .......................... 24-19
- **24.11 Configure the USTVAULT Profiles** ..................... 24-20
- **24.12 Creating the FDR/UPSTREAM Encryption Key File (USTCRYFM)** ........................................ 24-21
- **24.13 Format Statement** ........................................ 24-22
- **24.14 Dump Statement** ......................................... 24-23
- **24.15 Restore Statement** ....................................... 24-24
- **24.16 Delete and Reset Statements** ............................ 24-25
- **24.17 Reorg Statement** ......................................... 24-27
- **24.18 Report Statement** ....................................... 24-29
- **24.19 USTCRYFM JCL Parameters** ............................. 24-31
- **24.20 USTCRYFM JCL Examples** .............................. 24-32
- **24.21 FDR/UPSTREAM Data Encryption Recommendations** .................................................. 24-35

## 25 FDR/UPSTREAM Messages

- **25.1 Introduction** ............................................. 25-1
- **25.2 Reporting a Problem** .................................... 25-2
- **25.3 The Log File (USTLOG)** .................................. 25-3
- **25.4 z/OS Console Messages** ................................... 25-5
- **25.5 The Summary File (USTSUMM)** ........................... 25-6
- **25.6 Managing the USTLOG and USTSUMM Logs** .......... 25-7
- **25.7 FDR/UPSTREAM Completion Codes** ...................... 25-8
- **25.8 FDR/UPSTREAM Message Reference** ...................... 25-9
- **25.9 FDR/UPSTREAM Started Task Messages** ............... 25-10
- **25.10 FDR/UPSTREAM Configurator Messages** ............... 25-48
- **25.11 USTREGEN and USTRPORT Utility Messages** ......... 25-58
- **25.12 USTMAINT and USTREORG Utility Messages** .......... 25-63
- **25.13 USTMIGRT, USTVAULT, and USTMERGE Messages** ........ 25-68
- **25.14 USTBATCH Utility Messages** ............................ 25-78
- **25.15 USTSCHED Utility Messages** ............................ 25-88
SUMMARY OF MODIFICATIONS
SUMMARY OF MODIFICATIONS FOR FDR/UPSTREAM z/OS V3.9.0

PERFORMANCE IMPROVEMENTS
❖ USTMERGE processing time and I/O are dramatically reduced using a new merge feature, the Synthetic Differential Full Merge. By copying and consolidating only changed files that have been backed up since the most recent full backup, typically a small number of files, this feature can greatly reduce CPU and wall time. Fewer tape mounts are required, reducing I/O and drive hours. Please refer to Section 2.3 “FDR/UPSTREAM System Components” for further details.

❖ Significant changes were made to 64-bit memory management to support backup, merge, and restore of more than 100 million files.

❖ USTMERGE processing has been improved with enhancements to 64-bit memory allocation logic.

OPERATIONAL ENHANCEMENTS
❖ Possible allocation deadlocks due to a SYSZTIOT enqueue are eliminated by performing tape allocations in a separate, optional, z/OS address space, USTTAPEM. Please refer to Section 3.19 “Define the FDR/UPSTREAM Started Task PROC” for further details.

❖ Problem diagnosis related to 64-bit memory issues has been improved with the addition of SVC dump capability via the “ABENDS” and “SDUMP” commands. Please refer to Section 17.8 “FDR/UPSTREAM Diagnostics” for further details.
### Chapter 1 – Page 1-2 – Section 1.2

#### Summary of Modifications for FDR/UPSTREAM z/OS V3.8.0

FDR/UPSTREAM z/OS V3.8.0 consolidates 53 PTF feature enhancements and stability improvements since V3.7.0.

<table>
<thead>
<tr>
<th>Performance Improvements</th>
<th>Restore, Full Merge, and USTMERGE processing enhanced with optimized sorting and table-handling code.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director Enhancements</td>
<td>CSV output for importing into spreadsheets – Reports can be requested in a comma separated value (CSV) file and automatically launches Microsoft Excel.</td>
</tr>
</tbody>
</table>
| Operational Enhancements | - BLK64K parm for USTVAULT – Specifying BLK64K limits the maximum block size to 64KB on the vault output tape data set. Please refer to “VAULT Initiation via a z/OS Operator Command” in Section 9.7 for further details.  
- MIGTHRESH=255 – MIGTHRESH=255 does not migrate incremental backups made after the most recent full backup. Please refer to “MIGTHRESH=” in Section 5.3 and “MIGTHRESH=” in Section 21.9 for further details.  
- Mixed case passwords – Mixed case passwords are now accepted in USTBATCH main panel.  
- TCP timeout – TCP timeout value is now configurable by backup profile. Please refer to “TIMEOUT=” in Section 21.9 for further details.  
- FDR/UPSTREAM emailer – FDR/UPSTREAM emailer was updated to correct issues in newline sequences and Exchange Server HELO messages.  
- Count of copied incremental backup versions was corrected in the UST158 log message.  
- Changes were made to improve tape positioning (BSAM POINT) issues during restore operations.  
- Several scrolling issues were corrected in the UPSTREAM for z/OS ISPF panels. |
| USTRPORT Enhancements     | Increased file size support for BKFILES option – Individual client files up to 9.99 TB are reported and tallied. |
| Control Card Change       | VERIFY= – The default value has been changed to NO. |
2 SYSTEM OVERVIEW

2.1 AN INTRODUCTION TO FDR/UPSTREAM

FDR/UPSTREAM is a powerful, reliable and high-performance backup/recovery tool for your open systems data. It provides a centralized, automated, and unattended backup and restore of open systems data to your z/OS mainframe.

The open systems backups can be placed on either z/OS DASD, virtual tape, or physical tape, and the backup processes can interact with your existing z/OS infrastructure, including your tape management system, your scheduling system, and your security system. UPSTREAM offers a reliable, flexible, and scalable solution for your open systems backups.

If you are licensed for the data encryption feature, your off-site or VAULT copies of your original UPSTREAM backups can be encrypted. Encryption options include AES-128, AES-192, or AES-256. Please see Chapter 24 “FDR/UPSTREAM Data Encryption” for further details.

The UPSTREAM Family

FDR/UPSTREAM is a member of the “UPSTREAM Family” of open systems Storage Management products. The family includes the following products, which are licensed separately:

❖ FDR/UPSTREAM – Enterprise Storage Management, providing Volume and File-Level backups for data stored on open systems servers and databases.

❖ FDR/UPSTREAM z/OS UNIX – File-Level backups for z/OS UNIX Systems Services (USS) data.

❖ FDRSOS for EMC and FDRSOS for IBM – Volume-Level backups for open systems data stored on either the EMC Symmetrix VMAX with the z/SOS feature, Symmetrix DMX with the ESP feature, or the IBM DS8700/DS8800 with the zDDB feature.

❖ FDR/UPSTREAM/SOS – Volume and File-Level backups for open systems data stored on either the EMC Symmetrix VMAX with the z/SOS feature, Symmetrix DMX with the ESP feature, or the IBM DS8700/DS8800 with the zDDB feature.

❖ FDR/UPSTREAM Reservoir – Enterprise Storage Management, providing Volume and File-Level backups for data stored on open systems servers and databases. Unlike the other members of the family, where the storage server is a z/OS mainframe, the Reservoir storage server can reside on Windows, AIX, x86 Linux, or Linux on System z platforms. Backups created by UPSTREAM can be logically interchangeable with Reservoir and vice versa, assuming that the z Systems media is compatible.

Client Platform Support

The data to be backed up by UPSTREAM can reside on any of the following workstation/server platforms, referred to in this manual as the “Client”:

❖ Microsoft Windows
❖ X 86 Linux
❖ Linux on System z
❖ AIX on IBM Power Systems
❖ HP-UX
❖ Sun Solaris
❖ Sun X86
❖ VMware
❖ z/OS UNIX Systems Services (USS) data

NOTE: Specific details on backing up these clients can be found in the FDR/UPSTREAM Client Guide.
As well as backing up standard files and documents, the UPSTREAM Client software takes advantage of database API’s and includes specially developed agents to provide online hot backup facilities for the following popular database, messaging, and groupware systems:

- Oracle
- IBM DB2 UDB (Universal Database Server)
- IBM Notes and Domino
- Microsoft Exchange
- Microsoft SQL Server
- SAP

**NOTE:** Specific details on backing up these database systems can be found in the *FDR/UPSTREAM Client Guide.*
The following diagram summarizes a typical implementation of UPSTREAM for Linux on System z clients.

**Figure 2.1 Typical Implementation of FDR/UPSTREAM**

As you can see, UPSTREAM is a dual component system.

**UPSTREAM (UPSTREAM z/OS Storage Server)**

This component resides on your z/OS system. It runs as a standard z/OS started task with multiple sub-tasks and it is responsible for the storage and retention of UPSTREAM backups, which can be placed on either z/OS DASD or TAPE. This is also where the main configuration control files reside, together with the repository and history files relating to your UPSTREAM backups.

This manual describes the UPSTREAM z/OS Storage Server.

**UPSTREAM Client (Client Software)**

This component resides on the client to be backed up. It is responsible for accessing open system files and databases during the backup and restore process.

The *FDR/UPSTREAM Client Guide* describes the FDR/UPSTREAM Client software.

**UPSTREAM Client Communications**

During a backup or restore operation, data is transferred between the two components across one or more connections. UPSTREAM provides multiple choices for the type of connection that can be used, allowing optimum data transfer rates, based on the capabilities of the hardware available.

UPSTREAM z/OS uses Transmission Control Protocol/Internet Protocol (TCP/IP) to communicate with the UPSTREAM client. For users looking to backup Linux on IBM System z data, FDR/UPSTREAM utilizes *Hipersocket* connections, if available and configured on your CPU.

Users that have either an EMC Symmetrix VMAX, Symmetrix DMX, or the IBM DS8700/DS8800 systems with the appropriate microcode features (please see “The UPSTREAM Family” in Section 2.1), can take advantage of the enhanced performance UPSTREAM/SOS offers using fiber networks.
Aside from using fastest possible links, UPSTREAM also includes other performance-enhancing features:

**Data Compression** – Prior to transmitting data from the UPSTREAM Client to the mainframe, UPSTREAM can optionally compress that data, which can potentially improve backup elapsed times by reducing the amount of data sent across the network. Due to their highly compressible nature, this may be more appropriate for data base files. Multiple levels of compression are available.

**Merge backups** – Using a sophisticated technique, UPSTREAM can construct a complete Synthetic full backup of a Client without the need to transmit all the files across to the z/OS Storage Server. (See “Deferred Merge Backups” in Section 2.2 for more details).

Various interfaces are provided to the UPSTREAM system, both from the FDR/UPSTREAM z/OS Storage Server, and also from the Client software. UPSTREAM operations can be controlled through:

**ISPF Panels** – A full set of ISPF panels is provided with the FDR/UPSTREAM z/OS Storage Server component.

**z/OS Batch Job initiation** – An z/OS batch process can be initiated via the USTBATCH program. (See Chapter 18 “z/OS Initiation with USTBATCH”).

**FDR/UPSTREAM Web Portal** – The Web Portal is a hosted interface that can be installed on any Java Based Server such as USS, Windows, or Linux. It provides a new alternate approach to backup management, client maintenance, and end user restore interfaces (see the FDR/UPSTREAM Client Guide)

**FDR/UPSTREAM Director interface** – The Director is a Java-based interface that can be installed and accessed from any Client in the network. The Director is used by administrators as a “dash board” to monitor and control the overall system.

Despite the various interfaces that are available to initiate UPSTREAM operations, the system is primarily designed to run in an **unattended** mode. On a day-to-day basis, UPSTREAM can be transparent in its normal operations. Should a backup fail to complete (e.g., because of a communications failure) UPSTREAM can restart the incomplete backup from the point of failure.

UPSTREAM includes several utilities (e.g., USTVAULT and USTMIGRT) for copying backups and for migrating them from disk to tape. With these utilities, you can:

- Create additional or “vault” copies of your backups for long term retention, or off-site storage.
- Migrate/merge multiple disk/tape backups onto a single tape or tape set.

See Chapter 9 “Copying Backups with USTVAULT” and Chapter 10 “Migrating Backups from Disk to Tape” for more details.

UPSTREAM includes a data encryption option as an additional cost add-on to your existing UPSTREAM license. With the encryption option licensed and enabled, you can use USTVAULT to create additional encrypted copies of some/all of your primary “copy 1” backups, which may be intended for off-site transportation and storage. The “copy 1” backups themselves cannot be encrypted.

You can chose from among three encryption algorithms, each driven by an encryption key that can either be user-specified, or (as recommended by Innovation) automatically generated by UPSTREAM. The encryption key used for each USTVAULT copy is stored in a special “key file” on disk, which is itself protected against unauthorized access by your z/OS security system. The key file is automatically read by UPSTREAM in order to restore from an encrypted copy of a backup.
In a disaster recovery scenario, the key file must first be securely transported to the DR site and restored to disk before UPSTREAM can restore encrypted copies of any backups. As an alternative, if the key file cannot be made available, the individual encryption keys (if known) can be manually provided to the restore process.

An optional master key is also supported, which is used to create an encrypted copy of the actual key used to encrypt the data. This encrypted key is then saved on the backup data set. The master key can then be used to decrypt any copy of a backup that has been encrypted by USTVAULT, in the event that the key file is either not available, or the actual keys cannot be provided manually.

See Chapter 24 “FDR/UPSTREAM Data Encryption” for full details on the UPSTREAM data encryption option.

In addition to the primary functions of backup and restore, UPSTREAM includes several other ancillary capabilities:

**File Transfer**

UPSTREAM can be used to transfer files from the Client to the z/OS Storage Server, or vice versa. No additional software or communication connection is required. Text files may be translated between ASCII on the Client and EBCDIC on the z/OS Storage Server. The transfers can be requested by either the z/OS Storage Server or by the Client. See Chapter 14 “File Transfer”.

**FDR/UPSTREAM Client File Migration**

File migration is the process of taking a backup and then deleting files that are no longer required, or which have not been used for a period of time. With UPSTREAM, files may be migrated as part of the normal backup process, or the migration can be done separately. See Chapter 15 “FDR/UPSTREAM Client File Migration”.

**Running an FDR/UPSTREAM Client User Process**

UPSTREAM also provides a facility for a “user process” to be initiated on a Client machine. This can be any program, batch file, or script that can execute on the Client. Generally, although not always, this process will be used to control some aspect of an UPSTREAM operation, such as a backup or a restore. An example may be a process to quiesce update activity to a database prior to backing it up. See Chapter 16 “Running an FDR/UPSTREAM Client User Process”.
2.2 FDR/UPSTREAM BACKUP FUNDAMENTALS

The following sub-sections describe the fundamentals of the UPSTREAM backup process:

- **Backup Architecture**
- **UPSTREAM Backups to z/OS Tape and DASD**
- **Full and Incremental Backups**
- **Merge Backups**
- **Backup Scenarios - Part 1**
- **Deferred Merge Backups**
- **Backup Scenarios - Part 2**

**Backup Architecture**

UPSTREAM maintains a repository at the z/OS Storage Server containing details of all current backups. This information includes file names, dates/times, locations, and other attributes specific to each backup. (See Chapter 6 “The FDR/UPSTREAM Repository”). All UPSTREAM backups are identified through a hierarchical structure:

**Backup Profiles**

These are unique, user-specified definitions (see Chapter 5 “FDR/UPSTREAM Profiles”) that identify a backup and control the options associated with that backup. A backup profile has a 1- to 8-character name. Every Client (i.e., workstation/server running the Client software) will typically have one backup profile associated with that workstation/server only. If there is a very large amount of data to be protected, you may want to use more than one profile. Backup profiles are specific to a given server and are not used on more than one server.

**Version Dates**

Each instance of a backup for a given backup profile is identified by a “Version Date”. This is the date and time (on z/OS) that the backup was created. Combined with the backup profile name, the “Version Date” allows the unique identification of a particular backup instance.

**File Specifications (“file specs”)**

The actual files, directories, or whole drives that are to be backed up (or excluded) within a backup profile are identified in one or more include/exclude file specifications, often referred to as “file specs”.

Examples of “include” file specs (to include files in a backup) might be:

- `\.` (this file spec will backup the entire server)
- `C:\msoffice`
- `F:\agenda\*.*`
- `G:\database\production\*.exe`

An “exclude” file spec (to exclude files from a backup) might look like the one shown below, where all “.exe” files in the previously selected “F:\agenda” folder are being excluded:

- `F:\agenda\*.exe`

**NOTE**: UPSTREAM supports Client filenames up to 1023 characters in length.

**UPSTREAM Backups to z/OS Tape and DASD**

UPSTREAM supports backups to z/OS DASD, physical tape, and virtual tape.

**Sequential Tape Backup**

A sequential tape backup is written as a sequential data set directly to z/OS physical or virtual tape. The data set is dynamically allocated at the beginning of the backup process according to parameters specified in the associated backup profile. Either a data set prefix or a z/OS GDG base name can be specified.
Sequential Disk Backup

A sequential disk backup is written as a sequential data set directly to z/OS DASD. The data set is dynamically allocated at the time of the backup according to parameters specified in the backup profile, which may also include details of DASD unit name or volume serial to be used. UPSTREAM automatically performs the space allocation for the disk data set according to an estimate provided from the Client software at the beginning of the backup process.

For SMS installations, a default Storage Class, Management Class, and Data Class can be passed to the ACS routines, though these may be later overridden by SMS. Sequential disk backups may be managed by a DASD management system, such as Innovation's ABR, CA Disk™ Backup and Restore, or IBM DFSMShsm. This includes both backup and migration. In the case of migration, if a UPSTREAM sequential disk backup is migrated by a data management system, an auto-recall will be required to recover the data set to primary disk before UPSTREAM can once again access it. For this reason, we recommend that you use the disk-to-tape migration facilities of USTMIGRT (see Chapter 10 “Migrating Backups from Disk to Tape”) to move your UPSTREAM backups from disk to tape, instead of your z/OS DASD management software.

UPSTREAM's flexible backup schemes can be used to protect an entire server, a database, or simply individual folders or files.

These backups are then scheduled to run at either a “full” level, where all files are backed up, or at an “incremental” level, where only changed files are backed up.

A first time full backup copies all of the files from the client server to z/OS DASD or tape. An Incremental backup copies only the changed files from the client server. This reduces the time required to take daily backups. During the incremental process, our client for Windows uses the Volume ShadowCopy Service (VSS) to “snapshot” the volume(s), detect the changed files, and eliminate file contention. In UNIX and Linux systems, the UPSTREAM client can use its own “local incremental database” (INCRDB) to record the files it has backed up, or can compare the file modification date to the last backup, to determine what files are to be included in the next incremental backup.

Below, are two screens from the Director interface (see the FDR/UPSTREAM Client Guide) that is being used to define an UPSTREAM backup task.

On the left-hand screen we have an “include” file spec to perform a full backup “\.” Notice also that we have specified an “exclude” file spec for the directory named ‘1’.

On the right-hand screen is the Target File Explorer used to include or exclude specific files or directories.

**Figure 2.2**
SYSTEM OVERVIEW
FDR/UPSTREAM BACKUP FUNDAMENTALS

MERGE BACKUPS

A typical backup cycle may be a weekly first time full backup followed by daily incremental backups. However, because of the potentially large volume of data, first time full backups can consume valuable client-side resources and impose larger than desired loads on the network. UPSTREAM's efficient "Synthetic Merge Backup" mechanism allows administrators to obtain the benefits of a full backup, but without the aforementioned overheads.

To create the full backup, UPSTREAM backs up only the changed files from the server. What makes this backup different from an incremental backup is that it also sends a copy of the directory entries of the unchanged files to the z/OS Storage Server. Then, instead of using network and client-side resources to transmit these unchanged files to the z/OS Storage Server, UPSTREAM simply retrieves the most recent copy of each file from its prior backup.

So, using CPU resources only at the z/OS Storage Server end of the operation, UPSTREAM then combines all of the changed files, and, optionally, retrieves copies of the unchanged files, to create a new "merged", or synthetic, full backup, which contains an up-to-date copy of every file from the Client.

The Merge backup advantages are:

❖ The synthetic full backup is created using client-side resources that are only marginally greater than on a standard (i.e., non-merge) incremental backup.
❖ It is easy to use, understand and manage. The benefits of a merge backup is that all the complexity is behind the scenes; it is actually as easy or easier to use than non-merge backups.

THE MERGE PROCESS

A single backup profile name is used for both the full and incremental merge backups. It is recommended that this backup profile represent an unchanging group of file specs (e.g., it identifies a whole server, a range of drives or file systems, or an application). The facility is flexible enough for you to be able to add or remove folders or drives, however it is not recommended that you use a backup profile for more than one entity or server.

The Merge process requires that you perform a first-time full backup of the file specifications that you wish to maintain. In this backup you copy all the files. However, once you've created this full backup, it does not need to be repeated. Incremental merge and full merge backups are performed from this point onward.

The first backup following a full backup always begins a new tape or disk file. This is typically an incremental backup and copies only the changed files to the UPSTREAM z/OS storage server. By default, incremental merge backups to tape are appended to the previous incremental tape backup data set, while incremental backups to disk create new disk files every time.

Another full backup is performed, but instead of a new First Time Full backup, a synthetic Full Merge backup, Deferred Full Merge backup, or Synthetic Differential Full Merge backup is performed. By default, full merge backups are appended to the end of the incremental backup file (if the backup is on tape), or a new file is created (if the incremental backups are on disk).

The following section describes the different types of Full Merge backups in greater detail.

FULL MERGE BACKUP WORK-FLOW

There are three different options using the Merge synthetic full backup process. The "output" of any of these options can be used as "input" for a full system restore. Please refer to Section 7.3 “Building the USTBATCH Job”, and Chapter 18 “z/OS Initiation with USTBATCH”, for further details on creating and running a USTBATCH initiated backup.
FULL MERGE BACKUP

This synthetic full backup is a complete backup of all files and meta data on the server at the time the backup is run. The backup of the client server begins by identifying the changed files since the last backup. The changed files and a directory listing from the client server are copied to the UPSTREAM z/OS Storage Server. The remainder of the backup data is not copied from the client server, but from the prior backups on tape or DASD. This results in a co-location of all changed and unchanged files from the client server. The backup uses client resources that are only marginally greater than an incremental backup. This process significantly reduces the resources used on the client at the time of the backup and is particularly suited for backups that have a high rate of file change.

FIGURE 2.3 FULL MERGE BACKUP

1. A first time full backup is run producing a backup data set containing every file that existed on the server at the time of the backup. This backup is required to begin the Full Merge process.

2. A series of incremental backups are run, copying only the changed files and placing them in the incremental backup data set. In the example below, files "A, F, K, P, and R" have been changed in the incremental backups taken during the week.

3. A Full Merge backup is run specifying MERGE=1 in the backup JCL control cards and the profile MERGE option set to "YES". The backup copies the files that have changed since the last backup and transfers a directory listing of all of the files on the client file system(s) to the UPSTREAM, z/OS storage server.

4. The backup then copies, from prior backups, not from the client server, the files that have changed since the last full backup ("A, F, K, P, and R") and copies the unchanged files from the last full backup (B, C, D, E, etc), "merging" or co-locating all of the files into the backup data set. The backup is now complete and all of the client files have been copied to the backup data set on tape.

5. The process repeats the following week with files "B, G, L, N, and S" changing in the incremental backups taken during the week.

6. As with the prior week, a new Full Merge backup is run, copying any files that have changed since the last backup and transferring a directory listing of all of the files on the client file system(s) to the UPSTREAM, z/OS storage server.

7. The backup then copies, from prior backups, the files that have changed since the last full backup "B, G, L, N, and S" and copies the unchanged files from the last full backup (A, C, D, E, F, etc), "merging" all of the files into the backup data set. Lastly, the comparison of the client directory listing is done and the backup is now complete. All of the client files have been copied to a new backup data set on tape.
Deferring the co-location of the client files, the Deferred Full Merge backup is a Full Merge backup with an additional step. This new step co-locates the changed and unchanged files similar to that in the Full Merge. However, instead, this step is “deferred” until a later point in time when tape and other mainframe resources are more available.

**Figure 2.4 Deferred Full Merge Backup**

1. A first time full or full merge backup has previously been run producing a backup data set containing every file that existed on the server at the time of the backup. One of these backups is required to begin the Deferred Full Merge process.

2. A series of incremental backups are run, copying only the changed files and placing them in the incremental backup data set. In the example below, files “A, F, K, P, and R” have been changed in the incremental backups taken during the week.

3. A Deferred Full Merge backup is created by running a regular Full Merge Backup but with the profile MERGE option set to “DEFER”. The process is as follows:
   a. MERGE=1 is specified in the backup JCL control cards.
   b. DEFER is specified for the MERGE option in the backup profile.
   c. Server Files changed since the last incremental backup are copied into the Deferred Full backup data set.
   d. Unchanged server files have pointers created to prior backups, they are reflected in the diagram with grayed out file names.

The Deferred Full Merge backup runs just slightly longer than a normal incremental backup, using significantly less resources than a traditional first time full backup. Once this backup completes, the backup is viable for a complete system restore, even though the client files are not yet co-located. Any files from prior backups that are needed for a restore are taken from those backups.

4. At some later point in time when tape and other mainframe resources are available, the USTMERGE utility function is executed which will “merge” and co-locate all of the incremental data (2) and the unchanged files from the prior first time full or full merge data (1). The final result is that the completed Deferred Full Merge has a copy of EVERY file on the server at the time the deferred full backup was run. USTMERGE is a batch operation and can process more than one profile per run. This feature consolidates deferred full merge backups for multiple profiles onto a single tape set saving tape over that needed for a regular full merge or first time full backup.

5. The process repeats the following week with files “B, G, L, N, and S” changing in the incremental backups taken during the week.

6. As with the prior week, a new Deferred Full Merge backup is run, copying any files that have changed since the last backup and transferring directory listing of the files on the client file system(s) to the UPSTREAM, z/OS storage server.

7. A USTMERGE utility function is executed which will again “merge” and co-locate
all of the incremental data (5) and the prior completed deferred full merge data (4). The final result is that the completed deferred full merge has a copy of EVERY file on the server at the time the deferred full backup was run.

The Synthetic Differential Full Merge backup copies only the most recent version of ALL of the changed files since a reference full backup, the “MASTER” full backup was taken. This is identical to the Deferred Full Merge backup with the exception that the USTMERGE process does not co-locate all of the changed and unchanged files but instead copies only the files that have changed since the MASTER full backup. Using this option, the USTMERGE process completes in far less time than with the Deferred Full Merge and uses the least amount of z/OS CPU cycles and tape resources of any of the Merge backup types. Since the unchanged files are kept on the “Master” full backup and not copied forward to a new Full Merge backup, thus eliminating the tape to tape copy of the unchanged files, this process is particularly suited for backups that have a low rate of file change.

**Figure 2.5 Synthetic Differential Full Merge Backup**

1. Either a completed Deferred Full, Full Merge or First Time Full backup is run producing a backup data set containing every file that existed on the server at the time of the backup. This is known as your “MASTER” backup and starts the Synthetic Differential Full Merge process. Its retention MUST be long enough to keep it from expiring while the later backups that are dependent on it, remain cataloged to the UPSTREAM z/OS storage server.

2. A series of incremental backups are run, transferring only the changed files over the network and placing them in the incremental backup data set. In the example below, files “A, F, and K” have been changed in the incremental backups taken during the week.

3. A Deferred Full Merge backup is created by running a regular Full Merge Backup but with the profile MERGE option set to “DEFER”. The process is as follows:
   a. MERGE=1 is specified in the backup JCL control cards.
   b. DEFER is specified for the MERGE option in the backup profile.
   c. Server Files changed since the last incremental backup are copied into the Deferred Full backup data set, as example “J and W” illustrate.
   d. Unchanged server files have pointers created to prior backups, these are reflected in the diagram with grayed out file names.
As explained in the Deferred Full Merge backup in Figure 2.4, the backup runs just slightly longer than a normal incremental backup, using significantly less resources than a traditional first time full backup. Once this backup completes, this backup can now be used to restore any and all files, even though the client files are not yet co-located. Any files from prior backups that are needed for a restore are taken from those backups.

4. At some later point in time when tape and other mainframe resources are more available, the USTMERGE utility function is executed with the MASTER option. Unlike regular Full Merge or completed Deferred Full Merge backups that contain co-located copies of all changed and unchanged files on the server, the unchanged files from the prior full backup are not co-located on this full backup. Instead, the backup contains:
   a. reference pointers to the unchanged client files that were backed up in the Master full backup.
   b. the most recent version of ALL of the CHANGED files from the incremental backups since the prior MASTER Full backup.

In this example, only "A, F, J, K, and W" are on the backup data set. This is where the "differential" name comes from. A full system restore at this point would access the Deferred Full Merge AND the MASTER Full backups.

**WEEK TWO**

5. The following weeks incremental cycle continues with files "B, G, and L" changing in the incremental backups taken during the week. File "K" is deleted from the server and will be noted in the UPSTREAM repository.

6. As with step 3 above, a new Deferred Full Merge backup is run copying any files that have changed since the last backup as example "R" illustrates above. Then pointers are created to all the other UNCHANGED files currently on the server but that are on the MASTER full. The pointers are reflected in the diagram with grayed out file names.

7. As with step 4 above, the USTMERGE utility function is executed with the MASTER option. Reference pointers to the unchanged client files that were backed up in the Master full backup and ALL of the CHANGED files from the incremental backups since the prior MASTER Full backup are stored on this backup data set. In this example, only "A, F, J, W, B, G, L, and R" are on the backup data set. Another differential backup has been created.

**FIGURE 2.6**

**WEEK THREE**

8. Week 3 begins and the Incremental cycle continues with files "N and S" being changed and subsequently backup and "Y" is deleted.
9. Another Deferred Full Merge is run and any files that have been changed since the last backup are copied, as example “N” and “S” illustrate. Then pointers are created to all the UNCHANGED files currently on the server but that are on the MASTER full. The pointers are reflected in the diagram with grayed out file names.

10. The USTMERGE command is executed with the MASTER option. ONLY the most recently changed version of individual changed Incremental files will be co-located on to the full. Files from the prior MASTER FULL will NOT be co-located and the pointers created in the Deferred Full Merge are copied. The USTMERGE process will end quickly. The final result is the completed Full Merge now contains the most recent copy of every file on the server that has CHANGED since the time the MASTER full was run. In this example, only “A, F, J, W, B, G, L, R, N, S,” and “X” are on the backup data set. A 2nd differential that now contains the 3rd weeks changes has been created!

11. Week 4 begins and the incremental cycle continues with files “C, D” being changed and subsequently backed up. File “T” has been deleted, so this is reflected.

12. Another Deferred Full Merge is run and any files that have changed since the last backup are copied, as example “Q” illustrates above. Then pointers are created to all the other UNCHANGED files currently on the server but that are on the MASTER full. The pointers are reflected in the diagram with grayed out file names.

13. Since a sufficient amount of incremental changes have occurred to warrant creating another MASTER:
   a. The USTMERGE command is run WITHOUT the MASTER option.
   b. The most recently changed Incremental files will be co-located on to the full.
   c. All unchanged files from week 1, the original MASTER full, will be co-located to create this new MASTER FULL.

The final result is that the completed Full Merge now has the most recent copy of every file on the server. In this example, the most recent version of all changed files from this weeks incremental backups and prior deferred to master backups, are co-located onto the new MASTER Full. Deleted files are reflected.
**RECOMMENDATION:**

Use Deferred to Master (Synthetic Differential) backup.

The following scenarios describe the merge backup process in more detail.

**Scenario #1: Full on Tape and Incremental Backups on Disk or Tape**

The diagram below shows how a “tape only” deferred to master (Synthetic Differential) backup system works. The advantages of this scenario are:

- Long running “Full” backup run once and the tape is retained as a processing Master Copy with a very long retention period such as 365 days or a GDC with 2 or more generations for a very long period of time.
- Daily Incremental backups run backing up file changes since the prior backup.
- Once per week, a Deferred to Master Merge runs that consolidates these daily incremental backups onto a new Synthetic Differential Tape/Disk.
- This repeats over time with the Deferred to Master Merge process constantly consolidating Incremental and Synthetic Differential Tapes/Disks to a new Synthetic Differential Tape/Disk.
- The original Full Backup remains in the system, so the daily and weekly processing only process files that changed since the Full Backup was created. This greatly reduces what is typically a long running tape to tape merge process.
- At some intervals – based on how large the Synthetic Differential Tape / Disk is, or how long the weekly merge process runs – a new Full Master might be required to “reset” the weekly tape. This can either be done as a First Time Full Backup or as a regular Full Merge Backup job.

**FIGURE 2.7**

When you run your first-time full backup, a new tape is created that holds all the data selected from the Client (Tape 1). The first incremental backup then creates a new tape (on Tape 2). Subsequent incremental backups are appended to the end of that tape file on Tape 2.

After your first-time full backup, all subsequent backups are then Incremental backups. During Synthetic Differential (Merge to Deferred Master) processing, the tape/disk holding the previous Synthetic Differential backup (Tape 1) is mounted as well as the tape holding the incremental backups (Tape 2) and a new Tape 3 is mounted to become the new Synthetic Differential Backup tape.

Any files that have not been changed since the last Deferred to Master job are copied from Tape 1 to Tape 3, unless a more recent file are in one of the incremental backups already on Tape 2, in which case the most recent file gets copied from Tape 2 over to Tape.

**NOTE:** Deferred to Master (Synthetic Differential) is designed to work with the concept of a Full Backup Master Tape / Disk backup always being available on the system for as long as new Deferred to Master tapes are created. Loosing the Master Tape / Disk backup Tape / Disk due to accidental deletions or expiry will destroy the entire backup for that data. It is very important these Full Master tapes / Disk are kept around and we strongly recommend making copies of them for additional Vault processing. UPSTREAM provides multiple recovery scenarios where a missing or bad master can be recovered back into the backup / restore process.
Scenario #2: Full Backups on Tape, Incremental Backups on Disk

The diagram below shows how a “tape only” merge backup system would work. The advantages of this scenario are:

❖ No intermediate disk requirements. Data goes directly to tape without having to be staged through disk. This saves on z/OS disk space.
❖ Good for large volumes of data.
❖ Only one tape is created per backup cycle (usually weekly). This saves on tape management.

When you run your first-time full backup, a new tape is created that holds all the data selected from the Client (Tape 1). The first incremental backup then creates a new tape (on Tape 2). Subsequent incremental backups are appended to the end of that tape file on Tape 2.

After your first-time full backup, all subsequent full backups are then “full merge” backups. In a full merge backup, in the preceding example, the tape holding the previous full backup (Tape 1) is mounted, as well as the tape holding the incremental backups (Tape 2). Any files that have not been changed since the last backup are copied from Tape 1 to Tape 2 unless they are in one of the incremental backups already on Tape 2, in which case they are simply recorded as being part of the new full merge backup and the incremental backup. They are not copied into the new full. UPSTREAM then requests that the Client software send up any files from the directory listing that could not be matched against previous backups.

NOTE: Options may be set in the backup profile to modify the preceding scenario so that a new scratch tape is used for every full backup (NEWTAPEF=YES) and/or for every incremental (NEWTAPEI=YES). This may be useful in installations where tapes must be manually fetched from a library. However, this means that more tapes must be mounted during the full backup (i.e., to read the incremental backups) and that data must be copied from the incremental backups (as well as the previous full backup) to the new full backup. This increases the elapsed time of the full merge backup.

Scenario #3: Full Backups on tape Incremental Backups on Disk

The diagram below illustrates a scenario similar to “Scenario #1: Full on Tape and Incremental Backups on Disk or Tape”, but the incremental backups are now stored on disk. You may want to choose this option if you have sufficient z/OS disk space and do not wish to mount the backup tapes each day. In addition, file restores from the incremental backups can be quicker because they will not involve a tape mount.
The initial process is similar to “Scenario #1: Full on Tape and Incremental Backups on Disk or Tape”. When you run your first-time full backup, a new tape data set is created that holds all the data selected from the Client (Tape 1).

The first incremental backup then creates a data set on disk (File 1), and subsequent incremental backups create additional new data sets on disk.

When you run a full merge backup, the tape holding the prior full backup (Tape 1) is mounted, as well as the output tape for the new full merge backup (Tape 2).

As in “Scenario #1: Full on Tape and Incremental Backups on Disk or Tape”, the Client software sends up all the files that have changed since the last incremental, as well as a directory listing. UPSTREAM then copies to the new full backup (on Tape 2) all the files that were included in the directory listing, obtaining their most current backup from the incremental disk files (File 1 and File 2) or from the last full merge backup (Tape 1). It then requests that the Client software send up any files from the directory listing that could not be located on those previous backups.

If you do not have enough disk space available to hold a week's worth of incremental backups for all UPSTREAM Clients, the USTMIGRT migration utility can be used move accumulated disk backups to tape. (See Chapter 10 “Migrating Backups from Disk to Tape”).

Scenario #4: Full and Incremental Backups on Disk

The diagram below illustrates a scenario similar to “Scenario #2: Full Backups on Tape, Incremental Backups on Disk”, but where all backups are now stored on disk. You may want to use this scenario for small backups or where restore speed is important.

When you run your first-time full backup, a new z/OS disk file is created that holds all of the data from the Client (File 1 in the figure). Each subsequent incremental backup creates a new z/OS disk file (File 2 and File 3).

When you run a full merge backup, the Client software transmits the changed files, that are written to the new full merge backup file (File 4).

UPSTREAM then takes the directory listing transmitted from the UPSTREAM Client and copies the most recent backups of all other files listed in the directory, from the incremental backups (File 2 and File 3) and the last full merge backup (File 1).

It then requests that the Client software send up any files from the directory listing that could not be located on those previous backups.

Although the UPSTREAM merge backup process described above is the most efficient type of full backup that you can create, there might be limitations on the use of this process in some installations, especially when sequential tape is being used:

- The full merge backup process can require two tape drives: one for the output and one to read the previous backups. There may not always be sufficient tape drives to satisfy this need, especially if multiple backups are run at once.

- If automated tape libraries are not used or are unavailable, there might not always be an operator around to satisfy requests for specific tape mounts.

The UPSTREAM “Deferred Merge” process is designed to circumvent these limitations.
If the MERGE=DEFER option is set in the backup profile, the deferred merge backup will do all of the steps described in the previous scenarios. Normal processing will also occur if the required previous backups of files are on disk. However, if any previous backups are on tape, the deferred merge backup will not copy those backups to the new full merge backup. Instead, it simply records in the UPSTREAM repository that the copy process for that backup has been “deferred”.

This means that during a deferred full merge backup:

- It is not necessary to mount any previous input tapes
- It still needs to mount an output scratch tape (unless the backup profile is setup to write the full backup to sequential disk).

When the deferred merge process is used, the backup is not truly complete until the deferred files have been properly copied to the new full merge backup. The UPSTREAM utility program USTMERGE is used to complete this processing. (See Chapter 11 “Completing Deferred Merge Backups”.)

Normally, you will want to run USTMERGE as soon as possible after the deferred merge backup – as soon as tape limitations or operator availability permits. However, while an execution of USTMERGE is pending, UPSTREAM can still restore data from the backup in deferred status.

When run, USTMERGE will identify backup profiles whose most recent full merge backup was done with MERGE=DEFER in effect, and for which the copy process is still pending. It will then complete those backups by:

- Copying the full backup data set from disk to tape (if the initial full merge backup was taken to sequential disk). The backup profile must be enabled for both sequential disk and sequential tape backups.
- Mounting the required previous full and incremental backup tapes and copying to the new full backup any Client files that were deferred during the full backup.

Utilization of the deferred merge process leads to several more backup scenarios.
**Scenario #5: Deferred Merge Backups on Disk**

The following diagrams show a deferred merge process where the backups are directed to disk. If you have sufficient disk space to keep a week’s worth of incremental backups on disk, this is the most efficient way to use deferred merge.

**FIGURE 2.11**

- Each daily incremental backup is taken to disk (File 1 and File 2).
- The weekly full backup, with MERGE=DEFER set in the backup profile, is also taken to disk (File 3).

As in previous scenarios, the deferred merge process will backup all the updated files from the Client and then copy the other files that were updated during the week from the appropriate disk-based incremental backups. However, any files required from the previous full backup will be “deferred”, since that full backup resides on tape. The interim full backup on disk will not be much larger than the daily incremental data sets, since it only contains the accumulated Client files that were updated during the week.

When USTMERGE is executed (below), it will copy the full backup from disk (File 1) to tape (Tape 2). It will also mount the previous full backup (Tape 1) and copy any Client files that were “deferred” during the actual backup. The new full backup on tape is now complete and contains a copy of every file that was on the Client at the time of the backup.

**FIGURE 2.12**

---

**Scenario #4: Deferred Merge backups to disk**

In the preceding scenario:

- Each daily incremental backup is taken to disk (File 1 and File 2).
- The weekly full backup, with MERGE=DEFER set in the backup profile, is also taken to disk (File 3).

As in previous scenarios, the deferred merge process will backup all the updated files from the Client and then copy the other files that were updated during the week from the appropriate disk-based incremental backups. However, any files required from the previous full backup will be “deferred”, since that full backup resides on tape. The interim full backup on disk will not be much larger than the daily incremental data sets, since it only contains the accumulated Client files that were updated during the week.

When USTMERGE is executed (below), it will copy the full backup from disk (File 1) to tape (Tape 2). It will also mount the previous full backup (Tape 1) and copy any Client files that were “deferred” during the actual backup. The new full backup on tape is now complete and contains a copy of every file that was on the Client at the time of the backup.
**Scenario #6: Deferred Merge Backups on Disk (In Conjunction with USTMIGRT)**

This final scenario shows a deferred merge process where the backups are directed to disk, but the incremental backups are migrated to tape on a daily basis using the USTMIGRT utility. (See Chapter 10 “Migrating Backups from Disk to Tape”.) This scenario might be used if you do not have sufficient disk space to accumulate a week's worth of backups before USTMERGE is run.

This scenario also illustrates the more realistic processing of USTMERGE, in that a number of Client backup profiles (for Client #1, #2, and #3) are being processed in one execution, creating multiple data sets on the output tapes, each containing data belonging to one backup profile.

**FIGURE 2.13**

Each daily incremental backup is written to disk, shown as “Today's Incrementals”. The USTMIGRT utility is then run daily to move the incremental backups for a group of backup profiles (via GROUPID – see “Profile Grouping” in Section 5.4), freeing up the disk space in the process. The FORWARD option of USTMIGRT has been specified, causing it to read the previous incremental backups on tape (Tape 1) and to forward merge them onto the new output tape (Tape 2).

The result is that the tape produced daily by USTMIGRT contains all of the incremental backups taken for these backup profiles since the last full merge backup. Note that you could get a similar result by taking the incremental backups directly to tape (see “Scenario #1: Full on Tape and Incremental Backups on Disk or Tape”), but this would put each backup on a separate tape, which would require more tape handling during USTMERGE execution.

The weekly full backup is also taken to disk with the MERGE=DEFER option set in the profile. The merge backup process backs up all updated files from the Client, and it requests any files for which it does not have a current backup. All other files are marked “deferred”, since the backups reside on tape.
When USTMERGE is executed for the same set of backup profiles, it copies the full backups (shown as “Deferred Full Merge”) from disk to tape. It also mounts the previous full backup on tape (Tape 1), plus the most recent accumulated incremental backup tape (Tape 2), and copies any Client files that were deferred during the actual backup. The new full backup on tape (Tape 3) is now complete, containing a copy of every file that was on the Client at the time of the backup.

NOTE: The backup profiles will always be processed in the same order by USTMERGE and USTMIGRT, so their backups will always be in the same relative positions on the tapes. This allows USTMERGE to mount each previous full backup tape and each incremental backup tape only once and read through them sequentially with a minimum of tape mounts.

You could optionally write the deferred full merge directly to tape. The processing would be similar to preceding, except that USTMERGE (executed with its NEWTAPE option) would simply add the required deferred files from the previous full and incremental backup tapes to the end of the new full backup tape. This also creates a separate tape for each profile that requires more output scratch tape mounting during USTMERGE execution.
2.3 FDR/UPSTREAM SYSTEM COMPONENTS

This chapter provides an overview of the main components of the FDR/UPSTREAM system, and also describes some of the system maintenance utilities.

**THE z/OS STARTED TASK (USTMAIN)**

The z/OS started task is the major functional component of UPSTREAM. It contains the processing and communications interface routines to perform the following functions:

- Backup and restore operations
- File transfer operations
- Communications handling with the Client software
- System console communications
- Event and status logging
- Security authorization
- Registered name processing and resolution
- Error handling and restart functions
- Backup retention and expiration cleanup
- Inquiry processing

As described in Chapter 17 “FDR/UPSTREAM Operation”, the UPSTREAM started task accepts standard commands from the system console (e.g., the STOP (P) command and the MODIFY (F) command) to control its operation. This includes:

- Displaying the current activity
- Turning the diagnostic trace facilities on or off
- Running utility functions
- Starting/stopping UPSTREAM

**THE CONFIGURATOR (USTCONFIG)**

The UPSTREAM Configurator program USTCONFIG (see Chapter 21 “FDR/UPSTREAM Configurator”) maintains a configuration file that is loaded by the z/OS started task (USTMAIN) at start-up time. The configuration file contains:

- **General Options**, controlling the overall functionality of UPSTREAM (e.g., which security level is to be used).
- **Profile Options**, controlling the behavior of most UPSTREAM functions, including backups, restores and utility operations.

The configuration file can be maintained and updated through:

- The USTCONFIG TSO/ISPF dialog
- The USTCONFIG batch program (see Chapter 21 “FDR/UPSTREAM Configurator”)
- The Client interface (see FDR/UPSTREAM Client Guide).

**REPOSITORY MAINTENANCE #1 (USTMAINT)**

Details of all backups are maintained in the UPSTREAM z/OS repository (see Chapter 6 “The FDR/UPSTREAM Repository”).

USTMAINT is a utility program for removing the records of old/expired backups from that repository. When your DASD and/or Tape Management Systems expire and delete your UPSTREAM backup files, USTMAINT detects that they are no longer cataloged and removes their related information from the repository. USTMAINT can also delete records from the UPSTREAM history log (MAXHIST) and remove unused registered name records.

USTMAINT is automatically executed during the initialization of UPSTREAM (USTMAIN), but it can also be initiated via an z/OS console command (see Section 17.2 “Start the FDR/UPSTREAM z/OS Storage Server”) or through the USTBATCH interface (see Chapter 18 “z/OS Initiation with USTBATCH”).
As new backup records are added and older ones subsequently deleted from the UPSTREAM repository, a periodic reorganization is needed to maintain efficiency. USTREORG is a utility to dynamically reorganize the repository files without having to shutdown UPSTREAM. See Section 6.7 “Repository Maintenance” for documentation on USTREORG.

The UPSTREAM Scheduler, USTSCHED, (see Chapter 19 “FDR/UPSTREAM Scheduler”) is executed as a sub-task of the main started task (USTMAIN). It can be automatically invoked when the main task is initialized, or it can be manually stopped/started at any time via a console command.

USTSCHED issues z/OS console commands at the defined times and dates to control UPSTREAM operations (e.g., backups and restores). It can also be used to control other events on either the z/OS Storage Server, or an Client (e.g., quiesce a database prior to backing it up).

The schedule definitions, which are maintained though the UPSTREAM TSO/ISPF dialogs, may be updated and refreshed at any time. Multiple copies of USTSCHED can run concurrently, each with a unique schedule definition.

UPSTREAM operations can also be controlled by your existing z/OS scheduler (see “Batch Initiation Utility (USTBATCH)” in Section 2.3), or, if preferred, through the scheduler panels included with the Client software (see the FDR/UPSTREAM Client Guide).

USTBATCH (see Chapter 18 “z/OS Initiation with USTBATCH”) is a utility that runs as a submitted batch job on the z/OS mainframe to initiate backup or restore operations for one or more Clients. It can also be submitted through the UPSTREAM scheduler (USTSCHED), or through your existing z/OS job scheduling system.

USTBATCH parameters specify the Client(s) for which the operation is to be initiated, identified by the Client's TCP/IP network address, or though the UPSTREAM registered name service (see Chapter 20 "Registered Name Service").

Parameters controlling the actual UPSTREAM operation (e.g., backup, restore) can either be supplied directly by USTBATCH, or they can be picked up from a “parameter file” defined on the Client. The UPSTREAM TSO/ISPF dialog includes facilities for generating, saving, and executing USTBATCH jobstreams.
2.4 BACKUP UTILITIES AND MAINTENANCE

Several utilities are provided within FDR/UPSTREAM to assist with the control and maintenance of your backups and the media on which they reside.

USTVAULT

USTVAULT is a utility program to create secondary copies (on tape) of sequential disk or sequential tape backups for selected backup profiles. These secondary copies can be retained on-site as a backup to the primary copy, or they can be sent off-site for safe storage for disaster recovery.

**NOTE:** USTVAULT is invoked as a sub-task of USTMAIN, either in response to a console command, or via the UPSTREAM TSO/ISPF dialog. See Chapter 9 “Copying Backups with USTVAULT” for a full description of USTVAULT.

USTMIGRT

As illustrated in scenario #5 earlier (see “Scenario #6: Deferred Merge Backups on Disk (In Conjunction with USTMIGRT)” in Section 2.2), USTMIGRT allows you to do backups from multiple Clients, temporarily storing them on disk, and then consolidating them later onto a single tape or tape set. This improves efficiency, since the number of concurrent backups is not restricted to the number of available tape drives.

**NOTE:** USTMIGRT is invoked as a sub-task of USTMAIN, either in response to a console command, or via the UPSTREAM TSO/ISPF panels. Chapter 10 “Migrating Backups from Disk to Tape” for a full description of USTMIGRT.

USTREGEN

UPSTREAM control records in the repository normally point to the original “copy 1” backup data set, so that all restore requests will use that primary copy. When a secondary copy is created by USTVAULT, it also creates a copy of the control records, updated to point to the secondary copy. These updated records are placed in a special “vault control data set” that is added to the end of the copied tape (they are not recorded in the UPSTREAM repository).

If you need to access the copied backup at any time (e.g., at a disaster recovery site), the USTREGEN utility is used to quickly update the UPSTREAM repository to point to the copied backup, enabling all restores to use that copy.

USTREGEN (see Chapter 12 “Updating the Repository” for a full description), is also useful for:

- Re-creating the appropriate control file pointers for copies of UPSTREAM backups that have been created using a utility other than USTVAULT.
- Re-creating control file pointers for a backup that has been deleted from the repository, either in error, or legitimately by USTMAINT.

If you have the UPSTREAM encryption option licensed and enabled (see Chapter 24 “FDR/UPSTREAM Data Encryption”), and you need to REGEN an encrypted “copy-2” backup, USTREGEN will decrypt the necessary information to add the backup to the UPSTREAM. The actual backup data and control information will remain encrypted.
FDR/UPSTREAM includes several useful reporting tools.

**GENERAL REPORTING TOOL (USTRPORT)**

USTRPORT is a general, batch-driven reporting program, that can read UPSTREAM history records and report on them in a variety of ways.

Selection criteria can be specified to create custom reports detailing various aspects of UPSTREAM operation. As an example, you can select only records for a given backup profile (or group of profiles), or only those backups that fall in a certain date/time range. All reports can be customized to include only the data you want to see, and in a layout that you specify.

See Chapter 22 “Reporting with USTRPORT” for documentation on USTRPORT.

**BACKUP FILE REPORTING TOOL (USTBKPR**

USTBKPR is another batch-driven reporting utility. It can be used to display the contents of any UPSTREAM sequential backup, either on disk or tape. You can point it to a single backup data set, and it will display the name and statistics of every Client file that was included in the backup.

See Chapter 23 “Reporting with USTBKPR” for documentation on USTBKPR.
3 INSTALLATION AND CONFIGURATION

3.1 OVERVIEW AND INSTALLATION CHECKLIST

This section contains the instructions for installing the FDR/UPSTREAM z/OS product on your system.

The installation of UPSTREAM requires TSO with ISPF and can be done in two different ways:

1. **Electronic Installation** – This is the most commonly used installation method and the install package is downloaded from the INNOVATION DATA PROCESSING FTP site. If you are installing UPSTREAM using this method, follow the “Electronic Installation” in Section 3.4 and onward as required.

2. **DVD Installation** – The install package is copied from a DVD. If you are installing UPSTREAM using this method, follow the instructions in “DVD Installation” in Section 3.2 and then continue with “Installation ISPF Dialog” in Section 3.5 and onward as required.
3.2 INSTALLATION CHECKLIST

The installation of UPSTREAM z/OS involves several steps as outlined in the following table that you can use as a checklist as you work through the installation process.

- Install Type "ALL" must be done by all users (i.e., new and existing customers), including trial customers replacing a trial version of UPSTREAM with a production version.
- Install Type "NEW" is ordinarily only done by new users.
- Install Type "NEW (optional) is an optional step for new users wishing to extend an UPSTREAM trial.

<table>
<thead>
<tr>
<th>CHECK</th>
<th>STEP</th>
<th>INSTALL TYPE</th>
<th>SECTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ 1</td>
<td>ALL</td>
<td>3.3</td>
<td></td>
<td>“Upgrading and Replacing a Trial Version”</td>
</tr>
<tr>
<td>☐ 2</td>
<td>ALL</td>
<td>3.4 3.23</td>
<td></td>
<td>“Electronic Installation” or “DVD Installation”</td>
</tr>
<tr>
<td>☐ 3</td>
<td>ALL</td>
<td>3.5</td>
<td></td>
<td>“Installation ISPF Dialog”</td>
</tr>
<tr>
<td>☐ 4</td>
<td>ALL</td>
<td>3.6</td>
<td></td>
<td>“APF Authorize the FDR/UPSTREAM Load Library”</td>
</tr>
<tr>
<td>☐ 5</td>
<td>ALL</td>
<td>3.7</td>
<td></td>
<td>“Start the FDR/UPSTREAM ISPF Interface”</td>
</tr>
<tr>
<td>☐ 6</td>
<td>NEW</td>
<td>3.9</td>
<td></td>
<td>“Define the “CONFIG” Configuration File”</td>
</tr>
<tr>
<td>☐ 7</td>
<td>NEW</td>
<td>3.10</td>
<td></td>
<td>“Define the “CATALOG” Repository Data Set”</td>
</tr>
<tr>
<td>☐ 8</td>
<td>NEW</td>
<td>3.11</td>
<td></td>
<td>“Define the “FILEINFO” Repository Data Set”</td>
</tr>
<tr>
<td>☐ 9</td>
<td>NEW</td>
<td>3.12</td>
<td></td>
<td>“Define the “FILEDATA” Repository Data Set”</td>
</tr>
<tr>
<td>☐ 10</td>
<td>NEW</td>
<td>3.13</td>
<td></td>
<td>“Generate the JCL”</td>
</tr>
<tr>
<td>☐ 11</td>
<td>NEW</td>
<td>3.14</td>
<td></td>
<td>“Define Required VTAM System Resources”</td>
</tr>
<tr>
<td>☐ 12</td>
<td>NEW</td>
<td>3.15</td>
<td></td>
<td>“Define Optional TCP/IP System Resources”</td>
</tr>
<tr>
<td>☐ 13</td>
<td>NEW</td>
<td>3.16</td>
<td></td>
<td>“Configure the MAIN Options”</td>
</tr>
<tr>
<td>☐ 14</td>
<td>ALL</td>
<td>3.17</td>
<td></td>
<td>“Make the FDR/UPSTREAM ISPF Dialogs Easily Available”</td>
</tr>
<tr>
<td>☐ 15</td>
<td>NEW</td>
<td>3.18</td>
<td></td>
<td>“Authorize FDR/UPSTREAM ISPF Programs to TSO/E”</td>
</tr>
<tr>
<td>☐ 16</td>
<td>NEW</td>
<td>3.19</td>
<td></td>
<td>“Define the FDR/UPSTREAM Started Task PROC”</td>
</tr>
<tr>
<td>☐ 17</td>
<td>NEW/ (Optional)</td>
<td>3.21</td>
<td></td>
<td>“Extend an FDR/UPSTREAM Trial (Optional)”</td>
</tr>
<tr>
<td>☐ 18</td>
<td>NEW</td>
<td>3.22</td>
<td></td>
<td>“What’s Next?”</td>
</tr>
</tbody>
</table>
3.3 Upgrading and Replacing a Trial Version

The following section describes configuring a test FDR/UPSTREAM to run in parallel with your production environment for testing. If you do not wish to configure a new test UPSTREAM and prefer to use an existing test UPSTREAM or your production UPSTREAM, please skip to “Upgrading UPSTREAM to a Newer Version” below.

A new production (i.e. non-trial) version of UPSTREAM can be tested while an existing version continues to be used for full production. To insure that the two instances of UPSTREAM do not interfere with each other:

❖ Load the new UPSTREAM libraries from the distribution media (Section 3.4 “Electronic Installation” or Section 3.23 “DVD Installation” and Section 3.5 “Installation ISPF Dialog”) being sure to specify library names different from those used in production.

❖ Create a new configuration data set and repository data sets for testing:
  • Section 3.9 “Define the ‘CONFIG’ Configuration File”
  • Section 3.10 “Define the ‘CATALOG’ Repository Data Set”
  • Section 3.11 “Define the ‘FILEINFO’ Repository Data Set”
  • Section 3.12 “Define the ‘FILEDATA’ Repository Data Set”

❖ Define the VTAM application major node (Section 3.14 “Define Required VTAM System Resources”)

❖ Assign a TCP/IP port number different from the one used by production (Section 3.15 “Define Optional TCP/IP System Resources”).

❖ Copy the UPSTREAM startup PROC to your procedure library under a different name (e.g., USTTEST) updating it to point to the test data sets. Your existing startup options may be used (if any). If using the UPSTREAM Scheduler, change the reference from your production to your test UPSTREAM.

❖ Configure the MAIN options, ISPF panel 4, Section 3.16 “Configure the MAIN Options” updating the SUBSYS and TCPPORT parameters.

❖ While testing the new ISPF dialogs, the USTALLOC procedure shown at the beginning of (“Start the FDR/UPSTREAM ISPF Interface” in Section 3.7) can be used to invoke them. See Section 17.7 “Controlling Multiple FDR/UPSTREAM Started Tasks” for use of the USTID feature.

❖ Set the required parameters in the test configuration (see Chapter 5 “FDR/UPSTREAM Profiles”). The test backup profiles should have names different from those used for production and should create different backup data set names (DASDPREF= and TAPEPREF=).
After unloading the distribution libraries, creating the new UPSTREAM installation data sets and testing of a new version is complete, it can be easily placed into full production and set up to use the existing configuration and repository data sets:

1. If the Started Task PROC distributed with the new release is not changed from the old, make a new copy of your Started Task PROC and edit the STEPLIB reflecting the new UPSTREAM program library name/loadlib. You can, and should, use your existing control files. The old library (and PROC) should be saved for a quick and easy fall-back, if required.

2. Either take a current USTREORG of each of the control files and note the backup file created as part of the USTREORG, or take a DUMPX (the backup portion of the USTREORG), saving the backup files created.

3. Bring down the old UPSTREAM and using the new started task PROC created above, bring up UPSTREAM with the new loadlib.

4. Once UPSTREAM is started using the new loadlib, browse the started task logs (JESMSGLG and USTLOG DD statements) for any errors starting up. If you wish, performing a USTREORG or DUMPX for each of the control files will verify the integrity of the control files that have been migrated from the prior version. Performing a backup (writes to the control files and the backup data set), restore (reads from the control files and the backup data set) and any other UPSTREAM functions you use regularly will exercise the product.

5. Once you are satisfied that the new UPSTREAM is performing as expected, rename your production started task PROC to a save version and rename the PROC created in step 1 to your production name.

6. Change the STEPLIB in any USTBATCH job streams and other UPSTREAM batch jobs to refer to the new UPSTREAM program library.

7. The ISPF dialogs can be updated by renaming those new libraries to match the names of the existing production UPSTREAM ISPF libraries (saving the original libraries under another name for any potential fall-back). Alternatively, update your TSO logon procs to reflect the new ISPF panels, clist, messages, skeleton, and tables data sets.

8. Once the new version has been running successfully for a time, the libraries from the old version can be deleted.

If you are completing a trial of UPSTREAM and you are now replacing the trial version with a full production version:

❖ You need to load the new UPSTREAM production libraries from the distribution tape (Section 3.4 “Electronic Installation” or Section 3.23 “DVD Installation” and Section 3.5 “Installation ISPF Dialog”).

❖ Then follow the notes above (under “Testing and Implementing a New Production Version” in Section 3.3) for advice on how to implement the production version while retaining the configuration and repository data sets that you built during the trial.

❖ You should also ensure that the UPSTREAM repository data sets created during the trial are of adequate size for production use (see sizing calculations in Chapter 6 “The FDR/UPSTREAM Repository”).
3.4 ELECTRONIC INSTALLATION

The FDR/UPSTREAM z/OS software is available via our Electronic Distribution service. See the following link, or contact INNOVATION DATA PROCESSING for details: http://fdr.innovation.com/upgrade/exform.cfm

If you are a trial customer, the trial copy expires on the date specified in the order acknowledgment and order completion e-mails, unless it is extended by INNOVATION. You are supplied a production library when you purchase the product. Reinstall the UPSTREAM product from a new electronic distribution before your trial expiration date.

Follow the link in the second e-mail below and then execute the Java applet to download the installation file from the FTP site and transfer the file to z/OS.

With the electronic installation, instructions are sent via a set of two e-mails for installing the libraries. The e-mail installation instructions supersede these printed instructions and should be used if any differences are noted.

The order acknowledgment e-mail (first of two e-mails) will look similar to:

**ORDER ACKNOWLEDGMENT E-MAIL**

Subject: Innovation Distribution Server Order Acknowledgment 012345
From: ENSMTP@CPUA.IDPNJ.COM
To: SYSPROG@ABC.COMPANY

You are receiving the first of a two message set acknowledging your Innovation software product order. Retain this e-mail until you receive a status (second) message containing instructions for performing the product installation. The status message will be sent when your order is ready to be downloaded from the Innovation FTP site.

NOTE:
1. You must perform the install of this distribution file before THURSDAY, JUNE 30 2011. The install program IDPREC in your distribution file will expire on this day and the file will be removed from our FTP site.

This order is for UPS Product Group including the following options:
FDR/UPSTREAM z/OS TRIAL
  Maximum-Workstations(50)
...

FTP DOWNLOAD AND TRANSFER TO Z/OS

ORDER ACKNOWLEDGMENT E-MAIL
The order completion e-mail (second of two e-mails) looks similar to:

**ORDER COMPLETION E-MAIL**

Subject: Innovation Distribution Server Order Completion 012345
From: ENSMTP@CPUA.IDPNJ.COM
To: SYSPROG@ABC.COMPANY

You are receiving the second of a two message set acknowledging your Innovation software product order is ready to be downloaded from the Innovation FTP site. Verify that the Customer Order Number is the same on both e-mail messages before performing the retrieval procedure below.

This order is for UPS Product Group including the following options:
- FDR/UPSTREAM Z/OS TRIAL
- Maximum-Workstations(50)

Customer Order Number:
012345012345012345

Customer number:
012345

Company name:
ABC COMPANY

Customer contact:
SYSPROG

Product version: Expiration Date:
3.9.0 2016.056

The instructions below outline the procedure you will use to retrieve the product file from the Innovation FTP site and then install our software.

The most convenient method is to ...
The Java applet receive procedure downloads a product distribution file from the INNOVATION FTP site to your PC using the Windows FTP.EXE client. It then connects to your z/OS FTP server to transfer this file to z/OS. This process is done within the user’s local network; data is never transmitted across the internet. You need to supply the IP address or DNS name of the z/OS LPAR you will unload the distribution to. Supply your TSO User ID and Password, the destination data set name (it will be allocated for you) and select how you would like the allocation to be performed. Once complete, select the button labeled “Start Transfer.”

Confirmation is required prior to the transfer proceeding.

Upon successful file transfer to your z/OS host, the applet displays a confirmation message box labeled “Transfer to MVS Host Successful”. After clicking “OK”, another message box containing the remaining z/OS installation instructions are displayed (please
see the following page.)

![Transfer To MVS Host Successful dialog box]

- UST product installation file now on MVS Host for processing

OK
Follow the "Remaining Product Installation Instructions" that are presented at the end of the file transfer.

--- TOP ---

- Expanding the product distribution file on your z/OS host is a two step process. Logon to your z/OS host and enter ISPF, issue the following TSO commands from ISPF Option 6. You can also exit ISPF and issue them from the TSO "READY" prompt. This TSO session must have access to an ISPF environment because this install process expects to employ ISPF panels to complete the installation. The steps described below assume TSO PROFILE NOPREFIX IS NOT used.

- 1 RECEIVE INCDSAT(UST BIN)
  
  Where the INCDSAT() value is the name that you created during the file transfer to z/OS.

  The above creates a partitioned data set containing two load modules. After the RECEIVE is completed the name of the PDS will be 'userid.IDFREC LOAD'. If you want a different name, then at the prompt.

- Dataset USTSYS.IDFREC LOAD from USTCFG on JESCPUA
Enter restore parameters or 'DELETE' or 'END' +

  Enter:
  DSN(desired.name)

  or take the default by pressing ENTER.

- 2 CALL 'dname(IDFREC)'

- CALL 'userid.IDFREC LOAD(IDFREC)'

  Or, if you gave the PDS a different name:

- A welcome message is displayed. Enter appropriate responses to Dataset Name and output class prompts.

You will also be prompted to enter the 16 digit
IDFREC PASSWORD supplied in the ORDER ACKNOWLEDGMENT (first) e-mail you received.

IDFREC Password:
0504160436251640

Follow the instructions on the ISPF panel to complete the installation of the distribution files.

--- BOTTOM ---
Expanding the product distribution file on your z/OS host is a two-step process. If you are using ISPF, issue the following TSO commands from ISPF Option 6 (TSO Commands). You can also exit ISPF and issue them from the TSO “READY” prompt. This TSO session must have access to an ISPF environment because the z/OS install process expects to employ ISPF panels to complete the installation. The steps described below assume TSO PROFILE NOPREFIX is NOT used.

1. Enter:
   RECEIVING INDATASET(UST.BIN)
   Where the INDATASET(...) value is the name that you created during the file transfer to z/OS.
   This creates a partitioned data set containing two load modules. After the RECEIVE is complete, the name of the PDS is ‘user id.IDPREC.LOAD’. If you want a different name, then at the prompt:
   Data set FDRSYS.IDPREC.LOAD from USTCFG on JESCPUA
   Enter restore parameters or 'DELETE' or 'END' +
   Enter:
   DSN(desired.name)
   Or take the default by pressing “ENTER.”
   A confirmation message is posted:
   Restore successful to dataset 'CRL.IDPREC.LOAD'
   ***
   NOTE: This library is used to unload the distribution files. It is not the FDR/UPSTREAM program library which will be unloaded as part of this installation.

2. Enter:
   CALL 'userid.IDPREC.LOAD(IDPREC)'
   or, if you gave the PDS a different name:
   CALL 'dsname(IDPREC)'
   A welcome message is displayed. Enter appropriate responses to name and SYSOUT class prompts.
   You are also prompted to enter the 16-digit IDPREC PASSWORD supplied in the Order Acknowledgment e-mail
   A sample dialogue follows:

   *--------*
   * Welcome to Innovation's - PRODUCTION install of the UPSTREAM PRODUCT
   * A default pds 'CRL.UST.SHIPPDS' will be deleted, allocated and loaded
   * Enter a new name or press enter to use default
   * A default TSO receive sysout class of X will be used
   * Enter a new sysout class value or press enter to use default
   * After the transmission file is unpacked and the TSO receive is finished
   * an ISPF menu will be displayed with a menu titled:
   * IDP PRODUCT INSTALL (SCREEN1) - (This will take about a minute)
   * This dialog has Help containing additional information about the install process
   *--------*
   Please enter IDPREC Password to load install file or QUIT to end

Follow the instructions on the ISPF panel to complete the installation of the distribution files.
3.5 INSTALLATION ISPF DIALOG

This screen allows you to specify the data set names that are used for the data sets you are loading from the install package. These may be existing data sets to be updated, or they may be new data sets that are allocated and cataloged (new data sets are recommended).

**IDP PRODUCT INSTALL – SCREEN 1**

The load library must be an APF authorized library. If necessary, you can authorize it after the install using the SETPROG console command (see the IBM z/OS System Commands (SA22-7627) manual for details).

The names shown above are the default names provided by the IDPPREC Install program (when the default user of IDP being used). You may change these names in one of two ways:

1. To change the High or 2nd Level qualifiers for all data sets, change the values in the corresponding field for the Output DSN section.
2. To change an individual Low Level qualifier, change desired Low Level Qualifier for the data set(s) that you want to change.

The resulting data set names that are used are displayed at the bottom area of the panel. You can also specify the SMS attributes (if they are to be SMS-managed) or VOLUME/UNIT information on this panel to allocate these data sets when creating them as NEW.

Once you are satisfied with the selections, press **ENTER** and then **END** (PF3.). The HFSDIR prompt specifies the location to put the UPSTREAM client installation files for z/OS UNIX Systems Services (USS). These are used to backup USS file systems. This is optional if you are licensed for z/OS UNIX Systems Services (USS) or are installing a trial version. If you are not licensed for USS, please ignore the prompt. For further information, please see the UPSTREAM z/OS UNIX Systems Services manual.
This screen documents the process that is used to create the product libraries. When you press “ENTER” to continue, it shows you the status of each of the data sets being created.

**IDP Product Install – Screen 2**

<table>
<thead>
<tr>
<th>Command ====&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press <strong>Enter</strong> to continue</td>
</tr>
<tr>
<td>Enter <strong>Can/Cancel</strong> to quit</td>
</tr>
</tbody>
</table>

The TSO RECEIVE command will be invoked to create each file selected from the previous menu. **Before each file is created by using TSO RECEIVE the target data set will be deleted.** The install will display messages below indicating install progress and results. If a file RECEIVE fails the user is given the option to continue or quit. The user can view RECEIVE output by looking at the RECEIVE sysout allocation under their TSO user session. If any dialog file fails to RECEIVE it is suggested that the user **NOT** continue to the next screen.

The next step will change member **USTALLOC** in the Clist library that is used to allocate libraries and invoke the product dialog.

Once all the product libraries have been created, a completion message is displayed.

**IDP Product Install – Screen 3**

<table>
<thead>
<tr>
<th>Command ====&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press <strong>Enter</strong> to continue</td>
</tr>
<tr>
<td>Enter <strong>Can/Cancel</strong> to quit</td>
</tr>
</tbody>
</table>

The **UPSTREAM** installation data sets have been received.

If you would like to display the UPSTREAM PRIMARY OPTIONS MENU and **continue with the Installation process**, press **ENTER**; otherwise press **CANCEL**.

To use the libraries just loaded at another time, issue the following command, either under ISPF option 6, or from TSO "READY" mode:

```
EXEC 'IDP.UST390.CLIST(USTALLOC)'
```

(To continue customization go to Section 3.5 in the manual)
3.6 APF AUTHORIZE THE FDR/UPSTREAM LOAD LIBRARY

The FDR/UPSTREAM load library (file 2 in the preceding screen) must be defined to z/OS as an APF authorized library. If it is not already defined as authorized, you (or your z/OS system programmer) must do so by one of the following methods:

❖ If your installation uses the PROGxx member in PARMLIB to define authorized libraries, you can update the PROGxx member and activate the updated list with the following z/OS console command:

   SET PROG=xx

❖ If your installation has specified that the authorized program list is in dynamic format, you can also temporarily authorize the UPSTREAM load library with the following z/OS console command:

   SETPROG APF,ADD,DSNAME=upstream.loadlib,VOL=volser

**NOTE:** Temporary authorization will no longer be in effect after the next IPL unless the appropriate PARMLIB member is updated.
3.7 Start the FDR/UPSTREAM ISPF Interface

With the FDR/UPSTREAM libraries loaded, you can now invoke the USTALLOC dialog to continue the installation process. From ISPF Option 6 (TSO COMMANDS), issue the following command to display the UPSTREAM Main Menu:

EXEC 'upstream.clist.library(USTALLOC)'

This panel is displayed:

```
FDR/UPSTREAM - MAIN ISPF PANEL

COMMAND ===>  

1  USTBATCH  - Host Initiated Services
2  STATUS    - Current Status Information
3  DEFINE    - Define Control Files
4  CONFIGURE - Main Options
5  PROFILE   - Workstation Profile Names
6  OPER      - Operator Commands
7  REPORT    - Report
8  REGISTRY  - Name Registry
9  DUPAUDIT  - Duplicate File Audit
10  SCHEDULE - Command Scheduler
11  MANAGEMENT - Backup Management
12  USTCRYPT - USTCRYPT Options
```
3.8 **Define the FDR/UPSTREAM System Data Sets**

*NOTE:* If you are upgrading from an earlier version of UPSTREAM and plan to use the *existing* system data sets, you can skip the UPSTREAM DEFINE steps. If you want to re-size any of those data sets, specify the filename of the existing data set at the bottom of the DEFINE screen, and a REPRO step will be generated to copy the existing data.

Option 3 (“DEFINE”) from the UPSTREAM Main Menu takes you to a sub-menu (below) where you can define the data sets used by the UPSTREAM system. These data sets include the main configuration data set and the three repository data sets (Chapter 6 “The FDR/UPSTREAM Repository”).

---

### FDR/UPSTREAM - Define Panel

```
----------------------- FDR/UPSTREAM - Define -----------------------------
COMMAND ==> 
Please select the desired file(s) to define, one at a time, then press the END key (PF3) to generate the define statements.

1  CONFIG      - Define the Configuration file
2  CATALOG     - Define the Catalog cluster
3  FILEINFO    - Define the File-Information cluster
4  FILEDATA    - Define the File-Data cluster
```

---

The next steps show how to create each of the four data sets by selecting the appropriate number (1 to 4) from the UPSTREAM DEFINE menu. Each selection takes you to another panel where you specify the parameters to be used for allocating that data set. Only the data sets that you select are defined.

Once you have selected all the desired data sets, Section 3.13 “Generate the JCL” shows you how to generate (and optionally modify) the JCL required to create those data sets.
3.9 **DEFINE THE “CONFIG” CONFIGURATION FILE**

The FDR/UPSTREAM configuration data set contains options describing and controlling the various processes that can run with UPSTREAM (backups, restores, utility functions, etc) as well as options controlling the behavior of the FDR/UPSTREAM system itself. See Chapter 21 “FDR/UPSTREAM Configurator” for a full description of the UPSTREAM Configuration File.

The configuration data set is a sequential or partitioned data set (PDS is recommended) and it must have the following DCB characteristics: RECFM=FB, LRECL=120, and a blocksize that is a multiple of 120.

Selecting option 1 (“CONFIG”) from the define menu takes you to the panel shown below, where you define the parameters for the allocation of the configuration data set.

```
FDR/UPSTREAM - DEFINE THE CONFIGURATION FILE
-------------
FDR/UPSTREAM - Define the Configuration file
-----------------
Command ===> 
Please enter the necessary information to allocate a new Configuration file

Data Set Name ===> 'UPSTREAM.CONFIG.FILE'

Management Class ===> (blank for default)
Storage Class ===> (blank for default)
Data Class ===> (blank for default)
Volume Serial ===> (blank for default)
Space Units ===> TRACK (TRACK, CYLINDER)
Primary Quantity ===> 10
Secondary Quantity ===> 1
Directory Blocks ===> 10 (0 for sequential)
```

If the configuration data set is to be SMS-managed, you specify the SMS classes to be assigned, but they may be omitted if your installation’s ACS routines assign appropriate classes, or if the data set is NOT to be SMS-managed.

When you are satisfied with the values displayed, press **PF3/END** to return to the main DEFINE menu.
3.10 **DEFINE THE “CATALOG” REPOSITORY DATA SET**

The CATALOG repository data set contains information about all the backups currently recorded by UPSTREAM and (optionally) history records detailing recent operations.

Selecting option 2 (“CATALOG”) from the define menu takes you to the panel shown below, where you define the parameters for the allocation of the CATALOG repository data set.

---

**FDR/UPSTREAM - DEFINE THE CATALOG CLUSTER**

Please enter the necessary information to allocate a new Catalog cluster

<table>
<thead>
<tr>
<th>Information</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Set Name</td>
<td>'UPSTREAM.CATALOG.SUST.CLUSTER' (include the index level $UST in the dsname for best performance)</td>
</tr>
<tr>
<td>Management Class</td>
<td>(blank for default)</td>
</tr>
<tr>
<td>Storage Class</td>
<td>(blank for default)</td>
</tr>
<tr>
<td>Data Class</td>
<td>(blank for default)</td>
</tr>
<tr>
<td>Volume Serial</td>
<td>(required unless defaulted)</td>
</tr>
<tr>
<td>File Structure</td>
<td>PRO (Pro, Enhanced, Compatible)</td>
</tr>
<tr>
<td>Number of backups to keep track of....</td>
<td>175000</td>
</tr>
<tr>
<td>Number of cylinders to allocate.....</td>
<td>50</td>
</tr>
</tbody>
</table>

To copy the contents of an existing Catalog cluster into the new file, specify:

Repro from dsname

---

If the CATALOG data set is to be SMS-managed, you specify the SMS classes to be assigned, but they may be omitted if your installation's ACS routines assign appropriate classes, or if the data set is **NOT** to be SMS-managed.

You can ask UPSTREAM to estimate the required size of the CATALOG data set by entering an estimate of the number of backups for all Clients that are recorded by UPSTREAM at any one time. Alternatively, you may specify a data set size in cylinders. Filling in either value and pressing ENTER causes UPSTREAM to display a calculated value for the other value.

For example, if you plan to backup 10 Clients and each Client retains (on average) 10 weekly full merge backups and 5 incremental merge backups between each full, (a total of 6 backups each week), then:

- backups/client = (6 backups/week) * (10 weeks) = 60
- total backups = 60 backups/client * 10 clients = 600

The resultant space calculation includes a generous factor for expansion and for history records, but since the CATALOG file is fairly small, we suggest you add your own factor to ensure sufficient space (e.g., 2000 instead of 600 in the example). See Section 6.3 “The CATALOG (USTCATLG) File” for more detailed information on the contents of the CATALOG file and estimating space requirements.

See Section 6.2 “Choosing the Repository File Format” for help in deciding whether to use IAM or VSAM for the repository file format.

When you are satisfied with the values displayed, press **PF3/END** to return to the main DEFINE menu.
### INSTALLATION AND CONFIGURATION

**DEFINE THE “FILEINFO” REPOSITORY DATA SET**

#### 3.11 DEFINE THE “FILEINFO” REPOSITORY DATA SET

The FILEINFO repository data set contains one record for every FDR/UPSTREAM Client file backed up by UPSTREAM. This includes information such as the Client file/path name, file/path attributes, and the physical location of the actual backup.

Selecting option 3 (“FILEINFO”) from the define menu takes you to the panel shown below, where you define the parameters for the allocation of the FILEINFO repository data set.

**FDR/UPSTREAM - DEFINE THE FILE-INFORMATION CLUSTER**

<table>
<thead>
<tr>
<th>Command ====&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please enter the necessary information to allocate a new File-Info cluster</td>
</tr>
<tr>
<td>Data Set Name ===&gt; 'UPSTREAM.FILEINFO.$UST.CLUSTER'</td>
</tr>
<tr>
<td>(include the index level $UST in the dsname for best performance)</td>
</tr>
<tr>
<td>Management Class ===&gt; (blank for default)</td>
</tr>
<tr>
<td>Storage Class ===&gt; (blank for default)</td>
</tr>
<tr>
<td>Data Class ===&gt; (blank for default)</td>
</tr>
<tr>
<td>Volume Serial ===&gt; (required unless defaulted)</td>
</tr>
<tr>
<td>Enhanced Format ===&gt; YES (yes, no)</td>
</tr>
<tr>
<td>Storage Estimates</td>
</tr>
<tr>
<td>Number of File Servers..................... ===&gt; 5</td>
</tr>
<tr>
<td>Average number of files per server........ ==&gt; 30000</td>
</tr>
<tr>
<td>Number of incrementals between full backups ===&gt; 10</td>
</tr>
<tr>
<td>Number of full backup cycles kept......... ===&gt; 7</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>Number of cylinders to allocate........... ===&gt; 424</td>
</tr>
<tr>
<td>To copy the contents of an existing File-Info cluster to the new file, specify:</td>
</tr>
<tr>
<td>Repro from dsname ===&gt;</td>
</tr>
</tbody>
</table>

If the FILEINFO data set is to be SMS-managed, you can specify the SMS classes to be assigned, but they may be omitted if your installation's ACS routines assign appropriate classes, or if the data set is NOT to be SMS-managed.

You can ask UPSTREAM to estimate the required size of the FILEINFO data set by entering the number of different Clients for which backups will be taken, the average number of files on each Client and the number of incremental backups and full backups per Client. Alternatively, you may specify a data set size in cylinders. If you change one or more of the first four values, UPSTREAM displays its calculated value for the size in cylinders. See Section 3.11 "Define the “FILEINFO” Repository Data Set" for more detailed information on the contents of the FILEINFO file and estimating space requirements.

When you are satisfied with the values displayed, press PF3/END to return to the main DEFINE menu.
3.12 **DEFINE THE “FILEDATA” REPOSITORY DATA SET**

The FILEDATA data set is a system required file and should be defined as 1 track. It is no longer required to estimate the number of Keyed files or the average file size.

Selecting option 4 ("FILEDATA") from the define menu ("Define the FDR/UPSTREAM System Data Sets" in Section 3.8) will take you to the panel shown below, where you can define the parameters for the allocation of the FILEDATA repository data set.

---

**FDR/UPSTREAM - DEFINE THE FILE-DATA CLUSTER**

---

Please enter the necessary information to allocate a new File-Data cluster

<table>
<thead>
<tr>
<th>Data Set Name</th>
<th>'UPSTREAM.FILEDATA.CLUSTER' (include the index level $UST in the dsname for best performance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Class</td>
<td>(blank for default)</td>
</tr>
<tr>
<td>Storage Class</td>
<td>(blank for default)</td>
</tr>
<tr>
<td>Data Class</td>
<td>(blank for default)</td>
</tr>
<tr>
<td>Volume Serial</td>
<td>(required unless defaulted)</td>
</tr>
<tr>
<td>Enhanced Format</td>
<td>YES (yes, no)</td>
</tr>
</tbody>
</table>

Storage Estimates
- Number of Keyed/Archive files: 5000
- Average number of bytes per file: 50000
- Number of cylinders to allocate: 416

To copy the contents of an existing File-Data cluster to the new file, specify:
- Repro from dsname

The FILEDATA data set is a system required file and should be defined as 1 track. It is no longer required to estimate the number of Keyed files or the average file size. If the FILEDATA data set is to be SMS-managed, you can specify the SMS classes to be assigned, but they may be omitted if your installation's ACS routines will assign appropriate classes, or if the data set is NOT to be SMS-managed.

When you are satisfied with the values displayed, press **PF3/END** to return to the main DEFINE menu.
3.13 **Generate the JCL**

If you opt to define one or more of the FDR/UPSTREAM system data sets, the define menu displays the text "**JCL GENERATED**" next to each data set to be defined. From that define menu, press **PF3/END** to display the following menu:

```
COMMAND ===> FDR/UPSTREAM - Define
Please select one of the following options or press the END key to cancel

1 - Browse the generated JCL stream
2 - Edit the generated JCL stream
3 - Submit the generated JCL stream

FDR/UPSTREAM Program Library for STEPLIB DD (blank if LINKLIST) :
Steplib ===> 'upstream.loadlib'

JCL Job statements:
( //useridA JOB (ACCOUNT),'NAME',NOTIFY=userid )
( /* )
( /* )
( /* )
```

First, you need to update the JCL JOB statements on the lower half of the menu to meet your installation requirements. You can then browse the generated JCL, edit it, or submit it for execution. The data sets are not defined until you submit this generated jobstream for execution.

**USTCAM**

PGM=USTCAM is used for the definition of the three repository data sets.

USTCAM is an UPSTREAM front-end to the IBM IDCAMS utility and accepts all of the control statements of IDCAMS. However, USTCAM allows the UPSTREAM repository data sets to be defined as either VSAM KSDS clusters or as IAM (Innovation Access Method) files.

If any of the cluster names in the three DEFINE statements have an index level of "$UST" (for example, UPSTREAM.CATALOG.$UST.CLUSTER), it will be defined in IAM format, otherwise it will be defined as a VSAM KSDS.

For optimum performance, FDR/UPSTREAM Technical Support recommends that the CATALOG, FILEINFO, and FILEDATA data sets be defined as IAM files (i.e., with "$UST" in the cluster name). These are the defaults, as presented by the above panel.

If you have defined any of the repository data sets as IAM, you must use USTCAM instead of IDCAMS for all operations on those data sets, including REPRO and LISTCAT operations. See Chapter 6 "The FDR/UPSTREAM Repository" for more information on the repository data sets, including details of IAM and the USTCAM program.

If you receive an informational message "IDC2908I FILEINFO NOT FOUND IN SYSTEM" for the FILEDATA or CATALOG files, the message(s) can be safely ignored.
3.14 DEFINE REQUIRED VTAM SYSTEM RESOURCES

To define to VTAM the application IDs that will be used by FDR/UPSTREAM, tailor the "USTAPPL" member from the Installation Control Library (ICL) and copy it into your SYS1.VTAMLST data set.

The member name in VTAMLST may be USTAPPL or any name of your choice. You can activate it with the console command "V NET,ACT,ID=membername". You will probably want to add the member name to the "ATCCONxx" member of VTAMLST in order that the UPSTREAM application names are automatically activated when VTAM is started.

❖ The first application, UPSTREAM, is used by the UPSTREAM started task. If you change the application name, you must also change the name on the APPLID parameter in your UPSTREAM configuration (see "APPLID" in Section 3.16).

❖ The other applications, UPSTR*, are used by USTBATCH (See Chapter 18 "z/OS Initiation with USTBATCH"). If you change the prefix, you will also have to specify that prefix on the APPLPREF= statement input to USTBATCH.

On the APPL statements, DLOGMOD= defines the default log mode table entry name that will be used when UPSTREAM establishes a session to a Client, or when USTBATCH establishes a session to UPSTREAM. #INTER is a mode table entry provided by IBM (in ACF/VTAM V3.4 and above, in the default mode table ISTINCLM) and can be used with UPSTREAM that overrides the parameters in #INTER to allow 4K RU sizes and pacing values of 24.

## SAMPLE VTAM DEFINITION

```verbatim
USTAPPL VBUILD TYPE=APPL
  * ONLINE FDR/UPSTREAM MAIN APPL DEFINITION
  UPSTREAM APPL APPC=YES, X
      AUTH=VPACE, X
      AUTOSES=1, X
      DLOGMOD=#INTER, X
      DDRAINL=ALLOW, X
      PARSESS=YES, X
      SECACPT=NONE, X
      VPACING=24
  *
  * APPLS FOR MAINFRAME INITIATION
  *
  UPSTR* APPL APPC=YES, X
      AUTH=VPACE, X
      AUTOSES=1, X
      DLOGMOD=#INTER, X
      DDRAINL=ALLOW, X
      EAS=1, X
      PARSESS=YES, X
      SECACPT=NONE, X
      VPACING=8
```
3.15 DEFINE OPTIONAL TCP/IP SYSTEM RESOURCES

In order for the FDR/UPSTREAM Client to communicate with FDR/UPSTREAM z/OS Storage Server, two pieces of information are required:

❖ The network address of the z/OS Storage Server, usually expressed as 4 decimal numbers separated by periods (e.g., 152.12.93.1). During UPSTREAM startup, the default TCP/IP FDR/UPSTREAM z/OS Storage Server address is displayed, but this address may not be correct for every Client if you have multiple TCP/IP interfaces to the mainframe. When configuring UPSTREAM for TCP/IP on an Client, verify this address with the system programmer or network administrator responsible for TCP/IP on your system.

❖ A "well-known port" number, within your TCP/IP z/OS Storage Server system, on which UPSTREAM will listen for requests from the Client. By default, UPSTREAM uses port 1972, but this can be changed in the UPSTREAM configuration (UPSTREAM ISPF option 4).

The address and port number need to be supplied when the Client software is configured using TCP/IP (but the port number there also defaults to 1972).

UPSTREAM uses the well-known port number you assign (or the default of 1972) as long as that port is not already in use by some other application. During UPSTREAM testing, that port will probably be available, so no TCP/IP changes are required, but when UPSTREAM is in production, you probably want to reserve that port number to ensure it is always available when UPSTREAM is started.

For IBM's TCP/IP, you will need to edit the TCP/IP profile data set. Check with your TCP/IP systems programmer for the name of this data set (probably "TCPIP.PROFILE.TCPIP"). Find the PORT statement in that profile, and add a line as shown below, where 1972 is the port number, TCP is the protocol, and “UPSTREAM” is the name of the UPSTREAM started task (usually the name of the cataloged procedure used to start UPSTREAM). The text after the # is comments:

```
1972 TCP UPSTREAM  # well-known port for FDR/UPSTREAM
```

If the port number is in use by another task when z/OS Storage Server is started, or (for IBM TCP/IP) if the task name in the reserved port list does not match the actual UPSTREAM task name, you will receive a message (from UPSTREAM) indicating that the port is in use. In that case, TCP/IP access will not be available until the situation is corrected and FDR/UPSTREAM z/OS Storage Server is restarted.

The "z/OS eNetwork Communications Server", which is the name of the IBM TCP/IP included with uses z/OS UNIX for the HPNS API, requires that the security user id associated with the UPSTREAM started task have an OE segment. See the IBM eNetwork documentation for details.
3.16 Configure the MAIN Options

You now need to configure the MAIN options used by FDR/UPSTREAM z/OS. These options define system-wide processing used by UPSTREAM. From the UPSTREAM main menu below, which we first saw in "Start the FDR/UPSTREAM ISPF Interface" in Section 3.7, select option 4 ("Configure"):

<table>
<thead>
<tr>
<th>COMMAND</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 USTBATCH</td>
<td>Host Initiated Services</td>
</tr>
<tr>
<td>2 STATUS</td>
<td>Current Status Information</td>
</tr>
<tr>
<td>3 DEFINE</td>
<td>Define Control Files</td>
</tr>
<tr>
<td>4 CONFIGURE</td>
<td>Main Options</td>
</tr>
<tr>
<td>5 PROFILE</td>
<td>Workstation Profile Names</td>
</tr>
<tr>
<td>6 OPER</td>
<td>Operator Commands</td>
</tr>
<tr>
<td>7 REPORT</td>
<td>Report</td>
</tr>
<tr>
<td>8 REGISTRY</td>
<td>Name Registry</td>
</tr>
<tr>
<td>9 DUPAUDIT</td>
<td>Duplicate File Audit</td>
</tr>
<tr>
<td>10 SCHEDULE</td>
<td>Command Scheduler</td>
</tr>
<tr>
<td>11 MANAGEMENT</td>
<td>Backup Management</td>
</tr>
<tr>
<td>12 USTCRYPT</td>
<td>USTCRYPT Options</td>
</tr>
</tbody>
</table>

In the subsequent menu you select the name (and optionally a member name, if a PDS) of your UPSTREAM configuration data set. The first time you enter this screen, specify the input data set and member name as a blank, and specify the output data set and member name to match the names you previously specified in "Define the "CONFIG" Configuration File" in Section 3.9. UPSTREAM will then initialize the configuration file for use and provide a default set of system-wide option values.

**WARNING:** Do not specify the input data set as blank on subsequent re-visits to this screen, as this will result in the configuration file being re-initialized removing any updates to the configuration file.

Once you have completely entered the data, press the ENTER key to proceed to the next configuration screen.

The subsequent screen displays all of the UPSTREAM MAIN configuration options. The configuration can be saved by entering SAVE on the top line and hitting ENTER. Each option is described below. See Chapter 21 “FDR/UPSTREAM Configurator” for more detailed
Installation and Configuration
Configure the MAIN Options

The following describes each parameter and its possible values.

**APPLID**

`cccccccc` – Specifies the name of the VTAM application ID used by z/OS Storage Server, usually “UPSTREAM”. This is the name on the first APPL statement in the USTAPPL member of VTAMLST (see Section 3.14 “Define Required VTAM System Resources”), or, if specified, the ACBNAME= value on that APPL statement. This operand is required.

**DASDBLK**

`nnnnn` – Specifies the default blocksize (1024 to 32760) that UPSTREAM uses when allocating a sequential disk backup. This value can be overridden on any or all individual backup profiles.

Default: 27998.

**DESC**

`xxxx` – Specifies, in hex, the descriptor codes used for WTOs issued by the UPSTREAM started task. The descriptor codes allow you to control the z/OS processing of UPSTREAM console messages. The bits in the 4-digit hex string represent, left to right, the descriptor codes 1 to 16. Descriptor codes are described in the IBM manual *Routing and Descriptor Codes*.

Default: 1000, a code 4 (“system status”).

---

1. This parameter requires immediate attention during the initial install and configuration of FDR/UPSTREAM.
Installation and Configuration
Configure the Main Options

Duplicate
This is a system required parameter. Please use the default value.

DuplicDays
This is a system required parameter. Please use the default value.

DupsSize
This is a system required parameter. Please use the default value.

MaxDupl
This is a system required parameter. Please use the default value.

MaxHist
nnnnn – Specifies the number of days (0 to 32760) that UPSTREAM retains history records in the CATALOG repository. Records older than the number of days specified are purged when USTMAINT (see Section 17.10 “FDR/UPSTREAM Configuration Maintenance”) is run. If MAXHIST=0 is specified, no history records are created.

Default: 365.

MaxTapeb
nnn – Specifies the maximum number of tape drives (0 to 255) that UPSTREAM uses for backups at any one time. This includes the output tapes required for the online utilities such as USTMIGRT, USTMERGE, and USTVAULT. If the limit is exceeded, any new tasks requiring tape drives wait until the number of backup tapes in use declines. If MAXTAPEBACKUP=0 is specified, no tape limit is enforced.

Default: 0.

Note: A full merge backup may require 2 tape drives (the second to read previous backups), but this cannot be determined until the backup is already in progress. If the MAXTAPEBACKUP limit has not been reached, the second drive is acquired and counts against the limit. But if the limit has already been reached, the second drive is acquired anyway, and does not count against the limit.

MaxTaper
nnn – Specifies the maximum number of tape drives (0 to 255) that UPSTREAM uses for restores at any one time. If this limit is exceeded, any new restore tasks requiring tape drives wait until the number of backup tapes in use drops below MAXTAPERESTORE. If MAXTAPERESTORE=0 is specified, no tape limit is enforced.

Default: 0.

MaxTasks
nnn – Specifies the maximum number of sub-tasks (1 to 255) that UPSTREAM can have active at any one time. This includes all backups, restores, inquiries, and utility functions. If this limit is exceeded, UPSTREAM rejects the initiation of any new tasks until the number of active tasks drops below MAXTASKS.

Default: 100.
RACFUPD\(^2\)

Valid only if SECLVL=2 or 3 has been specified and if a userid has been granted UPDATE or READ access to a Client profile name. RACFUPD then specifies what operation the user is authorized to perform:

**BACKUP** – Allows users with UPDATE authority to do backups or restores, while users with only READ access can do only restores.

**RESTORE** – Allows users with UPDATE authority to do backups or restores, while users with only READ access can do only backups.

Default: RESTORE.

*Note*: If SECLVL=3 is in effect, a userid that matches a profile name is automatically granted UPDATE authority.

ROUTCDE

\(nnnn\) – Specifies, in hex, the routing codes to be used for WTOs issued by the UPSTREAM started task. The routing codes allow control over which consoles receive the UPSTREAM console messages. The bits in the 4-digit hex string represent, left to right, the routing codes 1 to 16. Routing codes are described in the IBM manual *Routing and Descriptor Codes*.

Default: 4020, which is a code 2 ("operator information") and code 11 ("programmer information").

SECLVL\(^3\)

Controls UPSTREAM security (see "The SECLVL Parameter" in Section 4.2).

**0** – (the default) specifies that UPSTREAM is to do no security checking on the userid and password entered by the end user at the Client. Specify this if you have no security system or prefer not to enforce userid security.

**1** – specifies that UPSTREAM is to issue a security call to verify the userid and password entered by the end user at the Client. No further security checking is done.

**2** – specifies that, in addition to verifying the userid and password (SECLVL=1), UPSTREAM issues additional security calls to verify that the userid is permitted to access the Client profile name entered by the end user. It also verifies that the userid is permitted to request restores from tape.

**3** – same as SECLVL=2, except that if the profile name and userid specified at the Client are the same, the user is automatically considered to be authorized to that profile name.

SORTUNIT

\(cccccccc\) – Specifies a z/OS unit name (anything valid in the UNIT= operand in JCL) that will be used to allocate temporary sort work files when external sorts are required. UPSTREAM does internal sorts whenever possible.

Default: SYSDA.

SUBSYS

\(cccccccc\) – Specifies the subsystem and control point name (default "UPSTREAM") that will be used on security system calls if SECLVL=1, 2, or 3 is specified. Contact FDR/UPSTREAM Technical Support if you need assistance in altering this value.

---

2. This parameter requires immediate attention during the initial install and configuration of FDR/UPSTREAM.
3. This parameter requires immediate attention during the initial install and configuration of FDR/UPSTREAM.
TAPEBLK

- **ccc** – Specifies the maximum tape DCB BLKSIZE parameter that will be used when allocating a new tape data set; the default is "MAX".

UPSTREAM backups can utilize up to a maximum 256KB DCB BLKSIZE, or the optimum that the target tape device manufacturer will allow.

**NOTE:** The term "optimum" refers to the manufacturer defined "optimum" BLKSIZE for their device.

TCPNAME

- **cccccccc** – Identifies the z/OS TCP/IP started task instance name with which the UPSTREAM started task will communicate.

This is generally the name of your TCP/IP started task on your z/OS system. However, if you started the TCP/IP started task with the command similar to the following, the proper value for this parameter would be “SYS2:

- `S TCPIP.SYS2`

If the specified TCP/IP system is not active when z/OS Storage Server is started, a warning message is issued and TCP/IP access is disabled. You must restart the z/OS Storage Server started task to re-establish TCP/IP communications.

TCPPORT

- **nnnn** – Specifies the TCP/IP port number that z/OS Storage Server uses as a "well-known" port number to listen for Client connections.

Default: 1972, which is generally fine.

WTOCOMP

Specifies whether UPSTREAM should issue WTOs to the z/OS system console for all messages relating to backups starting and completing, in addition to writing them to the UPSTREAM log (USTLOG).

**YES** – UPSTREAM issues WTOs to the z/OS system console for all messages relating to backups starting and completing, in addition to writing them to the UPSTREAM log.

**NO** – UPSTREAM only writes the messages to the UPSTREAM log.

This operand is optional. If omitted, these messages are written only to USTLOG. This feature may be useful for installations with mainframe automation and tracking facilities that monitor console messages.

Default: NO.

ATBCOUNT

- **nnnn** – This parameter is for internal use only and should only be changed if requested by FDR/UPSTREAM Technical Support.

Default: 10.

PDMSUB

- **cccccccc** – Specifies the subsystem name for Alebra Parallel Data Mover systems.

Default: DMES.

---

4. This parameter requires immediate attention during the initial install and configuration of FDR/UPSTREAM.
3.17 MAKE THE FDR/UPSTREAM ISPF DIALOGS EASILY AVAILABLE

The FDR/UPSTREAM TSO/ISPF dialog can be invoked at any time, from any TSO userid that is authorized to read the UPSTREAM dialog libraries. This can be done by going to ISPF option 6 (TSO COMMAND) and entering the following command, as previously shown in “Start the FDR/UPSTREAM ISPF Interface” in Section 3.7:

EXEC 'upstream.clist.library(USTALLOC)'

Two shortcuts to this process are also available:

**SHORTCUT 1:**
**ADDING AN “UPSTREAM” OPTION TO YOUR MAIN MENU**
You may add “FDR/UPSTREAM” as an option on your ISPF main menu (ISR@PRIM), or any other ISPF menu of your choice. In the UPSTREAM ISPF panel data set there are two example panels showing how to add an option for UPSTREAM to the ISPF main menu:

- ISR@V3X – for ISPF V3.x
- ISR@V4X – for ISPF V4.x

**SHORTCUT 2:**
**ADDING UPSTREAM AS AN ISPF COMMAND**
You can add the UPSTREAM command to an ISPF command table so that the UPSTREAM dialog can be entered from almost any ISPF panel by entering “UPSTREAM” or just “UPS” on the command line.

This is achieved by entering the command “USTCMDS” on the UPSTREAM main menu.

The modified command table is stored in the first library in the ISPTLIB concatenation for this TSO userid. If the user has a private table library, it normally is the first one in that concatenation, so the updated command table is available only to this user.

If the user does not have a private library, but has update authority to the first public library in ISPTLIB, that library will be updated, and it is available to any userid using it.

However, you are given an option to specify a different table library before it is actually stored. If you choose a different table library, that library will have to be in the ISPTLIB concatenation in front of any other library containing a table by the same name.

The ISPF command table name consists of a prefix followed by the constant CMDS (default ISPCMDS).

For ISPF version 4.2 or higher, we recommend that you update the public command table.
3.18 Authorize FDR/UPSTREAM ISPF Programs to TSO/E

Some of the functions available in the FDR/UPSTREAM ISPF dialog require that several program names be added to the TSO/E list of authorized programs:

- **USTATUS** – for status displays (ISPF option 2)
- **USTCMD** – for issuing commands to UPSTREAM (ISPF option 6)
- **USTRPORT** – for generating dynamic reports (ISPF option 7)
- **USTMONA** – for the UPSTREAM Debugging Facility

If you do not intend to give TSO users access to one or more of the preceding facilities, you can omit the associated program name from the TSO/E list of authorized programs. In TSO/E V2R4 and higher, you can authorize programs by modifying member IKJTSOxx in SYS1.PARMLIB. The program names must be added to both the AUTHPGM and AUTHTSF lists in that member. If you have the proper authority, you may issue the following TSO command to activate the updated IKJTSOxx member immediately, otherwise it is activated after the next IPL:

```
PARMLIB UPDATE(XX)
```
3.19 Define the FDR/UPSTREAM Started Task PROC

The ICL member "USTPROC" is a sample PROC to start the FDR/UPSTREAM started task. It will need to be tailored to meet your installation specifications and copied into an appropriate system PROCLIB as member "UPSTREAM" (or another name of your choice).

The JCL parameters included in this PROC are described below.

```
//UPSTREAM PROC OUT=X
//*
//*  RUN ONLINE FDR/UPSTREAM
//*
//MAIN EXEC PGM=USTMAIN,DYNAMNBR=100,MEMLIMIT=8G,
//      REGION=0M,TIME=1440 ,PARM='SCHEDULE'
//STEPLIB DD DSN=your.upstream.loadlib,DISP=SHR
//ABNLDUMP DD DUMMY FOR ABEND-AID
//NOFASTC DD DUMMY CIRCUMVENT PROBLEMS WITH PDSMAN
//USTLOG DD SYSOUT=&OUT
//USTLOG2 DD SYSOUT=&OUT
//USTSUMM DD SYSOUT=&OUT
//USTSUMM2 DD SYSOUT=&OUT
//USTINFO DD SYSOUT=&OUT
//USTSNAP DD SYSOUT=&OUT
//SYSUDUMP DD SYSOUT=&OUT
//SYSOUT DD DUMMY FOR TAPE RESTORES (SORT OUTPUT)
//SYSIN DD DUMMY,DCB=BLKSIZE=80 FOR OLDER XA SYSTEMS
//INTRDR DD SYSOUT=(A,INTRDR),DCB=BLKSIZE=80 FOR SUBMIT
//USTCONFG DD DSN=your.upstream.config.file(member),DISP=SHR
//USTSCHED DD DSN=your.upstream.config.file(schedule),DISP=SHR
//USTCATLG DD DSN=your.upstream.catalog.cluster,DISP=SHR
//USTFILEI DD DSN=your.upstream.fileinfo.cluster,DISP=SHR
//USTFILEC DD DSN=your.upstream.filedata.cluster,DISP=SHR
//USTTAPEM DD DUMMY *OPTIONAL
```

EXEC STATEMENT

Specifies the UPSTREAM started task program USTMAIN. REGION=0M is recommended to allow UPSTREAM to acquire whatever virtual storage is required to perform the requested operations. Certain startup parameters can be specified via the PARM= operand on the EXEC statement, or via a PARM= override on the console START command used to start UPSTREAM. If multiple values need to be specified, separate them by commas. Some supported values on the PARM= operand are shown below. See "Startup Options" in Section 17.2 for a full list:

SCHEDULE

This automatically starts USTSCHED, the UPSTREAM scheduler (see Chapter 19 "FDR/UPSTREAM Scheduler"). If specified, the USTSCHED DD statement must be included.

NOMAINT

This bypasses the automatic execution of the USTMAINT utility (see Section 17.10 "FDR/UPSTREAM Configuration Maintenance"). However, since USTMAINT should be run periodically in order to cleanup any obsolete entries in the UPSTREAM repository, FDR/UPSTREAM Technical Support does not recommend that you run this way normally.
INSTALLATION AND CONFIGURATION
DEFINE THE FDR/UPSTREAM STARTED TASK PROC

RBSZ=
This overrides the default setting of the TCP/IP receive buffer size. This buffer size controls the number of bytes received by the z/OS TCP/IP stack before acknowledging this to the remote system. To set this value previously it was necessary for the installation systems programmer to specify this value via the TCP/IP profile data set keyword TCPRCVBUFSIZE.
Default: 131,072, which should be effective for most shops.

SBSZ=
This overrides the default setting of the TCP/IP send buffer size. To set this value previously it was necessary for the installation systems programmer to specify this value via the TCP/IP Profile data set keyword TCPSENDBUFSIZE.
Default: 65,535, which should be effective for most shops.

URBSZ=
This overrides the default setting of the TCP/IP receive buffer size for z/OS UNIX Systems Services based Client communication. This buffer size controls the number of bytes received by the z/OS TCP/IP stack before acknowledging this to the remote UNIX system.
Default: 32768.

USBSZ=
This overrides the default setting of the TCP/IP send buffer size for z/OS UNIX Systems Services based Client communication.
Default: 131072.

TIMEOUT=

\texttt{nnn} – This specifies the maximum number of minutes that UPSTREAM will wait for most communication requests to complete. The value can be specified from 1 to 8191 minutes.
Default: 10.

STEPLIB DD STATEMENT
This is the UPSTREAM z/OS Storage Server load library created earlier in Section 3.4 “Electronic Installation”. It must be an APF-authorized library, as described in Section 3.7 “Start the FDR/UPSTREAM ISPF Interface”.

USTLOG AND USTLOG2 DD STATEMENTS
These data sets contain all the messages from UPSTREAM z/OS Storage Server. USTLOG is the primary log and USTLOG2 is the (optional) alternate log. Their format is DSORG=PS, RECFM=VB, LRECL=134. The blocksize defaults to 6233 if the data sets are on disk, but you can specify a larger value (smaller values are ignored). BLKSIZE=138 is forced if they are going to SYSOUT. You can switch between USTLOG and USTLOG2 as the active log data set with the following console command:
\texttt{F UPSTREAM,SWITCHLOG}
Section 17.9 “Log Handling” for full details on flushing and switching UPSTREAM logs.

USTSUMM AND USTSUMM2 DD STATEMENTS
These optional data sets contain a one-line summary of each operation performed by UPSTREAM. USTSUMM is the primary log and USTSUMM2 is the (optional) alternate log. Their format is DSORG=PS, RECFM=FB, LRECL=133. The blocksize defaults to 1330 if the data sets are on disk, but you can specify any value that is a multiple of 133. BLKSIZE=133 is forced if they are going to SYSOUT data set. You can switch between USTSUMM and USTSUMM2 (requires the presence of USTLOG2) with the following console command:
\texttt{F UPSTREAM,SWITCHLOG}

USTINFO DD STATEMENT
If one or more of the UPSTREAM repository data sets have been defined as IAM (i.e., they have "$UST" as an index level in the name), this file contains messages about their usage.
Under certain error circumstances, UPSTREAM will take a z/OS “SNAP” dump for problem diagnosis. This data set contains the “SNAP” dump if one is taken. The format of the USTSNAP data set should be: DSORG=PS, LRECL=125, BLKSIZE=1632, RECFM=VBA.

**USTRCHDD**

Used for submission of jobs by the UPSTREAM scheduler USTSCHED (see Chapter 19 “FDR/UPSTREAM Scheduler”). It should point to a JES internal reader. If omitted, USTSCHED will dynamically allocate an internal reader, so it can safely be omitted.

**SYSDUMP DD**

In the event of a catastrophic error, this data set contains a system dump taken by z/OS. This dump may prove invaluable in resolving the problem.

**USTCONFIG DD**

This is the UPSTREAM configuration data set that you created in Section 3.9 “Define the “CONFIG” Configuration File” and then configured with initial settings. If the configuration data set is a PDS, the member name of the current configuration must be specified. This configuration is used during the startup of UPSTREAM, but the configuration can be changed while UPSTREAM is running, (See Section 17.11 “Adjusting FDR/UPSTREAM Main Configuration Options”). The characteristics of this data set must be RECFM=FB and LRECL=120 (any blocksize that is a multiple of 120 is acceptable).

**USTSCHED DD**

This optional DD statement must be included if you are using the UPSTREAM scheduler USTSCHED (see Chapter 19 “FDR/UPSTREAM Scheduler”). It points to the data set where the schedule definitions are stored. This is usually the same configuration data set pointed to by USTCONFIG, but it can be a separate data set if it has the proper DCB characteristics of RECFM=FB and LRECL=120 (any blocksize that is a multiple of 120 is acceptable). The member name specified contains the schedule definition that will be used by default, but the member name can be overridden when USTSCHED is started.

**USTCATLG DD**

This data set is the UPSTREAM repository CATALOG data set (see Section 3.10 “Define the “CATALOG” Repository Data Set”).

**USTFILEI DD**

This data set is the UPSTREAM repository FILEINFO data set (see Section 3.11 “Define the “FILEINFO” Repository Data Set”).

**USTFILEC DD**

This data set is the UPSTREAM repository FILEDATA data set (see Section 3.12 “Define the “FILEDATA” Repository Data Set”).

**USTCRYPT DD**

If you are using the UPSTREAM encryption feature (Chapter 24 “FDR/UPSTREAM Data Encryption”), this data set contains the USTCRYPT control statements and must be allocated as RECFM=FB, LRECL=80, and a BLKSIZE as a multiple of LRECL.

**USTTAPEM DD**

This optional DD statement invokes the USTTAPEM facility. USTTAPEM performs tape allocations in a separate, z/OS address space. See Section 3.20 “Define the USTTAPEM Started Task Proc (Optional)”. 
3.20 DEFINE THE USTTAPEM STARTED TASK PROC (OPTIONAL)

Device allocation in z/OS continues to be single-threaded using an exclusive enqueue on the SYSZTIO resource. To lessen the possibility of a deadlock in allocation and/or deallocation, specific mount requests (non-scratch/private requests) can now be processed by an optional external address space, USTTAPEM. To process a mount request, the UPSTREAM address space will pass the mount request to the USTTAPEM address space to process the request and pass the ready device back to the Upstream address space.

Each specific mount request starts a new USTTAPEM started task. This started task processes the request and ends. This process repeats for each specific mount request. An active system processing hundreds of tape mounts will have started task output for each one. Care should be taken to avoid exceeding the maximum number of jobs allowed in your JES system. We suggest the USTTAPEM started task proc be defined in the Master JCL library and specify a sysout class on the Job card that does not retain job or started task output. See the sample procedure further below and also in the installation ICL library in member USTTAPEM.

Tape mounts will be handled in an external address space, consequently, tape mount activity will no longer be posted in the JESMSGLG DD of the UPSTREAM started task. Instead, that log activity can be found in the individual USTTAPEM started task output. Or if, as suggested, the USTTAPEM output is not retained, see the JES SYSLOG for mount activity.

There are two steps required to enable tape mounts via USTTAPEM.

1. Add the USTTAPEM DD card to the UPSTREAM started task JCL (please refer to Section 3.19 “Define the FDR/UPSTREAM Started Task PROC” and the installation ICL library, member USTPROC):

   //USTTAPEM DD DUMMY
   
   You may override the name of the USTTAPEM procedure in the Upstream started task JCL by specifying the DATACLAS parameter as follows:

   //USTTAPEM DD DUMMY,DATACLAS=<new proc name>

2. Create the USTTAPEM started task (please refer to the installation ICL library, member USTTAPEM):

   //USTTAPEM JOB MSGCLASS=Z
   //USTTAPEM PROC OUT=X
   //*
   //* MOUNT TAPE FOR UPSTREAM IN AN EXTERNAL ADDRESS SPACE
   //*
   //* THE USTTAPEM PROCEDURE IS INVOKED FOR SELECTED TAPE
   //* MOUNTS ON BEHALF OF THE UPSTREAM ADDRESS SPACE. IT
   //* SHOULD BE ASSIGNED TO A JES MESSAGE CLASS THAT IS
   //* AUTOMATICALLY PURGED, AS NOT TO FILL UP THE JES SPOOL.
   //* *CHANGE* MSGCLASS=Z IN THE JOB STATEMENT TO A MSGCLASS=
   //* THAT WILL AUTOMATICALLY PURGE THE JOB FROM JES SPOOL.
   //*
   //* THE USTTAPEM PROCEDURE CONTAINS A JOB CARD, SO IT
   //* *MUST* BE PLACED IN A LIBRARY POINTED BY EITHER THE
   //* IEFJOBS DD OR THE IEFPSI DD IN THE MSTJCLXX MEMBER
   //* IN SYS1.PARMLIB.
   //*
   //* *CHANGE* OUT=X TO A SYSOUT HELD CLASS SO ANY ABENDS
   //* WRITTEN TO THE SYSUDUMP DD WILL BE HELD IN SPOOL.
   //*
   //USTTAPEM EXEC PGM=USTTAPEM
   //STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
   //SYSUDUMP DD SYSOUT=&OUT
**INSTALLATION AND CONFIGURATION**

**DEFINE THE USTTAPEM STARTED TASK PROC (OPTIONAL)**

```plaintext
//*USTTAPEM DD DUMMY         *** FOR WTO MESSAGE ***
//         PEND
//         EXEC USTTAPEM
EXEC STATEMENT – Specifies the UPSTREAM started task program USTTAPEM

STEPLIB DD STATEMENT – This is the UPSTREAM z/OS Storage Server load library created earlier in Section 3.4 “Electronic Installation” It must be an APF-authorized library, as described in Section 3.6 “APF Authorize the FDR/UPSTREAM Load Library”

SYSUDUMP DD STATEMENT – In the event of a catastrophic error, this data set contains a system dump taken by z/OS. This dump may prove invaluable in resolving the problem.

USTTAPEM DD STATEMENT – Optional. Issues a UST990 WTO to the SYSLOG as follows:

UST990 USTTAPEM MOUNTED VOL=E40159 RC=0000 RS=0000 FLAGS=9000
DSN=USTPROD.PROFILE.COPYF1.G0096V00
```
3.21 EXTEND AN FDR/UPSTREAM TRIAL (OPTIONAL)

NOTE: Production (licensed) users of FDR/UPSTREAM do **not** have to perform this step. Trial users whose trial period is about to expire (see messages “UST070W” and “UST111E” in the started task USTLOG) may need to apply a zap provided by FDR/UPSTREAM Technical Support to extend the trial expiration. Member “USTZAP” in the ICL library contains a sample jobstream for extending the expiration date. Replace the `VER` and `REP` statements with values provided by FDR/UPSTREAM Technical Support. Replace the “SYSLIB” DD statement with one pointing to your UPSTREAM z/OS Storage Server load library and submit the “ZAP”.

```*/
//* FDR/UPSTREAM z/OS Storage Server TRIAL EXTENSION ZAP
//*
//ZAP EXEC PGM=AMASPZAP
//SYSPRINT DD SYSOUT=* 
//SYSLIB DD DSN=your.upstream.loadlib,DISP=SHR
//SYSIN DD *
   NAME UST020U
   VER aaaa zzzz,zzzz,zzzz,zzzz
   VER bbbb zzzz,zzzz
   VER cccc zzzz,zzzz
   REP aaaa xxxxxxxx,xxxxxxxx
   REP bbbb xxxxxxxx
   REP cccc xxxxxxxx
/*
3.22 **WHAT’S NEXT?**

Before you can start to run backups and restores with FDR/UPSTREAM, you will need to do the following:

❖ Install and configure the UPSTREAM Client software.
   See the *FDR/UPSTREAM Client Guide* for full details.

❖ Review UPSTREAM Security Options.
   Review Chapter 4 “Security”, which describes the SECLVL main configuration parameter. Make sure that you understand the implications of the value you have set for SECLVL (see “The SECLVL Parameter” in Section 4.2).

❖ Construct a Backup Profile.
   Review Chapter 5 “FDR/UPSTREAM Profiles” for a full description of UPSTREAM backup profiles.

❖ Run your first backup and restore.
   Having created a backup profile, you can then run your first backup and restore. This can be done either from the UPSTREAM z/OS Storage Server (see Chapter 7 “Performing a Backup” and Chapter 8 “Performing a Restore”), or through the UPSTREAM Director or GUI interfaces (please see the *FDR/UPSTREAM Client Guide*).
FTP TRANSFER AND RECEIVE INSTALLATION FILES ON z/OS

3.23 DVD INSTALLATION

The DVD install method contains a "Readme.rtf" file that documents the install process. This file is located in the z/OS directory found in the root directory of the DVD. You should follow these instructions provided to install the product using the DVD install method. You must transfer the "FDR.BIN" file from the z/OS directory found in the root directory of the DVD to your z/OS host. The required file attributes for the target z/OS data set are listed in the instructions. The exact directions for the FTP transfer are also documented in the instructions.

If you are a trial customer, the trial copy expires on the date specified in your DVD order, unless it is extended by INNOVATION. You are supplied a production library when you purchase the product. Reinstall the UPSTREAM product from a new DVD distribution before your trial expiration date.

Continue with the installation instructions “Receiving Installation Files on z/OS” in Section 3.4.
4  SECURITY

4.1  INTRODUCTION

FDR/UPSTREAM interacts with your mainframe security system to provide various levels of security checking. These security checks are implemented by issuing RACROUTE macros that call the z/OS Security Access Facility (SAF) Router. SAF will route the security check to your security system.

UPSTREAM supports any security system that supports SAF. This includes CA ACF2, IBM RACF, CA Top Secret, and others. Specific notes about these security systems appear later in this chapter.

UPSTREAM security checking falls into two distinct categories:

❖ Internal Security
❖ External Security

**INTERNAL SECURITY** *(Optional)*. For operations such as backups, restores and file transfers. This ensures that users or jobs can only initiate UPSTREAM operations for which they have the appropriate authority. The following sections describe the implementation of UPSTREAM internal security.

**EXTERNAL SECURITY** *(Mandatory)*. Regardless of the internal security settings that have been chosen, UPSTREAM (like any other application running under z/OS) also requires the appropriate level of security for the z/OS data sets that it will create and access, such as its backup files. Section 4.8 “z/OS Data Set Security” describes the implementation of UPSTREAM external security.

If you are using the UPSTREAM encryption feature (Chapter 24 “FDR/UPSTREAM Data Encryption”), you should also look at using your security system to restrict access to the data encryption “key file” and to optionally set up a security profile for the encryption Master Key. Both of these processes are described in Section 4.9 “FDR/UPSTREAM Data Encryption”.
FDR/UPSTREAM SECURITY PARAMETERS

4.2 FDR/UPSTREAM Security Parameters

FDR/UPSTREAM security is controlled by the SUBSYS, SECLVL, and RACFUPD main configuration parameters.

The SUBSYS Parameter

The SUBSYS parameter specifies a value that will be used on security calls (if SECLVL=1, 2, or 3 is used) to identify the “subsystem” and “requester” of the security request.

SUBSYS is optional. If it is not specified, the value of “UPSTREAM” will be used instead.

For some security systems, as described later in this chapter, this name may need to be defined to the system to permit these security requests.

The SECLVL Parameter

The SECLVL parameter specifies the level of security UPSTREAM is to employ on requests from a UPSTREAM Client.

SECLVL=0

This is the DEFAULT value. This level causes UPSTREAM to perform no security checking.

The GLOBAL profile (see Section 5.2 “The GLOBAL Profile”) is used for any profile name that does not exist in the configuration, effectively allowing any profile name to be used by any Client. For this reason, we generally recommend that you disable the backup operations for the GLOBAL profile by setting DASD=NO and TAPE=NO.

SECLVL=1

UPSTREAM issues a security call to verify that the entered userid is defined to your z/OS security system and that the entered password is correct for that userid. The userids used with UPSTREAM may be those already existing in your security system, or special userids established just for the purposes of UPSTREAM, or a combination of both.

As with SECLVL=0, the profile name and operation type are also verified against the UPSTREAM configuration. No security authorization check are made against the profile name itself. This means a user with a valid userid and password is permitted to backup or restore data using any valid profile name.

SECLVL=2

This is the most restrictive level available. In addition to the checks done for SECLVL=0 and 1, a security call is also issued to verify that the userid is authorized to use the profile name entered.

Employing SECLVL=2 prevents a user with a valid userid and password from backing up or restoring data under an unauthorized profile name. Users may be granted full backup and restore authority, or they may be authorized to perform only backups or only restores. For restores, another security call is done to determine the USERID’s authority to request restore from tape (see “Tape Mount Authority” in Section 4.3).

Users can also be granted the authority to modify the definition of certain profiles, using the configuration modification facility under UPSTREAM at the Client. Special security rules must be established to define authority to the profile names (see Section 4.3 “Implementing FDR/UPSTREAM Security”).

SECLVL=3

This is the same as SECLVL=2 with one difference. If the profile name entered at the Client is the same as the userid, UPSTREAM assumes that the userid is authorized to do backups and restores under that profile name without further checking. This reduces overhead and also simplifies the security rule definition. If you create a security userid with the same name as every profile name, you do not need to explicitly authorize the userid to the profile.
### SECURITY

**FDR/UPSTREAM SECURITY PARAMETERS**

<table>
<thead>
<tr>
<th><strong>The RACFUPD Parameter</strong></th>
<th>Valid only if SECLVL=2 or 3 has been specified and if a userid has been granted UPDATE or READ access to a Client profile name. RACFUPD then specifies what operation the user is authorized to perform.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RACFUPD=BACKUP allows users with UPDATE authority to do backups or restores, while users with only READ access can do only restores.</td>
</tr>
<tr>
<td></td>
<td>RACFUPD=RESTORE allows users with UPDATE authority to do backups or restores, while users with only READ access can do only backups.</td>
</tr>
</tbody>
</table>

**NOTE:** If SECLVL=3 is in effect, a userid that matches a profile name is automatically granted UPDATE authority.
Implementing FDR/UPSTREAM Security

4.3 IMPLEMENTING FDR/UPSTREAM SECURITY

SECLVL=0
Implementing SECLVL=0 security within UPSTREAM requires no modifications to your z/OS security system. UPSTREAM will not perform calls to the z/OS SAF Router.

SECLVL=1
Implementing SECLVL=1 security within UPSTREAM requires only minor modifications to your z/OS security system. SECLVL=1 issues RACROUTE TYPE=VERIFY to verify the userid and password, so to implement SECLVL=1 security, you will need to:

* Verify that the SAF interface is enabled for your z/OS security system (IBM RACF and CA Top Secret always support SAF).
* Modify security tables to allow security calls from the subsystem named by the SUBSYS parameter. This may not be necessary for some security systems, as described later in this chapter.
SECLVL=2 and 3

SECLVL=2 and 3 allow you to define security rules so that only certain USERIDs can use certain profile names. They also allow you to grant certain USERIDs the authority to do only backups or only restores.

In addition to the authorization checks described previously for SECLVL=1, SECLVL=2 or 3 issues a RACROUTE to verify that the userid is authorized to use the profile name sent from the FDR/UPSTREAM Client:

```
TYPE=AUTH, CLASS='$UPSTRM', ENTITY='profilename', ATTR=type
```

For compatibility with earlier releases, if class $UPSTRM is not found, an additional check is done with class WSIDENT. If the userid is not authorized to the profile name, but the profile definition was provided in the UPSTREAM configuration by a PREFIX= entry instead of an explicit PROFILE=entry (see Chapter 21 “FDR/UPSTREAM Configurator”), a second check is done to see if the userid is authorized for the prefix name. This allows one userid to be authorized for all profile names that begin with the specified prefix.

However, if SECLVL=3 is in effect, and the userid specified at the Client matches the profile name entered, or the name of the PREFIX= profile entry in the UPSTREAM configuration matches the profile name, the userid is automatically considered to be authorized for UPDATE to that profile name. In this case, the RACROUTE for the profile name will not be done. This can greatly simplify the setup of the security rules, since the profile names do not have to be defined, only the userids.

In the RACROUTE request shown previously, the “ATTR=type” is the type of authority requested.

- You must give the userid **UPDATE** authority if it is permitted to do backups and restores.
- Give the userid **ALTER** authority if, in addition to backup and restore operations, it is also authorized to modify the profile definition from the Client.
- You may also give users the authority to perform only one type of operation by granting them only **READ** access.

The type of access granted is then defined by the RACFUPD configuration parameter:

- RACFUPD=BACKUP means that users with **READ** access can only do **restores**. It should be used when you want to protect against unauthorized backup while allowing some users to do restores at will.
- RACFUPD=RESTORE (the default) grants **READ** users the authority to do **backups** only and protects against unauthorized or ill-considered restores.

**NOTE:** FDR/UPSTREAM profile names that are not protected in your security system can be used by any userid.

To implement SECLVL=2 or 3 security, you need to perform the following steps, in addition to those already outlined for SECLVL=1:

- Define a resource class of $UPSTRM. A class of WSIDENT is also acceptable if already in use with an earlier release, but INNOVATION recommends you convert to $UPSTRM for compliance with IBM recommendations for user-defined resource classes.
- Define resource names under that class corresponding to the profile names that will be used with UPSTREAM. Generic resource names are acceptable. If you have defined PREFIX= profiles in the UPSTREAM configuration, you can either define resource names equal to the prefix names (to give a userid authority to all of the profiles under that prefix), or you may define the actual profile names to be used, or both. If SECLVL=3 is enabled, you do not need to define the profile names (or prefixes) if the userids themselves match the profile names or prefixes. Be sure to specify that the universal (default) access is NONE (e.g., for IBM RACF; UACC(NONE)).
**SECURITY**
**IMPLEMENTING FDR/UPSTREAM SECURITY**

- Authorize appropriate userids to have READ, UPDATE, or ALTER access to those profile names they are permitted to use.
- If you wish to restrict restores from tape for certain userids (as described below), define a resource of TAPEMOUNT under the $UPSTRM (or WSIDENT) class to grant global tape restore authority. Alternatively, define resources of “Rprofilename” (profile name preceded by the letter “R”) to grant tape restore authority for specific profiles. You must then authorize appropriate userids to those profiles with UPDATE authority.
- Finally, define any userids for use with UPSTREAM that are not already defined to your security system.

**TAPE MOUNT AUTHORITY**

By default, any authorized user can do restores from either tape or disk backups. But if you want to limit tape mounts by allowing only certain users to restore from tape backups, you can do so under SECLVL=2 and 3. For a restore request, a RACROUTE will be issued:

```
RACROUTE TYPE=AUTH,CLASS='$UPSTRM',ENTITY='TAPEMOUNT',ATTR=UPDATE
```

If the userid is authorized to this name, then the FDR/UPSTREAM Client is permitted to request restores that require tape mounts. If not, only disk restores are permitted. TAPEMOUNT allows you to give global tape restore authority to selected users. However, if TAPEMOUNT has not been defined as a resource to your security system (resource not found), UPSTREAM will repeat the check using an entity name of “Rprofilename” (profile name preceded by the letter R). This allows you to give a userid the authority to do tape restores for certain profiles, but not for others.

If neither resource (TAPEMOUNT nor Rprofilename) is defined to your security system, all tape restores will be allowed. You can use either the TAPEMOUNT or Rprofilename resource names to control tape mounts, but not both. TAPEMOUNT is much simpler (and is recommended) because you simply define that one resource and give the appropriate userids UPDATE access to it.

**THE USTRGSTR PROFILE**

The Registered Name Service is described in Chapter 20 "Registered Name Service". Although there are no special security requirements for a Client to register its own name, the special profile name of “USTRGSTR” must be security authorized for UPDATE for any userid to display or update the registered name table from ISPF, or from the equivalent Client interface. This applies only for SECLVL=2 or 3. A profile for USTRGSTR does not need to be defined in the UPSTREAM configuration.
4.4 USTBATCH Security Checking

There is a special security check done for FDR/UPSTREAM functions requested via USTBATCH (see Section 18.10 “USTBATCH Security”).

When a security system is active, a security userid must be associated with every batch job. This userid can be specified by the USER= parameter on the JOB statement, or can be the userid of the TSO user or other job that submitted the batch job. Since this userid and its password have already been validated, if the same userid is being used for the UPSTREAM operation, there is no need to re-validate it or re-specify the password.

When USTBATCH initiates its conversation with the UPSTREAM started task, the started task will extract the userid of the USTBATCH job. Several validation techniques are used to ensure that the calling program is actually a USTBATCH job. This is done only if CONV=KEEP or WAIT was specified to USTBATCH and only if USTBATCH is executing as an APF authorized program (under TSO, USTBATCH must be defined as an authorized program, (Section 3.18 “Authorize FDR/UPSTREAM ISPF Programs to TSO/E”).

Later, when the function request has been sent to the Client and is being initiated by the Client, UPSTREAM will compare the security userid associated with the request with the userid extracted from the USTBATCH job.

❖ If they match, FDR/UPSTREAM does not require or validate a password; it assumes that the password of the userid has already passed validation and it will use the userid for security checking as though a valid password had been provided. If SECLVL=2 or 3 is in use, the userid must still be authorized to the profile associated with the request, as described earlier. For installations that change passwords regularly, this means that the password need be changed only in the TSO logon or USTBATCH JCL and does not need to be changed (or even specified) in the USTBATCH parameters or Client parameters.

❖ If the userids do not match, then normal validation will be done on the userid associated with the UPSTREAM request and a password will be required. This is also true if the userid cannot be extracted from the job, or the USTBATCH job does not pass the UPSTREAM validation checks.

To simplify use of this feature, USTBATCH accepts a statement (USERID &JOB) that automatically copies the userid associated with the USTBATCH job and makes it the userid associated with the USTBATCH-initiated request.

When USTBATCH is used to submit UPSTREAM console commands, there are two classes of commands for security purposes:

❖ All console commands check for READ authority to a dummy profile name of USTCMD. This profile does not need to exist in the UPSTREAM configuration, but you can define a security rule for that profile to control the ability to execute UPSTREAM console commands through USTBATCH.

❖ Utility commands that execute in a sub-task and have an associated profile name (e.g., USTVAULT) do normal security checking against that profile name. For example, a command of VAULT03 requires authority to the profile USTVLT03. This allows you to restrict certain sub-task-type commands to certain userids.
4.5 IBM RACF Considerations

Listed below are considerations for implementing FDR/UPSTREAM security under IBM RACF. These notes and procedures should be verified in the appropriate manuals for your level of IBM RACF.

IBM RACF Router

If you are using SECLVL=1, 2, or 3, you will need to update the installation-defined IBM RACF Router Table ICHRFR01 to include the subsystem name and resource class used by UPSTREAM, so that SAF will pass those requests to IBM RACF.

This is a sample of the ICHRFRTB macro required to define UPSTREAM. This should be added to the entries you already have in this table, if any. Consult your IBM RACF documentation for details on assembling this table.

```
$UPSTRM ICHRFRTB CLASS=$UPSTRM,                   X
    REQSTOR=UPSTREAM, <= omit if RACF 1.9+  X
    SUBSYS=UPSTREAM,  <= omit if RACF 1.9+  X
    ACTION=RACF
```

If you have specified a SUBSYS parameter in the FDR/UPSTREAM configuration with a value other than "UPSTREAM", change the REQSTOR= and SUBSYS= values to match.

If you are using IBM RACF 1.9 or higher, the REQSTOR= and SUBSYS= parameters should be omitted.

If you are using only SECLVL=1 security, this table update is not required at all for IBM RACF 1.9 or higher.

Activating the Class

If you are using SECLVL=2 or 3, you must define the $UPSTRM class by updating the installation-defined class-descriptor table ICHRRCDE.

This is a sample of the ICHERCDE macro required to define class $UPSTRM. This should be added to the entries you already have in this table, if any. Consult your IBM RACF documentation for details on assembling this table.

```
$UPSTRM ICHERCDE CLASS=$UPSTRM,                   X
    ID=129,        <=value of your choice, see RACF doc  X
    POSIT=23,      <=value of your choice, see RACF doc  X
    MAXLNTH=9,     X
    FIRST=ALPHANUM,         X
    OTHER=ANY,     X
    DFTUACC=NONE,  X
    OPER=NO
```

Once the Class Descriptor Table has been updated and activated, resource checking for the $UPSTRM class must be activated by a security administrator using the command:

```
SETROPTS CLASSACT($UPSTRM)
```

Now you can begin defining profile names under the $UPSTRM class with the RDEFINE command, and granting the appropriate access to them by specified userids with the PERMIT command.
4.6 CA Top Secret Considerations

Listed below are considerations for implementing FDR/UPSTREAM security under CA Top Secret. These notes and procedures should be verified in the appropriate manuals for your level of CA Top Secret.

**NOTE:** The security subsystem name defined by the SUBSYS configuration parameter is not used for security calls to CA Top Secret.

**Facility Definition**

In order that UPSTREAM be able to verify userids and passwords, it must be defined as a “facility” to CA Top Secret. The following is a sample of the input required to do this definition. It replaces “USER10”, one of the user-defined facility names provided by CA Top Secret. If this name has already been used, choose another available name. You should verify in CA Top Secret documentation that the options shown are correct for your installation.

```
FAC(USER10=NAME=UPSTREAM)
FAC(UPSTREAM=PGM=UST)
FAC(UPSTREAM=NOSTMSG,SIGN(S),NOINSTDATA)
FAC(UPSTREAM=NORNDPW,NOASUBM)
FAC(UPSTREAM=MODE=FAIL)
FAC(UPSTREAM=LOG(INIT,MSG))
FAC(UPSTREAM=UIDACID=8,LOCKTIME=0)
FAC(UPSTREAM=DEFACID(*NONE*),KEY=8)
```

**Resource Class Definitions**

If you are using SECLVL=2, the resource class $UPSTRM must be defined to CA Top Secret. Shown below is a sample resource class definition (RDT) for the “$UPSTRM” resource class used by UPSTREAM:

```
TSS ADD(RDT) RESCLASS($UPSTRM) -
    RESCODE(01) -
    ATTR(DEFPROT,MERGE,LONG) -
    ACLST(NONE,ALTER=0400,READ,UPDATE,ALL) -
    DEFACC(UPDATE)
```

❖ The RESCODE is any value from “01” to “3F” that is not already in use. You can use the TSS LIST(RDT) command to display the codes currently in use.

❖ The DEFPROT attribute is optional. If specified, all UPSTREAM profiles will be protected by default, even if no specific rule has been defined for them.

Now you can begin defining profile names under the $UPSTRM class, and granting the appropriate access to them by specified userids.
### 4.7 CA ACF2 Considerations

Listed below are considerations for implementing FDR/UPSTREAM security under CA ACF2. These notes and procedures should be verified in the appropriate manuals for your level of CA ACF2.

#### SAF Interface

The security checks done by UPSTREAM can only be processed by CA ACF2 if the CA ACF2 SAF interface is enabled. Consult the appropriate CA ACF2 manuals for details on enabling this interface if you do not already use it.

Depending on your level of CA ACF2, you may need to define a rule for the SAF interface in order to process SECLVL=2 security calls. This rule is not required in CA ACF2 V6 or higher.

An example of such a rule is:

```
SAFPROT.UST SUBSYS(UPSTREAM) CNTLPT(UPSTREAM) CLASS($UPSTRM,VERIFY)
```

If you have specified a SUBSYS parameter in the UPSTREAM configuration with a value other than "UPSTREAM", change the SUBSYS= and CNTLPT= values to match.

#### CA ACF2 Command Limiting Facility

If you are using the CA ACF2 Command Limiting Facility to limit the use of TSO command processors, you must add USTATUS, USTISPF, USTCONFIG, USTMONA, and USTSCWK to the list of authorized commands for any user who will use the UPSTREAM TSO/ISPF dialogs.

#### Other Considerations for CA ACF2

UPSTREAM must be defined to CA ACF2 as a “MUSASS” (multi-user) application subsystem. Consult CA ACF2 documentation for details on defining the UPSTREAM application, and for defining the $UPSTRM class and profile names, and authorizing userids to use them.
4.8 Z/OS DATA SET SECURITY

Just like any other z/OS job or started task, FDR/UPSTREAM is itself also subject to security rules for the z/OS data sets it creates or accesses, as follows.

**The UPSTREAM Started Task**
The UPSTREAM started task authority is controlled by the userid that you have assigned to that started task. Consult the documentation of your z/OS security system for details on assigning security IDs to started tasks. It should be given CREATE and UPDATE authority to the UPSTREAM repository data sets, as well as to any sequential disk and tape backups that will be created.

**UPSTREAM Batch Jobs**
UPSTREAM batch jobs are subject to the authority of the userid assigned to that batch job. This can be the propagated userid of the user/task that submits the USTBATCH job (e.g., a TSO user, the Job Scheduling System), or optionally the USER= operand on the submitted requesters JCL JOB statement.

**File Transfer**
If the file transfer feature is used (see Chapter 14 “File Transfer”), the output data sets created by a client-to-z/OS file transfer are subject to the security of the userid under which the transfer is run. In other words, that userid must be authorized to create the z/OS output data sets used by the file transfer.
As described in Chapter 24 “FDR/UPSTREAM Data Encryption”, FDR/UPSTREAM includes a data encryption feature. With this feature licensed and enabled, you can use USTVAULT to create additional encrypted copies of some/all of your primary “copy 1” backups, which may be intended for off-site transportation and storage.

Since numerous encryption algorithms and accompanying encryption keys can be used by USTVAULT, it is not practical to manually enter the required key for each restore from an encrypted copy of a backup. For that reason, UPSTREAM stores the encryption keys in a special “key file”, which is named either in the KEYFILE keyword in the USTCRYPT DD statement in the UPSTREAM startup PROC (Chapter 3 “Installation and Configuration”), or via the USTCRYPTV option set though the TSO/ISPF dialog or USTZAPOP program (Chapter 24 “FDR/UPSTREAM Data Encryption”). The key file is automatically read by UPSTREAM when restoring from an encrypted copy of a backup.

In your security system, only those users that have a need to create (ALTER), backup (READ), or restore (UPDATE) the key file should be given the required access. All other users should be prevented from accessing the key file.

❖ Under IBM RACF, UPSTREAM itself does not require security access to the key file as it is always able to read and write to it. Any user who can create or restore from an encrypted copy of a backup can access the key file, but only via UPSTREAM. They will not be able to browse, update or copy the key file externally.

❖ Under non-RACF security systems, UPSTREAM users may need to be given UPDATE authority to the key file to create encrypted copies of backups, and READ authority to restore (decrypt) an encrypted copy of a backup.

The UPSTREAM data encryption feature also supports an optional master key, which is used to create an encrypted copy of the actual key used to encrypt the data. This encrypted key is then saved on the backup data set. The master key can be used to decrypt any copy of a backup that has been encrypted by USTVAULT, in the event that the key file is either not available, or the actual keys cannot be provided manually.

The most secure way to specify a master key is to store it in a FACILITY class profile in IBM RACF (or the equivalent in a non-RACF security system). The profile must be created with:

❖ Class FACILITY.

❖ Profile name “USTCRYPT.keyname” (“keyname” is a 1-8 character name of your choice). Multiple profiles can be created if multiple master keys are needed.

❖ Set Universal Access should to NONE so that no one can display the master key.

❖ Only those individuals who need to know or update the master keys should have authority to these profiles.

In IBM RACF, you can define this profile with the RACF ISPF dialog, or you can issue a RACF command such as the following, where “keyvalue” must be a valid 16-byte AES128 master key, consisting of exactly 32 hexadecimal digits (0-9, A-F):

RDEFINE FACILITY USTCRYPT.keyname UACC(NONE)
APPLDATA('MASTERKEY='keyvalue')

For CA ACF2 and CA Top Secret, the procedure for defining the security profile is different and you may need assistance or a usermod. Contact CA Technologies for information.
**SECURITY**

**FDR/UPSTREAM DATA ENCRYPTION**

**USING MASTER KEYS**

When encrypting a copy of a backup with USTVAULT, UPSTREAM extracts the master key that was specified via "MASTERKEY" in the above security profile. Under IBM RACF, UPSTREAM users do not need to be authorized to the profile in order to use master keys, but in other security systems they may need READ authority to the profile name.

For restores, or when running USTREGEN (Chapter 12 "Updating the Repository") against an encrypted copy of a backup, if the master key is to be used, MASTERKEY must be manually specified on a DECRYPT statement (MASTERKEYID is not supported for restores or USTREGENs).

For obvious reasons, master keys must be kept extremely secure and secret:

- Easily remembered keys should be avoided, as should repetitive strings and duplicated characters (this is also true for other user-specified encryption keys).
- Access to the master keys, either in printed form or from the FACILITY profile, should be limited to a small number of trusted individuals.
- The printed copies of master keys should be stored securely, such as in a bank safe-deposit box.

To enhance security, you may wish to periodically change master keys, e.g., once a month or once a quarter. However, if you change your master key, remember that encrypted copies of backups that were created before the change in master key will require the previous master key if you plan to restore using a master key. Therefore, if you periodically change master keys, the dates of those changes and the actual master keys used should be retained in a secure location.
GOALS

❖ Mainframe (z/OS) or client initiated FDR/UPSTREAM RUNJOB function.
❖ Allow for the specification or propagation of the submitters z/OS security system userid.
❖ Allow for impersonation of a selected client system userid.
❖ No z/OS or client system passwords are to be transmitted or stored.
❖ This facility should operate in a similar manner to existing UPSTREAM z/OS initiated functions.
❖ The solution should work with all supported SAF interface security systems (CA ACF2, IBM RACF, CA Top Secret, etc.).
1. The initiating process (TSO user, UPSTREAM internal scheduler, OPCA, etc.) submits the USTBATCH JOB. This provides the initial userid to be associated with the UPSTREAM request (USER=SCHED in this example).

2. The USTBATCH JOB has the userid of the submitting process (USER=SCHED) and it contains two important parameters instream, ACTION=5 (run a client script) and LOCALUSER=ORACLE (in this example) that provides the userid that will ultimately be “impersonated” on the client system. The USTBATCH JOB connects to the UPSTREAM z/OS Started Task and passes the request. An implementation restriction will allow the specification of only 8 national characters for the LOCALUSER (client system userid specification) parameter for an ACTION=5 type request. If the LOCALUSER parameter is NOT coded, the IBM RACF userid of the submitting USTBATCH JOB will be used on the client system.

3. The UPSTREAM z/OS Started Task receives the request from the USTBATCH JOB and connects to the remote client system as normal and passes the request via an x'A1' structure and subsequent x'A2' structures containing all the other control cards.

4. The Client software receives the request from the z/OS Started Task and reformulates the request as necessary. It then performs an UPSTREAM LOGIN function to the UPSTREAM z/OS Started Task for security validation purposes via the x'80' structure. The IBM RACF userid for this example request continues to be SCHED and now the LOCALUSER value is ORACLE because it was supplied in the x'A2' UPSTREAM control cards.

5. The UPSTREAM z/OS Started Task receives the security LOGIN validation request from the client system and calls the z/OS SAF security interface to process it. The IBM RACF SAF call is
   
   `RDEFINE $UPSTRM ORACLE UACC(NONE)`
   
   and optionally if the password is NOT being propagated along via the AVI indicator
   
   `PERMIT ORACLE CLASS($UPSTRM) ACC(READ) ID(SCHED)`
   
   6. For requests in which there was an IBM RACF userid and password specified, we need to validate the userid and password combination. This is to maintain compatibility with customers who want to continue doing this.

7. IBM RACF responds either positively or negatively to the request to validate the IBM RACF userid and password combination outlined in item # 6.

8. This SAF return code is returned to the IBM RACF z/OS Started Task.

9. If the prior two steps completed successfully or where not necessary (propagated/already verified IBM RACF userid), a IBM RACF request is made by the UPSTREAM z/OS Started Task to validate the userid (USER=SCHED in our example) against the previously created and configured IBM RACF Resource Class $UPSTRM. Within that resource class are entities for each client system userid that is going to be impersonated. Each entity is also permitted access of at least read by the user of the initiating process (USER=SCHED in our example). The IBM RACF commands to define these classes and entities are:

   - Add an Entity of “ORACLE” to IBM RACF Resource Class $UPSTRM:
     
     `RDEFINE $UPSTRM ORACLE UACC(NONE)`
     
   - Permit RACF Userid “SCHED” to be Impersonated by Client System Userid “ORACLE”:
     
     `PERMIT ORACLE CLASS($UPSTRM) ACC(READ) ID(SCHED)`

10. IBM RACF examines the IBM RACF database for previously defined entity access definitions, in this example: Does IBM RACF user SCHED have at least READ level access to $UPSTRM resource class entity (client system userid) ORACLE?

11. The request is responded to positively or negatively depending on the previously made definitions. Special cases are:

   - If a LOCALUSER value is specified and the matching IBM RACF entity value is NOT defined, the request fails.
SECURITY
Z/OS INITIATED RUN JOB FUNCTIONS WITH SECLVL=2

- If a LOCALUSER value is specified and the $UPSTRM IBM RACF resource class is NOT defined, the operation will be a success.

12. The SAF return code is provided to the UPSTREAM z/OS Started Task.
13. The UPSTREAM z/OS Started Task communicates the success (or failure) of the authorization request back to the requesting Client system.
14. The Client system (running as “root” user authority) spawns a new Client process that then “impersonates” the user (ORACLE in this example) previously validated with IBM RACF and begins execution of the requested script.
15. The requested client script is executed and it returns its messages and return code to the client upstream.log file.
16. The Client software forwards (if so requested) the script generated messages and return code to the z/OS Started Task.
17. The UPSTREAM z/OS Started task passes the client messages (if requested) and return code to the requesting USTBATCH JOB.
18. All the requested output is placed on the USTBATCH USTLOG DD statement output data set or SYSOUT.

SECLVL = 2 RUNJOB Logical Flow

---

If a LOCALUSER value is specified and the $UPSTRM IBM RACF resource class is NOT defined, the operation will be a success.

12. The SAF return code is provided to the UPSTREAM z/OS Started Task.
13. The UPSTREAM z/OS Started Task communicates the success (or failure) of the authorization request back to the requesting Client system.
14. The Client system (running as “root” user authority) spawns a new Client process that then “impersonates” the user (ORACLE in this example) previously validated with IBM RACF and begins execution of the requested script.
15. The requested client script is executed and it returns its messages and return code to the client upstream.log file.
16. The Client software forwards (if so requested) the script generated messages and return code to the z/OS Started Task.
17. The UPSTREAM z/OS Started task passes the client messages (if requested) and return code to the requesting USTBATCH JOB.
18. All the requested output is placed on the USTBATCH USTLOG DD statement output data set or SYSOUT.
WHAT ARE UPSTREAM PROFILES?

A profile is a set of customized options that are used to control various aspects of FDR/UPSTREAM operations, from the primary functions of backup and restore, ancillary functions of file transfer and running a Client process, through to the system utility functions like the re-organization of the UPSTREAM repository data sets (USTREORG). Profiles are also used to control the backup management utility operations, such as vaulting (USTVAULT), backup migration (USTMIGRT), and deferred merge (USTMERGE).
FDR/UPSTREAM Profiles

Introduction to FDR/UPSTREAM Profiles

Profiles are created and stored in the UPSTREAM configuration data set (see Chapter 21 "FDR/UPSTREAM Configurator"), alongside the main configuration parameters. Profiles are usually maintained by the UPSTREAM Administrator through the TSO/ISPF dialogs, although they can also be maintained via the Client interface (see the FDR/UPSTREAM Client Guide).

From the main TSO/ISPF menu specify option number 5, “PROFILE”, and press ENTER.

---

```
COMMAND ===>
1 USTBATCH - Host Initiated Services
2 STATUS - Current Status Information
3 DEFINE - Define Control Files
4 CONFIGURE - Main Options
5 PROFILE - Workstation Profile Names
6 OPER - Operator Commands
7 REPORT - Report
8 REGISTRY - Name Registry
9 DUPAUDIT - Duplicate File Audit
10 SCHEDULE - Command Scheduler
11 MANAGEMENT - Backup Management
12 USTCRYPT - USTCRYPT Options
```

---

The next menu to appear requires you to specify the input and output data set and member names for the UPSTREAM configuration data set.

❖ The input data set and member name specified must previously exist.
❖ The output data set must also previously exist, but the member will be created if it does not already exist.

It is recommended that you “update in place” by specifying the input and output data set and member name as the same. As these names are included in the UPSTREAM startup PROC (see Section 3.19 "Define the FDR/UPSTREAM Started Task PROC"), retaining the same names makes configuration management much easier.

When you have completed entering all the fields on this menu press the ENTER key.

---

```
COMMAND ===>

Input Configuration data set:

Data set name ===> 'UPSTREAM.CONFIG.FILE'
Member name ===> UPSTREAM
Profile name ===> * ( * for all profiles )

Output Configuration data set:

Data set name ===> 'UPSTREAM.CONFIG.FILE'
Member name ===> UPSTREAM

Press enter to display the profiles.

Note: Changes to the active configuration do not take effect until the operator command F UPSTREAM,REFRESH is issued from a system console or by the OPER dialog (option 6), or by stopping and re-starting UPSTREAM.
```

You can also specify a profile name or profile mask on the preceding menu to limit the list of profiles contained within the configuration that will be displayed on the subsequent menu.
A profile mask can be zero to seven initial characters, followed by the asterisk "*".

As an example, entering UST* would limit the subsequent list of profiles to just the ones starting with the three characters "UST".

In the subsequent menu shown below, we can see various "UST" profiles from within the configuration. These "UST" profiles are examples of the reserved profiles that control the behavior of various system utility functions within UPSTREAM, as explained later in this chapter.

The preceding menu allows you to perform the following actions:

**ADD**

Use this option to add an entirely new profile, either from scratch, or by using an existing profile as a template.

- To add a new profile from scratch, type "ADD" on the command line and press ENTER.

  **HINT:** You can also type "ADD profilename". This is particularly useful when adding some of the special profiles described later in this chapter. For example, typing ADD USTVLT01 would bring up a menu with far fewer options to fill-in than "ADD XYZ", which would bring up the full backup profile menu.

- To add a new profile utilizing an existing profile as a template, type "ADD" in the command column adjacent to the profile you wish to utilize as the template.

The following letters may also be entered in the command column adjacent to a profile entry to cause the following actions:

- Enter "S" or "E" to SELECT or EDIT an existing profile entry (they are equivalent).
- Enter "D" to DELETE a profile entry from the list. You will be asked to confirm the deletion.
- Enter "B" to BROWSE a profile entry. You will not be able to make any changes to the values displayed while in browse mode.

**COMPRESS**

This allows you to run the IEBCOPY utility program in the TSO foreground to compress the previously specified output configuration data set. This is useful if you are attempting to update a configuration data set member but the PDS data set has filled up.

**L**

This is a debugging feature that displays the USTLOG output from the USTCONFIG configuration program (see Chapter 21 "FDR/UPSTREAM Configurator"). It may be utilized to get additional problem determination information about errors encountered in updating the configuration data set.

The following menu shows the individual options that can be set within a profile. As described in the sections below, these options have different characteristics depending on which type of profile is being created. Subsequent sub-sections, below, describe only the parameters that refer to the specific type of profile being created.
INTRODUCTION TO FDR/UPSTREAM PROFILES

A reference table describing all the parameters can be found in Section 21.9 "DEFINE, MODIFY, and COPY Statements".

--- FDR/UPSTREAM - Configure Profile ---

**COMMAND ==>** SAVE profile  REPLICATE profile  CANCEL changes

--- FDR/UPSTREAM - Configure Profile ---

**PROFILE.. ==>** (Profile name or prefix)

**PREFIX.. ==>** (Yes- profile name is a prefix  No- not a prefix)

--- Tape Backup options: ---

**TAPE.... ==>** (Yes- allow sequential tape backups  No- disallow)

**IDRC.... ==>** (Yes- use IDRC compression  No- no IDRC compression)

**TAPEGD.. ==>** (Yes- Use GDG for sequential tape backups  No- non-GDG)

**TAPEPREF. ==>** (dsname prefix)

**TUNIT.... ==>** (tape unit name)

or **TSTOR ==>** (tape SMS storage class)

**UNITCNT.. ==>** (tape unit count: 1 or 2)

**RETPD.... ==>** (retention period)

or **EXPDT ==>** (yyddd - expiration date)

**NEWTAPEF. ==>** (Yes- mount new tape for full merge bkp  No-piggyback)

**NEWTAPEI. ==>** (Yes- mount new tape for incr. merge bkp No-piggyback)

--- DASD Backup options: ---

**DASD.... ==>** (Yes- allow sequential disk backups  No- disallow)

**DASDBLK.. ==>** (Blocksize for sequential disk backups)

**DASDGD.. ==>** (Yes- Use GDG for sequential disk backups  No- non-GDG)

**DASDPREF. ==>** (dsname prefix)

**DUNIT.... ==>** (disk unit name)

or **VOL.. ==>** (volume serial)

**MGMTCLAS. ==>** (SMS management class)

**STORCLAS. ==>** (SMS storage class)

**DRETPD... ==>** (retention period)

**MAXSIZE.. ==>** (Maximum size in kb of disk backup)

--- File Data Backup options: ---

**KEYED.... ==>** 0 (Number of keyed backups retained)

--- Other options: ---

**MERGE.... ==>** (Merge Backup: Yes, No, Defer)

**COPYINCR. ==>** (Yes- copy incrementals to full merge No- do not copy)

**MIGTHRESH ==>** (Number of sequential disk backups to retain on disk)

**VAULT.... ==>** (Yes- allow vaulting  No-disallow vaulting)

**GROUPID.. ==>** (nn - 2 character group id for utility execution)

**DUPLICATE ==>** (Copy- copu duplicate files Nocopy- do not copy dups)

**TRANSFER. ==>** (Profile is for PC file transfers only: Yes, No)

**PCMIGRATE ==>** (Profile is for PC file migration only: Yes, No)

**ENCRIPTV. ==>** (Vault  (copy 2) encryption type.  No - no encryption)

Encryption types: AES128 AES192 AES256

**TIMEOUT.. ==>** 0 (TCP/IP Timeout in Minutes, 0=Use default)

Once you have entered all the required options, type "SAVE" on the command line and press the ENTER key to save the profile.

The remainder of this chapter describes the various types of profiles that can be found in the UPSTREAM configuration data set, as follows:

- Section 5.2 "The GLOBAL Profile"
- Section 5.3 "Backup Profiles"
- Section 5.4 "Utility Profiles (USTVLTxx, USTMIGxx, USTMERxx)"
FDR/UPSTREAM Profiles
Introduction to FDR/UPSTREAM Profiles

❖ Section 5.5 “FDR/UPSTREAM Repository Re-organization Profiles”
❖ Section 5.6 "File Transfer Profiles"
❖ Section 5.7 “Client File Migration Profiles”
5.2 THE GLOBAL PROFILE

Your FDR/UPSTREAM configuration must contain a profile with a name of GLOBAL. The installation process, described in Chapter 3 “Installation and Configuration”, automatically creates a GLOBAL profile for you.

The GLOBAL profile operates as a default profile and specifies options to be used for any profile name that is specified in a UPSTREAM function requested by a user, but which is not explicitly defined in the configuration.

The GLOBAL profile allows requests to use any profile name (except where limited by security - see Chapter 4 “Security”) even if that profile is not included in the configuration.

For this reason, we recommend the following:

❖ Do not use the GLOBAL profile for your general UPSTREAM functions, such as backup and restore. Make sure that these functions are controlled by user-defined specific or generic backup profiles in the configuration, as described later in this chapter.

❖ Do not alter the defaults of DASD=NO and TAPE=NO for the GLOBAL profile. These defaults intentionally disable backup and restore operations for this profile.

❖ Do not delete the GLOBAL profile, as it is utilized by some internal UPSTREAM functions.
5.3 Backup Profiles

FDR/UPSTREAM backup profiles control the behavior of backup and restore operations. Each "entity" to be backed up by UPSTREAM (e.g., an application, a drive, or perhaps even a whole server) will have a backup profile associated with it.

The menu below displays the option settings for a backup profile called TEST. See Section 21.9 "DEFINE, MODIFY, and COPY Statements" for a full description of the options specified.
Options are set within a backup profile to control such things as:

❖ The backup media to be used
❖ The data set names that will be allocated to contain the backup data
❖ The retention and expiration of the backups
❖ Tape handling issues

Our example TEST profile on the previous page has the following important attributes:

❖ It allows backups to DASD and TAPE
❖ It utilizes z/OS GDGs to store the data and provide for retention control
❖ It allows the use of merge backups
❖ It allows the use of vaulting with USTVAULT
❖ It allows USTVAULT to create AES-encrypted copies of the backups

Having entered all the options into the menu, type “SAVE” on the command line and press the ENTER key to save your changes.

The menu below reappears and contains your newly defined profile in the list of system profiles.

Before a new backup profile can be used the configuration must be reloaded by the UPSTREAM started task, using the REFRESH command. See “Reload an Existing Configuration” in Section 17.10 for more details.

This chapter describes the options that were set in our sample TEST backup profile. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full list of all the parameters that can be specified in an UPSTREAM profile.

PROFILE=

cccccccc – Specifies the backup profile name. It may be 1-8 characters, and it must start with an alphabetic or national character (the remainder may be any alpha, numeric, or national characters). Every entity to be backed up by UPSTREAM (e.g., be it a server, an application, a drive) should have a unique backup profile name associated with its backups. All backups and restores taken for that entity are associated with that unique profile name.
FDR/UPSTREAM Profiles

Backup Profiles

PREFIX=

**ccccccc** – Indicates that the backup profile name is a “prefix” (max. 7 characters), rather than a fully qualified name. When this option is in effect, the parameters specified for this backup profile will be used when the exact profile name specified in the backup request does **not** exist in the configuration, but it **does** match all the characters specified.

For example, a “prefix” backup profile called “TES” could be used to control UPSTREAM backup requests that use profiles of TEST, TEST21, TESTER, etc. This effectively allows you to manage numerous unique backup profile names with just one overall controlling backup profile in the configuration. This feature is useful if a large number of profiles have similar prefix naming and can utilize similar profile attributes.

This option may also be used for Oracle and DB2 multi-channel database backups. If the backup profile is defined as a prefix, the channel number of that portion of the multi-channel backup is appended to the profile prefix name in the backup data set name. This feature, in addition to the backup date and time, creates a unique backup data set name. If the data set is a GDG, either the profile prefix name must be specified as the last qualifier of the GDG base data set name or the “%PROFILE” profile name substitution parameter must be used as a qualifier in the GDG base data set name. When creating the GDG base, define a base name for each `profile_prefix_channel_number` combination for all channels that may be used when the backup is run. For example, using the example above, data set names might be:

- HLQ.DB2.DATA.TES1.G0123V00
- HLQ.DB2.DATA.TES2.G0123V00

where “TES” is the profile prefix name and channels 1 and 2 are used in the backup.

See also “**WSPREF=**” in Section 21.9.

TAPE=

**cccccccc** – Specifies that this backup profile will allow backups directly to z/OS sequential tape. When enabled for a given profile, the TAPEPREF and the TUNIT or TAPESTORCLAS options must also be enabled. This is equivalent to the TAPECOMP operands on a USTCONFg DEFINE, MODIFY, or COPY statement (see Section 21.9 “**DEFINE, MODIFY, and COPY Statements**”).

IDRC

This option only applies to 3480/3490 cartridge drives and causes UPSTREAM to specify the TRTCH=COMP parameter when dynamically allocating the tape backup to request hardware (IDRC) compaction of the tape data set. IDRC compaction may be used even if compaction is your system default.

TAPEGDG=

Applies to profiles where TAPE=YES has been specified. It allows a tape backup data set to be allocated as a new generation of a GDG. YES is recommended, since GDG processing will automatically delete old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required backups.

**YES** – Use GDG for sequential tape backups.

**NO** – Use non-GDG for sequential tape backups.
TAPEPREF=

prefix – Applies to profiles where TAPE=YES has been specified. It specifies the high level qualifiers of the data set name to be used for sequential tape backups. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “TAPEPREF=” in Section 21.9 parameter.

TUNIT=

tapeunit – Applies to profiles where TAPE=YES has been specified. Specifies an z/OS tape unit name for use in allocating the backup data set.

EXPDT=

yyddd – Specifies the Julian format expiration date of the data sets created when using this profile. The meaning of this value is identical to the JCL parameter EXPDT. EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century (20xx). This parameter is mutually exclusive with RETPD. In our TEST example we specified “99000” to indicate catalog retention control by the tape management system. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for full usage notes on the “EXPDT=”, “RETPD=”, and “DREPTD=” operands.

NEWTAPEF=

Applies to profiles where TAPE=YES has been specified. Specifies if a new z/OS data set should be created on a new tape volume when processing full merge backups. See “UPSTREAM Backups to z/OS Tape and DASD” in Section 2.2 for a description of these backup types.

YES – Mount new tape for full merge backup.
NO – Append the full merge backup to the prior tape.
Default: NO.

NEWTAPEI=

Applies to profiles where TAPE=YES has been specified. Specifies if a new z/OS data set should be created on a new tape volume when processing incremental merge backups.

YES – Mount new tape for incremental merge backup.
NO – Append the incremental merge backup to the prior tape.
Default: NO

DASD=

Specifies whether this backup profile will allow backups directly to z/OS sequential disk. When enabled for a given profile, the DASDPREF and one of the DUNIT, VOL, or STORCLAS options must also be specified.

YES – Allow sequential disk backups.
NO – Backups to disk are disallowed.
Default: NO.

DASDBLK=

nnnnn – Applies to profiles where DASD=YES has been specified. Specifies the blocksize to be used when allocating those backups. It is not used as the actual blocksize of the backup data set, but it is used in performing space allocation calculations. In our TEST example we left this field blank to allow the system to use the value specified in the matching (system wide) “DASDBLK” main configuration parameter. (See Section 3.16 “Configure the MAIN Options”).

TAPEPREF=

prefix – Applies to profiles where TAPE=YES has been specified. It specifies the high level qualifiers of the data set name to be used for sequential tape backups. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “TAPEPREF=” in Section 21.9 parameter.

TUNIT=

tapeunit – Applies to profiles where TAPE=YES has been specified. Specifies an z/OS tape unit name for use in allocating the backup data set.

EXPDT=

yyddd – Specifies the Julian format expiration date of the data sets created when using this profile. The meaning of this value is identical to the JCL parameter EXPDT. EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century (20xx). This parameter is mutually exclusive with RETPD. In our TEST example we specified “99000” to indicate catalog retention control by the tape management system. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for full usage notes on the “EXPDT=”, “RETPD=”, and “DREPTD=” operands.

NEWTAPEF=

Applies to profiles where TAPE=YES has been specified. Specifies if a new z/OS data set should be created on a new tape volume when processing full merge backups. See “UPSTREAM Backups to z/OS Tape and DASD” in Section 2.2 for a description of these backup types.

YES – Mount new tape for full merge backup.
NO – Append the full merge backup to the prior tape.
Default: NO.

NEWTAPEI=

Applies to profiles where TAPE=YES has been specified. Specifies if a new z/OS data set should be created on a new tape volume when processing incremental merge backups.

YES – Mount new tape for incremental merge backup.
NO – Append the incremental merge backup to the prior tape.
Default: NO

DASD=

Specifies whether this backup profile will allow backups directly to z/OS sequential disk. When enabled for a given profile, the DASDPREF and one of the DUNIT, VOL, or STORCLAS options must also be specified.

YES – Allow sequential disk backups.
NO – Backups to disk are disallowed.
Default: NO.

DASDBLK=

nnnnn – Applies to profiles where DASD=YES has been specified. Specifies the blocksize to be used when allocating those backups. It is not used as the actual blocksize of the backup data set, but it is used in performing space allocation calculations. In our TEST example we left this field blank to allow the system to use the value specified in the matching (system wide) “DASDBLK” main configuration parameter. (See Section 3.16 “Configure the MAIN Options”).
FDR/UPSTREAM Profiles

Backup Profiles

DASDGDG=
Applies to profiles where DASD=YES has been specified. It allows a DASD backup data set to be allocated as a new generation of a GDG. YES is recommended, since GDG processing will automatically delete old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required backups.

YES – Use GDG for sequential disk backups.
NO – Do not use GDG data sets for sequential disk backups.

DASDPREF=
(prefix) – Applies to profiles where DASD=YES has been specified. It specifies the high level qualifiers of the data set name to be used for sequential DASD backups. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “DASDPREF=” parameter.

DUNIT=
diskunit – Applies to profiles where DASD=YES has been specified. Specifies an z/OS DASD unit name for the backup data sets to be dynamically allocated on. Either DUNIT, VOL, or STORCLAS is required when the DASD=YES option is enabled. DUNIT and VOL cannot both be specified on the same profile.

MAXSIZE=
nnnnnn – Applies only to profiles with the DASD option set. Specifies a maximum size in kilobytes (units of 1024 bytes) for INCREMENTAL MERGE sequential disk backups. For incremental backups to DASD, if the estimated size of the backup exceeds this value, the backup will be redirected to sequential tape. If MAXSIZE is specified, the profile must be enabled for sequential tape backups (TAPE) as well as sequential disk backups (DASD). However, the DASDPREF value (not TAPEPREF) will be used to name the backup. MAXSIZE=0 indicates never to redirect incremental merge DASD backups to tape.

Default: 0.

MERGE=
This controls the utilization of the UPSTREAM merge backup and “deferred merge” processes. See “Merge Backups” in Section 2.2 for a full description.

YES – specifies that this profile is enabled for merge backup processing. The profile must also be enabled for DASD (sequential disk) or TAPE (sequential tape) backups.

NO – indicates that this profile can not be used for MERGE processing.

DEFER – enables the profile for merge backup processing, but indicates that those backups will be performed with the “deferred merge” (USTMERGE) processing option. (See Chapter 11 “Completing Deferred Merge Backups”).

Default: YES.
COPYINCR=
Applies to profiles where MERGE=YES has been specified. This option determines whether a full merge backup copies all incremental backups that are stored in separate locations to the full backup data set. Incremental backups that are already on the same tape as the full backup are not copied, but incremental backups that are on different tapes, or on DASD, are copied. Incremental backups that are successfully copied will be deleted and uncataloged. All UPSTREAM database records regarding the location of the moved backups are updated to point to the new full backup data set.

YES – Copy incremental backups to full merge.
NO – Do not copy incremental backups to full merge.
Default: NO.

MIGTHRESH=

nn – Specifies a threshold for the migration of disk-based backups to tape with the USTMIGRT utility. (See Chapter 10 "Migrating Backups from Disk to Tape"). When USTMIGRT is run, it looks for sequential disk backups recorded under each backup profile name. If the number of such backups equals or exceeds the MIGTHRESH=nn value, USTMIGRT migrates the least recent backups to tape until the remaining number is nn-1. MIGTHRESH=0 disables USTMIGRT migration for a backup profile. MIGTHRESH=255 does not migrate incremental backups made after the most recent full backup.
Default: 0.

VAULT=

Specifies whether this backup profile is enabled for the USTVAULT vaulting facility. (See Chapter 9 "Copying Backups with USTVAULT"). If this option is enabled, special data set naming requirements take effect for TAPEPREF and DASDPREF.

YES – Allow vaulting.
NO – Disallow vaulting.
Default: NO.

ENCRYPTV
If you are using the UPSTREAM data encryption feature, this option specifies the encryption algorithm that will be used by USTVAULT when creating encrypted copies of backups belonging to this backup profile. See Chapter 24 “FDR/UPSTREAM Data Encryption” for a full description of the UPSTREAM encryption feature.
Utility profiles are a set of specifically named, special purpose profiles that are used to control the behavior of the following FDR/UPSTREAM utility operations:

❖ Deferred Merge with USTMERGE (see “Deferred Merge Utility Profile (USTMERxx)”)
❖ Migration with USTMIGRT (see “Migration Utility Profile (USTMIGxx)”)
❖ Vaulting with USTVAULT (see “Vaulting Utility Profile (USTVLTxx)”)

These special utility profiles cannot be used as a backup profile, or for any other UPSTREAM function. Samples of these utility profiles are automatically generated (with default values) during the installation process and the initial creation of the configuration data set.

When using the sample profiles, or when constructing your own new profiles, the options specified should be carefully reviewed and, if required, modified to meet your installation standards for data set naming, unit names etc, as outlined in the following sections.

Full documentation on the actual functions controlled by these utility profiles can be found in the sections indicated.

Utility profiles are created with either a “USTVLT”, “USTMIG”, or “USTMER” prefix, accompanied by a 2-character (alphanumeric) suffix.

For example:

USTVLT01, USTVLT02, ...
USTMIGA3, USTMIG12, ...
USTMER6C, USTMER56, ...

The preceding naming convention allows multiple profiles to be created for each of the utilities. Each profile has a unique 2-character suffix, allowing the utility processing to be segregated. This provides more flexibility and control over the utility process, and also allows multiple utility tasks to be run concurrently.

A utility process is associated with a utility profile via a GROUPID parameter. For example, to associate a USTMERGE process with the USTMER01 utility profile, a GROUPID=01 parameter is provided in the USTMER01 profile.

By design, the USTVAULT, USTMIGRT, and USTMERGE utilities described below usually create multi-file tape volume sets. Some z/OS tape management systems control the retention of all the files on a multi-file tape volume set by the retention period specified on the first file of the tape set.

USTMERGE, USTMIGRT, and USTVAULT create an empty “Tape Retention Data Set” as the first file on the tape, thus establishing the retention period for all tape volumes that make up the tape set.
The USTMER utility program is used to complete the deferred merge backup process. See Chapter 11 “Completing Deferred Merge Backups” for full details.

If you are going to perform deferred merge backups, you will need to have at least one USTMERxx utility profile defined within your FDR/UPSTREAM configuration. The behavior of USTMER is controlled by a USTMERxx utility profile.

❖ The USTMERxx profile must be enabled for sequential tape backups (TAPE=YES).
❖ The tape backup parameters (TAPEGDG, TAPEUNIT, etc.) are used to dynamically allocate an output tape to which the completed deferred merge backup tape set is written.
❖ The TAPEPREF value is used to create an empty “Tape Retention Data Set” as the first file on the tape, unless NEWTAPE is specified.

After the tape retention data set has been written, subsequent files placed on the tape set are the completed deferred merge backups. As an example, running USTMER for the backup profiles “SERVER01” and “PRODSRV2”, in which each profile has one deferred full merge backup, would result in tape set logically laid out as follows.

The menu below shows how to add a new USTMERxx utility profile to the UPSTREAM configuration. In this instance, we are creating a utility profile called USTMER01. (See “Creating and Viewing UPSTREAM Profiles” in Section 5.1 for a full description of creating and editing profiles).
The following menu shows the option settings for our new USTMER01 utility profile.

<table>
<thead>
<tr>
<th>COMMAND ==&gt;</th>
<th>SCROLL ==&gt; CSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top of data</td>
<td>SAVE profile</td>
</tr>
<tr>
<td></td>
<td>REPLACE profile</td>
</tr>
<tr>
<td></td>
<td>CANCEL changes</td>
</tr>
</tbody>
</table>

PROFILE... ==> USTMER01  (Profile name)

Merge/Migrate Retention File specifications:

- IDRC..... ==> YES  (Yes- use IDRC compression No- no IDRC compression)
- TAPEGDG.. ==> YES  (Yes- Use GDG for sequential tape backups No- non-GDG)
- TAPEPREF. ==> USTMER01  (dsnname of dummy file)
- TUNIT.... ==> TAPE  (tape unit name)
- or TSTOR ===> (tape SMS storage class)
- UNITCNT.. ==> 1  (tape unit count: 1 or 2)
- RETPD.... ==> 99000  (retention period)
- or EXPDT ==> (yyddd - expiration date)

The options set for this utility profile are described below.

Once you have entered all the required options into the menu, type “SAVE” on the command line and press the ENTER key.

Before a new USTMERxx profile can be used the configuration must be reloaded by the FDR/UPSTREAM started task, using the REFRESH command. See “Reload an Existing Configuration” in Section 17.10 for more details.

Below is a description of each of the parameter options that were set in our sample USTMER01 deferred merge utility profile. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full list of all the parameters that can be specified.

PROFILE

Specifies the deferred merge utility profile name. It must begin with “USTMER” and have a suffix of a two character alphanumeric identifier.

TAPEGDG

TAPEGDG=YES indicates that the tape retention data set is to be a new generation of a GDG. This is recommended, since GDG processing will automatically delete old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required deferred merge backups.

TAPEPREF

Specifies the high level qualifiers to be used for the tape retention data set. If the TAPEGDG option is not specified as YES, the TAPEPREF value can be up to 19 characters long. USTMERGE will add the merge profile name, date and time in the format “profilename.Dmmmyyd.Thhmmss” at the end of the data set name to form a unique name. If the TAPEGDG option is specified as YES, then the TAPEPREF value can be up to 35 characters long and will have the standard GDG type suffix of “.GnnnnV00” appended.

This value may contain a “?” , in which case USTMERGE will substitute the copy number (2 to 9) for the “?” in the name of the tape retention data set. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “TAPEPREF” parameter.

TUNIT

Applies to profiles where TAPE=YES has been specified. Specifies an z/OS tape unit name for use in allocating the deferred merge retention file and subsequent completed deferred merge backup data sets.
EXPDT

Specifies the Julian format expiration date of the tape retention data set. The meaning of this value is identical to the JCL parameter EXPDT.

EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century (20xx). This parameter is mutually exclusive with RETPD.

In our example we will specify “99000” to indicate catalog retention control by the tape management system.

See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for full usage notes on the “EXPDT=” and “RETPD=”.

The USTMIGRT utility program is used to migrate previously taken sequential disk backup data sets to tape. See Chapter 10 “Migrating Backups from Disk to Tape” for full details.

If you are going to use USTMIGRT, you will need to have at least one USTMIGxx utility profile defined within your UPSTREAM configuration. The behavior of USTMIGRT is controlled by a USTMIGxx utility profile.

❖ The USTMIGxx profile must be enabled for sequential tape backups (TAPE=YES).
❖ The tape backup parameters (TAPEGDG, TAPEUNIT, etc.) will be used to dynamically allocate an output tape to which the disk backups will be migrated.
❖ The TAPEPREF value (see “TAPEPREF=” in Section 5.3) will be used to create an empty “Tape Retention Data Set” as the first file on the tape, unless NEWTAPE is specified. Additional files will be added to the tape to contain the migrated backups using their original DASD backup data set names.

For example, performing a migration for the backup profile “SERVER01” for which the MIGTHRESH value is set to “1” and three previously taken DASD backups exist, results in a Migration Tape Set logically laid out as follows, with no backups remaining on DASD.

<table>
<thead>
<tr>
<th>Tape Retention Data Set</th>
<th>LABEL=(1, SL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASD Backup #1 for Profile “SERVER01”</td>
<td>LABEL=(2, SL)</td>
</tr>
<tr>
<td>DASD Backup #2 for Profile “SERVER01”</td>
<td>LABEL=(3, SL)</td>
</tr>
<tr>
<td>DASD Backup #3 for Profile “SERVER01”</td>
<td>LABEL=(4, SL)</td>
</tr>
</tbody>
</table>

In the following example we construct a USTMIGxx utility profile with the following important attributes:

❖ Its name will be USTMIG01
❖ It specifies the appropriate data set names and features to allow for the migration of existing DASD backup data sets to tape
❖ It utilizes GDGs to provide for retention control.
The menu below shows how to add a new USTMIGxx utility profile to the UPSTREAM configuration. In this instance, we are creating a utility profile called USTMIG01. (See “Creating and Viewing UPSTREAM Profiles” in Section 5.1 for a full description of creating and editing profiles).

```
------------------------ FDR/UPSTREAM - Configure Profiles  ------------------------
COMMAND ===> ADD USTMIG01                                              SCROLL ===> CSR

Please specify one of the following row commands: Edit, Browse, Add or Delete.

Command Profile  Prefix  Tape  IDRC  Tapegdg  Tapepref
----------------- --------- ----------- ------ -------- --------------
USTCATLG   NO   YES  NO    YES    UPSTREAM.REORGCAT
USTFILEC   NO   YES  NO    YES    UPSTREAM.REORGDAT
USTFILEI   NO   YES  NO    YES    UPSTREAM.REORGINF

******************************************************************************** Bottom of data  ********************************************************************************
```

The following menu shows the option settings for our new USTMIG01 utility profile.

```
------------------------ FDR/UPSTREAM - Configure Profile  ------------------------
COMMAND ===> SAVE                                              SCROLL ===> CSR
Top of data
SAVE profile          REPLACE profile          CANCEL changes
----------------------------------------------------------------------------------------------
PROFILE.. ===> USTMIG01  (Profile name)
Merge/Migrate Retention File specifications:
IDRC..... ===> YES      (Yes- use IDRC compression No- no IDRC compression)
TAPEGDG.. ===> YES      (Yes- Use GDG for sequential tape backups No- non-GDG)
TAPEPREF. ===> UPSTREAM.USTMIG01  (dsname of dummy file)
TUNIT.... ===> TAPE    (tape unit name)
or TSTOR ===>        (tape SMS storage class)
UNITCNT.. ===> 1       (tape unit count: 1 or 2)
RETPD.... ===>         (retention period)
or EXPDT ===> 99000   (yyddd - expiration date)
```

The options set for this utility profile are described below.

Once you have entered all the required options into the menu, type “SAVE” on the command line and press the ENTER key.

Before a new USTMIGxx profile can be used the configuration must be reloaded by the UPSTREAM started task, using the REFRESH command. See “Reload an Existing Configuration” in Section 17.10 for more details.

Below is a description of each of the parameter options that were set in our sample USTMIG01 migration utility profile. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full list of all the parameters that can be specified in a UPSTREAM profile.

PROFILE
Specifies the migration utility profile name. It must begin with “USTMIG” and have a suffix of a two character alphanumeric identifier.

TAPEGDG
TAPEGDG=YES indicates that the tape retention data set is to be a new generation of a GDG. This is recommended, since GDG processing automatically deletes old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required migrated backup data sets.
TAPEPREF

Specifies the high level qualifiers to be used for the tape retention data set. If the TAPEGDG option is not specified as YES, the TAPEPREF value can be up to 19 characters long. USTMIGRT will add the migrate profile name, date and time in the format "profilename.Dmmyydd.Thhmmss" at the end of the data set name to form a unique name. If the TAPEGDG option is specified as YES, then the TAPEPREF value can be up to 35 characters long and will have the standard GDG type suffix of ".GnnnnV00" appended.

This value may contain a "?", in which case USTMIGRT will substitute the copy number (2 to 9) for the "?" in the name of the tape retention data set. See Section 21.9 "DEFINE, MODIFY, and COPY Statements" for a full description of the naming standards used for the "TAPEPREF=" parameter.

EXPDT

Specifies the Julian format expiration date of the tape retention data set. The meaning of this value is identical to the JCL parameter EXPDT.

EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century "20xx". This parameter is mutually exclusive with RETPD.

In our example we will specify "99000" to indicate catalog retention control by the tape management system.

See Section 21.9 "DEFINE, MODIFY, and COPY Statements" for full usage notes on the "EXPDT=" and "RETPD=" operands.

NOTE: You should also review the parameter "MIGTHRESH=" in any backup profiles that will be processed by USTMIGRT.

VAULTING UTILITY PROFILE (USTVLTxx)

The USTVAULT utility program is used to create secondary copies of sequential backups on tape, usually for off-site storage and disaster recovery. The original backup data sets can be resident on either tape or DASD. See Chapter 9 "Copying Backups with USTVAULT" for full details.

If you are going to use USTVAULT, you will need to have at least one USTVLTxx utility profile defined within your UPSTREAM configuration. The behavior of USTVAULT is controlled by a USTVLTxx utility profile, which will establish the name, location, and other allocation related data for the supporting data sets that are placed on the vault tapes.

The USTVAULT vault control data set is created as the last file on the tape set and it contains control records extracted from the UPSTREAM database. This data set allows USTREGEN (see Chapter 12 "Updating the Repository") to quickly reload the UPSTREAM database control records for all backup data sets that are contained on this vaulted tape set, without having to read through all of the backup tapes and data. Since "Profile Grouping" can be applied to a USTVAULT request, a tape set can consist of many tape volumes and consume a large amount of time to read through all the tapes. Having the control records in a separate file solves this problem.
If you are using the UPSTREAM data encryption feature (Chapter 24 “FDR/UPSTREAM Data Encryption”), USTVAULT can optionally encrypt the copies of the backups that it creates, using a choice of five encryption algorithms. This feature is controlled by the ENCRYPTV option in the backup profile (Section 5.3 “Backup Profiles”).

As an option, USTVAULT can also encrypt the vault control data set before writing it as the last file on the output media. This feature is controlled by the ENCRYPTV option in the USTVLTx profile (described below).

A Vault Profile (USTVLTxx) should have the following attributes:

❖ It must be enabled for sequential disk and sequential tape backups (DASD=YES, TAPE=YES).
❖ The tape backup parameters (TAPEGDG, TAPEUNIT, etc.) will be used to dynamically allocate an output tape on which the secondary backups will be created.
❖ The TAPEPREF value will be used to create an empty “Tape Retention Data Set” as the first file on the tape. TAPEPREF must have a value that is different from the TAPEPREF or DASDPREF specification in the original profiles. Additional files will be added to the tape to contain the secondary backups using their original names, except that the copy number (specified by a “?” in the DASDPREF=/TAPEPREF= in the backup profile) is changed from “1” to another copy number from “2” to “9” (2 is used by default).
❖ The DASDPREF value is used to create the vault control data set, which is temporarily stored on disk and then copied as the last file on the tape at the end of USTVAULT processing.

**NOTE:** DASDPREF and TAPEPREF cannot specify the same value. Either of them may contain a “?” within the name, which USTVAULT will substitute for the copy number (2 to 9). This is strongly recommended if you plan to create vault copies other than the default of copy 2. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of “DASDPREF=” and “TAPEPREF=”.

As an example, performing a USTVAULT on the backup profiles “PRDSRV01” and “SERVER01” would result in a vault tape set logically laid out as follows.

<table>
<thead>
<tr>
<th>Tape Retention Data Set</th>
<th>LABEL=(1, SL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copies of Profile “SERVER01” Backups</td>
<td>LABEL=(2, 3, SL)</td>
</tr>
<tr>
<td>Copies of Profile “PRDSRV01” Backups</td>
<td>LABEL=(4, 5, SL)</td>
</tr>
<tr>
<td>VAULT Control File Data Set</td>
<td>LABEL=(6, SL)</td>
</tr>
</tbody>
</table>

In the following example we will construct a USTVLTxx profile with the following important attributes:

❖ Its name will be USTVLTA
❖ It will specify the data set name and attributes of the tape retention data set
❖ It will specify the data set name and attributes of the vault control file
❖ It will utilize GDGs to store the data and provide for retention control
The menu below shows how to add a new USTVLTxx utility profile to the UPSTREAM configuration. In this instance, we are creating a utility profile called USTVLTAA. (See “Creating and Viewing UPSTREAM Profiles” in Section 5.1 for a full description of creating and editing profiles).

The following menu shows the option settings for our new USTVLTAA utility profile:

--- FDR/UPSTREAM - Configure Profiles ---

**COMMAND ====>** ADD USTVLTAA
**SCROLL ===>** CSR

ADD a new profile  COMPRESS configuration data set  L display USTLOG

Please specify one of the following row commands: Edit, Browse, Add or Delete.

**Command Profile Prefix Tape IDRC Tapegdg Tapepref**

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USTCATLG</td>
<td>NO, YES</td>
<td>IDRC compression: Yes-No</td>
</tr>
<tr>
<td>USTFILEC</td>
<td>NO, YES</td>
<td>File compression: Yes-No</td>
</tr>
<tr>
<td>USTFILEI</td>
<td>NO, YES</td>
<td>File compression: Yes-No</td>
</tr>
</tbody>
</table>
| ******************************* Bottom of data *******************************

--- FDR/UPSTREAM - Configure Profile ---

**COMMAND ===>**
**SCROLL ===>** CSR

**Top of data**

SAVE profile  REPLACE profile  CANCEL changes

**PROFILE.. ===>** USTVLTAA  (Profile name)

Vault Retention File Specifications:

IDRC..... ===> YES  (Yes- use IDRC compression No- no IDRC compression)
TAPEGDG.. ===> YES  (Yes- Use GDG for dummy file No- non-GDG)
TAPEPREF. ===> UPSTREAM.USTVLTAA  (dsname of dummy file)
TUNIT.... ===> TAPE  (tape unit name)
or TSTOR ====>  (tape SMS storage class)
UNITCNT.. ===> 1  (tape unit count: 1 or 2)
RETPD.... ===> 99000  (yyddd - expiration date)
or EXPDT ====>

Vault Control File specifications:

DASDBLK.. ===>  (Blocksize for vault control file)
DASDGDG.. ===> YES  (Yes- Use GDG for vault control file No- non-GDG)
DASDPREF. ===> UPSTREAM.USTVLCAA  (dsname prefix)
DUNIT.... ===> SYSDA  (disk unit name)
or VOL.. ====>  (volume serial)
MGMTCLAS. ===>  (SMS management class)
STORCLAS. ===>  (SMS storage class)
DRETPD... ===>  (retention period)
MAXSIZE.. ===>  (Number of cylinders for primary allocation)
ENCRYPTV ===> AES128  (Vault (copy2) encryption type. No - no encryption)

The options set for this utility profile are described below. Once you have entered all the required options into the menu, type “SAVE” on the command line and press the ENTER key. Before a new USTVLTxx profile can be used the configuration must be reloaded by the UPSTREAM started task, using the REFRESH command. See “Reload an Existing Configuration” in Section 17.10 for more details.
USTVLTA** PROFILE**

Below is a description of each of the parameter options that were set in our sample USTVLTA vault utility profile. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full list of all the parameters that can be specified in a UPSTREAM profile.

**PROFILE**

Specifies the vault utility profile name. It must begin with “USTVLT” and have a suffix of a two character alphanumeric identifier.

**TAPEGDG**

TAPEGDG=YES indicates that the tape retention data set is to be a new generation of a GDG. This is recommended, since GDG processing will automatically delete old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required vault copies.

**TAPEPREF**

Specifies the high level qualifiers to be used for the tape retention data set. If the TAPEGDG option is not specified as YES, the TAPEPREF value can be up to 19 characters long. USTVAULT will add the vault profile name, date and time in the format “profilename.Dmmyydd.Thhmmss” at the end of the data set name to form a unique name. If the TAPEGDG option is specified as YES, then the TAPEPREF value can be up to 35 characters long and will have the standard GDG type suffix of “.GnnnnV00” appended. This value may contain a “?”, in which case USTVAULT will substitute the copy number (2 to 9) for the “?” in the name of the tape retention data set. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “TAPEPREF=” parameter.

**EXPDT**

Specifies the Julian format expiration date of the tape retention data set. The meaning of this value is identical to the JCL parameter EXPDT. EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century (20xx). This parameter is mutually exclusive with RETPD. In our example we will specify “99000” to indicate catalog retention control by the tape management system. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for full usage notes on the “EXPDT=” and “RETPD=” operands.

**DASDBLK**

This field specifies the blocksize for the vault control file data set that is initially created on DASD and subsequently placed on tape as the final data set on the vault tape. In our example we left this field blank to allow the system to use the value specified in the matching (system wide) “DASDBLK” configuration main parameter. (See “UPSTREAM MAIN Configuration Options” in Section 3.16).

**DASDGDG**

DASDGDG=YES indicates that the vault control data set is to be a new generation of a GDG. This is recommended since GDG processing will automatically delete old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required vault control data sets.
DASDPREF

Specifies the high level qualifiers to be used for the vault control data set. If the
DASDGDG option is not specified as YES, the DASDPREF value can be up to 19
characters long. USTVAULT will add a data set name suffix including the Vault
control profile name as “USTVLClmn”, the date and time in the format
“USTVLClmn.Dmmyydd.Tthmmss” at the end of the data set name to form a
unique name. If the DASDGDG option is specified as YES, then the DASDPREF
value can be up to 35 characters long and will have the standard GDG type suffix
of “.GnnnV00” appended.

This value may contain a “?”, in which case USTVAULT will substitute the copy
number (2 to 9) for the “?” in the name of the vault control data set. See
Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of
the naming standards used for the "DASDPREF=" parameter.
5.5 **FDR/UPSTREAM Repository Re-organization Profiles**

As described in "USTREORG and USTCAMS" in Section 6.7, the USTREORG utility program can be used to dynamically reorganize the FDR/UPSTREAM repository data sets.

Before you use USTREORG, you will need to modify the following three default reorganization profiles that were placed into the configuration during the installation process: **USTCATLG**, **USTFILEI**, and **USTFILEC**.

These special reorganization profile names correspond to the DDNAMEs for the repository data sets in the UPSTREAM started task JCL (Chapter 3 "Installation and Configuration").

The reorganization profiles must be enabled for either sequential disk or tape backups. The specified parameters will be used to dynamically allocate a sequential data set to hold a copy of the contents of the repository data set being reorganized. This backup should be retained even if the reorganization is successful, allowing it to be used for future recovery processing, in the event that this becomes necessary.

The specification of the reorganization backup data sets as GDGs is strongly recommended so that older backup copies will automatically be uncataloged and scratched as new reorganizations are performed. The GDG base should be defined with two or more generations to allow for the retention of several copies of the backup for emergency recovery of the repository files.

In the following example we will modify the USTFILEI repository reorganization profile that was predefined by the system at installation time. It will have the following important attributes:

- Its name will be USTFILEI.
- It will specify the appropriate data set name and other options to allow a backup data set to be created. It will also specify where that backup data set will be placed.
- It will utilize GDGs to store the data and provide for retention control.

**NOTE:** The following example illustrates the USTFILEI reorganization profile, but similar settings are also applicable to the USTCATLG and USTFILEC reorganization profiles.

Below, we enter “E” on the left-hand prefix entry area to edit the default system generated USTFILEI reorganization profile.

```
---------------------- FDR/UPSTREAM - Configure Profiles ------------------ Row 1 of 9
COMMAND ==>          SCROLL ==> CSR
ADD a new profile    COMPRESS configuration data set    L display USTLOG
Please specify one of the following row commands: Edit, Browse, Add or Delete.

Command Profile  Prefix  Tape IDRC  Tapegdg  Tapepref
------- -------- ------ ------ ------- -----------------------------------
      USTCATLG  NO    YES  NO    YES    UPSTREAM.REORGCAT
      USTFILEC  NO    YES  NO    YES    UPSTREAM.REORGDAT
      E          USTFILEI  NO    YES  NO    YES    UPSTREAM.REORGINF

****************************************************************************** Bottom of data ******************************
```
The following menu shows the revised option settings for our USTFILEI reorganization profile.

```
--------------------- FDR/UPSTREAM - Configure Profile -----------------------
COMMAND ====> SAVE
SCROLL ====> CSR

SAVE profile       REPLACE profile       CANCEL changes

PROFILE... ====> USTFILEI (Profile name or prefix)

Tape Backup options:
TAPE..... ==> NO   (Yes- allow sequential tape backups  No- disallow)
IDRC..... ==>      (Yes- use IDRC compression No- no IDRC compression
TAPEGDG.. ==>      (Yes- Use GDG for sequential tape backups No- non-GDG)
TAPEPREF. ==>      (dsname prefix)
TUNIT.... ==>      (tape unit name)
or TSTOR ==>      (tape SMS storage class)
RETPD.... ==>      (retention period)
or EXPDT ==>      (yyyydd - expiration date)

DASD Backup options:
DASD..... ==> YES  (Yes- allow sequential disk backups  No- disallow)
DASDGDG.. ==> YES  (Yes- Use GDG for sequential disk backups No- non-GDG)
DASDPREF. ==> UPSTREAM.REORG.USTFILEI (dsname prefix)
DUNIT.... ==> SYSDA (disk unit name)
or VOL.. ==> (volume serial)
MGMTCLAS. ==> (SMS management class)
STORCLAS. ==> (SMS storage class)
DRETPD... ==> (retention period)
```

The options set for this utility profile are described below.

Once you have entered all the required options into the menu, type “SAVE” on the command line and press the ENTER key.

Before a new USTFILEIxx (or USTCATLG/USTFILEC) reorganization profile can be used the configuration must be reloaded by the FDR/UPSTREAM started task, using the REFRESH command. See “Reload an Existing Configuration” in Section 17.10 for more details.

Below is a description of each of the parameter options that were set in our sample USTFILEI reorganization profile. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full list of all the parameters that can be specified in a FDR/UPSTREAM profile.

PROFILE

Specifies the name of the reorganization profile. This is a reserved Profile name used solely to reorganize a USTFILEI, USTFILEC, or USTCATLG repository data set.

TAPE

Specifies that you want the reorganization to occur to mainframe tape. When this option is enabled, the TAPEPREF and the TUNIT or TAPESTORCLASS options must also be specified.

TAPEGDG

TAPEGDG=YES indicates that the backup data set is to be a new generation of a GDG. This is recommended, since GDG processing will automatically delete old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required backups.
TAPEPREF

Specifies the high level qualifiers of the data set name that will be created to hold the backup of repository data set being reorganized. TAPEGDG option is specified as NO, then the TAPEPREF value can be up to 29 characters long and the USTREORG utility program will append the date and time in the format “.Dmmyydd.Tthmmss” to the generated data set name in order to form a unique name. If the TAPEGDG option is specified as YES, then the TAPEPREF value can be up to 35 characters long and will have the standard GDG type suffix of “.GnnnnV00” appended. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “TAPEPREF=” parameter.

EXPDT

Specifies the Julian format expiration date of the backup data set. The meaning of this value is identical to the JCL parameter EXPDT. EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century (20xx). This parameter is mutually exclusive with RETPD. In our example we will specify “99000” to indicate catalog retention control by the tape management system. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for full usage notes on the “EXPDT=” and “RETPD=” operands.

DASD

Specifies that you want the reorganization to occur to mainframe DASD. When this option is enabled, the DASDPREF and one of the DUNIT, VOL, or STORCLAS options must also be specified.

DASDGDG

DASDGDG=YES indicates that the backup data set is to be a new generation of a GDG. This is recommended, since GDG processing will automatically delete old generations. GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required backups.

DASDPREF

Specifies the high level qualifiers of the DASD data set name that will be created to hold the backup of the repository data set. If the DASDGDG option is specified as NO, then the DASDPREF value can be up to 29 characters long and the USTREORG utility program will append the date and time in the format “.Dmmyydd.Tthmmss” to the generated data set name in order to form a unique name.

If the DASDGDG option is specified as YES, then the DASDPREF value can be up to 35 characters long and will have the standard GDG type suffix of “.GnnnnV00” appended. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “DASDPREF=” parameter.
5.6 **FILE TRANSFER PROFILES**

If you plan to use the file transfer facility of FDR/UPSTREAM (see Chapter 14 "File Transfer") you need to create one or more file transfer profiles.

- These profiles must have the TRANSFER attribute set
- The DASD attribute is required if client-to-host transfers will go directly to z/OS disk
- The TAPE attribute is required if client-to-host transfers will go directly to z/OS tape
- The DASDPREF and TAPEPREF attributes can be used to supply the name of the z/OS output data set on client-to-host transfers.

Below, we have entered “ADD FILETRAN” in the command line to create a new file transfer profile.

```
--------------------- FDR/UPSTREAM - Configure Profiles ---------- Row 1 of  9
COMMAND ====> ADD FILETRAN
ADD a new profile COMPRESS configuration data set L display USTLOG

Please specify one of the following row commands: Edit, Browse, Add or Delete.

Command Profile  Prefix Tape IDRC Tapegdg Tapepref
-------- -------- ---- ---- ---- ------- -----------------------------------
USTCATLG NO YES NO YES UPSTREAM.REORGCAT
USTFILEC NO YES NO YES UPSTREAM.REORGDAT
USTFILEI NO YES NO YES UPSTREAM.REORGINF
```

**************************************************** Bottom of data *****************************************************
The following section describes the key parameters that can be set within a file transfer profile.

Once you have entered all the required options into the menu, type “SAVE” on the command line and press the ENTER key.

Before a new file transfer profile can be used, the configuration must be reloaded by the UPSTREAM started task, using the REFRESH command. See “Reload an Existing Configuration” in Section 17.10 for more details.

Below is a description of each of the parameter options that were set in our sample FILETRAN file transfer profile. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full list of all the parameters that can be specified in a UPSTREAM profile.
PROFILE
Specifies the file transfer profile name. It may be 1-8 characters, and it must start with an alphabetic or national character (the remainder may be any alpha, numeric, or national characters).

TAPE
Specifies that this profile allows file transfers directly to z/OS sequential tape. When enabled for a given profile, the TAPEPREF and the TUNIT or TAPESTORCLAS options must also be enabled.

TAPEPREF
Applies to profiles where TAPE=YES has been specified. It specifies the high level qualifiers of the data set name to be used as output for the file transfer. See Section 21.9 "DEFINE, MODIFY, and COPY Statements" for a full description of the naming standards used for the "TAPEPREF=" parameter.

TUNIT
Applies to profiles where TAPE=YES has been specified. Specifies an z/OS tape unit name for use in allocating output data sets.

EXPDT
Specifies the Julian format expiration date of the output data sets created when using this profile. The meaning of this value is identical to the JCL parameter EXPDT. EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century (20xx). This parameter is mutually exclusive with RETPD. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for full usage notes on the “EXPDT=” and “RETPD=” operands.

In our TEST example we specified “99000” to indicate catalog retention control by the tape management system.

DASD
Specifies that this profile allows file transfers directly to z/OS sequential disk. When enabled for a given profile, the DASDPREF and one of the DUNIT, VOL, or STORCLAS options must also be specified.

DASDBLK
Applies to profiles where DASD=YES has been specified. Specifies the blocksize to be used when allocating the output data set. It is not used as the actual blocksize of the output data set, but it is used in performing space allocation calculations. In our example we left this field blank to allow the system to use the value specified in the matching (system wide) "DASDBLK" configuration main parameter (See “UPSTREAM MAIN Configuration Options” in Section 3.16).

DASDPREF
Applies to profiles where DASD=YES has been specified. It specifies the high level qualifiers of the data set name to be used as output for the file transfer. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the "DASDPREF=" parameter.

DUNIT
Applies to profiles where DASD=YES has been specified. Specifies an z/OS tape unit name for use in allocating output data sets.

Either DUNIT, VOL, or STORCLAS is required when the DASD=YES option is enabled. DUNIT and VOL cannot both be specified on the same profile.

TRANSFER
TRANSFER=YES enables this profile for file transfer.
FDR/UPSTREAM Profiles

Client File Migration Profiles

5.7 Client File Migration Profiles

FDR/UPSTREAM Client file migration (see Chapter 15 “FDR/UPSTREAM Client File Migration”) is the process of moving inactive files off the Client workstation/server by backing them up to disk or tape on the z/OS Storage Server and then deleting them from the Client. This is usually done to free up disk space on the Client and is sometimes called “grooming”.

This process should not be confused with the “backup file migration” carried out by USTMIGRT (See Chapter 10 “Migrating Backups from Disk to Tape”) where UPSTREAM disk-based backups are moved to tape.

If you plan to use the Client file migration facility of UPSTREAM, you will need to create one or more Client file migration profiles.

❖ These profiles must have the PCMIGRATE=YES attribute specified.
❖ The DASD attribute is required if migrations will be written directly to z/OS disk.
❖ The TAPE attribute is required if migrations will be written directly to z/OS tape.
❖ The DASDPREF and TAPEPREF attributes are used to supply the names of the z/OS disk/tape data sets that will hold the migrated Client files.
❖ RETPD and/or EXPDT are used to control the retention and expiration of the migrated files.

Below, we have entered “ADD SRV01MIG” in the command line to create a new Client file migration profile.

```
-------------------- FDR/UPSTREAM - Configure Profiles --------- Row 1 of 9
COMMAND ==> ADD SRV01MIG
SCROLL ==> CSR

ADD a new profile COMPRESS configuration data set L display USTLOG

Please specify one of the following row commands: Edit, Browse, Add or Delete.

Command Profile Prefix Tape IDRC Tapegdg Tapepref
------- -------- ------ ---- ---- ------- -----------------------------------
USTCATLG NO    YES  NO    YES    UPSTREAM.REORGCAT
USTFILEC NO    YES  NO    YES    UPSTREAM.REORGDAT
USTFILEI NO    YES  NO    YES    UPSTREAM.REORGINF

****************************************************************************** Bottom of data *****************************************************
```
The following section describes the key parameters that can be set within a Client file migration profile.

Once you have entered all the required options into the menu, type “SAVE” on the command line and press the ENTER key.

Before a new Client file migration profile can be used, the configuration must be reloaded by the UPSTREAM started task, using the REFRESH command. See “Reload an Existing Configuration” in Section 17.10 for more details.
FDR/UPSTREAM Profiles

Client File Migration Profiles

Below is a description of each of the parameter options that were set in our sample SRV01MIG client file migration profile. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full list of all the parameters that can be specified in a UPSTREAM profile.

**PROFILE**

Specifies the Client file migration profile name. It may be 1-8 characters, and it must start with an alphabetic or national character (the remainder may be any alpha, numeric, or national characters).

**TAPE**

Specifies that this profile will allow Client file migration directly to z/OS sequential tape. When enabled for a given profile, the TAPEPREF and the TUNIT or TAPESTORCLAS options must also be enabled.

**TAPEPREF**

Applies to profiles where TAPE=YES has been specified. It specifies the high level qualifiers of the data set name to be used as output for the Client file migration. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “TAPEPREF=” parameter.

**TUNIT**

Applies to profiles where TAPE=YES has been specified. Specifies an z/OS tape unit name for use in allocating output data sets.

**EXPDT**

Specifies the Julian format expiration date of the output data sets created when using this profile. The meaning of this value is identical to the JCL parameter EXPDT. EXPDT only accepts a 2-digit year number. Year values less than 70 are assumed to be in the 21st century “20xx”. This parameter is mutually exclusive with RETPD. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for full usage notes on the “EXPDT=” and “RETPD=” operands.

In our TEST example we specified “99000” to indicate catalog retention control by the tape management system.

**DASD**

Specifies that this profile allows Client file migrations directly to z/OS sequential disk. When enabled for a given profile, the DASDPREF and one of the DUNIT, VOL, or STORCLAS options must also be specified.

**DASDBLK**

Applies to profiles where DASD=YES has been specified. Specifies the blocksize to be used when allocating the output data set. It is not used as the actual blocksize of the output data set, but it is used in performing space allocation calculations. In our example we left this field blank to allow the system to use the value specified in the matching (system wide) “DASDBLK” configuration main parameter (See “UPSTREAM MAIN Configuration Options” in Section 3.16).

**DASDPREF**

Applies to profiles where DASD=YES has been specified. It specifies the high level qualifiers of the data set name to be used as output for the Client file migration. See Section 21.9 “DEFINE, MODIFY, and COPY Statements” for a full description of the naming standards used for the “DASDPREF=” parameter.

**DUNIT**

Applies to profiles where DASD=YES has been specified. Specifies an z/OS tape unit name for use in allocating output data sets.

Either DUNIT, VOL, or STORCLAS is required when the DASD=YES option is enabled. DUNIT and VOL cannot both be specified on the same profile.

**PCMIGRATE**

PCMIGRATE=YES enables this profile for Client file migration.
6 THE FDR/UPSTREAM REPOSITORY

6.1 INTRODUCTION

This chapter describes the FDR/UPSTREAM repository, which stores information on your current backups, together with historical information about backups, restores and vaulting operations.

The repository may also contain information pertaining to some of the optional features available under UPSTREAM, such as registered names (see Chapter 6 “The FDR/UPSTREAM Repository”).

The repository consists of three files. The generic name to which they are referred is shown below, together with the DD statement name (in brackets) to which they are referenced in the UPSTREAM startup PROC. The individual repository files are described in more detail in the sections indicated.

❖ The CATALOG file (USTCATLG).
  See Section 3.10 “Define the “CATALOG” Repository Data Set”.
❖ The FILEINFO file (USTFILEI).
  See Section 3.11 “Define the “FILEINFO” Repository Data Set”.
❖ The FILEDATA file (USTFILEC).
  See Section 3.12 “Define the “FILEDATA” Repository Data Set”.

The contents of the repository files can be reported in various ways.

❖ USTRPORT (Chapter 22 “Reporting with USTRPORT”)
❖ Via the Client GUI interface (See the FDR/UPSTREAM Client Guide for more details.)
❖ Using the Director interface (See the FDR/UPSTREAM Client Guide for more details.)

The remainder of this chapter describes in detail the format of the repository files and the contents of the individual files and recommendations for sizing them. It also describes how to maintain and re-organize the repository files, as well as how to re-load data into them in the event of a problem.
6.2 CHOOSING THE REPOSITORY FILE FORMAT

IAM vs. VSAM

The FDR/UPSTREAM repository files can be created in one of two formats.

❖ As a VSAM KSDS
❖ As an IAM file

The recommended format is IAM (Innovation Access Method), which is a proprietary file format that provides VSAM-compatible keyed access, but with a fraction of the usual overhead normally associated with VSAM.

The IAM format provides high-speed low-overhead access to the repository data. It uses an advanced internal file structure that is far superior to regular VSAM and requires 30 to 70 percent less DASD space than a similarly defined VSAM file.

These savings are achieved by IAM through the following design features:

❖ IAM loads the entire index structure in above-the-bar, 64 bit storage in the UPSTREAM address space to hold the index for the UPSTREAM repository files, eliminating the need for imbedded indices.
❖ IAM files have an internally stored, compressed index, which requires minimal DASD space.
❖ IAM's free space allocation techniques make much more efficient use of DASD space for the data records in the file.

RECOMMENDATION:

Users specify a MEMLIMIT=8G parameter on their started task EXEC card (see Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”). This limits the indexspace to 8 GB to prevent exhaustion of storage needed for the z/OS page data sets.

NOTE:

UPSTREAM z/OS 3.6.1 and higher includes support for IAM 9.0 functionally. The minimum requirements for IAM are a z/OS operating system and a z/Architecture processor. IAM 9.0 utilizes various functions and features only available in z/OS operating systems and instructions available only on processors that support z/Architecture.

NOTE:

IAM files on EAV volumes have a minimum operating system levels of z/OS 1.11 for SMS Extended Format IAM files, and z/OS 1.12 for basic sequential and large sequential IAM files.

UPSTREAM repository files in IAM format can be allocated on any DASD device and appear to the z/OS operating system as physical sequential files (DSORG=PS), even though the data is accessed internally by a key field, just like under VSAM.

IAM repository files appear in the z/OS catalog as non-VSAM type entries.

ALLOCATING THE REPOSITORY FILES, IAM PRO

The repository files are initially created through a TSO/ISPF dialog during the installation of UPSTREAM. See Section 3.10 “Define the “CATALOG” Repository Data Set”. See Section 3.11 “Define the “FILEINFO” Repository Data Set”. See Section 3.12 “Define the “FILEDATA” Repository Data Set”.

If they are in VSAM format, they can be created and allocated with standard IDCAMS. If they are in IAM format, a special UPSTREAM utility USTCAM must be used. See “USTREORG and USTCAM” in Section 6.7.

Regardless of the format chosen, the repository files may be SMS-managed and they can be allocated as extended format (EF) files, which will support hardware compression, Alternatively, they may be allocated as Large format files, or as Basic format files.
If you choose to allocate the UPSTREAM repository files in IAM format and are running
UPSTREAM z/OS release 3.6.0 or later, you may wish to consider using two new IAM
features, Prime Related Overflow (PRO) and 64BIT INDEXSPACE. Both features are
recommended for the USTFILEI control file.

UPSTREAM z/OS 3.6.0 includes support for IAM 9.0 functionality and IAM PRO. The
minimum requirements for IAM PRO are a z/OS operating system and a z/Architecture
processor. IAM Version 9.0 utilizes various functions and features only available in z/OS
operating systems and instructions available only on processors that support
z/Architecture. PRO format repository files created with Version 9.0 are not downward
compatible with prior UPSTREAM releases. Users wishing to revert back to UPSTREAM
z/OS 3.5.0 need to reallocate their repository files.

IAM PRO is an enhancement that provides greater scalability for IAM format repository
files, reduces virtual storage use, and requires fewer reorganizations during a given
period. The PRO format has a different internal structure to the overflow area than
previous IAM releases and is indexed at the block level rather than the record level. This
generally results in a much smaller in-storage index and a decreased need to reorganize
the file. PRO can be implemented by defining new repository files with the PRO=YES
CREATE operand. This is specified with the USTOVRID DD statement used when
defining the files.

The 64BIT INDEXSPACE feature of IAM 9.0 uses above-the-bar, 64 bit addressable z/OS
storage in the UPSTREAM address space to hold the index for the UPSTREAM repository
files. This eliminates the two gigabyte index limitation of a data space and frees up above-
the-line storage that would otherwise be occupied in the UPSTREAM address space, thus
increasing the amount of virtual storage for other UPSTREAM functions, such as deferred
merge (USTMERGE), vaulting (USTVAULT) and migration (USTMIGRT). When migrating
to UPSTREAM z/OS 3.6.0, this feature is enabled by default unless overridden with the
INDEXSPACE ACCESS operand defined with the USTOVRID DD statement placed in the
UPSTREAM startup JCL (Section 3.19 “Define_the_FDR/UPSTREAM_Started_Task
PROC”.)
Enabling PRO format repository files

Allocate the UPSTREAM repository files

1. Either use the output file of a current REORG or perform a backup of your control files created by a DUMPX command for use in the REPRO referred to below. The DUMPX command can be submitted either from the UPSTREAM ISPF panel 6, Operator Commands or via the modify command below. Please refer to Section 6.9 “Making a Sequential Copy of a Repository File” for further details.

   `F UPSTREAM,DUMPX DD=ddname`

2. Define appropriate new FILEINFO, FILEDATA, and USTCATLG files using the UPSTREAM ISPF option 3 (DEFINE) option.
   - Use the allocation of your existing control files for sizing of your new control files.
   - “File Structure ===> PRO” is specified by default. When enabling PRO, do not change this value.
   - Specify the name of the data set created by a current REORG or DUMPX command in the “specify Repro from dsname ===>” field for the REPRO control card with REUSE option to be generated. If you wish, you may stop your z/OS Storage Server Started Task and use your existing control files as the input for the Repro.
   - Do a PF3/END from the DEFINE panel to be presented with Browse, Edit, or Submit options.
   - The JCL will contain the USTOVRID DD control card similar to the one below.

     ```
     //USTOVRID DD *
     CREATE DD=CATALOG,B=4,PE=20,VARO=YES,REL=NO,PRO=YES
     CREATE DD=FILEINFO,B=2,PE=100,VARO=YES,REL=NO,PRO=YES
     ```

3. Submit the JCL and define your new repository control files.

4. Update the z/OS Storage Server Started Task JCL. Either rename the new control file data set names to your old names or change the z/OS Storage Server Started Task JCL to point to the new names.

5. Restart the z/OS Storage Server Started Task
Fallback procedures, disabling PRO format

Should it be necessary to remove the PRO feature, please contact FDR/UPSTREAM Technical Support for problem diagnosis. If you are downgrading from UPSTREAM z/OS 3.6.0 back to UPSTREAM 3.5.0, the PRO and the 64BIT INDEXSPACE features are not supported in UPSTREAM z/OS 3.5.0 and prior releases and both features must be removed. Please contact FDR/UPSTREAM Technical Support to discuss this process.

Allocate the UPSTREAM repository files

1. Either use the output file of a current REORG or perform a backup of your control files created by a DUMPX command for use in the REPRO referred to below. The DUMPX command can be submitted either from the ISPF panel 6, Operator Commands or via the modify command below. Please refer to Section 6.9 "Making a Sequential Copy of a Repository File" for further details.

   F UPSTREAM,DUMPX DD=ddname

2. Define appropriate new FILEINFO, FILEDATA, and USTCATLG files using the UPSTREAM ISPF option 3 (DEFINE) option.
   - Use the allocation of your existing control files for sizing of your new control files.
   - “File Structure ===> PRO” is specified by default. To disable PRO, specify ENHANCED, do not specify PRO.
   - Specify the name of the data set created by a current REORG or DUMPX command in the “specify Repro from dsname ===>” field for the REPRO control card with REUSE option to be generated. If you wish, you may stop your z/OS Storage Server Started Task and use your existing control files as the input for the REPRO.
   - Do a PF3/END from the DEFINE panel to be presented with Browse, Edit, or Submit options.
   - The JCL contains the USTOVRID DD control cards similar to the example below.

   //USTOVRID DD *
   CREATE DD=CATALOG,B=4,PE=20,VARO=YES,REL=NO,ENHANCED
   CREATE DD=FILEINFO,B=2,PE=100,VARO=YES,REL=NO,ENHANCED

3. Submit the JCL and define your new repository control files.

4. Update the z/OS Storage Server Started Task JCL. Either rename the new control file data set names to your old names or change the z/OS Storage Server Started Task JCL to point to the new names.

5. Restart the z/OS Storage Server Started Task
Reducing virtual storage utilization using a 64 BIT INDEXSPACE or Dataspace

For users of UPSTREAM z/OS 3.6 and later, the default method to hold the index for IAM format repository files and reduce virtual storage utilization is to use above-the-bar, 64 bit addressable z/OS storage in the UPSTREAM address space. For users not yet running UPSTREAM z/OS 3.6, you may wish to consider placing the indexes for these files in a separate, above-the-line, 2GB z/OS dataspace instead. Both of these features free up storage that would otherwise be occupied in the UPSTREAM address space, and increases the amount of virtual storage for other UPSTREAM functions. Only one method may be used at a time.

64 BIT INDEXSPACE (UPSTREAM z/OS 3.6)

❖ We recommend users specify a MEMLIMIT=8G parameter on their started task EXEC card. This limits the indexspace to 8 GB to prevent exhaustion of storage needed for the z/OS page data sets.

❖ Users currently specifying INDEXSPACE=YES via a USTOVRID DD statement in their started task JCL, need to either change INDEXSPACE=YES to INDEXSPACE=64BIT or remove the INDEXSPACE operand entirely (since INDEXSPACE=64BIT is the default, either action will have the same affect.)

❖ Restart the FDR/UPSTREAM z/OS Started Task to enable the change.

2GB z/OS dataspace (UPSTREAM z/OS 3.5 and earlier releases)

❖ Define a USTOVRID DD statement referencing a member in your UPSTREAM control library data set containing the IAM ACCESS command INDEXSPACE=YES and place the USTOVRID DD statement in the UPSTREAM startup JCL (Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”). Please refer to the example below.

The “&ALLDD” in the example shown below creates a separate dataspace for the indexes of all three repository files.

❖ USTOVRID DD statement in the UPSTREAM startup JCL -

  //USTOVRID DD DISP=SHR,DSN=your.control.library(membername)

❖ Contents of your.control.library(membername)

  ACCESS DD=&ALLDD,INDEXSPACE=YES

❖ Restart the UPSTREAM z/OS Started Task to enable the change.
6.3 THE CATALOG (USTCATLG) FILE

The CATALOG (USTCATLG) repository file contains the primary control records for the main functions of FDR/UPSTREAM. Those records include:

❖ “History” Records (for backups, restores, vaulting)
❖ “Backup Data Set” Records (for backups only)
❖ “File Specification” Records (for backups only)
❖ “Vault Copy” Records (for USTVAULT operations)
❖ “Registered Name” Records

The following sections describe these CATALOG file records in more detail.

“History” Records

Instead of writing z/OS SMF records for every operation, UPSTREAM writes a “History” record into the CATALOG repository. These history records are created on the completion of each UPSTREAM function (backup, restore, or vault) and they contain information such as the function requested, the elapsed time, execution time, and the number of files processed. This information allows you to report on overall UPSTREAM activity, or on the activity of specific Clients or functions.

The setting of the MAXHIST MAIN configuration parameter (see “UPSTREAM MAIN Configuration Options” in Section 3.16) controls the retention of the history records by specifying the number of days that the records should be retained in the CATALOG file before being purged (See Section 6.7 “Repository Maintenance”.)

The default setting for the MAXHIST parameter is 365 days, but should be altered to equal the highest retention of your full backups, so that you have full history reporting for all backups that still exist.

“Backup Data Set” Records

“Backup Data Set” records are created for each backup that you run. The record contains information such as the name of the backup profile used, the type of backup requested, the time and date of the backup, and the z/OS data set name created to hold the contents of the backup.

The retention of “backup data set” records is controlled indirectly by the retention and expiration of the actual backups they describe. UPSTREAM does not automatically uncatalog its backups from z/OS. Instead, it assumes that your Tape and/or DASD management systems will uncatalog the backups when they reach their expiration. This is controlled by the RETPD or EXPDT attributes of the associated backup profile (Section 5.3 “Backup Profiles”), or by GDG roll-off processing, if the backups are allocated as GDGs.

Alternatively, you can manually delete specific backups through the UPSTREAM TSO/ISPF interface (see Chapter 13 “Managing Your Backups”), or through the Client panels (See the FDR/UPSTREAM Client Guide).

Regardless of the retention technique used, once the backup is no longer cataloged, the corresponding “backup data set” record in the CATALOG file becomes eligible for purging by the MAINT command or USTMAINT utility (Section 6.7 “Repository Maintenance”.)

“File Specification” Records

A “file specification” record is created in the CATALOG repository file for each file specification (see “Backup Architecture” in Section 2.2) used in a backup. For example, if you specified that you wanted to back up the /usr/* and /opt/* directories for a particular file server, this would result in the creation of two “file specification” records in the CATALOG file.

Old “file specification” records are purged when their associated “backup data set” record is purged from the CATALOG file.
If you are performing vaulting with USTVAULT, two “vault copy” catalog records will be created for each vault run. See Chapter 9 “Copying Backups with USTVAULT”.

❖ The first record contains information relating to the tape retention data set that is created as the first file on the vaulted tape.

❖ The second record is for the vault control data set that is created as the last file on the vaulted tape.

These “vault copy” records are purged (by the same rules described previously for “backup data set” records) on the expiration of the vaulted backups that they describe.

When the first data set on the vault tape is no longer cataloged, it is eligible for purging. See Section 6.7 “Repository Maintenance”.

If you are using the optional registered name facility (see Chapter 20 “Registered Name Service”), a “registered name” record will be recorded in the CATALOG file for each Client that signs on with auto-registration enabled, or which is manually registered via the TSO/ISPF dialog.

“Registered name” records are utilized in order to establish an alias for a remote Client and to conceal its network address from the connection process. This allows the use of IP DHCP protocol when interfacing between the Client and the z/OS Storage Server software.

The “registered name” record also contains information regarding the version of the UPSTREAM software installed on the Client when that Client last connected to the z/OS Storage Server. This information can be used by the “automatic software distribution” feature to update the version of UPSTREAM software that is running on the Client.

If a “registered name” record is not accessed within 90 days, it becomes eligible for deletion. The records can also be manually deleted, if required, via the UPSTREAM TSO/ISPF dialog.

The CATALOG repository file is generally less than 5 cylinders in size, even in the largest shops. The approximate sizing for the CATALOG file is fairly straightforward and can be expressed as follows:

\[ N \times (H + B + F + 2V) + R = T \]

where:

- **H** – # of history records per backup (always one).
- **B** – # of backup data set records per backup (always one).
- **F** – # of file specification records per backup (variable).
- **V** – # of vault requests (two per vault run).
- **R** – # of defined registered names (optional, variable).
- **N** – # of retained backups (full, incremental, and non-merge).
- **T** – The total number of CATALOG records to allocate.

**NOTE:** The average record size for the CATALOG file is 150 bytes.

The easiest method for performing this calculation is to use the “DEFINE” panel in the UPSTREAM TSO/ISPF dialog (see Section 3.10 “Define the “CATALOG” Repository Data Set”), which calculates the size of the file, based on input provided by you, and then generates all the necessary z/OS JCL to define the file.

The contents of the CATALOG file changes on a regular basis, as each request issued to UPSTREAM is completed. The file should be adequately allocated to allow for uninterrupted service for at least one week.

It should also be regularly reorganized (see Section 6.7 “Repository Maintenance”).
6.4 THE FILEINFO (USTFILEI) FILE

❖ The FILEINFO (USTFILEI) file contains “File Information” Records that are created when a backup is run.

The following section describes these FILEINFO record in more detail.

A “file information” record is created for each Client file that is backed up under a backup profile. If a file is backed up many times, multiple records will appear for that file in the FILEINFO repository file.

The “file information” records contain details of your backups, such as the date/time and location of the backup, as well as the name and size of the files that have been backed up.

“File information” records are used when constructing a list of files to be restored, and for general reporting on the contents of a backup.

“File Information” records are purged (see Section 6.7 “Repository Maintenance”) when their associated “backup data set” record is purged from the CATALOG file.

The FILEINFO file is generally quite large in size, often extending across multiple volumes.

Since most Clients will contain a very large number of files that you will wish to backup and track, the FILEINFO repository file is the most important capacity planning issue when setting up and maintaining the UPSTREAM repository.

The approximate sizing for this file is fairly straightforward and can be expressed as follows:

\[ N \times F = T \]

where:

- \( F \) – Average # of files backed up (very variable per server)
- \( N \) – # of retained backups (full, incremental, and non-merge)
- \( T \) – The total # of records to allocate.

NOTE: The average record size for the FILEINFO file is 150 bytes.

The easiest method for performing this calculation is to use the “DEFINE” panel in the UPSTREAM TSO/ISPF dialog (see Section 3.11 “Define the “FILEINFO” Repository Data Set”), which will calculate the size of the file, based on input provided by you, and then generate all the necessary z/OS JCL to define the file.

The FILEINFO file will change as each backup is completed. The file should be adequately allocated to allow for uninterrupted service for a reasonable length of time.

Due to the size of this file and the large amount of activity that it receives, it should be regularly reorganized (see Section 6.7 “Repository Maintenance”).
6.5 Repository Utilization Statistics

You can check the current utilization of the three repository files through the FDR/UPSTREAM TSO/ISPF dialog, using option 2 ("Status").

<table>
<thead>
<tr>
<th>COMMAND PROFILE</th>
<th>LUNAME</th>
<th>USERID</th>
<th>ELAPS</th>
<th>CPU</th>
<th>#FILE</th>
<th>#BYTES(KB)</th>
<th>OPERATION</th>
<th>BY/SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>USTSCHED</td>
<td>USTSCHED</td>
<td>SCHEDULE</td>
<td>1459</td>
<td>0.4</td>
<td>2</td>
<td>0</td>
<td>SCHEDULE</td>
<td>1 TASKS CURRENTLY ACTIVE</td>
</tr>
</tbody>
</table>

FDR/UPSTREAM started task name: **UPSTREAM**

For automatic mode, specify refresh rate: 0 seconds

Config. member: USTPRODP  USTCATLG: 82%  TCP/IP started task.: ENSRV001
VTAM APPLID....: UPSTREAM  USTFILEI: 02%  TCP/IP Host address.: 192.168.x .x
Security level: 0          USTFILEC: 99%  TCP/IP Host port....: 1972

In the preceding example, the USTCATLG is 18% used at 82% of space available for use and the USTFILEI has 2% of space remaining. The USTFILEI file will soon need to be reorganized. See Section 6.7 “Repository Maintenance“.
6.6 Repository File Interrelationships

The FILEINFO repository will be the target of keyed access requests based on the version date, profile name, and other fields contained in the CATALOG file records.

For these reasons, the USTCATLG and USTIFLEI files should be regarded as a single entity for the purpose of backup and recovery and for maintaining those files at a single point-in-time.

WARNING: Any alteration or restore of a single repository file without similar activities to the other file would result in a corrupted and possibly unusable repository.
6.7 Repository Maintenance

The CATALOG and FILEINFO repository files are generally accessed by a key in order to reduce file access times during record location and insertion operations. Under normal operating circumstances, the vast majority of activity against the repository will be for the insertion of records, usually relating to backup operations.

Due to the nature of the insertion process on any type of key sequenced file, VSAM or IAM, the optimization of the file will be slowly reduced as a result of that heavy insertion. This may affect the future ability to insert records, and could impact the performance of the repository.

Various utility processes are provided to address this problem, as described in the indicated sub-sections that follow:

- "USTMAINT (MAINT)" – This utility purges obsolete records from the CATALOG and FILEINFO repository files.
- "USTMAINT (MAINTF)" – This utility purges "orphan" records from the FILEINFO repository that may have been created due to system or application failures during backup processing.
- "USTREORG and USTCAMS" – These utilities are used to reorganize one or more of the repository files to reclaim space freed up by the preceding two utilities.

**USTMAINT (MAINT)**

The USTMAINT utility processes the UPSTREAM Catalog repository file looking for backups that have been previously taken, but which are no longer recorded in the z/OS catalog. If it locates a backup that is no longer cataloged, it purges all "backup data set" records from the CATALOG file and any related "file information" records from the FILEINFO file. Any "history" records for the backup in the CATALOG file will be retained, until eventually removed based on the value specified for the MAXHIST MAIN configuration parameter (see "UPSTREAM MAIN Configuration Options" in Section 3.16).

The space utilized by the deleted repository records is not reclaimed, however, until the CATALOG and FILEINFO files are reorganized (see "USTREORG and USTCAMS" in Section 6.7).

**RECOMMENDATION:** USTMAINT should be run **at least once a week** to remove unnecessary control records from the repository. By default, USTMAINT is run automatically every time you start FDR/UPSTREAM (unless the "NOMAINT" parameter has been specified. See Section 3.19 "Define the FDR/UPSTREAM Started Task PROC").

USTMAINT can also be run **manually** at any time via the following methods:

- Via an z/OS modify operator command: F UPSTREAM,MAINT
- Through the TSO/ISPF Operator Command dialog
- With "COMMAND=MAINT" in a USTBATCH job, as shown here:

```plaintext
//jobname JOB (accounting,information),'job id data', NOTIFY=userid
//
//MAINT EXEC PGM=USTBATCH
//STELIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSDUMP DD SYSOUT=* 
//USTLOG DD SYSOUT=* 
//USTPARM DD * 
APPLPREF=UPSTR
USAPPL=UPSTREAM
LOGMODE=#INTER
CONV=WAIT
*
COMMAND=MAINT
*
ENDPARM
/*
```

---

**USTMAINT (MAINTF)**

This utility purges "orphan" records from the FILEINFO repository that may have been created due to system or application failures during backup processing.

**USTREORG and USTCAMS**

These utilities are used to reorganize one or more of the repository files to reclaim space freed up by the preceding two utilities.
When a UPSTREAM backup task is in progress, control records are added to the FILEINFO repository file as each Client file is backed up. The corresponding (final) record in the CATALOG repository file is not written until the backup completes.

If a UPSTREAM backup is interrupted prior to completion, perhaps due to a system or application ABEND, a re-start of the z/OS system while the backup is in progress, or even a forced cancellation of the backup itself, this will create “orphan” entries in the FILEINFO file with no corresponding record in the CATALOG file.

The USTMAINT (MAINTF) utility function will correct this situation and should be run at least once a week.

However, unlike the MAINT function described previously, MAINTF is not run automatically when UPSTREAM is started up. It can only be run manually by one of the following methods:

❖ Via an z/OS modify operator command: F UPSTREAM,MAINTF
❖ Through the TSO/ISPF Operator Command dialog
❖ With “COMMAND=MAINTF” in a USTBATCH job, as shown here:

```
//jobname JOB (accounting,information),'job id data',
//        NOTIFY=userid
//*
//*
//MAINTF EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=*
//USTLOG DD SYSOUT=*
//USTPARM DD *
APPLPREF=UPSTR
USAPPL=UPSTREAM
LOGMODE=#INTER
CONV=WAIT
*COMMAND=MAINTF
*ENDPARM
/*
```

In order to reclaim space for deleted records and put all inserted records in their proper locations, a re-organization of the repository files is required at periodic intervals, based upon the level of insertion activity and the sizing of the file in question.

The reorganization process can be performed as either:

❖ An “online” re-organization, with USTREORG. See “Online” Re-organization (USTREORG).
❖ An “offline” re-organization, with USTCAMS. See “Offline” Re-organization (USTCAMS).
**ONLINE** Re-organization (USTREORG)

An online re-organization can be run with the USTREORG utility while the UPSTREAM started task is still active. However, all other UPSTREAM activity must be quiesced. If USTREORG is initiated before all activity is quiesced it will wait. This is the recommended method for re-organizing the repository data sets.

USTREORG utilizes the special USTCATLG and USTFILEI reorganization profiles. See “USTFILEI and USTCATLG Profile Parameters” in Section 5.5 for more details.

The sample JCL below shows how to execute the USTREORG function via a USTBATCH batch job. In this particular job we are re-organizing the CATALOG file (USTCATLG).

```jcl
//jobname JOB (accounting,information),'job id data',
// NOTIFY=userid
//*
//--
//REORG EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=*  
//USTLOG DD SYSOUT=* 
//USTPARM DD *  
//APPLPREF=UPSTR  
//USAPPL=UPSTREAM  
//CONV=WAIT *  
//COMMAND=REORG DD=USTCATLG *  
//ENDPARM /*
```

**OFFLINE** Re-organization (USTCAMS)

As an alternative, you can utilize the USTCAMS utility program to perform an “offline” reorganization, but this requires that the z/OS Storage Server started task be down or quiesced for the duration of the reorganization.

Unlike with USTREORG, the special USTCATLG, USTFILEI, and USTFILEC profiles are not utilized when performing an “offline” reorganization with USTCAMS.

The sample JCL below illustrates how to perform the reorganization via a USTCAMS batch job, which is a simple REPRO out to a work data set, immediately followed by a REPRO back into the database file. This works in much the same way as a normal VSAM KSDS reorganization with IDCAMS. In the example, we are reorganizing the FILEINFO file.

```jcl
//jobname JOB (accounting,information),'job id data',
// NOTIFY=userid
//*
//*  
//REORG EXEC PGM=USTCAMS  
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib  
//SYSUDUMP DD SYSOUT=*  
//SYSPRINT DD SYSOUT=*  
//FILEINFO DD DSN=your.upstream.fileinfo.file,DISP=OLD  
//WORKFILE DD DSN=your.workfile.dataset.name,DISP=(NEW,CATLG),  
// UNIT=tape,LABEL=(1.SL),  
// DCB=(LRECL=504,BLKSIZE=27998,RECFM=VB)  
//SYSIN DD *  
// REPRO INFILE(FILEINFO) OUTFILE(WORKFILE)  
// IF LASTCC=0  
// THEN REPRO INFILE(WORKFILE) OUTFILE(FILEINFO) REUSE  
//*/
```
FDRREORG is a separately-priced component of the FDR DASD Management System. FDRREORG can enhance performance of a reorganization of a multi-volume UPSTREAM control file by using parallel devices for the dump and reload to reduce the reorganization elapsed time. When the UPSTREAM REORG is started, USTREORG looks for the USTREOC and USTREOF DD statements and, if present in the UPSTREAM PROC, calls the FDRREORG utility for that particular file reorganization.

FDRREORG provides an easy and automated method of reorganizing VSAM, IAM and PDS data sets. FDRREORG eliminates the manual effort of running reports to see how many CI/CA splits a cluster has or how much available space there is in a PDS and manually submitting batch jobs to REPRO or IEBCOPY the files.

For more information on FDRREORG or the rest of the FDR family, visit our web site at:  
www.innovationdp.fdr.com

This facility requires FDRREORG 5.4/56 or higher and UPSTREAM V3.5.0.

Enabling FDRREORG:

1. Add a DD statement to the UPSTREAM started task PROC specifying a 80-byte card-image parameter file or member such as a member of SYS1.PARMLIB.
   Specify a DD statement name of USTREOC to use FDRREORG for the USTCATLG file, or USTREOF to use FDRREORG for the USTFILEI file.

2. In the card-image parameter member created in the previous step, include the appropriate statements to be passed to the FDRREORG utility.

This is a sample USTREOF input file to use FDRREORG to reorganize a control file:

REORG NODEFAULTS,CANCELPROT=NO,MODIFY=NO,MODE=PARALLEL, NOUP=YES, BACKUPUNIT= tapeunitname, MAXP=4, MAXT=2, BACKUPI=++BKP?, MSGT=YES, RECORDCOUNTS=YES, BACKUPFAILURE=WARNING, IAMDISP=SHR, SELTERR=WRN, NORCOUNTERR
SELECT CATDSN=upstream.dataset.to.be.reorganized

Please refer to the FDRREORG manual for compete details on each of the keywords.
Both the “online” and “offline” methods described previously will create an z/OS sequential “backup file” on disk or tape containing the data records from the repository file being re-organized. These records are then re-loaded in key sequence.

RECOMMENDATION: That you keep some number of these control-file backup data sets, perhaps as GDGs, to guard against corruption of the repository file, or other problems.

However, if you have to restore from the “backup file”, you MUST restore all three repository files back to the same point-in-time, as outlined earlier under repository file interrelationships.
6.9 **MAKING A SEQUENTIAL COPY OF A REPOSITORY FILE**

Use the **DUMPX** command to cause the FDR/UPSTREAM started task to allocate and write a sequential copy of one of the repository control files (USTCATLG and USTFILEI). This command is equivalent to the dump phase of a REORG process without the RELOAD phase. The allocation will be based on the control file reserved profile names (USTCATLG and USTFILEI) just as is done in the REORG process.

`F UPSTREAM,DUMP DD=ddname`
6.10 UPDATING THE REPOSITORY WITH USTREGEN

The USTREGEN utility (Chapter 12 “Updating the Repository”) can be used to update the FDR/UPSTREAM repository with information obtained from an UPSTREAM backup or vault file.

USTREGEN can be used for the following situations:

❖ When repository information for a backup has been lost or is incorrect
❖ When a vaulted copy of a backup is to be used in place of the primary copy
❖ To add information to the repository for a “physical” backup taken with FDRSOS

See Chapter 12 “Updating the Repository” for more details on USTREGEN.
6.11 INCREASING THE SIZE OF THE FILEINFO REPOSITORY FILE

Use the procedures below to increase the size of your FDR/UPSTREAM FILEINFO repository file. (The size of the FILEINFO file should be increased if the data set is at 16 extents. When the data set is out of space, a "UST051E" error will be posted to the Started Task USTLOG DD statement with a FDBK code ending in "1C").

You need to create a backup of your FILEINFO file for use by the REPRO with reloading the FILEINFO file. You can either use the output file of a current REORG or perform a backup of your FILEINFO file created by a DUMPX command. (If using DUMPX, the allocation is based on the USTFILEI reserved profile, just as is done in the REORG process, and if the backup data set is defined as a GDG, this will roll-off the oldest reorg data set.)

1. The DUMPX command can be submitted either from the UPSTREAM ISPF panel 6, Operator Commands, or via the modify command below.
   
   F UPSTREAM,DUMPX DD=fileinfo

2. Define a new FILEINFO file using the UPSTREAM ISPF option 3, Define, option.
   • Select option 3, FILEINFO. Use the allocation of your existing FILEINFO data set for sizing of your new FILEINFO file and increase the number of cylinders to allocate.
   • Specify the name of the data set created by a current REORG or DUMPX command in the "Specify Repro from dsname ===>" field for the REPRO control card with REUSE option to be generated. If you wish, you may stop your z/OS Storage Server Started Task and use your existing FILEINFO repository file as the input for the Repro.
   • Do a PF3/END from the "Define the File-Information cluster" panel and a PF3/END from the "Define" panel to be presented with Browse, Edit, or Submit options. If not previously specified, add STEPLIB and JOB card specifications. If you wish to save the JCL, use the ISPF CREATE command and save the JCL to a library that you specify.

3. Submit the JCL and define the new FILEINFO file.

4. Update the z/OS Storage Server Started Task JCL. Either rename the new FILEINFO data set name to your old name or change the z/OS Storage Server Started Task JCL to point to the new data set name.

5. Restart the z/OS Storage Server Started Task to open the new FILEINFO file.
7 PERFORMING A BACKUP

7.1 OVERVIEW

FDR/UPSTREAM backups can be initiated from several locations in your enterprise, including:

❖ From the UPSTREAM Client, using the Client GUI panels.
❖ From any workstation/server with the Java-based Director interface.
❖ From your z/OS mainframe using the USTBATCH utility.

The first two options are described in the *FDR/UPSTREAM Client Guide*. The third option (initiation via USTBATCH) is described in this chapter.
7.2 BEFORE YOU BEGIN

Before you can initiate a backup with FDR/UPSTREAM, there are two issues that you must first review.

You will need to create a backup profile for the entity (e.g., server, drive, application) that you wish to backup. See Section 5.3 "Backup Profiles" for full details on creating UPSTREAM backup profiles.

If your UPSTREAM backup data sets are going to be GDGs (i.e., you have either TAPEGDG=YES or DASDGDG=YES in your backup profile), then you will also need to build GDG base definitions for those backup files. The following sample JCL illustrates how to construct these definitions. See Chapter 5 “FDR/UPSTREAM Profiles” for a full discussion on the "TAPEGDG=" and "DASDGDG=" backup profile parameters.

```jcl
/*
//** DEFINE GDG BASE TO USE WITH FDR/UPSTREAM
//**
//DEFINE EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=* 
//SYSIN DD *
   DEFINE GDG (NAME(UPSTREAM.TEST.COPY1) LIMIT(20) SCRATCH)
   DEFINE GDG (NAME(UPSTREAM.TEST.COPY2) LIMIT(20) SCRATCH)
/*
```
7.3 BUILDING THE USTBATCH JOB

This section shows how to use the UPSTREAM TSO/ISPF dialogs to build a USTBATCH batch job to run a backup. USTBATCH JCL can also be constructed manually (although this is not recommended) as described in Chapter 18 "z/OS Initiation with USTBATCH".

Enter the UPSTREAM TSO/ISPF dialog via your installation defined method (see Section 3.17 "Make the FDR/UPSTREAM ISPF Dialogs Easily Available"). From the main menu, specify option number 1, "USTBATCH", and press ENTER.

The next menu to appear allows for the specification of the USTBATCH parameters required for the backup request. The parameters of most interest are highlighted, and a description follows on the next page. Once you have completed entering all the fields of this menu, press the ENTER key to proceed to the next menu.

The parameters highlighted in the previous menu are explained here. For a full description of all parameters, see Chapter 21 "FDR/UPSTREAM Configurator".

---
PERFORMING A BACKUP
BUILDING THE USTBATCH JOB

APPLPREF
The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

USAPPL
The VTAM APPLID of the UPSTREAM started task.

TPNAME
The Transaction Program Name to be used during LU 6.2 communications.

LOGMODE
The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

CONV
This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.

WTOCOMP
Allows a WTO completion message to be issued to the z/OS system operator when the request finishes.

TCP/IP ADDR
The IP address of the Client that you wish to backup. Note that this parameter is mutually exclusive with the TARGNAME, DSNAME, and TARGLU keywords.

TCP/IP PORT
The TCP port number configured in the Client that you wish to backup (see the FDR/UPSTREAM Client Guide for more details).

ACTION
Controls which UPSTREAM function is to be performed by this set of generated statements. In our preceding example, ACTION=1 specifies a backup request.
PERFORMING A BACKUP
BUILDING THE USTBATCH JOB

CHAPTER 7 – PAGE 7-5 – SECTION 7.3

STEP #3 - BACKUP
SPECIFICATION #1
(MAIN PARAMETERS)

The next menu to appear is the first in a series of up to four menus that describe the actual backup process itself. The relevant parameters are described after each menu. For a full description of all parameters, see Chapter 21 “FDR/UPSTREAM Configurator”.

In this first menu, we are specifying:

- **The backup profile name** (TEST)
- **The backup type** (First-time full)
- **The backup media** (Sequential tape)
- **The files to be backed up** (All files on the workstation/server)

### FDR/UPSTREAM – USTBATCH Backup

<table>
<thead>
<tr>
<th>Backup Profile</th>
<th>Backup Type</th>
<th>Storage Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST</td>
<td>First-time full</td>
<td>Seq. Tape</td>
</tr>
<tr>
<td></td>
<td>Full merge</td>
<td>Seq. Disk</td>
</tr>
<tr>
<td></td>
<td>Incremental Merge</td>
<td>Archive</td>
</tr>
<tr>
<td></td>
<td>Non-merge</td>
<td>Keyed/Dup.</td>
</tr>
</tbody>
</table>

| NetWare Directory Svcs |

**Backup Profile**

Specifies the backup profile name used for this backup request. See Chapter 5 “FDR/UPSTREAM Profiles” for a full description of UPSTREAM backup profiles.

**Backup Type**

Specifies the type of UPSTREAM backup that we are going to perform. See Chapter 2 “System Overview” for a description of UPSTREAM backup types.

**Storage Type**

Specifies the z/OS storage media to which the backup is written.

**Files Selected for Backup**

In this section you specify one or more file specifications or “file specs” (Chapter 2 “System Overview”) to select the drives/folders/files that are included in this backup.

**NOTE:** UPSTREAM can only support Client filenames up to 255 characters in length.
STEP #4 - BACKUP SPECIFICATION #2 (FILE SPEC - DETAILS)

On the previous menu you notice that an “X” is in the Spec Detail column of the file specification. This indicates that we wish to display the “File Spec Detail” menu (shown below) so that we can specify additional information about our “/” file spec.

--- FDR/UPSTREAM - USTBATCH Backup File Spec ---

| COMMAND ===| SCROLL ===|
| File Spec... /* |

--- Spec Type ---

<table>
<thead>
<tr>
<th>( X ) Include these files</th>
<th>( ) Exclude</th>
<th>( ) Migrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include</td>
<td>Exclude</td>
<td>Migrate</td>
</tr>
<tr>
<td>Include</td>
<td>Exclude</td>
<td>Migrate</td>
</tr>
<tr>
<td>Include</td>
<td>Exclude</td>
<td>Migrate</td>
</tr>
<tr>
<td>Include</td>
<td>Exclude</td>
<td>Migrate</td>
</tr>
</tbody>
</table>

Spec Type

This controls the nature of this file specification. “Include” includes the selected files in the backup, while “Exclude” excludes them from the backup. “Migrate” causes the selected files to be migrated (Chapter 15 “FDR/UPSTREAM Client File Migration”). The three options are mutually exclusive.

Reset Archive Bit

This causes the archive bit to be reset for each file backed up, allowing the incremental backup process to function on subsequent (incremental) backups.

Backup Subdirs

Indicates that the backup includes all subdirectories and files found under the file specification.

Hidden Files

All files on the Client that are marked as “hidden” or “read-only” are selected by this backup request.

More...

This takes you to the third of the four menus.
This menu controls the handling of any non-file data included in the file specification. See the *FDR/UPSTREAM Client Guide* for full details of this menu.

---Non File Data-------------------------------------------------------------
| <  > Registry and Event Logs                                           |
| <  > File Extended Attributes                                          |
| <  > Directory Extended Attributes                                    |
| <  > File and Directory ACLs (Security)                               |
| <  > Reset Last Access Date                                            |
| <  > Add Permissions If Access Denied                                 |
| <  > Hard Links...<  > Use Client Default                             |
---Novell Non File Data-----------------------------------------------------
| <  > Directory Information                                            |
| <  > Directory Restrictions                                            |
| <  > Directory Trustee Information                                     |
| <  > File Information                                                  |
| <  > File Trustee Information                                           |
| <  > Set Archive Date                                                  |
---PlugIn--------------------------------------------------------------------
| File Name ( )                                                         |
| Parameters( )                                                          |
---Mount Point Options (Restore only)---------------------------------------
| (   ) Do not restore                                                   |
| (   ) Verify before restoring                                          |
| (   ) Recreate if necessary                                            |
| (   ) Restore without verification                                     |
---Restore Options----------------------------------------------------------
| <  > Restore Migrated Files                                            |
|   <  > Only                                                            |
---Restore File Overwrites--------------------------------------------------
| (   ) Restore all files (overwrite)                                    |
| (   ) Do not overwrite existing files                                  |
| (   ) Do not overwrite the same files                                  |
---Reparse Point Options (Backup only)--------------------------------------
| (   ) Skip files with Reparse Points                                  |
| (   ) Open files without using Reparse Points                          |
| (   ) Open files using Reparse Points                                 |
|   <  > Recall offline files to disk                                   |
---Backup File Deletions----------------------------------------------------
| ( X ) No file deletes                                                 |
| (   ) All files in spec                                               |
| <  > Delete empty dirs                                                |
| <  > Prompt for file deletions                                         |
| <  > Prompt for dir deletions                                          |
---SOS Timestamp Options----------------------------------------------------
| <  > Write SOS Timestamp                                              |
| Path( )                                                              |
---UNIX Restore Options-----------------------------------------------------
| (   ) Use UID instead of name                                          |
| (   ) Use GID instead of name                                          |
STEP #6 - BACKUP
SPECIFICATION #4
(MISC.)

PERFORMING A BACKUP
BUILDING THE USTBATCH JOB

Pressing ENTER and then PF3 from the previous menu will then take you to the fourth and final backup specification menu, shown below. This menu contains additional parameters that control the overall backup.

```
------------------------- FDR/UPSTREAM - USTBATCH More... -------------------------

----------ULTra--------------- -------Compression------- -Restart Bkup/Restore
|LAN WS Name.(                ) |(   )No Compression    | |(   )Never         |
|LAN WS Pwd..(                ) |(   )Fast Compression  | |(   )On Any Error  |
|                            | |(   )High Compression 1| |(   )Not Completed |
|(( )IPX/SPX (   )Register    | |(   )High Compression 2| |                   |
|(( )NetBIOS (   )Auto-upgrade| |(   )High Compression 3| |                   |
|(( )TCP/IP                   | |                   | |                   |

------------------------- Miscellanous------------------------- -------------Reporting-------------------------
|Exclude File...            | |(   ) Files Backed Up/Restored |
|                           | |(   ) Files Skipped           |
|Novell Profile...          | |(   ) Files Deleted/Migrated  |
|                           | |(   ) Version Inquiries       |
|                           | |(   ) File Inquiries         |
|Record Size ....(8192   )  | |(   ) Files Deleted/Migrated  |
|                           | |(   ) Version Inquiries       |
|(   ) Log Non-Fatal Messages| |(   ) Files Skipped           |
|(   ) Attended             | |(   ) Files Backed Up/Restored |
|(   ) Host Sort            | |(   ) Files Skipped           |
|                            | |(   ) Files Backed Up/Restored |
|                            | |(   ) Files Skipped           |
|                            | |(   ) Files Backed Up/Restored |
|                            | |(   ) Files Skipped           |
|                            | |(   ) Files Backed Up/Restored |

OK <enter>       Prior panel <PF3>
```

**Compression**

Selects the level of compression to be performed on the backup data by the Client, before that data is transmitted to the z/OS Storage Server.

**RECOMMENDATION:** INNOVATION generally recommends Hi Compression 3, unless this causes a discernible impact on throughput performance.

**Restart Bkup/Restore**

The backup re-starts if any error occurs during the process.

**Log Non-Fatal Messages**

All messages that are issued by the UPSTREAM are recorded in the started task USTLOG.
PERFORMING A BACKUP
BUILDING THE USTBATCH JOB

STEP #7 - GENERATE THE USTBATCH JCL

Having worked through the four backup specification menus, press the PF3 key twice to return to the USTBATCH specification menu, previously seen in “Step #2 - USTBATCH Specification”. We can now generate the z/OS JCL that is used to invoke the USTBATCH utility program, which submits your backup request to the UPSTREAM started task for processing.

You do this by specifying “GEN” on the command line and pressing the ENTER key.

-----------------------------------------------------------------
COMMAND ===>
Gen - Generate statements Read/Save/Delete parameter set
APPLREF => UPSTR QUEUE => MAXRETRY =>
USAPPL => UPSTREAM CONV => WAIT TMAXRETRY =>
TPNAME => WTOCOMP => YES APPLRETRY =>
LOGMODE => #INTER RESTART => TASKLIM => ALLOWDUP =>
TARGNAME => ZVMINST1 or TARGLU =>
or DNSname =>
or TCP/IP addr =>
IPADAPTER addr =>
. ERRWTO . WTOR=>
WSPARM =>
USERID ===> | PASSWORD ===> MIXED ===> NO
ACTION ===> 1 (specify to display related parameters and press enter)
 1 - Backup 5 - Restart Backup 9 - FDRSOS Backup
 2 - Restore & Inquiry 6 - Restart Restore 10 - FDRSOS Restore
 3 - Run a PC Job 7 - Kill Restart Backup 11 - PC Migration
 4 - File Transfer 8 - Kill Restart Restore 12 - Operator Commands
 13 - Performance Tests
Client Login Name ===> 
Client Password ===> 
-----------------------------------------------------------------

STEP #8 - ADDING A JOBCARD AND STEPLIB

The panel below then allows you to tailor the USTBATCH JCL to match your installation's requirements. As a minimum, you should alter the JCL to provide a valid mainframe JOBCARD. You will also need to include a STEPLIB to point to the UPSTREAM load library if it is not in the Linklist. If you use the DNSNAME option to address the Client, you may also need a SYSTCPD DD statement.

-----------------------------------------------------------------
COMMAND ===>
Please select one of the following options or press the END key to cancel
 1 - Browse the generated JCL stream
 2 - Edit the generated JCL stream
 3 - Submit the generated JCL stream
 4 - Save the generated JCL in a data set
 5 - Run the generated USTBATCH statements in the TSO foreground
JCL statements:
  ( //jobname JOB (job acct data),'job id data',NOTIFY=userid )
  ( //*
  ( //*
  ( //*
  ( //USTBATCH EXEC PGM=USTBATCH
  ( //STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
  ( //SYSUDUMP DD SYSOUT=* )
  ( //USTLOG DD SYSOUT=* )

-----------------------------------------------------------------
PERFORMING A BACKUP
BUILDING THE USTBATCH JOB

STEP #9 - EDITING THE USTBATCH JOB

Select Option 2 “Edit” on the command line of the preceding menu (then press ENTER) to review and optionally edit the generated USTBATCH JCL and parameters via a standard ISPF Edit screen.

The USTBATCH job can then be submitted for batch processing, either immediately, or it can be saved to a member in a PDS for later submission (manually, or through a job scheduling system).

Once it has been initiated, the executing backup request can then be monitored via the UPSTREAM ISPF STATUS panel (Option #2), or via the UPSTREAM STATUS operator command (Chapter 17 “FDR/UPSTREAM Operation”).
7.4 **WHAT’S NEXT?**

Having created your backup, you may wish to take a look at some of the following features in FDR/UPSTREAM.

- **Performing a Restore** – Chapter 8 “Performing a Restore” describes how to restore some/all the files from your test backup.

- **Copying your backups** – Chapter 9 “Copying Backups with USTVAULT” shows you how to make additional tape-based copies of your backups.

- **Moving your backups to tape** – Chapter 10 “Migrating Backups from Disk to Tape” shows you how to move disk-based backups to tape.

- **Deferred merge** – Chapter 11 “Completing Deferred Merge Backups” describes the deferred merge process.

- **Reporting on your backups** – Chapter 22 “Reporting with USTRPORT” and Chapter 23 “Reporting with USTBKPRT” describe various ways to report on your backup, either by extracting information about the backup from the UPSTREAM repository, or by obtaining detailed information directly from the backup itself.

- **Data Encryption** – Chapter 24 “FDR/UPSTREAM Data Encryption” describes UPSTREAM's data encryption feature, which allows you to create encrypted copies of some/all your backups when copying those backups with USTVAULT.
PERFORMING A RESTORE

FDR/UPSTREAM restores can be initiated from several locations in your enterprise, including:

❖ From the UPSTREAM Client, using the Client GUI panels.
❖ From any workstation/server with the Java-based Director interface.
❖ From your z/OS mainframe using the USTBATCH utility.

The first two options are described in the FDR/UPSTREAM Client Guide. This chapter describes the third option - initiation via your z/OS mainframe using the USTBATCH utility.
8.1 Building the USTBATCH Job

This section shows how to use the UPSTREAM TSO/ISPF dialogs to generate a USTBATCH batch job to restore a data set. The example restore is performed against the sample backup of TEST, which was created in Chapter 7 "Performing a Backup". USTBATCH JCL can also be constructed manually (although this is not recommended) as described in Chapter 18 "z/OS Initiation with USTBATCH".

Enter the UPSTREAM TSO/ISPF dialog via your installation defined method (see Section 3.17 "Make the FDR/UPSTREAM ISPF Dialogs Easily Available". From the main menu, specify option number 1, "USTBATCH", and press "ENTER".

--- FDR/UPSTREAM ----------------

**COMMAND ===> 1**

1 USTBATCH - Host Initiated Services
2 STATUS - Current Status Information
3 DEFINE - Define Control Files
4 CONFIGURE - Main Options
5 PROFILE - Workstation Profile Names
6 OPER - Operator Commands
7 REPORT - Report
8 REGISTRY - Name Registry
9 DOPAUDIT - Duplicate File Audit
10 SCHEDULE - Command Scheduler
11 MANAGEMENT - Backup Management
12 USTCRYPT - USTCRYPT Options

The next menu to appear allows for the specification of the USTBATCH parameters required for the restore request. The parameters of most interest are highlighted and explained below. See Chapter 18 "z/OS Initiation with USTBATCH" for a full description of all parameters.

--- FDR/UPSTREAM - USTBATCH ------- * ------------------

**COMMAND ===>**

Gen - Generate statements Read/Save/Delete parameter set

APPLREF ==> UPSTR QUEUE ==> MAXRETRY ==> USAPPL ==> UPSTREAM CONV ==> WAIT TMAXRETRY ==> TPNNAME ==> WTOCOMP ==> YES APPLRETRY ==> LOGMODE ==> #INTER RESTART ==> TASKLIM ==> ALLOWDUP ==> TARGNAME ===> ZVMINST1 or TARGLU ===> or DNSname ==> or TCP/IP addr ==> TCP/IP port ==> IPADAPTER addr ==> . ERRWTO . WTOR= WSPARM ==> USERID ===> | PASSWORD ===> | MIXED ===> NO

**ACTION ===> 1** (specify to display related parameters and press enter)

1 - Backup 5 - Restart Backup 9 - FDRSOS Backup
2 - Restore & Inquiry 6 - Restart Restore 10 - FDRSOS Restore
3 - Run a PC Job 7 - Kill Restart Backup 11 - PC Migration
4 - File Transfer 8 - Kill Restart Restore 12 - Operator Commands

Client Login Name ===> Client Password ===> Once you have completed entering all the fields of this menu, press the ENTER key to proceed to the next menu.
PERFORMING A RESTORE
BUILDING THE USTBATCH JOB

APPLPREF
The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

USAPPL
The VTAM APPLID of the UPSTREAM z/OS started task.

TPNAME
The Transaction Program Name to be used during LU 6.2 communications.

LOGMODE
The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

CONV
This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task or end immediately after the request is accepted.

WTOCOMP
Allows a WTO completion message to be issued to the z/OS system operator when the request finishes.

TCP/IP ADDR
The IP address of the Client to which you wish to restore the file(s).

NOTE: This parameter is mutually exclusive with the TARGNAME, DNSNAME, and TARGLU keywords.

TCP/IP PORT
The TCP port number of the Client to which you wish to restore the file(s).

ACTION
Controls which UPSTREAM function is to be performed by this set of generated statements. In our preceding example, ACTION=2 specifies a restore request.

In this next menu we have selected the “Inquire backups” option. Press the ENTER key to send this inquiry to the UPSTREAM z/OS started task for a list of the backups that have been recorded for the TEST profile. These backups are displayed on the subsequent menu.

You can also obtain information about UPSTREAM backups using the reporting tools. See Chapter 22 “Reporting with USTRPORT” and Chapter 23 “Reporting with USTBKPRTR”.

-------------------------- FDR/UPSTREAM - USTBATCH Restore -------------------
COMMAND ===>                                                   SCROLL ===> CSR
Backup Profile.( TEST     )            --Inquire and Restore Files From...-----
< > Display Migrated Files             |(   ) Only Version Specified       |
< > Only                               |(   ) Spec. Version Back to Full    |
( X ) Inquire Backups                  |(   ) Spec. Version Back to Oldest  |
                                         |(   ) Spec. Version Back to SOS Full|
--- Profile  Backup Date/Time  Type    Comp Stor Est. Kb    # Files Lcl ---
| Default to Latest Backup             |
|                                      |
|                                      |
|                                      |
|                                      |
|                                      |
|                                      |
---(   ) File Inquiry     (   ) Details      (   ) More...---
OK <enter>           Prior panel <PF3>
**Performing a Restore**

**Building the USTBATCH Job**

In the menu below, which shows the backups previously taken under the TEST backup profile, we have highlighted several parameters:

- We have selected the merge full backup taken at 13:03:05 on 03/06/00.
- We have highlighted the “File Inquiry” parameter to request a list of files contained within that backup.
- We have specified the “Only version specified” option to limit the file search to just the indicated backup.

```plaintext
------ FDR/UPSTREAM - USTBATCH Restore ------
COMMAND ===> SCROLL ===> CSR
Backup Profile.( TEST ) --Inquire and Restore Files From...----
| ( X ) Only Version Specified |
< > Display Migrated Files | ( ) Spec. Version Back to Full |
< > Only                  | ( ) Spec. Version Back to Oldest |
| ( ) Spec. Version Back to SOS Full |
( ) Inquire Backups

Profile Backup Date/Time Type Comp Stor Est. Kb # Files Lcl

| ( _ ) TEST     03/06/00 13:02:23 MERGE FULL DISK 2542         17     |
| ( _ ) TEST     03/06/00 13:02:45 MERGE FULL DISK 105185          5     |
| ( X ) TEST     03/06/00 13:03:05 MERGE FULL DISK 13408        206     |
| ( _ ) TEST     03/06/00 13:04:12 MERGE FULL DISK 1265          4     |
| ( _ ) TEST     03/06/00 13:04:39 MERGE FULL DISK 2559         88     |

(X) File Inquiry   ( ) Details   ( ) More...
OK <enter>       Prior panel <PF3>
```

In the **Inquire Files** section of the resultant display, shown below, we can see the files that were included in the backup. All these files were selected under the “/*” file specification, which we used in our sample backup in Chapter 7 “Performing a Backup”.

```plaintext
------ FDR/UPSTREAM - USTBATCH Restore File Spec ------
COMMAND ===> SCROLL ===> CSR
< > StreetTalk name   < > Exclusion   < > Include Subdirs   < > NDS
Destination...(                                                             )
Specification.(/*                                                           )
( ) Long names                                              ( _ ) Update Spec
Inquire Files                      Files Selected for Restore

Row 1 of 205------------- MORE + -------------Row 1 of 1-------------
| ( _ ) 961230113831 27 ACROGRAF.INI      |
| ( _ ) 981211114318 2522 ACOREAD.INI     |
| ( _ ) 990423163407 37504 Active Setup Log.B|
| ( _ ) 000120114037 43748 Active Setup Log.t|
| ( _ ) 971114103527 15928 Active Setup.Log |
| ( _ ) 000120113100 34451 AdvpackExt.log  |
| ( _ ) 970730145201 817K ArtGalry.cag     |
| ( _ ) 960321205020 10656 BARCTL.DLL      |

( ) File Inquiry   ( ) Add Spec   ( ) Delete Spec
OK <enter>       ( ) More...       Prior panel <PF3>
```
The next step involves selecting the specific files that are to be restored. This is done by adding them to the selection list in the “Files Selected For Restore” box on the right-hand side of the display.

The “UP” and “DOWN” ISPF function keys, usually PFK7 and PFK8 respectively, can be used to scroll through the list of files on the selected backup.

To **ADD** a file to the restore selection list:

❖ Place any character in the underlined prefix area immediately to the left of the file.
❖ Place any character in the “Add Spec” selection field.
❖ Press the ENTER key.
❖ The file selected should now appear in the “Files Selected for Restore” box. Repeat this action once for each file you wish to add to the restore specification.

To **DELETE** an entry from the selection list:

❖ Place any character in the underlined prefix area immediately to the left of the file specification to be deleted from the “Files Selected for Restore” box.
❖ Place any character in the “Delete Spec” selection field.
❖ Press the ENTER key.
❖ The file specification selected should no longer appear in the “Files Selected for Restore” box. Repeat this action once for each file you wish to delete from the restore specification.

To **UPDATE** a previously existing line in the “Files Selected for Restore” box:

❖ Place any character in the underlined prefix area immediately to the left of the file to be selected in the “Inquire Files” box.
❖ Place any character in the underlined prefix area immediately to the left of the file specification to be updated in the “Files Selected for Restore” box.
❖ Place any character in the “Update Spec” selection field.
❖ Press the ENTER key.
❖ The updated file specification should now appear in the “Files Selected for Restore” box. Repeat this action once for each file specification you wish to update for the restore specification.

In the example screen below, we have used the ADD procedure described previously to select the ACROREAD.INI file and add it to the Files Selected for Restore section.

```
----------------------- FDR/UPSTREAM - USTBATCH Restore File Spec -----------------------
COMMAND ===> SCROLL ===> CSR
< > StreetTalk name < > Exclusion < > Include Subdirs < > NDS

Destination...
( ) Specification.( C:\WINNT\*.*
( ) Long names ( ) Update Spec
( ) File Inquiry (X) Add Spec ( ) Delete Spec

Inquire Files Files Selected for Restore
------------------- Row 1 of 205 ----------------- MORE + ------------------ Row 1 of 1 ---
| ( _) 961230113831 27 ACROREAD.INI | ( _ ) C:\WINNT\ACROREAD.INI |
| ( X ) 98121114318 2522 ACROREAD.INI |
| ( _ ) 990423163407 37504 Active Setup Log.B|
| ( _ ) 000120114037 43748 Active Setup Log.t|
| ( _ ) 97111403527 15928 Active Setup.Log |
| ( _ ) 000120113100 34451 AdvpackExt.log |
| ( _ ) 970730145201 817K ArtGalry.cag |
| ( _ ) 960321205020 10656 BARCTL.DLL |

----------- --------------------- --------------------- --------------------- ---------------------
```

In the example screen below, we have used the ADD procedure described previously to select the ACROREAD.INI file and add it to the Files Selected for Restore section.

```
----------------------- FDR/UPSTREAM - USTBATCH Restore File Spec -----------------------
COMMAND ===> SCROLL ===> CSR
< > StreetTalk name < > Exclusion < > Include Subdirs < > NDS

Destination...
( ) Specification.( C:\WINNT\*.*
( ) Long names ( ) Update Spec
( ) File Inquiry (X) Add Spec ( ) Delete Spec

Inquire Files Files Selected for Restore
------------------- Row 1 of 205 ----------------- MORE + ------------------ Row 1 of 1 ---
| ( _) 961230113831 27 ACROREAD.INI | ( _ ) C:\WINNT\ACROREAD.INI |
| ( X ) 98121114318 2522 ACROREAD.INI |
| ( _ ) 990423163407 37504 Active Setup Log.B|
| ( _ ) 000120114037 43748 Active Setup Log.t|
| ( _ ) 97111403527 15928 Active Setup.Log |
| ( _ ) 000120113100 34451 AdvpackExt.log |
| ( _ ) 970730145201 817K ArtGalry.cag |
| ( _ ) 960321205020 10656 BARCTL.DLL |

----------- --------------------- --------------------- --------------------- ---------------------
```
Once you have selected all the files that you wish to restore, press the ISPF EXIT key twice (generally PF3) to return to the original USTBATCH main menu, previously seen in “Step #2 - USTBATCH Specification”.

Having worked through the restore specification menus, we can now generate the z/OS JCL that will be used to invoke the USTBATCH utility program, which will submit your restore request to the UPSTREAM started task for processing. You do this by specifying “GEN” on the command line and pressing the ENTER key.

```
-------------------------- FDR/UPSTREAM - USTBATCH ------- * ---------------
COMMAND ===>                                                   SCROLL ===> CSR
    Gen - Generate statements       Read/Save/Delete parameter set

APPLPREF ==> UPSTR   QUEUE ==> MAXRETRY ==>
USAPPL ==> UPSTREAM CONV ==> WAIT   TMAXRETRY ==>
TPNAME  ==>           WTOCOMP ==> YES  APPLRETRY ==>
LOGMODE  ==> #INTER   RESTART ==>       TASKLIM  ==> ALLOWDUP ==>

    TARGNAME  ==> ZVMINST1 or TARGLU  ==>
or DNSname ==>
or TCP/IP addr ==> TCP/IP port ==>
IPADAPTER addr =>
   . ERRWTO . WTOR=>
WSPARM  ===> |
USERID  ===>   | PASSWORD  ===>   | MIXED ===> NO
ACTION  ===> 1  (specify to display related parameters and press enter)
   1 - Backup
   2 - Restore & Inquiry
   3 - Run a PC Job
   4 - File Transfer
   5 - Restart Backup
   6 - Restart Restore
   7 - Kill Restart Backup
   8 - Kill Restart Restore
   9 - FDRSOS Backup
  10 - FDRSOS Restore
  11 - PC Migration
  12 - Operator Commands
  13 - Performance Tests

Client Login Name ===>   
Client Password  ===>   
```

The panel below then allows you to tailor the USTBATCH JCL to match your installation’s requirements. As a minimum, you should alter the JCL to provide a valid mainframe JOBCARD. You will also need to include a STEPLIB to point to the UPSTREAM load library if it is not in the Linklist. If you use the DNSNAME option to address the Client, you may also need a SYSTCPD DD statement.

```
-------------------------- FDR/UPSTREAM - USTBATCH -------------------------
COMMAND ===>   

Please select one of the following options or press the END key to cancel

   1 - Browse the generated JCL stream
   2 - Edit the generated JCL stream
   3 - Submit the generated JCL stream
   4 - Save the generated JCL in a data set
   5 - Run the generated USTBATCH statements in the TSO foreground

JCL statements:
( //jobname JOB (job acct data),'job id data',NOTIFY=userid )
( //*)
( //*)
( //*)
( //*)
( //USTBATCH EXEC PGM=USTBATCH )
( //STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib )
( //SYSUDUMP DD SYSOUT=* )
( //USTLOG DD SYSOUT=* )
```
STEP #9 - EDITING THE USTBATCH JOB

Select option 2 (“Edit”) on the command line of the preceding menu (then press ENTER) to review and optionally edit the generated USTBATCH JCL and parameters via a standard ISPF Edit screen.

File  Edit  Confirm  Menu  Utilities  Compilers  Test  Help
------------------------------------------
EDIT------ USER01.SPFTEMP2.CNTL----------------------------- Columns 00001 00072
Command ==>                                                  Scroll ==> CSR
****** ***************************** Top of Data ***********************
 000001 //jobname   JOB (job acct data),'job id data',NOTIFY=userid
 000002 /*
 000003 //USTBATCH EXEC PGM=USTBATCH
 000004 //STEPLIB  DD DISP=SHR,DSN=your.upstream.loadlib
 000005 //SYSUDUMP DD SYSOUT=*  
 000006 //USTLOG   DD SYSOUT=*  
 000007 /*
 000008 //USTPARM  DD *
 000009 APPLPREF=UPSTR
 000010 USAPPL=UPSTREAM
 000011 LOGMODE=#INTER
 000012 *
 000013 TARGNAME=ZVMINST1
 000014 ACTION 0
 000015 BACKUPPROFILE TEST
...
 000064 *
 000065 ENDPARM
/*

The USTBATCH job can then be submitted for batch processing, either immediately, or it can be saved to a member in a PDS for later submission (manually, or through a job scheduling system).

Once it has been initiated, the executing restore request can then be monitored via the UPSTREAM ISPF STATUS panel (Option #2), or via the UPSTREAM STATUS operator command (Chapter 17 “FDR/UPSTREAM Operation”).

STEP #10 - SUBMITTING & MONITORING THE USTBATCH JOB
8.2 Restoring from Encrypted Copies of Your Backups

Chapter 24 “FDR/UPSTREAM Data Encryption” describes FDR/UPSTREAM's data encryption feature, which allows you to create encrypted copies of some/all your backups when copying the original backup with USTVAULT.

During the USTVAULT copy process, data can be encrypted using a choice of several encryption algorithms, each with an increasing level of strength, but with a corresponding increase in CPU and elapsed time for the USTVAULT copy process.

All of the algorithms use an encryption key, which can either be supplied manually, or (as recommended by INNOVATION) they can be automatically generated. In order to restore data from an encrypted copy of a backup, the encryption key that was used during the encryption process must be supplied.

Although the encryption keys can be manually recorded and then supplied (again manually) to the restore process, this would not be very efficient, especially if many backups are to be restored, as in a disaster recovery. The manual recording of encryption keys would also create a security exposure that would weaken the effect of the encryption.

For these reasons, UPSTREAM automatically stores the encryption keys used by USTVAULT in a special disk-based "key file", which can be secured against unauthorized access via your z/OS security system (Section 4.9 "FDR/UPSTREAM Data Encryption").

During a restore of an encrypted backup, UPSTREAM then automatically reads the key file to obtain the required encryption key to be used for the decryption process. So, assuming the key file is available to the UPSTREAM restore process, no additional effort is required in order to restore from an encrypted copy of a backup.

However, for “off-site” restores (i.e. during a disaster recovery), the key file must first be restored at the DR site before the UPSTREAM restore process can begin. "Disaster Recovery Considerations" in Section 24.5 discusses the various ways that the key file can be securely transported to the DR site without introducing a security exposure.

Once the key file has been restored, the restore process can proceed as normal, again with no further need for manual intervention of supplying of encryption keys.

If, for any reason, the key file is not available for restore, or only a back-dated copy of the key file is available, the required encryption keys (if known) can be manually supplied to the restore process.

UPSTREAM's data encryption also provides an option for using a master key, which is used to create an encrypted copy of the actual key used to encrypt the data. This encrypted key is then saved on the backup data set. The master key can be used to decrypt any copy of a backup that has been encrypted by USTVAULT, in the event that the key file is either not available, or the actual keys cannot be provided manually. "Master Keys" in Section 24.5 describes master keys in more detail.

In summary:

❖ If you have used UPSTREAM's data encryption feature to create encrypted copies of your backups, and assuming that the key file is available during the restore process, no additional effort is required in order to restore from those encrypted backups.

❖ If the key file is not available, the required keys can be supplied manually, or (if used, the master key can be provided).
Chapter 9 – Page 9-1 – Section 9.1

Copy backups with USTVAULT

9.1 USTVAULT overview

The FDR/UPSTREAM vaulting facility (USTVAULT) automates the creation of secondary ("vault") copies of your sequential disk and tape backup files. The vaulted copies will be placed on tape. Your tape management system can then optionally send these vaulted copies off-site, if required. If you have the UPSTREAM data encryption feature licensed and enabled (Chapter 24 “FDR/UPSTREAM Data Encryption”), you can use USTVAULT to create encrypted copies of some/all your “copy 1” backups.

There are several reasons why you may want to use USTVAULT to create secondary copies of your backups:

❖ For on-site recovery: in case the primary backups are damaged or become unusable.
❖ For disaster recovery: the secondary copies can be stored in an off-site vault for use in the event of a disaster.
❖ For long-term retention: as described in Section 9.6 “Creating Long-Term Retention Backups”, the secondary copies are to be retained for much longer than the primary backups, without requiring additional space in the UPSTREAM repository.
❖ You can also use USTVAULT to create secondary copies of backups created under the Client file migration facility (see Chapter 15 “FDR/UPSTREAM Client File Migration”).

A single execution of USTVAULT can create vault copies for specific backup profiles, or for a group of backup profiles, if you choose. USTVAULT will only create vaulted copies going back to the last full backup.

If you have any merge backups in deferred status (see Chapter 11 “Completing Deferred Merge Backups”) these will be automatically bypassed since they are not yet complete. Once they have been completed by USTMERGE, they will be eligible for vaulting.

If a backup was flagged as “interrupted”, it will only be selected for vaulting if it is also flagged as “restartable”. If USTVAULT copies an interrupted backup, and that backup is later restarted, the next execution of USTVAULT which processes that backup profile will correctly copy the backup again, uncataloging the earlier copy.

USTVAULT keeps track of the backups that already have vaulted copies, and will, by default, only create secondary copies for those backups that have not yet been processed. However, the NOVCHK option allows USTVAULT to create vaulted copies for backups that do already have vaulted copies. This allows you to create extra copies of your backups for additional safety, or to create copies to be kept for a longer period. A “copy number” from 2 - 9 can be specified on the VAULT command to identify these additional vaulted copies.

Note: USTVAULT can make vault copies of sequential disk backups and sequential tape backups. If you are vaulting tape backups, this may require mounting many input tapes during the vault process. If possible, incremental backups that are to be vaulted should be written to disk, then USTVAULT can be executed to create the vaulted copies on tape. Once USTVAULT has completed, the USTMIGRT utility (see Chapter 10 “Migrating Backups from Disk to Tape”) can then be run to migrate the primary copies of the backups from disk to tape. For obvious reasons, USTVAULT cannot operate concurrently with USTMIGRT on the same GROUPID.
CHAPTER 9 – PAGE 9-2 – SECTION 9.2

9.2 USTVAULT CONFIGURATION

Several steps are required before you can use USTVAULT.

**THE BACKUP PROFILES**

Each backup profile for which you intend to create copies of your backups must be enabled for vaulting. There are several steps to this process. See Chapter 5 “FDR/UPSTREAM Profiles” for full details on how to create backup profiles and also for full descriptions of the parameters mentioned below.

- The VAULT parameter in the backup profile must be set to “YES”.
- The values specified for DASDPREF and/or TAPEPREF must contain a question mark “?”.
- If the backup profile specifies DASDGDG and/or TAPEGDG, you must also create the required GDG bases for both the primary copy and also for any secondary vaulted copies of the backups that you may wish to create. See Chapter 5 “FDR/UPSTREAM Profiles” for example JCL to create these GDG bases.
- If the backup profile specifies ENCRYPTV, and if you have the UPSTREAM data encryption feature licensed and enabled, the copies of backups created under this profile can be encrypted by USTVAULT.

**THE USTVLTxx PROFILES**

The USTVAULT process is controlled by one or more USTVLTxx profiles. See Chapter 5 “FDR/UPSTREAM Profiles” for full details on how to create USTVLTxx profiles and also for full descriptions of the parameters mentioned below.

The sequential tape backup parameters in the USTVLTxx profile are used to allocate a "tape retention" data set on the output tape.

- The tape retention data set is created as the first file on the output tape holding the vaulted backups.
- The TAPEPREF parameter provides the name of the tape retention data set, which will be recognized by your tape management system for off-site vaulting.
- The RETPD/EXPDT parameters are used to set the expiration of the tape retention data set, and of all the other vaulted files that will be placed on the tape.

The sequential disk backup parameters in the USTVLTxx profile are used to allocate a vault control data set on disk.

- The vault control data set contains the control records that describe the new vault copies. It is created initially on disk, and then copied across as the last file on the output tape when USTVAULT processing completes. The DASDPREF parameter provides the name of the vault control data set.
- If you have the UPSTREAM data encryption feature licensed and enabled, and if USTVAULT has created one or more encrypted copies of backups on this run, the ENCRYPTV parameter causes the vault control file data set to also be encrypted, just prior to the point that it is moved to the output tape.
9.3 USTVAULT Segregation

Since you may want to run a different vaulting process for different backup profiles, you can create more than one USTVLTxx profile. This allows you to segregate your vaulting across more than one set of controlling parameters. As an example, each USTVLTxx profile may provide different data set names and/or retention for the vaulted copies of your backups.

This segregation is controlled through the GROUPID parameter in the backup profile, which specifies that the backup profile can only be vaulted under the control of a matching USTVLTxx vault profile. When USTVAULT is executed, the "xx" suffix of the VAULTxx operand on the USTVAULT command determines which USTVLTxx profile will be used, and which backup profiles will be processed.

For example, a USTVAULT operation executed with the VAULT01 operand will initiate vault processing controlled by the USTVLT01 vaulting profile, which will in turn search for and process only the backup profiles with a GROUPID=01 coded.

Backup profiles that are enabled for vaulting, but which do not specify a GROUPID value can be processed under any USTVLTxx profile. However, it is recommended that if one or more of your backup profiles includes GROUPID, then all profiles should utilize the GROUPID parameter to avoid confusion on vaulting assignments.

If you wish, you can start multiple concurrent vaulting operations, using different USTVLTxx profiles. However, an attempt to start a second vault with the same USTVLTxx profile will wait until the active one has completed.
9.4 USTVAULT WORKFLOW

For each selected sequential backup, USTVAULT will locate the original COPY=1 backup on disk (for sequential disk backups), or it will mount the required tape (for sequential tape backups), and then create a copy of it as the next sequential file on the output vault tape. The vaulted data set name is the same as the original backup, except that the copy number in the filename (as specified by the "?" in TAPEPREF= or DASDPREF= in the backup profile) is changed from “1” to the copy number of the vault copy. This is controlled by the COPY=n operand on the USTVAULT command.

If you are using the UPSTREAM data encryption feature, and if the profile describing the backup being copied by USTVAULT has the ENCRYPTV option set, USTVAULT encrypts the data during the copy process. As described in Chapter 24 “FDR/UPSTREAM Data Encryption”, INNOVATION recommends that you use high compression when creating the original backups that you later wish to be encrypted by USTVAULT, as this reduces the volume of data requiring encryption and the amount of tape media required to contain the USTVAULT copy.

UPSTREAM repository records describing the vaulted copy are then written to a temporary vault control data set on disk. When the vaulting process has completed for all selected profiles, USTVAULT then copies the vault control data set as the last file on the vault tape and catalogs it. The temporary disk file is deleted, unless the NOSCR operand is specified, in which case it is retained on DASD and is cataloged in place of the tape copy.

The original repository records are not updated; they continue to point to the COPY=1 backup, which is used for any restore requests. If you need to restore files from a vaulted backup of a backup, you must first use the USTREGEN utility to update the repository with information about the vaulted backups, as described in Section 9.11 “Restoring from Vaulted Backups”. Each time USTVAULT is run, two new records are however added to the UPSTREAM repository:

❖ A record is added under the USTVLTxx profile name, showing a sequential tape backup with the name of the tape retention data set, which was created as the first file on the vault tape. This record documents when the vaulting operation began.
❖ A record is also added under the profile name USTVLCxx, showing a sequential tape backup with the name of the vault control data set created as the last file on the vault tape. This USTVLCxx profile does not exist in the configuration and is used for reporting purposes only.

The USTVLTxx and USTVLCxx records remain in the repository for as long as the data sets they point to are still cataloged. The USTMAINT utility (see Chapter 17 “FDR/UPSTREAM Operation”) deletes them when they are no longer cataloged. See Section 9.10 “USTVAULT Reporting” for details on how to report on the USTVLTxx and USTVLCxx records in the UPSTREAM repository.
9.5 USTMIGRT AND USTMERGE CONSIDERATIONS

USTVAULT cannot operate concurrently with a USTMIGRT (see Chapter 10 “Migrating Backups from Disk to Tape”) or USTMERGE (see Chapter 11 “Completing Deferred Merge Backups”) using the same GROUPID. In other words, if you start a USTVAULT process with VAULT01 you cannot start a USTMIGRT or USTMERGE process that also targets profiles with GROUPID=01 specified. Any attempt to start one utility operation when the other is operating will cause the second operation to wait until the contending task completes.

Any attempt to run USTVAULT for a backup profile that has a pending deferred merge (see Chapter 11 “Completing Deferred Merge Backups”) will be rejected. You may not run USTVAULT against the backups until the deferred merge has been completed by USTMERGE.
9.6 CREATING LONG-TERM RETENTION BACKUPS

The primary copy of each FDR/UPSTREAM backup requires space in the “USTCATLG” and “USTFILEI” repository data sets. In particular, the “USTFILEI” cluster contains a record for every file that has been backed up.

Multiple records exist for files that have been backed up multiple times. If you are backing up large servers, or a great number of servers and workstations, this repository storage can be quite considerable (see space calculations in Chapter 6 “The FDR/UPSTREAM Repository”).

For this reason, most UPSTREAM backups would be kept only for a limited period of time, perhaps for 1 month, or for a specific number of “versions”, before they are finally uncataloged and expired. This not only frees up the disk/tape media on which the backups reside, but it also allows the USTMAINT utility (see Chapter 17 “FDR/UPSTREAM Operation”) to release the space taken up by the related control records in the UPSTREAM repository data sets.

However, if you need to keep certain backups for an extended period of time, for example to allow for long-term recovery or for legal reasons, you can do this with USTVAULT without requiring the additional space in the UPSTREAM repository.

As previously described, USTVAULT can create vault copies of your backups with differing names (i.e., different copy numbers). Thus, you can run a special USTVAULT execution whenever required, which utilizes a different USTVLTxx profile from the norm. This special USTVLTxx profile provides different (i.e., longer) retention periods for those long-term backup copies.

A console command to initiate a special “long-term” USTVAULT might look like this:

```
F UPSTREAM,VAULT01 COPY=4,N0VCHK
```

The COPY=4 causes USTVAULT to replace the “?” with a “4” in the vaulted filenames. The NOVCHK option allows USTVAULT to create the long-term vaulted copies for backups that already have other vaulted copies.

This process works best if the TAPEPREF prefix names in the USTVLTxx profile are GDGs, so that you can build the GDG bases with the proper number of generations to keep the number of versions you need. For example, 12 generations of a quarterly backup will be kept for 3 years. Tape management catalog control (EXPDT=99000) could then be used to retain and eventually expire the backups.
9.7 INITIATING USTVAULT

USTVAULT can only be executed as a sub-task of the FDR/UPSTREAM z/OS Storage Server started task. This sub-task can be initiated in several ways:

❖ Using the USTBATCH utility
❖ Via the UPSTREAM TSO/ISPF dialog
❖ Through a z/OS operator command
❖ Through the UPSTREAM scheduler USTSCHED (see Chapter 19 “FDR/UPSTREAM Scheduler”), or your own scheduler.

VAULT INITIATION VIA USTBATCH

USTVAULT can be initiated via the USTBATCH utility.

The sample USTBATCH JCL below shows the initiation of the vaulting facility for the backup profile called TEST.

This JCL would require some customization for your own site’s requirements, such as the JOB card and STEPLIB specifications. Please also review the parameter descriptions that follow.

```//jobname JOB (accounting,information),'UPSTREAM VAULT',
//        MSGLEVEL=(1,1),CLASS=A,MSGCLASS=X
//*
//**  **********************************************************
//**  ***         VAULT PREVIOUSLY TAKEN BACKUPS             ***
//**  **********************************************************
//*
//VAULT EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=* 
//USTLOG DD SYSOUT=* 
//USTPARM DD *

APPLPREF=UPSTR       * VTAM APPL Prefix
USAPPL=UPSTREAM      * Name of UPSTREAM Started TASK VTAM APPL
LOGMODE=#INTER       * VTAM LOGMODE to use from USTBATCH to STC
CONV=WAIT            * WAIT for Backup to complete before ending
COMMAND=VAULT01,PROFILE=TEST    * VAULT Request
ENDPARM              * End of UPSTREAM USTBATCH Parameters
/*
```

When you have completed reviewing the JCL and parameters, you can submit the JCL and the USTVAULT sub-task operation will begin execution immediately.

USTBATCH/USTVAULT PARAMETERS

The key parameters used in the preceding example are explained here. For a full description of all USTBATCH parameters, see Chapter 18 “z/OS Initiation with USTBATCH”.

APPLPREF

The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

USAPPL

The VTAM APPLID of the UPSTREAM started task.

LOGMODE

The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

CONV

This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.
COPYING BACKUPS WITH USTVAULT
INITIATING USTVAULT

COMMAND
This specifies the UPSTREAM started task command that is to be issued, in this case a VAULT process.

The final two characters of the specified command (01 in our example) refer to the GROUPID parameter in the backup profiles that will be targeted by this vaulting process. We have limited the selection of backup profiles by adding a PROFILE= parameter, to select only the backups belonging to the TEST backup profile. Without this coded, the vault process would select all vault enabled backup profiles (VAULT=YES specified in the profile) that have GROUPID=01 specified.

The actual vault process itself will be controlled by the corresponding special vault profile, as described in Chapter 5 “FDR/UPSTREAM Profiles”. In our example, that special profile would be USTVLT01.

ENDPARM
Indicates the end of the USTBATCH input parameters.
You can initiate USTVAULT using the UPSTREAM TSO/ISPF dialog. First, select Option # 6 “Operator Commands”.

In the subsequent menu, shown below, locate the “Utility Commands” section, where you specify the vault profile suffix in the ID entry field, followed optionally by the profile name. In our example, we will run the process against all vault enabled backup profiles (VAULT=YES specified in the profile) that have a GROUPID of 01.

The COPY field specifies the numeric substitution character that will replace the “?” character specified in the backup profile TAPEPREF/DASDPREF fields when the VAULT copy of the backup data set is created (see Section 9.2 “USTVAULT Configuration” for more details).

When you have completed the preceding menu, simply press ENTER to pass the command to the UPSTREAM started task for processing by the USTVAULT sub-task.
You can initiate USTVAULT using a z/OS Operator command. This is often useful when initiating via an automated schedule or an automated operations tool. However, unlike with USTBATCH initiation, running the command “manually” in this way will not allow you to perform any conditional checking of the results.

❖ First, enter the z/OS console interface that you would normally utilize to access the z/OS system console. In the example below we are using the IOF product.

❖ Then, on the command line, enter your UPSTREAM VAULT command in the format shown below and press ENTER to execute the command.

```
F [started task name],VAULTxx [PROFILE=xxxxxxxx][,NOVCHK][,NOINCR][,NOSCR][,NOCRYPT][C=n][,NOFULL][BLK64K]
```

❖ In our example below, we are running a USTVAULT against all vault enabled backup profiles (VAULT=YES specified in the profile) which have a GROUPID=01. The NOINCR parameter allows USTVAULT to vault only the most recent full backup, effectively bypassing any recent incremental backups. The NOFULL Vault parameter instructs USTVAULT to vault only incremental backups, which have not been previously vaulted, back to the last full backup.

A backup profile may be specified as PROFILE=, PROF=, or P=, and can also accept a trailing “***” as a wildcard to match profiles beginning with the same set of characters. If the PROFILE keyword is not specified, backups for all profiles matching this GROUPID value will be included in this vault run.

❖ Specify C=n to set the “copy number” of this vault run. The default is C=2.

❖ By default the VAULT utility does not vault a backup that has already been vaulted. Specify NOVCHK to bypass that test. This may be abbreviated as “NOV”.

❖ During the VAULT process, the utility creates a Vault Control File data set on DASD containing the control records related to the backup that was vaulted. At the end of the process, the Vault Control File is moved to the end of output tape as a separate data set, recataloged and scratched from DASD. Specify the NOSCR keyword on the VAULT command to leave the cataloged copy of the Vault Control File data set on DASD.

❖ Specify NOCRYPT to cause execution of the VAULT utility to bypass the specified encryption. This keyword may be abbreviated as “NOC”.

❖ Specifying BLK64K limits the maximum block size to 64KB on the vault output tape data set.
9.8 Terminating USTVAULT

You may terminate an active USTVAULT sub-task if, for any reason, you cannot wait for it to complete. This is not recommended. Whenever possible you should always allow the process to complete. However, if you need to prematurely terminate a USTVAULT sub-task, you can do so by:

❖ Issuing the console command: F UPSTREAM,TERM LU=USTVLTxx
❖ Using the TERM line command on the UPSTREAM ISPF status display (see Section 17.6 “Controlling FDR/UPSTREAM Sub-Tasks”).
❖ Using a console STOP (P) command to shutdown UPSTREAM itself. This will have the same effect as TERM on a USTVAULT sub-task.

When terminated by any of the preceding methods, USTVAULT completes the processing on the current backup, and then copies the temporary vault control data set to the tape before finally terminating. This orderly termination may take a few minutes to complete. If you restart the vaulting operation at a later time, USTVAULT processes only those backups that were not completed on the earlier run.

USTVAULT should not be terminated while it has an outstanding tape mount, as this may cause premature termination of the utility. If you cannot wait for the orderly termination, as previously described, then you can issue the TERM a second time to force the termination. This should only be done in extreme circumstances as the forced termination of an incomplete sub-task can occasionally cause problems within the main UPSTREAM started task.
9.9 Recovering from a Failed USTVAULT

If a USTVAULT run does not complete for some reason (perhaps an abend, or a forced termination) all backups that were successfully copied to tape will have been flagged as being successfully vaulted, so a later execution of USTVAULT will correctly bypass them. However, the temporary vault control data set will remain on disk (and cataloged), but it will not have been copied across to the vault tape. This is not generally a problem because the USTREGEN process (see Section 9.11 “Restoring from Vaulted Backups”) can access the vault control data set directly from disk, rather than off the tape.

In a full-blown disaster, however, where the disk has been destroyed and the vault control data set has been lost, you would need to run the USTREGEN utility against each vaulted backup (i.e., instead of the "lost" vault control data set) before being able to initiate the restores.
You can report on vaulting activity with the USTRPORT utility (see Chapter 22 “Reporting with USTRPORT”), allowing you to display information on when a vault process has been run for each USTVLTx profile. You can also get this information via the Client panels - see the FDR/UPSTREAM Client Guide for details.

As an example, a report TYPE=BACKUP that includes the USTVLTx and/or USTVLc profiles will display the data set names and tape volume serials of the tape retention data set and vault control data set created during a vault process. If the vaulting tape is multi-volume, the USTVLx profile will show the first tape volser in the set, and the USTVLc will show the last tape.

A report TYPE=VAULT, shown below, displays only details of backups that have vault copies. The report shows the data set name and tape volume serials of the vaulted copy (copies 2 through 9).

```/*
*      THIS JOB PRINTS A VAULT REPORT OF FDR/UPSTREAM BACKUPS
*      
*REPORT   EXEC PGM=USTRPORT,REGION=0M
*STEPLIB  DD DISP=SHR,DSN=your.upstream.loadlib
*SYSUDUMP DD SYSOUT=* 
*SYSPRINT DD SYSOUT=* 
*USTCATLG DD DISP=SHR,DSN=your.upstream.ustcatalg.file
*USTFILEI DD DISP=SHR,DSN=your.uptsream.ustfilei.file
*SYSIN    DD * 
*      SELECT PROFILE=* 
*      PRINT RPTYPE=VAULT
*/```

In this extract from a TYPE=VAULT report you can see the vaulted "COPY2" backups for Clients PROD01 and TESTXP1:
If you are using the UPSTREAM data encryption feature, and if you have used USTVAULT to create encrypted copies of some of your backups, you can report on those encrypted backups using the REPORT statement of USTCRYFM (Chapter 24 "FDR/UPSTREAM Data Encryption").
9.11 RESTORING FROM VAULTED BACKUPS

Having created one or more copies of a primary FDR/UPSTREAM backup with USTVAULT, there are several considerations for using that vaulted backup during a restore, either at your home site or for disaster recovery. This final section discusses the issues involved in using USTVAULT-copied backups for restore purposes.

If you need to restore from a vaulted copy of a backup, the control records in the UPSTREAM repository must first be updated to point to that vaulted copy. If you have created multiple copies of your backups, you must choose which copy will be used for the restore.

Having selected the vaulted backup that will be used for the restore, the USTREGEN utility (see Chapter 12 “Updating the Repository”) is then used to read the appropriate vault control data set, which was written as the last file on the vault tape. This data set contains UPSTREAM repository records, which have already been updated to point to the vaulted copy of the backup. USTREGEN reads these records from the vaulted tape and updates the UPSTREAM repository with this information. This is much quicker than having to read through the entire vaulted tape to create the new repository records from scratch.

Once USTREGEN has been run to update the repository, any subsequent restore requests will then call for the appropriate vaulted tape.

USTREGEN must be executed once for each vault tape whose records are to be updated - i.e., each vaulted backup from which you wish to do a restore. The names of the control files on the vault tapes are recorded under the USTVLCxx profile names and can be obtained with USTRPORT (as described in Section 9.10 “USTVAULT Reporting”).

It is possible that your vaulted backups may contain multiple copies of the same Client file. For example, incremental merge backups will normally append each day’s incremental to the back of the first incremental - i.e., the incremental backup file is cumulative. However, if you vault that backup every day, USTVAULT will copy the entire backup file, so each copy of that backup is also cumulative, with each one containing one more day’s worth of incremental data.

When you need to recover from those vault copies you need only to run USTREGEN against the latest USTVAULT copy of the backup.

USTREGEN has several safety catches to prevent an accidental processing of a back-level copy of a backup. First, it compares the tape volume serial in its input records with the system catalog entry for the backup; if the volser in the catalog does not match, it will reject those records with a warning message reminding you that you should do the USTREGEN only against the latest version. Also, if the backup data set in the control records is not cataloged at all, USTREGEN will not update those records in the repository.

For UPSTREAM to successfully restore from the vault copies, the vault data sets must be cataloged in the system catalog.

NOTE: The vault control data set written to the end of a vault tape contains pointers to physical blocks on the vault tape. If the tape is copied by IEBGENER, or any other tape utility, these pointers may become invalid, making the tape useless for recovery unless you do a USTREGEN on every backup file on the tape. It is strongly recommended against copying vaulted backup tapes; always use USTVAULT to create any additional copies of your UPSTREAM backup tapes.

DISASTER RECOVERY

If you are recovering from a full-blown disaster, and you are recovering your entire UPSTREAM system, you must first complete the following steps prior to running USTREGEN to point to your off-site copies of your FDR/UPSTREAM backups:

❖ Recover the UPSTREAM system (e.g., the load library, configuration, logs).
❖ Restore the UPSTREAM repository data sets (see Chapter 6 “The FDR/UPSTREAM Repository”) from their most recent backup.
❖ Recover copies of the z/OS catalogs in which the vault control data sets were cataloged.

NOTE: The preceding tasks would ordinarily be carried out as part of the z/OS disaster recovery process, probably using your z/OS DASD management system.
As described in Chapter 12 "Updating the Repository", USTREGEN can be executed in various ways including a batch job (if the UPSTREAM started task is not active) or as a console command, through the ISPF interface, or via USTBATCH (all of which require the UPSTREAM started task to be active).

Here is an example of running USTREGEN as a batch job. In this instance the USTARCH DD statement points directly to the backup itself, rather than to the vault control data set (but USTREGEN can read the required information from either source).

```plaintext
//*
//* EXECUTE THE USTREGEN MODULE
//*
//*
//REGEN EXEC PGM=USTREGEN
//STEPLIB DD DSN=your.upstream.loadlib,DISP=SHR
//USTLOG DD SYSOUT=*  
//USTSNAP DD SYSOUT=*  
//USTCATLG DD DSN=your.upstream.ustcatlg.file,DISP=SHR
//USTFILEI DD DSN=your.upstream.ustfilei.file,DISP=SHR
//USTARCH DD DSN=backup.dataset.name,DISP=SHR
//SYSUDUMP DD SYSOUT=*  
```

See Chapter 12 "Updating the Repository" for full details on USTREGEN.
MIGRATING BACKUPS FROM DISK TO TAPE

USTMIGRT OVERVIEW

10 MIGRATING BACKUPS FROM DISK TO TAPE

10.1 USTMIGRT OVERVIEW

USTMIGRT is a utility program that will “migrate” recently created sequential disk backups to tape. This should not be confused with Client file migration, as described in Chapter 15 “FDR/UPSTREAM Client File Migration”.

USTMIGRT allows you to initially write your backups to disk instead of tape. This improves efficiency, since many backups can operate simultaneously, without being limited by tape mount requirements or available tape drives.

Periodically, you can then collect those disk backups with USTMIGRT and move them across to tape, freeing up the disk space. This can be especially useful if you want to do daily incremental backups to disk, but you do not have enough available disk space to hold the entire set of incremental backups for the week; i.e., between your regular full merge backups.

When processing multiple backup profiles, all backups will be placed on a single/consolidated output tape set (unless the NEWTAPE option is specified) reducing the number of tape volumes when compared to writing multiple backups to separate tapes.

Once a backup data set has been migrated across to tape, a restore from that backup will operate exactly as if the original backup had been done directly to tape - it does not have to be copied to disk first. The UPSTREAM repository information is updated to point directly to the new location of the backups on tape.

USTMIGRT vs. Z/OS DASD MANAGEMENT

UPSTREAM disk backups can also be migrated to tape by your z/OS DASD Management System, as long as the appropriate auto-recall services are in place to allow UPSTREAM to recall the backup to disk prior to doing the restore. This may, however, be very time-consuming and may require multiple tape mounts when several backups must be read to complete a restore. For this reason, this method is not recommended.

As previously described, with USTMIGRT, the restore can take place directly from the tape, without requiring the backup file to first be recovered to disk before the restore can take place. For this reason, USTMIGRT is the recommended method for moving disk-based backups to tape.

USTMIGRT vs. COPYINCR

The COPYINCR option of full merge backups (Chapter 11 “Completing Deferred Merge Backups”) is another way of moving incremental backups from disk to tape, but this is not done until the full merge backup is run. USTMIGRT, on the other hand, can move backups at any time, and for more than one backup profile.
10.2 USTMIGRT CONFIGURATION

Several steps are required before you can use USTMIGRT.

**THE BACKUP PROFILES**

Each backup profile for which you intend to utilize USTMIGRT must be enabled for the migration process. This is achieved via the “MIGTHRESH=” parameter, as follows.

- The default value is 0, which disables USTMIGRT for the profile.
- Any value greater than 0 enables USTMIGRT for the profile.
- See “USTMIGRT Workflow” for a full description of the MIGTHRESH parameter.

Any backup profile that will utilize USTMIGRT must also be enabled for tape backups, even if it will not at any time directly create tape-based backups. This enabling of tape backups is achieved with the TAPE=YES parameter.

See Chapter 5 “FDR/UPSTREAM Profiles” for full details on how to create backup profiles.

**THE USTMIGXX PROFILES**

The USTMIGRT process is controlled by one or more USTMIGxx migration profiles. See Chapter 5 “FDR/UPSTREAM Profiles” for full details on how to create USTMIGxx profiles and also for full descriptions of the parameters mentioned below.

The **sequential tape** backup parameters in the USTMIGxx migration profile are used to allocate a tape retention data set on the output tape.

- The tape retention data set is created as the first file on the output tape holding the migrated backups.
- The TAPEPREF parameter provides the name of the tape retention data set, which is recognized by your tape management system for off-site vaulting.
- The RETPD/EXPDT parameters are used to set the expiration of the tape retention data set, and of all the other migrated backups that are placed on the tape.
- If the USTMIGxx profile contains the TAPEGDG option, the tape retention data set is created as a GDG; this is recommended so that normal GDG processing uncatalogs the tape retention data set as new generations are created. If you use tape management catalog control (EXPDT=99000 for some tape management systems), the migration tapes are retained for the number of generations specified by the GDG base created for this GDG.
10.3 USTMIGRT Segregation

Since you may want to run a different migration process for different backup profiles, you can create more than one USTMIGxx profile. This allows you to segregate your migrations across more than one set of controlling parameters. As an example, each USTMIGxx profile may provide different retention periods for the migrated backups.

This segregation is controlled through the GROUPID parameter in the backup profile, which specifies that the backups belonging to that profile can only be migrated under the control of a matching USTMIGxx migration profile. When USTMIGRT is executed, the “xx” suffix of the MIGRTxx operand on the USTMIGRT command determines which USTMIGxx profile will be used, and which backup profiles will be processed.

For example, a USTMIGRT executed with the MIGRT01 operand initiates migrate processing controlled by the USTMIG01 migration profile, which in turn searches for and processes only the backup profiles with a GROUPID=01 coded.

Backup profiles that are enabled for USTMIGRT migration, but which do not specify a GROUPID value can be processed under any USTMIGxx profile. However, it is recommended that if one or more of your backup profiles include GROUPID, then all profiles should utilize the GROUPID parameter to avoid confusion on migration assignments.

If you wish, you can start multiple concurrent USTMIGRT operations, using different USTMIGxx profiles. However, an attempt to start a second migration with the same USTMIGxx profile will wait until the active one has completed.
10.4 USTMIGRT Workflow

When USTMIGRT is run:

❖ It first scans the FDR/UPSTREAM repository for sequential disk backups recorded under a backup profile whose MIGTHRESH value is greater than 0.

❖ If the number of such backups is equal to or higher than the threshold, the least recently created disk backups will be migrated to tape until the number of disk backups remaining is \( n - 1 \) (one less than the threshold).

❖ For example, MIGTHRESH=1 will cause all disk backups to migrate, but MIGTHRESH=3 leaves the 2 most recently created backups on disk.

❖ If the latest backup is a restartable/interrupted backup, it will not migrate until the backup has been restarted and successfully completed.

The new tape-based backups have the same data set name as their original disk counterparts. However, if multiple backups are migrated under the same backup profile name (e.g., USTMIGRT is being run infrequently and you are migrating several days worth of incremental backups in one pass), all of these backups will be combined into a single output tape file. The name of that file is the same as the most recently created disk backup that has been migrated.

Assuming multiple backup profiles are being processed in a single pass, the output tape is a multi-file tape volume. If the amount of data being migrated exceeds the capacity of the first tape volume, additional scratch tapes are requested, making this a multi-file, multi-volume tape aggregate. As each disk backup is migrated, the appropriate UPSTREAM repository records are updated to point to the new location of the backups.

Several options are provided to add additional control to the USTMIGRT process.

NEWTAPE

If the NEWTAPE operand is specified, USTMIGRT calls for a new scratch tape for each backup migrated to tape. It uses the sequential tape parameters in the associated backup profile to allocate the tape. The TAPEPREF value is used for the output data set name unless the TAPEPREF and DASDPREF values are identical; in which case, the original backup data set name is used. When NEWTAPE is specified, no dummy file is created at the beginning of each tape.
FORWARD

If USTMIGRT migrates several backups for the same backup profile in one execution, it combines them into one file on the output tape. The FORWARD option enhances this process to also add previous backups that have already been migrated.

With the FORWARD option, USTMIGRT will do a “forward merge” of any incremental backups previously moved to tape by USTMIGRT, back to the last full backup. It reads those backups from past tapes and merges them with the new data being written to the new tape. This effectively creates one file on the output tape for each backup profile being processed, and this file contains data from all of the preceding incremental backups, back to the last full backup.

This consolidation of all backups onto a single tape makes restores very efficient, since a minimum number of tapes must be mounted to complete the process.

The FORWARD migration process requires two tape drives; one for the new output tape, and one to hold the input tape(s) containing the previously migrated backups.

USTMIGRT is very efficient on tape handling during the FORWARD processing. For example, if the next “previously migrated” backup is on an input tape already mounted, even if it is for a different backup profile, USTMIGRT simply re-positions to that file and reads it without first dismounting the tape.

If you do FORWARD migration on the same set of backup profiles every day, all of the data required for each day’s migration is on the previous day’s migration tape. Since the backup profiles are processed in the same order each time, USTMIGRT is usually able to process that input tape efficiently, without dismounting it.

Once the previous tape backups have been moved over to the new output tape, the input tape data sets are uncataloged. If you have them under tape management “catalog control” they are automatically eligible for scratch.

When FORWARD is specified, no dummy file is created at the beginning of each tape.

MAXV=

The MAXV value (1-99) limits the number of backup versions for a profile that are migrated FORWARD from the previous migration tape data set. It is only valid if FORWARD is also specified.

ALL

Specify ALL to migrate all DASD-resident backup data sets to tape. This keyword is mutually exclusive with the FORWARD option. This causes no backup data sets to be left on DASD.
10.5 USTMIGRT with USTVAULT and USTMERGE

USTMIGRT cannot operate concurrently with a USTVAULT (Chapter 9 “Copying Backups with USTVAULT”) or USTMERGE (Chapter 11 “Completing Deferred Merge Backups”) using the same GROUPID. In other words, if you start a USTMIGRT process with MIGRT01 you cannot start a USTVAULT/USTMERGE process which also targets profiles with GROUPID=01 specified. Any attempt to start one utility operation when the other is operating will cause the second operation to wait until the contending task completes.

For deferred merge backups in “pending” status, the USTMERGE process must first complete the merge process before USTMIGRT can be used to migrate the backups. Refer also to the USTMERGE section for details on using USTMIGRT in conjunction with USTMERGE.

NOTES ON UTILITY EXECUTION

For USTVAULT only, the optional parameter NOINCR causing vaulting to occur only for full backups, bypassing any incremental backups. The optional parameter NOVCHK will cause backups to be vaulted even if they are flagged as already having been vaulted, allowing you to recreate vault tapes or, in conjunction with COPY=, create additional vault copies. The optional parameter COPY=n controls the copy number that will replace the “?” in the backup file names created on the vault (2 through 9, 2 is the default).

For USTMERGE only, if you do multiple Deferred Full MERGE backups without running USTMERGE, resulting in multiple uncompleted full MERGE backups, USTMERGE will normally only process the most recently created Deferred MERGE backup. If you need to retain the other backups, specify the optional FORCE parameter; this will cause USTMERGE to select the oldest Deferred MERGE backup instead. If there are multiple such uncompleted backups, you will have to execute with FORCE multiple times until they are all processed.

For USTMIGRT only, the MAXV keyword specifies the maximum number of backups for a profile that will be processed during a MIGRATE FORWARD operation. This feature exists to limit the overhead associated with continual copying and DISP=MOD processing associated with MIGRATE FORWARD execution. For example, if MAXV=3 is specified and one backup is created each day, then on Monday the first backup is copied from disk to tape. On Tuesday, the backup on disk is copied plus the Monday backup that is on tape. On Wednesday, the backup on disk is copied plus the two previous backups on tape. On Thursday only the disk backup is copied to tape because there are now 3 backups on the previous migration tape. If the previous backups on tape plus the disk backups exceed the MAXV value, the previous backups will not be moved forward.

The MAXV value does not apply to disk. If 2 backups for the same profile exist on disk they will all be copied to tape and counted towards the MAXV value. If the previous tape contains two backups then neither backup will be copied forward since it makes no sense to copy some of the backups from the previous tape.
10.6 INITIATING USTMIGRT

USTMIGRT can only be executed as a sub-task of the FDR/UPSTREAM started task. This sub-task can be initiated in several ways:

❖ Using the USTBATCH utility
❖ Via the UPSTREAM TSO/ISPF Interface
❖ Through a z/OS Operator command
❖ Through the UPSTREAM scheduler USTSCHED (see Chapter 19 "FDR/UPSTREAM Scheduler"), or your own scheduler.

USTMIGRT can be initiated via the USTBATCH utility.

The sample USTBATCH JCL below shows the initiation of the migration facility for the backup profile called TEST.

This JCL requires some customization for your own site's requirements, such as the JOB card and STEPLIB specifications. Please also review the parameter descriptions that follow.

```
//jobname JOB (accounting,information),'UPSTREAM MIGRATE',
//        MSGLEVEL=(1,1),CLASS=A,MSGCLASS=X
//*
//*  **********************************************************
//*  ***         MIGRATE PREVIOUSLY TAKEN BACKUPS           ***
//*  **********************************************************
//*
//MIGRATE EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=*
//USTLOG DD SYSOUT=* 
//USTPARM DD *
APPLPREF=UPSTR        * VTAM APPL Prefix
USAPPL=UPSTREAM       * Name of UPSTREAM Started TASK VTAM APPL
LOGMODE=#INTER        * VTAM LOGMODE to use from USTBATCH to STC
CONV=WAIT             * WAIT for Backup to complete before ending
COMMAND=MIGRT01 PROFILE=TEST     * MIGRATE Request
ENDPARM               * End of UPSTREAM USTBATCH Parameters
/*
```

When you have completed reviewing the JCL and parameters, you can submit the JCL and the USTMIGRT sub-task operation begins execution immediately.

The key parameters used in the preceding example are explained here. For a full description of all USTBATCH parameters, see Chapter 18 "z/OS Initiation with USTBATCH".

**APPLPREF**

The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

**USAPPL**

The VTAM APPLID of the UPSTREAM started task.

**LOGMODE**

The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

**CONV**

This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.
COMMAND

This controls the UPSTREAM started task command that is to be issued, in this case a MIGRATE process.

The final two characters of the specified command (01 in our example) refer to the GROUPID parameter in the backup profiles that will be targeted by this migration process. We have limited the selection of backup profiles by adding a PROFILE= parameter, to select only the backups belonging to the TEST backup profile. Without this coded, the migration process would select all migrate enabled backup profiles (i.e., with a MIGTHRESH greater than 0 specified in the profile) that have GROUPID=01 specified.

The actual migration process will be controlled by the corresponding special migration profile, as described in Chapter 5 “FDR/UPSTREAM Profiles”. In our example, that special profile would be USTMIG01.

ENDPARM

Indicates the end of the USTBATCH input parameters.
You can initiate USTMIGRT using the UPSTREAM TSO/ISPF dialog. First, select Option # 6 “Operator Commands”.

In the subsequent menu, shown below, locate the “Utility Commands” section, where you can specify the migration profile suffix in the ID entry field, followed optionally by the profile name. In our example, we will run the process against all migration enabled backup profiles (MIGTHRESH greater than 0 specified in the profile) which have a GROUPID of 01.

When you have completed the preceding menu, simply press ENTER to pass the command to the UPSTREAM started task for processing by the USTMIGRT sub-task.
You can initiate USTMIGRT using a z/OS Operator command. This is often useful when initiating via an automated schedule or an automated operations tool. However, unlike with USTBATCH initiation, running the command “manually” in this way will not allow you to perform any conditional checking of the results.

- First, enter the z/OS console interface that you would normally utilize to access the z/OS system console. In the example below we are using the IOF product.
- Then, on the command line, enter your UPSTREAM MIGRT command in the format shown below and press ENTER to execute the command.

  F [started task name],MIGRTxx [PROFILE=xxxxxxxx] [,NEWTAPE] [,FORWARD]

- In our example below, we are running a USTMIGRT against all migration enabled backup profiles (MIGTHRESH greater than 0 specified in the profile) which have a GROUPID=01.

| CPUB SYSLOG from 05151 Tue 00:00 to 01:01 | Record 703 Col 26 |
| COMMAND ==> /f upstream,MIGRT01 | SCROLL ==> CURSOR |

The PROFILE parameter can also accept a trailing “*” as a wildcard to match profiles beginning with the same set of characters.
**10.7 Terminating USTMIGRT**

You may terminate an active USTMIGRT sub-task if, for any reason, you cannot wait for it to complete. This is **not** recommended. Whenever possible you should always allow the process to complete. However, if you need to prematurely terminate a USTMIGRT sub-task, you can do so by:

- Issuing the console command: `F UPSTREAM,TERM LU=USTMIG,xx`
- Or, using the TERM line command on the FDR/UPSTREAM ISPF status display (see Section 17.6 “Controlling FDR/UPSTREAM Sub-Tasks”).
- Or, using a console STOP (P) command to shutdown UPSTREAM. This will have the same effect as TERM on a USTMIGRT sub-task.

When terminated by any of the preceding methods, USTMIGRT will complete the processing on the current backup. This orderly termination may take a few minutes to complete. If you restart the migration operation at a later time, USTMIGRT will process only those backups that were not completed on the earlier run.

USTMIGRT should **not** be terminated while it has an outstanding tape mount, as this may cause premature termination of the utility. If you cannot wait for the orderly termination, as previously described, then you can issue the TERM a second time to force the termination. This should only be done in extreme circumstances as the forced termination of an incomplete sub-task can occasionally cause problems within the main UPSTREAM started task.
10.8 RECOVERING FROM A FAILED USTMIGRT

If a USTMIGRT run does not complete for some reason (perhaps an abend, or a forced termination) all backups that were successfully copied to tape will have been flagged as being successfully migrated, so a later execution of USTMIGRT will correctly bypass them.
Completing Deferred Merge Backups

11.1 USTMERGE Overview

The various modes of backup available under the FDR/UPSTREAM system are described in Chapter 2 “System Overview”. That chapter also provides numerous backup scenarios, which illustrate the utilization of disk and/or tape media to hold those backups.

A type of backup described in Chapter 2 “System Overview” is the synthetic “full merge” backup. There are three types of “full merge backups, the Full Merge, Deferred Full Merge and the Synthetic Differential Full Merge Backup. They are similar, either copying unchanged files from previous backups (already stored at the z/OS Storage Server) or recording reference pointers to those files (Synthetic Differential Full Merge Backup) and “Merging” with updated files transmitted from the Client to create a new full backup. These methods have the advantage of creating the new full backup with only a fraction of the overhead - i.e., only the files updated since the most recent (incremental) backup are actually transmitted from the Client to create the full.

To carry out this merging process, a full merge backup has to gain access to one or more previous backups; either the last merged full backup or the Master full backup, plus also any incremental backups taken after it. If either the past full and/or the incremental backups are located on tape, the full merge process will require the use of several tape drives to complete the process. In addition to needing an “output” tape drive to hold the new merged backup, it may also require one or two “input” drives to process the previous backups. Depending on the type of tape drives (e.g., robot or stand-alone), the merging process may also need the intervention of an z/OS operator to mount the required tapes.

In some installations, sufficient tape drives and/or z/OS operations personnel may not be available at the exact time that the full merge backups are being run. For example, it may be most convenient from the Client perspective to run the backups at 22:00, while the most convenient time for doing the merge from a tape-usage perspective may be at 07:00 the following morning.

The USTMERGE utility allows you to take your deferred full merge backups at a time that is most convenient from the Client perspective, but to “defer” the final processing of the merge backup until such time as sufficient tapes drives are available, or z/OS personnel are more readily on hand. Completing a Deferred Full Merge with USTMERGE copies the unchanged files from previous backups to tape. Completing a Synthetic Differential Full Merge Backup with USTMERGE, using the MASTER parameter, copies reference pointers to the unchanged client files that were backed up in the Master full backup and the most recent version of ALL of the CHANGED files from the incremental backups since the prior MASTER Full backup.

While a full merge backup is in “deferred merge” status, the UPSTREAM restore programs recognize this and will mount the previous full and/or incremental backups in order to restore the selected file(s). Once the pending merge process has been completed, all future restores will then come from the newly created merged full backup.

**WARNING:** Although the “Deferred” Full Merge or the Synthetic Differential Full Merge will appear to be complete from the Client, it will not be regarded by UPSTREAM as truly complete until the USTMERGE utility has been run.
11.2 USTMERGE Configuration

Several key steps are required before you can use USTMERGE.

**The Backup Profiles**

For each backup profile that will employ deferred merge processing, you must specify the `MERGE=DEFER` option (see "MERGE=" in Section 5.3).

**The USTMERxx Profiles**

The deferred merge process is controlled by one or more special USTMERxx profiles. A default USTMERxx is created for you when you first install FDR/UPSTREAM. You can tailor this default and/or create one or more of your own. See Chapter 5 “FDR/UPSTREAM Profiles” for full details.

In summary, the **sequential tape** backup parameters in the USTMERxx profile are used to allocate a “tape retention” data set on the output tape where the new merged full backups will be written.

❖ The tape retention data set is created as the first file on the output tape holding the merged backups.
❖ The `TAPEPREF` parameter provides the name of the tape retention data set.
❖ The `RETPD/EXPDT` parameters are used to set the expiration of the tape retention data set, and of all the other full merged backup files that are placed onto the output tape.
11.3 USTMERGE Segregation

Since you may want to run a different USTMERGE process for different backup profiles, you can have more than one USTMERxx profile. This allows you to segregate USTMERGE processing across more than one set of controlling parameters (e.g., to apply differing retention periods).

This segregation is controlled through the GROUPID parameter in the backup profiles, which specifies that the backup profile can only be processed by USTMERGE under the control of a matching USTMERxx profile. When USTMERGE is executed, the “xx” suffix of the MERGExx operand on the USTMERGE command determines which USTMERxx profile will be used, and which backup profiles are eligible for processing.

For example, a USTMERGE executed with the MERGE01 operand initiates deferred merge processing controlled by the USTMER01 vaulting profile, which in turn searches for and processes only the backup profiles with a GROUPID=01 coded. Parameters in the USTMER01 profile control the deferred merge processing for that execution of USTMERGE.

Backup profiles that are enabled for deferred merge processing, but which do not specify a GROUPID value can be processed under any USTMERxx profile. However, it is recommended that if one or more of your backup profiles include GROUPID, then all profiles should utilize the GROUPID parameter to avoid confusion on USTMERGE assignments.

If you wish, you can start multiple concurrent USTMERGE operations, using different USTMERxx profiles. However, an attempt to start a second USTMERGE with the same USTMERxx profile waits until the active one has completed.
11.4 USTMERGE Workflow

When USTMERGE runs:

❖ It first scans the FDR/UPSTREAM repository for backups that were taken with DEFER=MERGE, but for which the final merge processing has not yet been completed - i.e., the final merge processing is still pending. It then matches the GROUPID in the profile with the value specified on the MERGExx command, as previously described.

❖ For each backup profile that passes the GROUPID validation, USTMERGE then locates the “deferred” full merge backup, which is at this point really just an incremental backup containing only the files updated since the last backup.

❖ Assuming the “deferred” full merge backup was written to disk, this file is copied across to a new output tape. The profile of the backup being processed must be enabled for sequential tape (TAPE=YES) for this to take place.

❖ The tape data set name in the backup profile (TAPEPREF) will be used for the output data set name, unless it is identical to the disk data set name (DASDPREF), in which case the backup data set will not be renamed when copied across to tape.

❖ Processing a Deferred Full Merge backup, USTMERGE locates the previously merged full backup for this profile together with all the subsequent incremental backups that have been taken since that point. Assuming these previous backups are all on tape, USTMERGE mounts the tapes and reads all the required (i.e., unchanged) files, adding them to the end of the output tape to complete the USTMERGE process.

❖ Processing a Synthetic Differential Full Merge backup, USTMERGE locates the prior completed synthetic differential full merge backup for this profile and all of the subsequent incremental backups. It then copies ALL of the CHANGED files since the prior MASTER Full backup. Assuming these previous backups are all on tape, USTMERGE mounts the tapes and copies the changed files to complete the USTMERGE process.

❖ As the backup of each Client file is moved across to the output tape, the appropriate records in the UPSTREAM repository are updated to reflect their new location.

The NEWTAPE operand of USTMERGE can be used to control the allocation and handling of the output tape(s), as follows:

❖ If NEWTAPE is not specified, each execution of USTMERGE will call for a new scratch output tape, using just one drive. Even if the original deferred backup is already on tape, it will still be moved to the new output tape.

All deferred merge backups processed by that one execution of USTMERGE will be written to the same output tape. Unless only one backup profile is processed, the tape will thus become a multi-file tape volume. If the amount of data exceeds the capacity of a single tape, more scratch tapes will be requested, making this a multi-file, multi-volume tape aggregate.

As each outstanding deferred merge backup is selected for processing, USTMERGE will add a new file to the output tape.

❖ If NEWTAPE is specified, USTMERGE will call for a new output scratch tape for each merge backup being processed in this execution, using the sequential tape parameters in the associated backup profile to allocate the tape. Only one merge backup will be written to each output tape.
11.5 Coordination with USTMIGRT

As previously described, USTMERGE needs to access previous backups associated with the backup profile being processed in order to copy those files to the new output tape. If the original backups are on tape and spread across more than one tape volume, USTMERGE may need to de-allocate and reallocate numerous input tapes to complete the process. However, if USTMERGE detects that the next required backup is in another tape file on the same tape volume, it will simply reposition the tape and read the file. This intelligent utilization of the tape drive can be exploited to further improve the efficiency of the overall USTMERGE process.

USTMERGE always processes the specified backup profiles in reverse alphabetical order. When run without the NEWTAPE operand, described previously, it creates a multi-file tape set containing all of the completed full merge backups, in reverse alphabetical order. On subsequent re-runs, it will then process the previously created multi-file tape set in the same order, thus reducing tape mounting to a minimum. However, if USTMERGE has to read Client files from several sources in order to copy all of the deferred files, it may still be necessary for it to mount several different tapes during the processing of each backup profile. If that is the case, it will be forced to dismount the currently mounted tape and mount another, thus losing the positioning on that tape. If that tape is required for processing of the next backup, it will have to be remounted and repositioned.

This situation is most likely to occur if daily incremental backups were taken to sequential disk, and then USTMIGRT (see Chapter 10 “Migrating Backups from Disk to Tape”) was used to move them off to tape without using the FORWARD option to “forward merge” them onto one consolidated tape. One solution to this might be:

❖ Use the FORWARD option of USTMIGRT to create one consolidated tape set containing all of the recent incremental backups for a selected group of backup profiles, identified by GROUPID.

❖ Then run USTMERGE against the same set of backup profiles (again, identified by GROUPID), allowing it to read those backups, in order, without having to dismount the tape.
11.6 USTVAULT AND USTMIGRT CONSIDERATIONS

USTMERGE cannot operate concurrently with a USTVAULT (Chapter 9 “Copying Backups with USTVAULT”) or USTMIGRT (Chapter 10 “Migrating Backups from Disk to Tape”) using the same GROUPID. In other words, if you start a USTMERGE process with MERGE01 you cannot start a USTVAULT/USTMIGRT process that also targets profiles with GROUPID=01 specified. Any attempt to start one utility operation when the other is operating causes the second operation to wait until the contending task completes.

Any attempt to run USTVAULT or USTMIGRT for any backups that have pending deferred merges are rejected. You may not run those utilities against the backups until the deferred merges have been completed by USTMERGE.
11.7 **Delaying USTMERGE Processing**

USTMERGE processing can be delayed for some time after the initial deferred merge backup. If the delay extends beyond the next full merge, you will have two (or more) deferred merges pending for the same backup profile. By default, USTMERGE only attempts to complete the most recent pending merge; any others remain in deferred status. However, if you specify the optional FORCE operand, it processes the oldest one (instead of the most recent one). If you have multiple deferred merges pending, you must execute USTMERGE with the FORCE parameter repeatedly until they are all processed.

**Recommendation:** Not having multiple pending deferred merge backups, as this can unnecessarily increase the elapsed time of USTMERGE, and you may also run the risk that the old backups expire before USTMERGE has the chance to process them. This would force the next full merge backup to call (unnecessarily) for the re-transmission of those old files from the Client, significantly increasing the elapsed time of that backup.
11.8 INITIATING USTMERGE

USTMERGE can only be executed as a sub-task of the FDR/UPSTREAM started task. This sub-task can be initiated in several ways:

❖ Using the USTBATCH utility
❖ Via the UPSTREAM TSO/ISPF Interface
❖ Through a z/OS Operator command
❖ Through the UPSTREAM scheduler USTSCHED (Chapter 19 “FDR/UPSTREAM Scheduler”), or your own scheduler

The sample USTBATCH JCL below shows the initiation of the deferred merge facility for all backup profiles beginning with PROD and with the GROUPID=05 specified. This JCL requires some customization for your own site's requirements, such as the JOB card and STEPLIB specifications. Please also review the parameter descriptions that follow.

```plaintext
//jobname JOB (accounting, information), 'UPSTREAM MERGE',
// MSGLEVEL=(1,1),CLASS=A,MSGCLASS=X
//*
//**  **********************************************************
//**  ***         COMPLETE THE DEFERRED MERGE PROCESS        ***
//**  **********************************************************
//*
//MERGE EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR, DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=* 
//USTLOG DD SYSOUT=*
//USTPARM DD *
APPLPREF=UPSTR   * VTAM APPL Prefix
USAPPL=UPSTREAM * Name of UPSTREAM Started TASK VTAM APPL
LOGMODE=#INTER  * VTAM LOGMODE to use from USTBATCH to STC
CONV=WAIT       * WAIT for Backup to complete before ending
COMMAND=MERGE05 PROFILE=PROD* * MERGE Request
ENDPARM         * End of UPSTREAM USTBATCH Parameters
/*
```

When you have completed reviewing the JCL and parameters, you can submit the JCL and the USTMERGE sub-task operation will begin execution immediately.

The key parameters used in the preceding example are explained here. See Chapter 18 “z/OS Initiation with USTBATCH” for a full description of all USTBATCH parameters.

**APPLPREF**

The 5 character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

**USAPPL**

The VTAM APPLID of the UPSTREAM started task.

**LOGMODE**

The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

**CONV**

This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task or end immediately after the request is accepted.
COMMAND

This controls the UPSTREAM started task command that is to be issued, in this case a MERGE process.

The final two characters of the specified command (05 in our example) refer to the GROUPID parameter in the backup profiles that will be targeted by this deferred merge process. We have limited the selection of backup profiles by adding a PROFILE= parameter, to select only the backup profiles beginning with PROD. Without this coded, the deferred merge process would select all outstanding deferred backups (i.e., with MERGE=DEFER in the profile) that have GROUPID=05 specified. Addition of the MASTER parameter (,MASTER) will cause USTMERGE to process as a Synthetic Deferred Full Merge backup.

The actual deferred merge process itself will be controlled by the corresponding special merge profile, as described in Chapter 5 “FDR/UPSTREAM Profiles”. In our example, that special profile would be USTMER05.

ENDPARM

Indicates the end of the USTBATCH input parameters.
You can initiate USTMERGE using the UPSTREAM TSO/ISPF dialog. Select option 6 ("Operator Commands") and press ENTER.

In the subsequent menu, shown below, locate the “Utility Commands” section, where you can specify the deferred merge profile suffix in the ID entry field, followed optionally by the profile name. In our example, we will run the process against all outstanding deferred merge backups (with MERGE=DEFER specified in the profile) which have a GROUPID of 05.

When you have completed the preceding menu, simply press ENTER to pass the command to the UPSTREAM started task for processing by the USTMERGE sub-task.
You can initiate USTMERGE using a z/OS Operator command. This is often useful when initiating via an automated schedule or an automated operations tool. However, unlike with USTBATCH initiation, running the command “manually” in this way does allow you to perform any conditional checking of the results.

❖ First, enter the z/OS console interface that you would normally utilize to access the z/OS system console. In the example below we are using the IOF product.

❖ Then, on the command line, enter your UPSTREAM MERGE command in the format shown below and press ENTER to execute the command:

   F [started task name],MERGE[xx][PROFILE=xxxxxxxx][,NEWTAPE][,FORCE][,MASTER]

❖ In our example below, we will run the process against all outstanding deferred merge backups for profiles beginning with SRV and which have a GROUPID of 05.

<table>
<thead>
<tr>
<th>CPUB SYSLOG from 05151 Tue 00:00 to 01:01</th>
<th>Record 703 Col 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMAND ===&gt; /f upstream,MERGE05PROFILE=SRV*</td>
<td>SCROLL ===&gt; CURSOR</td>
</tr>
</tbody>
</table>

The PROFILE parameter can also accept a trailing "*" as a wildcard to match profiles beginning with the same set of characters.

NOTE: PROFILE may be abbreviated as P=, or PROF=. NEWTAPE may be abbreviated as NEWT and MASTER may be abbreviated as MS.
11.9 Terminating USTMERGE

You may terminate an active USTMERGE sub-task if, for any reason, you cannot wait for it to complete. This is not recommended. Whenever possible you should always allow the process to complete. However, if you need to prematurely terminate a USTMERGE sub-task, you can do so by:

❖ Issuing the console command: F UPSTREAM,TERM LU=USTMERGE
❖ Using the TERM line command on the FDR/UPSTREAM ISPF status display (see Section 17.6 “Controlling FDR/UPSTREAM Sub-Tasks”).
❖ Using a console STOP (P) command to shutdown UPSTREAM itself. This has the same effect as TERM on a USTMERGE sub-task.

When terminated by any of the preceding methods, USTMERGE completes the processing on the current backup. This orderly termination may take a few minutes to complete. If you restart the merge operation at a later time, USTMERGE processes only those backups that were not completed on the earlier run.

USTMERGE should not be terminated while it has an outstanding tape mount, as this may cause premature termination of the utility. If you cannot wait for the orderly termination, as previously described, then you can issue the TERM a second time to force the termination. This should only be done in extreme circumstances as the forced termination of an incomplete sub-task can occasionally cause problems within the main UPSTREAM started task.
11.10 RECOVERING FROM A FAILED USTMERGE

If a USTMERGE run does not complete for some reason (perhaps an abend, or a forced termination) all backups that were successfully merged have been flagged as such, so a later execution of USTMERGE correctly bypasses them.
11.11 **USTMERGE REPORTING**

You can use USTRPORT (Chapter 22 “Reporting with USTRPORT”) to produce a report showing all FDR/UPSTREAM backups that are in deferred merge status (i.e., the full merge backup has been run but the USTMERGE process, which completes the backup, has not yet been executed).

```
//USTRPORT EXEC PGM=USTRPORT
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=*  
//SYSPRINT DD SYSOUT=*  
//USTCATLG DD DISP=SHR,DSN=your.upstream.ustcatlg.file
//USTFILEI DD DISP=SHR,DSN=your.upstream.ustfilei.file
//SYSIN DD *
  SELECT PROFILE=*,BKTYPE=DEFR
  PRINT RPTYPE=BACKUP  
/*
The USTREGEN utility can be used to insert or update information in the FDR/UPSTREAM repository. The source of the new/updated information can be:

- **An original UPSTREAM backup**
  
  If, for any reason, information for a backup is inadvertently removed from the repository (deleted, expired etc), this information can be re-written to the repository, as long as you still have the original backup tape available and cataloged to z/OS. Every UPSTREAM backup contains a copy of the repository records that describe it, allowing USTREGEN to read that information and re-write it back into the repository.

- **A foreign UPSTREAM or UPSTREAM Reservoir backup**
  
  USTREGEN can read any backup created by any FDR/UPSTREAM system, including the UPSTREAM Reservoir (assuming the tape hardware is compatible and the defaulted “UPSTREAM-z/OS Compatible” option was set in the profile definition that was used to create the backup). USTREGEN can, therefore, be used to read a “foreign” backup created by a different UPSTREAM or UPSTREAM Reservoir system, importing the appropriate control records into the new host UPSTREAM system's repository.

- **A vaulted copy of an UPSTREAM backup (USTVAULT)**
  
  UPSTREAM repository records normally point to the original (copy 1) backup, so that all restores use that primary copy. When additional copies are created by USTVAULT (Chapter 9 "Copying Backups with USTVAULT") control records updated to point to the secondary copy are written to a separate data set at the end of the vaulted tape. If you need to access the vaulted backup at any time (e.g., at a disaster recovery site), USTREGEN can read those control records from the separate data set and update the repository to point to the copied backup, enabling all future restore requests to use that copy.

  If you are using the UPSTREAM data encryption feature (Chapter 24 "FDR/UPSTREAM Data Encryption") and if you have chosen to encrypt the vault control data set as well as the actual copies of the backups themselves (via the ENCRYPTV option in the USTVLTxx profile), you need to ensure that the UPSTREAM encryption key file is accessible to USTREGEN.

**Caution:** Once an UPSTREAM backup that has been REGEN'd back into the repository with USTREGEN, it **cannot** then subsequently be used as input to a USTVAULT process.
12.2 Executing USTREGEN

USTREGEN can be executed in various ways:

❖ “USTREGEN via UPSTREAM Operator Command”
❖ “USTREGEN via z/OS Operator Command”
❖ “USTREGEN via USTBATCH”
❖ “USTREGEN as a Batch Job”

See USTVAULT (Chapter 9 “Copying Backups with USTVAULT”) for additional information on running USTREGEN.
USTREGEN can be initiated through an UPSTREAM operator command with the UPSTREAM started task active.

Select option 6 (“Operator Commands”) from the UPSTREAM TSO/ISPF dialog main menu and press ENTER.

```plaintext
-------------------------- FDR/UPSTREAM --------------------------
COMMAND ==> 6
1 USTBATCH - Host Initiated Services
2 STATUS   - Current Status Information
3 DEFINE   - Define Control Files
4 CONFIGURE - Main Options
5 PROFILE  - Workstation Profile Names
6 OPER     - Operator Commands
```

In the subsequent menu, shown below, locate the “Utility Commands” section, where you can select the REGEN function, and specify the name of the backup file to be processed. In our example, we will run a REGEN against the “backup.dataset.name” data set. This will update the appropriate repository records with information regarding this backup.

```plaintext
-------------------------- FDR/UPSTREAM Operator Commands --------------------------
Command ==> Scroll ==> PAGE

UPSTREAM started task name: UPSTREAM

SEL  OPERATION
--- ---------------------------------------------

Startup/Termination Commands
( ) START..........................start the UPSTREAM started task
( ) STOP...........................terminate UPSTREAM gracefully
( ) QUIT...........................terminate UPSTREAM immediately

Log Commands
( ) FLUSHLOG.......................flush the log and summary buffers
( ) SWITCHLOG.....................switch the log and summary files

Utility Commands
( ) MAINT..........................start the USTMAINT maintenance utility
( ) MAINTF.........................start the USTMAINT for F-record cleanup
( ) REMOVEDSN=(
( ) COMPRESS.......................compress the active configuration dataset
( ) REFRESH MEMBER=( UPSTREAM )....refresh the configuration parameters
( X ) REGEN DSN=( backup.dataset.name )
     PROFILE=(
```

When you have completed the preceding menu, simply press ENTER to pass the REGEN command to the UPSTREAM started task for processing.
You can initiate a USTREGEN process using an z/OS operator command to the UPSTREAM started task.

❖ First, enter the z/OS console interface that you would normally utilize to access the z/OS system console. In the example below we are using the IOF product.

❖ Then, on the command line, enter a REGEN command in the format shown below and press **ENTER**.

```
F [started task name],REGEN [P=xxxxxxxxx][,DSN=xxxxxx]
```

❖ In our example below, we are running a REGEN process against a vaulted copy of a backup:

```plaintext
CPUB SYSLOG from 05151 Tue 00:00 to 01:01 Record 703 Col 26
COMMAND ===> /f upstream,REGEN DSN=dataset.name SCROLL ===> CURSOR
```

If you wish to REGEN in a specific profile, use the P= parameter. The P= parameter can also accept a trailing """" as a wildcard to match profiles beginning with the same set of characters. The combined length of the P= and DSN= operands can not exceed 43 characters.

USTREGEN can also be executed via USTBATCH (Chapter 18 "z/OS Initiation with USTBATCH") when the UPSTREAM started task is active. The sample USTBATCH job below shows a REGEN against the backup called "backup.dataset.name" This JCL would require some customizing for your own site's requirements, such as the JOB card and STEPLIB specifications. Please also review the parameter descriptions that follow.

```jcl
//jobname JOB (accounting,information),'UPSTREAM REGEN',
//        MSGLEVEL=(1,1),CLASS=A,MSGCLASS=X
//*  **********************************************************
//*  ***         REGEN A BACKUP                             ***
//*  **********************************************************
//REGEN EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=*
//USTLOG DD SYSOUT=*
//USTPARM DD *
//APPLPREF=UPSTR
//USAPPL=UPSTREAM
//LOGMODE=#INTER
//CONV=WAIT
//COMMAND=REGEN DSN=backup.dataset.name
ENDPARM
/*
```

The key parameters used in the preceding USTBATCH example are described here. For a full description of all USTBATCH parameters, see Chapter 18 "z/OS Initiation with USTBATCH".

**APPLPREF=**

The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

**USAPPL=**

The VTAM APPLID of the UPSTREAM started task.

**LOGMODE=**

The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

**CONV=**

This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.
COMMAND=

This controls the started task command that is to be issued, in this case a REGEN.

ENDPARM

Indicates the end of the USTBATCH input parameters.

**USTREGEN as a Batch Job**

As we have shown, USTREGEN can be executed in various ways. If the UPSTREAM started task is not active, USTREGEN can be executed rather than USTBATCH.

In this example of running USTREGEN as a batch job, the USTARCH DD statement points directly to the backup itself, rather than to the vault control data set (but USTREGEN can read the required information from either source).

```plaintext
//* EXECUTE THE USTREGEN MODULE
/**
 //REGEN EXEC PGM=USTREGEN
 //STEPLIB DD DSN=your.upstream.loadlib,DISP=SHR
 //USTLOG DD SYSOUT=* 
 //USTSNAP DD SYSOUT=* 
 //USTCATLG DD DSN=your.upstream.ustcatlg.file,DISP=SHR 
 //USTFILEI DD DSN=your.upstream.ustfilei.file,DISP=SHR 
 //USTARCH DD DSN=backup.dataset.name,DISP=SHR 
 //SYSUDUMP DD SYSOUT=* 
```
MANAGING YOUR BACKUPS
INTRODUCTION

13 MANAGING YOUR BACKUPS
13.1 INTRODUCTION

Previous chapters of this guide have shown several ways that you can manage your FDR/UPSTREAM backups:

❖ You can create duplicate copies of your backups with USTVAULT. See Chapter 9 “Copying Backups with USTVAULT”.
❖ You can move your disk-based backups to tape with USTMIGRT. See Chapter 10 “Migrating Backups from Disk to Tape”.
❖ You can complete pending deferred merge backups with USTMERGE. See Chapter 11 “Completing Deferred Merge Backups”.
❖ You can place information about backups into the repository with USTREGEN. See Chapter 12 “Updating the Repository”.

UPSTREAM includes numerous other functions that provide further possibilities for managing your backups, as discussed below. It should be noted, however, that the functions described here are provided only for specialized cases and are not intended for every day usage.

For example, the DELETE command is not usually required to delete and uncatalog your UPSTREAM backups. Instead, the retention settings and optional GDG utilization, as defined in the backup profile (Chapter 5 “FDR/UPSTREAM Profiles”), ordinarily is used to control the eventual and automatic expiration, deletion and uncataloging of your backups. The following functions are only required outside the normal day-to-day management of your backups.
13.2 AVAILABLE FUNCTIONS

The following backup management functions are available under UPSTREAM.

REMOVEDSN (REM)

This function allows you to delete backup information from the UPSTREAM repository.

It works at a UPSTREAM backup data set level; i.e., not at an individual Client file level. When the information for a backup data set is removed from the repository with REMOVEDSN, all information regarding the individual Client files within that backup is also removed, but the backup data set itself is not uncataloged from z/OS. If the backup is on disk, it will not be deleted. (See “DELETE” in Section 13.2.)

REMOVEBKP (RBK)

Similar to REMOVEDSN, but for backups that are part of a multi-backup data set. REMOVEBKP allows the removal of a single backup from the UPSTREAM repository.

DELETE

This function is similar to REMOVEDSN in that it will delete backup information from the UPSTREAM repository. However, in addition, it will also uncatalog the backup data set from z/OS, potentially releasing the tape back to the tape management system's scratch pool if it is the only (or last) cataloged backup on the tape. If the backup is on disk, it will also be scratched to free up z/OS DASD resources.

DELETE NO REMOVE (DNR)

This function is a modified/reduced version of DELETE in that it will uncatalog the backup data set from z/OS and (if the backup is on disk) scratch it to free up z/OS DASD resources.

However, it will not delete backup information from the repository. Instead, it will leave that information in tact.

BROWSE

The function is used for diagnostic purposes. It invokes the standard TSO/ISPF browse function on any disk-based UPSTREAM backup data set. All standard TSO/ISPF browse functions work normally.

REGEN

This function is the same as USTREGEN (Chapter 12 “Updating the Repository”) and can be used to update (or create) backup information in the UPSTREAM repository. There are several reasons why you may wish to do this.

Firstly, it can be used to update the repository information to point to a vaulted copy of a backup that has previously been created with USTVAULT (Chapter 9 “Copying Backups with USTVAULT”). The REGEN function uses information taken from the vault control data set created by USTVAULT and written at the end of a vaulted backup.

The REGEN function can also be used to recreate information about any backup (a primary copy or a vaulted copy) that may have been previously removed from the repository. This may occurred either by natural expiration, as the result of a previous REGEN, or perhaps as a result of a previous REMOVEDSN or DELETE command.

Finally, the REGEN function can also be used to create repository records from scratch for a new backup. This “new” backup may be one created by another UPSTREAM system, or perhaps a backup taken with the Reservoir. When used in this way, the REGEN function effectively allows you to “import” a backup taken by another UPSTREAM or UPSTREAM Reservoir system.

See Chapter 12 “Updating the Repository” for full details on running USTREGEN.
13.3 INITIATING THE BACKUP MANAGEMENT FUNCTIONS

The backup management functions described previously can be initiated in several ways, as outlined in the following sections:

❖ “Initiation via "Backup Management" in the TSO/ISPF Interface”
❖ “Initiation via "Operator Commands" in the TSO/ISPF Dialogs”\(^1\)
❖ “Initiation via USTBATCH”
❖ “Initiation via a z/OS Operator Command”\(^2\)

---

1. Applies only to REGEN and REMOVEDSN.
2. Applies only to REGEN, REMOVEDSN, and REMOVEBKUP.
MANAGING YOUR BACKUPS
INITIATING THE BACKUP MANAGEMENT FUNCTIONS

First, select the “Management” option “11” in the TSO/ISPF Interface main menu and press ENTER.

<table>
<thead>
<tr>
<th>COMMAND ===</th>
<th>FDR/UPSTREAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 USTBATCH</td>
<td>Host Initiated Services</td>
</tr>
<tr>
<td>2 STATUS</td>
<td>Current Status Information</td>
</tr>
<tr>
<td>3 DEFINE</td>
<td>Define Control Files</td>
</tr>
<tr>
<td>4 CONFIGURE</td>
<td>Main Options</td>
</tr>
<tr>
<td>5 PROFILE</td>
<td>Workstation Profile Names</td>
</tr>
<tr>
<td>6 OPER</td>
<td>Operator Commands</td>
</tr>
<tr>
<td>7 REPORT</td>
<td>Report</td>
</tr>
<tr>
<td>8 REGISTRY</td>
<td>Name Registry</td>
</tr>
<tr>
<td>9 DUPAUDIT</td>
<td>Duplicate File Audit</td>
</tr>
<tr>
<td>10 SCHEDULE</td>
<td>Command Scheduler</td>
</tr>
<tr>
<td>11 MANAGEMENT</td>
<td>Backup Management</td>
</tr>
<tr>
<td>12 USTCRYPT</td>
<td>USTCRYPT Options</td>
</tr>
</tbody>
</table>

In the subsequent panel, shown below, you will be asked to provide the profile name relating to the backup profile(s) that you wish to work with.

Next, you specify the repository record type, which may be either those describing your main backups, or it may be the control records describing vault operations carried out by USTVAULT.

Finally you are also required to enter the name of the UPSTREAM catalog and fileinfo repository data sets, which are specified in the UPSTREAM started task JCL by the DDnames USTCATLG and USTFILEI (Chapter 6 “The FDR/UPSTREAM Repository”). Once entered, these values are retained each time you return to this screen.

In our example below, by entering a “*” on the profile name field and “backup” in the record type field, we have requested a display of all records relating to all backup profiles. We have also provided the names of our CATALOG and FILEINFO data sets. Note the use of the quotes to avoid name resolution interference with your TSO/E profile prefix setting.

| ------------------------------- | FDR/UPSTREAM Backup Management ----------------------------------------------- |
| Command ===| * for all profiles |
| Profile name ===| BACKUP | Backup Vault |
| Catalog data set: Data set name ===| 'UPSTREAM.CATALOG.$UST.CLUSTER' |
| Fileinfo data set: Data set name ===| 'UPSTREAM.FILEINFO.$UST.CLUSTER' |

Once you have completed the preceding menu, press ENTER to continue.

The next menu to appear is the actual “Backup Management” panel. The available functions (as described earlier), together with their abbreviations, are shown on the “Available row commands” line. These functions or abbreviations can be entered in the SEL column, against the backup(s) you wish to process.

In the example below, we have selected to delete the backup data set, UPSTREAM.TEST.COPY1.G0004V00, that was created under the backup profile TEST on 01/05/2016 at 13:02. As described earlier, the DELETE function will remove all repository entries relating to this backup data set, and all information regarding the actual
files contained in that backup. It will also uncatalog the backup data set from z/OS.

The "Backup Management" panel then re-appears, updated to show a confirmation of
the DELETE function. (The DELETE actually runs the USTMAINT utility to perform a
REMOVEDSN on the backup data set followed by a CATALOG SCRATCH to complete
the request).

The message that appears at the bottom of the updated panel indicating the action that was
submitted to the UPSTREAM started task for processing. You must review the started task
USTLOG data set to determine if the function processed correctly.
You may now select another backup for processing or press the PF3 key to return to the prior menu.
The REMOVEDSN and REGEN functions (but not the REMOVEBKUP, DELETE, or DELETE NO REMOVE functions) can also be initiated through option 6 (“Operator Commands”) in the UPSTREAM TSO/ISPF dialog main menu.

In the subsequent menu, shown below, locate the “Utility Commands” section, where you can select the REMOVEDSN or REGEN function, and specify the name of the backup file to be processed. In our example, we will issue a REMOVEDSN against the UPSTREAM.TEST.COPY1.G0004V00 backup file. As described earlier, this will remove from the repository the information about the backup, but it will not uncatalog it from z/OS, nor will it scratch it from disk.

When you have completed the preceding menu, simply press ENTER to pass the REMOVEDSN command to the UPSTREAM z/OS started task for processing.
All of backup management functions described earlier can be initiated via the USTBATCH utility. (see Chapter 18 “z/OS Initiation with USTBATCH”.)

The sample USTBATCH JCL below shows the initiation of the REMOVEDSN function against the backup file called UPSTREAM.TEST.COPY1.G0004V00.

This JCL requires some customizing for your own site’s requirements, such as the JOB card and STEPLIB specifications. Please also review the parameter descriptions that follow.

```
//jobname JOB (accounting, information), 'UPSTREAM REMOVEDSN',
// MSGLEVEL=(1,1), CLASS=A, MSGCLASS=X
//*
// *** **********************************************************
// ***           REMOVEDSN A BACKUP                             ***
// *** **********************************************************
//*
//VAULT EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR, DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=*  
//USTLOG DD SYSOUT=* 
//USTPARM DD *
APPLPREF=UPSTR
USAPPL=UPSTREAM
LOGMODE=#INTER
CONV=WAIT
COMMAND=REMOVEDSN=UPSTREAM.TEST.COPY1.G0004V00
ENDPARM
/*
```

The key parameters used in the preceding USTBATCH example are described here. See Chapter 18 “z/OS Initiation with USTBATCH” for a full description of USTBATCH.

- **APPLPREF=**
  - `ccccc` – The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

- **USAPPL=**
  - `cccccccc` – The VTAM APPLID of the UPSTREAM started task.

- **LOGMODE=**
  - `cccccccc` – The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

- **CONV=**
  - This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.

- **COMMAND=**
  - This controls the UPSTREAM started task command that is to be issued, in this case a REMOVEDSN function. The DSN operand specifies the target of the specified command, in this case the backup file called UPSTREAM.TEST.COPY1.G0004V00

- **ENDPARM**
  - Indicates the end of the USTBATCH input parameters.
You can initiate some of the UPSTREAM backup management functions using a z/OS operator command.

❖ First, enter the z/OS console interface that you would normally utilize to access the z/OS system console. In the example below we are using the IOF product.

❖ Then, on the command line, enter your backup management command in the format shown below and press ENTER to execute the command. Only the REGEN, REMOVEDSN, and REMOVEBKUP functions are supported here (not DELETE or DELETE NO REMOVE).

\[ \text{F [stc name],REMOVEDSN=xxxxxx} \]
\[ \text{F [stc name],REMOVEBK [VERSIONDATE=xxxxxxxxxxxx][,PROFILE=xxxxxxxxx]} \]
\[ \text{F [stc name],REGEN [PROFILE=xxxxxxxx][,DSN=xxxxxx]} \]

❖ In our example below, we are issuing a REMOVEDSN to remove from the repository the details of the backup file called UPSTREAM.TEST.COPY1.G0004V00.
14  FILE TRANSFER

14.1  INTRODUCTION

FDR/UPSTREAM includes an optional file transfer facility that can be used to transfer files between the z/OS Storage Server and the Client workstation/server, referred to in this chapter as “host” and “client” respectively. The transfer request can be initiated from either the z/OS Storage Server or the Client.

Only one file can be transferred at a time. If it is a text (printable) file, UPSTREAM includes ASCII-EBCDIC translation and automatic record conversion. You may also transfer binary files.

One example use of this very flexible yet simple file transfer facility is the transmission of UPSTREAM log files from the Client to the z/OS Storage Server, from where they can be centrally analyzed and printed or archived. Another example may be a simple “file distribution” system, where an Client file is transmitted to the z/OS Storage Server and then re-transmitted back to numerous other Clients.

The UPSTREAM file transfer facility has many other practical uses and can usually be employed whenever you need to transfer files from host-to-client, or vice versa.
The file transfer facility is very easy to implement. It requires no additional software or communication configuration, because it uses the same client-to-host connection as a normal backup. If you already have a Client configured for UPSTREAM, you can do file transfers simply by defining an appropriate file transfer profile.
14.3 **FILE TRANSFER PROFILES**

One or more special profiles are required to support the file transfer facility. These profiles are fully described in Chapter 5 "FDR/UPSTREAM Profiles", but in summary:

- A file transfer profile has the **TRANSFER** attribute specified
- The **DASD** attribute is required if client-to-host transfers will go directly to z/OS disk
- The **TAPE** attribute is required if client-to-host transfers will go directly to z/OS tape
- The **DASDPREF** and **TAPEPREF** attributes can be used to supply name of the z/OS output data set on client-to-host transfers

Although file transfer profiles share similar attributes to normal backup profiles, they cannot be used for anything other than file transfers.
14.4 **CLIENT-TO- HOST TRANSFERS**

**UPSTREAM Client Input File**

The name of the FDR/UPSTREAM Client input file to be transferred to the z/OS Storage Server is specified at execution time, as described in Section 14.9 “Initiating File Transfers”.

If it is a text file, an ASCII-to-EBCDIC translation will take place by default.

If you are transmitting a non-text (binary) file, you should turn off the “Translation to EBCDIC” and “Each line is a separate record” options. Unless you have detailed knowledge of the format of the binary file, the transferred file will be of use only if you later transfer it back to the same (or other) Clients, perhaps as part of a simple “file distribution” system.

**UPSTREAM z/OS Storage Server Output File**

The name and location of the z/OS Storage Server output file can be controlled either through the special file transfer profile (as described earlier), or this information can be supplied at execution time.

❖ If the z/OS Storage Server output file is to be a sequential disk/tape data set it will be allocated as a new data set and cataloged by UPSTREAM.

❖ If it is to be the next generation of a GDG, you must specify “(+1)” at the end of the name, e.g., “A.B.C(+1)”.

❖ If it is a member of an existing PDS, you must specify a member name, e.g., “A.B.C(MEMBER1)”. The PDS must be pre-allocated and it must have the proper DCB characteristics (see below). UPSTREAM never allocates a new PDS.

The z/OS Storage Server output file will have the following DCB characteristics:

❖ **RECFM**: Since Client files may have variable-length records, the z/OS Storage Server output data set will be in variable blocked format (RECFM=VB)

❖ **LRECL**: This will be the USERECORDSIZE specified at the Client when the transfer is initiated (+4 for the variable format length fields)

❖ **BLKSIZE**: This will be the value of DASDBLK in the associated file transfer profile, which must be at least USERECORDSIZE+8.

The size of the individual records written to the z/OS Storage Server output file depends on various options.

Since text files are usually broken into records delimited by a CR/LF (just LF on UNIX systems), by default UPSTREAM will scan for those delimiters and transmit the individual records (with the delimiters removed). This results in an z/OS file with the same number and size of records as the Client file.

This option can be overridden, in which case the transmitted file is considered to be a continuous set of data bytes and delimiters, which are not removed. Since z/OS requires that data sets consist of individual records, UPSTREAM breaks the transmitted data in records of the size specified by USERECORDSIZE. For example, if USERECORDSIZE is 6000, the z/OS data set consists of variable length records, all of which are 6000 bytes in length (except the last one).
14.5 HOST-TO-CLIENT TRANSFERS

If it is a text file, an EBCDIC to ASCII translation will take place by default. Since Client text files are usually broken into records delimited by a CR/LF (just LF on UNIX systems), UPSTREAM defaults to transmitting the individual records from the z/OS Storage Server data set with the appropriate delimiters inserted. This results in a Client output file with the same records as the z/OS Storage Server input file.

If you are transmitting a non-text binary file, you must turn off the “Translation to EBCDIC” and “Each line is a separate record” options so that the z/OS Storage Server file is transmitted back to the Client without translation and without delimiters inserted.

The name of the z/OS Storage Server input file to be transmitted to the Client would normally be specified at execution time. UPSTREAM automatically allocates the specified input data set using the z/OS catalog; you do not need to specify its location on disk or tape.

If the z/OS Storage Server input file is omitted at execution time, UPSTREAM chooses the file that was last transmitted to z/OS under the same profile name. This file is then transmitted back to the specified Client, which may be either the same Client from where it came, or (in the case of a simple “file distribution” system) back to a different Client.

This option of omitting the z/OS Storage Server input filename at execution time only works, however, if UPSTREAM is recording your file transfer operations (see Section 14.6 “Maintaining Records of Your Client-to-Host Transfers”). If it is not, then you must specify the z/OS Storage Server input file name.

The name of the Client output file is specified at execution time. See Section 14.9 “Initiating File Transfers” for more details.
14.6 MAINTAINING RECORDS OF YOUR CLIENT-TO-HOST TRANSFERS

On client-to-host file transfers only, FDR/UPSTREAM can optionally record information about each file transfer operation in the CATALOG repository data set. This information is logged under the file transfer profile name and allows you to query and report on client-to-host file transfer activity. See the “Record on Host” option in “Step #3 - File Transfer Specification” in Section 14.9 and also the “HOSTRECORD=” option.
14.7 DELETING THE INPUT FILE

On file transfers in either direction, you can opt to delete the input file after the transfer has taken place. This is controlled by the “Delete local file after transfer” option.
14.8 Z/OS SECURITY

If SECLVL=1 or more is specified in the FDR/UPSTREAM configuration (see Section 3.16 “Configure the MAIN Options”), a userid and password must be associated with the file transfer request.

Access to z/OS Storage Server data sets are verified under that userid, as follows:

❖ On client-to-host transfers, the userid must have CREATE authority to the z/OS output data set.
❖ On host-to-client transfers, the userid must have READ authority to the z/OS input data set.
14.9 INITIATING FILE TRANSFERS

File transfers in either direction can be initiated in several ways:

❖ From the Client, using the GUI or Director panels (see the FDR/UPSTREAM Client Guide for details)
❖ From the z/OS Storage Server, using USTBATCH.

The remainder of this chapter shows how to use the UPSTREAM TSO/ISPF dialogs to generate a USTBATCH batch job to initiate a file transfer. USTBATCH JCL can also be constructed manually, if desired, although this is not recommended. See Chapter 18 "z/OS Initiation with USTBATCH" for more information on USTBATCH.

Enter the UPSTREAM TSO/ISPF dialog via your installation defined method (see Section 3.17 "Make the FDR/UPSTREAM ISPF Dialogs Easily Available"). From the main menu, specify option number 1, ("USTBATCH"), and press ENTER.

<table>
<thead>
<tr>
<th>COMMAND</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USTBATCH - Host Initiated Services</td>
</tr>
<tr>
<td>2</td>
<td>STATUS - Current Status Information</td>
</tr>
<tr>
<td>3</td>
<td>DEFINE - Define Control Files</td>
</tr>
<tr>
<td>4</td>
<td>CONFIGURE - Main Options</td>
</tr>
<tr>
<td>5</td>
<td>PROFILE - Workstation Profile Names</td>
</tr>
<tr>
<td>6</td>
<td>OPER - Operator Commands</td>
</tr>
<tr>
<td>7</td>
<td>REPORT - Report</td>
</tr>
<tr>
<td>8</td>
<td>REGISTRY - Name Registry</td>
</tr>
<tr>
<td>9</td>
<td>DUPAUDIT - Duplicate File Audit</td>
</tr>
<tr>
<td>10</td>
<td>SCHEDULE - Command Scheduler</td>
</tr>
<tr>
<td>11</td>
<td>MANAGEMENT - Backup Management</td>
</tr>
<tr>
<td>12</td>
<td>USTCRYPT - USTCRYPT Options</td>
</tr>
</tbody>
</table>
The next menu to appear allows for the specification of the USTBATCH parameters required to initiate the file transfer. The parameters of most interest are highlighted and explained below. See Chapter 18 “z/OS Initiation with USTBATCH” for a full description of all parameters. Note that we are selecting an Action of 4 “File Transfer”.

Once you have completed entering all the fields of this menu, press the ENTER key to proceed to the next menu.

**APPLPREF**

The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

**USAPPL**

The VTAM APPLID of the UPSTREAM started task.

**TPNAME**

The Transaction Program Name to be used during LU 6.2 communications.

**LOGMODE**

The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

**CONV**

This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.

**WTOCOMP**

Allows a WTO completion message to be issued to the z/OS system operator when the request finishes.

**TCP/IP ADDR**

The IP address of the Client that will participate in this file transfer. Note that this parameter is mutually exclusive with the TARGNAME, DNSNAME, and TARGLU keywords.
FILE TRANSFER
INITIATING FILE TRANSFERS

TCP/IP PORT
The TCP port number of the Client that will participate in this file transfer.

ACTION
Controls which UPSTREAM function is to be performed by this set of generated statements. In our preceding example, ACTION=4 specifies a file transfer request.

---

STEP #3 - FILE TRANSFER SPECIFICATION
The next menu to appear allows you to provide details of the file transfer, including the name of the special profile that will control the operation and the direction of the intended file transfer (“send to host” or “receive from host”).

It is in this panel that you also provide the name of the Client file that acts as either the input file (on client-to-host transfers) or the output file (on host-to-client transfers). You can also use this panel to provide the name and location (disk or tape) of the z/OS Storage Server file, overriding the options setup in the profile. At the bottom of the panel you find the other options mentioned earlier in this chapter, such as “Translate to EBCDIC”, “Record on host” and “Delete local file after transfer”.

---

COMMAND ===>

( ) Send to Host   ( ) Receive from Host
Backup Profile..( FILETRAN )
Record Size.....(
PC File Name....( /opt/fdrupstream/upstream.log )
Host File Name..( admin.upstream.log )

( ) To Disk
( ) To Tape

( ) Translate to EBCDIC   ( ) Attended
( ) Each Line is a Separate Record   ( ) Record on host
( ) Remove Trailing Blanks   ( ) Delete local file after transfer
( ) Truncate

OK <enter>   ( ) More...   Prior panel <PF3>
On completion of the preceding menu, press the ENTER key, then press the PF3 key to return to the USTBATCH Specification menu previously seen in "Step #2 - USTBATCH Specification". We can now generate the z/OS JCL that is used to invoke the USTBATCH utility program that submits the request to the UPSTREAM started task for processing. You do this by specifying "GEN" on the command line and pressing the ENTER key.

The menu below then allows you to tailor the USTBATCH JCL to match your installation's requirements. As a minimum, you should alter the JCL to provide a valid mainframe JOBCARD. You will also need to include a STEPLIB to point to the UPSTREAM load library if it is not in the Linklist. If you use the "DNSNAME=" option to address the Client, you may also need a SYSTCPD DD statement.

--- FDR/UPSTREAM - USTBATCH --- * ---

Command ==> GEN
Scroll ==> CSR

Gen - Generate statements
Read/Save/Delete parameter set

Appearance ==> UPSTR
Queue ==> MAXRETRY
Useappl ==> UPSTREAM
Conv ==> WAIT
Tmaxretry ==> APPLRETRY
Logmode ==> #INTER
Tasklim ==> ALLOWDUP

Targname ==> ZVMINST1 or TARGLU
Or DNSname ==> TCP/IP port ==> IPAdapter addr ==> WTOR=

Wsparm ==> Password ==> Mixed ==> No

Action ==> 4
1 - Backup
2 - Restore & Inquiry
3 - Run a PC Job
4 - File Transfer
5 - Restart Backup
6 - Restart Restore
7 - Kill Restart Backup
8 - Kill Restart Restore
9 - FDRSOS Backup
10 - FDRSOS Restore
11 - PC Migration
12 - Operator Commands
13 - Performance Tests

Client Login Name ==> Client Password ==>
Select option “2” on the command line of the preceding menu (then press ENTER) to review and optionally edit the generated USTBATCH JCL and parameters via a standard ISPF Edit screen.

```
000001 //jobname JOB (accounting,information),'job id data',
000002 // NOTIFY=userid
000003 //*
000004 //*
000005 //XFER EXEC PGM=USTBATCH
000006 //STEPLIB DD DISP=SHR, DSN=your.upstream.loadlib
000007 //SYSUDUMP DD SYSOUT=*  
000008 //USTLOG DD SYSOUT=*  
000009 //USTPARM DD *
000010 APPLPREF=UPSTR
000011 USAPPL=UPSTREAM
000012 LOGMODE=#INTER
000013 CONV=WAIT
000014 *
000015 TCPTARG=ZVMINST1
000016 FILETRANSFER Y * FILE TRANSFER
000017 ACTION 0  * RECEIVE FROM HOST
000018 BACKUPPROFILE FILETRAN
000019 HOSTFILENAME EFG.TEST
000020 TRANSLATE Y
000021 LINEBLOCK N
000022 HOSTRECORD Y
000023 STORAGETYPE 2
000024 COMPRESSLEVEL 0
000025 LATESTVERSION Y
000026 INQOPTIONS 2
000027 MERGE 3
000028 RESTARTTYPE 0
000029 ATTENDED Y
000030 HOSTSORT N
000031 LOGNONFATAL N
000032 REPORTOPTIONS 0
000033 REPORTNAME US.RPT
000034 SKIP 0
000035 *
000036 SPECNUMBER 1
000040 FILES /opt/fdrupstream/upstream.log
000041 FILEDELETE N
000042 ENDPARM
000043 *
000044 */
```

The USTBATCH job can then be submitted for batch processing, either immediately, or it can be saved to a member in a PDS for later submission (manually, or through your job scheduling system).

Once it has been initiated, the executing request can then be monitored via the UPSTREAM ISPF STATUS panel (Option #2), or via the UPSTREAM STATUS operator command (Chapter 17 “FDR/UPSTREAM Operation”).
FDR/UPSTREAM CLIENT FILE MIGRATION
INTRODUCTION

15 FDR/UPSTREAM CLIENT FILE MIGRATION

15.1 INTRODUCTION

FDR/UPSTREAM Client file migration is the process of moving inactive files off the Client workstation/server by backing them up to disk or tape on the z/OS Storage Server and then deleting them from the Client. This is usually done to free up disk space on the Client and is sometimes called "grooming".

NOTE: This process should not be confused with the "backup file migration" carried out by USTMIGRT (Chapter 10 "Migrating Backups from Disk to Tape") where UPSTREAM disk-based backups are moved to tape.

UPSTREAM Client files can be selected for migration in one of two ways:

❖ Unconditional. You may already know that some files are not needed in the near future, perhaps because they belong to an old application, or to an employee that has left the company. If that is the case, you can explicitly select those files through one or more "file specs", in much the same way as they would be selected during a backup or restore.

❖ Conditional. Client files can also be selected for migration based on one or more conditions; the most common of which is the file's last usage (e.g., it was not used within a certain number of days). Other conditions, such as the size of the file, can also be used to determine if it is eligible for migration.

If a Client file is required after it has been migrated, it can be restored to the Client. How this "restore" takes place depends on the operating system on the Client. For Linux, migrated files can only be recovered by a manual process, similar to a restore from backup. See the FDR/UPSTREAM Client Guide for more details.
15.2 IMPLEMENTATION

The FDR/UPSTREAM Client file migration facility is very easy to implement. It requires no additional software or communication configuration, because it uses the same TCP/IP link as a normal backup or restore. If you already have a Client configured for UPSTREAM backups, you can do Client file migration simply by defining an appropriate file migration profile.
15.3 File Migration Profiles

Although the migration process can be carried out at the same time as a backup (see Section 15.4 "Migration During Backup"), it is usually done via a separate migration profile. These profiles are fully described in Chapter 5 "FDR/UPSTREAM Profiles", but in summary:

❖ A file migration profile has the **PCMIGRATE=YES** attribute specified. Any attempt to use this profile for a normal backup will fail
❖ The **DASD** attribute is required if migrations are to be written directly to z/OS disk
❖ The **TAPE** attribute is required if migrations are to be written directly to z/OS tape
❖ The **DASDPREF** and **TAPEPREF** attributes are used to supply the names of the z/OS disk and tape data sets that will hold the migrated data
❖ **RETPD** and/or **EXPDT** are used to control the retention and expiry of the migrated data.
15.4 Migration During Backup

FDR/UPSTREAM Client file migration can optionally be carried out as part of a normal UPSTREAM backup process. In this case, the backup job includes special "migration" file specs, alongside the normal file specs selecting (other) files to be backed up.

The files selected for migration are backed up and stored along with the regular backups and they are recorded under the same backup profile. However, unlike regular backups, the migrated files are then deleted from the Client at the end of the backup process.

If the backups in question are merge backups, the migrated files will be copied forward to each successive full backup during the merge process, until they eventually reach their expiry date. Please note, this method is not recommended due to the complications it can cause in the retention and eventual expiration of migrated files, as explained in Section 15.7 "Migration Retention".
15.5 Migration Types

As with the backup processes described in Chapter 7 “Performing a Backup”, there are also several types of migration process that can be run. They are, in fact, quite similar to the backup processes.

“Full Merge” Migration

This is similar to a full merge backup:

❖ It creates an z/OS backup file containing the migrated Client files selected on this particular run.
❖ It then copies all non-expired migrated files from previous “full merge” migrations.
❖ Finally, it copies all files that have been migrated by “simple” migrations (see “Simple Migration” in Section 15.5) since the last “full merge” migration.

The net result is that you end up with a single z/OS file containing all files migrated on this run, plus all past migrated files that have not yet reached their expiration. This file ordinarily is written to tape though it can also be written to disk, if required.

“Simple” Migration

This is similar to an incremental backup in that it creates an z/OS file containing only the Client files selected in this particular migration run. Most migrated data that eventually gets restored is usually restored within the first few days of its migration so, although the “simple” migration z/OS file can be written to tape, it would normally be directed to disk. This allows for restores or auto-recalls of recently migrated data without requiring a tape mount.

“End Set” Migration

An “end set” migration is almost identical to the “full merge” migration, except that it sets a special flag in its related record in the USTCATLG repository. This flag causes the next “full merge” migration for the same profile to bypass the copying forward of migrated files from previous “full merge” or “simple” migrations. The “end set” migration therefore effectively ends a set of migrations (“full merges” and “simples”) so that the next “full merge” migration creates a brand-new, self-contained file, not containing any previously migrated data.

“End Set” migrations are usually used when the amount of non-expired migrated data has become so large that the processing time of the “full merge” migrations has become too long. It can also be used when the number of tapes required to hold the migrated data has become too large to manage as a single set.

“End set” migrations are generally not required unless:

❖ A large amount of data has been migrated under this profile with a very long retention (e.g., more than a year).
❖ You do an unconditional migration (e.g., not based on last usage dates) of a set of files and you need to keep them for an extended period of time, longer than the usual migration retention period.
15.6 RECOMMENDATIONS

The following is recommended:

❖ Run “simple” migrations on a fairly frequent basis (e.g., daily or weekly) to ensure that unwanted files are removed from your Client servers and workstations. Place the migration files in z/OS disk data sets to allow for easy recovery.

❖ Run “full merge” migrations on a semi-frequent basis (perhaps monthly) to merge all the migrated files onto a single consolidated file. Put that file on z/OS tape.

❖ Make sure that the z/OS backup filenames defined in the migration profile for the “simple” migrations on disk (DASDPREF) and for the “full merge” migrations on tape (TAPEPREF) are different.

❖ Consider making the “full merge” migration tape data sets a GDG (TAPEGDG=YES), perhaps with a limit of 3 or 4 generations so that you have a rolling backup.

❖ The “simple” migration data sets on disk do not need to be a GDG, but you should ensure that they are not deleted from disk until the next “full merge” migration has been run.
15.7 Migration Retention

The retention period of migrated FDR/UPSTREAM Client files is set by the EXPDT or RETPD attributes in the controlling migration profile, which is used to calculate the expiration date of the files as they are migrated. When a “full merge” migration is done, previously migrated files that have now past their expiration date are dropped from the process and not copied forward.

❖ If you do not use “end set” migrations, this means that the latest full migration will contain all of the non-expired files that have ever been migrated under this profile.
❖ If you do use an “end set” migration, previously migrated files are not copied forward on the subsequent “full merge” migration, so you must ensure that the “end set” migration is retained until every migrated file on it has reached its individual expiration date.

The easiest way to do this is to include an exclamation mark “!” in the DASDPREF and TAPEPREF prefixes set in the migration profile. The various migration types will replace the “!” with an “N” (simple), “F” (full merge), or an “E” (end set).

This allows you to create a GDG for the “full merge” migrations and a separate GDG (with a much longer retention) for the “end set” migrations. Depending on how often you intend to do an “end set” migration, you must define this GDG with sufficient generations so that the z/OS files are retained until the Client migrated file with the highest possible/likely retention has reached its expiration date.

For example, if you do “end set” migrations once a quarter, and the highest retention period that you set is 365 days (1 year), the “end set” GDG should have at least 5 generations (covering 5 quarters).

**NOTE:** If you opt to do your migrations as part of the backup process, as previously described in “Migration During Backup”, and if that backup process includes a “first time full” backup, this will not copy forward any previously migrated files. The previous “full” backups, which may contain non-expired migrated files, will need to be retained until all of those migrated files have expired. There is no convenient way to automate this, so you may need to manually change the retention of that previous full backup in your tape management system. This is why it is recommended to run your Client file migration separately from the backup process, controlled by special migration profiles.
15.8  Error Recovery

During the migration process, FDR/UPSTREAM Client files are not deleted until they have all been safely copied to the UPSTREAM disk/tape migration data set. On “full merge” migrations, the deletion does not occur until all of the merge processing from previous migrations backups is complete.

If a migration fails while the Client is transmitting files to the z/OS, the migration process will be marked re-startable, and you may re-start it at any time without any need for error recovery. If a “full merge” migration fails while it is in the process of merging migrated files from previous backups, the new (but incomplete) migration backup data set should be discarded and the process re-started from scratch.

If the merging process fails because the previously merged “full” migration is not available (e.g., it is no longer cataloged, or has been accidentally deleted), you must:

❖ Recover the missing “full” migration from a vaulted copy (see below), or
❖ If the missing “full” migration cannot be located or recovered, manually delete it from the CATALOG (USTCATLG) repository using either the REMOVEDSN or REMOVEBKP commands (see Chapter 13 "Managing Your Backups"). You can then re-submit the migration, which will read the preceding “full” migration and recover most of the previously migrated files, losing only what was migrated between the two “full” migrations.
15.9 MAKING SECONDARY COPIES WITH USTVAULT

You can use the USTVAULT facility (Chapter 9 “Copying Backups with USTVAULT”) to make secondary copies of your migration backup files. This is recommended, as the primary copy of a migration backup file may be the only copy that you have of the original data now that it has been deleted from the UPSTREAM Client.
15.10 INITIATING FDR/UPSTREAM CLIENT FILE MIGRATION

FDR/UPSTREAM Client file migration can be initiated in several ways:

❖ From the Client, using GUI or Director panels (see the FDR/UPSTREAM Client Guide for details).
❖ From the z/OS Storage Server, using USTBATCH.

The remainder of this chapter shows how to use the UPSTREAM TSO/ISPF dialog to generate a USTBATCH batch job to initiate a Client file migration. USTBATCH JCL can also be constructed manually, if desired, although this is not recommended. See Chapter 18 “z/OS Initiation with USTBATCH” for more information on USTBATCH.

Enter the UPSTREAM TSO/ISPF dialog via your installation defined method (see Chapter 3 “Make the FDR/UPSTREAM ISPF Dialogs Easily Available”). From the main menu, specify option number 1, (“USTBATCH”), and press ENTER.
The next menu to appear allows for the specification of the USTBATCH parameters required to initiate the file migration. The parameters of most interest are highlighted and explained below. See Chapter 18 “z/OS Initiation with USTBATCH” for a full description of all parameters. Note that we are selecting an Action of 11 “PC Migration”.

Once you have completed entering all the fields, press the ENTER key to proceed to the next menu.

<table>
<thead>
<tr>
<th>Command: Generate statements</th>
<th>Read/Save/Delete parameter set</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPLPREF ==&gt; UPSTR QUEUE ==&gt; MAXRETRY ==&gt;</td>
<td></td>
</tr>
<tr>
<td>USAPPL ==&gt; UPSTREAM CONV ==&gt; WAIT TMAXRETRY ==&gt;</td>
<td></td>
</tr>
<tr>
<td>TPNAME ==&gt; WTOCOMP ==&gt; APPLRETRY ==&gt;</td>
<td></td>
</tr>
<tr>
<td>LOGMODE ==&gt; #INTER RESTART ==&gt; TASKLIM ==&gt; ALLOWDUP ==&gt;</td>
<td></td>
</tr>
<tr>
<td>TARGNAME ==&gt; ZVMINST1 or TARGLU ==&gt;</td>
<td></td>
</tr>
<tr>
<td>or DNSname ==&gt;</td>
<td></td>
</tr>
<tr>
<td>or TCP/IP addr ==&gt; TCP/IP port ==&gt;</td>
<td></td>
</tr>
<tr>
<td>IPADAPTER addr ==&gt; . ERRWTO . WTOR=</td>
<td></td>
</tr>
<tr>
<td>WSPARM ==&gt;</td>
<td></td>
</tr>
<tr>
<td>MIXED ==&gt;  NO</td>
<td></td>
</tr>
<tr>
<td>ACTION ==&gt; 11 (specify to display related parameters and press enter)</td>
<td></td>
</tr>
<tr>
<td>1 - Backup 5 - Restart Backup 9 - FDRSOS Backup</td>
<td></td>
</tr>
<tr>
<td>2 - Restore &amp; Inquiry 6 - Restart Restore 10 - FDRSOS Restore</td>
<td></td>
</tr>
<tr>
<td>3 - Run a PC Job 7 - Kill Restart Backup 11 - PC Migration</td>
<td></td>
</tr>
<tr>
<td>4 - File Transfer 8 - Kill Restart Restore 12 - Operator Commands</td>
<td></td>
</tr>
<tr>
<td>13 - Performance Tests</td>
<td></td>
</tr>
</tbody>
</table>

The key parameters used in the preceding example are explained here. For a full description of all USTBATCH parameters, see Chapter 18 “z/OS Initiation with USTBATCH”.

**APPLPREF**

The 5-character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.

**USAPPL**

The VTAM APPLID of the UPSTREAM started task.

**TPNAME**

The Transaction Program Name to be used during LU 6.2 communications.

**LOGMODE**

The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.

**CONV**

This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.

**WTOCOMP**

Allows a WTO completion message to be issued to the z/OS system operator when the request finishes.
**FDR/UPSTREAM CLIENT FILE MIGRATION**

**INITIATING FDR/UPSTREAM CLIENT FILE MIGRATION**

**TCP/IP ADDR**

The IP address of the Client from which the files will be migrated.

*NOTE:* This parameter is mutually exclusive with the TARGNAME, DNSNAME, and TARGLU keywords.

**TCP/IP PORT**

The TCP port number of the Client from which the files are migrated.

**ACTION**

Controls which UPSTREAM function is to be performed by this set of generated statements. In this case, we are specifying Action=11 for a migration.

**STEP #3 - FILE MIGRATION SPECIFICATION**

The next menu to appear allows you to provide details of the file migration, including the name of the profile that controls the operation. You also specify the type of migration that takes place (“full merge”, “simple” or “end set”) and the z/OS media that is used to hold the migration backup file.

It is in this panel that you also provide one or more file specs to select the Client files to be migrated. You can then place a “*” in the “spec detail” column of a file spec to access a sub-menu (shown in the second panel below) where you can decide if this will be a “conditional” or “unconditional” migration.

---

<table>
<thead>
<tr>
<th>COMMAND ===&gt;</th>
<th>SCROLL ===&gt; CSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup Parameters:</td>
<td>------Migration Type------</td>
</tr>
<tr>
<td>Backup Profile. (ZVMINST1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( ) Full merge migration</td>
</tr>
<tr>
<td></td>
<td>( ) Simple migration</td>
</tr>
<tr>
<td></td>
<td>( ) Migration end set</td>
</tr>
<tr>
<td>Spec Files Selected for Migration</td>
<td>Detail</td>
</tr>
<tr>
<td></td>
<td>/tmp/*</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OK <enter> ( ) More... Prior panel <PF3>
In our example below, we have opted for a "conditional" migration, in that we are selecting all files that match the file spec that have not been accessed in the last 180 days. An "unconditional" migration would have the “all files in this spec” option flagged, so that everything on the “/tmp” directory would be unconditionally migrated.

<table>
<thead>
<tr>
<th>(   ) Include these files  (   ) Exclude            ( X ) Migrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include</td>
</tr>
<tr>
<td>Reset Archive Bit</td>
</tr>
<tr>
<td>Incremental</td>
</tr>
<tr>
<td>Date Limit</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>&lt;X&gt; Backup Subdirs</td>
</tr>
<tr>
<td>&lt;X&gt; Hidden Files</td>
</tr>
</tbody>
</table>

---

COMMAND ==>

```
File Spec... /tmp/*
----------------------- FDR/UPSTREAM - USTBATCH PC Migration File Spec ------
<p>| |
| |</p>
<table>
<thead>
<tr>
<th>{( ) Include these files ( ) Exclude ( X ) Migrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include</td>
</tr>
<tr>
<td>Reset Archive Bit</td>
</tr>
<tr>
<td>Incremental</td>
</tr>
<tr>
<td>Date Limit</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>&lt;X&gt; Backup Subdirs</td>
</tr>
<tr>
<td>&lt;X&gt; Hidden Files</td>
</tr>
</tbody>
</table>
```

OK <enter> ( ) Chg All ( ) More... Prior panel <PF3>
FDR/UPSTREAM CLIENT FILE MIGRATION
INITIATING FDR/UPSTREAM CLIENT FILE MIGRATION

On completion of the preceding menus, press the ENTER key, then press the PF3 key to return to the USTBATCH Specification menu previously seen in “Step #2 - USTBATCH Specification”. We can now generate the z/OS JCL that will be used to invoke the USTBATCH utility program, which will submit the request to the UPSTREAM started task for processing. You do this by specifying “GEN” on the command line and pressing the ENTER key.

-------- FDR/UPSTREAM - USTBATCH ------ * ---------------
COMMAND ===> GEN  SCROLL ===> CSR

Gen - Generate statements  Read/Save/Delete parameter set

APPLPREF ==> UPSTR  QUEUE ==> MAXRETRY ==>
USAPPL ==> UPSTREAM  CONV ==> WAIT  TMAXRETRY ==>
TPNAME ==>  WTOCOMP ==> APPLRETRY ==>
LOGMODE ==> #INTER  RESTART ==> TASKLIM ==> ALLOWDUP ==>

TARGNAME ===> ZVMINST1 or TARGLU ==>
or DNSname ==> or TCP/IP addr ==> TCP/IP port ==>
IPADAPTER addr ==> . ERRWTO . WTOR=>

WSPARM ==> or PASSWORD ===> MIXED ===> NO

USERID ===> ACTION ===> 11 (specify to display related parameters and press enter)

1 - Backup 5 - Restart Backup 9 - FDRSOS Backup
2 - Restore & Inquiry 6 - Restart Restore 10 - FDRSOS Restore
3 - Run a PC Job 7 - Kill Restart Backup 11 - PC Migration
4 - File Transfer 8 - Kill Restart Restore 12 - Operator Commands

Client Login Name ===> Client Password ===> 

-------------------------- FDR/UPSTREAM -------------------------
COMMAND ===> 2  

Please select one of the following options or press the END key to cancel 

1 - Browse the generated JCL stream 
2 - Edit the generated JCL stream 
3 - Submit the generated JCL stream 
4 - Save the generated JCL in a data set 
5 - Run the generated USTBATCH statements in the TSO foreground 

JCL statements:

( //jobname JOB (job acct data),'job id data',NOTIFY=userid )
( /// )
( /// )
( /// )
( /// )
( ///USTBATCH EXEC PGM=USTBATCH )
( ///STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib )
( ///SYSUDUMP DD SYSOUT=* )
( ///USTLOG DD SYSOUT=* )

----------------------- FDR/UPSTREAM - USTBATCH ------- * ------------------
COMMAND ===> GEN  SCROLL ===> CSR

Gen - Generate statements  Read/Save/Delete parameter set

APPLPREF ==> UPSTR  QUEUE ==> MAXRETRY ==>
Select option 2 on the command line of the preceding menu (then press ENTER) to review and optionally edit the generated USTBATCH JCL and parameters via a standard ISPF Edit screen.

```
000001 //jobname JOB (accounting,information),'job id data',
000002 // NOTIFY=userid
000003 /*
000004 */
000005 //XFER EXEC PGM=USTBATCH
000006 //STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
000007 //SYSUDUMP DD SYSOUT=* 
000008 //USTLOG DD SYSOUT=* 
000009 //USTPARM DD *
000010 APPLPREF=UPSTR
000011 USAPPL=UPSTREAM
000012 LOGMODE=#INTER
000013 CONV=WAIT
000014 TARGNAME=ZVMINST1
000015 TPNAME=UPSTREAM
000016 ERRNTO
000017 ACTION 11                              * PC FILE MIGRATION
000018 BACKUPPROFILE ZVMINST1 
000019 RECORDSIZE 8192
000020 PACKRECSIZE 32700
000021 MERGE 3
000022 STORAGETYPE 2                              * SEQ. DISK
000023 COMPRESSLEVEL 1
000024 LOGNONFATAL Y
000025 SENDHOSTDETAILS Y
000026 *
000027 SPECNUMBER 1
000028 FILES /tmp/*
000029 SKIPOLD N
000030 SPECTYPE 2                                      * MIGRATE
000031 LASTACCESS Y
000032 DASOLD 180
000033 SUBDIRECTORIES N
000034 DIREDELETE N
000035 RETAIN 90
000036 *
000037 ENDPARM
000038 */
```

The USTBATCH job can then be submitted for batch processing, either immediately, or it can be saved to a member in a PDS for later submission (manually, or through your job scheduling system). Once it has been initiated, the executing request can then be monitored via the UPSTREAM ISPF STATUS panel (Option #2), or via the UPSTREAM STATUS operator command (Chapter 17 “FDR/UPSTREAM Operation”).
Chapter 7 “Performing a Backup” and Chapter 8 “Performing a Restore” show how to run backups and restores from/to an FDR/UPSTREAM Client. UPSTREAM also provides a facility for a “user process” to be initiated on a Client machine.

The “user process” can be any program, batch file, or script that can execute on a Client machine. Generally, although not always, this process is used to control some aspect of an UPSTREAM operation, such as a backup or a restore.

As an example, a script might be run prior to backing up a database. This script could inform users of a pending backup before going on to close down the database and prepare it for the backup to begin. Similarly, a matching script could be run after the backup has completed to re-start the database and inform the users of the resumption of normal service.

Utilizing the USTBATCH process (Chapter 18 “z/OS Initiation with USTBATCH”), the before/after scripts and the backup itself can all be automated into an z/OS batch-driven procedure, optionally controlled by your z/OS job scheduling system or the UPSTREAM scheduler USTSCHED (Chapter 19 “FDR/UPSTREAM Scheduler”).
16.2 BUILDING THE USTBATCH JOB

This chapter shows how to use the UPSTREAM TSO/ISPF dialogs to build a USTBATCH batch job to initiate a user process on a Client machine. USTBATCH JCL can also be constructed manually (although this is not recommended) as described in Chapter 18 "z/OS Initiation with USTBATCH".

Enter the UPSTREAM TSO/ISPF dialog via your installation defined method (see Section 3.17 "Make the FDR/UPSTREAM ISPF Dialogs Easily Available"). From the main menu, specify option number 1, "USTBATCH", and press ENTER.
The next menu to appear allows for the specification of the USTBATCH parameters required to initiate the Client user process. The parameters of most interest are highlighted and explained below. See Chapter 18 “z/OS Initiation with USTBATCH” for a full description of all parameters. Note that we are selecting an Action of 3 "Run A PC Job", instead of the usual Action 1 (backup) or Action 2 (restore).

Once you have completed entering all the fields of this menu, press the ENTER key to proceed to the next menu.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPLPREF</td>
<td>The 5 character prefix of the VTAM APPLID to be used by USTBATCH for its communications with the UPSTREAM started task.</td>
</tr>
<tr>
<td>USAPPL</td>
<td>The VTAM APPLID of the UPSTREAM started task.</td>
</tr>
<tr>
<td>TPNAME</td>
<td>The Transaction Program Name to be used during LU 6.2 communications.</td>
</tr>
<tr>
<td>LOGMODE</td>
<td>The VTAM LOGMODE to be used for communicating with the UPSTREAM started task.</td>
</tr>
<tr>
<td>CONV</td>
<td>This controls whether or not the USTBATCH job should wait for the completion of the request submitted to the started task, or end immediately after the request is accepted.</td>
</tr>
<tr>
<td>WTOCOMP</td>
<td>Allows a WTO completion message to be issued to the z/OS system operator when the request finishes.</td>
</tr>
</tbody>
</table>
**TCP/IP ADDR**

The IP address of the Client on which you wish to initiate the user process. Note that this parameter is mutually exclusive with the TARGNAME, DNSNAME, and TARGLU keywords.

**TCP/IP PORT**

The TCP port number of the Client on which you wish to initiate the user process.

**ACTION**

Controls which UPSTREAM function is to be performed by this set of generated statements. In our preceding example, ACTION=3 specifies the running of a Client process or “PC Job”.

---

**STEP #3 - USER PROCESS SPECIFICATION**

The next menu to appear allows you to specify the location (on the Client) and the filename of the user process that you want to execute. This is done on the “Command Line” field, as shown below, where we are going to execute a program or script called “setupdb” that resides in the “/u/user01” directory or folder on the Client. We are also controlling the return code mapping sent back to the originating USTBATCH job (see the FDR/UPSTREAM Client Guide for more details).

| (   ) Do not run job, terminate UPSTREAM or ULTra immediately | ( X ) Run job from UPSTREAM or ULTra and: |
| < X > Wait for job completion | <   > Terminate UPSTREAM or ULTra after job start/completion |

OK <enter> Prior panel <PF3>
**Step #4 - Generate the USTBATCH JCL**

On completion of the preceding menu, press the **ENTER** key, then press the **PF3** key to return to the USTBATCH Specification menu. We can now generate the z/OS JCL that is used to invoke the USTBATCH utility program that submits the request to the UPSTREAM started task for processing. You do this by specifying “GEN” on the command line and pressing the **ENTER** key.

```
----------------------------- FDR/UPSTREAM - USTBATCH -----------------------------
COMMAND ==> GEN
Gen - Generate statements
Read/Save/Delete parameter set

APPLPREF ==> UPSTR
QUEUE ==> MAXRETRY ==>
USAPPL ==> UPSTREAM
CONV ==> WAIT
TPNAME ==> WTOCOMP ==> APPRETRY ==>
LOGMODE ==> #INTER
RESTART ==> TASKLIM ==> ALLOWDUP ==>

TARGNAME ==> ZVMINST1 or TARGLU ==>
or DNSname ==> or TCP/IP addr ==> TCP/IP port ==>
IPADAPTER addr ==>

ERRWTO . WTOR=>

WSPARM ===> PASSWORD ===> MIXED ===> NO

ACTION ==> 3 (specify to display related parameters and press enter)
1 - Backup
2 - Restore & Inquiry
3 - Run a PC Job
4 - File Transfer
5 - Restart Backup
6 - Restart Restore
7 - Kill Restart Backup
8 - Kill Restart Restore
9 - FDRSOS Backup
10 - FDRSOS Restore
11 - PC Migration
12 - Operator Commands
13 - Performance Tests

Client Login Name ===> Client Password ===>
```

**Step #5 - Adding a JOBCARD and STEPLIB**

The menu below then allows you to tailor the USTBATCH JCL to match your installation's requirements. As a minimum, you should alter the JCL to provide a valid mainframe JOBCARD. You also need to include a STEPLIB to point to the UPSTREAM load library if it is not in the Linklist. If you use the “DNSNAME=” option to address the Client, you may also need a SYSTCPD DD statement.

```
----------------------------- FDR/UPSTREAM - USTBATCH -----------------------------
COMMAND ==> 2
Please select one of the following options or press the END key to cancel

1 - Browse the generated JCL stream
2 - Edit the generated JCL stream
3 - Submit the generated JCL stream
4 - Save the generated JCL in a data set
5 - Run the generated USTBATCH statements in the TSO foreground

JCL statements:
{ //jobname JOB (job acct data),'job id data',NOTIFY=userid }
{ /* */
{ /* */
{ /* */
{ //USTBATCH EXEC PGM=USTBATCH }
{ //STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib }
{ //SYSUDUMP DD SYSOUT=* }
{ //USTLOG DD SYSOUT=* }
```
STEP #6 - EDITING THE USTBATCH JOB

Select option 2 on the command line of the preceding menu (then press ENTER) to review and optionally edit the generated USTBATCH JCL and parameters via a standard ISPF Edit screen.

```
jobname JOB (accounting,information),'job id data',
NOTIFY=userid

//BACKUP EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=* 
//USTLOG DD SYSOUT=* 
//USTPARM DD *
APPLPREF=UPSTR
USAPPL=UPSTREAM
LOGMODE=#INTER
CONV=WAIT
TARGNAME=ZVMINST1
ACTION=5
SPECNUMBER=1
FILES=/u/user01/*
ENDPARM
```

STEP #7 - SUBMITTING AND MONITORING THE USTBATCH JOB

The USTBATCH job can then be submitted for batch processing, either immediately, or it can be saved to a member in a PDS for later submission (manually, or through a job scheduling system).

Once it has been initiated, the executing request can then be monitored via the UPSTREAM ISPF STATUS panel (Option #2), or via the UPSTREAM STATUS operator command (Chapter 17 “FDR/UPSTREAM Operation”).
17 FDR/UPSTREAM OPERATION

17.1 OVERVIEW

As described in Chapter 2 “System Overview”, the central point of control for FDR/UPSTREAM is the z/OS started task. After the initial “manual” stopping/starting of the started task during the testing of FDR/UPSTREAM, the startup process is then usually initiated automatically during the z/OS IPL process. This is usually done via a PROC (usually called “UPSTREAM”), stored in a system PROCLIB. See Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”.

Once the started task is up and running, there may be numerous occasions when an operator or administrator needs to communicate with the UPSTREAM system. Examples of this interaction with the UPSTREAM started task include:

❖ Starting (Section 17.2 "Start the FDR/UPSTREAM z/OS Storage Server") and Stopping (Section 17.3 "Stop the FDR/UPSTREAM z/OS Storage Server") the z/OS started task, “TCP/IP Re-Connect”, “Freeing (De-Allocating) a DDname Allocation” in Section 17.3
❖ Viewing status displays (see Section 17.4 “Status Display (MODIFY Command)"
❖ Controlling UPSTREAM sub-tasks (Section 17.6 “Controlling FDR/UPSTREAM Sub-Tasks”)
❖ Controlling multiple UPSTREAM started tasks (Section 17.6 “Controlling FDR/UPSTREAM Sub-Tasks”)
❖ Requesting diagnostics (Section 17.8 “FDR/UPSTREAM Diagnostics”)
❖ Message/Summary log handling (Section 17.9 “Log Handling”)
❖ Configuration maintenance (Section 17.10 “FDR/UPSTREAM Configuration Maintenance”)
❖ Adjusting operating controls (Section 17.11 “Adjusting FDR/UPSTREAM Main Configuration Options”)
❖ Initiating commands with USTCMD (Section 17.12 “Initiating Commands with USTCMD”).

The various sub-sections of this chapter describe the mechanisms and commands that can be used by an authorized operator or administrator of UPSTREAM to communicate with the z/OS started task.

NOTE: Throughout this chapter it is assumed that the PROC installed in your system procedure library as part of UPSTREAM installation (Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”) has been called “UPSTREAM”. This is also the name of the UPSTREAM started task and, as such, is used in all of the example commands given in this chapter.
17.2 START THE FDR/UPSTREAM Z/OS STORAGE SERVER

The normal z/OS START command is used to start the FDR/UPSTREAM z/OS Storage Server started task:

```
S UPSTREAM
```

If you like, you can assign a name that is different from the PROC name. In the example below, the PROC is called UPS311, but the started task has the name "UPSTREAM":

```
S UPS311.UPSTREAM
```

When UPSTREAM has completed its initialization, it issues the following message, showing the member name of the configuration file (if it is a PDS), the VTAM application ID, and the SECLVL (security level) in use:

```
UST035 FDR/UPSTREAM Vn.n.n INIT COMPLETE-CONFIG=member,
              APPLID=applid,SECLVL=n
```

If any errors are encountered during the initialization phase, they are reported to the z/OS system console as well as the UPSTREAM log file (USTLOG). If you encounter any problems with the initialization, be sure to check both sources for diagnostic information.

**STARTUP OPTIONS**

When starting UPSTREAM, options can be specified via PARM= on the START command, for example:

```
S UPSTREAM,PARM='NOMAINT,SCHEDULE'
```

The options specified here on the START command override any PARM= options specified in the UPSTREAM startup PROC (see Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”). The supported options on PARM= are as follows:

**SCHEDULE**

Start the UPSTREAM automatic scheduler USTSCHED (Chapter 19 “FDR/UPSTREAM Scheduler”).

**NOMAINT**

Bypass the automatic execution of USTMAINT (Chapter 17 “FDR/UPSTREAM Operation”) during startup. USTMAINT should be run periodically in order to cleanup any obsolete entries in the UPSTREAM repository. If you choose to run with NOMAINT specified, remember to execute USTMAINT at regular intervals.

**TCPHPNS**

For TCP/IP V3R3 and beyond, High Performance Native Sockets (HPNS) is automatically used. However, if you are using IBM TCP/IP V3R2, both the IUCV and HPNS APIs are supported. To use HPNS on V3R2, specify TCPHPNS on the PARM=, otherwise IUCV is used for compatibility with earlier releases.

**RBSZ**

overrides the default setting of the TCP/IP receive buffer size (TCPRCVBUFRSIZE) that controls the number of bytes received by the z/OS TCP/IP stack before acknowledging this to the remote system.

Default: 131,072 (effective for most shops).

**SBSZ**

overrides of the TCP/IP default settings of the TCP/IP send buffer size (TCPSENDBUFSIZE).

Default: 65,535 (effective for most shops).

**URBSZ**

overrides the default setting of the TCP/IP receive buffer size (TCPRCVBUFRSIZE) for USS based Client communication. This controls the number of bytes received by the z/OS TCP/IP stack before acknowledging this to the remote USS system.

Default: 32,768.
FDR/UPSTREAM OPERATION
START THE FDR/UPSTREAM z/OS STORAGE SERVER

USBSZ
Overrides the TCP/IP default setting of the TCP/IP send buffer size (TCPSENDBUFSIZE) for USS-based Client communication.
Default: 131,072.
17.3 Stop the FDR/UPSTREAM z/OS Storage Server

If the FDR/UPSTREAM z/OS Storage Server started task has to be stopped at any time prior to its normal termination at z/OS shutdown, there are three methods available to request this termination:

❖ "z/OS STOP"
❖ "z/OS MODIFY"
❖ "z/OS CANCEL"

The differences between these methods are described below.

**z/OS STOP**

z/OS STOP causes UPSTREAM to perform an orderly “quiesce” stop. All sub-tasks in progress at the time the command is received continue until completion, but no new sub-tasks are allowed to start. When all sub-tasks have terminated, the main UPSTREAM task then ends.

The format of the STOP command is:

```
P UPSTREAM
```

UPSTREAM issues the following acknowledgment message:

```
UST008*  UPSTREAM STOP ACCEPTED -- SHUTDOWN IN PROGRESS
```

If any BACKUP/RESTORE sub-tasks are active, FDR/UPSTREAM issues:

```
UST240W*  ACTIVE TASK FOUND -- SHUTDOWN AWAITING TASK TERMINATION
```

**z/OS MODIFY**

In those instances when an immediate termination is required, a z/OS MODIFY command can be used. This command causes UPSTREAM to notify all currently processing sub-tasks to terminate. Any backups in progress are suspended. When all sub-tasks have performed an orderly termination, the main task is notified and it then ends.

The format of the MODIFY command is:

```
F UPSTREAM,TERM or F UPSTREAM,QUIT
```

UPSTREAM issues the following acknowledgment message:

```
UST242*  QUIT ACCEPTED -- SHUTDOWN IN PROGRESS
```
Although the UPSTREAM system can also be closed down by an z/OS CANCEL command, this should not ordinarily be used as it may cause a problem with data integrity across the CATALOG, FILEINFO, and FILEDATA repository data sets (Chapter 6 “The FDR/UPSTREAM Repository”). For this reason, the UPSTREAM started task protects itself against operator CANCEL commands, as follows:

❖ If a CANCEL is issued, UPSTREAM intercepts the CANCEL.
❖ If no backup, restore or utility tasks are active, the CATALOG, FILEINFO, and FILEDATA repository data sets, together with the USTLOG data set, are closed and the CANCEL command is allowed to proceed. This may take up to one minute.
❖ If a shutdown is already in progress (perhaps because of a previous STOP or CANCEL command), all sub-tasks are stopped. The repository and log data sets are closed and the CANCEL is allowed to proceed.
❖ However, if there are any backup, restore, or utility tasks active, a status display is issued (see Section 17.4 “Status Display (MODIFY Command)” and Section 17.5 “Status Display (TSO/ISPF)”) and message “UST240W” is issued to give the operator several options:
  • Ignore the “CANCEL” and continue with normal operations
  • Wait for an orderly shutdown (an internal “STOP” command is issued).
  • Terminate a specific sub-task and ignore the “CANCEL”
  • Re-display the status
  • Accept the “CANCEL” (closing the repository and log data sets first).
If UPSTREAM does not come to a normal termination in a reasonable amount of time, another CANCEL can be issued to terminate it.
Prior to using the CANCEL command, it is recommended that you first use the z/OS console DUMP command to obtain an SVC dump of the UPSTREAM address space. This must be done before issuing the CANCEL. The resultant SVC dump provides invaluable information for any subsequent problem determination.

TCP/IP RE-CONNECT
In the event UPSTREAM loses its TCP/IP connection, you can attempt to reconnect via the TCPSTART command:

```
F UPSTREAM, TCPSTART
```
If this command fails to reconnect, you need to stop and start the region.

FREEING (DE-ALLOCATING) A DDNAME ALLOCATION
In the event UPSTREAM has not released a device allocation, you can use the FREE command to cause the UPSTREAM started task to issue a dynamic de-allocation request based on a DDname you specify: You may determine the DDname from the started task JES and initiator logs.

```
F UPSTREAM, FREE DD=ddname
```
17.4 **STATUS DISPLAY (MODIFY COMMAND)**

The FDR/UPSTREAM started task supports an z/OS STATUS inquiry command:

```
F UPSTREAM, STATUS
```

UPSTREAM responds with "UST014*" messages indicating the following details for each active sub-task.

- Profile name
- Network address
- Number of files processed (if applicable)
- CPU time
- Type of operation (e.g., "backup", "restore")
- Internal sub-task ID (see below)

Here is an example of a status display. If no sub-tasks are currently active, message "UST016*" would be issued in place of the "UST015*" indicating "No tasks currently active". The final value on each of the "UST014*" messages (e.g., "0013") is the unique internal ID allocated to each sub-task.

```
<table>
<thead>
<tr>
<th>UST013 STATUS REQUEST --- ACTIVE TASKS ---</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST013 PROFILE LUNAME - # FILES CPU TIME OPERATION ID</td>
</tr>
<tr>
<td>UST014 US02 LU4AS030 15 0.308 BACKUP 0013</td>
</tr>
<tr>
<td>UST014 US01 LU3AS030 2 0.289 BACKUP 0017</td>
</tr>
<tr>
<td>UST014 NTTEST LU0AS039 0 0.123 RESTORE 0022</td>
</tr>
<tr>
<td>UST014 * LU0AS03A 17 0.075 INQUIREV 0032</td>
</tr>
<tr>
<td>UST015 4 TASKS CURRENTLY ACTIVE - END OF DISPLAY</td>
</tr>
</tbody>
</table>
```
17.5 **STATUS DISPLAY (TSO/ISPF)**

A similar display of active sub-tasks can also be obtained via Option 2 (“Status”) on the UPSTREAM TSO/ISPF dialog main menu. This feature requires the program USTATUS to be defined as an ISPF authorized program (see Section 3.18 “Authorize FDR/UPSTREAM ISPF Programs to TSO/E”).

As you can see in our example, for each active sub-task, the display shows the profile name, LUNAME, userid, and operation type, much like on the “UST014*” messages issued by the z/OS STATUS command. Some of these fields on the display may be blank if not applicable to a particular type of operation. Utility tasks, such as USTMAINT, have special profile names, LU names and operation names. More complete descriptions of the possible values in the operation field can be found under OPERNAME in USTRPORT (Chapter 22 “Reporting with USTRPORT”).

The elapsed time and CPU time accumulated by each sub-task are also displayed. If appropriate, the number of files and kilobytes of data processed by the sub-task is shown, together with the bytes per second processed by the sub-task. For some types of operations the file count (# file) may display other quantities, such as “number of backup versions” in the case of a “version inquiry” operation.

In addition to the “sub-task-specific” information, the top half of the panel also provides information about the UPSTREAM system itself, including the configuration file name, VTAM application ID, TCP/IP connection information. It also shows utilization statistics for the repository files, which can be useful in determining when a reorganization of these files may be required, as described in Chapter 6 “The FDR/UPSTREAM Repository”. The statistics detail the space remaining in the file. In the example, the USTFILEI is nearly empty at 95% space remaining.

The display is refreshed every time you press ENTER. To have it automatically refreshed at intervals, overtype the refresh rate (in seconds). Once in automatic mode, press PA1 or ATTN to return to manual mode.

Commands such as “TERM” or “SUSPEND” can be entered in the command line against an active sub-task, but see Section 17.6 “Controlling FDR/UPSTREAM Sub-Tasks” for more information on controlling the behavior of active UPSTREAM sub-tasks.
17.6 CONTROLLING FDR/UPSTREAM SUB-TASKS

FDR/UPSTREAM starts an internal sub-task for every backup, restore, or file inquiry operation. It also uses a sub-task to process some of the utility functions, such as USTVAULT, USTMERGE, and USTMIGRT. On occasions, it may be necessary to manually control the behavior of one or more of these sub-tasks - e.g., to begin, terminate, suspend, or restart it. The command line in the ISPF Status display (Section 17.5 “Status Display (TSO/ISPF)”) and the USTCMD program (Section 17.12 “Initiating Commands with USTCMD”) are two ways of issuing those controlling commands. FDR/UPSTREAM sub-tasks can also be controlled through standard z/OS console commands.

NOTE: To issue a z/OS console command against an active UPSTREAM sub-task (e.g., to terminate, suspend, or restart it), you must first use one of the STATUS displays previously described to obtain either the unique Task ID or the LU name of the sub-task you wish to control.

STARTING A SUB-TASK

You can use a z/OS console command to initiate a sub-task for many of the UPSTREAM utility operations, including USTVAULT, USTMERGE, USTREGEN, USTMAINT, and USTREORG. Here are two examples:

F UPSTREAM,VAULT01
F UPSTREAM,MIGRT05

TERMINATING A SUB-TASK

To terminate a sub-task, enter one of the following commands. If the sub-task does not terminate within a few minutes, it may have hung during termination; if so, re-issue the command to force termination:

F UPSTREAM,TERM ID=task
F UPSTREAM,TERM LU=luname

SUSPENDING A SUB-TASK

To suspend a sub-task you can enter one of the following commands. However, due to operating system considerations, this is not recommended:

F UPSTREAM,SUSPEND ID=task
F UPSTREAM,SUSPEND LU=luname

RESTARTING A SUB-TASK

To restart a suspended sub-task, enter one of the following:

F UPSTREAM,RESTART ID=task
F UPSTREAM,RESTART LU=luname

NOTE: In the preceding examples:

❖ The “ID=“ form is preferred, because it uniquely identifies the sub-task.
❖ If “LU name” is used, there may be several sub-tasks associated with a given LU, and those sub-tasks may change while you are entering the command. If there are several tasks running with the same LU name, the LU= form will terminate the first such task.
❖ For utility tasks (such as USTMIGRT, USTVAULT, and USTMERGE) the LU name is the utility name.
17.7 Controlling Multiple FDR/UPSTREAM Started Tasks

Normally, the ISPF variables associated with the ISPF panel dialog are stored in your ISPF profile data set under an application name of “UST”. If you have a need to keep several sets of FDR/UPSTREAM profiles, or when testing new versions of UPSTREAM, you can use other application names. On the UPSTREAM main menu panel, type “USTID” on the command line. The panel will then display a field where you can enter a new application prefix, and will also display all of the prefixes you have used previously.

For example, to activate this feature, perform the following steps:

1. Enter the UPSTREAM ISPF Panels and on the primary panel enter the “USTID” command on the “COMMAND ===>” line. You see a “USTID ===>” field appear at the bottom of the panel. This field allows for the entry of a three (3) character value that can be used to specify the name to store these definitions under.

2. The UST id is automatically created. Go through the various UPSTREAM ISPF option screens, filling in the appropriate fields with the desired values for your PRODUCTION Started Task.

3. These values are automatically saved under the “UST” USTID.

4. Then return to the primary panel and replace “UST” with “TST” and do the same for your “TEST” Started Task.

5. Now you just need to input the appropriate three character value to switch between saved sets of input fields to address the appropriate z/OS Storage Server Started Task. The history of the saved USTIDs you have created will appear just to the right of the USTID input field enclosed in parenthesis. For example: “(UST TST)”.

Figure 17-1:

```
------------------------- FDR/UPSTREAM -------------------------
COMMAND ===> V 3.9.0
Enter option
 1 USTBATCH - Host Initiated Services
 2 STATUS - Current Status Information
 3 DEFINE - Define Control Files
 4 CONFIGURE - Main Options
 5 PROFILE - Client Profile Names
 6 OPER - Operator Commands
 7 REPORT - Report
 8 REGISTRY - Name Registry
 9 DUPAUDIT - Duplicate File Audit
10 SCHEDULE - Command Scheduler
11 MANAGEMENT - Backup Management
12 USTCRYPT - USTCRYPT Options

USTID ===> TST - for multiple sets of FDR/UPSTREAM dialog profile variables
  ( UST TST )
```

---------- Copyright 1992, 2016 --- Innovation Data Processing, Inc. ----------
17.8 FDR/UPSTREAM Diagnostics

Various facilities are provided within FDR/UPSTREAM for obtaining internal diagnostics, often useful in problem determination:

- "Internal Tracing"
- "Communications Tracing"
- "Abend on Message"
- "Initiating SVC Dumps"

**INTERNAL TRACING**

The internal trace facility should only be used when specifically requested by FDR/UPSTREAM Technical Support for problem diagnosis. The trace records are written to the USTLOG data set, which should be retained for review.

**START INTERNAL TRACING**

To start the internal trace, enter one of the following commands:

- `F UPSTREAM,TRACE ON` (for all UPSTREAM Clients)
- `F UPSTREAM,TRACE ON LU=uname` (for a specific UPSTREAM Client)
- `F UPSTREAM,TRACE ON ID=task` (for a specific UPSTREAM Client)

If either LU= or ID= is specified, only that specific FDR/UPSTREAM sub-task is traced. If multiple TRACE commands are entered, only the last one entered is honored.

If necessary, and again only on the request of FDR/UPSTREAM Technical Support, you can initiate internal tracing during the UPSTREAM startup procedure. This can be done by adding PARM='TRACE' to the EXEC statement in the UPSTREAM startup PROC. See Section 3.19 "Define the FDR/UPSTREAM Started Task PROC".

**STOP INTERNAL TRACING**

To stop an internal trace at any time, enter:

- `F UPSTREAM,TRACE OFF`

**COMMUNICATIONS TRACING**

UPSTREAM also includes a more generalized "communications" trace, which traces VTAM and TCP/IP activity within the UPSTREAM system. This trace has much less overhead than the full internal trace described previously, but should nonetheless still only be run at the request of FDR/UPSTREAM Technical Support.

**START COMMUNICATIONS TRACING**

To start the communications trace, enter the following command, where "nnnnn" (1-5 digits) is the maximum bytes of data to print for each trace entry. The default, if omitted, is 20 bytes:

- `F UPSTREAM,COMTRACE ON,nnnnn`

If necessary, you can initiate the communications trace during UPSTREAM startup. This can be done by adding PARM='COMTRACE' to the EXEC statement in the UPSTREAM startup PROC. See Section 3.19 "Define the FDR/UPSTREAM Started Task PROC".

**STOP COMMUNICATIONS TRACING**

To subsequently stop the communications trace at any time, enter:

- `F UPSTREAM,COMTRACE OFF`
ABEND ON MESSAGE

In order to diagnose certain errors, UPSTREAM provides the option to take an abend when a specific message is generated. Alternatively, the abend can be taken on the nth occurrence of the message.

Since this causes the sub-task generating the message (or occasionally the entire UPSTREAM started task) to abnormally terminate, this facility should be used only on the specific request of FDR/UPSTREAM Technical Support.

To invoke the “Abend on Message” feature, enter the following command, where “mmm” is the 3-digit UPSTREAM message number (e.g., ABENDM=012 for message “UST012E”) and where “ccc” is the 3-digit count of occurrences of the message required before the abend occurs.

F UPSTREAM,ABENDM=mmm, or
F UPSTREAM,ABENDM=mmm,ccc

The following example causes an abend on the fifth occurrence of the message “UST235”.

F UPSTREAM,ABENDM=235,005

INITIATING SVC DUMPS

UPSTREAM includes various methods of obtaining SVC dumps:

SVC Dump ON MESSAGE

Similar to the Abend on Message diagnostic, UPSTREAM provides the option to take a SVC dump when a specific message is generated. Alternatively, the SVC dump can be taken on the nth occurrence of the message.

To invoke the “SVC Dump on Message” feature, enter the following command, where “mmm” is the 3-digit UPSTREAM message number (e.g., ABENDS=012 for message “UST012E”) and “ccc” is the 3-digit count of occurrences of the message required before the SVC dump occurs.

F UPSTREAM,ABENDS=mmm, or
F UPSTREAM,ABENDS=mmm,ccc

The following example causes an abend on the fifth occurrence of the message “UST235”.

F UPSTREAM,ABENDS=235,005

SVC Dump ON DEMAND

An SVC dump of the UPSTREAM started task can be initiated via an UPSTREAM modify command, enter:

F UPSTREAM,SDUMP TITLE=FDR/UPSTREAM SVC DUMP

The TITLE text can be the operators choice but is limited to 60 characters. The default title is “FDR/UPSTREAM SVC DUMP.”

INITIATING AN SVC DUMP VIA A BATCH JOB

As an alternative to initiating an SVC dump via an UPSTREAM modify command, an SVC dump can also be initiated via the batch job below.

```c
//** INITIATE AN SVC DUMP VIA BATCH JOB
//**
//SDUMP EXEC PGM=USTSDUMP,PARM='<stc task name,dump title text'
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=* 
/*
```

PARM= Specify the UPSTREAM started task name to capture in the dump followed by a comma and the title for the dump.
17.9 **LOG HANDLING**

During its operation, FDR/UPSTREAM writes informational and error messages into a log file (USTLOG) and optionally out to a summary file (USTSUMM). These log files may be SYSOUT or DASD data sets.

All of the messages that can be written to these logs are documented in "FDR/UPSTREAM Messages", and the specification of the log names within the UPSTREAM startup PROC is described in Section 3.19 "Define the FDR/UPSTREAM Started Task PROC".

You may wish to see the messages on the log while UPSTREAM is still active. Unfortunately, it is often impossible to see the most recent messages (which are usually those of most interest). This is because they are still in a buffer and have not yet been written out to the log.

UPSTREAM offers two methods of making these messages available:

- **Flushing**
- **Switching**

**FLUSHING THE LOG**

You use the following "FLUSHLOG" command to request that UPSTREAM "flush" the log and summary buffers by closing the files and reopening them (with EXTEND, if on DASD, so that new messages will still be added to the end).

F UPSTREAM,FLUSHLOG

**SWITCHING THE LOG**

UPSTREAM also optionally supports a second log and summary file, specified by the DDNAMEs of "USTLOG2" and "USTSUMM2" in the UPSTREAM startup PROC.

You can use the following SWITCHLOG command to request that UPSTREAM close the current log and summary file and "switch" to the alternate ones:

F UPSTREAM,SWITCHLOG

**NOTE:** The new log and summary files will be opened for OUTPUT. For DASD files this means that they will be overwritten, so you should save the contents of the inactive files as soon as possible after a SWITCHLOG has taken place.

DASD files also need a DISP=SHR for flushing and switching to operate correctly.
17.10 FDR/UPSTREAM CONFIGURATION MAINTENANCE

As described in Chapter 21 "FDR/UPSTREAM Configurator", the FDR/UPSTREAM configuration data set contains the main operating settings for the UPSTREAM started task, as well as descriptions of all the backup and utility profiles. The configuration, which was initially created during the installation process, can then be subsequently altered through:

❖ The UPSTREAM TSO/ISPF dialog (option 4 - “Configure”)
❖ The USTCONFG program (Chapter 21 "FDR/UPSTREAM Configurator")
❖ The Client panels (see the FDR/UPSTREAM Client Guide).

Any changes to the configuration can be brought online dynamically, without having to stop/start the UPSTREAM started task. Having made the required changes to the configuration, you must do one of the following:

❖ Reactivate the existing (but now altered) configuration file
❖ Activate a brand new configuration file.

To reload or “reactivate” the configuration file that was last activated successfully (but has subsequently been changed), enter the following REFRESH command. This format of the REFRESH command is usually only possible if the USTCONFG DD statement in the UPSTREAM startup PROC points to a sequential configuration file:

F UPSTREAM,REFRESH

If your configuration file is stored in a PDS, you can choose to “activate” a new set of configuration parameters, which have been saved to a new member of the same PDS. If the activation is successful, the new membername will be saved in memory as the current configuration. That membername will also be used if a REFRESH is later entered without an accompanying membername (i.e., a “reactivation”, as previously described):

F UPSTREAM,REFRESH MEMBER=membername

If a new configuration member is activated, you must remember to manually change the USTCONFG DD statement in the UPSTREAM startup PROC (Section 3.19 "Define the FDR/UPSTREAM Started Task PROC") to point to the new member name. Otherwise, the old configuration member will be re-activated the next time that UPSTREAM is started.

If you have the UPSTREAM encryption feature licensed and enabled (Chapter 24 "FDR/UPSTREAM Data Encryption"), and if you have implemented the facility with a USTCRYPT DD statement in your startup PROC, you can instruct the UPSTREAM started task to reload your encryption definitions via the following command:

F UPSTREAM,CRYPT=REFRESH
17.11 Adjusting FDR/UPSTREAM Main Configuration Options

As an alternative to permanently (or semi-permanently) changing the Main options (ISPF option 4) configuration, you can temporarily modify these options while the FDR/UPSTREAM started task is running. These temporary changes stay in effect until the started task is terminated and re-started, at which time the "permanent" settings in the configuration file once again take effect. You might wish to use this facility to temporarily adjust the operating behavior of UPSTREAM, perhaps to react to a particular condition (e.g., tape drive availability).

**MAXTASKS**

Control the maximum number of backup/restore/inquiry tasks that can run concurrently. See "MAXTASKS" in Section 3.16 for additional documentation.

F UPSTREAM,MAXTASKS=nnnn (0 inhibits all new tasks)

**MAXTAPEB**

Control the maximum number of tape drives that UPSTREAM uses for concurrent backups. See "MAXTAPEB" in Section 3.16 for additional documentation.

F UPSTREAM,MAXTAPEB=nnn (0 means no limit, 255 max)

**MAXTAPER**

Specify the maximum number of tape drives that UPSTREAM uses for concurrent restores. See "MAXTAPER" in Section 3.16 for additional documentation.

F UPSTREAM,MAXTAPER=nnn (0 means no limit, 255 max)

**TIMEOUT**

Specify the maximum number of minutes that UPSTREAM waits for most communication requests to complete. See "TIMEOUT=" in Section 3.19 for additional documentation.

F UPSTREAM,TIMEOUT=nnn (1 to 8191 minutes)

**LOGBLKN**

Specify the number of 64K internal buffers used to save USTLOG messages for display at a Client.

Default: 2.

F UPSTREAM,LOGBLKN=nnn (1 to 255 buffers)
17.12 INITIATING COMMANDS WITH USTCMD

Many of the z/OS console commands described in this chapter can also be issued through the utility program USTCMD. This command allows you to control FDR/UPSTREAM operation without actually being at an z/OS console. USTCMD can be invoked in one of two ways, as described below:

❖ Through the UPSTREAM TSP/ISPF dialog (see “USTCMD via the TSO/ISPF Interface” in Section 17.12)

❖ Via an z/OS batch job (see “USTCMD in Batch” in Section 17.12).

USTCMD VIA THE TSO/ISPF INTERFACE

Option 6 (“OPER”) on the UPSTREAM TSO/ISPF dialog main menu invokes a panel that allows authorized users to issue z/OS “console” commands. If this panel is too large to fit on your TSO screen, it can be scrolled up and down with PF7 and PF8. Place an “S” next to the command to be issued (only one at a time), and fill in any required parameters on that line. You receive a confirmation that the command was issued, but you need to check the z/OS SYSLOG and/or the UPSTREAM log (USTLOG) for results.

NOTE: Use of this dialog requires that USTCMD program be added to the TSO/E list of authorized programs (see Section 3.18 “Authorize FDR/UPSTREAM ISPF Programs to TSO/E”).
--- FDR/UPSTREAM Operator Commands ---

Command ==> | Scroll ==> | CSR

UPSTREAM started task name: UPSTREAM

SEL  OPERATION

---

**Startup/Termination Commands**

( ) START..........................start the FDR/UPSTREAM started task
( ) STOP...........................terminate FDR/UPSTREAM gracefully
( ) QUIT...........................terminate FDR/UPSTREAM immediately

**Log Commands**

( ) FLUSHLOG.......................flush the log and summary buffers
( ) SWITCHLOG......................switch the log and summary files

**Utility Commands**

( ) MAINT..........................start the USTMAINT maintenance utility
( ) MAINTF.........................start the USTMAINT for F-record cleanup
( ) REMOVEDSN=(                    )

( ) COMPRESS.......................compress the active configuration dataset
( ) REFRESH MEMBER=( UPSTREAM )....refresh the configuration parameters

( ) REGEN DSN=(                           )

PROFILE=(                         )

( ) REORG DD=USTCATLG %FREE=(        ).reorganize the online repository catalog
( ) REORG DD=USTFILEI %FREE=(        ).reorganize the file-information data set
( ) REORG DD=USTFILEC %FREE=(        ).reorganize the file-data data set

( ) MIGRATE ID= 00 PROFILE=(          ) FORWARD(   ) MAXV(   )

...start MIGRATE utility

( ) MERGE ID= 01 PROFILE=(          ) NEWTAPE(   )...start MERGE utility

( ) VAULT ID= 01 PROFILE=(          ) COPY( 2 ) NOVCKH(   ) NOINCR(   )

NOSCR(   ) NOFULL(   )     ...start VAULT utility

( ) SCHEDULE MEMBER=(         ) LIST(   )....start/refresh SCHEDULE utility

( ) CRYPT=REFRESH.................refresh USTCRYPT parameters
You can also use USTCMD in a batch job to issue one or more z/OS console commands to UPSTREAM.

```plaintext
//USTCMD   EXEC PGM=USTCMD
//STEPLIB  DD DISP=SHR,DSN=your.upstream.loadlib
//SYSPRINT DD SYSOUT=*  
//SYSIN DD * 
F UPSTREAM,cmd
.. additional commands if desired .. 
/*
```
18 Z/OS INITIATION WITH USTBATCH

18.1 OVERVIEW

FDR/UPSTREAM backup and restore operations can be initiated in many different ways.

❖ From the Client (see the FDR/UPSTREAM Client Guide for details)
  • Manually, through the Client panels.
  • Manually, through the Director Java interface
  • Automatically, through the Dispatcher scheduler
  • Automatically, through your own client-side scheduler.

❖ From the z/OS Storage Server
  • Manually, through the TSO/ISPF dialog (after building a USTBATCH job)
  • Manually, through a USTBATCH job (created outside of the ISPF dialog)
  • Automatically, initiating a USTBATCH job through the UPSTREAM scheduler
  • Automatically, initiating a USTBATCH job through your own scheduler.

As you can see, all of the z/OS Storage Server initiation methods listed involve the eventual submission of a batch job to execute the UPSTREAM utility program called USTBATCH, which then communicates with the main UPSTREAM started task to initiate the requested process.

Aside from initiating backup and restore operations, USTBATCH jobs can also be used to initiate other UPSTREAM functions described elsewhere in this manual. For example, you can use a USTBATCH job to invoke any of the following:

❖ The USTVAULT, USTMIGRT, and USTMERGE utilities (Chapter 9 “Copying Backups with USTVAULT”, Chapter 10 “Migrating Backups from Disk to Tape”, and Chapter 11 “Completing Deferred Merge Backups”)

❖ The File Transfer utility (Chapter 14 “File Transfer”)

❖ The Client File Migration service (Chapter 15 “FDR/UPSTREAM Client File Migration”)

❖ A “user process” on an Client (Chapter 16 “Running an FDR/UPSTREAM Client User Process”)

❖ The USTMAINT utility and UPSTREAM console commands (Chapter 17 “FDR/UPSTREAM Operation”)
18.2 AUTOMATION WITH USTBATCH

USTBATCH jobs can be submitted manually, or through an automated process, such as your own job scheduling system (if you have one), or through USTSCHED, the scheduling system provided within FDR/UPSTREAM (Chapter 19 “FDR/UPSTREAM Scheduler”).

USTBATCH processing can be further automated by enabling the "WTOCOMP" facility in the UPSTREAM configuration (see Section 3.16 “Configure the MAIN Options”). This will cause the FDR/UPSTREAM started task to issue WTO messages to the system log regarding the completion status of the requested function. These messages can be intercepted by your scheduling and automation systems to control subsequent initiations of additional USTBATCH driven processes, or any other process.

A similar result can be obtained using the CONV=WAIT and WTOCOMP options of USTBATCH itself (described later in this chapter), which cause USTBATCH to produce console messages detailing the progress of initiated tasks.

With careful planning and design, you can potentially automate your entire UPSTREAM workload using a combination of USTBATCH jobs and your job scheduling system or automation systems.
18.3 USTBATCH WORK-FLOW

The work-flow of USTBATCH varies slightly, depending on whether the requested process is “client-based” (e.g., you are running a backup) or “host-based” (e.g., running an FDR/UPSTREAM internal utility, such as USTVAULT, USTMERGE, or USTMIGRT).

The following sequence of events occurs when USTBATCH is used to initiate an Client-based process, such as a backup, restore or file transfer.

❖ A USTBATCH job is submitted on the mainframe either manually or automatically, as previously described.
❖ USTBATCH allocates a VTAM APPC (LU 6.2) conversation to the UPSTREAM started task. Unless the CONV=WAIT option is specified (see below), the USTBATCH job does not need to run on the same z/OS system as UPSTREAM, so long as there is a VTAM connection between the z/OS images.
❖ USTBATCH then forwards the specified request (backup, restore, etc) to the UPSTREAM z/OS started task, including all of the supporting parameters that may have been provided within the USTBATCH job. As a minimum, this job contains details of the target Client on which the process is to run. It may optionally contain additional parameters to control how that process operates.
❖ UPSTREAM stores the received request and parameters (for potential retry attempts) before initiating a conversation with the target Client. The actual request and specified parameters are then sent to the Client for action, together with a request for a “confirmation”. If no response is received from the target Client within three minutes, UPSTREAM times-out the request and logs an error (though this can be overridden by adding PARM='NOTIMER' to the USTBATCH EXEC statement).
❖ If the target Client is busy or not available when the request is sent, a retry process is started by the online initiator, as controlled by various “retry” parameters available to USTBATCH (APPLRETRY, TMAXRETRY, MAXRETRY - as described later).
❖ If the request is accepted by the Client, a "confirmed" response is returned to the requesting USTBATCH task, which in turn logs the confirmation. If CONV=KEEP or WAIT is specified, the "confirmed" response is not returned until the Client has validated and initiated the request.
❖ Once the request has been accepted and the initiation of the process is completed at the Client (either successfully, or the retries have been exhausted), the online initiator logs the final results of the initiation attempt to the online UPSTREAM log. Assumingly the initiation attempt was successful, the target Client then starts a conversation with the UPSTREAM started task to begin the requested operation (e.g., the backup, restore). If CONV=KEEP or WAIT is specified, the Client uses the connection that was previously established for the initial request, otherwise it disconnects and establishes a new connection.
❖ If CONV=WAIT is not specified, USTBATCH terminates its connection as soon as the Client has accepted the initial request. It then continues to scan the job input to see if another Client operation has been requested within the same batch job. If so, that operation is initiated, as previously described. If no additional Client operations have been requested, the USTBATCH job terminates.
❖ If CONV=WAIT is specified, USTBATCH scans all of the input during initiation and builds a queue of requests. It then goes through the process described for each request in the queue, retaining the conversation with the UPSTREAM started task until the Client(s) complete the processing of the request(s). It then logs a final return code associated with each request in the USTBATCH log (and optionally to the system console if WTOCOMP is specified). If e-mail notification is enabled, and if the specified condition is met, an e-mail will be issued at the completion of each step. When working with a queue of requests in this way, USTBATCH attempts to concurrently initiate as many of the requests in its queue as possible (but controlled by the TASKLIM parameter).
When USTBATCH is used to initiate a “host-based” process, such as USTMERGE, USTMIGRT, USTVAULT (or perhaps a console command), no communication with an Client is required. All communication is between the USTBATCH job and the FDR/UPSTREAM started task.

The request or command is executed by UPSTREAM as if it was entered on the z/OS console. If CONV=WAIT is specified, USTBATCH waits for the end of the execution of the request or command. It then logs the success or failure of the request and displays any messages associated with it. If e-mail notification is enabled, and if the specified condition is met, an e-mail is issued at the completion of each step.

USTBATCH can issue a condition code dependent e-mail indicating the success or failure of the USTBATCH operation. This is invoked by an optional USTEMAIL DD statement in the USTBATCH job step. The DD statement references control statements defining the message and the recipients. This feature is supported for either "Client based" or "Host based" processes. The use of CONV=WAIT (described previously) and an e-mail server that supports SMTP (Simple Mail Transport Protocol) are also required.
18.4 Creating Your USTBATCH Jobs

USTBATCH jobs can be created in one of two ways, as follows:

**THROUGH THE UPSTREAM TSO/ISPF DIALOG**

Many of the previous chapters in this manual include samples of the TSO/ISPF dialogs that can be used to create USTBATCH jobs. Some examples include:

- Running USTREORG (Chapter 6 “The FDR/UPSTREAM Repository”)
- Chapter 7 “Performing a Backup”
- Chapter 8 “Performing a Restore”
- Chapter 9 “Copying Backups with USTVAULT”
- Chapter 10 “Migrating Backups from Disk to Tape”
- Chapter 11 “Completing Deferred Merge Backups”
- Chapter 12 “Updating the Repository”
- Doing a File Transfer (Chapter 14 “File Transfer”)
- Chapter 15 “FDR/UPSTREAM Client File Migration”
- Chapter 16 “Running an FDR/UPSTREAM Client User Process”

When using the TSO/ISPF dialogs, you do not have to be concerned about the USTBATCH parameter formats and coding rules (described later in this chapter), since all parameter generation is done for you.

**RECOMMENDATION:** For this reason, use of the UPSTREAM TSO/ISPF dialogs to generate and/or submit USTBATCH requests is **highly** recommended.

**MANUAL JOB CREATION**

As an alternative, however, you can create USTBATCH job manually, without the use of the TSO/ISPF dialogs. The remainder of this chapter describes the parameters and settings available under USTBATCH.

Some example USTBATCH jobs are shown in Section 18.8 “USTBATCH Examples”.
18.5 USTBATCH JCL Parameters

These are the JCL parameters required to execute USTBATCH.

**EXEC Statement**

- Must specify PGM=USTBATCH.
- The EXEC statement should specify REGION=0M to make the maximum region available.
- It may optionally contain a PARM= operand to pass options to the USTBATCH program. For example, “PARM=NOTIMER” overrides the 3-minute timer that the UPSTREAM started task uses to determine if an Client is not responding (although this is not generally recommended).
- Any PARM= data passed to the USTBATCH program is interpreted as control statement input. Multiple commands specified via this method must be separated by a slash “/” character.

**JOBLIB or STEPLIB DD Statement**

- If UPSTREAM has not been placed into the system linklist, this DD statement is required to point to the UPSTREAM load library. This must be an APF authorized library.

**SYSTCPD DD Statement**

- This is an optional data set for use when a TCP/IP Domain Name Server (DNS) is not defined in the TCP/IP PROFILE data set. In the absence of a Domain Name Server to handle the name resolution requests, the SYSTCPD DD statement is used to point to a valid TCPDATA data set or member.

**SYSUDUMP DD Statement**

- Recommended in all USTBATCH jobs in order to diagnose more easily error conditions that make USTBATCH abend.

**USTEMAIL DD**

- This data set is a PDS with one or more members that specify input control statements, defining the message and the recipients, for the USTBATCH e-mail facility. If present, USTBATCH can issue an e-mail indicating the success or failure of the USTBATCH operation. The data set must have the characteristics RECFM=FB and LRECL=80.

**USTLOG DD Statement**

- This is the USTBATCH log file, which contains informational and error messages. It is usually a SYSOUT data set with the characteristics RECFM=V, LRECL=134, and BLKSIZE=138.

**USTPARM DD**

- This data set contains the USTBATCH input parameters. It may be a SYSIN data set, or it can point to a parameter file. It must have the characteristics RECFM=FB and LRECL=80.
18.6 **USTBATCH INPUT PARAMETERS**

Input parameters to USTBATCH are fixed-length 80-byte records. The rules for coding the USTBATCH input parameter records are as follows:

❖ All parameters must start in the first position (column 1) of the record.
❖ All keyword parameters must be followed by at least one blank. All Client override parameters, since they may contain embedded blanks, must be followed by at least 2 blanks. Blanks are not required if the parameters extend to the end of the record (column 71). Parameters can be continued to another record, following these rules:
  ✷ Enter the parameter text in columns 1 to 71 of the current record. The text must continue through column 71. No comments are permitted.
  ✷ Place any non-blank character in column 72.
  ✷ Start the continuing text in column 1 of the next record. It will be concatenated with the text from the previous statement.
  ✷ A statement can be continued multiple times, for a maximum parameter length of 261 characters, including blanks.
❖ Data beyond a terminating blank is considered as a comment. Entire comment records may also be included anywhere in the input parameter file. They are indicated by the presence of a "**" in the first position of the record.
❖ Only one parameter is permitted per input record, except that the WSPARM= operand can also appear after a TCPTARG or TARGLU= parameter.
❖ Certain parameters apply to the entire USTBATCH step. They can appear only once in the input and must be placed at the beginning of the input. These parameters are documented in "Single Use" Input Parameters in Section 18.6.
❖ Other parameters apply to a target Client that will be contacted by this execution of USTBATCH. If requests are to be sent to multiple Clients, these parameters can appear many times in the USTBATCH input. These parameters are documented in "Multiple Use" Input Parameters in Section 18.6.
❖ The operation to be performed may be fully described in a "parameter file" stored on the target Client. If that is the case, the USTBATCH input parameters need only to provide the name of the target Client (via TCPTARG, TARGNAME, DNSNAME or TARGLU,) and the name and location of the Client's parameter file. However, USTBATCH input parameters can also be used to modify or override some/all of the client-side parameters. These parameters are documented in Section 18.7 “USTBATCH "FDR/UPSTREAM Client Override" Parameters”.
❖ If any optional parameters that have a default value are omitted, a warning message is logged and the USTBATCH step will end with return code 4, even if the request is successfully processed.
❖ The end of a set of Client parameters is assumed when another TCPTARG, TARGNAME, DNSNAME, or TARGLU parameter is found, or the end of the USTBATCH input is encountered.
The following "single use" input parameters may appear only once and must be placed before any of the "Multiple Use" Input Parameters (except for LOGMODE).

<table>
<thead>
<tr>
<th><strong>Input Parameter</strong></th>
<th>Description</th>
</tr>
</thead>
</table>
| ALLOWDUP=YES|NO | Controls the ability to have multiple requests for the same target Client running simultaneously and initiated by a single USTBATCH job step. This parameter, when used in conjunction with TASKLIM, allows for a reduction in the number of separate USTBATCH jobs required to initiate a given workload.  
YES – multiple requests for the same target Client running simultaneously is allowed.  
NO – multiple requests for the same target Client running simultaneously is disabled.  
Default: NO. |
| APPLPREF=cccccc|UPSTR | Specifies the five-character prefix that USTBATCH uses to build its own VTAM APPLID value. It appends a character-numeric value (beginning at "001") to the specified APPLPREF and use the resulting name to attempt to open a VTAM ACB (with the generated name as the APPLID). If that APPLID is already in use, the appended value is incremented until a free APPLID is found.  
Default: UPSTR. |
| APPLRETRY=nnnn|240 | Used only if USTBATCH cannot find a free VTAM application ID (see “APPLPREF=” in Section 18.6). USTBATCH waits 5 seconds and tries again, repeating this until a free application ID is found or the APPLRETRY limit is reached.  
Default: 240, which causes USTBATCH to retry every 5 seconds for about 20 minutes. |
CONV=

As described in Section 18.3 “USTBATCH Work-Flow”, USTBATCH always establishes an APPC connection to the UPSTREAM started task for each requested operation specified in its input stream. It then transmits details of the target Client and (optionally) parameters relating to the requested operation. The UPSTREAM started task then initiates a conversation with the target Client and forwards the request. The CONV= parameter controls what happens next:

NONE – causes the Client to disconnect as soon as the request has been accepted. The UPSTREAM started task informs USTBATCH that the request has been accepted (or not), and USTBATCH disconnects and goes on to process its next request, or terminates if there are no more requests. The Client then reconnects to the UPSTREAM started task to perform the requested function.

NOTE: USTBATCH cannot tell if the request was successful. It only knows that the initial request was accepted by the Client.

KEEP – causes the UPSTREAM started task to use the same conversation with the Client for processing the request as was used to send the initial request - i.e., it keeps that connection open to process the request. USTBATCH is notified as soon as the Client begins processing the request, at which point it disconnects and processes its next request, as with CONV=NONE.

WAIT – includes the effect of CONV=KEEP. In addition, USTBATCH remains connected to the UPSTREAM started task until the Client completes the requested operation, at which time USTBATCH logs the final return code and UPSTREAM messages associated with the operation. This allows the success or failure of the operation to be determined from the USTBATCH log. If WTOCOMP is also specified, the return code is logged on the system console as well as in the USTBATCH log.

CONV=WAIT causes USTBATCH to maintain two internal queues of requests. All the requests in the USTBATCH input are parsed and added to a “wait” queue, ready for initiation. USTBATCH attempts to initiate concurrent requests to multiple Clients, keeping as many Clients busy as possible (controlled by TASKLIM). Once a request has been successfully initiated, it is transferred to an “active” queue to await notification of its completion. CONV=WAIT also enables USTBATCH to accept console commands which can be used to display USTBATCH status and modify its operation, as described in Section 18.9 “Controlling USTBATCH”.

NOTE: Certain parameter errors (such as invalid file specs) which prevent the request from ever being processed are logged by the main task (and by USTBATCH) with CONV=KEEP. However, with CONV=NONE, they are only recorded at the Client.

Default: NONE.
Z/OS INITIATION WITH USTBATCH

USTBATCH INPUT PARAMETERS

EMAILOK=
EMAILWRN=
EMAILERR=

Used when the USTBATCH e-mail notification facility is invoked by the presence of the USTEMAIL DD statement in the USTBATCH JCL. These optional parameters each specify a unique member of the PDS referenced by the USTEMAIL DD statement. This member specifies input control statements, defining the message and the recipients of the e-mail, that is issued if the return code result indicated in message “UST747[E]” of the UPSTREAM process is met. (This should not be confused with the Job condition code.)

- **EMAILOK=**`member_name` – invoked upon a return code of 0.
- **EMAILWRN=**`member_name` – invoked upon a return code of 4.
- **EMAILERR=**`member_name` – invoked upon a return code greater than 4.

As previously mentioned, there should be a member in the PDS referenced by the USTEMAIL DD statement, for each of the preceding three parameters. Those members specify:

- **TCPNAME** – name of the TCP/IP started task.
- **MAILSERVER** – the SMTP mail server IP address or DNS name.
- **FROM** – e-mail address of the sender.
- **TO** – one or more recipient e-mail addresses.
- **SUBJECT** – subject line that may contain substitution variables (see below).

The body of the e-mail is defined on the line following the **SUBJECT** line and is one or more lines of text that may contain substitution variables (see below). The substitution variables used for the Subject line and the e-mail body text are:

- **&JOBNAME** – replaced by the batch jobname.
- **&STEPNAME** – replaced by the name of the batch JCL step.
- **&EMAILDATE** – replaced by the current date in the form MM/DD/YYYY.
- **&EMAILEDAT** – replaced by the current date in the form DD/MM/YYYY.
- **&EMAILTIME** – replaced by the time of day in the form HH.MM.SS.
- **&SYSTEM** – replaced by the z/OS System ID the started task is running on.

The “UST747[E]” message text is included at the end of the specified e-mail text as the last message line.

UST747 +PROCESS COMPLETED - RETURN CODE= 00,
TARGET=LARRYNEW -40000000

Please see “Example 4: E-mail Notification” in Section 18.8.
Z/OS INITIATION WITH USTBATCH
USTBATCH INPUT PARAMETERS

ERRWTO=
In the event of a failure of a USTBATCH-initiated process, this parameter specifies up to 60-characters of text to include in a "UST731E" message written to the system console and system log. Three variables may be embedded within the text to allow for customization of the message:

&JOBNAME – include the z/OS job name in the message text (8 characters).
&STEPNAM – include the z/OS step name in the message text (8 characters).
&NAME – include the target Client name in the message text (20 characters).

A reason code is also provided with the following meanings:

4 – USTBATCH cannot establish or maintain communications with the UPSTREAM started task.
8 – the UPSTREAM started task cannot establish or maintain communications between itself and the target Client.
12 – this reason code occurs if any other error is encountered on the connection.

If specified, this keyword must follow TCPTARG, TARGNAME, or DNSNAME.

ERRWTOR=
See “ERRWTO=” in Section 18.6 for full details. Using ERRWTOR instead of ERRWTO causes USTBATCH to wait for a reply from the system operator or an automated operations console product.

If specified, this keyword must follow TCPTARG, TARGNAME, or DNSNAME.

IPADAPTER=

nnn.nnn.nnn.nnn – Specifies the IP address of an IP stack to which the UPSTREAM started task should bind to make the connection to the Client when CONV=WAIT or KEEP is specified. It is required only if the z/OS Storage Server has multiple TCP/IPs running. The IP address is specified in dotted-decimal form, e.g., IPADAPTER=192.175.000.000.

LOGMODE=
For connections to VTAM SNA Clients only. It specifies the VTAM logon mode entry name that is used by the UPSTREAM started task to establish a session with the SNA Client. It is also used by the Client when it establishes its session back to UPSTREAM to perform the requested function. (See Section 3.14 "Define Required VTAM System Resources" for a discussion of the mode tables used by UPSTREAM).

Default: #INTER.

NOTE: Unlike the other “single-use” parameters, LOGMODE= can appear more than once. If it is placed in the beginning of the USTBATCH input, with the other “single-use” parameters, it is used for all sessions established by USTBATCH (unless overridden later in the input). If it appears after a TARGLU= or TARGNAME= parameter, its value is used for that session and all sessions that follow it, unless overridden by a subsequent LOGMODE=. The default of #INTER is usually correct for all sessions, so LOGMODE= usually does not have to be specified at all.
MAXRETRY=

nnn – Used only if the UPSTREAM sub-task fails its initial attempt to initiate a conversation with the Client. This parameter specifies the maximum number of retry attempts allowed. If the MAXRETRY value is non-zero and the initial attempt fails, USTBATCH retries the initiation with the Client every 10 minutes, decreasing the retry count until it reaches 0. At that time, an “LU NOT AVAILABLE” indication is sent to USTBATCH and subsequently logged. Any value from 0 to 255 is allowed.

If a RESTART count is also specified, and the MAXRETRY value is lower than the RESTART count value, MAXRETRY value is set to the RESTART count value.
Default: 0 (zero).

QUEUE=

In the event that the target Client cannot process a request immediately, this parameter instructs the Client to queue the request, if possible. Otherwise, requests are not queued.

**NOTE:** QUEUE should be used with caution if CONV=KEEP or WAIT is also specified. If the Client operation cannot be immediately started and must be queued, USTBATCH waits until the request can finally be processed.

RESTART=

nn,nn – Controls automatic restart of backups (if they are defined as restartable) and restores if a communication failure occurs and if CONV=WAIT is also specified. It has two values (e.g., RESTART=3,2). The first value is the number of times to attempt a restart of an interrupted operation. The second value is the number of minutes to wait between restart attempts. When a communication error occurs and a wait to restart is begun, a message is issued to the z/OS operator in case some type of manual intervention is required to correct the communications problem.

Default: RESTART=0,10; automatic restart is disabled.

TASKLIM=

nnnn – A 4-digit numeric value specifying the maximum number of concurrent tasks a USTBATCH utility job will dispatch. Once this value is reached, USTBATCH does not initiate another request until one or more of active tasks ends.

Only valid if CONV=WAIT is specified.
Default: 1.

TIMEOUT=

nnnn – If CONV=WAIT was specified, this specifies the number of minutes (1 to 1440) to wait for the request to complete. If the request does not complete within the time limit, it is terminated.

Default: 10.

**NOTE:** If you are issuing multiple concurrent requests from one USTBATCH, it cannot handle time-out processing for more than 15 requests at a time.

TMAXRETRY=

Used only if USTBATCH connects to UPSTREAM but is informed that the started task is already at its maximum permitted sub-task limit, as defined by the MAXTASKS configuration parameter (see Section 3.16 “Configure the MAIN Options”). USTBATCH retries the operation every 10 minutes until it is accepted, or until the specified TMAXRETRY limit is reached.

Default: 0 (no retries), the recommended value.
USAPPL=  
cccccccc – Specifies the VTAM APPLID of the UPSTREAM started task.  
USTBATCH uses this value to allocate an LU 6.2 conversation with  
UPSTREAM to request the remote initiation of the requested function. The  
USAPPL value must match the value specified for APPLID= in the  
UPSTREAM configuration (see Section 3.16 “Configure the MAIN Options”).  
Default: UPSTREAM.

VERIFY=  
Controls the verification of the spelling of input parameters (i.e., not the syntax or  
values, just the spelling). All valid input parameters to USTBATCH are shown in  
this chapter of the manual.  
YES – Specifies that the spelling of these parameters will be verified.  
NO – Requests that the parameters are not verified.  
Default: NO.

WSPARM=  
This optional parameter specifies the name and location of a parameter file on the  
target Client that is used to control the requested operation (e.g., backup, restore).  
See full documentation of WSPARM under the “Multiple Use” Input Parameters  
in Section 18.6 for more details. The value may be up to 255 characters.

WTOCOMP=  
If CONV=WAIT is specified, WTOCOMP causes USTBATCH to issue a  
"UST747[E]" message on the system console indicating the success or failure of  
each Client request. This may be used for visual confirmation by the operator, or  
for use with automation products.
The “multiple use” input parameters described below can appear one or more times in the USTBATCH input. The parameters may be repeated to invoke multiple UPSTREAM operations or console commands.

For “host-based” operations, each individual set of parameters will begin with COMMAND.

For “client-based” operations, each individual set of parameters must start with one of the following to identify the target Client: TCPTARG, TARGNAME, DNSNAME, or TARGLU. These “Client identifying” parameters can then be optionally followed by “Client override” parameters, which can be used to specify or modify the operation to be performed at the Client.

**COMMAND=**

**CMD=**

Specifies an z/OS console command to be issued to the UPSTREAM started task, such as a request to initiate “host-based” operations like USTVAULT, USTMIGRT or USTMERGE. See Chapter 17 “FDR/UPSTREAM Operation” for full details on the z/OS console commands that can be issued to control UPSTREAM, either through USTBATCH or through the USTCMD dialog. The USTBATCH COMMAND parameter does not include the “F UPSTREAM” portion of the z/OS command. It cannot be continued beyond column 71. For example:

```
COMMAND=STATUS
CMD=VAULT01 PROFILE=PAYROLL
```

**DNSNAME=**

This allows you to identify the target Client using a TCP/IP Domain Name Server (DNS) name (up to 63 characters). If a Domain Name Server is not pre-configured in the TCP/IP PROFILE data set, the USTBATCH JCL must contain a SYSTCPD DD statement pointing to a valid TCPDATA file or member.

**TARGLU=**

(For VTAM/SNA Clients.) Specifies the network LU name of the target Client.

**TARGNAME=**

Specifies the UPSTREAM registered name of the target Client. As described in Chapter 20 “Registered Name Service”, the UPSTREAM registered name service allows you to identify a target Client using a descriptive name that is independent of its current network address and connection type.

**TCPPORT=**

(For TCP/IP Clients.) Specifies the TCP/IP port number on which the Client is configured to listen for z/OS Storage Server requests, as configured within the Client software. The TCPPORT= value can be optionally specified after TCPTARG= or DNSNAME=.


**TCPTARG=**

(For TCP/IP Clients.) Specifies the IP address of the target Client, specified in “dotted decimal” form. The TCP/IP port number (see “TCPPORT=” in Section 18.6) can optionally be appended to the address as 2 more periods (or a comma) and the decimal port. Examples:

```
TCPTARG=192.168.000.000..1972
TCPTARG=192.168.000.000,1972
```

Or:

```
TCPTARG=192.168.000.000
TCPPORT=1972
```
TPNAME=

  cccccccc – (For VTAM/SNA Clients only.) Specifies the Transaction Program Name (TPName) used to communicate to the Client. Used only following TARGLU= (or TARGNAME, when the connection is SNA) TPNAME= allows multiple simultaneous mainframe initiated conversations to SNA Clients.

  Default: UPSTREAM.

WSPARM=

This optional parameter specifies the name and location of a parameter file on the target Client, which is used to control the requested operation (e.g., backup, restore). One or more of the parameters contained in that Client parameter file can, however, be overridden from within the USTBATCH job itself, as described in "Non-Repeated” Client Override Parameters” in Section 18.7.

The WSPARM value is passed to the target Client during the initiation request from the UPSTREAM started task. It appears as a sub-parameter on the TCPTARG= parameter:

  TCPTARG=192.168.000.000..1972,WSPARM=/opt/fdrupstream/upstream.dat

Although, strictly speaking, WSPARM is regarded as a “multiple use” parameter, it can operate as a global “Single Use” Input Parameters” in Section 18.6. This, however, assumes that the name and the location of the Client parameter file is consistent across all target Clients. For example, the following WSPARM could be coded as a global “single use” parameter in USTBATCH, negating the need to code it for every target Client:

  WSPARM=/opt/fdrupstream/upstream.dat

The WSPARM value may be up to 255 characters.
18.7 USTBATCH “FDR/UPSTREAM CLIENT OVERRIDE” PARAMETERS

In addition to the “single use” and “multiple use” USTBATCH parameters previously described, the USTBATCH job may also include parameters that are specific to the FDR/UPSTREAM Client request, and which control or override the behavior of that request.

Client override parameters apply only to the Client request defined by the preceding TCPTARG, TARGNAME, DNSNAME, or TARGLU in the USTBATCH input stream. They can be either “non-repeated” (single use) or “repeated” (multiple use).

Full details of all these parameters can be found in the FDR/UPSTREAM Client Guide. The examples section includes an example (“Example 2: “BATPARM”” in Section 18.8) of a USTBATCH job that uses some of these parameters.

**NOTE:** When including these parameters in your USBATCH input, there must be exactly one space between the parameter and its value. Multiple spaces will cause the value to be taken as a comment. You can also use an equal sign “=” instead of a space.
This section describes all “non-repeated” Client override parameters. These parameters can be specified only once per each target Client.

**ACTION=**

The function to be performed.

* 0 – Restore (or “Client receive” file transfer)
* 1 – Backup (or "Client send" file transfer)
* 2 – As of … Restore
* 3 – Wait for remove initiate
* 4 – Restart backup only
* 5 – Run a Client process
* 6 – Kill last restartable backup
* 7 – Run z/OS Storage Server report
* 8 – Restart restore only
* 9 – Kill last restartable restore
* 10 – Submit a z/OS Storage Server job
* 11 – Client file migration
* 12 – Inquire versions
* 13 – Performance test
* 14 – Physical disk restore
* 15 – Physical disk backup
* 16 – Delete backup
* 17 – Register target name
* 18 – Inquire file

Default: 1.

**ASCTOEBC=**

*filename* – The name of a Client file containing a user-supplied ASCII to EBCDIC translation table. This table is used for this and all subsequent operations on the Client until UPSTREAM is terminated and restarted. If not specified on a Client, a default US English translation table is used.

Default: USATOE.TAB.

**ATTENDED=**

*Y* – It is assumed that there is a user present to make prompted decisions.

*N* – Unattended mode. It is recommended that you also specify MESSAGETIMELIMIT as well.

Default: Y.

**BACKUPPROFILE=**

*cccccccc* – The backup profile name. You can specify up to 8 characters.

Default: NONE.

**BACKUPVERIFY=**

*Y* – UPSTREAM reads and compresses the data, but does not sent it to the z/OS Storage Server. A checksum of the data is compared against a checksum on the z/OS Storage Server. If a mismatch occurs, the file is transmitted. As it degrades performance, this option should be used on slow lines only when you wish to verify non-file data.

Default: N.
BLANKTRUNC=
If the LINEBLOCK parameter is set to Y, this parameter controls truncation of trailing blanks.
Y – Trailing blanks are removed from records being transmitted.
N – Trailing blanks are not removed.
Default: Y.

NOTE: File Transfer only.

CALCDASDSIZE=
N – If you are performing a sequential disk backup the amount of space allocated on z/OS for the backup depends on the amount of file data found.
Y – If you are performing a sequential disk backup the amount of space allocated on z/OS depends on the amount of file and non-file data found.
Default: N.

COMPRESSLEVEL=
Selects the level of compression to be performed on the backup data by the client before that data is transmitted to the z/OS host.
0 – No compression
1 – Fast compression
2 – High compression 1
3 – High compression 2
4 – High compression 3
Default: 1.

NOTE: Backups only.

RECOMMENDATION: To minimize the use of mainframe cycles, for non-database files, we recommend “No Compression”, instead of allowing the default of “Fast Compression”. For database files, due to their highly compressible nature, and if not using one of our database agents, try using “Fast Compression” to determine it’s suitability in your environment.

DASDOVERRIDE=
Allows you to override the amount of space (bytes) requested on a sequential disk backup. There are four forms:
+n...n – Add the given number of bytes to the total calculated.
-n...n – Subtract the given number of bytes from the total calculated.
nnn% – Use the given percentage to calculate the total.
n...n – Use the given number to override any calculated value.
Default: 100%.

NOTE: Backups only.

DISPLAY=
Y – Backup or restore status information continually updated.
N – No status display during the backup or restore.
Default: Y.
EBCTOASC=
The name of a Client file containing a user-supplied EBCDIC to ASCII translation table. This table is used for this and all subsequent operations on the Client until UPSTREAM is terminated and restarted. If not specified on an Client, a default US English translation table is used.
Default: USETOA.TAB.

**NOTE:** File Transfer only.

EXCLUDELISTNAME=
Specifies the name of a Client exclude list file.

FAILJOB
If specified, this job is run if the current function fails and UPSTREAM is running in unattended or z/OS Storage Server initiated mode.

FILETRANSFER=
Controls the file transfer facility (the ACTION parameter controls whether it is a send or receive).

Y – This is a file transfer operation.
N – This is a backup or restore.
Default: N.

HOLDTAPE=

Y – UPSTREAM keeps the tape volume mounted for an additional 2-3 minutes after this backup request completes so that any additional requests for this tape volume by the same profile can be satisfied without causing it to be remounted. This feature is used primarily by the database interfaces.

N – Tape volumes are immediately de-allocated at the end of the request.
Default: N.

HOSTFILENAME=
If specified, the name of the z/OS Storage Server file. If not specified, UPSTREAM generates a name for Client sends, or uses the latest recorded file transfer for Client receives.

**NOTE:** File Transfer only.

HOSTRECORD=
For client-to-host transfers only.

Y – Details of files transferred to the z/OS Storage Server are to be recorded in the UPSTREAM CATALOG repository file for reporting purposes.

N – Transferred files are not recorded in the UPSTREAM CATALOG repository.
Default: Y.

**NOTE:** File Transfer only.

HOSTSORT

Y – Use the z/OS Storage Server sort utility.
N – Do not use the z/OS Storage Server sort utility.
Default: N.

**NOTE:** Restores only.
Z/OS INITIATION WITH USTBATCH
USTBATCH “FDR/UPSTREAM CLIENT OVERRIDE” PARAMETERS

INQOPTIONS=
A bit map of options used during inquiry and restore.
0 – Inquiries and restores only show normal files and the highlighted backup (VERSIONDATE)
1 – Inquiries show migrated files as well as normal files
2 – Inquiries and restores use “Highlighted back to full”.
4 – Inquiries and restores operate from the currently highlighted backup to the first version (“Highlighted back to oldest”).
8 – (not used)
16 – Only display migrated files in an inquiry
32 – Reserved
64 – Expiration date is displayed for migrated files.
128 – Old style file inquiries work as for list and restore.
Default: 2.
NOTE: Merge Inquiries and Restores.

JOBOPTIONS=
A bit map of options used when a job is requested and started.
0 – Start job and immediately terminate UPSTREAM.
1 – Start job and do not terminate UPSTREAM.
2 – Wait for job to be terminated.
4 – Kill the job if it runs longer than the JOBWAITTIMELIMIT number of milliseconds or when UPSTREAM terminates. Also sets value 2.
8 – No job, terminate the current UPSTREAM program. Terminates the parent as well if running in automatic attach manager mode.
16 – (UNIX) Run the job using exec() (Internal use only).
32 – Write the STDOUT and STDERR output from the job to the UPSTREAM log and back to the Storage Server (if CONV=WAIT and value 1 is specified). Implicitly sets value 2.
Default: 0.
RECOMMENDATION: 35 (32+2+1).
NOTE: Request job only.

JOBRETURNCODEMAP=
For CONV=WAIT jobs, a mapping between the Client return code and the z/OS Storage Server job return code. You can specify multiple mappings (including Client return code ranges). The “?” is used for all unassigned Client return codes.
Default: 0:0 ?:8.
NOTE: Request job only.

KEEPALIVE=

nn – This parameter allows you to tune how often (in seconds) “Keep Alives” are transmitted to the z/OS Storage Server. Keep Alives are used to tell the z/OS Storage Server how much data the Client has written and allows the z/OS Storage Server to read the data from the disk as the Client is writing it.
Default: 2.

LATESTVERSION=
Y – Restore the latest version available for the backup profile.
N – Use a specific version date.
Default: Y.
NOTE: Restores only.
LINEBLOCK=

Y – Records are separated by a CR/LF (LF only on Unix) for Client sends; CR/LF (LF only on Unix) is added to the end of each record for Client receives.

N – all records are separated by the record size (Client sends).

Default: Y.

NOTE: File Transfer only.

LINETRUNC=

Used only if LINEBLOCK=Y for Client sends).

Y – data exceeding the record size is truncated

N – data exceeding the record size is sent as a separate record.

Default: Y.

NOTE: File Transfer only.

LOCALBACKUP=

0 – Host storage is used exclusively for backups and restores.

1 – During a backup, files should be stored locally as well as at the host. During a restore, files should be taken from local storage whenever possible.

2 – Local backups are stored on shared EMC or IBM FDRSOS Local Backup disks.

Default: 0.

LOCALBACKUPDIR=

If local backups are enabled to:

1 – Disk (LOCALBACKUP=1) the name of the directory where the local backup files are stored.

2 – FDRSOS (LOCALBACKUP=2) the internal UPSTREAM name of the disk where the data is stored.

Default: None.

NOTE: For FDRSOS only.

LOCALBACKUPMAX=

n – The number of local backups to keep. When a new local backup is created in the location specified by LOCALBACKUPDIR and there are already “n” or more such backups in that location, the older ones are deleted.

Default: 3.

NOTE: Backups only.

LOCALBACKUPMAXFILESIZE=

nnnnn – The maximum size of a file to be placed in local backup, in bytes. Files greater than this size are not backed up locally.

Default: 10MB.

NOTE: Backups only.

LOCALBACKUPMAXSIZE=

nnnnn – The maximum size of the local backup file, in bytes. Once this many bytes have been placed in the local backup file, no more files are backup up locally (but they are still sent to the z/OS Storage Server.

Default: 100MB.

NOTE: Backups only.

LOCALPASSWORD=

The password of the remote user who wishes to logon to this system.
LOCALUSER=
The local user name of the remote user who wishes to logon to this system. For Windows NT, you can specify domain/user.

LOGNONFATAL=
0 (or N) – Non-fatal errors during a backup are not logged, displayed or transmitted to the z/OS Storage Server.
1 (or Y) – Non-fatal errors during a backup are logged and displayed.
2 – Only messages during a backup which result in a skipped file are transmitted to the z/OS Storage Server.
Default: N.

MAXBACKUPTIME=
nn – The number of minutes before a backup or migration will terminate due to excessive time.
0 – No termination.
Default: 0.

MAXKFILESIZE=
nnnn – Exclude files that are larger than the specified size (in 1024 byte increments).
0 – No file size exclusion.
Default: 0.

MAXRESTORETIME=
nnnn – The number of minutes before a restore will terminate due to excessive time.
0 – No termination.
Default: 0.

MERGE=
The backup type:
0 – No merge used
1 – Full merge
2 – Incremental merge
3 – First-time merge backup
Default: 0.

MINIMIZE=
Y – Allows UPSTREAM, when running unattended, to start minimized.
N – Do not start minimized.
Default: N.

MODIFYFILE=
Y – Incremental backup eligibility is determined by the last date/time UPSTREAM was run (stored in the modification file).
N – Incremental backup eligibility is determined by the archive bit.
Default: Y (for UNIX); N (for other environments).

NOVELLPROFILE=
The profile name, set in SETNOV.EXE, referencing the server, user name, and drive mappings to be mapped to your Novell file server.
Default: NONE.
Z/OS INITIATION WITH USTBATCH

USTBATCH “FDR/UPSTREAM CLIENT OVERRIDE” PARAMETERS

NOVELLRECALL=

Y – This backup profile could be used to backup a Novell server that uses the UPSTREAM auto-recall facility.

N – This backup profile is never used to backup a Novell server that uses the UPSTREAM auto-recall facility.

Default: Y.

NTREGRESTORE=

Windows NT registry restore options:

0 – “Legacy.” Replace the registry with no additional prompting.

1 – “Keep.” Keep existing registry entries, but prompt allowing user interaction if attended.

2 – “Replace.” Replace registry entries, but prompt allowing user interaction if attended.

Default: 0.

PACKFLUSHAFTERFILE=

Y – Forces a packed record in a backup to be transmitted after each file.

N – records are fully packed.

Default: N.

PACKRECSIZE=

No longer used and replaced by USBACKUPPACKRECSIZE and USRESTOREPACKRECSIZE.

PASSWORD=

ccccc – The password associated with the security userid. Usually required if USERID is required. However, it can be omitted if the security userid is the same as the userid under which the USTBATCH job is being run.

PERFORMBITMAP=

If ACTION=13, specifies a bit map of the performance tests you wish to run.

8 – Backup, no I/O test

16 – VSAM performance test

32 – Raw communications test, PC send

64 – Raw communications test, z/OS send

128 – Backup - no communications

For additional details, please see the FDR/UPSTREAM Client Guide, Performance, Chapter 10.

Default: 96 (64+32).

PERFORMNUMRECORDS=

nnnn – The number of records sent/received on raw communications performance tests.

Default: 5000. Maximum is 65400.

PERFORMRECORDSIZE=

nnnn – The size of records sent/received on raw communications performance tests.

Default: 32700. Maximum is 65400.

POSTJOB=

cce…cc – If defined, this is the name of a program, batch file, or script file that is run after the unattended UPSTREAM function.

PREJOB=

cce…cc – If defined, this is the name of a program, batch file, or script file, that is run before the unattended UPSTREAM function.
Z/OS INITIATION WITH USTBATCH

USTBATCH “FDR/UPSTREAM_CLIENT OVERRIDE” PARAMETERS

PRTYCLASS=
The priority class for the requested action:
1 – Idle-time.
2 – Regular.
3 – Time-critical (Very Dangerous).
4 – Fixed-high.
Default: 4.
NOTE: OS/2 and 32-bit Windows only.

PRTYLEVEL=
\text{nn} – A number from 0 to 31 (OS/2) or 0 to 8 (32-bit Windows, where 0 and 1 are resolved as 8) modifying the priority class.
Default: 1 (OS/2) and 6 (32-bit Windows).

RECALLCLEANUP=
Y – UPSTREAM examines Novell auto-recall stub files to determine if any have expired and, if so, they are deleted.
N – Auto-recall stub files are not deleted.
Default: N.

RECORDSIZE=
No longer used and replaced by USERECORDSIZE.

REPORTNAME=
cc….cc – The name of the file to write reporting information to.
Default: UPSTREAM RPT.

REPORTOPTIONS=
A bit map describing any of the report features you wish to enable, add the required options and enter the sum:
1 – Files backed up/restored
2 – Files skipped during the backup
4 – Files automatically deleted
8 – Inquire versions
16 – Inquire files
32 – Specified parameters
Default: 0.

RESTARTTYPE=
Specifies the action to be performed at a restart point (usually the next time UPSTREAM is run) if there is a restartable error:
0 – Never restart.
1 – Restart failed files and incomplete backups.
2 – Restart only incomplete backups.
Default: 0.
NOTE: Backups only.

RESTOREARCHIVEBIT=
Y – Archive bits are set for files that are restored.
N – Archive bits are not set for files that are restored.
Default: N.
RESTORECHECKPOINT=

`nnnn` – The number of seconds between automatic checkpoints when performing a restartable restore.

Default: 120.

RESTOREFILEDAIL=

Allows you to specify what to do if a file is locked when you attempt to restore it.

0 – Fail the file.
1 – Restore the file to a generated name.
2 – Restore the file to a generated name and rename the file to its original name after a reboot.

Default: 0.

**NOTE:** Windows NT only.

SENDHOSTDETAILS=

N – Only the first line of an error is sent to the z/OS Storage Server.
Y – All message lines of a message are sent except additional description lines from the message file.

Default: N.

SKIP=

For restores using “List and Restore”, a set of options of how to process existing files:

0 – Restore all files regardless of whether there are existing files
1 – Restore only files where there is no existing file of the same name
2 – Restore only files where the existing file’s modification date/time and size are not the same.

Default: 0.

**NOTE:** Restores only.

SKIPBACKUPSCAN=

Y – UPSTREAM does pre-scan the disk for files to backup but performs the scan while the backup is running. Only recommended in certain cases due to the lack of a size estimate. For disk backups, must also specify DASDOVERRIDE.

Default: N.

SORTBACKUP=

Y – Sorts the backup in the same order as the z/OS Storage Server uses. May result in slightly reduced FILEINFO overhead.
N – Do not sort the backup in the order that the z/OS Storage Server uses.

Default: N.

STORAGETYPE=

Specifies how the data is stored on the mainframe.

2 – Sequential disk. Stored directly to mainframe disk.
3 – Sequential tape. Stored directly to mainframe tape.

Default: 3.

**NOTE:** Backups only.
**TIMEOVERRIDE=**

(Win32) overrides the time settings for a given backup specified in the Configurator parameter TIMECONVERSION.

- **0** – Local time.
- **1** – Standard time.
- **2** – Daylight savings time.
- **3** – Greenwich Mean Time.

Default: **0**.

**TRANSLATE=**

- **Y** – ASCII-to-EBCDIC translation is performed on all data (assumes text).
- **N** – No translation of the data (assumes binary).

Default: **Y**.

*NOTE:* File Transfer only.

**USBACKUPPACKRECSIZE=**

- **nnnnn** – The maximum number of bytes transmitted to the z/OS Storage Server. If less than the value for USERECORDSIZE, the value for USERECORDSIZE is used. Specify a value from 0 to 65400 inclusive.

Default: **65400**.

**USERECORDSIZE=**

- **nnnn** – The data blocking size. This is a memory and performance tool. Disk backups of files of sizes between 10,000 and 50,000 bytes are set to use record sizes of 8192. Specify a value up to the maximum of 32700.

For file transfers to z/OS, this is the largest record that can be transmitted and USERECORDSIZE+4 is the LRECL of the output z/OS data set.

Default: DASD backups - 27968 (optimized for half-track blocking)

TAPE backups - 32695

*NOTE:* Backups only.

**USERID=**

- **cccccccccccccccccccccccccccccccc** – Your security identifier, up to 32 characters. This may be required by some z/OS systems (see your system Administrator). There is a special form of this parameter (USERID &JOB) that requests that the security userid under which the USTBATCH job is executing (usually specified on the JOB statement) is to be used. This format can be specified only in USTBATCH input.

**USRESTOREPACKRECSIZE=**

- **nnnnn** – The maximum number of bytes received from the z/OS Storage Server. Specify a value from 0 to 65400 (inclusive).

Default: **65400**

**UTF8=**

- **Y** – UTF-8 unicode encoding.
- **N** – UPSTREAM Unicode encoding.

Default: **N**.

*NOTE:* Win NT/2000 only.
Z/OS INITIATION WITH USTBATCH
USTBATCH “FDR/UPSTREAM CLIENT OVERRIDE” PARAMETERS

**VERSIONDATE=**

*nnnnnnnnnnnn* – For a restore, if you specified LATESTVERSION=N, then you are required to specify a complete version date. This is usually used with an inquire versions command. The version date is exactly 12 numeric characters.

**NOTE:** Restores only.

**XFERRECORDSIZE=**

*nxxx* – The record blocking size for file transfers. Users often use 80 for text files as well. Default: 8192.

**NOTE:** File Transfer Only.
This section describes all "repeated" Client override parameters, which may be specified in groups to define the Client files to be processed.

**FILES=**

filespec – The Client file specification to be processed by this request. This can include wild-cards, but note that UPSTREAM can only support Client filenames up to 255 characters in length.

For physical disk/backup restores, specify `<|location|*.* where location is the internal UPSTREAM physical disk form.

For FDRSOS restores, specify `/_FDRSOS_BACKUP if the source is a UNIX disk or `|*.* if the source is a PC disk.

**SPECNUMBER=**

nnnn – The header to this file set. Each file set begins with SPECNUMBER definition with an ascending number starting at 1.

**ARCHIVEBIT=**

Y – The archive bit is reset for all files successfully backed up.

N – The archive bit is not reset.

Default: Y.

**DATELIMIT=**

Allows inclusion or migration of files based on modification date. If you enable this feature you must also specify a LATESTDATE.

0 (or N) – This feature is disabled.

1 (or Y) – Files after the LATESTDATE (and LATESTTIME for UNIX) are included/migrated.

2 – Files before the LATESTDATE (and LATESTTIME for UNIX) are included/migrated.

Default: N.

**DAYSOLD=**

nnnn – The number of days that a file has not been accessed before eligible for inclusion in the backup.

Default: 180.

**DELETEPROMPTS=**

0 – No prompts; delete the files without waiting (unattended).

1 – Prompt for each file before deleting.

2 – Prompt for the files in each directory before deleting.

Default: 0.

**DESTINATION=**

c…cc – This parameter allows files to be restored to a different file or path name from which they were originally backed up. The wild-card specifications must match the wild-card specifications in the FILES parameter. You can specify up to 128 characters.

**NOTE:**

Restores only.
Z/OS INITIATION WITH USTBATCH
USTBATCH “FDR/UPSTREAM CLIENT OVERRIDE” PARAMETERS

DIRDELETE=
   Y – If automatically deleting files, remove directories from which all files have
       been deleted.
   N – Leave the directories that were just emptied.
   Default: Y.
   **NOTE:** Backups only.

DIRSONLY=
   Specifies whether **only directories** and no files should be restored:
   Y – Restore only directories (no files).
   N – Restore files and directories.
   Default: N.
   **NOTE:** Restores only.

DRIVEALIAS=
   c – If specified, the drive letter transmitted to the z/OS Storage Server in lieu of the
   specified one. Allows you to move drive mappings without affecting merge
   backups. Specify a single letter (no trailing colon).
   **NOTE:** Backups only.

FILEDELETE=
   Y – Delete the files that were successfully backed up.
   N – Do not delete the files that were successfully backed up.
   Default: N.

FILESOPENFORUPDAT=
   Y – Win32 and OS/2 backups use the DENY_WRITE file open attribute. For AIX,
   files open for update are not included at all.
   Default: N.

HARDLINKS=
   Y – Enables hardlink support for backups or restores.
   N – Disables hardlink support for backups or restores.
   Default: Y (Unix), N (Win).
   **NOTE:** Backups only

HIDDENFILES=
   Specifies whether hidden files should be backed up or restored as well as normal files.
   Y – Backup and restore hidden files.
   N – Do not backup and restore hidden files.
   Default: Y.
   **NOTE:** Backups only.

INCREMENTAL=
   Y – Only those files with the archive bit set (files that have changed) are backed up.
   N – All files specified will be backed up.
   Default: N.
   **NOTE:** Backups only.
LASTACCESS=
  Y – Only include files that have not been accessed for the number of days (or more) specified in the DAYSOLD parameter.
  N – Do not restrict by access date.
Default: N.
  **NOTE:** Backups only.

LATESTDATE=
  \texttt{mm/dd/yy} – Only used with DATELIMIT=Y. This field must be 8 characters and the date specified using the format MM/DD/YY.
  **NOTE:** Backups only.

LATESTTIME=
  \texttt{hh:mm:ss} – The time, within the LATESTDATE to backup the files (HH:MM:SS)
  **NOTE:** UNIX Backups only.

MIGRBITS=
  Specifies how migrated files should be treated in a restore:
  0 – Do not include migrate files in the restore.
  1 – Include migrated files in the restore
  2 – Include only migrated files (no regular files) in the restore.
Default: 0.
  **NOTE:** Restores only.

MOUNTPOINTS=
  Y – Include a mount point and all of its files in a backup.
  N – Exclude the mount point and all of its files in a backup.
Default: N.

NDS=
  Y – This is a NetWare Directory Services backup specification.
  N – This is a non-NDS specification.
Default: N.

NONFILEDATABITMAP=
  An integer, which defines the types of non-file data, UPSTREAM attempts to backup or restore. The separate values are coded as powers of 2 and are then added to reach the total value:
  1 – OS/2 or NT extended attributes (files).
  2 – OS/2 or NT extended attributes (dirs).
  4 – NOVELL directory information.
  8 – NOVELL directory restrictions.
  16 – NOVELL directory trustees.
  32 – NOVELL file information.
  64 – NOVELL file trustees.
  128 – NT Registry and Event Logs.
  256 – NOVELL, HPFS, or NTFS reset last access date.
  512 – NOVELL set archive date.
  16384 – HPFS or NTFS ACLs
  32768 – Windows NT registry files
Default: 915. (512+256+128+16+2+1).
NOVELLMIGRATE=
  Y – Leave a Novell migration sub instead of deleting the file after the file has been successfully backed up.
  N – Delete the file after it has been successfully backed up.
  Default: N.
  **NOTE:** Migration specifications only.

NOVELLMIGRATEADDEXT=
  Y – With NOVELLMIGRATE=Y, this option adds the extension “.UPSTREAM_MIGRATED” to all migrated stub files to keep Windows Explorer from recalling files in directory listings.
  N – Do not add the extension to migrated stub files.
  Default: N.
  **NOTE:** Migration specifications only.

NTFSADDPERMISSION=
  Y – If an UPSTREAM directory or file access fails for security on an NTFS volume, the user that UPSTREAM is running as is added to the ACLS for that directory or file.
  N – The user is not added to the ACLS for that directory or file.
  Default: Y.

PLUGIN=
  *filespec* – Allows you to specify the name of a DLL or shared library, which can be used to extend UPSTREAM functionality. PLUGINS must be in the \plugin subdirectory, directly beneath the UPSTREAM directory.

PLUGINPARAMETERS=
  Parameters specific to a plugin.

RESTOREMOUNTPOINT=
  Whether or how Windows 2000 mount points are restored:
  0 – Do not restore.
  1 – Verify before restoring.
  2 – Recreate if necessary.
  3 – Restore without verification.
  Default: 0.

RETAIN=
  *nnn* – In a migration spec, the number of days that the file should be merged forward onto new full backups.
  Default: 90.
  **NOTE:** Migration specs only.

ROOTENTRY=
  Y – A dummy file: <Volume Information> is created for Windows NT and NLM backups containing non-file data for the volume itself.
  N – This file is not created.
  Default: Y.
Z/OS INITIATION WITH USTBATCH
USTBATCH “FDR/UPSTREAM CLIENT OVERRIDE” PARAMETERS

SKIPOLD=
  Y – Only those files that have a newer version on the backup than that contained on the Client are restored.
  N – All files are restored.
  Default: Y.
  **NOTE:** Restores only.

SOSDISK
The source for backups and the destination for physical disk/FDRSOS restores, using the internal UPSTREAM physical disk format.

SOSTIMESTAMP=
  Y – Create an FDRSOS Timestamp file during the backup, which is used at restore time to determine if an FDRSOS restore has been done if the “Highlighted back to FDRSOS” restore option is selected.
  N – Do not create an FDRSOS Timestamp file.
  Default: N.

SOSTIMESTAMPPATH=
  filespc – If SOSTIMESTAMP=Y, this is the path where the FDRSOS timestamp file is written (for backups) or read from (for restores). If not specified the file is written/read in the specified backup directory.

SPECTYPE=
  0 – File specification is for files to be included in the backup or restore.
  1 – File specification is for files to be excluded from the backup or restore.
  2 – File specification is for files to be migrated during the backup.
  Default: 0.

SUBDIRECTORIES
  Y – All subdirectories under the current one are checked for files that match the file specification.
  N – Only those files in the specified or default directory that match the file specification are transferred.
  Default: Y.
18.8 USTBATCH EXAMPLES

This section provides several examples of USTBATCH jobs.

**EXAMPLE 1:**  “BATCHJCL”

The following example is found in the **BATCHJCL** member of the FDR/UPSTREAM Installation Control Library (ICL). It shows a fairly simple jobstream in which a Client-based operation is requested.

Initiate a backup against the target Client currently located at TCP/IP address 192.168.000.000. The backup is controlled entirely by the client-side parameters stored in the “BKUP.DAT” parameter file in “/opt/fdrupstream” on the Client.

In this example execution, **no** Client override parameters are being used.

```plaintext
//RUNBAT   EXEC PGM=USTBATCH
//STEPLIB  DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=*  
//USTLOG   DD SYSOUT=*  
//USTPARM  DD *

* THIS IS AN EXAMPLE OF USING USTBATCH TO INITIATE OPERATIONS
* ON A FDR/UPSTREAM CLIENT USING A PARAMETER FILE ON THE
* FDR/UPSTREAM CLIENT TO DEFINE THE OPERATION
* 
* APPLPREF=UPSTR       APPL NAME PREFIX
USAPPL=UPSTREAM       ONLINE UPSTREAM APPLID
LOGMODE=USTMODE       MODE NAME FOR SESSION
MAXRETRY=1            RETRY COUNT
QUEUE                 QUEUE REQUEST IF UPSTREAM CLIENT BUSY

* INSTITUTE A BACKUP ON A TCP/IP FDR/UPSTREAM CLIENT
* 
TCPTARG=192.168.000.000.1972, WSPARM=/opt/fdrupstream/bkup.dat
/*
EXAMPLE 2: “BATPARM”

The following example is found in the BATPARM member of the FDR/UPSTREAM Installation Control Library (ICL). It shows a more complex jobstream in which various Client-based operations are being requested.

- **Task 1** is an incremental backup against the Client currently on TCP/IP address 192.168.000.000. The file spec used for the backup is being overridden by the USTBATCH job.
- **Task 2** is the execution of an UPSTREAM process described entirely in the “DAILY.DAT” parameter file on the target Client currently registered to UPSTREAM as “MKTNG1”.
- **Task 3** is a restore of some application files to the Client currently at TCP/IP address 192.168.000.000. The entire restore process is being controlled by Client override parameters in the USTBATCH job.

```
//RUNBAT   EXEC PGM=USTBATCH
//STEPLIB  DD DISP=SHR,DSN=your.upstream.loadlib
//USTLOG   DD SYSOUT=*  
//USTPARM  DD * 
***************************************************************
* THIS IS AN EXAMPLE OF USTBATCH INPUT TO INITIATE OPERATIONS 
* AT 3 FDR/UPSTREAM CLIENTS 
***************************************************************
APPLPREF=UPSTR   APPL NAME PREFIX (DEFAULT)
USAPPL=UPSTREAM   ONLINE FDR/UPSTREAM APPLID (DEFAULT)
MAXRETRY=3   RETRY 3 TIMES (EVERY 10 MINUTES)
CONV=WAIT   WAIT FOR RESULTS FROM FDR/UPSTREAM CLIENT 
***************************************************************
* TASK 1. INITIATE AN INCREMENTAL BACKUP, USING THE 
*         MERGBKUP.DATA PARAMETER FILE AT THE FDR/UPSTREAM CLIENT, 
*         BUT OVERRIDING THE FILESPEC. 
***************************************************************
TCPTARG=192.168.000.000..1972,WSPARM=/opt/fdrupstream/mergbkup.dat
ACTION 1   RUN A BACKUP
STORAGETYPE 2   TO SEQUENTIAL DISK
MERGE 2   BACKUP IS AN INCREMENTAL MERGE
SPECNUMBER 1   1st (and only) FILE SPEC
FILES /usr/*   BACKUP THE /usr DIRECTORY 
***************************************************************
* TASK 2. INITIATE AN OPERATION DEFINED ENTIRELY BY THE 
*         PARAMETER FILE AT THE FDR/UPSTREAM CLIENT 
***************************************************************
TARGNAME=MKTNG1,WSPARM=/opt/fdrupstream/daily.dat
***************************************************************
* TASK 3. INITIATE A RESTORE OPERATION DEFINED ENTIRELY BY 
*         FDR/UPSTREAM CLIENT OVERIDES 
***************************************************************
TCPTARG=192.168.000.000..1972
ACTION 0   RUN A RESTORE
USERID USER37   MAINFRAME USERID
PASSWORD MYPASS   MAINFRAME PASSWORD
BACKUPPROFILE SERVER2   FDR/UPSTREAM CLIENT PROFILE NAME
LATESTVERSION Y   RESTORE LATEST VERSION OF ALL FILES
SPECNUMBER 1   1st FILE SPEC -
FILES /usr/*  RESTORE ALL FILES FROM /usr/*
SPECNUMBER 2   2nd FILE SPEC -
FILES /opt/*  RESTORE ALL FILES FROM /opt/*
SUBDIRECTORIES N   DO NOT RESTORE FILES IN SUBDIRECTORIES 
SKIPOLD N   RESTORE EVEN IF RESTORED FILES ARE OLDER 
/*
This example demonstrates a multi-step USTBATCH job being used to run a Client process (Chapter 16 "Running an FDR/UPSTREAM Client User Process").

❖ **Step 1** executes a script on the target Client to close and export databases.
❖ **Step 2** performs a backup up of the databases.
❖ **Step 3** then re-enables the databases for user access.

The backup step (Step 2) is skipped if the initial step to close the databases does not get a zero return code (as controlled by the COND= parameter on the EXEC statement for Step 2).

```
* STEP 1: EXECUTE AN FDR/UPSTREAM CLIENT PROCESS TO CLOSE THE DATABASES
***************************************************************
//RUNJOB1 EXEC PGM=USTBATCH
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSUDUMP DD SYSOUT=* 
//USTLOG DD SYSOUT=* 
//USTPARM DD * 
CONV=WAIT 
TARGNAME=MARKETSERVER 
ACTION 5 RUN A JOB 
SPECNUMBER 1 FILE SPEC 
FILES /mysql/exportall.sh EXECUTE THIS SCRIPT 
*/

* STEP 2: INITIATE A BACKUP OF THE DATABASES
***************************************************************
//BACKUP EXEC PGM=USTBATCH,COND=(0,NE,RUNJOB1) 
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib 
//SYSUDUMP DD SYSOUT=* 
//USTLOG DD SYSOUT=* 
//USTPARM DD * 
CONV=WAIT 
TARGNAME=MARKETSERVER 
ACTION 1 BACKUP 
STORAGETYPE 2 SEQUENTIAL DISK 
MERGE 1 MERGE BACKUP 
SPECNUMBER 1 FILE SPEC 
FILES /mysql/* 
*/

* STEP 3: EXECUTE AN FDR/UPSTREAM CLIENT PROCESS TO REOPEN DATABASES
***************************************************************
//RUNJOB2 EXEC PGM=USTBATCH 
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib 
//SYSUDUMP DD SYSOUT=* 
//USTLOG DD SYSOUT=* 
//USTPARM DD * 
CONV=WAIT 
TARGNAME=MARKETSERVER 
ACTION 5 RUN A JOB 
SPECNUMBER 1 FILE SPEC 
FILES /mysql/openall.sh EXECUTE THIS SCRIPT */
```
Example 4: E-mail Notification

Please refer to “Single Use Input Parameters” in Section 18.6 for further details.

The three PDS members below define the parameters and substitution variables used to enable e-mail notification for a given condition code. The members are optional and are located in the PDS referenced in the USTEMAIL DD statement in the USTBATCH JCL of the backup or utility job. The member names need not be as listed below and may be of your choosing.

- The MAILSERVER parameter may reference either the DNS name of the mail server (as in member EMAIL0), or the TCP address (as in members EMAIL4 and EMAIL8),
- The e-mail SUBJECT text may be up to 71 characters inclusive,
- The e-mail BODY text is defined on the line following the SUBJECT. The substitution variables listed in the SUBJECT and BODY are optional.

Sample JCL listing the USTEMAIL and SYSTCPD DD statements and the EMAILOK, EMAILWRN, and EMAILERR parameters are listed on the following page. These samples can also be found in the Installation Control Library (ICL) that was created as part of the installation of UPSTREAM.

Member “EMAIL0” in data set “YOUR.EMAIL.PDS” contains:

TCPNAME ENSRV001
** MAILSERVER YOUR.MAILSERVER.DNS *EITHER IP ADDR OR DNS ACCEPTED
MAILSERVER 192.168.X.X
FROM:<CPUA@YOURCOMPANY.COM>
***** MULTIPLE ADDRESSES ACCEPTED
TO:<SUPPORT@YOURCOMPANY.COM>
TO:<SYSPROG@YOURCOMPANY.COM>
SUBJECT: FDR/UPSTREAM JOB &JOBNAME ZERO RETURN CODE
JOB &JOBNAME STEP &STEPNAME ZERO RETURN CODE ON SYSTEM &SYSTEM

Member “EMAIL4” in data set “YOUR.EMAIL.PDS” contains:

TCPNAME ENSRV001
MAILSERVER YOUR.MAILSERVER.DNS *EITHER IP ADDR OR DNS ACCEPTED
FROM:<CPUA@YOURCOMPANY.COM>
TO:<SUPPORT@YOURCOMPANY.COM>
TO:<SYSPROG@YOURCOMPANY.COM>
SUBJECT: FDR/UPSTREAM JOB &JOBNAME WARNING &EMAILDATE &EMAILTIME
JOB &JOBNAME STEP &STEPNAME WARNING RETURN CODE ON SYSTEM &SYSTEM
Member “EMAIL8” in data set “YOUR.EMAIL.PDS” contains:

TCPNAME ENSRV001
MAILSERVER 192.168.X.X
FROM:<CPUA@YOURCOMPANY.COM>
TO:<SUPPORT@YOURCOMPANY.COM>
SUBJECT: FDR/UPSTREAM JOB &JOBNAME ERROR &EMAILDATE AT &EMAILTIME
JOB &JOBNAME STEP &STEPNAME ERROR RETURN CODE

Sample USTBATCH JCL illustrating use of the USTEMAIL and SYSTCPD DD statements and the EMAILOK, EMAILWRN, and EMAILERR parameters.

❖ The USTEMAIL DD statement is required for e-mail notification, but is otherwise optional. It references a PDS that contains the members referenced in the EMAILOK, EMAILWRN, and EMAILERR parameters.

❖ The SYSTCPD DD statement may be used when a TCP/IP Domain Name Server (DNS) is not defined in the TCP/IP PROFILE data set. It is otherwise optional.

//BACKUP   EXEC PGM=USTBATCH
//STEPLIB  DD DISP=SHR,DSN=your.upstream.loadlib
//USTEMAIL DD DISP=SHR,DSN=your.email.pds
//*        USTEMAIL ONLY REQUIRED FOR E-MAIL NOTIFICATION
//SYSTCPD DD DISP=SHR,DSN=your.tcpdata.dataset
//*        SYSTCPD NEEDED IF NO DNS IN TCP/IP PROF
//SYSUDUMP DD SYSOUT=* 
//USTLOG   DD SYSOUT=* 
//SYSPRINT DD SYSOUT=* 
//* 
//USTPARM DD * 
APPLPREF=UPSTR  * 5 CHAR PREFIX OF THE VTAM APPLID
USAPPL=UPSTREAM  * VTAM APPLID OF FDR/UPSTREAM z/OS STARTED TASK
LOGMODE=#INTER
CONV=WAIT
MAXRETRY=0
WTOCOMP
EMAILOK=EMAIL0  *DEFINE FOR NOTIFICATION IF STEP CONDITION CODE=0
EMAILWRN=EMAIL4 *DEFINE FOR NOTIFICATION IF STEP CONDITION CODE=4
EMAILERR=EMAIL8 *DEFINE FOR NOTIFICATION IF STEP CONDITION CODE=8
RESTART=3,5
*
TARGNAME=ZVMINST1
ACTION 1        *1=BACKUP 
.
.
.(remainder of backup job follows)
18.9 CONTROLLING USTBATCH

If CONV=WAIT is specified within the USTBATCH input parameters, USTBATCH can accept z/OS console commands in order to monitor and modify its operation. In the examples shown below, “jobname” is the name of the USTBATCH job.

**STATUS DISPLAY**

F jobname,STA

This causes USTBATCH to display multiple “UST749” messages, one for each Client request that is either pending or active. The messages contain the following information:

- An internal 4-digit task ID
- The target Client name or address
- The status of the request (see below)
- The time that the request was confirmed by the Client

The possible status values are:

**WAIT** – The request is still in the wait queue and has not yet been initiated.

**CNFRM** – The request has been sent to the UPSTREAM started task and USTBATCH is waiting for confirmation from the target Client that it has been accepted.

**ACTIV** – The request has been initiated and confirmed by the target Client and has been moved to the “active” queue awaiting completion notification.

**FAILD** – The request has failed. UPSTREAM will shortly issue a failure notification and remove the request from the queue.

**TASK TERMINATION**

F jobname,TERM ID=nnnn

This console command requests that USTBATCH terminate a request (identified by its ID number “nnnn”, as obtained from the status display). This has two possible effects, depending on the current status of the request.

- If the request is in **WAIT** status, it is deleted from the queue.
- If the request is in **ACTIV** or **CNFRM** status, it continues to be processed since it has already been sent to the UPSTREAM started task. However, USTBATCH removes it from its queues and no longer waits for completion of that request (essentially converting it to CONV=NONE processing). Depending on the status of other requests, this allows USTBATCH to terminate while the requested operations are still running.

**IMMEDIATE STOP**

P jobname

This cause USTBATCH to clear all of its queues and terminate as soon as possible. Any requests that have not yet been initiated (i.e., they are in WAIT status) are discarded. All requests that have been initiated (i.e., in ACTIV or CNFRM status) continue to execute, but USTBATCH no longer waits for them.

**FLUSH LOG**

F jobname,FL

This causes USTBATCH to close and reopen its log file (DD USTLOG). This allows the most recent USTBATCH messages to be available for viewing so that you can check on the status or results of requests while some requests are still executing.
USTBATCH SECURITY

Please refer to Section 4.4 "USTBATCH Security Checking" for the security implications of using USTBATCH.
FDR/UPSTREAM Scheduler

19.1 USTSCHED Overview

FDR/UPSTREAM includes a simple, yet flexible scheduler program (USTSCHED), which can be used to schedule the automatic execution of:

- **z/OS console commands** to control UPSTREAM operations. This includes most of the commands described in Chapter 17 “FDR/UPSTREAM Operation”, with the exception of z/OS START (UPSTREAM has to be started before the scheduler can be activated, so the scheduler cannot start FDR/UPSTREAM itself).
- USTSCHED can also be used to schedule any other command that can be issued on the z/OS console.
- It can also schedule commands to start USTBATCH tasks (Chapter 18 “z/OS Initiation with USTBATCH”).
- It can be used to initiate any other (i.e., non-UPSTREAM) z/OS batch job or operator command.

It is important to note that USTSCHED is a basic scheduler and it has not been designed to replace other console automation or job scheduling software, which can usually do more sophisticated scheduling control, such as checking the results of a scheduled job or command.

If you currently use other, more advanced, scheduling software, it is recommended that you use that software for scheduling your UPSTREAM operations, instead of using USTSCHED.
19.2 USTSCHED Schedules

USTSCHED schedules are stored and maintained as one or more members of a PDS, as indicated by the USTSCHED DD statement in the FDR/UPSTREAM startup PROC (see Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”). This PDS is usually the same PDS as the one containing the main UPSTREAM configuration member (Chapter 21 “FDR/UPSTREAM Configurator”). However, another PDS with the same characteristics (RECFM=FB, LRECL=120) can be used, if desired.
19.3 USTSCHED TSO/ISPF Dialog

The USTSCHED schedules are maintained through the UPSTREAM TSO/ISPF dialog. Select option 10 ("SCHEDULE") and press **ENTER**.

**Figure 19-1: FDR/UPSTREAM TSO/ISPF Dialog**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USTBATCH - Host Initiated Services</td>
</tr>
<tr>
<td>2</td>
<td>STATUS - Current Status Information</td>
</tr>
<tr>
<td>3</td>
<td>DEFINE - Define Control Files</td>
</tr>
<tr>
<td>4</td>
<td>CONFIGURE - Main Options</td>
</tr>
<tr>
<td>5</td>
<td>PROFILE - Workstation Profile Names</td>
</tr>
<tr>
<td>6</td>
<td>OPER - Operator Commands</td>
</tr>
<tr>
<td>7</td>
<td>REPORT - Report</td>
</tr>
<tr>
<td>8</td>
<td>REGISTRY - Name Registry</td>
</tr>
<tr>
<td>9</td>
<td>DUPAUDIT - Duplicate File Audit</td>
</tr>
<tr>
<td>10</td>
<td>SCHEDULE - Command Scheduler</td>
</tr>
<tr>
<td>11</td>
<td>MANAGEMENT - Backup Management</td>
</tr>
<tr>
<td>12</td>
<td>USTCRYPT - USTCRYPT Options</td>
</tr>
</tbody>
</table>

At the top of the "Command Scheduler" panel (shown below), you specify the data set name of the PDS where your schedules are stored. Put the name in single quotes, unless it begins with your TSO userid.

You then specify the **member name** of the specific schedule that you wish to create, display or modify. You can use any name up to 8 characters in length.

**Figure 19-2: FDR/UPSTREAM - Command Scheduler**

<table>
<thead>
<tr>
<th>Schedule dataset:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dataset name ===&gt;</td>
</tr>
<tr>
<td>Member name ===&gt;</td>
</tr>
</tbody>
</table>

Press enter to view the schedule. To test the schedule, use the fields below:

Test schedule ===> NO (yes no)

Test date: 03 / 29 / 2016 (MM/DD/YY or MM/DD/YYYY)

**Note:** Changes to the active schedule do not take effect until the operator command `F UPSTREAM,SCHEDULE` is issued from a system console or by the OPER dialog (option 6).

If you specify "NO" in the **Test Schedule** field, and the specified member does not already exist, it is created for you. If it does already exist, it is displayed and you may modify it.

Once a schedule member has been created or modified, you can test the schedule by specifying "YES" in the **Test Schedule** field. If necessary, update the **Test Date** field (the current date is filled in by default). The resulting dialog then displays all the commands that are issued on that date, with the time of day, under the schedule member shown.
19.4 **SPECIFYING THE SCHEDULES**

When a schedule member is being created, or an existing member is being displayed or modified, you get a display similar to the one shown below:

**Figure 19-3: FDR/UPSTREAM - COMMAND SCHEDULER**

If you are creating a new schedule member, the preceding panel displays one blank entry with nothing filled in. If it is an existing schedule member and its contents are too large to display on your screen, you can scroll up (PF7) and down (PF8) to see other parts of the schedule.

Our preceding example shows a schedule with two entries. The first entry is for the reorganization of the CATALOG repository file, scheduled to run every Tuesday and Friday at 02:00. The second entry is a backup of SERVER 1 to be run every other Monday at 22:00. Although not shown here, a SERVER1 member within PROD.JCL.CNTL will contain the USTBATCH parameters required to initiate the backup.

As you can see, the CMD field on the far left of the screen is normally filled in with the unique sequence number of the schedule entry. However, you can overtype this number with any of the following standard ISPF-type editing codes:

- **I** – insert a new entry after this one.
- **D** – delete this entry.
- **R** – replicate this entry.

The Schedule operands follow:

- **Selection ID** – A meaningful description of the schedule entry.
- **z/OS Command** – The z/OS console command to be issued. (Required).
- **Time(s)** – One or more times (in 24-hour clock format). (Required).
- **Date(s)** – One or more dates (mm/dd/yy or mm/dd/yyyy). (Conditional).
- **Monthday(s)** – One or more days of the month (nn or LAST). (Conditional).
- **Weekday(s)** – One or more days of the week (any character). (Conditional).

At least one entry is required for either the **Date(s)**, or **Monthday(s)**, or **Weekdays(s)** operands. If two or all three of the operands has an entry, each will be honored.
If one or more Weekday(s) are checked, you may optionally modify that selection with data on one of the two **Occurrence** lines, as follows:

- Place any character in one or more of the boxes on the **first** occurrence line to limit execution to the first, second, last, etc., occurrence of the selected weekdays.
- Alternatively, you can enter values on the **second** occurrence line to limit execution to selected weekdays on every nth week, for up to 52 weeks, starting on the indicated date (the current date by default).

The **Time(s)**, **Date(s)**, and **Monthday(s)** fields are limited in size. If you run out of room before you enter all required values, you can replicate the entry (using “R” in the CMD field) and add the additional values on the new entry. Normally, the **Selection ID** field should be unique for each entry, but it may be the same for entries replicated for this purpose.

If you want to schedule the execution of batch jobs you can use the **SUB** command, as shown in the second example entry. Alternately, you can copy the USTRDR member from the UPSTREAM Installation Control Library (ICL) to a system PROCLIB. It can then be used in the UPSTREAM schedule, or as an actual console command to submit jobstreams from any library using the following syntax:

```
S USTRDR,DSN=PROD.JCL.CNTL(SERVER1)
```

The difference between using USTRDR and the **SUB** command relates to security:

- With the **SUB** command, the submitted job inherits the security userid under which the UPSTREAM started task itself runs.
- With USTRDR, the security userid probably needs to be specified in the submitted jobstream.
19.5 Schedule Exclusions

You notice towards the top of the scheduler screen that there are two check boxes called “Selection Entries” and “Exclusion Entries”. There is an “X” in one of these two boxes indicating what type of schedule entries are being displayed on the panel, as follows:

❖ “Selection Entries” displays the actual schedule entries.
❖ “Exclusion Entries” display exceptions to the selection schedules.

The exceptions may, for example, be special dates on which the schedules are not to be executed. The “Exclusion Entries” panel optionally allows you to exclude certain commands (or all commands) from executing at certain times.

You can enter an “X” (or any other character) in the “Selection Entries” or “Exclusion Entries” check box to switch between the two types of display. When you select “Exclusion Entries”, you get a display similar to this:

Figure 19-4: FDR/UPSTREAM - Command Scheduler

As you can see, exclusion entries are specified in the same way as the selection entries, except that the "z/OS Command" field is absent.

The values specified here are dates and/or times that the equivalent selection entries are not to be executed. An exclusion entry is only meaningful if there is one or more accompanying selection entry that matches on the time and/or date specified.

The first entry in our preceding example ("Global Exclusion Entry") will apply to all selection entries, causing the entire schedule to be bypassed on January 1 in 2012 and 2013.

To specify an exclusion that applies only to a particular selection entry, specify an Exclusion ID that matches the Selection ID of the entry to which it applies.

If there are multiple Selection IDs with the same name, the exclusion will apply to all of them. Conversely, if there are multiple Exclusion IDs with the same name, they affect all Selection ID's that match that name.

In the preceding example, the selection entry with an ID of "Backup Server 1" is bypassed if it falls on the last day of any month.
19.6 SAVING THE SCHEDULE

The revised schedule member is not modified or saved until you enter SAVE in the command field at the top of the panel. If you do not wish to save the changes you have made, enter CANCEL to discard them and then exit.
19.7 **Operation and Startup**

USTSCHED operates as a sub-task of the main FDR/UPSTREAM started task. It can be automatically started whenever the UPSTREAM started task is initiated by adding the SCHEDULE parameter (via a PARM=) to the UPSTREAM startup PROC (see Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”).

USTSCHED can also be started and stopped manually at any time. Below is an example of the z/OS MODIFY command (issued to the UPSTREAM started task) to start the scheduler.

The "membername" and “list” parameters are both optional. “Membername” points to the PDS member containing the current schedule. This is not needed if that member is pointed to by the USTSCHED DD statement in the UPSTREAM startup PROC (see Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”). The “List” parameter causes the schedule entries to be listed out in the FDR/UPSTREAM log file (USTLOG) as it is activated:

```
F UPSTREAM, SCHEDULE MEMBER=membername LIST
```

The result of the preceding MODIFY command depends on the following:

- If USTSCHED is currently started and has been activated from the same member, the schedule is refreshed and USTSCHED continues operation. This allows you to update the schedule dynamically, without having to stop/start USTSCHED or the UPSTREAM started task.

- If USTSCHED is not already active when the preceding command is issued, it starts up using the settings in the specified member.

- If USTSCHED is already active but it has been activated from a different member to the one indicated by `membername`, it starts a **second instance** in a separate sub-task using the settings in the specified member. This allows you to have more than one USTSCHED schedule active at any one time, each controlled by a different member.
19.8 USTSCHED Task Control

Any task that has been successfully initiated through USTSCHED is then regarded as being just another FDR/UPSTREAM sub-task. Thus, once running, that sub-task can be controlled with the standard z/OS console commands (e.g., STOP, MODIFY, CANCEL), as described in Chapter 17 “FDR/UPSTREAM Operation”.
19.9 USTSCHED IN STATUS DISPLAYS

On z/OS status displays (see Section 17.4 "Status Display (MODIFY Command)" and Section 17.5 "Status Display (TSO/ISPF)"), all instances of USTSCHED will be displayed with the unique "membername" appearing in the userid field.
The FDR/UPSTREAM registered name service provides these optional function:

- **Registered Names**: A Client (workstation/server) can be assigned a “Registered Name” that is independent of its network address (Section 20.2 “Registered Names”).

- **Automatic Software Upgrades**: The UPSTREAM software installed on a client can be automatically upgraded when a new version becomes available (Section 20.3 “Automatic Software Upgrades”).
20.2 REGISTERED NAMES

The registered name service allows an FDR/UPSTREAM Client to be assigned an arbitrary unique "registered" name that is independent of its TCP/IP network address or DNS Name. This name can then be used to refer to that Client in UPSTREAM operations, most notably in USTBATCH, but also in any other situation where the TCP/IP network address (TCPTARG), or DNS name (DNSNAME) would ordinarily be used.

The utilization of a registered name allows you to setup your USTBATCH jobs independently of your network addressing and configuration. Instead of hard-coding network addressing information in your USTBATCH jobs, you can refer to the target Client by its registered name. This is especially useful in environments where the network addressing is dynamically assigned via DHCP and may frequently change.

NAMING

A registered name can be up to 16 characters in length and can include blanks. Care must be taken to ensure that the names are unique across all Clients.

RECOMMENDATION: Use names that are meaningful, e.g., "Payroll Server". If the registered name service is used across a large number of servers or workstations, the allocation of registered names should, ideally, be controlled centrally.

ASSIGNING THE NAMES

A registered name can be assigned during the initial configuration of the Client software. It can also be assigned at any time after the Client software has been installed. This is the recommended method as it validates that communications between the Client and the z/OS Storage Server are functioning correctly. When assigning the name using the Client Configurator, the Name field defaults to &SYSNAME. This causes registration to use the machines host name. For Linux on System z systems, selecting Use VM Name uses the z/VM virtual machine name instead of the machines host name or a user defined name. If manually editing the TARGETNAME field in the upstream.cfg file, specify &VMNAME to use the z/VM virtual machine name. Specify $SYSNAME to use the machines host name. See the FDR/UPSTREAM Client Guide for more details on assigning registered names through the Client software.

Registered names can also be assigned using the TSO/ISPF dialog on the FDR/UPSTREAM z/OS Storage Server (see "Maintaining the Table" in Section 20.2).

REGISTERING THE NAMES

For a registered name to be recognized and usable by UPSTREAM, the Client must first "register" that name with the z/OS Storage Server. Although this can be done manually (see "Maintaining the Table" in Section 20.2), the recommended method is to configure your Client to do an automatic registration. For this to work correctly, the Client must be enabled for remote functions (see the FDR/UPSTREAM Client Guide).

When the UPSTREAM software is started on the Client it will automatically contact the z/OS Storage Server and transmit its registered name, together with the network address at which it is currently located. You can also request that the Client software periodically re-transmit this registered name and network address (see the FDR/UPSTREAM Client Guide for more details).

Details of all Clients that are currently "registered" with the z/OS Storage Server are maintained in a table in the CATALOG repository file (Chapter 6 "The FDR/UPSTREAM Repository"). This table is also kept in memory for quick access.

For each record in the table, a timestamp is maintained showing the last time that the registered name was updated or referenced. If a given registered name has not been updated or referenced within 90 days it is automatically deleted from the table.

Contents of the table can be reported on at any time with the RPTYPE=REGISTRY option of USTRPORT (see "REGISTRY" in Section 22.4). This information can also be viewed and modified through the either Client interface (see the FDR/UPSTREAM Client Guide), or the TSO/ISPF dialog. See "Maintaining the Table" in Section 20.2.
Once registered, an Client's registered name can be referenced by USTBATCH (or any other UPSTREAM operation) using the TARGNAME parameter instead of the usual TCPTARG or DNSNAME parameters.

The registered name table is searched for a match to the specified TARGNAME.

❖ If a match is found, the corresponding current network address and PORT number stored in the table for that Client is used. As a check, UPSTREAM first verifies that the registered name in the table matches that of the Client at the network address indicated by the table entry.

❖ If a match to TARGNAME is not found in the registered name table, the requested operation fails.
MAINTAINING THE TABLE

As described earlier, the contents of the registered name table can be reported at any time using the RPTYPE=REGISTRY command of USTRPORT (Chapter 22 "Reporting with USTRPORT"). Entries in the table can also be displayed, modified, inserted or deleted through the Client interface (see the FDR/UPSTREAM Client Guide), or through the UPSTREAM TSO/ISPF dialog. Select option 8 ("REGISTRY") and press ENTER.

Figures 20-1: FDR/UPSTREAM TSO/ISPF Dialog

This displays a panel showing all current entries in the registered name table. In our example below you see several registered names ("RED53", "RED54" etc.), together with the current network address where that Client is located, and the date and time that this table entry was last referenced.

Note: This panel shows the current version of the UPSTREAM software running on each registered Client.

Figures 20-2: FDR/UPSTREAM - Name Registry

This displays a panel showing all current entries in the registered name table. In our example below you see several registered names ("RED53", "RED54" etc.), together with the current network address where that Client is located, and the date and time that this table entry was last referenced.

Note: This panel shows the current version of the UPSTREAM software running on each registered Client.

From the above panel, various commands are available to maintain the entries in the registered name table, including Insert, Delete, and Repeat. The insert option is essentially a "manual" registration of a Client. You can also go into Edit mode to alter the contents of a table entry (e.g., to change its name). Any modifications made to an entry in the table are reflected by a "UST285" message in the z/OS Storage Server log file.
20.3 Automatic Software Upgrades

The registered name service also incorporates a feature that can automatically upgrade
the version of the FDR/UPSTREAM software running on a client. This removes the need
to manually install new releases of the Client software.

When a client registers with the z/OS Storage Server (as described in Section 20.2
"Registered Names"), the entry in the registered name table also records the version of
the Client software currently installed.

As part of the initial client registration process, an option can be set to say that this client is
eligible for automatic software upgrades. Alternatively, this option can be set later by the
administrator, either through the client configuration panels (see FDR/UPSTREAM Client
Guide), or through the TSO/ISPF dialog (see "Maintaining the Table" in Section 20.2).

Once you have tested and proven a new release of the Client software, it can be
automatically distributed to some/all other clients that have a registered name and which
are enabled for automatic software upgrades.

The process, which is fully described in the FDR/UPSTREAM Client Guide, is as follows:
❖ You first take a backup from a “testing/proving” client of the new version of Client
  software.
❖ The registration record for that client is updated to say that it is running the
  “master” copy of the updated client software.

When other clients subsequently register with the z/OS Storage Server, their version of
the client software is compared to the master copy and updated, if required, via an
automatic restore.
FDR/UPSTREAM is configured through options set in a control file known as the "Configuration File" (see Section 3.9 "Define the "CONFIG" Configuration File"). This file is first created during the installation process and is subsequently read by the UPSTREAM started task during initialization. It is named on the USTCONFG DD statement in the UPSTREAM startup PROC (see Section 3.19 "Define the FDR/UPSTREAM Started Task PROC").
21.2 CONFIGURATION FILE CONTENTS

The configuration file contains numerous options, which can be divided into two distinct categories:

**Main Options**
These control the behavior of UPSTREAM itself, such as security settings and the retention of history records. Initial values for these general options are set during the installation of UPSTREAM, as described in FDR/UPSTREAM MAIN Configuration Options (see Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”).

**Profile Options**
These options control the behavior of most UPSTREAM functions, grouped into individual “profiles”. This includes the primary functions of backup and restore, as well as ancillary functions like file transfer and Client file migration. Profiles in the configuration are also used to control utility operations like USTVAULT, USTMERGE, and USTMIGRT. Chapter 5 “FDR/UPSTREAM Profiles” provides a full description of all UPSTREAM profiles.

Although the main options are likely to remain fairly static after the initial installation and configuration of UPSTREAM, the profile options continue to be added to and modified as the use of UPSTREAM increases.
21.3 maintaining the configuration file

The primary tools that can be used to maintain the UPSTREAM configuration file are:

❖ The UPSTREAM TSO/ISPF dialog.

❖ The UPSTREAM Profile options (not Main options) can be viewed, modified, added, or deleted by using the Director. UPSTREAM security parameters (Chapter 4 “Security”) may be used to control which Client users can modify which profiles. See the FDR/UPSTREAM Client Guide for full details.

**Recommendation:** Use either of the preceding tools for the majority of your UPSTREAM configuration work. However, the configuration file can also be maintained via an z/OS batch process, utilizing the USTCONFG program.

The remainder of this chapter describes the USTCONFG program. It also lists, in tabular form, all of the operands that can be used by USTCONFG, which can be set via the TSO/ISPF dialog and Client panels.
21.4 **The USTCONFG Program**

The FDR/UPSTREAM configuration file can be created and/or updated using the configuration utility program USTCONFG, which can be invoked via batch JCL.

The configuration can be modified at any time by executing USTCONFG in one of two modes:

❖ A complete **new** configuration can be built by providing input that completely describes the new configuration.

❖ An **existing** configuration can be modified by adding new profile definitions, or by modifying existing profile definitions with new options. This modified configuration can then be written back over the original, or it can be written as a new configuration.

You can have multiple configuration files, stored either as individual sequential (PS) data sets, or as multiple members in a partitioned (PO) data set.

**Recommendation:** Use members in a partitioned data set because this allows you to activate various configuration members dynamically during UPSTREAM operation.
21.5 **Activating the New/Modified Configuration**

Any changes made to the configuration by USTCONFIG do not take effect until the new or modified configuration has been activated. This is done with the REFRESH console command, issued to the FDR/UPSTREAM started task, as described in Chapter 17 “FDR/UPSTREAM Operation”.
# FDR/UPSTREAM Configurator

## USTCONFJ JCL Statements

These JCL statements are required to execute USTCONFJ as a batch job. Some sample JCL is provided at the end of this chapter.

### EXEC STATEMENT
Must specify PGM=USTCONFJ, the name of the FDR/UPSTREAM configuration program.

### STEPLIB DD Statement
Must specify the name of the UPSTREAM load library.

### SYSUDUMP DD Statement
In the event of a catastrophic error, z/OS will take a diagnostic dump to this data set, which may prove invaluable in resolving the problem.

### USTCFGIN DD Statement
If updating or printing an existing configuration, this specifies the data set (PS) or member (PO) containing that configuration. The configuration file specified must have DCB characteristics RECFM=FB and LRECL=120. If a completely new configuration is being defined, USTCFGIN can be omitted or specified as DUMMY.

### USTCONFJ DD Statement
Specifies the output configuration data set or member and must have the DCB characteristics RECFM=FB and LRECL=120. If you are updating an existing configuration, this can specify a data set or member different from the one specified on the USTCFGIN DD. In that case, the modified configuration is written to the new location. Alternatively, it can specify the same data set or member, in which case the modified configuration will replace the original.

**Recommendation:** A new data set or member name be specified when modifying a configuration, so that you can easily fall back to the original configuration if problems occur with the new one.

### USTLOG DD Statement
This is the output message data set for USTCONFJ, usually a SYSOUT data set. It has DCB characteristics RECFM=FB and LRECL=80. The BLKSIZE can be any multiple of 80.

### USTSRCE DD Statement
This is the control statement input data set for USTCONFJ. It can be an input stream (DD *) data set or can point to a data set (sequential or PDS member) as long as the DCB characteristics of the data set are RECFM=FB and LRECL=80.

If you are creating a new configuration, USTSRCE must contain a complete configuration definition, including a MAIN statement and one or more DEFINE statements. If updating an existing configuration, it need only contain the statements required to specify the modifications (i.e., an optional MAIN statement, and one or more MODIFY, DEFINE, DELETE, or PRINT statements).
21.7 USTCONFG CONTROL STATEMENTS

The input control statements to USTCONFG must be 80-byte fixed-length records. The control statements may be in the input stream (USTSRCE DD *) or may come from a data set, such as control statement PDS library.

On any control statement, the control statement name (e.g., MAIN) may be preceded and followed by any number of blank columns. At least one blank column must follow the control statement name.

The operands on each control statement are separated by commas with no intervening blanks. The operands may appear in any order.

If the operands are too long to fit on one 80-byte input record, they may be continued onto another record by putting a blank after any comma, and then continuing the operands on the next record, starting in any column, with any number of preceding blanks.

Totally blank records and records with an asterisk "*" in column 1 are treated as comments.

**STATEMENT TYPES**

USTCONFG accepts the following control statements:

- **MAIN** Defines the main UPSTREAM options (Section 21.8 "MAIN Statement").
- **DEFINE** Defines or replaces a WSNAME/WSPREF profile definition ("DEFINE Statement" in Section 21.9).
- **MODIFY** Changes options on an existing WSNAME/WSPREF profile definition ("MODIFY Statement" in Section 21.9).
- **COPY** Copies an existing WSNAME/WSPREF profile definition to create a new one ("COPY Statement" in Section 21.9).
- **DELETE** Removes a WSNAME/WSPREF definition from an existing configuration (Section 21.10 "DELETE Statement").
- **PRINT** Prints all (or part) of the configuration definition (Section 21.11 "PRINT Statement").

A sample of a complete USTCONFG input stream is shown at the end of this section.
21.8 MAIN STATEMENT

The MAIN statement, if present, must be the first control statement specified.

❖ For a new configuration (i.e., the USTCFGIN DD statement is omitted), the MAIN statement is required.

❖ When updating an existing configuration (i.e., the USTCFGIN DD statement points to an existing configuration data set or member), the MAIN statement can be omitted, unless you need to change the general UPSTREAM options specified on the MAIN statement.

If a MAIN statement is specified when updating an existing configuration, all operands not using the default value must be re-specified. A value for any operand not specified is replaced with the default value. Please re-specify all non-defaulted operands.

<table>
<thead>
<tr>
<th>MAIN STATEMENT SYNTAX</th>
<th>MAIN STATEMENT OPERANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN</td>
<td>APPLID=appliance</td>
</tr>
<tr>
<td></td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td>,DASDBLK=nnnnn</td>
</tr>
<tr>
<td></td>
<td>27998</td>
</tr>
<tr>
<td></td>
<td>,DESC=xxxxx</td>
</tr>
<tr>
<td></td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>,DUPLICATE=NOAUTO</td>
</tr>
<tr>
<td></td>
<td>,DUPDAYS=30</td>
</tr>
<tr>
<td></td>
<td>,DUPSIZE=1024</td>
</tr>
<tr>
<td></td>
<td>,MAXDUPL=30</td>
</tr>
<tr>
<td></td>
<td>,MAXHIST=nnnnn</td>
</tr>
<tr>
<td></td>
<td>365</td>
</tr>
<tr>
<td></td>
<td>,MAXTAPEBACKUP=nnn</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>,MAXTAPERESTORE=nnn</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>,MAXTASKS=nnnnn</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>,WTOCOMP=+</td>
</tr>
<tr>
<td></td>
<td>,SORTUNIT=unitname</td>
</tr>
<tr>
<td></td>
<td>SYSDA</td>
</tr>
<tr>
<td></td>
<td>,SUBSYS=cccccccc</td>
</tr>
<tr>
<td></td>
<td>UPSTREAM</td>
</tr>
<tr>
<td></td>
<td>,TAPEBLK=nnn</td>
</tr>
<tr>
<td></td>
<td>MAX</td>
</tr>
<tr>
<td></td>
<td>,TCPNAME=ccccccc</td>
</tr>
<tr>
<td></td>
<td>,TCPNAME=ccccccc</td>
</tr>
<tr>
<td></td>
<td>,TCPNAME=ccccccc</td>
</tr>
<tr>
<td></td>
<td>,TCPNAME=ccccccc</td>
</tr>
</tbody>
</table>

These are the operands of the MAIN statement.

APPLID=

applname – Specifies the 1 - 8 character name of the VTAM application ID to be used by UPSTREAM.

NONE –

This is the name on the first APPL statement in the USTAPPL member of VTAMLST, or the ACBNAME= value on that APPL statement (if specified). This value has no default but is usually “UPSTREAM”

DASDBLK=

Specifies the default blocksize (1024 - 32760) that UPSTREAM uses when allocating a sequential disk backup.

It is no longer used as the actual blocksize of the backup data set, so you generally do not need to change the default value. It can be overridden on any or all profiles by the equivalent DASDBLK= operand on a DEFINE or MODIFY statement.

Default: 27998.
DESC=

xxxx – Specifies, in hex, the descriptor codes to be used for WTOs issued by the UPSTREAM started task.

The descriptor codes allow you to control the z/OS processing of UPSTREAM console messages. The bits in the 4-digit hex string represent, left to right, the descriptor codes 1 to 16. Descriptor codes are described in the IBM manual “Routing and Descriptor Codes”.

Default: The default of 1000 is a code 4 (“system status”).

DUPLICATE=

This is a system required parameter. Please use the default value.

DUPDAYS=

This is a system required parameter. Please use the default value.

DUPSIZE=

This is a system required parameter. Please use the default value.

MAXDUPL=

This is a system required parameter. Please use the default value.

MAXHIST=

nnnnn – Specifies the number of days (0 - 32760) that UPSTREAM retains history records in the CATALOG repository.

Records older than the number of days specified are purged when USTMAINT (Chapter 17 “FDR/UPSTREAM Operation”) is run.

If MAXHIST=0 is specified, no history records will be created.

Default: 365.

MAXTAPEBACKUP=

nnn – Specifies the maximum number of tape drives (0 - 255) that UPSTREAM uses for backups at any one time.

This includes the output tapes required for the online utilities such as USTMIGRT, USTMERGE, and USTVAULT. If the limit is exceeded, any new tasks requiring tape drives wait until the number of backup tapes in use declines.

If MAXTAPEBACKUP=0 is specified, no tape limit is enforced.

Default: 0.

NOTE: A full merge backup may require 2 tape drives (the second to read previous backups), but this cannot be determined until the backup is already in progress. If the MAXTAPEBACKUP limit has not been reached, the second drive will be acquired and will count against the limit. But if the limit has already been reached, the second drive will be acquired anyway, and will not count against the limit.

MAXTAPERESTORE=

nnn – Specifies the maximum number of tape drives (0 - 255) that UPSTREAM uses for restores at any one time.

If this limit is exceeded, any new restore tasks requiring tape drives wait until the number tape drives in use drops below MAXTAPERESTORE.

If MAXTAPERESTORE=0 is specified, no tape limit is enforced.

Default: 0.

MAXTASKS=

nnn – Specifies the maximum number of sub-tasks (1 - 255) that UPSTREAM can have active at any one time. This includes all backups, restores, inquiries, and utility functions. If this limit is exceeded, UPSTREAM rejects the initiation of any new tasks until the number of active tasks drops below MAXTASKS.

Default: 100.
FDR/UPSTREAM CONFIGURATOR
MAIN STATEMENT

RACFUPD=
Valid only if SECLVL=2 or 3 has been specified and if a userid has been granted UPDATE or READ access to a Client profile name. RACFUPD then specifies what operation the user is authorized to perform.

BACKUP – Allows users with UPDATE authority to do backups or restores, while users with only READ access can do only restores.

RESTORE – Allows users with UPDATE authority to do backups or restores, while users with only READ access can do only backups.

Default: RESTORE.

**NOTE**: If SECLVL=3 is in effect, a userid that matches a profile name is automatically granted UPDATE authority.

ROUTCDE=

xxxx – Specifies, in hex, the routing codes to be used for WTOs issued by the UPSTREAM started task.

The routing codes allow you to control which consoles receive the UPSTREAM console messages. The bits in the 4-digit hex string represent, left to right, the routing codes 1 to 16. Routing codes are described in the IBM manual “Routing and Descriptor Codes”.

Default: The default 4020 is a code 2 (“operator information”) and code 11 (“programmer information”).

SECLVL=
Controls UPSTREAM security (see Chapter 4 “Security” for full details).

0 – Specifies that UPSTREAM is to do no security checking on the USERID and PASSWORD entered by the end user at the Client. Specify this if you have no security system or prefer not to enforce userid security.

1 – Specifies that UPSTREAM is to issue a security call to verify the USERID and PASSWORD entered by the end user at the Client. No further security checking is done.

2 – Specifies that, in addition to verifying the USERID and PASSWORD (SECLVL=1), UPSTREAM issues additional security calls to verify that the userid is permitted to access the Client profile name entered by the end user. It also verifies that the userid is permitted to request restores from tape.

3 – Same as SECLVL=2, except that if the profile name and userid specified at the Client are the same, the user is automatically considered to be authorized to that profile name.

Default: 0.

SORTUNIT=

*unitname* – Specifies an z/OS unit name (anything valid in the UNIT= operand in JCL) that is used to allocate temporary sort work files when external sorts are required. UPSTREAM does internal sorts whenever possible.

Default: SYSDA.

SUBSYS=

*cccccccc* – Specifies the 1 - 8 character subsystem and control point name that is used on security system calls if SECLVL=1, 2, or 3 is specified.

Specification of this value is optional. Contact FDR/UPSTREAM Technical Support if you need assistance in altering this value.

Default: UPSTREAM.
TAPEBLK=  

   nnn – Specifies the maximum tape DCB BLKSIZE parameter that is used when allocating a new tape data set.  

   MAX – UPSTREAM backups can utilize up to a maximum 256KB DCB BLKSIZE, or the optimum that the target tape device manufacturer allows. Utility functions such as USTVAULT, USTMIGRT, and USTMERGE support a maximum of 64KB, or the optimum that the target tape device manufacturer allows. The term “optimum” refers to the manufacturer defined “optimum” BLKSIZE for their device.  

   Default: MAX.

TCPNAME=  

   cccccccc – Identifies the z/OS TCP/IP Started Task instance name with which the UPSTREAM started task communicates.  

   NONE –  

   This is generally the 1 - 8 character name of your TCP/IP Started Task on your z/OS system. However, if you started the TCP/IP Started Task with the command similar to the following: S TCPIP.SYS2 the proper value for this parameter would be “SYS2”.  

   If the specified TCP/IP system is not active when UPSTREAM is started, a warning message is issued and TCP/IP access is disabled. You must restart the UPSTREAM started task to re-establish TCP/IP communications.

TCPPORT=  

   nnnnn – Specifies the TCP/IP port number that UPSTREAM will use as a “well-known” port number to listen for Client connections. The value can range from 1 to 65535.  

   Default: 1972, which is generally fine for most sites.

WTOCOMP=  

   Specifies that UPSTREAM issues WTOs to the z/OS system console for all messages relating to backups starting and completing, in addition to writing them to the UPSTREAM log (USTLOG). This operand is optional; if omitted, these messages are written only to USTLOG. This feature may be useful for installations with mainframe automation and tracking facilities that monitor console messages.
FDR/UPSTREAM CONFIGURATOR
DEFINE, MODIFY, AND COPY STATEMENTS

21.9 DEFINE, MODIFY, AND COPY STATEMENTS

FDR/UPSTREAM profiles (Chapter 5 “FDR/UPSTREAM Profiles”) can be created or modified using the DEFINE, MODIFY, and COPY statements, as follows.

**DEFINE STATEMENT**
The DEFINE statement is used to create or replace a profile, named by either a WSNAME or WSPREF operand.

When creating a new configuration, a DEFINE WSNAME or DEFINE WSPREF statement must be present for every profile to be defined. When updating an existing configuration, DEFINE statements are used to add new profiles or completely replace existing profiles. Operands that are not specified on the DEFINE statement take their default values.

**MODIFY STATEMENT**
When updating a configuration, the MODIFY statement is used to change options on an existing profile, named by either a WSNAME or WSPREF operand.

Operands that are not specified on the MODIFY statement retain their previous values in the profile. If a MODIFY statement names a profile that does not already exist in the configuration, it is treated as a DEFINE, but a warning message is issued and, since defaults may have been taken for many operands, may not result in an appropriate profile.

**COPY STATEMENT**
The COPY statement can be used when updating a configuration, to create a new profile or replace an existing one.

This is done by copying the attributes associated with an existing profile. The WSNAME or WSPREF operand specifies the input profile, while the NEWNAME/NEWPREF operands specify the profile to be created or replaced. You can also specify any of the other operands shown below to modify the profile as it is being copied.
### DEFINE, MODIFY, AND COPY Statement Syntax

<table>
<thead>
<tr>
<th>DEFINE</th>
<th>MODIFY</th>
<th>COPY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WSNAME</strong>=xxxxxxx</td>
<td><strong>WSNAME</strong>=xxxxxxx</td>
<td><strong>NEWNAME</strong>=cccccccc</td>
</tr>
<tr>
<td><strong>WSPREF</strong>=xxxxxxx</td>
<td><strong>NEWPREF</strong>=cccccccc</td>
<td></td>
</tr>
<tr>
<td><strong>COPYINCR</strong></td>
<td><strong>NEWTAPEF</strong></td>
<td><strong>NONEWTAPEF</strong></td>
</tr>
<tr>
<td><strong>NOCOPYINCR</strong></td>
<td></td>
<td><strong>NONEWTAPEF</strong></td>
</tr>
<tr>
<td><strong>DASD</strong></td>
<td></td>
<td><strong>NEWTAPEI</strong></td>
</tr>
<tr>
<td><strong>DASDBLK=nnnnn</strong></td>
<td></td>
<td><strong>NONEWTAPEI</strong></td>
</tr>
<tr>
<td><strong>27998</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DASDGDG</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NODASDGDG</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DASDMAXSIZE=nnnnnn</strong></td>
<td></td>
<td><strong>PCMIGRATEONLY=YES</strong></td>
</tr>
<tr>
<td><strong>0</strong></td>
<td></td>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>DASDPREF=prefix</strong></td>
<td></td>
<td><strong>STORCLAS=storclas</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOSTORCLAS</strong></td>
</tr>
<tr>
<td><strong>DATAclas=prefix</strong></td>
<td></td>
<td><strong>TAPE</strong></td>
</tr>
<tr>
<td><strong>NODAclas</strong></td>
<td></td>
<td><strong>Tapecomp</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTAPEcomp</strong></td>
</tr>
<tr>
<td><strong>DUNIT=prefix</strong></td>
<td></td>
<td><strong>TapeGDDG</strong></td>
</tr>
<tr>
<td><strong>VOL=volser</strong></td>
<td></td>
<td><strong>NOTAPEGDDG</strong></td>
</tr>
<tr>
<td><strong>DUPLICATE=COPY</strong></td>
<td></td>
<td><strong>TAPESTORCLAS=storclas</strong></td>
</tr>
<tr>
<td><strong>ENCRYPTV=AES128</strong></td>
<td></td>
<td><strong>NOTAPESTORCLAS</strong></td>
</tr>
<tr>
<td>AES192</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AES256</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GROUPID=id</strong></td>
<td></td>
<td><strong>TIMEOUT=nnn</strong></td>
</tr>
<tr>
<td><strong>NOGROUPID</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MERGE=YES</strong></td>
<td></td>
<td><strong>TRANSFER=YES</strong></td>
</tr>
<tr>
<td><strong>NO</strong></td>
<td></td>
<td><strong>NO</strong></td>
</tr>
<tr>
<td><strong>DEFER</strong></td>
<td></td>
<td><strong>TUNIT=prefix</strong></td>
</tr>
<tr>
<td><strong>NODEFER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>UNITCNT=1</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2</strong></td>
</tr>
<tr>
<td><strong>MGMTclas=mgmtclas</strong></td>
<td></td>
<td><strong>VAULT</strong></td>
</tr>
<tr>
<td><strong>NOMGMTclas</strong></td>
<td></td>
<td><strong>NOVAULT</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These are the operands of the DEFINE, MODIFY, and COPY statements. Defaults for optional operands apply only to the DEFINE statement. For a MODIFY or COPY of an existing profile, the defaults are the values previously specified for that profile.

**NOTE:**

The corresponding "NO**" operands (e.g., NOCOPYINCR) can be used on a MODIFY/COPY to turn off the primary operand.
COPYINCR

COPYINCR – Specifies that, when doing a full merge backup, any incremental backups that are stored in separate locations is copied to the full backup data set. Incremental backups that are already on the same tape as the full backup are not copied, but incremental backups that are on different tapes or on DASD are copied. Once the incremental backups are successfully copied, they are scratched (if on DASD) and uncataloged, and the UPSTREAM repository record detailing their location is updated to point to the new full backup.

This option is particularly useful if incremental backups are taken to disk but the full backup is written to tape. This option is ignored when MERGE=DEFER is specified.

**NOTE:** Valid for profiles with MERGE=YES.
Default: NOCOPYINCR.

NOCOPYINCR

DASD

Specifies that this profile is permitted to perform backups directly to z/OS sequential disk.

If specified, the “DASDPREF=”, “DUNIT=”, and “VOL=” or “STORCLAS=” options must also be enabled.

Default: NO.

DASDBLK=

nnnnn – The blocksize (1024 through 32760) to use when allocating to DASD.

This option is no longer used as the actual blocksize of the backup data set, so you generally do not need to override the default.

An exception to this is the special profile for USTVAULT where DASDBLK is used as the blocksize of the vault control file (Chapter 9 “Copying Backups with USTVAULT”).

On a DEFINE, the default is the value of DASDBLK specified on the MAIN statement.

**NOTE:** Applies only to profiles with the DASD option set.
Default: 27998.

**NOTE:** When creating sequential disk backups, UPSTREAM allocates the backup file in blocks. The total of data bytes to be backed up is divided by DASDBLK and the resulting number of blocks of that size is requested (plus an extra few percent for safety). However, when opening the file, a blocksize of 32760 is used; you see this in the DSCB of the backup data sets. This does not indicate that UPSTREAM is using the disk tracks inefficiently. Since the record format is variable (VB), UPSTREAM writes on each track one block that is close to 32760 in size, and a second block that uses the remaining capacity of that track, resulting in extremely efficient utilization.
FDR/UPSTREAM CONFIGURATOR
DEFINE, MODIFY, AND COPY STATEMENTS

DASDGDG
NODASDGDG

DASDGDG – Specifies that backups are to be allocated as new generations of a GDG. This is recommended, since GDG processing will automatically delete old generations.

GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required backups.

If DASDGDG is used in a “prefix” profile defined with WSPREF, and the last index level of DASDPREF matches the profile prefix name, then UPSTREAM substitutes the actual profile name used by the Client.

Example:

WSPREF=ABC,DASDGDG,DASDPREF=BACKUP.ABC

If the Client uses profile name ABC123, the actual GDG name will be BACKUP.ABC123.

This allows unique data set names to be generated based on the actual profile name. The GDG bases for these modified names must be predefined, and the total length of the name (with a maximum 8-character profile name) cannot exceed 35 characters.

If the last index does not match, the unmodified GDG name is used for all actual profile names (in this case, GDG is not recommended).

NOTE: Applies only to profiles with the DASD option set.

DASDMAXSIZE=

nnnnnn – Specifies a maximum size (0 - 999999) in kilobytes (units of 1024 bytes) for sequential disk backups.

For incremental merge backups to DASD only, if the estimated size of the backup exceeds this value, the backup is redirected to sequential tape.

Full merge backups are never redirected to tape.

If DASDMAXSIZE is specified, the profile must be enabled for sequential tape backups (TAPE) as well as sequential disk backups (DASD). However, the DASDPREF value (not TAPEPREF) is used to name the backup.

DASDMAXSIZE=0 indicates never to redirect DASD backups to tape.

NOTE: Applies only to profiles with the DASD option set.

Default: 0.
FDR/UPSTREAM CONFIGURATOR
DEFINE, MODIFY, AND COPY STATEMENTS

DASDPREF=

prefix – DASDPREF provides a 1 to 35 character data set name prefix that is used to dynamically allocate the disk data set for the backup. The prefix may include periods “.” to separate index levels and must meet z/OS data set naming standards (no more than 8 characters in an index level and the first character of an index must be an alpha/national character).

With DASDGDG=NO, UPSTREAM allocates the backup file as a non-GDG. The length of the value of DASDPREF must not exceed 19 characters, and FDR/UPSTREAM adds three additional index levels at the end of the name to create a unique data set name containing the profile name, the date (Dyymmdd), and the time (Thhmmss). Since UPSTREAM adds the profile name to the prefix, the same prefix may be specified in multiple profiles.

For DASDGDG=YES, UPSTREAM allocates the file as a new generation of a GDG. DASDPREF must specify the GDG base name, and may be up to 35 characters long. The GDG name used in each profile should be unique. The suggestion is that it include the profile name. The “%PROFILE” profile name substitution parameter may be used for any qualifier in the data set name. Using this parameter substitutes the name of the backup profile (or, if a DB backup, the backup profile prefix) in the backup data set. The GDG base must be predefined in the appropriate z/OS catalog along with the number of generations to keep. The DELETE option should be specified when defining the GDG base so that old generations are scratched from disk. Ensure that GDG data set names are unique across all profiles, for all UPSTREAM regions, on all LPARS sharing the same z/OS user catalog. i.e., a GDG data set name is used by only one profile. (See also IBM publication z/OS DFSMS Using Data Sets, GDS Reclaim Processing.)

Special Characters:

DASDPREF may optionally contain a single exclamation character “!” (X'5A') anywhere in the name. If present, it is replaced at the time the backup is created with:

F Full merge backup or first-time full merge
I Incremental merge backup
N Non-merge backup (or simple migration)
E Migration end set

This is especially useful if a profile with DASDGDG and where merge backups are being created. You can setup one GDG with the “F” character to specify the number of full backups to be kept, and a second with the “I” character for the number of incremental backups to be retained. You must define GDG bases with each of the possible characters substituted. You must also specify NEWTAPE=FULL.

DASDPREF may also contain a single question mark character “?” anywhere in the name except as the first character of an index level. If present, that character will be replaced with a “1” when the backup is created. If the profile is enabled for vaulting (USTVAULT), the profile must contain the “?”. When USTVAULT is run to create additional copies of the backup, each copy will have another copy number (from 2 to 9) in place of the “?”.

NOTE: Required for profiles with the DASD option set. See also “WSPREF=” in Section 21.10.
DATACLAS=

NODATACLAS

dataclas – Specifies a data class name (1 - 8 characters) that will be passed to SMS during the dynamic allocation of the backup data set. This value is used by SMS if the data set becomes SMS-managed (see also “STORCLAS=” and “MGMTCLAS=” in Section 21.9).

Consult your storage administrator or z/OS system programmer for valid data class names.

NOTE: Applies only to profiles with the DASD option set and where your z/OS system has SMS (System Managed Storage) enabled.

Default: NODATACLAS.

NOTE: SMS may override or ignore your data class name, and may assign a data class even if you do not specify one in the profile.

DREPTD=

nnnn – See “RETPD=” in Section 21.9.

Default: 0.

DUNIT=

diskunit – Specifies an z/OS disk unit name (i.e., any value that will allocate a disk device when specified in a UNIT= parameter in JCL).

This unit name is used when dynamically allocating the backup data set. The DASD volumes mounted on the devices included in that unit name must include one or more volumes with a mount attribute of STORAGE.

If necessary, UPSTREAM allocates the backup data set on as many as 5 volumes (if that many STORAGE volumes are available).

NOTE: Applies only to profiles with the DASD option set.

NOTE: DUNIT, VOL, and STORCLAS are mutually exclusive.

DUPLICATE=

This is a system required parameter. Please use the default value.

ENCRYPTV=

If you have the UPSTREAM data encryption feature licensed and enabled, this option specifies the encryption algorithm that will be used by USTVAULT when creating encrypted copies of backups belonging to this backup profile. See Chapter 24 “FDR/UPSTREAM Data Encryption” for a full description of the FDR/UPSTREAM encryption feature.

AES128 –

AES192 –

AES256 –

EXPDT=

yyddd – See “RETPD=” in Section 21.9.

GROUPID=

NOGROUPID

id – Used to group profiles for processing by the online utility programs USTMIGRT, USTMERGE, and USTVAULT (see Chapter 5 “FDR/UPSTREAM Profiles” for full details). The “id” value is specified as a 2-alpha-numeric character value.

The use of GROUPID is recommended since it automates the selection of backup profiles for utility processing, instead of depending on the operator to specify profile names.

Default: NOGROUPID.
**MERGE=**

Controls the utilization of the merge backup facility.

**YES** – Specifies that this profile is enabled for merge backup processing. The profile must also be enabled for DASD (sequential disk) or TAPE (sequential tape) backups.

**NO** – Indicates that this profile cannot be used for merge processing.

**DEFER** – Enables the profile for merge backups, but in addition requests that those backups be performed with “deferred merge” processing option (Chapter 11 “Completing Deferred Merge Backups”).

Default: **YES**.

**MGMTCLAS=**

**NOMGMTCLAS**

- mgmtclas – Specifies a management class name (1 - 8 characters) that will be passed to SMS during the dynamic allocation of the backup data set. This value will be used by SMS if the data set becomes SMS-managed (see also “DATACLAS=“ and “STORCLAS=“ in Section 21.9).

Consult your storage administrator or z/OS system programmer for valid management class names.

**NOTE:** Applies only to profiles with the DASD option set and where your z/OS system has System Managed Storage (SMS) enabled.

Default: **NOMGMTCLAS**.

**NOTE:** SMS may override or ignore your management class name, and may assign a management class even if you do not specify one in the profile.

**MIGTHRESH=**

- nn – Specifies a threshold for the migration of disk-based backups to tape with USTMIGRT (Chapter 10 “Migrating Backups from Disk to Tape”).

When the USTMIGRT utility is run, it looks for sequential disk backups recorded under each profile name. If the number of such backups equals or exceeds the MIGTHRESH=nn value, USTMIGRT migrates the least recent backups to tape until the remaining number is nn-1.

MIGTHRESH=0 disables USTMIGRT migration for this profile.

MIGTHRESH=255 does not migrate incremental backups made after the most recent full backup.

Default: 0.

**NEWNAME=**

- cccccccc – Specifies the new profile name (1 - 8 characters) to be assigned to the copied profile. (See “WSNAME=” in Section 21.9 and “WSPREF=” in Section 21.10 for an explanation of profile names).

WSNAME must also be specified with NEWNAME to identify the existing profile to be copied. The newly copied profile will then be modified by any other operands on the COPY statement and saved under the new name. If a profile with that name already exists it will be replaced by the new one.

NEWNAME and NEWPREF are mutually exclusive.

**NOTE:** Permitted (and required) only on a COPY statement.
NEWPREF=

`ccccccc` – Specifies the new “prefix” profile name (1 - 7 characters) to be assigned to the copied profile. (See “WSNAME=” and “WSPREF=” in Section 21.10 for an explanation of profile names).

WSPREF must also be specified with NEWPREF to identify the existing profile to be copied. The newly copied profile is then modified by any other operands on the COPY statement and saved under the new name. If a profile with that name already exists it is replaced by the new one.

NEWNAME and NEWPREF are mutually exclusive.

NOTE: Permitted (and required) only on a COPY statement.

NEWTAPEF
NONEWTAPEF

Specifies if a new z/OS data set should be created on a new tape volume when processing first time full or full merge backups.

NOTE: Applies only to profiles with the TAPE option set.
Default: NONEWTAPEF.

NEWTAPEI
NONEWTAPEI

Specifies if a new z/OS data set should be created on a new tape volume when processing incremental merge backups.

NOTE: Applies only to profiles with the TAPE option set.
Default: NONEWTAPEI.

PCMIGRATEONLY=

Controls the utilization of the Client file migration facility (Chapter 15 “FDR/UPSTREAM Client File Migration”).

YES – This profile can be used only for the migration of Client files.

NO – This profile is for normal UPSTREAM operations (i.e., not Client file migration).

Default: NO.
RETPD=

*nnnn* – The RETPD, DRETPD, and EXPDT operands apply only to profiles where DASD (sequential disk) or TAPE (sequential tape) backups are enabled, and they specify the retention period in days (0 to 9999), or the expiration date “yyddd” of the dynamically allocated backup data set.

RETPD/DRETPD are identical to the JCL parameter RETPD=.

EXPDT is identical to the JCL parameter EXPDT=. However, it only accepts a 2-digit year number (years less than 70 are assumed to be in the 21st century - 20xx).

Only one of the operands RETPD= or EXPDT= can be specified.

If the profile is enabled for both DASD and TAPE, you can optionally specify a retention period to be used only for disk with "DREPTD=".

If “DREPTD=” is specified (even as DRETPD=0), then the RETPD/EXPDT value will be used only for tape. If it is omitted, the RETPD value applies to both disk and tape, but EXPDT applies only to tape and no expiration is used for disk.

All three operands are optional. By default, no retention or expiration is specified when the data set is allocated. However, your DASD or TAPE management system may apply a default retention.

UPSTREAM does not explicitly enforce these dates, but if you have a DASD or TAPE management system which does, UPSTREAM recognizes that the data set has been scratched or uncataloged during USTMAINT execution.

Special expirations, such as EXPDT=99000 for catalog control, can be specified if they are meaningful to your tape management system. Catalog control is especially meaningful for tape GDGs, since older backups expire as they roll out of the GDG (exceed the maximum generations defined in the GDG base).

**NOTE:** Users of the CA 1® Tape Management can use EXPDT=99000 for catalog control even if your installation has the CA 1® Tape Management option TRUXPD=YES set (to treat expirations as real dates). UPSTREAM z/OS passes a dynamic allocation parameter to override that option if EXPDT=99000.

Default: 0.

**WARNING:** Be sure that the retention period or expiration date you specify causes the backups to be retained for a sufficient period. Once the backups are scratched by tape or disk management systems, they are no longer available to UPSTREAM and the next execution of USTMAINT cause them to be deleted from the repository.
STORCLAS=
NOSTORCLAS

storclas – Specifies a valid storage class name (1 to 8 characters) that is passed to SMS during the dynamic allocation of the backup data set and requests that the data set be SMS-managed (see also “DATACLAS=” and “MGMTCLAS=” in Section 21.9).

Consult your storage administrator or z/OS system programmer for valid storage class names.

NOTE: SMS may override or ignore your storage class name, and may assign a storage class even if you do not specify one in the profile.

NOTE: Applies only to profiles with the DASD option set and if your z/OS system has System Managed Storage (SMS) enabled.

Default: NOSTORCLAS.

NOTE: If your ACS routines assign an appropriate SMS data class, the UPSTREAM backup may be allocated as an Extended Format (EF) data set that may be striped or compressed by z/OS. Although UPSTREAM supports EF data sets, restores may perform poorly so they are not recommended.

TAPE

Specifies that this profile is permitted to perform backups directly to z/OS sequential tape data sets.

If TAPE=YES is specified, TAPEPREF and TUNIT or TAPESTORCLAS must also be enabled.

Default: NO.

TAPECOMP

NOTAPECOMP

TAPECOMP – Causes UPSTREAM to specify the TRTCH=COMP parameter when dynamically allocating the tape backup to request hardware (IDRC) compaction of the tape data set.

NOTE: Applies only to profiles with the TAPE option set and where the backups are directed to 3480/3490 cartridge drives.

NOTE: TAPECOMP is equivalent to the IDRC option when creating/editing profiles through the TSO/ISPF dialog.

Default: NOTAPECOMP.

TAPEGDG

NOTAPEGDG

TAPEGDG – Specifies that any backup data sets are to be allocated as new generations of a GDG. This is recommended since GDG processing automatically deletes old generations.

GDG bases must be predefined in the appropriate system catalog before they can be used by UPSTREAM. Be sure you define sufficient generations in the GDG base to retain all required backups.

NOTE: Applies only to profiles with the TAPE option set.

Default: NOTAPEGDG.

TAPEPREF=

prefix – Specifies the prefix of the data set name (1 - 44 characters) to be used for sequential tape backups.

See the “DASDPREF=” in Section 21.9 description for details of the data set name that is created by UPSTREAM for these backups.

NOTE: Applies only to profiles with the TAPE option set.
TAPESTORCLAS=

    storclas – Specifies an SMS storage class name (1 to 8 characters) that allocates an appropriate SMS-managed scratch tape. This storage class is used when dynamically allocating the backup data set.

    **NOTE:** Applies only to profiles with the TAPE option set and your system has SMS enabled for tape processing.

TIMEOUT=

    nnn – This specifies the maximum number of minutes that UPSTREAM waits for most communication requests to complete. The value can be specified from 0 to 8191 minutes and only affects this backup profile. A value of 0 will not change the timeout value set by either the timeout startup parameter (if set) or a modify command changing the timeout value (if performed).

    Default: 0.

TRANSFER=

    Controls the file transfer facility (Chapter 14 “File Transfer”).

    YES – Identifies this profile as one controlling a file transfer operation.

    NO –

    Default: NO.

TUNIT=

    tapeunit – Specifies a z/OS tape unit name. This unit name is used when dynamically allocating the tape backup data set.

    **NOTE:** Applies only to profiles with the TAPE option set.

UNITCNT=

    n – Specifies how many tape drives are allocated when doing tape backups under this profile. Two tape drives may be requested to avoid the delays that occur while rewinding the tape and mounting a new output volume as each tape volume is filled.

    **NOTE:** Applies only to profiles with the TAPE option set.

    Default: 1.

VAULT

NOVAULT

    Specifies if this profile is enabled for the USTVAULT facility (Chapter 9 “Copying Backups with USTVAULT”).

    With VAULT=YES, special data set naming takes effect. See the “TAPEPREF=” and “DASDPREF=” in Section 21.9 fields for additional information.

    Default: NOVAULT.

VOL=

    volser – Specifies an z/OS disk volume serial (1 to 6 characters) where the backup data set is allocated. If VOL is specified, a unit name of SYSALLDA is used for all dynamic allocations to the volume.

    The DUNIT, VOL, and STORCLAS parameters are mutually exclusive.

    **NOTE:** Applies only to profiles with the DASD option set.

WSNAME=

    ccccccccc – Specifies the profile name to be defined. WSNAME is 1 to 8 alpha, numeric, or national characters in length and must start with an alphabetic or national character, but the remainder may be any alphanumeric or national character.

    UPSTREAM profiles are fully described in Chapter 5 “FDR/UPSTREAM Profiles”.
WSPREF=

`ccccccc` – Specifies that the backup profile name is a “prefix”, rather than a fully qualified name. When this option is in effect, the parameters specified for this backup profile are used when the exact profile name specified in the backup request does **not** exist in the configuration, but it **does** match all the characters specified.

For example, a “prefix” backup profile called “TES” can used to control UPSTREAM backup requests that use profiles of TEST, TEST21, TESTER etc. This effectively allows you to manage numerous unique backup profile names with just one overall controlling backup profile in the configuration.

This feature is useful if a large number of profiles have similar prefix naming and utilize similar profile attributes.

This option may also be used for Oracle and DB2 multi-channel database backups. If the backup profile is defined as a prefix, the channel number of that portion of the multi-channel backup is appended to the profile prefix name in the backup data set name. This feature, in addition to the backup date and time, creates a unique backup data set name. If the data set is a GDG, either the profile prefix name **must be specified as the last qualifier of the GDG base data set name** or the “%PROFILE” profile name substitution parameter must be used as a qualifier in the GDG base data set name. When creating the GDG base, define a base name for each `profile_prefix_channel_number` combination for all channels that may be used when the backup is run. For example, using the example above, data set names might be:

- `HLQ.DB2.DATA.TES1.G0123V00`
- `HLQ.DB2.DATA.TES2.G0123V00`

where “TES” is the profile prefix name and channels 1 and 2 were used in the backup.

WSPREF is 1 - 7 characters in length and must start with an alphabetic or national character, but the remainder may be any alphanumeric or national character.

UPSTREAM profiles are fully described in Chapter 5 “FDR/UPSTREAM Profiles”.
21.10 DELETE STATEMENT

The DELETE statement is used to delete a profile from an existing configuration. As such, it can only be used when updating a configuration (i.e., if USTCFGIN DD statement is present).

**DELETE Statement Syntax**

<table>
<thead>
<tr>
<th>DELETE STATEMENT SYNTAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELETE</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**WSNAME=**

*profilenamex* – Specifies the name of the profile to be deleted.

**WSPREF=**

*prefixnamex* – Specifies the name of the “prefix” profile to be deleted.
21.11 PRINT STATEMENT

The PRINT statement is used to print information about the configuration. It can print definitions of:

❖ Individual profiles
❖ The FDR/UPSTREAM general options
❖ The entire configuration

PRINT STATEMENT SYNTAX

<table>
<thead>
<tr>
<th>PRINT</th>
<th>ALL</th>
<th>,LIST=LONG</th>
<th>PUNCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSNAMES=</td>
<td>profname</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WSPREF=</td>
<td>prefixname</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ALL

Specifies that information about the entire configuration is printed, including UPSTREAM options from the MAIN statement and all profile definitions.

WSNAME=

profname – Specifies that only the definition of the specified profile is printed. Multiple profiles can be printed by entering multiple PRINT statements. If neither ALL, WSNAMES, nor WSPREF is specified, then only the options from the MAIN statement and the definition of the GLOBAL profile (if defined) is printed.

WSPREF=

prefixname – Specifies that only the definition of the specified “prefix” profile is printed. Multiple profiles can be printed by entering multiple PRINT statements. If neither ALL, WSNAMES, nor WSPREF is specified, then only the options from the MAIN statement and the definition of the GLOBAL profile (if defined) is printed.

LIST=

LONG – Lists the profiles in a format similar to the DEFINE statement.
PUNCH – Lists the profiles in a format that duplicates the MAIN and DEFINE statements necessary to reproduce the configuration. With minor editing, the output can then be turned into a data set that can be read back in by USTCONFNG.

This operand is optional.
Default: LONG.
EXAMPLE #1: CREATING A NEW CONFIGURATION

This sample JCL is provided as member USTCONF in the FDR/UPSTREAM Installation Control Library (ICL).

It creates a brand new configuration by reading USTCONF control statements stored in a member of a control statement library pointed to by the USTSRCE DD. The new configuration is stored in the member pointed to by the USTCONF DD statement.

```plaintext
//CONFIG  EXEC  PGM=USTCONF
//STEPLIB  DD  DSN=your.upstream.loadlib,DISP=SHR
//USTLOG  DD  SYSOUT=*  
//USTSRCE  DD  DSN=your.config.source.file(member),DISP=SHR
//USTCONF  DD  DSN=your.output.config.file(member),DISP=SHR
//SYSUDUMP  DD  SYSOUT=*  
```

EXAMPLE #2: UPDATING AN EXISTING CONFIGURATION

This sample JCL updates an existing configuration.

The old configuration is read from DD USTCFGIN and updated by control statements stored in the file pointed to by the USTSRCE DD. The updated configuration is then written to the member indicated on the USTCONF DD statement.

```plaintext
//CONFIG  EXEC  PGM=USTCONF
//STEPLIB  DD  DSN=your.upstream.loadlib,DISP=SHR
//USTLOG  DD  SYSOUT=*  
//USTSRCE  DD  DSN=your.config.source.file(member),DISP=SHR
//USTCONF  DD  DSN=your.output.config.file(member),DISP=SHR
//USTCFGIN  DD  DSN=your.input.config.file(member),DISP=SHR
//SYSUDUMP  DD  SYSOUT=*  
```
21.13 **SAMPLE USTCONFg CONFIGURATION**

The following sample configuration is included in the FDR/UPSTREAM Installation Control Library (ICL) as member USTCFG01 and serves as a sample of a fairly basic UPSTREAM configuration.

**NOTE:** As previously stated at the beginning of this chapter, it is strongly recommended that the definition and maintenance of your UPSTREAM configuration be done with the TSO/ISPF dialog (see Section 3.16 “Configure the MAIN Options”) or the Client panels (see the FDR/UPSTREAM Client Guide), rather than with USTCONFg.

* DEFINE ENVIRONMENT TO FDR/UPSTREAM z/OS Storage Server
  MAIN APPLID=UPSTREAM,SECLVL=0,SUBSYS=UPSTREAM,
  SORTUNIT=SYSDA,WTOCOMP,MAXTASKS=200
  *---------------------------------------------------------------
  * DEFINE BACKUP PROFILES (WORKSTATION ID'S)
  *---------------------------------------------------------------
  * PC8: ALLOW FULL AND INCREMENTAL “MERGE” BACKUPS TO TAPE
  * FDR/UPSTREAM z/OS Storage Server COMPLETES THE DSNAME WITH THE
  * PROFILE NAME AND VERSION DATE. TAPES ARE SCRATCHED BY
  * TAPE MANAGEMENT SYSTEMS AFTER 30 DAYS.
  *---------------------------------------------------------------
  DEFINE WSNAME=PC8,ONLINE=0,MERGE,
  TAPECOMP,TUNIT=CART,RETPD=30,
  TAPEPREF=USER8.BACKUPS
  *---------------------------------------------------------------
  * WSTECH: IS A GROUP ENTRY DEFINING A SET OF PROFILES WITH
  * IDENTICAL CHARACTERISTICS. AT THE WORKSTATION, ANY PROFILE
  * NAME THAT STARTS WITH “WSTECH” CAN BE USED.
  * IT ALLOWS FULL AND INCREMENTAL “MERGE” BACKUPS TO TAPE.
  * USING GDG DATA SET NAMES. SINCE THE LAST INDEX IN THE TAPEPREF
  * IS THE NAME OF THE PROFILE PREFIX (WSTECH), FDR/UPSTREAM WILL
  * REPLACE THAT INDEX WITH THE ACTUAL PROFILE NAME USED (E.G.,
  * WSTECH12). GDG BASES MUST BE PREBUILT FOR EACH FULL PROFILE
  * NAME TO BE USED. TAPE MANAGEMENT SYSTEMS WILL SCRATCH THE
  * TAPES WHEN THEY ROLL OFF OF THE GDG BASE.
  *---------------------------------------------------------------
  DEFINE WSNAME=WSTECH,ONLINE=0,MERGE,
  TAPECOMP,TUNIT=CART,EXPDT=99000,
  TAPEPREF=USER.Backup.WSTECH,TAPEGDG
  *---------------------------------------------------------------
  * PC7: ALLOW FULL AND INCREMENTAL “MERGE” BACKUPS TO TAPE AND
  * DISK, USING A PREDEFINED GDG. FDR/UPSTREAM z/OS Storage Server
  * ALLOCATES THE NEXT GDG GENERATION. DISK BACKUPS ARE
  * SMS-MANAGED. “DEFERRED MERGE” BACKUPS ARE USED. THE PROFILE
  * IS ASSIGNED TO GROUP “01” FOR ONLINE UTILITY EXECUTION.
  *---------------------------------------------------------------
  DEFINE WSNAME=PC7,ONLINE=0,MERGE=DEFER,GROUPID=01,
  TAPECOMP,TUNIT=CART,EXPDT=99000,
  TAPEPREF=USER7.Backups.ONTAPE,TAPEGDG
  DASD,DUNIT=SYSDA,
  STORCLAS=BACKUP,MGMTCLAS=LANBKUP,
  DASDPREF=USER7.BACKUPS.ONDISK,DASDGDG
  *---------------------------------------------------------------
  * ADDITIONAL SAMPLE ENTRIES
  *---------------------------------------------------------------
FDR/UPSTREAM Configurator
Sample USTCONFg Configuration

* PC#1 ALLOW SEQUENTIAL SMS-MANAGED DISK BACKUPS ONLY
  * FDR/UPSTREAM z/OS Storage Server CONSTRUCTS THE FULL DSN
  DEFINE WSNAMe=PC3, ONLINE=0, DASD, DASDPREF=USER2.BACKUP,
  MGMTCLAS=BATCH, STORCLAS=CACHED, DUNIT=SYSDA

*---------------------------------------------------------------

* PC#2 ALLOW SEQUENTIAL TAPE AND DASD BACKUPS
  * FDR/UPSTREAM z/OS Storage Server CONSTRUCTS THE FULL DSN
  DEFINE WSNAMe=PC4, ONLINE=0, TAPE, DASD,
  TAPEPREF=USER3.BACKUP,
  TUNIT=TAPE, DUNIT=SYSDA, MGMTCLAS=BATCH

*---------------------------------------------------------------

* PC#3 ALLOW DASD BACKUPS TO A PRE-DEFINED GDG
  * FDR/UPSTREAM z/OS Storage Server ALLOCATES THE NEXT GDG GEN
  DEFINE WSNAMe=PC6, ONLINE=0, DASDGDG, DASD, DUNIT=SYSDA,
  DASDPREF=USER6.DAILY.BACKUPS.DASDGDG

*---------------------------------------------------------------

* PRINT THE CONFIGURATION

PRINT ALL
22 REPORTING WITH USTRPORT

22.1 INTRODUCTION

The ability to produce a range of reports, both detailed and in summary format, is an essential feature of any storage management system. FDR/UPSTREAM provides a wide range of reporting capabilities, including:

❖ USTRPORT (described in this chapter)
❖ USTBKPRT (see Chapter 23 “Reporting with USTBKPRT”.)
❖ UPSTREAM Client GUI interface (see the FDR/UPSTREAM Client Guide.)
❖ UPSTREAM Director interface (see the FDR/UPSTREAM Client Guide.)
22.2 USTRPORT OVERVIEW

USTRPORT allows you to report on a wide range of FDR/UPSTREAM system activity, including backups, restores, unsuccessful backups and USTVAULT operations. UPSTREAM history records, retained by the MAXHIST configuration parameter, can also be queried and reported with USTRPORT.

Additional reports are also available in support of key UPSTREAM features, such as registered names and configuration. Administrators responsible for the support and maintenance of the UPSTREAM system can use USTRPORT to view some/all of the contents of the UPSTREAM configuration file.

USTRPORT reports can be in either a “fixed” format (where the layout of the report is fixed, but the contents are controlled by the user. (These can be output either in a standard print and/or a CSV file for import into a spreadsheet. Or, they can be generated from scratch, with full control over both the print layout and the contents of the report.
22.3 **RUNNING USTRPORT**

Reports can be generated with USTRPORT in one of two ways:

- Via an z/OS batch job (see “Initiation via an z/OS Batch Job” in Section 22.13)
- Via the ISPF Reporting Interface (see “Initiation via the TSO/ISPF Dialog” in Section 22.14)
22.4 USTRPORT REPORT TYPES

The following types of report can be produced by USTRPORT, as controlled by the RPTYPE operand of the PRINT control statement (see Section 22.11 "PRINT Statement").

**BACKUP**
For each backup that you perform, UPSTREAM stores a record in the CATALOG repository data set. The USTRPORT "BACKUP" report can display information from some/all of those backup records. Additionally, available as a z/OS batch job, output can also be made to a CSV file.

**EXCEPTION**
By reading records from the CATALOG and FILEINFO repository data sets, the USTRPORT "EXCEPTION" report can be used to identify profiles that have not had a successful backup within the exception period.

**SQBACKUP**
The USTRPORT "SQBACKUP" report can be used to list the contents of a UPSTREAM sequential disk/tape backup, taking information from the CATALOG and FILEINFO repository data sets.

**VAULT**
For each vault operation performed by USTVAULT (Chapter 9 "Copying Backups with USTVAULT"), UPSTREAM stores a record in the CATALOG repository data set. The USTRPORT "VAULT" report can display information from some/all of those vaulting records.

**HISTORY**
In addition to the preceding records, a “history” record is also created on the completion of each UPSTREAM function (backup, restore, or vault). These records, which are also stored in the CATALOG repository data set, contain information such as the function requested, the elapsed time, execution time, and the number of files processed. They allow you to report on overall UPSTREAM activity, or on the activity of specific servers or functions. The USTRPORT "HISTORY" report can display information from some/all of those history records.

**CONFIG**
The USTRPORT "CONFIG" report can be used to report on one or more backup profiles currently defined in your UPSTREAM configuration, including all of their associated parameters and settings.

**CUSTOM**
While the previous reports are all “fixed format”, a USTRPORT "CUSTOM" report allows you to have more control over the content and layout of the report, allowing you to specify which fields will appear in the report, and the order in which those fields will appear.

**REGISTRY**
This report displays information about the registered name facility (see Chapter 20 "Registered Name Service").


22.5 **USTRPORT Control Statements**

Each report can be controlled by one or more control statements, which are used to specify the format of the report and what data is to be included.

The control statements are briefly described below, and full details then follow. A PRINT statement **must** be entered for a report to be generated. All other statements are optional.

**TITLE**

The TITLE statement allows you to provide a user-defined title for the report. All reports should contain a title to describe and summarize the contents of the report. Section 22.6 “TITLE Statement”.

**HEADING**

The HEADING statement allows you to alter the default column headings for the fields that are selected to appear in the report. Section 22.7 “HEADING Statement”.

**DEFAULT**

The DEFAULT statement is used to change the operating defaults of USTRPORT when generating a report. Section 22.8 “DEFAULT Statement”.

**SELECT and EXCLUDE**

The SELECT statement specifies selection criteria for the data values that are to be included in the report. Section 22.9 “SELECT and EXCLUDE Statements”.

The EXCLUDE statement specifies criteria for excluding certain data values from the report. Section 22.9 “SELECT and EXCLUDE Statements”.

**REPORT**

The REPORT statement is used customize the report, specifying the fields that are to appear in the report. Section 22.10 “REPORT Statement”.

**PRINT**

The PRINT statement follows all previous control statements and generates the requested report. Section 22.11 “PRINT Statement”.

**CANCEL**

The CANCEL statement is used to negate the effects of all or some prior statements, except DEFAULT. Section 22.12 “CANCEL Statement”.
22.6 TITLE Statement

The TITLE statement is used to define a user-specified title line to be displayed between the default header identification and the column headings. This title line is used as the main identifier for the contents of the report. A maximum of one line may be specified. Regardless of the use of the TITLE statement, a two line header is automatically generated to identify the fields being reported (i.e., column headings).

**TITLE Statement Syntax**

| TITLE | LINE='text' , SKIP=n |

**LINE=**

- `text` – Specifies the text to be printed or displayed in the title. The text must be enclosed in quotes. The number of characters specified must not exceed the page width.

- If the title cannot be contained on one control statement (Column 1 to 71), you can continue the text by specifying a “+” or a “-” after the last character on this line.

- If “+” is specified, USTRPORT scans for the first non-blank character on the next statement.

- If “-” is specified, USTRPORT starts with column 1 of the next statement.

**Example:**

```
TITLE LINE='BACKUP + REPORT'
```

**SKIP=**

- `n` – Specifies the number of lines to be left blank between the title line and the data heading line. A value of 1 to 3 lines may be specified.

- Default: 1.
22.7 **HEADING STATEMENT**

USTRPORT provides default column headings for each field in the report. (See Section 22.10 "REPORT Statement" for a full list).

The HEADING statement allows you to specify up to 3 lines of replacement text. It is your responsibility to line up the text with the actual columns generated by USTRPORT.

### HEADING STATEMENT SYNTAX

<table>
<thead>
<tr>
<th>HEADING</th>
<th>LINE(1)=&quot;first heading line text&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>,LINE(2)=&quot;second heading line text&quot;</td>
</tr>
<tr>
<td></td>
<td>,LINE(3)=&quot;third heading line text&quot;</td>
</tr>
</tbody>
</table>

**LINE(n)=**

Specifies the replacement text for up to 3 heading lines (n=1, 2, or 3). Only LINE(1)= is required, the others are optional.

If the heading text cannot be contained in one control statement (columns 1 to 71), it may be continued using the same conventions described for the TITLE statement.
22.8 DEFAULT STATEMENT

The purpose of the DEFAULT statement is to change USTRPORT’s default values for various options used when generating a report. Most of the operands on the DEFAULT statement are also operands on the PRINT statement and can be specified there.

The DEFAULT statement can be used when more than one report (i.e., more than one PRINT statement) is to be generated in one execution of USTRPORT. The DEFAULT statement avoids having to specify more than once any options used in multiple reports.

The alias SET can be used in place of DEFAULT.

**DEFAULT STATEMENT SYNTAX**

<table>
<thead>
<tr>
<th>DEFAULT STATEMENT SYNTAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFAULT BYTEFORMAT=BYTE</td>
</tr>
<tr>
<td>KILOBYTE</td>
</tr>
<tr>
<td>MEGABYTE</td>
</tr>
<tr>
<td>,CLOCK12</td>
</tr>
<tr>
<td>,CLOCK24</td>
</tr>
<tr>
<td>,EXNOBKDSN</td>
</tr>
<tr>
<td>,SLNOBKDSN</td>
</tr>
<tr>
<td>,EXNOCATLG</td>
</tr>
<tr>
<td>,SLNOCATLG</td>
</tr>
<tr>
<td>,FORMAT=DUMP</td>
</tr>
<tr>
<td>,NORMAL</td>
</tr>
<tr>
<td>,VERIFY</td>
</tr>
<tr>
<td>,FULLNAME</td>
</tr>
<tr>
<td>,SHORTNAME</td>
</tr>
<tr>
<td>,LINECNT=nnn</td>
</tr>
<tr>
<td>,MAXCC=nnn</td>
</tr>
</tbody>
</table>

**BYTEFORMAT=**

Specifies the format of the print fields that report a number of bytes.

- **BYTE** – Values are always reported in bytes; if the value exceeds 8 digits, asterisks are displayed.
- **KILOBYTE** – Values are always reported in kilobytes (bytes/1024). Commas are usually inserted to improve readability, but may be omitted if the value exceeds 6 digits.
- **MEGABYTE** – Values are always reported in megabytes and tenths (e.g., 120.5).

Default: The default is that byte fields are displayed in bytes, but if the value is too large it automatically converts the display to kilobytes or megabytes, as required, with a “K” or “M” to the right to indicate the conversion.

**CLOCK12**

**CLOCK24**

Specifies how the time of day should be printed in a report including BKFILES (information about workstation/server files included in a backup). The time is the “last update” time recorded for the file.

- **CLOCK12** – Displays it in AM/PM format.
- **CLOCK24** – Displays in 24-hour clock format.

Default: CLOCK12.
EXNOBKDSN
SLNOBKDSN
For RPTYPE=BACKUP, or a custom report that includes the BKDSN or BKVOLS fields:

EXNOBKDSN – Specifies that report lines for history records whose backup data set is no longer recorded in the CATALOG repository (probably because they have expired) is not reported.

SLNOBKDSN – Indicates that they are reported (with “DSN not available” in the BKDSN field).

Default: EXNOBKDSN

EXNOCATLG
SLNOCATLG
For RPTYPE=BACKUP, or a custom report that includes the BKDSN field.

EXNOCATLG – Specifies that report lines for backup data sets that are no longer cataloged in the z/OS catalog are not generated.

SLNOCATLG – Indicates that they are generated (with “not catlg” in the BKVOLS field).

Default: EXNOCATLG.

FORMAT=
Specifies formatting options for the records selected.

DUMP – Indicates that the record is printed in hexadecimal dump format only.

NORMAL – Indicates records are formatted as normal.

VERIFY – Indicates that the record is printed in hexadecimal dump format immediately following the formatted record.

Default: NORMAL

FULLNAME
SHORTNAME

FULLNAME – Specifies that in a report including BKFILES (information about Client files included in a backup) all file names should be printed with the full path name.

SHORTNAME – Is that the full path name is included only with the first file under a given directory; additional files under that directory have blanks up to the last backslash “\” in the name.

Default: SHORTNAME.

LINECNT=
nn – Specifies the maximum number of lines each report page can contain. The number can be any value from 10 to 99, inclusive.

Default: 58.

MAXCC=
nnnn – Overrides the maximum completion code from all USTRPORT statements that preceded this DEFAULT (or SET) statement. This is the completion code returned to z/OS at the end of this USTRPORT step, unless a subsequent statement causes a higher code. This might be used to set the maximum code to zero (SET MAXCC=0) when the successful completion of preceding operations has no bearing on this particular report.

NOABEND
Directs USTRPORT to exit with an error return code instead of a user abend for the rare and unusual conditions that would normally cause a user abend to be taken.
REPORTING WITH USTRPORT
DEFAULT STATEMENT

NOCLOCK
USTRPORT generates a title line with the time, date, and page number as the first line of every page. The NOCLOCK option directs USTRPORT to only obtain (from z/OS) the time and date at the beginning of the report and always repeat that value on each page. Normally, without this option, USTRPORT refreshes the time and date at the beginning of each new page.

PAGEWIDTH=

nnn – When creating custom reports with the REPORT statement, USTRPORT calculates the width of the report using the length of all requested fields, plus spaces between the fields. An error occurs if the report width exceeds the current page width. PAGEWIDTH= has a minimum of 132 and maximum of the LRECL of SYSPRINT minus 1 (which is also the default).

PROFSTACK
NOPROFSTACK
When creating custom reports with the REPORT statement, USTRPORT normally builds the report in the same manner that it builds the report for RPTYPE=HISTORY or RPTYPE=BACKUP - by printing the backup profile name first and then reporting all records for that backup profile, indented by one space. This is the PROFSTACK option.

If the FIELD operand on the REPORT statement includes PROFILENAME, this is not done. This is the NOPROFSTACK option.

The PROFSTACK and NOPROFSTACK operands on the DEFAULT statement can be used to override the default operation previously described.

NOPROFSTACK does not list the backup profile name, even if PROFILENAME is not included on the FIELD operand of the REPORT statement. PROFSTACK lists the backup profile name and indents the following records, even if the profile name is also printed on each line.

SELTERR=
Specifies if USTRPORT should end with a condition code if no records were selected for reporting by a PRINT statement.

YES – Indicates that you want to be notified that no records were selected (probably due to an error in your SELECT/EXCLUDE statements).

NO – Causes a zero condition code if the only error was that no records were selected.

Default: YES.

SHOWATTR
NOSHOWATTR
Specifies whether a report including BKF ILES (information about Client files included in a backup) should include the attribute flags associated with each file.

Default: NOSHOWATTR - do not display attributes.
SUMDIR=

For RPTYPE=BACKUP or RPTYPE=VAULT, and with the BKFILES field specified on the SELECT statement, SUMDIR controls the printing of summaries of the number of files and data bytes in each directory.

As shown in the syntax summary, SUMDIR has three sets of parameters. You can specify one from each set, enclosing the values in parenthesis, or you can specify only one parameter without parenthesis. Examples:

SUMDIR=(ONLY,FULLNAME) or SUMDIR=INCLSUB

Valid values for SUMDIR are:

YES – Requests that the summary-by-directory be printed at the end of the report.

NO – Suppresses the summary (all other SUMDIR options are ignored).

ONLY – Requests that only the summary be printed, suppressing the detail report.

FULLNAME – Prints the full path name for each directory summarized.

SHORTNAME – Uses an indenting scheme to show the structure of subdirectories.

INCLSUB – The summary for each directory includes all files in that directory, plus all subdirectories beneath that directory. This also means that the directory at the very top of the summary summarizes all files in all directories listed.

EXCLSUB – The summary for each directory includes only those files that actually exist in that directory, not including those in subdirectories beneath that directory.

Default: YES, NOFULLNAME, EXCLSUB.

UPPERCASE

LOWERCASE

UPPERCASE – Forces all output to be generated in only uppercase characters.

LOWERCASE – Allows USTRPORT to use both upper and lower case characters in reports.

Default: LOWERCASE.
22.9 SELECT AND EXCLUDE Statements

The SELECT and EXCLUDE statements act as a filter for the data sets to be processed by USTRPORT, comparing the values you specify against the values in the repository records to be processed.

The operands on SELECT and EXCLUDE may be followed by one of a number of comparison operators. Since one form of those operators involves special characters, such as the not “¬” and the less than “<”, alternate forms of each operator without special characters are provided.

The operators are:

= or .EQ. – equal
¬= or .NE. – not equal
< or .LT. – less than
> or .GT. – greater than
<= or .LE. – less than or equal to
>= or .GE. – greater than or equal to

Some operands only accept an equal test, some equal and not equal, and some accept all six comparisons, as shown in the syntax summary below.

USTRPORT tests each SELECT and EXCLUDE against the values in each input record. The test implied by each operand is true if the indicated comparison of the FIELD value and the value you provide is true. For example, COMPCODE.NE.0 selects all records for operations that did not complete successfully.

Some operands allow you to specify multiple values in parenthesis for equal and not-equal (as shown in the table below) or single values without parenthesis. If multiple values are specified, USTRPORT compares the input record to each of those values. For equal, the test is true if ANY of the comparisons are equal. For not-equal, the test is true if ALL of the comparisons are not-equal. For example, COMPCODE=(0,SUSPEND) selects those entries whose completion code was either zero or whose operation was suspended. A given field name may be specified more than once with several different operators.

If there are no SELECT or EXCLUDE statements present then all records relevant to the report type (RPTYPE=) are reported. If only EXCLUDE statements are present, then all records not excluded are reported; likewise if only SELECT statements are present, only selected records are reported. If both types are used, EXCLUDE statements should precede SELECT statements to EXCLUDE a subset of the records selected; other than that, the order of the SELECT and EXCLUDE statements is not significant.

SELECT / EXCLUDE Examples

SELECT PROFILE=PROD*,FILES>100,DAYS<5
SELECT OPERNAME=(BACKUP,'BACKUP M'),BYTES>100000,BYTES<500000
EXCLUDE TRACKS.LE.1000
EXCLUDE FILES.GT.100
## SELECT AND EXCLUDE STATEMENTS

### SELECT / EXCLUDE Statement Syntax

<table>
<thead>
<tr>
<th>Operand</th>
<th>Valid Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFILE operator (profname1, profname2, ...) = .EQ. ¬= .NE.</td>
<td></td>
</tr>
<tr>
<td>.BKFILES operator filemask = .EQ.</td>
<td></td>
</tr>
<tr>
<td>.BCTYPE operator (bctype1, bctype2, ...) = .EQ.</td>
<td></td>
</tr>
<tr>
<td>.BLOCKS operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.BYTES operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.CONDCODE operator (comp1, comp2, ...) = .EQ. ¬= .NE.</td>
<td></td>
</tr>
<tr>
<td>.CPUTIME operator nnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.DAYS operator nnn = all</td>
<td></td>
</tr>
<tr>
<td>.DATE operator yy/mm/dd = all</td>
<td></td>
</tr>
<tr>
<td>.ELAPSEDTIME operator nnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.FILES operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.HOURS operator nnnn = .EQ. &lt;= .LE. &lt; .LT.</td>
<td></td>
</tr>
<tr>
<td>.LUNAME operator (luname1, luname2, ...) = .EQ. ¬= .NE.</td>
<td></td>
</tr>
<tr>
<td>.MERGEBLOCKS operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.MERGEBYTES operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.MIGRATEFILES operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.MIGRATEFILES operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.OPERNAME operator (oper1, oper2, ...) = .EQ. ¬= .NE.</td>
<td></td>
</tr>
<tr>
<td>.OPERTYPE operator (type1, type2, ...) = .EQ. ¬= .NE.</td>
<td></td>
</tr>
<tr>
<td>.TAPES operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.TIME operator hh:mm:ss = all</td>
<td></td>
</tr>
<tr>
<td>.TRACKS operator nnnnnnn = all</td>
<td></td>
</tr>
<tr>
<td>.USERID operator (userid1, userid2, ...) = .EQ. ¬= .NE.</td>
<td></td>
</tr>
</tbody>
</table>

### NOTE:

When you are using RPTYPE=CONFIG, only the PROFILE operand is honored; all other operands are ignored. When you are using RPTYPE=EXCEPTION, only the PROFILE, DAYS, HOURS, OPERNAME, and OPERTYPE operands are honored; all other operands are ignored. The other operands can be used with RPTYPE of HISTORY, BACKUP, and VAULT.

### PROFILE

Specifies one or more backup profile names. A profile prefix can be specified by using a "*" as the last character of the operand. For example to list all of the entries for all profiles that begin with "SYS" and "OPER" specify PROFILE=(SYS*, OPER*). If necessary, the field can be continued by using a trailing comma onto multiple lines.

### BKFILES

Only valid with RPTYPE=BACKUP and VAULT to print output. The operand may be up to 60 characters in length and is not case sensitive. If the value contains embedded blanks, the value must be enclosed in single quotes. If present, the report displays details of Client files that were included in each UPSTREAM backup file reported. The length of the filename printed is limited by the page width currently in effect (see "PAGEWIDTH=" in Section 22.8); the usual page width can display the first 88 characters of file names (including the complete path name). BKFILES=* displays all files contained in the backup, or you may specify a prefix to limit the display. The prefix must match on the beginning characters of the complete path name of the file, for example:

- BKFILES=/opt/*
- 'BKFILES=/opt/name of file'

Individual client files up to 9.99 TB are reported and tallied.
BKTYPE
For backups, indicates the type of backup. Valid values are as follows:
- DASD – Backups to disk.
- TAPE – Backups to tape.
- DEFR – Deferred merge backups that have not yet completed

BLOCKS
Specifies the number of blocks transmitted to/from the Client.

BYTES
Specifies the number of bytes transmitted to/from the Client.

CONDCODE
Specifies the completion codes status of the operation. One or more values can be specified. The following are the valid options:
- ABEND – The operation received a System or User abend.
- SUSPEND – The operation was suspended.
- CANCEL – The operation was canceled.
- SYSTEM – The operation received a SYSTEM abend.
- USER – The operation received a USER abend.
- 0 or ZERO – The operation completed successfully.
- 4 – The operation completed with warning messages.
- 8 – The operation was terminated with error messages.
- 12 – The operation was terminated with severe errors.
- 16 – The operation was terminated by the operator.

CPUTIME
Specifies the CPU time required, in thousands of a second or milliseconds, for the operation to complete. For example, to report all of the events that took less than one second of CPU time you would specify CPUTIME.LE.1000 or CPU<=1000.

DAYS
Calculates a date “n” days (0 to 9999) previous to the current date; that date is compared to the starting date recorded in each history record. For example to select records for the last ten days, specify DAYS.LE.10 or DAYS<=10. To select records over 30 days old specify DAYS>30.

DATE
Specifies a date, in the format “yy/mm/dd”, that is compared to the starting date recorded in each history record. For backups, this is the date part of the “version-date”.

ELAPSEDTIME
Specifies the elapsed time, in tenths of minutes, recorded for the operation to complete. For example, to select records for operations that took over 2.5 minutes you would specify ELAPSEDTIME.GE.25 or ELAPSEDTIME>=25.

FILES
Specifies the number of files transmitted to/from the Client.

HOURS
Calculates a time “n” hours (0 to 999) previous to the current time; that time is compared to the starting date and time recorded in each history record. For example to select records for the last ten hours, specify HOURS.LE.10 or HOURS<=10.
REPORTING WITH USTRPORT
SELECT AND EXCLUDE STATEMENTS

LUNAME
Specifies one or more Client workstation/server IDs (up to 8 characters) or ID prefixes (up to 7 characters followed by an asterisk). For TCP/IP Clients, this is the network address coded as an 8-digit hexadecimal value (each pair of digits corresponds to one of the 4 values in the address, converted to hex). For SNA APPC Clients, this is the VTAM LUNAME.

MERGEBLOCKS
Specifies the number of blocks that were merged forward from previous backups during a full merge backup. Not valid for other operations.

MERGEBYTES
Specifies the number of bytes that were merged forward from previous backups during a full merge backup. Not valid for other operations.

MERGEFILES
Specifies the number of files that were merged forward from previous backups during a full merge backup. Not valid for other operations.

MIGRATEFILES
Specifies the number of migrated files that were merged forward from previous backups during a full merge backup. Not valid for other operations.

OPERNAME
Specifies one or more UPSTREAM operations. Valid values are:
For UPSTREAM operations:
- BACKUP
- 'BACKUP M'
- 'BACKUP D'
- RESTORE
- RESTARTB
- INQUREV
- INQUIREF
- 'REMOVE F'
- 'REMOVE B'
- 'COMM z/OS'
- 'COMM PC'
- 'VSAM TST'
- 'NON I/O'
- LOGIN
For utility operations:
- DELETE
- MAINT
- MAINTF
- REGEN
- REORG
For UPSTREAM Termination:
- SHUTDOWN
For mainframe-initiated operations
- HOSTINIT

NOTE: Values shown with quotes must be entered that way as they contain blanks; others can be entered with or without quotes.
OPERTYPE

Specifies one or more UPSTREAM operation types. Operation types are used with certain operation names to qualify the type of operation. Valid operation types are:

For BACKUP:
- **INCR** – Incremental backup
- **FULL** – First-time full backup
- **MERG** – Merge backup

For EXCEPTION:
- **INCR** – Incremental backup
- **FULL** – First-time full backup
- **MERG** – Merge backup
- **NONM** – Non-merge backup

For RESTORE
- **TAPE** – Backups to tape
- **DASD** – Backups to disk

For HOSTINIT
- **z/OS** – Functions remotely initiated from the z/OS Storage Server
- **PC** – Functions remotely initiated from the Client

TAPES

Specifies the number of tape volumes that were used for a sequential tape backup. Not valid for other operations.

TIME

Specifies a time, in the format “hh:mm:ss”, that is compared to the starting time recorded in each history record. For backups, this is the time part of the “version-date”.

TRACKS

Specifies the number of DASD tracks that were used for a sequential DASD backup. Not valid for other operations.

USERID

Specifies one or more userids (up to 8 characters) or userid prefixes (up to 7 characters followed by an asterisk). Userids are recorded in history records if the userid was specified at the Client.

**NOTE:** If the SECLVL=0 configuration option is specified (see “The SECLVL Parameter” in Section 4.2), userids are optional.
22.10 REPORT Statement

The REPORT statement is used to customize reports by specifying the fields to be printed, and the order in which to print them. The REPORT statement is honored if RPTYPE=CUSTOM is specified, or if RPTYPE= is omitted.

The report generated uses the same input data as RPTYPE=HISTORY or BACKUP. If the fields do not include any fields related to backup data sets, the report reports on history records only. If any backup fields are included in the report, it reports on history and backup data, including backup data that has no matching history records.

SELECT and EXCLUDE statements, if present, filter the data to be reported.

### REPORT Statement Syntax

**REPORT FIELD=(field1,field2,...)**

**FIELD=**

Specifies the names of one or more FIELDS to be printed in the custom report. The available field names are shown in the table below.

The fields are printed in the order specified. There is one space between fields, unless the SPn field names are used (where “n” is 0 to 9) to cause the specified number of spaces to appear between the preceding and following fields.

The example below uses SP3 to insert 3 spaces between VERSION and BKDSN, but only one space between BKDSN and BKVOL:

```
REPORT FIELD=(VERSION,SP3,BKDSN,BKVOL)
```

**FIELD NAME Table**

The following table lists the field names that are available for inclusion in the FIELD operand of the REPORT statement. Many of these field names can also be used on SELECT and EXCLUDE statements and have already been described in that section. For each field, the table shows:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ABBREV</th>
<th>ALIAS</th>
<th>ATTR</th>
<th>LEN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BKDSN</td>
<td></td>
<td></td>
<td>CHAR</td>
<td>44</td>
<td>Backup data set name</td>
</tr>
<tr>
<td>BKDS1</td>
<td></td>
<td></td>
<td>CHAR</td>
<td>27</td>
<td>1st half split backup data set name</td>
</tr>
<tr>
<td>BKDS2</td>
<td></td>
<td></td>
<td>CHAR</td>
<td>27</td>
<td>2nd half of split backup data set name</td>
</tr>
<tr>
<td>BKSPLDSN</td>
<td></td>
<td></td>
<td>CHAR</td>
<td>27</td>
<td>Backup data set name, split over two lines</td>
</tr>
<tr>
<td>BKTYP</td>
<td></td>
<td></td>
<td>CHAR</td>
<td>4</td>
<td>Backup type: DASD, TAPE, NONE, ARCH, KEYD</td>
</tr>
<tr>
<td>BKVOLS</td>
<td></td>
<td></td>
<td>CHAR</td>
<td>21</td>
<td>Three volumes per line of backup DSN</td>
</tr>
<tr>
<td>BLOCKS</td>
<td>BLK</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Number of blocks transmitted</td>
</tr>
<tr>
<td>BYTES</td>
<td>BYT</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Number of bytes transmitted</td>
</tr>
<tr>
<td>NAME</td>
<td>ABBREV</td>
<td>ALIAS</td>
<td>ATTR</td>
<td>LEN</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>----------------</td>
<td>--------</td>
<td>-------</td>
<td>------</td>
<td>-----</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>COMPRESSTYPE</td>
<td>COMPTYPE</td>
<td>CHAR</td>
<td>4</td>
<td></td>
<td>Compression type used:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HI-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HI-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HI-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FAST</td>
</tr>
<tr>
<td>COMPCODE</td>
<td>COND</td>
<td>CHAR</td>
<td>9</td>
<td></td>
<td>Completion code</td>
</tr>
<tr>
<td>CPUTIME</td>
<td>CPU</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>CPU time (in seconds)</td>
</tr>
<tr>
<td>DATE</td>
<td></td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Date of event (yy/mm/dd)</td>
</tr>
<tr>
<td>ELAPSEDTIME</td>
<td>ELAPS</td>
<td>MINS</td>
<td>NUM</td>
<td>6</td>
<td>Elapsed time (in minutes)</td>
</tr>
<tr>
<td>FILES</td>
<td>FIL</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Number of files transmitted</td>
</tr>
<tr>
<td>HFLAGS</td>
<td>FLAGS</td>
<td>HEX</td>
<td>5</td>
<td></td>
<td>History flags HISTSFL1 and HISTSFL2</td>
</tr>
<tr>
<td>HISTSFL0</td>
<td>SFL0</td>
<td>HEX</td>
<td>2</td>
<td></td>
<td>History TYPE flag</td>
</tr>
<tr>
<td>HISTSFL1</td>
<td>SFL1</td>
<td>HEX</td>
<td>2</td>
<td></td>
<td>History Flag 1</td>
</tr>
<tr>
<td>HISTSFL2</td>
<td>SFL2</td>
<td>HEX</td>
<td>2</td>
<td></td>
<td>History Flag 2</td>
</tr>
<tr>
<td>LUNAME</td>
<td>LU</td>
<td>CHAR</td>
<td>8</td>
<td></td>
<td>LUNAME of originating event</td>
</tr>
<tr>
<td>MEGEBLOCKS</td>
<td>MBLK</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Number of blocks merged</td>
</tr>
<tr>
<td>MERGEBYTES</td>
<td>MBYT</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Number of bytes merged</td>
</tr>
<tr>
<td>MERGEFILES</td>
<td>MFIL</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Number of files merged</td>
</tr>
<tr>
<td>MIGRATEFILES</td>
<td>MIGFIL</td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Number of files migrated</td>
</tr>
<tr>
<td>OPERNAME</td>
<td>OPNAME</td>
<td>CHAR</td>
<td>8</td>
<td></td>
<td>Operation name</td>
</tr>
<tr>
<td>OPERTYPE</td>
<td>OPTYPE</td>
<td>CHAR</td>
<td>4</td>
<td></td>
<td>Operation type</td>
</tr>
<tr>
<td>PROFILE</td>
<td>PROFI</td>
<td>CHAR</td>
<td>8</td>
<td></td>
<td>Backup profile name</td>
</tr>
<tr>
<td>TAPES</td>
<td>TAP</td>
<td>NUM</td>
<td>7</td>
<td></td>
<td>Number of tapes used</td>
</tr>
<tr>
<td>TIME</td>
<td></td>
<td>NUM</td>
<td>8</td>
<td></td>
<td>Time of event</td>
</tr>
<tr>
<td>TRACKS</td>
<td>TRK</td>
<td>NUM</td>
<td>7</td>
<td></td>
<td>Number of DASD tracks used</td>
</tr>
<tr>
<td>USERID</td>
<td>US</td>
<td>CHAR</td>
<td>8</td>
<td></td>
<td>USERID recorded for the event</td>
</tr>
<tr>
<td>VERSION</td>
<td></td>
<td>CHAR</td>
<td>17</td>
<td></td>
<td>Combination of DATE and TIME field</td>
</tr>
</tbody>
</table>
The PRINT statement instructs USTRPORT to generate the report, using the characteristics specified by the preceding control statements (SELECT, EXCLUDE, DEFAULT, TITLE, HEADING, or REPORT) that are currently in effect. These statements remain in effect until canceled by a CANCEL statement, or superseded by new TITLE/HEADING statements.

A PRINT statement must be entered, or no report is generated. Multiple PRINT statements may be given to produce various reports in one execution of USTRPORT.

**PRINT Statement Syntax**

```plaintext
PRINT BYTEFORMAT=BYTE|KILOBYTE|MEGABYTE
,RPTYPE=BACKUP|CONFIG|CUSTOM
,EXNOBKDSN|SLNOBKDSN
,EXNOCATLG|SLNOCATLG
,FORMAT=DUMP|NORMAL|VERIFY
,EXNBKDSN|SLNBKDSN
,EXNCATLG|SLNCATLG
,EXNOCATLG|SLNOCATLG
,EXNOBKDSN|SLNOBKDSN
,FORMAT=DUMP|NORMAL|VERIFY
,SELTERR=NO|YES
,SUMDIR=(YES|NO|ONLY)
,LINECNT=nn|58
,MEMBER=membername
```

Most of the operands on the PRINT statement are also operands on the DEFAULT statement, and are documented there. Operands **specific** to the PRINT statement are as follows.

**MEMBER=**

Used with RPTYPE=CONFIG only, specifies the PDS member name of the UPSTREAM configuration file against which this report is to run. It can be omitted if the member name is specified on the “USTCONF DD Statement” in the UPSTREAM startup PROC. It must be omitted if the configuration data set is a sequential file.

**RPTYPE=**

Specifies the format of the report to be generated, as well as implying the data source for the report. See Section 22.4 “USTRPORT Report Types” for the allowable values for RPTYPE.

Default: HISTORY, except that if a REPORT statement is in effect, when the default is CUSTOM.
22.12 CANCEL STATEMENT

The CANCEL statement is used to negate the effects of some or all prior statements, except DEFAULT.

By default, the options specified on all preceding statements (except PRINT) remain in effect until you cancel them (or, in the case of TITLE, HEADING, and REPORT, until you override them). Additional SELECT and EXCLUDE statements are added to those already in effect.

CANCEL can be used between PRINT statements to cancel options in effect so that they can be re-specified (or the defaults used).

If no operands are specified, CANCEL cancels the effect of all of the prior commands except DEFAULT.

<table>
<thead>
<tr>
<th>CANCEL STATEMENT SYNTAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>CANCEL EXCLUDE,SELECT,HEADING,REPORT</td>
</tr>
</tbody>
</table>

**CANCEL STATEMENT OPERANDS**

**EXCLUDE**

Cancels the current exclusion criteria table as created by preceding EXCLUDE statements.

**HEADING**

Cancels the current HEADING line(s), reinstating the defaults.

**REPORT**

Cancels the current REPORT field specifications.

**SELECT**

Cancels the current selection criteria table as created by preceding SELECT statements.

**TITLE**

Cancels the current TITLE line(s), reinstating the defaults.
REPORTING WITH USTRPORT

22.13 USTRPORT INITIATION

USTRPORT reports can be initiated in one of two ways:
❖ Via a z/OS Batch job. (Section 22.14 “USTRPORT Batch Examples”.)
❖ Via the TSO/ISPF Dialog. (Section 22.14 “Initiation via the TSO/ISPF Dialog”.)

INITIATION VIA AN

Z/OS BATCH JOB

The following job control statements are required to execute USTRPORT as an z/OS

batch job. Example jobstreams are provided in Section 22.14 “USTRPORT Batch

Examples”.

NOTE: Additional samples can also be found in the Installation Control Library (ICL), which was

created as part of the installation of UPSTREAM. The USTRPORT ICL sample members all

begin with “RPT”.

EXEC STATEMENT

Must specify USTRPORT.

The EXEC statement should also specify REGION=0M to make the maximum region available.

It may optionally contain a PARM= operand to pass options to the USTRPORT program. Any

PARM= data passed to the USTRPORT program is interpreted as control statement input.

Multiple commands specified via this method must be separated by a slash (/) character.

JOBLIB OR

STEPLIB DD

STATEMENT

Specifies the library in which USTRPORT resides (usually the UPSTREAM load library).

This must be an APF authorized library.

SYSPRINT DD

STATEMENT

Specifies the primary output message data set. This is a required DD statement and is

usually a SYSOUT data set. The LRECL may be specified from a minimum of 133 to a

maximum of 241 (133 is the default if not specified).

If BLKSIZE is not specified, the system determined blocksize (SDB) is used on systems

that support it. LRECL multiplied by 64 is used on other systems.

SYSUDUMP DD

STATEMENT

Recommended in all USTRPORT jobs in order to diagnose more easily error conditions

that make USTRPORT abend. Usually a SYSOUT data set.

USTCATLG DD

STATEMENT

Specifies the CATALOG repository file. For example,

//USTCATLG DD DSN=UPSTREAM.CATALOG.$UST.CLUSTER,DISP=SHR

This DD statement is required for all report types except RPTYPE=CONFIG.

USTCONFIG DD

STATEMENT

Specifies the data set name (and member name, if a PDS) of the FDR/UPSTREAM

configuration file. For example:

//USTCONFIG DD DSN=UPSTREAM.CONFIG.FILE(CONFIG02),DISP=SHR

This DD statement is required only when you are doing RPTYPE=CONFIG. It may also be

used with RPTYPE=EXCEPTION. If the configuration data set is a PDS, member name

can be omitted if the MEMBER= operand is specified on the PRINT statement.

USTFILEI DD

STATEMENT

Specifies the FILEINFO repository file. For example,

//USTFILEI DD DSN=UPSTREAM.FILEINFO.$UST.CLUSTER,DISP=SHR

This DD statement is required only when you are doing RPTYPE=BACKUP, VAULT, or

CUSTOM (if backup fields are included in the REPORT fields).

USTCSV DD AND

USTPUNCH DD

STATEMENTS

Either DD statement may be used to specify the data set name of the optional CSV output

file for RPTYPE=BACKUP reporting. For example:

//USTPUNCH DD DSN=UPSTREAM.CSV.FILE,DISP=(NEW,CATLG,DELETE),

// UNIT=SYSDA,

// SPACE=(CYL,(10,10),RLSE)

SYSIN DD

STATEMENT

Specifies the control statement data set. Usually a “DD **” data set or control card PDS

member.
This section shows several example reports that could be created with USTRPORT. Example output is also shown.

**“RECENT ACTIVITY” REPORT**

This report, using RPTYPE=HISTORY, shows all UPSTREAM activity in the past 7 days.

```
//USTRPORT EXEC PGM=USTRPORT,REGION=0M
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//USTCATLG DD DISP=SHR,DSN=your.upstream.ustcatlg.file
//SYSIN DD *
TITLE LINE='XYZ CORPORATION - RECENT FDR/UPSTREAM ACTIVITY'
SELECT DAYS<7
PRINT RPTYPE=HISTORY
/*
```

**FIGURE 22-1: “RECENT ACTIVITY” REPORT**

<table>
<thead>
<tr>
<th>Seconds</th>
<th>Luname</th>
<th>UserId</th>
<th>Name</th>
<th>Type</th>
<th>Files</th>
<th>Bytes</th>
<th>Files</th>
<th>Bytes</th>
<th>Files</th>
<th>Tapes</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/02/06 15:55:23</td>
<td>70 80</td>
<td>0.297 LU3AS018</td>
<td>BACKUP</td>
<td>0 0 0 0 2D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/02/06 15:57:08</td>
<td>0 0</td>
<td>0.039 LU3AS018</td>
<td>INQUIREV</td>
<td>1 0 0 0 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/02/06 15:57:48</td>
<td>0 0</td>
<td>0.635 LU3AS018</td>
<td>BACKUP</td>
<td>23 1,184K 0 0 0 29D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/02/06 15:58:34</td>
<td>0 0</td>
<td>0.037 LU3AS018</td>
<td>INQUIREV</td>
<td>1 0 0 0 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/02/06 16:02:32</td>
<td>0 0</td>
<td>0.055 LU3AS018</td>
<td>INQUIREF</td>
<td>23 0 0 0 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**“HEAVY AFTERNOON ACTIVITY” REPORT**

This report, also using RPTYPE=HISTORY, shows all UPSTREAM backups of more than 5MB that have taken place in the afternoon. This may be done, for example, with a view to shifting those larger backups to an “off-peak” schedule.

```
//USTRPORT EXEC PGM=USTRPORT,REGION=0M
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//USTCATLG DD DISP=SHR,DSN=your.upstream.ustcatlg.file
//SYSIN DD *
TITLE LINE='XYZ CORPORATION - HEAVY AFTERNOON BACKUPS'
SELECT BYTES>5000000,TIME.GE.13:00:00,TIME.LE.17:00:00
PRINT RPTYPE=HISTORY
/*
```

**FIGURE 22-2: “HEAVY AFTERNOON ACTIVITY” REPORT**

<table>
<thead>
<tr>
<th>XYZ CORPORATION - HEAVY AFTERNOON BACKUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile / Start Date+Time</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>SERVER3</td>
</tr>
<tr>
<td>SERVER5</td>
</tr>
</tbody>
</table>
“INCOMPLETE BACKUPS” REPORT

The example shows a customized report using RPTYPE=CUSTOM. It shows any backups that did not complete normally and it has been customized with the REPORT statement to show only selected fields.

//USTRPORT EXEC PGM=USTRPORT,REGION=0M
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSPRINT DD SYSOUT=*"
This next report is an expanded example of the preceding report. The BKFILES=* has been added to the SELECT statement to request the display of all the individual Client files contained in each backup. The DEFAULT FULLNAME statement has also been added to request the display of the full path for each file.

```
//USTRPORT EXEC PGM=USTRPORT,REGION=0M
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//USTCATLG DD DISP=SHR,DSN=your.upstream.ustcatlg.file
//USTFILEI DD DISP=SHR,DSN=your.upstream.ustfilei.file
//SYSIN DD *
TITLE LINE='XYZ CORPORATION – FINANCE DEPARTMENT BACKUPS'
DEFAULT FULLNAME
SELECT PROFILE=FIN*,BKFILES=* 
PRINT RPTYPE=BACKUP
/*
```

**Figure 22-5: “Backup and Files” Report**

<table>
<thead>
<tr>
<th>XYZ CORPORATION – FINANCE DEPARTMENT BACKUPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile name / CondCode</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Version Date.Time</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>RED60A</td>
</tr>
<tr>
<td>36,864 11/06/24 4:39:25pm</td>
</tr>
<tr>
<td>36,864 11/06/23 7:30:12pm</td>
</tr>
<tr>
<td>143 11/06/23 6:45:35pm</td>
</tr>
<tr>
<td>143 11/06/23 6:45:35pm</td>
</tr>
<tr>
<td>143 11/06/23 6:45:35pm</td>
</tr>
<tr>
<td>143 11/06/23 6:45:35pm</td>
</tr>
<tr>
<td>143 11/06/23 6:45:35pm</td>
</tr>
<tr>
<td>143 11/06/23 6:45:35pm</td>
</tr>
</tbody>
</table>
The Exception Report is useful for identifying the most recent unsuccessful backup (condition code greater than 4) for a profile, within the exception period, as defined by the Days select operand. A successful backup within the exception period would result in the profile's exclusion from the Exception report. Additionally, if the USTCONFIG DD statement is provided, profiles that have never had a backup or profiles that no longer exist are also excluded from the Exception report. The date and the number of days of the most recent successful backup, (within the specification for MAXHIST) and the date of the most recent unsuccessful backup attempt (if any) within the exception period are listed.

```
//USTPORT EXEC PGM=USTPORT,REGION=0M
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSPRINT DD SYSOUT=*  
//USTCATLG DD DISP=SHR,DSN=your.upstream.ustcatlg.file
//USTFILEI DD DISP=SHR,DSN=your.upstream.ustfilei.file
//USTCONFIG DD DISP=SHR,DSN=your.upstream.config.file
//SYSIN    DD *
EXCLUDE PROFILE=SUSELINX
SELECT OPERNAME=BACKUP,DAYS<=9999
PRINT RPTYPE=EXCEPTION
```

**FIGURE 22-6: “EXCEPTION” REPORT**

<table>
<thead>
<tr>
<th>Profile</th>
<th>Days Since</th>
<th>Last Successful</th>
<th>Operation</th>
<th>Last Attempted</th>
<th>CondCode</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1356</td>
<td>10/10/26 12:19:55</td>
<td>BACKUP</td>
<td>NONM</td>
<td>- None in last 101</td>
<td>------</td>
</tr>
<tr>
<td>BUGSERV</td>
<td>444</td>
<td>10/11/08.11:58:54</td>
<td>BACKUP</td>
<td>INCR</td>
<td>10/12/16.22:26:15</td>
<td>12* BACKUP INCR</td>
</tr>
<tr>
<td>EFGIDP</td>
<td>145</td>
<td>10/12/30 22:15:29</td>
<td>BACKUP</td>
<td>FULL</td>
<td>- None in last 101</td>
<td>------</td>
</tr>
<tr>
<td>FTP</td>
<td>235</td>
<td>10/12/16 22:01:00</td>
<td>BACKUP</td>
<td>FULL</td>
<td>10/01/30 22:00:09</td>
<td>8* BACKUP D MERG</td>
</tr>
<tr>
<td>MAIL</td>
<td>104</td>
<td>10/11/18 22:09:56</td>
<td>BACKUP</td>
<td>INCR</td>
<td>10/05/06 12:36:57</td>
<td>CANCELED* BACKUP FULL</td>
</tr>
<tr>
<td>MAIL2</td>
<td>136</td>
<td>10/02/06 10:54:55</td>
<td>BACKUP</td>
<td>INCR</td>
<td>10/11/27 22:00:04</td>
<td>S613 BACKUP INCR</td>
</tr>
</tbody>
</table>

- Exception Report over last 101 days. From: 2010/mm/dd - To: 2011/mm/dd

As well as reporting on UPSTREAM activity, such as backups and restores, you can also use USTRPORT to display information about the UPSTREAM configuration data set. In this next report, we are displaying the contents of the CONFIG02 configuration member, but we have asked to see only the details of backup profiles beginning with "FIN".

```
//USTPORT EXEC PGM=USTPORT,REGION=0M
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//SYSPRINT DD SYSOUT=*  
//USTCONFG DD DISP=SHR,DSN=your.upstream.configuration.file
//SYSIN    DD *
TITLE LINE='XYZ CORPORATION - FINANCE DEPARTMENT PROFILES',
SELECT PROFILE=FIN*
PRINT RPTYPE=CONFIG,MEMBER=CONFIG02
```

**FIGURE 22-7: “CONFIGURATION” REPORT**
As an alternative to running USTRPORT batch jobs, you can also report on UPSTREAM activity through the TSO/ISPF dialog. Select option 7 (“Report”) and press ENTER.

**Figure 22-8: FDR/UPSTREAM TSO/ISPF Dialog**

In the subsequent panel, shown next, you will be asked to provide the profile name relating to the backup profile(s) that you wish to report on. You also specify the USTRPORT report type that you wish to run.

You need to enter the name of the UPSTREAM configuration data set and member name, as well as the catalog (USTCATLG) and fileinfo (USTFILEI) repository data sets, all of which are specified in the UPSTREAM startup PROC. Once entered, these values are retained each time you return to this screen. Note the use of the quotes to avoid name resolution interference with your TSO/E profile prefix setting. In our example below, by entering an “*” on the profile name field and “backup” in the report type field, we have requested a display of all backups for all profiles.
Having completed the preceding menu and pressed ENTER, you see a display similar to the one shown here.
23 REPORTING WITH USTBKPRT

23.1 INTRODUCTION

USTBKPRT is a basic reporting utility that lists the contents, by backup version, of any FDR/UPSTREAM sequential disk or tape backup. Output is to a print and/or CSV formatted data set. The backup need not be currently recorded in the UPSTREAM repository. This may be useful for determining the contents of a vaulted backup created by USTVAULT, or a primary backup whose records have been removed or expired from the repository.
**23.2 Executing USTBKPR**

**USTBKPR JCL Statements**
USTBKPR can only be executed as an z/OS batch job.

**EXEC Statement**
Must specify USTBKPR. Optionally, may specify PARM=SUMMARY. PARM=SUMMARY, lists the UPSTREAM backup control records and a summary of the backup, omitting the file detail.

**STEPLIB DD Statement**
Specifies the library that USTBKPR resides (usually the UPSTREAM load library). This must be an APF authorized library.

**SYSUDUMP DD Statement**
Usually a SYSOUT data set. Recommended to diagnose error conditions that cause USTBKPR to abend.

**USTBKUP / SYSUT1 DD Statement**
Either DD statement is acceptable. The UPSTREAM backup data set to be reported. USTBKPR can only report on one backup at a time. If the backup is part of a multi-file tape data set, run multiple executions of USTBKPR as necessary.

**USTCSV DD Statement**
Specifies the data set name of the optional CSV output file If it is directed to other than SYSOUT, file attributes are RECFM=VB, and any blocksize of 365 or larger is acceptable. The LOCATOR, TTTR/RB# and OFFSET are hex values and are prefixed with an “X”.

**USTRPRT / SYSPRINT DD Statement**
Either DD statement is acceptable. This is the USTBKPR report file. This is a required DD statement and is usually a SYSOUT data set and has attributes of RECFM=VBA, and LRECL=136. If it is directed to other than SYSOUT, any blocksize of 140 or more is acceptable.
The following example shows a report against backup data set: USTPROD.RED60A.COPY11.G0001V00.

```bash
//BKPR  EXEC PGM=USTBKPR
//STEPLIB DD DISP=SHR,DSN=your.upstream.loadlib
//USTBKUP DD DSN=USTPROD.RED60A.COPY11.G0001V00,DISP=SHR
//USRPR  DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=* 
```

Here is an edited sample of a USTBKPR report.

```
INPUT DATASET: (TAPE) USTPROD.RED60A.COPY11.G0001V00                    NVOL=01 VOL1=ST0265 BLKSIZE=229375
FILE NAME                                        FILE-BYTES    REC-COUNT INFO DLOCATOR  VOLSER TTTR/RB#   OFFSET  FLGS TP 
-------------------------------------------------------------------------------------------------------------------------------- 
C-REC: 81 RED60A   110624 174329 FLGS='20812000' INCR RECSZ=32259 KB8='0000D30A KB12='0000D30A 
C-REC: 82 RED60A   110624 174329 FLGS='6D7FC300' INCL /*
C-REC: 82 RED60A   110624 174329 FLGS='6D7FC310' INCL /dev
C-REC: 82 RED60A   110624 174329 FLGS='6D7FC310' INCL /boot
C-REC: 82 RED60A   110624 174329 FLGS='6D7FC310' INCL /dev/shm 
/.autofsck                                                      60           1      F8C65AEB  ST0265 00000001  00000147 0000 84
/etc/resolv.conf                                               129           2      F8C65AEC  ST0265 00000001  0000024F 0000 84
/etc/mtab                                                      395           2      F8C65AED  ST0265 00000001  000003BC 0000 84
/etc/lvm/cache/.cache                                        3,952           2      F8C65AEE  ST0265 00000001  0000062C 0000 84
/home/efg/maketestdata                                       8,489           2      F8C65AF0  ST0265 00000001  00001796 0000 84
/home/efg/count                                                 8,335           2      F8C65AF1  ST0265 00000001  00003272 0000 84
/home/efg/makeit                                               2,132           2      F8C65AF2  ST0265 00000001  00003418 0000 84
/home/efg/basedata                                              62           1 DIR            ST0265 00000001  00004892 0000 84
/home/efg/basedata/10.66                                       205           2      F8C65AF4  ST0265 00000001  000049A4 0000 84
/home/efg/basedata/15.99                                       205           2      F8C65AF5  ST0265 00000001  00004B65 0000 84
==> IN THIS BACKUP VERSION THERE WERE:       2,292 FILES          2 DIRECTORIES       6,138 DATA RECORDS
18 DELETED FILES                  55,460,373 DATA BYTES 
===> IN THIS BACKUP DATASET THERE WERE:       2,292 FILES, AND         2 DIRECTORIES
--------------------------------------------- END OF REPORT --------------------------------------------
```
24 FDR/UPSTREAM DATA ENCRYPTION

24.1 OVERVIEW

FDR/UPSTREAM incorporates an additional-cost data encryption component that allows encryption of secondary copies of backup data sets intended for off-site transport and storage. These secondary copies are created using USTVAULT (Chapter 9 “Copying Backups with USTVAULT”). The original “copy-1” backup cannot be encrypted.

You can choose from among three different encryption algorithms, as described below in Section 24.2 “Encryption Algorithms”. Each algorithm is driven by an encryption key, which may be user-specified or randomly generated for each backup, allowing a unique encryption key for each. Random encryption key generation is the recommended method.

In order to restore the data from an encrypted copy of a backup, you must have the encryption key available that was used by USTVAULT to create the encrypted copy. Although you can record encryption keys manually, this is not recommended as it weakens the security of the encryption process. Instead, UPSTREAM stores the encryption keys in a special key file on disk. Whenever a restore from an encrypted backup is requested, the key file is automatically read by UPSTREAM to obtain the appropriate key. For off-site restores, such as a disaster recovery, this key file must be securely transported to the restore site. Alternatively, the keys can be manually supplied during the restore process.

UPSTREAM’s encryption component also supports an optional master key, which is used to create an encrypted copy of the actual key used to encrypt the data. This encrypted key is then saved with the encrypted copy of the backup. The master key can then be used to decrypt any encrypted copy of a backup, in the event the actual keys (or the key file) is not available.

**RECOMMENDATION:** INNOVATION strongly recommends using master keys.

For additional security, the vault control data set created by USTVAULT, which is written to the end of a USTVAULT-created tape, can also be encrypted. The vault control data set is only encrypted if at least one of the backups being copied by USTVAULT is also encrypted.

Section 24.6 “Enabling and Configuring Data Encryption” through Section 24.21 “FDR/UPSTREAM Data Encryption Recommendations” describe the steps required to enable and configure UPSTREAM encryption, including a final summary of recommendations.
FDR/UPSTREAM DATA ENCRYPTION
ENCRYPTION ALGORITHMS

24.2 ENCRYPTION ALGORITHMS

FDR/UPSTREAM’s data encryption component offers the following encryption algorithms, all of which are “symmetric”, meaning that the same key is used to encrypt and decrypt the data.

All of the encryption algorithms described below are implemented in software and do not depend on any installed encryption hardware or assist. However, UPSTREAM encryption can use the AES-128 hardware assist on IBM z9-109 processors (and their successors) and the TDES hardware assist on z890, z990, and z9-109 processors (and their successors), if enabled.

UPSTREAM encryption does not use IBM ICSF encryption software for any of the algorithms. This insures that your data can be decrypted at any disaster site with any processor type and any z/OS operating system.

When creating copies of your original “copy-1” backups with USTVAULT, you may choose to do no encryption or any one of the 3 algorithms described below. Your eventual choice of encryption method depends on the sensitivity of the data, balanced with the additional CPU required for each strength of encryption, as outlined in the “CPU Usage” and “Strength” summaries at the end of each sub-section below.

AES
AES stands for Advanced Encryption Standard, which was adopted by the National Institute of Standards and Technology (NIST, a division of the US Commerce Department) in 2002, after an international competition among proposed algorithms. AES is also known as “Rijndael” after its two inventors. The AES algorithm is described in US government publication FIPS 197, and is now the official US government standard for encryption, replacing the previous DES, which was officially de-certified for US government encryption in May 2005.

UPSTREAM’s encryption component supports three implementations of AES:

❖ AES-128 (128-bit key)
❖ AES-192 (192-bit key)
❖ AES-256 (256-bit key)

AES is an extremely secure, mathematically based, encryption algorithm. It performs repetitive transformations of the data (called “rounds”) using various applications of the key and other manipulations (including forms of substitution and transposition), to produce an encrypted version of the data that is almost impossible to decipher without the key. The algorithm is coded entirely within UPSTREAM encryption modules.

The number of rounds varies by the key length:

<table>
<thead>
<tr>
<th>Key Length (bits)</th>
<th>Rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>128</td>
<td>10</td>
</tr>
<tr>
<td>192</td>
<td>12</td>
</tr>
<tr>
<td>256</td>
<td>14</td>
</tr>
</tbody>
</table>

IBM introduced a hardware assist (CPACF) for AES-128 on the z9-109 processor (and its successors). If this assist is enabled on your processor, FDR/UPSTREAM uses it for encryption and decryption when ENCRYPTTYPE=AES is specified. The assist does not support AES-192 or AES-256, which are implemented only in UPSTREAM encryption.

The AES-128 results produced by UPSTREAM encryption and the IBM hardware assist are identical, so you can encrypt with the hardware assist and restore (and decrypt) on a system without the assist, and vice versa.
CPU Usage
The CPU overhead increases in proportion to the number of rounds. For example, AES-192 requires 20-25% more CPU than AES-128, and AES-256 requires 40-50% more CPU than AES-128. INNOVATION has made every effort to make the AES code as efficient as possible, and we believe that we are faster than most AES implementations. Utilization of the hardware assists described above also reduce CPU requirements and is recommended where available.

Strength
AES is a very strong form of encryption with no weak or semi-weak keys. Because of the increased CPU overhead of the longer keys, AES-128 should be used whenever AES encryption is needed, unless regulations require that you use AES-192 or AES-256 (such as for Secret or CA Top Secret requirements).

RECOMMENDATION: INNOVATION recommends that if you use a master key (see “Master Keys” in Section 24.5) with AES encryption, you should let UPSTREAM randomly generate the AES encryption key. The nature of AES provides that any key value is as secure as any other - changing just 1 bit in the key can produce an encrypted result that is significantly different. If, however, you decide to specify your own AES encryption keys, INNOVATION recommends that you avoid repetitive characters and strings that are easily recognizable.
24.3 CIPHER BLOCK CHAINING

All five of the encryption algorithms described above use a variation of “cipher block chaining”, a technique whereby the encryption of each section of data within an encrypted block uses the results of the encryption of the previous section as part of its encryption algorithm. This increases the strength of all the algorithms.

With cipher block chaining, an attacker must find the beginning of a cipher block chain before attempting a brute force attack on the encryption. This reduces the likelihood of recognizable plain text appearing when applying a key during such an attack.
24.4 COMPRESSION AND ENCRYPTION

Encryption defeats the hardware compression used on most tape drives, since the encrypted data is usually not compressible. This means that encrypted copies of FDR/UPSTREAM backups could occupy 2-3 times more tape than the original unencrypted backup, as compression of encrypted data may actually increase the backup size.

However, if the data is compressed by UPSTREAM during the initial backup process (i.e. when the original “copy-1” backup is created), this reduces the amount of backup data and saves tape, not only on the original backup, but also on any resultant encrypted copy of that backup. Compression also reduces the amount of data that must be encrypted, therefore reducing CPU usage. It also increases the variety of byte values in the data, which enhances the strength of the encryption.

During the initial backup process, it is important to choose the highest level of data compression; keeping in mind that compression adds its own CPU overhead on the client-side of the backup process.

UPSTREAM automatically turns off tape hardware compression for an encrypted copy of a backup.
24.5 **FDR/UPSTREAM Encryption Key Management**

The foundation of secure encryption is the security of the encryption keys used. Since the FDR/UPSTREAM encryption algorithms described above are all symmetric (the same key is used for both encryption and decryption), it is essential that the keys be kept secure so that if an unauthorized person accesses your encrypted files, they do not also have access to the keys required to decrypt them. UPSTREAM uses a variety of methods to ensure key security, as described in the following sub-sections:

- "Key Generation"
- "Key Validation"
- "The UPSTREAM Encryption Key File"
- "Master Keys"
- "Disaster Recovery Considerations"

**Key Generation**

Although you can specify the key to be used for each USTVAULT operation on a particular backup profile name, UPSTREAM's encryption component contains code to randomly generate encryption keys for you. This code is driven by the system hardware TOD clock and other system variables, using an INNOVATION-written algorithm that provides truly random keys.

UPSTREAM does not use "pseudo" random number generators, as the "seed" used to start the sequence (often only 4 bytes) does not provide sufficient unique combinations for our needs, especially for AES keys. For example, a 4-byte seed can only generate 4.2 billion sequences, where a 16-byte generated key can have $2^{16} \times (3.4 \times 10^{38})$ values.

When random keys are requested, a different key is generated for each encrypted copy of a backup, making it much more difficult for an unauthorized person to access your data. Even if the key of one file is determined by some sort of attack, the attack must be repeated for the next file, and the next, etc. For this reason, INNOVATION highly recommends that you allow UPSTREAM to generate random encryption keys for you.

**Key Validation**

For validation purposes, UPSTREAM stores a value derived from the actual key used to encrypt a backup (similar to a checksum), in the copy of the backup itself. This value is encrypted using the actual key as an AES key.

At the beginning of a USTREGEN on an encrypted copy of a backup, or during a restore from an encrypted copy of a backup, UPSTREAM decrypts this value using the decryption key and it fails the process if the decrypted value is not as expected. Although this test is not infallible, it usually detects an USTREGEN or restore request with an improper key. The actual decryption key cannot itself be derived from this value.
Since many different encryption keys may be used for various encrypted copies of your backups, it is not practical (nor secure) to require you to constantly enter the key in order to read an encrypted backup. UPSTREAM solves this by storing all the encryption keys used by USTVAULT in a special disk-based key file.

Whenever an encrypted copy of a backup is created by USTVAULT, the encryption key used is recorded in the key file. The data is not stored in the clear, so a simple browse or print of the key file does not disclose any encryption keys.

When an encrypted copy of a backup is processed by USTREGEN, or when it is used for a restore, the key file is automatically read by UPSTREAM to get the encryption key required to decrypt the file. If you provide the actual key (or the master key - see below) on a DECRYPT statement, the key file is opened but not read.

To maintain security of your encryption, the key file must be protected by a data set profile in your security system, as described in Section 4.9. Only those userids that have a need to create, back up, or restore the key file should be given authority to access it. READ authority is required to back up the key file, UPDATE is required to restore it, and ALTER is required to create it. All other users should have no authority to the key file.

Under IBM RACF, UPSTREAM itself is able to read and write to the key file, and does not require security access to it. Any UPSTREAM user who can create or restore from an encrypted copy of a backup can use the key file, but only under UPSTREAM. They cannot, for example, browse, update, or copy the key file externally.

Under other security systems, UPSTREAM users may need to be given UPDATE authority to the key file for encryption and READ authority for decryption.

The key file is created and maintained by the USTCRYFM utility (see Section 24.12 “Creating the FDR/UPSTREAM Encryption Key File (USTCRYFM)”)

The z/OS data set name of the key file may be specified in one of two places:

- Via the KEYFILE keyword in the USTCRYPT DD statement input data set - see Section 24.7 “Add an USTCRYPT DD Statement to the Startup PROC”
- In the USTOPT option table module - see Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”

The second option is recommended, unless you are running multiple instances of UPSTREAM and you wish to have separate key files for each one.

See “Disaster Recovery Considerations” in Section 24.5 for notes on handling the key file in a disaster recovery.
In addition to the encryption keys described in “Key Generation” in Section 24.5, UPSTREAM encryption also supports one or more optional “master” keys, which can be used to create an encrypted copy of the actual encryption key used to encrypt the data. This AES128-encrypted key is then saved on the USTVAULT-encrypted output, together with the encrypted copy of the backup.

During a USTREGEN operation on an encrypted backup, or during a restore from an encrypted backup, the master key can be provided, and is used to decrypt the actual key stored in the file, which itself is then used to decrypt the backup.

So, in the event that the actual key (or the key file itself) is not available during the USTREGEN or RESTORE operation, the master key can be used to allow the data to still be decrypted.

The UPSTREAM master key facility is enabled via the MASTERKEYID= keyname keyword, which can be specified via either:

❖ The USTCRYPT DD statement in the UPSTREAM startup PROC (Section 24.7 “Add an USTCRYPT DD Statement to the Startup PROC”)
❖ The FDR/UPSTREAM USTOPT options table (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”).

The actual master key itself (or keys - you can use more than one) may be specified in one of two places:

❖ By the MASTERKEY keyword on an ENCRYPT statement in the USTCRYPT DD statement in the UPSTREAM startup PROC (“ENCRYPT Statement” in Section 24.8).
❖ Within a special FACILITY class (or equivalent) profile in your security system, which is then pointed to by the MASTERKEYID keyword on an ENCRYPT statement in the USTCRYPT DD statement in the UPSTREAM startup PROC (“ENCRYPT Statement” in Section 24.8).

Of the two options above, INNOVATION highly recommends the second, so that only individuals authorized through your security system can view or update the master key. As the master key is “the key to the kingdom” it is essential that:

❖ It be kept extremely secure, and known only to a few trusted individuals.
❖ Easily remembered keys should be avoided, as should repetitive strings and duplicated characters. This is also true for other user-specified encryption keys.
❖ Access to the master keys, either in printed form or from the security system FACILITY profile, should be limited to a small number of trusted individuals.
❖ Any printed copies of master keys should be stored securely, such as in a bank safe-deposit box.

To enhance security, you may wish to periodically change master keys; perhaps once a month or once a quarter. However, if you change your master key, remember that encrypted copies of backups that were created before the change in master key require the previous master key if you plan to restore via master key. If you periodically change master keys, the dates of those changes and the actual master keys used should be retained in a secure location.

An encrypted copy of a backup can be read only if its actual key, or its master key (if used), is known. If the actual key (or key file) are unavailable, and if no master key is used (or is also unavailable or lost), then there is no way to restore an encrypted backup.
You need to pay special attention to the handling of the UPSTREAM encryption key file during a disaster recovery (test or real). In order to recover from encrypted copies of your backups at a DR site:

❖ You must first transport a current copy of the key file to the recovery site:
  • If this backup is on tape, you should transport it to the recovery site separately from the backups themselves. If the backup of the key file is on disk, you may be able to transmit it to the recovery site with e-mail or FTP. Once at the recovery site, you need to restore the backup of the key file, using its own unique key, before you can restore any other backups recorded in it.
  • Alternatively, if you have a mechanism for securely transporting the key file directly to the recovery site, such as encrypted FTP, you can use this mechanism, but make sure that the FTP encryption is a strong algorithm, such as AES128 or above.

❖ Remember that if you restore the volume containing the key file as part of your recovery, this may restore a back-level version of that file, so you need to restore the key file backup again after restoring that volume to bring it up-to-date.

❖ Once you have the key file restored, you can run USTREGEN (see Chapter 12 “Updating the Repository”) against your encrypted copies of your backups, before subsequently restoring them in the normal way, using the appropriate encryption keys extracted from the restored key file.

❖ If the key file is not available, or cannot be restored for any reason (or is not up to date), you can use the optional master keys to restore the backups, but only if master keys were specified during the backup process.

❖ If used, master keys should be stored in a secure location (such as a safe-deposit box) that can be accessed only if the key file is not available.

RECOMMENDATION: INNOVATION strongly recommends using master keys on your backups. However, it is not recommended that you routinely use master keys for off-site restores, as this may increase the exposure of the master key to unauthorized individuals. Use the master keys only if the key file cannot be used.

When you leave the disaster site, you want to be sure that all information related to your encrypted backups has been securely deleted. If you leave behind copies of your key file or your security system database containing master keys, subsequent users of the same disks may be able to access your keys, putting your backups at risk. Using z/OS commands or programs to delete the UPSTREAM key file and related security data may not fully delete the data. An ICKDSF minimal INIT, for example, does not erase any data at all, and an ICKDSF medial INIT is very slow. As an alternative, the FORMAT command of the FDRCRYFM utility (Section 24.12 “Creating the FDR/UPSTREAM Encryption Key File (USTCRYFM)”) can be used to overwrite an UPSTREAM key file existing key file and then delete it.

```
//FORMAT   EXEC PGM=USTCRYFM
//* WARNING: THIS JOB ERASES ALL SAVED ENCRYPTION
//* KEYS IN THIS KEY FILE
//STEPLIB  DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=*  
//ENCRYPT  DD DSN=upstream.keyfile,DISP=(OLD,DELETE)
//SYSSIN   DD *
  FORMAT  RECS=1,ENABLE=ERASE  
/*
```

If you restored a copy of the key file to a disk volume belonging to the DR site’s starter system, you should also remember to erase that copy of the key file as well. You may want to do that while still running under the starter system, i.e. before IPLing your own system. On a wider scale, you should consider using a product such as INNOVATION DATA PROCESSING's FDRERASE to quickly and securely erase all of the z/OS disks that were used at the disaster site.
Numerous steps are required in order to enable and configure FDR/UPSTREAM data encryption. Those steps are summarized here, and are then described in more detail in the indicated sections that follow:

- Section 24.7 “Add an USTCRYPT DD Statement to the Startup PROC”
- Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”
- Section 24.10 “Configure the Backup Profiles”
- Section 24.11 “Configure the USTVAULT Profiles”
- Section 24.12 “Creating the FDR/UPSTREAM Encryption Key File (USTCRYFM)”
- Specify any master key(s) that you wish to use
- Section 24.21 “FDR/UPSTREAM Data Encryption Recommendations”

**NOTE:** The order of the above steps is not important, but all of them should be reviewed and implemented before you can begin to fully use the UPSTREAM encryption facility.
FDR/UPSTREAM Data Encryption

Add an USTCRYPT DD Statement to the Startup PROC

24.7 Add an USTCRYPT DD Statement to the Startup PROC

As described in Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”, FDR/UPSTREAM’s z/OS startup PROC contains various DD statements that control the operation of UPSTREAM. If you are licensed for UPSTREAM’s data encryption feature, you enable this option by adding an USTCRYPT DD statement to the startup PROC.

**Note:**
The data set pointed to by the USTCRYPT DD Statement must be allocated as RECFM=FB, LRECL=80 and a BLKSIZE as a multiple of LRECL.

Having added the USTCRYPT DD statement to the startup PROC, you see the following message in the USTLOG when UPSTREAM starts:

```
UST338 ENCRYPTION INITIALIZATION SUCCESSFUL
```

Here is an example of an UPSTREAM startup PROC with a USTCRYPT DD.

```
//UPSTREAM
//PROC OUT=X
//MAIN EXEC PGM=USTMAIN,DYNAMNBR=100,REGION=0M,TIME=1440
//STEPLIB DD DSN=upstream.loadlib,DISP=SHR
//USTLOG DD SYSOUT=&OUT
//USTLOG2 DD SYSOUT=&OUT
//USTCRYPT DD DSN=upstream.ustcrypt.file(member),DISP=SHR
/*
```

**Note:**
The above example is for illustrative purposes only. INNOVATION strongly recommends that:

- You specify the UPSTREAM key file name via USTOPT (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”), so that the key file name is hidden from view.
- You specify the encryption algorithm(s) to be used by USTVAULT via the profiles of the backups you wish to copy and encrypt (Section 5.3 “Backup Profiles”).
- You let UPSTREAM automatically generate the encryption keys for you.
- You store your master key(s) in your security system (Section 4.9 “FDR/UPSTREAM Data Encryption”).

If the above recommendations are followed, the USTCRYPT DD statement may point at an empty data set or member.
24.8 USTCRYPT DD CONTROL STATEMENTS

The sequential file or PDS member named on the USTCRYPT DD statement can contain several statements that control certain aspects of the FDR/UPSTREAM encryption feature. A brief summary of the statements is shown below, which is then followed (in the indicated sub-sections) by the full details of those statements, together with their respective operands.

**KEYFILE** – ("KEYFILE Statement") The KEYFILE statement specifies the data set name (and optionally the volume serial) of the UPSTREAM key file. This statement should always be the first statement in the USTCRYPT DD statement input.

**ENCRYPT** – ("ENCRYPT Statement") One or more ENCRYPT statements can be specified in the USTCRYPT DD statement input, and it can be used for several purposes:

- With the PROFILE= operand, it can control the encryption algorithm (and optionally the encryption key) to be employed by USTVAULT when it is copying the backups belonging to a specified backup profile or profiles.
- With the MASTERKEY= operand, it can supply a master key to be used by USTVAULT when encrypting copies of backups.
- With the MASTERKEYID= operand, it can specify the suffix of a FACILITY class profile in your security system from which the master key is obtained.

**DECRYPT** – ("DECRYPT Statement") DECRYPT statements are optionally used to supply encryption keys when running a USTREGEN against an encrypted copy of a backup, or when running an actual restore from an encrypted copy of a backup.

**NOTE:** A DECRYPT statement would not normally be used if the UPSTREAM key file is available, as the keys are usually obtained automatically from there.

**KEYFILE STATEMENT**

The KEYFILE statement, if present, must be the first statement in the USTCRYPT DD statement input, and specifies the data set name (and optionally the volume serial) of the UPSTREAM key file.

To ensure the most secure encryption possible, INNOVATION recommends that you specify the name of the UPSTREAM key file via USTOPT (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”) so that the key file name is hidden from general view.

**KEYFILE STATEMENT SYNTAX**

<table>
<thead>
<tr>
<th>DSN=</th>
<th>keyfiledsnname</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOL=</td>
<td>volser</td>
</tr>
</tbody>
</table>

**KEYFILE STATEMENT OPERANDS**

**DSN=**

The fully qualified data set name of the UPSTREAM key file that is used by USTVAULT, USTREGEN, and by UPSTREAM itself on restores from encrypted copies of backups.

Default: None; this statement is required.

**VOL=**

The volume serial of the key file named by the DSN= operand, if it is not cataloged.

Default: The volser is obtained from the system catalog.
An ENCRYPT statement (with PROFILE=) can be used to control the encryption algorithm (and optionally the encryption key) that is to be employed by USTVAULT when it is copying the backups belonging to a specified backup profile or profiles.

If the PROFILE= operand is omitted, the encryption level to be used, if any, is taken from the backup profile definition (Section 5.3), which is the recommended way of specifying the encryption algorithm to be used.

A separate ENCRYPT statement (with MASTERKEY=) can be used to directly supply the master key(s) to be used by USTVAULT. INNOVATION recommends, however, that you use the separate MASTERKEYID= operand to specify the suffix of a FACILITY class profile in your security system, from which the master key(s) is/are obtained (Section 4.9 "FDR/UPSTREAM Data Encryption").

You can have two ENCRYPT statements that apply to the same profile name or prefix; one with a master key specification, and the second with the other encryption operands. For example:

```
ENCRYPT MASTERKEY=6242A2902565FFC58140E2DD02990034
ENCRYPT PROFILE=SERVER1, ENCRYPTTYPE=AES128
ENCRYPT PROFILE=SERVER2, ENCRYPTTYPE=AES256
```

In the above example, the ENCRYPT MASTERKEY= statement is providing the master key value to be used for all USTVAULT encryption. The other two statements are scanned in order, so AES128 encryption is to be used for USTVAULT runs against the backups belonging to profile SERVER1, while AES256 encryption is used when creating encrypted copies of SERVER2's backups.

### ENCRYPT Statement Syntax

<table>
<thead>
<tr>
<th>ENCRYPT</th>
<th>PROFILE=profilenam</th>
<th>AESKEY=aeskey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MASTERKEY=masterkey</td>
<td>PRINTKEY=NO</td>
</tr>
<tr>
<td></td>
<td>MASTERKEYID=suffix</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>ENCRYPTTYPE=AES128</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AES128</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AES128</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AES256</td>
<td></td>
</tr>
</tbody>
</table>

The keywords PROFILE, MASTERKEY and MASTERKEYID are mutually exclusive - only one of these three keywords may be specified on a single ENCRYPT statement.

**PROFILE=**

Specifies the backup profile name that was used to create the initial "copy1" backup that is copied and encrypted by USTVAULT. You can specify a single profile name or a profile prefix value followed by an asterisk, e.g., SERV*.

Default: PROFILE=*, which causes the ENCRYPT statement to apply to all USTVAULT operations against all backup profiles.

**MASTERKEY=**

 Specifies the 16-byte (128-bit) AES master key to be used, in hex (exactly 32 hex digits, 0-9, A-F). A value of all zeros is invalid.

See "Master Keys" in Section 24.5 for a full discussion on the use of FDR/UPSTREAM master keys.

**NOTE**: If neither MASTERKEY= nor MASTERKEYID= are specified, then no master key is used when USTVAULT encrypts copies of your backups. If the actual key used for the encryption (or the key file) is not available, there is no way to restore from these encrypted copies of your backups.
FDR/UPSTREAM Data Encryption
UstCRYPT DD Control Statements

**MASTERKEYID=**

Specifies the suffix of a security system FACILITY class profile, from which the master key is obtained (Section 4.9 “FDR/UPSTREAM Data Encryption”).

The value of MASTERKEYID= is 1 to 8 alphanumeric characters, and it is appended to “UstCRYPT.” to form the profile name.

For example, MASTERKEYID=ABC looks for profile USTCRYPT.ABC in class FACILITY in your security system. The master key is obtained from the “application data” field of that profile.

**NOTE:** If neither MASTERKEYID= nor MASTERKEY= are specified, then no master key is used when USTVAULT encrypts copies of your backups. If the actual key used for the encryption (or the key file) is not available, there is no way to restore from these encrypted copies of your backups.

**ENCRYPTTYPE=**

Specifies the encryption algorithm to be used by USTVAULT; see Section 24.2 “Encryption Algorithms” for a full description of the various encryption algorithms supported by UPSTREAM.

If ENCRYPTTYPE is not specified here, UPSTREAM defaults to the value specified on the ENCRYPTV option in the backup profile definition (Section 5.3 “Backup Profiles”), which is the INNOVATION recommended way of specifying the encryption algorithm.

If the encryption value is specified in both places, the value in the backup profile definition is used.

**AESKEY=**

**AK=**

If any of the AES algorithms have been coded on the ENCRYPTTYPE parameter (or in the backup profile), AESKEY specifies the AES key to be used for the encryption.

The US government specifications for AES state that there are no weak keys in AES, but INNOVATION recommends that you avoid repetitive strings or many duplicate characters.

Specify the key as hex digits (0-9, A-F).

- For AES128 - provide exactly 32 hex digits (128 bits)
- For AES192 - provide exactly 48 hex digits (192 bits)
- For AES256 - provide exactly 64 hex digits (256 bits)

The key must be specified on a single statement and cannot extend past column 71. If necessary, use the short operand form (AK=) and the short statement form of ENCRYPT (EC).

If AESKEY is omitted, or if a key of all zeros is specified, a key is randomly generated by UPSTREAM. For the strongest possible encryption, INNOVATION strongly recommends that you omit AESKEY= and let UPSTREAM generate the AES key for you.

**PRINTKEY=**

Controls whether the AES key used for each backup profile name is displayed in the UPSTREAM USTLOG listing.

**YES** – Keys are displayed, allowing the printed listing to serve as a backup for the key file.

**NO** – Keys are not displayed in the log.

Default: NO.

**NOTE:** Master keys are never displayed in the UPSTREAM log.
DECRYPT statements can be optionally used to supply the decryption key when running a USTREGEN against an encrypted copy of a backup, or when running an actual restore from an encrypted copy of a backup. Note, however, DECRYPT statements are not normally required if the UPSTREAM key file is available, as the decryption keys are usually obtained automatically from there.

On each DECRYPT statement, the PROFILE= operand specifies the backup profile name affected by this statement. For example:

```
DECRYPT PROFILE=SERVER6, AESKEY=89AB20C1E2973167058432A04BF938D2
DECRYPT PROFILE=SERVER7, AESKEY=258911ABFE44C291B802FF0089EF1191
```

In the above example, the AESKEY value is used for decrypting encrypted copies of backups taken under the profile name of SERVER6, while the specified AES encryption key is used to decrypt copies of backups taken under the profile name of SERVER7.

UPSTREAM automatically determines the actual encryption type used for each encrypted copy of a backup that is processed. If you opt for providing decryption keys using DECRYPT statements, you must specify the proper type of AESKEY to match the encryption type that was used to encrypt the copy of the backup.

There is no equivalent to the PRINTKEY= operand (on the ENCRYPT statement). All keys coded on DECRYPT statements are obscured before appearing in the UPSTREAM USTLOG listing.

A separate DECRYPT statement can be coded with the MASTERKEY= operand, in which case that master key is used instead of any decryption keys specified for individual profile names on other DECRYPT statements. In other words, the master key is always used if specified, ignoring all other keys. INNOVATION recommends, however, that you only specify the master key on a DECRYPT statement if the UPSTREAM key file is not available or has been back-dated.

### DECRYPT Statement Syntax

| DECRYPT DC | PROFILE=profilenname ,AESKEY=aeskey ,MASTERKEY=masterkey |

**PROFILE=**

Specifies the backup profile name that was used to create the initial “copy1” backup. You can specify a single profile name or a profile prefix value followed by an asterisk, e.g., SERV*.

Default: PROFILE=*, which causes the DECRYPT statement to apply to all decryption operations against all backup profiles.

**MASTERKEY=**

Specifies the 16-byte (128-bit) AES master key to be used, in hex (exactly 32 hex digits, 0-9, A-F). This can only be used if a master key was used during the encryption of the backup now being restored or REGENd. See “Master Keys” in Section 24.5 for a full discussion on the use of FDR/UPSTREAM master keys.
AESKEY=

AK=

Specifies the AES key as hex digits (0-9, A-F) to be used for decryption, if the backup data set now being decrypted was encrypted with any of the AES encryption types.

- For AES128 - provide exactly 32 hex digits (128 bits)
- For AES192 - provide exactly 48 hex digits (192 bits)
- For AES256 - provide exactly 64 hex digits (256 bits)

The key must be specified on a single statement and cannot extend past column 71. If necessary, use the short operand form (AK=) and the short statement form of DECRYPT (DC).

There is no need to specify AESKEY if the UPSTREAM key file is available. AESKEY is ignored if MASTERKEY= is specified.

Additional Notes

Please note the following points if you decide to use DECRYPT statements in your USTCRYPT DD:

- Only one of the 3 “key” parameters can be specified on a single DECRYPT statement.
- If a DECRYPT statement with MASTERKEY= matches the profile of the encrypted backup being processed, that master key is used to recover the actual key (which is encrypted on the backup itself) and any other key operands are ignored. The backup must have been encrypted with the specified master key.
- If no DECRYPT statement can be found to match the profile of the encrypted backup being processed, the key is read from the UPSTREAM key file (if available).
FDR/UPSTREAM DATA ENCRYPTION
SETTING THE FDR/UPSTREAM ENCRYPTION OPTIONS

24.9 SETTING THE FDR/UPSTREAM ENCRYPTION OPTIONS

FDR/UPSTREAM uses an internal table called USTOPT to contain many operating options for the product. The main controls for UPSTREAM would have been set in this table when you did the initial installation of the product (Section 3.15, Step 14). Other FDR/UPSTREAM facilities, such as Registered Names (Chapter 20 “Registered Name Service”) and the USTSCHED Scheduler (Chapter 19 “FDR/UPSTREAM Scheduler”) also have control options that are recorded in the options table.

The UPSTREAM data encryption feature has two control options which can be recorded in the table:

- **KEYFILE** – The name of the key file.
- **MASTERKEYID** – The master key RACF resource name suffix.

There are two ways that these options can be set, as described in the subsections below:

- Through the UPSTREAM TSO/ISPF dialog (see “Using the TSO/ISPF Dialog” in Section 24.9)
- Using the USTZAPOP batch facility (see “Using USTZAPOP” in Section 24.9)

The KEYFILE and MASTERKEYID controls can also be set in the USTCRYPT DD (Section 24.8 “USTCRYPT DD Control Statements”). However, to ensure optimum security on your encryption, and to keep these options well hidden from general view, INNOVATION recommends that you set them through one of the two methods described below. Use the USTCRYPT DD statement only if you are running multiple instances of UPSTREAM in the same z/OS system and you wish to use a separate key file and/or MASTERKEYID value for each one.

The UPSTREAM encryption options can be maintained through the UPSTREAM TSO/ISPF dialog. Select option 12 (“USTCRYPT”) and press ENTER.

**Figure 24-1: FDR/UPSTREAM TSO/ISPF Dialog**

<table>
<thead>
<tr>
<th>COMMAND ===</th>
<th>FDR/UPSTREAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 USTBATCH</td>
<td>- Host Initiated Services</td>
</tr>
<tr>
<td>2 STATUS</td>
<td>- Current Status Information</td>
</tr>
<tr>
<td>3 DEFINE</td>
<td>- Define Control Files</td>
</tr>
<tr>
<td>4 CONFIGURE</td>
<td>- Main Options</td>
</tr>
<tr>
<td>5 PROFILE</td>
<td>- Workstation Profile Names</td>
</tr>
<tr>
<td>6 OPER</td>
<td>- Operator Commands</td>
</tr>
<tr>
<td>7 REPORT</td>
<td>- Report</td>
</tr>
<tr>
<td>8 REGISTRY</td>
<td>- Name Registry</td>
</tr>
<tr>
<td>9 DUAUDIT</td>
<td>- Duplicate File Audit</td>
</tr>
<tr>
<td>10 SCHEDULE</td>
<td>- Command Scheduler</td>
</tr>
<tr>
<td>11 MANAGEMENT</td>
<td>- Backup Management</td>
</tr>
<tr>
<td>12 USTCRYPT</td>
<td>- USTCRYPT Options</td>
</tr>
</tbody>
</table>

After supplying the name of the UPSTREAM load library where your options table is stored, you see the following screen, where you can set the two UPSTREAM encryption options. Enter SAVE to save the values and store the updated table. You must then use the following z/OS MODIFY command (“z/OS MODIFY” in Section 17.3) to cause the UPSTREAM started task to reload the USTCRYPT options:

```
F procname,CRYPT=REFRESH
```
As an alternative to setting the UPSTREAM encryption options via the TSO/ISPF dialog, you can use the USTZAPOP batch utility. Here is an example:

//ZAPKEYID EXEC PGM=USTZAPOP
//STELIB DD DISP=SHR,DSN=upstream.loadlib
//SYSLIB DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=*  
//SYSin DD *
ZAP KEYFILE=key.file.dsname
ZAP MASTERKEYID=qualifier
/*

The UPSTREAM Installation Control Library (ICL), which would have been created during the main installation of the product (Chapter 3 “Installation and Configuration”) contains a sample member CRYZAPKF, which has an example of running USTZAPOP to set the name of the key file.
24.10 CONFIGURE THE BACKUP PROFILES

The main controlling mechanism for an FDR/UPSTREAM backup is the backup profile, in which you set various options such as the retention of the backup, the media to be used for the backup, and whether or not it is eligible for merge backup processing. See Section 5.3 “Backup Profiles” for a full description on how to create and maintain your UPSTREAM backup profiles.

To enable encryption for a profile, the ENCRYPTV option must be set in each backup profile for which encryption is used in that Vault copy process.

The menu below displays an edited view of the configuration of a backup profile called TEST, in which the “Other Options” section is being displayed. You’ll find this section at the very bottom of a backup profile configuration.

As you can see, we have enabled USTVAULT encryption for this backup profile, and we have requested AES128 encryption be used. You may chose from any of the algorithms supported. See Section 24.2 “Encryption Algorithms” for a full list and description of the encryption types supported by UPSTREAM.

Specifying the encryption level here in the backup profile (which is highly recommended) overrides any ENCRYPT statements that refer to this profile in the USTCRYPT DD statement input in the UPSTREAM startup PROC (Section 24.7 “Add an USTCRYPT DD Statement to the Startup PROC”).

Notice also that this backup profile is enabled for USTVAULT processing (via the VAULT option), which is a prerequisite for UPSTREAM USTVAULT encryption. See Chapter 9 “Copying Backups with USTVAULT” for full details on configuring USTVAULT processing.

--- FDR/UPSTREAM - Configure Profile ---

Once you have set the ENCRYPTV option, type “SAVE” on the command line and press the ENTER key.

Before an updated backup profile can be used, the configuration must be reloaded by the UPSTREAM started task, using the “REFRESH” command. See Section 17.7 “Controlling Multiple FDR/UPSTREAM Started Tasks” for more details.
24.11 **Configure the USTVAULT Profiles**

USTVAULT is the FDR/UPSTREAM utility for creating additional copies of your original "copy 1" backups. The main controlling mechanism for USTVAULT processing is one or more USTVLTTxx profiles, in which you set various options such as the name of the copied backup, the retention of the copy, and the media to be used to hold the copied backup. See "USTVLTTxx Profile Parameters" in Section 5.4 for a full description on how to create and maintain your USTVLTTxx profiles.

If you are licensed for the UPSTREAM encryption option, and if you want to use encryption when copying some/all of your backups with USTVAULT, you have set the ENCRYPTV option in each backup profile for which encryption is used in that copy process, as described in Section 24.10 "Configure the Backup Profiles".

For additional strength of encryption, you may also want to consider encrypting the USTVAULT control data set, which is written as the last file on a USTVAULT-created tape. As shown below, the ENCRYPTV option in a USTVLTTxx profile causes the vault control file data set to be encrypted just prior to the point that it is moved to the output tape. This only occurs if you are licensed for UPSTREAM encryption, and if one or more of the backups vaulted by USTVAULT has been encrypted. If no encrypted backups are on this vault copy, the ENCRYPTV option is ignored and the vault control data set is not encrypted.

The menu below displays an edited view of the configuration of a USTVLTT profile called USTVLTT01, in which the "Other Options" section is being displayed. You find this section at the very bottom of an USTVLTTxx profile configuration. As you can see, we have requested that AES128 encryption be used to encrypt the USTVAULT control data set. You may chose from any of the five algorithms supported by UPSTREAM. See Section 24.2 "Encryption Algorithms" for a full list and description of encryption types.

**Figure 24-4: FDR/UPSTREAM - Configure Profile**

Once you have set the ENCRYPTV option, type “SAVE” on the command line and press the ENTER key.

Before a new USTVLTTxx profile can be used the configuration must be reloaded by the UPSTREAM started task, using the “REFRESH” command. See Section 17.7 “Controlling Multiple FDR/UPSTREAM Started Tasks” for more details.
24.12 CREATING THE FDR/UPSTREAM ENCRYPTION KEY FILE (USTCRYFM)

Before you read this section, please review the following sections:

❖ Section 24.5 “FDR/UPSTREAM Encryption Key Management”, which describes the role of UPSTREAM's encryption key file and the process of generating and maintaining UPSTREAM encryption keys.

❖ Section 4.9 “FDR/UPSTREAM Data Encryption”, which contains information on the security requirements for the UPSTREAM key file.

In this section, we look at the USTCRYFM utility, which can be used for a number of management tasks on the UPSTREAM encryption key file. A summary of the commands is shown below, with full details in the sub-sections shown.

FORMAT – (Section 24.13 “FORMAT Statement”) Pre-formats an UPSTREAM encryption key file.

DUMP – (Section 24.14 “DUMP Statement”) Creates a formatted backup copy of the UPSTREAM encryption key file. The backup can only be restored by the RESTORE command.

RESTORE – (Section 24.15 “RESTORE Statement”). Creates a new key file from the contents of a backup previously created by the DUMP function.

DELETE and RESET – (Section 24.16 “DELETE and RESET Statements”). DELETE can be used to mark for deletion one or more records in the UPSTREAM encryption key file. The deletion does not actually take place until the REORG function is run. The RESET function can be used to remove a deletion flag from a record, which has been previously set by the DELETE function.

REORG – (Section 24.17 “REORG Statement”). Takes a backup of the key file (similar to the DUMP function) and then re-loads the key file (similar to RESTORE), dropping any records marked for deletion by the DELETE function.

REPORT – (Section 24.18 “REPORT Statement”). Reports details of the encrypted copies of backups that have been created by USTVAULT and are recorded in the key file. The actual encryption keys themselves are not printed unless the user running the REPORT function has been granted UPDATE authority to the key file.

Section 24.19 “USTCRYFM JCL Parameters” describes the JCL statements required to run USTCRYFM, and Section 24.20 “USTCRYFM JCL Examples” contains several illustrative examples of running USTCRYFM.
FDR/UPSTREAM DATA ENCRYPTION

24.13 FORMAT STATEMENT

The FORMAT statement pre-formats the FDR/UPSTREAM encryption key file. A FORMAT must be run against the key file before it can start to record the encrypted copies of your backups created by USTVAULT.

FORMAT STATEMENT SYNTAX

<table>
<thead>
<tr>
<th>FORMAT</th>
<th>B=n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>,ENABLE=(DYNALLOC, ERASE, RESERVE), RECS=nnnnnnn</td>
</tr>
</tbody>
</table>

FORMAT STATEMENT OPERANDS

B=  

\( n \) – Specifies the number of blocks to be placed on each track, from 2 through 5. USTCRYFM automatically calculates the best blocksize for this device type. Default: 2 (half-track blocking).

RECS=  

\( nnnnnnn \) – Specifies the minimum number of backup entries that are formatted on the key file. The highest value that can be specified varies with the disk device type, the blocking factor, and the size of the file. With the default blocking factor \( B=2 \), the file can contain a maximum of 131070 blocks, which requires 65535 tracks. If the file is on a 3390 disk, this is a maximum of RECS=22806180. Sufficient space must be allocated to the file to contain the required number of entries, otherwise FORMAT fails.

If SPACE= does not include the RLSE operand (or SPACE= is omitted for an existing file), then USTCRYFM formats all tracks of the initial allocation. If this is insufficient to hold the required number of records and a secondary allocation quantity was specified in SPACE=, USTCRYFM takes secondary allocations until the space is sufficient, and formats all of the secondary tracks.

So, in summary, FORMAT formats all tracks allocated to the key file, with a guaranteed minimum capacity specified by RECS=.

ENABLE=  

Controls the options that are enabled for this FORMAT operation. Multiple options are allowed and must be enclosed in parentheses and separated by commas.

DYNALLOC – If the ENCRYPT DD statement is omitted, dynamically allocates the key file specified in the UPSTREAM configuration (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”).

ERASE – Allows an existing, formatted key file to be reformatted. This removes all encryption keys previously recorded in that file. This is usually only appropriate when erasing a key file following a disaster recovery test. By default, FORMAT can only be run against a newly allocated control file.

RESERVE – Protects the formatting with a RESERVE against the volume where the key file resides.
24.14 DUMP STATEMENT

The DUMP statement causes a formatted backup copy of the key file to be created. This backup can only be restored by the RESTORE statement of USTCRYFM.

The backup created by DUMP is not encrypted, but data in the key file is not stored in the clear, so encryption keys cannot be extracted by browsing the backup.

The USTCRYFM JCL must include a TAPE1 DD statement to specify the backup data set.

A combination of the DUMP and RESTORE statements can be used to move the key file from one device to another (even across unlike devices like 3380 to 3390). They can also be used to change the size and/or blocking factor of the key file.

The FDRCOPY and FDRDSF members of INNOVATION DATA PROCESSING’s FDR DASD Management System can also be used to move the key file from one disk to another, but they do not expand or re-block the key file.

**DUMP STATEMENT SYNTAX**

<table>
<thead>
<tr>
<th>DUMP DEVICE=</th>
<th>DISK</th>
<th>TAPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISABLE=</td>
<td>DYNALLOC, RESERVE</td>
<td>DYNALLOC, RESERVE</td>
</tr>
<tr>
<td>ENABLE=</td>
<td>DYNALLOC, RESERVE</td>
<td>DYNALLOC, RESERVE</td>
</tr>
</tbody>
</table>

**DUMPDEVICE=**

- Specifies the device type that is to be used as a DUMP medium.
- **DISK** – Allows the backup data set to be placed on either disk or tape devices.
- **TAPE** – Restricts the backup data set to tape devices only.

**DISABLE=**

The options specified are disabled or enabled for this DUMP operation. Multiple options are allowed and must be enclosed in parentheses and separated by commas.

- **DYNALLOC** – If the ENCRYPT DD statement is omitted, dynamically allocates the key file specified in the UPSTREAM configuration (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”)
- **RESERVE** – Protects the key file with a RESERVE against the volume on which it resides.
24.15 RESTORE STATEMENT

The RESTORE statement creates a key file from a backup copy previously created by BACKUP. The USTCRYFM JCL must include a TAPE1 DD statement to specify the backup data set.

If the data set that USTCRYFM is restoring is newly allocated, it does not have to be pre-initialized with the FORMAT statement because the RESTORE operation includes the formatting functions of FORMAT.

If the data set that USTCRYFM is restoring to is already allocated, RESTORE completely replaces the contents of that file. All encrypted backups and keys previously recorded in that file are lost. To protect you, USTCRYFM only allows a restore to a previously formatted key file if ENABLE=ERASE is specified.

A combination of the DUMP and RESTORE statements can be used to move the key file from one device to another (even across unlike devices like 3380 to 3390). They can also be used to change the size and/or blocking factor of the key file.

The FDRCOPY and FDRDSF members of INNOVATION DATA PROCESSING’s FDR DASD Management System can also be used to move the key file from one disk to another, but they do not expand or re-block the key file.

### RESTORE Statement Syntax

<table>
<thead>
<tr>
<th>RESTORE</th>
<th>B=n</th>
<th>,DISABLE=(DYNALLOC, ERASE, RESERVE)</th>
<th>,ENABLE=(DYNALLOC, ERASE, RESERVE)</th>
<th>,RECS=nnnnnnn</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESTORE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B=n</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>,DUMPDEVICE=DISK</td>
<td>TAPE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>,DISABLE=(DYNALLOC, ERASE, RESERVE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>,RECS=nnnnnnn</td>
<td></td>
</tr>
</tbody>
</table>

**B=**

- **n** – Specifies the number of blocks to be placed on each track, from 2 through 5. USTCRYFM automatically calculates the best blocksize for this device type.

Default: 2 (half-track blocking).

**DUMPDEVICE=**

Specifies the device type that is to be used as a RESTORE medium.

- **DISK** – Reads the backup from either disk or tape.
- **TAPE** – Reads the backup from tape devices only.

Default: TAPE.

**DISABLE=**

- **DISABLE** specifies the options that are disabled for this RESTORE operation. Multiple options are allowed and must be enclosed in parentheses and separated by commas.

- **DYNALLOC** – If the ENCRYPT DD statement is omitted, dynamically allocates the key file specified in the UPSTREAM configuration (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”)

- **ERASE** – Allows an existing, formatted key file to be reformatted. This removes all encryption keys previously recorded in that file. This is usually only appropriate when erasing a key file following a disaster recovery test. By default, FORMAT can only be run against a newly allocated control file.

- **RESERVE** – Protects the formatting with a RESERVE against the volume containing the key file.

**RECS=**

- **nnnnnn** – Specifies the minimum number of key entries that are formatted during the restore of the key file. See “RECS=” in Section 24.13 for more details. The default is the number of records that were formatted during the DUMP of the key file, or 2000, whichever is the larger.
24.16 DELETE AND RESET STATEMENTS

The DELETE statement is used to mark records within the key file for deletion. The statement may appear more than once in the control statement input if you need to delete records based on several sets of criteria. The actual deletion does not take place until the next reorganization of the key file with the REORG statement.

The RESET statement is used to reset the delete flag in key file records previously marked by a DELETE statement. The RESET statement may appear more than once in the control statement input if you need to reset records based on several sets of criteria. RESET must be executed before the next REORG of the key file, since REORG may physically delete records marked for deletion. Note that REORG creates a backup of the key file, so if you save that backup and then later discover that you need records that were deleted, you may be able to recover them from the backup.

Operands of DELETE and RESET that have numeric values (such as BKDATE and BKDAYS) accept comparison operators in addition to a simple equal "=". The operators are:

- = or .EQ. – Equal
- ^= or .NE. – Not Equal
- < or .LT. – Less Than
- > or .GT. – Greater Than
- <= or .LE. – Less Than or Equal
- => or .GE. – Greater Than or Equal

In most cases, you may also specify an operand more than once, such as the following to select a range of values: BKDAYS>5,BKDAYS<20

Other operands only accept equal (= or .EQ.) or not equal (= or .NE.).

A record must meet all of the selection criteria specified to be marked or reset for deletion.

### DELETE AND RESET STATEMENTS SYNTAX

<table>
<thead>
<tr>
<th>DELETE</th>
<th>RESET</th>
</tr>
</thead>
<tbody>
<tr>
<td>BKDATE=yyddd</td>
<td>, ENCRYPTIONTYPE=AES128</td>
</tr>
<tr>
<td>, yyyyddd</td>
<td>AES192</td>
</tr>
<tr>
<td>, BKDAYS=nnnnn</td>
<td>AES256</td>
</tr>
<tr>
<td>, BKDSNAME=(dsn,...,dsn)</td>
<td>, FLAGS=(MASTERKEYAPPLIED</td>
</tr>
<tr>
<td>, BKFILESEQ=nnnnn</td>
<td>, DELETE</td>
</tr>
<tr>
<td>, BKTIME=hhmmss</td>
<td>, GENERATEDKEY</td>
</tr>
<tr>
<td>, BKVOLUME=volspec</td>
<td>, TAPEFILE</td>
</tr>
<tr>
<td>, REAL</td>
<td></td>
</tr>
<tr>
<td>, SIMULATE</td>
<td></td>
</tr>
<tr>
<td>, VOL=volspec</td>
<td></td>
</tr>
</tbody>
</table>

**BKDATE=**

Specifies that encrypted copies of backups created on this date by USTVAULT are marked for deletion or reset. This is a Julian date, which may be in the form "yyyyddd" (e.g. 2006123) or "yyddd" (e.g. 06123). For improved readability, a period may be inserted between the year and day (e.g. 2006.123).

**BKDAYS=**

nnnnn – Specifies that encrypted copies of backups created “nnnnn” days ago by USTVAULT are marked for deletion or reset. Values of 0 to 32000 are accepted.

**BKDSNAME=**

Specifies the dsname(s) of one or more encrypted copies of backups that are to be marked for deletion or reset. Multiple names may be specified in parentheses, separated by commas.
FDR/UPSTREAM DATA ENCRYPTION
DELETE AND RESET STATEMENTS

BKFILESEQ=
nnnnn – Specifies a tape file sequence number (1 to 4095) of an encrypted copy of a backup that is to be marked for deletion or reset.

BKTIME= hhmmss – Specifies that encrypted copies of backups created by USTVAULT at “hhmmss” are to be marked for deletion or reset.

BKVOLUME= Specifies that encrypted copies of backups created by USTVAULT, whose first volume matches the BKVOLUME serial or serial mask, are marked for deletion or reset (e.g. BKVOLUME=0033##).

ENCRYPTIONTYPE= Specifies the encryption type used by USTVAULT when the copy of the backup was created. Only copies of backups matching this encryption type are marked for deletion or reset.

  AES128 –
  AES192 –
  AES256 –

FLAGS= Specifies one or more flags which must all be on in the key file record in order for it to be marked for deletion or reset. Multiple flags must be enclosed in parentheses and separated by commas.

  MASTERKEYAPPLIED – A master key was used when this backup was encrypted.
  DELETE – This backup is flagged for deletion.
  GENERATEDKEY – The key used in this backup was generated by UPSTREAM.
  TAPEFILE – This backup is on tape (otherwise it is on disk).

REAL
SIMULATE

SIMULATE causes the DELETE or RESET statement to operate in simulation mode, so that you can verify that the parameters you specified return the correct results. No records in the key file are updated. REAL makes the desired modifications in the selected records.

Default: REAL.

VOL=

volspec – Specifies the volume serial or mask (e.g., VOL=123*) of the original disk from which the backup was created, which was then copied and encrypted by USTVAULT. Only the encrypted copies of backups taken from that volser/mask are marked for delete or reset.
24.17 **REORG Statement**

The REORG statement takes a backup of the key file (similar to DUMP), writing it to the file specified by the TAPE1 DD statement in the USTCRYFM JCL. It then reloads the key file from that backup, dropping obsolete records.

Although the TAPE1 DD statement can specify a temporary data set, INNOVATION recommends that it be a permanent data set for backup purposes and to protect against a failure during the reload.

There are three options that control removal of obsolete entries during the reload. None of them are enabled by default, so you must specify at least one for the REORG to have any meaning:

- **DELETE=**PURGE  To purge entries marked by a DELETE statement
- **ENABLE=**NULLFILE To purge entries where the output file was DUMMY (DSN=NULLFILE)
- **ENABLE=**IFNOTCURRENT To purge uncataloged encrypted copies of your backups on disk and copies of encrypted backups on tape which are no longer recorded in your tape management system.

The key file does not need frequent reorganization, unless you frequently create lots of encrypted copies of your backups. In most situations, a monthly REORG of the key file is sufficient.

### REORG Statement Syntax

| REORG | CNTRESV=\(nn\) | ,ENABLE=(DYNALLOC|IFNOTCURRENT|NULLFILE|RESERVE) |
|--------|-----------------|---------------------------------------------|
|        | ,DELETE=\(\text{IGNORE|PURGE|RETAIN}\) | ,DUMPDEVICE=\(\text{DISK|TAPE}\) |
|        | ,DISABLE=(\text{DYNALLOC|IFNOTCURRENT|NULLFILE|RESERVE}) | ,LOG|NOLOG |
|        | | ,SIMULATE |

- **CNTRESV=**  \(nn\) – Specifies the number of key file blocks (1 to 99) to be processed before releasing and reacquiring the RESERVE on the volume containing the key file (if ENABLE=RESERVE is in effect).
  
  Default: 10.

- **DELETE=**  Specifies whether entries marked for deletion by a previous DELETE statement (in this step or a previous USTCRYFM step) should be removed:
  
  - **IGNORE** – Ignore the delete flag (entries may still be removed for other reasons)
  
  - **RETAIN** – Retain all entries with the delete flag on, even if they are selected for other reasons
  
  - **PURGE** – Remove all entries with the delete flag on
  
  Default: **IGNORE**, so **DELETE=**PURGE must be specified to remove entries marked by a previous DELETE statement.
DISABLE=  
ENABLE= 
The options specified are disabled or enabled for this REORG operation. Multiple options are enclosed in parentheses and separated by commas.

**DYNALLOC** – If the ENCRYPT DD statement is omitted, dynamically allocates the key file specified in the UPSTREAM configuration (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”).

**IFNOTCURRENT** – Removes all key file entries for which the corresponding encrypted backup no longer exists. For a backup on disk, the key file entry is removed if the backup is no longer cataloged in an z/OS catalog. For a backup on tape, the key file entry is removed if the backup is no longer recorded in the tape management system.

**NULLFILE** – Removes key file entries whose corresponding backup was DUMMY (DSN=NULLFILE); these are usually tests.

**RESERVE** – Protects the REORG with a RESERVE against the volume on which the key file resides (see also “CNTRESV=” in Section 24.17).

Default: All options are disabled by default, except RESERVE, which is enabled by default.

**DUMPDEVICE=**

Specifies the device type that is eligible to be used as a backup medium during the REORG operation.

DISK allows the backup data set to be placed on either disk or tape devices, while TAPE restricts the backup data set to tape devices only.

Default: TAPE.

**LOG**

**NOLOG**

Specifies whether the key file entries being dropped by the REORG operation are listed.

Default: LOG.

**SIMULATE**

Specifies whether the REORG operation is simulated. If specified, all processing is done and all entries selected for removal are displayed (if LOG is in effect) but the key file is not updated. By default, the key file is updated and entries are actually removed.

SIMULATE is recommended to first verify that only the expected records are removed. Once a record is removed from the key file you can only restore from that encrypted backup by explicitly specifying the actual key or master key of the backup.
24.18 REPORT STATEMENT

The REPORT statement prints details of selected key file records. The ENCRYPT DD statement in the USTCRYFM JCL points to the FDR/UPSTREAM encryption key file.

The encryption keys themselves are not displayed unless the user executing the program has UPDATE authority to the key file in your security system (Section 4.9 “FDR/UPSTREAM Data Encryption”). If the key file is not protected by a data set profile in your security system, you are able to report on it, but keys are never displayed.

Operands of REPORT that have numeric values (such as BKDATE and BKDAYS) accept comparison operators in addition to a simple equal “=”. The operators are:

- `=` or `.EQ.` – Equal
- `^=` or `.NE.` – Not Equal
- `<` or `.LT.` – Less Than
- `>` or `.GT.` – Greater Than
- `<=` or `.LE.` – Less Than or Equal
- `>=` or `.GE.` – Greater Than or Equal

In most cases, you may also specify an operand more than once, such as the following to select a range of values: `BKDAYS>5,BKDAYS<20`

Other operands only accept equal (`=` or `.EQ.`) or not equal (`=` or `.NE.`).

A record must meet all of the selection criteria specified to be displayed.

### REPORT STATEMENT SYNTAX

<table>
<thead>
<tr>
<th>REPORT STATEMENT SYNTAX</th>
<th>REPORT STATEMENT OPERANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPORT</td>
<td>BKDATE=yyddd</td>
</tr>
<tr>
<td></td>
<td>,BKDAYS=nnnnn</td>
</tr>
<tr>
<td></td>
<td>,BKDSNAME=(dsn,....,dsn)</td>
</tr>
<tr>
<td></td>
<td>,BKFILESEQ=nnnnn</td>
</tr>
<tr>
<td></td>
<td>,BKVOLUME=volspec</td>
</tr>
</tbody>
</table>

**BKDATE=**

Specifies that encrypted copies of backups created on this date by USTVAULT are reported. This is a Julian date, which may be in the form “yyyydd” (e.g. 2006123) or “yydd” (e.g. 06123). For improved readability, a period may be inserted between the year and day (e.g. 2006.123).

**BKDAYS=**

`nnnnn` – Specifies that encrypted copies of backups created “`nnnnn`” days ago by USTVAULT are reported. Values of 0 to 32000 are accepted.

**BKDSNAME=**

Specifies the dsname(s) of one or more encrypted copies of backups that are to be reported. Multiple names may be specified in parentheses, separated by commas.

**BKFILESEQ=**

`nnnnn` – Specifies a tape file sequence number (1 to 4095) of an encrypted copy of a backup that is to be reported.

**BKTIME=**

`hhmmss` – Specifies that encrypted copies of backups created by USTVAULT at “`hhmmss`” are to be reported.
FDR/UPSTREAM DATA ENCRYPTION
REPORT STATEMENT

BKVOLUME=
Specifies that encrypted copies of backups created by USTVAULT, whose first volume matches the BKVOLUME serial or serial mask, are reported (e.g. BKVOLUME=0033##).

ENCRYPTIONTYPE=
Specifies the encryption type used by USTVAULT when the copy of the backup was created. Only copies of backups matching this encryption type is reported.
AES128 –
AES192 –
AES256 –

FLAGS=
Specifies one or more flags that must all be on in the key file record in order for it to be reported. Multiple flags must be enclosed in parentheses and separated by commas.
MASTERKEYAPPLIED – A master key was used when this backup was encrypted.
DELETE – This backup is flagged for deletion.
GENERATEDKEY – The key used in this backup was generated by UPSTREAM TAPEFILE - This backup is on tape (otherwise it is on disk).

VOL=
Specifies the volume serial or mask (e.g., VOL=123*) of the original disk from which the backup was created, which was then copied and encrypted by USTVAULT. Only the encrypted copies of backups taken from that volser/mask are reported.
### 24.19 USTCRYFM JCL Parameters

These are the JCL parameters required to execute USTCRYFM. Full JCL examples of USTCRYFM jobs can be found in Section 24.20 "USTCRYFM JCL Examples".

#### EXEC Statement

Must specify PGM=USTCRYFM, and should also specify REGION=0M to make the maximum region available.

If a PARM field is specified, USTCRYFM uses the data specified as the first control statement, which must be a valid USTCRYFM statement. For example:

```bash
//FORMAT EXEC PGM=USTCRYFM,PARM='FORMAT RECS=5000'
```

#### JOBLIB or STEPLIB Statement

If the UPSTREAM load library has not been placed in the system linklist, this DD statement is required to point to the load library. This must be an APF authorized library.

#### SYSUDUMP DD Statement

Recommended in all USTCRYFM jobs in order to diagnose more easily error conditions that make USTCRYFM abend.

#### ENCRYPT DD Statement

This DD statement specifies the USTCRYPT key file to be processed. It must be on disk. No DCB parameters should be specified, but you may want to specify DSORG=PS so that the key file is marked as a sequential data set instead of the default of DA.

If creating a new key file, a SPACE= parameter with secondary allocation and RLSE are supported and highly recommended. Estimate the number of encrypted backups that need to be recorded and calculate the tracks required (based on a figure of 348 backups per 3390 track).

The key file does not take secondary allocations once it has been formatted.

#### TAPE1 DD Statement

Required only for the DUMP, RESTORE, and REORG functions, and specifies the file to be used for the backup copy of the key file. It must point to a tape device unless the DUMPDEVICE=DISK operand is specified.

Although the TAPE1 DD statement can point to a temporary data set for a REORG operation, it is recommended that you always make it a permanent data set and retain it for some time after the REORG, in case required records are inadvertently removed by the REORG.

#### SYSIN DD Statement

Specifies the control statement data set. Usually a DD * data set or control card PDS member.
Chapter 24 – Page 24-32 – Section 24.20

FDR/UPSTREAM DATA ENCRYPTION
USTCRYFM JCL EXAMPLES

24.20 USTCRYFM JCL EXAMPLES

This section contains several examples of using USTCRYFM. To make the examples clearer, the key file data set name includes the word KEYFILE, but INNOVATION recommends that to enhance security you should use a name that does not suggest that it contains encryption keys.

FORMAT A KEY FILE EXAMPLE

This example allocates a key file and formats it using the default of half-track blocking. On a 3390 (348 records/track), 500,000 records require 95 cylinders, so USTCRYFM formats the entire primary allocation of 100 cylinders.

```
//FORMAT   EXEC PGM=USTCRYFM,REGION=0M
//STEPLIB  DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//ENCRYPT DD DSN=UPSTREAM.KEYFILE,UNIT=DISK,DISP=(,CATLG),
//          SPACE=(CYL,(100,10)),DSORG=PS
//SYSIN    DD *
//FORMAT   RECS=500000
/*
```

FORMAT A KEY FILE (WITH RLSE) EXAMPLE

This example allocates a key file and formats it using quarter-track blocking. On a 3390 (348 records/track), 300,000 records require 58 cylinders. Since RLSE is specified, USTCRYFM formats that many cylinders and releases the remainder.

```
//FORMAT   EXEC PGM=USTCRYFM,REGION=0M
//STEPLIB  DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//ENCRYPT DD DSN=UPSTREAM.KEYFILE,UNIT=DISK,DISP=(,CATLG),
//          SPACE=(CYL,300,RLSE),DSORG=PS
//SYSIN    DD *
//FORMAT   RECS=300000,B=4
/*
```

BACKUP A KEY FILE EXAMPLE

This example DUMPs a key file to a sequential backup data set on tape. The backup file is a GDG.

```
//DUMP     EXEC PGM=USTCRYFM,REGION=0M
//STEPLIB  DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//ENCRYPT DD DSN=UPSTREAM.KEYFILE,DISP=SHR
//TAPE1    DD DSN=UPSTREAM.KEYFILE.BACKUP(+1),DISP=(,CATLG),
//          UNIT=CART,EXPDT=99000
//SYSIN    DD *
//DUMP
/*
```

RESTORE A KEY FILE EXAMPLE

This example creates a new key file and restores data to it from a backup created by a previous DUMP.

```
//RESTORE  EXEC PGM=USTCRYFM,REGION=0M
//STEPLIB  DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//ENCRYPT DD DSN=UPSTREAM.KEYFILE,UNIT=DISK,DISP=(,CATLG),
//          SPACE=(CYL,(100,10)),DSORG=PS
//TAPE1    DD DSN=UPSTREAM.KEYFILE.BACKUP(0),DISP=SHR
//SYSIN    DD *
//RESTORE
/*
```
This example REORGs a key file. It backs up the key file to the TAPE1 DD (a disk file), then reloads it from that backup, removing all records for disk backups that are no longer cataloged and tape backups that are no longer recorded in your tape management system (IBM DFSMSrmm or CA 1® Tape Management).

```plaintext
//REORG EXEC PGM=USTCRYFM,REGION=0M
//STEPLIB DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//ENCRYPT DD DSN=UPSTREAM.KEYFILE,DISP=SHR
//TAPE1 DD DSN=UPSTREAM.KEYFILE.BACKUP(+1),DISP=(,CATLG),
//       UNIT=DISK,SPACE=(CYL,(50,10),RLSE)
//SYSIN DD *
//REORG DUMPDEVICE=DISK,ENABLE=IFNOTCURRENT
/*
```

This example REPORTs on all the records currently in the key file.

```plaintext
//FORMAT EXEC PGM=USTCRYFM,REGION=0M
//STEPLIB DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//ENCRYPT DD DSN=UPSTREAM.KEYFILE,DISP=SHR
//SYSIN DD *
//REPORT
/*
```

This example REPORTs on selected records from the key file - records for encrypted copies of backups created by USTVAULT in the last week, and where AES128 encryption was used.

```plaintext
//FORMAT EXEC PGM=USTCRYFM,REGION=0M
//STEPLIB DD DISP=SHR,DSN=upstream.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//ENCRYPT DD DSN=UPSTREAM.KEYFILE,DISP=SHR
//SYSIN DD *
//REPORT ENCRYPTIONTYPE=AES128,BK DAYS<8
/*
Here is a sample of the report generated by the REPORT function of USTCRYFM. The keys are displayed only if the user has UPDATE authority to the key file data set.

The meaning of the FLAGS field is:

- **M** – a master key was used when this backup was encrypted
- **G** – the specific encryption key was generated by UPSTREAM
- **T** – this backup is on tape (otherwise it is on disk)
- **D** – this key record is marked for deletion
- **U** – data set created by UPSTREAM

The UPSTREAM Installation Control Library (ICL), which would have been created during the main installation of the product (Chapter 3 “Installation and Configuration”) contains sample members to help you with the formatting and maintenance of the key file using USTCRYFM, as follows:

<table>
<thead>
<tr>
<th>ICL Member Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRYBACKP</td>
<td>Sample USTCRYFM to backup a key file to a tape GDG.</td>
</tr>
<tr>
<td>CRYFRMT</td>
<td>Sample USTCRYFM to format a key file</td>
</tr>
<tr>
<td>CRYPRINT</td>
<td>Sample USTCRYFM key file report for a particular backup profile name.</td>
</tr>
<tr>
<td>CRYPRIN2</td>
<td>Sample USTCRYFM key file report for all profiles.</td>
</tr>
<tr>
<td>CRYREORG</td>
<td>Sample USTCRYFM to reorg a key file using a GDG backup.</td>
</tr>
</tbody>
</table>
24.21 FDR/UPSTREAM DATA ENCRYPTION RECOMMENDATIONS

Below is a list of INNOVATION recommendations for the implementation of the FDR/UPSTREAM data encryption feature.

Before choosing the encryption algorithm(s) to be used by USTVAULT, take time to review the description of all encryption algorithms available under UPSTREAM (Section 24.2 “Encryption Algorithms”), being careful to balance the strength of the encryption with the increased CPU requirement.

❖ Before implementing encryption on a given backup profile, run a “first time full” backup with the highest level of compression (“COMPRESSLEVEL 4”). Use the same level of compression for all subsequent backups taken under that backup profile. This ensures the optimum tape utilization when you create the encrypted “copy-2” backups with USTVAULT, as it avoids the “expansion” of the data when USTVAULT encrypts the data blocks before writing them to the output tape.

❖ Use the ENCRYPTV option in the backup profile (Section 5.3 “Backup Profiles”) to enable USTVAULT encryption for a given backup profile, in preference to the ENCRYPT statement in your USTCRYPT DD.

❖ For additional strength of encryption, use the ENCRYPTV option in your USTVLTxx profiles (“Data Encryption” in Section 5.4) to specify encryption of the vault control data set.

❖ Use the KEYFILE option in the UPSTREAM options table (Section 24.9 “Setting the FDR/UPSTREAM Encryption Options”) to point to the key file, in preference to the KEYFILE statement in your USTCRYPT DD.

❖ Use the MASTERKEYID option in the UPSTREAM options table (”MASTERKEYID=“ in Section 24.8) to point to the suffix of a security system FACILITY class from which the master key can be obtained, in preference to the MASTERKEY operand on an ENCRYPT statement in your USTCRYPT DD.

❖ Let UPSTREAM automatically generate random encryption keys for you (Section 24.5 “FDR/UPSTREAM Encryption Key Management”), in preference to supplying them manually on an ENCRYPT statement in your USTCRYPT DD.

❖ Use a master key on all encrypted copies of your backups, and be sure to keep the master key secure.

❖ BACKUP and REORG the key file on a regular basis with USTCRYFM (Section 24.12 “Creating the FDR/UPSTREAM Encryption Key File (USTCRYFM)”).

❖ Secure the key file from unauthorized access using your security system (Section 4.9 “FDR/UPSTREAM Data Encryption”).
25 FDR/UPSTREAM MESSAGES

25.1 INTRODUCTION

This chapter contains a full list of all the messages that can be issued by FDR/UPSTREAM, and also explains where those messages are issued. Most of the messages listed in this chapter come from the UPSTREAM started task, but some of them may also be issued by UPSTREAM utility programs, such as USTBATCH.
25.2 **REPORTING A PROBLEM**

Should you have any questions regarding the installation, implementation, or use of the FDR/UPSTREAM product, please feel free to contact FDR/UPSTREAM Technical Support.

In the event that you have any difficulty with UPSTREAM, please retain all the error information that you can gather, including:

- UPSTREAM USTLOG file. (See Section 25.3 "The LOG File (USTLOG)".)
- z/OS Console Messages. (See Section 25.4 "z/OS Console Messages").
- UPSTREAM USTSUMM file. (See Section 25.5 "The SUMMARY File (USTSUMM)").
- Any relevant JOBLOG or SYSLOG messages
- UPSTREAM Client logs. (See the FDR/UPSTREAM Client Guide.)
- Any relevant UPSTREAM configuration information. (See Chapter 21 “FDR/UPSTREAM Configurator").

Once you have all the information, please contact FDR/UPSTREAM Technical Support as soon as possible after the error has occurred. We make every effort to resolve the difficulty in the shortest possible time.
## 25.3 The Log File (USTLOG)

FDR/UPSTREAM maintains a log file (DD statement USTLOG) to record status information and error conditions. This log file is usually directed to SYSOUT and are printed or held when the UPSTREAM started task terminates (depending on the SYSOUT class chosen).

The UPSTREAM log file is one of the primary sources of information if a problem occurs in an UPSTREAM operation. A sample listing from a USTLOG log file is shown below. Each line in the listing contains the following:
- The UPSTREAM message number
- The time the message was logged
- The UPSTREAM profile name (or LU name) that generated the message
- The message text

<table>
<thead>
<tr>
<th>Message Number</th>
<th>Time</th>
<th>Message Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST106</td>
<td>08:51:54</td>
<td>*** CUSTOMER NUMBER: 99999999 ***</td>
</tr>
<tr>
<td>UST241</td>
<td>08:51:55</td>
<td>USTMAINT NOW ACTIVE</td>
</tr>
<tr>
<td>UST550</td>
<td>08:51:55</td>
<td>USTMAINT UPSTREAM USTMAINT PROCESS STARTED ***</td>
</tr>
<tr>
<td>UST507</td>
<td>08:51:56</td>
<td>USTMAINT 50 OF 500 HISTORY RECORDS ERASED FOR DATES EARLIER THAN 96/01/12</td>
</tr>
<tr>
<td>UST510</td>
<td>08:51:56</td>
<td>USTMAINT UPSTREAM MAINT COMPLETED - 20 VERSION RECORDS ERASED 157 FILE RECORDS ERASED</td>
</tr>
<tr>
<td>UST244</td>
<td>08:51:56</td>
<td>USTMAINT COMPLETED RC=00</td>
</tr>
<tr>
<td>UST248</td>
<td>08:51:56</td>
<td>USTMAINT * PROCESS DETACHED *</td>
</tr>
<tr>
<td>UST280</td>
<td>08:51:58</td>
<td>TCP MAIN CONNECT TO SOCKET=00001,PORT=01972,IPA=130.50.75.1</td>
</tr>
<tr>
<td>UST035</td>
<td>08:51:58</td>
<td>FDR/UPSTREAM V3.3.0 INIT COMPLETE-CONFIG=CONFIG02,APPLID=UPSTREAM,SECLVL=2</td>
</tr>
<tr>
<td>UST280</td>
<td>09:18:06</td>
<td>TCP USER CONNECT TO SOCKET=00002,PORT=01032,IPA=130.50.75.11</td>
</tr>
<tr>
<td>UST233</td>
<td>09:18:07</td>
<td>MERGE1 STARTING BACKUP PROCESS, TYPE=DASD LU=82324800 BACKUP=FULL</td>
</tr>
<tr>
<td>UST234</td>
<td>09:18:07</td>
<td>MERGE1 BACKUP DATE: 01/25/99</td>
</tr>
<tr>
<td>UST001</td>
<td>09:18:08</td>
<td>MERGE1 TO DSN:PROD.UPSTREAM,DGBKUP,G0077V00</td>
</tr>
<tr>
<td>UST158</td>
<td>09:20:33</td>
<td>MERGE1 2150 MERGE FILES: 1900 COPIED FROM BACKUP 0 ALREADY ON BACKUP 250 FROM PC</td>
</tr>
<tr>
<td>UST158</td>
<td>09:20:33</td>
<td>MERGE1 2 COPYINCR FILES: 2 BACKUPS COPIED TO FULL</td>
</tr>
<tr>
<td>UST078</td>
<td>09:20:36</td>
<td>MERGE1 BACKUP STATISTICS (TOTALS RECEIVED):</td>
</tr>
<tr>
<td>UST079</td>
<td>09:20:36</td>
<td>MERGE1 VERSIONDATE: 990125091807; 138 FILES RECEIVED 4 DIRECTORIES RECEIVED</td>
</tr>
<tr>
<td>UST090</td>
<td>09:20:36</td>
<td>MERGE1 1,194 DATA-BLOCKS; 6,730,078 DATA-BYTES RECEIVED</td>
</tr>
<tr>
<td>UST173</td>
<td>09:20:36</td>
<td>MERGE1 BACKUP FULL COMPLETED SUCCESSFULLY (LU=82324800B)</td>
</tr>
<tr>
<td>UST224</td>
<td>09:20:39</td>
<td>MERGE1 1.871 CPU SECOND(S) USED IN BACKUP</td>
</tr>
<tr>
<td>UST248</td>
<td>09:20:39</td>
<td>MERGE1 82324800B * PROCESS DETACHED *</td>
</tr>
<tr>
<td>UST197</td>
<td>01:03:42</td>
<td>T550F6AA REMOTE INITIATION TO T550F6AA FROM UPSTR001</td>
</tr>
<tr>
<td>UST009</td>
<td>01:03:42</td>
<td>SESSION STARTED TO T550F6AA</td>
</tr>
<tr>
<td>UST247</td>
<td>01:03:50</td>
<td>UPSTR001 *** SNA SESSION DEACTIVATED ***</td>
</tr>
<tr>
<td>UST233</td>
<td>01:04:02</td>
<td>W50443DL STARTING BACKUP PROCESS, TYPE=DASD LU=T550F6AA</td>
</tr>
<tr>
<td>UST224</td>
<td>01:04:02</td>
<td>W50443DL BACKUP DATE: 01/25/96</td>
</tr>
<tr>
<td>UST001</td>
<td>01:04:02</td>
<td>W50443DL TO DSN:G1ITS2T.UST13.WS0443DL.Z990125.Z010402</td>
</tr>
<tr>
<td>UST050</td>
<td>01:04:10</td>
<td>W50443DL (2004,2) a:\NULL.TXT</td>
</tr>
<tr>
<td>UST050</td>
<td>01:04:12</td>
<td>W50443DL (2005,13) a:\USSTART.EXE</td>
</tr>
<tr>
<td>UST050</td>
<td>01:04:16</td>
<td>W50443DL a:\USSTART.EXE</td>
</tr>
<tr>
<td>UST050</td>
<td>01:04:22</td>
<td>W50443DL (2005,13) a:\US.RES</td>
</tr>
<tr>
<td>UST113</td>
<td>01:04:22</td>
<td>W50443DL a:\DIR3\0221I.EXE</td>
</tr>
<tr>
<td>UST113</td>
<td>01:04:22</td>
<td>W50443DL a:\DIR3\0221I.EXE</td>
</tr>
<tr>
<td>UST078</td>
<td>01:04:46</td>
<td>W50443DL BACKUP STATISTICS (TOTALS RECEIVED):</td>
</tr>
<tr>
<td>UST079</td>
<td>01:04:46</td>
<td>W50443DL VERSIONDATE: 990125010402; 13 FILES RECEIVED</td>
</tr>
<tr>
<td>UST080</td>
<td>01:04:46</td>
<td>W50443DL 24 DATA-BLOCKS; 30,327 DATA-BYTES RECEIVED</td>
</tr>
<tr>
<td>UST174W</td>
<td>01:04:46</td>
<td>W50443DL BACKUP COMPLETED WITH ERRORS (LU=T550F6AA)</td>
</tr>
<tr>
<td>UST224</td>
<td>01:04:48</td>
<td>W50443DL 0.051 CPU SECONDS USED IN BACKUP</td>
</tr>
<tr>
<td>UST224</td>
<td>01:04:48</td>
<td>W50443DL T550F6AA * PROCESS DETACHED *</td>
</tr>
<tr>
<td>UST197</td>
<td>01:39:28</td>
<td>T550F62Z REMOTE INITIATION TO T550F62Z FROM UPSTR001</td>
</tr>
<tr>
<td>UST247</td>
<td>01:39:28</td>
<td>T550F62Z *** SNA SESSION DEACTIVATED ***</td>
</tr>
<tr>
<td>UST190E</td>
<td>01:39:28</td>
<td>T550F62Z APIC/TCP ALLOCATE ERROR</td>
</tr>
<tr>
<td>UST038E</td>
<td>01:39:29</td>
<td>T550F62Z NAME=T550F62Z RCFB=000B RCFRI=0004 RCSEC=0000 - ALLOCATION ERROR</td>
</tr>
<tr>
<td>UST038E</td>
<td>01:39:29</td>
<td>T550F62Z R0=00000000 R1=00000000 SENSE=087DD001</td>
</tr>
<tr>
<td>UST193E</td>
<td>01:39:29</td>
<td>T550F62Z TARGET LU NOT AVAILABLE - REQUEST FAILED</td>
</tr>
<tr>
<td>UST247</td>
<td>01:39:29</td>
<td>UPSTR001 *** SNA SESSION DEACTIVATED ***</td>
</tr>
<tr>
<td>UST247</td>
<td>01:39:29</td>
<td>FDR/UPSTREAM STOP ACCEPTED - SHUTDOWN IN PROGRESS</td>
</tr>
<tr>
<td>UST247</td>
<td>01:39:29</td>
<td>FDR/UPSTREAM SHUTDOWN COMPLETED</td>
</tr>
</tbody>
</table>
In the sample log on the previous page we can see:

❖ UPSTREAM was started at 08:51.
❖ The USTMAINT utility was automatically started to clean up the UPSTREAM repository files.
❖ The TCP/IP and VTAM APPC interfaces were initialized.
❖ A full merge backup (to sequential tape) was initiated at 09:18 by an Client at TCP/IP address 82324B0B (equivalent to 130.50.75.11) using the backup profile name MERGE1. The backup completed at 09:20 and UPSTREAM has logged the backup completion statistics.
❖ A USTBATCH-initiated backup job was started at 01:03. It is a backup to sequential disk from the Client at VTAM LU T550F6AA using the backup profile name WS0443DL. The z/OS backup data set name has been logged. During the backup process, the Client notified UPSTREAM of four skipped files. The backup completed (with the errors logged) at 01:04:46.
❖ A mainframe-initiated job to backup Client at LU T550F6ZZ was submitted and began execution at 03:39:28. UPSTREAM received an error indication attempting to allocate the LU 6.2 session and conversation to the target LU. The error indicates that the LU was not available at the time the request was made. The submitted batch job was notified and the backup terminated. In this case, had there been a “MAXRETRY” value specified in the USTBATCH job input stream, UPSTREAM would have delayed and then retried the conversation allocation again.
25.4 Z/OS Console Messages

Some FDR/UPSTREAM messages, particularly those that indicate initialization errors or other conditions of interest to the system operator, are written to the z/OS system console as well as to USTLOG.

These messages are identified in the message tables in Section 25.8 "FDR/UPSTREAM Message Reference" by an asterisk "*" after the message ID. If the “WTOCOMP” in Section 3.16 configuration option has been set, then all “backup started” and “backup completed” messages are written to the z/OS system console as well as to USTLOG.
The SUMMARY File (USTSUMM)

FDR/UPSTREAM also optionally creates a summary file that is enabled by the presence of a USTSUMM DD statement in the UPSTREAM startup PROC. This summary log file, which contains single-line descriptions of each operation performed by UPSTREAM, provides a quick and effective reference to all UPSTREAM activity.

USTSUMM information is usually directed to SYSOUT and is printed or held when the UPSTREAM started task terminates (depending on the SYSOUT class chosen).

Here is a short example of a UPSTREAM USTSUMM summary log. Note that the final entry (operation SHUTDOWN), shows the start/stop time, total elapsed time and CPU (TCB) time used by this execution of UPSTREAM. The # FILES value is the total number of operations that UPSTREAM handled, and COMPCODE is the highest completion code of any operation. See “completion codes” below (20 if any operation abended).

The fields in the summary log are as follows:

- **START DATE/TIME**: The date and time that the indicated operation started. For backups, this is also the “version-date” of the backup.
- **END-TIME**: The time that the operation ended. The report is sorted in order of end-time.
- **PROFILE**: The UPSTREAM profile name associated with the operation. For backup inquiries and profile operations, this may be a mask, as in the “M*” profile. For utility operations, such as USTMAINT, this is the utility name.
- **LUNAME**: The TCP/IP network address (in hex) or the VTAM LUNAME of the Client associated with the operation. For utility operations, such as USTMAINT, this is the utility name.
- **USERID**: The security userid entered at the Client, if any. It may be blank if SECLVL=0 is in effect.
- **OPERATION**: Indicates the operation requested, such as BACKUP, RESTORE, INQUIREV (inquire versions), REMOVE B (remove backups).
- **TYPE**: For some operations, this indicates the type of operation, such as “INCR” for merge incremental backup, “MERG” for merge full backup, and “TAPE” or “DISK” for restores.
- **COMPCODE**: Indicates the completion code. (See Section 25.7 “FDR/UPSTREAM Completion Codes”.)
- **TIME/CPU**: The elapsed time (in minutes and tenths) and the CPU time (in seconds and thousandths) TCB time only.
- **# FILES**: For backups and restores, the number of files processed. For other functions, this value indicates the relevant quantity (e.g., for an INQUIRE it is the number of versions).
- **PC BLOCKS**: The number of transmission records actually sent to/from the Client.
- **BYTES**: The total amount of data (in kilobytes) processed for this request.
- **PHYBLKS**: The total number of blocks read from or written to a backup for this request. For MERGE backups, it is the total blocks read from all sources, including the Client, previous incremental backups, and the previous full backup. This value is the physical blocks on the backup medium, which may differ from the records sent to/from the Client.
25.6 MANAGING THE USTLOG AND USTSUMM LOGS

FDR/UPSTREAM console commands can be used to manage the USTLOG and USTSUMM log files. In summary:

❖ The FLUSHLOG command closes and reopens the log so that the most recent messages are visible.
❖ If the log files are on disk, the SWITCHLOG command switches between the primary log (USTLOG and USTSUMM) and an alternate log (USTLOG2 and USTSUMM2) so that the inactive log file can be read or copied for reporting purposes without shutting down UPSTREAM.
25.7 FDR/UPSTREAM COMPLETION CODES

There is a completion (return) code associated with every sub-task that runs under the main FDR/UPSTREAM started task. These codes are displayed in the USTSUMM summary file, and also in many reports produced by USTRPORT (see Chapter 22 “Reporting with USTRPORT”).

The completion code of the UPSTREAM main task, at shutdown, is the highest numeric completion code encountered for any sub-task. UPSTREAM batch utility and reporting programs also set one of the following numeric completion codes.

The possible values are:

- **SUSPEND**: Backup was suspended.
- **CANCEL**: Cancelled by operator.
- **Ssss**: System abend ss.
- **Uuuuu**: User abend uu.
- **0**: Normal completion.
- **4**: Completed with warnings.
- **8**: Terminated with error.
- **12**: Terminated with severe errors.
- **16**: Terminated by operator.
- **20**: Terminated by abend.
25.8 FDR/UPSTREAM MESSAGE REFERENCE

FDR/UPSTREAM messages are in the format USTnnns, where “nnn” is a 3-digit message number, and “s” is one of the following severity codes:

- **E** – Error message
- **W** – Warning messages
- **T** – Internal trace messages (not documented in this manual)
- **Blank** – Informational messages (so the others stand out)

In general, the messages are posted to the UPSTREAM log (USTLOG). Messages with an asterisk “*” following the message ID may also be written to the system console. For messages that indicate an error condition: if you are unable to resolve the problem, please save all documentation (usually the UPSTREAM log and the system SYSLOG for the time of the problem) and contact FDR/UPSTREAM Technical Support for assistance.

All UPSTREAM messages are documented in the tables below, and are divided into the following sections:

- **UST001-UST299** see Section 25.9 “FDR/UPSTREAM Started Task Messages”;
- **UST300-UST399** see Section 25.10 “FDR/UPSTREAM Configurator Messages”;
- **UST400-UST499** see Section 25.11 “USTREGEN and USTRPORT Utility Messages”;
- **UST500-UST599** see Section 25.12 “USTMAINT and USTREORG Utility Messages”;
- **UST600-UST699** see Section 25.13 “USTMIGRT, USTVAULT, and USTMERGE Messages”;
- **UST700-UST799** see Section 25.14 “USTBATCH Utility Messages”;
- **UST800-UST810** see Section 25.15 “USTSCHED Utility Messages”.
25.9  FDR/UPSTREAM Started Task Messages

**UST001**  TO DSN: backup file data set name APPENDING TO PREVIOUS BACKUP

**VOL=xxxxxx** [PC FILE=pcfilename]

**Reason:** This informational message is issued by the sequential backup processes to log the name of the sequential data set dynamically allocated to contain the backup data for this version. The optional text APPENDING TO PREVIOUS BACKUP indicates that the backup is being added to an existing backup data set. The VOL field indicates the first volume serial that the backup data set has been placed on. For file transfers only, the PC FILE= specifies the name of the Client file that was transferred.

**Action:** None.

**UST002E**  OPEN clusternamenamel CLUSTER FAILED COMP=rrrr CODE=cccc -- TERMINATING

**Reason:** The z/OS Storage Server Main task was unable to open the indicated “clusternamenamel”, either “CATALOG”, “FILE-INFO”, or “FILE-DATA”. UPSTREAM terminates. “rrrr” is the return code in R15 after the open, and “cccc” is the ACBERFLG error code.

**Action:** Verify your JCL specification for the “USTCATLG”, “USTFILEI” or “USTFILEC” DD statement. Refer to the IBM VSAM Macro Reference or Macro Instructions for Data Sets manual (depending on the level of your operating system) to understand the OPEN error codes reported.

**UST003E**  VTAM SETLOGON REQUEST FAILED - SNA DISABLED

**Reason:** The z/OS Storage Server Main task received a non-zero return code from a VTAM “SETLOGON START” request to begin queuing sessions. This is most likely a temporary VTAM problem. UPSTREAM disables SNA (VTAM) communications; if TCP/IP communications are enabled, it continues, otherwise it terminates.

**Action:** Verify the VTAM “APPL” and “MODE TABLE” definitions were correctly specified and installed. Stop and restart the UPSTREAM Started Task to attempt to enable VTAM communications again.

**UST004E**  TCP/IP ERROR REQUEST=xx COMP=cccccc reason

**Reason:** A TCP/IP error during processing “xx” is an internal UPSTREAM request code. “cccccc” is the TCP/IP completion code from register 15 in decimal, and reason is a brief explanation of the error. Common error codes include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0042</td>
<td>PROTOCOL NOT AVAILABLE – port in use or improper PORT statement in the TCP/IP profile. Can also occur after z/OS Storage Server abend if UPSTREAM is restarted too quickly.</td>
</tr>
<tr>
<td>0054</td>
<td>CONNECTION RESET BY PEER – The connection to the Client was closed by the Client.</td>
</tr>
<tr>
<td>0060</td>
<td>CONNECTION TIMED OUT – UPSTREAM Client not active or wrong IP address specified.</td>
</tr>
<tr>
<td>0061</td>
<td>CONNECTION REFUSED – wrong Client port number specified or FDR/UPSTREAM PC not active on Client.</td>
</tr>
</tbody>
</table>

**Action:** Determine the cause, correct it, and repeat the operation (or restart UPSTREAM).

**UST005**  function COMPLETED SUCCESSFULLY

**Reason:** A management function requested from a Client has completed successfully. “function” may be UPDATE OF PROFILE, REFRESH REQUEST, or LOGIN REQUEST.

None.
FDR/UPSTREAM Messages
FDR/UPSTREAM Started Task Messages

UST005E  function COMPLETED WITH ERRORS - REASON=reason
Reason: A management function from a Client has completed abnormally. "reason", if present, explains the error.
Action: Verify your JCL specification for the “USTCONFG” DD statement. Review the most recent Configurator output for possible errors which may have made the file unusable.

UST006E  OPEN CONFIGURATION-FILE FAILED -- TERMINATING
Reason: The z/OS Storage Server main task, “USTMAIN”, was unable to open the Configuration File, “USTCONFG” DD statement. The UPSTREAM started task terminates.
Action: Determine the cause, correct it, and repeat the request. If necessary, contact FDR/UPSTREAM Technical Support for assistance.

UST007E  OPEN FOR VTAM ACB FAILED -- ACBERFLG=nn - reason
Reason: The z/OS Storage Server main task was unable to open the VTAM “ACB”. UPSTREAM terminates. “reason” indicates the meaning of the ACBERFLG error code.
Action: For certain errors, UPSTREAM retries the OPEN once a minute for up to 5 minutes, in case the error is due to VTAM not being fully initialized. In this case, the message is printed every minute until the OPEN is successful or the 5th attempt fails (which causes UPSTREAM to terminate). If UPSTREAM does fail, correct the error, if possible. Review the VTAM “APPL” definition for z/OS Storage Server to be sure the VTAM “APPLID” (or “ACBNAME” if used) matches the “APPLID=” specification in your Configuration file “MAIN” record. Be sure the VTAM application IDs for UPSTREAM are active.

UST007W  OPEN FOR VTAM ACB BYPASSED
Reason: The VTAM ACB was not opened because you specified APPLID=NONE in the z/OS Storage Server configuration. Only TCP/IP connections are supported and note that mainframe-initiated operations via USTBATCH are not possible.
Action: None, if this is as desired. Otherwise, reconfigure the UPSTREAM MAIN options to specify a valid ACBNAME.

UST007W  OPEN FOR TCP/IP OR TCPACCESS BYPASSED
Reason: The TCP/IP connection was not established because you specified TCPIP=NONE in the z/OS Storage Server MAIN options configuration, or because the required TCP/IP interface module was not found (probably because TCP/IP is not installed on your system). Only VTAM APPC connections are supported.
Action: None, if this is as desired. Otherwise, reconfigure the UPSTREAM MAIN options to specify a valid TCP/IP Address space name (TCPNAME MAIN options parameter).

UST008  UPSTREAM STOP ACCEPTED -- SHUTDOWN IN PROGRESS
Reason: A UPSTREAM console command has been entered, requesting an orderly shutdown of the UPSTREAM stated task.
Action: None.

UST009  SESSION STARTED TO luname BIND=bindimage x
Reason: This is an information message only. It is logged only for VTAM LUs at the time the session is initiated to the Client. “bindimage” is the first 16 bytes of the SNA bind, in hex, used for this session. “x” is “L” for dependant LUs and “S” for independent LUs. If the “WTOCOMP” option was selected in the UPSTREAM configuration “MAIN” record, this message is also written to the system log (SYSLOG).
Action: None.
UST010E UNABLE TO ENQUEUE CONTROL FILE
Reason: The UPSTREAM online task detected that a UPSTREAM utility function that updates the UPSTREAM repository files is running. The two cannot execute together.
Action: Wait until the utility job terminates, then start the online task again.

UST010W INQUIRE-FILES MAY NOT BE IN ORDER DUE TO INSUFFICIENT MEMORY
Reason: An inquire-files request that required sorting of UPSTREAM records, such as request against a MERGE backup profile, failed due to insufficient above-the-line storage for the sort. This could be due to multiple such requests running concurrently. The displayed files may not be in the correct order.
Action: If you need the files properly sorted, try the request again. If these requests fail frequently, you may have to increase the REGION= value in the z/OS Storage Server startup JCL (values over 32M increase the above-the-line region size).

UST011E RESTORE-FILES TERMINATED DUE TO INSUFFICIENT MEMORY
Reason: A restore request that required sorting of UPSTREAM records, such as a “restore-to-full” or “restore-as-of” from a MERGE backup, failed due to insufficient above-the-line storage for the sort. This could be due to multiple such requests running concurrently.
Action: Try the request again later. If it still fails, you may have to increase the REGION= value in the z/OS Storage Server startup JCL (values over 32M increase the above-the-line region size).

UST012E UPSTREAM COMMAND NOT RECOGNIZED - command
Reason: A command issued from the system console to z/OS Storage Server was not STOP(P) or MODIFY(F). The command received is shown.
Action: See Chapter 17 “FDR/UPSTREAM Operation” for valid commands for UPSTREAM.

UST012E MODIFY REQUEST NOT RECOGNIZED REQ: request
Reason: An z/OS MODIFY(F) command issued from the system console was not recognized by z/OS Storage Server. The invalid request is shown.
Action: Recall the command and check the spelling and syntax. See Chapter 17 “FDR/UPSTREAM Operation” for the valid commands for UPSTREAM.

UST013* (PART OF STATUS DISPLAY GROUP)
Reason: This message is issued as part of a message group when a “STATUS” inquiry request is issued from the system console.
Action: None.

UST014* (PART OF STATUS DISPLAY GROUP)
Reason: This message is issued as part of a message group when a “STATUS” inquiry request is issued from the system console.
Action: None.

UST015* (PART OF STATUS DISPLAY GROUP)
Reason: This message is issued as part of a message group when a “STATUS” inquiry request is issued from the system console.
Action: None.

UST016* NO TASKS CURRENTLY ACTIVE Vn.n.n
Reason: This message is issued as part of a message group when a “STATUS” inquiry request is issued from the system console.
Action: None.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST017E** APPCCMD RCVFMH5 REQUEST FAILED

**Reason:** The z/OS Storage Server main task received an error indication during an “APPC” request to receive the SNA Function Management Header (FMH) type-5 for the conversation allocation.

**Action:** VTAM error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST018E** START CONVERSATION RECEIVE FAILED

**Reason:** The z/OS Storage Server sub-task received an error indication while trying to start a conversation with an UPSTREAM Client.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST019E** INITIAL RECEIVE NOT START-CONVERSATION

**Reason:** The z/OS Storage Server sub-task received an unexpected data type during its conversation initialization.

**Action:** This is an internal error. Retain the error log and contact FDR/UPSTREAM Technical Support for assistance.

**UST020E** PROFILE NAME FAILED CONFIGURATION VERIFICATION

**Reason:** The z/OS Storage Server sub-task was unable to validate the Client Profile Name received for this conversation.

**Action:** Verify that the Profile Name sent by the Client is correct and was included in the Configuration file that last time the z/OS Storage Server Configurator was run.

**NOTE:** This error may also be posted if the GLOBAL profile has been deleted. Certain internal UPSTREAM functions utilize this profile and post the error when they are called if it is missing.

**UST021** COMM. PERFORMANCE TEST (WORKSTATION SEND) REQUESTED

**Reason:** An UPSTREAM Client has requested the communication performance (WS send) test. This message is informational only.

**Action:** None.

**UST022E** RECEIVED STRUCTURE NOT RECOGNIZED

**Reason:** The z/OS Storage Server sub-task received a data or control structure it did not recognize.

**Action:** This is an internal error. Retain the error log and contact FDR/UPSTREAM Technical Support for assistance.

**UST023E** COMM. PERFORMANCE TEST (M/F SEND) COMPLETED $n$ BYTES PER SECOND

**Reason:** The communications performance test (M/F send) logic has completed the request and achieved a data rate of "$n" bytes per second. This message is informational only.

**Action:** None.

**UST024E** SEND FOR BACKUP-STARTED FAILED

**Reason:** The z/OS Storage Server backup process received a communication error indication trying to send control information to the Client.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.
<table>
<thead>
<tr>
<th>Code</th>
<th>Message Description</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST025E</td>
<td>RECEIVE ERROR</td>
<td>The z/OS Storage Server received a communication error indication while receiving data or control information from the Client.</td>
<td>Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST026E</td>
<td>RECEIVED DATA xxxxxxxx UNRECOGNIZED -- EXPECTED FILE-INFORMATION</td>
<td>The z/OS Storage Server Backup process received an unrecognized data or control structure.</td>
<td>This is an internal error. Retain the error log and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST027E</td>
<td>RECEIVED DATA xxxxxxxx UNRECOGNIZED -- EXPECTED FILE-DATA</td>
<td>The z/OS Storage Server backup process received an unexpected data or control structure.</td>
<td>This is an internal error. Retain the error log and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST028E</td>
<td>UNEXPECTED DEALLOCATE RECEIVED</td>
<td>The z/OS Storage Server backup process received an unexpected APPC DEALLOCATE-CONVERSATION request. This is most likely the result of an error having occurred on the Client.</td>
<td>Review the UPSTREAM Client log file for the error.</td>
</tr>
<tr>
<td>UST029E</td>
<td>COMM. PERFORMANCE TEST (M/F SEND) REQUESTED</td>
<td>The communications performance test (M/F send) requested by a Client has begun. Message UST023E is logged at its completion. This message is informational only.</td>
<td>None.</td>
</tr>
<tr>
<td>UST030E</td>
<td>REQUESTED DATA BLOCK-SIZE LESS THAN 10 BYTES</td>
<td>The communications performance test (M/F send) requested by a Client has found that the requested block size for the test transmission was less than 10 bytes.</td>
<td>Reissue the request from the Client specifying a valid test block size.</td>
</tr>
<tr>
<td>UST031E</td>
<td>REQUESTED DATA BLOCK SIZE EXCEEDS 32760 BYTES</td>
<td>The communications performance test (M/F send) requested by a Client has found that the requested block size for the test transmission exceeded 32760 bytes.</td>
<td>Reissue the request from the Client specifying a valid test block size.</td>
</tr>
<tr>
<td>UST032E</td>
<td>REQUESTED SEND-COUNT INVALID</td>
<td>The communications performance test (M/F send) requested by a Client has found that the requested data block send count was invalid.</td>
<td>Reissue the request from the Client specifying a valid send count.</td>
</tr>
<tr>
<td>UST033E</td>
<td>APPC ERROR ON SEND OF DATA BLOCK</td>
<td>The communications performance test (M/F send) requested by a Client has received a communication error indication after issuing a SEND-DATA request.</td>
<td>Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Retry the communications performance test.</td>
</tr>
</tbody>
</table>
### FDR/UPSTREAM Messages

#### FDR/UPSTREAM Started Task Messages

<table>
<thead>
<tr>
<th>Code</th>
<th>Message Description</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST034E</td>
<td>Error on Confirm to Workstation</td>
<td>The communications performance test (M/F send) requested by a Client has received a communication error indication after issuing a CONFIRM request at the completion of the test.</td>
<td>Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST035</td>
<td>Upstream Vn.n.n Initialization Complete - Config=member applid=applid Seclvl=n</td>
<td>This is an informational message only. It is issued by the z/OS Storage Server main task when its initialization process has completed. If shows the configuration member name used (if the configuration data set is a PDS), the VTAM application ID used, and the SECLVL in effect.</td>
<td>None.</td>
</tr>
<tr>
<td>UST036E</td>
<td>Configuration File Format Error -- Terminating</td>
<td>During loading the Configuration Table, the z/OS Storage Server main task found the file contained an error. UPSTREAM terminates with a non-zero return code.</td>
<td>Review the most recent output from the z/OS Storage Server Configurator program for errors. Correct them, rerun the Configurator, and restart the task.</td>
</tr>
<tr>
<td>UST037E</td>
<td>Attach for Subtask Failed -- Session Denied Lu=luname</td>
<td>The z/OS Storage Server main task was unable to attach a processing sub-task for the indicated logical unit. This may be a result of a storage shortage.</td>
<td>Try increasing the REGION size for the UPSTREAM task, if the problem is memory related and retry the operation.</td>
</tr>
<tr>
<td>UST038E</td>
<td>VTAM Error Return Codes and Sense Information</td>
<td>This message is written by an error processing routine used for VTAM APPC and control-type requests. It contains the VTAM error codes from the “RPL” control block. In most cases it also contains a brief text description of the error, to save you the effort of trying to interpret the error codes manually from VTAM manuals. This message is usually written to the log along with other messages indicating the location of the error.</td>
<td>See the “Action” for the accompanying message.</td>
</tr>
<tr>
<td>UST039E</td>
<td>Profile Name Is Invalid</td>
<td>The profile name received from a Client had a length greater than 8.</td>
<td>Insure that the specified profile name is 8 characters or less. Profile names are limited to 1 - 8 alpha, numeric, and national characters. If you are unable to determine the cause of the error, retain the error log and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST040E</td>
<td>Lu=luname Userid Is Missing Or Invalid</td>
<td>The userid received from a Client had a length of 0 or greater than 8.</td>
<td>This error message may be issued if you have specified a non-zero security level parameter (SECLVL=) in the z/OS Storage Server configuration and the request being processed specified no USERID value. Otherwise, this is internal error; Retain the error log and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST041E LU=*luname* PASSWORD IS MISSING OR INVALID**

**Reason:** The password received from a Client had a length of 0 or greater than 8.

**Action:** This error message may be issued if you have specified a non-zero security level parameter (SECLVL=) in the z/OS Storage Server configuration and no password was specified. Otherwise, this is internal error; Retain the error log and contact FDR/UPSTREAM Technical Support for assistance.

**UST042E RECEIVE-DATA ERROR**

**Reason:** The z/OS Storage Server sub-task received a communication error indication during a RECEIVE-DATA request.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST043E UNEXPECTED DEALLOCATE RECEIVED**

**Reason:** The z/OS Storage Server sub-task received an unexpected DEALLOCATE-CONVERSATION indication. This is most likely the result of an error condition on the UPSTREAM Client.

**Action:** Review the error log on the UPSTREAM Client to resolve the problem.

**UST046E RECEIVE BACKUP-DESC REPEATED STRUCTURE FAILED**

**Reason:** The z/OS Storage Server backup process received an error indication during a RECEIVE-DATA request.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST047E RECEIVE FOR FILE-INFORMATION FAILED**

**Reason:** The z/OS Storage Server backup process received a communication error indication during an RECEIVE-DATA request.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST048E MAIN SUBEND UNABLE TO LOCATE ATB FOR TCB=*tcbaddress***

**Reason:** This is an internal error.

**Action:** Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

**UST049E SEND CONFIRMED-RESPONSE FAILED**

**Reason:** The z/OS Storage Server backup process received a communication error indication attempting to send an CONFIRMED response.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST050 event information reported from workstation**

**Reason:** This message contains text sent from the Client. It is usually used to report an error condition at the Client.

**Action:** Review the message and consult the *FDR/UPSTREAM Client Guide* to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.
**UST051E**  **general VSAM error diagnostic information**  
**Reason:** This message is logged by the VSAM error diagnosis routine. It contains specific error codes from the VSAM “RPL” control block. If possible, the message also contains a brief text description of the error. This message is accompanied by others, indicating the location of the error.  
**Action:** If necessary, refer to the IBM VSAM *Macro Reference* or *Macro Instructions for Data Sets* manual (depending on the level of your operating system) to understand the error codes reported. Correct the error or contact FDR/UPSTREAM Technical Support for assistance.

**UST052E**  **COMM ERROR ON RECEIVE DATA REQUEST**  
**Reason:** The communications performance test (PC send) requested by a Client has received an error indication after issuing a RECEIVE request.  
**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST053E**  **RECEIVE FOR RESTORE-DESC REPEATED STRUCTURE FAILED**  
**Reason:** The z/OS Storage Server restore process received a communication error indication during a RECEIVE-DATA request.  
**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST054E**  **SEND OF BACKUP-DESCRIPTION FAILED**  
**Reason:** The z/OS Storage Server restore process received a communication error indication during a SEND-DATA request.  
**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST054E**  **SEND OF PROFILE-DESCRIPTION FAILED - reason**  
**Reason:** An UPSTREAM Client requested display or update of a profile definition, but the request failed for the reason given.  
**Action:** If possible, correct the error and resubmit the request. If necessary, contact FDR/UPSTREAM Technical Support for assistance.

**UST055**  **COMM. PERFORMANCE TEST (WORKSTATION SEND) COMPLETED n BYTES PER SECOND**  
**Reason:** The communications performance test (PC send) requested by a Client has completed and achieved a data rate of “n” bytes per second. This message is informational only.  
**Action:** None.

**UST056W**  **NO CATALOG RECORD FOUND FOR THIS PROFILE NAME**  
**Reason:** This message is issued by the z/OS Storage Server restore process. While searching for a Catalog Version record for the supplied Client Profile Name, no record was found. The specified Profile Name has no versions currently recorded. There may have been no prior backup done specifying this name.  
**Action:** Review the available backups and select the proper one. If you need assistance, contact FDR/UPSTREAM Technical Support.
<table>
<thead>
<tr>
<th>UST057E</th>
<th>NO F-RECORDS FOUND FOR THIS FILENAME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>During the Restore process, z/OS Storage Server was unable to locate a record for the requested filename. The requested filename may not have been backed up in a prior Backup request.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Review the available backups and select the proper one. If you need assistance, contact FDR/UPSTREAM Technical Support.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST058E</th>
<th>APPC SEND OF F-RECORD FAILED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>The z/OS Storage Server restore process received a communication error indication after requesting an SEND-DATA for control information to the Client.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST0059</th>
<th>SEND OF FILE-DATA RECORD FAILED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>The z/OS Storage Server restore logic received a communication error indication after a SEND-DATA request to send File Data to the Client.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST060E</th>
<th>UNEXPECTED DEALLOCATE RECEIVED FROM WORKSTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>The communications performance test (WS send) requested by a Client has received an unexpected conversation de-allocation indication from the Client.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Use these error codes to determine the cause of the error and correct it. Retry the communications performance test. Review the Client log to determine the cause of the APPC DEALLOCATE request.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST061E</th>
<th>DEALLOCATE-CONFIRM REQUEST FAILED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>The z/OS Storage Server Restore logic attempted to normally terminate the conversation by issuing a DEALLOCATE-CONFIRM request but got a communication error indication.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST062E</th>
<th>UNEXPECTED DEALLOCATE RECEIVED FROM WORKSTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>The z/OS Storage Server restore logic received an unexpected DEALLOCATE-CONVERSATION request from the Client. This is most likely the result of an error condition having occurred on the Client.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Review the Client error log to determine the reason the DEALLOCATE request was sent. Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST063E*</th>
<th>UNABLE TO LOAD CONFIG TABLE -- ENQ FAILED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>The z/OS Storage Server main task was unable to acquire an exclusive ENQ in order to load the Configuration Table.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Ensure that you were not trying to start more than one copy of the UPSTREAM main task. If not, this may be an internal error. Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>
### UST064E* CONFIGURATION TABLE LOAD FAILED - TERMINATING

**Reason:** The z/OS Storage Server main task was unable to load the Configuration Table, and is terminating as a result.

**Action:** This is an internal error. Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

### UST065E INQUIRE-VERSIONS INVALID FLAG BYTE FOUND

**Reason:** The z/OS Storage Server Version Inquiry logic detected an invalid value in an internal structure.

**Action:** This is an internal error. Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

### UST066E INVALID value IN INQUIRE-FILES REQUEST

**Reason:** The z/OS Storage Server Version Inquiry logic detected an invalid value in an internal structure. “value” is either “LENGTH VALUE” or “DIRECTORY STRUCTURE”.

**Action:** This is an internal error. Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

### UST067E SEND OF BACKUP-DESC FAILED -- VERSIONDATE

**Reason:** The z/OS Storage Server Version Inquiry logic received a communication error indication after issuing an APPC SEND-DATA request.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

### UST068E SEND OF BACKUP-DESC FAILED -- ALL VERSIONS

**Reason:** The z/OS Storage Server Version Inquiry logic received a communication error indication after issuing an APPC SEND-DATA request.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

### UST069E SEND OF BACKUP-DESC FAILED -- LATESTVERSION

**Reason:** The z/OS Storage Server Version Inquiry logic received a communication error indication after issuing an APPC SEND-DATA request.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

### UST070W NO RECORDS FOUND FOR INQUIRE-VERSIONS REQUEST

**Reason:** The z/OS Storage Server Version Inquiry logic found no records for the inquiry request.

**Action:** Verify the Profile Name and the VERSIONDATE requested are valid. Verify that a successful Backup had been performed previously for this Profile.

### UST071E SEND FOR FILE-INFORMATION RECORD FAILED

**Reason:** The z/OS Storage Server File Inquiry logic received a communication error indication after issuing a SEND-DATA for an internal control structure.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.
UST072W  NO FILES FOUND FOR VERDATE=versiondate PATH=fileid
   Reason: The z/OS Storage Server File Inquiry logic was unable to find a match for the request.
   Action: Verify the requested Profile Name and VERSIONDATE are correct and retry the operation.

UST073E  ATTNEXIT FOUND function IN PROGRESS -- REJECTED
   Reason: The requested conversation initiation was denied due to a z/OS Storage Server having a status that prevents new Client functions from starting. If “function” is SHUTDOWN, then UPSTREAM received a system console STOP request and is waiting for all currently active sub-tasks to terminate. If it is REORG, then one or more of the UPSTREAM files is being reorganized in response to a console REORG request.
   Action: The Client can retry the request after z/OS Storage Server is restarted or after the REORG completes.

UST074E  ATTNEXIT FMH5 CONV TYPE NOT BASIC - REJECTED
   Reason: The z/OS Storage Server main task found an invalid value in the received Function Management Header (FMH) type-5 from the Client.
   Action: This is an internal error. Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

UST075E  ATTNEXIT FMHS SYNC LEVEL NOT CONFIRM -- REJECTED
   Reason: The z/OS Storage Server main task found an invalid value in the received Function Management Header (FMH) type-5 from the Client.
   Action: This is an internal error. Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

UST076E  ROLLOFF -- NO C-RECORDS FOUND FOR ROLLOFF
   Reason: This is an internal error.
   Action: Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

UST077E  ROLLOFF -- VSAM ERROR
   Reason: The z/OS Storage Server Backup “Version Rolloff” logic encountered an error during a VSAM I/O request. This message is accompanied by message UST051E containing the VSAM error codes as reported.
   Action: Retain all error information and contact FDR/UPSTREAM Technical Support.

UST078 BACKUP STATISTICS (TOTALS RECEIVED):
   Reason: This is the first of a three message group. Statistics are logged to the UPSTREAM log file for each backup performed. This message is accompanied by messages UST079 and UST080 containing the statistics for the backup just ended.
   Action: None.

UST079 VERSIONDATE: vvvvvvvvv; nnnnnnnnnnn FILES function mmmmmmmmm DIRECTORIES function
   Reason: If “function” is RECEIVED, this is the second message of a three-message group (including UST078 and UST080); it shows the “versiondate” used to store the files being backed up as well as the number of files and the number of subdirectories backed up. If “function” is RESTORED, the message is issued with UST080 to show the number of files and subdirectories sent to the Client from the indicated “versiondate” (the Client may not restore all of them).
   Action: None.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST080**  
**nmmmmmmmmmm DATA-BLOCKS; mmmmmmmmmmm DATA-BYTES RECEIVED**  
**Reason:** This is the last of a multi-message group. This message is preceded by messages **UST078** and **UST079** containing the statistics for the function just ended. This message contains the total count of transmission data blocks and bytes send to or from the UPSTREAM Client.  
**Action:** None.

**UST081W**  
**RESTORE: C-RECORD NOT FOUND FOR SPECIFIC VERSION DATE=versiondate**  
**Reason:** During z/OS Storage Server Restore processing, the logic was unable to locate a Repository Catalog record for the specific version requested by the End User.  
**Action:** Use the “INQUIRE VERSIONS” function of the Restore panel to locate the version you are attempting to Restore. If the version is shown, this is an internal error. Otherwise, select a version listed, and retry the Restore request.

**UST082E**  
**RESTART: MODCB FOR RPL-C FAILED**  
**Reason:** During a Restarted Backup, the z/OS Storage Server logic received an error indication from a VSAM “MODCB” request. This message is accompanied by message **UST051E** containing the VSAM error codes as reported.  
**Action:** Refer to the IBM VSAM Macro Reference or Macro Instructions for Data Sets manual (depending on the level of your operating system) to understand the error codes reported.

**UST083E**  
**UNABLE TO RESTART BACKUP -- reason**  
**Reason:** During a Restarted Backup, z/OS Storage Server could not restart the backup for the reason given. This generally occurs when a Backup is interrupted for any reason prior to z/OS Storage Server having received sufficient data to consider the Backup committed, i.e., the interrupt occurred too early in the Backup process to retain the Backup information.  
**Action:** You need to rerun the Backup -- it is not re-startable.

**UST084E**  
**RESTART: SEND OF BACKUP-DESC FAILED**  
**Reason:** During a Restarted Backup, z/OS Storage Server received a communications error indication, having issued a SEND-DATA request.  
**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST085W**  
**WARNING -- FILES BACK TO FULL IGNORED FOR NON-MERGE**  
**Reason:** An UPSTREAM Client user requested a “back-to-full” restore, but the backups to be restored were not MERGE backups, so the option was ignored. The restore proceeds.  
**Action:** None.

**UST086E**  
**COMM RECEIVE REQUEST TIMEOUT -- function TERMINATED**  
**Reason:** A function in progress is terminated after a period of ten minutes if no data is received from the Client.  
**Action:** Review the UPSTREAM log on the Client to determine the cause of the timeout

**UST087E**  
**LU=luname USERID/PASSWORD OR PROFILE VALIDATION UNSUCCESSFUL**  
**Reason:** The SAF (security) call to verify the userid and password or profile name provided by the Client user (as requested by SECLVL=1 or 2 in the UPSTREAM Configuration) has failed. The user may have specified the wrong userid, password or profile name.  
**Action:** Verify the specified userid, password and profile are correct and are defined correctly to your security system.
<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST093W</td>
<td><strong>RESTORE: CATALOG ARCHIVE-RECORD NOT FOUND</strong></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>During z/OS Storage Server restore processing for a specified “versiondate”, no records were found.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Use the “Inquire Versions” request on the Restore menu to list all available versions, to verify your request was correct. If your request was correct, this is an internal error; retain all error information and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST094E</td>
<td><strong>OPEN FOR ARCHOLD DATASET FAILED</strong></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>During z/OS Storage Server restore processing, an error indication was received trying to open the Archive data set.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Refer to your system log for any additional messages to resolve the problem.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST095E</td>
<td><strong>DYNALLOC ERROR: reason</strong></td>
</tr>
<tr>
<td><strong>R15=rrrr CODE=cccc INFO=iiii DSN=dsname</strong></td>
<td></td>
</tr>
<tr>
<td><strong>DYNALLOC MSGS: messages</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>This message is issued when the dynamic allocation (SVC 99) request for a tape or disk sequential data set fails with a non-zero return code. If the error code is a common one, a brief explanation of the cause is shown as “reason”. In any case, the return code “rrrr”, return code “cccc” and information code “iiii” returned by SVC 99 are shown, as well as the name of the data set whose allocation failed. If SVC 99 also returned any messages (such as SMS errors) they are also displayed.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>If you cannot determine the cause of the error from the messages printed, dynamic allocation error codes are listed in various IBM manuals and are also listed in Appendix A of the IBM ISPF online HELP. If you are unable to resolve the problem, please retain all error information, including your System log, and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST096E</td>
<td><strong>RESTORE: ARCHIVE VOLUME NOT IN CURRENT SET -- FILE NOT ACCESSIBLE</strong></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>During a Restore from the Archive data set, z/OS Storage Server was unable to mount the correct volume.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>This indicates an internal error in the Repository Catalog records. Please retain all error information, including your System log, and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST097W</td>
<td><strong>IMMEDIATE SHUTDOWN REQUESTED -- function TERMINATED</strong></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>The indicated function was in progress when FDR/UPSTREAM z/OS Storage Server received an immediate shutdown request from the System Operator. The function is terminated</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST098E</td>
<td><strong>LOGON EXIT - NOT APPC INIT REQUEST</strong></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>The indicated function was not received as expected. The function is terminated.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST099</td>
<td><strong>PARM --&gt; parmdat</strong></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>If parameters were passed to UPSTREAM via the PARM= JCL operand on the EXEC statement in the UPSTREAM startup PROC, the parameters are shown here. (See Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”.)</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST099E</td>
<td><strong>PARM KEYWORD UNKNOWN [INVALID NUMERIC]</strong></td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td>One of the startup parameters or its specified value shown in the UST099 message is invalid.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>See Section 3.16 “Configure the MAIN Options” for valid parameters.</td>
</tr>
</tbody>
</table>
UST100W ‘QUIT’ REQUESTED -- INITIATION ABORTED
Reason: A F UPSTREAM,TERM or F UPSTREAM,QUIT console command was entered to request immediate termination of UPSTREAM. This Client was in the process of initiating a conversion; it is terminated.
Action: None.

UST101E type EXIT -- CHECK FOR ACTSESS ERROR
Reason: This message indicates VTAM returned an error indication to an APPC “CHECK” request to activate the pending active session to the Client.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST102W PROFILE NAME ALREADY IN USE -- DISALLOWED
Reason: A UPSTREAM Client attempted to use a Profile Name that was already in use by another Client currently in conversation with UPSTREAM.
Action: Verify that the same Profile Name has not been accidentally assigned to two Clients, and that the two Clients involved are using the correct Profile Names.

UST102W PROFILE NAME profilename NOT AUTHORIZED -- DISALLOWED
Reason: An UPSTREAM Client user requested display or update of a profile in the UPSTREAM configuration, and SECLVL=2 or 3 was in effect, but the userid entered by the user was not authorized for ALTER access to the profile name requested.
Action: Repeat the request using a userid that is authorized to ALTER the profile name, or update your security system to authorize the userid.

UST103E LOGON EXIT -- INQUIRE SESSPARM ERROR
Reason: The Main Task VTAM LOGON EXIT was unable to issue an INQUIRE request to verify the suggested BIND image. The session request is denied.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST104W LU=luname - USING DEFAULT BIND
Reason: This message is issued from within the Main Task VTAM LOGON exit. The supplied BIND image failed LU 6.2 standard verification. z/OS Storage Server will attempt to use the internal default Bind image to establish the session.
Action: If you are using the IBM-supplied #INTER log mode table entry for UPSTREAM sessions, this is normal and can be ignored. Otherwise, verify that the specified parameters in the mode table entry you are using are correct for an LU 6.2 session.

UST105E RESTORE: RECEIVE FOR EVENT RECORD FAILED
Reason: The RESTORE logic received a communication error while trying to retrieve a record describing a Client error.
Action: Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST106 UPSTREAM CUSTOMER NUMBER nnnnnnnnn
Reason: This message is informational only. It is issued by the z/OS Storage Server main task during its initialization. If this is a UPSTREAM trial, the text “TRIAL VERSION” will appear instead of a customer number.
Action: None.
UST107W*  
**DAYS TO UPSTREAM EXPIRATION**

**Reason:** This message is issued during main task initialization to indicate the z/OS Storage Server product authorization time period is about to expire.

**Action:** Contact FDR/UPSTREAM Technical Support if you have any questions.

UST109E  
**AUTHORIZATION FAILED, CODE = nn**

**Reason:** During initialization, the z/OS Storage Server main task found an authorization violation. The “CODE=nn” value indicates the type of authorization failure.

**Action:** Retain the error log and contact FDR/UPSTREAM Technical Support for assistance.

UST111E*  
**UPSTREAM USE HAS EXPIRED, CONTACT INNOVATION DATA FOR ASSISTANCE**

**Reason:** This message is issued by the UPSTREAM main task to indicate that the timed use of the product has expired. z/OS Storage Server will not start.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

UST112  
**WS FILE SKIPPED: wsfilename**

**Reason:** This message is informational, it is issued during a Backup process to indicate that the Client notified the mainframe it is skipping a file. This is a normal condition and is encountered if the Client finds a file inaccessible during the Backup process.

**Action:** None.

UST113W  
**CHECKSUM ERROR:checksm1-checksm2 wsfilename**

**Reason:** During a full MERGE backup, the checksum validation option was requested. For files which are already on the backup and do not need to be translated, UPSTREAM will calculate a checksum of each Client file on the Client and also on z/OS (from the backup). This message is issued if the checksum values do not match; “checksm1” is the checksum from z/OS, “checksm2” is the checksum from the Client. This detects files that have changed on the Client since the last backup but were not flagged as requiring backup.

**Action:** The Client file whose checksum did not match is retransmitted from the Client.

UST114E  
**MAINFRAME VSAM ERROR**

**Reason:** This message is issued during a Backup process along with a group of other messages indicating an error was encountered during a VSAM request. This message is also sent to the Client.

**Action:** Review the other messages associated with the VSAM error.

UST115E  
**REQUESTED RECORDSIZE EXCEEDS ALLOWED BLKSIZE -- TERMINATING**

**Reason:** The “RECORDSIZE” value specified in the Client backup parameters exceeded the allowable blocksize for the target device.

**Action:** Verify that a valid “RECORDSIZE” value was specified for the backup request. If the request is for a “sequential DASD” backup, you may increase the “DASDBLK” value in the z/OS Storage Server mainframe configuration to accommodate the request.

UST116E  
**ATTNEXIT: APPC ERROR RCVFMH5 REJECT FAILED**

**Reason:** A FMH5 was received in error; a request to REJECT it did not complete successfully.

**Action:** Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.
UST117E  function FAILED
  Reason:  A communications failure occurred.
  Action:  Refer to subsequent messages for additional information.

UST117  INQUIRE-VERSIONS PROCESS STARTED
  Reason:  An inquire-versions request was received from an UPSTREAM Client.
  Action:  None.

UST118E  PRIMARY RECEIVE PACING=ZERO -- SESSION DISALLOWED
  Reason:  The UPSTREAM main task VTAM logon exit found, during session initiation, that the bind contained a zero value for the primary receive pacing count. Using this value could result in serious mainframe problems. The logon exit instead disallowed the requested session.
  Action:  Verify that the VTAM APPL definition for z/OS Storage Server contains a valid “VPACING” value. Contact FDR/UPSTREAM Technical Support for assistance.

UST119E*  APF AUTHORIZATION CHECK FAILED -- CANNOT CONTINUE
  Reason:  During initialization, an z/OS Storage Server component has determined that it is not running as an APF authorized task. UPSTREAM terminates.
  Action:  Verify that the load library from which z/OS Storage Server is being run is APF authorized in the z/OS system.

UST120E  RECEIVE FOR RESTORE-DESC REPEATED STRUCTURE FAILED
  Reason:  The Sequential Restore process received a communication error indication after issuing an receive request.
  Action:  Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST121E  UNEXPECTED DEALLOCATE RECEIVED FROM WORKSTATION
  Reason:  The Sequential Restore process received an unexpected Deallocate indication, terminating the active conversation.
  Action:  Review the UPSTREAM log file on the Client for an indication as to the error cause. Contact FDR/UPSTREAM Technical Support for assistance.

UST122E  RESTORE: C-RECORD NOT FOUND FOR SPECIFIC VERSIONDATE
  Reason:  The sequential restore processor was unable to locate a catalog record for the requested "versiondate". It is possible that the original backup was not committed prior to it's termination.
  Action:  Perform an “inquire versions” function to verify that you are requesting a valid “versiondate” as recorded in the VSAM repository.

UST123E  ARCHIVE RESTORE DISALLOWED -- SECURITY CHECK FAILED
  Reason:  SECLVL=2 or 3 was specified in the configuration, and the security check for tape restores failed.
  Action:  See Chapter 4 “Security” for details on authorizing restores from tape.

UST124E  SEND OF BACKUP-DESCRIPTION FAILED
  Reason:  The z/OS Storage Server received an error indication after issuing an Send request.
  Action:  Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.
FDR/UPSTREAM Messages
FDR/UPSTREAM Started Task Messages

UST125E  RESTORE: CATALOG S-RECORD NOT FOUND

Reason: The sequential restore process was unable to locate the catalog record requested. It is possible that the backup was terminated before it was committed.

Action: Perform an “inquire versions” request to determine whether the backup information does exist. Verify that you are using the correct version information in the request. Verify that the sequential backup data set exists and is cataloged in the system.

UST126E  DYNALLOC ERROR: R15=rrrrrrrr CODE=cccc INFO=iiii

Reason: The sequential restore process was unable to dynamically allocate the requested sequential backup data set. The additional information fields contain the return codes and information reason codes associated with the failed dynamic allocation request.

Action: Verify that the requested sequential backup data set exists and is cataloged in the system. See message UST095E for information on interpreting the error codes.

UST127E  OPEN FOR RESTORE DATASET FAILED

Reason: The sequential restore process was unable to open the sequential data set to perform the restore.

Action: Verify that the requested sequential backup data set exists and is cataloged in the system. Use another system utility to verify that the backup sequential data set is the correct format and has not been altered, copied to a different format, or corrupted in any way.

UST128W  NO CATALOG RECORD FOUND FOR THIS PROFILE NAME

Reason: The sequential restore process was unable to locate the z/OS Storage Server catalog record for the requested sequential backup.

Action: Perform an “inquire versions” request to verify that you are requesting the correct Profile Name and “versiondate”.

UST129E  SEND FOR F-RECORD FAILED

Reason: The sequential restore process received a communication error indication after issuing a Send-Data request for a File-Information Record.

Action: Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

UST130E  INSUFFICIENT STORAGE FOR MERGE BACKUP

Reason: The MERGE BACKUP function requires storage above the 16MB line; the amount varies by the number of files involved and the number of concurrent backups in progress. Insufficient storage was available for the MERGE BACKUP requested by this Client and the backup is terminated.

Action: Increase the above-the-line storage available to z/OS Storage Server by coding a REGION= value on the EXEC statement in the UPSTREAM startup PROC, (see Section 3.19 “Define the FDR/UPSTREAM Started Task PROC”) with a value greater than 32M (32MB is the default above-the-line storage size), or schedule the MERGE BACKUPS so that fewer are running concurrently.

UST131W  IMMEDIATE SHUTDOWN REQUESTED -- RESTORE TERMINATED

Reason: The sequential restore process was notified that the system operator requested an immediate UPSTREAM shutdown.

Action: None.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST132E**  RESTART: BACKUP ALREADY ARCHIVED -- CANCELLED

**Reason:** Restart of an interrupted backup was attempted, but UPSTREAM records indicate that the backup was successfully completed.

**Action:** No restart is required.

**UST133E**  DEALLOCATE-CONFIRM REQUEST FAILED

**Reason:** The sequential restore process received a communication error indication at the end of the restore process after issuing a Confirm request.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

**UST134E**  SEND FILE-DATA RECORD FAILED

**Reason:** The sequential restore process received a communication error indication after issuing an Send-Data request for a File-Data Record.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

**UST135E**  RECEIVE FOR EVENT RECORD FAILED

**Reason:** The sequential restore process received a communication error indication after issuing a Receive request for a Client event record.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

**UST136E**  RESTORE: DATA RECORD NOT FOUND IN BLOCK EXPECTED

**Reason:** The sequential restore process was unable to locate a data record during the restore in the block in which it was expected.

**Action:** Verify that you are restoring from the correct data set, that it is not a copy of the current backup data set. You may have to run the USTREGEN utility to make the copied data set current in the VSAM control clusters.

**UST137E**  RESTORE: UNABLE TO LOCATE BACKUP FILE FOR RESTORE

**Reason:** The sequential restore process was unable to dynamically allocate a sequential disk backup file to perform the restore. It received an indication that the file does not exist or is not cataloged. You may be attempting to restore from a sequential backup file that has been deleted or uncataloged in the system. This message is accompanied by message UST138E containing the data set name z/OS Storage Server was attempting to dynamically allocate.

**Action:** Verify that the data set exists and is cataloged.

**UST138E**  DSN=dsname

**Reason:** This message accompanies message UST137E. It contains the data set name z/OS Storage Server was attempting to dynamically allocate.

**Action:** None.
UST139E UNABLE TO LOCATE BACKUP DATASET FOR RESTORE

Reason: The sequential restore process was unable to dynamically allocate a sequential tape backup file to perform the restore. It received an indication that the file does not exist or is not cataloged. You may be attempting to restore from a sequential backup file that has been deleted or uncataloged in the system. This message is accompanied by message UST159E containing the data set name z/OS Storage Server was attempting to dynamically allocate.

Action: Verify that the data set exists and is cataloged.

UST140E COMMUNICATIONS ERROR

Reason: The sequential backup process received a communication error indication.

Action: Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

UST141 text of a message from the workstation

Reason: This message is issued when a Client in session with z/OS Storage Server sends an error or informational message. This message is a Client message.

Action: None.

UST142W function DISALLOWED BY CONFIGURATION

Reason: The profile in use is not enabled for the function indicated.

Action: Review the z/OS Storage Server configuration file to determine whether this profile should be permitted to perform the requested function.

UST143E RECEIVE FOR BACKUP_DESC_REP FAILED

Reason: The sequential backup process received a communication error.

Action: Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

UST144E RECEIVED UNRECOGNIZED STRUCTURE

Reason: The sequential backup process received an unrecognized structure from the Client. This is most likely an internal UPSTREAM error.

Action: Review the UPSTREAM log on the Client for information as to the cause of the failure.

UST145E DYNALLOC ERROR: R15=rrrrrrrr CODE=cccc INFO=iiii

Reason: The sequential backup process was unable to dynamically allocate the backup sequential backup data set.

Action: Verify that the requested sequential backup data set exists and is cataloged in the system. See message UST095E for information on interpreting the error codes.

UST146E *** OPEN FOR BACKUP DATASET FAILED ***

Reason: The sequential backup process was unable to open the sequential backup output data set.

Action: If you are unable to resolve the problem, contact FDR/UPSTREAM Technical Support for assistance.
UST147E  SEND BACKUP-STARTED STRUCTURE FAILED
Reason: The sequential backup process received a communication error indication.
Action: Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

UST148E  *** MAINFRAME VSAM ERROR ***
Reason: The sequential backup process sends this message to the Client to indicate an error occurred during a mainframe VSAM request.
Action: None.

UST149E  DEALLOCATE_CONFIRM ERROR
Reason: The sequential backup process received a communication error indication after issuing a Deallocate request.
Action: Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance. Review the UPSTREAM log on the Client for information as to the cause of the failure.

UST150E  BACKUP_DESC FLAG LENGTH ERROR
Reason: The sequential backup process received an invalid internal structure from the Client. The most probable cause for this problem is that the Client is using an old, unsupported version of UPSTREAM.
Action: If you are unable to resolve the problem, contact FDR/UPSTREAM Technical Support for assistance.

UST151W  DASD BACKUP DISALLOWED BY CONFIGURATION
Reason: The sequential backup process has determined that this Client profile name was not configured to allow sequential backups to mainframe DASD.
Action: Review your mainframe configuration file. Verify that this Profile Name is permitted to perform sequential disk backups.

UST152W  TAPE BACKUP DISALLOWED BY CONFIGURATION
Reason: The sequential backup process has determined that this Client profile name was not configured to allow sequential backups to mainframe tape.
Action: Review your mainframe configuration file. Verify that this Profile Name is permitted to perform sequential tape backups.

UST153E  REMOVE-FILE NAME MISMATCH -- IGNORED
Reason: The sequential backup process received a REMOVE-FILE request from the Client for a file other than the current file being processed.
Action: This is an internal error. Notify FDR/UPSTREAM Technical Support as soon as possible.

UST154W  CATALOG RECORD NOT FOUND FOR BACKUP RESTART
Reason: The sequential backup process was unable to locate the control record to restart the backup. The prior backup may not have progressed far enough to be committed.
Action: Perform an “inquire versions” process to determine whether you are attempting to restart an interrupted backup and if the backup is present in FDR/UPSTREAM.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST155E ERROR READING CATALOG RECORD -- UNABLE TO RESTART BACKUP**

**Reason:** The sequential backup process was unable to read the required control record to restart the backup. The prior backup may not have progressed far enough to be committed.

**Action:** Perform an “inquire versions” process to determine whether you are attempting to restart an interrupted backup and if the backup is present in UPSTREAM.

**UST156E TAPE BACKUP DISALLOWED -- NO UNIT VALUE SPECIFIED IN CONFIGURATION**

**Reason:** The sequential tape backup process is unable to build the dynamic allocation request because the “TUNIT” value was not specified in the z/OS Storage Server Configurator input “DEFINE” record for this Profile Name.

**Action:** This may be perfectly valid if you intended to disallow this Client Profile Name from performing sequential tape backups. Otherwise, verify that the configuration “DEFINE” record for this Profile Name contains the “TUNIT” parameter to specify the z/OS "unitname" to be used for the dynamic allocation request.

**UST157E MERGE BACKUP ERROR -- REASON=reason text**

**Reason:** A MERGE BACKUP was requested by the Client, but it failed for the reason indicated. Possible reason codes and the actions to be taken are:

1 – **PREVIOUS FULL BACKUP NOT FOUND** – z/OS Storage Server cannot find a record of a previous full backup taken under this profile. Either it has expired or one was never taken. Take a “first-time full” backup.

2 – **ERROR READING CATALOG FOR PREVIOUS BACKUP** – z/OS Storage Server could not successfully read its catalog records to locate the previous backup under this profile. Contact FDR/UPSTREAM Technical Support for assistance. If necessary, take a “first-time full” backup.

3 – **PROFILE DOES NOT ALLOW MERGE BACKUP** – The profile does not have the MERGE attribute, so MERGE BACKUPS cannot be done. Use a different profile with MERGE, or update the configuration to add MERGE to this profile, or do a “non-MERGE backup”.

4 – **OPERATOR CANCELLED MOUNT OF PREVIOUS TAPE -- CALLING FOR SCRATCH** – The console operator replied NO to the console messages requesting that a previous backup tape be mounted so that UPSTREAM can append data to it. FDR/UPSTREAM will call for the mount of a SCRATCH tape instead.

5 – **OPERATOR CANCELLED MOUNT OF MERGE BACKUP** – The console operator replied “NO” to the console messages requesting that a previous backup tape be mounted. If message UST157 REASON=Z is issued, UPSTREAM will recover by requesting the missing files from the Client. Otherwise, a “first-time full” backup will have to be done.

6 – **PREVIOUS FULL BACKUP FAILED TO OPEN** – An OPEN error occurred when trying to open a previous backup. See the z/OS SYSLOG or the UPSTREAM JOBLOG for IBM messages indicating the error. Contact FDR/UPSTREAM Technical Support for assistance. UPSTREAM will recover by requesting the missing files from the Client.

7 – **DYNAMIC ALLOCATE FAILED FOR PREVIOUS FULL BACKUP**

   **COMP=cccc DSN=dsn** – z/OS Storage Server had an error (completion code “cccc”) trying to dynamically allocate the previous full backup file named “dsn”. See message UST095E for codes. UPSTREAM will recover by requesting the missing files from the Client.

8 – **DEBLOCKING ERROR** – z/OS Storage Server found an invalidly formatted block when reading a previous backup tape. That backup is probably not usable. UPSTREAM recovers by requesting the missing files from the Client.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

9 – NO PREVIOUS BACKUPS WILL REQUEST FILES FROM PC – z/OS Storage Server could not find a catalog record for a previous backup for this profile. Either it has expired or one was never taken. All required files are requested from the Client.

A – FILEDATA WITHOUT FILEINFO – z/OS Storage Server did not find expected file-info records on a previous backup tape. This is probably due to a backup taken with a version of UPSTREAM prior to V2.3.2 after MERGE BACKUPS were taken under this profile. A “first-time full” backup will have to be done. If necessary, contact FDR/UPSTREAM Technical Support for assistance.


D – PREVIOUS BACKUP WAS INTERRUPTED – During MERGE processing, a backup required as input was interrupted and never completed. If possible, complete the backup and rerun MERGE. If this backup can no longer be completed, it might be necessary to exclude it from the MERGE process. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

E – VSAM ERROR KEY=keyvalue – While writing FILEINFO records to the FILEINFO database file, a VSAM error was encountered. The key of the record in error is displayed. Review additional messages to determine the actual reason for the error. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

F – COPYINCR DSN=dsname – During MERGE processing, the system was performing the COPYINCR function and encountered a VSAM error updating the UPSTREAM repository with the new information about the location of the COPYINCR data sets. Review additional messages to determine the actual reason for the error. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

G – SCRATCH ERROR COMP=cccc DSN=dsname – During MERGE processing, an error was encountered when attempting to UNCATALOG/SCRATCH a z/OS data set. Review the COMP field value to determine the actual error code associated with the operation (CATALOG). Contact FDR/UPSTREAM Technical Support for assistance if necessary.

H – READ I/O ERROR DSN=dsname – While de-blocking records during normal MERGE processing an error was encountered on the backup data set name listed in the error message. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

J – DUPLICATE MISSING RECORDS KEY=keyvalue – While processing files associated with the DUPLICATE database during MERGE processing an error was encountered on the key listed in the error message. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

Q – OPERATOR CANCELLED MERGE BACKUP – During MERGE processing, the z/OS system operator (or someone with system operator privileges) requested that this UPSTREAM function be terminated. Review the z/OS Storage Server USTLOG output as well as the z/OS SYSLOG to determine who issued the request and their reasoning.

V – DUPLICATE VSAM ERROR KEY=keyvalue – While processing files associated with the DUPLICATE database during MERGE processing an error was encountered on the key listed in the error message. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

Y – DUE TO PRIOR ERROR MERGE TERMINATED – A preceding message indicates that an error occurred during a Full Merge Migration. No recovery is possible, so the Merge was terminated. Review the Migration section of this manual for the necessary actions you must take before re-submitting the Migration request.
Z – DUE TO PRIOR ERROR WILL REQUEST MISSED FILES FROM PC – This is an information message that follows another message and indicates that the previous error is one that UPSTREAM can recover from by requesting files from the Client to replace those that it was unable to copy from a previous backup.

**Action:** Follow the suggested actions contained within the REASON description. Contact FDR/UPSTREAM Technical Support if you require further assistance.

**UST158**

```
MERGE FILES: bbbbbbb COPIED FROM BACKUP
ALREADY ON BACKUP ddddddd FROM PC IN PHASE3
DEFERRED MERGE FILES
FILES MIGRATED: gggggggg MIGRATED FILES COPIED
MIGRATED FILES DELETED
COPYINCR FILES: mmmmmmmmm COPYINCR DIRECTORIES
BACKUPS COPIED TO FULL
FILES SAVED IN DUPLICATE DATABASE
```

**Reason:** At the end of a successful MERGE BACKUP, this message indicates what work the MERGE had to do. Not all parts of the message shown will appear, depending on what parts of the MERGE BACKUP process were required for this backup.

**Action:** None.

**UST159**

```
EDSN=dsname
```

**Reason:** This message accompanies message UST139E. It contains the data set name z/OS Storage Server was attempting to dynamically allocate.

**Action:** None.

**UST160**

```
NO RECORDS MATCH RESTORE SPECIFICATION
```

**Reason:** The sequential tape restore process was unable to locate any backup records which match the requested restore specification.

**Action:** Verify that you are using a correct Profile Name and VersionDate value. You should perform an Inquire-Versions to verify that the backup version exists. Also, verify that the Client path name you are requesting was contained in the backup you are attempting to restore. You should perform an Inquire-Files process to verify this.

**UST161**

```
SEND OF FILE-INFO RECORD FAILED
```

**Reason:** The sequential tape restore process received a communication error indication after issuing a SEND-DATA request to send a File-Information record to the Client.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST162**

```
OPEN FOR SEQUENTIAL BACKUP FILE FAILED
```

**Reason:** The sequential tape restore process received an error indication trying to OPEN the sequential tape backup data set.

**Action:** If you are unable to resolve the problem, retain all error information and contact FDR/UPSTREAM Technical Support for assistance as soon as possible.
UST163E  SEND OF FILE-DATA RECORD FAILED  
**Reason:** The sequential tape restore process received a communication error indication after issuing a SEND-DATA request to send a File-Data record to the Client.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST164E  DYNALLOC ERROR: R15=rrrrrrrr CODE=cccc INFO=iiii  
**Reason:** The sequential tape restore process received an error indication trying to dynamically allocate the tape backup data set to perform the restore process.

**Action:** Verify that the requested sequential backup data set exists and is cataloged in the system. See message UST095E for information on interpreting the error codes.

UST165E  GOTEVENT RECEIVE ERROR  
**Reason:** The sequential tape restore process received a communication error indication while attempting to receive an “event” information record from the Client.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST166W  NO FILES MEET RESTORE SPECIFICATION versiondate filespec  
**Reason:** The sequential tape restore process was unable to locate any files that match the requested restore specification.

**Action:** Verify that the Client has specified the correct Profile Name and Versiondate for the restore request; perform an Inquire-Versions request to verify this. Verify that the Client has specified a valid restore file specification path name that is contained in the backup version being requested; run a Inquire-Files request on this version to verify this.

UST167E  OPEN FOR SEQUENTIAL BACKUP FILE FAILED  
**Reason:** The sequential tape restore process was unable to OPEN the sequential backup file to perform the restore.

**Action:** If you are unable to resolve the problem, retain all error information and contact FDR/UPSTREAM Technical Support for assistance as soon as possible.

UST168E  SEND OF FILE-INFO RECORD FAILED  
**Reason:** The sequential tape restore process received a communication error indication while attempting to send a File-Information record to the Client.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST169E  SEND OF FILE-DATA RECORD FAILED  
**Reason:** The sequential tape restore process received a communication error indication while attempting to send a File-Data record to the Client.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.
UST170E  EVENT HANDLER RECEIVE ERROR

Reason: The sequential tape restore process received a communication error indication while attempting to receive an event record from the Client.

Action: Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST171E  DATA RECORD NOT FOUND FOR RESTORE

Reason: The sequential tape restore process found that the data requested by the Client for restore was not where UPSTREAM records indicate it should be located.

Action: Verify that the correct tape data set is being used for the restore and that it is not a copy of the tape backup. If so, you will need to run the USTREGEN utility to make that tape data set usable for restore processing.

UST172E  error type FOR RESTORE OF FILE=file description

Reason: The sequential tape restore process found that the data requested by the Client for restore was not where UPSTREAM records indicate it should be located.

“error type” is:
- NO DATA RECORD FOUND – if no records were found at all.
- DATA RECORDS MISSING – if some records were found.
- VSAM RECORD ERROR – if an error occurred reading the UPSTREAM repository.
- PREMATURE END-OF-FILE – if the end of the backup was encountered when not expected.

“file description” includes the data set name, volume serial, and location information describing the backup file where the error occurred.

Action: Verify that the correct tape data set is being used for the restore and that it is not a copy of the tape backup. If so, you need to run the USTREGEN utility to make that tape data set usable for restore processing.

UST173  function COMPLETED SUCCESSFULLY (LU=luname)

Reason: This message is issued by all processes to show that the indicated function has completed successfully. This message may optionally be written to the system log (SYSLOG) if the “WTOCOMP” option was specified in the z/OS Storage Server Configurator “MAIN” record.

Action: None.

UST174W  function COMPLETED WITH ERRORS (LU=luname)

Reason: This message is issued by all processes to show that the indicated function has completed with some potential errors. This may simply indicate that one or more of the files requested for backup were not available for one reason or another at the time the backup was performed (“skipped files”). This message may optionally be written to the system log (SYSLOG) if the “WTOCOMP” option was specified in the z/OS Storage Server Configurator “MAIN” record.

Action: None.
<table>
<thead>
<tr>
<th>Code</th>
<th>Message Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST175E</td>
<td>Function failed reason (LU=luname)</td>
</tr>
<tr>
<td>Reason</td>
<td>This message is issued by all processes to indicate the indicated function has failed. This message may optionally be written to the system log (SYSLOG) if the “WTOCOMP” option was specified in the z/OS Storage Server Configurator “MAIN” record. “reason” may be “WAS SUSPENDED” if the Client requested suspension or “COMMUNICATIONS” if the failure was due to a communications error; otherwise it is blank.</td>
</tr>
<tr>
<td>Action</td>
<td>Review any preceding messages in the z/OS Storage Server log file, the z/OS system log (SYSLOG), and the Client UPSTREAM log file for the causes of the process failure.</td>
</tr>
<tr>
<td>UST176</td>
<td>Restore completed successfully (LU=luname)</td>
</tr>
<tr>
<td>Reason</td>
<td>This message is issued by all restore processes to indicate a restore has completed successfully. This message may optionally be written to the system log (SYSLOG) if the “WTOCOMP” option was specified in the z/OS Storage Server Configurator “MAIN” record.</td>
</tr>
<tr>
<td>Action</td>
<td>None.</td>
</tr>
<tr>
<td>UST177W</td>
<td>Restore completed with errors (LU=luname)</td>
</tr>
<tr>
<td>Reason</td>
<td>This message is issued by all restore processes to indicate a restore process has encountered errors. This message may optionally be written to the system log (SYSLOG) if the “WTOCOMP” option was specified in the z/OS Storage Server Configurator “MAIN” record.</td>
</tr>
<tr>
<td>Action</td>
<td>Review any preceding messages in the z/OS Storage Server log file, the z/OS system log (SYSLOG), and the Client log file for the causes of the process errors.</td>
</tr>
<tr>
<td>UST178E</td>
<td>Restore failed reason (LU=luname)</td>
</tr>
<tr>
<td>Reason</td>
<td>This message is issued by all restore processes to indicate a restore process has failed. This message may optionally be written to the system log (SYSLOG) if the “WTOCOMP” option was specified in the z/OS Storage Server Configurator “MAIN” record. “reason” may be “WAS CANCELLED” if the Client requested termination or “COMMUNICATIONS” if the failure was due to a communications error; otherwise it is blank.</td>
</tr>
<tr>
<td>Action</td>
<td>Review any preceding messages in the z/OS Storage Server log file, the z/OS system log (SYSLOG), and the Client log file for the causes of the process errors.</td>
</tr>
<tr>
<td>UST179E</td>
<td>File-Info VOL=vvvvvv and backup catalog do not match on DSN=dsname</td>
</tr>
<tr>
<td>Reason</td>
<td>The volume information in the UPSTREAM File-Info data set and that in the system catalog entry for the backup data set do not match.</td>
</tr>
<tr>
<td>Action</td>
<td>Attempt to determine the reason for the mismatch. If you can determine which volume list is correct, either recatalog the backup data set (e.g., IDCAMS DEFINE NONVSAM) or run USTREGEN against the backup tapes to update the UPSTREAM information.</td>
</tr>
<tr>
<td>UST180E</td>
<td>Subtask process failed profilename luname COMP=Snnn Unnn</td>
</tr>
<tr>
<td>Reason</td>
<td>This message is issued by the z/OS Storage Server main task to indicate that a sub-task process has abnormally terminated; “Snnn” is the z/OS System sub-task completion or abend code if applicable, Unnn is the User completion code. This message may optionally be written to the system log (SYSLOG) if the “WTOCOMP” option was specified in the z/OS Storage Server Configurator “MAIN” record.</td>
</tr>
<tr>
<td>Action</td>
<td>Review the z/OS Storage Server JES joblog to determine the cause of the sub-task failure.</td>
</tr>
</tbody>
</table>
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST181W**  NO FILES FOUND FOR VERDATE=versiondate\ PATH=fileid

**Reason:** This message is issued by the z/OS Storage Server sequential restore processes to indicate they were unable to locate any File-Information records that matched the requested restore specification.

**Action:** Verify that the Client is using the correct Profile Name and VersionDate to perform the restore; perform an Inquire-Versions request to verify this. Verify that the Client is using a valid file path name for the restore that was included in this backup version; perform an Inquire-Files request to verify this.

**UST182E**  CNOS REQUEST FAILED

**Reason:** During an initiation request an “CNOS” request returned a communication error indication.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST183E**  SEND-DATA RUN-FUNCTION STRUCTURE FAILED

**Reason:** During an initiation request an “send data” request returned a communication error indication.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST184E**  ERROR ON RECEIVE FROM REQUESTOR

**Reason:** During an initiation request an “receive data” request returned a communication error indication.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST185E**  ERROR ON SEND-DATA TO WORKSTATION

**Reason:** During an initiation request an “send-data” request returned a communication error indication.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST186E**  ERROR ON DEALLOC-CONFIRM TO WORKSTATION

**Reason:** During an initiation request an “deallocate-confirm” request returned a communication error indication.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST187E**  ERROR RECEIVING TYPE-90 EVENT RECORD FROM WORKSTATION

**Reason:** During an initiation request an “receive data” request for an error notification message from the Client returned a communication error indication.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST188E**  INVALID STRUCTURE RECEIVED FROM WORKSTATION -- EXPECTED TYPE-\ xx EVENT

**Reason:** During an initiation request an invalid structure was received from the Client LU. This is most likely an internal UPSTREAM error.

**Action:** Please retain all the error information and contact FDR/UPSTREAM Technical Support for assistance.
<table>
<thead>
<tr>
<th>Message Code</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST189E</td>
<td>SEND-CONFIRMED TO REQUESTOR FAILED</td>
<td>During an initiation request an &quot;send-confirmed&quot; request to the USTBATCH requester returned a communication error indication. Communication error codes are reported in a following message. Consult IBM z/OS Communications Server manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST190E</td>
<td>APPC/TCP ALLOCATE ERROR</td>
<td>VTAM or TCP/IP returned an error indication as the result of the z/OS Storage Server mainframe-initiator module having issued an &quot;ALLOCATE&quot; request to initialize a conversation to the indicated Client. Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST191E</td>
<td>UNEXPECTED DEALLOCATE RECEIVED FROM WORKSTATION</td>
<td>A &quot;deallocate&quot; indication was detected prematurely. Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST192E</td>
<td>DEALLOCATE RECEIVED FROM REQUESTOR -- REQUEST TERMINATED</td>
<td>During an initiation request an &quot;deallocate&quot; indication was received from the requester prematurely. The initiation request is being discarded. Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST0193E</td>
<td>reason -- REQUEST FAILED</td>
<td>During a remote initiation attempt (USTBATCH), the request could not be initiated due to the reason indicated. Validate that the target Client name is valid and that the Client is active and eligible for a session and conversation request (for TCP/IP-connected Clients, UPSTREAM may need to started on the Client before the remote initiation is attempted).</td>
</tr>
<tr>
<td>UST194E</td>
<td>TARGET LU IS INVALID - REQUEST FAILED</td>
<td>The USTBATCH utility found the specified “TARGLU” value to be invalid. This can also occur if TARGNAME= was specified but the indicated name was not registered. Verify that the “TARGLU” value specified to USTBATCH is correct. If the target name was not registered, ensure that the name is registered and resubmit the request.</td>
</tr>
<tr>
<td>UST195E</td>
<td>LOGMODE NAME IS INVALID - REQUEST FAILED</td>
<td>The USTBATCH utility found the value specified for the &quot;LOGMODE&quot; parameter was invalid. Verify that the “LOGMODE” parameter value specified to the USTBATCH utility is valid.</td>
</tr>
<tr>
<td>UST196E</td>
<td>REQUEST PARAMETER ERROR RC='xxxxxxxxx'</td>
<td>The USTBATCH utility found an invalid parameter in the input stream. Correct the indicated parameter statement.</td>
</tr>
</tbody>
</table>
### FDR/UPSTREAM Messages
#### FDR/UPSTREAM Started Task Messages

**UST197** REMOTE INITIATION TO lu1 FROM lu2 - USTBATCH JOBNAME=jobname USERID=userid

**Reason:** This is an informational message indicating a remote initiation is in progress from an LU named “lu2” to an LU named “lu1”. If the request is from USTBATCH, the batch “jobname” or TSO “userid” running USTBATCH is shown. If the security “userid” was successfully extracted from that job or TSO session, it is also shown.

**Action:** None.

**UST198E** ERROR RECEIVING RUN_FUNCTION FROM REQUESTOR

**Reason:** During an initiation request an “receive data” request returned a communication error indication.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST199E** INITIATOR UNABLE TO GENERATE A VTAM RPL - POSSIBLE STORAGE SHORTAGE

**Reason:** During an initiation request the online initiator was unable to generate a VTAM RPL control block. This may indicate a storage shortage.

**Action:** Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

**UST200E** RESTORE BACKUP DENIED DUE TO DUMMY (SIMULATE) PROFILE

**Reason:** A request was received from a Client to restore from a backup taken under a special DUMMYxxx profile used for backup testing and simulation. Such backups do not contain file data and cannot be restored.

**Action:** None.

**UST201E** VSAM MODCB/POINT REQUEST FAILED

**Reason:** The “remove-backup” processor encountered a VSAM error. This message is accompanied by message UST051E containing the VSAM error indicators.

**Action:** Refer to message UST051E for details on interpreting the error.

**UST202E** REMOVE BACKUP ERROR REASON=reason

**Reason:** The ‘remove-backup” processor encountered an error for the reason shown.

**Action:** Based on the reason code, correct the error and resubmit the request.

**UST203E** VSAM ERASE REQUEST FAILED

**Reason:** The “remove-backup” processor encountered a VSAM error. This message is accompanied by message UST051E containing the VSAM error indicators.

**Action:** Refer to message UST051E for details on interpreting the error.

**UST204E** reqtype REQUEST FAILED -- R15=nnnnnnnn DSN=dsname

**Reason:** The “remove-backup” processor encountered an error attempting to delete a sequential data set. “reqtype” is LOCATE, SCRATCH, or UNCATALOG. “nnnnnnnn” is the return code in hex.

**Action:** If you are unable to resolve the problem, please retain all the error information and contact FDR/UPSTREAM Technical Support for assistance.

**UST206E** SEND CONFIRMED RESPONSE ERROR

**Reason:** The “remove-backup” processor encountered a communication error attempting to return an “confirmed” response to the requester.

**Action:** Communication error codes are reported in a following message. Consult TCP/IP or IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST207**  REMOVE-BACKUP ENTERED BY USER `username`

*Reason:* The “remove-backup” processor has been entered on request by the user indicated. This message is informational only.

*Action:* None.

**UST208**  REMOVING: `profile` `version` `date` `backup-type` - `nnnnnnnn` FILE RECORDS ERASED

*Reason:* The “remove-backup” function (REMOVEDSN) has been entered and is deleting the specified backup version. This may also occur during Full Merge Migration as Simple Migration files are copied to the full backup and deleted. “`nnnnnnnn`” includes both file records and directory records. This message is informational only.

*Action:* None.

**UST209E**  PREMATURE END-OF-FILE ON DSN=`dsname`

*Reason:* The restore processor encountered the end of the tape backup file before finding all expected data. Possibly the catalog entry was corrupted so that not all volumes are recorded.

*Action:* Verify that the tape data set requested during the restore is the correct one, and that this is not a copy of the original backup file data set.

**UST210E**  TARGET NOT AVAILABLE -- `function` TIMEOUT

*Reason:* The z/OS Storage Server mainframe initiator has determined that the target LU is not available to respond to the function noted in the error message.

*Action:* Verify that the target LU is specified correctly in the batch requester job. Verify that the target LU is available and configured for session and conversation requests. Review the UPSTREAM log on the target LU for error messages.

**UST211**  ENTERING WAIT FOR RETRY

*Reason:* The z/OS Storage Server mainframe initiator was unable to allocate the requested conversation with the target UPSTREAM LU. It is entering a 10-minute wait period prior to attempting a retry operation. This message is informational only.

*Action:* None.

**UST212**  ATTEMPTING CONVERSATION RETRY

*Reason:* The z/OS Storage Server mainframe initiator task has completed its wait period and is attempting to retry the conversation initiation to the specified target UPSTREAM LU. This message is informational only.

*Action:* None.

**UST213E**  TARGET LU NOT AVAILABLE - CONFIRM TIMEOUT

*Reason:* The z/OS Storage Server mainframe initiator has sent the specified request to the target LU; but, has not received a confirmation response within the 5 minute timeout window.

*Action:* Verify that the target UPSTREAM LU is still functional. Review the UPSTREAM log on the target LU for errors.

**UST214E**  INVALID STRUCTURE RECEIVED - REQUEST ABORTED

*Reason:* The z/OS Storage Server mainframe initiator received an invalid response from the target LU. This is most likely an internal UPSTREAM error.

*Action:* Please retain all the error information and contact FDR/UPSTREAM Technical Support for assistance.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

**UST215E IMMEDIATE SHUTDOWN REQUESTED - REQUEST ABORTED**

**Reason:** The z/OS Storage Server mainframe initiator was notified that the system operator requested an immediate z/OS Storage Server shutdown. The indicated process was aborted.

**Action:** None.

**UST216W IMMEDIATE SHUTDOWN REQUESTED - function TERMINATED**

**Reason:** The indicated function was in progress when z/OS Storage Server received an immediate shutdown request from the System Operator. The function is terminated.

**Action:** None.

**UST218E TAPE RESTORE DISALLOWED -- TAPEMOUNT SECURITY CHECK FAILED**

**Reason:** SECLVL=2 or 3 was specified in the configuration, and the security check for tape restores failed.

**Action:** See Chapter 4 “Security” for details on authorizing restores from tape.

**UST219E CATALOG RECORD NOT FOUND FOR RESTORE OF versiondate**

**Reason:** During z/OS Storage Server restore processing for a specified “versiondate”, no records were found.

**Action:** Use the “Inquire Versions” request on the Restore menu to list all available versions, to verify that your request was correct. If it was correct, this is an internal error.

**UST220E SECURITY: INVALID USERID FORMAT**

**Reason:** During security authorization checking, z/OS Storage Server determined there was an invalid format in a control structure containing the specified userid.

**Action:** This is an internal error. Retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

**UST221E SECURITY: INVALID PASSWORD FORMAT**

**Reason:** During security authorization checking, z/OS Storage Server detected an invalid format item in a received control structure.

**Action:** This is an internal error. Please retain all error information and contact FDR/UPSTREAM Technical Support for assistance.

**UST222E SECURITY CHECK FAILED SAF COMP=X’ssss’, RACF COMP=X’rrrr’ CODE=X’cccc’ reason**

**Reason:** During security authorization checking, z/OS Storage Server received a non-zero return code from the z/OS SAF Router “ssss” or from your security system (rrrr and cccc). “reason” will have a brief description of the error for common error codes. However, if a check for authority to a given resource failed, “reason” will display the class and entity names, e.g., CLASS=$UPSTRM ENTITY=profile

**Action:** Verify the specified Userid and Password are correct and defined to your security system. A SAF error may mean that your security system is not functioning.

**UST223E SECURITY: LEVEL-2 VERIFICATION FAILED**

**Reason:** The SAF (security) call to verify the user's authority to the UPSTREAM Profile Name (as requested by SECLVL=2 or 3 in the UPSTREAM Configuration) has failed. The user is not authorized.

**Action:** If appropriate, authorize the user to use the Profile Name.

**UST224 profilename ssssss.sss CPU SECONDS USED IN process**

**Reason:** The indicated number of CPU seconds were used in processing the just-completed request for the indicated Profile name.

**Action:** None.
<table>
<thead>
<tr>
<th>UST228</th>
<th>CONFIGURATION TABLE [RE]LOADED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>This informational message confirms that the UPSTREAM configuration table has been successfully LOADED during online initialization or successfully RELOADED in response to a F UPSTREAM,REFRESH console command.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST229</th>
<th>REQUEST USING &quot;profname&quot; CONFIGURATION ENTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>The profile name entered at the Client has no entry in the z/OS Storage Server configuration, but there was either a prefix profile defined with WSPREF=prefix that matched the beginning of the entered profile name, or a profile defined with the special name “GLOBAL”. The characteristics of this profile were used for this request.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST230</th>
<th>INQUIRE-FILES PROCESS STARTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>An inquire-files request was received from a Client.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST231</th>
<th>RESTARTED-BACKUP PROCESS ENTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>This informational message is issued by the backup “restart” process to indicate it has accepted the Client request and has begun the restart process.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST232</th>
<th>RESTARTED-BACKUP PROCESS ENDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>This informational message is issued by the backup “restart” process to indicate it has completed the “backup restart” process. Any errors that may have occurred are indicated by other messages in the log file.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST233*</th>
<th>STARTING BACKUP PROCESS, TYPE=tttt LU=nnnnnnnn[BACKUP=bbbbb]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>This informational message is issued by all backup processes at the time the backup begins. The &quot;type&quot; value &quot;tttt&quot; may be any of the four backup types supported by z/OS Storage Server: “DASD”, or “TAPE”. The LU value contains the network LU name of the Client. If this is a sequential backup, the &quot;backup&quot; value &quot;bbbbb&quot; indicates the type of sequential backup: “FULL” (first-time full), “FULLM” (full merge), “INCR” (incremental merge), “USER” (non-merge under a profile enabled for MERGE) or “NON-M” (non-merge under a non-merge profile). If the “WTOCOMP” option was specified on the z/OS Storage Server Configurator &quot;MAIN&quot; record, this message is also written to the system console and the system log (SYSLOG) via a &quot;WTO&quot;. If this is a simulated backup (using a DUMMYxxx profile name), “STARTING” is changed to “SIMULATE”. For a file transfer, “STARTING” is changed to “TRANSFER”.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST234</th>
<th>BACKUP DATE: mm/dd/yyyy- ESTIMATED SIZE: kkkkkkkkkkk KB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>All backup processes issue this informational message at the time the backup begins. It indicates the date the backup began on the mainframe and the estimated size in kilobytes.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST235</th>
<th>STARTING BACKUP NON-I/O TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>This informational message indicates that the non-I/O backup test routine has started.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>
FDR/UPSTREAM Messages
FDR/UPSTREAM Started Task Messages

UST236 INQUIRE-VERSIONS PROCESS ENDING
Reason: An inquire-versions request from a Client was completed.
Action: None.

UST237 INQUIRE-FILES PROCESS ENDING nnnnnnnnn FILES SENT FROM mmmmmmm VERSIONS
Reason: An inquire-files request from a Client was completed.
Action: None.

UST238 SEQUENTIAL RESTORE PROCESS STARTED
Reason: This informational message indicates that a sequential restore has begun.
Action: None.

UST239* RESTORE PROCESS STARTED, TYPE=tttt LU=nnnnnnnnn
Reason: This informational message is issued for all restore processes at the time the restore begins. The TYPE value “tttt” may be any of the three backup types supported by z/OS Storage Server: “ARCH”, “DASD”, or “TAPE”. The LU value contains the network LU name of the Client. If the “WTOCOMP” option was specified on the z/OS Storage Server Configurator “MAIN” record, this message is also written in the system console and the system log (SYSLOG) via a “WTO”.
Action: None.

UST240W* ACTIVE TASK FOUND -REPLY W(AIT)-FOR TASK TERM,TERM ID=NNNN, C(ANCEL),S(TATUS) OR I(GNORE)
Reason: The operator issued a console CANCEL command for the UPSTREAM online task, but UPSTREAM CANCEL protection detected that there were active backup, restore, or utility sub-tasks. This message is preceded by the UST013*, UST014*, and UST015* messages showing the active sub-tasks.
Action: The operator may reply:
- WAIT – to wait for all tasks to end naturally before terminating UPSTREAM.
- TERM ID=nnnn – to terminate the specified task (“nnnn” is the task ID from the status display).
- CANCEL – to process the CANCEL command after closing all open data sets.
- STATUS – to redisplay the sub-task status.
- IGNORE – to ignore the CANCEL and return to normal operation.
All of the replies (except TERM) can be abbreviated by the first character.

UST240W* ACTIVE TASK FOUND - function AWAITING TASK TERMINATION
Reason: The operator requested termination of UPSTREAM via a STOP (P) console command (function=SHUTDOWN) or via a CANCEL (C) console command (function=CANCEL) but there were active backup/restore/utility tasks in progress. For CANCEL, this message is issued if the operator replies “WAIT” to the preceding UST240W* message.
Action: UPSTREAM terminates when all sub-tasks have completed.

UST241* function NOW ACTIVE
Reason: A trace or utility function has been started. See additional messages for the output and status of the requested function.
Action: None.

UST241* function COMPLETED RC=nn
Reason: A trace or utility function has completed with completion code “nn”.
Action: None.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

<table>
<thead>
<tr>
<th>UST242*</th>
<th>QUIT ACCEPTED -- SHUTDOWN IN PROGRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>A console command has been entered requesting immediate shutdown of UPSTREAM. See Section 17.3 “Stop the FDR/UPSTREAM z/OS Storage Server” for details on shutting down UPSTREAM.</td>
</tr>
<tr>
<td>Action:</td>
<td>If there are active backup/restore tasks, they are signaled to interrupt their processing. UPSTREAM terminates when all sub-tasks have terminated.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST243*</th>
<th>QUIT ACCEPTED -- LU=luname TERMINATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>A console command has been entered requesting immediate termination of the UPSTREAM session with the specified logical unit. The termination was successful.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST244E*</th>
<th>QUIT REJECTED -- LU=luname INVALID OR NOT ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>A console command has been entered requesting immediate termination of the UPSTREAM session with the specified logical unit. The “luname” is either not a valid name or is not currently in session with UPSTREAM.</td>
</tr>
<tr>
<td>Action:</td>
<td>Determine the proper value to specify for LUNAME and resubmit the request.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST245</th>
<th>STARTING VSAM WRITE TEST PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>This informational message indicates that the VSAM write test has begun.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST246</th>
<th>xxxx FILE-DATA, xxxx FILE-INFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>This informational message indicates the number of records written per second to the File-Data and File-Info files during the VSAM write test.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST247</th>
<th>luname * SNA SESSION DEACTIVATED *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>The SNA session with the indicated logical unit has been terminated.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST248</th>
<th>luname profilename function PROCESS DETACHED TASKID=nnnn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>The backup or restore sub-task for the indicated profile name and logical unit has been terminated. The internal task identifier for this process was “nnnn”.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST249*</th>
<th>MODIFY COMMAND ACCEPTED - REQUEST: parms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>An F UPSTREAM command entered on the system console has been completely processed by UPSTREAM.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST250E</th>
<th>DATA RECORD(S) NOT FOUND ON REPOSITORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>Data records were not found where they were expected.</td>
</tr>
<tr>
<td>Action:</td>
<td>The UPSTREAM repository may be corrupted. Contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST253E*</th>
<th>MAXTASKS EXCEEDED - LU=luname REJECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason:</td>
<td>The z/OS Storage Server received a request to initiate a new conversation, but the maximum number of active UPSTREAM tasks specified in the UPSTREAM configuration has been reached. This conversion request is rejected.</td>
</tr>
<tr>
<td>Action:</td>
<td>Retry the request at a later time, after some other UPSTREAM tasks have terminated.</td>
</tr>
</tbody>
</table>
**UST254W**  RAW BACKUP FROM *version date* BYPASSED. USE PHYSICAL BACKUP PANEL.

**Reason:** One or more of the backups selected for restore are either “raw” physical backups. These cannot be restored from the normal restore panels; select the physical backup panel to restore them.

**Action:** The physical backup is bypassed. If no other backups were selected, the restore is terminated.

**UST257**  TOO MANY SPACES PRECEEDING INPUT RECORD
INVALID INPUT RECORD OR NO SUBJECT FOUND
OPEN INPUT FILE FAILED
PROBLEM WITH SPECIFIED MAILSERVER
HELO RECORD TOO LONG
ERROR IN “FROM:” STATEMENT
ERROR IN “TO:” STATEMENT
ERROR IN “SUBJECT:” STATEMENT
NO MAILSERVER SPECIFIED
EMPTY INPUT FILE
NO “FROM:” STATEMENT FOUND
NO “TO:” STATEMENT FOUND
NO TCPNAME ACQUIRED
TCP/IP ERROR API=
SERVER ERROR API=

**Reason:** These are informational status messages issued for USTBATCH e-mail notification. They are issued via WTO and are posted to the JES message DD statement of the USTBATCH job.

**Action:** Correct the syntax within the e-mail notification member referenced by the e-mail control card (EMAILOK, EMAILWRN, or EMAILERR).

**UST263**  UPSTREAM LOG SWITCH WAS SUCCESSFUL

**Reason:** A F UPSTREAM,SWITCHLOG console command was successfully executed, to switch the UPSTREAM log to the alternate log file.

**UST263E**  UPSTREAM LOG SWITCH FAILED

**Reason:** A F UPSTREAM,SWITCHLOG console command was entered, but the switch to the alternate log file failed, probably due to errors opening the alternate log. Logging to the current log file continues.

**Action:** Check the UPSTREAM job log for IBM error messages relating to this error. Correct the problem if possible.

**UST265E**  REORG COMMAND BYPASSED REASON=*reason text*

**Reason:** A F UPSTREAM,REORG console command was entered, but the reorganization request was rejected for the reason indicated, which may be:

- **TASK ACTIVE** – a REORG cannot be initiated when another task other than a REORG of another file is already active.
- **DD NOT FOUND** – the DDNAME was not one of the three permitted. (USTCATLG, USTFILEI, USTFILEC).
- **FILE IS NOT BELOW %FREE** – %F=nn was specified and the file has more that nn% free space.
- **%F KEYWORD INVALID** – an invalid value was specified for the “%F=” operand.

**Action:** Consult the resolution options outlined in the “*reason text*”. 
<table>
<thead>
<tr>
<th>Code</th>
<th>Message Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST266E</td>
<td>OPERATOR CANCELLED MOUNT OF BACKUP VOLUME</td>
</tr>
<tr>
<td>Reason:</td>
<td>The console operator replied &quot;NO&quot; to the console messages requesting that a previous backup tape be mounted.</td>
</tr>
<tr>
<td>Action:</td>
<td>The requested restore is terminated. If the tape can be mounted at a later time, resubmit the request at that time.</td>
</tr>
<tr>
<td>UST267E</td>
<td>C-STRUCTURE NOT FOUND</td>
</tr>
<tr>
<td>Reason:</td>
<td>A catalog record was not found where expected.</td>
</tr>
<tr>
<td>Action:</td>
<td>The UPSTREAM repository may be corrupted. Contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST268E</td>
<td>INVALID TCP ADDRESS RECEIVED - REQUEST ABORTED</td>
</tr>
<tr>
<td>Reason:</td>
<td>For a mainframe-initiated request (via USTBATCH) an invalid TCP/IP target address was specified.</td>
</tr>
<tr>
<td>Action:</td>
<td>Verify and correct the TCPTARG= value and resubmit the USTBATCH job.</td>
</tr>
<tr>
<td>UST269E</td>
<td>REQUEST CONTROL REJECT FAILED</td>
</tr>
<tr>
<td>Reason:</td>
<td>For a mainframe-initiated request (via USTBATCH) a VTAM APPC REQUEST-CONTROL request to the Client failed.</td>
</tr>
<tr>
<td>Action:</td>
<td>Check the Client. Make sure that its APPC software is operating correctly.</td>
</tr>
<tr>
<td>UST270E</td>
<td>NOTIFY SEND TO USTBATCH FAILED</td>
</tr>
<tr>
<td>Reason:</td>
<td>The UPSTREAM online initiator attempted to communicate with the USTBATCH job that initiated the request, but the APPC SEND request failed. A UST038E message follows with details.</td>
</tr>
<tr>
<td>Action:</td>
<td>Check the UPSTREAM job log for IBM error messages relating to this error. Correct the problem if possible.</td>
</tr>
<tr>
<td>UST280E</td>
<td>TCP type CONNECT TO SOCKET=sssss,PORT=pppp,IPA=aaa.bbb.ccc.ddd</td>
</tr>
<tr>
<td>Reason:</td>
<td>A connection has been made between UPSTREAM and IBM's TCP/IP. The socket number and port number used, and the network address (in dotted decimal format) are displayed. If “type” is MAIN, this is the UPSTREAM connecting to TCP/IP during initialization and the IPA is UPSTREAM’s primary address (there may be others if your z/OS Storage Server has multiple TCP/IP connections to the network). If “type” is USER, this is a Client connecting to UPSTREAM and the address is that of the Client.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
<tr>
<td>UST283E</td>
<td>BYTES PER SECOND</td>
</tr>
<tr>
<td>Reason:</td>
<td>An UPSTREAM performance test was requested from a Client. This message is the header on a histogram that shows the range of instantaneous data rates that were measured during that test.</td>
</tr>
<tr>
<td>Action:</td>
<td>None.</td>
</tr>
<tr>
<td>UST284E</td>
<td>BACKUP EXCEEDS MAXIMUM VOLUMES - BACKUP TERMINATED</td>
</tr>
<tr>
<td>Reason:</td>
<td>A single tape backup file has required more than 255 tape volumes.</td>
</tr>
<tr>
<td>Action:</td>
<td>The backup is terminated. To rerun the backup, you must reduce the number of tapes required. If the hardware supports it, you might use larger capacity tapes. If necessary, change the backup file specifications to reduce the amount of data to be backed up (you may need to break the backup into 2 pieces, under different profile names).</td>
</tr>
</tbody>
</table>
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM STARTED TASK MESSAGES

UST285 TARGET pcversion NAME=targname IS REGISTERED TO netname

Reason: A Client has used the z/OS Storage Server “Registered Name Service” to report that it has been configured with Client name “targname” (up to 16 characters). “netname” is “LU=luname” for VTAM/SNA Clients and is “IP=nnn.nnn.nnn.nnn..port” for TCP/IP-connected Clients. “pcversion” displays the version of UPSTREAM in use on the Client, if available. The target name can now be used with the TARGNAME= parameter of USTBATCH.

If the target name is being deleted from the table due to a request from the Client or from the z/OS Storage Server ISPF dialog, the additional text “WAS DELETED” appears at the end of the message. The target name is no longer usable unless it is registered again. If the target name is marked for automatic UPSTREAM software updates, the additional text “AUTO-UPDATE” appears.

Action: None.

UST287* UPSTREAM TAPE UNIT NOT AVAILABLE, VARY ONE ONLINE OR REPLY ‘RETRY’, ‘WAIT’, CANCEL’ OR ‘DISPLAY’

Reason: To avoid allocation interlocks, UPSTREAM does dynamic allocation of tape drives with a flag indicating it is not to wait if no drives are available. An allocation received an error indicating that all eligible tape drives are offline or in use. This message is displayed on the system console as a WTOR.

Action: If the operator does not reply to the message, UPSTREAM retries the allocation at five second intervals; if the operator varies a drive online or a drive is de-allocated by another task, the allocation will succeed and the message is deleted. The operator may also reply:

- RETRY – retry the allocation. The message is reissued if there are still no available drives.
- WAIT – same as not replying except that the message is deleted.
- CANCEL – fail the allocation, which will fail the backup.
- DISPLAY – retry the allocation, allowing z/OS allocation recovery to take place. z/OS messages on the console will indicate which offline tape drives are eligible.

**WARNING:** If you reply “DISPLAY” you must reply to the z/OS allocation messages promptly to avoid potential allocation interlocks.

UST288E I/O ERROR type BACKUP FILE CHECK z/OS LOG

Reason: A sequential backup or restore has encountered an I/O error on the backup file. “type” is either "WRITING TO" or "READING THE". The backup or restore is interrupted.

Action: Check the z/OS job log of the z/OS Storage Server tasks for z/OS messages which may indicate the type of I/O error that occurred. It will probably not be possible to restart the backup, but you should be able to restore any files which were successfully written and recorded. If necessary, contact FDR/UPSTREAM Technical Support for assistance.

UST289E ERROR DURING POINT TO A BACKUP FILE

Reason: A sequential restore has encountered an error issuing a POINT to position to a record in the backup file. The restore is interrupted. This may be due to an invalid pointer in the UPSTREAM repository.

Action: Execute the USTREGEN utility against this backup to refresh the pointers in the repository. If necessary, contact FDR/UPSTREAM Technical Support for assistance.
UST290W HISTORY RECORD BYPASSED reason

Reason: An UPSTREAM history record was not recorded in the UPSTREAM catalog file for the reason indicated, which may be:

- **CATALOG NOT OPEN** – probably because it is being reorganized.
- **DUE TO CATALOG ERROR COMP=xxxxxxxx** – the “comp” is the VSAM RPL feedback word.

Action: The operation completed, only the history record was lost. If multiple catalog errors occur, you may need to reorganize the catalog file. If necessary, contact FDR/UPSTREAM Technical Support for assistance.

UST291W ACQUIRING THE USERID OF USTBATCH BYPASSED REASON=reason

Reason: UPSTREAM attempted to extract the security userid from the address space of a USTBATCH job which has requested an UPSTREAM function, but the attempt was unsuccessful. Reason codes are:

1 – **CROSS-MEMORY ALREADY SETUP** – indicates an internal error.
2 – **AXSET MACRO ERROR** – indicates an internal error.
3 – **ERROR FINDING USTBATCH TCB** – indicates that could not locate a TCB (Task Control Block) in the other address space. May indicate that the indicated address space was not really a batch job or TSO user.
4 – **JOB PACK QUEUE ERROR** – indicates that the list of programs loaded in the address space could not be located. May indicate that the indicated address space was not really executing a batch job.
5 - **PROGRAM NAME NOT USTBATCH** – indicates that UPSTREAM could not find a program called USTBATCH in the address space. May indicate that the address space was not really executing USTBATCH.
6 - **USTBATCH IS NOT AUTHORIZED** – indicates that the USTBATCH program in the address space is not an authorized program. When USTBATCH is executed directly under TSO, this will occur unless USTBATCH is added to the list of authorized TSO programs.
7 - **MISMATCH ON INTERNAL FIELD** – indicates a validation check failed.
8 - **NO ACEE (SECURITY) POINTER** – indicates there was no ACEE (security control block) associated with the address space, so no userid could be extracted.
9 - **NO USERID ON USTBATCH JOB** – indicates that there was no security userid stored in the ACEE.
A - **USTBATCH NOT ON SAME CPU** – indicates that the USTBATCH job was not executing on the same z/OS image as the UPSTREAM online task, so the userid could not be extracted.

Action: Since a validated userid could not be extracted from the USTBATCH job, FDR/UPSTREAM requires that a security password be provided (as well as a userid) for validation. This security information could be specified at the Client or could be in the USTBATCH parameters. If a validated userid was extracted and it matched the userid associated with the USTBATCH request, no password would be necessary.

If necessary, contract FDR/UPSTREAM Technical Support for assistance. Existing USTBATCH users might get this message and the resulting return code 4 in jobstreams that used to get RC=0.

UST292 BACKUP SIZE EXCEEDS DASD MAX SIZE - SWITCHING TO TAPE

Reason: An incremental MERGE backup was directed to sequential DASD, but the estimated size of the backup exceeded the DASDMAXSIZE= value in the profile, so the backup was directed to tape instead.

Action: None.
25.10 FDR/UPSTREAM Configurator Messages

**UST301E** NO APPLID FOUND IN “MAIN” RECORD - TERMINATING

*Reason:* While parsing the configuration input file “MAIN” record, the z/OS Storage Server Configurator, USTCONFG, was unable to locate the “APPLID=” parameter. The “APPLID” parameter is required in the configuration input file “MAIN” record.

*Action:* Add the “APPLID” parameter and rerun the z/OS Storage Server Configurator.

**UST305W** WSNAMES/WSPREF MISSING IN COMMAND - RECORD BYPASSED:

*Reason:* While parsing a DEFINE/MODIFY/COPY statement, the z/OS Storage Server Configurator, USTCONFG, found no WSNAME= or WSPREF= parameter in the listed record.

*Action:* Correct the input configuration source file and rerun the z/OS Storage Server Configurator.

**UST306W** NEWNAME/NEWPREF MISSING IN COMMAND - RECORD BYPASSED:

*Reason:* While parsing a COPY statement, the z/OS Storage Server Configurator, USTCONFG, found no NEWNAME= or NEWPREF= parameter in the listed record.

*Action:* Correct the input configuration source file and rerun the z/OS Storage Server Configurator.

**UST313E** CONTINUATION STATEMENT EXPECTED - NOT FOUND

*Reason:* The previous statement indicated that it should continue on the next statement (trailing comma) but a valid continuation statement was not found.

*Action:* Correct the continuation syntax and rerun the z/OS Storage Server Configurator.

**UST319W** SUBSYS PARAMETER NOT FOUND - DEFAULTED TO UPSTREAM

*Reason:* This is a warning message. The z/OS Storage Server Configurator, USTCONFG, did not find a “SUBSYS=” parameter in the input configuration “MAIN” record. The “SUBSYS” parameter value has been defaulted to “UPSTREAM”.

*Action:* None.

**UST322E** NO CONFIGURATION RECORD GENERATED - FILE IS NOT USABLE

*Reason:* Due to catastrophic errors, the z/OS Storage Server Configurator, USTCONFG, was unable to generate the configuration table.

*Action:* Review the Configurator output log for errors, correct them, and rerun the z/OS Storage Server Configurator.

**UST323E** VAULT CANNOT BE SPECIFIED ON RESERVED PROFILES

*Reason:* A DEFINE/MODIFY/COPY for one of the reserved profile names contained the VAULT parameter. This is not valid.

*Action:* Remove VAULT, and rerun the z/OS Storage Server Configurator.

**UST324E** DASDPREF/TAPEPREF MUST CONTAIN “?” MASK WITH VAULT OPTION

*Reason:* For profiles with the VAULT parameter specified, the DASDPREF= and TAPEPREF= parameters must contain a question mark “?” somewhere within the name, anywhere except as the first character of an index level. This is replaced with the copy number (1 to 9).

*Action:* Correct the prefix, or specify NOVAULT, and rerun the z/OS Storage Server Configurator.
### FDR/UPSTREAM Messages

#### FDR/UPSTREAM Configurator Messages

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Message Text</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST325</td>
<td>nnnnnnnnn PROFILE ENTRIES IN CONFIG ON mm/dd/yy AT hh:mm:ss</td>
<td>This is an informational message issued at the conclusion of a Configurator run. This message contains the count of profile entries in the configuration table after applying all updates from your current z/OS Storage Server Configurator input.</td>
<td>None.</td>
</tr>
<tr>
<td>UST326E</td>
<td>OPEN FOR CONFIGURATION FILE FAILED - ABEND IN PROGRESS</td>
<td>The z/OS Storage Server Configurator, USTCONFIG, was unable to open the output configuration file.</td>
<td>Review your JCL specifications and DCB attributes for the output configuration file, correct any errors, and re-run the z/OS Storage Server Configurator.</td>
</tr>
<tr>
<td>UST327E</td>
<td>OPEN FOR INPUT SOURCE FILE FAILED - ABEND IN PROGRESS</td>
<td>The z/OS Storage Server Configurator, USTCONFIG, was unable to open the input source configuration file.</td>
<td>Review your JCL specifications and DCB attributes for the input source configuration file, correct any errors, and re-run the z/OS Storage Server Configurator.</td>
</tr>
<tr>
<td>UST328E</td>
<td>UNABLE TO FIND “MAIN” RECORD - CONFIGURATOR TERMINATING</td>
<td>The z/OS Storage Server Configurator, USTCONFIG, found the first input record was not a configuration “MAIN” record. It cannot continue.</td>
<td>Correct the error and re-run the z/OS Storage Server Configurator.</td>
</tr>
<tr>
<td>UST329E</td>
<td>CONFIGURATION FILE DEFINITION ERROR - LRECL MUST BE DEFINED AS 120</td>
<td>The configuration data set does not have proper DCB characteristics. It must be RECFM=FB and LRECL=120 (any blocksize a multiple of 120 is acceptable).</td>
<td>Define a new configuration data set with proper characteristics.</td>
</tr>
<tr>
<td>UST330W/E</td>
<td>UNABLE TO OPEN DDNAME=ddname - MISSING OR MISSPECIFIED</td>
<td>USTCONFIG was unable to open the indicated DDNAME. It may have been omitted or misspelled. If the file is required, this is an Error message, otherwise it is a Warning.</td>
<td>If necessary, correct the USTCONFIG JCL and resubmit.</td>
</tr>
<tr>
<td>UST331</td>
<td>ddname=dsname, VOL=volser</td>
<td>This informational message documents that the indicated DDNAME points to the indicated data set name, on the indicated volume.</td>
<td>None.</td>
</tr>
<tr>
<td>UST332</td>
<td>BACKUP OF P=profilename COPY=n IS ENCRYPTED TYPE=encrypt_level KEY=key</td>
<td>This message is issued at the completion of an encrypted VAULT output operation. It indicates the copy of the backup data set produced in the prior UST655 message was encrypted using the specified encryption level.</td>
<td>This message is informational only. It corresponds to an FDR178 message.</td>
</tr>
<tr>
<td>UST333E</td>
<td>** ENCRYPT ERROR REASON=**</td>
<td>An error occurred during the encryption or decryption of a data set. The REASON code indicates the cause of the problem:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>** DECRYPT ERROR REASON=**</td>
<td>0 – USTCRYPT NOT FOUND</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 – DECRYPT KEY NOT SPECIFIED</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 – NOT AUTHORIZED</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 – UNSUPPORTED ENCRYPTTYPE</td>
<td></td>
</tr>
</tbody>
</table>
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM CONFIGURATOR MESSAGES

4 – MASTERKEY IS INVALID
5 – DECRYPT KEY IS INVALID/MISSING
6 – DUPLICATE BYTE GENERATED
7 – KEYFILE OPEN ERROR
8 – KEYFILE NOT FORMATTED BLKSIZ=0
9 – KEYFILE IS FULL
A – KEYFILE INTERNAL ID INVALID
B – KEYFILE READ/WRITE I/O ERROR
C – USTCRYPT PROGRAM HAS EXPIRED
D – KEYFILE NOT DEFINED
E – BACKUP NOT RECORDED IN KEYFILE
F – KEYFILE DYNALLOC ERROR
G – MASTERKEYID NOT FOUND
H – MASTERKEYID INVALID
M – MUST BE DECRYPTED WITH FDRCAMS
P – PUBLIC KEY ERROR - ERROR CODE=
Z – UNKNOWN REASON CODE

Action: Correct the problem indicated by the provided REASON code and retry the operation.

UST334E UNABLE TO CREATE KEYFILE ACEE - SAF RC=xx RACF RC=xx
MISSING MASTERKEY
INCOMPATIBLE KEYWORD(S) SPECIFIED
SUBKEY VALUE NOT HEXADECIMAL OR KEY LENGTH NOT EXACTLY 32 BYTES
CIPHERKEY VALUE NOT HEXADECIMAL OR KEY LENGTH NOT EXACTLY 32 BYTES
AESKEY VALUE NOT HEXADECIMAL OR KEY LENGTH NOT EXACTLY 32, 48, OR 64 BYTES
USTCRYPT DD MISSING OR OPEN ERROR
INCOMPLETE CONTROL CARD - MISSING REQUIRED KEYWORD OPERAND
INVALID KEY VALUE – ZERO
KEY LENGTH MUST BE 48 BYTES WHEN ENCRYPTTYPE=AES192 IS SPECIFIED
KEY LENGTH MUST BE 64 Bytes WHEN ENCRYPTTYPE=AES256 IS SPECIFIED
KEY LENGTH MUST BE 32 BYTES WHEN ENCRYPTTYPE=AESES128/AESFAST IS SPECIFIED
MASTERKEY LENGTH MUST BE EXACTLY 32 BYTES

Reason: This message is issued for the error conditions shown above.
Action: Correct the error situation according to the message content and retry the operation.

UST335E CONTROL STATEMENT ERROR NEAR REL LOCATION nn - REASON r - JOB TERMINATED

Reason: An error was found while reading a control statement from the USTCRYPT input. The REASON code below indicates the error found:

1 – NO OPERANDS
3 – INVALID OPERAND
6 – MISSING CONTINUATION
8 – BLANK OR COMMA AFTER =
9 – VOLSER > 6 CHRS
A – REASON=A - MAXVOLS EXCEEDED
I – KEYWORD INVALID FOR OPERATION
J – BLANK STATEMENT
S – DUPLICATE KEYWORD

Action: Correct the input control statement and restart the facility.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM CONFIGURATOR MESSAGES

**UST336**  
CARD IMAGE – input statement  
**Reason:** This message logs one input record in the USTCRYPT DD input stream.  
**Action:** This message is informational only.

**UST337E**  
DYNAMIC ALLOCATION ERROR FOR KEYFILE COMP=cccc, CODE=nnnn, INFO=iii, DDNAME= name  
**Reason:** This message indicates that the encryption/decryption module could not access the keyfile.  
**Action:** Be sure the correct name is specified for the keyfile in the USTOPT table or in the USTCRYPT DD input stream. This file must be preformatted using the USTCryFM utility and periodically reorganized.

**UST338**  
ENCRIPTION INITIALIZATION SUCCESSFUL  
**Reason:** This message is issued by the UPSTREAM main task during initialization to indicate that the encryption facility has been successfully established.  
**Action:** This message is informational only. The absence of this message may indicate a problem.

**UST339E**  
PROFILE=aaaaaaaa REQUESTED ENCRYPTION WAS BYPASSED DUE TO SERVICE NOT ACTIVE OR FAILURE  
**Reason:** Encryption could not be enabled because the encryption facility was not available or not initialized by the UPSTREAM main task at start up.  
**Action:** Make sure that message UST338 ENCRYPTION INITIALIZTION SUCCESSFUL was issued when the UPSTREAM started task initialized. Look for other messages in the USTLOG indicative of the problem.

**UST342W**  
DSNAME TOO LONG WITHOUT “GDG” SPECIFIED - RECORD BYPASSED:  
**Reason:** The z/OS Storage Server Configurator, USTCONFIG, found an invalid value specified for the “DASDPREF=” or “TAPEPREF=” parameter in the listed DEFINE/MODIFY/COPY record. The value specified exceeded the 19 allowable characters without the “DASDGDG” or “TAPEGDG” parameter also being specified.  
**Action:** Correct the value or specify the appropriate GDG parameter, and rerun the z/OS Storage Server Configurator.

**UST343W**  
WARNING: “DASDBLK” NOT FOUND IN “MAIN” RECORD - DEFAULTING TO 27998  
**Reason:** The z/OS Storage Server Configurator, USTCONFIG, was unable to locate the “DASDBLK” keyword parameter in the configuration “MAIN” record. This message warns that when appropriate, the “DASDBLK” value will default to 27998.  
**Action:** If this is not appropriate for your installation, add the DASDBLK parameter with the correct value and rerun the z/OS Storage Server Configurator.

**UST344W**  
DSNAME TOO LONG FOR RESERVED PROFILE - RECORD BYPASSED  
**Reason:** On a DEFINE/MODIFY/COPY statement specifying a WSNAME= of one of the reserved profiles, the DASDGDG or TAPEGDG option was not specified, and the data set name prefix (DASDPREF= or TAPEPREF=) specified exceeds 26 characters.  
**Action:** Correct the data set name and rerun the z/OS Storage Server Configurator.

**UST345E**  
“DASDPREF” REQUIRES “DASD” - RECORD BYPASSED  
**Reason:** On a DEFINE/MODIFY/COPY statement, DASDPREF= was specified without DASD.  
**Action:** Correct the parameters and rerun the z/OS Storage Server Configurator.
UST346E  "DASDGDG" REQUIRES "DASDPREF=" AND "DASD" - RECORD BYPASSED
Reason: On a DEFINE/MODIFY/COPY statement, DASDGDG was specified without DASD and DASDPREF=.
Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

UST347E  INVALID VALUE SPECIFIED FOR xxxxxxxx - RECORD BYPASSED
Reason: An invalid value was specified for the parameter "xxxxxxxx".
Action: See Section 21.7 "USTCONFG Control Statements" for valid values. Correct the parameters and rerun the z/OS Storage Server Configurator.

UST348E  "WSNAME/WSPREF" SPECIFIED IS A RESERVED NAME - ENTRY NOT ADDED
Reason: A DEFINE/MODIFY was entered which specified a profile name that may not be used.
Action: See Section 21.7 "USTCONFG Control Statements" for valid values. Correct the parameters and rerun the z/OS Storage Server Configurator.

UST349E  "DASDBLK" REQUIRES "DASD" AND "DSNPREF" - RECORD BYPASSED:
Reason: The z/OS Storage Server Configurator, USTCONFG, found the "DASDBLK" parameter in the listed record, but was unable to find the "DASD" and/or "DASDPREF" additional required parameters.
Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

UST350E  "GROUPID" MUST BE EXACTLY 2 ALPHA-NUMERIC CHARACTERS - RECORD BYPASSED:
Reason: The z/OS Storage Server Configurator, USTCONFG, found that the "GROUPID" parameter in the listed record did not have the correct syntax.
Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

UST351E  "DUNIT" REQUIRES "DASD" AND "DSNPREF" - RECORD BYPASSED:
Reason: The z/OS Storage Server Configurator, USTCONFG, found the "DUNIT" parameter in the listed DEFINE/MODIFY/COPY record, but was unable to find additional required parameters.
Action: Correct the "DEFINE" record definition and rerun the z/OS Storage Server Configurator.

UST352E  "TUNIT" REQUIRES "TAPE" AND "DSNPREF" - RECORD BYPASSED:
Reason: The z/OS Storage Server Configurator, USTCONFG, found the "TUNIT" parameter in the listed DEFINE/MODIFY/COPY record, but was unable to find additional required parameters.
Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

UST353E  "TAPE" REQUIRES "TUNIT" AND "DSNPREF" - RECORD BYPASSED:
Reason: The z/OS Storage Server Configurator, USTCONFG, found the "TAPE" parameter in the listed record, but was unable to find additional required parameters.
Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

UST354E  "DASD" REQUIRES "DSNPREF/DASDPREF" - RECORD BYPASSED:
Reason: The z/OS Storage Server Configurator, USTCONFG, found the "DASD" parameter in the listed record, but was unable to find the "DSNPREF" or "DASDPREF" required parameter.
Action: Correct the parameters and rerun the z/OS Storage Server Configurator.
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM CONFIGURATOR MESSAGES

**UST355E**  “DSNPREF” REQUIRES “TAPE” OR “DASD” - RECORD BYPASSED:

Reason: The z/OS Storage Server Configurator, USTCONF, found the “DSNPREF” parameter in the listed DEFINE/MODIFY/COPY record, but was unable to find additional required parameters.

Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

**UST356E**  “GDG” REQUIRES “DSNPREF” AND “TAPE” OR “DASD” - RECORD BYPASSED:

Reason: The z/OS Storage Server Configurator, USTCONF, found the “GDG” parameter in the listed DEFINE/MODIFY/COPY record, but was unable to find additional required parameters.

Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

**UST357E**  “STORCLAS” REQUIRES “DASD” - RECORD BYPASSED:

Reason: The z/OS Storage Server Configurator, USTCONF, found the “STORCLAS” parameter in the listed record, but was unable to find additional required parameters.

Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

**UST358E**  “MGMTCLAS” REQUIRES “DASD” - RECORD BYPASSED:

Reason: The z/OS Storage Server Configurator, USTCONF, found the “MGMTCLAS” parameter in the listed DEFINE/MODIFY/COPY record, but was unable to find additional required parameters.

Action: Correct the parameters and rerun the z/OS Storage Server Configurator.

**UST359W**  “SORTUNIT” NOT FOUND IN MAIN RECORD - DEFAULTING TO “SYSDA”

Reason: The z/OS Storage Server Configurator was unable to find the “SORTUNIT” keyword parameter in the listed configuration “MAIN” record. The sort unitname is defaulted to “SYSDA” for any sequential tape restores performed.

Action: This message is mostly informational. If you do not intend doing any sequential tape backups and restores, or if the unitname of “SYSDA” is acceptable for temporary sort work data sets, you can safely ignore this message.

**UST360E**  PROFILE NOT IN CONFIGURATION - CAN NOT UPDATE

Reason: A MODIFY/COPY statement was entered, but the WNAME= or WSPREF= parameter specified a profile name that does not exist in the input configuration, so it cannot be processed.

Action: Change the MODIFY/COPY to a DEFINE or remove it and rerun the z/OS Storage Server Configurator.

**UST361E**  ENQ CONTENTION FOR THE CONFIGURATION FILE. TRY AGAIN LATER.

Reason: The z/OS Storage Server Configurator, USTCONF, found online UPSTREAM held the ENQ on the FDR/UPSTREAM configuration file and did not release it within a reasonable period of time. UPSTREAM only holds the ENQ while it is actually reading the configuration file, so this indicates that something is wrong.

Action: Rerun the z/OS Storage Server Configurator at a later time. If it still fails, you may have to terminate the UPSTREAM online task before running the z/OS Storage Server Configurator.

**UST362E**  EXPDT= MUST BE 5 DIGIT NUMERIC - RECORD BYPASSED

Reason: EXPDT= did not have a 5-digit value in the format “yyddd”.

Action: Correct the parameter and rerun the z/OS Storage Server Configurator.
<table>
<thead>
<tr>
<th>Message ID</th>
<th>Message</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST363E</td>
<td>MEMBER DOES NOT EXIST IN CONFIGURATION DATASET</td>
<td>The member name specified on the USTCFGIN DD statement does not exist in the configuration PDS.</td>
<td>Correct the USTCFGIN member name and rerun the z/OS Storage Server Configurator.</td>
</tr>
<tr>
<td>UST364W</td>
<td>ONLY ONE “GLOBAL” DEFINE PERMITTED IN CONFIGURATION FILE</td>
<td>The z/OS Storage Server Configurator found multiple configuration entries with the reserved profile name “WSNAME=GLOBAL”.</td>
<td>Correct your configuration input to contain only one “GLOBAL” definition record and rerun the z/OS Storage Server Configurator.</td>
</tr>
<tr>
<td>UST365E</td>
<td>“GLOBAL” RECORD MUST BE FIRST IN CONFIGURATION</td>
<td>The z/OS Storage Server Configurator found the “WSNAME=GLOBAL” definition record was not the first record in the configuration file.</td>
<td>Correct your configuration input file placing the “GLOBAL” definition record as the first “DEFINE” record of the file and rerun the z/OS Storage Server Configurator.</td>
</tr>
<tr>
<td>UST366E</td>
<td>“GLOBAL” RECORD INCLUDED IN CONFIGURATION</td>
<td>This informational message documents that a DEFINE record with “WSNAME=GLOBAL” was found in the configuration file.</td>
<td>None.</td>
</tr>
<tr>
<td>UST367W</td>
<td>WARNING: NO “GLOBAL” RECORD FOUND IN CONFIGURATION</td>
<td>The z/OS Storage Server Configurator found no “GLOBAL” definition record in your input configuration file. This message is a warning only.</td>
<td>None.</td>
</tr>
<tr>
<td>UST368E</td>
<td>NO CHANGES MADE TO CONFIGURATION. FILE NOT REWRITTEN</td>
<td>The input configuration was not altered (perhaps because of syntax errors in configuration statements) so the output configuration was not written to DD statement name USTCONFG.</td>
<td>None.</td>
</tr>
<tr>
<td>UST369E</td>
<td>PROFILE ALREADY EXISTS CANNOT ADD TO CONFIGURATION</td>
<td>A DEFINE statement specified a WSNAME= or WSPREF= name that already exists in the input configuration</td>
<td>None.</td>
</tr>
<tr>
<td>UST370</td>
<td>MAIN STATEMENT ACCEPTED. MAIN WILL BE ADDED TO CONFIGURATION</td>
<td>The MAIN statement passed syntax checking. The options are added to the output configuration.</td>
<td>None.</td>
</tr>
<tr>
<td>UST371W</td>
<td>DELETE “ALL” REQUEST INVALID. STATEMENT IGNORED</td>
<td>The DELETE statement specified “ALL” instead of a specific WSNAME= Client profile name. This is not allowed.</td>
<td>Remove or correct the DELETE statement. If your intention is to delete the entire configuration file, delete the configuration data set or (if it is a PDS) delete the desired member.</td>
</tr>
</tbody>
</table>
FDR/UPSTREAM MESSAGES
FDR/UPSTREAM Configurator Messages

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST372</td>
<td>DELETE REQUEST ACCEPTED. PROFILE WILL BE DROPPED FROM CONFIGURATION</td>
<td>This informational message indicates that the requested Client profile is deleted from the configuration.</td>
<td>None.</td>
</tr>
<tr>
<td>UST373W</td>
<td>DELETE FUNCTION FAILED. WORKSTATION NOT FOUND IN CONFIGURATION</td>
<td>The Client profile specified by WSNAME= was not found in the existing configuration and could not be deleted.</td>
<td>Correct the Client profile name and resubmit. If necessary, use the PRINT function to display existing profile names.</td>
</tr>
<tr>
<td>UST374</td>
<td>REQUEST ACCEPTED. PROFILE WILL BE ADDED TO THE CONFIGURATION</td>
<td>This informational message indicates that the specified Client profile name is added to the configuration.</td>
<td></td>
</tr>
<tr>
<td>UST375W</td>
<td>WARNING: WORKSTATION ALREADY DEFINED. PROFILE WILL BE REPLACED</td>
<td>The Client profile name specified on a DEFINE statement by WSNAME= already exists. The existing profile is deleted and redefined as specified by the DEFINE statement.</td>
<td>If your intention was to replace the profile, no action is required. If you intended to modify an existing profile, but neglected to use the MODIFY statement instead of DEFINE, review the profile to be sure that all required options have been specified.</td>
</tr>
<tr>
<td>UST376W</td>
<td>PRINT FUNCTION FAILED. WORKSTATION NOT FOUND IN CONFIGURATION</td>
<td>A PRINT statement specified a Client profile name which does not exist in the configuration.</td>
<td>Correct the WSNAME= and resubmit.</td>
</tr>
<tr>
<td>UST377</td>
<td>PRINT FUNCTION COMPLETED</td>
<td>This informational message indicates that a PRINT function has completed successfully.</td>
<td>None.</td>
</tr>
<tr>
<td>UST378W</td>
<td>WARNING: “MAIN” RECORD ALREADY IN FILE. ABOVE STATEMENT IGNORED.</td>
<td>A MAIN statement was encountered in the USTCONFG input, and the configuration file is not NEW, i.e., an existing configuration is being modified. The MAIN statement is ignored.</td>
<td>If your intention was to modify an existing configuration, you can ignore the message or remove the MAIN statement and resubmit. If you intended to create a new configuration, change your JCL to specify a new configuration data set or member and resubmit.</td>
</tr>
<tr>
<td>UST379W</td>
<td>WARNING: MAIN STATEMENT ALREADY IN CONFIG - REPLACING MAIN STATEMENT</td>
<td>A MAIN statement was entered for an update to an existing configuration. All the original MAIN options are replaced by options (and defaults) on the new MAIN statement.</td>
<td>None.</td>
</tr>
<tr>
<td>UST380W</td>
<td>WARNING: NOTHING TO MODIFY - RECORD BYPASSED:</td>
<td>A MODIFY statement did not contain any operands indicating which attributes of the Client profile to modify. The MODIFY is ignored.</td>
<td>If necessary, correct the MODIFY statement and resubmit.</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
<td>Reason</td>
<td>Action</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>UST381W</td>
<td>WARNING: RECORD NOT FOUND IN CONFIG FILE CHANGING TO DEFINE</td>
<td>The Client profile name specified by WSNAME= on a MODIFY statement was not found in the configuration. The MODIFY is treated as a DEFINE and the profile is added to the configuration.</td>
<td>Verify that the profile name is correct and that all required attributes have been specified. If necessary, DELETE the incorrect profile name and MODIFY the correct one.</td>
</tr>
<tr>
<td>UST382W</td>
<td>DELETE ‘GLOBAL’ INVALID. STATEMENT IGNORED</td>
<td>A DELETE WSNAME=GLOBAL statement was encountered. You cannot delete the GLOBAL profile. The statement is ignored.</td>
<td>If necessary, correct the input and resubmit.</td>
</tr>
<tr>
<td>UST383W</td>
<td>WARNING: “GLOBAL” RECORD ALREADY IN FILE - ABOVE STATEMENT IGNORED</td>
<td>A DEFINE WSNAME=GLOBAL statement was encountered, and the GLOBAL profile already exists in the configuration. This DEFINE was ignored.</td>
<td>Remove the DEFINE, or change the DEFINE to a MODIFY if you intend to change the attributes of the GLOBAL profile, and resubmit.</td>
</tr>
<tr>
<td>UST384W</td>
<td>MODIFY REQUEST ACCEPTED. PROFILE WILL BE CHANGED IN CONFIGURATION</td>
<td>This informational message indicates that a MODIFY statement was successfully processed.</td>
<td>None.</td>
</tr>
<tr>
<td>UST385W</td>
<td>REQUEST FAILED. PROFILE NOT UPDATED IN THE OUTPUT CONFIGURATION</td>
<td>A MODIFY statement was rejected for some reason. The Client profile is not updated.</td>
<td>Correct the MODIFY and resubmit.</td>
</tr>
<tr>
<td>UST386W</td>
<td>PRINT REQUEST FAILED. CONFIGURATION FILE IS EMPTY.</td>
<td>A PRINT statement could not be executed because the configuration file does not contain a configuration definition.</td>
<td>None.</td>
</tr>
<tr>
<td>UST387E</td>
<td>INVALID MEMBER NAME, CONFIG FILE IS NOT A PDS</td>
<td>A member name was specified for the output configuration, but the configuration file is not a PDS.</td>
<td>Specify a PDS for the output configuration or omit the member name.</td>
</tr>
<tr>
<td>UST388E</td>
<td>PC DRIVEN CONFIGURATION UPDATE ERROR</td>
<td>The configuration was being updated from UPSTREAM at a Client, but an error occurred. The configuration was not updated.</td>
<td>Correct the error, if possible, and update the configuration again.</td>
</tr>
<tr>
<td>UST389E</td>
<td>CONFIGURATION ERROR - reason</td>
<td>An invalid parameter or another error was encountered. “reason” is a short description of the error.</td>
<td>Correct the error and rerun the Configurator.</td>
</tr>
<tr>
<td>UST390</td>
<td>ACCEPTED CHANGES NOW APPLIED. CONFIGURATION FILE UPDATED SUCCESSFULLY</td>
<td>One or more changes have been successfully applied to the configuration and the configuration file has been rewritten with the new configuration.</td>
<td>None.</td>
</tr>
<tr>
<td>Message ID</td>
<td>Description</td>
<td>Reason</td>
<td>Action</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>UST391E</td>
<td>SERIOUS CONFIGURATION PROCESSOR CHAIN ERROR. ABEND IN PROGRESS</td>
<td>A serious error in the configuration file format has been detected.</td>
<td>Save the abend dump and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST392E</td>
<td>SERIOUS ERROR DURING PRINT PROCESSING. ABEND IN PROGRESS</td>
<td>A serious error in the configuration file format has been detected.</td>
<td>Save the abend dump and contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST399E</td>
<td>error text from control statement processor</td>
<td>The z/OS Storage Server control statement processor detected a syntax or usage error in a USTCONF or USTRPORT control statement. The text indicates the error and where on the control statement it occurred. The job is terminated.</td>
<td>Correct the control statement and resubmit. See Section 21.7 “USTCONF Control Statements” for details on syntax and usage of USTCONF control statements or Chapter 22 “Reporting with USTRPORT” for Reporting on details of USTRPORT control statements.</td>
</tr>
</tbody>
</table>
25.11 USTREGEN AND USTRPORT UTILITY MESSAGES

**UST400E**
*** ONLINE UPSTREAM IS ACTIVE - CANNOT CONTINUE ***

**Reason:** The USTREGEN utility found the online UPSTREAM component active upon starting.

**Action:** Stop Online UPSTREAM while the REGEN utility is run or run REGEN under the Started Task.

**UST401E**
USTREGEN UNABLE TO OPEN LOG FILE - TERMINATING

**Reason:** The USTREGEN utility was unable to open the Log File (DD statement USTLOG). For obvious reasons, this is written as a WTO to the system console only.

**Action:** Verify that the USTLOG DD statement is correctly specified.

**UST402E**
USTREGEN APF AUTHORIZATION CHECK FAILED - CANNOT CONTINUE

**Reason:** The USTREGEN utility detected it was not being run as an z/OS APF authorized program.

**Action:** Verify that the load library containing the USTREGEN utility is currently APF authorized.

**UST403E**
OPEN FOR CATALOG CLUSTER FAILED - TERMINATING

**Reason:** USTREGEN was unable to open the VSAM UPSTREAM Catalog cluster.

**Action:** Review your JCL to be sure it is correct. Review the USTREGEN job log for error messages that may indicate the cause of the problem.

**UST404E**
OPEN FOR FILE-INFO CLUSTER FAILED - TERMINATING

**Reason:** USTREGEN was unable to open the VSAM UPSTREAM File-Information cluster.

**Action:** Review your JCL to be sure it is correct. Review the USTREGEN job log for error messages that may indicate the cause of the problem.

**UST405E**
DYNAMIC ALLOCATION ERROR R15=rr CODE=cccc INFO=iiii

**Reason:** USTREGEN encountered an error trying to dynamically allocate the backup file to be read.

**Action:** See message **UST095E** for details on the error codes and possible actions.

**UST406E**
OPEN FOR ARCHOLD DD FAILED - TERMINATING

**Reason:** USTREGEN was unable to open the ARCHOLD file.

**Action:** Review your JCL to be sure it is correct. Review the USTREGEN job log for error messages that may indicate the cause of the problem.

**UST407E**
BACKUP DATASET NOT FOUND DSN=dsname

**Reason:** USTREGEN was executing as a sub-task of the UPSTREAM online task, as the result of a console command. The backup data set specified in that command was not cataloged.

**Action:** Verify that the backup data set name was properly specified, and that the name is currently cataloged in the z/OS catalogs.

**UST408E**
VSAM ERROR - SNAP-002 TAKEN

**Reason:** USTREGEN encountered an error on one of the VSAM clusters. A diagnostic SNAP dump with ID 002 was taken to the USTSNAP DD, if present. It is accompanied by message **UST409E** with VSAM diagnostic codes.

**Action:** See message **UST409E**.
**UST409E** VSAM error indicators

**Reason:** This message is logged by the VSAM error diagnosis routine. It contains specific error codes from the VSAM “RPL” control block and also indicates the location in USTREGEN of the error.

**Action:** Refer to the IBM VSAM Macro Reference or Macro Instructions for Data Sets manual (depending on the level of your operating system) to understand the error codes reported. The job log or SYSLOG may contain additional diagnostic messages. If you are unable to resolve the problem, contact FDR/UPSTREAM Technical Support.

**UST410** UPSTREAM REGEN PROCESS STARTED

**Reason:** This informational message indicates that the USTREGEN process has begun.

**Action:** None.

**UST411** ARCHOLD DSN: *dsname*

**Reason:** This informational message indicates the “dsname” of the ARCHOLD data set.

**Action:** None.

**UST412** ARCHOLD VOL: *volser*

**Reason:** This informational message indicates the volume serial of the ARCHOLD data set.

**Action:** None.

**UST413** FILE INFORMATION RECORDS UPDATED: *nnnnnnn* ADDED: *mmmmmmmm*

**Reason:** This informational message indicates the number of records in the FILE-INFO data set that were updated and added during this execution of USTREGEN.

**Action:** None.

**UST414** FILE DATA RECORDS READ: *nnnnnnnn*

**Reason:** This informational message indicates the number of data records read from the ARCHOLD data set.

**Action:** None.

**UST415** UPDATE FILE-INFO: *profilename* versiondate *filename*

**Reason:** The FILE-INFO record for the indicated *profilename*, *versiondate*, and *filename* has been updated with data from the ARCHOLD data set.

**Action:** None.

**UST416E** MISSING FILE-INFO RECORD FOR PROFILE=*profilename* *locator*

**Reason:** File descriptors were not found on the backup tape for the indicated *profilename*.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

**UST417E** C-RECORD MISSING ON BACKUP

**Reason:** A catalog record was not found on the backup tape.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

**UST418E** C-RECORD ERROR IN CONTROL FILE

**Reason:** USTREGEN had an error reading a control record from the online repository.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

**UST419E** F-RECORD IN CONTROL FILE MISSED UPDATE FILE=*filename*

**Reason:** A file record was not updated properly.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.
### FDR/UPSTREAM Messages

**USTREGEN and USTRPORT Utility Messages**

<table>
<thead>
<tr>
<th>Message Code</th>
<th>Description</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST420E</td>
<td>F-Record Get Previous Version Not Found</td>
<td>File: <code>filename</code></td>
<td>An expected file record was not found.</td>
</tr>
<tr>
<td>UST421</td>
<td>USTREGEN Completed Successfully</td>
<td></td>
<td>USTREGEN completed with no errors.</td>
</tr>
<tr>
<td>UST422W</td>
<td>USTREGEN Completed with Errors</td>
<td></td>
<td>USTREGEN completed with warnings or errors.</td>
</tr>
<tr>
<td>UST423E</td>
<td>F-Record Timestamp Not Found on Backup File: <code>filename</code></td>
<td></td>
<td>An expected file record was not found.</td>
</tr>
<tr>
<td>UST424</td>
<td>Vault Regen Started for DSN: <code>dsname</code></td>
<td></td>
<td>USTREGEN determined that the backup data set being read was the control file for a vault tape created by USTVAULT. The UPSTREAM control records are updated to point to the secondary (vault) copy of the backups, as recorded in that control file.</td>
</tr>
<tr>
<td>UST425</td>
<td>Upstream Regened <code>nnnnnn</code> Backup Versions</td>
<td></td>
<td>USTREGEN updated the control records for the indicated number of version dates.</td>
</tr>
<tr>
<td>UST426E</td>
<td>Unknown Record Type <code>data</code></td>
<td></td>
<td>USTREGEN found a record that it could not identify in the backup data set being read. Part of the record is displayed.</td>
</tr>
<tr>
<td>UST427E</td>
<td>Vault Backup Data Set Not Cataloged Vol: <code>vvvvvv</code> DSN: <code>dsname</code></td>
<td></td>
<td>USTREGEN was reading a vault control file created by USTVAULT but a backup data set pointed to by the control records was no longer cataloged in the system catalog. The backup would not be usable.</td>
</tr>
<tr>
<td>UST428W</td>
<td>Backup Cataloged to Another Volume - Regen From Lastest Copy Only Cataloged To <code>cccccc</code> Vault Copy Is <code>vvvvvv</code> DSN: <code>dsname</code></td>
<td></td>
<td>USTREGEN was reading a vault control file created by USTVAULT but a backup data set pointed to by the control records is currently cataloged in the system catalog to a different tape volume. &quot;cccccc&quot; is the volser in the catalog, while &quot;vvvvvv&quot; is the volser in the vault records. This probably occurred because you vaulted a copy of the same backup file multiple times. For example, an incremental MERGE BACKUP normally appends data to the previous incremental. If you vault that backup every day, you have multiple vaulted copies with each copy containing an additional day's data. You only need to REGEN the most recent vault copy of that backup.</td>
</tr>
</tbody>
</table>
### UST429
**VAULT BACKUP REGENED PROF=profile DATE=versiondate DSN=dsname**

**Reason:** USTREGEN was reading a vault control file created by USTVAULT. The records for the indicated backup (profile, versiondate, and backup dsname) have been successfully updated in the UPSTREAM repository.

**Action:** None.

### UST430
**UPSTREAM BACKUP REGENED PROF=profile VERDATE=versiondate FLAGS=X'xxxx'**

**Reason:** USTREGEN was reading an UPSTREAM backup. The records for the indicated backup (profile and versiondate) have been successfully updated in the UPSTREAM repository.

**Action:** None.

### UST480E
**FILEINFO POINT FAILED KEY=kkkkkkkkkkkkkk**

**Reason:** A VSAM POINT in the FILE-INFO data set for the specified key failed.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

### UST481E
**FILEINFO GET FAILED KEY=kkkkkkkkkkkkkk**

**Reason:** A VSAM GET in the FILE-INFO data set for the specified key failed.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

### UST482E
**CATALOG CLUSTER POINT FAILED KEY=kkkkkkkkkkkkkk**

**Reason:** A VSAM POINT in the catalog data set for the specified key failed.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

### UST483E
**CATALOG CLUSTER GET FAILED KEY=kkkkkkkkkkkkkk**

**Reason:** A VSAM GET in the catalog data set for the specified key failed.

**Action:** Contact FDR/UPSTREAM Technical Support for assistance.

### UST488E*
**error text**

**Reason:** USTRPORT encountered an error opening or processing some data set that made it impossible to continue. This may be due to missing DD statements. The text indicates the error.

**Action:** Correct the error and resubmit the USTRPORT job.

### UST494
**USTRPTPC - REPORT STARTED**

**Reason:** A USTRPORT request was received from a Client.

**Action:** None.

### UST495
**USTRPTPC - REPORT ENDED**

**Reason:** A USTRPORT request from a Client was completed.

**Action:** None.

### UST496
**USTRPTPC - REPORT CANCELED BY USER OR SEND ERROR**

**Reason:** A USTRPORT request from a Client was terminated because of user request at the Client or because of a transmission error.

**Action:** None.

### UST498E
**NO ENTRIES FOUND MATCHING SELECTION CRITERIA**

**Reason:** USTRPORT did not find any records which met the criteria specified on SELECT statements.

**Action:** Correct the SELECT statements and resubmit your USTRPORT request.
**UST499** TOTAL HISTORY RECORDS READ: 
nnnnnnnnn TOTAL RECORDS SELECTED: 

**Reason:** For RPTYPE=HISTORY or BACKUP, shows the total records read and the total records selected for reporting.

**Action:** None.
25.12 USTMAINT AND USTREORG UTILITY MESSAGES

**UST500*** UPSTREAM USTMAINT PROCESS STARTED ***

Reason: This informational message indicates that USTMAINT has begun execution.
Action: None.

**UST501E* USTMAINT UNABLE TO OPEN LOG FILE - TERMINATING

Reason: The USTMAINT utility was unable to open the USTLOG data set. It does not continue processing. For obvious reasons, this message is issued as a WTO to the system console only.
Action: Verify that you have correctly specified the USTLOG data set in your UPSTREAM JCL.

**UST503E* OPEN FOR CATALOG CLUSTER FAILED - TERMINATING

Reason: USTMAINT was unable to open the VSAM UPSTREAM Catalog cluster.
Action: Review your UPSTREAM JCL to be sure it is correct. Review the UPSTREAM job log for error messages which may indicate the cause of the problem.

**UST504E* OPEN FOR FILE-INFO CLUSTER FAILED - TERMINATING

Reason: USTMAINT was unable to open the VSAM UPSTREAM File-Information cluster.
Action: Review your UPSTREAM JCL to be sure it is correct. Review the UPSTREAM job log for error messages which may indicate the cause of the problem.

**UST505 PURGING: PROFILE=profilename DATE/TIME=versiondate

Reason: USTMAINT is purging a backup version with the indicated profilename and versiondate. This message is informational only.
Action: None.

**UST506 DSN: data set name WAS DELETED - nnnnnnnnn FILE RECORDS ERASED

Reason: USTMAINT is purging a backup version having found the preceding named data set is no longer cataloged on the z/OS system. This message is issued along with message UST505 and is informational only.
Action: None.

**UST507 nnnnnnnn OF nnnnnnnnn HISTORY RECORDS ERASED FOR DATES EARLIER THAN mm/dd/yy

Reason: History records are being kept in the UPSTREAM catalog data set (MAXHIST= was specified or default other than 0 in the configuration). USTMAINT has deleted obsolete history records older than MAXHIST days, calculated as “mm/dd/yy”.
Action: None.

**UST508E* VSAM ERROR - SNAP 002 TAKEN

Reason: USTMAINT encountered an error on one of the VSAM clusters. A diagnostic SNAP dump with ID 002 was taken to the USTSNAP DD, if present. It is accompanied by message UST509E with VSAM diagnostic codes.
Action: See message UST509E.

**UST509E VSAM error indicators

Reason: This message is logged by the VSAM error diagnosis routine. It contains specific error codes from the VSAM “RPL” control block and also indicates the location in USTREGEN of the error.
Action: Refer to the IBM VSAM Macro Reference or Macro Instructions for Data Sets manual (depending on the level of your operating system) to understand the error codes reported. The job log or SYSLOG may contain additional diagnostic messages. If you are unable to resolve the problem, contact FDR/UPSTREAM Technical Support.
FDR/UPSTREAM MESSAGES
USTMAINT AND USTREORG UTILITY MESSAGES

**UST510** UPSTREAM MAINT COMPLETED -- nnnnnnnn Version Records Erased
nnnnnnnnn File Records Erased

*Reason:* This informational message indicates the number of records erased from the UPSTREAM catalog due to USTMAINT processing.

*Action:* None.

**UST511E** UPSTREAM LOCATE ERROR COMP=cccc DSN=dsname

*Reason:* UPSTREAM issued a catalog LOCATE for a backup data set, and the return code was other than 0 (successful) and 8 (not found).

*Action:* Investigate the catalog entry for the indicated data set; correct or delete it as appropriate.

**UST512** n OF m REGISTERED NAME RECORDS ERASED FOR DATES EARLIER THAN mm/dd/yy

*Reason:* This informational message indicates that of the “m” records in the Registered Name table, “n” of them have not been referenced or updated in the last 90 days and have been deleted.

*Action:* None.

**UST550** REORG BEGUN FOR DDNAME ddname

*Reason:* A F UPSTREAM,REORG DD=ddname console command was entered to request dynamic reorganization of the UPSTREAM data set referenced by the indicated DDNAME. No other tasks were active (except possibly other reorganizations), so the requested reorganization was initiated.

*Action:* None.

**UST551W** REORG BYPASSED -- DDNAME ddname NOT FOUND

*Reason:* The ddname indicated on a F UPSTREAM,REORG DD=ddname console command is not one of the ddnames that can be reorganized.

*Action:* Re-enter the command, specifying DD=USTCATLG, USTFILEI, or USTFILEC.

**UST524W** REORG BYPASSED -- PROFILE ddname NOT IN CONFIGURATION

*Reason:* A profile whose name matches the ddname to be reorganized was not found in the UPSTREAM configuration currently active. The reorganization is not done.

*Action:* Update the configuration to specify a profile with a name matching the ddname to be reorganized. It must specify DASD or TAPE/TAPECOMP and is used to dynamically allocate a backup file for the reorganization.

**UST553W** REORG BYPASSED -- PROFILE ddname DOES NOT ALLOW SEQUENTIAL BACKUP

*Reason:* The profile named “ddname” in the currently active UPSTREAM configuration is not enabled for either DASD or TAPE/TAPECOMP, so the backup file for the reorganization could not be allocated. The reorganization is not done.

*Action:* Update the named profile in the configuration to specify either DASD or TAPE or TAPECOMP, along with an appropriate DSNPREF.

**UST554E** DYNALLOC ERROR: R15=rrrrrrrr CODE=cccc INFO=iiii

*Reason:* USTREORG received an error indication trying to dynamically allocate the backup file for a data set reorganization.

*Action:* Verify that the specifications for DASDPREF/TAPEPREF and DUNIT/TUNIT in the profile used for the reorganization are correct. If DASD, verify that the unit or volser specified by DUNIT have enough space for the data set. See message UST095E for information on interpreting these error codes.
UST555 BACKUP DATA SET ALLOCATED, DSN=dsn

Reason: USTREORG has successfully dynamically allocated the named backup file, which is used to backup the data from the UPSTREAM data set being reorganized. It may be on tape or disk.

Action: If the reload of the UPSTREAM data set fails, you probably need to delete and redefine the data set (possibly with more space) and manually REPRO this backup file back into the data set using the USTCAMS utility. This file is retained until deleted by your DASD or tape management software, or until manually deleted.

UST556E OUTPUT OPEN FOR BACKUP DATA SET FAILED

Reason: The OPEN for OUTPUT on the backup file by USTREORG has failed. The UPSTREAM data set being reorganized has not been modified.

Action: Check the joblog of the UPSTREAM online task for IBM error messages. Correct the cause if possible.

UST557E INPUT OPEN FOR BACKUP DATA SET FAILED

Reason: USTREORG has completed the backup of the UPSTREAM data set being reorganized, and has closed the backup file, but the reOPEN of the backup file for input has failed. The data set being reorganized has not been modified.

Action: Check the joblog of the UPSTREAM online task for IBM error messages. Correct the cause if possible.

UST558E general VSAM error diagnostic information

Reason: USTREORG has received an error reading or writing the UPSTREAM data set being reorganized. The message contains specific error indicators from the VSAM RPL. If REQ=00 is displayed, this was a read error; the backup was not completed and the data set has not been modified; however, there is probably an error in that data set which should be corrected. If REQ=01, this was a write error and the data set is probably unusable.

Action: You probably need to shutdown UPSTREAM and correct the error. If this was a write error, the backup file contains a backup of the data set. See IBM manual VSAM Macro Reference or Macro Instructions for Data Sets (depending on the level of your operating system) to understand the error codes.

UST559E OPEN OR CLOSE OF CLUSTER FAILED

Reason: An OPEN or CLOSE of the UPSTREAM data set being reorganized by USTREORG has failed. The data set is probably unusable.

Action: You probably need to shutdown UPSTREAM and correct the error. Check the joblog of the UPSTREAM online task for IBM error messages.

UST560E I/O ERROR ON BACKUP DATA SET

Reason: An I/O error (input or output) has occurred on the backup file being used by USTREORG during the reorganization of a UPSTREAM data set. If this is followed by message UST565E*, then this was a READ error during the RELOAD and the data set being reorganized is probably unusable.

Action: You probably need to shutdown UPSTREAM and correct the error. Check the joblog of the UPSTREAM online task for IBM error messages.
UST562* REORG SUCCESSFUL FOR DDNAME "ddname" -- RELOADED WITH:

Reason: The reorganization of the UPSTREAM data set pointed to by the named ddname has been successfully reorganized by USTREORG. It is now reOPENed by the main task, and UPSTREAM again accepts requests for backups and restores (unless another reorganization is still running).

Action: None.

UST563 nnnnnnnnnnnnnn DATA-BLOCKS; nnnnnnnnnnnnnn DATA-BYTES

Reason: This message follows message UST562* on the UPSTREAM log and indicates the number of blocks and bytes rewritten to the data set that was reorganized.

Action: None.

UST564W* REORG UNSUCCESSFUL FOR DDNAME "ddname" -- UPSTREAM FILE STILL USABLE

Reason: An error occurred during the reorganization of the UPSTREAM data set indicated, but it was before USTREORG began reloading the data set, so it is still usable, and UPSTREAM continues.

Action: Re-execute the reorganization after correcting the error, if possible.

UST565E* REORG UNSUCCESSFUL FOR DDNAME "ddname" -- UPSTREAM FILE NOT USABLE - MUST BE RELOADED

Reason: An error occurred during the reorganization of the UPSTREAM data set indicated, while USTREORG was reloading the data set. The data set is probably not usable. This is displayed on the console as a non-scrollable message to ensure that the operator does not overlook it.

Action: You probably need to shutdown UPSTREAM and correct the error. You may be able to correct it by manually reloading the file from the backup just created by USTREORG. You may also need to redefine the failing data set with more space.

UST566W IMMEDIATE SHUTDOWN REQUESTED - REORG TERMINATED

Reason: The operator has requested an immediate shutdown of UPSTREAM. The USTREORG operation in progress was terminated. The file being reorganized may or may not be usable.

Action: Determine by looking at subsequent UST564W* or UST565E* messages whether or not the file being reorganized is still usable. If it is not usable, reload the file from your most current backup of that file.

UST567 BACKUP DATASET SUCCESSFULLY CREATED

Reason: USTREORG has successfully created its backup data set. The reload of the file being reorganized now begins.

Action: None.

UST568E* REORG FAILED WITH SYSTEM ABEND Ssss

Reason: The USTREORG task has failed with the indicated system abend.

Action: USTREORG terminates. If the abend code is other than a Sx37, an abend dump is taken before termination. If the failure occurred during the reload phase, message UST565E* is issued (indicating that the file has become unusable); otherwise message UST564W* is issued.

UST570E* USTBKPRT UNABLE TO OPEN REPORT FILE - TERMINATING

Reason: USTBKPRT had a failure opening its report file (USTRPRT). Probably the DD statement was missing or incorrectly specified.

Action: Correct the JCL and resubmit.
FDR/UPSTREAM MESSAGES
USTMAINT AND USTREORG UTILITY MESSAGES

<table>
<thead>
<tr>
<th>UST571E</th>
<th>BSAM ERROR: USTBKUP DATASET - synad info</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>An I/O error occurred reading the USTBKUP data set in the USTBKPR utility. The &quot;synad info&quot; is the description of the error generated by the IBM SYNADEF macro. This may be accompanied by an IBM message in the joblog of the USTBKPR job. The sequential backup data set may be damaged or unusable.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>If this is a sequential tape backup, try a different tape drive. If the error cannot be corrected, the backup is not usable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST572E*</th>
<th>ERROR READING USTBKUP DATASET - MAY BE EMPTY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>An I/O error or end of file occurred reading the first block of the USTBKUP data set in the USTBKPR backup report utility. This may mean that the data set was created but was never written into due to some error during the backup.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>If this is a sequential tape backup, try a different tape drive. If the error cannot be corrected, the backup is not usable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UST573E</th>
<th>*** ERROR OPENING USTBKUP DATASET - TERMINATING ***</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason:</strong></td>
<td>An error occurred opening the USTBKUP data set in the USTBKPR backup report utility. This is probably accompanied by an IBM message in the joblog of the USTBKPR job. This may mean that the USTBKUP DD statement was omitted or the DD statement name misspelled, or that the dsname of the backup data set was misspelled.</td>
</tr>
<tr>
<td><strong>Action:</strong></td>
<td>Determine the error from the IBM message, and correct the error if possible.</td>
</tr>
</tbody>
</table>
25.13 USTMIGRT, USTVAULT, AND USTMERGE MESSAGES

**UST602E ONLINE UPSTREAM IS ACTIVE - OPERATOR REPLIED xxxxxx**

**Reason:** This message is printed after the operator replies to the UST602E message on the console. “xxxxxx” is either “GO” or “CANCEL”. If CANCEL, USTARCH terminates.

**Action:** None.

**UST603E* OPEN FOR CATALOG CLUSTER FAILED - TERMINATING**

**Reason:** The Archive Utility, USTARCH, was unable to open the Repository Catalog Cluster.

**Action:** Review your JCL to be sure it is correct. Review the job log for error messages that may indicate the cause of the problem.

**UST604E* OPEN FOR FILE-INFO CLUSTER FAILED - TERMINATING**

**Reason:** The Archive Utility, USTARCH, was unable to open the Repository File-Information Cluster.

**Action:** Review your JCL to be sure it is correct. Review the job log for error messages that may indicate the cause of the problem.

**UST605E* OPEN FOR FILE-DATA CLUSTER FAILED - TERMINATING**

**Reason:** The Archive Utility, USTARCH, was unable to open the Repository File-Data Cluster.

**Action:** Review your JCL to be sure it is correct. Review the job log for error messages that may indicate the cause of the problem.

**UST606E* OPEN FOR ARCHOLD DD FAILED - TERMINATING**

**Reason:** The Archive Utility was unable to open the prior Archive data set, “ARCHOLD” DD statement. This message can be issued only if USTARCH is operating in MERGE mode.

**Action:** Review your JCL to be sure it is correct. Review the USTARCH job log for error messages that may indicate the cause of the problem.

**UST607E* OPEN FOR OUTPUT ARCHNEW DD FAILED - TERMINATING**

**Reason:** The z/OS Storage Server Archive Utility, USTARCH, was unable to open the new Archive data set, “ARCHNEW” DD statement.

**Action:** Review your JCL to be sure it is correct. Review the USTARCH job log for error messages that may indicate the cause of the problem.

**UST608E* VSAM ERROR**

**Reason:** The utility received a VSAM error indication. This message is accompanied by message UST609E containing the VSAM error codes.

**Action:** None.

**UST609E VSAM error indicators**

**Reason:** This message is logged by the VSAM error diagnosis routine. It contains specific error codes from the VSAM “RPL” control block and also indicates the location in the utility of the error.

**Action:** Refer to the IBM VSAM Macro Reference or Macro Instructions for Data Sets manual (depending on the level of your operating system) to understand the error codes reported. The job log or SYSLOG may contain additional diagnostic messages. If you are unable to resolve the problem, contact FDR/UPSTREAM Technical Support.

**UST610E* DEVTYPE CHECK FOR dddname DD FAILED - TERMINATING**

**Reason:** The DEVTYPE macro for ARCHNEW or ARCHOLD, to determine the device type, has failed.

**Action:** Be sure that the DD statements for ARCHNEW and ARCHOLD are correct.
<table>
<thead>
<tr>
<th>Message Code</th>
<th>Message Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST611E*</td>
<td>ARCHNEW DEVICE IS NOT TAPE - TERMINATING</td>
</tr>
<tr>
<td>Reason</td>
<td>The z/OS Storage Server Archive utility, USTARCH, has determined the device for the &quot;ARCHNEW&quot; DD statement is not a TAPE device.</td>
</tr>
<tr>
<td>Action</td>
<td>Change your JCL to specify a valid TAPE device to contain the new Archive data set and rerun the USTARCH job.</td>
</tr>
<tr>
<td>UST612E*</td>
<td>APF AUTHORIZATION CHECK FAILED - TERMINATING</td>
</tr>
<tr>
<td>Reason</td>
<td>The z/OS Storage Server Archive utility, USTARCH, has determined it is not running as an z/OS APF authorized program.</td>
</tr>
<tr>
<td>Action</td>
<td>Verify that the load library containing the USTARCH utility is currently z/OS APF authorized.</td>
</tr>
<tr>
<td>UST613E*</td>
<td>UNABLE TO MOUNT CORRECT ARCHOLD TAPE - ARCHIVE ABORTED</td>
</tr>
<tr>
<td>Reason</td>
<td>The z/OS Storage Server Archive utility, USTARCH, had an error reading the ARCHOLD tape volume. It is not possible for it to continue. This message can occur only if USTARCH is operating in MERGE mode.</td>
</tr>
<tr>
<td>Action</td>
<td>Be sure that the ARCHOLD DD statement points to the correct old archive tape. Contact FDR/UPSTREAM Technical Support if required.</td>
</tr>
<tr>
<td>UST614E*</td>
<td>FEOV VOLUME SWITCH - ARCHOLD DATASET</td>
</tr>
<tr>
<td>Reason</td>
<td>The z/OS Storage Server Archive utility, USTARCH, is issuing the FEOV request to switch to the next volume in the ARCHOLD DD statement tape set. This message is informational only.</td>
</tr>
<tr>
<td>UST615W*</td>
<td>WARNING: ARCHOLD DEVICE IS NOT TAPE</td>
</tr>
<tr>
<td>Reason</td>
<td>The z/OS Storage Server Archive utility, USTARCH, has determined that the ARCHOLD DD statement in it's execution JCL does not indicate a tape device. ARCHOLD must be either a tape or DUMMY. If it is not DUMMY, message UST616E* is also issued. This message can occur only if USTARCH is operating in MERGE mode.</td>
</tr>
<tr>
<td>Action</td>
<td>If the ARCHOLD DD statement is specified as DUMMY, USTARCH runs without reading ARCHOLD. This is correct if this is the first time you have run USTARCH. Otherwise, correct the ARCHOLD DD statement and rerun USTARCH.</td>
</tr>
<tr>
<td>UST616E*</td>
<td>ARCHOLD DEVICE IS NOT DUMMY - TERMINATING</td>
</tr>
<tr>
<td>Reason</td>
<td>The z/OS Storage Server Archive utility, USTARCH, has determined that the device specified in the ARCHOLD DD statement is not a tape device and is not specified as “DUMMY”. USTARCH does not continue with the archival process. This message can occur only if USTARCH is operating in MERGE mode.</td>
</tr>
<tr>
<td>Action</td>
<td>Correct your JCL and rerun USTARCH.</td>
</tr>
<tr>
<td>UST618E*</td>
<td>LOCATE FAILED FOR ARCHOLD DD - TERMINATING</td>
</tr>
<tr>
<td>Reason</td>
<td>The z/OS Storage Server Archive utility, USTARCH, was unable to issue an z/OS catalog “LOCATE” request for the specified data set name in the ARCHOLD DD statement. This message can occur only if USTARCH is operating in MERGE mode.</td>
</tr>
<tr>
<td>Action</td>
<td>Review your execution JCL to be sure you have specified the correct data set name in the ARCHOLD DD statement. Correct your JCL and rerun USTARCH.</td>
</tr>
<tr>
<td>UST619E</td>
<td>UNABLE TO LOCATE FILE DATA RECORDS:</td>
</tr>
<tr>
<td>Reason</td>
<td>This is the first in a series of error messages from the archive utility, USTARCH. It indicates that the archive utility was unable to find the file data records in the ARCHOLD file. This may be the result of a prior BSAM I/O error encountered reading or writing this ARCHOLD tape volume. The archive process continues, but the file data for this file is no longer accessible.</td>
</tr>
<tr>
<td>Action</td>
<td>None.</td>
</tr>
</tbody>
</table>
FDR/UPSTREAM MESSAGES
USTMIGRT, USTVAULT, AND USTMERGE MESSAGES

UST620E  profilename  versiondate  filename
Reason: This message contains additional information for message UST619E.
Action: None.

UST621E  ARCHNEW BSAM WRITE ERROR - ABEND U0609
Reason: The z/OS Storage Server Archive utility, USTARCH, detected an unrecoverable BSAM write error while attempting to write a block to the ARCHNEW DD. It is not possible for it to continue. USTARCH abends with a U0609 abend. There are additional z/OS BSAM error messages in the FDR/UPSTREAM z/OS Storage Server job log.
Action: Contact FDR/UPSTREAM Technical Support.

UST622E  ARCHNEW BSAM WRITE ERROR - ABEND U0610
Reason: The z/OS Storage Server Archive utility, USTARCH, detected an unrecoverable BSAM write error while attempting to write a block to the ARCHNEW DD. It is not possible for it to continue. USTARCH abends with a U0610 abend. There are additional z/OS BSAM error messages in the z/OS Storage Server job log.
Action: Contact FDR/UPSTREAM Technical Support.

UST623E  BSAM ERROR: ddname  DATASET  dsname
I/O ERROR  text,  DSN=datasetname
Reason: The utility detected a fatal BSAM error accessing the data set in the DD statement named. It is not possible for it to continue. There are additional z/OS BSAM error messages in the z/OS Storage Server job log.
Action: Contact FDR/UPSTREAM Technical Support.

UST624E  REPOSITION ARCHOLD TAPE VOL
Reason: An error occurring positioning the “old” Archive Data set. The Archived file being processed is skipped, and the ARCHOLD data set is repositioned to the beginning.
Action: This is an internal error; contact FDR/UPSTREAM Technical Support.

UST625E  UNABLE TO FIND THE cccccccc CONFIGURATION ENTRY
Reason: The utility was being run as a sub-task of the z/OS Storage Server online task, and the current configuration did not contain a profile with the appropriate name (USTARCH, USTMIGxx, USTMERxx, or USTVLTxx).
Action: Update the configuration with an appropriate reserved profile and re-submit the request.

UST626E  UNIT NAME INVALID IN cccccccc CONFIGURATION ENTRY
Reason: No value was specified for TUNIT= in the reserved profile used for this utility operation.
Action: Update the reserved profile in the configuration and re-submit the request.

UST627E  DYNALLOC ERROR: R15=rrrrrrrr  CODE=ccccc  INFO=iiii
Reason: The utility received an error indication trying to dynamically allocate the output tape when executing as a sub-task of the z/OS Storage Server online task.
Action: Verify that the specifications for TAPEPREF and TUNIT in the associated reserved profile are correct. See message UST095E for information on interpreting these error codes.

UST628W  INTERRUPTED BACKUP BYPASSED: profilename  versiondate
Reason: The indicated backup was interrupted, and is not archived until it is restarted and successfully completed.
Action: None.
FDR/UPSTREAM MESSAGES
USTMIGRT, USTVAULT, AND USTEMERGE MESSAGES

**UST630**  *program process STARTED*

- **Reason:** This informational message indicates that the indicated program has started the indicated process, for example, “USTARCH ARCHIVE” or “USTMIGRT MIGRATE”.
- **Action:** None.

**UST633**  *ED: nnnnnnnnnnn VERSION(S) BYPASS*

- **Reason:** Indicates the number of version records that were bypassed because they were flagged as “DELETE VERSION”.
- **Action:** None.

**UST634**  *ARCHIVED: nnnnnnnnnnnn type*

- **Reason:** Indicates the number of versions, files, and data records moved to the ARCHNEW data set during USTARCH processing.
- **Action:** None.

**UST635**  *ERASED: nnnnnnnn DATA RECORDS*

- **Reason:** Indicates the number of data records erased from the UPSTREAM online repository during USTARCH processing.
- **Action:** None.

**UST636**  *ARCHNEW DSN: dsname*

- **Reason:** Indicates the data set name of the ARCHNEW data set.
- **Action:** None.

**UST637**  *ARCHNEW VOL: volser*

- **Reason:** Indicates the volume serial of the ARCHNEW data set.
- **Action:** None.

**UST638**  *ARCHOLD DSN: dsname*

- **Reason:** Indicates the data set name of the ARCHOLD data set.
- **Action:** None.

**UST639**  *ARCHOLD VOL: volser*

- **Reason:** Indicates the volume serial of the ARCHOLD data set.
- **Action:** None.

**UST649E**  *function REQUEST INVALID REASON=reason REQ: request*

- **Reason:** The request to start USTMIGRT, USTEMERGE, USTVAULT, or USTSCHED could not be processed for the reason indicated by “reason” that consists of brief explanatory text, including:
  - **GROUP ID NOT SPECIFIED** – indicates that the MODIFY command parameter did not contain a valid 2-character group ID, such as VAULTxx.
  - **BYTE AFTER COMMAND NOT BLANK** – indicates that the MODIFY command parameter (MIGRTxx, MERGExx, or VAULTxx) was not followed by a blank.
  - **KEYWORD IS INVALID** – indicates the MODIFY command parameter (MIGRTxx, MERGExx, or VAULTxx) was followed by an unrecognized keyword.
  - **KEYWORD EXCEEDS MAXIMUM LENGTH** – indicates the MODIFY command parameter (MIGRTxx, MERGExx, or VAULTxx) was followed by a keyword longer than the maximum permitted.
  - **KEYWORD VALUE IS BLANK** – indicates the MODIFY command parameter (MIGRTxx, MERGExx, or VAULTxx) was followed by a keyword with no value after it.
FDR/UPSTREAM MESSAGES
USTMIGRT, USTVAULT, AND USTEMERGE MESSAGES

KEYWORD AREA EXCEEDS MAX – indicates the MODIFY command parameter (MIGRTxx, MERGExx, or VAULTxx) was followed by a keyword with value longer than the maximum permitted.

COPY= VALUE CANNOT BE 1 – indicates that COPY=1 was specified on a VAULTxx command. The copy 1 backup is the original backup, COPY= must have some other value (usually 2 through 9).

Action: Correct the syntax of the command and reissue it.

UST650E function BYPASSED REASON=reason DSN=backupdsn

Reason: USTMIGRT, USTEMERGE, or USTVAULT bypassed processing of the backup data set indicated by “backupdsn” for the reason indicated by “reason” that consists of a reason number and brief explanatory text. Many of these reasons indicate an I/O error or inconsistency in the UPSTREAM repository data sets and are usually accompanied by additional messages detailing the error. Reason codes are:

1 – C-RECORD DOES NOT EXIST – indicates an internal error.
2 – C-RECORD NOT TYPE 81 – indicates an internal error.
3 – BACKUP CATALOGED TO TAPE – indicates that UPSTREAM's records indicated the backup was on disk but the z/OS catalog shows it on tape. The backup may have been copied to tape with IEBGENER or some other copy utility outside of UPSTREAM.
4 – C-RECORD PUT VSAM ERROR – see VSAM error message.
5 – BACKUP WAS INTERRUPTED – indicates that USTMIGRT bypassed a restartable-interrupted backup.
6 – BACKUP IS NOT CATALOGED – indicates a backup recorded by UPSTREAM is not in the z/OS catalog. This might occur if the backup was expired and uncataloged recently but USTMAINT has not yet been run to delete it from UPSTREAM.
7 – LOCATE ERROR COMP=X’cccccc’ – indicates that a catalog locate has failed.
8 – FILE CATALOGED TO MIGRAT – indicates that the disk backup has been archived by ABR or HSM; the backup is not recalled to disk.
9 – C-RECORD GET VSAM ERROR – see VSAM error message.
A – C-REC GET-UPDATE VSAM ERR – see VSAM error message.
B – S-REC GET-UPDATE VSAM ERR – see VSAM error message.
C – S-RECORD PUT VSAM ERROR – see VSAM error message.
D – F-REC GET-UPDATE VSAM ERR – see VSAM error message.
E – F-RECORD PUT VSAM ERROR – see VSAM error message.
F – I/O ERROR ON BACKUP FILE – indicates an I/O error on the output. See the UST623E message.
G – MORE THAN 254 BACKUP VOLUMES – indicates that a single tape file created required more than 254 tape volumes, which cannot be handled.
H – DEBLOCKING ERROR ON BACKUP – indicates a corrupted backup data set.
I – INSUFFICIENT STORAGE – indicates there is not sufficient free memory in the FDR/UPSTREAM online region to complete this operation. Increase the region if possible, restart UPSTREAM, and try again, or run the request at a time when fewer UPSTREAM operations are active.
J – MULTIPLE VERSION BACKUP – indicates that the utility encountered a disk backup data set that contained backups from multiple version dates; this should occur only if a full MERGE BACKUP was done to disk with COPYINCR. Change the profile to remove COPYINCR, since USTMIGRT combines the backups into one file.
K – NAME MISSING COPY MASK “?” – indicates that although the associated profile is enabled for vaulting, the backup data set name in the profile does not contain a question mark “?” for the copy number.
L – COPY VALUE NOT 1 AT OFFSET – indicates that the copy number in the data set name of the input backup (at the position reserved by a “?” in the profile) is not “1”. Contact FDR/UPSTREAM Technical Support for assistance.
FDR/UPSTREAM MESSAGES
USTMIGRT, USTVAULT, AND USTMERGE MESSAGES

M – BACKUP IS A DEFERRED MERGE – indicates that the backup is not processed by USTMIGRT or USTVAULT because it is a full MERGE BACKUP taken with DEFER=MERGE and USTMERGE has not yet been run against it.

N – INSUFFICIENT STORAGE – see reason I.

O – DEFER BACKUP OVER 20 VOLUMES – indicates that when USTMERGE was trying to add deferred files to the end of a deferred MERGE BACKUP already on tape, that backup was cataloged to over 20 tape volumes.

P – DEFER BACKUP NOT 1ST FILE – indicates that when USTMERGE was trying to add deferred files to the end of a deferred MERGE BACKUP already on tape, that backup was not cataloged as file 1 on the tape.

Q – OVER nn VERSIONS IN BACKUP – indicates that the input backup file contains backups for more than “nn” unique versiondates. The utility cannot handle this backup.

R – INVALID RECORD LENGTH – indicates that an invalid record was encountered.

T – FILE TRANSFER BACKUP – indicates that a backup selected was actually a file transfer, not a backup.

U – ONLY VAULTED COPY EXISTS – indicates that only a vault copy of the backup was found.

Action: If necessary, contact FDR/UPSTREAM Technical Support for assistance.

UST651 BACKUP SELECTED FOR operation PROFILE=profilenam DSN=backupdsn

Reason: The indicated disk backup under the indicated profile was selected for “migration”, “merging” or “vaulting” to tape.

Action: None.

UST652E ALLOCATE/OPEN FOR BACKUP FAILED DSN=backupdsn

Reason: An error occurred dynamically allocating or opening the indicated disk backup data set. There may be additional UPSTREAM or IBM messages indicating the specific cause.

Action: If the problem can be corrected, rerun the utility. If necessary, contact FDR/UPSTREAM Technical Support for assistance.

UST653E action FOR file FAILED DSN=backupdsn

Reason: An error occurred on the indicated tape backup data set. “action” may be ALLOCATE/OPEN, CLOSE, or ADD S-RECORD. “file” may be OUTPUT TAPE or CONTROL FILE (the latter for USTVAULT only). There may be additional UPSTREAM or IBM messages indicating the specific cause.

Action: If the problem can be corrected, rerun the utility. If necessary, contact FDR/UPSTREAM Technical Support for assistance.

UST654 BACKUP WAS SCRATCHED FROM source PROFILE=profile DSN=backupdsn

Reason: If “source” is DASD, a disk backup was successfully copied to tape and the disk backup data set named was scratched from disk. If “source” is TAPE, a tape backup was copied onto a new tape by USTMIGRT and the input tape backup data set named was uncataloged.

Action: None.

UST655 BACKUP PROF=profile D=versiondate operation TO DSN=tapebackupdsn

Reason: The utility has successfully completed the indicated operation on the backup described by “profile” and “versiondate”. The input backup data set is identified in the UST651 message. It was copied to the tape backup data set indicated. FDR/UPSTREAM records have been updated to point to the new backup data set.

Action: None.
FDR/UPSTREAM MESSAGES
USTMIGRT, USTVAULT, AND USTMERGE MESSAGES

**UST656E**

*Type Request Failed Comp=X'ffff00001111' Prof=profile Dsn=backupdsn*

**Reason:**
An operation against the indicated backup data set, under the indicated profile, failed. "Type" may be SCRATCH (delete disk backup data set), CATALOG (catalog tape data set), or RECATLG (update tape data set catalog). COMP contains the contents of R15 "ffff", R0 "0000" and R1 "1111". There may also be an IBM message in the FDR/UPSTREAM job log with more information on the error. If you get this message for SCRATCH on a given data set, but not for CATALOG or RECATLG, the migration was successful but the backup is left on disk. If a CATALOG/RECATLG error occurs, the z/OS catalog was not updated to point to the tape, and a USTMAINT execution might delete the records of this backup. These errors are NOT likely to occur.

**Action:**
For a SCRATCH error, try to manually delete the data set from disk (IEHPROGM SCRATCH). For a CATALOG/RECATLG error, try to manually catalog the tape data set (IDCAMS DEFINE NONVSAM) using the information from the UST660 message (check the FDR/UPSTREAM joblog to see if the tape backup data set extended to additional tape volumes). If you need assistance, contact FDR/UPSTREAM Technical Support.

**UST657E**

*Operation Terminated Due to VSAM Error*

**Reason:**
An error has occurred reading or updating the FDR/UPSTREAM online repository data sets. Message UST609E is also printed detailing the error. The repository may be damaged.

**Action:**
Contact FDR/UPSTREAM Technical Support.

**UST658E**

*Utility Cannot Be Executed As A Batch Program - Use Command Under USTMAIN*

**Reason:**
You attempted to execute PGM=USTMIGRT, USTMERGE, or USTVAULT in a batch job or under TSO.

**Action:**
Use the F UPSTREAM command to initiate the utility.

**UST659E**

*Type Not Enabled In Profile Configuration Entry*

**Reason:**
The reserved configuration profile, USTMIGxx, USTMERxx, or USTVLTxx, was not properly enabled for tape backups. The tape parameters in that profile are used to allocate the tape drive and create a dummy (empty) file at the beginning of that tape, followed by the migrated or vaulted backups. For USTVAULT, "type" may also be DASD, since vaulting requires that the profile be enabled for both tape and disk backups.

**Action:**
Update the profile entry in the configuration.

**UST660**

*Operation To Type Backup Vol=volser FileSeq=filsq Dsn=tapebackupdsn*

**Reason:**
The utility has successfully opened the tape backup data set named. "volser" is the first (or only) tape volume serial, and "filsq" is the file sequence number. If "type" is TAPE, then it has created a new tape data set; if it is PREV, it added data to the previously created tape data set.

**Action:**
None.

**UST661**

*New Type Tape Mounted Vol=volser FileSeq=filsq Dsn=tapebackupdsn*

**Reason:**
The utility filled the previous output tape. The indicated tape volume was mounted to continue the output of the indicated tape backup data set.

**Action:**
None.

**UST662E**

*Operation Missed Update File=filespec*

**Reason:**
The utility has copied a disk backup to tape, but while updating FDR/UPSTREAM's records for the backup, it discovered that the named file is recorded as being in that backup, yet the file was not encountered while copying the backup. In other words, UPSTREAM has a record of a file that is not in the backup. The utility continues updating the rest of the records.

**Action:**
This error should not occur, but if it does, contact FDR/UPSTREAM Technical Support for assistance.
### FDR/UPSTREAM Messages

**USTMIGRT, USTVAULT, and USTMERGE Messages**

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST663</td>
<td>Operation: vvvvvv Version(s) ffffffffff Files dddddd dDirs rrrrrrrr DATA BLOCKS kkkkkkkkk kBytes wwwwwww FORWARD</td>
<td>The utility copied this total number of version dates, files, directories, blocks, and kilobytes. FORWARD is the number of backups merged forward and appears only for USTMERGE.</td>
<td>None.</td>
</tr>
<tr>
<td>UST664</td>
<td>Type Backup Tape Name Is backupdsn</td>
<td>USTMIGRT, USTVAULT, or USTMERGE has successfully written the dummy (empty) data set as file 1 on the output tape, using the tape name specification in the corresponding special profile entry in the UPSTREAM configuration. The actual name is “backupdsn”. You may need to use this name in your tape management system for vaulting or retention purposes.</td>
<td>None.</td>
</tr>
<tr>
<td>UST665</td>
<td>Control File Data Set Name Is dsn</td>
<td>USTVAULT created the vaulting control file on disk with the indicated data set name. At the end of the vaulting operation, this control file is copied to the vault tape.</td>
<td>None.</td>
</tr>
<tr>
<td>UST666E</td>
<td>Control File Failed To Get Put On Tape Reason=reason</td>
<td>USTVAULT had an error copying the vault control file to the vault tape, for the reason indicated.</td>
<td>Contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST667</td>
<td>Control File Copied To Tape File=fff fVol=vvvvv</td>
<td>USTVAULT has successfully copied the vault control file to the vault tape, as file “fff” on tape volser “vvvvv”.</td>
<td>None.</td>
</tr>
<tr>
<td>UST668</td>
<td>Control File Left On DASD By Request</td>
<td>USTVAULT has left a copy of its control file on DASD, as requested by an option.</td>
<td>None.</td>
</tr>
<tr>
<td>UST669</td>
<td>Operator Cancelled Mount For Vault</td>
<td>The operator replied “CANCEL” to a request to mount a tape for USTVAULT. An UST652E message is also issued, and the vaulting operation is terminated.</td>
<td>None.</td>
</tr>
<tr>
<td>UST670E</td>
<td>I/O Or Logical Error For Backup File - Check z/OS Log DSN=backupdsn</td>
<td>An error occurred opening or reading the indicated backup data set. There may be additional UPSTREAM or IBM messages indicating the specific cause.</td>
<td>If the problem can be corrected, rerun the utility. If necessary, contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td>UST671</td>
<td>Merged: bbb Backups fff Files ddd dDirs bbb DATA BLOCKS eee DEFER FILES</td>
<td>USTMERGE has completed processing. These are statistics about the total data processed.</td>
<td>None.</td>
</tr>
<tr>
<td>UST672E</td>
<td>Merge Previous Backups Missing For Deferred Profile=profile</td>
<td>USTMERGE found records for the named profile, indicating that deferred files should be found in previous backups for that profile, but the indicated previous backups cannot be found in the UPSTREAM repository. They have expired or been deleted.</td>
<td>None.</td>
</tr>
</tbody>
</table>
FDR/UPSTREAM MESSAGES
USTMIGRT, USTVAULT, AND USTMERGE MESSAGES

**UST673** MIGRATE FORWARD ENDED FOR PROFILE DUE TO FULL BACKUP
Reason: USTMIGRT was copying incremental backups from a backup file but encountered a full backup at the end of that file. Since this is the end of the data required, processing for that profile was completed.
Action: None.

**UST674** HI-SPEED LOCATE VOL=volume FROM=blocknum TO=blocknum IN seconds SECONDS
Reason: An informational message. To expedite processing USTMERGE skipped to the starting location of the next client file to be processed.
Action: None.

**UST674** HI-SPEED LOCATE VOL=volume FROM=blocknum TO=blocknum IN seconds SECONDS FAILED
Reason: An error message. USTMERGE posted an error when skipping forward to the starting location of the next client file to be processed.
Action: Review any preceding messages in the z/OS Storage Server log file and the z/OS system log (SYSLOG) to determine the actual reason for the error. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

**HI-SPEED LOCATE SKIPPED tapeblocks TAPE BLOCKS IN seconds SECONDS**
Reason: An informational message. To expedite processing USTMERGE skipped forward to the next block required for processing.
Action: None.

**UST675W** OPEN/CLOSE/EOV ERROR - CHECK MVS LOG DSN=dsn
Reason: Utility processing (USTMERGE MIGRATE VAULT) posted an error processing a tape volume for the named data set.
Action: Review any preceding messages in the z/OS Storage Server log file and the z/OS system log (SYSLOG) to determine the actual reason for the error. Contact FDR/UPSTREAM Technical Support for assistance if necessary.

**UST676E** MISSING DATA RECORDS BLK=blknum1 blknum2
Reason: USTVAULT Backup data set is corrupted. This may be due to an I/O error or hardware malfunction when the data was written. Where blknum1 is the block number as recorded in the UPSTREAM repository, and blknum2 is the block number indicated in the record on tape.
Action: To work around this issue, do a first time full backup of the profile that was being processed and vault the new backup. Should the error reoccur, contact FDR/UPSTREAM Technical Support.

**UST677W** WARNING CONTROL FILE ENCRYPTION BYPASSED DUE TO PROFILE NOT SET
Reason: USTVAULT posts this warning if at least one profile in the vault was encrypted but encryption was **NOT** enabled for the Vault Control File.
Action: None.

**UST678** PROFILE=profile BYTES=kilobytes KBYTES files=FILES
Reason: Utility processing (USTMERGE MIGRATE VAULT) posted the number of KB and files processed for the named profile.
Action: None.

**UST679W** dupfiles DUP FILES directory_structure
Reason: USTMERGE. This is an informational message for diagnostic purposes. It represents the number of duplicate directory structures transmitted in the backup. There is at least one duplicate for each higher-level directory for directories having two or more sub-directories.
Action: None.
FDR/UPSTREAM MESSAGES
USTMIGRT, USTVAULT, AND USTMERGE MESSAGES

<table>
<thead>
<tr>
<th>UST680</th>
<th>profile INDEX SORT sortsec SEC mergesec SEC files FILES</th>
</tr>
</thead>
</table>

**Reason:** This is an informational message for diagnostic purposes. MERGE processing posts the amount of CPU time used in the sort logic of the Merge, the amount of CPU time used processing the merge portion of the backup, and the number of files.

**Action:** None.
FDR/UPSTREAM MESSAGES
USTBATCH UTILITY MESSAGES

25.14 USTBATCH UTILITY MESSAGES

UST700E INITIALIZATION FAILED - REASON = text
[OPEN INPUT FILE USTPARM FAILED]]
[APF AUTHORIZATION CHECK FAILED]

Reason: USTBATCH was unable to initialize due to one of the reasons specified in text. The job terminates with a non-zero return code.

Action: Verify that your batch JCL is correct, that the USTPARM data set is of the correct type, and that the UPSTREAM STEPLIB is APF authorized and execute USTBATCH again.

UST701E VALUE FOR “APPLPREF” MUST BE 5 CHARACTERS

Reason: USTBATCH found an invalid value for the “APPLPREF” parameter in the input stream. The job terminates with a non-zero return code.

Action: Verify that the APPLPREF parameter value is 5 characters long and execute USTBATCH again.

UST702E VALUE FOR “USAPPL” INVALID

Reason: USTBATCH found an invalid value specified for the USAPPL parameter in the input stream. The job terminates with a non-zero return code.

Action: Verify that the USAPPL parameter value is 8 characters long or less, and execute USTBATCH again.

UST703E TASKLIM VALUE ERROR

Reason: USTBATCH found an invalid value specified for the TASKLIM parameter in the input stream. The job terminates with a non-zero return code.

Action: Correct the TASKLIM parameter and execute USTBATCH again.

UST704E VALUE FOR “TARGLU” EXCEEDS 8 CHARACTERS

Reason: USTBATCH found an invalid value specified for the TARGLU parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.

Action: Correct the TARGLU parameter and execute USTBATCH again.

UST705E VALUE FOR “TARGLU” INVALID

Reason: USTBATCH found an invalid value specified for the TARGLU parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.

Action: Correct the TARGLU parameter and execute USTBATCH again.

UST706E PREVIOUS RETRY VALUE TOO LONG

Reason: USTBATCH found an invalid value specified for the MAXRETRY, APPLRETRY or TMAXRETRY parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.

Action: Correct the retry parameter and execute USTBATCH again.

UST707E PREVIOUS RETRY VALUE INVALID

Reason: USTBATCH found an invalid value specified for the MAXRETRY, APPLRETRY or TMAXRETRY parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.

Action: Correct the retry parameter and execute USTBATCH again.

UST708W WARNING: “APPLPREF” DEFAULTED TO “UPSTR”

Reason: USTBATCH was unable to locate a value for the “APPLPREF” parameter in the input stream. The parameter takes its default value of “UPSTR”.

Action: If this is incorrect, specify the APPLPREF parameter and execute USTBATCH again.
FDR/UPSTREAM MESSAGES
USTBATCH UTILITY MESSAGES

UST709W WARNING: “USAPPL” DEFAULTED TO “UPSTREAM”
Reason: USTBATCH was unable to locate a value for the “USAPPL” parameter in the input stream. The parameter takes its default value of “UPSTREAM”.
Action: If this is incorrect, specify the USAPPL parameter and execute USTBATCH again.

UST710E “TARGLU”, “TARGNAME”, “TCPTARG”, OR DNSNAME PARAMETER NOT FOUND
Reason: USTBATCH was unable to locate any “TARGLU”, “TCPTARG” or “TARGNAME” required parameter in the input stream and is terminating.
Action: Add the TARGLU, TCPTARG, TARGNAME, or DNSNAME parameter and execute USTBATCH again.

UST711W WARNING: “TPNAME” NOT VALID FOLLOWING A TCPIP TARGET - IGNORED
Reason: The TPNAME= parameter is only valid following a TARGLU= parameter for a VTAM APPC target Client. It is ignored if it follows a TCPTARG= for a TCP/IP Client.
Action: None.

UST712E TARGET OR DNSNAME MUST PRECEDE WSPARM
Reason: The TARGNAME, DNSNAME or TCPTARG parameter must precede the WSPARM parameter in the USTBATCH input stream.
Action: Correct the positioning of the input parameters and execute USTBATCH again.

UST713E “WSPARM” VALUE INVALID
Reason: USTBATCH has detected an invalid value specified for the “WSPARM” parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.
Action: Correct the WSPARM parameter and execute USTBATCH again.

UST714E UNABLE TO LOCATE AN AVAILABLE VTAM ACB NAME
Reason: The application name built by USTBATCH from APPLPREF plus “nnn” (e.g., UPSTR001) was either not defined to VTAM or already in use by another application.
Action: Verify that your “APPLPREF” parameter specifies a valid prefix in agreement with your definitions in the VTAM APPL definition member for z/OS Storage Server. If not, correct the value and resubmit the USTBATCH job. You may need to increase the number of VTAM application definitions available for use with USTBATCH.

UST715E VTAM SETLOGON REQUEST FAILED
Reason: USTBATCH has received an error indication after issuing the VTAM “SETLOGON” request to enable session setup. This message is followed by message UST719E containing the applicable VTAM error codes.
Action: Use these error codes to resolve the problem.

UST716W* USTBATCH COMPLETED WITH WARNINGS
Reason: The USTBATCH job has completed with warning-level errors.
Action: Review the USTBATCH log file to determine the warnings issued, and whether they were acceptable.

UST717E* USTBATCH COMPLETED WITH ERRORS
Reason: The USTBATCH job has completed with errors.
Action: Review with USTBATCH log file to determine the errors that have occurred.

UST718* USTBATCH COMPLETED SUCCESSFULLY
Reason: The USTBATCH job has completed successfully.
Action: None.
UST719E VTAM error codes and indicators
Reason: This message follows a descriptive error message and contains the applicable VTAM error codes relating the error described.
Action: Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST720E ALLOCATION FAILURE - BE SURE UPSTREAM TASK IS ACTIVE
Reason: USTBATCH has received a VTAM allocation failure while attempting to connect to the UPSTREAM online task. For errors other than an allocation failure, the text of the message is “APPC CNOS ERROR”.
Action: Be sure that the UPSTREAM online task is active.

UST721E APPC ALLOCATE TO APPL aaaaaaaa REQUEST FAILED
Reason: USTBATCH has received a VTAM error indication after issuing the APPC ALLOCATE request to the online UPSTREAM started task.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST722E APPC SEND-DATA RUN-FUNCTION REQUEST FAILED
Reason: USTBATCH has received a VTAM error indication after issuing the APPC SEND-DATA request to the online UPSTREAM started task.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST723E APPC SEND-DATA RUN-FUNCTION-PARAM REQUEST FAILED
Reason: USTBATCH has received a VTAM error indication after issuing the APPC ALLOCATE request to the online UPSTREAM started task.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST724E APPC CONFIRM REQUEST FAILED
Reason: USTBATCH has received a VTAM error indication after issuing the APPC CONFIRM request to the online UPSTREAM started task.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST725E RECEIVE FOR EVENT TYPE-90 FAILED
Reason: USTBATCH has received a VTAM error indication after issuing the APPC RECEIVE-DATA request to the online UPSTREAM started task.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.

UST726E RECEIVE FOR EVENT TYPE-91 FAILED
Reason: USTBATCH has received a VTAM error indication after issuing the APPC RECEIVE-DATA request to the online UPSTREAM started task.
Action: Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.
UST727  message text from the target workstation
Reason: This message contains message text sent by the target Client LU. This message is actually issued by the UPSTREAM LU.
Action: If it indicates an error, review the UPSTREAM log on the Client for additional information as to the cause of the error.

UST728  ACB aaaaaaa OPENED TO VTAM
Reason: USTBATCH has successfully located and opened an ACB to VTAM, using application name “aaaaaaa”. This message is informational only.
Action: None.

UST729  APPC ALLOCATE TO aaaaaaa SUCCESSFUL
Reason: USTBATCH has successfully allocated its LU 6.2 conversation to the online z/OS Storage Server started task using application name “aaaaaaa”. This message is informational only.
Action: None.

UST730E  PREVIOUS RETRY VALUE INVALID
Reason: USTBATCH found the MAXRETRY, APPLRETRY or TMAXRETRY value specified in the input stream was not numeric. The parameter is ignored and USTBATCH continues looking for valid parameters.
Action: Correct the retry parameter and execute USTBATCH again.

UST731E  - REASON=nnn, text [, R=RETRY/RERUN, C=CANCEL]
Reason: USTBATCH encountered a processing error and issues this message in response to a user having specified an ERRWTO or ERRWTOR keyword in the input parameters. The values for the REASON field are defined as follows:
4 – USTBATCH cannot establish or maintain communications between itself and the UPSTREAM Started Task.
8 – The UPSTREAM Started Task cannot establish or maintain communications between itself and the specified UPSTREAM remote Client.
12 – This reason code occurs if any error is encountered on the connection
Action: Evaluate the reason code supplied in the message, take appropriate corrective action, and optionally reply “R” to RETRY or “C” to CANCEL the pending request.

UST732E  LOGMODE VALUE INVALID
Reason: USTBATCH found an invalid value specified for the LOGMODE parameter in the input stream. The job terminates with a non-zero return code.
Action: Correct the LOGMODE parameter and execute USTBATCH again.

UST733W  WARNING: USING DEFAULT LOGMODE NAME “#INTER”
Reason: USTBATCH was unable to locate the LOGMODE parameter in the input stream, and is defaulting the value to “#INTER”. This message is informational.
Action: If this is not correct, specify the LOGMODE= parameter and execute USTBATCH again.

UST734  REQUEST SENT TO ONLINE INITIATOR FOR targetname
Reason: The USTBATCH job has completed sending one request for the Client address or name indicated to the z/OS Storage Server online initiator. It has requested confirmation. This message is informational only.
Action: None.
## UST735 REQUEST CONFIRMED BY ONLINE INITIATOR
**Reason:** USTBATCH has received positive confirmation to the request last sent to the z/OS Storage Server online initiator. This message is informational only.

**Action:** None.

## UST736E REQUEST NOT CONFIRMED (MESSAGE FOLLOWS):
**Reason:** USTBATCH has received a negative indication to its confirmation request. This message is followed by an indicative message from the z/OS Storage Server online initiator or from the Client itself.

**Action:** None.

## UST737E TPNAME FOUND, BUT NO TARGET ID SPECIFIED
**Reason:** USTBATCH found a value specified for the TPNAME parameter in the input stream; but no TARGLU parameter was found preceding it. The parameter is ignored and USTBATCH continues looking for valid parameters.

**Action:** Correct the values and resubmit the USTBATCH job.

## UST738E TPNAME VALUE TOO LONG
**Reason:** USTBATCH found an invalid value specified for the TPNAME parameter in the input stream. The associated TARGLU= parameter is ignored and USTBATCH continues looking for valid parameters.

**Action:** Correct the TPNAME parameter and execute USTBATCH again.

## UST739E INVALID TPNAME VALUE FOUND
**Reason:** USTBATCH found an invalid value specified for the TPNAME parameter in the input stream. The associated TARGLU= parameter is ignored and USTBATCH continues looking for valid parameters.

**Action:** Correct the TPNAME parameter and execute USTBATCH again.

## UST740E INVALID TCP ADDRESS AND/OR PORT SPECIFIED
**Reason:** USTBATCH found an invalid value specified for the TCPTARG parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.

**Action:** Correct the TCPTARG parameter and execute USTBATCH again.

## UST741E INVALID VALUE FOUND FOR "CONV=", NOWAIT,NOKEEP USED
**Reason:** USTBATCH found an invalid value specified for the CONV= parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.

**Action:** Correct the CONV parameter and execute USTBATCH again.

## UST742I CONTINUED STATEMENT TOO LONG
**Reason:** USTBATCH encountered continuation statements that exceeded it maximum length. The parameter is ignored and USTBATCH continues looking for valid parameters.

**Action:** Correct the continued statement.

## UST743E INVALID “TARGNAME” PARAMETER FOUND
**Reason:** USTBATCH found an invalid value specified for the TARGNAME parameter in the input stream. The parameter is ignored and USTBATCH continues looking for valid parameters.

**Action:** Correct the TARGNAME parameter and execute USTBATCH again.
UST744W  NO AVAILABLE VTAM ACBNAMES - ENTERING RETRY
Reason: USTBATCH attempted to find a free VTAM application name starting with the prefix specified by APPLPREF (or the default of UPSTR), but all such application names defined to VTAM are in use and APPLRETRY=0 was not specified.
Action: USTBATCH attempts to find an available VTAM application every 5 seconds until the retry limit specified by APPLRETRY is reached (default is 240).

UST745E  UPSTREAM TASK AT “MAXTASKS” - INITIATING RETRIES
Reason: USTBATCH connected to the FDR/UPSTREAM online tasks but UPSTREAM reported that it is already at its maximum task limit and TMAXRETRY= was specified.
Action: USTBATCH tries to initiated its request every 5 minutes until it is accepted or until the retry limit specified by TMAXRETRY is reached.

UST746E  RETRY COUNT EXHAUSTED
Reason: One of the USTBATCH retry parameters (indicated by a preceding message) was exceeded. The requested operation was not initiated.
Action: None.

UST746E  NO RETRIES SPECIFIED
Reason: One of the USTBATCH retry parameters (indicated by a preceding message) was specified as or defaulted to zero (0). The requested operation was not initiated.
Action: None.

UST747[E]*  PROCESS COMPLETED - RETURN CODE=nnn,TARGET=target
Reason: The requested operation at the target Client "target" completed with the indicated return code. If the return code is non-zero, the message number is UST747E, otherwise it is UST747. This message is issued only if CONV=WAIT is specified in the USTBATCH parameters. If WTOCOMP is also in the USTBATCH parameters, it is also printed on the system console by a WTO.
Action: None.

UST748E  INVALID RECORD BYPASSED:
Reason: A control statement was input to USTBATCH which was not recognized. The invalid record, printed after the message, is ignored.
Action: None.

UST749  status display
Reason: A “F jobname,STA” console command was issued to a USTBATCH job. This message indicates the requests currently queued or active in that job.
Action: None.

UST750E*  USTBATCH COMMAND INVALID OR CANNOT BE ACCEPTED AT THIS TIME
Reason: A STOP(P) or MODIFY(F) console command was issued to a USTBATCH job, but either the parameter was invalid or USTBATCH is not accepting console commands. Commands can only be accepted if CONV=WAIT was specified in the USTBATCH parameters.
Action: None.

UST751*  TERMINATING REQUEST ID = nnnn
Reason: A “F jobname,TERM ID=nnnn” console command was issued to a USTBATCH job. The request with ID number “nnnn” is being terminated.
Action: None.
### UST752* STOP SCHEDULED - CONFIRM IN PROGRESS

**Reason:** A “P jobname” console command was issued to a USTBATCH job, but USTBATCH is currently waiting for UPSTREAM to confirm a request. USTBATCH terminates as soon as the request is confirmed.

**Action:** None.

### UST753* STOP REQUEST RECEIVED

**Reason:** A “P jobname” console command was issued to a USTBATCH job. USTBATCH terminates.

**Action:** None.

### UST754E* ID VALUE FOR TERM REQUEST INVALID OR NOT FOUND

**Reason:** A “F jobname,TERM ID=nnnn” console command was issued to a USTBATCH job, but either the parameter “nnnn” was not a valid 4-digit number, or no USTBATCH request was found with that ID number.

**Action:** None.

### UST755 USTBATCH Vn.n.n STARTED

**Reason:** The USTBATCH job running the indicated version has started.

**Action:** None.

### UST756 REQUEST COMPLETED, REQ=request

**Reason:** An “F jobname,request” console command was issued to a USTBATCH job. The request has been processed.

**Action:** None.

### UST757W WARNING: NO KEYWORD VERIFICATION WILL BE PERFORMED

**Reason:** VERIFY=NO was specified; invalid Client parameter names are not detected.

**Action:** None.

### UST758E PREVIOUS RECORD KEYWORD INVALID - REQUEST BYPASSED

**Reason:** An invalid Client parameter name was encountered. The current Client request is bypassed. Other requests in the same jobstream are still processed.

**Action:** None.

### UST759E USERID NOT SPECIFIED ON JOB - REQUEST BYPASSED

**Reason:** A “USERID &JOB” statement was present in the USTBATCH input, but no security userid was associated with this job. The statement is bypassed. If a userid is required for UPSTREAM operation (a SECLVL= value greater than 0 in the UPSTREAM configuration), the requested function may fail when it is initiated by the Client.

**Action:** None.

### UST760 RESTART IS/NOT ENABLED - COUNT=cccc DELAY=dddd

**Reason:** This message documents that automatic restart of USTBATCH operations is or is not enabled. “cccc” is the retry limit, and “dddd” is the minutes between restart attempts. This is controlled by the RESTART operand of USTBATCH.

**Action:** None.

### UST761* ATTEMPTING type RESTART FOR target, REMAINING RETRIES=nnnn

**Reason:** This message documents that an automatic restart of a USTBATCH operation is being attempted. “type” is BACKUP or RESTORE, “target” is the target Client, and “nnnn” is the number of retries remaining.

**Action:** None.
**FDR/UPSTREAM MESSAGES**

**USTBATCH UTILITY MESSAGES**

<table>
<thead>
<tr>
<th>Message ID</th>
<th>Description</th>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UST762E</strong></td>
<td>INTERRUPTED - WAITING nnn MINUTES FOR RESTART TO target</td>
<td>This message documents that a USTBATCH operation was interrupted, and is restarted in “nnn” minutes. “type” is BACKUP or RESTORE, and “target” is the target Client.</td>
<td>None.</td>
</tr>
<tr>
<td><strong>UST763E</strong></td>
<td>RESTART REQUIRES CONV=WAIT</td>
<td>The USTBATCH parameter RESTART= was specified without also specifying CONV=WAIT.</td>
<td>Specify CONV=WAIT or remove the RESTART control card from your request. Then resubmit your request.</td>
</tr>
<tr>
<td><strong>UST764E</strong></td>
<td>RECEIVE OF STARTED TASK MESSAGES FAILED</td>
<td>A VTAM error occurred while USTBATCH was reading messages from the FDR/UPSTREAM z/OS Storage Server main task.</td>
<td>Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td><strong>UST765E</strong></td>
<td>ALLOCATE FOR STARTED TASK MESSAGES FAILED</td>
<td>A VTAM allocation error occurred while USTBATCH was reading messages from the z/OS Storage Server main task.</td>
<td>None.</td>
</tr>
<tr>
<td><strong>UST766E</strong></td>
<td>SEND OF “xx” STRUCTURE FOR LOG MESSAGES FAILED</td>
<td>A VTAM error occurred while USTBATCH was requesting messages from the z/OS Storage Server main task. “xx” is the ID of the structure being transmitted.</td>
<td>Communication error codes are reported in a following message. Consult IBM VTAM manuals to interpret the error, or contact FDR/UPSTREAM Technical Support for assistance.</td>
</tr>
<tr>
<td><strong>UST767E</strong></td>
<td>RECORD INVALID AFTER “ENDPARM” STATEMENT</td>
<td>An ENDPARM statement must be followed by a TARGLU=, TARGNAME=, or TCPTARG= statement, or another ENDPARM. The invalid statement is ignored.</td>
<td>None.</td>
</tr>
<tr>
<td><strong>UST768E</strong></td>
<td>INVALID COMMAND REQUEST</td>
<td>The specified “COMMAND=” value is invalid.</td>
<td>Specify a valid UPSTREAM command.</td>
</tr>
<tr>
<td><strong>UST769E</strong></td>
<td>UPSTREAM STARTED TASK TERMINATED</td>
<td>The UPSTREAM Started Task has ended.</td>
<td>If this is the result of a shutdown request, no action is required. If this is an abnormal event, consult previous messages to determine the reason for shutdown.</td>
</tr>
<tr>
<td><strong>UST770E</strong></td>
<td>HPNS TCP/IP ERROR - OP=’xxxxxx’,RC=nnnn,ERRNO=nnnn, text</td>
<td>A TCP/IP error has occurred. Possible “OP=” values are: GETHOSTN, INITAPI, SOCKET, CONNECT, WRITERFS, WRITEZ, WRITECFM, READCFMD, DEALLOC-CLOSE, MSOCKET, MCONNECT, DEALLOC, CLOSE, AND SENDRECV. The text field provides a short description of the error.</td>
<td>Investigate possible causes for the TCP/IP error and contact FDR/UPSTREAM Technical Support for additional assistance, if necessary.</td>
</tr>
</tbody>
</table>
UST771E  INVALID IP ADDRESS SPECIFIED
Reason:  The format of the specified IP address is incorrect.
Action:  Correct the specified IP address and resubmit the request.

UST772E  INVALID TIMEOUT= VALUE SPECIFIED
Reason:  More than 4 digits or non-numeric characters were specified for the TIMEOUT value.
Action:  Correct the specified TIMEOUT value and resubmit the request.

UST773E  PROCESS TIMED OUT: xxxxxxxxxxxxxxxxxxxxxxxxxxxx
Reason:  The TIMEOUT value was exceeded while processing this request.
Action:  Increase the “TIMEOUT” value or determine why the process is taking so long to complete.

UST774E  TIMER SET ERROR=nnnn- NO TIMEOUT IN EFFECT
Reason:  Error attempting to set a timer via z/OS API call.
Action:  Internal error, contact FDR/UPSTREAM Technical Support for further assistance.

UST775E  COMMAND VALUE EXCEEDS 44 CHARACTERS
Reason:  Value specified via the USTBATCH COMMAND parameter exceeded 44 characters in length.
Action:  Shorten the value in question or consider using the USTCMD alternative utility program to issue the command.

UST776W  WARNING: “TCPPORT” PARAMETER ONLY VALID FOR TCP/IP REQUESTS - PARAMETER IGNORED
Reason:  The TCPPORT parameter, used only for TCP/IP communications with remote Clients, was specified for a SNA request.
Action:  Remove the TCPPORT parameter specification. This is only a warning, the request should have been processed anyway after ignoring the specification of this parameter.

UST777E  UNABLE TO RESOLVE SPECIFIED DNS NAME OR NAME INVALID
Reason:  Format of specified DNSNAME parameter is invalid.
Action:  Correct the specified DNSNAME to be valid and resubmit the corrected request.

UST778W  WARNING: TCP/IP PORT DEFAULTED TO 1972
Reason:  The TCPPORT control card was not specified for a request that required it.
Action:  The processing of this request continues after the issuing of this error message. Specify the TCPPORT parameter in the next invocation of this request if the default value of 1972 is incorrect.

UST779W  INVALID VOL=REF DATASET NAME
Reason:  The format of the data set name specified in the VOL=REF parameter is incorrect.
Action:  Code the correct format data set name and resubmit the request.

UST780W  XM VALIDATION T/O
Reason:  When running a CONV=WAIT connection with the “xxx” keyword specified, USTBATCH determined that the specified timeout (T/O) interval was exceeded without a cross memory (XM) post occurring from the z/OS Storage Server Started Task.
Action:  Determine why the Started Task has not responded and resubmit the request if applicable. Contact FDR/UPSTREAM Technical Support for further assistance.
UST781  USTEMAIL DD FOUND
EMAIL MESSAGE SENT
NO EMAIL REQUESTED

**Reason:** These are informational status messages issued for USTBATCH e-mail notification. They are posted to the USTLOG DD statement of the USTBATCH job.

- **USTEMAIL DD FOUND** – the USTEMAIL DD statement was present in the JCL
- **EMAIL MESSAGE SENT** – an e-mail was sent to the specified SMTP e-mail server
- **NO EMAIL REQUESTED** – the USTEMAIL DD statement is present in the JCL but the e-mail control card corresponding to the job step completion code (EMAILOK, EMAILWRN, or EMAILERR) is not present in the “multiple use” input parameters of the batch job.

**Action:** If you have further questions concerning USTBATCH e-mail notification, please contact FDR/UPSTREAM Technical Support for assistance.
25.15 USTSCHED Utility Messages

**UST800E** OPEN FOR USTSCHED DDNAME FAILED

**Reason:** Either the DD statement for USTSCHED was omitted from the Section 3.19 "Define the FDR/UPSTREAM Started Task PROC" for the z/OS Storage Server started task, or another error occurred trying to open it.

**Action:** Check the joblog of the UPSTREAM task for IBM messages.

**UST801E** SCHEDULE RECORD DESCRIPTOR IS INVALID

**Reason:** Schedule data in the USTSCHED data set is not in the format expected by the USTSCHED utility. Either the data set was never properly initialized with a schedule by the UPSTREAM ISPF dialogs, or the data has been corrupted.

**Action:** Rebuild the schedule data set or correct the z/OS Storage Server started task JCL to point to the correct data set.

**UST802E** SCHEDULE DATA SET IS EMPTY

**Reason:** The USTSCHED data set is empty. Either the data set was never properly initialized with a schedule by the UPSTREAM ISPF dialogs, or the data has been corrupted.

**Action:** Build the schedule data set or correct the z/OS Storage Server started task JCL to point to the correct data set.

**UST803** SCHEDULE type DATE=mm/dd/yyyy DSN=datasetname(membername)

**Reason:** The schedule in the schedule data set name has either been STARTED or REFRESHED.

**UST805** SCHEDULE TIME=hh:ss SELECTION ID: selection event ID

**Reason:** A scheduled event has been executed. One of the two additional form of the UST805 shown below is also issued.

**SCHEDULE SENT TO THE INTERNAL READER: SUBMIT datasetname(membername)**

**Reason:** A scheduled SUBMIT event has been executed. The jobstream in the data set named has been submitted for batch execution through the internal reader (INTRDR).

**SCHEDULE ISSUED THE z/OS COMMAND: console command**

**Reason:** A scheduled event has been executed. The indicated z/OS console command was issued.

**UST806** NO ACTIVITY SCHEDULED FOR TODAY

**Reason:** There are no scheduled events that execute today.

**Action:** Check the schedule if you think this is incorrect.

**UST807E** SCHEDULE SUBMIT ERROR: error description

**Reason:** A SUB event was scheduled, but USTSCHED had an error either reading from the input data set named in the SUB event or writing to the INTRDR DD statement used to submit jobs. The error description identifies the error.

**Action:** Make sure that the data set named in the SUB event contains LRECL=80 jobstreams. If a member name was given on the SUB event, the data set must be a PDS or PDSE. If the member name is omitted, it must be sequential (DSORG=PS).

**UST808W** IMMEDIATE SHUTDOWN REQUESTED - SCHEDULING TERMINATED

**Reason:** The operator has requested shutdown of UPSTREAM or has done a TERM of USTSCHED. USTSCHED terminates immediately.

**Action:** Check the schedule if you think this is incorrect.
FDR/UPSTREAM MESSAGES  
USTSCHED UTILITY MESSAGES

UST990  USTTAPEM MOUNTED VOL='nnnnnn' RC=nnnn RS=nnnn FLAGS=nnnn  
DSN=<data_set_name>

**Reason:** A mount request for a specific (non-scratch) tape volume has been satisfied or failed. 
VOL=<volume_name>, RC=<the dynalloc return code>, RS=<the dynalloc reason code>, FLAGS=<the dynalloc flag bytes used>.

**Action:** If the mount request was successful, no action is necessary. If the mount request failed, review the JES Syslog and investigate possible causes for the failure. If necessary, contact FDR/UPSTREAM Technical Support for additional assistance.

UST999  UPSTREAM SHUTDOWN COMPLETED

**Reason:** The UPSTREAM Started Task has shutdown as requested.