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For more than 35 years, Innovation Data Processing has been producing high-quality Storage Management Software. During this time, its products have evolved into today’s high-speed, safe, reliable storage management solutions for z/OS and non-z/OS data.

It started with the **FDR Storage Management Family**, for which thousands of licenses have now been sold worldwide. The FDR Family is the complete Storage Management solution for z/OS.

- **FDR** has become the industry standard for fast, reliable backups of z/OS data, while **ABR** adds a layer of automation to provide advanced backup facilities like Incremental Backup, Application Backup and Archiving.

- **FDRINSTANT** provides near 24x7 backup of offline volumes created by DASD Subsystem features like Oracle SnapShot Copy, EMC TimeFinder, Hitachi ShadowImage and IBM FlashCopy. FDRINSTANT also enhances the performance of other utilities in the FDR Family, such as FDRCOPY and FDRMOVE.

- **FDRCRYPT** offers encryption services for all FDR and ABR backups, as well as sequential output created by an IDCAMS REPRO. FDRCRYPT protects these backups against unauthorized access by anyone who does not possess the proper encryption keys.

- **FDRDRP** is an extension to ABR, which can reduce full-volume recovery time by up to 80%.

- **FDRPAS** and **FDRMOVE** provide non-disruptive or minimally disruptive movement of data from one disk to another, either within the same disk subsystem or across different subsystems. Data can be moved non-disruptively at the volume level (with FDRPAS), or it can be moved non-disruptively or with minimal disruption at the data set level (with FDRMOVE). These products are particularly useful for migrating and/or consolidating data from smaller disks to larger disks (e.g. 3390-3s to 3390-9/27/54s and EAVs).

- **COMPAKTOR** and **FDRREORG** offer intelligent and powerful reorganization processes for whole DASD volumes and for PDS, VSAM and IAM data sets.

- **FDREPORT** and **FDRVIEWS** provide extensive, customized DASD Management Reporting to suit many needs and purposes. You can run your reporting as a z/OS batch job or through TSO/ISPF panels with FDREPORT, or you can use a Windows-based user interface available through FDRVIEWS.

- **FDRERASE** V5.4 L70 is an EAL2+ certified product that can be licensed as an option to FDRPAS (or separately). It can quickly and securely erase many z/OS disk volumes in parallel, allowing you to erase your data in the minimum elapsed time. Multiple levels of erasure are available. See also FDRERASE/OPEN.
IAM, FATS/FATAR and FATSCOPY complete Innovation’s z/OS product range:

- **IAM** is Innovation’s alternative to VSAM KSDS, ESDS and (as a cost option) AIX and RRDS files. IAM consistently provides 50-80% reductions in EXCPs, Batch Elapsed Times and Online Response Times, as well as a 20-40% reduction in CPU usage compared to VSAM. Due to its advanced file structure, IAM typically requires 30-70% less DASD space than VSAM to hold the same amount of data.

- **IAM/PLEX** is a cost option to IAM that allows applications to concurrently execute and update IAM files on multiple LPARs/Systems that are part of a z/OS sysplex.

- **FATS/FATAR** is a set of multi-purpose tape subsystem Media Integrity tools that allow for online tape certification, verification, analysis and erasure of tapes.

- **FATSCOPY** provides automated tape stacking and conversion, including Tape-to-VTS, VTS-to-Tape and VTS-to-VTS conversions.

The **UPSTREAM** family builds on the strengths of the FDR Storage Management system, and extends Innovation’s range of products beyond the boundaries of z/OS:

- **FDR/UPSTREAM** provides a fast, safe and reliable solution to backing up Open Systems data from file servers and workstations. Backups are transmitted across a network connection to disk or tape on the z/OS host.

- **FDR/UPSTREAM Linux on System z** offers a high performance solution for backing up your Linux on System z clients.

- **FDRSOS** and **UPSTREAM/SOS** provide additional performance enhancements to the backup and restore process, which can utilize high-performance System z FICON channels if the Open Systems data is resident on an IBM DS8700 with zDDB, or an EMC Symmetrix DMX or VMAX with Enterprise Storage Platform (ESP).

- **UPSTREAM Reservoir** is designed for those users who wish to take advantage of the many strengths provided by FDR/UPSTREAM, but would prefer to use an Open Systems environment (e.g. Windows, AIX, Linux, SUN Solaris) for hosting the backup management engine.

**FDRERASE/OPEN** completes the Innovation product range:

- **FDRERASE/OPEN** is an EAL2+ certified product that can quickly and easily erase any disk attached to an Intel (x86) or compatible system, attached via a SCSI, SATA, SAS, FIBRE, or an IDE, ATA or USB connection. The data on these disks may have been created by any one of a range of operating systems, including Windows, UNIX, Linux, Solaris and Novell OES2. Multiple levels of erasure are available, as well as PRINT and VERIFY options to check that the data has been successfully erased.
Each of the Innovation products is described in a range of Concepts & Facilities Guides.

In this particular guide, we look at FDRPAS.

PART ONE provides a brief overview of the features and benefits of FDRPAS and describes how it is the ideal tool for non-disruptive migration of z/OS disk volumes.

PART TWO then goes into more detail on the FDRPAS SWAP process and shows examples of it being executed through the ISPF interface and via a z/OS batch job.

Any comments or suggestions regarding this guide can be directed to: support@fdrinnovation.com

And don’t forget to visit our website for additional and up-to-date information on all Innovation products: www.innovationdp.fdr.com

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PART ONE
FDRPAS Overview
1.1 Introducing FDRPAS
The demand for 24x7 availability has never been greater. System outages due to the implementation of new DASD hardware, or the mass movement of data from one DASD subsystem to another, can no longer be tolerated.

Storage Managers need a solution that will allow them to migrate whole DASD volumes to new addresses with the minimum of disruption. FDRPAS provides that solution.

First launched into the market in 2001, FDRPAS has subsequently been used for DASD migration projects in over 1,400 sites worldwide. Its non-disruptive SWAP process allows for the mass movement of large amounts of data without adversely affecting Service Level Agreements.

FDRPAS offers a fast, simple and automated solution for all your DASD migration needs:

- FDRPAS is a fast, powerful and easy-to-use DASD Migration utility for the non-disruptive movement of z/OS disk volumes from one DASD device to another.

- Users or applications can continue to access their data uninterrupted during the FDRPAS SWAP process.

- After a SWAP has completed, all of the data from the source volume is located on the target device, and all user and application access to the data is automatically and transparently switched to that new device.

- The original source volume is placed offline, from where it can be re-purposed or de-commissioned.

1.2 FDRPAS Performance
FDRPAS offers an efficient, safe and fast way of relocating data from one z/OS disk device to another.

- On average, FDRPAS can swap a 3390-3 to a new DASD device in less than 3 minutes.

- For greater performance, especially when re-locating entire DASD sub-systems, multiple concurrent FDRPAS SWAPs can be initiated.

- With a few simple steps, FDRPAS can easily move 100s of disk volumes in a matter of hours.
1.3 FDRPAS Utilization
FDRPAS can reduce the disruption and application downtime generally associated with moving whole DASD volumes. FDRPAS is a multi-purpose storage management tool with numerous uses, including:

- **When installing new DASD Hardware**
  With FDRPAS you can move your data from existing volumes to new hardware while those volumes are still in use, and without the need for an IPL, making it the ideal tool for large-scale DASD migration.

- **For general data movement**
  With FDRPAS you can non-disruptively move terabytes of data during normal business hours without interrupting other system activity and while continuing to meet service levels, making it the perfect solution for any ad-hoc data movement and migration.

- **For I/O load balancing**
  You can use FDRPAS to rearrange the contents of disk volumes within a subsystem, or across subsystems, to distribute the I/O load and improve performance.

1.4 Supported Volumes
FDRPAS can swap almost any z/OS DASD volume, including:

- The SYSRES
- Other system volumes (including Checkpoint and Spool volumes)
- Volumes containing ICF Catalogs
- SMS-managed volumes
- CICS volumes
- Volumes containing the RACF database or Tape Management System catalog

1.5 Vendor Independence
FDRPAS supports the DASD subsystems from all major hardware vendors, and the SWAP process can operate across vendor platforms, easing the conversion or migration from one vendor’s subsystem to another.

1.6 Single System & Multi-System
The SWAP can occur in a single DASD subsystem, where both the source and target are in the same subsystem, or across subsystems, where the source is in one DASD subsystem and the target is located in another.

The source volume can be accessible either via a single LPAR or across multiple LPARs in a shared DASD Complex or SYSPLEX. Special FDRPAS monitor tasks ensure that all LPARs that have access to the source volume participate in the SWAP process.
1.7 DASD Conversions
FDRPAS can swap to a disk of equal or higher capacity. For example, you can move a 3390 model 27 to a model 54; FDRPAS will automatically update the VTOC and VTOC Index on the target device to reflect the additional capacity as free space.

1.8 DASD Consolidation (With FDRPAS & FDRMOVE)
If you have a large number of small disks to relocate to a smaller set of larger disks (for example, 3390 model 9’s onto 3390 model 27’s/54’s, or perhaps across to EAVs), FDRPAS can be used in conjunction with its sister product, FDRMOVE, to provide a near non-disruptive migration and consolidation of your data onto the larger disks. See the separate FDRMOVE Concepts & Facilities Guide for more details.

1.9 FDRPAS Summary
In today’s data centers, where 24 x 7 operations are now a must rather than a luxury, the ability to move data around the DASD subsystem with the minimum of disruption has become a priority for DASD Administrators.

Whether it is a single DASD volume being moved to alleviate I/O bottlenecks, or perhaps a full range of devices being migrated across to newly installed hardware, the data needs to be moved quickly and efficiently, and with the minimum of disruption to end-users and applications.

FDRPAS provides the DASD Administrator with a simple yet effective tool for non-disruptively moving data around the DASD subsystem. Simple, fast and fuss-free DASD migration.

See the FDRPAS web demo on the Innovation website www.fdr.com/demos for more details.
1.10 After You’ve Migrated Your Data (FDRERASE)...

FDRERASE is the ideal tool for erasing data from FDRPAS source disks before they are re-purposed or de-commissioned.

FDRERASE can be licensed separately or as an option to FDRPAS and can be utilized to quickly and securely erase all of the data from a z/OS disk with the minimum of CPU resources and in the minimum elapsed time.

FDRERASE was the first z/OS secure erase utility to complete Common Criteria Evaluation and Validation Scheme (CCEVS) evaluation and Common Criteria EAL2+ Augmented validation, has earned the right to display the international Common Criteria Recognition Arrangement (CCRA) certification mark on August 9, 2005.

• The “ERASE” function, which performs a single overwrite, meets Department Of Defense (DoD) standards for “Clearing & Overwriting” data.

• The “SECUREERASE” function, which performs three overwrites of varying patterns, meets DoD standards for “Purging & Sanitizing” data.

Performing a single overwrite, ERASE can erase approximately 1.5TB of data (per DASD controller) in 1 hour. Two ERASE jobs (running against two separate DASD controllers) can erase approximately 3TB in 1 hour.

See the separate FDRERASE Concepts & Facilities Guide for more details.
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PART TWO
FDRPAS Detail
2.1 Introduction

Part One of this Guide provided a brief introduction to FDRPAS and outlined its key features and benefits. In this second section, we now take a closer look at the FDRPAS SWAP process, and also some of the other features provided in the product.

The examples in this section illustrate how easy it is to use FDRPAS, and how large amounts of data can be easily and non-disruptively migrated across to new DASD devices with just a few simple steps.

2.2 FDRPAS Execution

FDRPAS offers two modes of execution:

- ISPF panels
- z/OS Batch Job

In this Guide we will focus on the execution through the ISPF interface, but SECTION 2.6 also provides an illustrative example of an FDRPAS batch job.

2.3 The FDRPAS SWAP Process

Before we take a look at an example FDRPAS ISPF session, here are some key points about the FDRPAS SWAP process, which are applicable regardless of the mode of execution:

- Only the Source and Target devices are accessed during the FDRPAS SWAP process.
- FDRPAS does not use any additional communication service (e.g. TCP/IP or VTAM).
- FDRPAS does not require a coupling facility, or a separate ‘control’ data set on a third disk volume.
- An FDRPAS copy process can be terminated at any time before the final SWAP has completed, either through the ISPF panels, or with the z/OS STOP command. This can be done without affecting the original device or any applications using it. When you stop a SWAP task, all active SWAPs will be allowed to complete, but any pending SWAPs requested in that same task will not start (a message will be issued to identify the volumes that were bypassed).
- Protection against accidental cancellation of a FDRPAS task, such as a console CANCEL command, is provided. If an FDRPAS task is cancelled with cancel protection in effect, the CANCEL acts like a STOP command (see above), in that it will wait for any active SWAPs to complete before terminating. If a task needs to be cancelled immediately (despite active tasks), a second CANCEL can be issued.
- When the SWAP has completed, FDRPAS can, if desired, send an e-mail message to one or more recipients informing them of the completion of the task and its status.
- FDRPAS can also send error messages to a TSO user, allowing that user to quickly discover problems with an ongoing FDRPAS SWAP operation.
2.4 The Simulation Feature
A comprehensive simulation feature is provided. As well as providing a pre-execution validation of the SWAP process, it also automatically identifies any pre-migration issues on the source volumes, such as VTOC or VVDS errors, which can then be corrected prior to the SWAP process being run for real.

2.5 Using The ISPF Panels
A set of ISPF panels is provided with FDRPAS, and they can be used to set-up and drive the FDRPAS SWAP process. Here is the main panel.

The pull-down menu option reveals all of the main FDRPAS commands.
If you just press ENTER in the main panel, FDRPAS checks to see if there are any SWAPs already in progress. In our example below, there are a couple of SWAP tasks already active.

As well as monitoring active SWAPs, the main FDRPAS panel can also be used to display one or more of the disk devices currently online to this LPAR.

As you can see in the above screen shot, you can specify such things as the Volume Serial (volser), the Unit Address, the SSID, the Control Unit ID or the SMS Storage Group as the selection criteria for which disks are to be displayed.

In our example below, we have requested a display of all disk volumes belonging to SSID 9970.

And in the next example below, we want to see all disk volumes attached to Control Units that have a serial number beginning with LR22.
Below is an example of what the resultant display might look like. As you can see, it shows the first of a range of disks attached to the Control Unit with a serial number of LR221.

<table>
<thead>
<tr>
<th>Command</th>
<th>Volume</th>
<th>Unit</th>
<th>Serial Addr</th>
<th>CU Mask</th>
<th>SMS Mask</th>
<th>Swap to Offline</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCR081</td>
<td>22EE</td>
<td>8102</td>
<td>LR221</td>
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<td></td>
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<td>LR221</td>
<td>INACTIVE</td>
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</tr>
</tbody>
</table>

Notice that the other selection columns, such as Volume Serial Mask, Unit Address and SSID, have all been filled in with the appropriate information.

The “INACTIVE” value in the status column shows that no current FDRPAS activity is taking place on these disk volumes.

The “Swap to offline unit” column is where you specify the target unit device address for each source disk that you want to swap.
Although it is possible to manually enter a target address for each disk, a quicker and easier way to allocate targets is illustrated in the example below.

The source disks on unit addresses beginning with 22 need to be swapped across to the corresponding units on addresses beginning with 7*, so we've just entered “7*” for the first disk in the display.

After pressing ENTER, you can see below that the corresponding target offline unit addresses have all been automatically filled in. This illustrates a very simple, yet effective way of pairing up hundreds or even thousands of target and source volumes with just a few simple keystrokes.

In our example above, some additional information has also been displayed to assist in the SWAP process.

- Three of the generated target addresses are not currently available, as illustrated by the “target not found” and “target not offline” messages in the status field.
- There are also some differences in sizes between three of the source disks and their generated targets.
In situations where there is a problem with the automatically-generated target device, you can either correct the problem (if it is possible/feasible to do so), or you can manually over-type the generated target address with a different value. In our example below, the generated target address of 72EE is not a valid offline device, so we’ve replaced it with an alternative value of 72EF.

Once you have your source and target disks paired-up, the OPTIONS command (shown below, right) allows you to display the options that can be set to control FDRPAS operations.

The first section of the OPTIONS panel (shown below, left) contains the main options for controlling the SWAP process. An example is LARGERSIZE, which we’ve set to “OK” to allow FDRPAS to swap a source disk to a larger target device.
Further down the OPTIONS panel (shown below) we define the CPU addresses of the other LPARs where an FDRPAS MONITOR task will be started prior to the SWAP process being run for real. MONITOR tasks are required if the source disk is accessible from LPARs other than where the SWAP process will be taking place.

```
COMMAND ===>                                                  SCROLL ===> PAGE
STEPLIB ===> 'fdrpas.loadlib'

Dataset name containing Swap Exclude statements (optional)
Dsname ===> 
Member ===> (required for partitioned data set)

Job Statement Information for Monitor Jobs:

Monitor #1
CPUID ===> 096E0D2096 (specify to include MONITOR in PASJOB)
==> //PASMONK JOB (acct), name',MSGLEVEL=(1,1),
==> // MSGCLASS=X,CLASS=M
==> /*ROUTE XEQ JESCPUA

Monitor #2
CPUID ===> 026E0D2096 (specify to include MONITOR in PASJOB)
==> //PASMONL JOB (acct), name',MSGLEVEL=(1,1),
==> // MSGCLASS=X,CLASS=M
==> /*ROUTE XEQ JESCPUB

Monitor
CPUID ===> 016E0D2096 (specify to include MONITOR in PASJOB)
==> //PASMONM JOB (acct), name',MSGLEVEL=(1,1),
==> // MSGCLASS=X,CLASS=M
==> /*ROUTE XEQ JESCPUC
```
Having built the target-and-source pairs, and having adjusted the required FDRPAS options, we can run a SIMSWAPMON (selected from the command options panel shown earlier), which will simulate the SWAP process before we run it for real.

- Shown to the right is an example of the first portion of the JCL that will be created.
- We’re running FDRPAS with the SIMSWAPMON command.
- Options (such as LARGERSIZE=OK) then follow. Note also that we have CHECKSOURCE=YES coded, which instructs the simulation process to check and report on any VTOC or VVDS errors on the source disks, which can then be investigated and resolved before the SWAP is run for real.
- After the options, we then have MOUNT statements for each of our source and target disk pairs that we set up in the main panel. We have a VOL for each source and a SWAPUNIT identifying its TARGET.
- Further down the generated JCL, we have one or more separate steps executing FDRPAS MONITOR commands. These commands will be routed through to the other LPARs that have access to the source volumes.
Shown below is an example of what the FDRPAS panel might look like after the SIMSWAPMON job has been submitted. At this point we have the opportunity to correct any conditions that may prevent the real SWAP process from running successfully. In our example, several of the designated target disks are not offline, which is a default requirement of the SWAP process. Depending on the circumstance, we might opt to place those volumes offline, or perhaps alter the target addresses to a different set of volumes.

Once we've run a SIMSWAPMON and we have all the source and target volumes paired up, and we also have all the monitor tasks up-and-running on any other LPARs that need to participate in the swap, we are then ready to run the non-disruptive SWAP process for real.

This is achieved with the “SWAP” option on the command panel. Alternatively, as illustrated below, individual SWAPS can be initiated from the main panel by typing “swap” into any one of the command lines.
You can then view the progress of each SWAP through the main panel, which has several different display formats. The single, “one-line-per-swap-task” format is shown here:

<table>
<thead>
<tr>
<th>Command</th>
<th>Volume Unit Swap to</th>
<th>Serial Addr Offline</th>
<th>Mask</th>
<th>Mask</th>
<th>Unit</th>
<th>Status</th>
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<td>17C2 9970 22398</td>
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</tbody>
</table>

You can toggle around the different display formats using the PF10 and PF11 keys. Shown below is the 2nd of the three possible formats, with two lines per swap task. The additional line shows some detail on the progress of each active SWAP task.

<table>
<thead>
<tr>
<th>Command</th>
<th>Volume Unit Swap to</th>
<th>Serial Addr Offline</th>
<th>Mask</th>
<th>Mask</th>
<th>Unit</th>
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</tr>
<tr>
<td>HI17CC</td>
<td>17CC 17CA</td>
<td>SYNCHRONIZING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HI17C2</td>
<td>17C2 17C1</td>
<td>SYNCHRONIZING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

And below is the 3rd possible display format, with 4 additional lines showing yet more detail of each SWAP.

<table>
<thead>
<tr>
<th>Command</th>
<th>Volume Unit Swap to</th>
<th>Serial Addr Offline</th>
<th>Mask</th>
<th>Mask</th>
<th>Unit</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HI17CC</td>
<td>17CC 17CA</td>
<td>SYNCHRONIZING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HI17C2</td>
<td>17C2 17C1</td>
<td>SYNCHRONIZING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Source - Reserve: | 0 | Level: 1 | Pace: | Type: 3390 | Cyls: 1113 |
|                   |   |          |       |            |            |
| Target - Reserve: | 1 | Level: 1 | Pace: | Type: 3390 | Cyls: 1113 |
|                   |   |          |       |            |            |
| Storgrp:          | SSID: 9970 | CU Serial#: 22398 |
|                   |           |           |
| Source - Reserve: | 0 | Level: 1 | Pace: | Type: 3390-3 | Cyls: 3339 |
|                   |   |          |       |            |            |
| Target - Reserve: | 1 | Level: 1 | Pace: | Type: 3390-3 | Cyls: 3339 |
|                   |   |          |       |            |            |
| Storgrp:          | SSID: 9970 | CU Serial#: 22398 |
Controlling SWAP Tasks
As well as initiating and monitoring SWAP tasks, the FDRPAS main panel can also be used to control those tasks. The two examples shown below illustrate tasks being **suspended** and **aborted**.

And below is an illustration of what the main panel may look like after FDRPAS has successfully completed a SWAP process.

Note that the Unit Address, SSID and Control Unit serial shown in this display are the values for the new target device where the swapped volume now resides.
History Reporting
If you want to know about previously completed SWAP tasks, you can use the HISTORY option. Shown below is an example of a HISTORY report showing the SWAP tasks that have been run, when and where they were run, and the unit addresses of both the source and target device.

```
Command Volume Unit Swapped System Date Time
------- Serial Addr to Unit ------- -------- ---------- --------
HI17CD 17CD 17CB CPUA 07/26/2010 10:09:15
HI17CD 17CD 17CB CPUA 07/26/2010 10:09:16
HI17CD 17CD 17CB CPUA 07/26/2010 10:09:16
PROD18 01C6 0200 CPUA 09/10/2010 09:22:05
SMS802 22E9 22D9 CPUA 09/14/2010 18:14:08
SMS802 22E9 22D9 CPUA 09/14/2010 18:14:08
```

2.6 JCL Example (SWAP in a Multi-System Environment)
Although the initiation of FDRPAS SWAPs through the ISPF interface is the simplest option and the one which most users will probably opt to use, the SWAP process can also be activated through standard z/OS batch jobs, which execute the FDRPAS program.

In our example below, a disk volume DATA22, which is accessible to multiple system images, will be swapped to a new device at 07C3. FDRPAS will determine the number of systems that have access to the volume.

Prior to running this job, FDRPAS monitor tasks will be started on each of the systems, to monitor the target device (see “Monitor Tasks” below). The target device must be offline on all sharing systems.

```
//SWAP EXEC PGM=FDRPAS,REGION=0M
//STEPLIB DD DISP=SHR,DSN=fdrpas.loadlib
//SYSPRINT DD SYSOUT=* 
//SYSUDUMP DD SYSOUT=* 
//SYSIN DD *,SWAP TYPE=FULL
//MOUNT VDL=DATA22,SWAPUNIT=07C3
/*/
A partial output from the SWAP of DATA22 to offline device 07C3 would look like this:

```
FDR241  FDRPAS SUCCESSFULLY COMPLETED SWAP OF VOL=DATA22 TO UNIT=07C3 ON CPUB  16.31.54
FDR241  FDRPAS SUCCESSFULLY COMPLETED SWAP OF VOL=DATA22 TO UNIT=07C3 ON CPUA  16.31.56
FDR241  FDRPAS SUCCESSFULLY COMPLETED SWAP OF VOL=DATA22 TO UNIT=07C3 ON CPUC  16.31.56
FDR122  OPERATION STATISTICS FOR 3390 VOLUME .....................DATA22  16.31.56
FDR122   CYLINDERS ON VOLUME ......................3,339  16.31.56
FDR122   DATASETS PROCESSED ....................234  16.31.56
FDR122   BYTES READ FROM DASD ..........237,893,477  16.31.56
FDR122   DASD TRACKS SWAPPED .................4,986  16.31.56
FDR122   UPDATED TRACKS RECOPIED ............2,639  16.31.56
FDR122   DASD EXCPs .........................381  16.31.56
FDR122   TARGET DASD EXCPs ...................450  16.31.56
FDR122   CPU TIME (SECONDS) .................0.522  16.31.56
FDR122   ELAPSED TIME (MINUTES) .............2.5  16.31.56
FDR122   SWAP TIME ............................2.5  16.31.56
FDR999  FDR SUCCESSFULLY COMPLETED         16.31.56
```

Monitor Tasks

If a source volume involved in a FDRPAS SWAP is accessible to multiple systems (even if it is offline on some of those systems) an FDRPAS monitor task must be started on every one of those systems before the SWAP is started.

In our example below, we will be monitoring offline device 07C3 as the FDRPAS target device from our previous example.

- FDRPAS will periodically check this device to see if an FDRPAS swap task has started on another z/OS system image that is using the device as a target.
- If so, the monitor task will assist the swap task by monitoring this system image for updates to the original volume during the copy process, and by switching all I/O activity to the new device when the swap is complete.

This type of monitor task will automatically terminate once the swap has completed to the target device.

```//MONITOR EXEC PASPROC
//PAS.SYSIN DD *
MONITOR TYPE=SWAP
MOUNT SWAPP=07C3
/*```
2.7 DASD Consolidation

As illustrated in this Concepts Guide, FDRPAS is the ideal tool for non-disruptively migrating one or more z/OS volumes from one disk device to another.

However, there may be occasions where you have a large number of small disks that you need to relocate to a smaller set of larger disks (for example, 3390 model 9’s onto 3390 model 27’s/54’s, or perhaps across to EAVs.)

For this sort of “consolidation” project, FDRPAS can be used in conjunction with its sister product, FDRMOVE, to provide a near non-disruptive migration and consolidation of your data onto the larger disks.

See the separate FDRMOVE Concepts & Facilities Guide for more details.