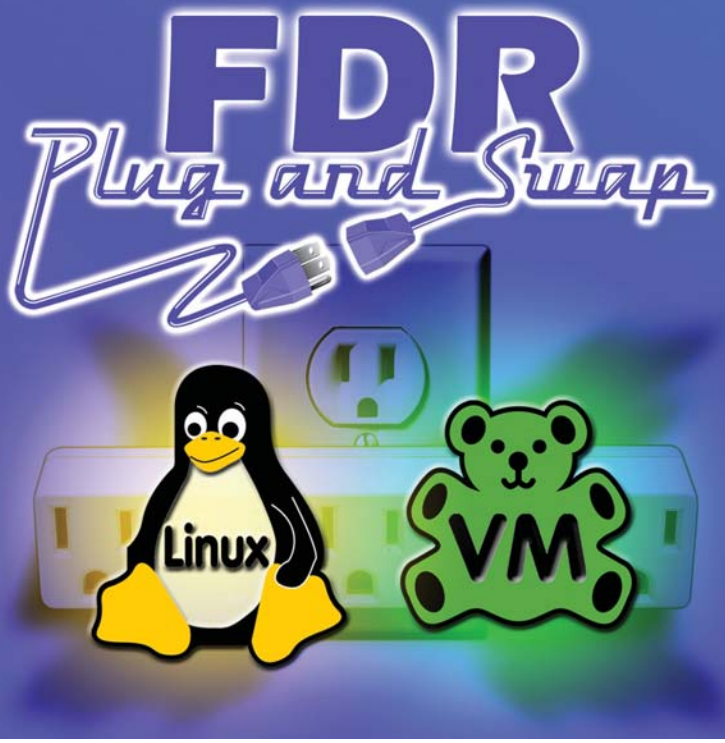
NOVEMBER 2014 • FDRPASVM

TechNEWS

INNOVATION® DATA PROCESSING

Non-Disruptive Migration

FDR Plug and Swap



Linux on System z Volumes

FDRPAS for z/OS Volumes

z/VM Volumes

FDRPASVM for FDRPAS...The Wait is Over

Non-Disruptive Migration of z/VM and Linux on System z Volumes.

FDRPASVM allows users to swap active z/VM user volumes. This enables the non-disruptive migration of volumes containing mini-disks, full pack mini-disks, and dedicated volumes for CMS users and Linux for System z.

NEW FEATURE AVAILABLE: FDRPASVM now supports moving your CP-Owned Volumes including Page, Spool, SYSRES and PARM DISK non-disruptively.

Non-Disruptive Migration of z/VM and Linux Volumes

"All our Linux guests and z/VM SSIs have been moved to the new storage on the fly with absolutely minimal impact using FDRPASVM."
Large Government Organization

Getting Started with FDRPASVM

The FDRPASVM software comes with a REXX EXEC called CALCDASD that provides INNOVATION with an overview of your z/VM DASD utilization. By running CALCDASD and sending the output to INNOVATION, we can help plan the non-disruptive migration of your z/VM and Linux on System z systems.

There are 3 report type options:

- CALCDASD (SHORT
- CALCDASD (ALL
- CALCDASD (DEFAULT

We ask that you run CALCDASD (ALL

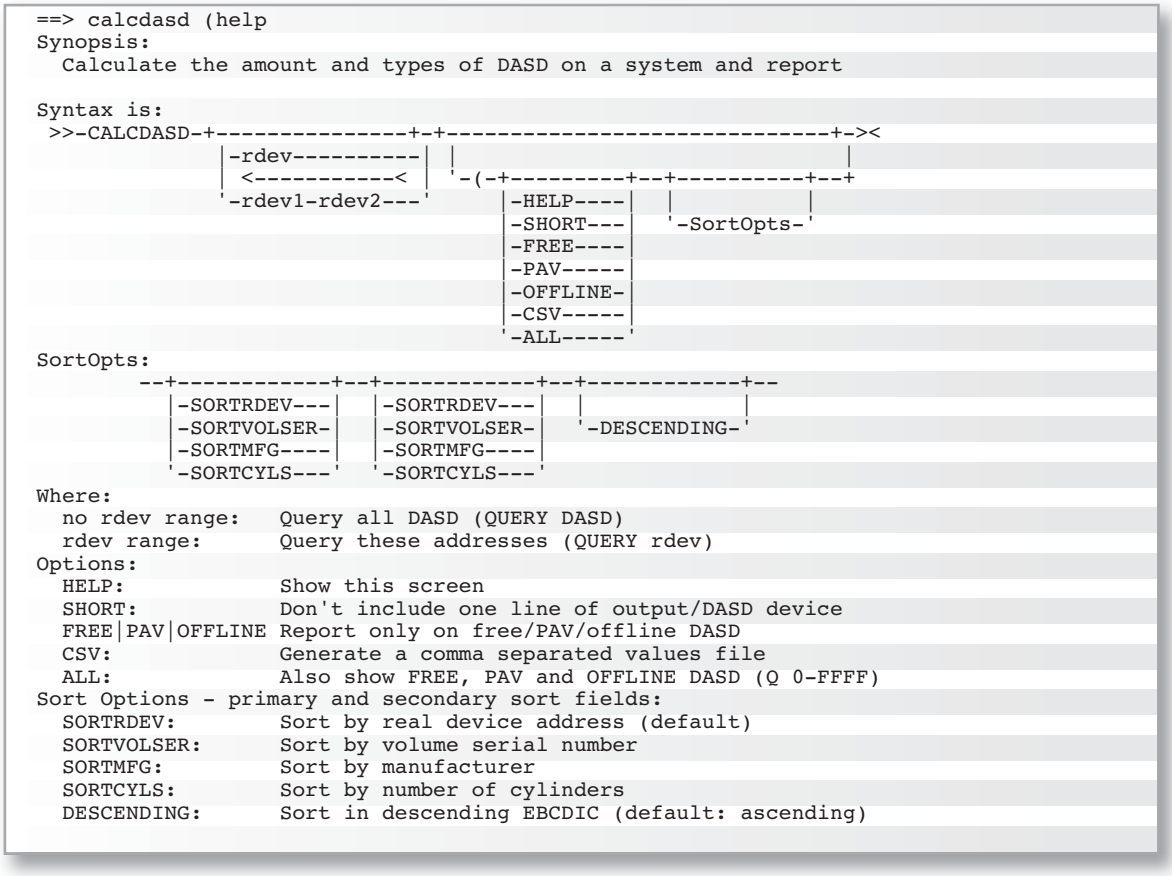
The report output should be sent to support@fdrinnovation.com or to your local support e-mail address (see http://fdr.com/intldirectory.cfm or http://fdr.com/ointldirectory.cfm for international e-mail addresses).

Other information reported on includes:

- Disk Manufacturer (z/VM 6.2 and 6.3 only)
- DASD makes, types, and volume IDs
- The number of volumes and a summary
- CP-owned volumes
- Status of each volume and its allocation attributes
- A CSV format is available and the values can be sorted to meet your needs

CALCDASD Help

CALCDASD has a number of operands that can be used to display the DASD information.



```
==> calcdasd (help
Synopsis:
  Calculate the amount and types of DASD on a system and report

Syntax is:
 >>-CALCDASD-+---------------+-+-------------------------------+->><
             |-rdev----------| |                                 |
             | <-----------< | '-(-+---------+--+----------+--+
             '-rdev1-rdev2---'     |-HELP----|  |          |
                                   |-SHORT---|  '-SortOpts-'
                                   |-FREE----|
                                   |-PAV-----|
                                   |-OFFLINE-|
                                   |-CSV-----|
                                   '-ALL-----'
SortOpts:
        --+------------+--+------------+--+------------+--
          |-SORTRDEV---|  |-SORTRDEV---|  |            |
          |-SORTVOLSER-|  |-SORTVOLSER-|  '-DESCENDING-'
          |-SORTMFG----|  |-SORTMFG----|
          '-SORTCYLS---'  '-SORTCYLS---'
Where:
  no rdev range:   Query all DASD (QUERY DASD)
  rdev range:      Query these addresses (QUERY rdev)
Options:
  HELP:            Show this screen
  SHORT:           Don't include one line of output/DASD device
  FREE|PAV|OFFLINE Report only on free/PAV/offline DASD
  CSV:             Generate a comma separated values file
  ALL:             Also show FREE, PAV and OFFLINE DASD (Q 0-FFFF)
Sort Options - primary and secondary sort fields:
  SORTRDEV:        Sort by real device address (default)
  SORTVOLSER:      Sort by volume serial number
  SORTMFG:         Sort by manufacturer
  SORTCYLS:        Sort by number of cylinders
  DESCENDING:      Sort in descending EBCDIC (default: ascending)
```

CALCDASD Reports

Example report 1: CALCDASD (SHORT

This shows CALCDASD being called with the "(SHORT" operand.

```
calcdasd (short

Run on VMLAB63B, V6.3(1302) at 12:13:10 EDT WEDNESDAY 09/17/14

Number of DASD models        CP-OWN SYSTEM  ATT'D  Total
3390-1s    (1113 cylinders):      0      0      0      0
3390-2s    (2226 cylinders):      0      0      0      0
3390-3s    (3339 cylinders):      0      0      0      0
3390-9s   (10017 cylinders):      4      6      0     10
3390-As     (sizes > 65520):      0      0      0      0
                              ----- ------ ------ ------
Total DASD models:                4      6      0     10

CP-owned volumes:
Slot  Vol-ID  Rdev  Type   Status                  SSIOwner SysOwner
   1  63BRES  1880  Own    Online and attached     -------- --------
   5  63BCOM  1881  Own    Online and attached     -------- --------
  10  63BSP1  1883  Own    Online and attached     -------- VMLAB63B
 255  63BPG1  1884  Own    Online and attached     -------- VMLAB63B

CP-owned TDISK PAGE SPOOL and DRCT allocation:
    Type  Volumes   Cylinders        GB   % used
    ----  -------   ---------      ----  -------
   TDISK        0           0      0.00     0.00
    PAGE        2       20033     17.03     0.00
   SPOOL        2       20033     17.03     3.00
    DRCT        1          20      0.02    35.00
          -------   ---------      ----  -------
Total:          5       40086     34.07     1.51

Total cylinder allocation:
       Type        Cylinders        GB
       ----        ---------      ----
   CP-OWNED            40068     34.06
     SYSTEM            60102     51.08
   ATTACHED                0      0.00
                     ---------  -------
Total DASD:           100170     85.14

WARNING:  only one spool volume, must add one
WARNING:  only one page volume, must add one
```

Displays the z/VM version where the report is run.

Displays a summary of DASD volumes by DASD model.

Displays CP-Owned volumes and their status.

Displays %Used information of CP-Owned volumes used by Innovation to make recommendations prior to SWAP.

Displays Total Cylinder Allocation of CP-Owned, System, and Attached volumes.

If either of these messages appears, another spool/page volume needs to be added. FDRPASVM requires a minimum of 2 spool and 2 page volumes.

Example report 2: CALCDASD (ALL

This example uses the "(ALL" operand to show other information that is available from CALCDASD.

```
calcdasd (all

Run on VMLAB2, V6.2(0000) at 10:34:51 EDT WEDNESDAY 09/17/14

QUERY PAV output:
Device 0460 is a base HyperParallel Access Volume device in Pool 1
Device 0461 is a base HyperParallel Access Volume device in Pool 1
…
There are 192 PAV alias devices
…
QUERY DASD OFFLINE output:
An offline DASD was not found.

Rdev Volser Mfg SSID CCA HPF Allocation      Model    Cylinders
---- ------ --- ---- --- --- ----------      -----    ---------
0460 62WRES IBM 8101 64  +   CP-Owned        3390-9       10017
0461 62WPAG IBM 8101 65  +   CP-Owned        3390-9       10017
…
046F FDR3MI IBM 8101 73  +   ATT to MEHDIMIN 3390-9       10017
0470 VM0470 IBM 8101 74  +   System          3390-3        3339
0471 FDR3VM IBM 8101 75  +   FREE            3390-3        3339
…
Number of DASD models        CP-OWN SYSTEM  ATT'D   FREE  Total
3390-1s    (1113 cylinders):      0      1      0      3      4
3390-2s    (2226 cylinders):      0      0      0      0      0
…
```

Display PAV devices.

Display any offline DASD.

Display Volsers by Rdev.

Rest of output is the same as the "(SHORT" operand.

Helpful Hints / Questions & Answers

FDRPASVM

For more than 14 years users have been able to non-disruptively move z/OS DASD volumes with FDRPAS. In January 2014, Innovation introduced FDRPASVM for z/VM and Linux users. Now in September 2014, Innovation has added support for CP-Owned volumes including Page, Swap, SYSRES and PARM DISK.

Recent User Experience

"All our Linux guests and z/VM SSIs have been moved to the new storage on the fly with absolutely minimal impact using FDRPASVM."

Large Government Organization

Questions & Answers

Q What is the advantage of using FDRPASVM?

A Moving z/VM and Linux systems to new DASD typically requires an outage. FDRPASVM, in conjunction with FDRPAS on z/OS, allows you to accomplish both of these tasks non-disruptively. Both Linux (SYSTEM volumes) and z/VM (CP-owned volumes) systems can be migrated to new storage controllers, all while the systems remain up. As your Linux workload under z/VM and the IT requirement for "Continuous operations" grows, maintenance outages are not acceptable.

Q Can I migrate my z/VM Single System Image (SSI) LPARs?

A Yes, both SSI and non-SSI systems are supported. When migrating an SSI system, you must run the FDRPAS MONITOR on all members of the SSI cluster, and you must update the PDVOL value in both the IPL parameters and the SAPL record.

Q How does FDRPASVM ensure that all disk changes are captured on the target DASD?

A A monitor task is run on z/VM. The main SWAP task is run on z/OS. The monitor task installs intercepts observing all changes to disk so that all tracks changed while the copy is taking place are communicated to z/OS and recopied. This process continues until the number of updated tracks are a few hundred or less, then the disk updates are frozen for less than a second so that the copy can be completed and the new volume is brought online to all LPARS.

Q How does FDRPASVM ensure that my DASD are not being updated by systems on other LPARs?

A Either the DASD must be offline to other systems, or a FDRPASVM monitor task must be running on all systems with the DASD online. For EMC DASD and IBM DS8800 and DS8700 DASD with the Query Host Access (QHA) feature installed, FDRPAS and FDRPASVM can determine which LPAR's have the volume online.

Q Which levels of z/VM are supported?

A All levels supported by IBM. Currently those are z/VM 5.4, 6.2 and 6.3.

Q What is involved in installing FDRPASVM?

A Two virtual machines, a CMS machine to store the code and a service virtual machine to do the monitoring, must be defined. Then the code can be installed on the first virtual machine. The complete install process takes less than an hour.

Helpful Hints / Questions & Answers

Q **Does FDRPASVM support functions other than 'migrate'?**

A Yes, migrating a volume is called a 'SWAP'. There is also a 'SWAPDUMP' function that creates point-in-time copies of volumes. There are also counterpart simulate functions (SIMSWAP and SIMSWAPMON) so you can test your process before making the actual moves.

Q **What states do the volumes have to be in on z/VM and on z/OS?**

A On z/VM, the source volumes must be online and the target volumes must be online and free. On z/OS, the source volumes must be online and the target volumes must be offline.

Q **Can I drive the process from z/VM?**

A Yes, by using the z/OS FTP server. It has a special mode (site filetype=JES) that allows you to submit jobs from z/VM with a PUT and copy the output of the job back with a GET.

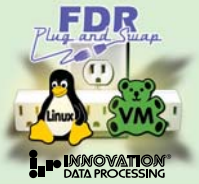
Q **Does FDRPASVM provide any reporting tools?**

A Innovation has created a REXX EXEC named CALCDASD that can be run on each z/VM system and report on the amount and status of the DASD.

See pages 2 and 3 for a sample of the CALCDASD reporting that is available.

Q **How fast can I migrate my systems?**

A Depending on update activity, a 3390-9 can usually be migrated in under three minutes. Typically, users migrate 20 or more volumes concurrently.




```
FDR001  FDR,PLUG,AND SWAP - FDRPAS  VER. 5.4 - INNOVATION DATA PROCESSING
FDR303  CARD IMAGE --  SWAP     TYPE=FULL
FDR303  CARD IMAGE --  MOUNT VOL=54PTST,SWAPUNIT=4606
FDR233  CPUB     (SERIAL# 02E2062818) ACKNOWLEDGES THE SWAP OF VOL=54PTST
FDRW66  SWAP OF VOL=54PTST TO UNIT=4606 STARTED ON   3 SYSTEMS
…
FDR122  OPERATION STATISTICS FOR 3390 VOLUME.................54PTST
FDR122                       CYLINDERS ON VOLUME............10,017
FDR122                       BYTES READ FROM DASD.....7,569,929,664
FDR122                       DASD TRACKS SWAPPED............153,648
FDR122                       UPDATED TRACKS RECOPIED..........3,394
                             DASD EXCPS.....................10,311
                             TARGET DASD EXCPS..............10,248
                             CPU TIME (SECONDS).............8.595
                             ELAPSED TIME (MINUTES).............2.5
FDR122                       SWAP TIME.........................2.3
```

There were more than 3,000 tracks updated during the SWAP, completed in less than 3 minutes.

Helpful Hints / Questions & Answers

Q **Do I need to monitor the FDRPASSV service virtual machine's console while volumes are being swapped?**

A No, in fact it is recommended that you leave the service virtual machine running disconnected. If you want to monitor every message sent to the console, it is recommended that you set up a secondary console, either temporarily or permanently depending on your requirements.

Q **Special consideration when going from smaller to larger volumes and minidisks have been defined using the "END" keyword.**

A If you are migrating Linux systems from smaller to larger volumes, and you have minidisks defined using the "END" keyword, you should first modify the user directory entries to specify the exact ending cylinder. For example, if you are moving from 3390-9s to 3390-27s, and you have minidisk statements with "1 END", you should update all user directory entries with "1 10016". This way, the Linux disks will remain the same size, and the remaining space will be available for other minidisks.

Q **I use the CHECKSOURCE=YES operand in my jobs for z/OS volumes. Should I use it in my z/VM jobs?**

A No. When this operand is coded on the SIMSWAP or SIMSWAPMON statement, FDRPAS checks the z/OS VTOC. Since z/VM volumes do not have a z/OS VTOC, the simulation will produce error messages.

Q **I use the CHECKTARGET=YES operand in my jobs for z/OS volumes. Should I use it in my z/VM jobs?**

A Yes, although it will not check as much. CHECKTARGET=YES checks that the target volumes are offline to z/OS, and that they do not have any data sets in the z/OS VTOC. (Note that on the z/VM systems, the target volumes must be online and free.) For volumes in CPVOLUME format, the check of the z/OS VTOC does not apply and is bypassed.

Q **If GDPS Hyperswap is active for z/VM as well as z/OS volumes, can I still use FDRPASVM to migrate volumes?**

A Yes, following the procedure in section 320.6 FDRPAS AND IBM GDPS/PPRC HYPERSWAP in the z/OS FDRPAS manual. There is a rule that FDRPAS cannot swap a volume while it is eligible to be swapped by HyperSwap, so this procedure automates the process of disabling HyperSwap for the minimum amount of time while FDRPAS does its swaps, and then re-enables HyperSwap.

Q **Should I specify NONRESPONDING=RETRY on the SWAP command?**

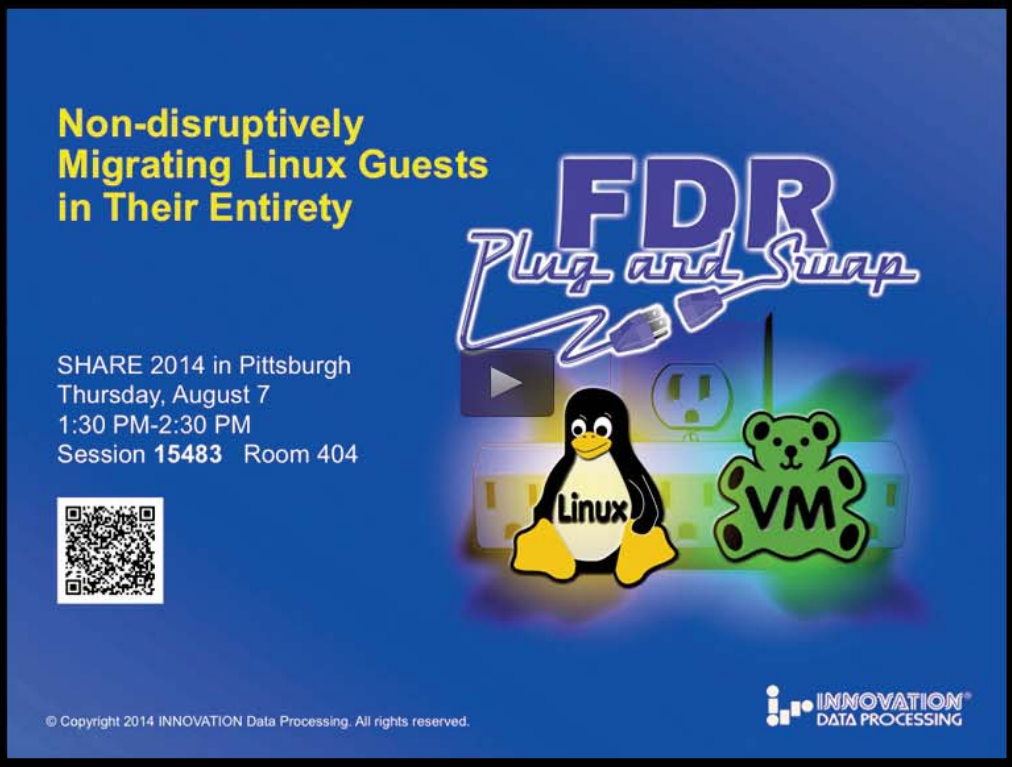
A Yes. If there is an LPAR that has the volume online but does not have a monitor running, you will be protected from the mistake of allowing the SWAP to proceed.

Best Practice Recommendation – Sometimes VM volumes have not been INITed properly. To avoid any problems in using FDRPASVM in migrating VM and Linux on System z volumes, we recommend that you add a SELECT statement after all MOUNT statements in the SWAP task input as in this example:

```
MOUNT VOL=LX4201,SWAPUNIT=6201
SELECT FROM(CYL=0),TO(CYL=65519)
```

The ending cylinder value must be as large as or larger than the highest cylinder number on the largest DASD to be swapped; 65519 as shown handles any DASD up to the size of a 3390-54. If you have EAV volumes contact Innovation for the proper values for the SELECT statement. Do not include z/OS volumes in a run with this MOUNT statement. ***For more detailed information see Section 320.3 of the FDRPAS user manual.***

TECHNICAL PRESENTATION VIDEOS

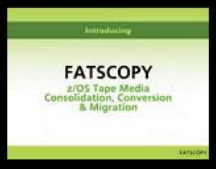


FDRPASVM Non-disruptively Migrating Linux Guests in Their Entirety
SHARE Pittsburgh | August 2014

PRODUCT PRESENTATIONS

FDRPASVM PRESENTATION

PRODUCT DEMOS



FATSCOPY PRODUCT DEMO

FDRPAS PRODUCT DEMO

FDRMOVE PRODUCT DEMO

FDRERASE PRODUCT DEMO

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FDRPAS for z/OS and FDRPASVM for z/VM and Linux on System z provide you Non-Disruptive Migration of your DASD.

Resources

For more information on FDRPASVM visit: www.fdr.com/FDRPASVM
Request a FREE No-Obligation Trial: www.fdr.com/riskfreetrial
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EVENTS

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- **SHARE Technology Exchange, Seattle, WA**
  Date: March 2 - 4, 2015
- **EMC WORLD 2015, Las Vegas, NV**
  Date: May 4 - 7, 2015
- **IBM Enterprise2015, Las Vegas, NV**
  Date: May 11 - 14, 2015
- **SHARE Technology Exchange, Orlando, FL**
  Date: August 10 - 12, 2015