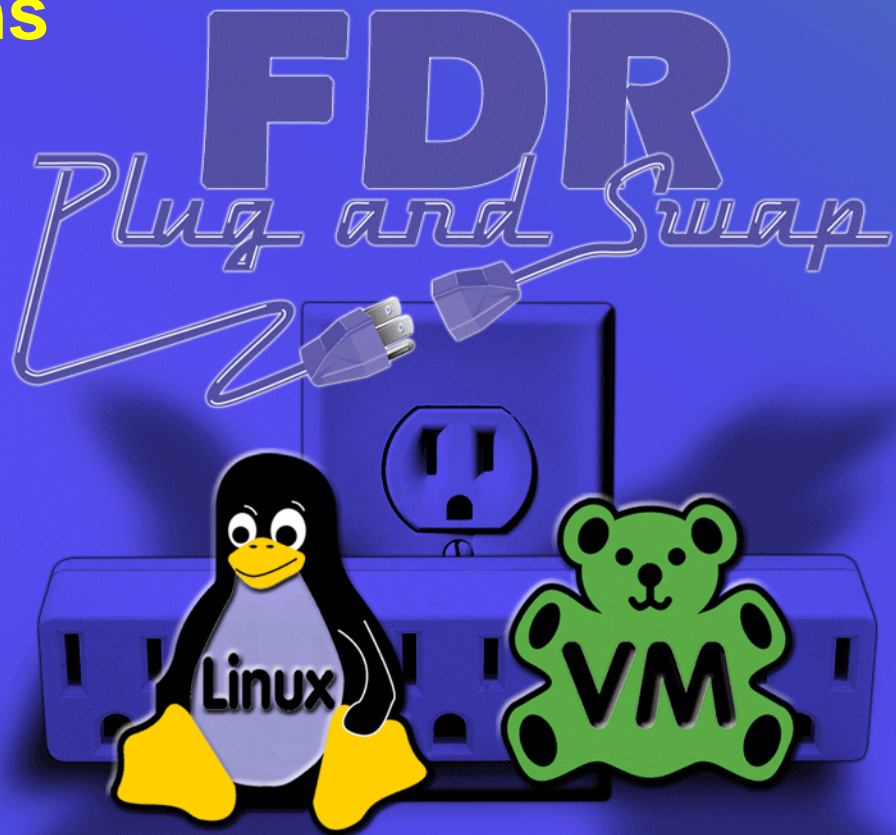


Learn What's New with INNOVATION Solutions

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SHARE session 17175
Tue. March 3, 2015
Seattle, WA



Agenda

Introductions

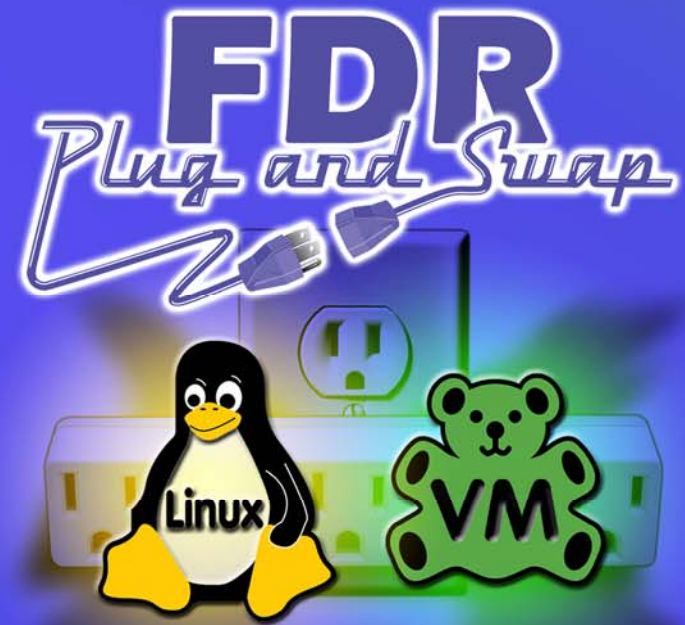
Hierarchy of Availability

Business Continuance Tools

z/VM and z/OS Platform
Convergence

Estimating Migration Effort

Summary



Introductions



- Who am I?
 - Michael MacIsaac
 - Product Manager for z/VM and Linux
 - mmacisaac@fdrinnovation.com
- Who are you?
 - An Innovation Data Processing customer?
 - An FDRPAS on z/OS customer?
 - A z/VM & Linux only shop?
 - z/VM SSI?
 - z/VM SMAPI configured?

Agenda

Introductions

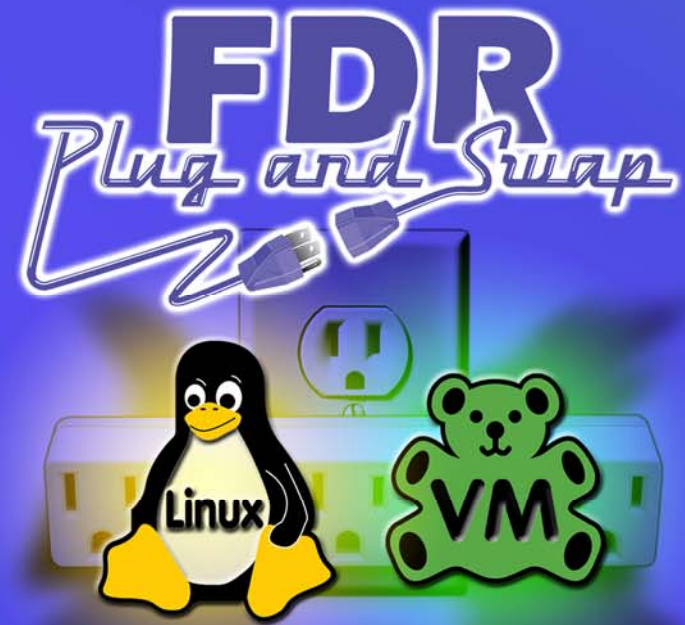
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Hierarchy of Availability

- Hierarchy of availability (lower to higher)
 - High Availability
 - Continuous Operations
 - Continuous Availability



Source: "High Availability Architectures For Linux on IBM System z" Version 2, June 15, 2010 by Steve Wehr, Scott Loveland and Harriet Morrill of IBM

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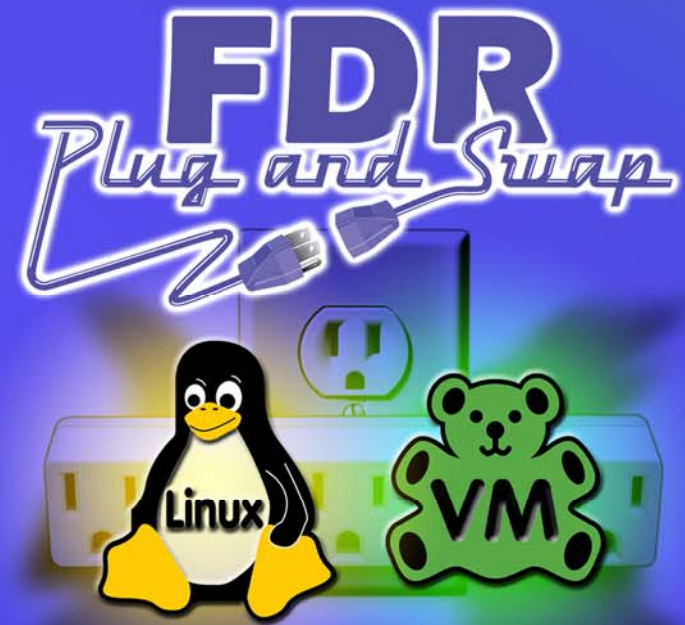
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Tools in Your “Availability” Toolbox

- Resilient hardware with dynamic features
 - Mainframe, PR/SM, standby memory/CPU, etc.
- Disk local mirroring and remote replication tools
- Resiliency z/VM and Linux features
 - Hot plugging memory, CPU, file systems
- HA software
 - Oracle RAC, IBM WAS XD, IBM DB2 HADR, etc.
- Business continuance tools
 - z/VM 6.2+ SSI and LGR
 - Innovation FDRPAS for z/OS & FDRPASVM for z/VM

z/VM SSI and LGR



- Single System Image (SSI)
 - 2-4 z/VM “member” systems share and coordinate resources
 - This becomes an “SSI cluster”
- Live Guest Relocation (LGR)
 - Running Linux systems can move cross-LPAR or CEC
 - Memory and CPU are moved, but not disk
- Can eliminate planned outages

Living up to “Non-disruptively Migrating z/VM and Linux Guests in Their Entirety”



- Customers tell us they are configuring SSI & LGR to:
 - Eliminate planned outages
 - Allow for non-disruptive hardware maintenance
 - Protect themselves against local disruption
 - Work during normal business hours
- FDRPASVM extends the scope of SSI & LGR objectives
 - While SSI & LGR are relocating memory and CPU...
 - FDRPASVM concurrently relocates z/VM & Linux disk storage

FDRPASVM – Non-disruptively moves disk



- Non-disruptively moves DASD of running systems
 - User and CP-owned volumes
 - Copies entire source volume(s) to target(s)
 - Monitors changed tracks on source volume
 - Copies changed tracks
 - Swaps all I/O operations to use target volume(s)
- Generally Available in January 2014
- Non-disruptive migration to new storage systems

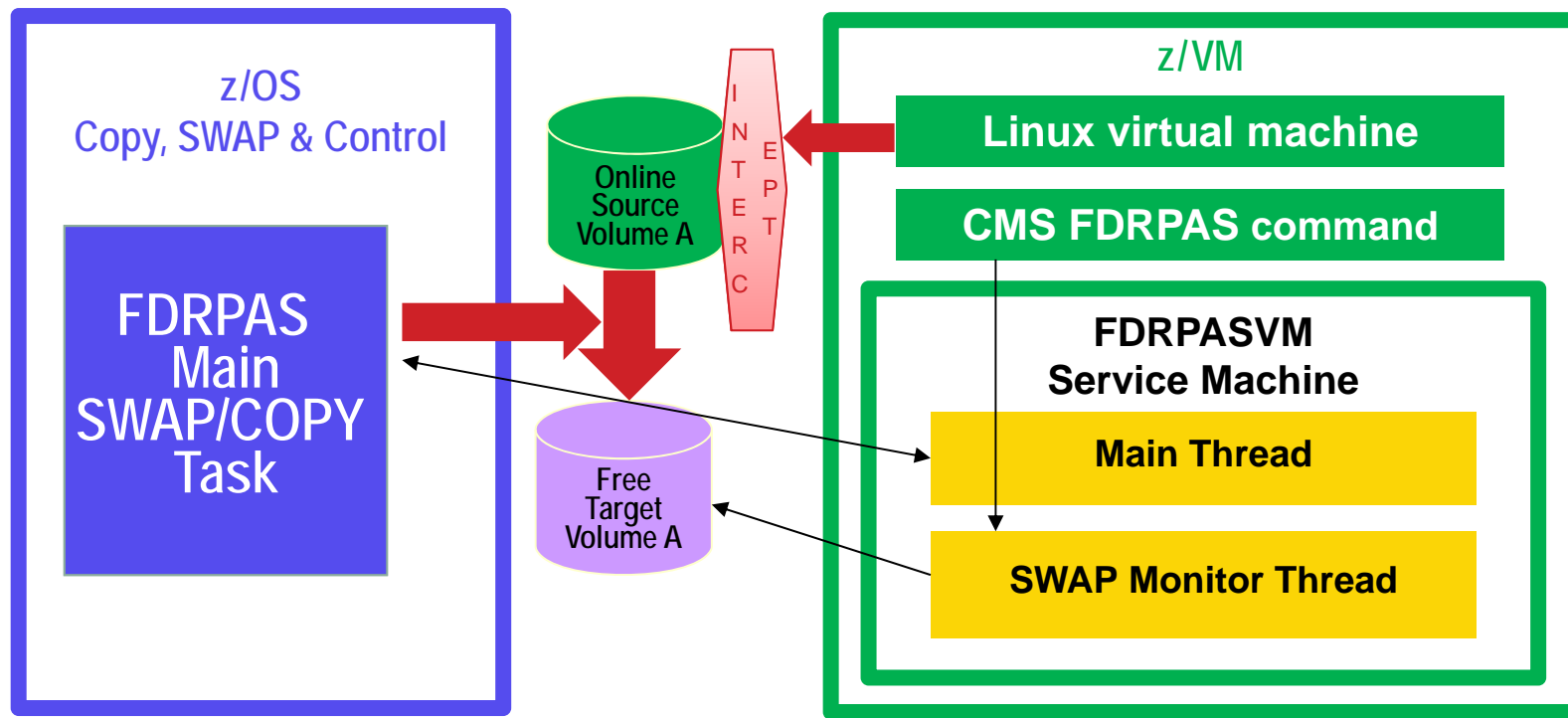


FDRPASVM Functions

- FDRPASVM supports migration of
 - Minidisk volumes (PERM)
 - Full-pack and DEDICATED volumes
 - CP-owned (must have two PAGE and two SPOOL volumes)
 - Page volumes can now be moved in parallel*
 - Smaller to larger volumes (ex: 3390-9 to 3390-27)
- FDRPAS functions
 - SIMSWAP – Simulate and validate main swap task
 - SIMSWAPMON – Simulate and validate monitoring updates
 - SWAPDUMP – Create point-in-time copy of volume(s)
 - SWAP – Copy and swap volume(s)



FDRPASVM Components



FDRPASVM IS EASY TO INSTALL & USE



- 3 files:
 - CALCDASD EXEC – understand the environment
 - EXTRFDRP EXEC – unwind DISTPIPE (saves typing)
 - FDRPASVM.DISTPIPE – the product code
- 2 virtual machines:
 - PASMAINT – stores the binaries
 - FDRPASVM – FDRPAS service virtual machine
- 1 CMS command:
 - FDRPAS – with many subcommands
 - MONITOR TYPE SWAP
 - MONSTAT
 - STOP

FDRPASVM Overview



- FDRPAS and FDRPASVM at a low level
 - Install z/VM “intercepts” to monitor source volume changes
 - z/OS main SWAP task copies source to target volume
 - FDRPASVM passes changes to z/OS main SWAP
 - z/OS main SWAP task recopies changed tracks
 - Uses z/VM HYPERSWAP when source and target are in sync
 - Target volume transparently becomes the source volume
 - Remove FDRPASVM intercepts

FDRPAS z/OS Migration Report



FDR233 CPUB (SERIAL# 02E2062818)
ACKNOWLEDGES THE SWAP OF VOL=VM1887 - HTC 2107900 TO HTC 2107900
FDR233 VMLAB63B (SERIAL# 04E2062818)
ACKNOWLEDGES THE SWAP OF VOL=VM1887 AND HAS JOINED IN SWAP OF
UNIT=1887 TO B887

...

OPERATION STATISTICS FOR 3390 VOLUME.....VM1887
CYLINDERS ON VOLUME.....**10,017**
DATASETS PROCESSED.....0
BYTES READ FROM DASD.....7,593,410,036
DASD TRACKS SWAPPED.....154,127
UPDATED TRACKS RECOPIED.....**3,873**
DASD EXCPS.....10,418
TARGET DASD EXCPS.....10,371
CPU TIME (SECONDS).....2.257
ELAPSED TIME (MINUTES).....**2.6**
SWAP TIME.....2.4

FDR SUCCESSFULLY COMPLETED

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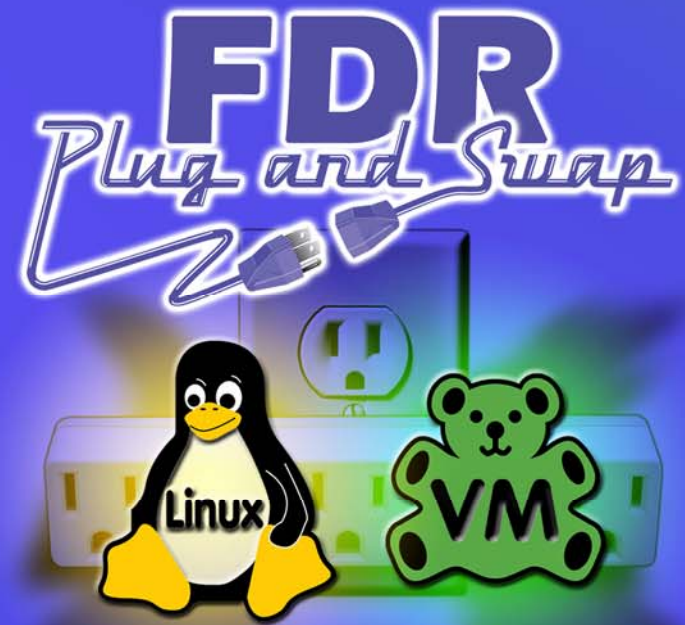
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Automating...from z/VM

z/OS Job Submission... from z/VM

- Submit JCL job(s) from z/VM to z/OS
 - Using FILETYPE=JES mode of the z/OS FTP server
 - Using the VMFTP tool to process output from FTP
- All in a REXX “wrapper”
- White paper describing how to at :
- http://www.fdr.com/Manuals_CurrentVersion/JCLfromVM.pdf

Display and Manage z/OS Device status from z/VM

- Display Label
- Manage UCBs

FTP Session Overview

- **Submit JCL jobs through FTP**

```
==> ftp zOS.ftp.server
ftp> z/OS credentials
...
ftp> site filetype=jes
...
ftp> put myjob.jcl
...
ftp> get <jobid>.x
...
ftp> quit
```





View and Manage z/OS devices from z/VM

- DUCB
 - Send a job to z/OS and **Display UCB(s)**
- VUCB
 - Send a job to z/OS and **Vary UCB(s)** online or offline
- QLABEL
 - Query the label of DASD volumes and report

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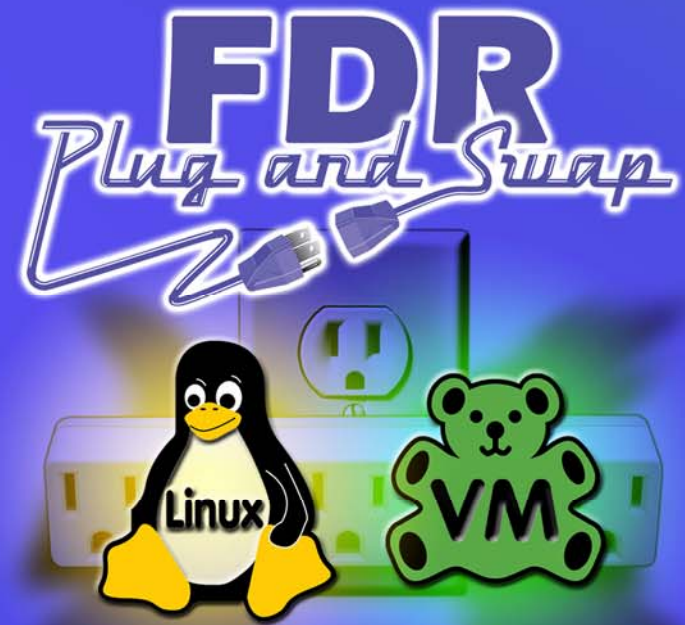
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Can You Estimate the Migration Effort?



FDRPASVM provides tools to help you determine...

- How much DASD space is on my systems?
 - CALCDASD EXEC reports on type and size of DASD
- Do my volumes have problem VTOCs?
 - QLABEL EXEC reports on VTOC types



CALCDASD EXEC

- CALCDASD EXEC

- Needs no arguments if all DASD “belongs” to z/VM

==> `calcdasd`

- Can take rdev-range if not all DASD “belongs” to z/VM

==> `calcdasd 1880-1887`

- Counts 3390-1s, -2s, -3s, -9s –As (EAVs) and “other sizes”
- Identifies CP-Owned, SYSTEM and ATTACHED disks
- Can report on free, offline and PAV alias devices
- Combination of `q DA`, `q rdev`, `q ALLOC` and `q DA DETAILS`

Tools to help you ...



- Request a copy of any of these EXECs by e-mailing:
 - support@fdrinnovation.com

Introductions

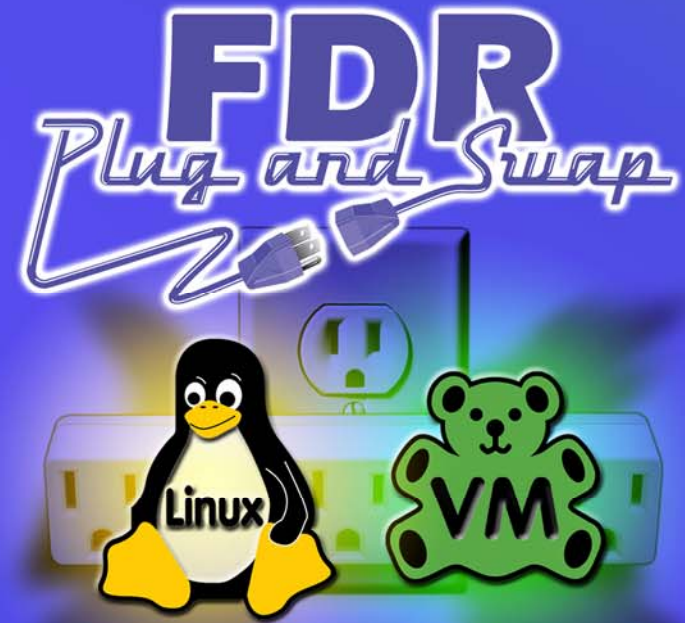
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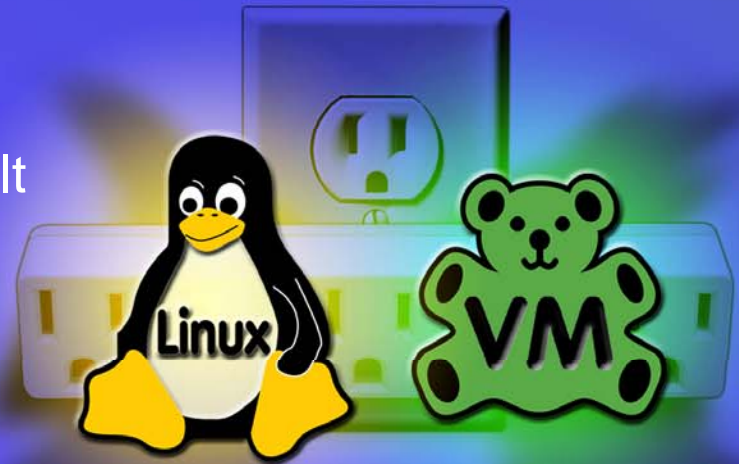
Testimonial... from a Large Financial Institution



Non-Disruptive Migration

“The business units requirements that rely on Linux volumes have made it very difficult for us to schedule outages to move their systems. FDRPASVM now allows us to move them non-disruptively like FDRPAS does for our z/OS volumes.”

A Large Financial Company





What problems did customer face?

- Storage technology refresh to accommodate Linux on z growth.
- Need to keep outage windows to an absolute minimum
- Desire to perform DASD technology refresh and to move data around for performance improvements without having to engage with our Business Units... and negotiate for long-duration outage windows.

Why did these problems exist?



- The z/VM and Linux on z process involved a costly (\$\$\$) data migration services agreement with our DASD vendor to “precopy” the data to new footprints and then perform a cutover during planned standalone windows (which were subject to 11th-hour cancellations by the BU).
- To complete this, we need to go through extensive planning for these events, with the Business Units, multiple teams to coordinate activities for standalone windows, including extensive timeline planning in the event a backout is needed.

Why did customer consider FDRPASVM?



- Data migrations using FDR products (FDRPAS, FDRMOVE) have been so successful and “foolproof” over the years that I’ve earned an exemption from the change team to have very low-level “standard” changes to perform these migrations.
- Non-prod migrations can actually be performed during the week which minimizes the amount of work my team needs to do on weekends.
- z/VM and z/Linux migrations using FDRPASVM allows us flexibility in how and when we schedule our data migrations.

What benefits did customer realize?



- The biggest benefit is the ability to be able to now move ALL our mainframe (including z/VM and z/Linux ECKD data) around non-disruptively.
- Perform technology refreshes and move data around for performance improvements without having to engage our Business Units and BU application teams and negotiate for long-duration outage windows.
- This saves time and helps us to absolutely minimize our planned outages throughout the year.
- Keeps the systems up making money for the firm.

Key Points Summary



- “Continuous Operations” is the new “HA”
- z/VM SSI is a powerful HA tool
- FDRPASVM is a unique complementary solution to move running systems & migrate to new DASD
- FDRPASVM has tools to assist:
 - Estimate the migration effort
 - Interface with z/OS
- FDRPAS technology has a proven reliability record
 - Over 1700 customer migrations since 2001



Backup/Restore of z/VM and Linux

- FDR ABR (Automatic Backup and Restore)
 - Now supports z/VM and Linux DASD
 - Simpler JCL
 - Backups can be stacked on multi-file tapes
 - Standardize z/VM and Linux backup with z/OS
- Planned for 2Q '15
- Currently in “Beta” testing

Key Points Summary



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Resources

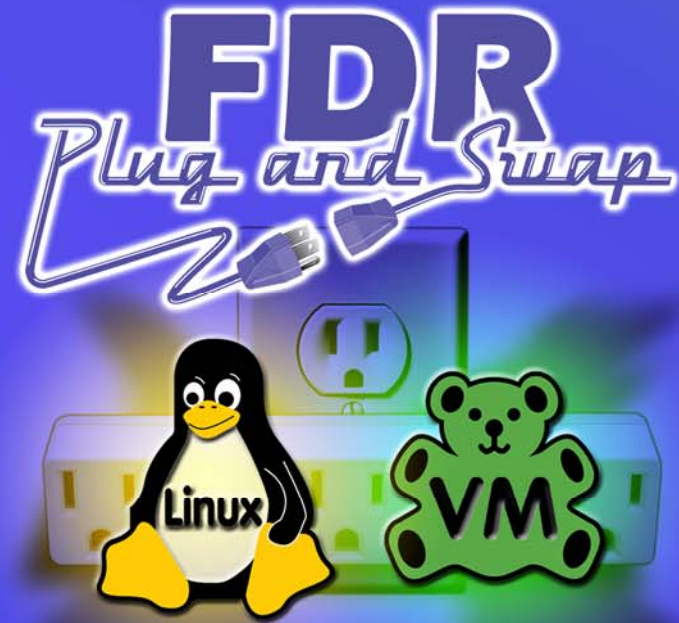
- This presentation:
 - Will be made available to the Linux Executive Council
- My e-mail address
mmacisaac@fdrinnovation.com



QUESTIONS?



Thank you!



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