FDR/UPSTREAM and INNOVATION's other z/OS Solutions for Managing BIG DATA. Protection for Linux on System z.

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Here's what we are going to talk about.

- Linux on System z data protection
- What do I need to think about
  - Storage Technologies installed
  - Data Protection – Backup Types available
  - Data Transports at my site
  - Storage Servers that will hold my backups

Storage on ECKD implies the following:

- Access technology is FICON
- Everything looks like 3390
- Everything is accessed by UCB address
- z/OS supports this

Storage on FCP implies the following:

- Access technology is FIBER channel
- Everything looks like blocks
- Everything is accessed by WWN (world wide name)
- z/OS does not support this currently

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What data transport do you want to use?

- Your choices are:
  - Network based (OSA adapter)
  - Intra CEC – (HiperSockets)
  - SAN (Fiber channel to FICON bridging via storage array)

What type of data protection do you want?

- Your choices are:
  - Physical Image
  - File Level
  - Database
  - Disaster Recovery

Hey where is your Linux on System z data?

- Is your user data on a FICON connected storage array?
- If yes, is it accessible by z/OS?
- Is your user data on FBA or CKD?

- If your data is NOT on a FICON storage array,
  your choices are:
  - On NAS
  - Direct attached storage/local drives
  - Other SAN attached storage

INNOVATION's Solution Selection Matrix

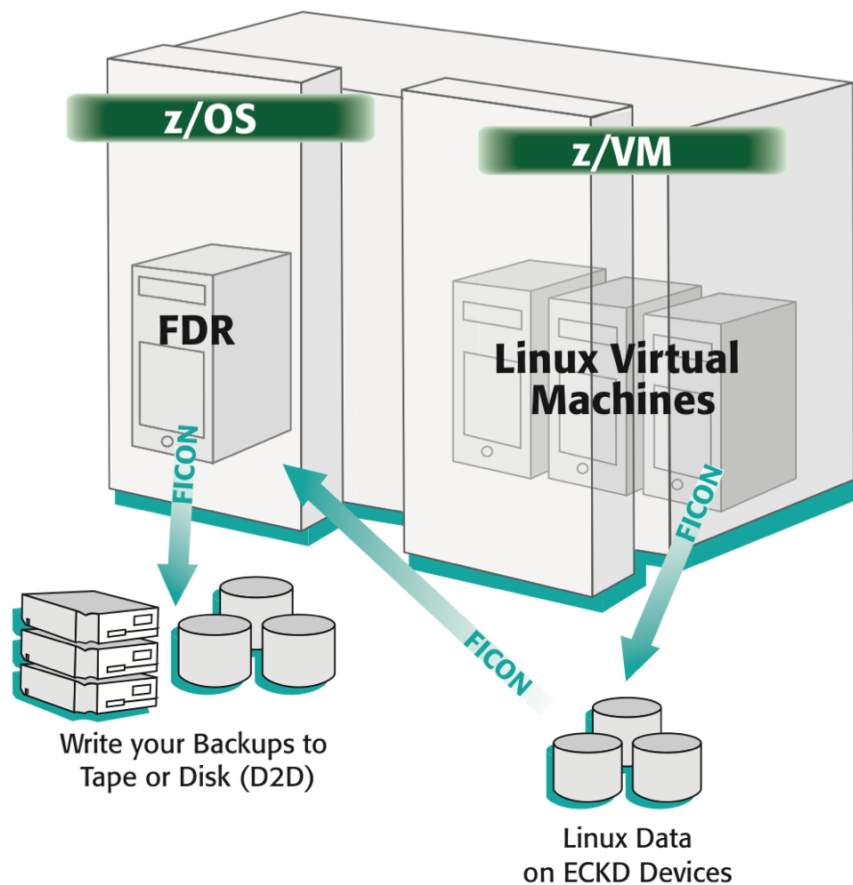|	User Data Storage Technology	Backup Type	Data Transport	Storage Server
FDR	FICON CKD	Image	FICON	z/OS
FDRSOS	FICON FCP	Image	SAN	z/OS
FDR/UPSTREAM	FICON CKD or FCP NAS DAS SAN	File Level & Database	OSA & HiperSockets	z/OS or Reservoir
UPSTREAM/SOS Or SAN EXPRESS	FICON CKD or FCP NAS DAS SAN	File Level & Database	SAN	z/OS or Reservoir

Centralized Enterprise Data Protection Using Mainframe Infrastructure Strengths

- **Enterprise Data Protection Solution Benefits**

  - z/OS controls backup data from OS server to z/OS tape

  - Virtualization helps solve backup window problems

  - Efficient tape drive and tape media utilization

  - Centralizes scheduling, tracking and auditing

  - Meet Disaster Recovery restore time objectives
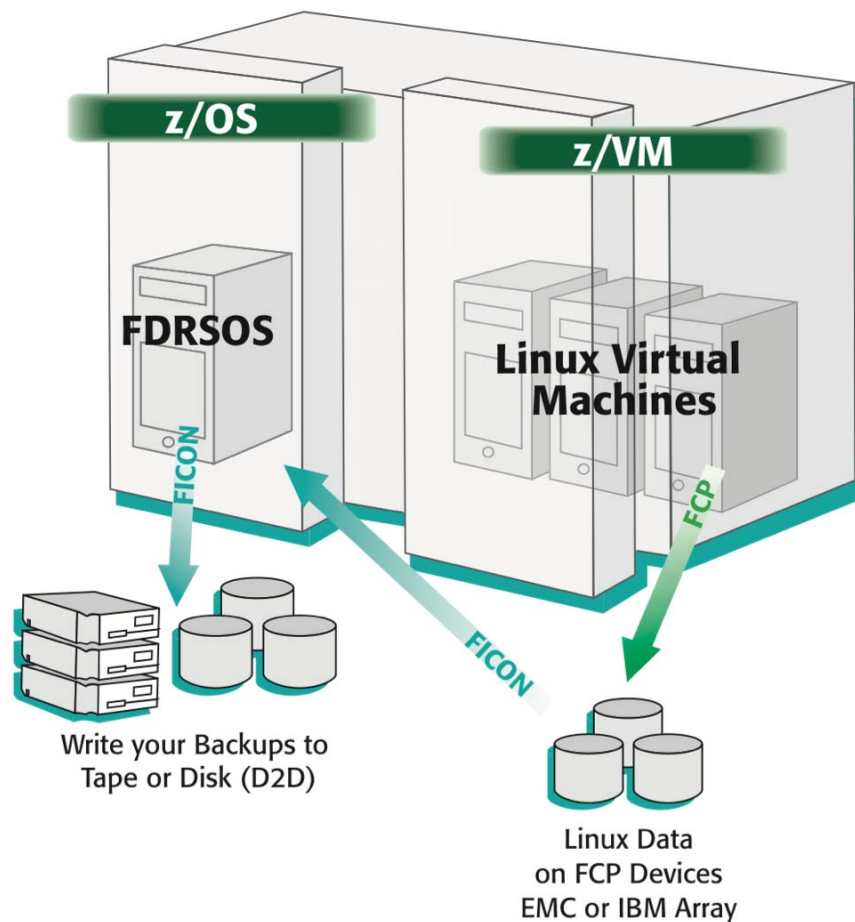
FDR for ECKD Devices

z/OS

z/VM

FDR

Linux Virtual Machines

FICON

FICON

FICON

Write your Backups to Tape or Disk (D2D)

Linux Data on ECKD Devices

FDR for ECKD Devices

- Simple to use DR data protection
- Image level data protection/restore
  - No file level support
- To get the "best" backup you should dismount the volume first
- Works with FDRINSTANT, IBM FlashCopy and TimeFinder Clone
- Great for bare metal recovery of virtual machines

FDRSOS for FCP Devices

z/OS

z/VM

FDRSOS

Linux Virtual Machines

FICON

FCP

FICON

Write your Backups to Tape or Disk (D2D)

Linux Data on FCP Devices EMC or IBM Array

FDRSOS for FCP Devices

- Simple to use DR data protection
- Image level data protection/restore of array resident data (i.e. DS8700/8800, DMX, VMAX etc.)
- No file level support
- To get the "best" backup you should dismount the volume first
- Works with SOSINSTANT, IBM FlashCopy and TimeFinder Clone
- Great for bare metal recovery of virtual machines

FDRSOS for FCP Devices

- Requires either IBM zDDB and EMC z/SOS no cost microcode features

- Agent less solution
  - High speed image backup across FICON channel to z/OS
  - No network traffic and no TCP/IP usage
  - Consolidate mainframe and distributed data protection
  - Extend the value of z/OS tape management & security systems
  - Improve distributed Data Disaster Recovery with reduced backup and recovery times

- SOSINSTANT
  - Advance distributed data disaster recovery backup with IBM FlashCopy and EMC TimeFinder

FDR/UPSTREAM
File Level Support to z/OS

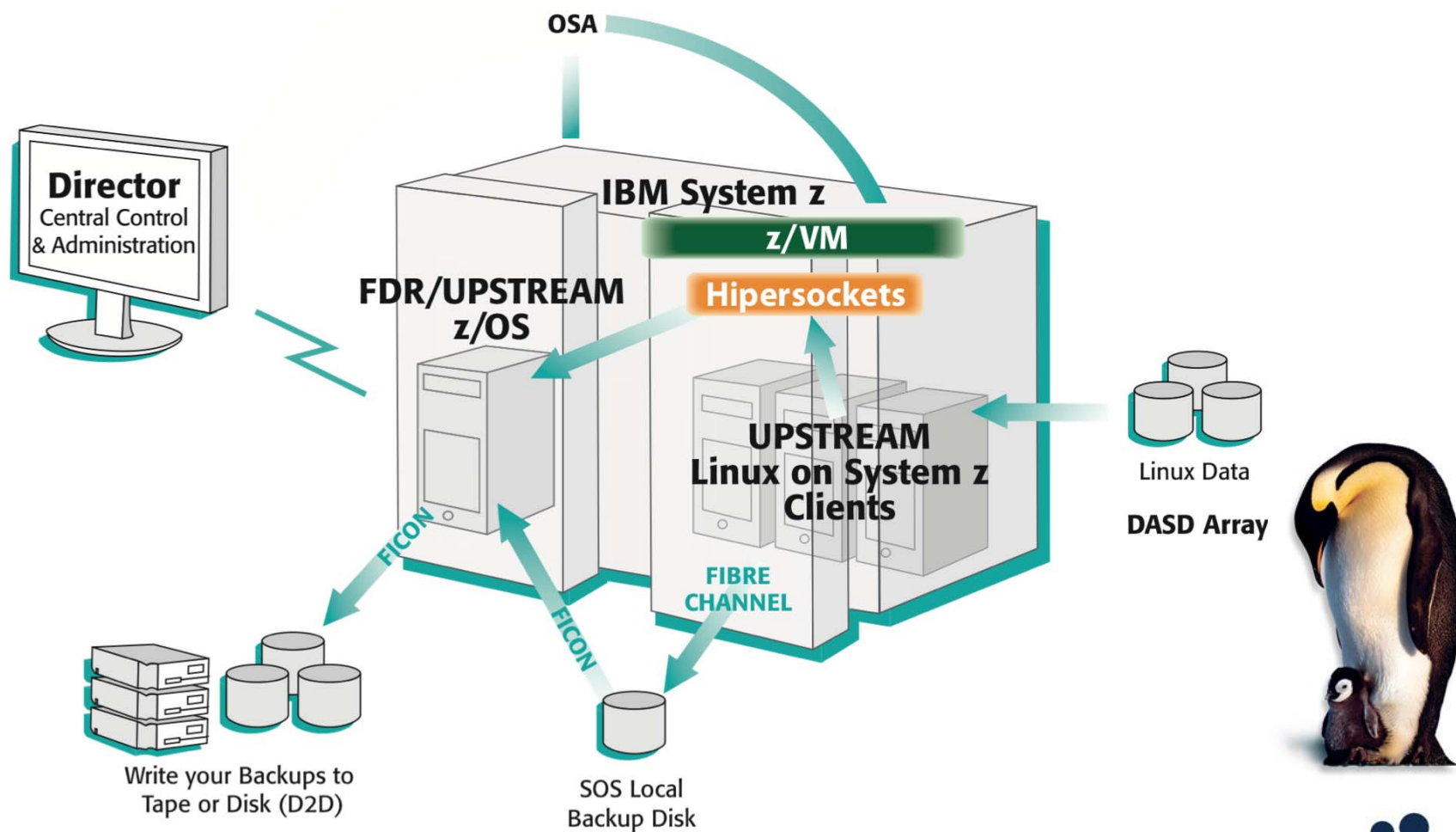Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval
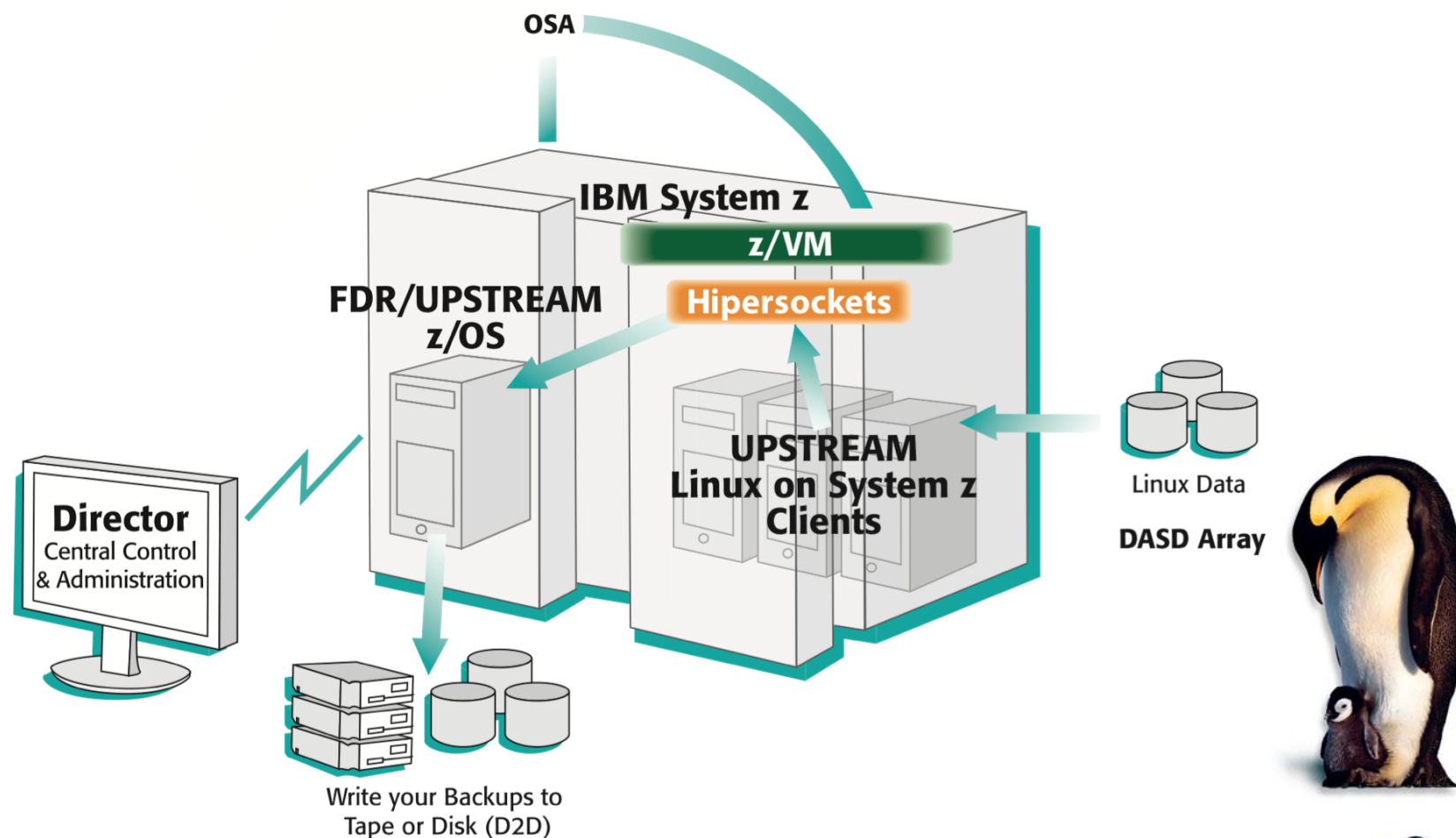
FDR/UPSTREAM z/OS

- File level and database support to z/OS Storage Server
- Backup & Metadata travel on the TCP/IP LAN or WAN Communications Network
- Centralized z/OS Tape Management, Security and Scheduling
- Hot Database Support for DB2/UDB, ORACLE, IBM Notes, SQL Server, MS Exchange, etc.
- User interfaces – Director & EUR GUI's, ISPF
- Provides Data De-duplication Methods, Synthetic Merge Backup, Block Level Segment Support

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UPSTREAM/SOS to z/OS

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UPSTREAM/SOS to z/OS

- File level and database support to z/OS Storage Server
- Backup data travels across FICON & Metadata on TCP/IP
- Reduces z/OS and client CPU usage by TCP/IP
- Makes use of small communications disk in array (LBV)
- User data and LBV can be in different arrays
- Centralized z/OS Tape Management, Security and Scheduling
- Hot Database Support for DB2/UDB, ORACLE, IBM Notes, SQL Server, MS Exchange, etc.
- User interfaces – Director & EUR GUI's, ISPF
- Provides Data De-duplication Methods, Synthetic Merge Backup, Block Level Segment Support

UPSTREAM Reservoir
File Level Support of Open Systems

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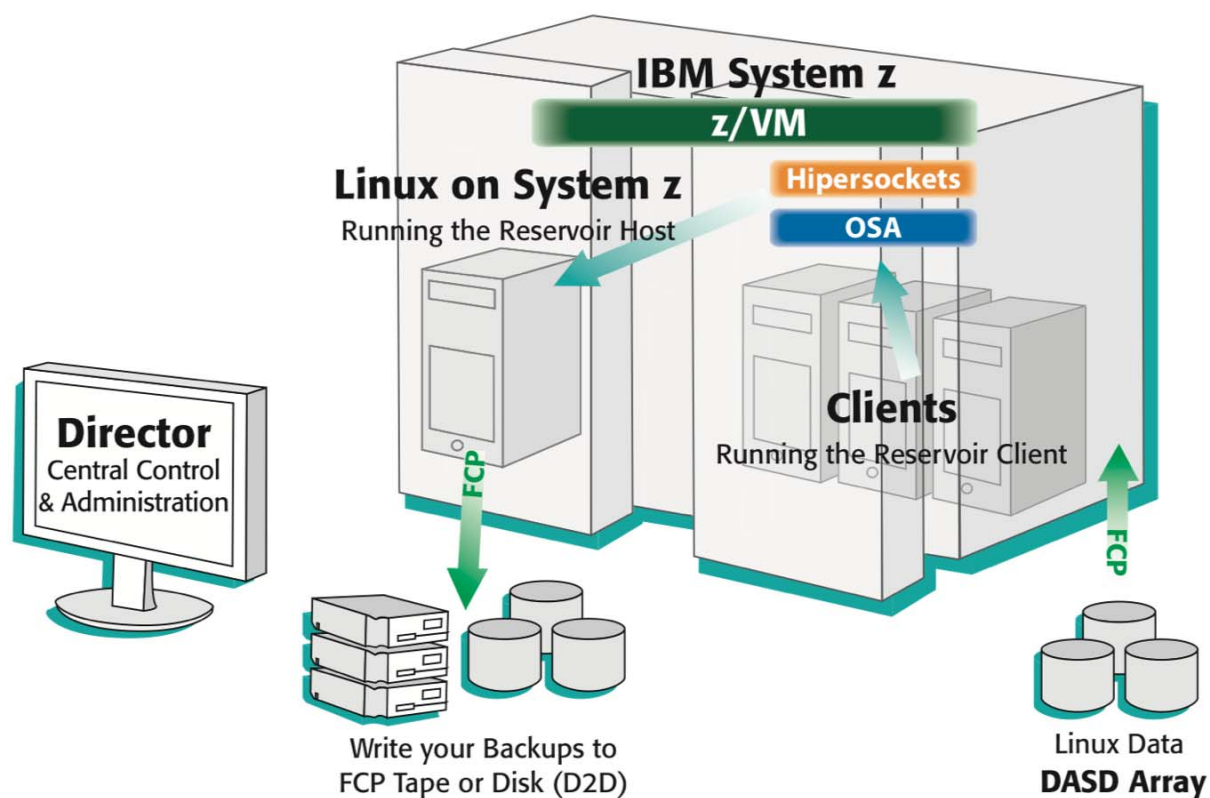
UPSTREAM Reservoir to Open Systems

- File level and database support to Open Systems storage Server
- Backup data travels across TCP/IP or FIBER channel (SAN EXPRESS)
- Hot Database Support for DB2/UDB, ORACLE, IBM Notes, SQL Server, MS Exchange, etc.
- Director & EUR GUI's User interface
- Provides Data De-duplication Methods that include Synthetic Merge Backup
- Source Side, Block Level De-duplication, Target Side File level de-duplication
- Supports backups to disk (D2D) or (D2D2T) or directly to tape

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Oracle RMAN
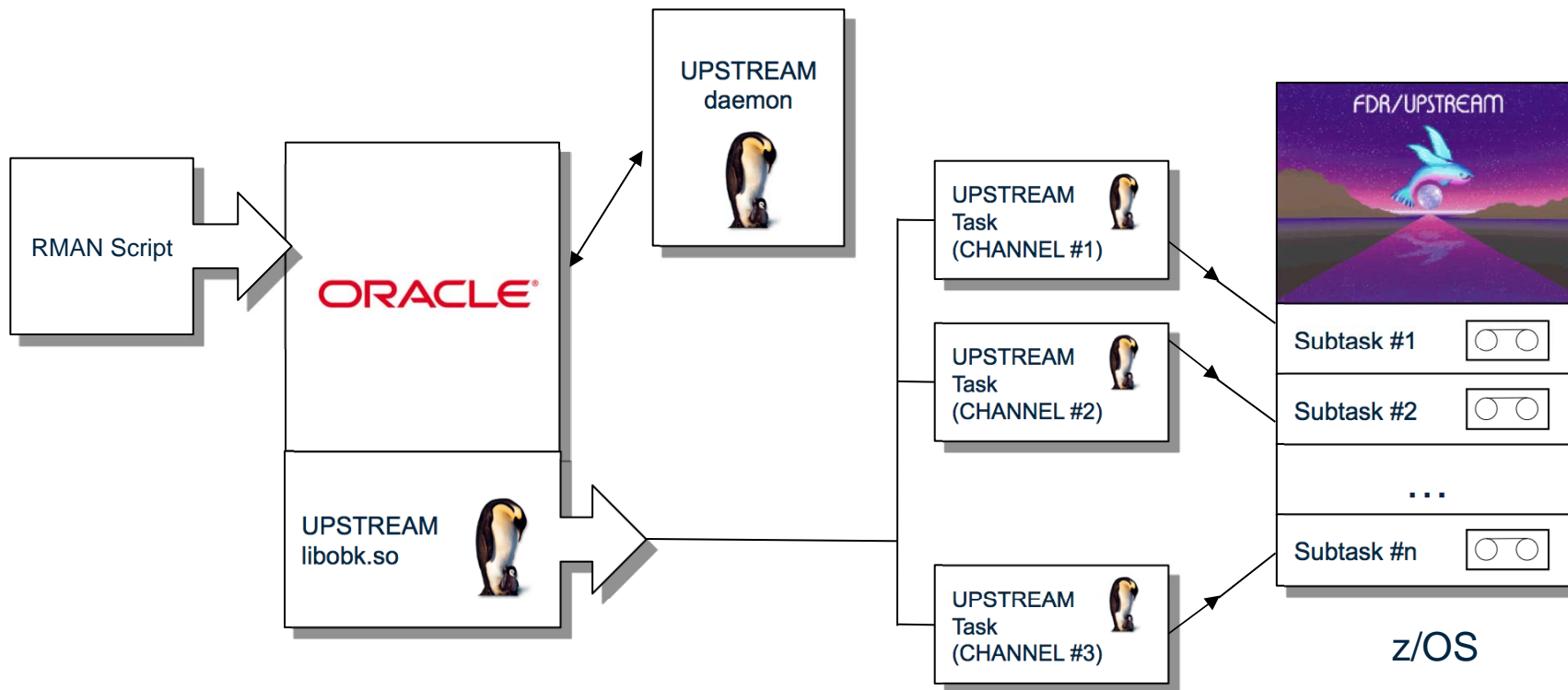
UPSTREAM Rescuer

- Single JOB step DR restore for Linux on System z virtual machines

- Virtual machine configuration detection utility executes with the backup

- Recovery is accomplished thru a Linux on System z proxy machine

- The RESCUER does the rest.

- Recovery example
  - 1.4GB virtual machine with 76,730 files recovered in 6 minutes
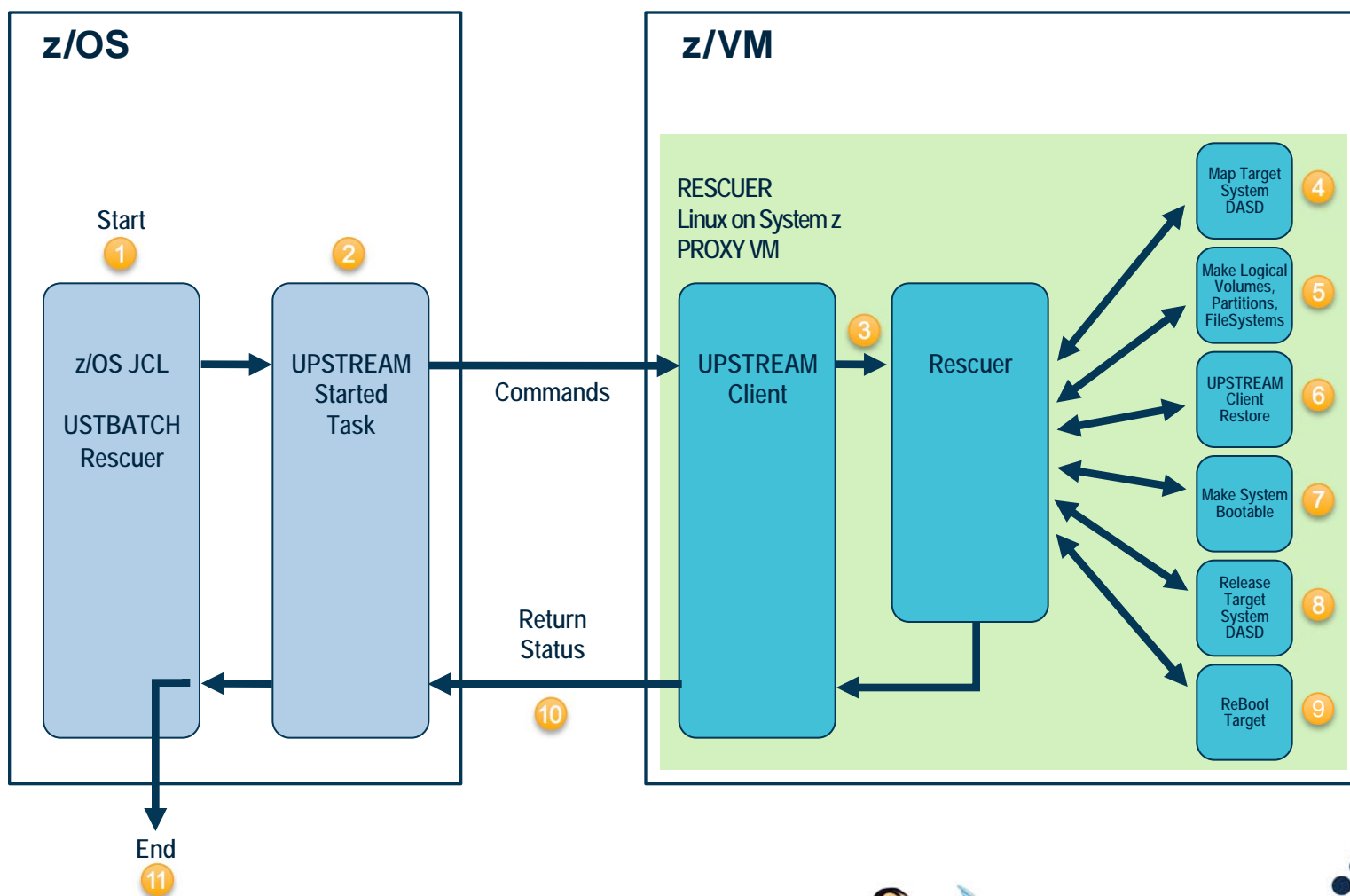
Backup View

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

Restore View

z/OS

z/VM

Start

1

2

z/OS JCL

USTBATCH
Rescuer

UPSTREAM
Started
Task

Commands

RESCUER
Linux on System z
PROXY VM

UPSTREAM
Client

3

Rescuer

Map Target
System
DASD **4**

Make Logical
Volumes,
Partitions,
FileSystems **5**

UPSTREAM
Client
Restore **6**

Make System
Bootable **7**

Release
Target
System
DASD **8**

ReBoot
Target **9**

Return
Status

10

End

11

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INNOVATION
DATA PROCESSING

UPSTREAM's Advanced Data Reduction Technologies

- UPSTREAM technologies to reduce backup time
  - Data Compression
    - 5 user selectable levels
  - Logical Volume Full Merge Backup
    - Target Side Data De-duplication
  - Segmented backup support
    - Source Side, Block Level De-duplication
  - Exclude/Include
  - Duplicate File support
    - Target side Data De-duplication
  - Migrate/deletion of inactive data

GREEN…
Performance Examples

FDR Performance	MB/Sec Calc
	176MB

FDRSOS Performance	MB/Sec Calc
	103MB

UPSTREAM TCP/IP HiperSockets Performance	MB/Sec Calc
	78MB

FDR/UPSTREAM 1GB Network Performance	MB/Sec Calc
	35.8MB

UPSTREAM/SOS Performance	MB/Sec Calc
	29.8MB

…MILEAGE MAY VARY

z/OS Data Protection for Open Systems Benefits Summary

- Extends investment in existing mainframe resources; CPU, ATL tape silos, VTL, tape drives and staff.

- Protects the customers software investment by utilizing existing tape library management software.

- Extends mainframe security to non-disruptive Open Systems data protection.

- Extends mainframe automated operations to non-disruptive Open Systems data protection.

- Backup and recovery for very large amounts of data without a negative performance impact on corporate networks.

- Hot backups for on-line Open Systems databases.

What's NEW for FDR/UPSTREAM

- UPSTREAM WEB PORTAL

- Windows Bare Metal Recovery

- UPSTREAM VMware Manager

- NDMP *support coming…finally*

What's NEW for FDR/UPSTREAM

- **Enhanced Windows Bare Metal Recovery**
- FDR/UPSTREAM now provides an enhanced Bare Metal Recovery for Windows Client Server 2008 and above. The process of the Bare Metal Recovery promotes automation, consistency and reliable operations to the server recovery process. The UPSTREAM Bare Metal Recovery allows for selective recovery of:
  - Full System
  - System State
  - Boot Drives only
  - Full System without Disk Configuration

What's NEW for FDR/UPSTREAM

- **Enhanced Windows Bare Metal Recovery**

- The enhanced Recovery eliminates the need of reinstalling the operating systems or manually

  Configuring hardware making server recovery simple and performed in a fraction of the time.

- Server recovery is as easy as…
  ① Boot from an ISO image or DVD or USB Drive
  ② That brings up UPSTREAM Bare Metal Recovery interface
  ③ Select the profile
  ④ Select the version to recover from
  ⑤ Start the restore

What's NEW for FDR/UPSTREAM

- **UPSTREAM WEB Portal** introduces new ways to manage some of the admin & operation of UPSTREAM clients.
- Provides detailed information about the installed inventory of UPSTREAM clients including version, Operating systems platform, etc.

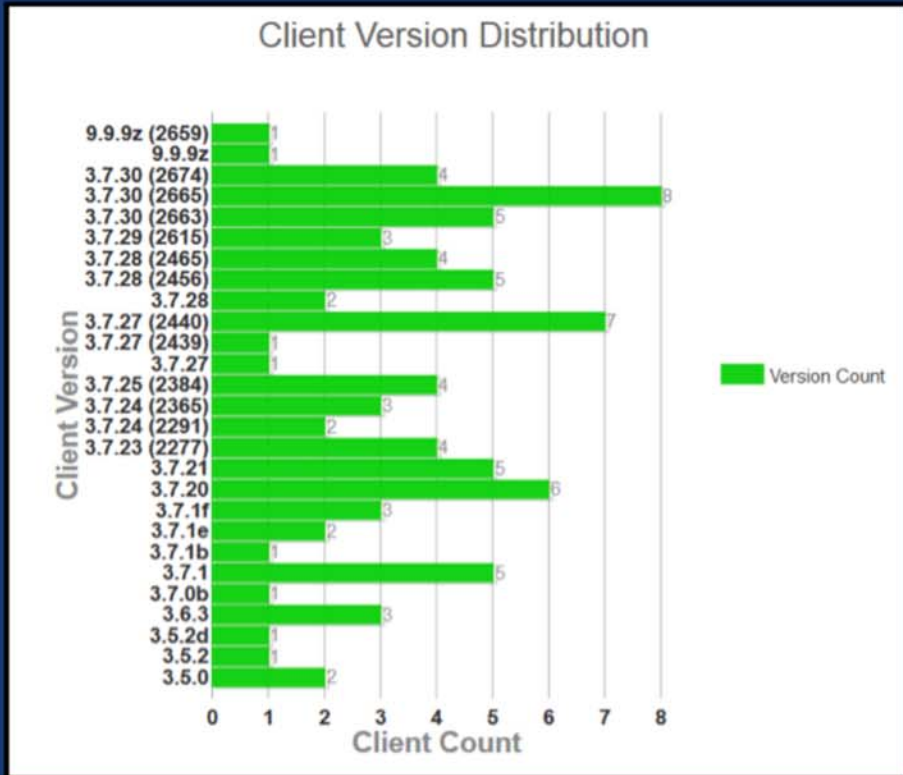|	
FDR / UPSTREAM Web Portal	Logoff
• Backup Host Repository(s) / Security	Maintain your list of host repository(s). Setup Storage Resource(s) for the host(s)
• Backup Storage Usage	View how much backup storage is in use by the entire system, each host or each client. View/delete the backup version(s) of each client
• Client List	Manage your list of all clients, add update additional information about each client. Build, view and manage your Client Groups and Client Filters. Update a Client's configuration, restart a Client. Initiate a Client backup and view its backup history
• Client Upgrade	Use this panel to upgrade you Upstream Client(s), show Client upgrade history
• Users	Create, update and delete Web Portal users. Assign to Admin Users and Restore Users their Client Group/Filters to give them access to those Clients
• Restore	Perform restore operations to a Client
• Restore Status / History	Displays the status of a Restore operation, show/manage the history of Client restore(s)
• Storage Policies	Setup the backup Storage policies
• System	Displays various system information, shutdown Web Portal

What's NEW for FDR/UPSTREAM
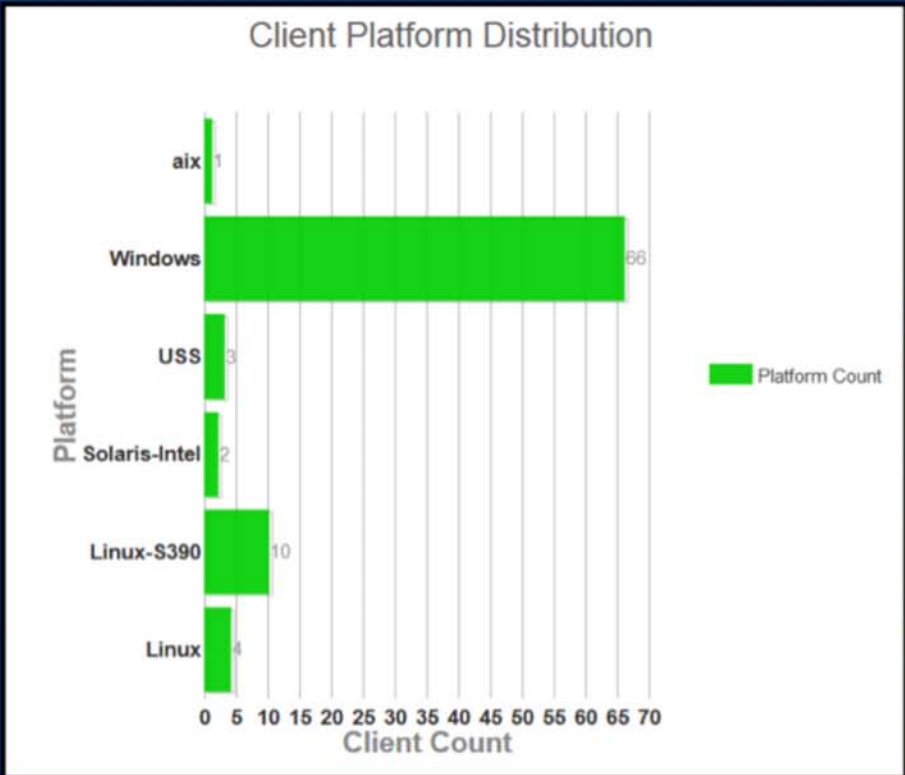# Centralized Controlled of Client upgrades

What's NEW for FDR/UPSTREAM

- Other UPSTREAM WEB PORTAL Functions
- Edit Client Configurations
- Data Protected Storage Reporting
  - TB protected, # of Files, # of Tapes
- Administrative Roles Assigned
- Restores for Non Admin personnel
- Simple and Improved Restores
- System Administrator Information

Thank You

Summary

- INNOVATION Data Processing leverages the latest technological innovations to virtualize, simplify and green all of its enterprise business resiliency solutions.

- INNOVATION Data Processing is a single source for enterprise business resiliency solutions addressing z/OS, Linux on System z, Linux on Power, Linux on x86, Novell NetWare/OES2, UNIX, Windows, Client/Server, SAN and direct attach storage providing:

  – High Performance Data Protection

  – Enterprise Data Protection

  – Non-Disruptive Business Continuance

  – Privacy Information Protection