

# Linux on zSeries: Backing Up Your Data

WAVV 2004  
Chattanooga, TN  
May 2004

Edward Salvati  
Computer Associates International, Inc.

# Abstract

---

With the move toward "data clumping", some clients are moving their UNIX applications to Linux on the zSeries and S390 for reliability, scalability and performance. This session explains how you can backup that data using BrightStor backup solutions and track tapes through the BrightStor VM and OS/390 tape management solutions.

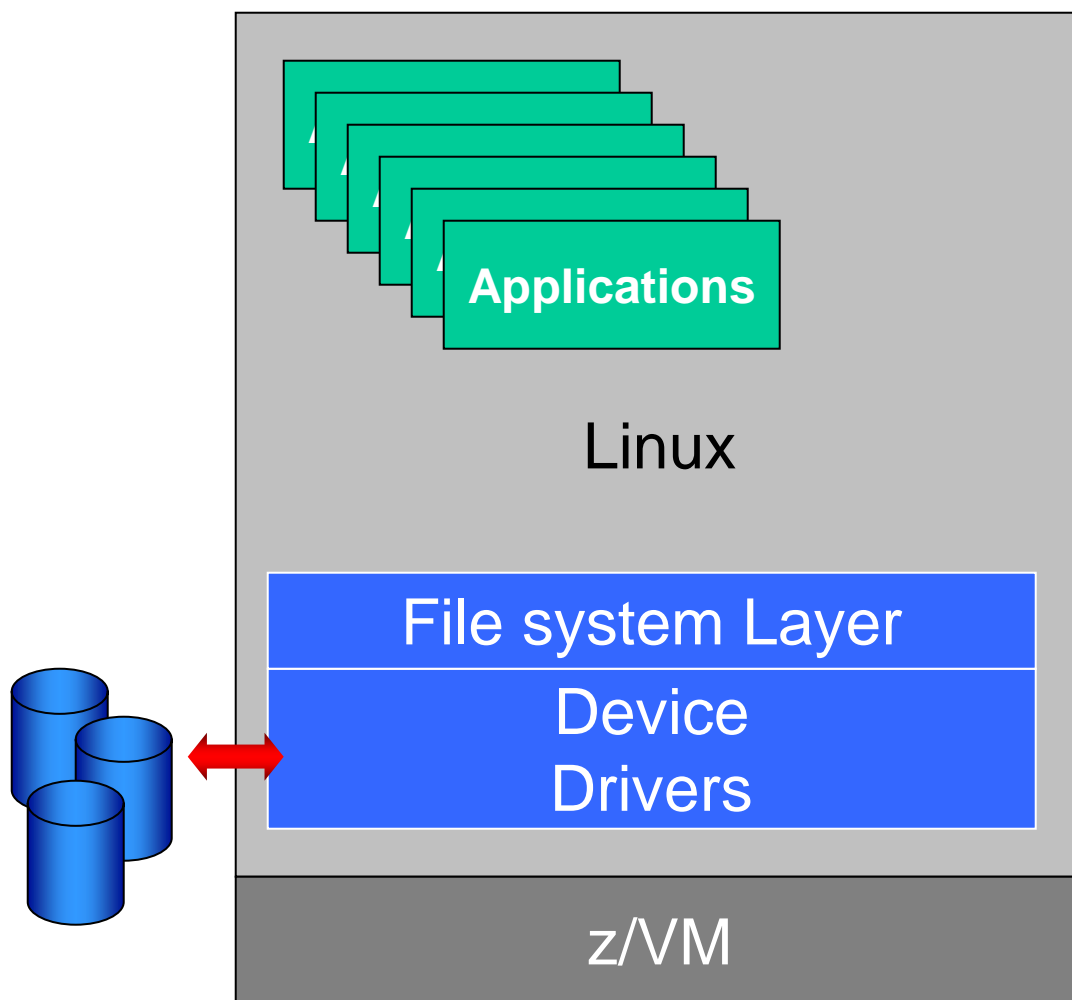


# Agenda

---

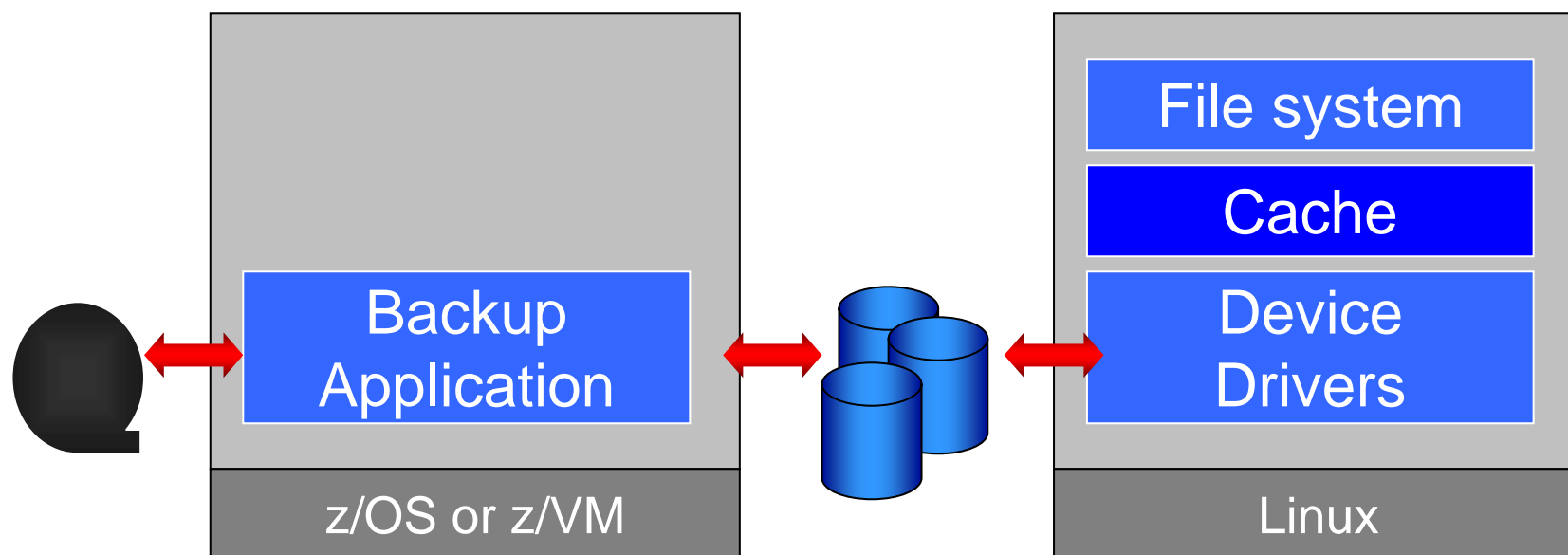
- ❑ Storage management challenges unique to Linux for the zSeries
- ❑ Brightstor solutions for Linux for the zSeries
- ❑ Options for managing physical tapes
- ❑ Summary

# Architectural Challenges



- Unique scale
  - Number of devices
  - Number of systems
- Device support
  - SCSI tape?
  - Mainframe tape
  - Robotic Devices
- Sharing and coexistence issues
  - z/OS tape management?
  - z/VM tape management?
  - Tape drive sharing?
- Supports IFL engines, Standalone LPAR, or zVM?

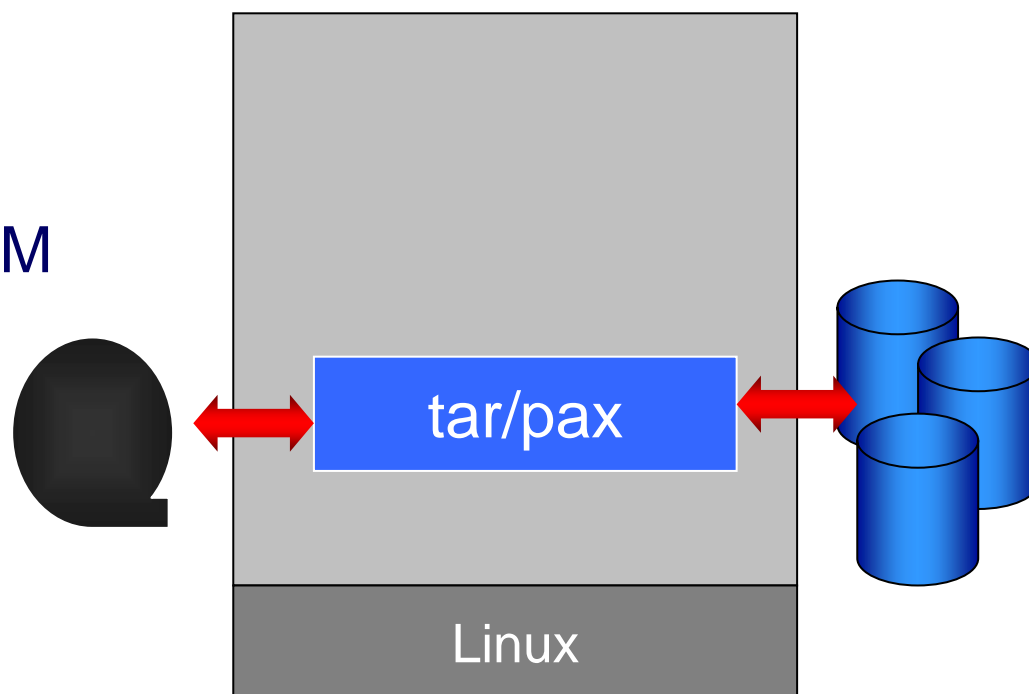
# Architectural Challenges



- Problem 1: Linux caches changed file system pages so they can't be backed up safely from outside Linux
- Problem 2: z/OS and z/VM do not understand Linux file systems at a file level – backups and restores are at volume level

# Architectural Challenges

- Weak S390 tape device support provided with Linux
- No integration with BrightStor z/OS or z/VM tape management
  - CA-1
  - CA-Vtape
  - CA-Dynam/TLMS
  - CA-VM:Tape
  - CA-Dynam/T for VM
- Not scalable to large numbers of Linux system images





# BrightStor Enterprise Backup

---

- Enterprise backup and recovery tool
- Full and incremental backups
- Full server and selective file/directory restore
- Manager-agent architecture
- Administrative functions
  - GUI administrative interface
  - Catalog and tape management

# BrightStor Enterprise Backup

BrightStor Enterprise Backup Home Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://138.42.32.10:6060/>

## BrightStor Enterprise Backup

### NEWS & SUPPORT







[BrightStor EB Home Page](#)  
Find out more about this premier data protection solution.

[Technical Support](#)  
Visit eSupport page on CA's web site to get help with your problems.

[eNews](#)  
Link to the archived E-News page on CA web site.

[Certified Device List](#)  
List of devices supported by BrightStor EB.

### Quick Start


-  **Backup Manager**  
Configure and submit backup jobs.
-  **Device Manager**  
Manage your storage devices.
-  **Job Status**  
Monitor the jobs and check the logs.
-  **Restore Manager**  
Perform complete data recovery.
-  **Database Manager**  
Manage the database records.
-  **Report Manager**  
Get reports based on BrightStor EB Database.
-  **Media Pool Manager**  
Create media pools for your media backups.

### What's New

**Performance - Backup and Restore Throughput**

This release of BrightStor EB incorporates sophisticated algorithms to enhance the performance of backup and restore. High Performance will be seen in both FileSystem and Database Agent backups.

[More news >>](#)

 Computer Associates

Copyright © 1990 - 2001 Computer Associates International, Inc. All rights reserved.

LOG ON

Domain Name: dc9ux06dom

User Name:

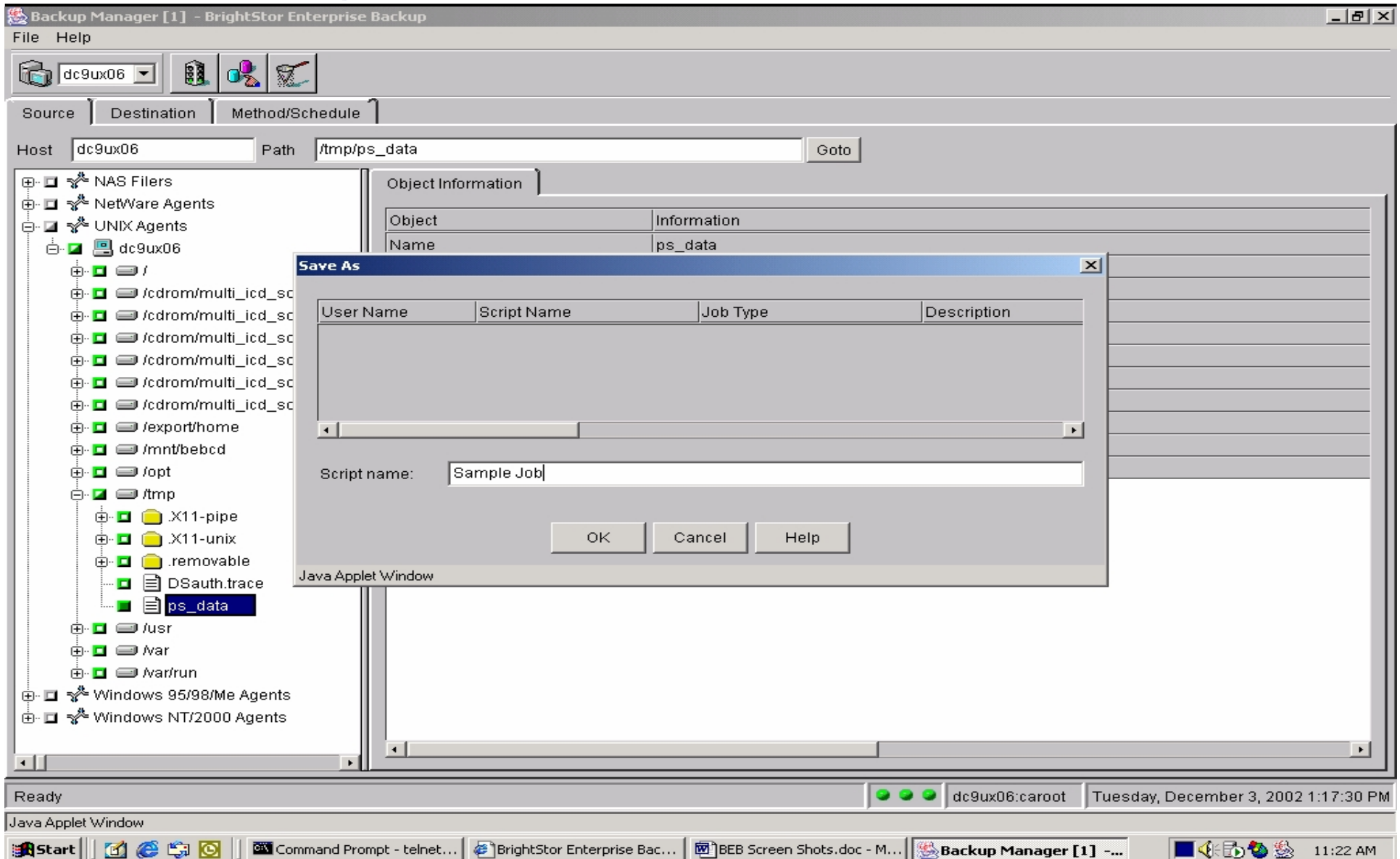
Default Host:

Local intranet

Start | Command Prompt - ... | BrightStor Enterp... | Computer Associat... | http://support.ca.c... | Document1 - Micros... | 7:10 AM



# Defining Backup Source



The screenshot shows the Backup Manager [1] - BrightStor Enterprise Backup interface. The main window displays a tree view of the file system for host 'dc9ux06', with the path '/tmp/ps\_data' selected. A 'Save As' dialog box is open, allowing the user to define a new backup source. The dialog box contains a table with columns for 'User Name', 'Script Name', 'Job Type', and 'Description'. The 'Script name' field is filled with 'Sample Job'. The dialog box also includes 'OK', 'Cancel', and 'Help' buttons.

Backup Manager [1] - BrightStor Enterprise Backup

File Help

dc9ux06

Source Destination Method/Schedule

Host: dc9ux06 Path: /tmp/ps\_data Goto

Object Information

Object	Information
Name	ps_data

Save As

User Name	Script Name	Job Type	Description

Script name: Sample Job

OK Cancel Help

Java Applet Window

Ready

dc9ux06:caroot Tuesday, December 3, 2002 1:17:30 PM

Java Applet Window

Start Command Prompt - telnet... BrightStor Enterprise Bac... BEB Screen Shots.doc - M... Backup Manager [1] - ... 11:22 AM

# Job Status Monitoring

Job Status Manager [1] - BrightStor Enterprise Backup

File Job Status Help

dc9ux06

BrightStor EB Server

Server

- dc9ux06
- dc9ux06

Time

12/03/2002
12/03/2002
12/03/2002
12/03/2002
12/03/2002
12/03/2002
12/03/2002
12/03/2002
12/03/2002

Job Monitor (Server: dc9ux06 Job ID: 2)

Job Type: Backup

Status: Active Phase: Backup

Source

dc9ux06 (IP: 192.168.9.10)

Path Size (Bytes) 5,176

/tmp

Filename ps\_data

Destination

06/26/02 10:51 AM [id: 6011, seq: 1, session: 3]

Totals

20%

Total Files	MB Processed	Elapsed Time
1	0.00	9s
MB/Minute	MB Estimated	Remaining Time
0.00	0.00	N/A

Activity Log Message

Backup /tmp to 06/26/02 10:51 AM (ID 6011) session 3 sequence 1

Start traversing dir /tmp/ (level=1)

Total Messages: 8

Activity Log

Last Result	Job Description
Completed	Sample 1
	Sample 2

Job running

dc9ux06:caroot Tuesday, December 3, 2002 1:34:46 PM

Java Applet Window

Start Command P... BrightStor E... BEB Screen ... Backup Man... Job Status ... Device Man... Job Monit...

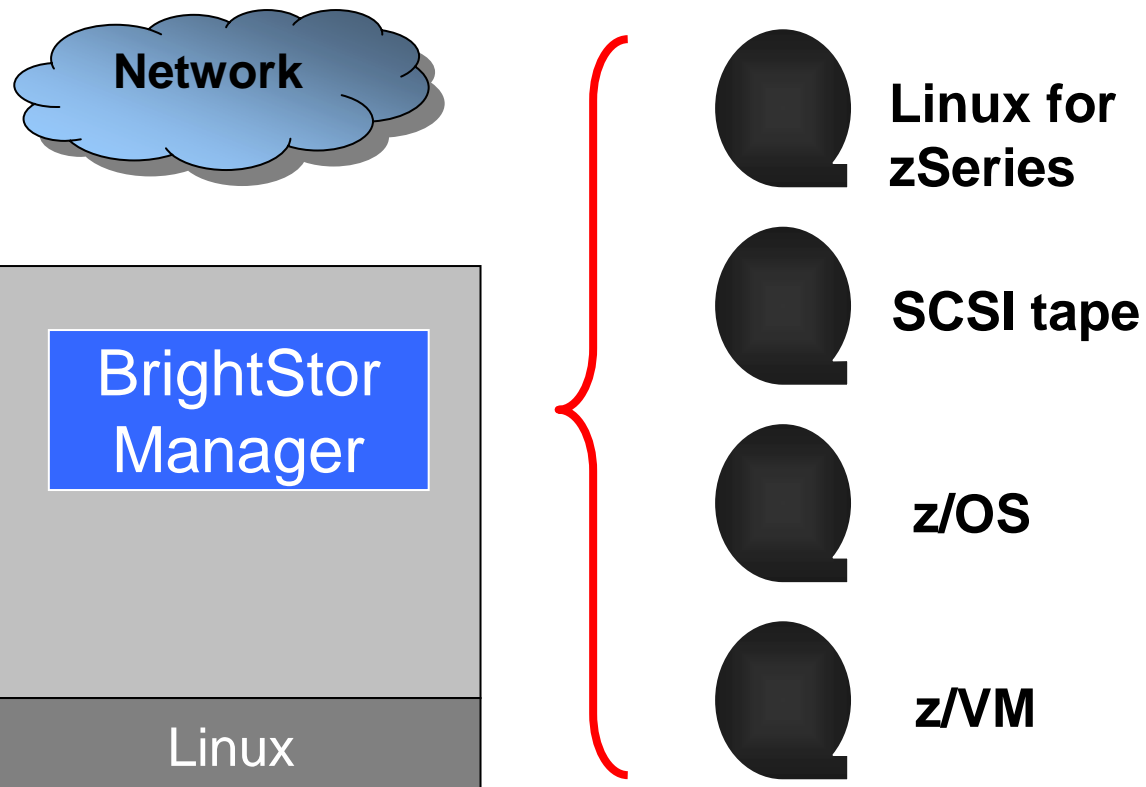
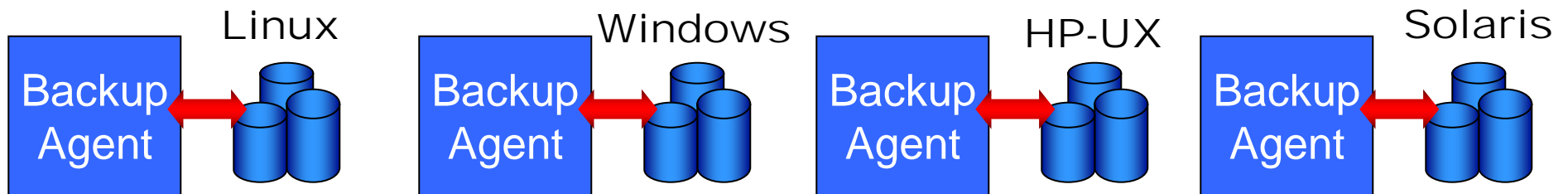
11:40 AM

# Enterprise Backup Agents

---

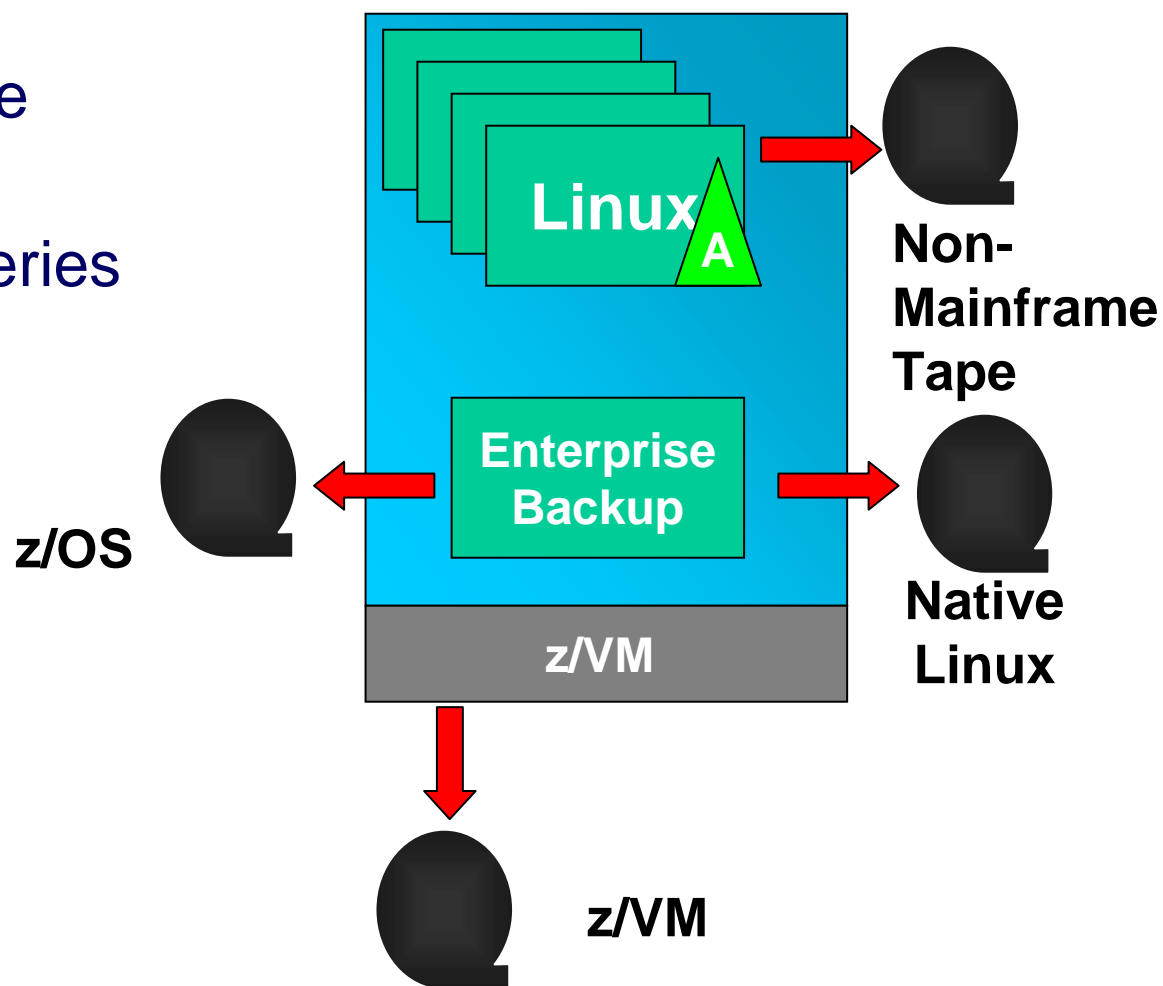
- Runs on each Linux instance
  - Small footprint
  - Scalable
  - Only component needed on most systems
  - Build into base Linux images
- Connects to BrightStor manager on any platform
  - Linux (Intel or zSeries)
  - Windows
  - Unix
- Performs physical filesystem operations
  - Backup, restore, file attribute, etc.

# Brightstor Enterprise Backup



# Physical Tape Options

- Non-mainframe tape systems
- Native Linux for zSeries
- z/OS media server
- z/VM integration

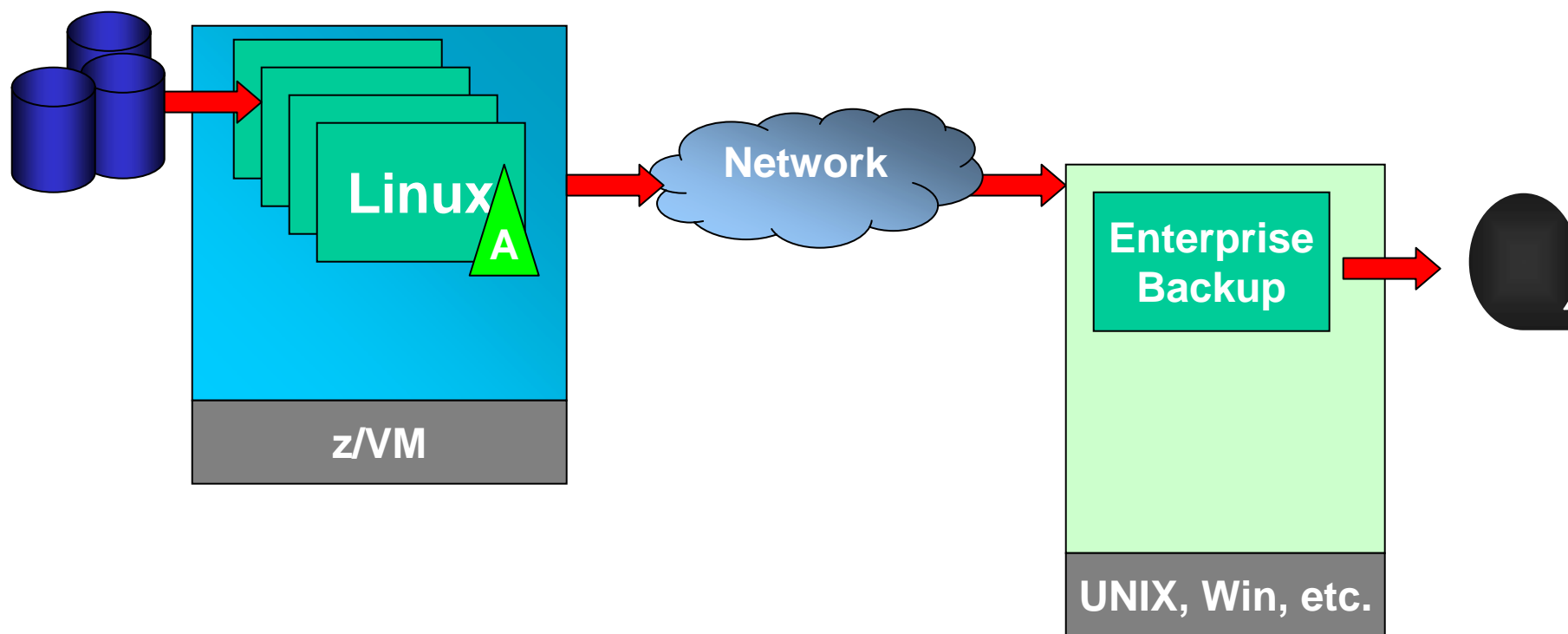


# Non-Mainframe Tape

---

- Linux for zSeries: Agent-only
- Backup to remote BrightStor Enterprise Backup manager on NT or Unix platforms
- Useful for
  - Existing clients
  - Resource constrained S/390 sites
  - Inexpensive remote backup solution for disaster recovery
  - Sites with tape hardware investments on non-mainframe platforms

# Non-Mainframe Tape



Mainframe Linux agents, backed up by BrightStor Enterprise Backup (BEB) manager on another platform.

# Native Linux zSeries Tape

---

- Stand-alone Linux for zSeries solution
  - No other platforms required
  - Supports running
    - Standalone
    - Single server in an LPAR
    - Multiple servers under z/VM
    - Standard or IFL engines,
  - Dedicated tape device(s)
  - VM attached or LPAR definitions
- Requires CA supplied tape device driver
  - High performance, low-level I/O
  - Permits fine-grained control of tape device

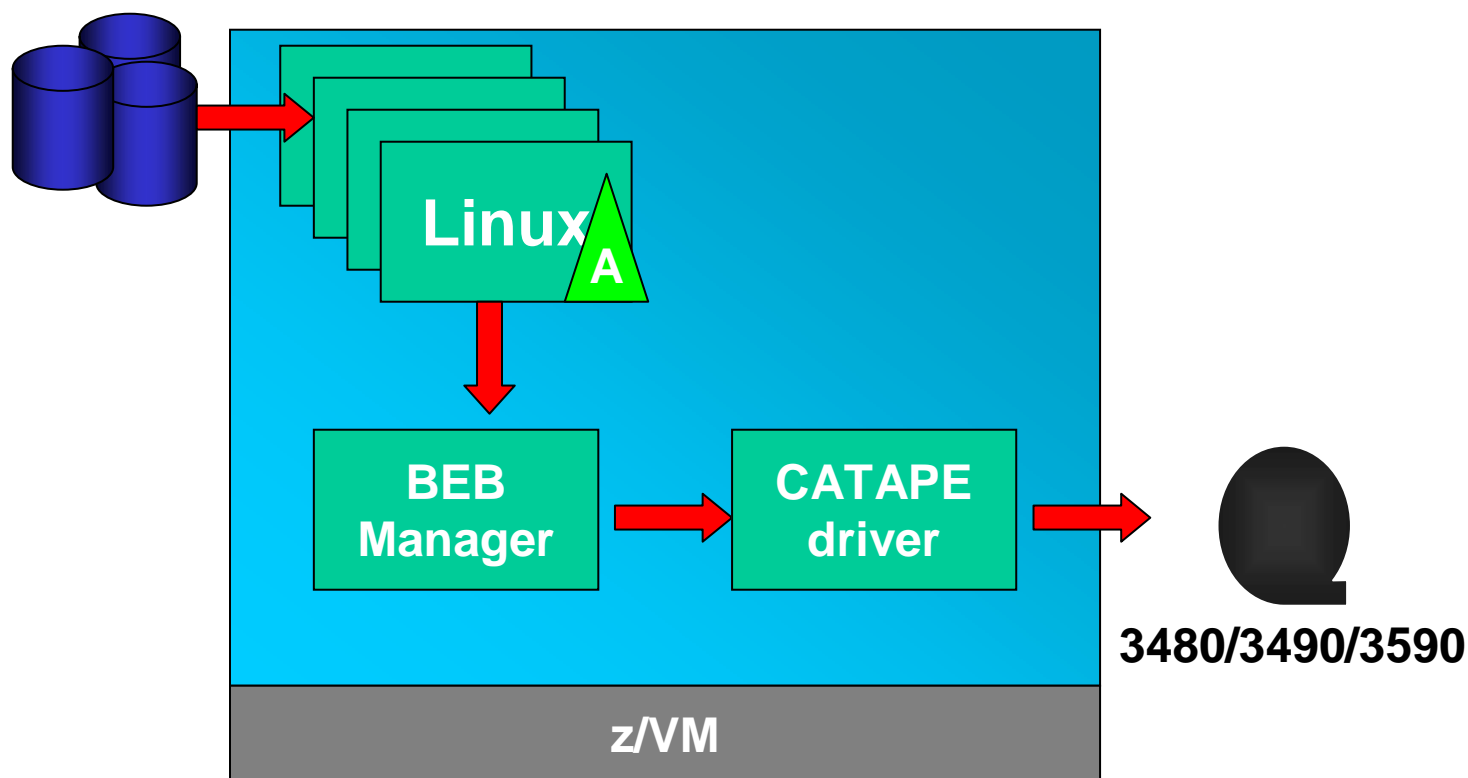


# Native Linux Tape

---

- CA supplied tape device driver
  - ESCON/FICON 3480, 3490, 3590 devices
  - Compatible with devices from other vendors.
  - `/dev/catape/*` device files
- Tapes written in native BrightStor format
  - Compatible with other platforms
- High performance, efficient tape I/O

# Native Linux zSeries Tape



# Native Linux Tape

---

- “tapedevinit” utility
  - Installs driver (dynamically)
  - Specify device address range
  - Creates /dev/catape/\* files
- /dev/catape/\* files
  - Can be used to read/write tapes under Linux
  - Not limited to BrightStor
  - ioctl() interface for low-level functions (rewind, WTM, positioning, etc.)

# Native Linux Tape

---

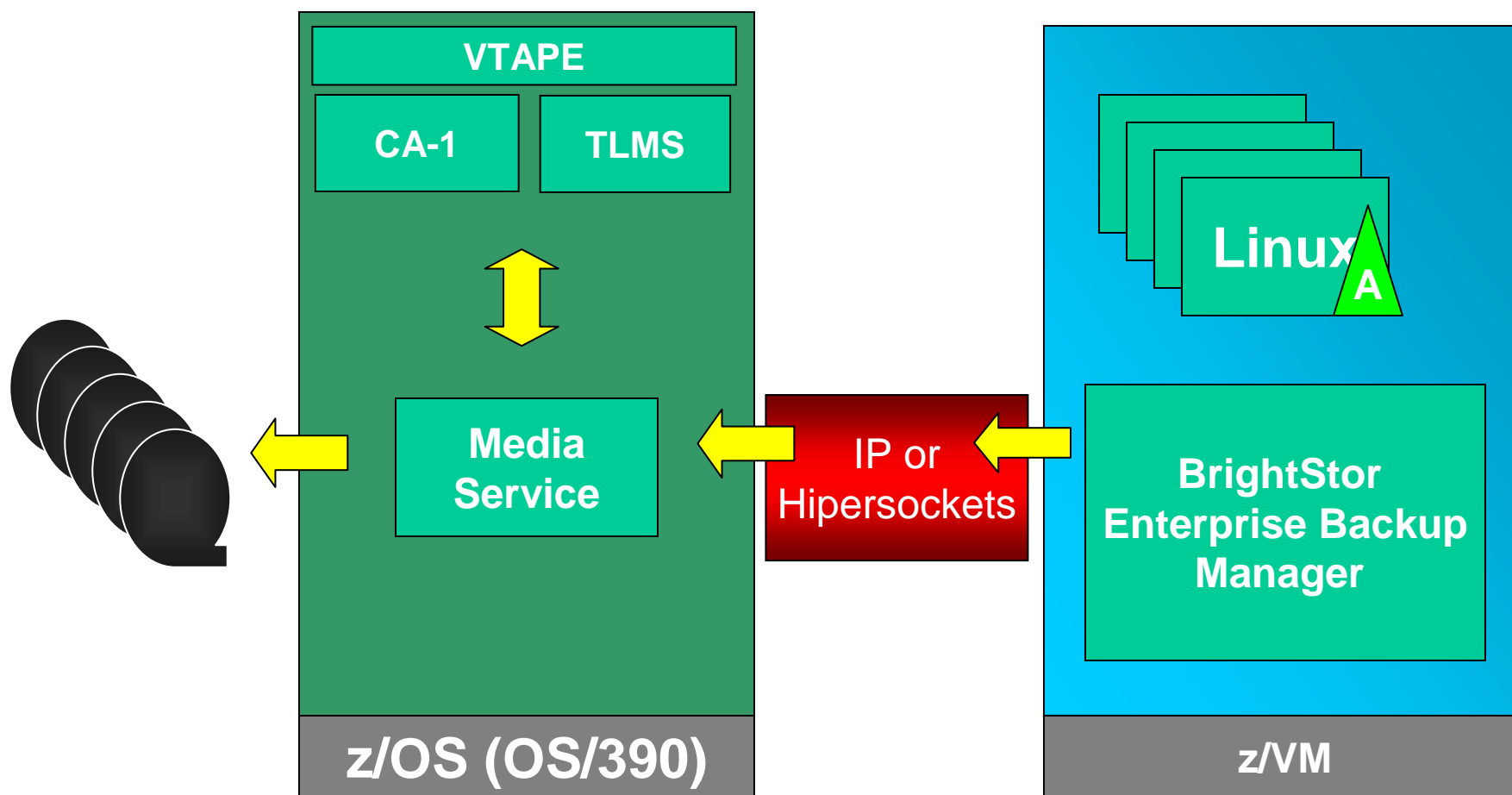
- Tapes managed by BrightStor
  - Retention, scratching, etc.
- “Unlabeled” tapes from z/OS or z/VM perspective
  - Any existing tape labels are overwritten
- Devices can safely be shared with z/OS or z/VM
  - Single-system ASSIGN
- Large blocksizes (minimum 64K)

# z/OS Media Server

---

- Works in conjunction with Enterprise Backup to enable physical tape processing on z/OS or OS/390.
- IP-based connection
  - Ideal Hipersocket candidate
- Standard format z/OS tapes
  - Standard label, multi-volume datasets
- Built-in feature available at no additional charge

# z/OS Media Server



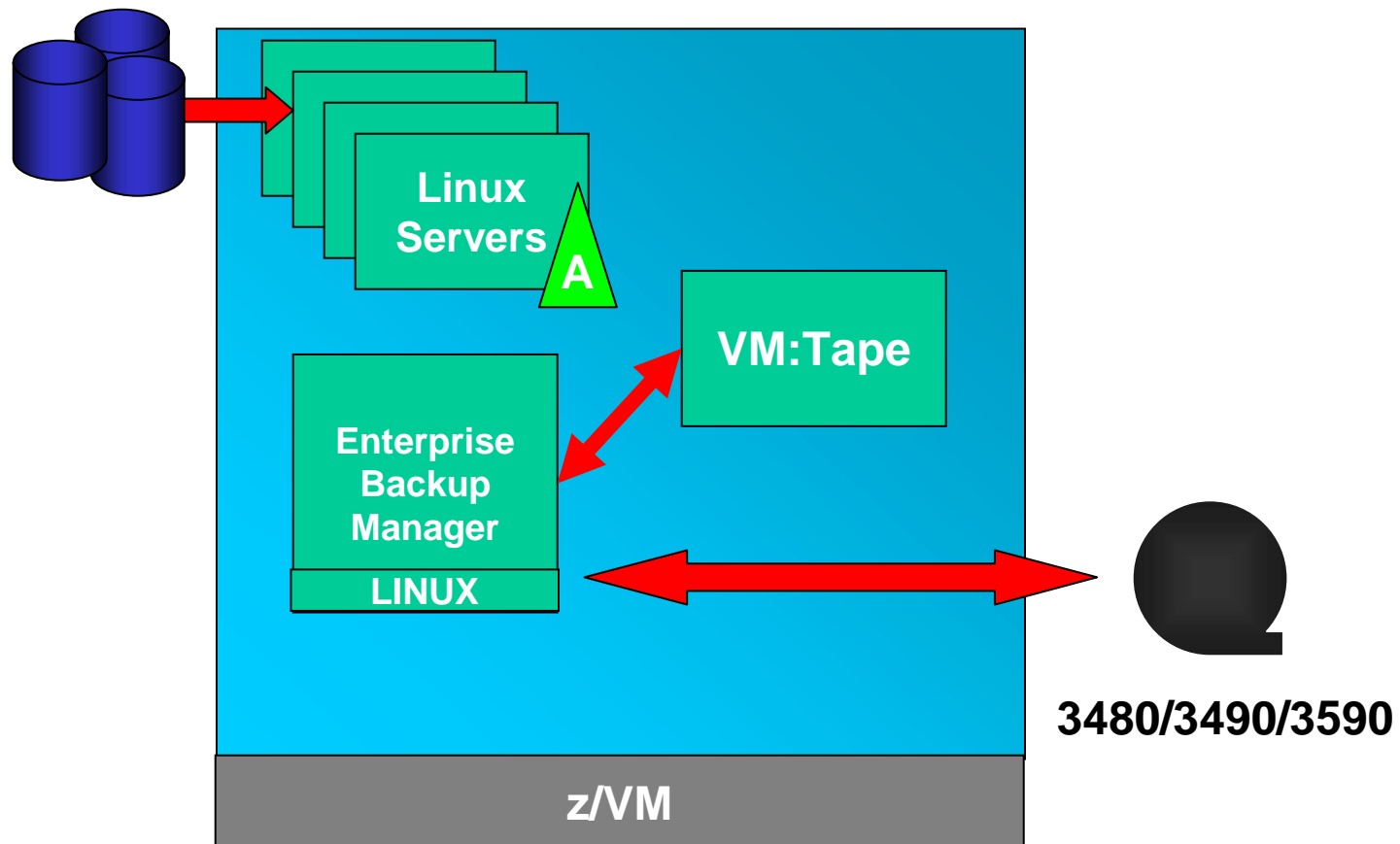


# z/VM Integration

---

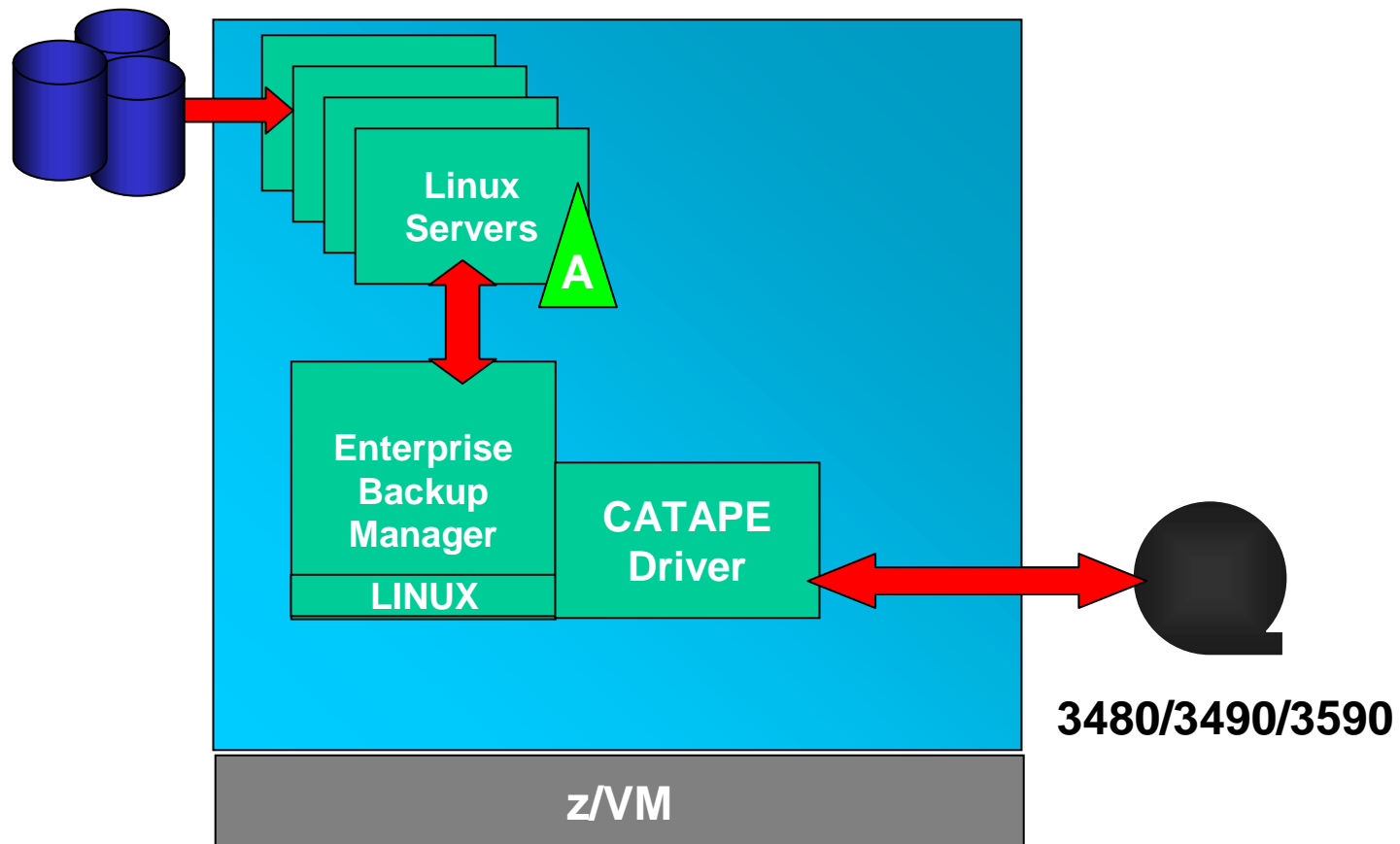
- Similar to native Linux solution, but integrated with VM tape processing
- Customizable scripts at key points
  - Attach/Detach tape device
  - Open/Close/EOV tape volume (mount)
  - Scratch expired tape
  - Tape label processing

# z/VM Integration

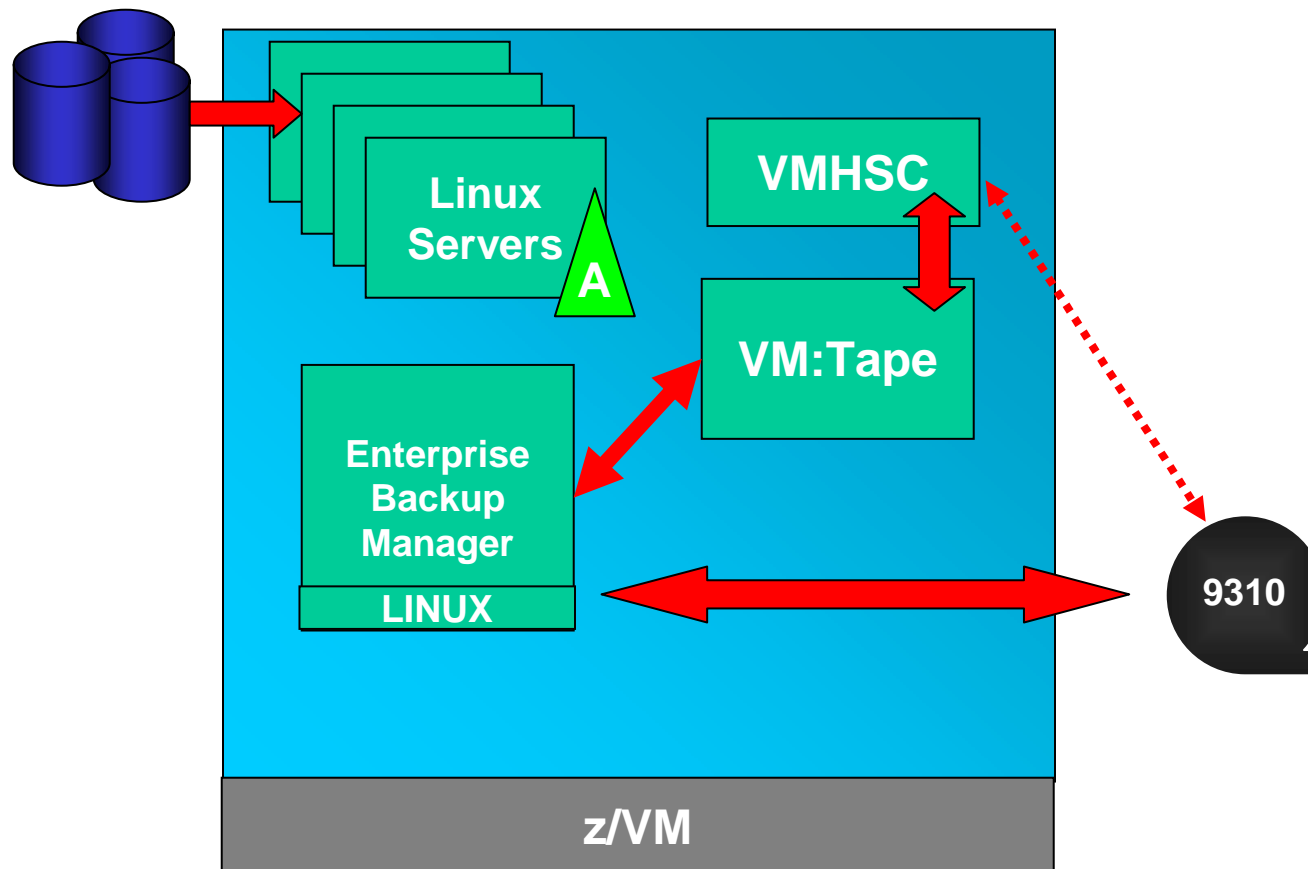




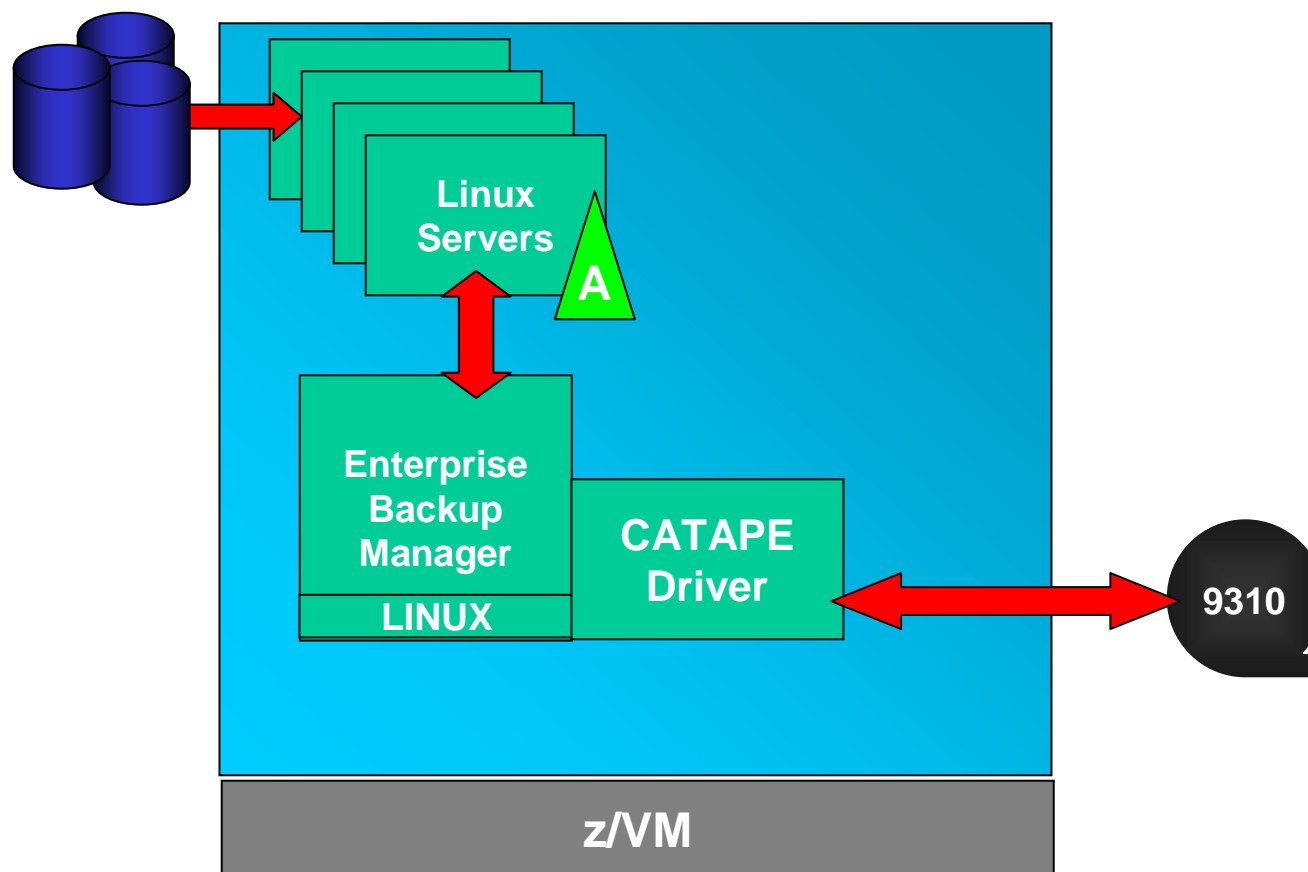
# z/VM Integration



# z/VM Integration with HSC

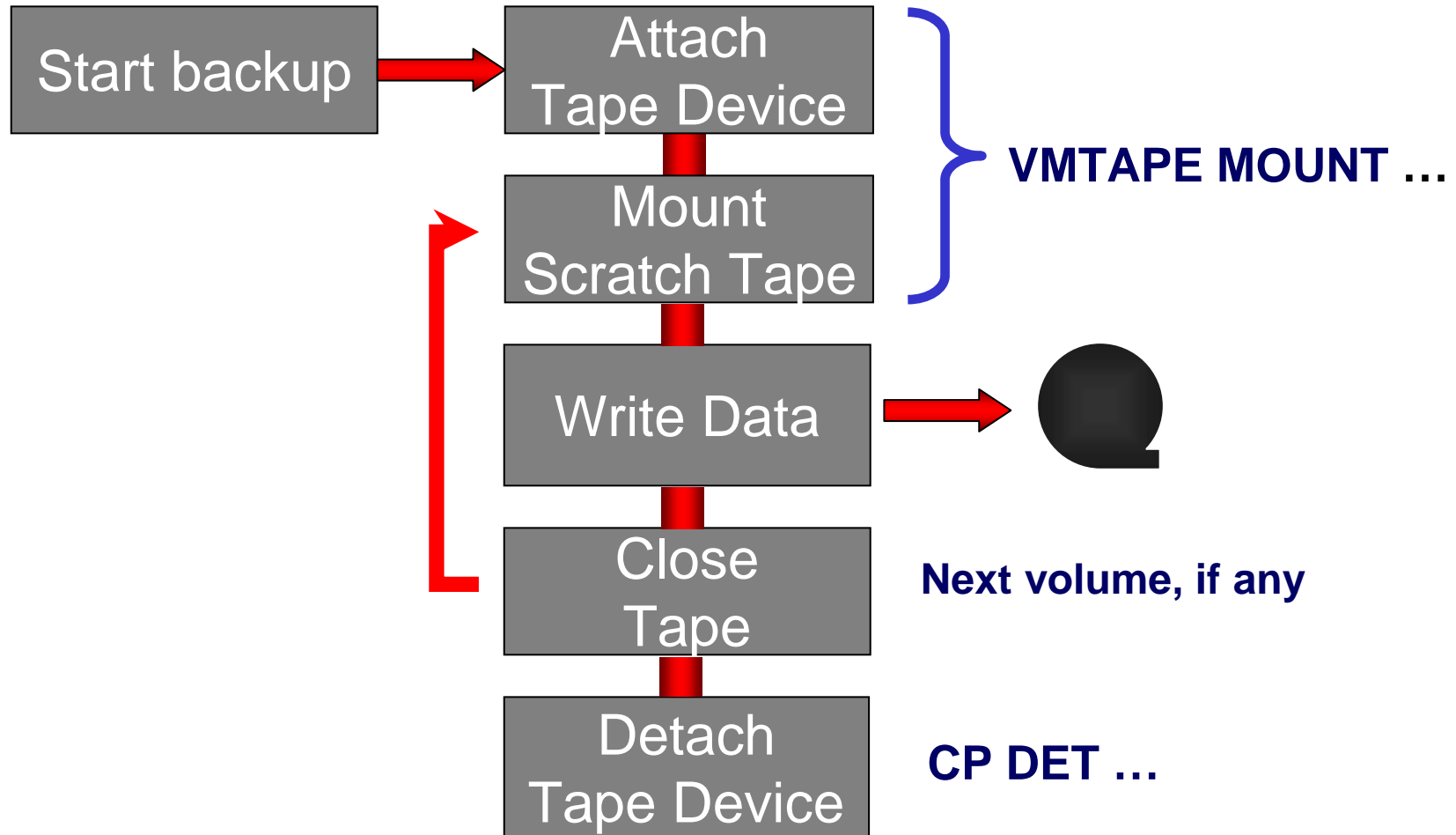


# z/VM Integration with HSC





# z/VM Integration



# Z/VM Integration

---

- Retains high performance of native Linux solution
  - I/O still managed by device driver
  - No IP transfer for 'local' agents
- Integrates with
  - Brightstor CA-VM:Tape
  - Brightstor Dynam/T for VM
  - Other VM tape management products
- Reduces need for dedicated resources on Linux images
- Support for VM-managed tape libraries and other hardware

# Summary

---

- Storage management challenges unique to Linux for the zSeries
- BrightStor solutions for Linux zSeries
  - Interface with existing BEB manager on distributed platform
  - Enterprise Backup manager on Linux Intel
  - Enterprise Backup manager on Linux zSeries
- Options for managing physical tapes
  - Native Linux tape management
  - z/OS media server
  - z/VM integration





# Questions

---

? ? ? ? ?





# Contact Information

---

**Edward Salvati**  
**Senior Consultant**  
**Technology Services**  
**Computer Associates International, Inc.**

**e-Mail:**

**[edward.salvati@ca.com](mailto:edward.salvati@ca.com)**

**Office Phone:**

**480-657-4253**

**Cell Phone:**

**602-770-7315**



# Linux on zSeries: Backing Up Your Data

WAVV 2004  
Chattanooga, TN  
May 2004

Edward Salvati  
Computer Associates International, Inc.