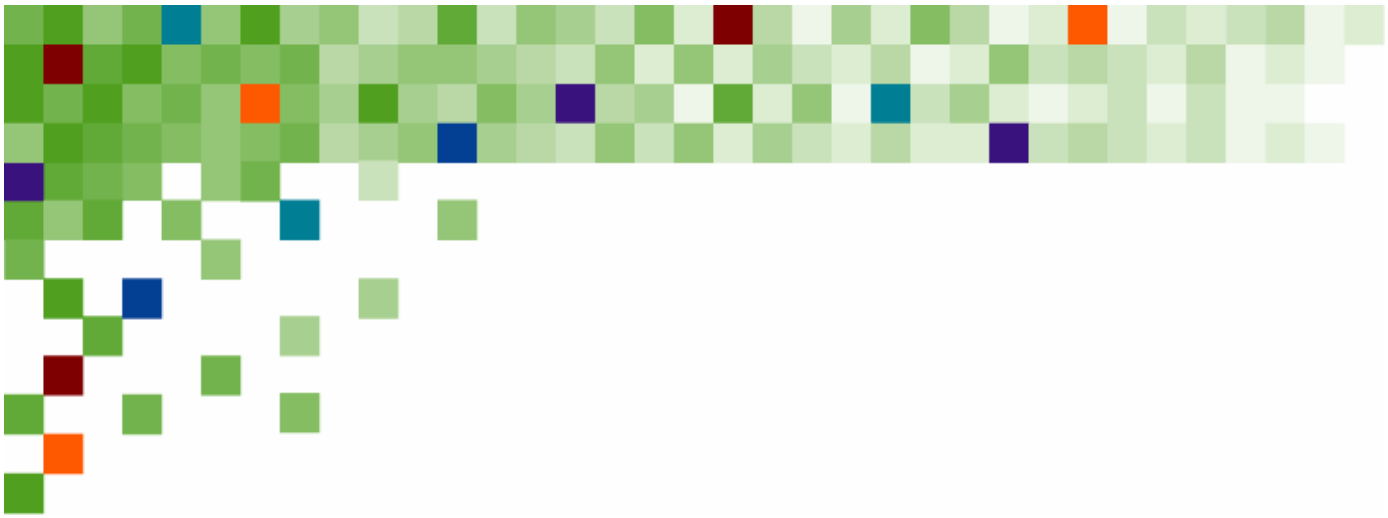

Linux on zSeries: Backing Up Your Data

WAVV 2004
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Edward Salvati
Computer Associates International, Inc.

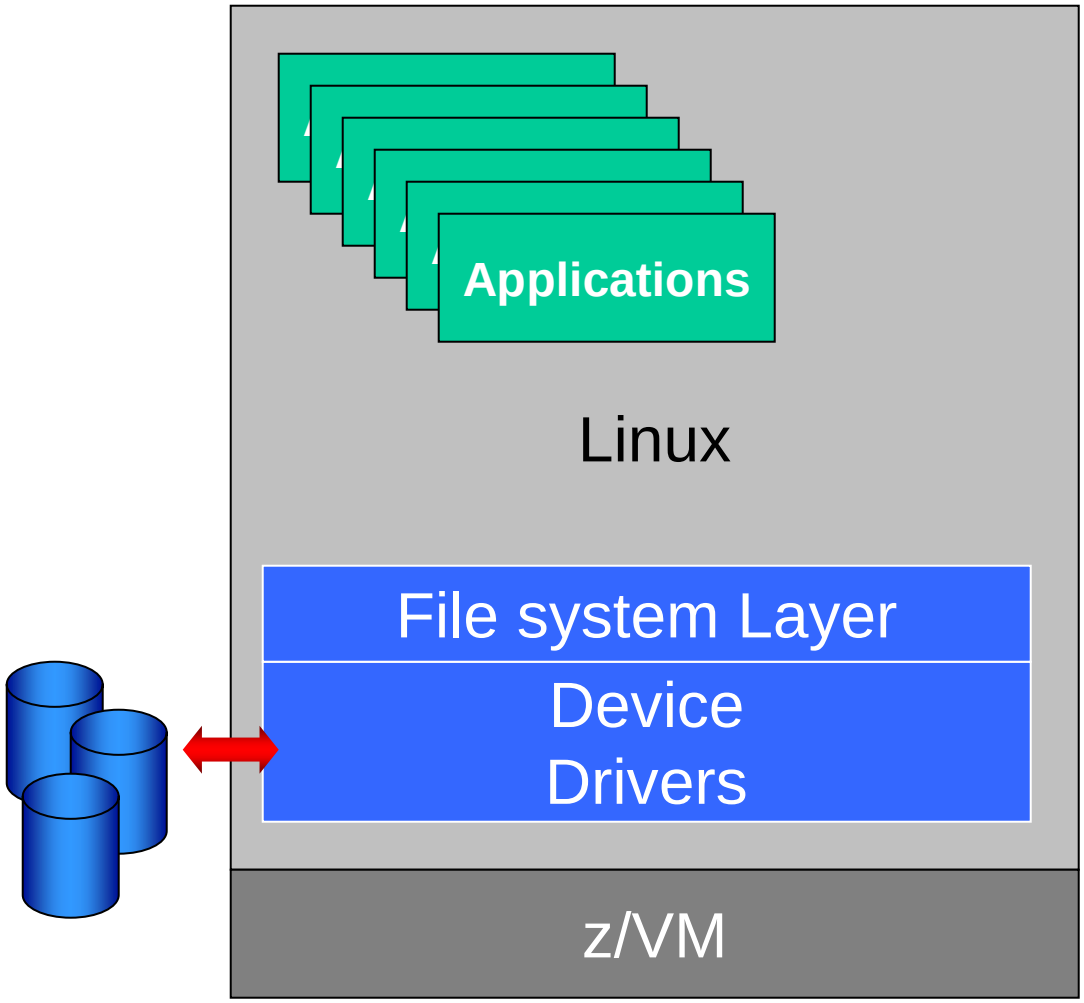
Abstract

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

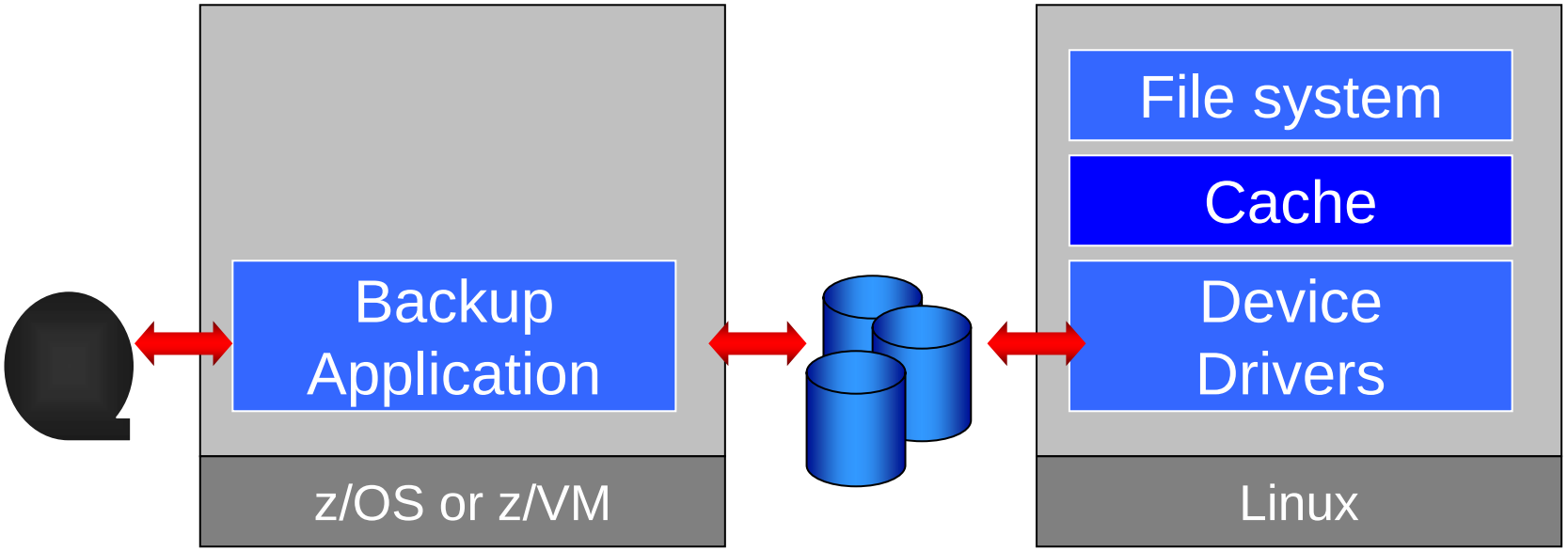
- Storage management challenges unique to Linux for the zSeries
- Brightstor solutions for Linux for the zSeries
- Options for managing physical tapes
- Summary

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?

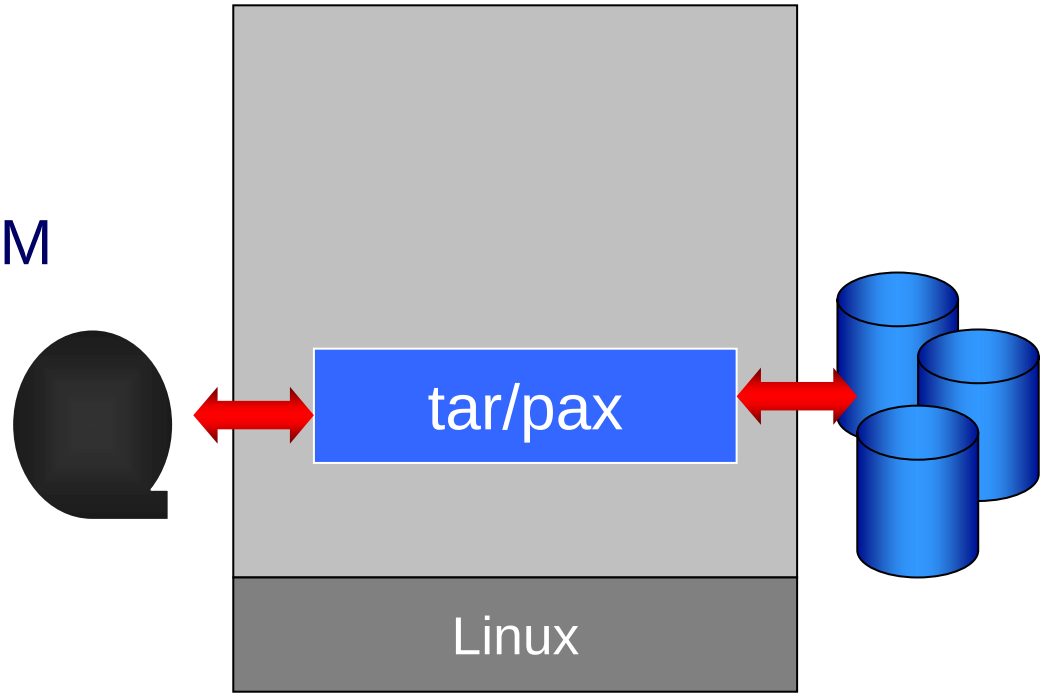
Architectural Challenges



- 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

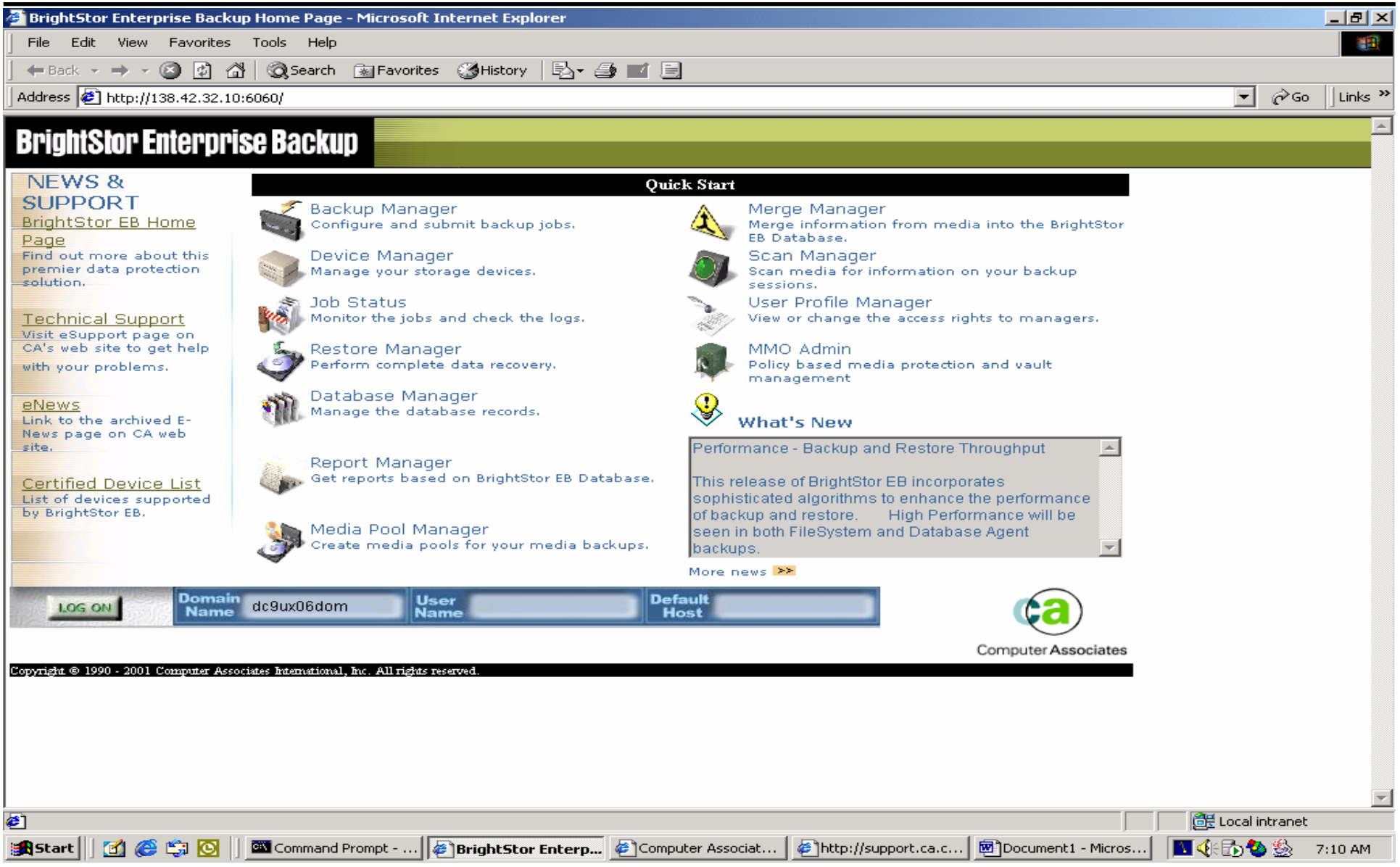
- Weak S390 tape device support provided with Linux
- No integration with BrightStor z/OS or z/VM tape management
  - CA-1
  - CA-Vtape
  - CA-Dynam/TLMS
  - CA-VM:Tape
  - CA-Dynam/T for VM
- Not scalable to large numbers of Linux system images



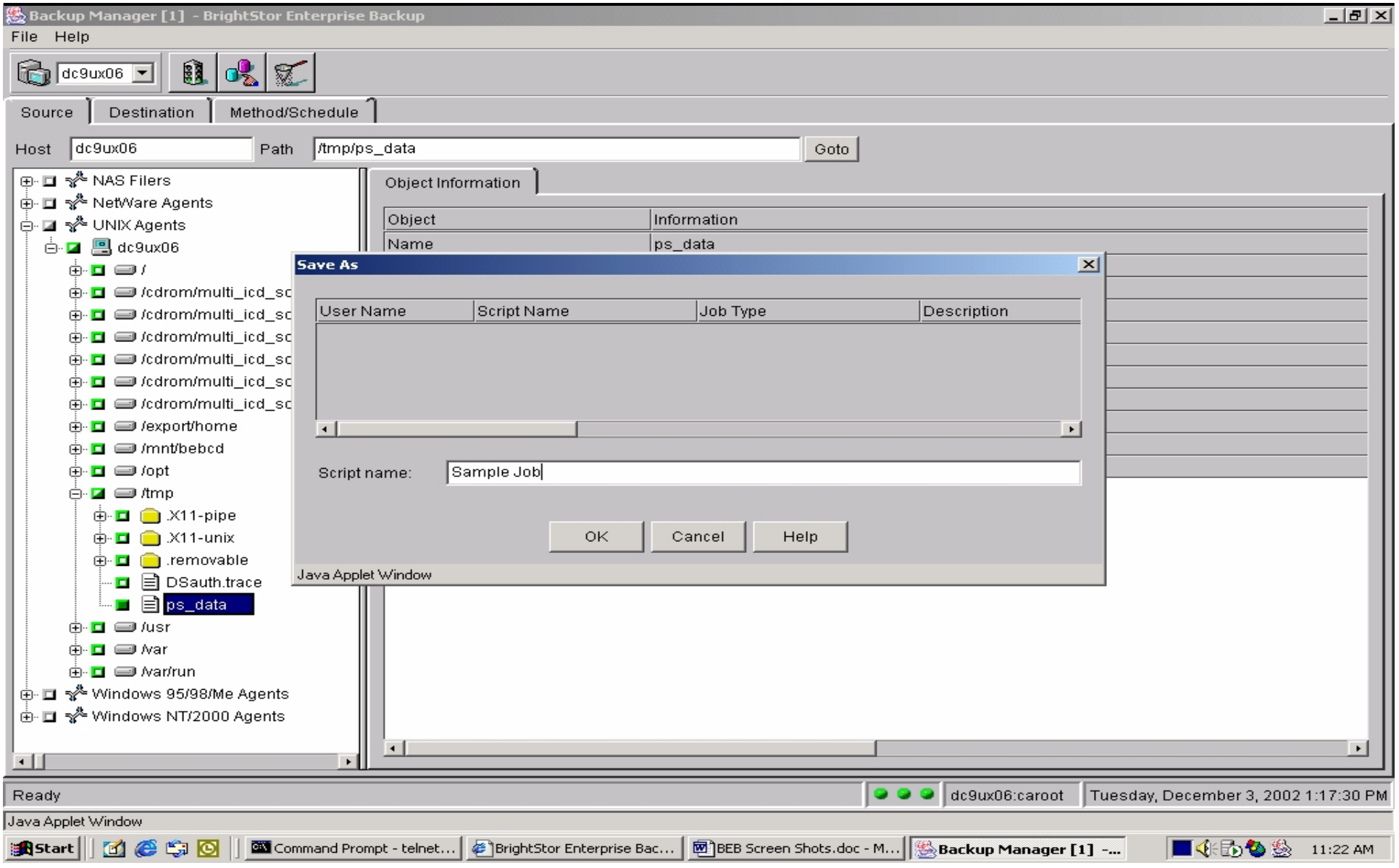
BrightStor Enterprise Backup

- 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

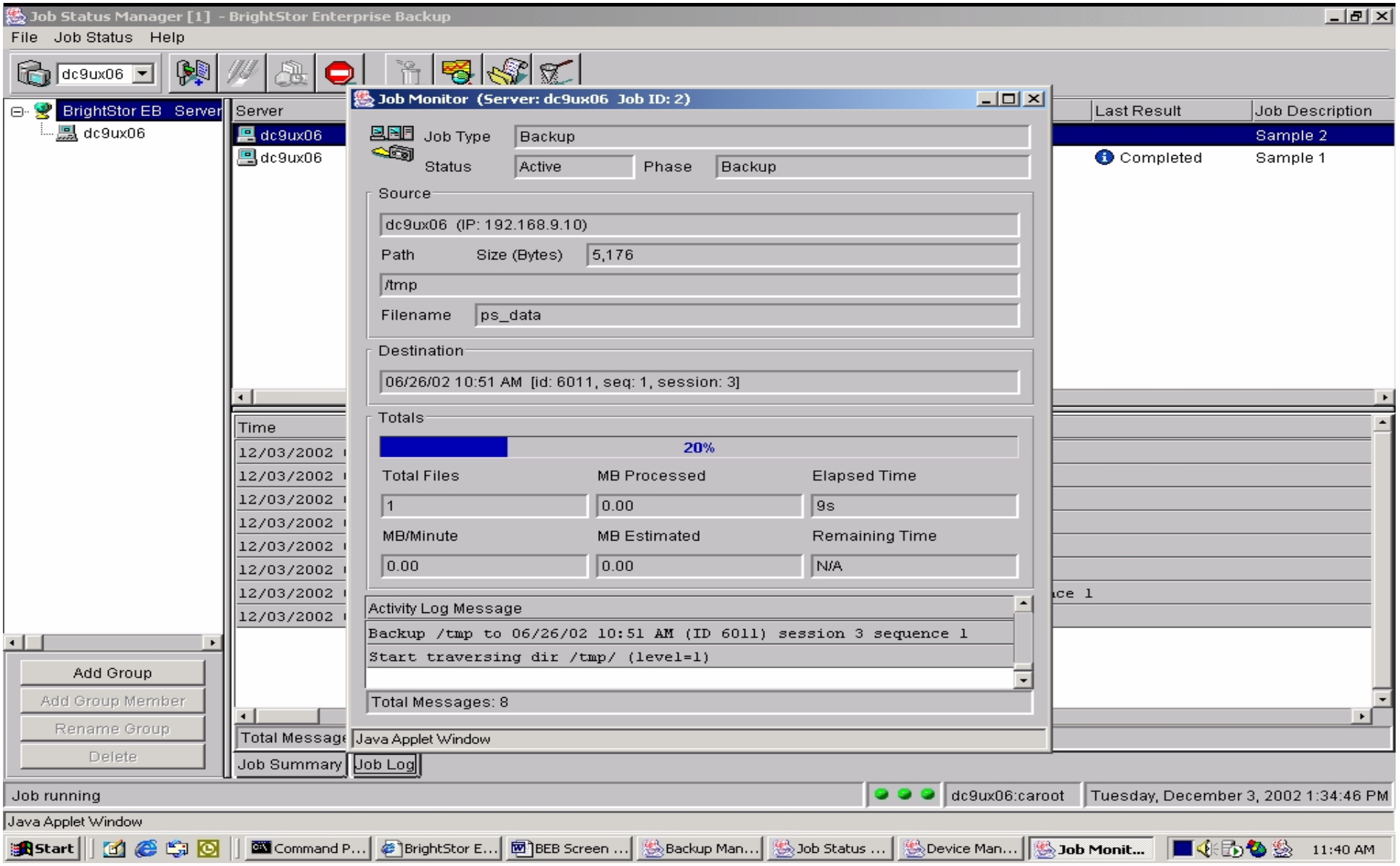
BrightStor Enterprise Backup



Defining Backup Source



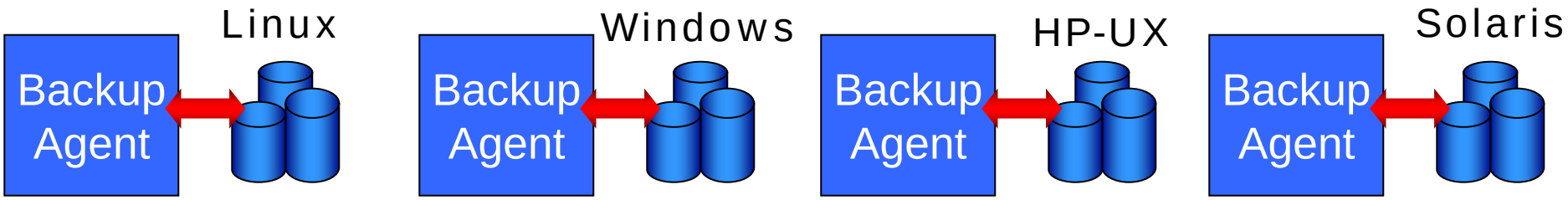
Job Status Monitoring

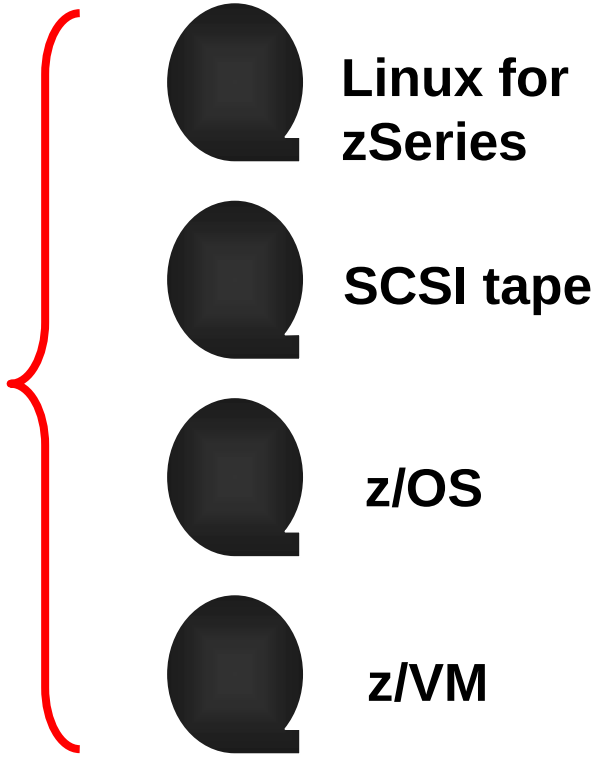


Enterprise Backup Agents

- 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





Linux for zSeries

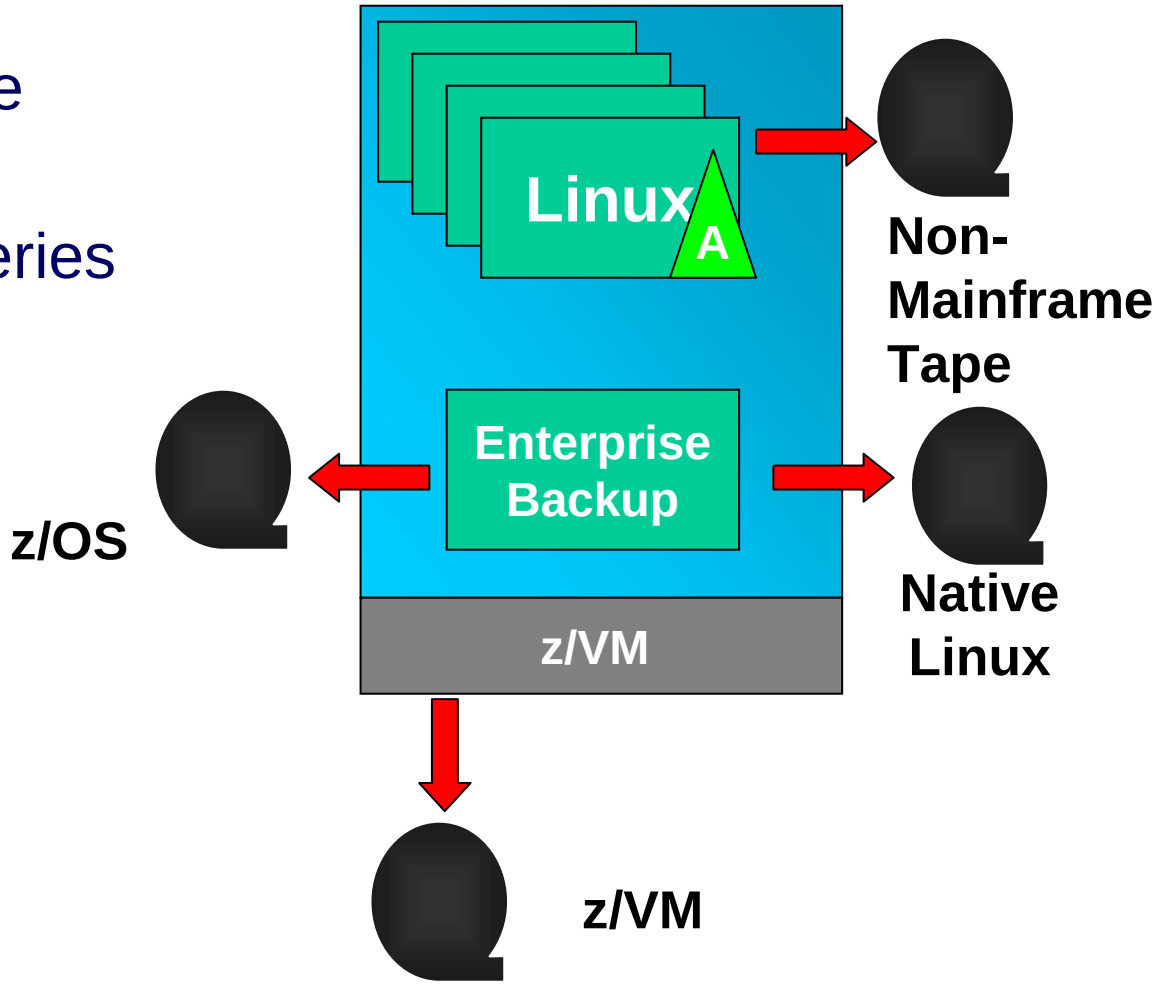
SCSI tape

z/OS

z/VM

Physical Tape Options

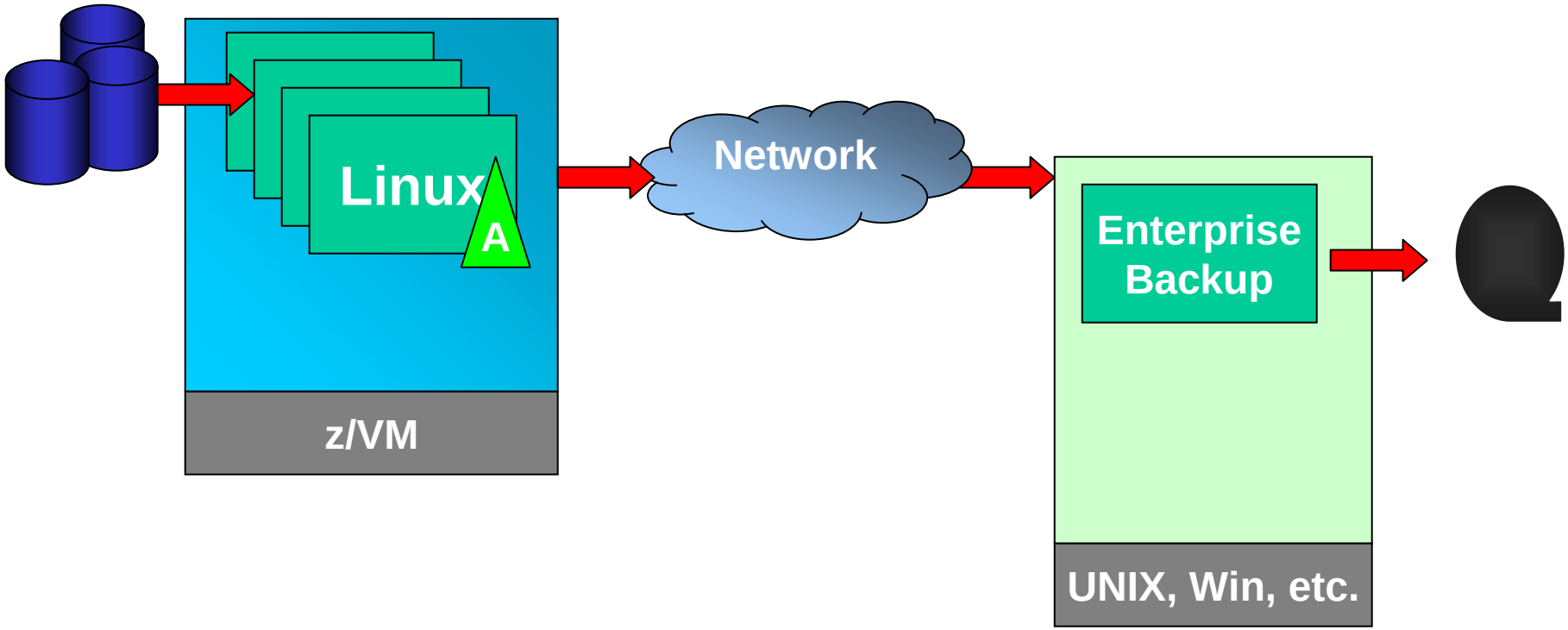
- Non-mainframe tape systems
- Native Linux for zSeries
- z/OS media server
- z/VM integration



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.

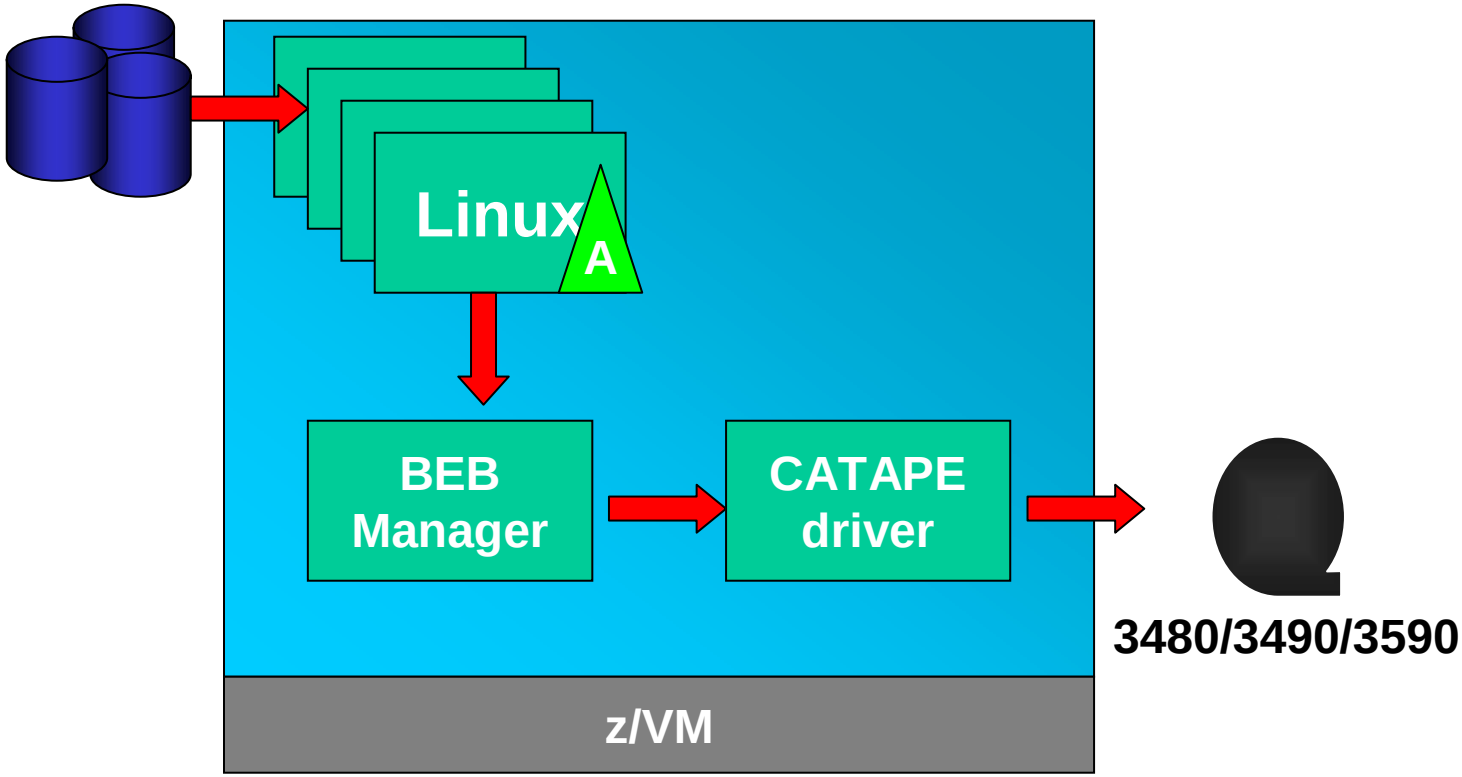
Native Linux zSeries Tape

- 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.)

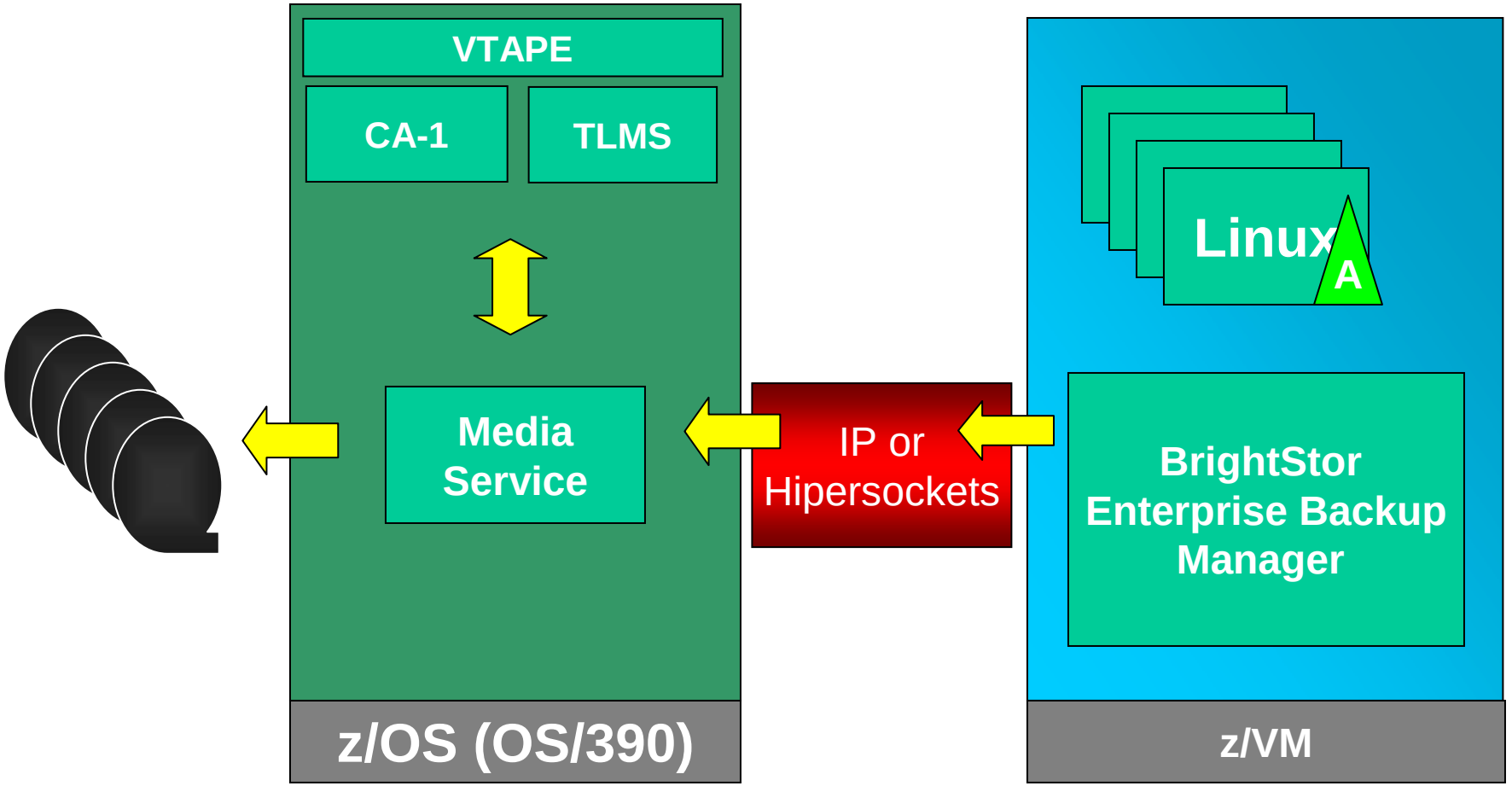
Native Linux Tape

- 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

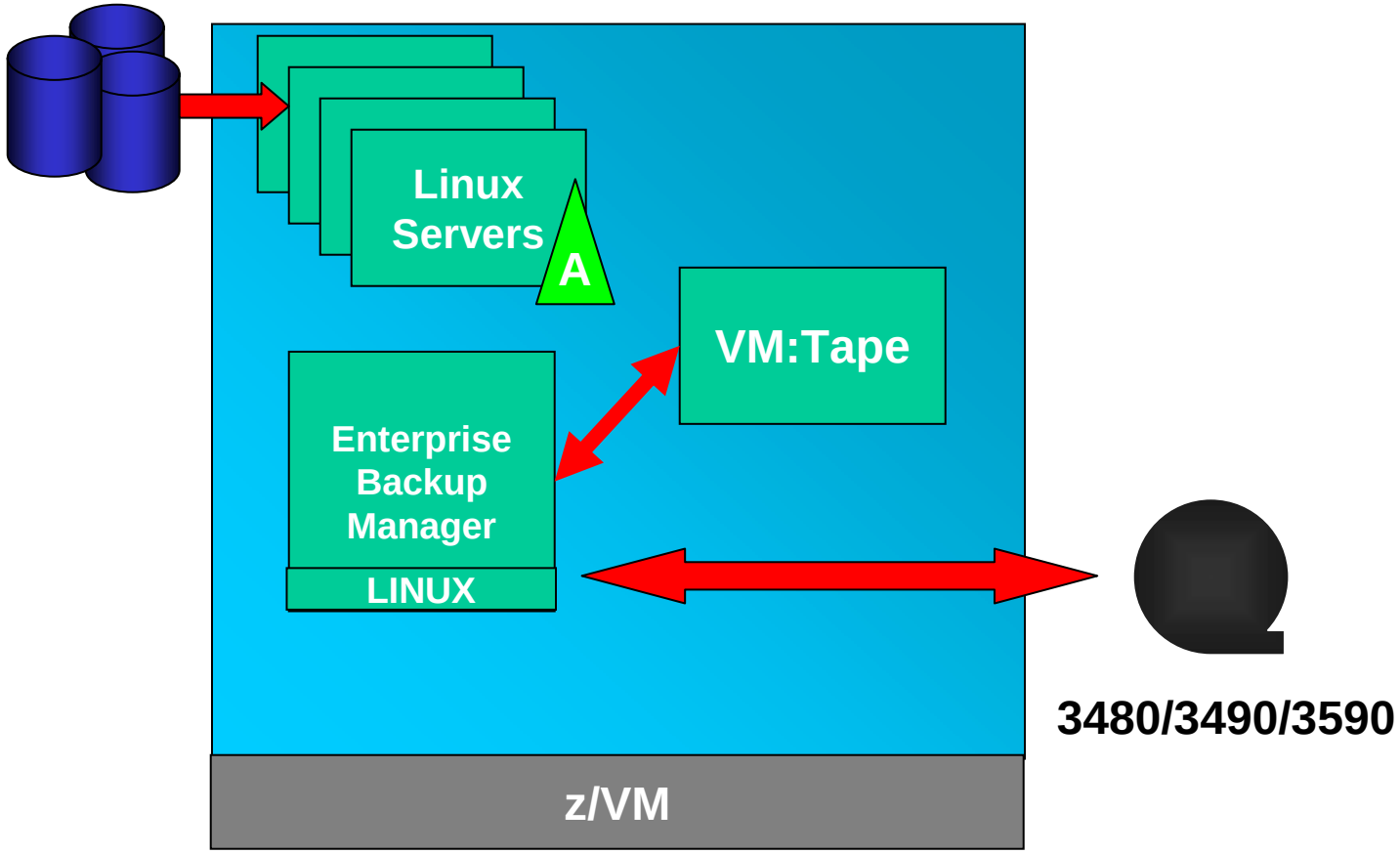
z/OS Media Server



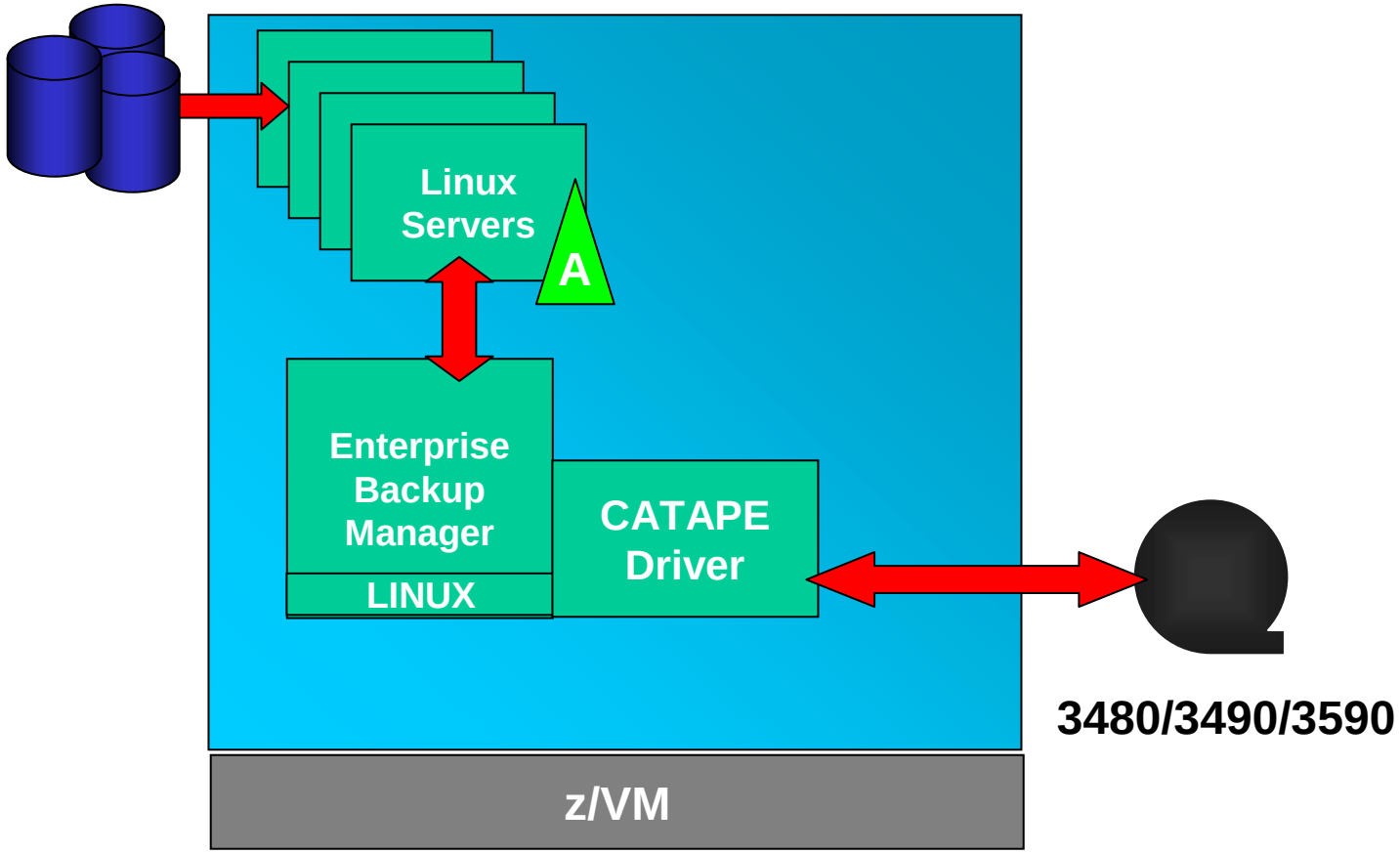
z/VM Integration

- 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

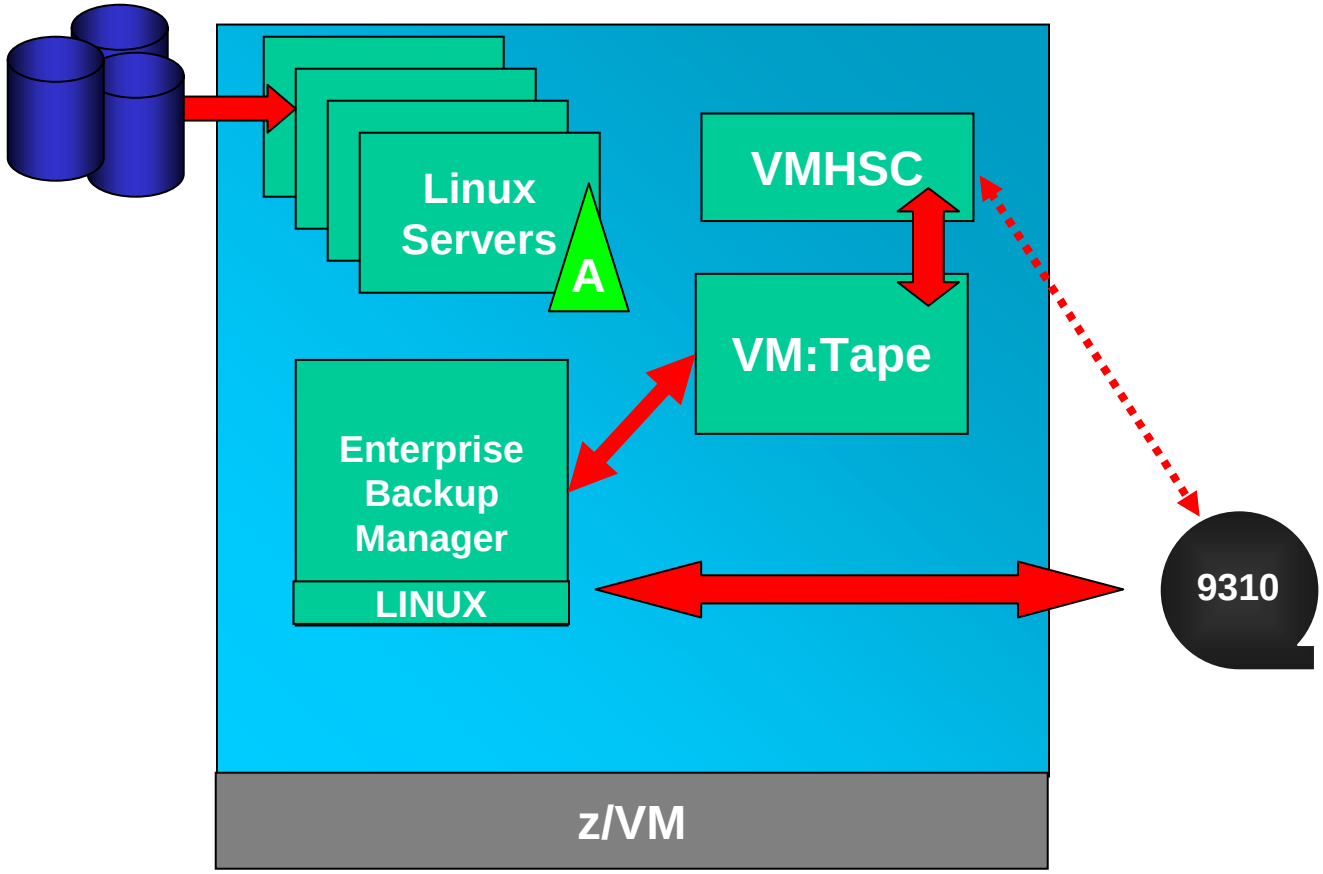
z/VM Integration



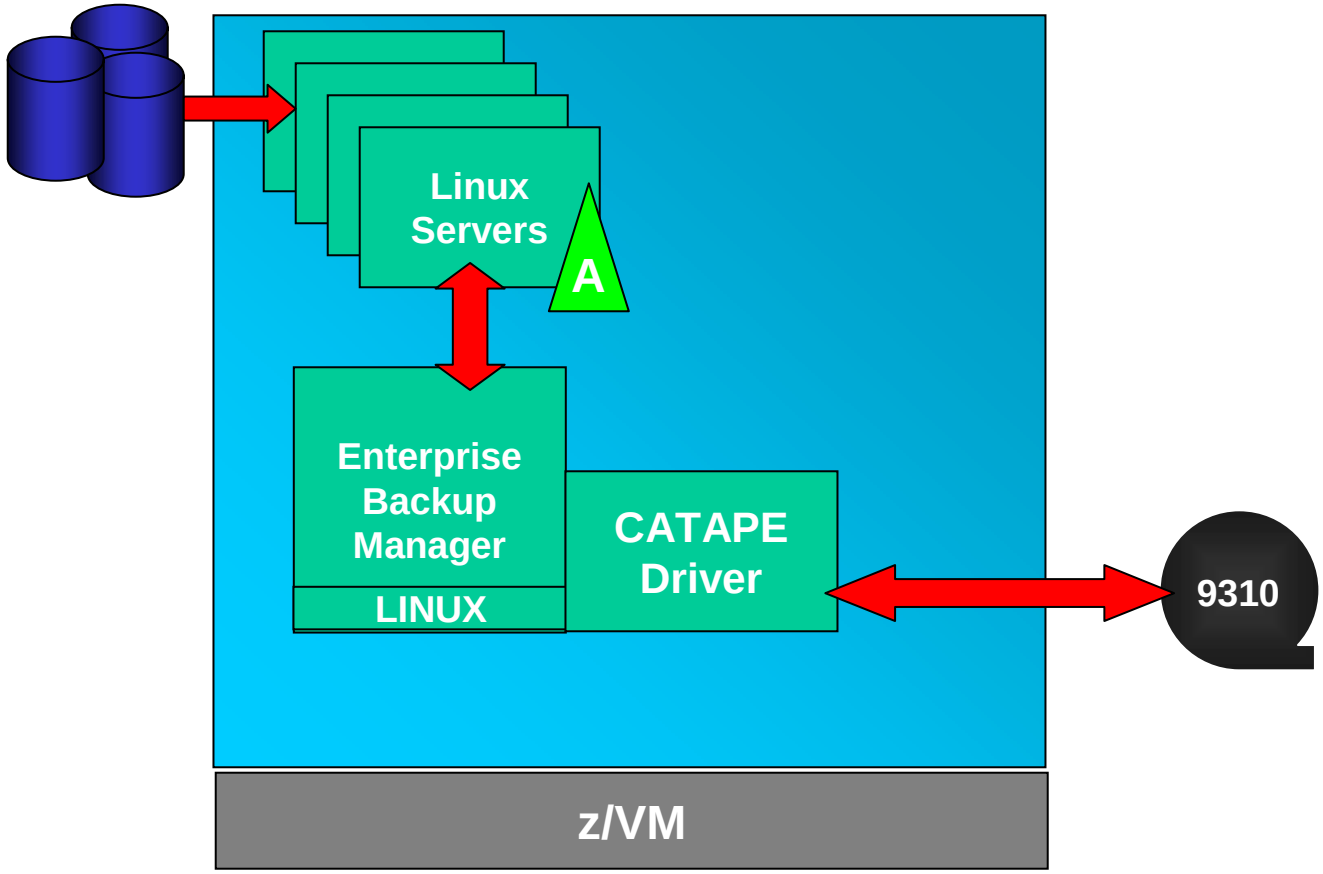
z/VM Integration



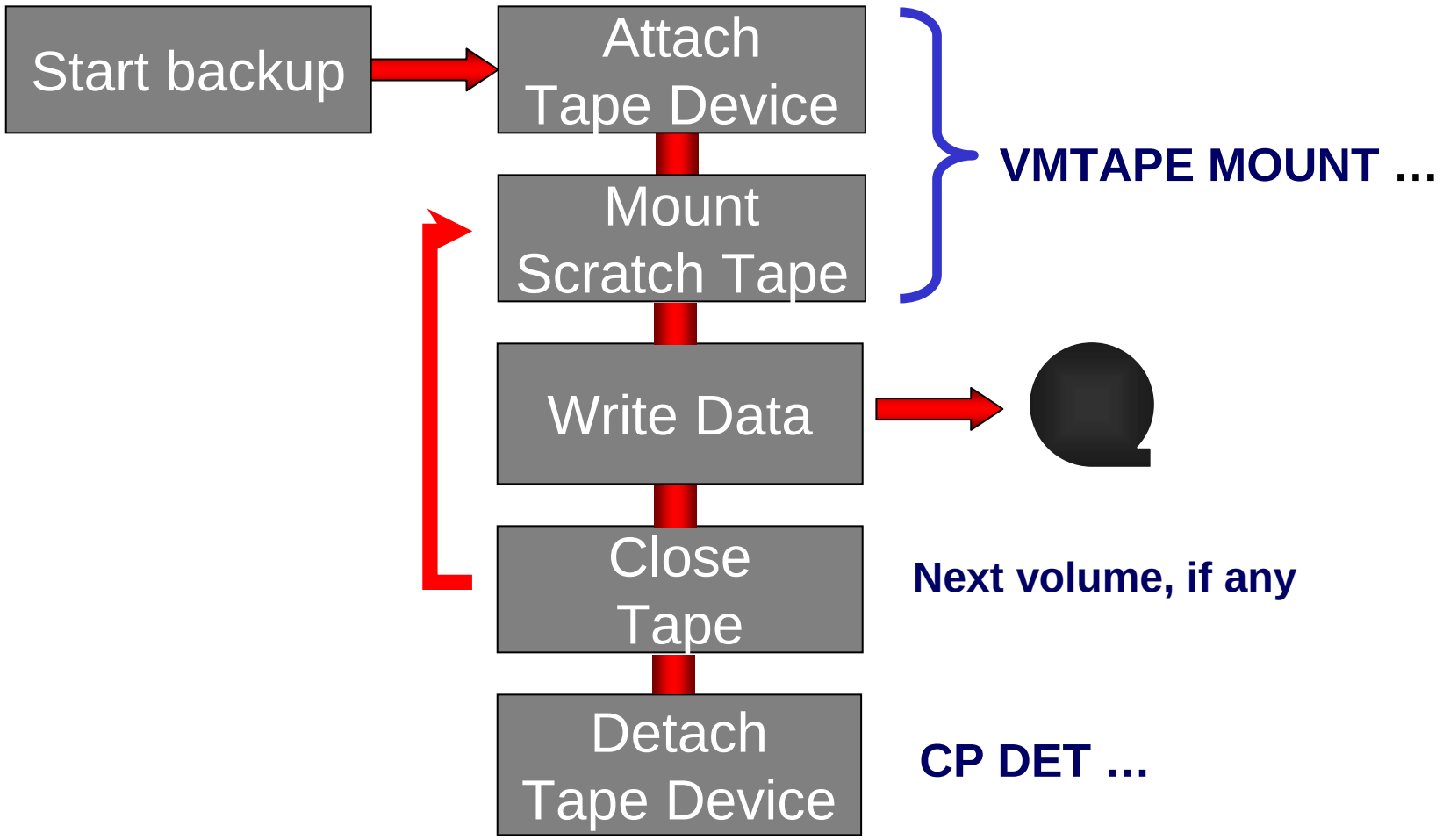
z/VM Integration with HSC



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

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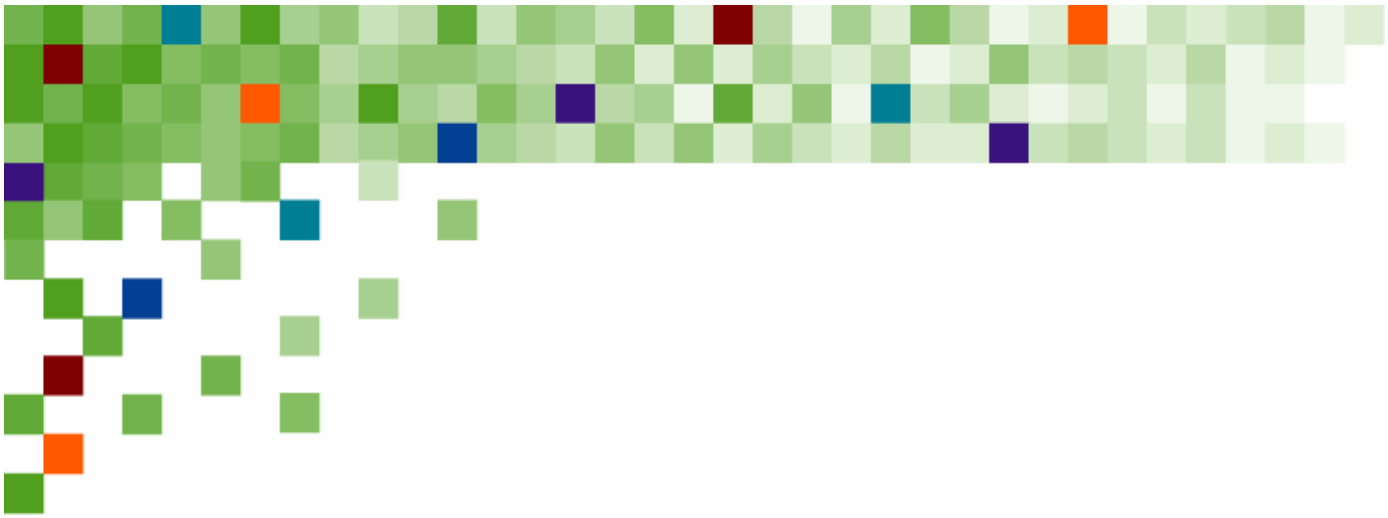

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