



# Backing Up the Linux/MF & Distributed Environments to One Place

Timothy O'Brien

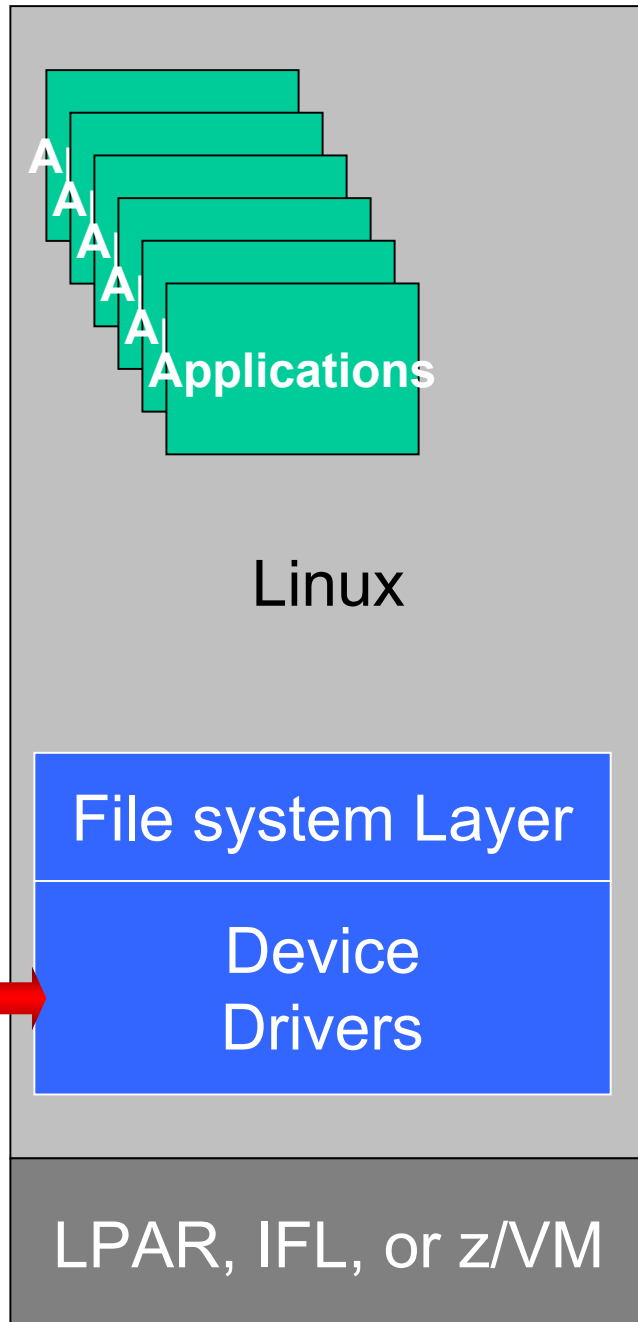
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Inc.

# Agenda

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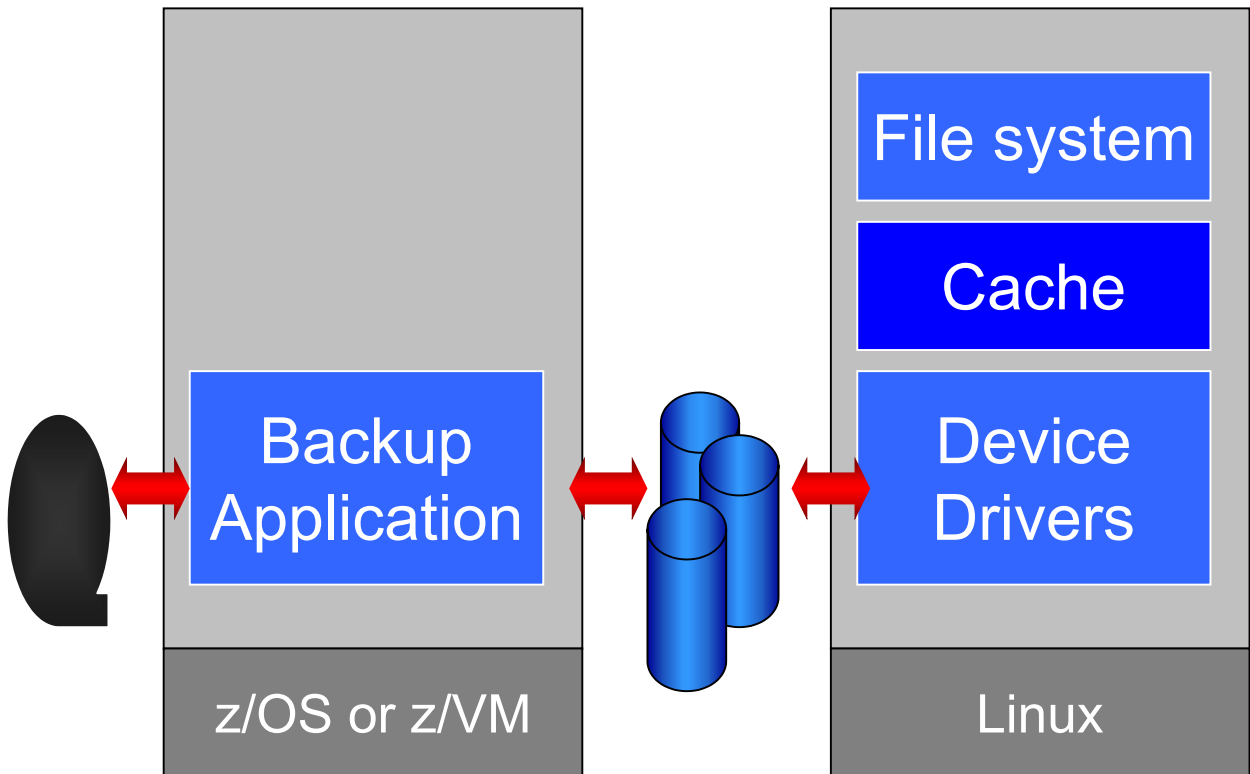
- ❑ Storage management challenges unique to Linux for the zSeries
- ❑ Brightstor solutions for Linux for the zSeries
- ❑ Options for managing physical tapes
- ❑ Summary

# Architectural Challenges



- Unique scale
  - Number of devices
  - Number of systems
- Device support
  - SCSI tape?
- Sharing and coexistence issues
  - z/OS tape management ?
  - z/VM tape management ?
  - Tape drive sharing?

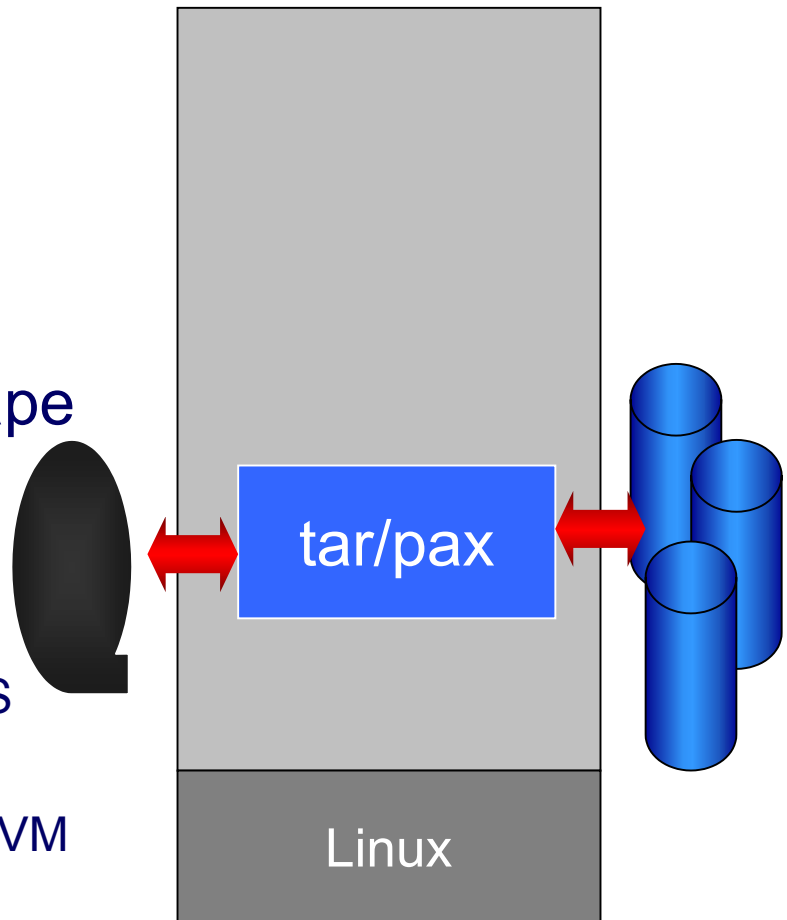
# Architectural Challenges



- 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

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- 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.
-  **Merge Manager**  
Merge information from media into the BrightStor EB Database.
-  **Scan Manager**  
Scan media for information on your backup sessions.
-  **User Profile Manager**  
View or change the access rights to managers.
-  **MMO Admin**  
Policy based media protection and vault management.
-  **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 >>](#)

**LOG ON**

<b>Domain Name</b>	dc9ux06dom	<b>User Name</b>		<b>Default Host</b>	
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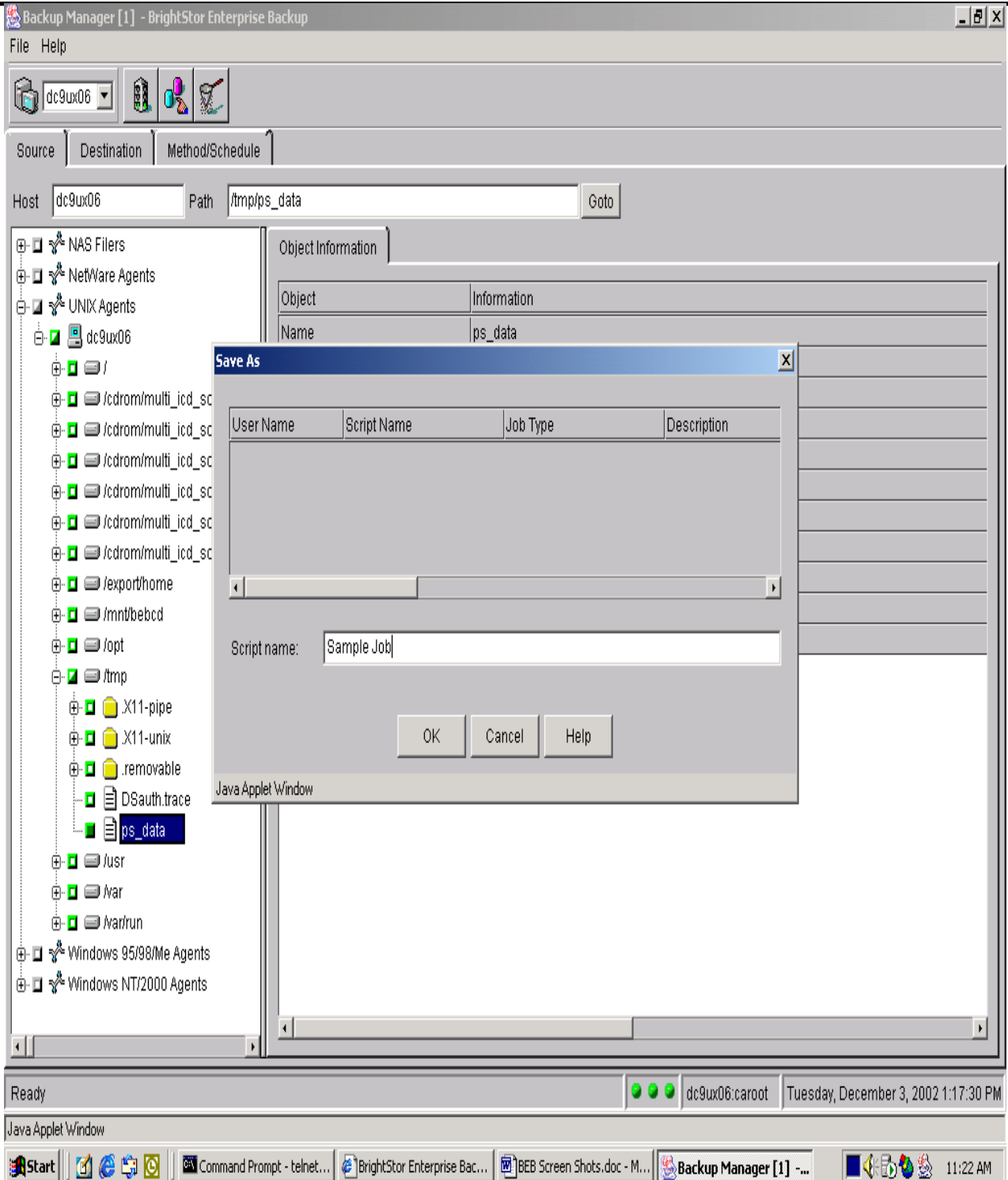
Computer Associates

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Local intranet

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

# Defining Backup Source



The screenshot shows the Backup Manager interface with the following details:

- Host:** dc9ux06
- Path:** /tmp/ps\_data
- File Tree:**
  - NAS Filers
  - NetWare Agents
  - UNIX Agents
    - dc9ux06
      - /
      - /cdrom/multi\_icd\_sc
      - /export/home
      - /mnt/bebcd
      - /opt
      - /tmp
        - .X11-pipe
        - .X11-unix
        - .removable
        - DSauth.trace
        - ps\_data
      - /usr
      - /var
      - /var/run
    - Windows 95/98/Me Agents
    - Windows NT/2000 Agents

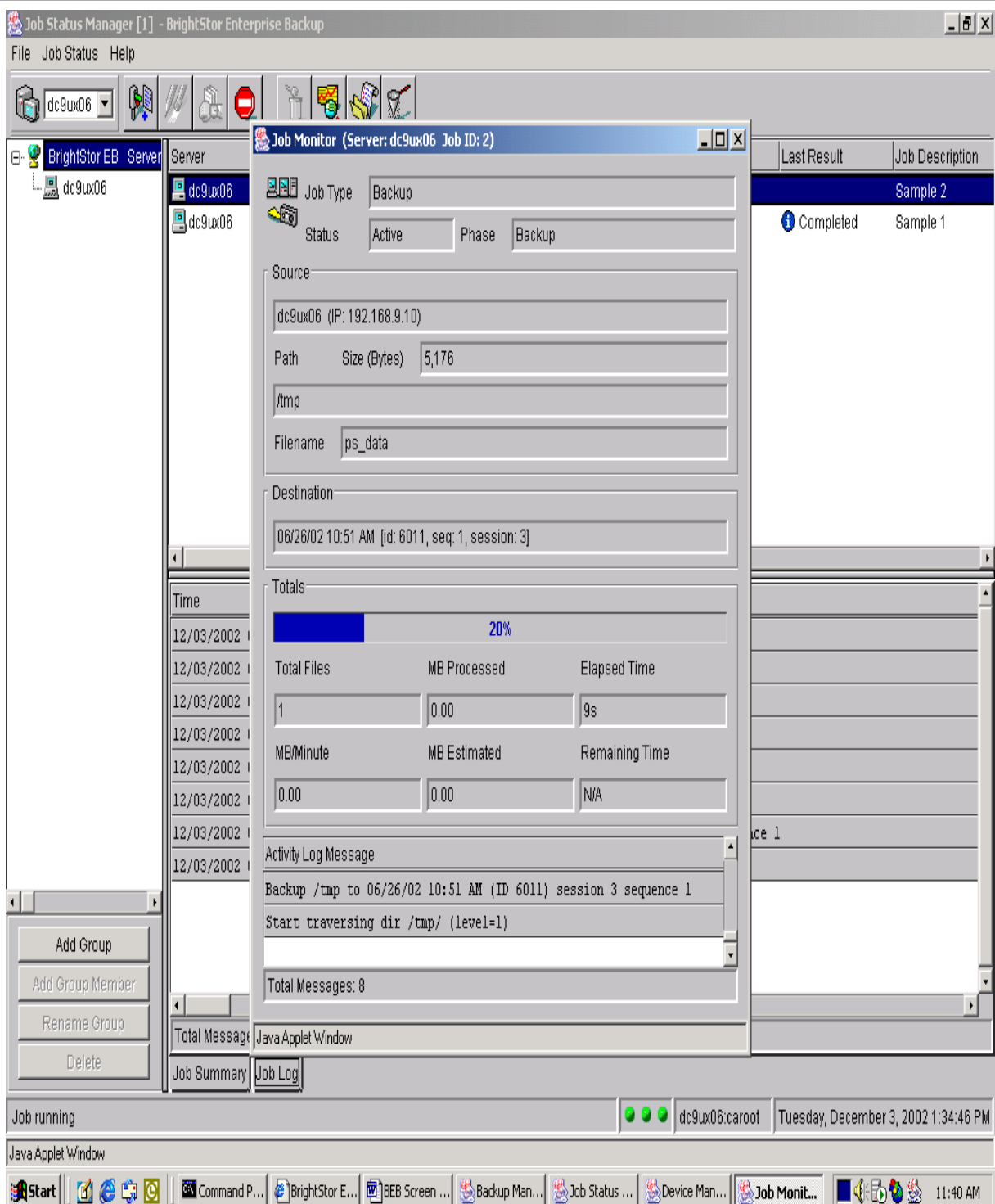
- Object Information Table:**

Object	Information
Name	ps_data
- Save As Dialog:**

User Name	Script Name	Job Type	Description
	Sample Job		

The system tray shows the status: Ready, dc9ux06:caroot, Tuesday, December 3, 2002 1:17:30 PM.

# Job Status Monitoring



The screenshot displays the 'Job Status Manager' application window. The main window title is 'Job Status Manager [1] - BrightStor Enterprise Backup'. The interface includes a menu bar (File, Job Status, Help), a toolbar, and a tree view on the left showing the server hierarchy: 'BrightStor EB Server' > 'Server' > 'dc9ux06'.

The central pane shows the details for a 'Job Monitor' (Server: dc9ux06 Job ID: 2). The job is 'Active' and in the 'Backup' phase. The source is 'dc9ux06 (IP: 192.168.9.10)' with a path of '/tmp' and filename 'ps\_data'. The destination is '06/26/02 10:51 AM [id: 6011, seq: 1, session: 3]'. A progress bar indicates that 20% of the job is complete.

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

The 'Activity Log Message' pane shows the following text:

```
Backup /tmp to 06/26/02 10:51 AM (ID 6011) session 3 sequence 1
Start traversing dir /tmp/ (level=1)
```

The 'Total Messages: 8' is displayed at the bottom of the log pane.

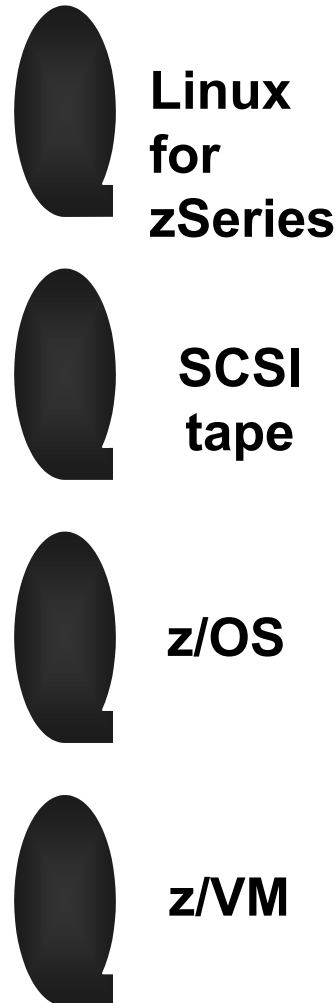
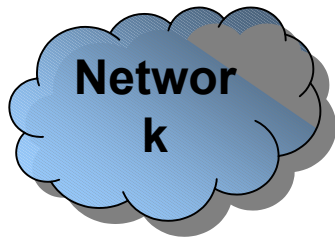
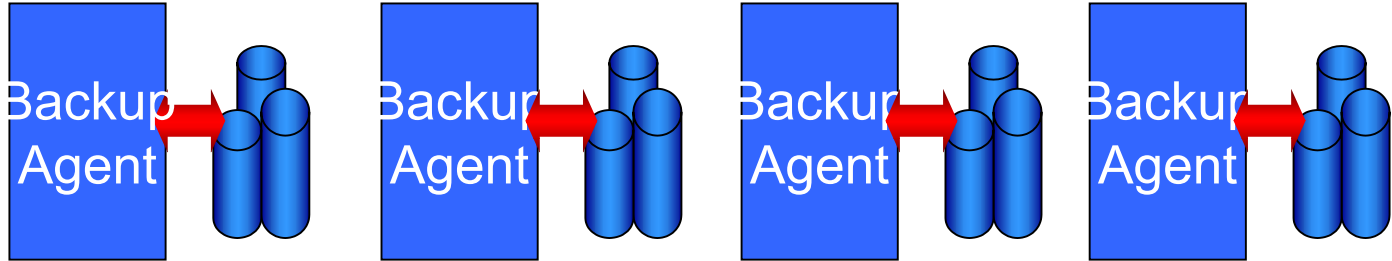
The status bar at the bottom indicates 'Job running' with three green dots, the user 'dc9ux06:caroot', and the time 'Tuesday, December 3, 2002 1:34:46 PM'. The taskbar shows several open applications including 'Command P...', 'BrightStor E...', 'BEB Screen ...', 'Backup Man...', 'Job Status ...', 'Device Man...', and 'Job Monit...'. The system clock shows '11:40 AM'.

# Enterprise Backup Agents

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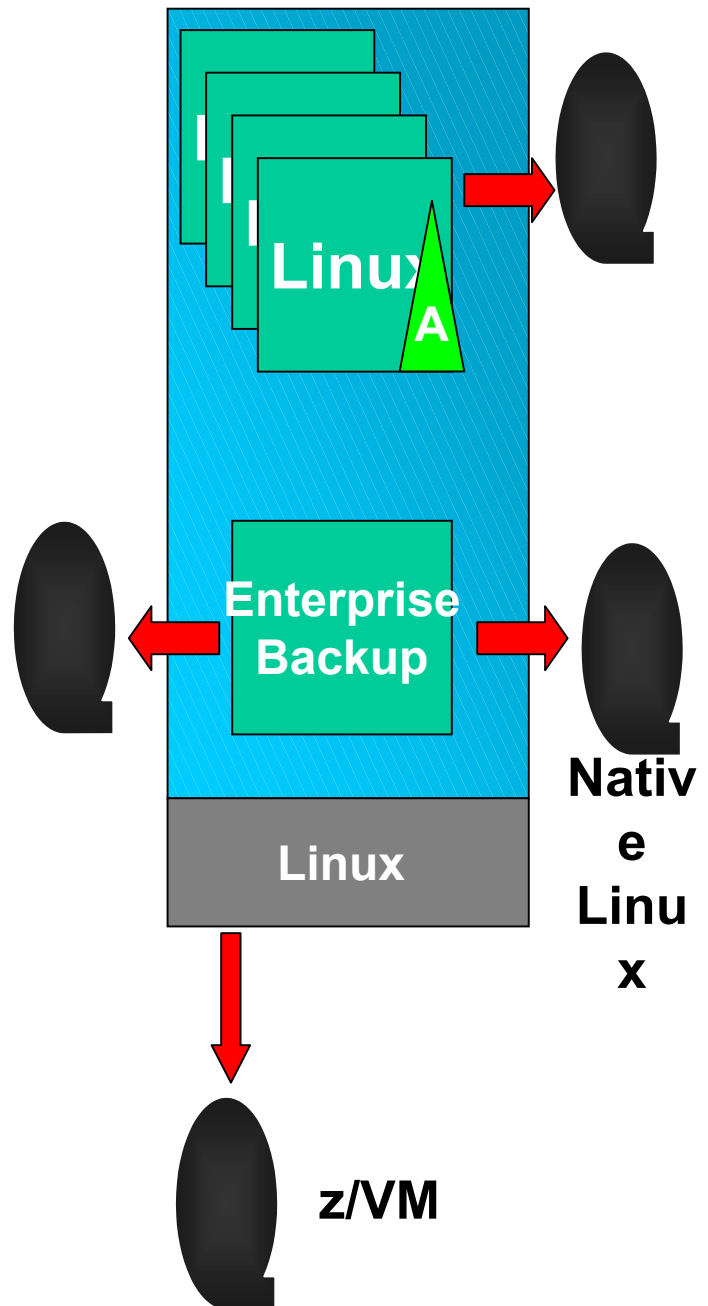
- Runs on each Linux instance
  - Small footprint
  - Scalable
  - Only component needed on most systems
  - Build into base Linux images
- Connects to BrightStor manager on any platform
  - Linux (Intel or zSeries)
  - Windows
  - Unix
- Performs physical filesystem operations
  - Backup, restore, file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

# Brightstor Enterprise Backup

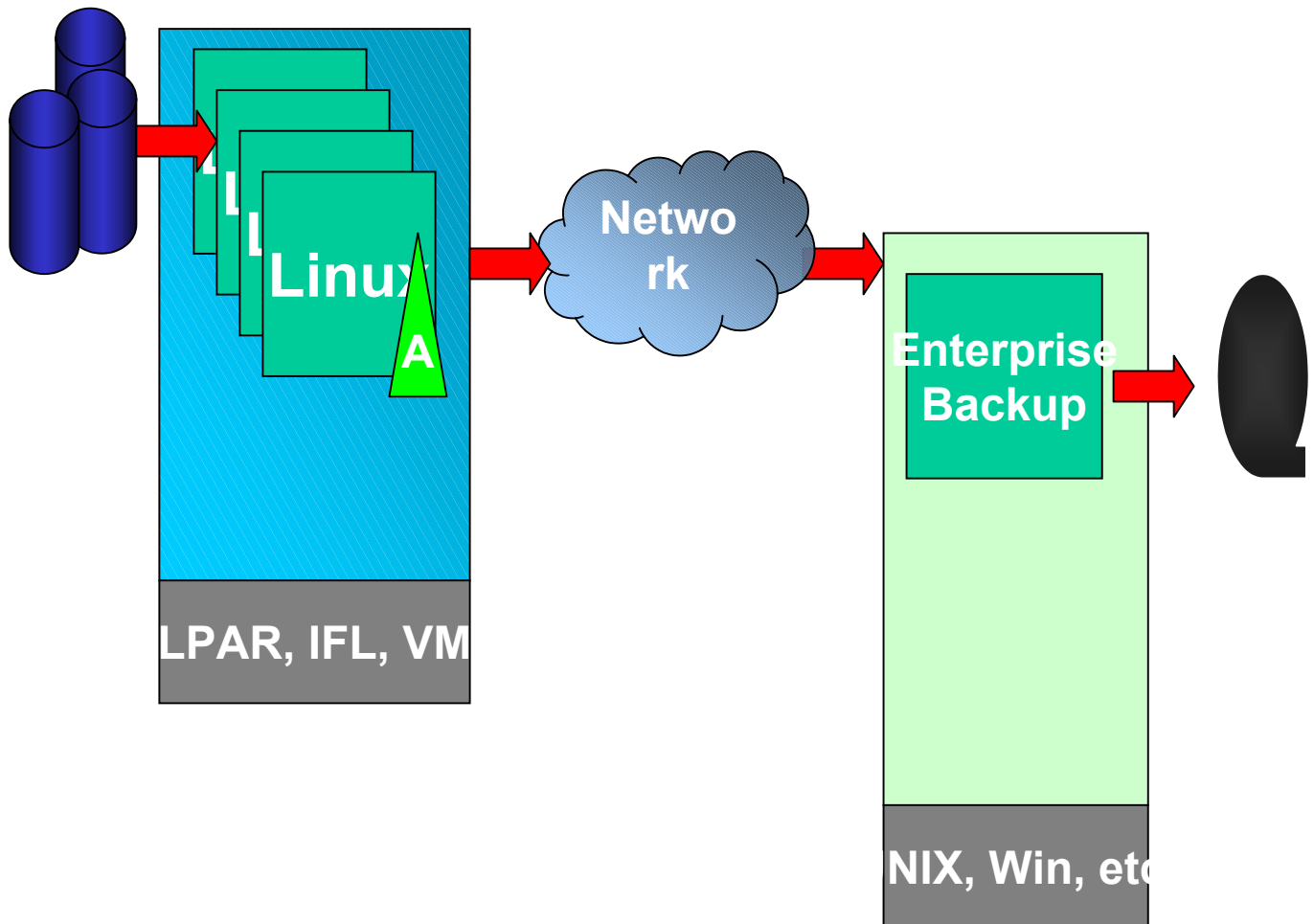


# Physical Tape Options

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



# Non-Mainframe Tape



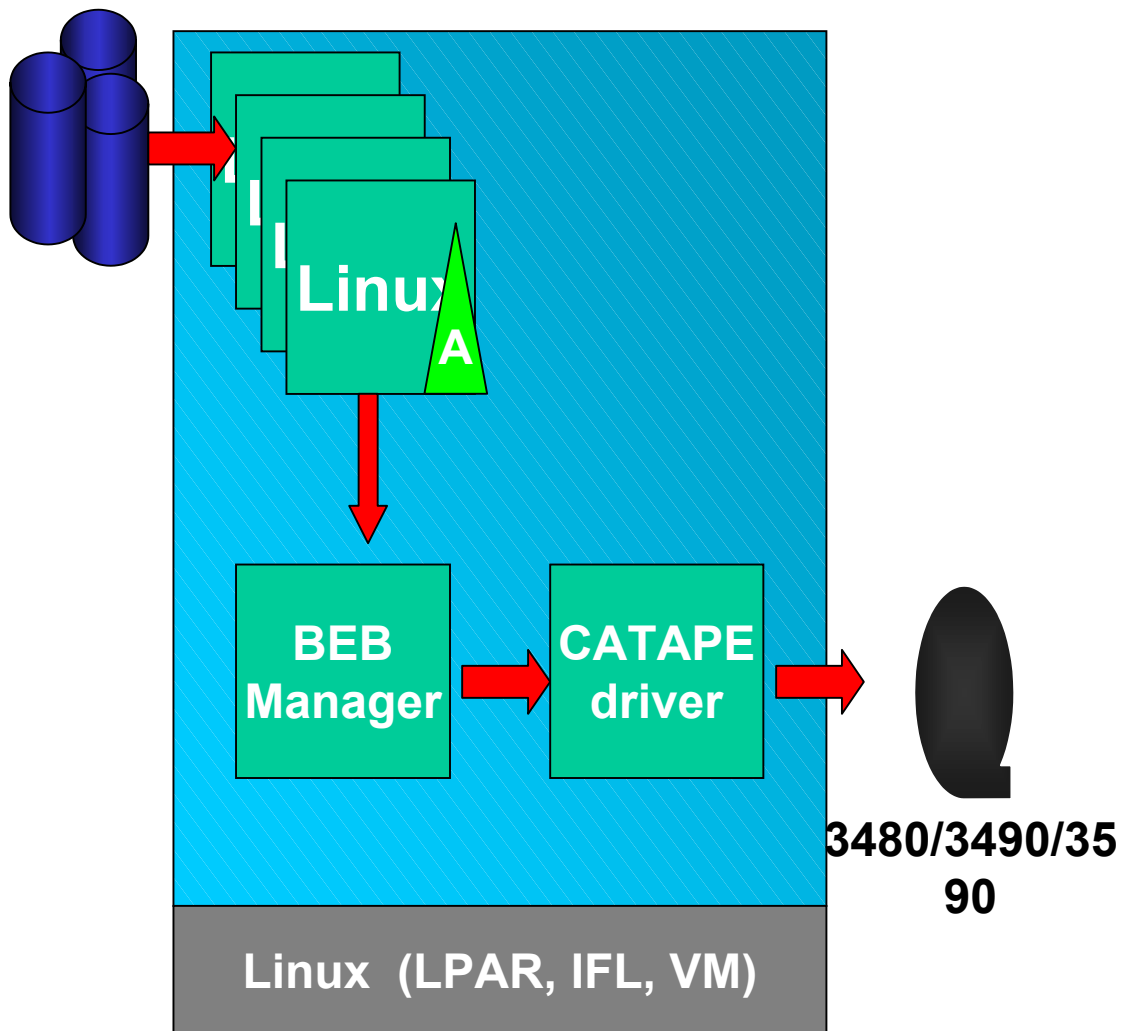
Mainframe Linux agents, backed up by BrightStor Enterprise Backup (BEB) manager on another platform.

# Non-Mainframe Tape

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- 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

# Native Linux zSeries Tape



# Native Linux zSeries Tape

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- Stand-alone Linux for zSeries solution
  - No other platforms required
  - Supports native, LPAR, IFL, VM Linux
- 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 zSeries Tape

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- CA supplied tape device driver
  - ESCON/FICON 3480, 3490, 3590 devices
  - Compatible 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 Tape

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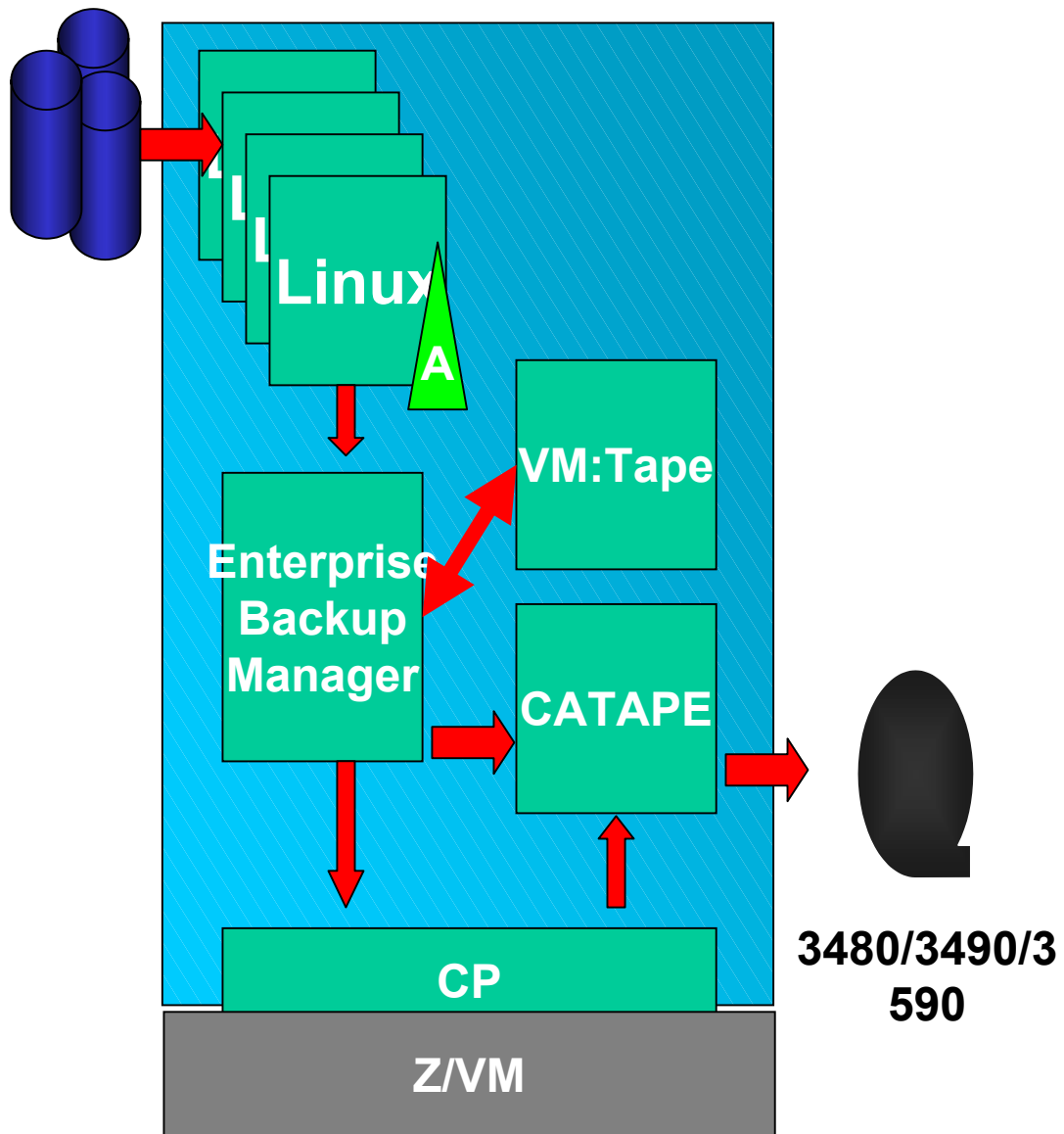
- “tapedevinit” utility
  - Installs driver (dynamically)
  - Specify device address range
  - Creates /dev/catape/\* files
- /dev/catape/\* files
  - Can be used to read/write tapes under Linux
  - Not limited to BrightStor
  - ioctl() interface for low-level functions (rewind, WTM, positioning, etc.)

# Native Linux Tape

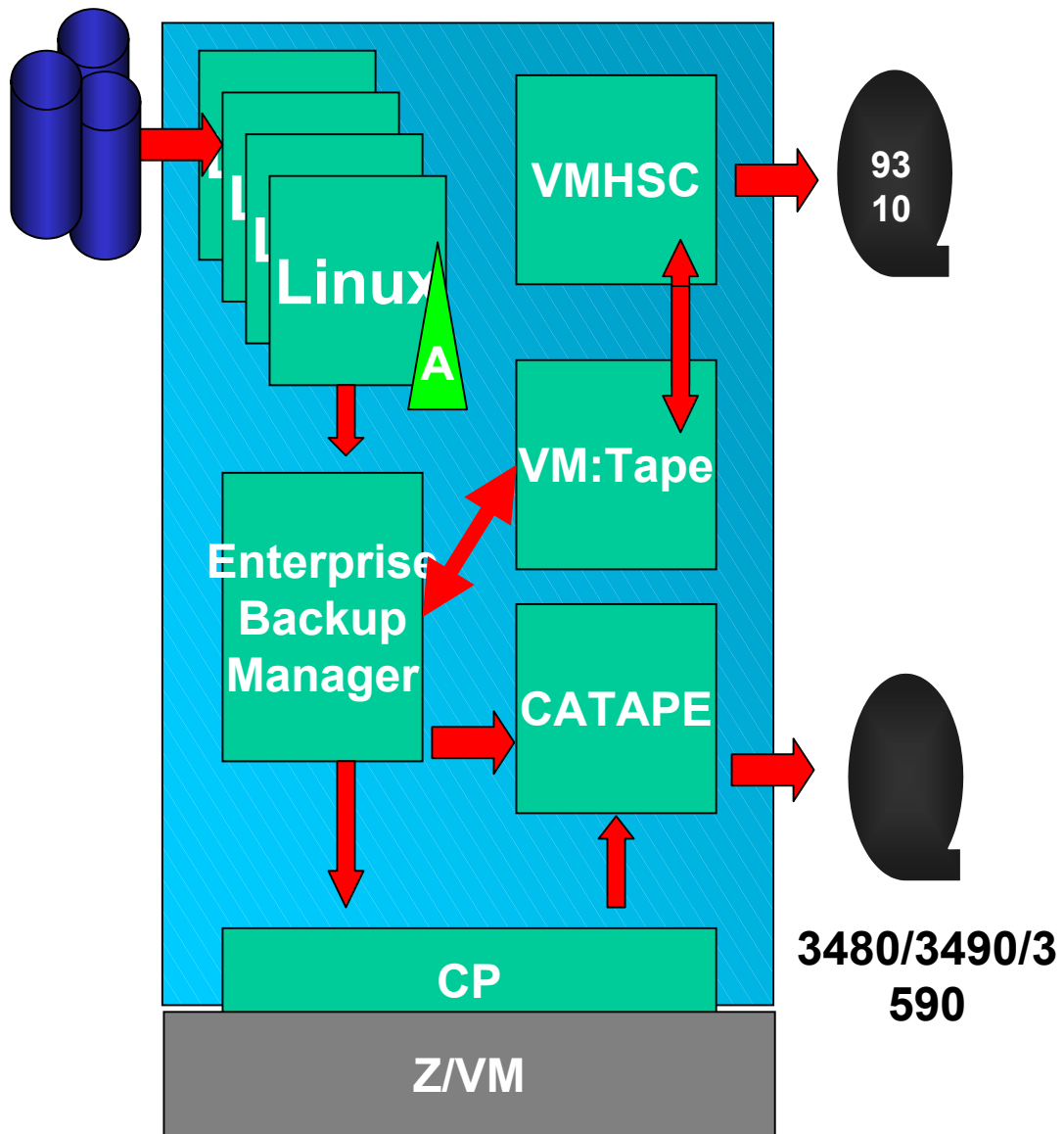
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- Tapes managed by BrightStor
  - Retention, scratching, etc.
- “Unlabeled” tapes from z/OS or z/VM perspective
  - Any existing tape labels are overwritten
- Devices can safely be shared with z/OS or z/VM
  - Single-system ASSIGN
- Large blocksizes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

# z/VM Integration



# z/VM Integration

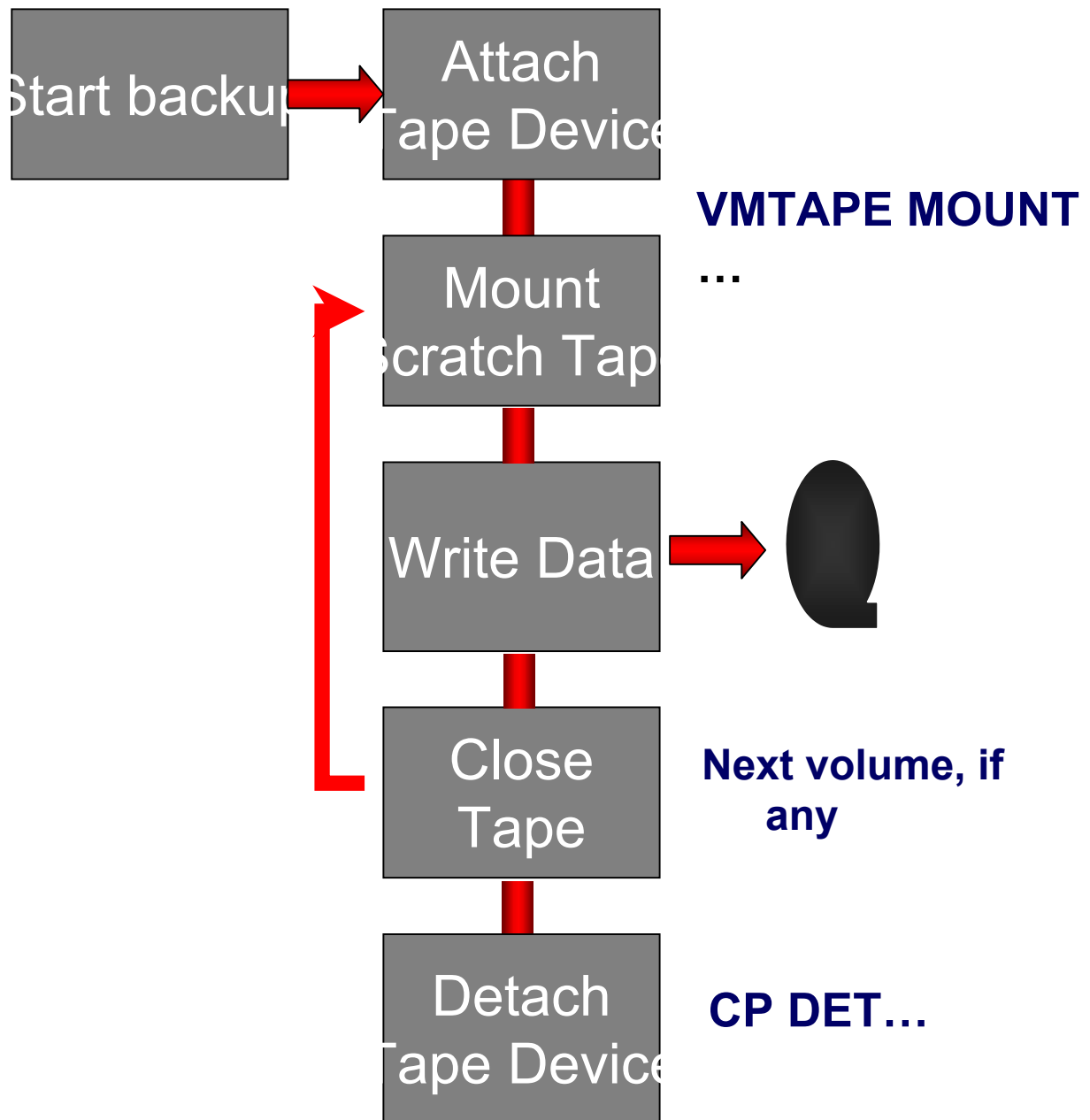


# z/VM Integration

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- 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

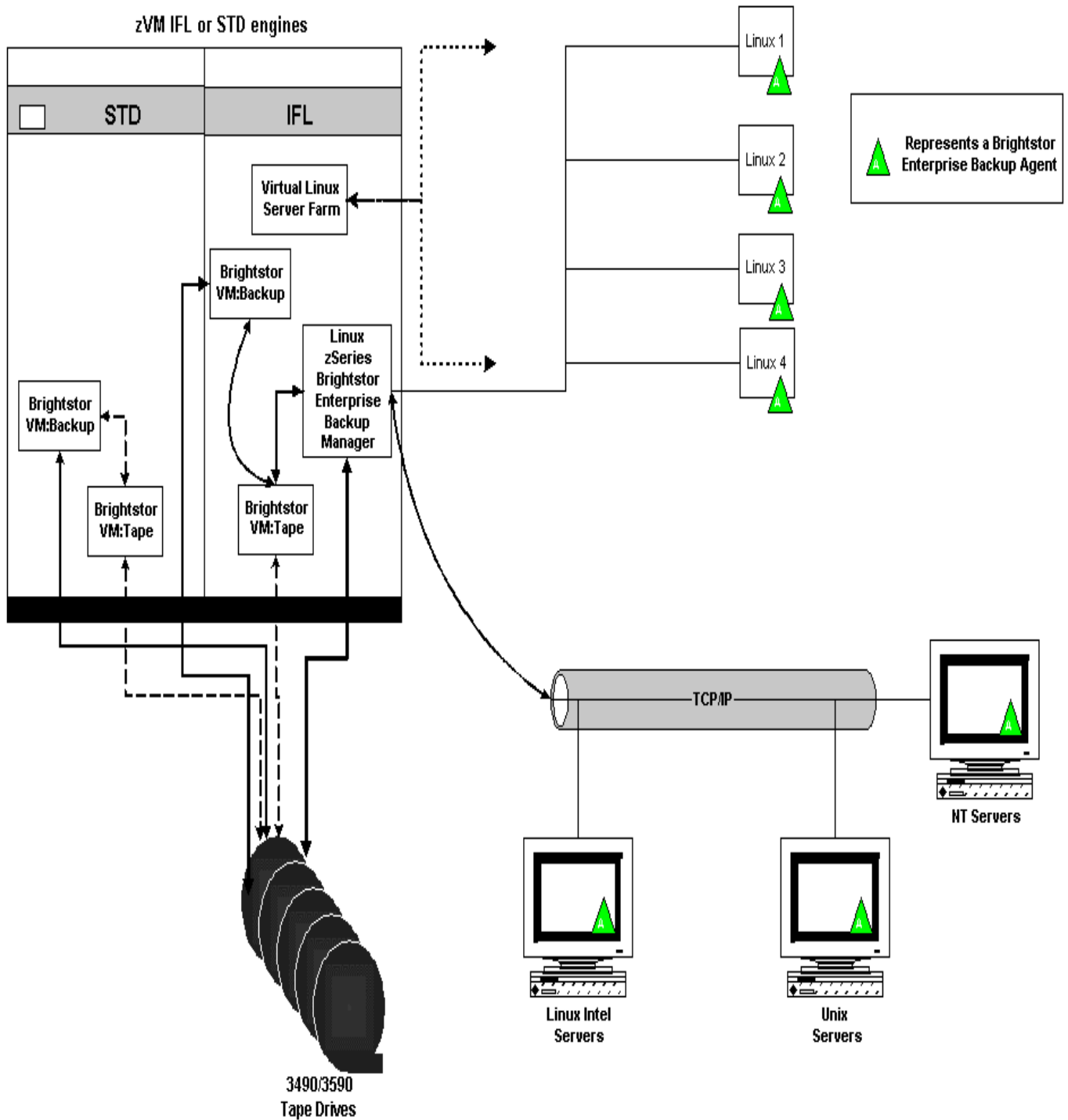
# z/VM Integration



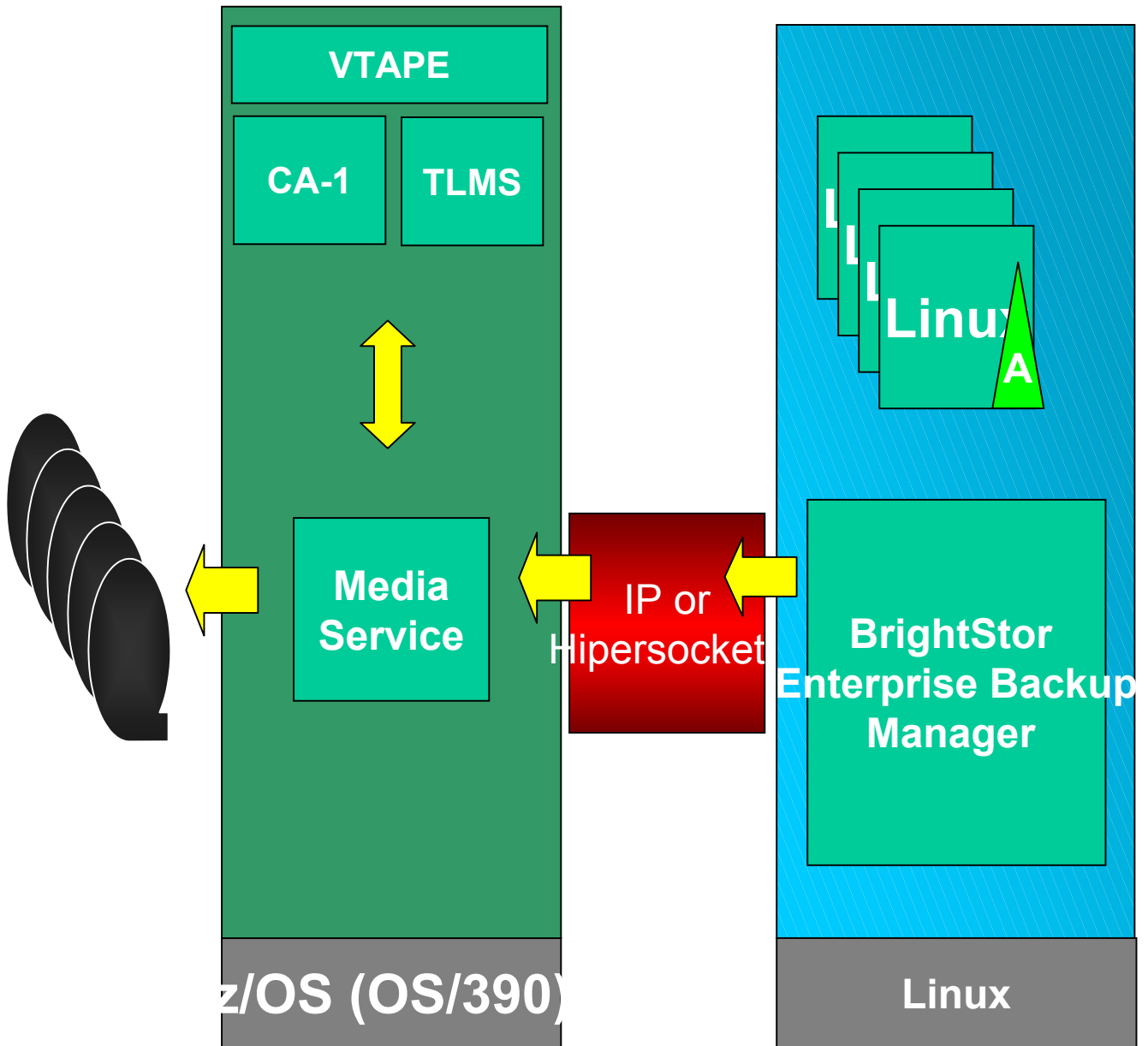
# Z/VM Integration

- 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

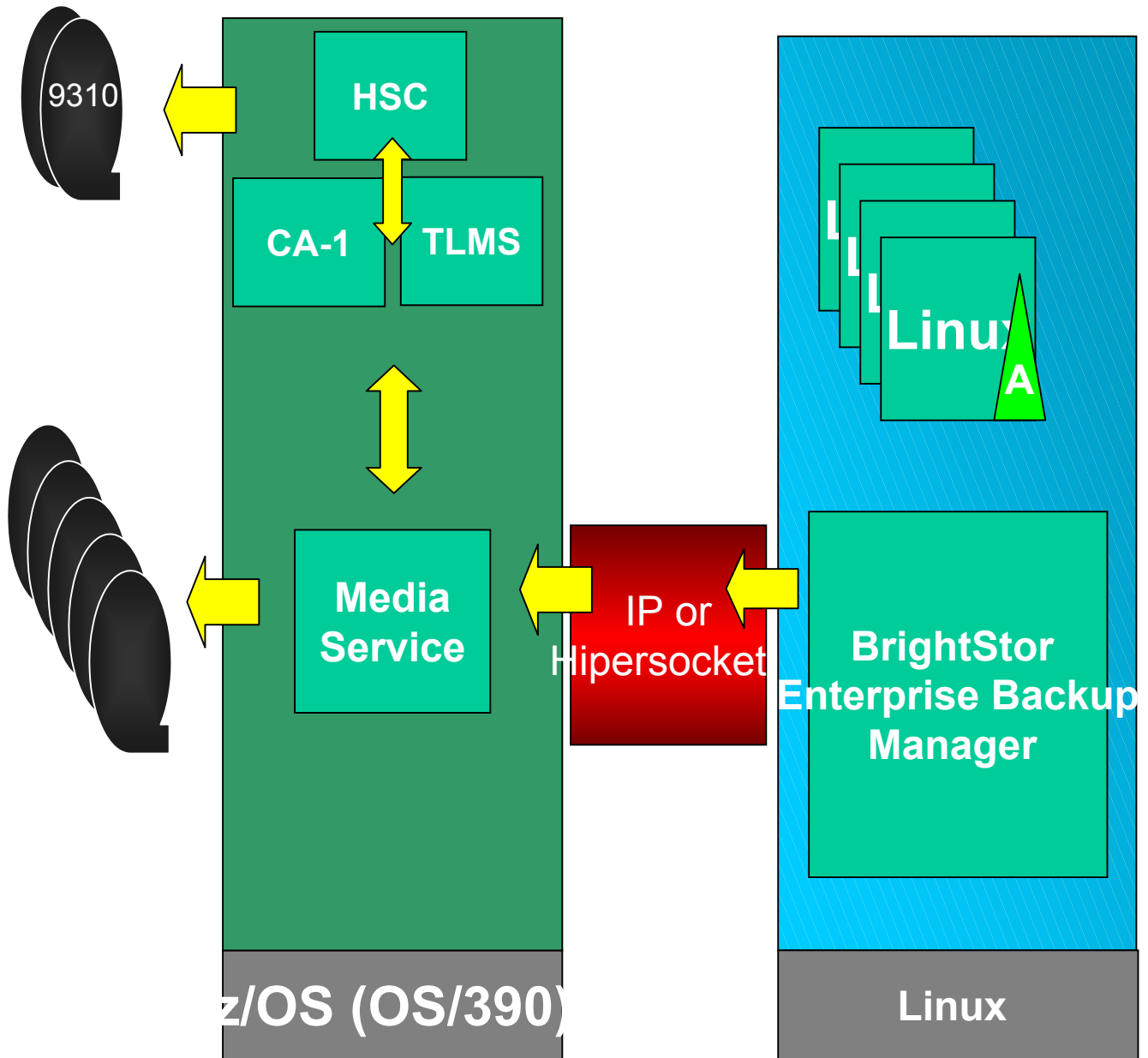
# Putting It All Together



# z/OS Media Server



# z/OS Media Server with Storage Tek



# z/OS Media Server

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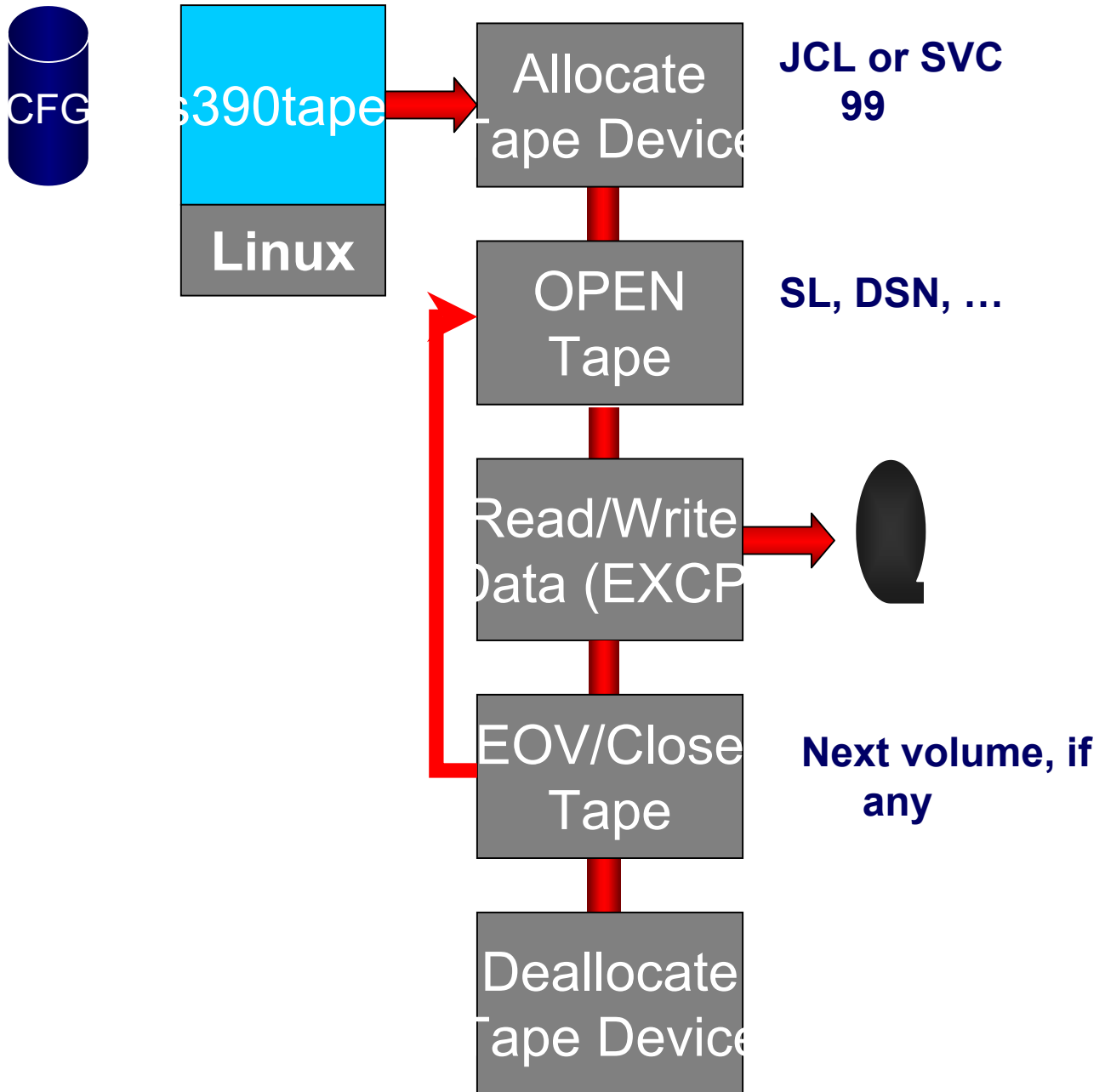
- Works in conjunction with Enterprise Backup to enable physical tape processing on z/OS or OS/390.
- IP-based connection
  - Ideal Hipersocket candidate
- Standard format z/OS tapes
  - Standard label, multi-volume datasets
- Built-in feature available at no additional charge

# z/OS Media Server

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- Multi-threaded single address space
- Define tape devices via SVC 99 or JCL
- Simple installation, setup
  - APF library
  - VSAM file
  - Tape management and security definitions
  - Few parameters to adjust or monitor
- Configure host name/port on Linux side

# z/OS Media Server



# z/OS Media Server

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- Enterprise Backup sees “virtual” tape devices, depending on configuration
- Devices dynamically allocated/freed as needed (if not statically defined in JCL)
- Single media server can handle multiple copies of Enterprise Backup managers
- Can mix-and-match real and z/OS tape
- Efficient, low-level EXCP tape processing

# z/OS Media Server

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- Full integration with mainframe tape products
  - BrightStor CA-1
  - BrightStor CA-Dynam/TLMS Tape Management
  - DFSMSrmm
  - BrightStor CA-Vtape Virtual Tape System
  - Tape libraries and other hardware
- Required z/OS components will be packaged with CA Common Services for z/OS and OS/390

# 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
- Share tape drives across zO zVM, and Linux systems
- Backing up to ONE Platform



# Questions

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# Contact Information

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