Managing z/VM and Linux on System z
Brief Overview

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Agenda

- **Overview**

- **System management**
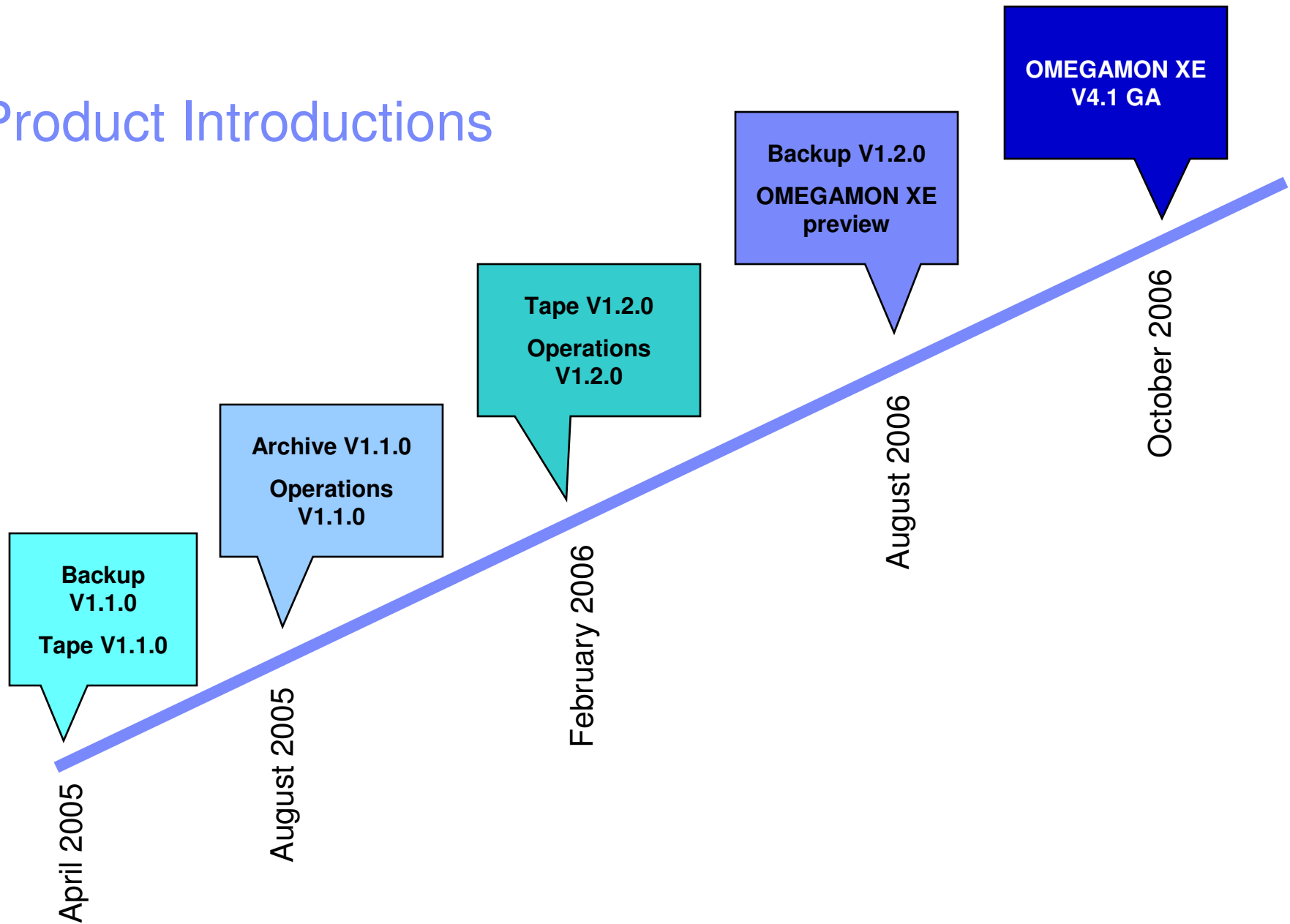
- **Storage management**

- **Demo**

- **Summary**

Overview

IBM Products

- **System and Performance Management**

  – OMEGAMON XE on z/VM and Linux

  – Operations Manager for z/VM

- **Storage Management**

  – Backup and Restore Manager for z/VM

  – Tape Manager for z/VM

  – Archive Manager for z/VM

Managing z/VM and Linux on System z

Product Introductions

OMEGAMON XE
V4.1 GA

Backup V1.2.0

OMEGAMON XE
preview

Tape V1.2.0

Operations
V1.2.0

Archive V1.1.0

Operations
V1.1.0

Backup
V1.1.0

Tape V1.1.0

October 2006

August 2006

February 2006
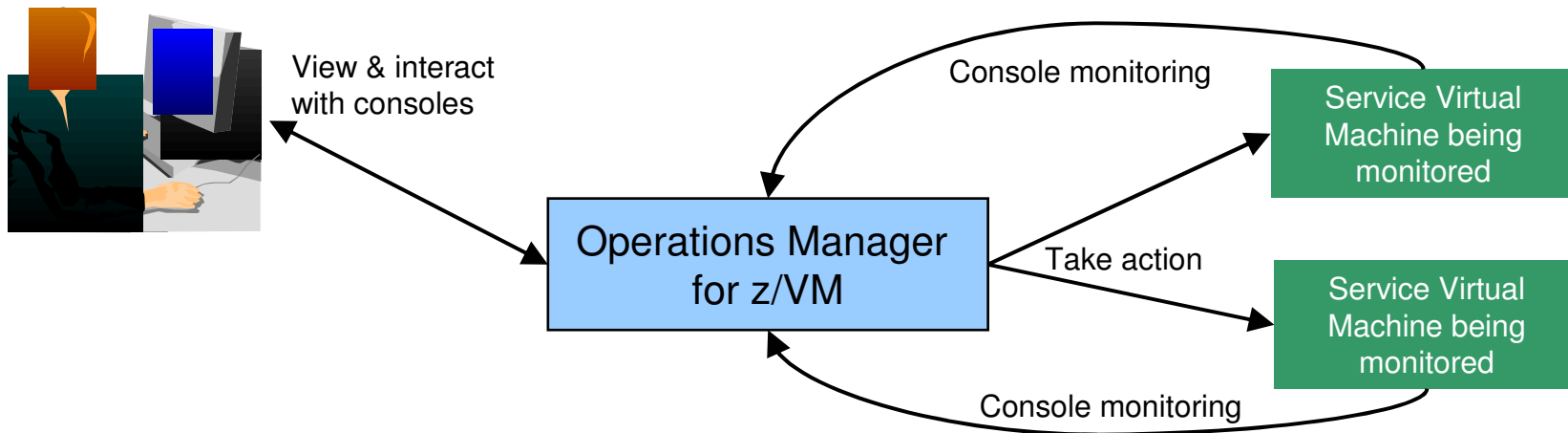
August 2005

April 2005

Managing z/VM and Linux on System z

Operations Manager for z/VM

Operations Manager for z/VM

➤Increase productivity
  ➤ Authorized users view and interact with monitored virtual machines without logging onto them
  ➤ Multiple users view/interact with a virtual machine simultaneously

➤Improve system availability
  ➤ Monitor virtual machines and processes
  ➤ Take automated actions based on console messages
  ➤ Reduce problems due to operator error

View & interact with consoles

Console monitoring

Operations Manager for z/VM

Service Virtual Machine being monitored

Take action

Service Virtual Machine being monitored

Console monitoring

Automation
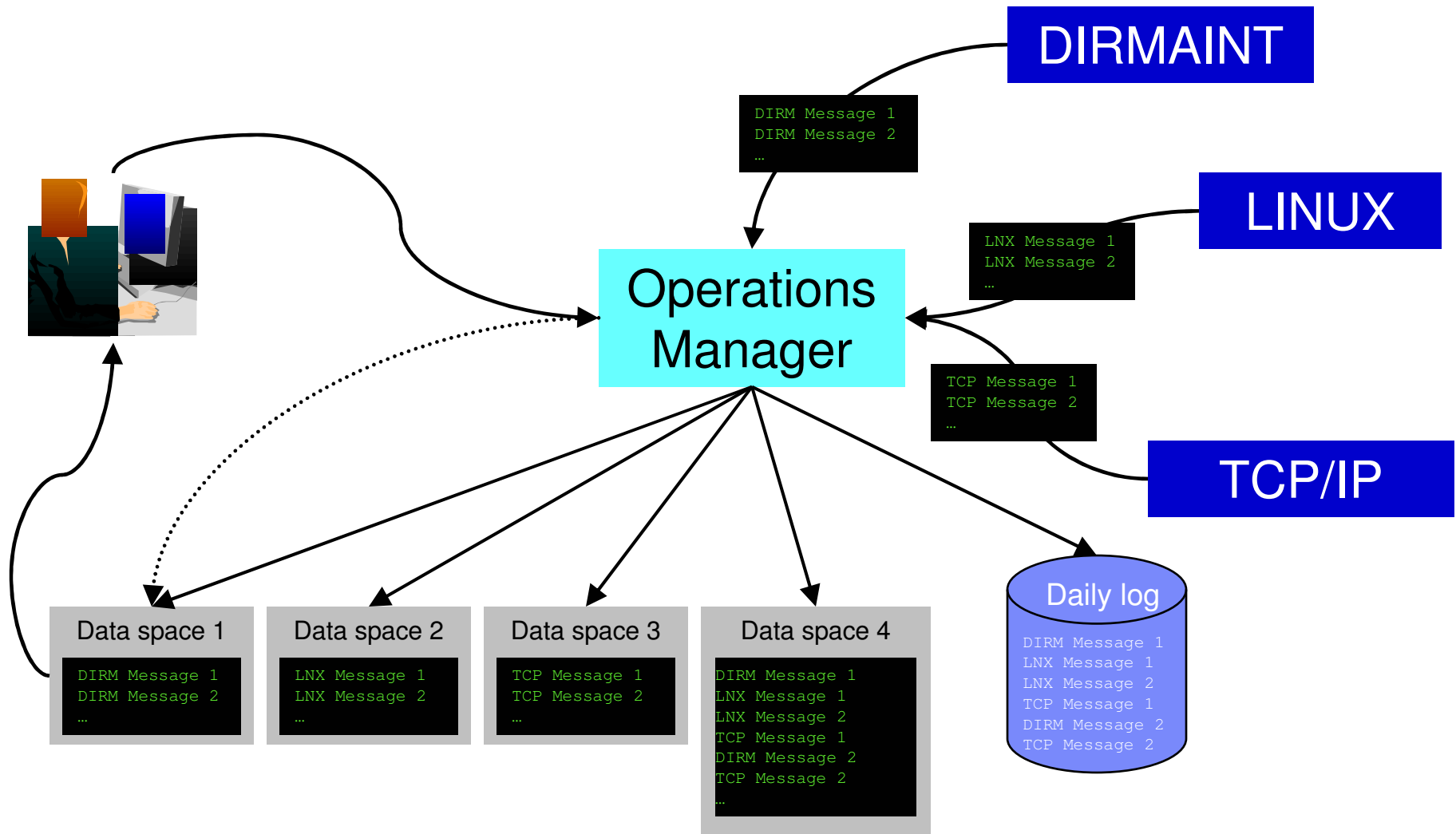Routine activities done more effectively with minimal operations staff

Integration
Fulfill take action requests from OMEGAMON XE on z/VM and Linux

Features and Functions

- **Monitor service machines**

- **View and interact with monitored consoles from authorized user IDs**

- **Schedule events/actions**

- **Dynamic configuration**

- **Separation of access control**

Monitor Service Machines

DIRMAINT

```
DIRM Message 1
DIRM Message 2
…
```

LINUX

```
LNX Message 1
LNX Message 2
…
```

Operations Manager

```
TCP Message 1
TCP Message 2
…
```

TCP/IP

Data space 1

```
DIRM Message 1
DIRM Message 2
…
```

Data space 2

```
LNX Message 1
LNX Message 2
…
```

Data space 3

```
TCP Message 1
TCP Message 2
…
```

Data space 4

```
DIRM Message 1
LNX Message 1
LNX Message 2
TCP Message 1
DIRM Message 2
TCP Message 2
…
```

Daily log

```
DIRM Message 1
LNX Message 1
LNX Message 2
TCP Message 1
DIRM Message 2
TCP Message 2
```

Managing z/VM and Linux on System z

Monitor Service Machines

- **Define rules to**

  – Scan console messages for text matching

    • Includes column, wildcard, and exclusion support

  – Take actions based on matches

- **Multiple rules can apply to one message**

  – Rules processed in order of definition in the configuration file

  – FINAL option available to indicate no additional rules should be evaluated

View and Interact with Consoles

- **Authorized users view a single server console or a group of server consoles**
  - Multiple users can view the same console simultaneously

- **Fullscreen mode**
  - Scroll up and down to view and search historical data
  - Auto scroll (on or off) as new output is displayed on the console
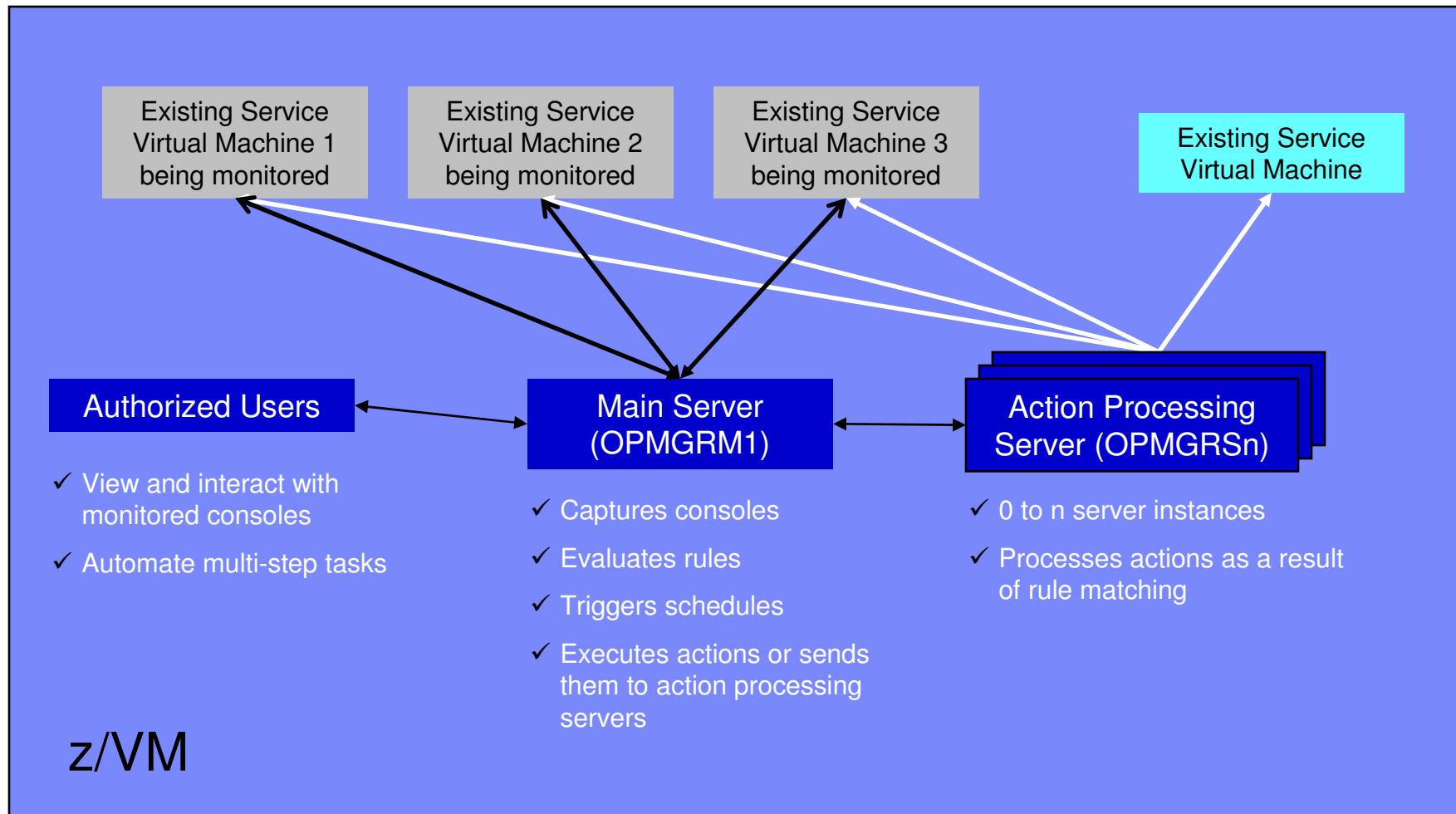 - From command line, issue commands back to the monitored console

- **Rules/actions may modify the view**
  - Suppress messages from the console
  - Hold or highlight messages with color, blinking, etc.

Schedule Events and Actions

- **Define schedules**
  - Hourly, daily, weekly, monthly, or yearly
  - Once on specified month, day, year, and time
  - At regular intervals
    - Every x hours and y minutes
  - Within a specified window of time
    - Specify start time
    - Specify conflicting schedules
    - Specify maximum time to defer this schedule
  - Within limits
    - Restrict to specific days of the week: Monday through Sunday plus holidays
    - Restrict to certain hours of the day

- **Specify the action associated with the schedule**
  - Actions specified are the same as those for console rules

Operations Manager

Existing Service Virtual Machine 1 being monitored	Existing Service Virtual Machine 2 being monitored	Existing Service Virtual Machine 3 being monitored	Existing Service Virtual Machine

Authorized Users

✓ View and interact with monitored consoles

✓ Automate multi-step tasks

Main Server (OPMGRM1)

✓ Captures consoles

✓ Evaluates rules

✓ Triggers schedules

✓ Executes actions or sends them to action processing servers

Action Processing Server (OPMGRSn)

✓ 0 to n server instances

✓ Processes actions as a result of rule matching

z/VM

Summary

- **Use Operations Manager to**

  – Automate daily operations

  – Prevent problems rather than react to them

  – Automate reactions to problems when they can't be prevented

  – Improve problem determination procedures

  – Increase programmer and operator productivity

IBM Software

Backup and Restore Manager for z/VM

Product Overview

- **Backup**
  - Requested by administrators
  - Full or incremental
  - Flexible selection of disks and files to back up
  - Review job before submitting for backup
  - Catalog housed in Shared File System

- **Restore**
  - Performed by users for their own data
  - Extending to other users available via exit
  - Performed by administrators for any data
  - Selection of data to restore
    - Full screen interface or commands

- **Integration with Tape Manager for z/VM**
- **Optional compression of data during backup**
  - **Call your own compression algorithm**
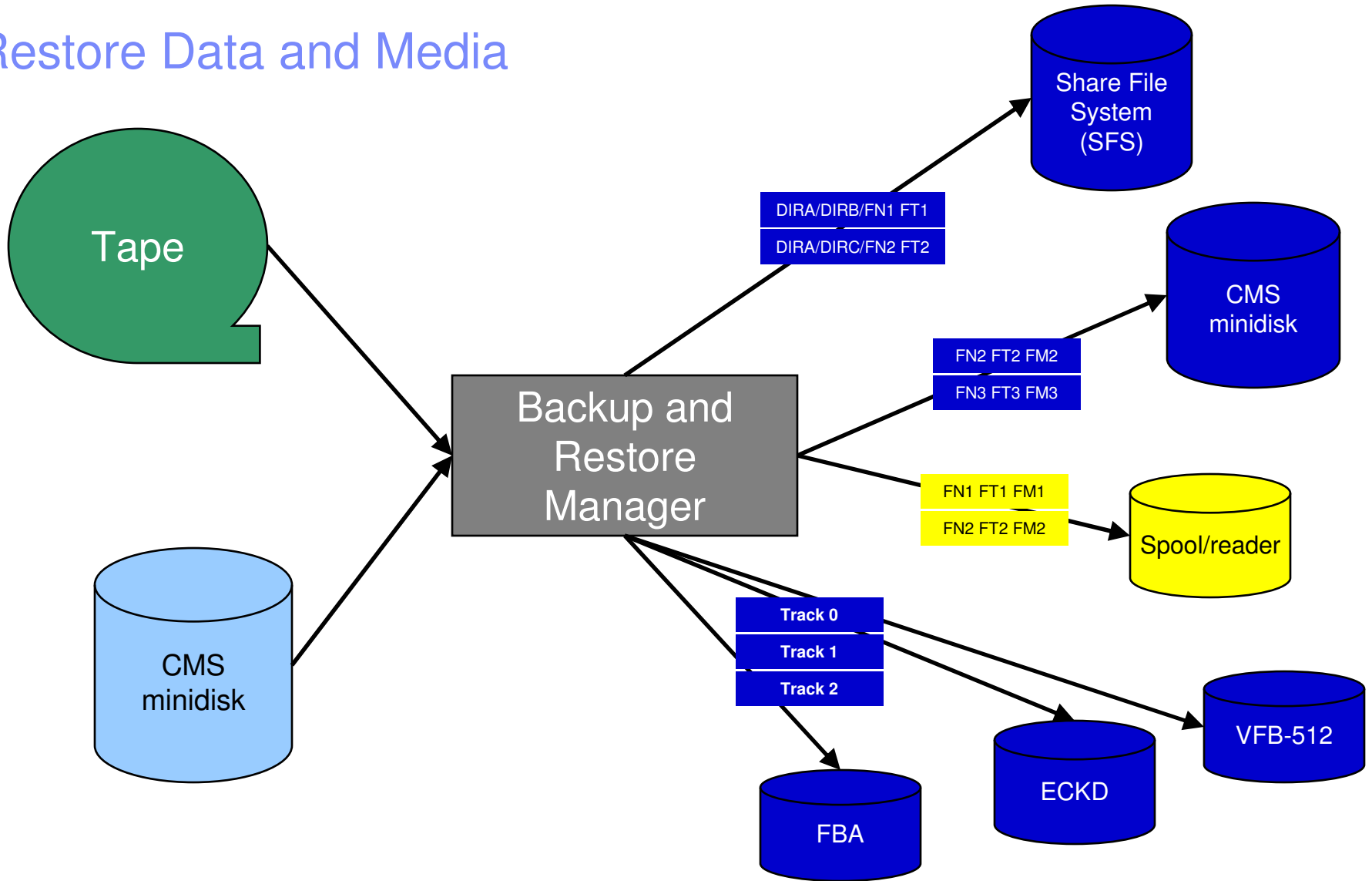 - **Use IBM provided routine**
- **Encryption exits available**
  - **Call your own routine**
  - **Use vendor-written routine, such as V/Soft Software's Encrypt/Backup for z/VM**

Backup Data and Media

Restore Data and Media

Tape

Share File System (SFS)

DIRA/DIRB/FN1 FT1
DIRA/DIRC/FN2 FT2

Backup and Restore Manager

CMS minidisk

FN2 FT2 FM2
FN3 FT3 FM3

FN1 FT1 FM1
FN2 FT2 FM2

Spool/reader

CMS minidisk

Track 0
Track 1
Track 2

FBA

ECKD

VFB-512
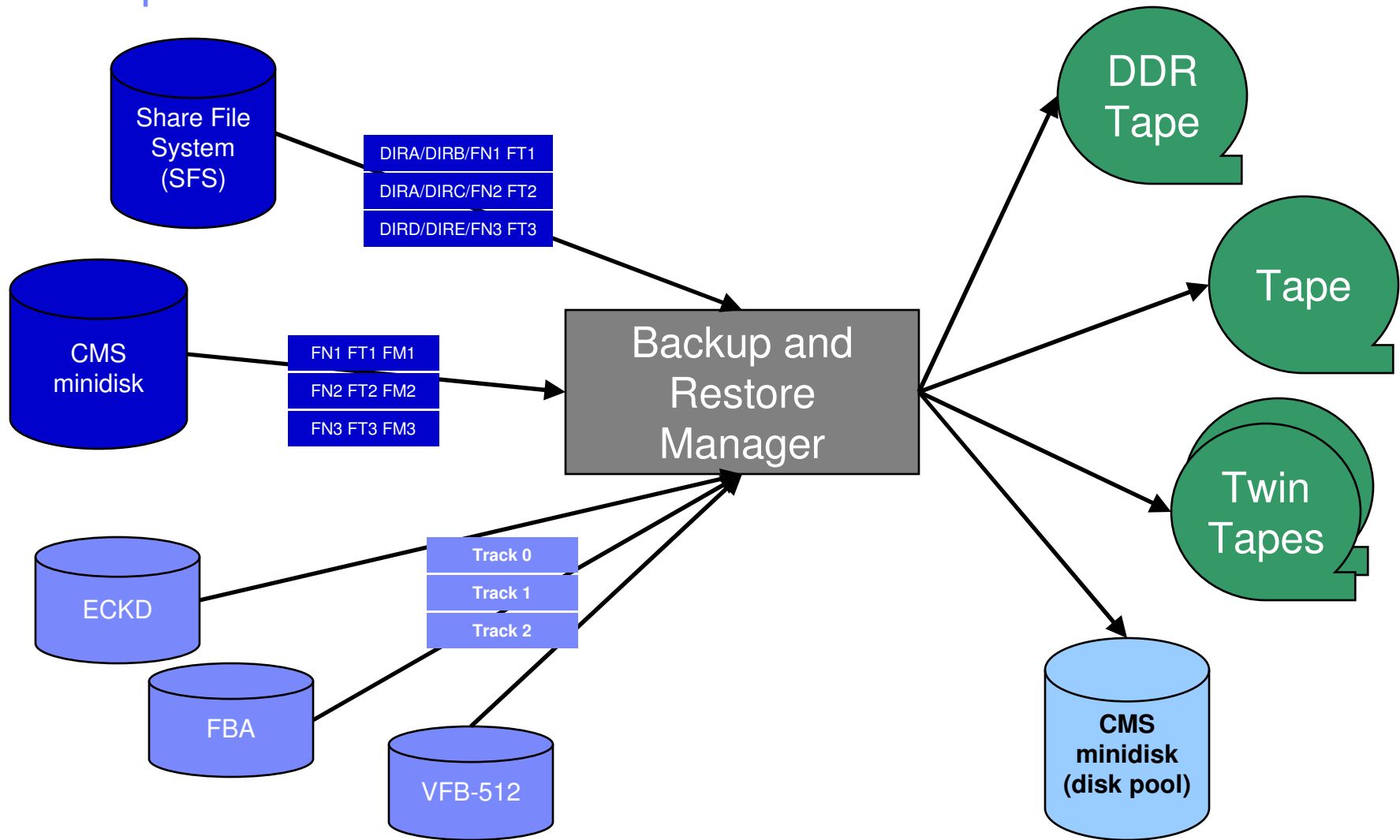
Backup and Restore Manager and Linux Guests

Using Backup and Restore Manager with Tivoli Storage Manager

Choose the solution that meets your needs
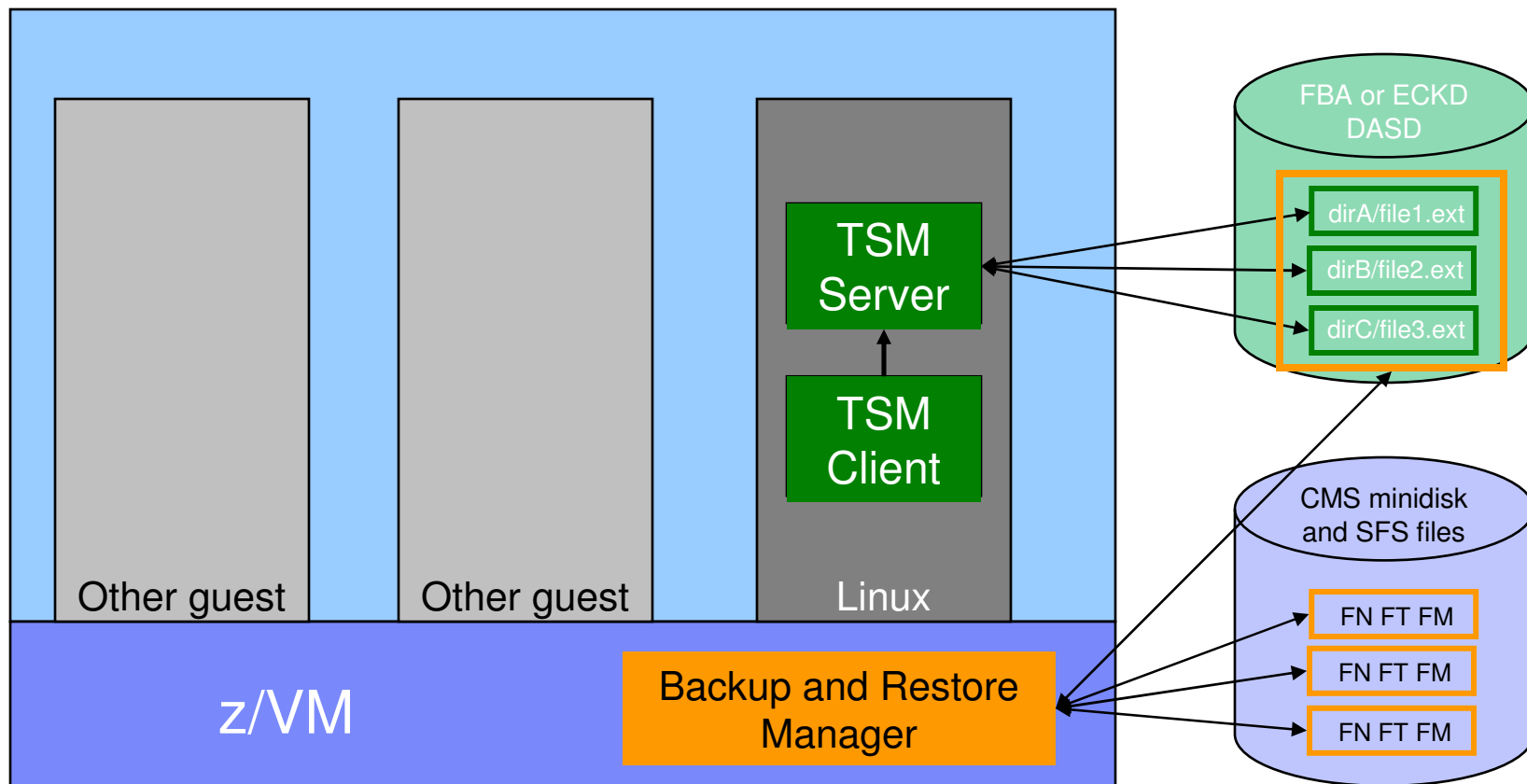
Key Benefits

- **System backups available for Disaster Recovery**
  - Option to restore using DDR or Backup and Restore Manager
  - Manage retention of DR backups
  - Retrieve a list of tapes associated with a specific backup
    - Pull list for movement to off-site storage
- **Guest backups available for restoring to a previous state or level**
- **Backups of user data available for**
  - Restoring to a previous state or level
  - Replacing files accidentally erased or corrupted
- **Users restore their own data**
  - No administrator interaction required

Key Benefits

- **Flexible selection of data to back up**
  - Include/exclude
    - Minidisks, directories
    - Real device addresses or volsers
    - Extents
  - Mask by filename, filetype, or SFS path
  - Review a defined backup job before submission

- **Management of backup data**
  - Retention set as part of the backup job
  - Automatic aging and pruning of the backup catalog
    - Including associated tapes and disk pools
  - View/query the list of expired backups

- **Reduced backup window with concurrent processing**
  - Multiple worker service machines sharing the job
  - Suggest one worker service machine for each available tape drive

Defining a Backup Job

```
/* Include/Exclude definitions                                      */
/***************************************************************/
  FUNCTION   MEDIATYPE   OWNER      VDEV VOLUME DEVTYPE        START          END           SIZE
|----------|----------|--------|--|----|------|--------|--|----------|--|----------|--|-------|
 INCLUDE    MINIDISK    *        = *    *      *        = *          = *          = *
 EXCLUDE    MINIDISK    *LNX*    = *    *      *        = *          = *          = *
 EXCLUDE    MINIDISK    MAINT    = 0123 *      *        = *          = *          = *
 EXCLUDE    MINIDISK    MAINT    = 0124 *      *        = *          = *          = *
 EXCLUDE    MINIDISK    *        = *    *      *        = *          = END        = *
 EXCLUDE    MINIDISK    *        = *    *      *        = *          = *          > 3300
 INCLUDE    MINIDISK    MAINT    = 012* *      *        = *          = *          = *
 *SELECT     MINIDISK    MAINT 0123 0-0,1-20,391.45,436-480,3230.4,3238-end
 *SELECT     MINIDISK    MAINT 0124 0-End


  FUNCTION   MEDIATYPE   ADDRESS
|----------|----------|---------|
 INCLUDE    RDEVICE     A0*
 INCLUDE    RDEVICE     900-90F


  FUNCTION   MEDIATYPE   VOLSER
|----------|----------|------|
 INCLUDE    RDEVVOL     510*


  FUNCTION   MEDIATYPE   POOLNAME   OWNER    FS
|----------|----------|--------|--------|---|
 INCLUDE    SFS         VMSYSU:    *        SFS
 EXCLUDE    SFS         VMSYSU:    VMSERVU  *
```

Summary

- **Use Backup and Restore Manager to**

    – Perform file-level backups of z/VM data

    – Perform image level backups on non-z/VM guest data

    – Perform disaster recovery backups of entire system

    – Easily find and restore data as needed

    – Manage retention of backup data

IBM Software

Tape Manager for z/VM

Product Overview

- **Manage tapes**
  - Define tapes in a catalog, including:
    - Free or used
    - Retention/expiration information
    - ATL or manual mount
    - Data Security Erase
  - Group tapes together into pools
    - Ownership and access control
    - Media type

- **Manage devices**
  - Define available devices
    - Dedicated or assignable
  - Group devices together into device pools
    - ATL/VTS or manual mount
    - Any other grouping you choose (read only vs. write, location, etc.)
  - Share devices with other systems

- **Manage mount requests**
  - Volume specific and scratch requests
    - Standard Label
    - Non-Label
    - Bypass Label Processing

Key Benefits

- **Effective management of tapes in ATLs**
  - Granular access control
  - Expiration processing
  - Notification for low threshold for tape resources
  - Interacts with devices through DFSMSRMS on z/VM

- **Improved accuracy of manual tape processing**
  - Automated interface to Operator for manual mounts
  - Internal label verification at attach/give and detach (SL only)
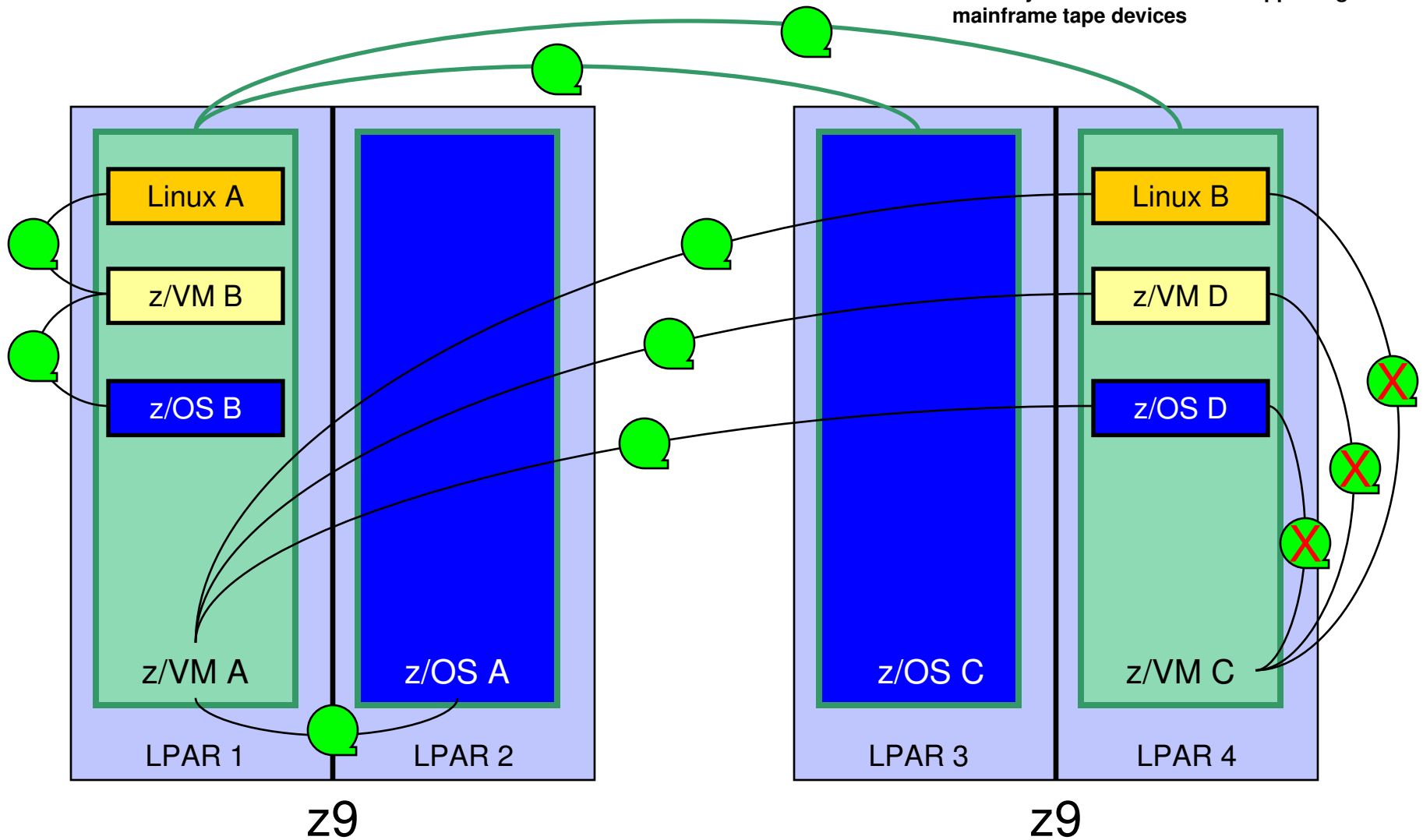 - Read/Write verification at attach/give

- **Integrated management of z/OS and z/VM tapes using DFSMSrmm on z/OS**
  - Optionally use RMM on z/OS as the tape catalog for z/VM and z/OS tapes
  - Tapes, access control, and retention managed by the existing RMM catalog
  - Accessible via Tape Manager on z/VM
  - Tapes managed by RMM
  - Devices managed by Tape Manager

Data Security Erase (DSE)

- **Erase (sensitive) data before tape is reused**
- **Option to enable DSE at tape pool or individual tape level**
  - DSE-enabled flag included in each catalog entry
- **DSE-enabled tapes marked as DSE-ready when freed**
- **Tape Manager DSE utility executed on a separate user ID**
  - Started manually or automatically with Operations Manager
  - Queries the catalog to find all tapes with DSE-ready flag on
  - Mounts each tape
    - Verifies volume label if possible
      - Configuration option to perform DSE on NL tapes or not
    - Erases tape
    - Turns off DSE-ready flag in catalog
  - Tape is now available for scratch unless its HOLD flag is on

Sharing of Tape Devices

> z/VM systems with IBM Tape Manager

> z/OS systems with IBM Automated Tape Allocation Manager

> Linux systems with software supporting mainframe tape devices

Linux A

z/VM B

z/OS B

z/VM A

z/OS A

LPAR 1

LPAR 2

z9

Linux B

z/VM D

z/OS D

z/OS C

z/VM C

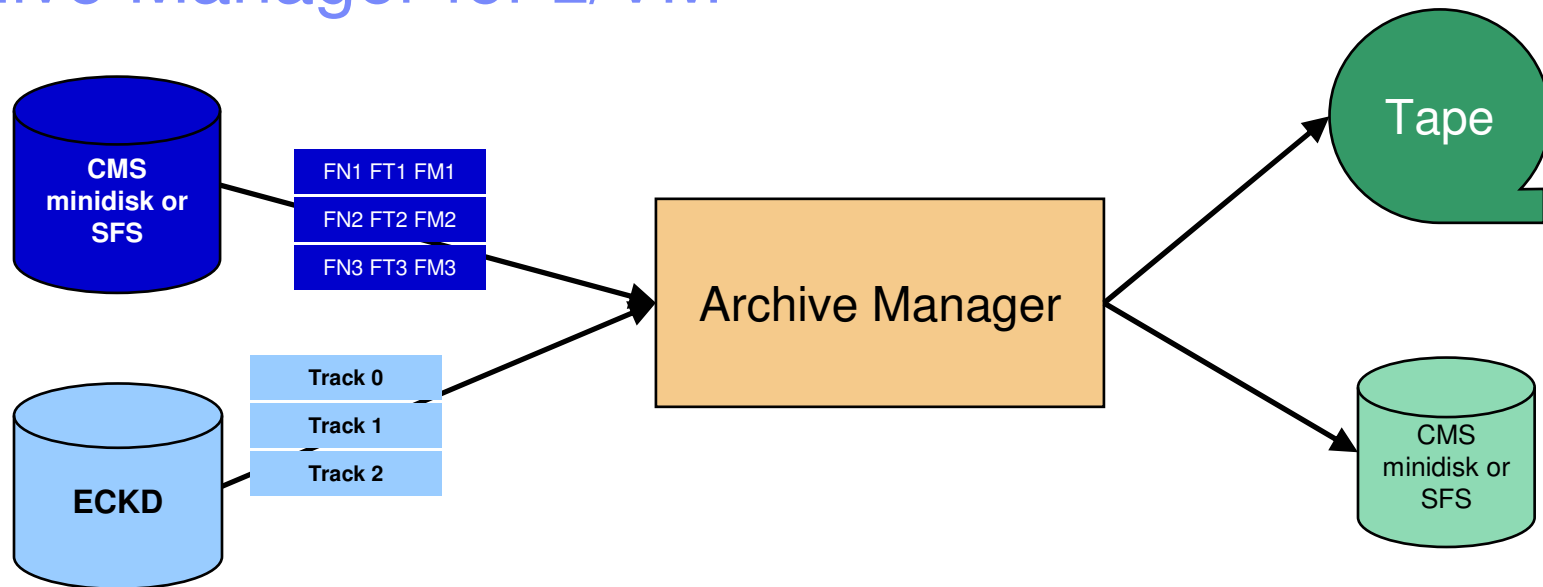LPAR 3

LPAR 4

z9

Summary

- **Use Tape Manager to**

  – Manage and share devices

  – Manage tape volumes

  - Access control

  - Retention

  - Data Security

  – Improve accuracy of mount requests

Archive Manager for z/VM

Archive Manager for z/VM

- **Improve end user satisfaction and productivity**
  - Users manage their own disk space
  - Move infrequently used files to tape or other disk
  - Archive and recall functions are controlled by the user
    - No administrator intervention required
  - Archived data staged to DASD, then tape if applicable
    - Users don't wait for a tape mount for archive request to complete

- **Reduce DASD space requirements**
  - Archive older files to less expensive storage media
  - Continue to provide users access to the archived data/files

- **Control location, retention, and access to archived data**

- **Integration with Tape Manager for z/VM**

Summary

- **Use Archive Manager to**

  – Improve management of disk space

  – Easily and immediately archive data when a disk is approaching full

  – Manage retention of archived data

Summary

- **Management of z/VM systems with Linux guests requires monitoring and management tools**

- **IBM solutions exist**

  – OMEGAMON XE on z/VM and Linux

  – Operations Manager for z/VM

  – Tape Manager for z/VM

  – Backup and Restore Manager for z/VM

  – Archive Manager for z/VM

Reference Information

- **Product Web sites**

  – http://www.ibm.com/software/stormgmt/zvm/

    • Publications

    • Pre-requisites

    • Announcements

    • Support

- **e-mail**

  – Tracy Dean, tld1@us.ibm.com