



IBM Software

# Backing Up and Restoring a z/VM Cluster and Linux on System z Guests

**Tracy Dean, IBM**  
**[tld1@us.ibm.com](mailto:tld1@us.ibm.com)**

**March 2012**

## Agenda


- **Recommended practices**
- **Requirements for these scenarios**
- **Overview of product(s) being used**
- **Backup scenarios**
  - Can be product agnostic
  - Live demos
  - Configuration options and sample code
- **Summary and reference information**

## Recommended Practices – Backup and Recovery

### Image level backup of z/VM

- Operating system

### File level backup of z/VM data

- Directory information
  - Configuration files
  - Log files
  - Tools – REXX EXECs, automation scripts, etc.
- 


### Image level backup of Linux guests

- Operating system
- Applications
- Application data (maybe)

### File level backup of Linux guests

- Configuration files
- Log files
- Tools

### Disaster recovery of z/VM system, including Linux guest

- Dependence on z/OS
- versus
- Independent recovery in parallel with z/OS
- 



IBM Software

# Requirements

*Implementing these Scenarios*

## Backup requirements for z/VM system

- **Define a backup job that limits the backup to a specified set of disks**
- **Customize messages that are displayed when backup is complete**
- **Invoke backup via an “API”**
- **Use a shared backup catalog across the cluster**
- **Use backup service machines on each member of the cluster**



IBM Software

# Managing Backup and Recovery

## *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

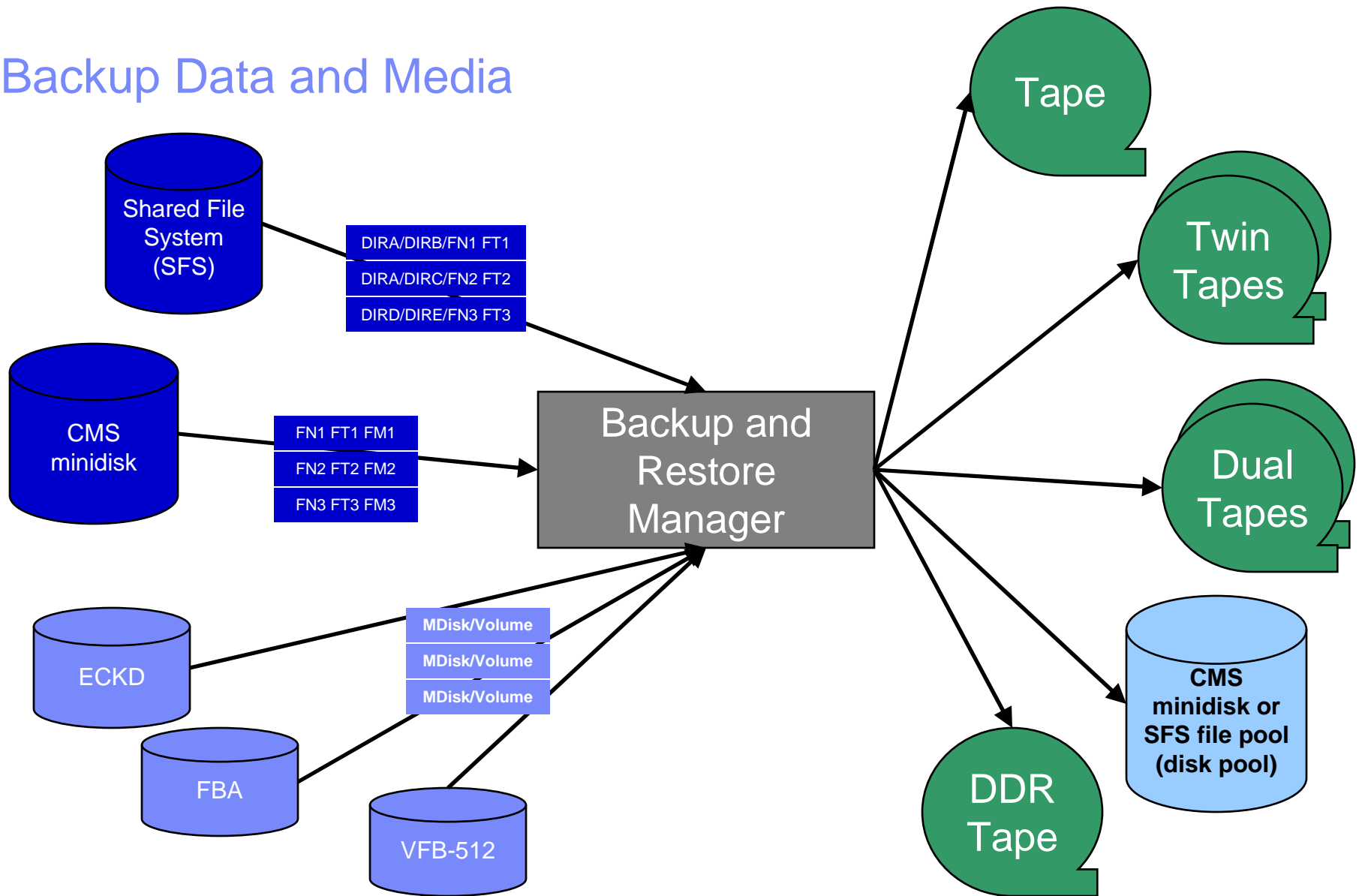
### ▪ Restore

- 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

**Catalog in Shared File System (SFS) – presentation on web site for installation and setup**

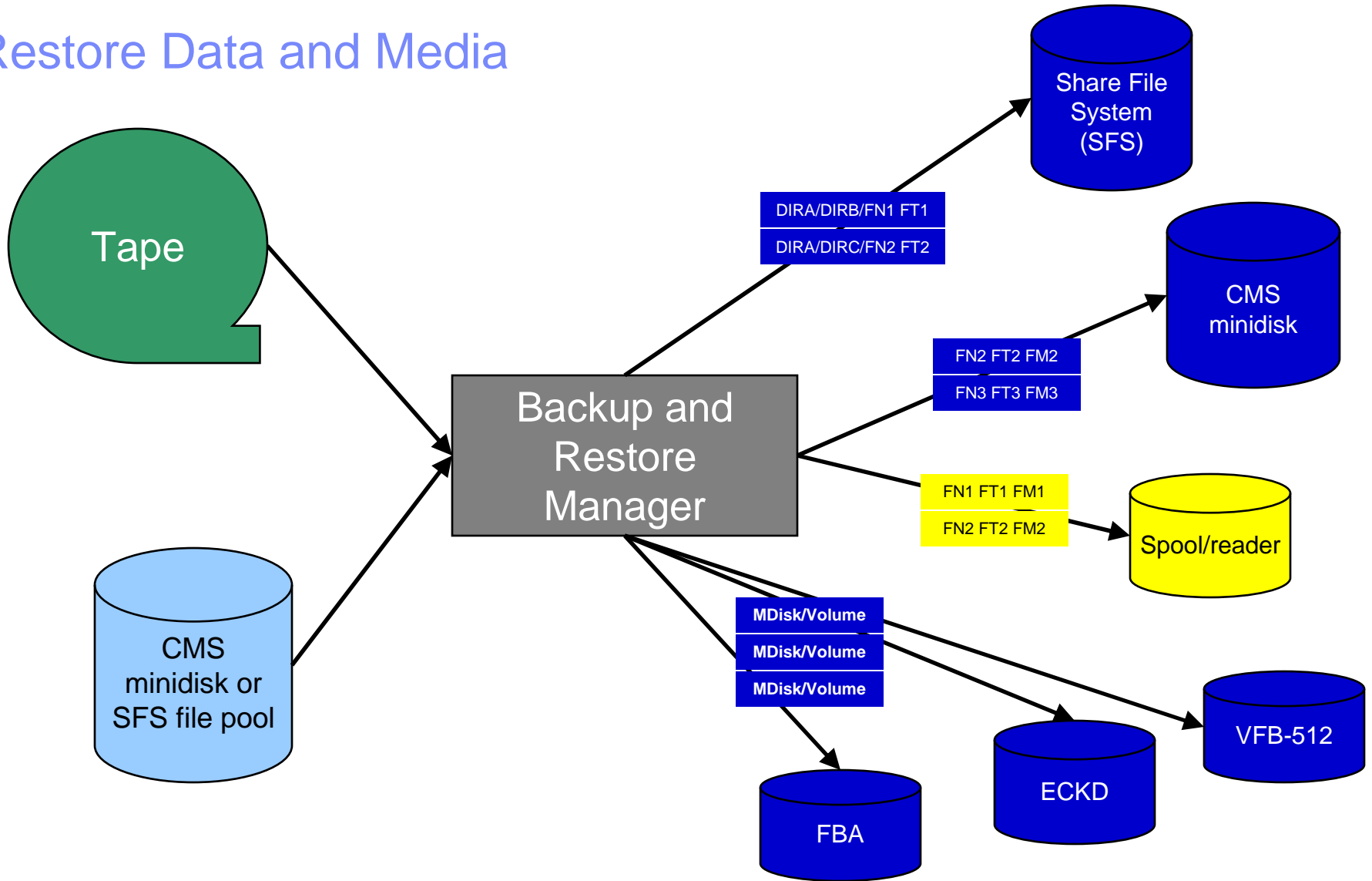
- **Integration with Tape Manager for z/VM**
- **Optional compression of data during backup via exits**
  - Call your own compression algorithm
  - Use IBM provided routine
- **Encryption available via exits**
  - Call your own routine
  - Use vendor-written routine, such as V/Soft Software's Encrypt/Backup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

# Backup Data and Media





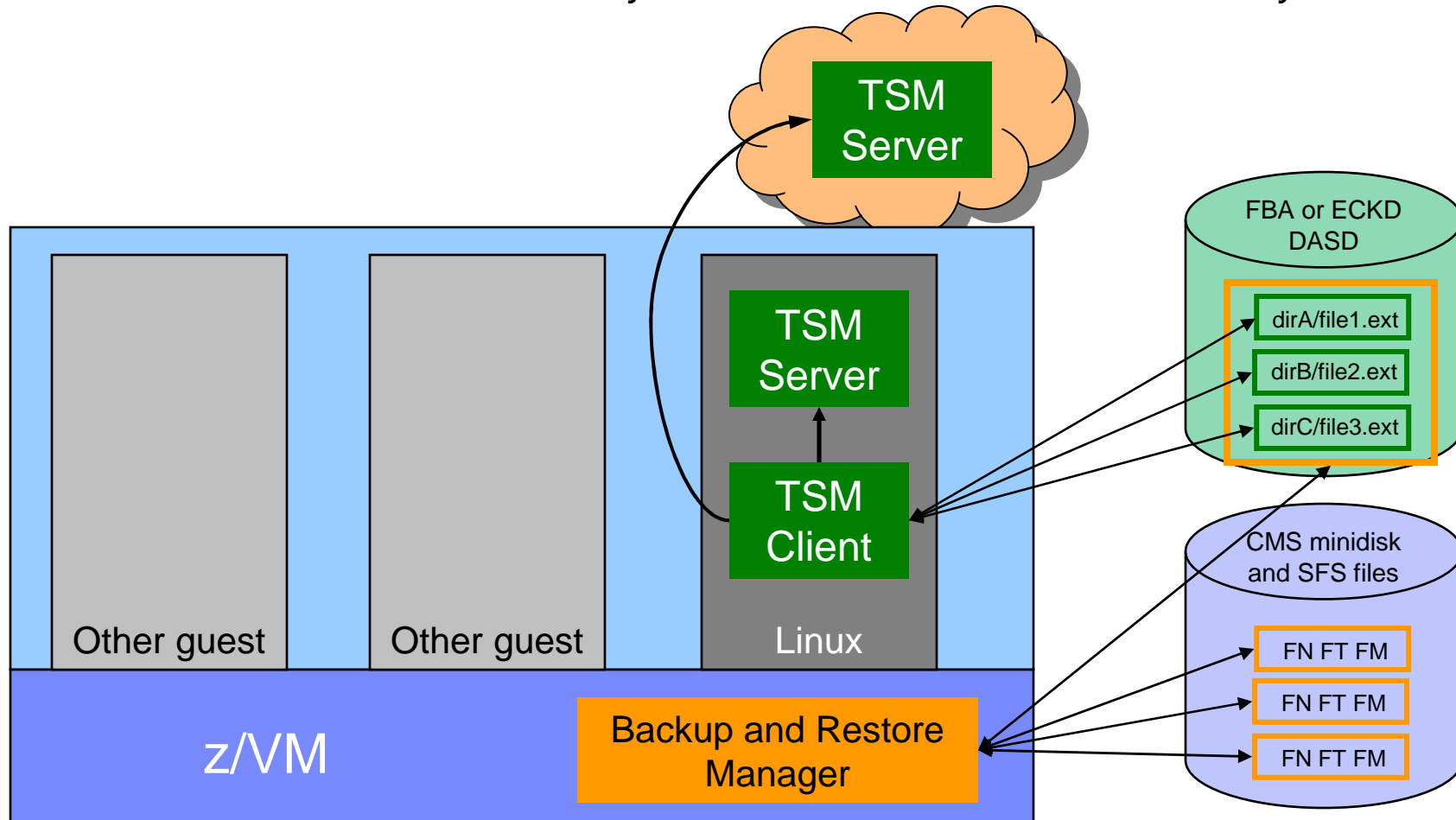
# Restore Data and Media



## Backup and Restore Manager and Linux Guests

### *Using Backup and Restore Manager with Tivoli Storage Manager*

*Choose the solution that meets your needs – or combine for file recovery and DR*



## 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 Cont...

- **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 */
/*****/

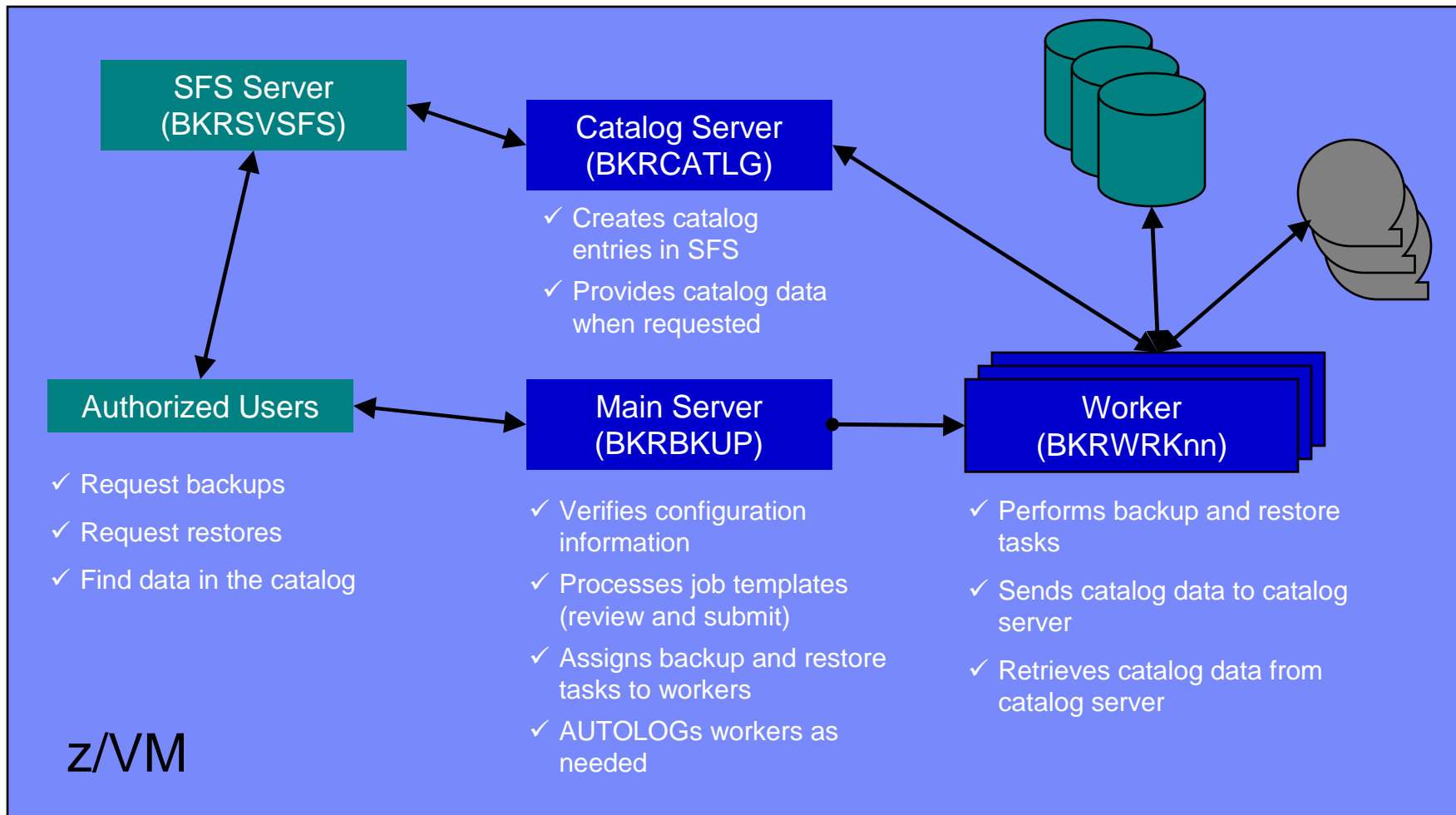
FUNCTION MEDIATYPE OWNER VDEV VOLUME DEVTYPE START END SIZE
-----|-----|-----|---|----|-----|---|-----|---|-----|
INCLUDE MINIDISK * = * * * = * = * = *
EXCLUDE MINIDISK *LNX* = * * * = * = * = *
EXCLUDE MINIDISK MAINT = 0123 * * = * = * = *
EXCLUDE MINIDISK MAINT = 0124 * * = * = * = *
EXCLUDE MINIDISK * = * * * = * = END = *
EXCLUDE MINIDISK * = * * * = * = * > 3300
INCLUDE MINIDISK MAINT = 012* * * = * = * = *

FUNCTION MEDIATYPE ADDRESS
-----|-----|-----|
INCLUDE RDEVICE 900-90F
EXCLUDE RDEVICE *B

FUNCTION MEDIATYPE VOLSER
-----|-----|-----|
INCLUDE RDEVVOL 610*

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

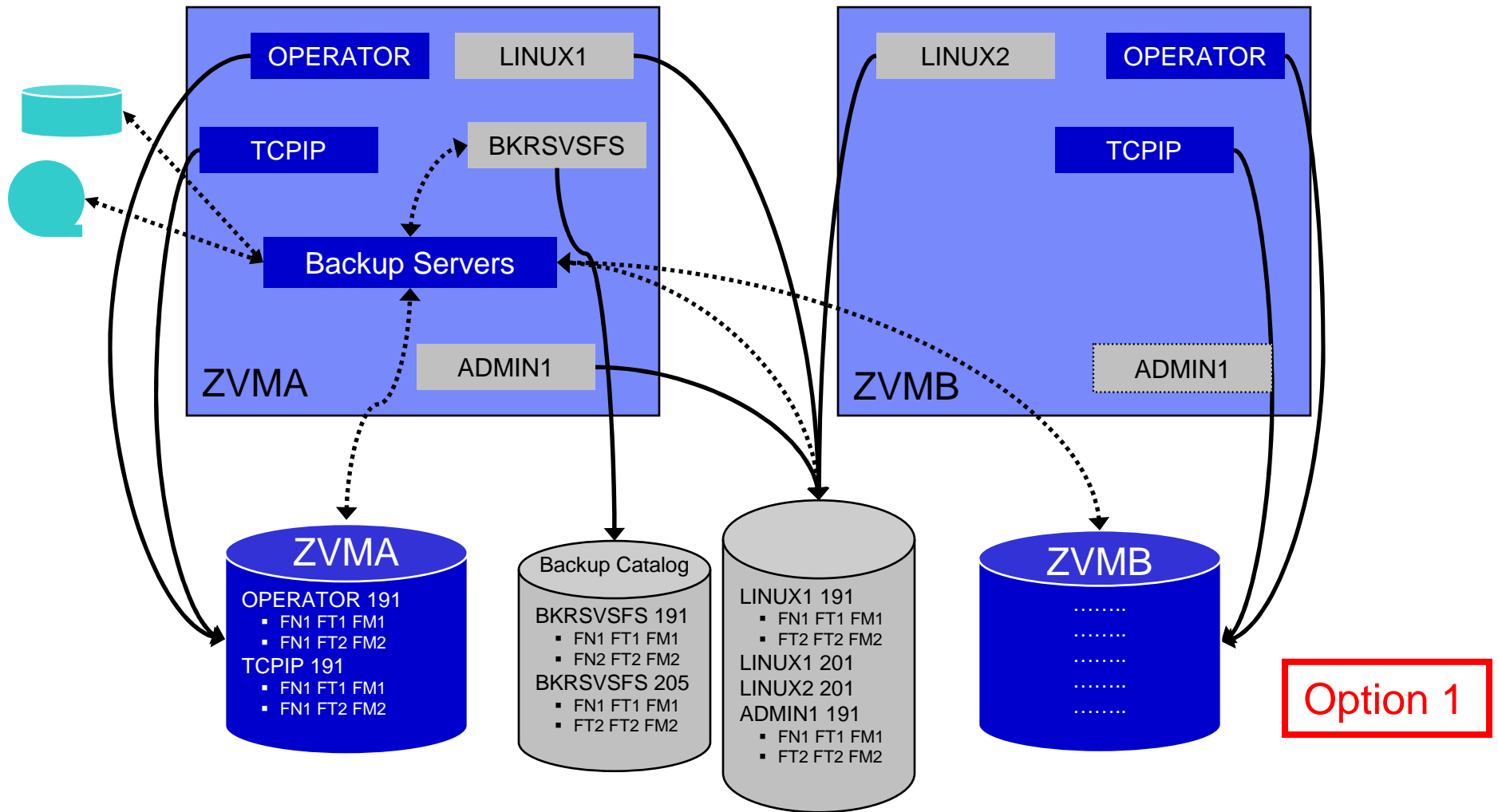
# Backup and Restore Manager Architecture – non-SSI



Single Config Users and MDisks

Multiconfig Users and MDisks

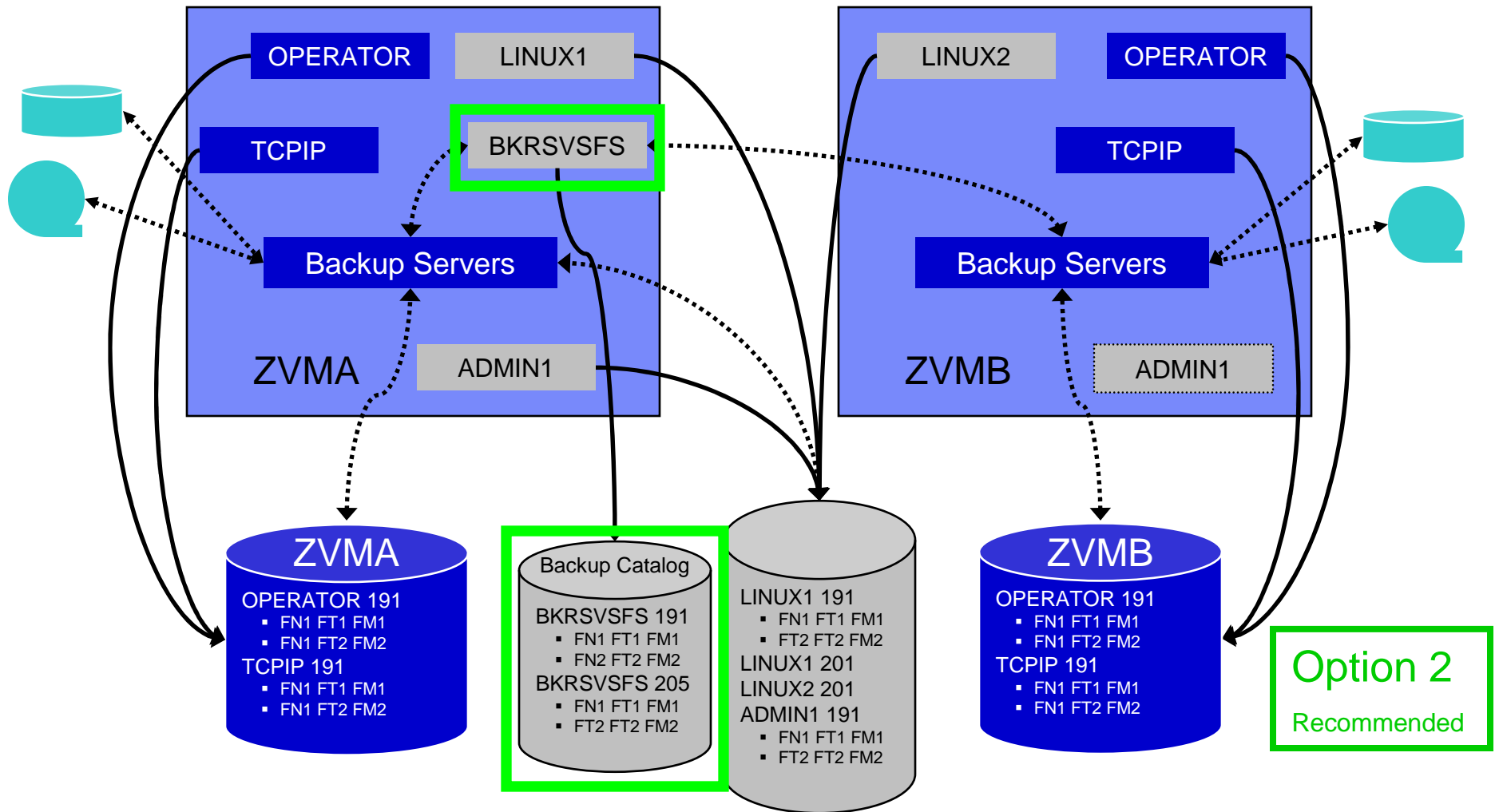
# SSI Considerations for Backup and Restore



Single Config Users and MDisks

Multiconfig Users and MDisks

# SSI Considerations for Backup and Restore

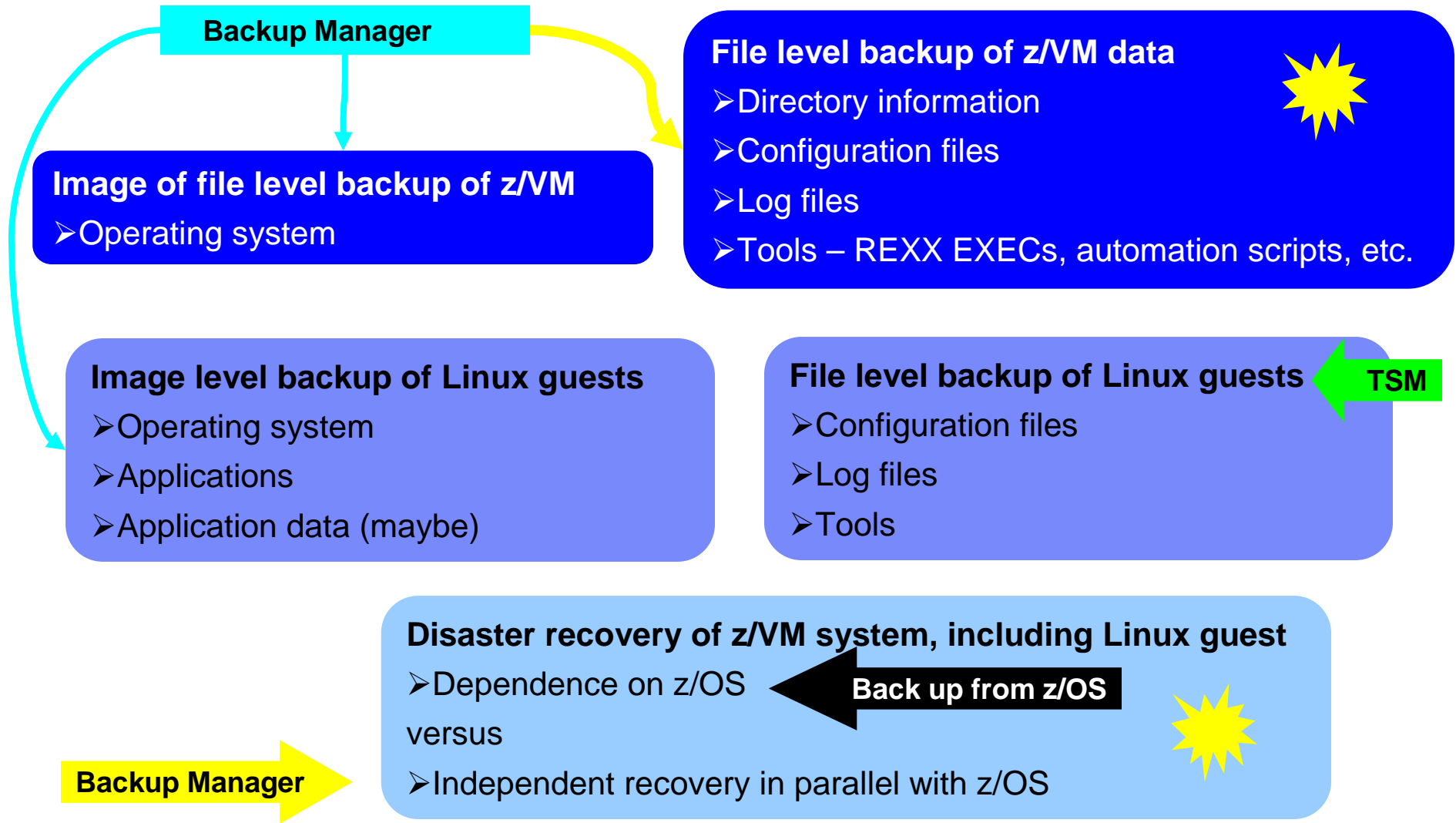




## SSI Considerations for Backup and Restore

- **Backup Manager service machines on any member can see all minidisks of single configuration users**
- **Backup Manager service machines on any member can see all minidisks of local multiconfiguration (IDENTITY) users**
  - Can not see minidisks of IDENTITY users on other members
  - Can only see DASD volume (if shared/available) of IDENTITY users on other members
- **Recommendation**
  - Create Backup Manager service machines as IDENTITY users on each member
  - Create one single configuration user for SFS server/filepool for the backup catalog
    - Configure as SSI (or REMOTE) in DMSPARMS file
    - Allows single configuration users to restore their own data when logged onto any member
  - Create multiple backup jobs
    - One job for all single configuration users – only run it from one member
    - For multiconfiguration (IDENTITY) users
      - One job per member
      - Use a unique job name on each member
      - Run the member specific job on that member's backup server

# Recommended Practices – Backup and Recovery



## Summary

- **Use Backup and Restore Manager to**
  - Perform file-level backups of z/VM data
  - Perform image level backups of non-z/VM guest data
    - Use Tivoli Storage Manager for file level backups of Linux
  - Perform disaster recovery backups of entire system
  - Easily find and restore data as needed
  - Automatically manage retention of backup data
  - Carefully plan for SSI configurations
    - Don't back up single configuration users from multiple systems



IBM Software

Automating Operations  
*Operations Manager for z/VM*

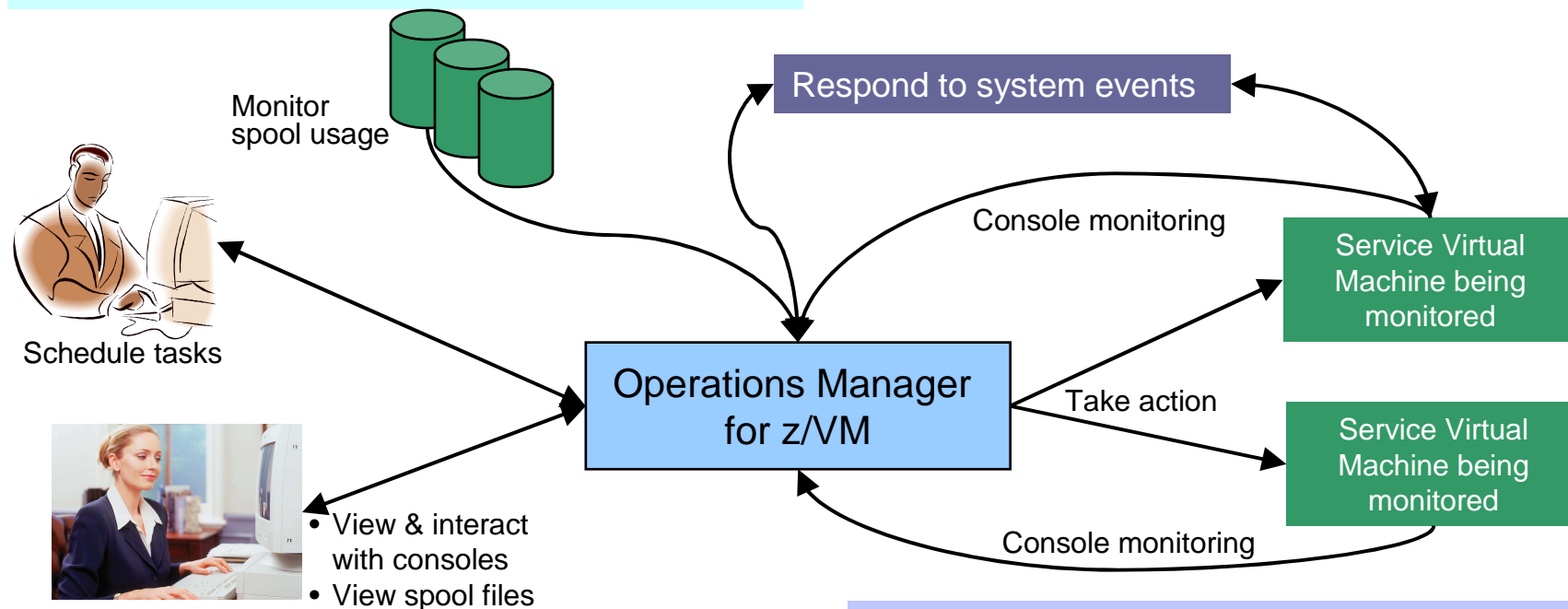
# Operations Manager for z/VM

## Increase productivity

- Authorized users to 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



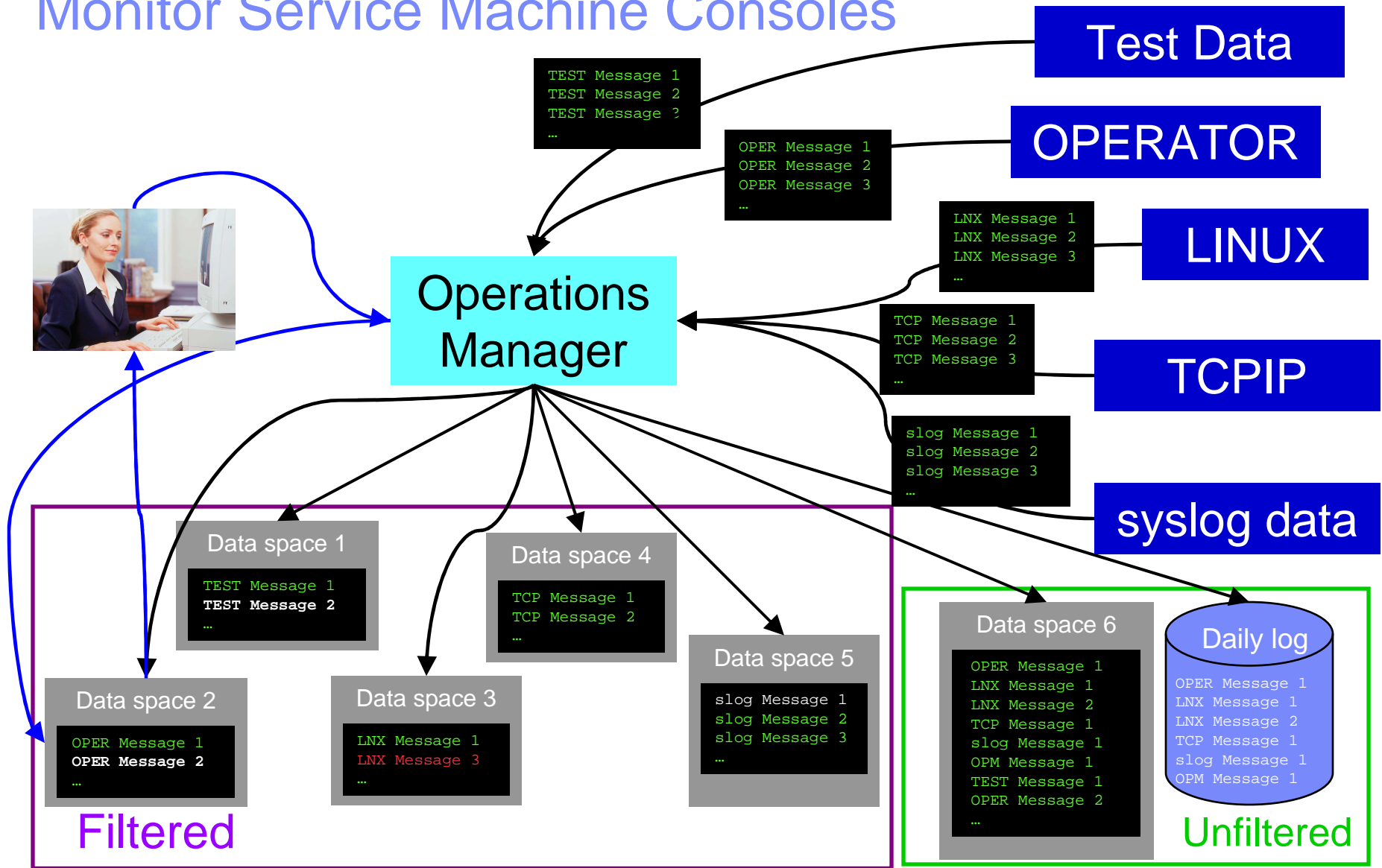
## Automation

- Routine activities done more effectively with minimal operations staff
- Schedule tasks to occur on a regular basis

## Integration

- Fulfill take action requests from performance monitoring products (e.g. OMEGAMON XE on z/VM and Linux)
- Send alerts to email, central event management systems (e.g. Netcool\OMNIbus), etc.

# Monitor Service Machine Consoles



## Summary

- **Use Operations Manager to**
  - Automate daily operations
  - Integrate your z/VM and Linux on System z environment with existing enterprise monitoring and alerting
  - 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
  - Continue to monitor locally with improved management of clusters

## Reference Information

- **Product Web site**
  - Start at <http://www.ibm.com/software/stormgmt/zvm/>
  - Product pages include
    - Publications
    - Pre-requisites
    - Announcements
    - Presentations
    - White papers
    - Support
- **e-mail**
  - Mike Sine, [sine@us.ibm.com](mailto:sine@us.ibm.com), Technical Marketing
  - Tracy Dean, [tld1@us.ibm.com](mailto:tld1@us.ibm.com), Product Manager
- **White papers on Operations Manager website (Library page)**
  - Routing Linux syslog data
  - Sending alerts from Operations Manager to Netcool/OMNIbus
  - Using Shared File System to store Operations Manager configuration files and automation EXECs
  - Automatically logging on a user at Linux system boot time for easier console management
- **White paper and presentation on Backup and Restore Manager website (Library page)**
  - Getting Started with Installation, including SFS server creation and installation of Backup Mgr
  - Backing up z/VM and Linux on System z – Tivoli Storage Manager vs Backup Manager





IBM Software

## Demonstration Scenarios

## Backup Demos Available (Including Automation)

- 1. Perform an incremental backup**
- 2. Find and restore a file from the backup catalog**
- 3. Backup and restore single and multiconfiguration users in an SSI environment**
- 4. Automatically shut down, back up, and restart a Linux guest**
- 5. Reviewing a disaster recovery backup**
- 6. Reviewing other ways to find data in the backup catalog**

धन्यवाद

Hindi

多謝

Traditional Chinese

감사합니다

Korean

Спасибо

Russian

Gracias

Spanish

شكراً

Arabic

Thank You

English

Obrigado

Brazilian Portuguese

Grazie

Italian

Danke

German

多谢

Simplified Chinese

Merci

French

நன்றி

Tamil

ありがとうございました

Japanese

ขอบคุณ

Thai