



IBM Software

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

SHARE Session 11812

Tracy Dean, IBM
tld1@us.ibm.com

August 2012



Agenda

- **Recommended practices**
 - Backing up and restoring z/VM
 - Backing up and restoring Linux on System z
 - Backing up and restoring data in a z/VM SSI cluster
- **Requirements for Demo Scenarios**
- **Overview of IBM products**
 - Backup and Restore Manager for z/VM
 - Tape Manager for z/VM
 - Operations Manager for z/VM
- **Backup scenarios**
 - Can be product agnostic
 - Live demos
 - Configuration options and sample code
- **Summary and reference information**

IBM z/VM Management Solutions

- **Security**
 - RACF and zSecure Manager for z/VM
- **Performance monitoring**
 - OMEGAMON XE on z/VM and Linux
- **Backup and recovery**
 - Backup and Restore Manager for z/VM
 - Tape Manager for z/VM
 - Tivoli Storage Manager
- **Automation and operational monitoring**
 - Operations Manager for z/VM
 - Including integration with existing monitoring and alert systems



IBM Software

Recommended Practices

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)

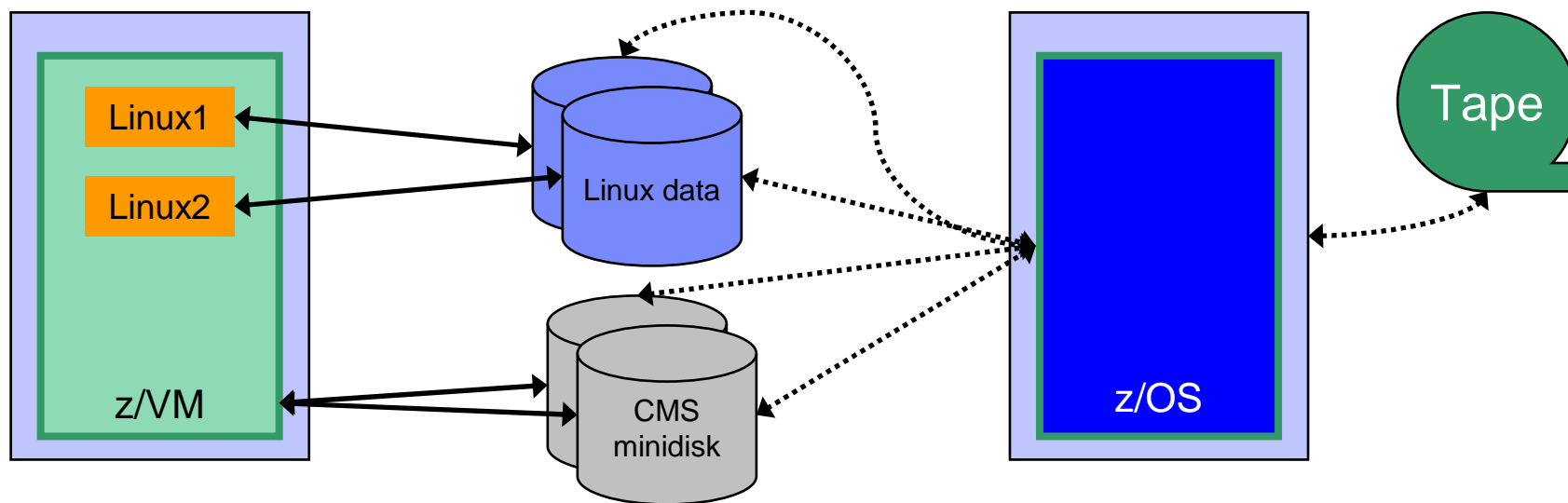
File level backup of Linux guests

- Configuration files
- Log files
- Tools

Disaster recovery of z/VM system, including Linux guest

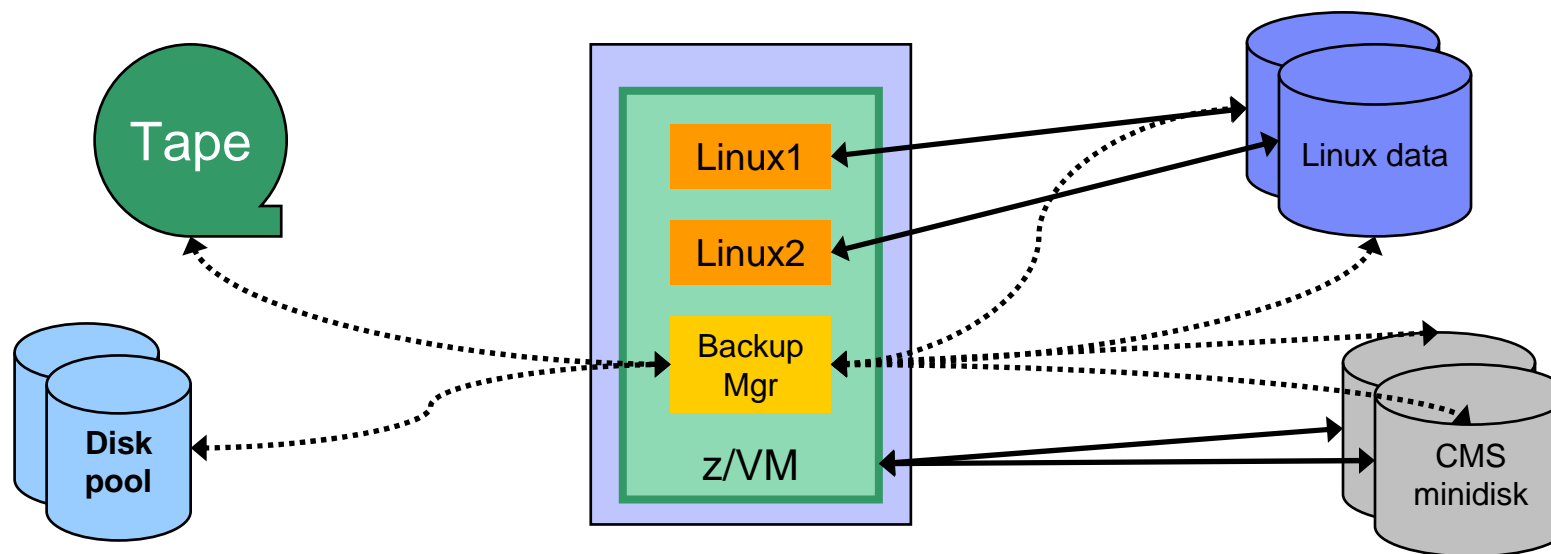
- Dependence on z/OS
versus
- Independent recovery in parallel with z/OS

Image Level Backup/Recovery of z/VM and Linux Guests from z/OS



- **Image level backup and recovery of DASD volumes from z/OS**
 - Existing z/OS procedures and tools in place
 - Use existing tape devices
 - Fast
 - Doesn't include FCP-attached DASD
 - Linux should be down
 - Dependent on z/OS for recovery
 - Is Linux workload critical – recovery required in parallel with z/OS in event of disaster?
 - Using z/OS cycles (on general purpose processors) to back up z/VM and Linux

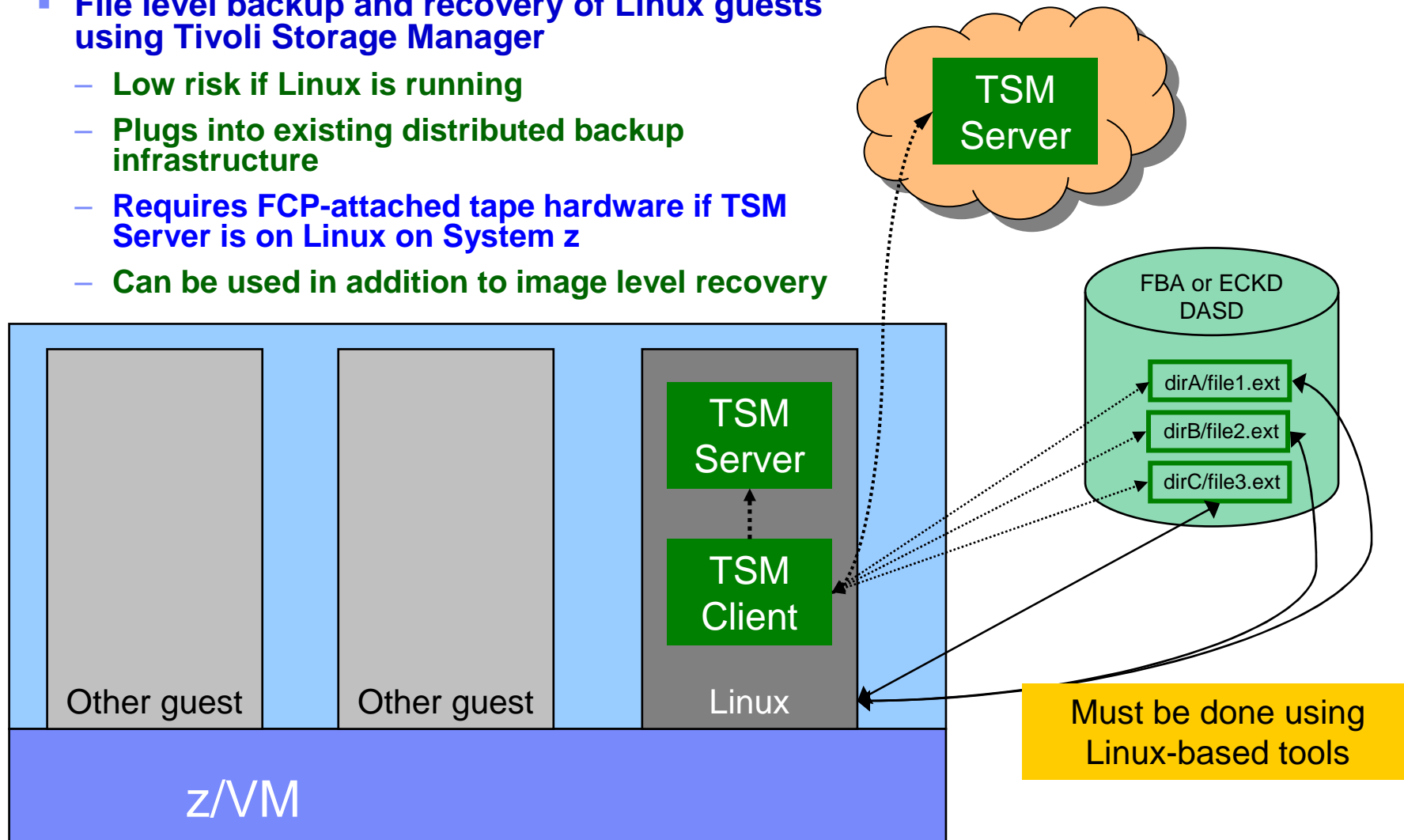
Image Level Backup/Recovery of z/VM and Linux Guests from z/VM



- **Image level backup and recovery of DASD volumes from z/VM**
 - Low risk if z/VM is running
 - Includes FCP-attached DASD (defined to z/VM as EDEVICES)
 - **Linux should be down**
 - Recovery of z/VM and Linux independent from recovery of z/OS
 - Critical Linux workload recovered in parallel with z/OS in event of disaster
 - Faster recovery of z/VM and Linux overall
 - **Backup software required on z/VM**
 - Use z/VM cycles on IFL processors to back up z/VM and Linux
 - **Requires mainframe attached tape devices**
 - Share tape devices with z/OS – does not require both systems to be up

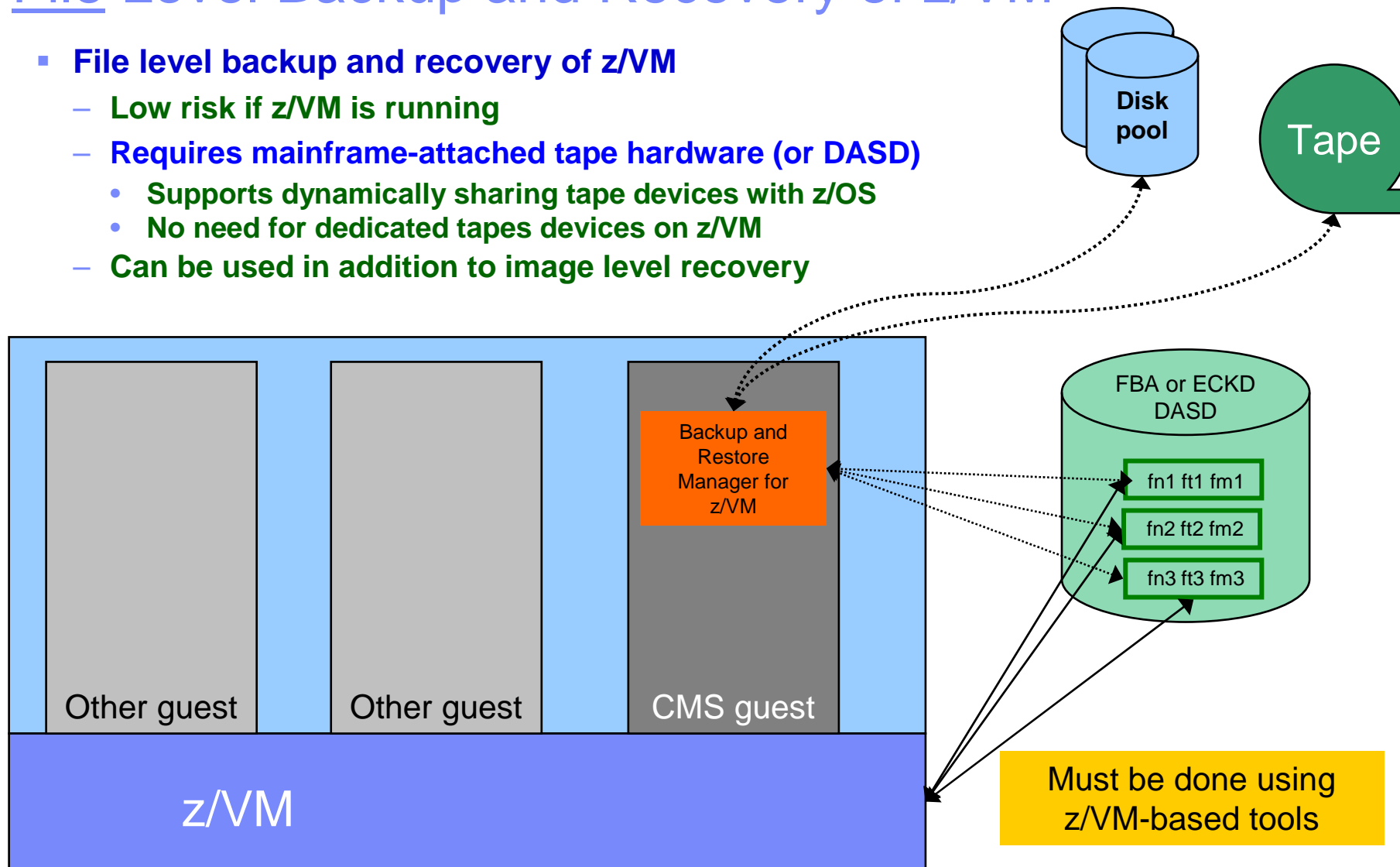
File Level Backup and Recovery of Linux Guests

- **File level backup and recovery of Linux guests using Tivoli Storage Manager**
 - **Low risk if Linux is running**
 - **Plugs into existing distributed backup infrastructure**
 - **Requires FCP-attached tape hardware if TSM Server is on Linux on System z**
 - **Can be used in addition to image level recovery**



File Level Backup and Recovery of z/VM

- **File level backup and recovery of z/VM**
 - **Low risk if z/VM is running**
 - **Requires mainframe-attached tape hardware (or DASD)**
 - **Supports dynamically sharing tape devices with z/OS**
 - **No need for dedicated tapes devices on z/VM**
 - **Can be used in addition to image level recovery**



Where and How to Back Up z/VM and Linux Guests

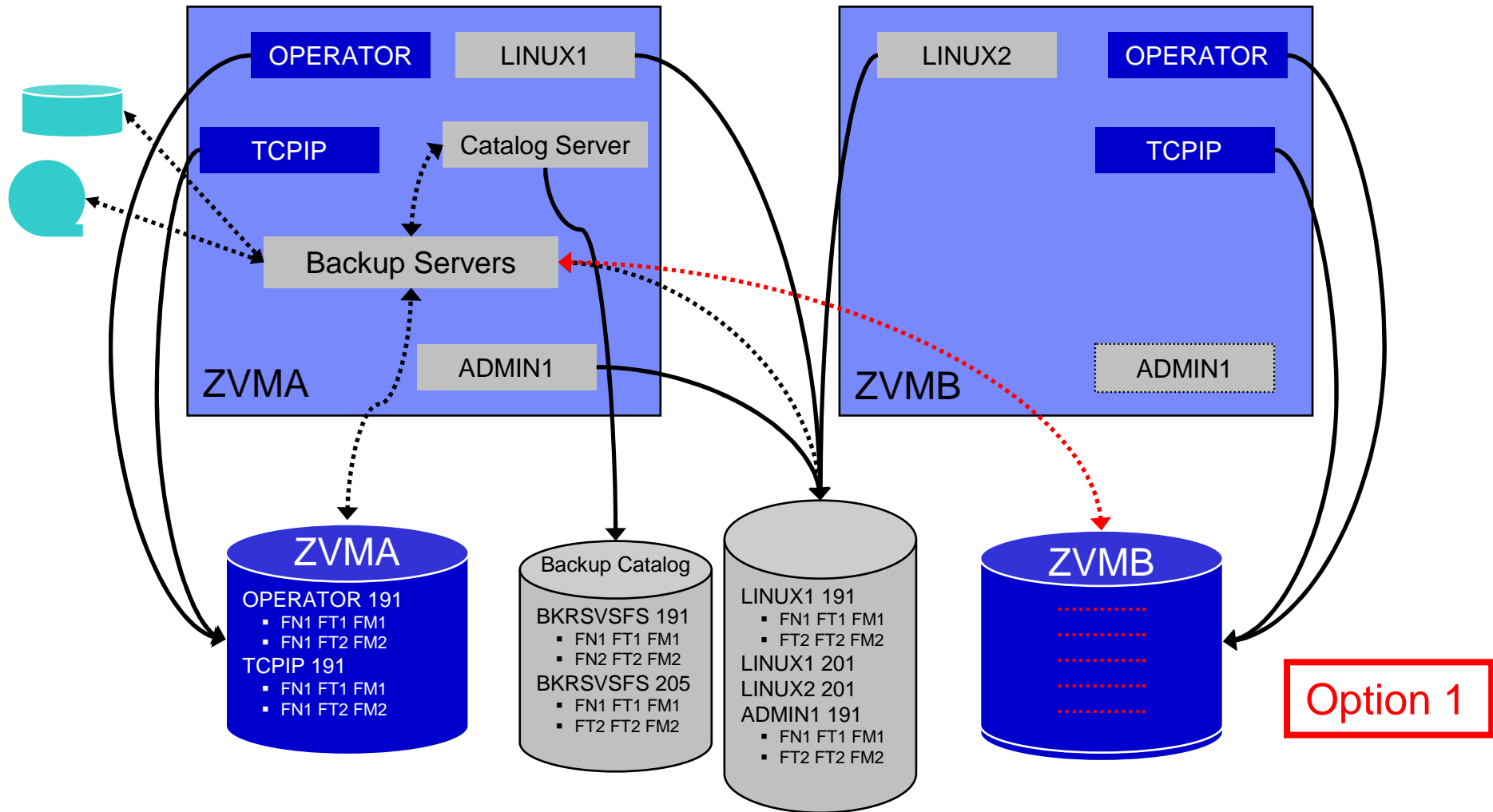
- **Using z/OS to back up and restore z/VM and Linux**
 - Useful during Linux on System z POC or early stages of Linux roll-out
 - Easy and fast to implement for existing z/OS customers
 - Provides disaster/volume level recovery (**not** file level recovery)
 - Concerns or issues long term as Linux workload grows or becomes critical
 - Doesn't support FCP-attached DASD
 - File level recovery of z/VM or Linux data is time consuming and manual – backups only contain volume images
 - In disaster situation, z/VM and Linux must wait for z/OS recovery before beginning their recovery
 - Increased use of z/OS CPU cycles to support z/VM and Linux
- **Using native z/VM and Linux solutions for backup and recovery**
 - Supports operational errors and disaster situations
 - File level backup and recovery
 - Image level backup and recovery of FCP and FICON-attached DASD
 - Independent of z/OS
 - Backups run on (less expensive) IFLs
 - Recovery in parallel with z/OS
 - Dynamically sharing of tape devices with z/OS is still possible
 - Does not require both systems to be up

Backing Up Linux – Should the Guest Be Up or Down?

- **Linux keeps pending I/O's in memory when possible**
 - Designed for distributed platforms where I/O is assumed to be slow
 - SYNC command exists to force all I/Os to be processed
 - Linux will immediately start caching new I/Os
- **Backup solutions that read Linux DASD volumes but run outside Linux don't have a view of these pending I/Os**
 - Data on DASD may be in inconsistent state due to pending I/Os
 - Restoring data that has been backed up while Linux is running may not yield usable results
 - Dependent on type of application running on Linux
 - Similar to pulling the plug on a distributed Linux server, then restarting it
- **For guaranteed recovery, shut down the guest before backing it up from z/VM or z/OS**
 - Your experience may (will) vary
 - Evaluate the risk based on the application

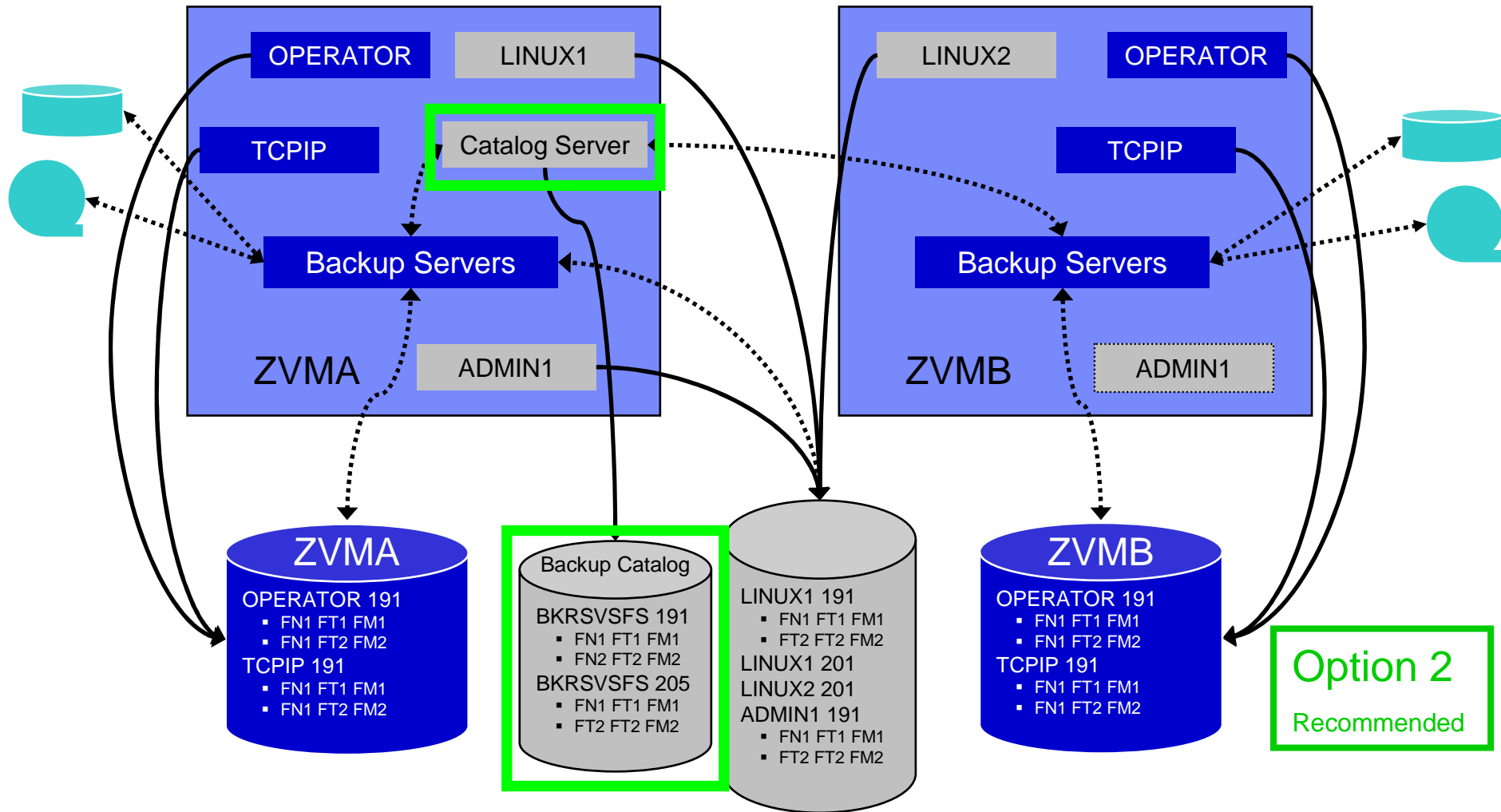
Single Config Users and MDisk
 Multiconfig / IDENTITY
 Users and MDisk

SSI Considerations for Backup and Restore



Single Config Users and MDisks
 Multiconfig / IDENTITY
 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 volumes (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



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**

Automation requirements for z/VM system

- **Take an action based on a message on a console**
 - Provide data from the message to the action
- **Send commands to Linux guests**
- **Schedule an action to occur immediately**
 - Or on a regular schedule
- **Chain actions (triggered by messages, schedules, etc.)**
- **Suspend and resume message rules, schedules, spool monitors, etc.**



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

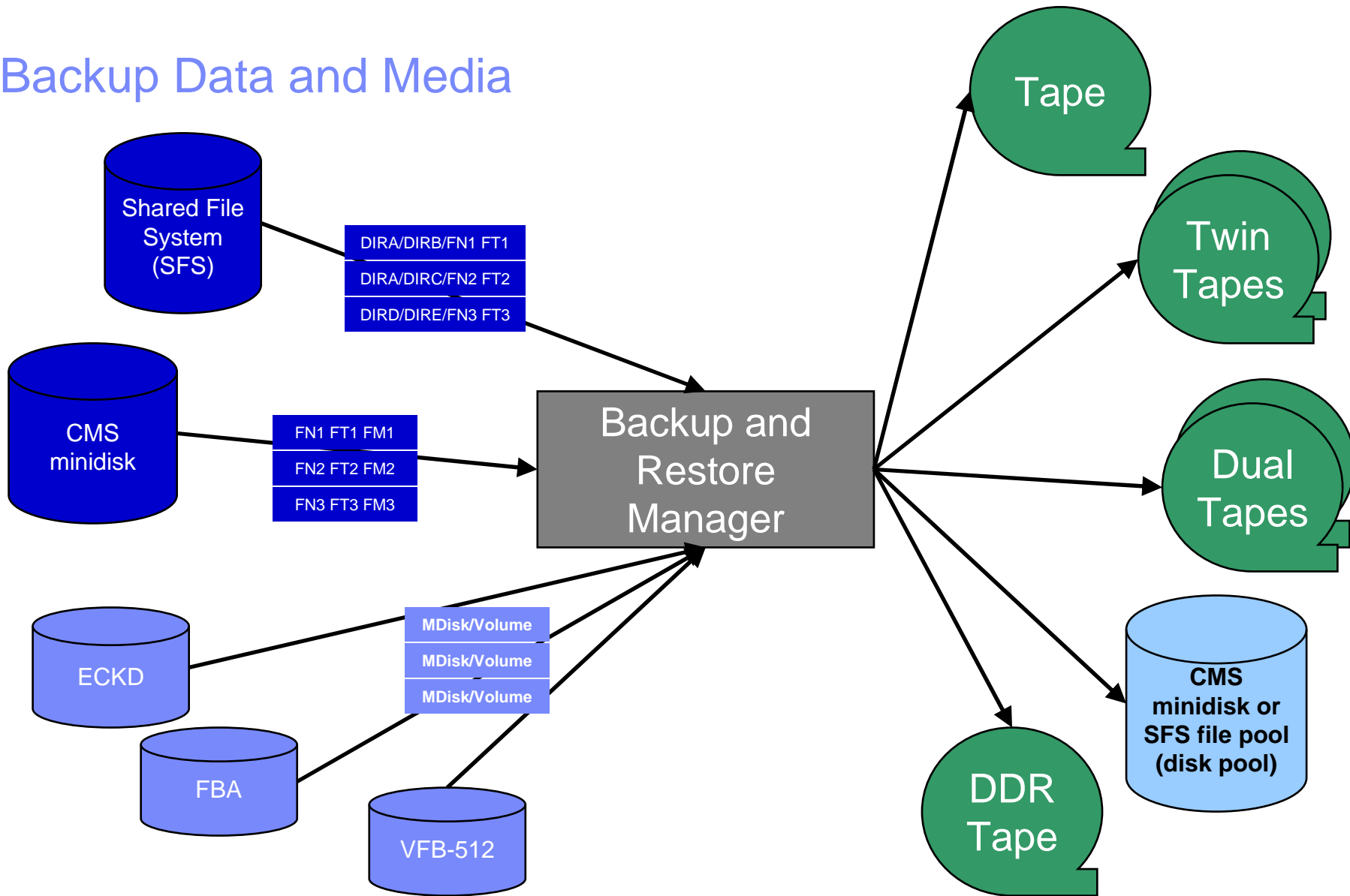
▪ Restore

- 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

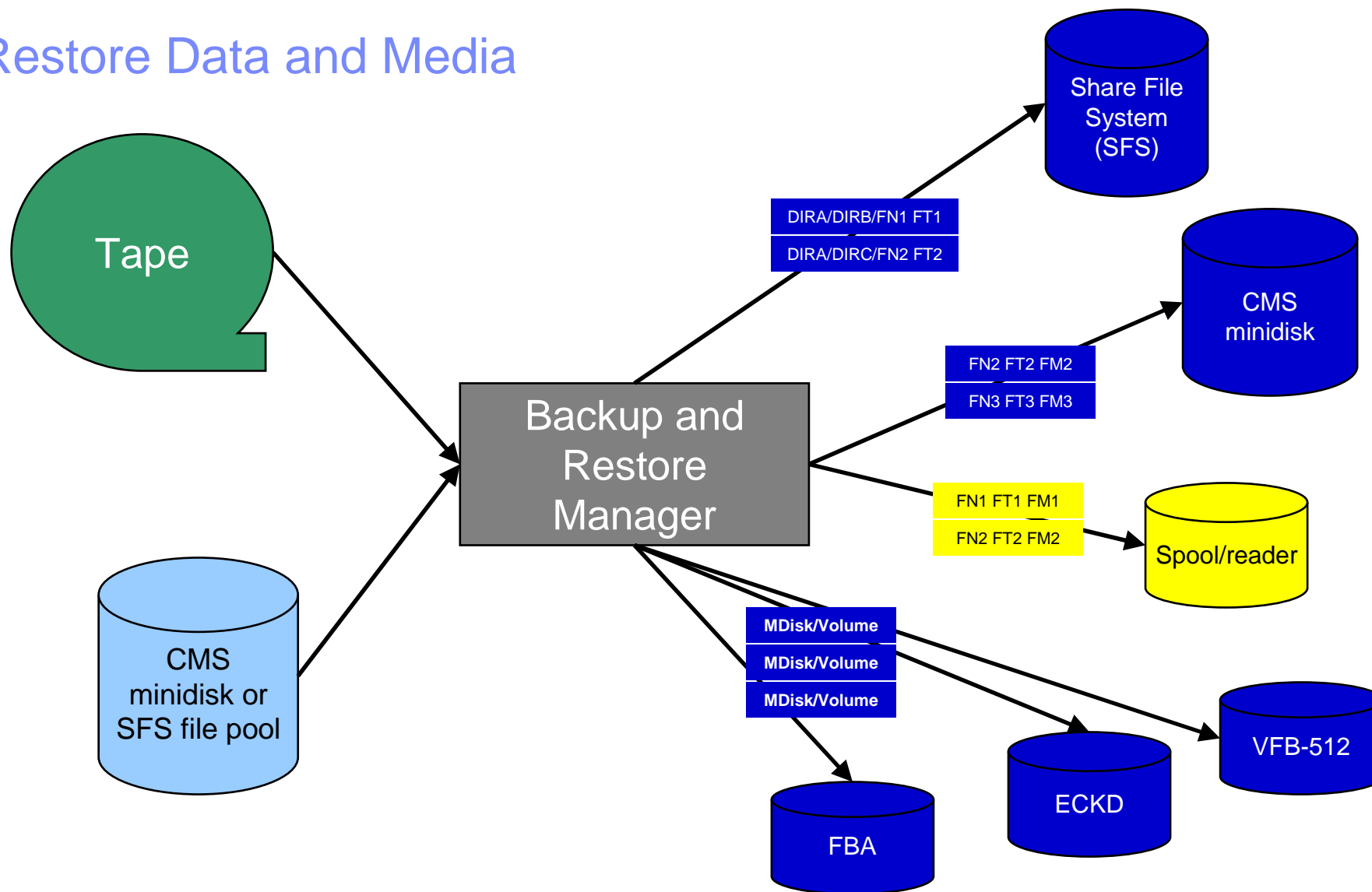
Catalog in Shared File System (SFS) – presentation on web site for installation and setup

- **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



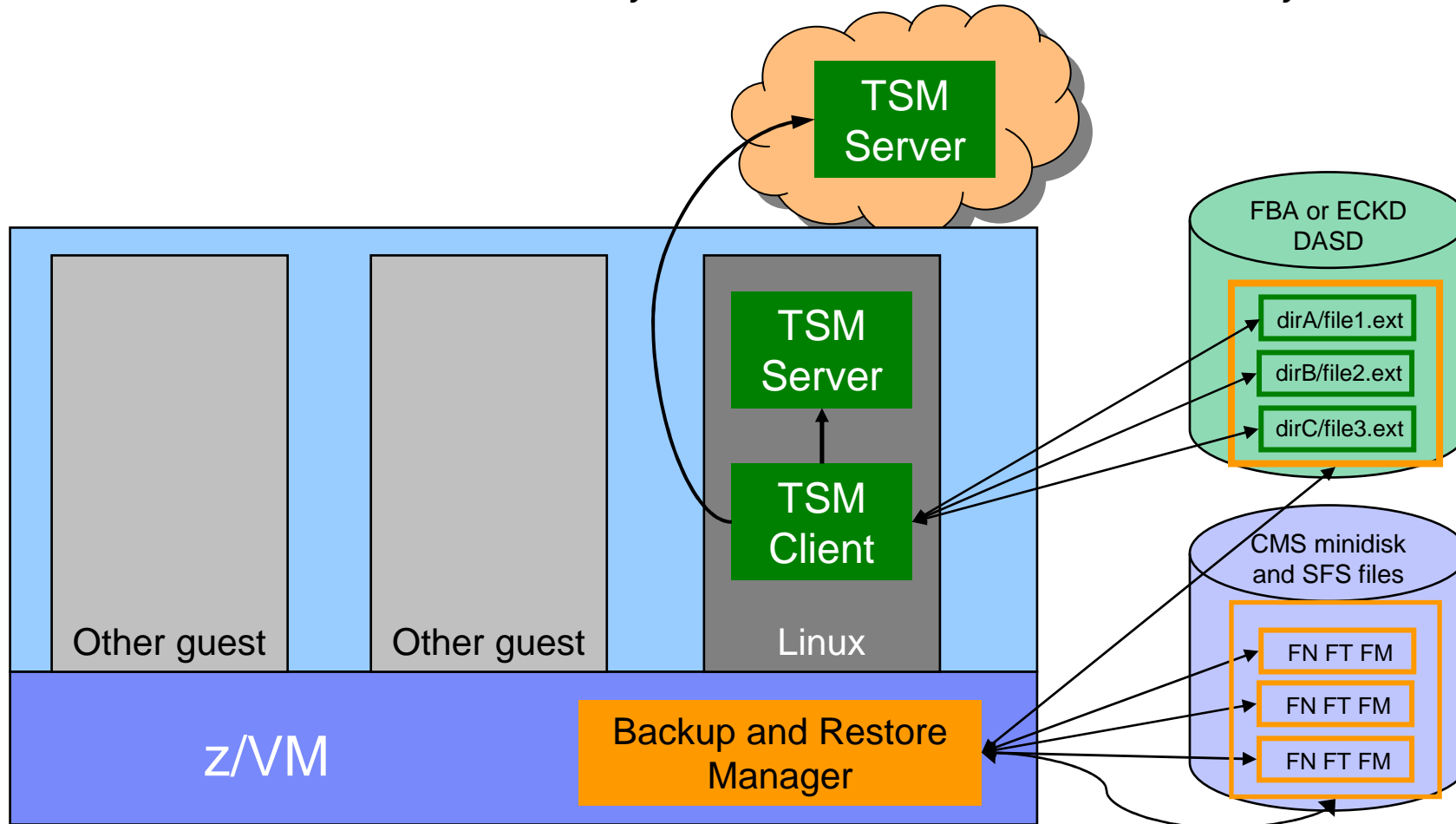
Restore Data and Media



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* *    *          = *      = *      = *

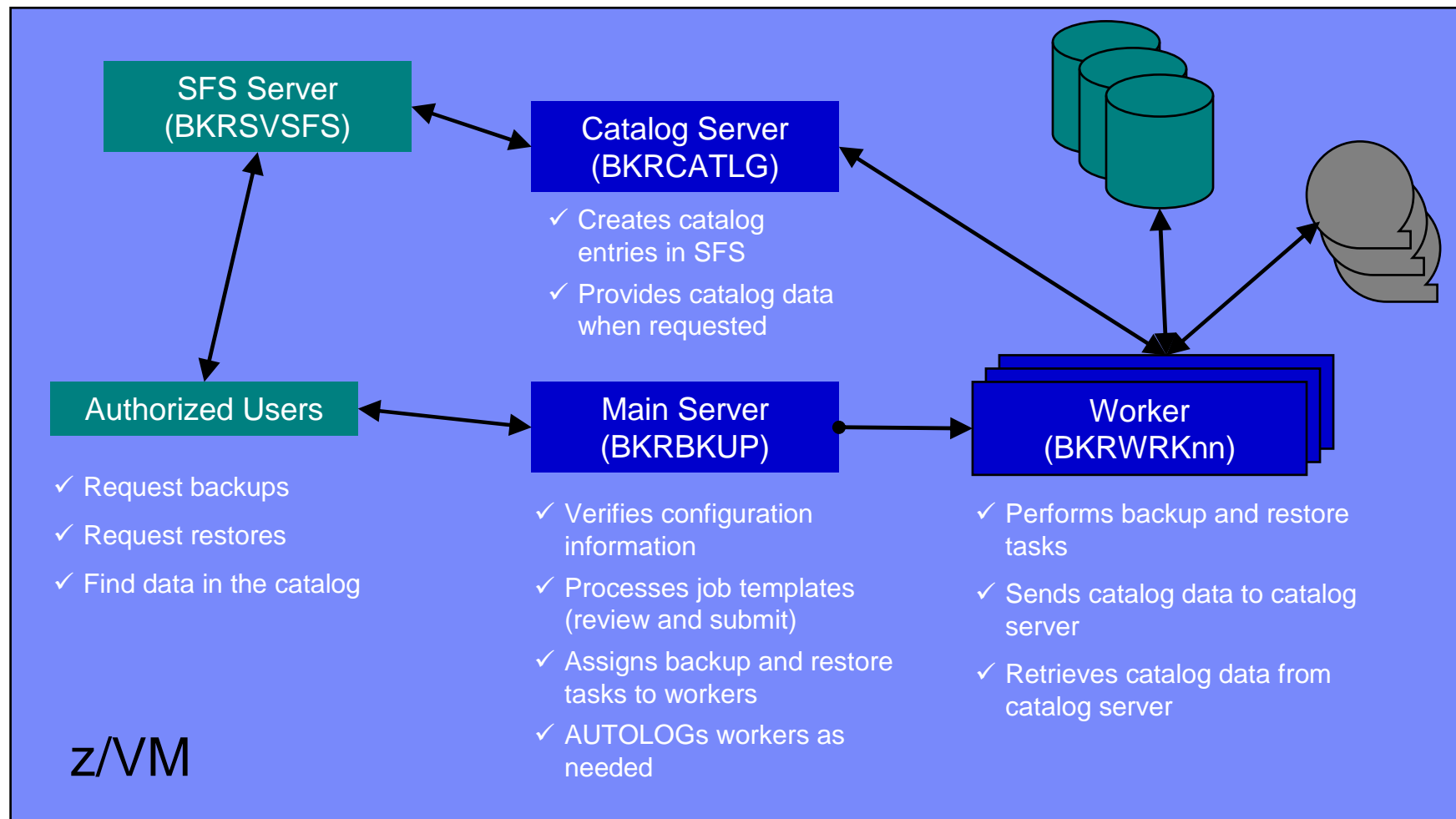
  FUNCTION  MEDIATYPE  ADDRESS
|-----|-----|-----|
INCLUDE    RDEVICE    900-90F
EXCLUDE    RDEVICE    *B

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

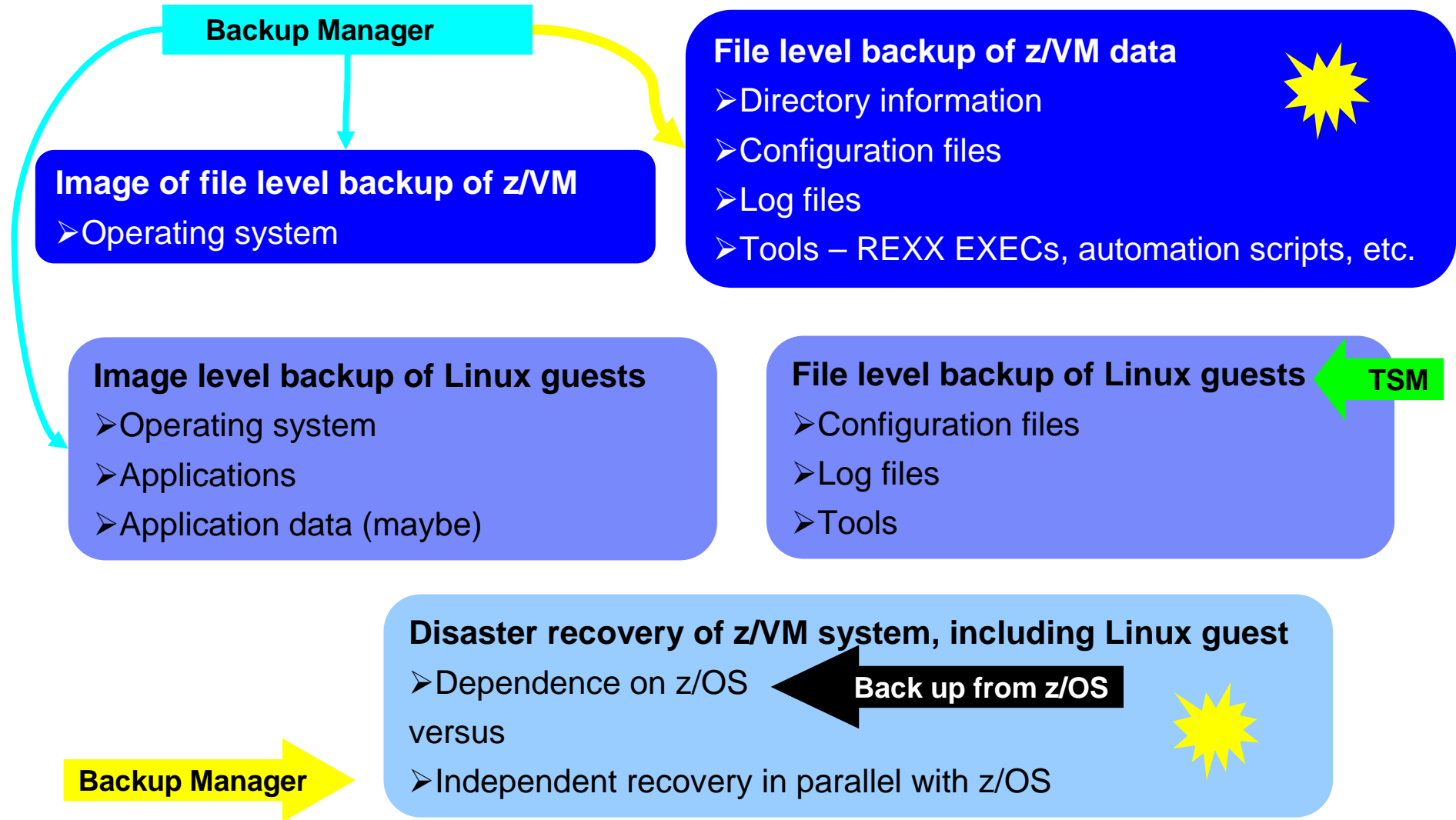
  FUNCTION  MEDIATYPE  POOLNAME  OWNER    FS
|-----|-----|-----|-----|---|
INCLUDE    SFS         VMSYSU:  *        SFS
EXCLUDE    SFS         VMSYSU:  VMSERVU SFS

```

Backup and Restore Manager Architecture – non-SSI



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



IBM Software

Managing Tapes and Tape Devices

Tape Manager for z/VM

Product Overview

■ Manage tapes

- Define tapes in a catalog, including:
 - Free or used
 - Retention/expiration information
 - ATL/VTs 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 ATL or VTS**
 - Granular access control
 - Expiration processing
 - Notification for low threshold for tape resources
 - Interacts with IBM devices through DFSMSRMS on z/VM
 - Interacts with STK devices through STK Host Software Component for VM, or STK VM Client

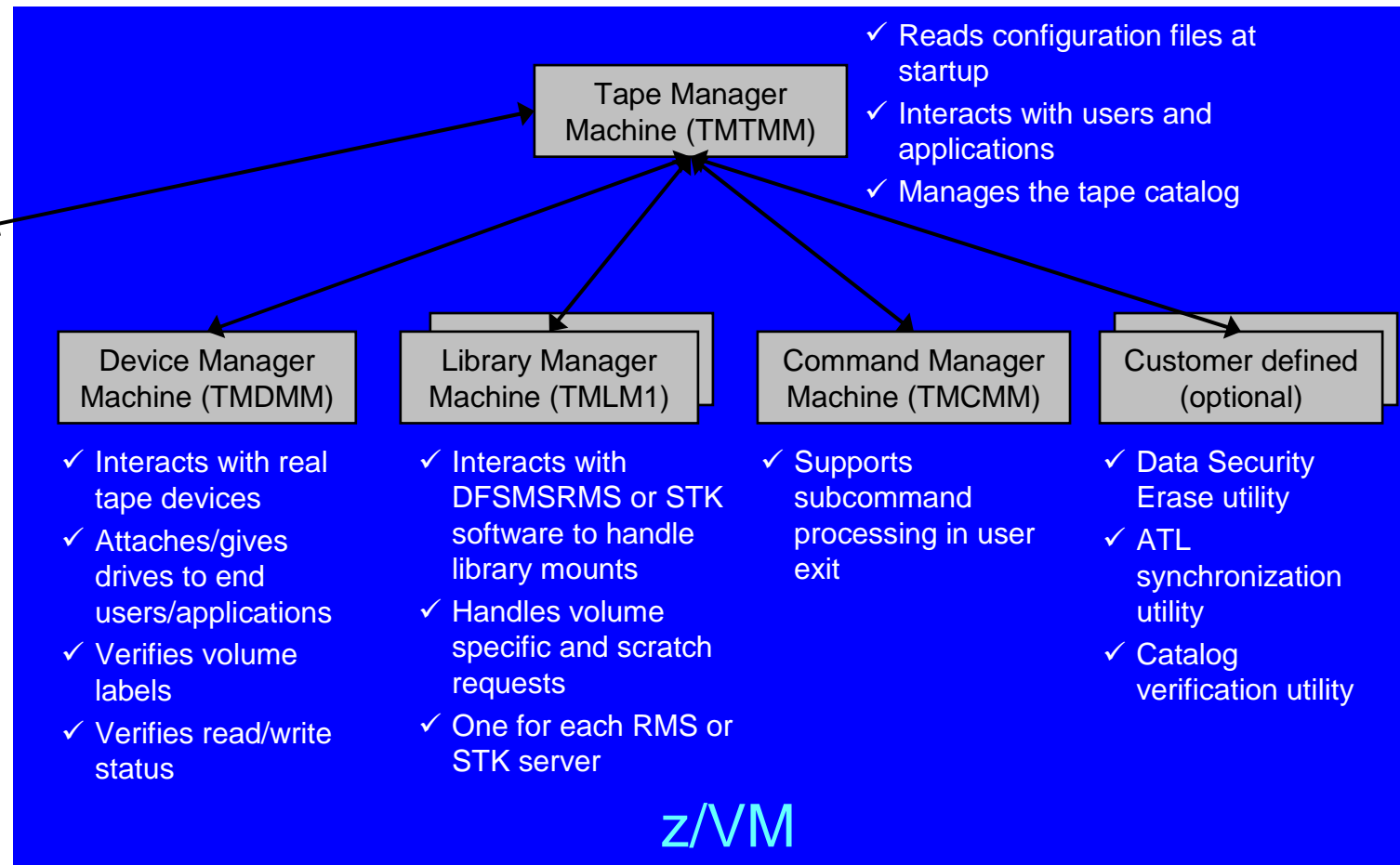
- **Improved accuracy of manual tape processing**
 - Granular access control
 - Automated interface to Operator for manual mounts
 - Internal label verification at attach/give and detach (SL only)
 - Read/Write verification at attach/give

- **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
 - Not available for STK libraries

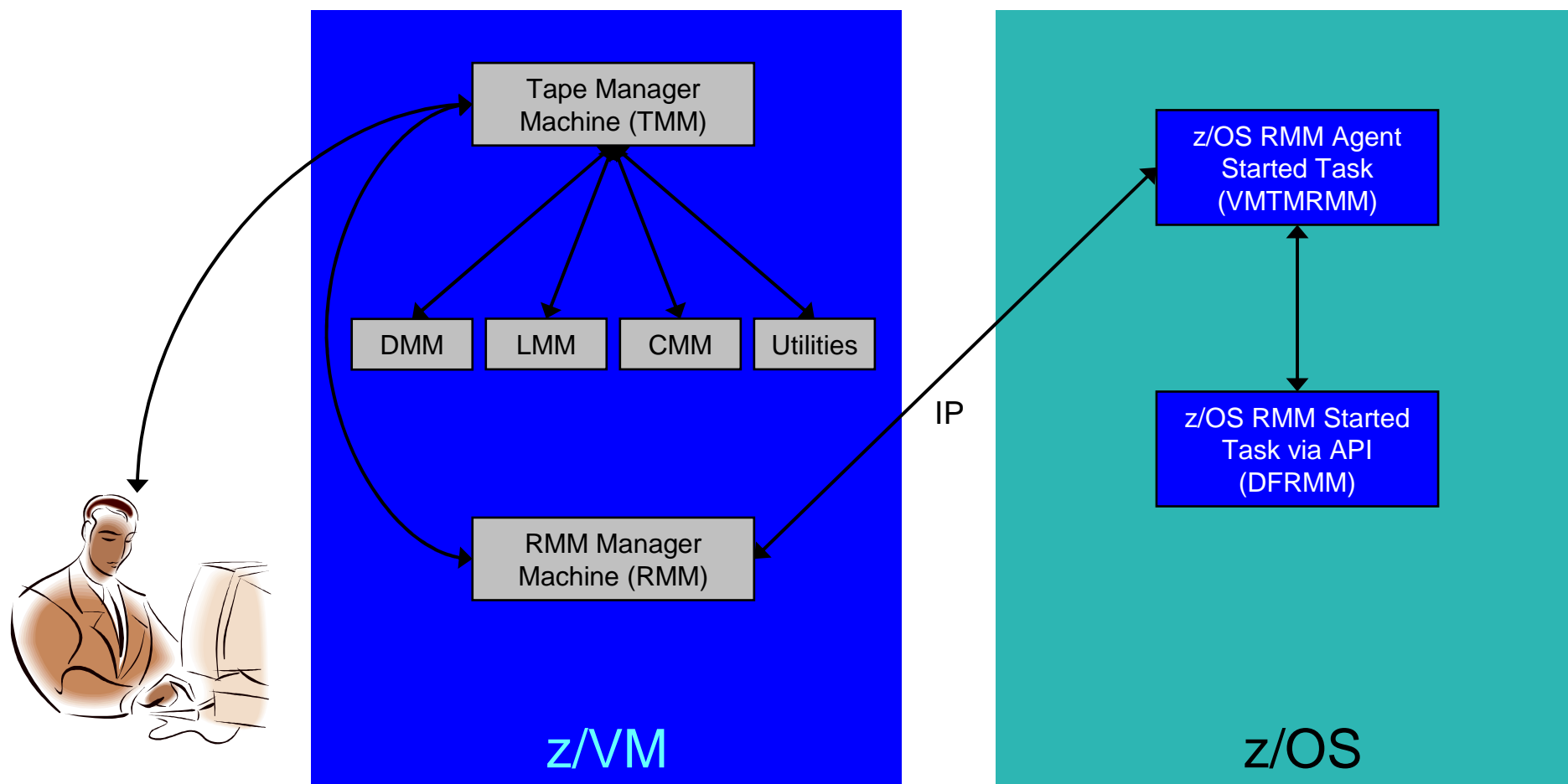
Data Security Erase (DSE)

- **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 (TMDSE) 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

Tape Manager in Standard Mode



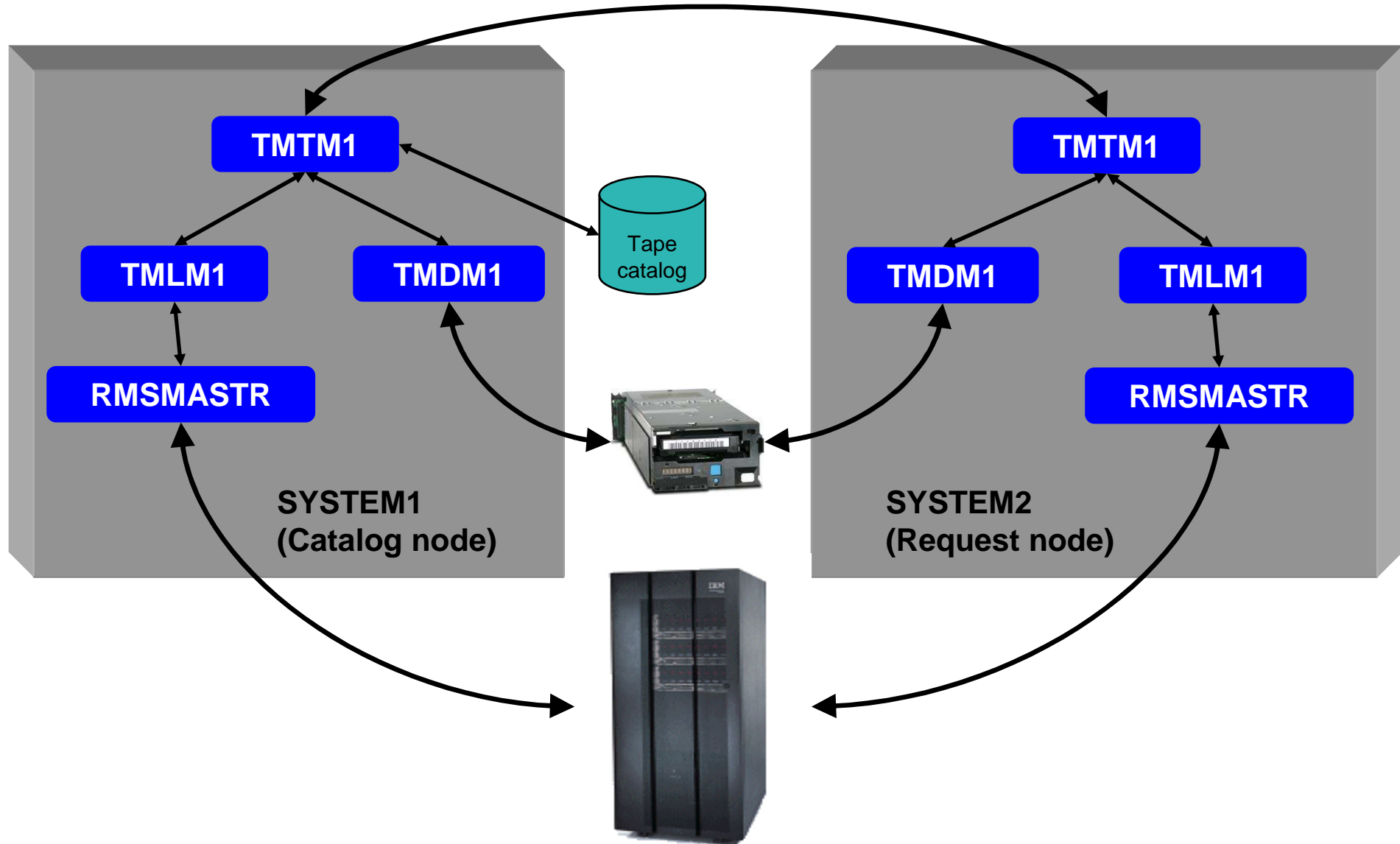
Tape Manager in RMM Mode



Support for One Tape Catalog Across Multiple z/VM Systems

- **One “catalog node”**
 - Responsible for the tape catalog contents
- **Multiple “request nodes”**
 - Manage requests on the local system
 - Communicate with catalog node to read or update catalog data
- **One catalog used by multiple z/VM systems**
 - No longer need to create a catalog on each z/VM system, each with its own range of volsers
 - All z/VM systems share one catalog
- **IP used for communication between systems**

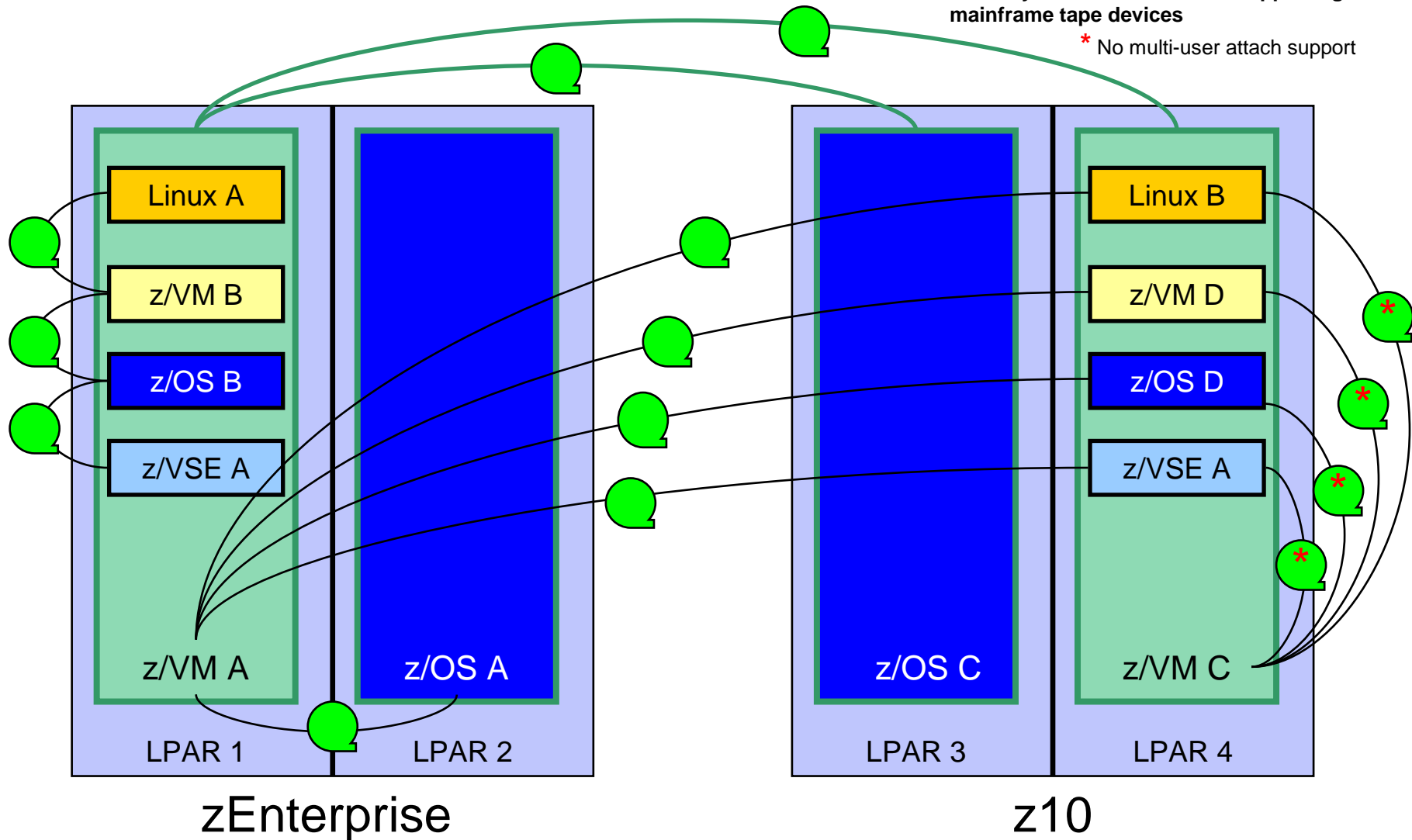
Communication Between Service Machines and Systems



Dynamically Share 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

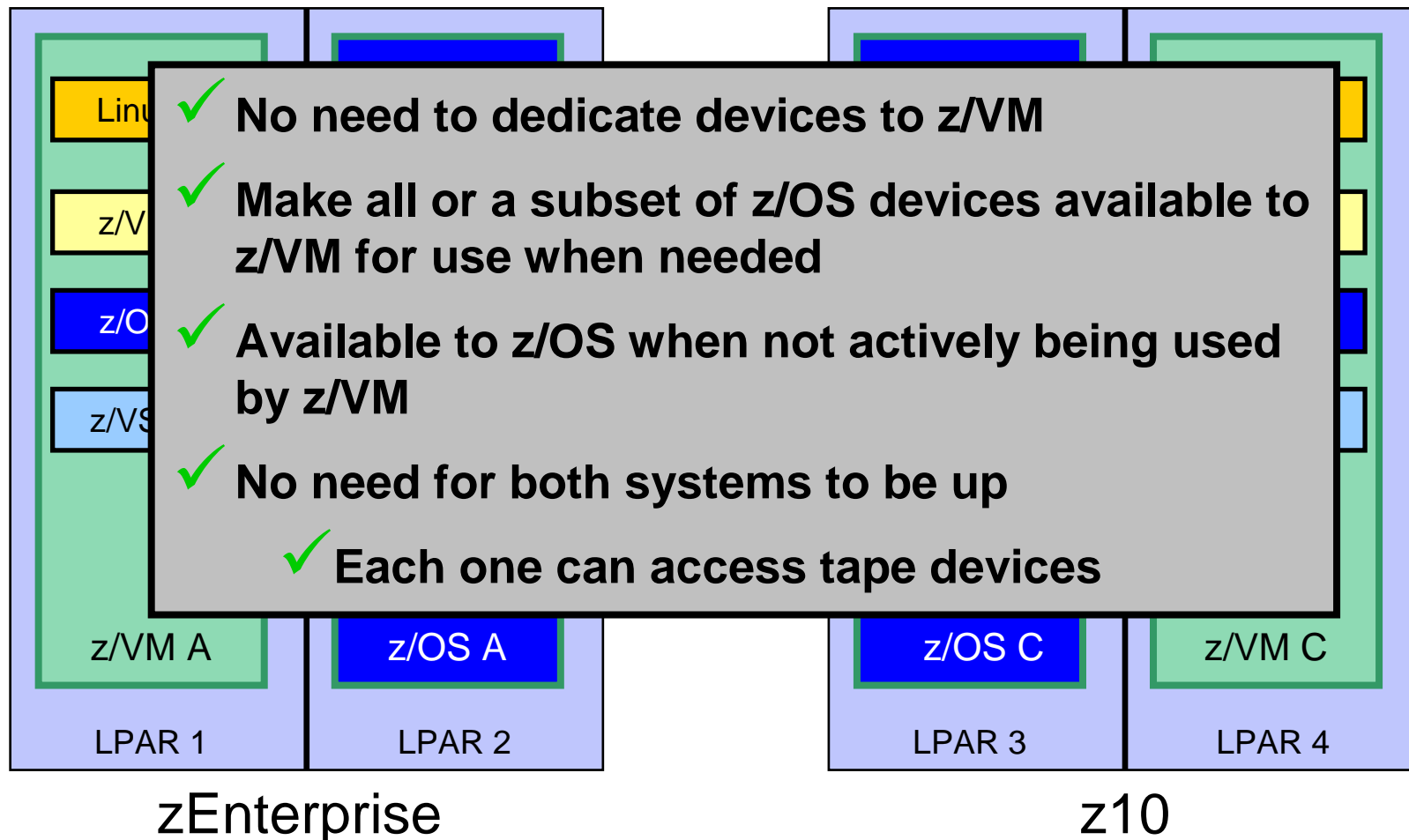
* No multi-user attach support



Dynamically Share 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

* No multi-user attach support



Summary

- **Use Tape Manager to**
 - Manage and share devices
 - Manage tape volumes
 - Access control
 - Retention
 - Data Security
 - Improve accuracy of mount requests



IBM Software

Automating Operations
Operations Manager for z/VM

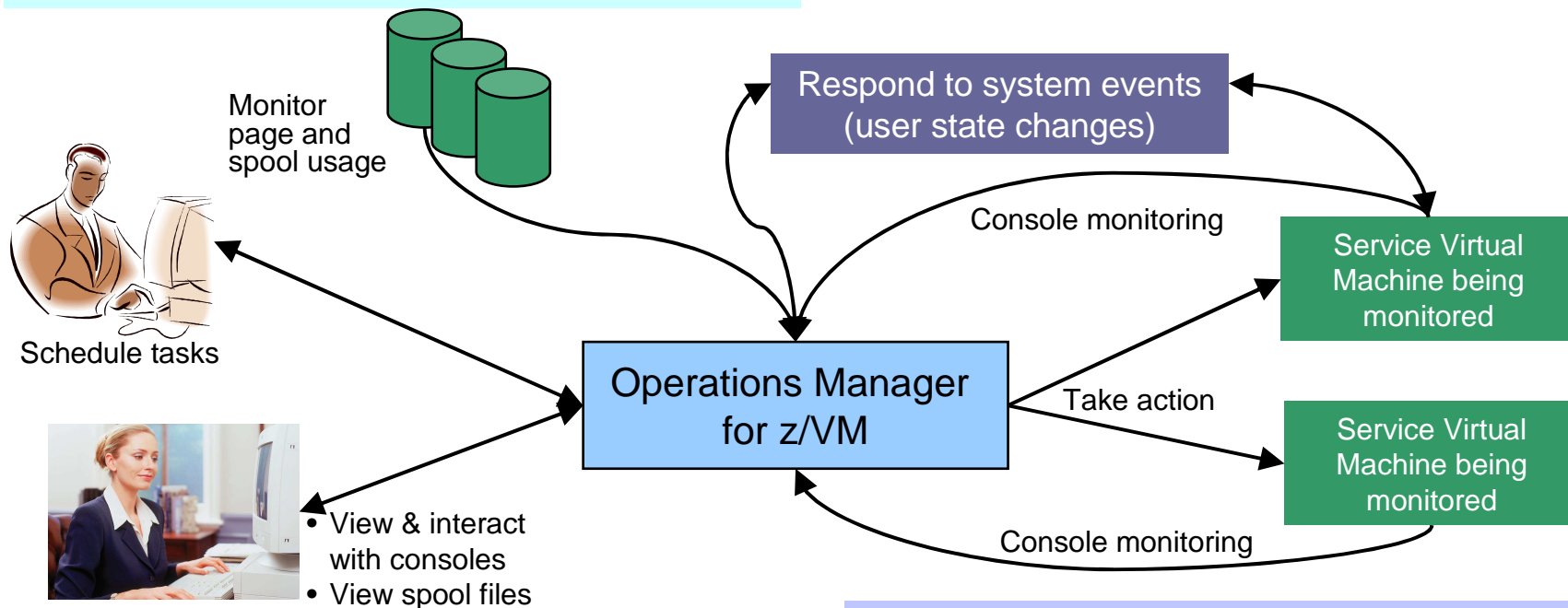
Operations Manager for z/VM

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



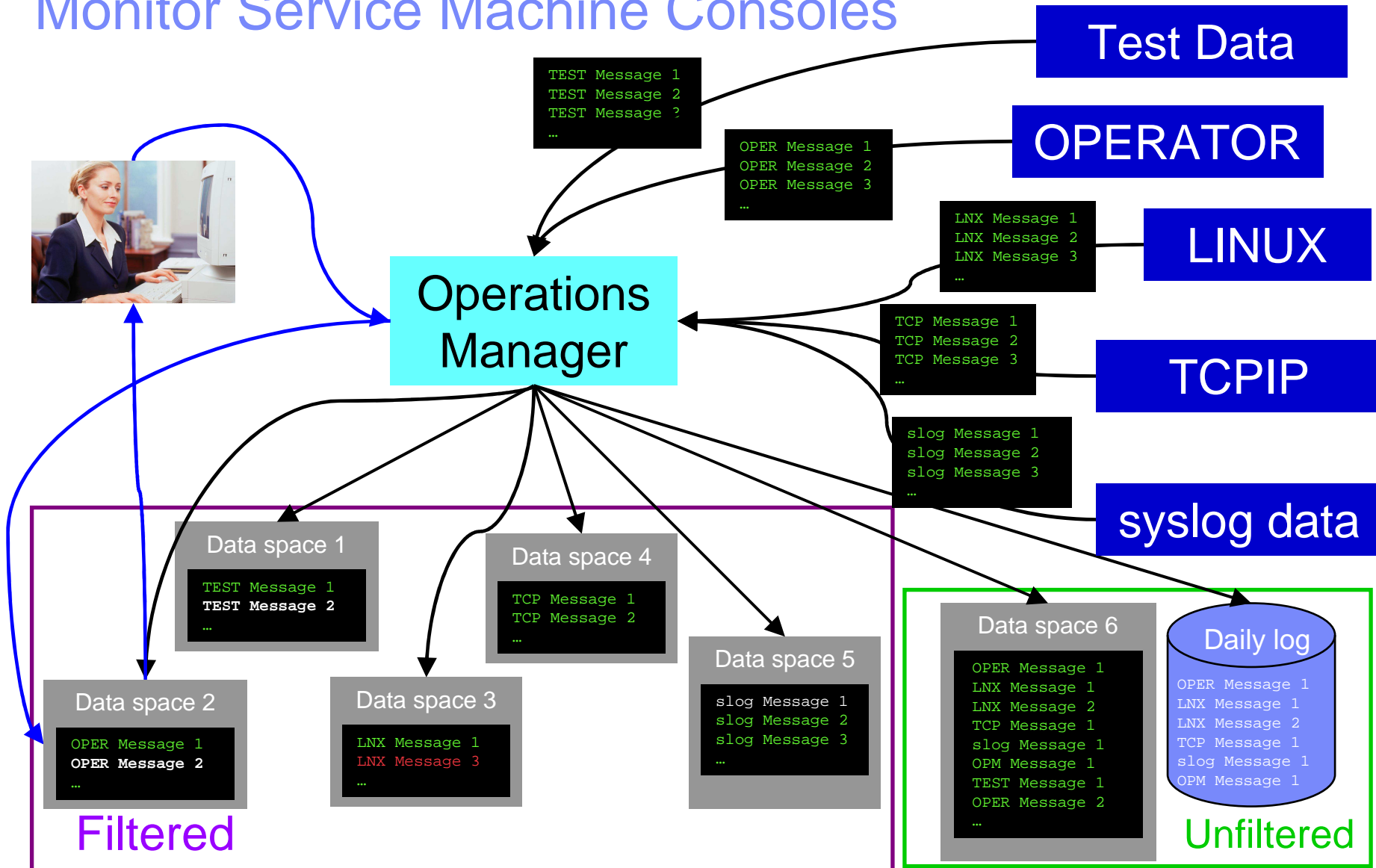
Automation

- 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



Schedule Events and Actions

- **Define schedules**
 - Hourly, daily, weekly, monthly, or yearly, nth weekday of the month
 - 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 and spool monitoring

- **No impact from SSI**

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

Summary

- **Management of z/VM systems with Linux guests requires monitoring and management tools**
- **IBM solutions exist**
 - OMEGAMON XE on z/VM and Linux
 - zSecure Manager for z/VM
 - Operations Manager for z/VM
 - Tape Manager for z/VM
 - Backup and Restore Manager for z/VM
 - Archive Manager for z/VM
- **Demos are available**

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, Technical Marketing
 - Tracy Dean, 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)

- 16. Perform an incremental backup**
- 17. Find and restore a file from the backup catalog**
- 18. Backup and restore single and multiconfiguration users in an SSI environment**
- 19. Automatically shut down, back up, and restart a Linux guest**
- 20. Reviewing a disaster recovery backup**
- 21. Reviewing other ways to find data in the backup catalog**

Scenario 16: Performing an Incremental Backup

- **Administrator previously performed a full backup**
- **Incremental job defined, using last full backup as its base**
- **Change a file on user's A-disk**
- **Submit incremental job for review**
- **Submit incremental job for backup processing**
- **Use Operations Manager to monitor backup servers**

Scenario 16: Detailed Steps

- **From a z/VM user ID, change a file**

```
xedit b b a
```

- **From an authorized z/VM user ID, submit a backup job for review**

```
smsg bkrbkup review increm01
```

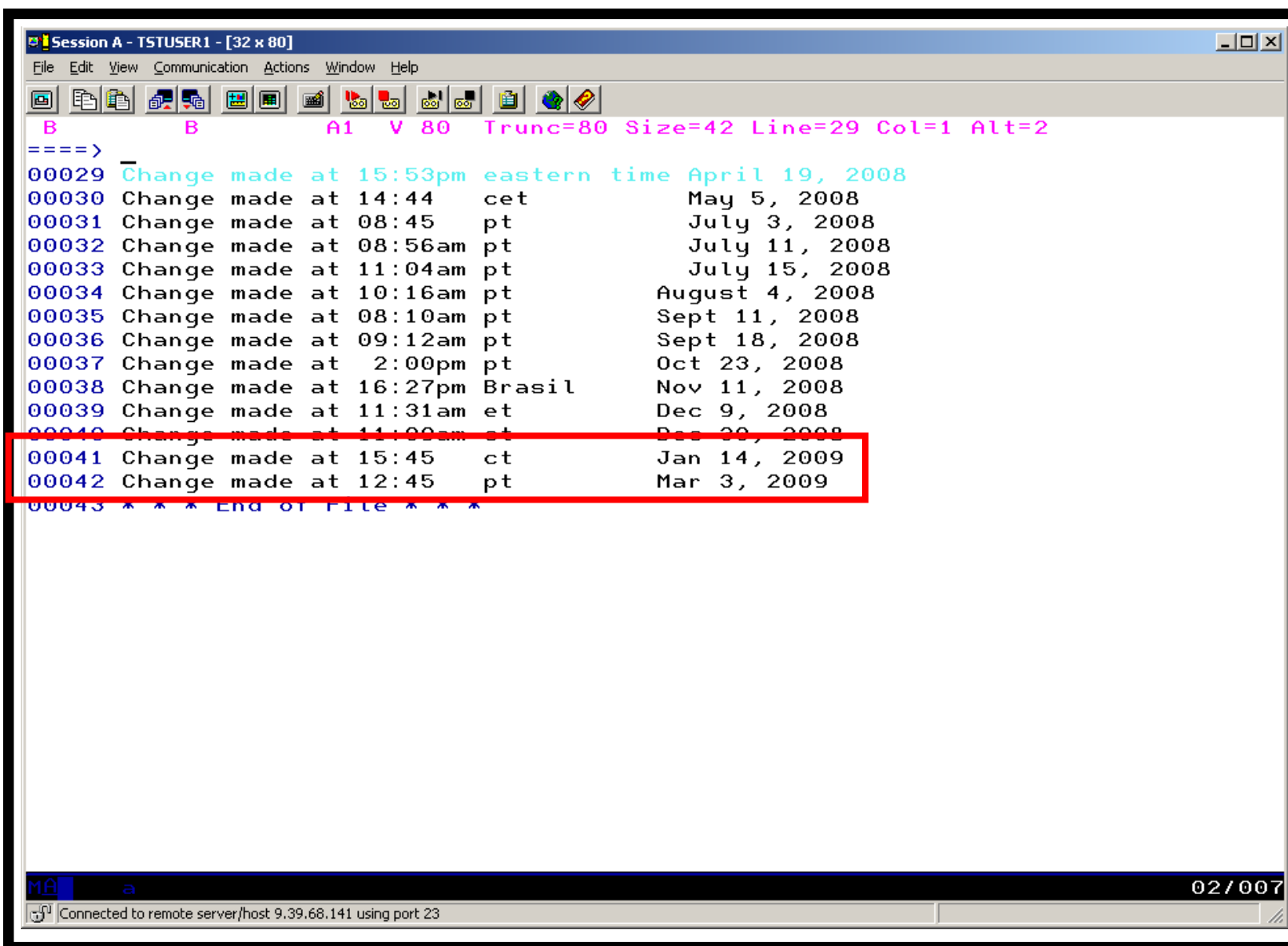
- **Review the resulting files in the reader (LINKFAIL and JOB files)**

- **From an authorized z/VM user ID, submit a backup job for backup processing**

```
smsg bkrbkup submit increm01
```

- **View the console of the backup servers to see the processing**

```
gomcmd opmgrm1 viewcon user(backup)
```



Session A - TSTUSER1 - [32 x 80]

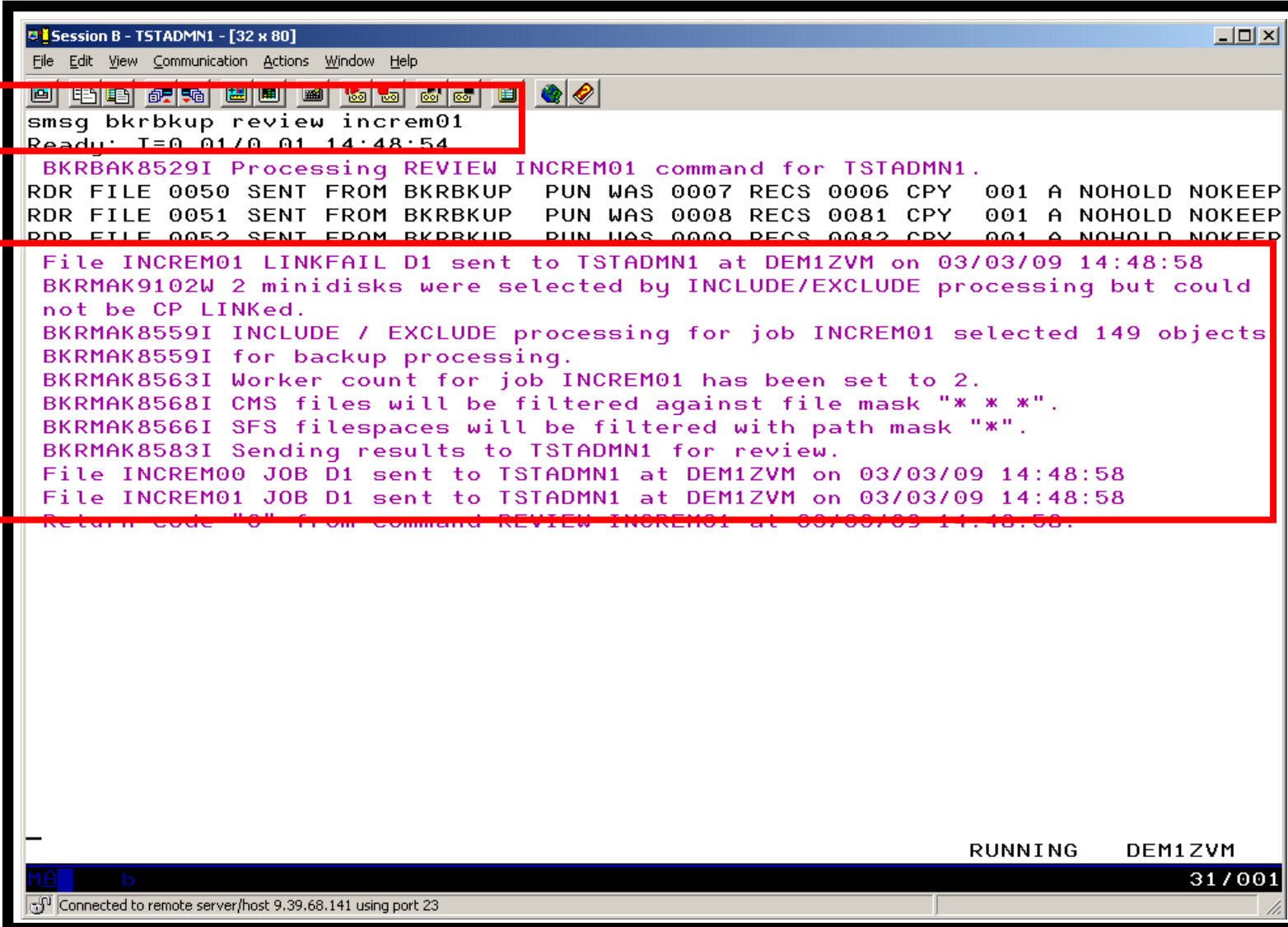
File Edit View Communication Actions Window Help

B B A1 V 80 Trunc=80 Size=42 Line=29 Col=1 Alt=2

```
====>
00029 Change made at 15:53pm eastern time April 19, 2008
00030 Change made at 14:44 cet May 5, 2008
00031 Change made at 08:45 pt July 3, 2008
00032 Change made at 08:56am pt July 11, 2008
00033 Change made at 11:04am pt July 15, 2008
00034 Change made at 10:16am pt August 4, 2008
00035 Change made at 08:10am pt Sept 11, 2008
00036 Change made at 09:12am pt Sept 18, 2008
00037 Change made at 2:00pm pt Oct 23, 2008
00038 Change made at 16:27pm Brasil Nov 11, 2008
00039 Change made at 11:31am et Dec 9, 2008
00040 Change made at 11:00am et Dec 20, 2008
00041 Change made at 15:45 ct Jan 14, 2009
00042 Change made at 12:45 pt Mar 3, 2009
00043 * * * End of File * * *
```

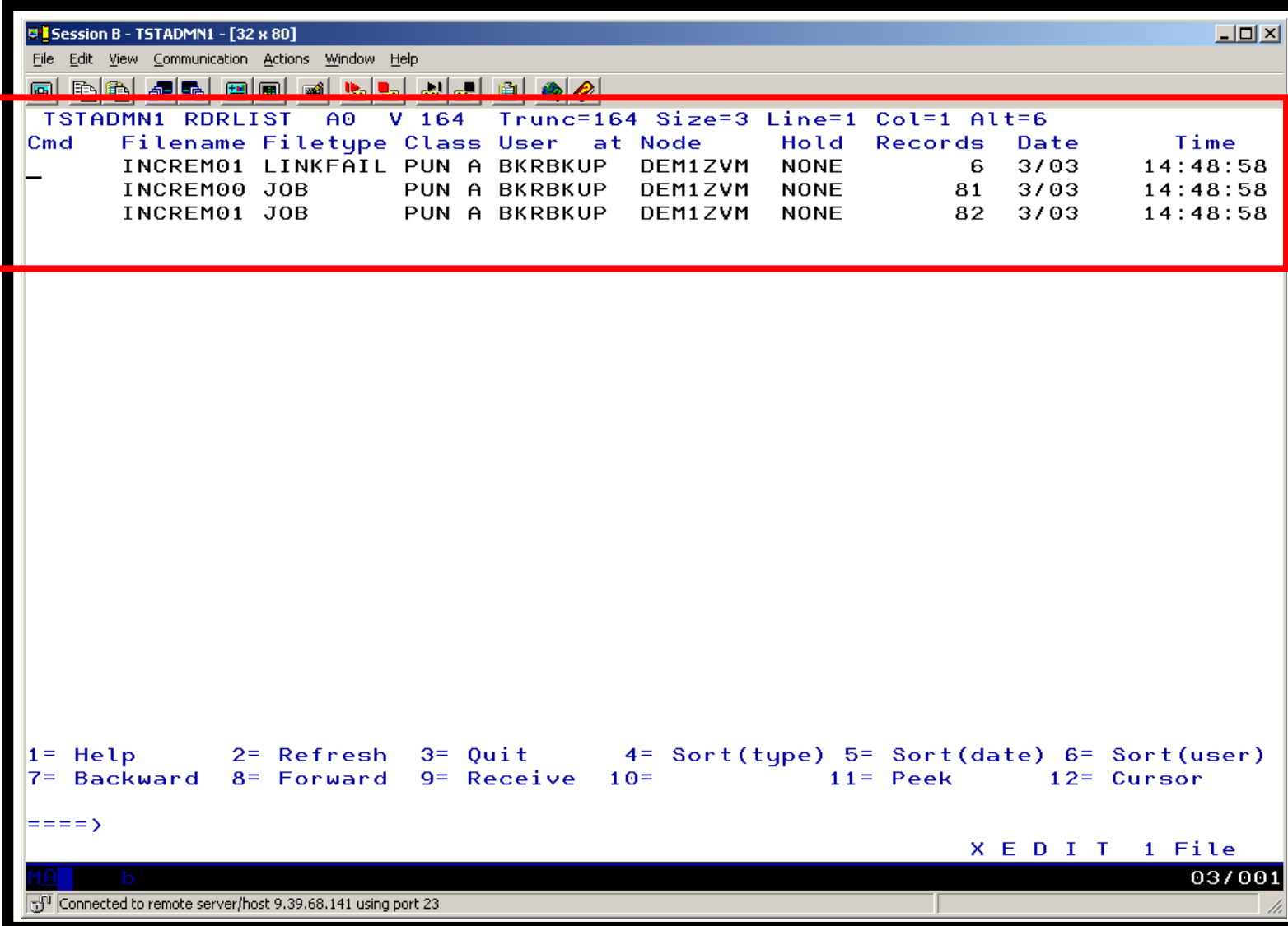
MA a 02/007

Connected to remote server/host 9.39.68.141 using port 23



```
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
msg bkrbkup review increm01
Ready: T=0 01/0 01 14:48:54
BKRBAK8529I Processing REVIEW INCREM01 command for TSTADMN1.
RDR FILE 0050 SENT FROM BKRBAKUP PUN WAS 0007 RECS 0006 CPY 001 A NOHOLD NOKEEP
RDR FILE 0051 SENT FROM BKRBAKUP PUN WAS 0008 RECS 0081 CPY 001 A NOHOLD NOKEEP
RDR FILE 0052 SENT FROM BKRBAKUP PUN WAS 0009 RECS 0082 CPY 001 A NOHOLD NOKEEP
File INCREM01 LINKFAIL D1 sent to TSTADMN1 at DEM1ZVM on 03/03/09 14:48:58
BKRMAK9102W 2 minidisks were selected by INCLUDE/EXCLUDE processing but could
not be CP LINKED.
BKRMAK8559I INCLUDE / EXCLUDE processing for job INCREM01 selected 149 objects
BKRMAK8559I for backup processing.
BKRMAK8563I Worker count for job INCREM01 has been set to 2.
BKRMAK8568I CMS files will be filtered against file mask "* * *".
BKRMAK8566I SFS filespace will be filtered with path mask "*".
BKRMAK8583I Sending results to TSTADMN1 for review.
File INCREM00 JOB D1 sent to TSTADMN1 at DEM1ZVM on 03/03/09 14:48:58
File INCREM01 JOB D1 sent to TSTADMN1 at DEM1ZVM on 03/03/09 14:48:58
Return code "0" from command REVIEW INCREM01 at 03/03/09 14:48:58.

RUNNING DEM1ZVM
MA b 31/001
Connected to remote server/host 9.39.68.141 using port 23
```

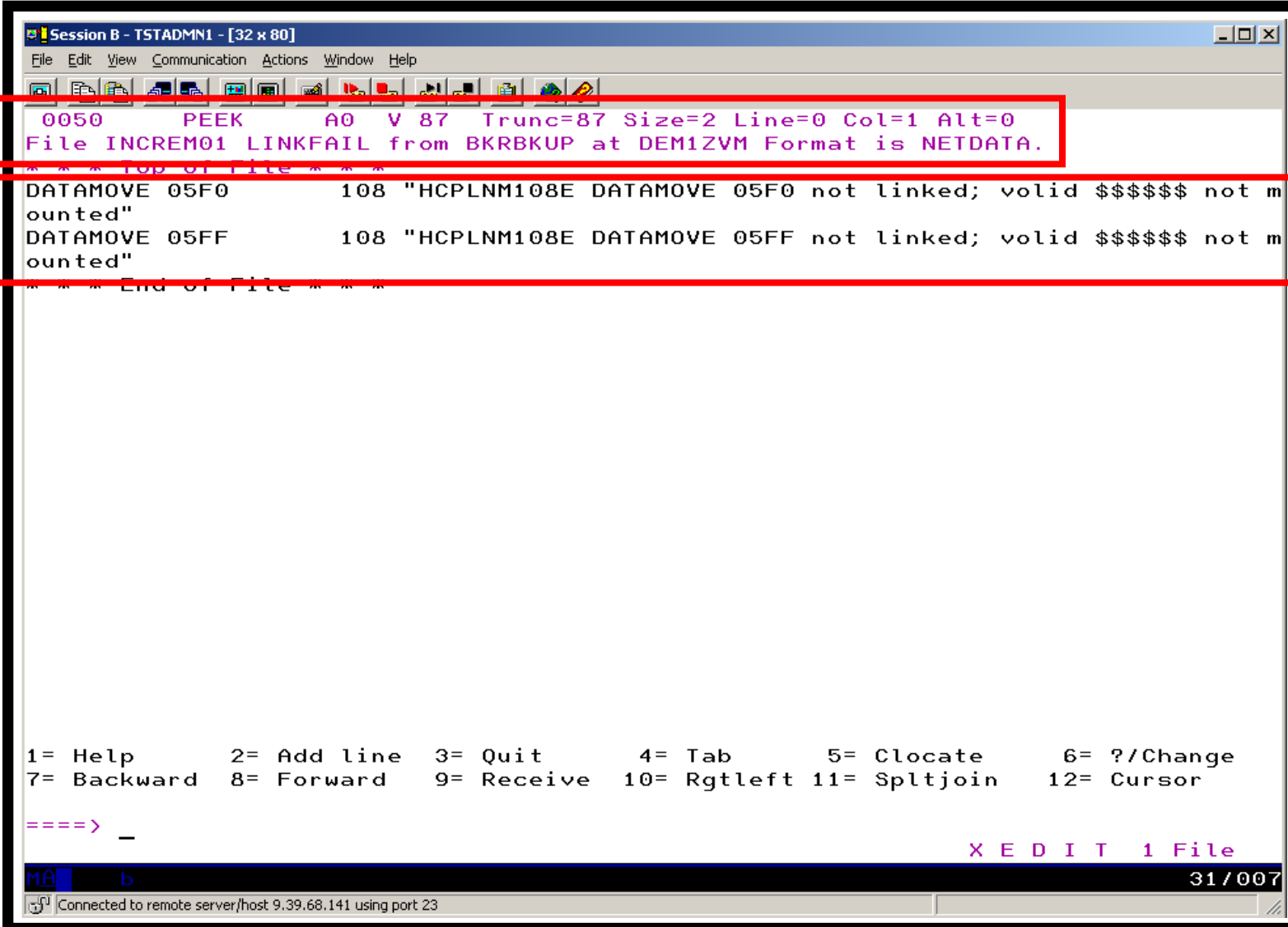


```
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
TSTADMN1 RDRLIST A0 V 164 Trunc=164 Size=3 Line=1 Col=1 Alt=6
Cmd  Filename Filetype Class User at Node Hold Records Date Time
-   INCREM01 LINKFAIL PUN A BKRBKUP DEM1ZVM NONE 6 3/03 14:48:58
    INCREM00 JOB      PUN A BKRBKUP DEM1ZVM NONE 81 3/03 14:48:58
    INCREM01 JOB      PUN A BKRBKUP DEM1ZVM NONE 82 3/03 14:48:58

1= Help      2= Refresh  3= Quit      4= Sort(type) 5= Sort(date) 6= Sort(user)
7= Backward  8= Forward  9= Receive   10=           11= Peek      12= Cursor

====>

X E D I T 1 File
MA b 03/001
Connected to remote server/host 9.39.68.141 using port 23
```



```
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
0050      PEEK      A0  V 87  Trunc=87 Size=2 Line=0 Col=1 Alt=0
File INCREM01 LINKFAIL from BKRKBUP at DEM1ZVM Format is NETDATA.
*** Top of File ***
DATAMOVE 05F0      108 "HCPLNM108E DATAMOVE 05F0 not linked; void $$$$$$ not m
ounted"
DATAMOVE 05FF      108 "HCPLNM108E DATAMOVE 05FF not linked; void $$$$$$ not m
ounted"
*** End of File ***

1= Help      2= Add line  3= Quit      4= Tab      5= Clocate   6= ?/Change
7= Backward  8= Forward  9= Receive 10= Rgtleft 11= Spltjoin 12= Cursor

====> _

X E D I T  1 File
MA b 31/007
Connected to remote server/host 9.39.68.141 using port 23
```

```
Session B - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
0051      PEEK      A0  V 80  Trunc=80 Size=163 Line=0 Col=1 Alt=0
File INCREM00 JOB from BKRBKUP at DEM1ZVM Format is NETDATA.
*** Top of File ***
* Basic syntax:
*
* CONSOLE - write something to the console
* CP_COMMAND - CP command, output displayed to console
* CP_QUIET - CP command, output suppressed
* JOB_HEADER - Emits a job header banner
* JOB_TRAILER - Emits job trailer banner
* CONFIG - Set the value of a REXX variable
* DUMPEDF - Invoke DUMPEDF to back up a CMS/EDF minidisk
* DUMPCKD - Invoke DUMPCKD to perform an image/raw CKD DASD backup
* DUMPSFS - Invoke DUMPSFS to back up a CMS/SFS filespace
* EOJ - Perform end-of-job housekeeping and exit
*
* WARNING:
*
* The job processor uses very simple-minded parsing. DO NOT intersperse
* blank lines, comments, or other verbs in amongst DUMPxxx statements
* unless you are certain you know what you are doing.
*
*CONFIG BKR_OUTPUT_SPEC = IBMTAPE SCRATCH RW 1
*CONFIG BKR_OUTPUT_SPEC = IBMTWIN SCRATCH RW 1 SCRATCH
*CONFIG BKR_OUTPUT_SPEC = CMSFILE DISK POOL X
*
1= Help      2= Add line  3= Quit      4= Tab      5= Clocate   6= ?/Change
7= Backward  8= Forward   9= Receive 10= Rgtleft 11= Spltjoin 12= Cursor

====> _
X E D I T 1 File
M@ b 31/007
Connected to remote server/host 9.39.68.141 using port 23
```

```
Session B - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
0051      PEEK      A0  V 80  Trunc=80 Size=163 Line=32 Col=1 Alt=0
File INCREM00 JOB from BKRKBKUP at DEM1ZVM Format is NETDATA.
*
CONFIG BKR_OUTPUT_SPEC = CMSFILE INCREM01 DISKPOOL *
*
* Next two lines override default system tape pool set in BKRSYSTEM CONFIG
* CONFIG BKR_JOB_EUM_POOL_OWNER = xxxxxxxxxx
* CONFIG BKR_JOB_EUM_POOL_NAME = xxxxxxxxxx

CP_COMMAND TERM MORE 50 10
CP_COMMAND TERM HOLD ON
CP_COMMAND SPOOL CONSOLE TO BKRADMIN CLASS T TERM START NAME INCREM01 20090303
CP_COMMAND TERM LINES 255

CONFIG BKR_JOB_WORKERS = 2
CONFIG BKR_JOB_NAME     = INCREM01
CONFIG BKR_JOB_INSTANCE = $$INST$$
CONFIG BKR_JOB_OWNER    = BKRADMIN
CONFIG BKR_JOB_MASTER   = BKRKBKUP
CONFIG BKR_JOB_TOKEN    = 20090303

CONFIG BKR_JOB_CMS_FILEMASK = * * *
CONFIG BKR_JOB_SFS_PATHMASK = *
CONFIG BKR_JOB_BACKUP_RESERVED_AS_IMAGE = NO
CONFIG BKR_JOB_SUPPRESS_IMAGE = YES

CONFIG BKR_JOB_CATALOG = Y
1= Help      2= Add line  3= Quit      4= Tab      5= Clocate   6= ?/Change
7= Backward  8= Forward  9= Receive 10= Rgtright 11= Spltjoin 12= Cursor

====> _

X E D I T 1 File
MA b 31/007
Connected to remote server/host 9.39.68.141 using port 23
```



```

Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
0051      PEEK      A0  V 80  Trunc=80  Size=163  Line=76  Col=1  Alt=0
File INCREM00 JOB from BKR BKUP at DEM1ZVM Format is NETDATA.
JOB HEADER
DUMPCKD $ALLOCS 0A02 $$$DRIVER$$
DUMPCKD $DIRECT$ 0A04 $$$DRIVER$$
DUMPCKD AMVADMIN 0191 $$$DRIVER$$
DUMPEDF AMVWRK01 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPCKD AMVWRK03 0191 $$$DRIVER$$
DUMPEDF ARCHLOGS 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF AUTOLOG1 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF AVSVM 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF BKR BKUP 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF BKRCATLG 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF BKRWRK02 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPCKD BKRWRK04 0191 $$$DRIVER$$
DUMPEDF BLDNUC 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF BLDSEG 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF CFCONSOL 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF CNTRLCON 0191 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF DATAMOVE 01AA $$$FMASK$$$ $$$DRIVER$$
DUMPEDF DATAMOVE 02AA $$$FMASK$$$ $$$DRIVER$$
DUMPEDF DIRMAINT 01AA $$$FMASK$$$ $$$DRIVER$$
DUMPCKD DIRMAINT 01DE $$$DRIVER$$
DUMPEDF DIRMAINT 0155 $$$FMASK$$$ $$$DRIVER$$
DUMPEDF DIRMAINT 01DB $$$FMASK$$$ $$$DRIVER$$
DUMPEDF DIRMAINT 02DB $$$FMASK$$$ $$$DRIVER$$
DUMPEDF DIRMSAT 0155 $$$FMASK$$$ $$$DRIVER$$
1= Help 2= Add line 3= Quit 4= Tab 5= Clocate 6= ?/Change
7= Backward 8= Forward 9= Receive 10= Rgtleft 11= Spltjoin 12= Cursor
====>
X E D I T 1 File
MA b 31/007
Connected to remote server/host 9.39.68.141 using port 23

```

```

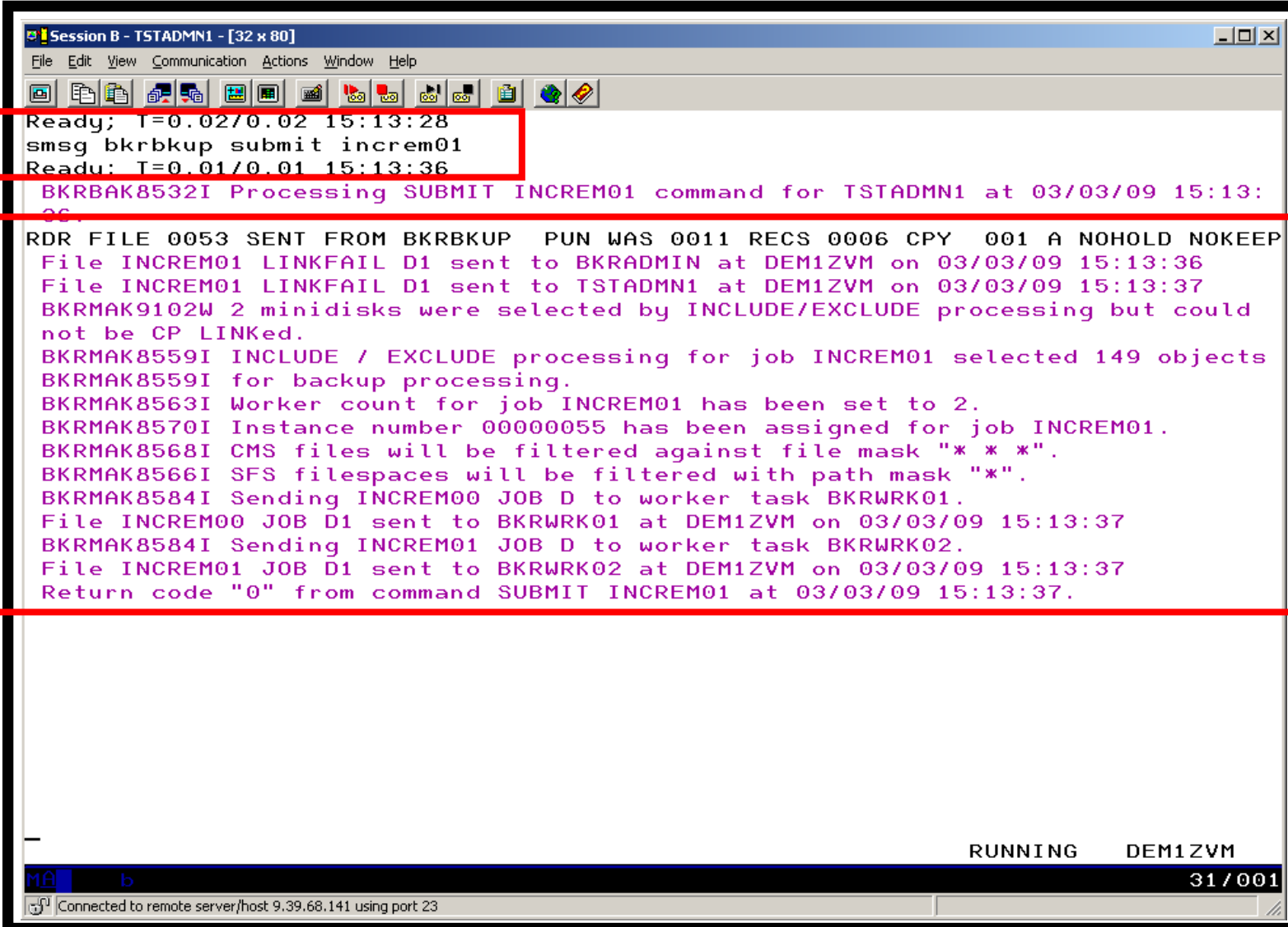
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
0051      PEEK      A0  V 80  Trunc=80 Size=163 Line=139 Col=1 Alt=0
File INCREM00 JOB from BKRKBUP at DEM1ZVM Format is NETDATA.
DUMPCKD TMTMM 0210 $$$DRIVER$$
DUMPEDF TSTADMN1 0191 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF TSTADMN3 0191 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF TSTUSER1 0191 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF TSTUSER3 0191 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF VMKERB 0191 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF VMRMADMN 0191 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF X25IPI 0191 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF 40SASF40 02B2 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF 40SASF40 02A6 $$$FMASK$$$ $$$DRIVER$$$
DUMPEDF 40SASF40 0100 $$$FMASK$$$ $$$DRIVER$$$
CONSOLE *** Could not LINK DATAMOVE 05F0 during INCLUDE/EXCLUDE; skipped.
JOB_TRAILER

* Retain catalog content for 30 days from date of job completion...
CONFIG BKR_CATALOG_RETENTION = 30
CP_COMMAND QUERY TIME
CONSOLE *
CONSOLE * INCREM01 INCREMENTAL BACKUP GENERATED 06/18/2007
CONSOLE * JOB IMAGE GENERATED 03/03/09 14:48:58
CONSOLE *

CP_QUIET SPOOL CONSOLE CLOSE NAME INCREM01 20090303
CP_QUIET SPOOL CONSOLE NAME WORKER OUTPUT
EOJ
1= Help      2= Add line  3= Quit    4= Tab      5= Locate   6= ?/Change
7= Backward  8= Forward  9= Receive 10= Rgtright 11= Spltjoin 12= Cursor

====> _
X E D I T 1 File
MA b 31/007
Connected to remote server/host 9.39.68.141 using port 23

```



The screenshot shows a terminal window titled "Session B - TSTADMN1 - [32 x 80]". The window contains the following text:

```
Ready; T=0.02/0.02 15:13:28
msg bkrbkup submit increm01
Ready; T=0.01/0.01 15:13:36
BKRBAK8532I Processing SUBMIT INCREM01 command for TSTADMN1 at 03/03/09 15:13:
36.
RDR FILE 0053 SENT FROM BKRBKUP PUN WAS 0011 RECS 0006 CPY 001 A NOHOLD NOKEEP
File INCREM01 LINKFAIL D1 sent to BKRADMIN at DEM1ZVM on 03/03/09 15:13:36
File INCREM01 LINKFAIL D1 sent to TSTADMN1 at DEM1ZVM on 03/03/09 15:13:37
BKRMAK9102W 2 minidisks were selected by INCLUDE/EXCLUDE processing but could
not be CP LINKed.
BKRMAK8559I INCLUDE / EXCLUDE processing for job INCREM01 selected 149 objects
BKRMAK8559I for backup processing.
BKRMAK8563I Worker count for job INCREM01 has been set to 2.
BKRMAK8570I Instance number 00000055 has been assigned for job INCREM01.
BKRMAK8568I CMS files will be filtered against file mask "* * *".
BKRMAK8566I SFS filespace will be filtered with path mask "*".
BKRMAK8584I Sending INCREM00 JOB D to worker task BKRWRK01.
File INCREM00 JOB D1 sent to BKRWRK01 at DEM1ZVM on 03/03/09 15:13:37
BKRMAK8584I Sending INCREM01 JOB D to worker task BKRWRK02.
File INCREM01 JOB D1 sent to BKRWRK02 at DEM1ZVM on 03/03/09 15:13:37
Return code "0" from command SUBMIT INCREM01 at 03/03/09 15:13:37.
```

At the bottom of the terminal window, the status "RUNNING DEM1ZVM" is displayed, along with a progress indicator "31/001" and a connection status "Connected to remote server/host 9.39.68.141 using port 23".

```
Session B - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
15:13:54 BKRWRK02 -----
15:13:54 BKRWRK02 -----
15:13:54 BKRWRK02 -----
15:13:54 BKRWRK02 BKRRVB9014I Job completed at 15:13:55 on 03/03/09.
15:13:54 BKRWRK02 BKRRVB9005I Executing CP command "QUERY TIME"
15:13:54 BKRWRK02 TIME IS 15:13:55 CST TUESDAY 03/03/09
15:13:54 BKRWRK02 CONNECT= 00:00:17 VIRTCPU= 000:00.42 TOTCPU= 000:00.56
15:13:54 BKRWRK02 BKRRVB9006I CP return code 0
15:13:54 BKRWRK02 *
15:13:54 BKRWRK02 * INCREM01 INCREMENTAL BACKUP GENERATED 06/18/2007
15:13:54 BKRWRK02 * JOB IMAGE GENERATED 03/03/09 15:13:37
15:13:54 BKRCATLG RDR FILE 0134 SENT FROM BKRWRK01 PUN WAS 0066 RECS 0013 CPY
15:13:54 BKRWRK02 *
15:13:54 BKRWRK02 BKRRVB9005I Executing CP command "SPOOL CONSOLE CLOSE NAME IN
15:13:54 BKRWRK02 BKRRVB9006I CP return code 0
15:13:54 BKRWRK02 BKRRVB9005I Executing CP command "SPOOL CONSOLE NAME WORKER 0
15:13:54 BKRWRK02 BKRRVB9006I CP return code 0
15:13:54 BKRWRK02 ***
15:13:54 BKRWRK02 *** End-of-Job Summary:
15:13:54 BKRWRK02 ***
15:13:54 BKRWRK02 *** Start time: 03/03/09 15:13:41
15:13:54 BKRWRK02 *** Ended time: 03/03/09 15:13:55
15:13:54 BKRWRK02 ***
15:13:54 BKRWRK02 *** DUMPCKD tasks, Max RC: 0, 0
15:13:54 BKRWRK02 *** DUMPFBA tasks, Max RC: 0, 0
15:13:54 BKRWRK02 *** DUMPEDF tasks, Max RC: 67, 4
15:13:54 BKRWRK02 *** DUMPSFS tasks, Max RC: 0, 0
15:13:54 BKRWRK02 *** RESTORE tasks, Max RC: 0, 0
15:13:54 BKRWRK02 ***
15:13:54 BKRCATLG 0000001 FILE PURGED
-
BACKUP
MA b 31/001
Connected to remote server/host 9.39.68.141 using port 23
```

Scenario 17: Restoring Files from Backup

- **Full and incremental backups performed previously**
- **User accidentally erases or corrupts a file**
- **User restores the file from backup**
 - Full screen interface to see all files available in backup
 - Including multiple “versions” of the same file
 - Filters and sorting available to easily find the needed file
 - Request restore directly to disk or to reader
- **No administrator intervention required**

Scenario 17: Detailed Steps

- **From a z/VM user ID, view all catalog data you own**

`bkrlist`

- **Use the filters to find the file you want to restore**
- **Put the cursor on the file and hit F10**
- **Specify the user ID to whom the file should be sent and hit F10**
- **Look at the reader of that user ID to see the restored file and a copy of the console during the restore processing**

`rdrlist`

- **View the contents of the file to verify it's the correct version**

`peek`


```
Session A - TSTUSER1 - [32 x 80]
File Edit View Communication Actions Window Help
CMS EDF Minidisk Restore Specifications
From TSTUSER1 0191 date 09/01/14 time 15:45:10 (job INCREM01 00000054 ).
To EDF minidisk, userid:          and virtual address:
Or to RDR of userid: tstuser1_node:          (defaults to this node).
Or to SFS filepool:          and filespace:
and path:

File filters:  Filename: B          Filetype: B          mode number: 1

Master backup userid: BKRKBUP

3= Quit          4= Return          10= Restore
MA a          07/030
Connected to remote server/host 9.39.68.141 using port 23
```

```
Session A - TSTUSER1 - [32 x 80]
File Edit View Communication Actions Window Help
Your command "RESTORE INCREM01 00000054 TSTUSER1 EDF $DEV0191 TO RDR TSTUSER1
- B B 1" is being processed at 03/03/09 15:57:55.
BKREST98291 Sending RESTORE Request 00000052 to worker task BKRWRK03...
File RESTORE JOB D1 sent to BKRWRK03 at DEM1ZVM on 03/03/09 15:57:55
*** Restore: Request 00000052 submitted to worker BKRWRK03 for processing
Return code "0" from command RESTORE INCREM01 00000054 TSTUSER1 EDF $DEV0191 T
O RDR TSTUSER1 - B B 1 at 03/03/09 15:57:55.
RDR FILE 0007 SENT FROM BKRWRK03 PUN WAS 0003 RECS 0026 CPY 001 R NOHOLD NOKEEP
RDR FILE 0008 SENT FROM BKRWRK03 CON WAS 0002 RECS 0080 CPY 001 R NOHOLD NOKEEP
Ready; T=0.027/0.02 15:57:57

RUNNING DEM1ZVM
MA a 31/001
Connected to remote server/host 9.39.68.141 using port 23
```

Session A - TSTUSER1 - [32 x 80]

TSTUSER1 DDPLIST 00 V 164 Trunc=164 Size=2 Line=1 Col=1 Alt=28

Cmd	Filename	Filetype	Class	User	at Node	Hold	Records	Date	Time
-	RESTORE	00000052	CON R	BKRWRK03	DEM1ZVM	NONE	80	3/03	15:57:55
	B	B	PUN R	BKRWRK03	DEM1ZVM	NONE	26	3/03	15:57:56

1= Help 2= Refresh 3= Quit 4= Sort(type) 5= Sort(date) 6= Sort(user)
 7= Backward 8= Forward 9= Receive 10= 11= Peek 12= Cursor

====>

X E D I T 1 File

MA a 03/001

Connected to remote server/host 9.39.68.141 using port 23

```
Session A - TSTUSER1 - [32 x 80]
File Edit View Communication Actions Window Help
0007 PEEK A0 V 80 Trunc=80 Size=41 Line=24 Col=1 Alt=0
File B B from *BACKUP* at DEM1ZVM Format is NETDATA.
Change made at 11:37am central time Sept 17, 2007
Change made at 12:31am eastern time Sept 25, 2007
Change made at 2:06pm mountain standard time Oct 9, 2007
Change made at 11:14am pacific time March 3, 2008
Change made at 9:20am central time March 4, 2008
Change made at 15:53pm eastern time April 19, 2008
Change made at 14:44 cet May 5, 2008
Change made at 08:45 pt July 3, 2008
Change made at 08:56am pt July 11, 2008
Change made at 11:04am pt July 15, 2008
Change made at 10:16am pt August 4, 2008
Change made at 08:10am pt Sept 11, 2008
Change made at 09:12am pt Sept 18, 2008
Change made at 2:00pm pt Oct 23, 2008
Change made at 16:27pm Brasil Nov 11, 2008
Change made at 11:01am ct Dec 9, 2008
Change made at 11:09am ct Dec 30, 2008
Change made at 15:45 ct Jan 14, 2009
* * * End of File * * *

1= Help 2= Add line 3= Quit 4= Tab 5= Clocate 6= ?/Change
7= Backward 8= Forward 9= Receive 10= Rgtright 11= Spltjoin 12= Cursor

====> _
X E D I T 1 File
MA a 31/007
Connected to remote server/host 9.39.68.141 using port 23
```

Scenario 18: Backup and Restore Single and Multiconfiguration Users in SSI

- **Two member SSI cluster**
 - TEST7SSI, TESTCSSI
- **Three backup jobs for full backups**
 - USERFULL – all single configuration users across the SSI cluster
 - Always run from TEST7SSI (required (for now))
 - IDSSI7FL – all multiconfiguration (IDENTITY) users on TEST7SSI
 - Always run from TEST7SSI (required)
 - IDSSICFL - all multiconfiguration (IDENTITY) users on TESTCSSI
 - Always run from TESTCSSI (required)
- **Three similar jobs for incremental**
- **Restore files in multiple ways**
 - Single configuration users
 - Restore to disk or reader from any member of the cluster
 - Multiconfiguration users
 - Restore to disk from the local member
 - Restore CMS files to reader from any member

Scenario 18: Detailed Steps

- **From a Backup Manager admin ID (DEMOADMN) on TEST7SSI, view all catalog data for multiconfiguration user OP1**

bkruser

- **Use the filters to find all files for OP1's 191 disk**
 - Note files exist from both TEST7SSI and TESTCSSI
- **F4 to return and then find all files for single configuration user DEMOADMN**
 - Note files only exist in the USERxxxx jobs – not member specific

- **Update a file on OP1 191 disk**

```
link op1 191 333 mr
```

```
acc 333 z
```

```
x test op1 z
```

Add a new line to the file

```
file
```

```
rel z (det
```

- **Similarly update a file on DEMOADMN 191 disk**

```
x test demoadm a
```

- **Perform a review of the incremental backup for multiconfiguration users on TEST7SSI**

```
smsg bkrbkup review idssi7in
```

Scenario 18: Detailed Steps

- **Perform a backup for multiconfiguration users on TEST7SSI**

```
smsg bkrbkup submit idssi7in
```

- **View the console of the worker(s) assigned**

```
gomcmd opmgrml viewcon user(bkrwrkxxx)
```

- **Perform a backup for single configuration users in the TEST7SSI and TESTCSSI cluster**

```
smsg bkrbkup submit userincr
```

- **When jobs are complete find the updated test files for OP1 and DEMOADMN in the catalog**

```
bkrlist
```

- **Once a file is chosen, use F10 to restore the file to the reader**

- **View the files in the reader**

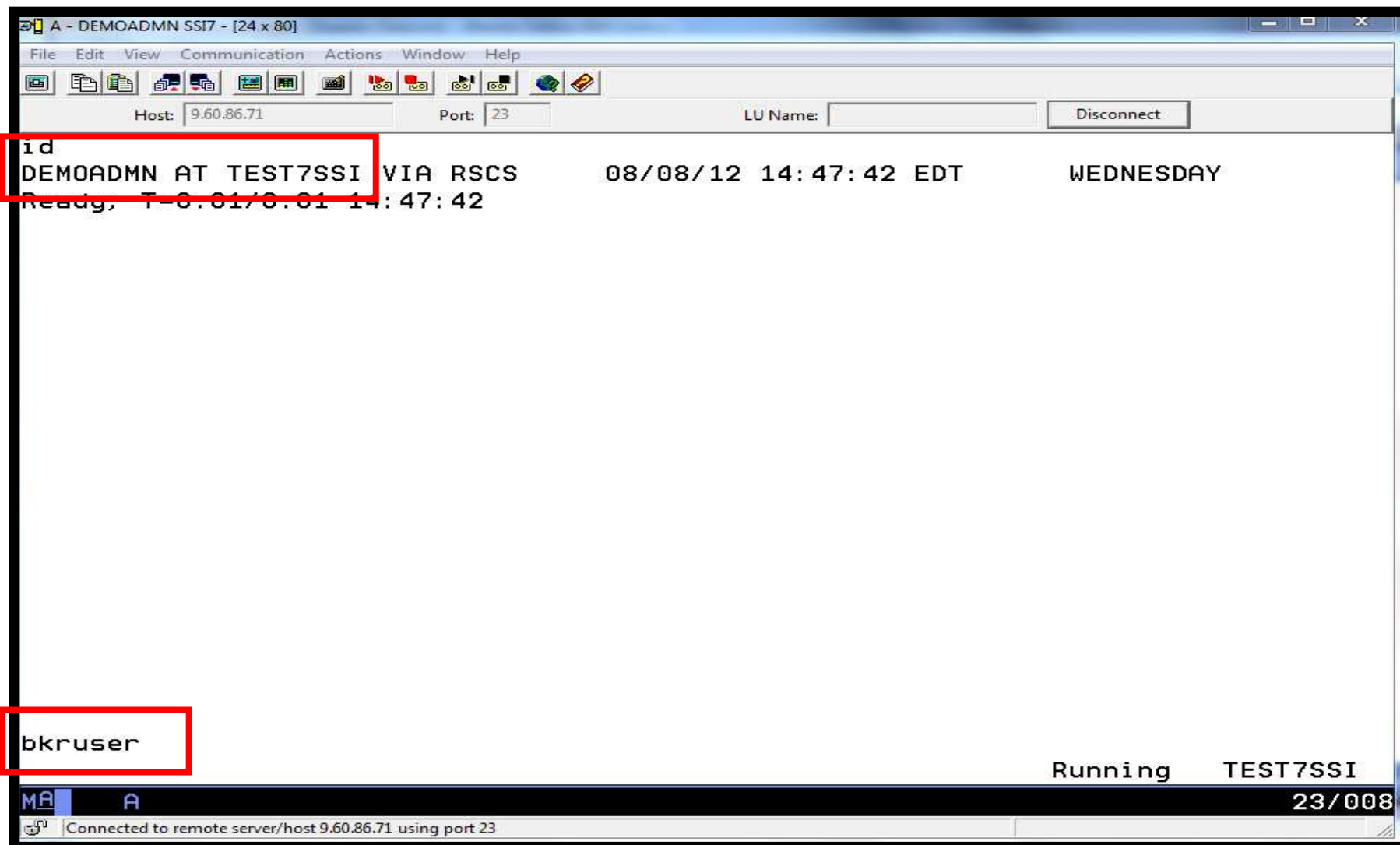
```
rdrlist
```

- **Logoff DEMOADMN (do not disconnect – must logoff)**

```
logoff
```

Scenario 18: Detailed Steps

- **Logon DEMOADMN on the other member of the cluster TESTCSSI**
- **Find the test files for DEMOADMN in the catalog**
`bkrlist`
- **Once a file is chosen, use F10 to restore the file to the reader**
- **View the files in the reader**
`rdrlist`
- **Notice you can restore files for DEMOADMN from either member of the cluster**



A - DEMOADMN SSI7 - [24 x 80]

File Edit View Communication Actions Window Help

Host: 9.60.86.71 Port: 23 LU Name: Disconnect

Catalog: BKRSFS: BKRCATLG.USERCAT. 72 of 72 ownerids displayed

Ownerid filter: *

Ownerids

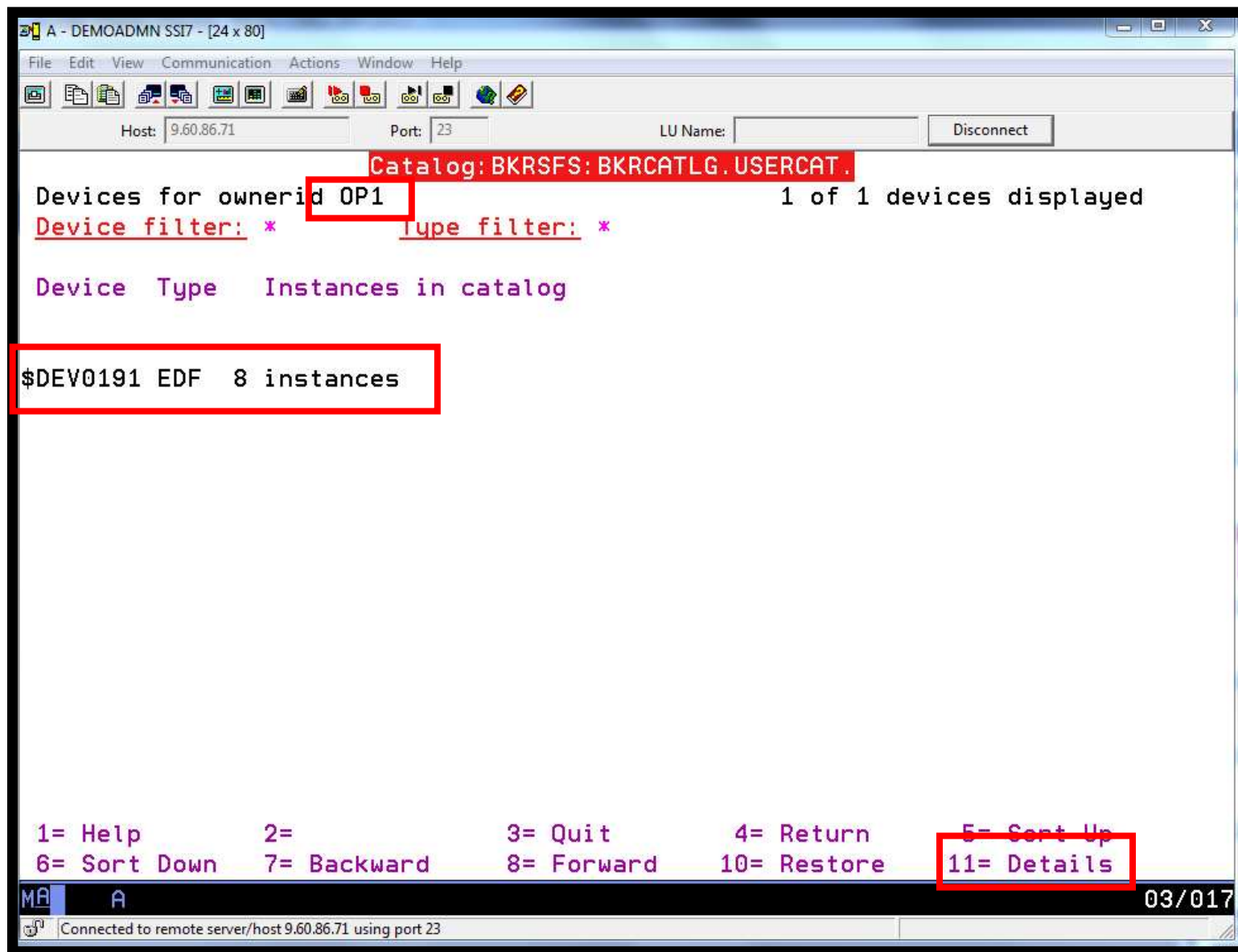
\$ALLOC\$	ATSSERV	AUDITOR	AUTOLOG1	AUTOLOG2	AVSVM	BKRADMIN
BKRBKUP	BKRCATLG	BKRSVSFS	BKRWRK01	BKRWRK02	BKRWRK03	BKRWRK04
BLDCMS	BLDNUC	BLDRACF	BLDSEG	CMAINT	CMSBATCH	DEMOADMN
DEMOADM2	DHCPD	DISKACNT	DTCENS1	DTCENS2	DTCMAPI	DTCVSW1
DTCVSW2	EREP	GCS	GSKADMIN	IBMUSER	IMAP	LDAPSRV
LGLOPR	LPSERVE	LVL2VM1	MAINT	MROUTE	OPERATOR	OPERSSI
OPERSYMP	OPMGRM1	OPMGRS1	OPMGRS2	OPMGRS3	OPMGRS4	OP1
PERFSVM	PORTMAP	REXECD	RSCSDNS	SNMPD	SNMPQE	SNMPSUBA
SSLDCSSM	SYSADMIN	SYSMON	TCPIP	TOOLS	TSAFVM	UFTD
VMRADMN	VMSERVP	VMSERVR	VMSEVS	VMSEVVU	5697J06B	5697J10D
6VMLEN20	6VMRSC20					

1= Help 2= 3= Quit 4= Return 5= Sort Up

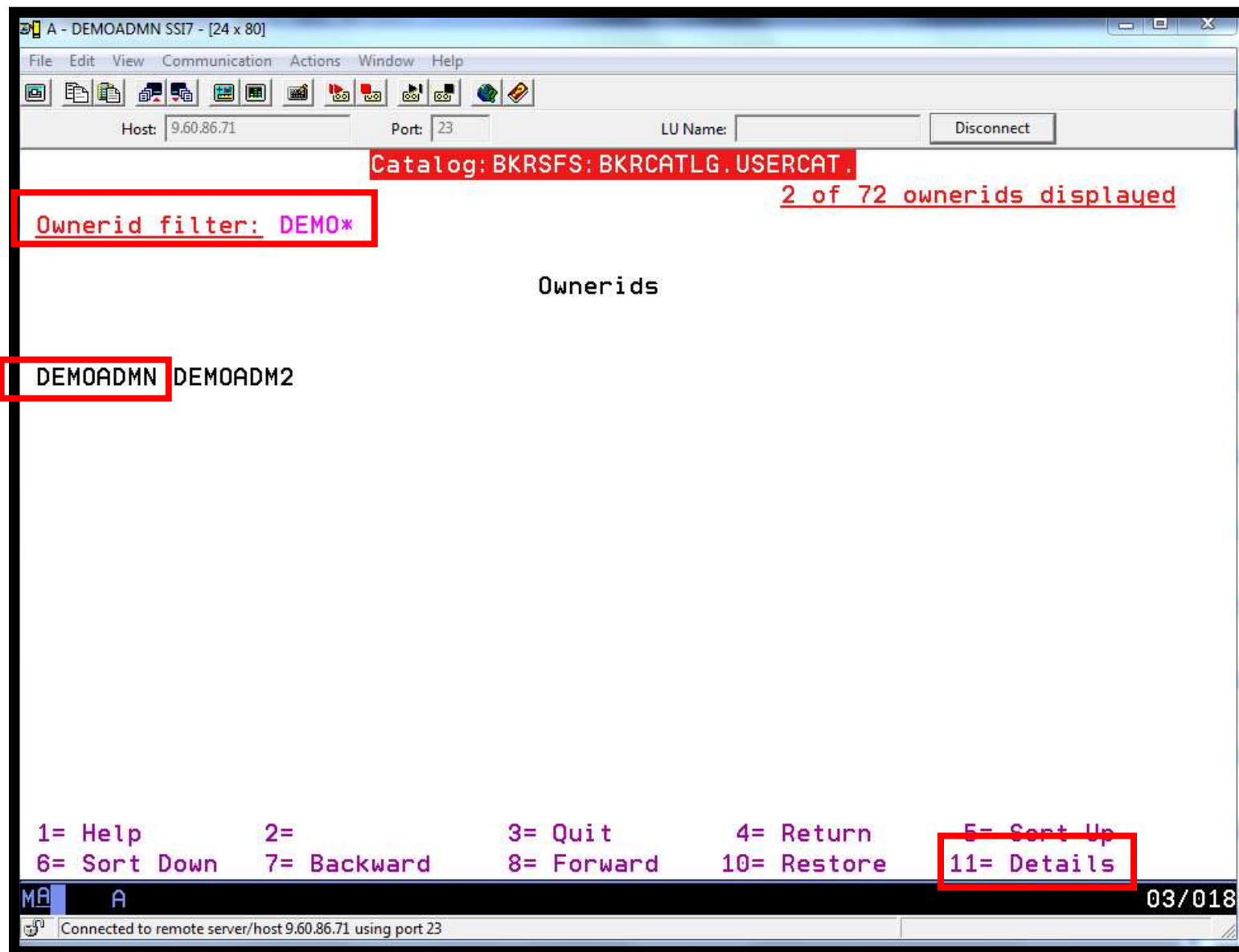
6= Sort Down 7= Backward 8= Forward 10= Restore 11= Details

MA A 03/018

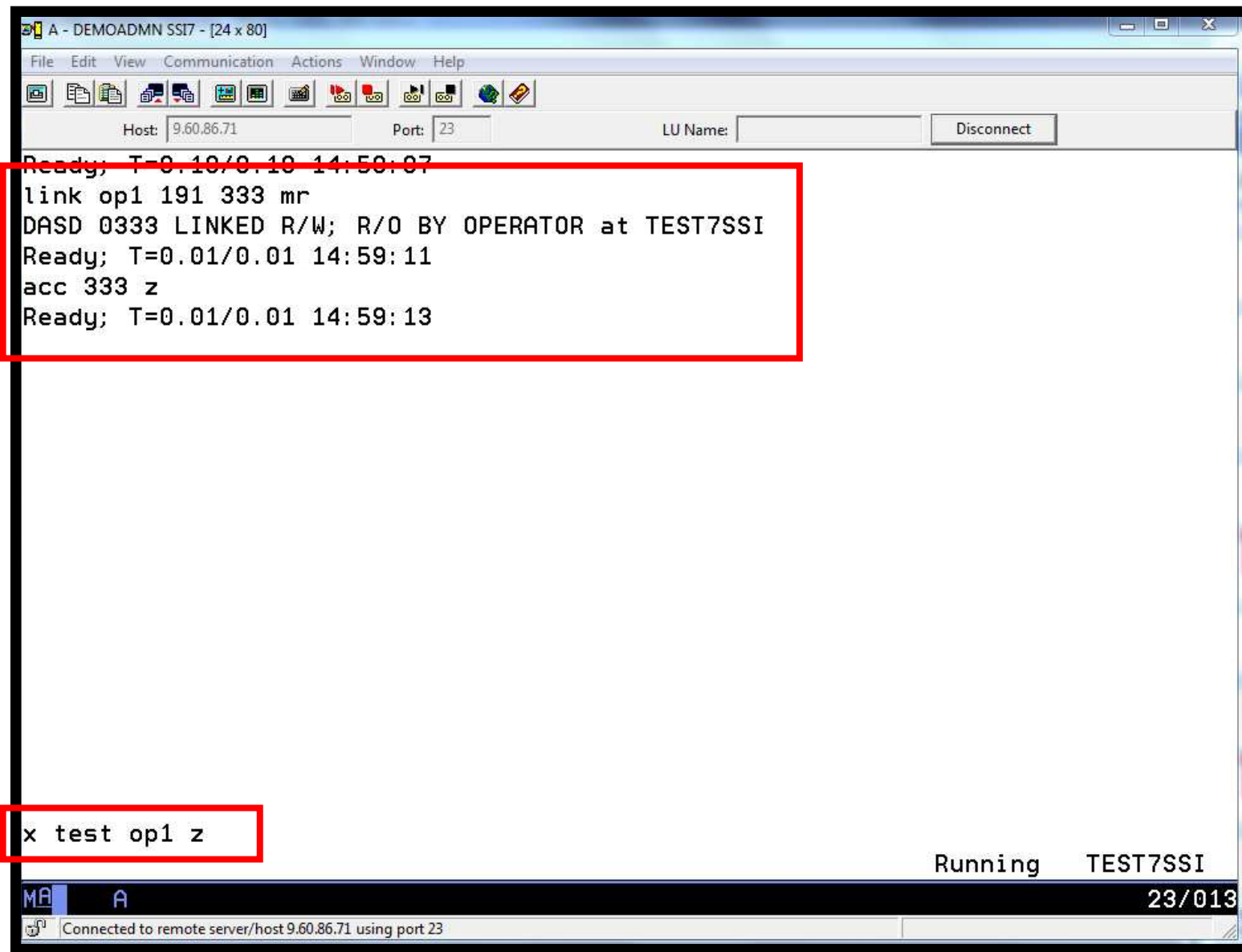
Connected to remote server/host 9.60.86.71 using port 23



```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
Catalog: BKRSFS: BKRCATLG.USERCAT.
For OP1 $DEV0191 EDF 8 of 8 instances displayed
Jobname filter: *
Jobname Instance Date/time completed
IDSSICFL 00000002 2012/03/06 18:54:51
IDSSICIN 00000001 2012/05/21 04:24:30
IDSSICIN 00000002 2012/05/21 04:27:30
IDSSI7FL 00000005 2012/03/06 18:54:01
IDSSI7IN 00000001 2012/03/09 14:09:14
IDSSI7IN 00000002 2012/03/14 17:11:04
IDSSI7IN 00000003 2012/05/21 04:15:22
IDSSI7IN 00000004 2012/05/21 11:21:16
1= Help 2= 3= Quit 4= Return 5= Sort Up
6= Sort Down 7= Backward 8= Forward 10= Restore 11= Details
MA A 03/018
Connected to remote server/host 9.60.86.71 using port 23
```



```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
Catalog: BKRSFS: BKRCATLG,USERCAT.
For DEMOADMN $DEV0191 EDF 3 of 3 instances displayed
Jobname filter: *
Jobname Instance Date/time completed
USERFULL 00000002 2012/03/06 19:12:38
USERINCR 00000001 2012/03/09 14:31:50
USERINCR 00000002 2012/05/21 04:18:24
1= Help 2= 3= Quit 4= Return 5= Sort Up
6= Sort Down 7= Backward 8= Forward 10= Restore 11= Details
MA A 03/018
Connected to remote server/host 9.60.86.71 using port 23
```



A - DEMOADMN SSI7 - [24 x 80]

File Edit View Communication Actions Window Help

Host: 9.60.86.71 Port: 23 LU Name: Disconnect

```
Ready; T=0.10/0.10 14:59:07  
link op1 191 333 mr  
DASD 0333 LINKED R/W; R/O BY OPERATOR at TEST7SSI  
Ready; T=0.01/0.01 14:59:11  
acc 333 z  
Ready; T=0.01/0.01 14:59:13
```

```
x test op1 z
```

Running TEST7SSI

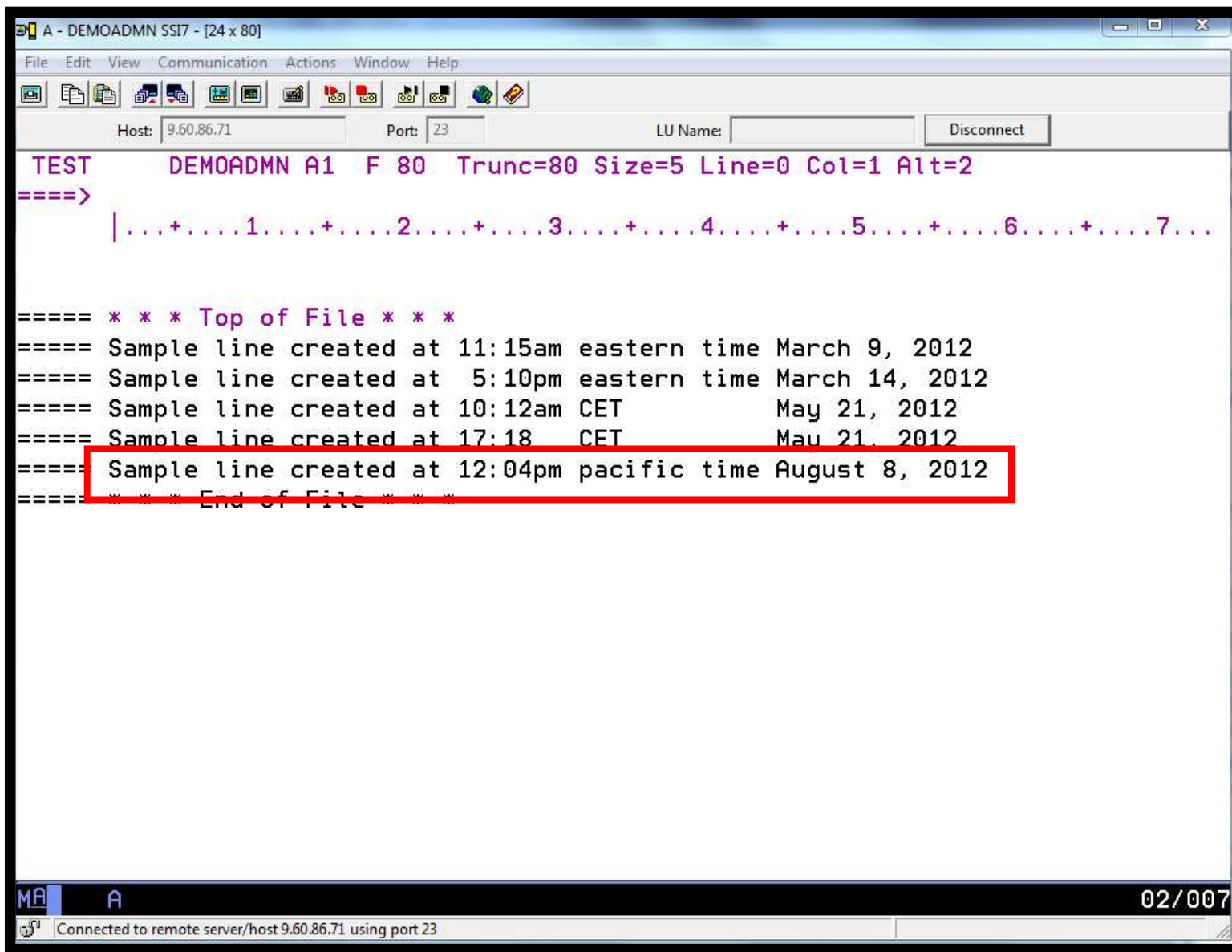
MA A 23/013

Connected to remote server/host 9.60.86.71 using port 23

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
TEST OP1 Z1 F 80 Trunc=80 Size=5 Line=0 Col=1 Alt=2
====> file
|...+...1...+...2...+...3...+...4...+...5...+...6...+...7...

==== * * * Top of File * * *
==== Sample line created at 11:01am eastern time March 9, 2012
==== Sample line created at 5:08pm eastern time March 14, 2012
==== Sample line created at 10:11am CET May 21, 2012
==== Sample line created at 17:15am CET May 21, 2012
==== Sample line created at 12:01pm pacific time August 8, 2012
==== * * * End of File * * *

MA A ^ 02/011
Connected to remote server/host 9.60.86.71 using port 23
```

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
TEST DEMOADMN A1 F 80 Trunc=80 Size=5 Line=0 Col=1 Alt=2
====>
|...+...1...+...2...+...3...+...4...+...5...+...6...+...7...

==== * * * Top of File * * *
==== Sample line created at 11:15am eastern time March 9, 2012
==== Sample line created at 5:10pm eastern time March 14, 2012
==== Sample line created at 10:12am CET May 21, 2012
==== Sample line created at 17:18 CET May 21, 2012
==== Sample line created at 12:04pm pacific time August 8, 2012
==== * * * End of File * * *

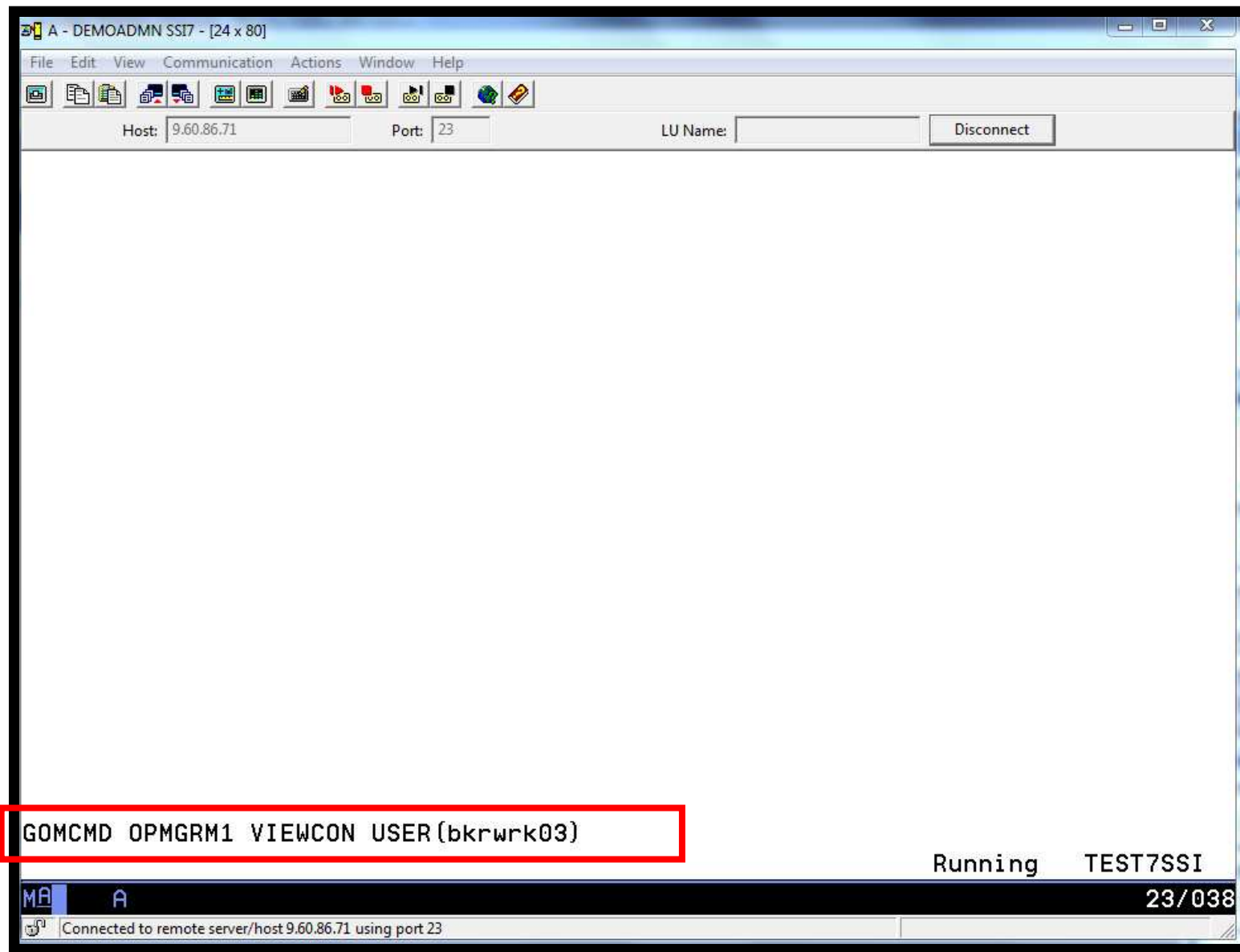
MA A 02/007
Connected to remote server/host 9.60.86.71 using port 23
```

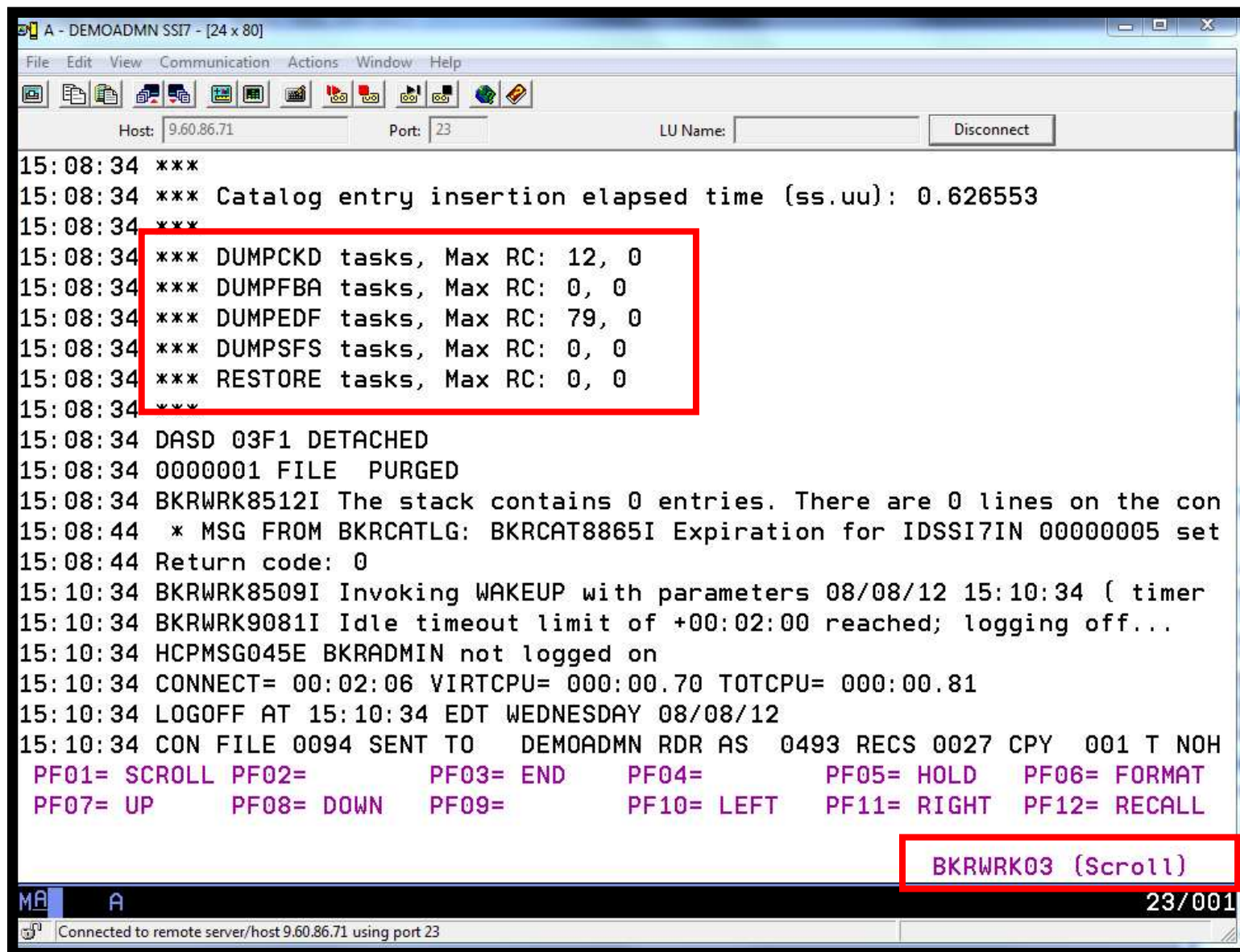
```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
Ready; T=0.01/0.01 15:06:18
smsg bkrbkup review idssi7in
Ready; T=0.01/0.01 15:06:24
BKRBAK8529I Processing REVIEW IDSSI7IN command for DEMOADMN.
RDR FILE 0477 SENT FROM BKRBAKUP PUN WAS 0006 RECS 0144 CPY 001 A NOHOLD NOKEEP
RDR FILE 0481 SENT FROM BKRBAKUP PUN WAS 0007 RECS 0145 CPY 001 A NOHOLD NOKEEP
BKRMAK8559I INCLUDE / EXCLUDE processing for job IDSSI7IN selected 183 objects
for backup processing.
BKRMAK8563I Worker count for job IDSSI7IN has been set to 2.
BKRMAK8568I CMS files will be filtered against file mask "* * *".
BKRMAK8566I SFS filespace will be filtered with path mask "*".
BKRMAK9345I Job will be processed by:
BKRMAK9346I ... BKRWRK01
BKRMAK9346I ... BKRWRK02
BKRMAK8583I Sending results to DEMOADMN for review.
File IDSSI7I0 JOB D1 sent to DEMOADMN at TEST7SSI on 08/08/12 15:06:25
File IDSSI7I1 JOB D1 sent to DEMOADMN at TEST7SSI on 08/08/12 15:06:25
Return code "0" from command REVIEW IDSSI7IN at 08/08/12 15:06:25.

Running TEST7SSI
MA A 23/001
Connected to remote server/host 9.60.86.71 using port 23
```

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
msg bkrbkup submit idssi7in
Ready, T=0.01/0.01 15:08:26
BKRBAK8532I Processing SUBMIT IDSSI7IN command for DEMOADMN at 08/08/12 15:08:
26.
BKRMMAK8559I INCLUDE / EXCLUDE processing for job IDSSI7IN selected 183 objects
BKRMMAK8559I for backup processing
BKRMMAK8563I Worker count for job IDSSI7IN has been set to 2.
BKRMMAK8570I Instance number 00000005 has been assigned for job IDSSI7IN.
BKRMMAK8568I CMS files will be filtered against file mask * * * .
BKRMMAK8566I SFS filespace will be filtered with path mask "*".
BKRMMAK9345I Job will be processed by:
BKRMMAK9346I ... BKRWRK03
BKRMMAK9346I ... BKRWRK04
BKRMMAK8584I Sending IDSSI7I0 JOB D to worker task BKRWRK03.
File IDSSI7I0 JOB D1 sent to BKRWRK03 at TEST7SSI on 08/08/12 15:08:27
BKRMMAK8584I Sending IDSSI7I1 JOB D to worker task BKRWRK04.
File IDSSI7I1 JOB D1 sent to BKRWRK04 at TEST7SSI on 08/08/12 15:08:27
Return code "0" from command SUBMIT IDSSI7IN at 08/08/12 15:08:27.
RDR FILE 0485 SENT FROM BKRWRK03 CON WAS 0002 RECS 0347 CPY 001 T NOHOLD NOKEEP
RDR FILE 0489 SENT FROM BKRWRK04 CON WAS 0002 RECS 0350 CPY 001 T NOHOLD NOKEEP

Running TEST7SSI
MA A 23/001
Connected to remote server/host 9.60.86.71 using port 23
```





A screenshot of a terminal window titled "A - DEMOADMN SSI7 - [24 x 80]". The window has a menu bar (File, Edit, View, Communication, Actions, Window, Help) and a toolbar. Below the toolbar, there are fields for "Host: 9.60.86.71", "Port: 23", and "LU Name:" with a "Disconnect" button. The main area displays a log of system messages. A red box highlights a block of statistics: "DUMPCKD tasks, Max RC: 12, 0", "DUMPFBA tasks, Max RC: 0, 0", "DUMPEDF tasks, Max RC: 79, 0", "DUMPSFS tasks, Max RC: 0, 0", and "RESTORE tasks, Max RC: 0, 0". Another red box highlights the text "BKRWRK03 (Scroll)" at the bottom right. The status bar at the bottom shows "MA A" on the left and "23/001" on the right. A footer at the very bottom indicates "Connected to remote server/host 9.60.86.71 using port 23".

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
15:08:34 ***
15:08:34 *** Catalog entry insertion elapsed time (ss.uu): 0.626553
15:08:34 ***
15:08:34 *** DUMPCKD tasks, Max RC: 12, 0
15:08:34 *** DUMPFBA tasks, Max RC: 0, 0
15:08:34 *** DUMPEDF tasks, Max RC: 79, 0
15:08:34 *** DUMPSFS tasks, Max RC: 0, 0
15:08:34 *** RESTORE tasks, Max RC: 0, 0
15:08:34 ***
15:08:34 DASD 03F1 DETACHED
15:08:34 0000001 FILE PURGED
15:08:34 BKRWRK8512I The stack contains 0 entries. There are 0 lines on the con
15:08:44 * MSG FROM BKRCATLG: BKRCAT8865I Expiration for IDSSI7IN 00000005 set
15:08:44 Return code: 0
15:10:34 BKRWRK8509I Invoking WAKEUP with parameters 08/08/12 15:10:34 ( timer
15:10:34 BKRWRK9081I Idle timeout limit of +00:02:00 reached; logging off...
15:10:34 HCPMSG045E BKRADMIN not logged on
15:10:34 CONNECT= 00:02:06 VIRTCPU= 000:00.70 TOTCPU= 000:00.81
15:10:34 LOGOFF AT 15:10:34 EDT WEDNESDAY 08/08/12
15:10:34 CON FILE 0094 SENT TO DEMOADMN RDR AS 0493 RECS 0027 CPY 001 T NOH
PF01= SCROLL PF02= PF03= END PF04= PF05= HOLD PF06= FORMAT
PF07= UP PF08= DOWN PF09= PF10= LEFT PF11= RIGHT PF12= RECALL
BKRWRK03 (Scroll)
MA A 23/001
Connected to remote server/host 9.60.86.71 using port 23
```

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
Ready, T=0.01/0.01 15:15:40
smsg bkrbkup submit userincr
Ready, T=0.01/0.01 15:15:56
BKRBAK8532I Processing SUBMIT USERINCR command for DEMOADMN at 08/08/12 15:15:
56.
BKRMMAK8559I INCLUDE / EXCLUDE processing for job USERINCR selected 72 objects
BKRMMAK8559I for backup processing.
BKRMMAK8563I Worker count for job USERINCR has been set to 2.
BKRMMAK8570I Instance number 00000003 has been assigned for job USERINCR.
BKRMMAK8568I CMS files will be filtered against file mask "* * *".
BKRMMAK8566I SFS filespace will be filtered with path mask "*".
BKRMMAK9345I Job will be processed by:
BKRMMAK9346I ... BKRWRK01
BKRMMAK9346I ... BKRWRK02
BKRMMAK8584I Sending USERINCO JOB D to worker task BKRWRK01.
File USERINCO JOB D1 sent to BKRWRK01 at TEST7SSI on 08/08/12 15:15:57
BKRMMAK8584I Sending USERINC1 JOB D to worker task BKRWRK02.
File USERINC1 JOB D1 sent to BKRWRK02 at TEST7SSI on 08/08/12 15:15:57
Return code 0 from command SUBMIT USERINCR at 08/08/12 15:15:57.
RDR FILE 0501 SENT FROM BKRWRK02 CON WAS 0002 RECS 0339 CPY 001 T NOHOLD NOKEEP
RDR FILE 0505 SENT FROM BKRWRK01 CON WAS 0002 RECS 0353 CPY 001 T NOHOLD NOKEEP

Running TEST7SSI
MA A 23/001
Connected to remote server/host 9.60.86.71 using port 23
```

A - DEMOADMN SSI7 - [24 x 80]

File Edit View Communication Actions Window Help

Host: 9.60.86.71 Port: 23 LU Name: Disconnect

Files for owner(s) : *

Selection: Name: Type: Mode: 8 of 1287 shown

Current filters: Name: TEST Type: * Mode: * Owner: OP1

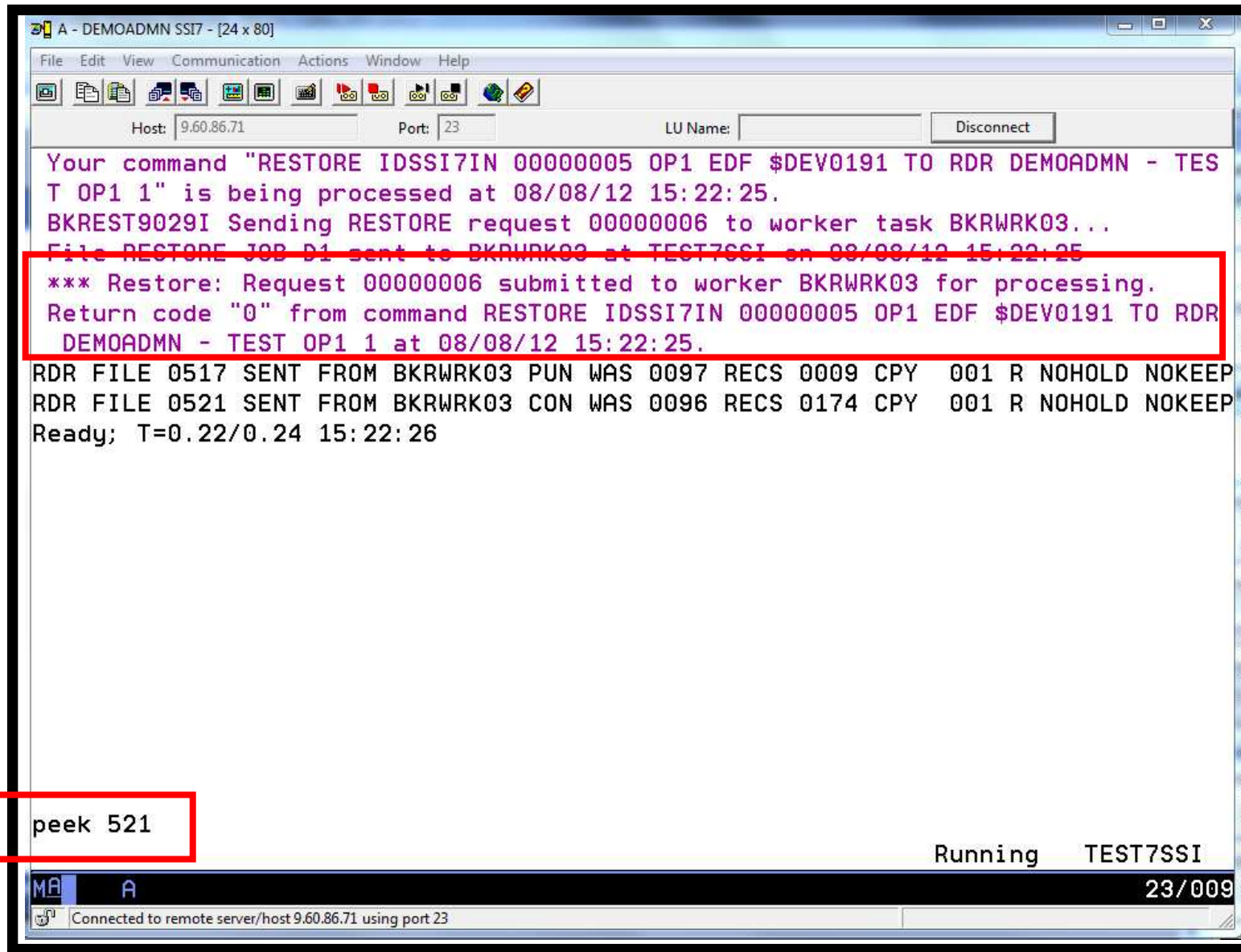
Owner	Filename	Filetype	Fm	Date	Time	Device or Path
OP1	TEST	OP1	1	12/05/21	04:22:38	0191
OP1	TEST	FILE	1	12/03/09	14:02:12	0191
OP1	TEST	OP1	1	12/03/14	17:08:35	0191
OP1	TEST	OP1	1	12/05/21	04:11:46	0191
OP1	TEST	OP1	1	12/05/21	11:18:48	0191
OP1	TEST	OP1	1	12/08/08	15:02:59	0191

1= Help 2= Mixed case 3= Quit 4= Return 5= Sort Up
 6= Sort Down 7= Backward 8= Forward 10= Restore 11= Details

MA A 03/029

Connected to remote server/host 9.60.86.71 using port 23

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
CMS EDF Minidisk Restore Specifications
From OP1 0191 date 12/08/08 time 15:02:59 (job IDSSI7IN 00000005 )
To EDF minidisk, userid: and virtual address:
FORMAT: OK if needed? NO FORMAT regardless? NO
Or to RDR of userid: demoadm node: (defaults to this node).
Or to SFS filepool: and file space:
and path:
File filters: Filename: TEST Filetype: OP1 mode number: 1
Master backup userid: BKRBKUP Options:
2= Mixed case 3= Quit 4= Return 10= Restore
MA A 08/038
Connected to remote server/host 9.60.86.71 using port 23
```

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
Your command "RESTORE IDSSI7IN 00000005 OP1 EDF $DEV0191 TO RDR DEMOADMN - TES
T OP1 1" is being processed at 08/08/12 15:22:25.
BKREST9029I Sending RESTORE request 00000006 to worker task BKRWRK03...
File RESTORE JOB D1 sent to BKRWRK03 at TEST7SSI on 08/08/12 15:22:25
*** Restore: Request 00000006 submitted to worker BKRWRK03 for processing.
Return code "0" from command RESTORE IDSSI7IN 00000005 OP1 EDF $DEV0191 TO RDR
DEMOADMN - TEST OP1 1 at 08/08/12 15:22:25.
RDR FILE 0517 SENT FROM BKRWRK03 PUN WAS 0097 RECS 0009 CPY 001 R NOHOLD NOKEEP
RDR FILE 0521 SENT FROM BKRWRK03 CON WAS 0096 RECS 0174 CPY 001 R NOHOLD NOKEEP
Ready; T=0.22/0.24 15:22:26

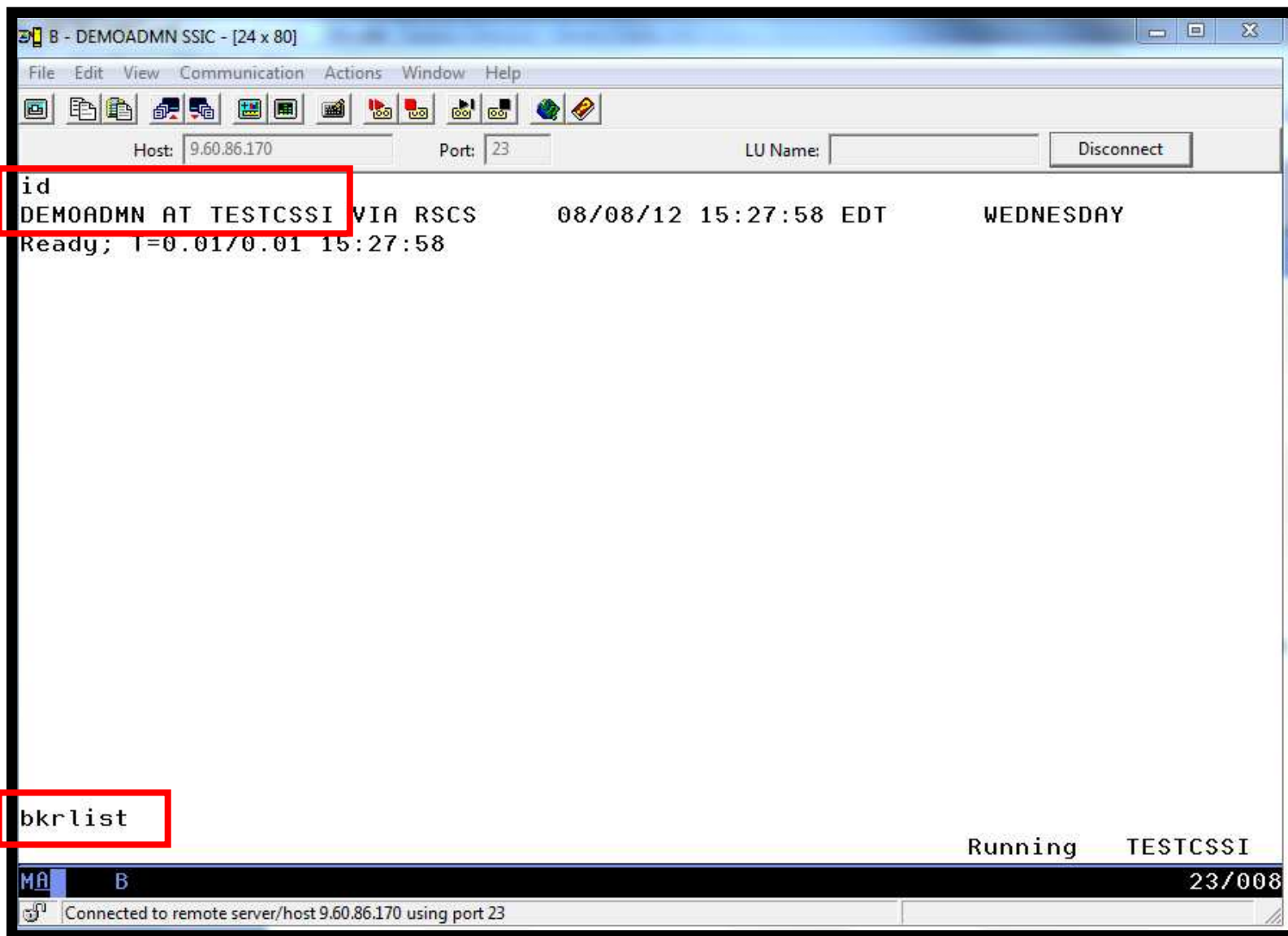
peek 521

Running TEST7SSI
MA A 23/009
Connected to remote server/host 9.60.86.71 using port 23
```

```
A - DEMOADMN SSI7 - [24 x 80]
File Edit View Communication Actions Window Help
Host: 9.60.86.71 Port: 23 LU Name: Disconnect
0517 PEEK A0 V 80 Trunc=80 Size=5 Line=0 Col=1 Alt=0
File TEST OP1 from *BACKUP* at TEST7SSI Format is NETDATA.
* * * Top of File * * *
Sample line created at 11:01am eastern time March 9, 2012
Sample line created at 5:08pm eastern time March 14, 2012
Sample line created at 10:11am CET May 21, 2012
Sample line created at 17:15am CET May 21, 2012
Sample line created at 12:01pm pacific time August 8, 2012
* * * End of File * * *

1= Help 2= Add line 3= Quit 4= Tab 5= Clocate 6= ?/Change
7= Backward 8= Forward 9= Receive 10= Rgtright 11= Spltjoin 12= Cursor

====>
XEDIT 1 File
MA A 23/007
Connected to remote server/host 9.60.86.71 using port 23
```



Host: 9.60.86.170 Port: 23 LU Name: Disconnect

Files for owner(s): *

selection: Name: * Type: * Mode: * 3 of 1267 shown

Current filters: Name: TEST Type: * Mode: * Owner: DEMOADMN

Owner	Filename	Filetype	Fm	Date	Time	Device or Path
DEMOADMN	TEST	DEMOADMN	1	12/03/09	14:15:31	0191
DEMOADMN	TEST	DEMOADMN	1	12/05/21	04:13:05	0191
DEMOADMN	TEST	DEMOADMN	1	12/08/08	15:04:32	0191

1= Help 2= Mixed case 3= Quit 4= Return 5= Sort Up
 6= Sort Down 7= Backward 8= Forward 10= Restore 11= Details

MA B 02/001

Connected to remote server/host 9.60.86.170 using port 23

Scenario 19: Scheduling Image Backups of Linux Guests

- **Initiated or scheduled by Operations Manager**
 - Schedule defined in Operations Manager to initiate backups at specific times/intervals
 - Action associated with each schedule
 - Linux guest is shut down
 - Operations Manager watches for shutdown complete
 - Sends request to Backup and Restore Manager to back up the specific DASD/minidisks associated with the guest
 - Alternatively use FLASHCOPY to copy DASD, restart guest, then perform backup of copy of DASD.
 - Operations Manager watches for backup complete message
 - Restarts Linux guest
 - Guest is down for minimum time required for backup

Scenario 19: Detailed Steps

- **Define a schedule to start the automated backup process**

```
gomcmd opmgrml defschd name(demo),action(stoplxx),when(now)
```

- **View the Operations Manager log to see the schedule trigger**

```
gomcmd opmgrml viewlog
```

- **View the console of the Linux guest to see it shut down**

```
gomcmd opmgrml viewcon user(omeglxx1)
```

- **View the console of the backup server to see the backup start**

```
gomcmd opmgrml viewcon user(bkrbkup)
```

- **Find the worker that has been assigned and view its console**

```
gomcmd opmgrml viewcon user(bkrwrkxx)
```

- **View the console of the Linux guest to see it restart**

```
gomcmd opmgrml viewcon user(omeglxx1)
```

- **View the backup catalog to see the completed job**

```
bkrjob
```

```

Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
03/03/2009 16:10:31 GOMCMD0201L "TSTADMN1 DEFSCHD NAME(DEMO),ACTION(STOPLNX),W
03/03/2009 16:10:44 GOMCMD0201L "TSTADMN1 VIEWLOG" VID=TSTADMN1 SRC=MASIUCV CL
03/03/2009 16:10:53 GOMACT0260I SCHEDULE DEMO ACTION STOPLNX TRIGGERED BY
03/03/2009 16:10:53 GOMACT0262I ACTION STOPLNX BEGIN FOR SCHEDULE SERVER OPMG
03/03/2009 16:10:53 GOMACT0269L COMMAND "RESUME RULE(LNXDOWN)"
03/03/2009 16:10:53 GOMCMD0201L "OPMGRM1 RESUME RULE(LNXDOWN)" VID=OPMGRM1 S
03/03/2009 16:10:53 GOMACT0267I ACTION STOPLNX END RC=0 SERVER OPMGRM1
03/03/2009 16:10:53 GOMACT0260I SCHEDULE DEMO ACTION STOPLNXA TRIGGERED BY
03/03/2009 16:10:53 GOMACT0262I ACTION STOPLNXA BEGIN FOR SCHEDULE SERVER OPMG
03/03/2009 16:10:53 GOMACT0269L COMMAND "CP SET SECUSER OMEGLNX1 OPMGRM1"
03/03/2009 16:10:53 GOMACT0270L HCPCFX6768I SECUSER of OMEGLNX1 initiated.
03/03/2009 16:10:53 GOMACT0267I ACTION STOPLNXA END RC=0 SERVER OPMGRM1
03/03/2009 16:10:53 GOMACT0260I SCHEDULE DEMO ACTION STOPLNXB TRIGGERED BY
03/03/2009 16:10:53 GOMACT0262I ACTION STOPLNXB BEGIN FOR SCHEDULE SERVER OPMG
03/03/2009 16:10:53 GOMACT0269L COMMAND "CP SIGNAL SHUTDOWN OMEGLNX1 WITHIN 90
03/03/2009 16:10:53 GOMACT0267I ACTION STOPLNXB END RC=0 SERVER OPMGRM1
03/03/2009 16:10:53 GOMCMD0216L "OMEGLNX1 Broadcast message from root (console
03/03/2009 16:10:53 GOMCMD0216L "OMEGLNX1 The system is going down for system
03/03/2009 16:10:54 GOMCMD0216L "OMEGLNX1 INIT: Switching to runlevel: 0" VID=
03/03/2009 16:10:54 GOMCMD0216L "OMEGLNX1 INIT: Sending processes the TERM sig
03/03/2009 16:10:58 GOMCMD0216L "OMEGLNX1 INIT: Sending processes the KILL sig
03/03/2009 16:11:00 GOMCMD0216L "OMEGLNX1 Boot logging started on /dev/ttyS0(/
03/03/2009 16:11:00 GOMCMD0216L "OMEGLNX1 Master Resource Control: previous ru
03/03/2009 16:11:00 GOMCMD0216L "OMEGLNX1 Shutting down CRON daemon" VID=*MSG
03/03/2009 16:11:00 GOMCMD0216L "OMEGLNX1 ..done" VID=*MSG SRC=MASIUCV CL
03/03/2009 16:11:01 GOMCMD0216L "OMEGLNX1 Shutting down service kdm..done" VID
03/03/2009 16:11:01 GOMCMD0216L "OMEGLNX1 Shutting down mail service (Postfix)
03/03/2009 16:11:01 GOMCMD0216L "OMEGLNX1 Shutting down Name Service Cache Dae
03/03/2009 16:11:01 GOMCMD0216L "OMEGLNX1 ..done" VID=*MSG SRC=MASIUCV CL
03/03/2009 16:11:01 GOMCMD0216L "OMEGLNX1 Shutting down cupsd" VID=*MSG SR
-
MASALOG
MA b 31/001
Connected to remote server/host 9.39.68.141 using port 23

```

```
Session B - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
16:10:53 Broadcast message from root (console) (Tue Mar  3 16:10:53 2009):
16:10:53 The system is going down for system halt NOW!
16:10:53 INIT: Switching to runlevel: 0
16:10:53 INIT: Sending processes the TERM signal
16:10:57 INIT: Sending processes the KILL signal
16:10:59 Boot logging started on /dev/ttyS0(/dev/console) at Tue Mar  3 16:11:0
16:10:59 Master Resource Control: previous runlevel: 5, switching to runlevel:
16:11:00 Shutting down CRON daemon
16:11:00 ..done
16:11:00 Shutting down service kdm..done
16:11:00 Shutting down mail service (Postfix)..done
16:11:01 Shutting down Name Service Cache Daemon
16:11:01 ..done
16:11:01 Shutting down cupsd
16:11:01 ..done
16:11:02 Shutting down slpd ..done
16:11:02 Shutting down sound driver..done
16:11:02 Shutting down SSH daemon..done
16:11:03 Remove Net File System (NFS)..unused
16:11:03 Umount SMB/ CIFS File Systems ..done
16:11:03 Shutting down resource manager..done
16:11:03 Shutting down RPC portmap daemon..done
16:11:03 Shutting down syslog servicesMar  3 16:11:04 sles9 kernel: Kernel logg
16:11:03 Mar  3 16:11:04 sles9 kernel: Kernel log daemon terminating.
16:11:04 ..done
16:11:06 Shutting down network interfaces:
16:11:06     eth0
16:11:06     eth0     configuration: qeth-bus-ccw-0.0.0600
16:11:07 Y1A..done
16:11:07 Shutting down service network . . . . .
-
MEGLNX1
31/001
Connected to remote server/host 9.39.68.141 using port 23
```



```
Session A - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
17:51:18 type=1505 audit(1282776678.910:456): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.910:457): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.910:458): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.910:459): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.910:460): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.940:461): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.940:462): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.940:463): operation="profile_remove" name=""
17:51:18 type=1505 audit(1282776678.940:464): operation="profile_remove" name=""
17:51:19 type=1505 audit(1282776678.950:465): operation="profile_remove" name=""
17:51:19 Unloading AppArmor profiles ..done
17:51:19 Turning off quota
17:51:19 ..done
17:51:19 Turning off swap files
17:51:19 Unmounting file systems
17:51:19 ..done..done
17:51:19 Stopping udevd: ..done
17:51:19 ..done
17:51:19 Sending all processes the TERM signal...
17:51:19 ..done
17:51:19 Sending all processes the KILL signal...
17:51:19 ..done
17:51:19 Please stand by while rebooting the system...
17:51:19 md: stopping all md devices.
17:51:29 Restarting system.
17:51:29 HCPGIR450W CP entered; disabled wait PSW 00020001 80000000 00000000 00
17:51:29 * -- Operations Manager Action LNXBKUP1 scheduled for execution -- *
17:51:29 CONNECT= 26:52:06 VIRT0PU= 001:06:00 TST0PU= 001:10:29
17:51:29 LOGOFF AT 17:51:29 CDT WEDNESDAY 08/25/10 AFTER SIGNAL
17:51:30 z/VM V5.4.0 2009-09-23 15:29
-
OMEGLNX1
31 / 001
Connected to remote server/host 9.39.68.141 using port 23
```

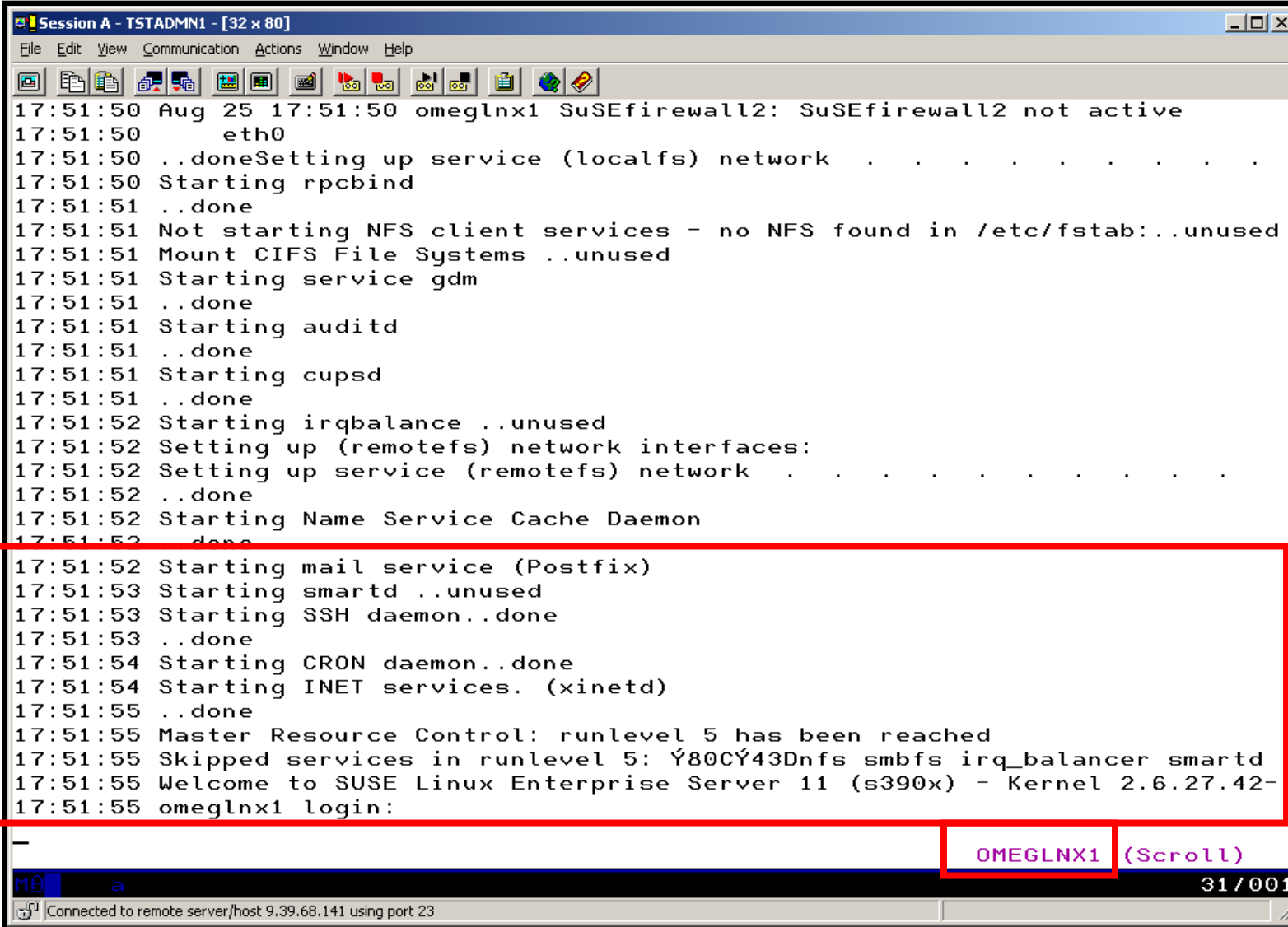
```
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
16:11:22 ***
16:11:22 *SMSG OPMGRM1 SUBMIT BKUPLNX1
16:11:22 BKRBAK8515I Queued command #1: "*SMSG OPMGRM1 SUBMIT BKUPLNX1"
16:11:22 BKRBAK8532I Processing SUBMIT BKUPLNX1 command for OPMGRM1 at 03/03/09
16:11:22 BKRBAK8532I Processing SUBMIT BKUPLNX1 command for OPMGRM1 at 03/03/09
16:11:22 AUTO LOGON *** BKRWRK01 USERS = 18
16:11:22 HCPCLS6056I XAUTOLOG information for BKRWRK01: The IPL command is veri
16:11:22 Output line 1 : BKRMAK8559I INCLUDE / EXCLUDE processing for job BKUPL
16:11:22 ed 1 objects
16:11:22 BKRMAK8559I INCLUDE / EXCLUDE processing for job BKUPLNX1 selected 1 o
16:11:22 Output line 2 : BKRMAK8559I for backup processing.
16:11:22 BKRMAK8559I for backup processing.
16:11:22 Output line 3 : BKRMAK8563I Worker count for job BKUPLNX1 has been set
16:11:22 BKRMAK8563I Worker count for job BKUPLNX1 has been set to 1.
16:11:22 Output line 4 : BKRMAK8570I Instance number 00000073 has been assigned
16:11:22 KUPLNX1.
16:11:22 BKRMAK8570I Instance number 00000073 has been assigned for job BKUPLNX
16:11:22 Output line 5 : BKRMAK8568I CMS files will be filtered against file ma
16:11:22 .
16:11:22 BKRMAK8568I CMS files will be filtered against file mask "* * *".
16:11:22 Output line 6 : BKRMAK8566I SFS filespaces will be filtered with path
16:11:22 BKRMAK8566I SFS filespaces will be filtered with path mask "*".
16:11:22 Output line 7 : BKRMAK8584I Sending BKUPLNX1 JOB D to worker task BKR
16:11:22 BKRMAK8584I Sending BKUPLNX1 JOB D to worker task BKRWRK01.
16:11:22 Output line 8 : File BKUPLNX1 JOB D1 sent to BKRWRK01 at DEM1ZVM on 03
16:11:22 11:23
16:11:22 File BKUPLNX1 JOB D1 sent to BKRWRK01 at DEM1ZVM on 03/03/09 16:11:23
16:11:22 Return code "0" from command SUBMIT BKUPLNX1 at 03/03/09 16:11:23.
16:11:23 BKRBAK8510I 03/03/09 16:11:23 WAKEUP exited on a VMCF interrupt.
-
MA b BKRBAKUP 31/001
Connected to remote server/host 9.39.68.141 using port 23
```

```
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
16:11:23 -----
16:11:23
16:11:23 BKRRVB9011I Job name: BKUPLNX1, instance identifier 00000073 starting
16:11:23 BKRRVB9011I Job owner: BKRADMIN
16:11:23 BKRRVB9011I Master backup server: BKRRBKUP; worker virtual machine BKRR
16:11:23 BKRRVB9011I Job token value is 20090303.
16:11:23 BKRRVB9012I Catalog content creation is ENABLED.
16:11:23 BKRRVB9012I Catalog content will be delivered to backup catalog server
16:11:23 BKRRVB9012I Temporary catalog granule data will be generated in CMS fi
16:11:23 -----
16:11:23 -----
16:11:23
16:11:23 BKRRVB9161I Scanning DISKPOOL "LNXBKUP DISKPOOL" for a volume with at
16:11:23 BKRRVB9162I DISKPOOL volume AMVCATLG 333 has 23968 4K blocks free.
16:11:23 BKRRVB9163I Continuing backup with output to AMVCATLG 333
16:11:31 OMEGLNX1 0191 RR EDF 4096 0X1191 00009000 00003977 00000050 00000050
16:11:31 -----
16:11:31 -----
16:11:31
16:11:31 BKRRVB9014I Job completed at 16:11:31 on 03/03/09.
16:11:31 BKRRVB9005I Executing CP command "QUERY TIME"
16:11:31 TIME IS 16:11:31 CST TUESDAY 03/03/09
16:11:31 CONNECT= 00:00:08 VIRTCPU= 000:00.05 TOTCPU= 000:00.10
16:11:31 BKRRVB9006I CP return code 0
16:11:31 *
16:11:31 * BACKUP COMPLETE - OMEGLNX1 LINUX GUEST
16:11:31 * -- Operations Manager Action STRTLNXB scheduled for execution -- *
16:11:31 * -- Operations Manager Action STRTLNXC scheduled for execution -- *
-----
BKRWRK01
MA b 31/001
Connected to remote server/host 9.39.68.141 using port 23
```

```

Session A - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
17:51:29 HCPGIR450W CP entered; disabled wait PSW 00020001 80000000 00000000 00
17:51:29 * -- Operations Manager Action LNXBKUP1 scheduled for execution -- *
17:51:29 CONNECT= 26:52:36 VIRTCPU= 001:06.93 TOTCPU= 001:13.29
17:51:29 LOGOFF AT 17:51:29 CDT WEDNESDAY 08/25/10 AFTER SIGNAL
17:51:30 z/VM V5.4.0 2009 09 23 15:29
17:51:30 DMSST002E File SYN SYNONYM * not found
17:51:30 STORAGE = 508M
17:51:30 Storage Configuration:
17:51:30 0.96M 100M.412M
17:51:30 Extent Specification Address Range
17:51:30 -----
17:51:30 0.96M 000000000000000000 - 0000000005FFFFFF
17:51:30 100M.412M 0000000006400000 - 000000001FFFFFFF
17:51:30 Storage cleared - system reset.
17:51:30 zIPL v1.8.0 interactive boot menu
17:51:30
17:51:30 0. default (LinuxV2)
17:51:30
17:51:30 1. LinuxV2
17:51:30 2. ipl
17:51:30
17:51:30 Note: VM users please use '#cp vi vmmsg <number> <kernel-parameters>'
17:51:30
17:51:30 Please choose (default will boot in 10 seconds):
17:51:40 Booting default (LinuxV2)...
17:51:41 Initializing cgroup subsys cpuset
17:51:41 Initializing cgroup subsys cpu
17:51:41 Linux version 2.6.27.42-0.1-default (geeko@buildhost) (gcc version 4.3
17:51:41 setup.1a06a7: Linux is running as a z/VM quest operating system in 64-
17:51:41 Zone PFN ranges:
-
OMEGLN1
MA a 31/001
Connected to remote server/host 9.39.68.141 using port 23

```



```
Session A - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
17:51:50 Aug 25 17:51:50 omeglrx1 SuSEfirewall2: SuSEfirewall2 not active
17:51:50 eth0
17:51:50 ..doneSetting up service (localfs) network . . . . .
17:51:50 Starting rpcbind
17:51:51 ..done
17:51:51 Not starting NFS client services - no NFS found in /etc/fstab:..unused
17:51:51 Mount CIFS File Systems ..unused
17:51:51 Starting service gdm
17:51:51 ..done
17:51:51 Starting auditd
17:51:51 ..done
17:51:51 Starting cupsd
17:51:51 ..done
17:51:52 Starting irqbalance ..unused
17:51:52 Setting up (remotefs) network interfaces:
17:51:52 Setting up service (remotefs) network . . . . .
17:51:52 ..done
17:51:52 Starting Name Service Cache Daemon
17:51:52 ..done
17:51:52 Starting mail service (Postfix)
17:51:53 Starting smartd ..unused
17:51:53 Starting SSH daemon..done
17:51:53 ..done
17:51:54 Starting CRON daemon..done
17:51:54 Starting INET services. (xinetd)
17:51:55 ..done
17:51:55 Master Resource Control: runlevel 5 has been reached
17:51:55 Skipped services in runlevel 5: Ý80CÝ43Dnfs smbfs irq_balancer smartd
17:51:55 Welcome to SUSE Linux Enterprise Server 11 (s390x) - Kernel 2.6.27.42-
17:51:55 omeglrx1 login:
-
OM EGLNX1 (Scroll)
31/001
Connected to remote server/host 9.39.68.141 using port 23
```

Scenario 19: How Do You Do That?

Console rule in Operations Manager:

*

* Watch for shutdown complete message on Linux guest

```
DEFRULE NAME(LNXDOWN),+
```

```
  MATCH(*HCPGIR450%*),+
```

```
  USER(OMEGLNX1),+
```

```
  ACTION(LNXBKUP)
```

* Turn off the rule in general

```
SUSPEND RULE(LNXDOWN)
```

Scenario 19: How Do You Do That?

Chain of actions in Operations Manager, triggered by schedule

*

* Start of guest backup scenario, resume rule for guest shutdown msg

```
DEFACTN NAME(STOPLNX),+  
  COMMAND('RESUME RULE(LNXDOWN)'),+  
  ENV(GOM),+  
  NEXTACTN(STOPLNXA)
```

*

* Change SECUSER to Operations Manager before shutting it down

```
DEFACTN NAME(STOPLNXA),+  
  COMMAND(CP SET SECUSER OMEGLNX1 OPMGRM1),+  
  ENV(LVM),+  
  NEXTACTN(STOPLNXB)
```

*

* Action to shut down Linux guest in prep for backup

```
DEFACTN NAME(STOPLNXB),+  
  COMMAND(CP SIGNAL SHUTDOWN OMEGLNX1 WITHIN 90),+  
  ENV(LVM)
```

Scenario 19: How Do You Do That?

Chain of actions and rules in Operations Manager:

* Highlight message and submit backup job for a specific Linux guest

```
DEFACTN NAME(LNXBKUP),+  
  INPUT(AHI),+  
  NEXTACTN(LNXBKUPB)
```

*

```
DEFACTN NAME(LNXBKUPB),+  
  COMMAND(CP SMSG BKRBACKUP SUBMIT BKUPLNX1),+  
  ENV(LVM)
```

*

* Define all Backup Manager workers as a group

```
DEFGROUP NAME(BKRWRKRS),+  
  USER(BKRWRK0*)
```

*

* Restart Linux guest when Backup is complete

```
DEFRULE NAME(BKUPDONE),+  
  MATCH(*BACKUP COMPLETE - OMEGLNX1*),+  
  GROUP(BKRWRKRS),+  
  ACTION(STRTLNX)
```


Scenario 19: How Do You Do That?

Suspend rule in Operations Manager (don't back up the guest every time it is shut down)

* Suspend rule for backing up Linux guest

```
DEFACTN NAME(DELBKUP),+
```

```
  COMMAND(SUSPEND RULE(LNXDOWN)),+
```

```
  ENV(GOM)
```

Scenario 20: Reviewing a Disaster Recovery Backup

- **Create a backup job based on sample provided**
- **Perform image backup of DASD volumes for Disaster Recovery (DR) purposes**
 - Can include z/VM and Linux guests
- **Output of backup is a DDR tape**
 - Compatible with DDR for restore at recovery site
- **Submit DR job for review**
- **Review output of review processing**

Scenario 20: Detailed Steps

- **From an authorized z/VM user ID, copy the sample DDR template from the sample disk to a new backup job**
- **Edit the new job and make necessary changes**

```
xedit ddrdemo template c
```

- **If not using SFS for templates disk, tell Backup Manager to reaccess the disk**

```
smsg bkrbkup cms acc 199 e/e
```

- **From an authorized z/VM user ID, submit the backup job for review processing**

```
smsg bkrbkup review ddrdemo
```

- **View the file(s) returned to you by Backup Manager**

```
peek <rdrfile>
```

Session B - TSTADMIN1 - [32 x 80]

File Edit View Communication Actions Window Help

q disk

LABEL	VDEV	M	STAT	CYL	TYPE	BLKSZ	FILES	BLKS USED-(%)	BLKS LEFT	BLK TOTAL
ADM191	191	A	R/W	10	3390	4096	53	245-14	1555	1800
ADM193	193	B	R/W	50	3390	4096	3	7927-88	1073	9000
06B199	199	C	R/W	5	3390	4096	9	31-03	869	900
06B202	202	D	R/O	2	3390	4096	37	113-31	247	360
06B592	592	G	R/O	5	3390	4096	24	145-16	755	900
J05592	593	H	R/O	5	3390	4096	15	82-09	818	900
06B198	198	I	R/O	2	3390	4096	5	14-04	346	360
10C400	400	J	R/W	5	3390	4096	20	124-14	776	900
J05198	197	K	R/W	2	3390	4096	6	16-04	344	360
J10401	401	L	R/W	3	3390	4096	7	18-03	522	540
TCM592	692	M	R/O	67	3390	4096	885	8526-71	3534	12060
MNT190	190	S	R/O	100	3390	4096	687	14513-81	3487	18000
MNT19E	19E	Y/S	R/O	250	3390	4096	1102	28088-62	16912	45000
MNT19D	19D	Z/Z	R/O	146	3390	1024	14855	53765-74	18505	72270

Ready; T=0.01/0.01 19:36:52

x ddrdemo template c_

RUNNING DEM1ZVM

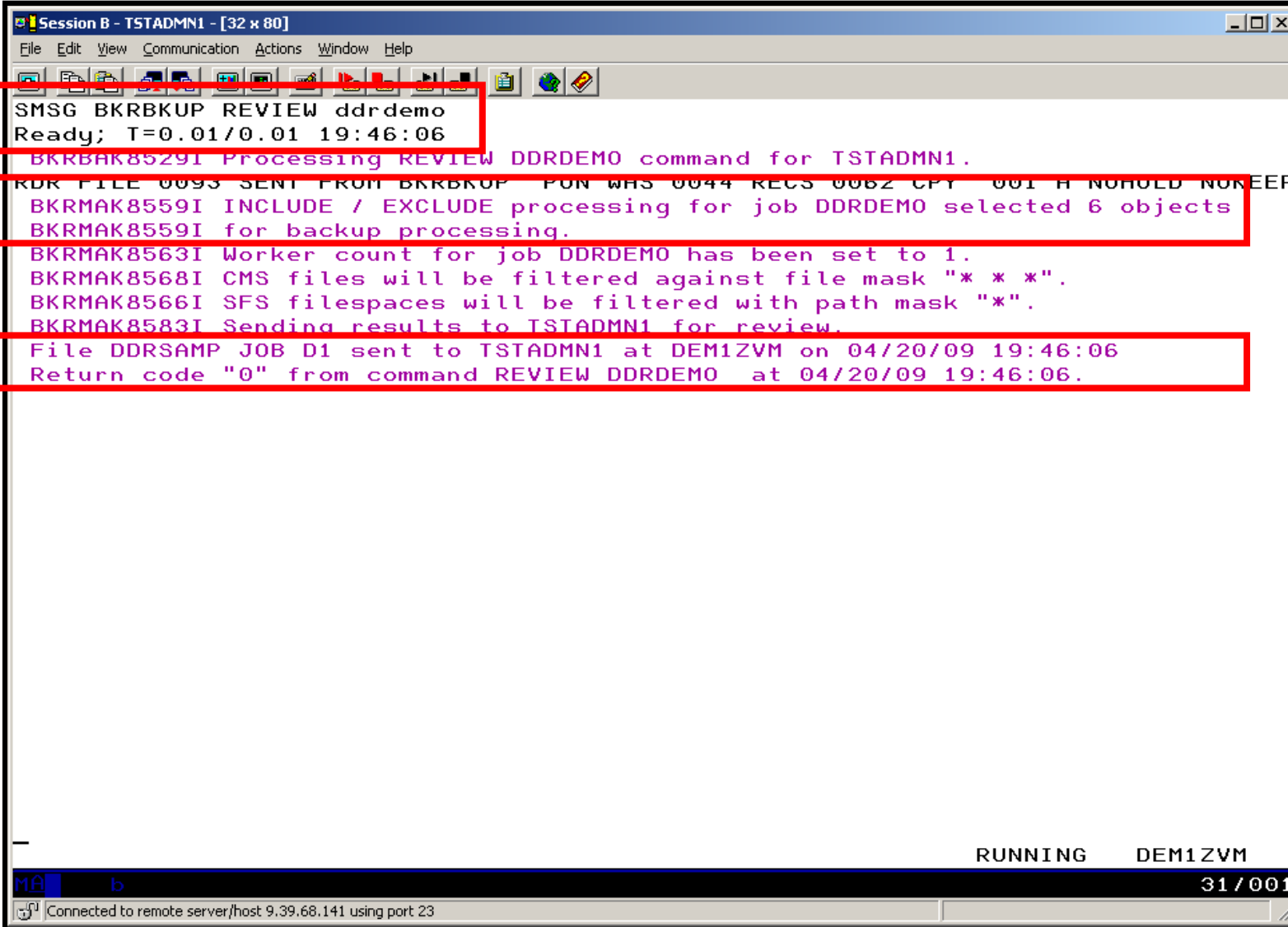
MA b 31/021

Connected to remote server/host 9.39.68.141 using port 23

```
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
DDRDEMO TEMPLATE C2 V 112 Trunc=112 Size=156 Line=0 Col=1 Alt=0
=====
T.....1.....2.....3.....4.....5.....6.....7.....
00000 * * * Top of File * * *
00001 * IBM Backup and Restore Manager for z/VM - 5697-J06 - 1.2.0
00002 *
00003 * Sample backup job template - DDRSAMP
00004 *
00005 * This file includes records longer than 80 characters. A screen width o
00006 * (327x model 5 or equivalent) is recommended when viewing or customizing
00007 * sample file for local use.
00008 *
00009 * SAMPDDR is an example of a full backup job definition. Output is direc
00010 * to single-copy tape via the IBMTAPE output handler.
00011 *
00012 * Backup type      : Full backup; no incremental backup processing will
00013 *                  : (See SAMPINCR TEMPLATE for an incremental backup j
00014 *
00015 * Output destination: Single-copy tape, DASD Dump Restore (DDR) format,
00016 *                  : (BKR_Output_Spec)
00017 *
00018 * Number of workers : 1; to increase bandwidth on larger systems, add ad
00019 *                  : (BKR_Job_Workers)
00020 *
00021 * Instance tracking  : Automatic; this is the recommended setting.
00022 *                  : (BKR_Job_Instance = $$INST$$)
00023 *
00024 * Catalog content   : Enabled; results of this job will be transmitted t
00025 *                  : (BKR_Job_Catalog)
00026 *
00027 * CMS file filtering: None; all files and SFS directories will be includ
00028 *                  : (BKR_Job_CMS_FileMask, BKR_Job_SFS_PathMask)
MA b
02/007
Connected to remote server/host 9.39.68.141 using port 23
```

```

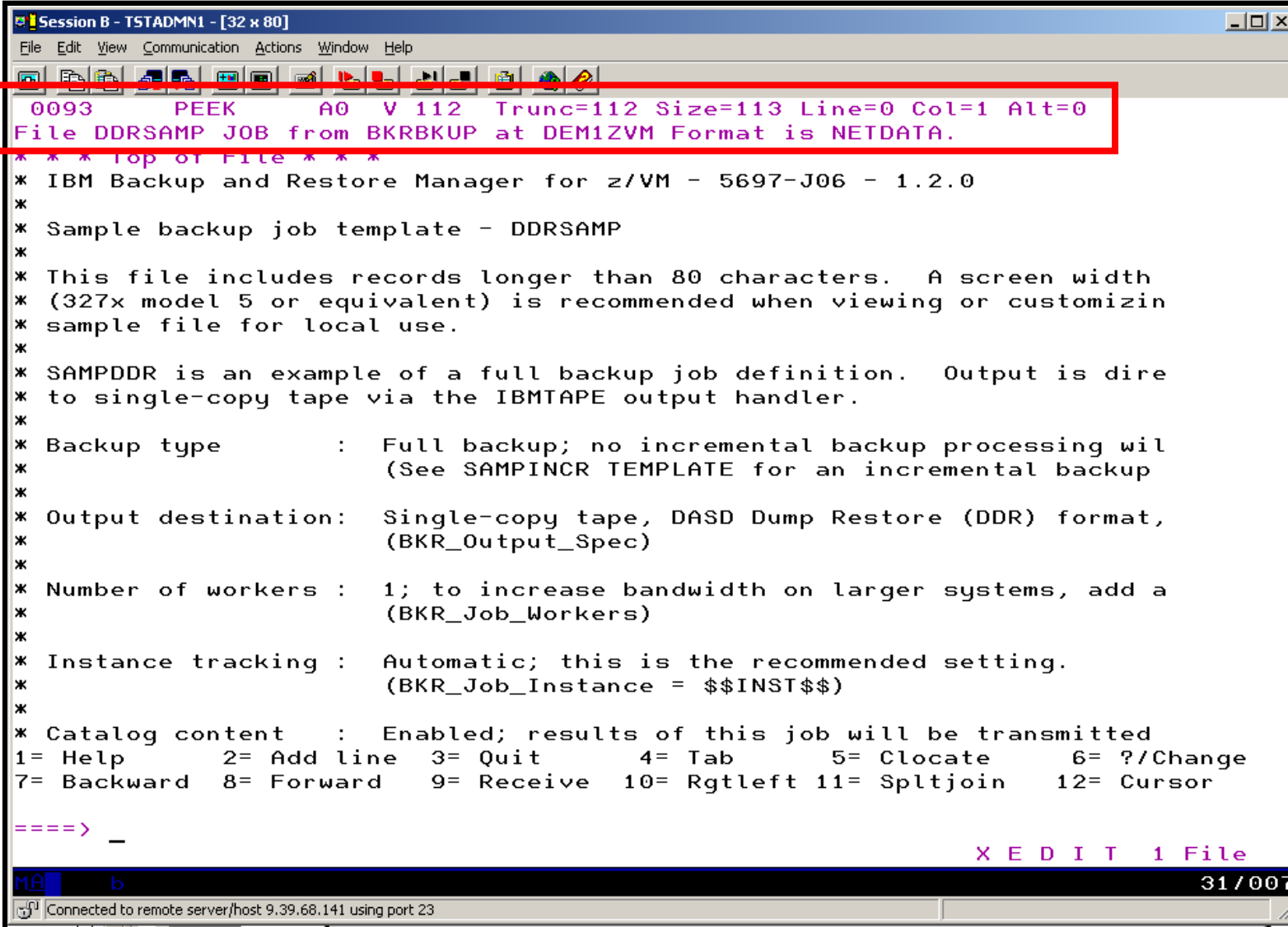
Session B - TSTADMN1 - [32 x 80]
File Edit View Communication Actions Window Help
DDRDEMO TEMPLATE C2 V 112 Trunc=112 Size=156 Line=117 Col=1 Alt=1
====> file_
|...+.1...+.2...+.3...+.4...+.5...+.6...+.7...
00117 /*****
00118
00119 |-----|-----|-----|---|-----|-----|-----|---|-----|---|
00120 |-----|-----|-----|---|-----|-----|-----|---|-----|---|
00121 EXCLUDE  MINIDISK  *      = *   *   *      = *   =
00122 INCLUDE   RDEVVOL   520*
00123 INCLUDE   RDEVICE   0128
00124
00125
00126 * Job_Trailer terminates the INCLUDE / EXCLUDE / SELECT definition sectio
00127 * post-backup processing specifications.
00128
00129 Job_Trailer
00130
00131 * Tell the catalog service virtual machine to retain catalog contents and
00132 * for a period of 30 days. The output from CP QUERY TIME provides a reco
00133 * to process this backup. Output from INDICATE USER provides additional
00134 * worker virtual machine resource consumption.
00135
00136 Config BKR_Catalog_Retention = 30
00137 CP_Command QUERY TIME
00138 CP_Command INDICATE USER
00139
00140 Console *
00141 Console * Sample DDRTAPE backup template created 5/10/2007.
00142 Console * Job image generated $$UPDATE$$ $$TIME$$
00143 Console *
00144
00145 * Close the console log; this will deliver the job history to the backup
MA b
02/011
Connected to remote server/host 9.39.68.141 using port 23
    
```



The screenshot shows a terminal window titled "Session B - TSTADMN1 - [32 x 80]". The window contains the following text:

```
MSG BKR BKUP REVIEW ddrdemo
Ready; T=0.01/0.01 19:46:06
BKRBAK8529I Processing REVIEW DDRDEMO command for TSTADMN1.
RDR FILE 0093 SENT FROM BKR BKUP PUN WAS 0044 RECS 0062 CPT 001 H NOHOLD NOKEEP
BKRMAK8559I INCLUDE / EXCLUDE processing for job DDRDEMO selected 6 objects
BKRMAK8559I for backup processing.
BKRMAK8563I Worker count for job DDRDEMO has been set to 1.
BKRMAK8568I CMS files will be filtered against file mask "* * *".
BKRMAK8566I SFS filespace will be filtered with path mask "*".
BKRMAK8583I Sending results to TSTADMN1 for review.
File DDRSAMP JOB D1 sent to TSTADMN1 at DEM1ZVM on 04/20/09 19:46:06
Return code "0" from command REVIEW DDRDEMO at 04/20/09 19:46:06.
```

At the bottom of the terminal, the status "RUNNING DEM1ZVM" is displayed, along with a cursor and the number "31/001". The status bar at the very bottom indicates the connection: "Connected to remote server/host 9.39.68.141 using port 23".



The screenshot shows a terminal window titled "Session B - TSTADMN1 - [32 x 80]". The window contains a file listing and backup job details. A red box highlights the first two lines of the file listing:

```
0093      PEEK      A0  V 112  Trunc=112 Size=113 Line=0 Col=1 Alt=0
File DDRSAMP JOB from BKR BKUP at DEM1ZVM Format is NETDATA.
```

The rest of the terminal output is as follows:

```
*** Top of File ***
* IBM Backup and Restore Manager for z/VM - 5697-J06 - 1.2.0
*
* Sample backup job template - DDRSAMP
*
* This file includes records longer than 80 characters.  A screen width
* (327x model 5 or equivalent) is recommended when viewing or customizin
* sample file for local use.
*
* SAMPDDR is an example of a full backup job definition.  Output is dire
* to single-copy tape via the IBMTAPE output handler.
*
* Backup type          : Full backup; no incremental backup processing wil
*                      (See SAMPINCR TEMPLATE for an incremental backup
*
* Output destination:  Single-copy tape, DASD Dump Restore (DDR) format,
*                      (BKR_Output_Spec)
*
* Number of workers   : 1; to increase bandwidth on larger systems, add a
*                      (BKR_Job_Workers)
*
* Instance tracking    : Automatic; this is the recommended setting.
*                      (BKR_Job_Instance = $$INST$$)
*
* Catalog content     : Enabled; results of this job will be transmitted
1= Help      2= Add line  3= Quit    4= Tab      5= Clocate    6= ?/Change
7= Backward  8= Forward  9= Receive 10= Rgtright 11= Spltjoin 12= Cursor

====> _

X E D I T 1 File

31/007

Connected to remote server/host 9.39.68.141 using port 23
```



```
Session B - TSTADMIN1 - [32 x 80]
File Edit View Communication Actions Window Help
0093 PEEK A0 V 112 Trunc=112 Size=113 Line=78 Col=1 Alt=0
File DDRSAMP JOB from BKRKBUP at DEM1ZVM Format is NETDATA.

JOB_HEADER
DUMPRDV 520RES 0123 $$$DRIVER$$
DUMPRDV 520SPL 0124 $$$DRIVER$$
DUMPRDV 520PAG 0125 $$$DRIVER$$
DUMPRDV 520W01 0126 $$$DRIVER$$
DUMPRDV 520W02 0127 $$$DRIVER$$
DUMPRDV DMZU00 0128 $$$DRIVER$$
JOB_TRAILER

* Tell the catalog service virtual machine to retain catalog contents an
* for a period of 30 days. The output from CP QUERY TIME provides a rec
* to process this backup. Output from INDICATE USER provides additional
* worker virtual machine resource consumption.

CONFIG BKR_CATALOG_RETENTION = 30
CP_COMMAND QUERY TIME
CP_COMMAND INDICATE USER

CONSOLE *
CONSOLE * SAMPLE DDRTAPE BACKUP TEMPLATE CREATED 5/10/2007.
CONSOLE * JOB IMAGE GENERATED 04/20/09 19:46:06
CONSOLE *

* Close the console log; this will deliver the job history to the backup
1= Help      2= Add line  3= Quit      4= Tab      5= Clocate   6= ?/Change
7= Backward  8= Forward   9= Receive 10= Rgtright 11= Spltjoin 12= Cursor

====> _

X E D I T 1 File
MA b 31/007
Connected to remote server/host 9.39.68.141 using port 23
```

Scenario 21: Reviewing data in the Backup catalog for recovery

- **Various backup jobs have previously been submitted and completed**
- **Full screen interfaces available for searching the backup catalog and finding data available for recovery**
 - BKRLIST
 - Useful when looking for a specific file or set of files owned by a specific user ID
 - Users with ADMIN authority beware of size
 - Use parameters to narrow the search
 - BKRUSER
 - Useful when looking for backup jobs associated with a specific user ID
 - BKRJOB
 - Useful when looking for backup jobs by job name
 - BKRVOL
 - Useful when looking for backup jobs associated with a specific DASD volume

Scenario 21: Detailed Steps

- **From an authorized z/VM user ID, issue one of the following commands to browse the catalog**

`bkrlist`

`bkruser`

`bkrjob`

`bkrvol`

- **Use F11 to drill down through details**
- **Use F10 to restore data**

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