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SHARE Session 09481

Automation and Backup Scenarios for z/VM and Linux on System z

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Agenda

- **Requirements for these scenarios**
- **Overview of products being used**
- **Automation scenarios**
  - Can be product agnostic
  - Live demos
  - Configuration options and sample code
- **Backup scenarios (including automation)**
  - Can be product agnostic
  - Live demos
  - Configuration options and sample code
- **Summary**

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Requirements

Implementing these Scenarios

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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
- **Trigger an action if spool usage reaches a specified percent full**
- **Chain any actions (triggered by messages, schedules, etc.)**
- **Suspend and resume message rules, schedules, spool monitors, etc.**
- **Issue commands real-time on a service machine console**
- **Add messages to a console view from local or remote sources**
- **Detect a user ID logging off**

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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”**

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Automating Operations
Operations Manager for z/VM

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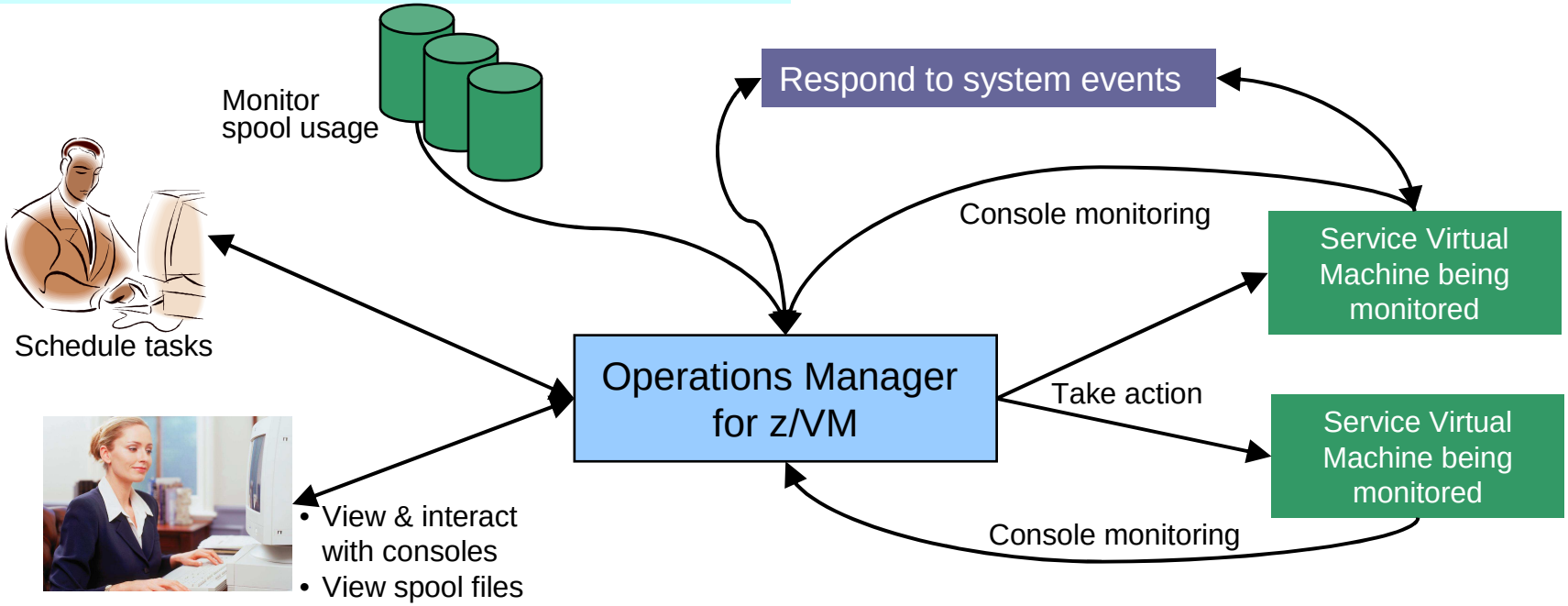
Operations Manager for z/VM

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

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



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

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

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Monitor Service Machine Consoles

Operations Manager

Test Data
TEST Message 1
TEST Message 2
TEST Message 3
…

OPERATOR
OPER Message 1
OPER Message 2
OPER Message 3
…

LINUX
LNX Message 1
LNX Message 2
LNX Message 3
…

TCPIP
TCP Message 1
TCP Message 2
TCP Message 3
…

syslog data
slog Message 1
slog Message 2
slog Message 3
…

Filtered

Data space 1
TEST Message 1
TEST Message 2
…

Data space 2
OPER Message 1
OPER Message 2
…

Data space 3
LNX Message 1
LNX Message 3
…

Data space 4
TCP Message 1
TCP Message 2
…

Data space 5
slog Message 1
slog Message 2
slog Message 3
…

Unfiltered

Data space 6
OPER Message 1
LNX Message 1
LNX Message 2
TCP Message 1
slog Message 1
slog Message 2
TEST Message 1
OPER Message 2
…

Daily log
DIRM Message 1
LNX Message 1
LNX Message 2
OPM Message 1
TCP Message 1
DIRM Message 2

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Monitor Service Machines

- **Define rules to**
  - Scan console messages for text matching
    - Includes column, wildcard, and exclusion support
    - Optionally restrict to specific user ID(s)
  - Take actions based on matches
- **Multiple rules can apply to one message**
  - Rules processed in order of definition in the configuration file
  - FINAL option available to indicate no additional rules should be evaluated

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View and Interact with Consoles

- **Authorized users can view live consoles of monitored service machines and guests**
  - Multiple users can view the same console simultaneously
  - No need to logon to the service machine to see its console
  - Test data and Linux syslog data treated as a “console”
  - Views can be defined to look at a group of consoles in one view
- **Full screen mode**
  - Scroll up and down to view and search historical data
  - Auto scroll (on or off) as new output is displayed on the console
  - From command line, issue commands back to the monitored console
- **Amount of data that is visible depends on specified or default data space size**
- **Rules/actions may modify the view**
  - Suppress messages from the console
  - Hold or highlight messages with color, blinking, etc.
- **Authorized users can view the log file**
  - Can also request a copy of the log file from today or a previous day

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Monitor and View Spool Files

- **Create spool monitors to trigger actions when**
  - Percent of spool usage falls within a specified range
  - Percent of spool usage increases at a specified rate
- **Actions triggered can be the same actions used by console monitoring**
- **Authorized users can**
  - Display a list of spool files based on one or more attributes
    - Owner
    - Size
    - Date created
  - From the list the user can
    - View the contents of an individual spool file
    - Transfer, change, or purge a spool file

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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

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Respond to System Events

- **Create monitors for z/VM system events (*VMEVENT) related to user IDs**
  - Logon
  - Logoff
  - Failure condition (typically CP READ)
  - Logoff timeout started
  - Forced sleep started
  - Runnable state entered (VM READ)
  - Free storage limit exceeded
- **Optionally restrict to specific user ID(s)**
- **Specify the action associated with the event**
  - Actions specified are the same as those for schedules and console and spool monitors

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Summary

- **Use Operations Manager to**
  - Automate daily operations
  - Prevent problems rather than react to them
  - Automate reactions to problems when they can't be prevented
  - Improve problem determination procedures
  - Increase programmer and operator productivity

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Managing Backup and Recovery

Backup and Restore Manager for z/VM

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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 exits available**
  - **Call your own routine**
  - **Use vendor-written routine, such as V/Soft Software's Encrypt/Backup for z/VM**

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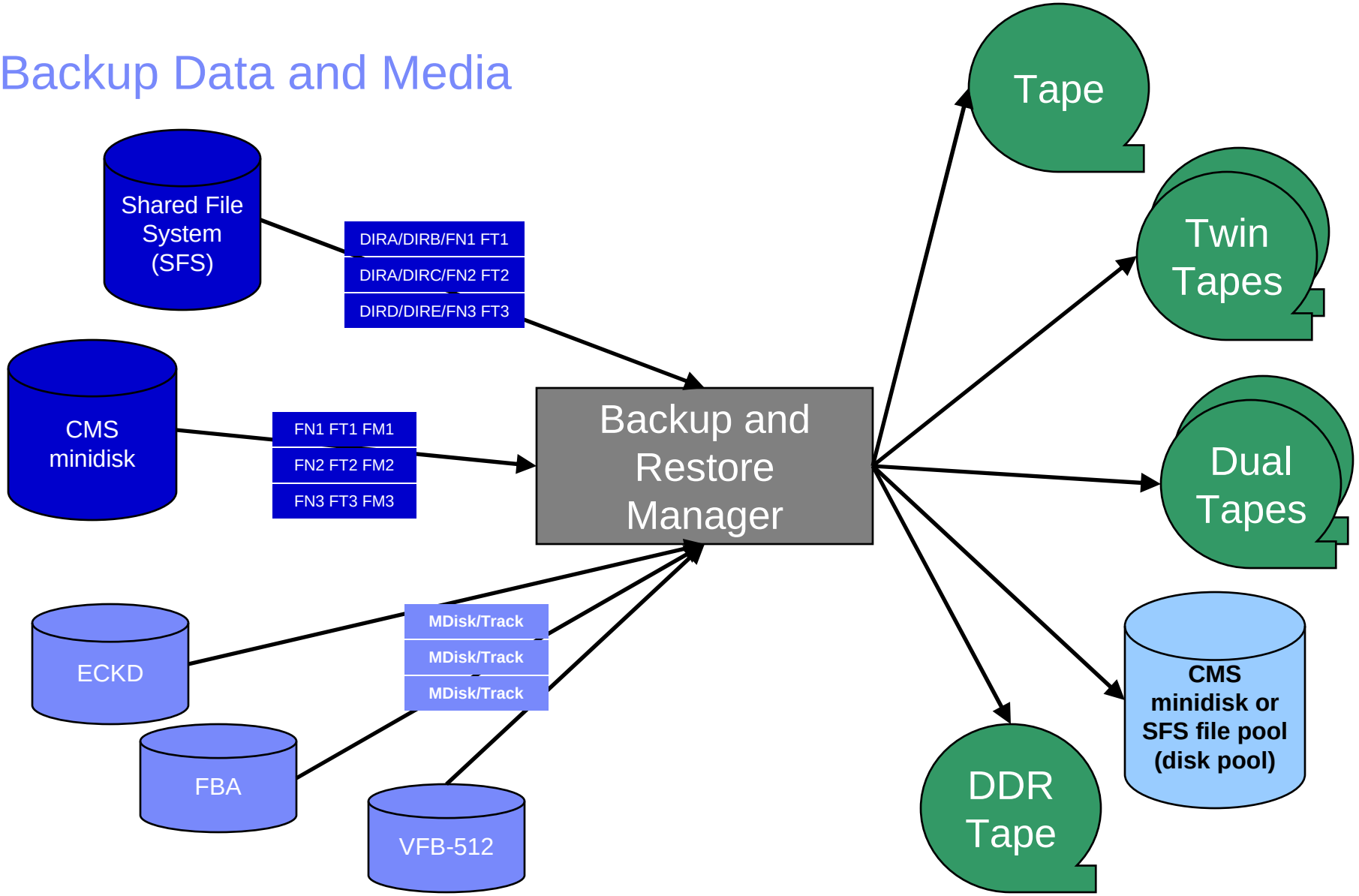
Backup Data and Media



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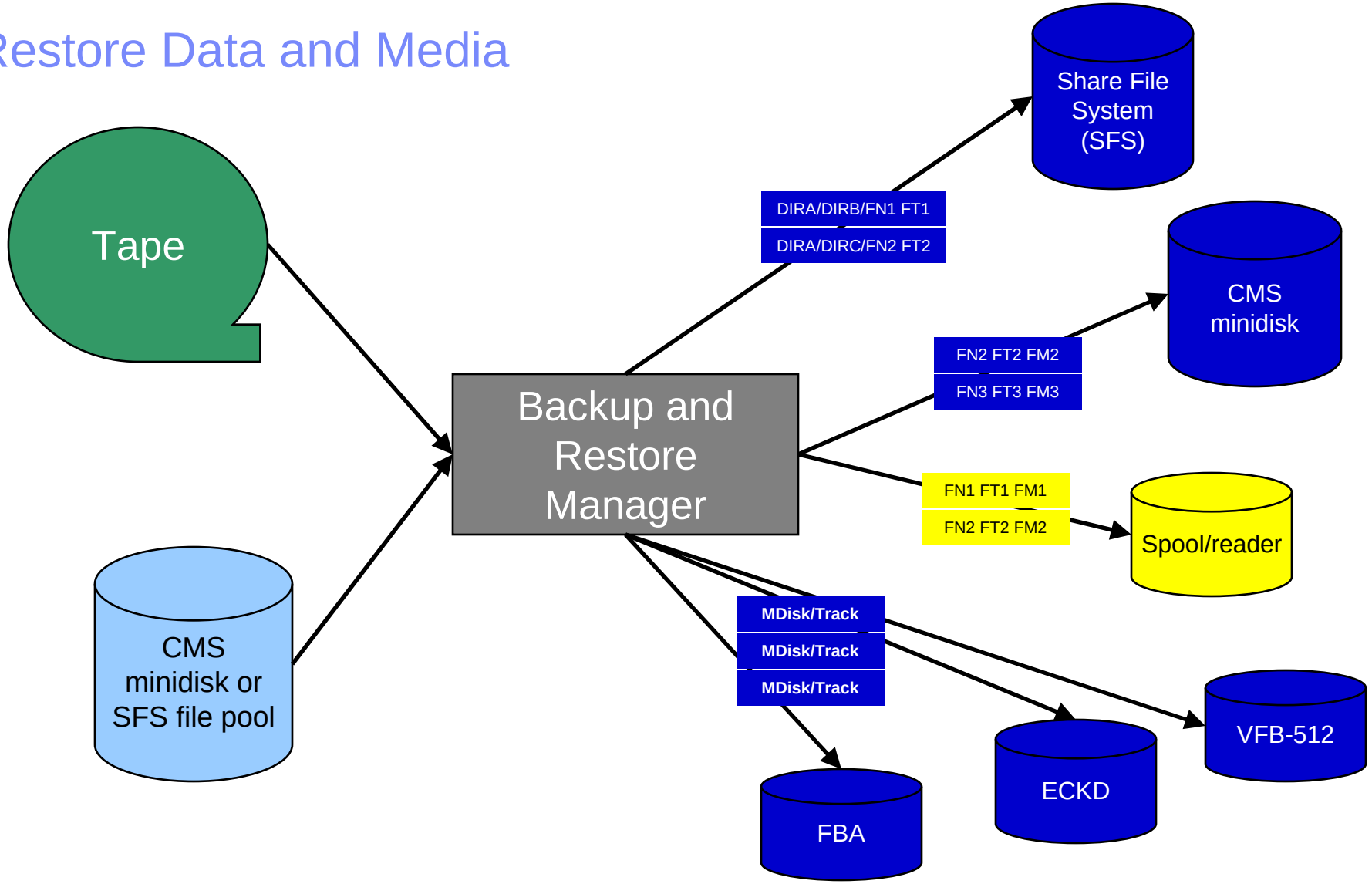
Restore Data and Media



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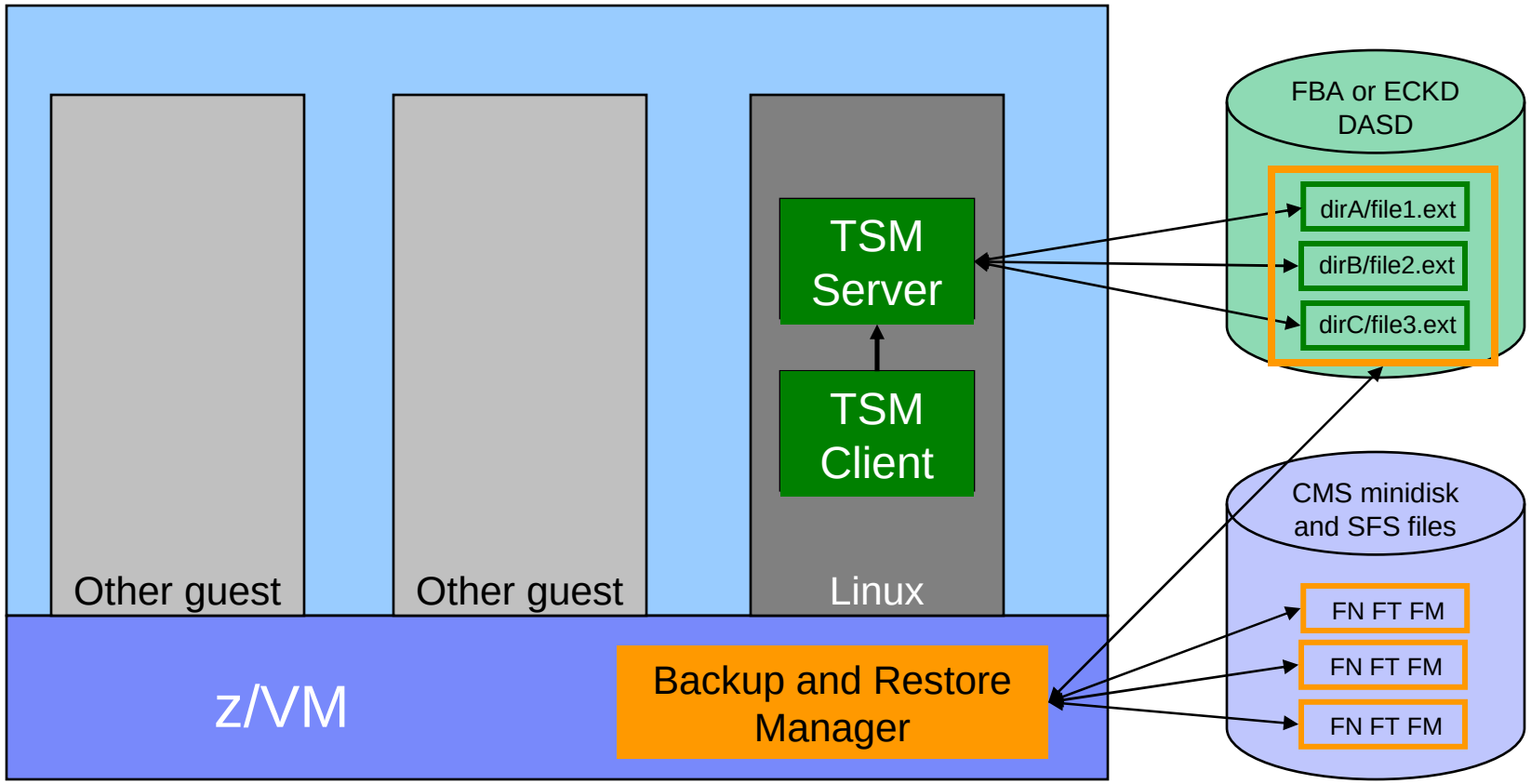
Backup and Restore Manager and Linux Guests

Using Backup and Restore Manager with Tivoli Storage Manager

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



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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

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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

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Summary

- **Use Backup and Restore Manager to**
  - Perform file-level backups of z/VM data
  - Perform image level backups on non-z/VM guest data
  - Perform disaster recovery backups of entire system
  - Easily find and restore data as needed
  - Manage retention of backup data

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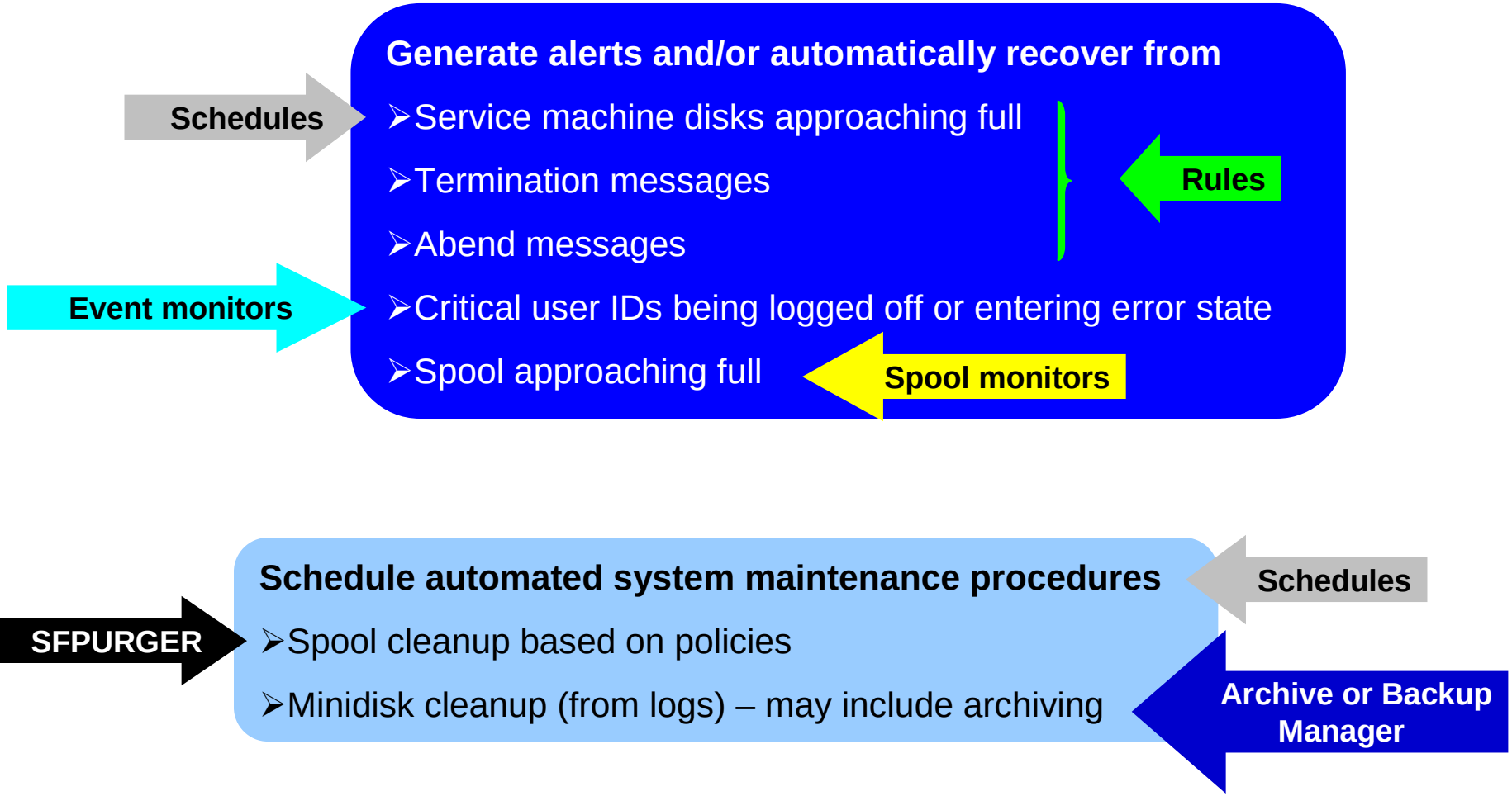
Recommended Practices – Operational Management



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Recommended Practices – Backup and Recovery

File level backup of z/VM data

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

INCLUDE MINIDISK

INCLUDE MINIDISK
INCLUDE RDEVICE
INCLUDE RDEVVOL

Image level backup of Linux guests

- Operating system
- Applications
- Application data (maybe)

Disaster recovery of z/VM system, including Linux guest

- Dependence on z/OS

Back up from z/OS

versus

- Independent recovery in parallel with z/OS

Backup Manager using DDRTAPE output spec

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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

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Demonstration Scenarios

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Demos Available

1. **Send an e-mail based on a console message**
2. **Send an alert to Netcool/OMNIbus based on a console message**
   a. Using POSTZMSG interface to Netcool/OMNIbus
   b. Using SNMP interface to Netcool/OMNIbus
3. **Send a message or e-mail based on spool usage**
4. **View and clean up spool files**
5. **Automated spool cleanup**
6. **Archiving DIRMAINT's log files when disk gets full**
7. **Process a file of test messages as a console**
8. **Process Linux syslog data as a console**
9. **Create a central operations console on one z/VM system**
10. **Create a central operations console across multiple z/VM systems**
11. **Integration with OMEGAMON XE on z/VM and Linux - take action based on CPU usage of a Linux guest**
12. **Monitor service machines for logoff – and autolog them**
13. **Perform an incremental backup**
14. **Find and restore a file from the backup catalog**
15. **Automatically shut down, back up, and restart a Linux guest**
16. **Reviewing a disaster recovery backup**
17. **Reviewing other ways to find data in the backup catalog**

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Automation Scenarios

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Scenario 1:
Send an E-mail if Abend or Fatal Message Occurs

- **Watch all monitored consoles for an error message that includes the word “fatal” or “abend”**
  - Message must also contain the word “mail” (for demo purposes only)
- **Send an e-mail if one of the words appears on a console**
- **Dynamically include in the e-mail**
  - Host name of z/VM system where the error occurred
  - User ID that received the error message
  - Indicator of whether the word was fatal or abend
  - Full text of the error message

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Scenario 1: Detailed Steps

- **From any VM user ID:**

```
tell opmgrc1 this is an abend message from SHARE. Send an e-mail, please.
```

- **From an authorized VM user ID, view the console of OPMGRC1:**

```
gomcmd opmgrm1 viewcon user(opmgrc1)
```

- **Check the inbox of the appropriate person to see the e-mail**

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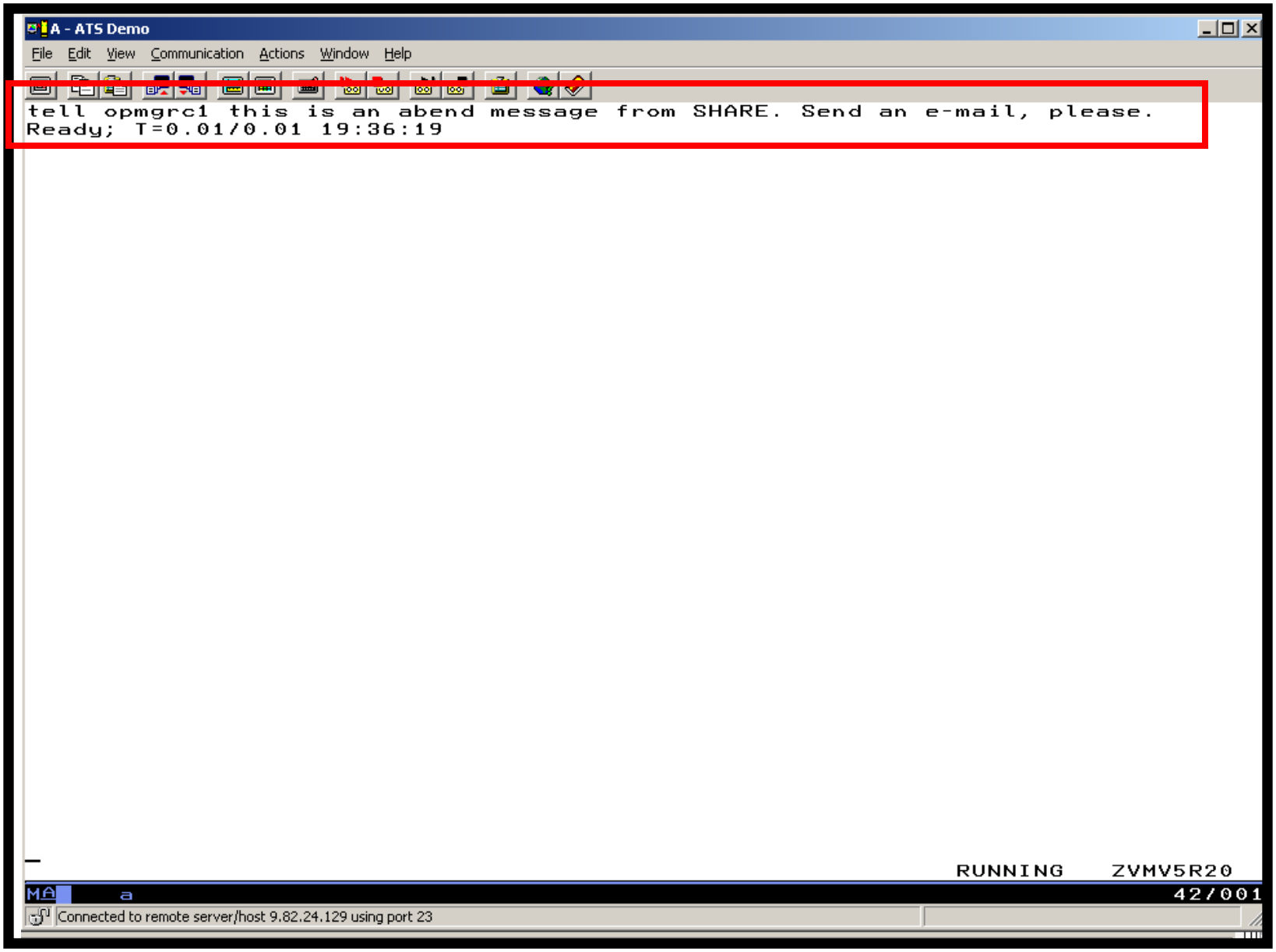

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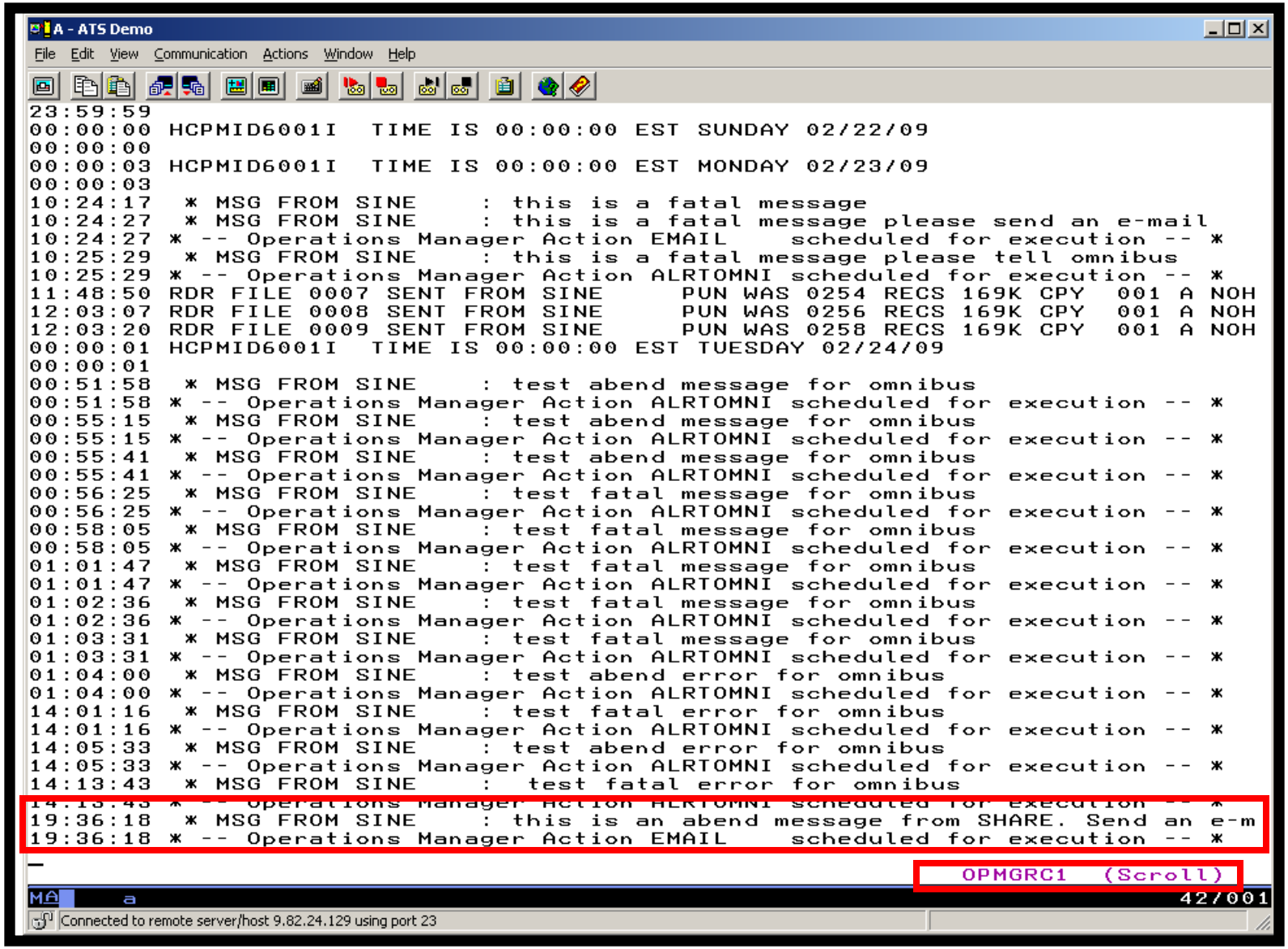

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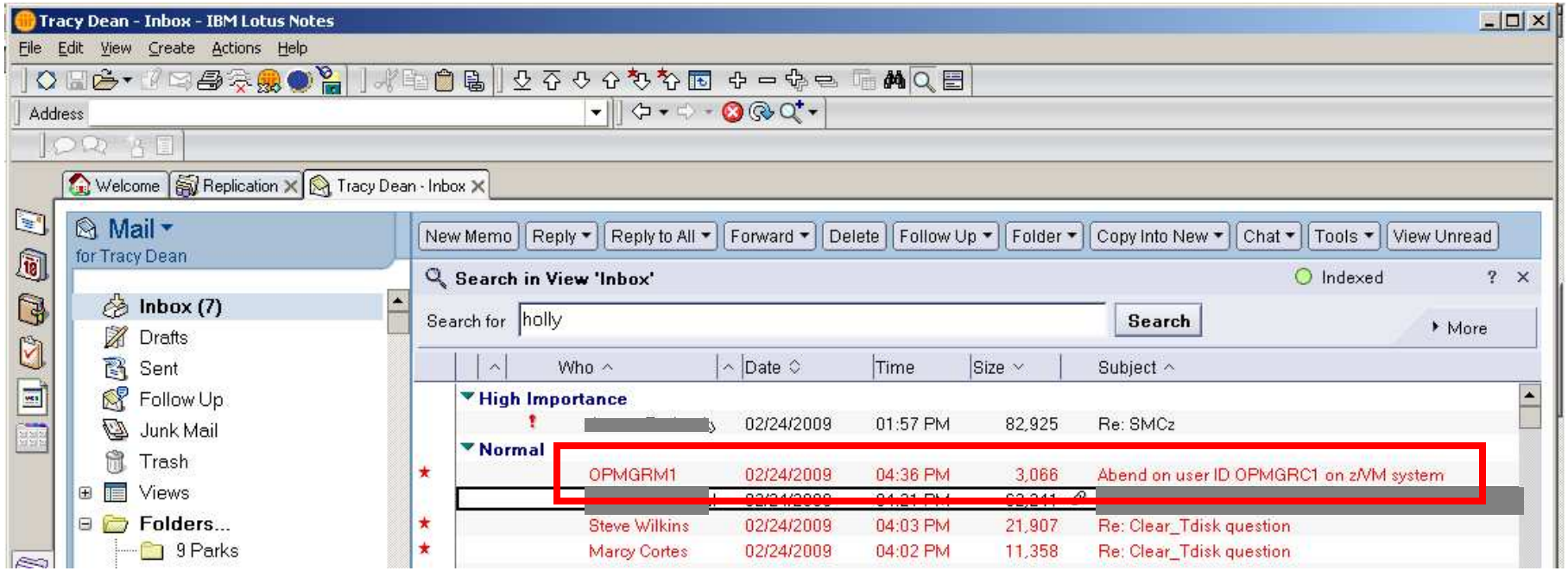

OPMGRM1@MSINE.WASHINGTON.IBM.COM
02/24/2009 11:36 AM

Default custom expiration date of 02/24/2010

To: Tracy Dean/Beaverton/IBM@IBMUS
cc:
bcc:
Subject: Abend on user ID OPMGRC1 on z/VM system

```
The following message was received on OPMGRC1 running on MSINE.WASHINGTON.IBM.COM :
 * MSG FROM SINE    : this is an abend message from SHARE. Send an e-mail, please.

DO NOT REPLY - This e-mail was generated by an automated service machine
```


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Scenario 1: How Do You Do That?

Rules in Operations Manager:

```
*
* Send an e-mail to someone if I see a message containing the word
* "fatal" on any monitored console
DEFRULE NAME(FATLMAIL),+
  MATCH(*FATAL*mail*),+
  EXUSER(ESMTS112),+
  ACTION(EMAIL),+
  PARM(FATAL)
*
* Send an e-mail to someone if I see a message containing the word
* "abend" on any monitored console
DEFRULE NAME(ABNDMAIL),+
  MATCH(*ABEND*mail*),+
  EXUSER(ESMTS112),+
  ACTION(EMAIL),+
  PARM(ABEND)
```


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Scenario 1: How Do You Do That?

Action in Operations Manager:

```
*
* Replace "tld1 at us.ibm.com" with the e-mail address of the user that
* should receive the e-mail
* Leave &u, &p, and &t as-is. These represent the user ID that had the
* "fatal" message, the parameter passed (fatal or abend), and the
* text of the message.  These will be included in the text of the
* e-mail.
DEFACTN NAME(EMAIL),+
  COMMAND(EXEC SMTPNOTE tld1 at us.ibm.com &u &p &t),+
  OUTPUT(LOG),+
  ENV(LVM)
```


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Scenario 1: How Do You Do That?

SMTPNOTE EXEC (excerpts)

```
/*  */
Parse arg mail_user 'AT' mail_node baduser errtype msgtext
if errtype = 'FATAL' then
  errtext = 'Fatal error on user ID' baduser 'on z/VM system'
else
  if errtype = 'ABEND' then
    errtext = 'Abend on user ID' baduser 'on z/VM system'
  else errtext = msgtext
/* Construct the e-mail */
line.1 = 'OPTIONS: NOACK    LOG    SHORT   NONOTEBOOK ALL CLASS A'
line.2 = 'Date: ' Date() ',' Time()
line.3 = 'From: Operations Manager for z/VM'
line.4 = 'To:  ' mail_user 'at' mail_node
line.5 = 'Subject: ' errtext
line.6 = 'The following message was received on' baduser 'running on'
line.7 = msgtext
line.8 = ' '
line.9 = 'DO NOT REPLY - This e-mail was generated by an automated service machine
line.0 = 9
'PIPE stem line. | > TEMP NOTE A'
'EXEC SENDFILE TEMP NOTE A (NOTE SMTP'
```


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Scenario 2a: Send an Alert to OMNIbus – Using POSTZMSG

- **Watch all monitored consoles for an error message that includes the word “fatal” or “abend”**
  - Message must also contain the word “omni” (for demo purposes only)
- **Send an alert to OMNIbus if one of the words appears on a console**
  - Use POSTZMSG, running on Linux guest
    - Do not trigger the action if the message is on this guest
- **Dynamically include in the alert**
  - User ID that received the error message
  - Indicator of whether the word was fatal or abend

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Scenario 2a: Detailed Steps

- **View “All Events” in OMNIbus**
- **From any VM user ID:**

```
tell opmgrc1 this user is abending at SHARE. Tell OMNIBUS.
```

- **From an authorized VM user ID, view the console of OPMGRC1:**

```
gomcmd opmgrm1 viewcon user(opmgrc1)
```

- **From an authorized VM user ID, view the console of the Linux guest that runs POSTZMSG:**

```
gomcmd opmgrm1 viewcon user(esmts112)
```

- **View the OMNIbus console to see the alert**

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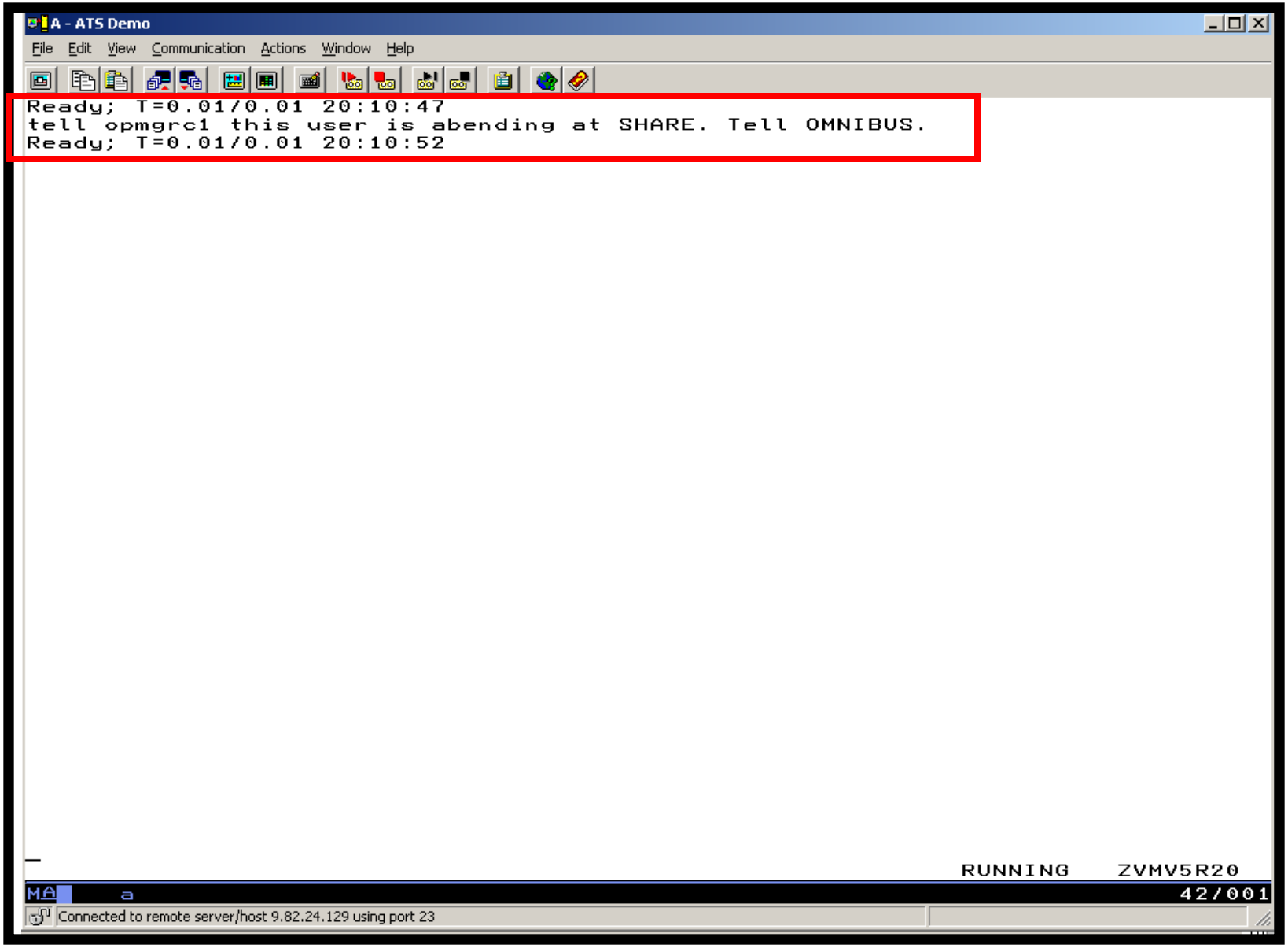

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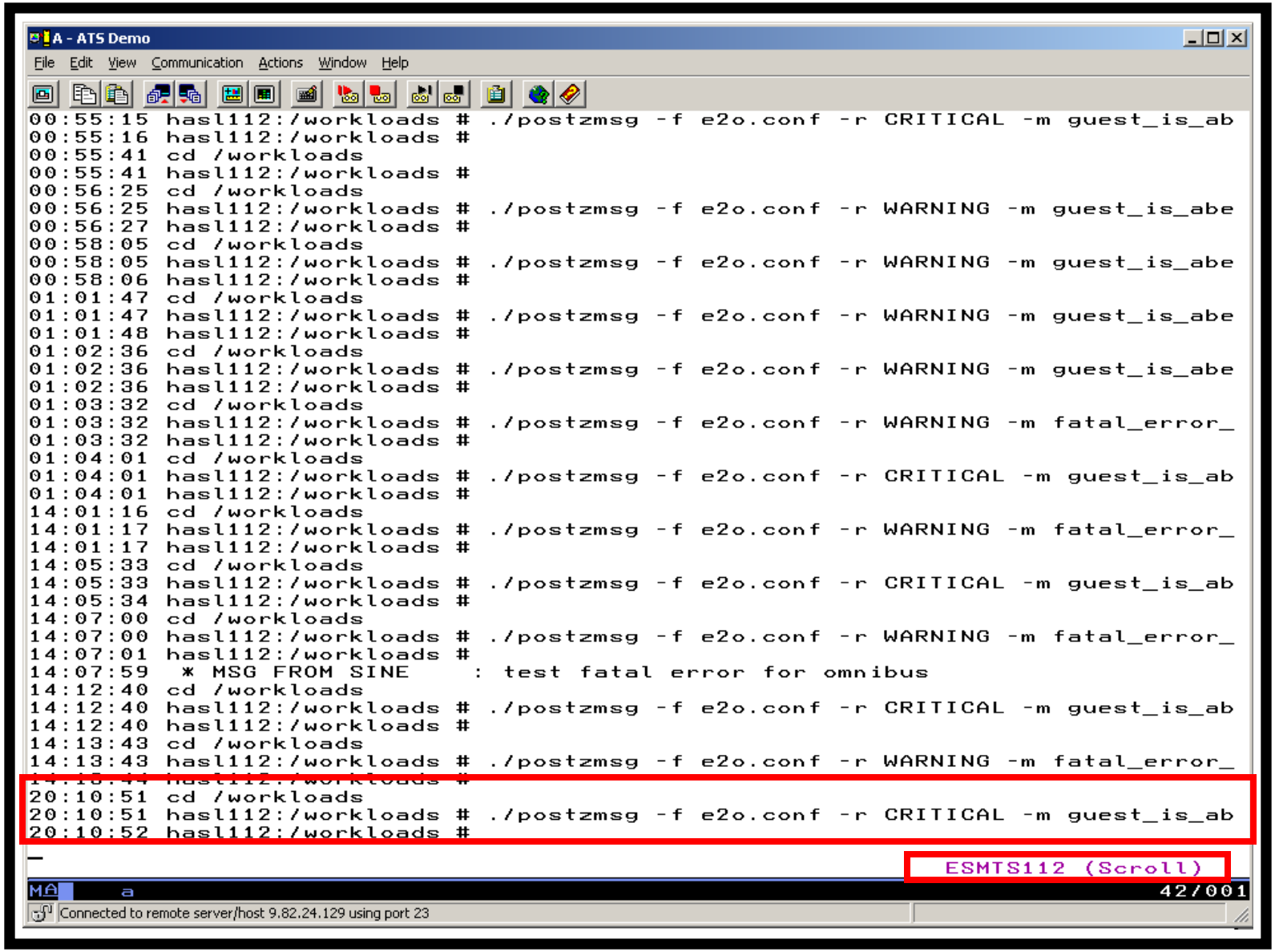

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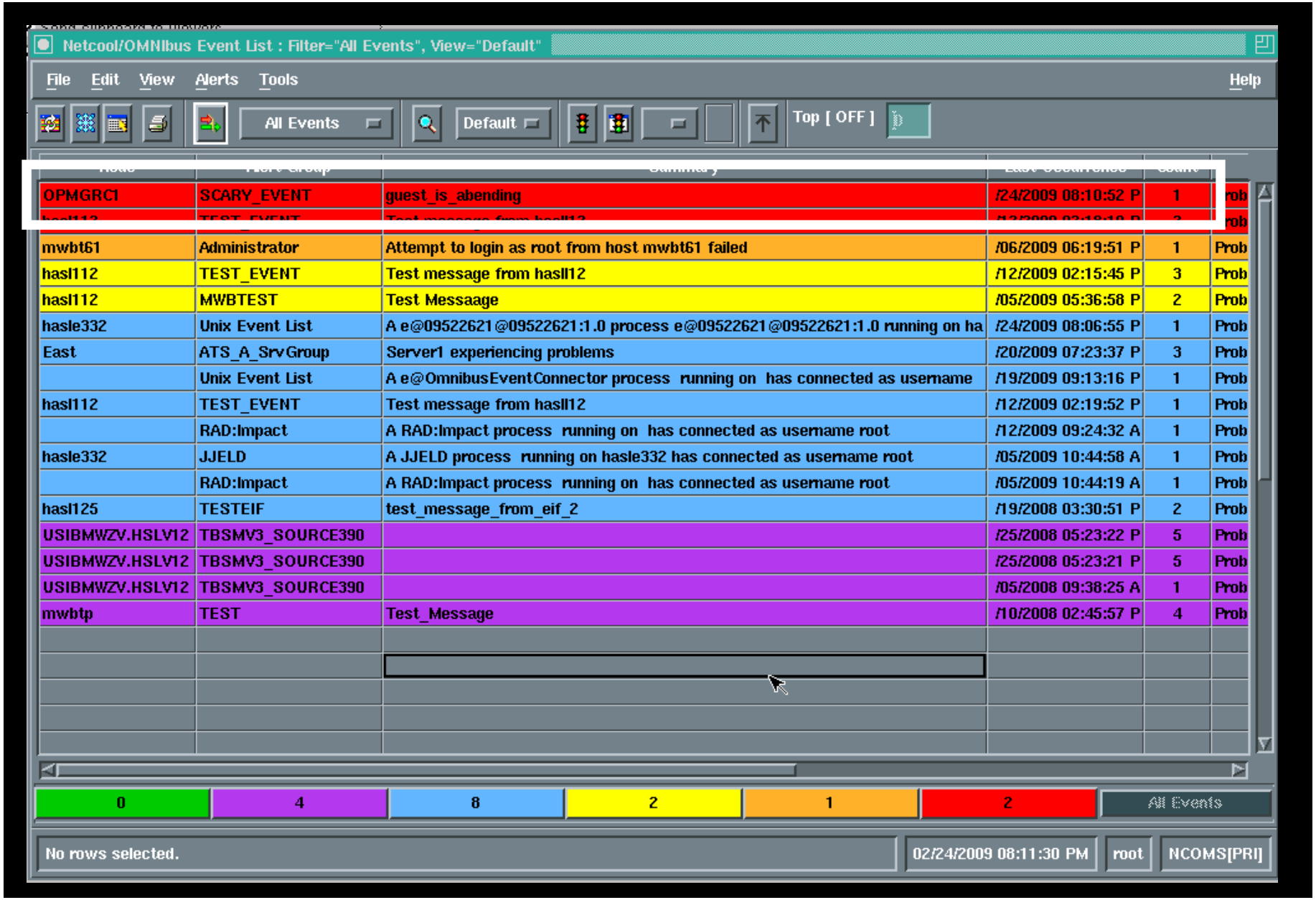

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Scenario 2a: How Do You Do That?

Rules in Operations Manager:

```
*
* Send an alert to OMNIBUS for fatal errors on consoles
DEFRULE NAME(FATLOMNI),+
  MATCH(*fatal*omni*),+
  EXUSER(ESMTS112),+
  ACTION(ALRTOMNI),+
  PARM(FATAL)
*
* Send an alert to OMNIBUS for abends on consoles
DEFRULE NAME(ABNDOMNI),+
  MATCH(*abend*omni*),+
  EXUSER(ESMTS112),+
  ACTION(ALRTOMNI),+
  PARM(ABEND)
```


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Scenario 2a: How Did You Do That?

Action in Operations Manager:

```
*
* Call POSTZMSG on a Linux guest to send alert to OMNIBUS
DEFACTN NAME(ALRTOMNI),+
  COMMAND(EXEC POSTZMSG &u &p),+
  OUTPUT(LOG),+
  ENV(LVM)
```


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Scenario 2a: How Did You Do That?

POSTZMSG EXEC (excerpts)

```
/*  */
Parse arg baduser errtype
if errtype = 'ABEND' then
  do
    zerrtype = 'CRITICAL'
    cmdpart2 = '-m guest_is_abending hostname='baduser
    cmdpart4 = 'sub_origin=tcp SCARY_EVENT OpsMgr'
  end
else
  do
    zerrtype = 'WARNING'
    cmdpart2 = '-m fatal_error_on_guest hostname='baduser
    cmdpart4 = 'sub_origin=tcp WARN_EVENT OpsMgr'
  end
cmdpart1 = './postzmsg -f e2o.conf -r' zerrtype
cmdpart3 = 'sub_source=postzmsg origin='baduser
'CP SEND ESMTS112 cd /workloads'
'CP SEND ESMTS112' cmdpart1 cmdpart2 cmdpart3 cmdpart4
```


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Scenario 2b: Send an Alert to OMNIbus – Using SNMP

- **Watch all monitored consoles for an error message that includes the word "abend"**
  - Message must also contain the word "snmp" (for demo purposes only)
- **Send an alert to OMNIbus if this word appears on a console**
  - Use SNMPTRAP command on z/VM
- **Dynamically include in the alert**
  - IP address of the z/VM system where the error occurred
  - User ID that received the error message
  - Text of the abend message

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Scenario 2b: Detailed Steps

- **View “All Events” in OMNIbus**
- **From any VM user ID:**

```
tell opmgrc1 this user is abending during demo. Send SNMP alert to Netcool
```

- **From an authorized VM user ID, view the console of OPMGRC1:**

```
gomcmd opmgrm1 viewcon user(opmgrc1)
```

- **View the OMNIbus console to see the alert**

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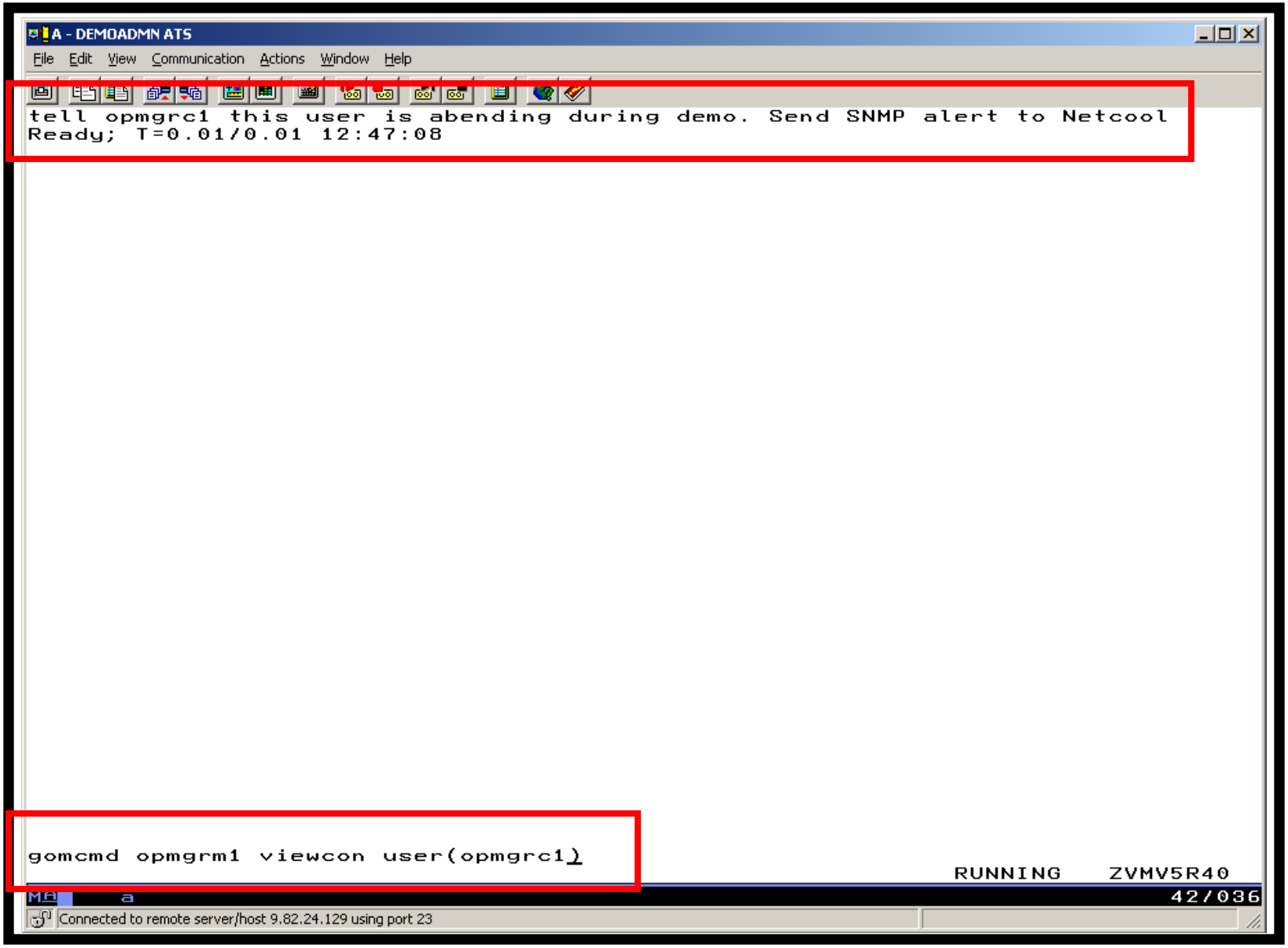

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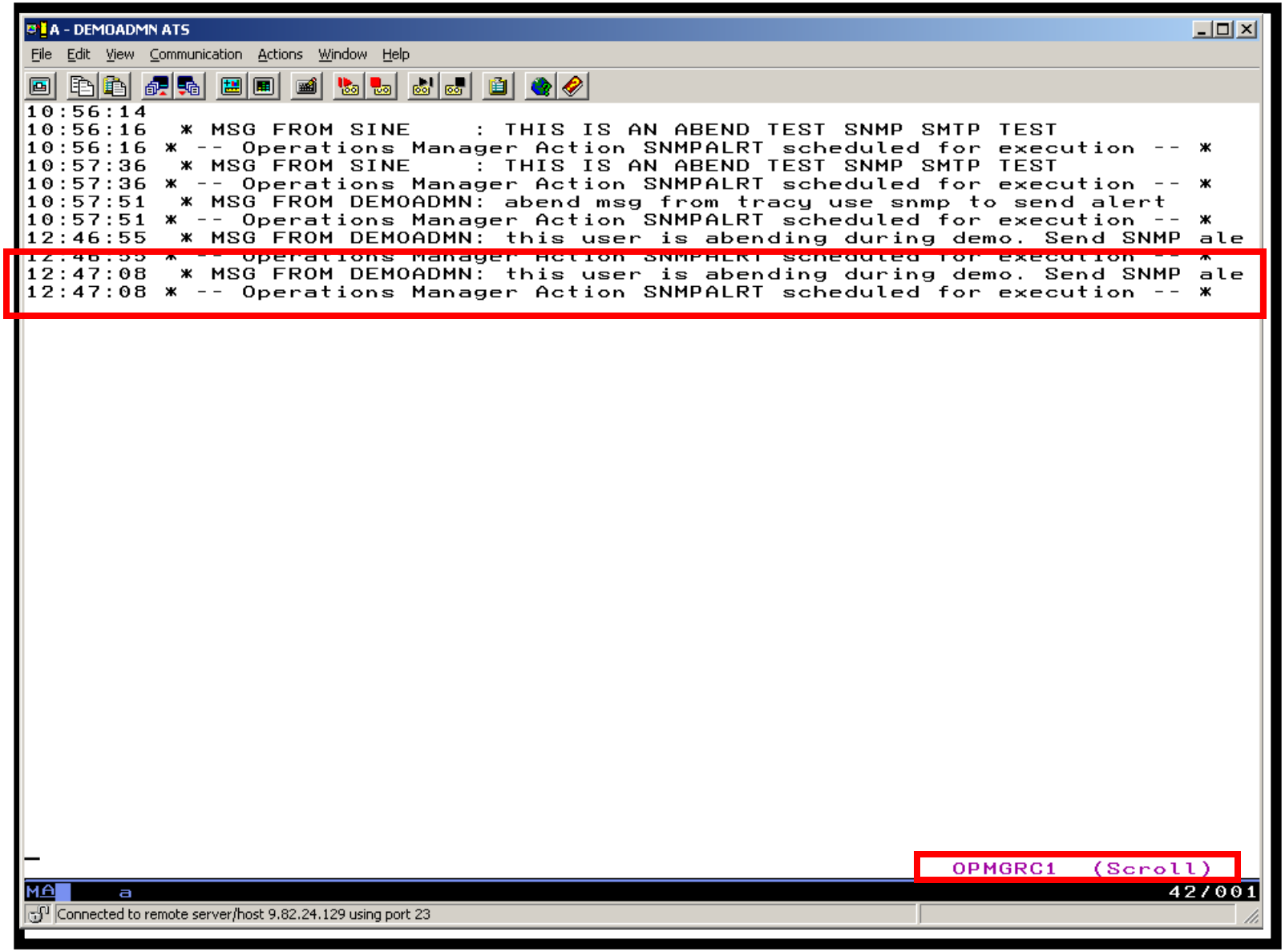

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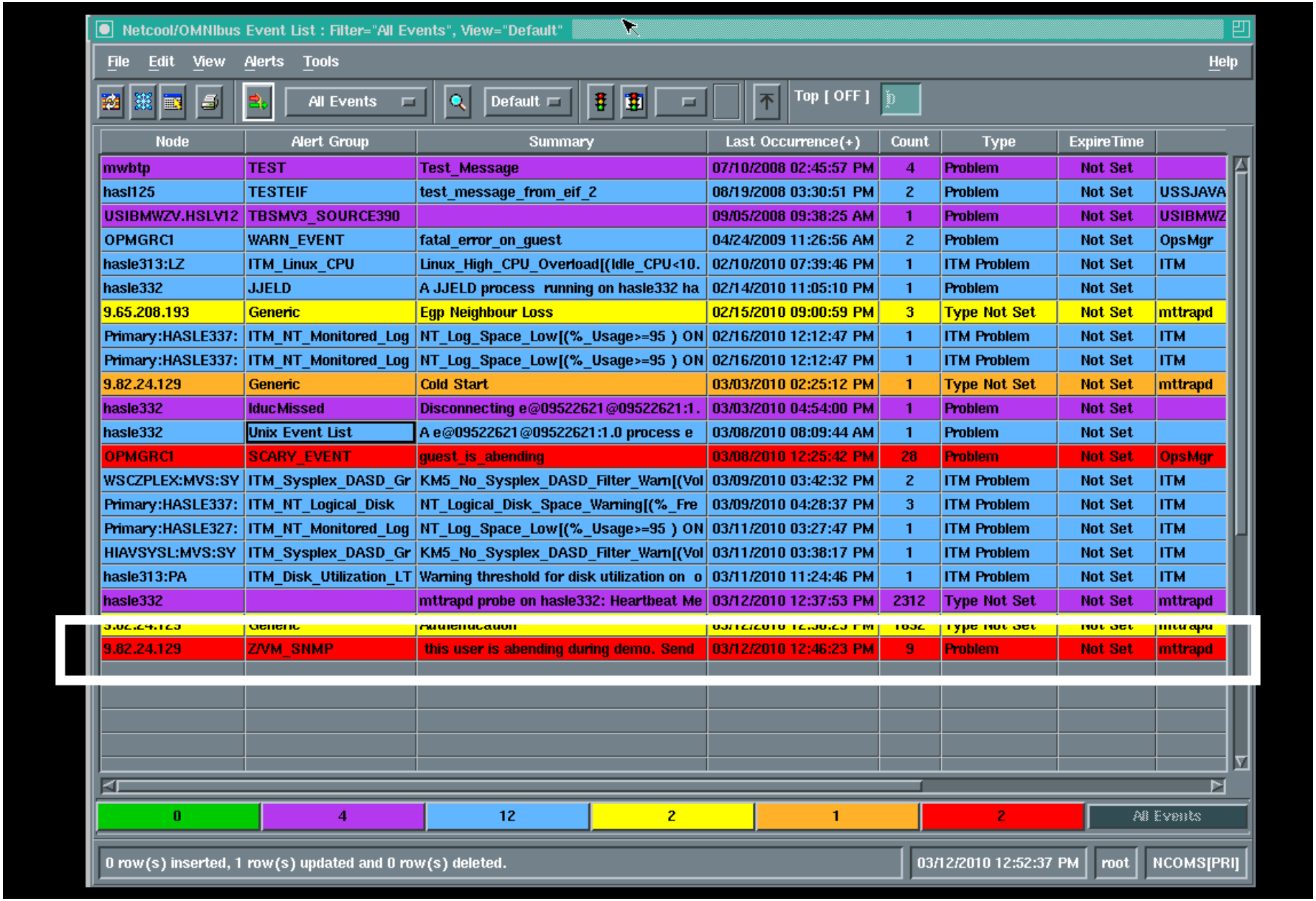

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Scenario 2b: How Do You Do That?

Rule and action in Operations Manager:

```
*
* Send an alert to OMNIbus using SNMP for abend
* msgs on consoles
DEFRULE NAME(ABNDSNMP),+
  MATCH(*abend*snmp*),+
  ACTION(SNMPALRT),+
  PARM(ABEND)
*
DEFACTN NAME(SNMPALRT),+
  COMMAND(EXEC SNMP2OMN &T),+
  ENV(SVM)
```


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Scenario 2b: How Did You Do That?

SNMP2OMN EXEC

```
/* SNMP2OMN action routine for Operations Mgr */
address command
parse arg ":" msgtext
msgtext2 = '"'msgtext '"'
/* Send message  */
snmptrap trape 1.1 number 30 1.2 text "UXZVM001" 1.3 text msgtext2 ent 1.3.6.1.4.1.9545.6
exit
```


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Scenario 2b: Additional Steps Required on z/VM

- **SNMPD user ID configured and running**
- **Update files on TCPMAINT 198 disk**
  - Add OMNIbus IP address to SNMPTRAP DEST file
  - Open SNMPD and SNMPQE ports in PROFILE TCPIP
  - Update SNMPMIBX TEXT section of MIB_EXIT DATA
- **Give OPMGRM1 and OPMGRSn access to SNMPTRAP command**
  - On TCPMAINT 592 disk

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Scenario 2b: Additional Steps Required on OMNIbus

- **Install the IBM Tivoli Netcool/OMNIbus SNMP Probe**
  - Install it on same platform as target OMNIbus server
- **Customize operational information in the probe properties (mttrapd.props)**
  - Listening port, heartbeat interval, mibs and mibs locations, etc.
- **Customize the probe rules (mttrapd.rules)**
  - Map variables created by the probe (from data extracted from the SNMP trap) into the desired OMNIbus event fields
    - Default mappings for the SNMP generic traps (trap types 0-5)
    - Enterprise-specific traps (trap type 6) require customization
- **Documentation for installation and customization**
  - IBM Tivoli Netcool/OMNIbus SNMP Probe Reference Guide (SC23-6003-04)

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Scenarios 2a and 2b – POSTZMSG vs SNMP

- **Using POSTZMSG**
  - Can direct the alert to only the IP address(es) you specify
  - Need a Linux guest running and logged on that can run POSTZMSG and must be on the same z/VM system
    - Can be overcome by using a socket interface to send POSTZMSG command to the guest
  - Limit of 160 characters on POSTZMSG command sent to Linux guest (using CP SEND)
    - Can't always send full text of message
    - Can be overcome by using a socket interface to send POSTZMSG command to the guest
- **Using SNMP**
  - No requirement for a Linux guest. SNMP runs on z/VM.
  - No limit on message size
  - All SNMP alerts on z/VM go the same set of IP addresses

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Scenario 3:
Send a Message or E-mail if Spool Usage is Too High

- **Operations Manager monitors the spool usage (percent full)**
- **Usage exceeds the specified limit**
  - For demo purposes, we'll dynamically resume (re-activate) an existing spool monitor that requires the spool to only be 25% full
- **Automatically send an e-mail to someone who can evaluate and take action**
- **For demo purposes, suspend (de-activate) the spool monitor when complete**

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Scenario 3: Detailed Steps

- **From an authorized VM user ID, see the spool usage:**

```
gomcmd opmgrm1 viewspl
```

- **From a user ID with Operations Manager privilieges:**

```
gomcmd opmgrm1 resume spool(splfull2)
```

- **Check the Operations Manager log to see the spool monitor triggered:**

```
gomcmd opmgrm1 viewlog
```

- **Check the inbox of the appropriate person to see the e-mail**

- **From a user ID with Operations Manager privilieges:**

```
gomcmd opmgrm1 suspend spool(splfull2)
```


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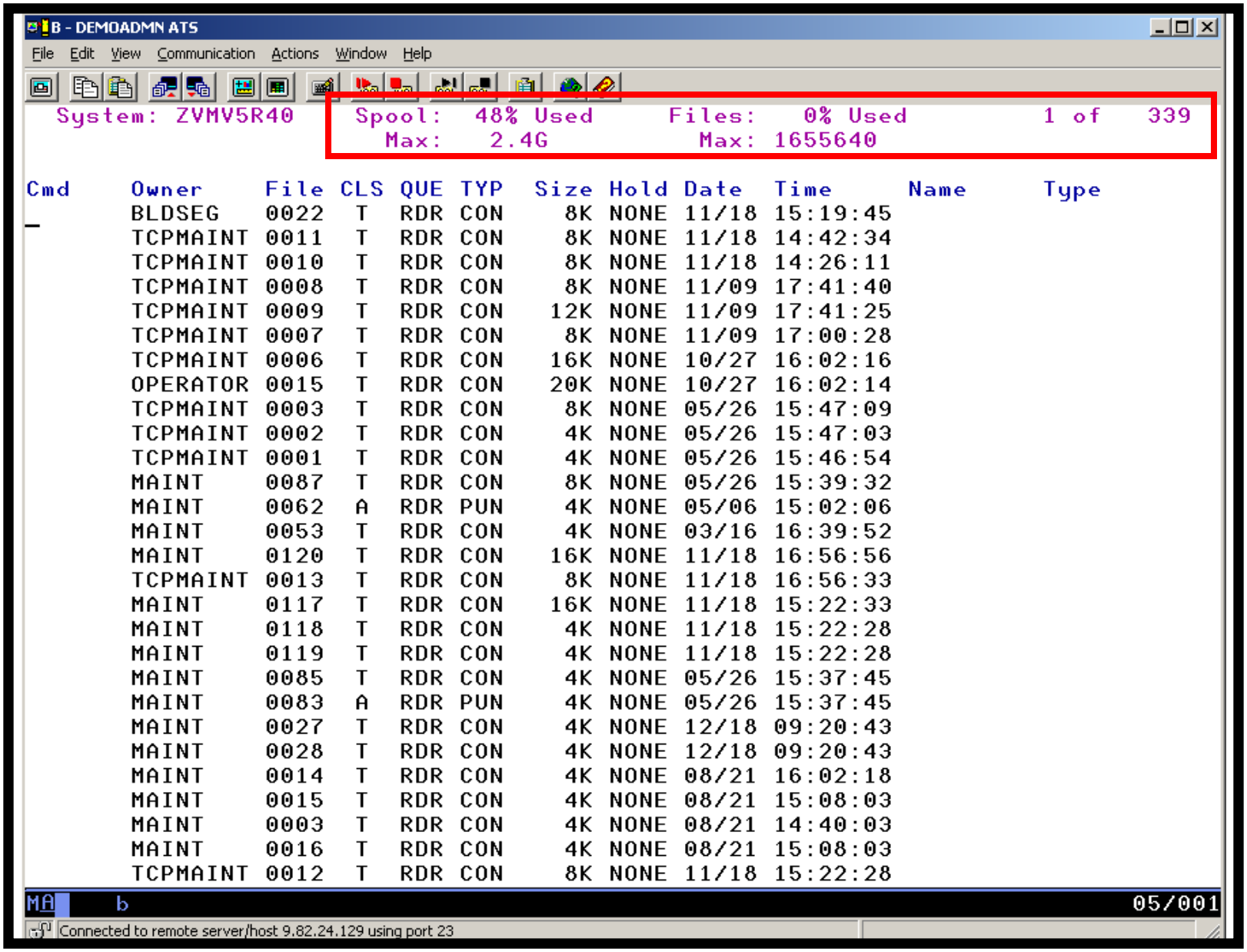

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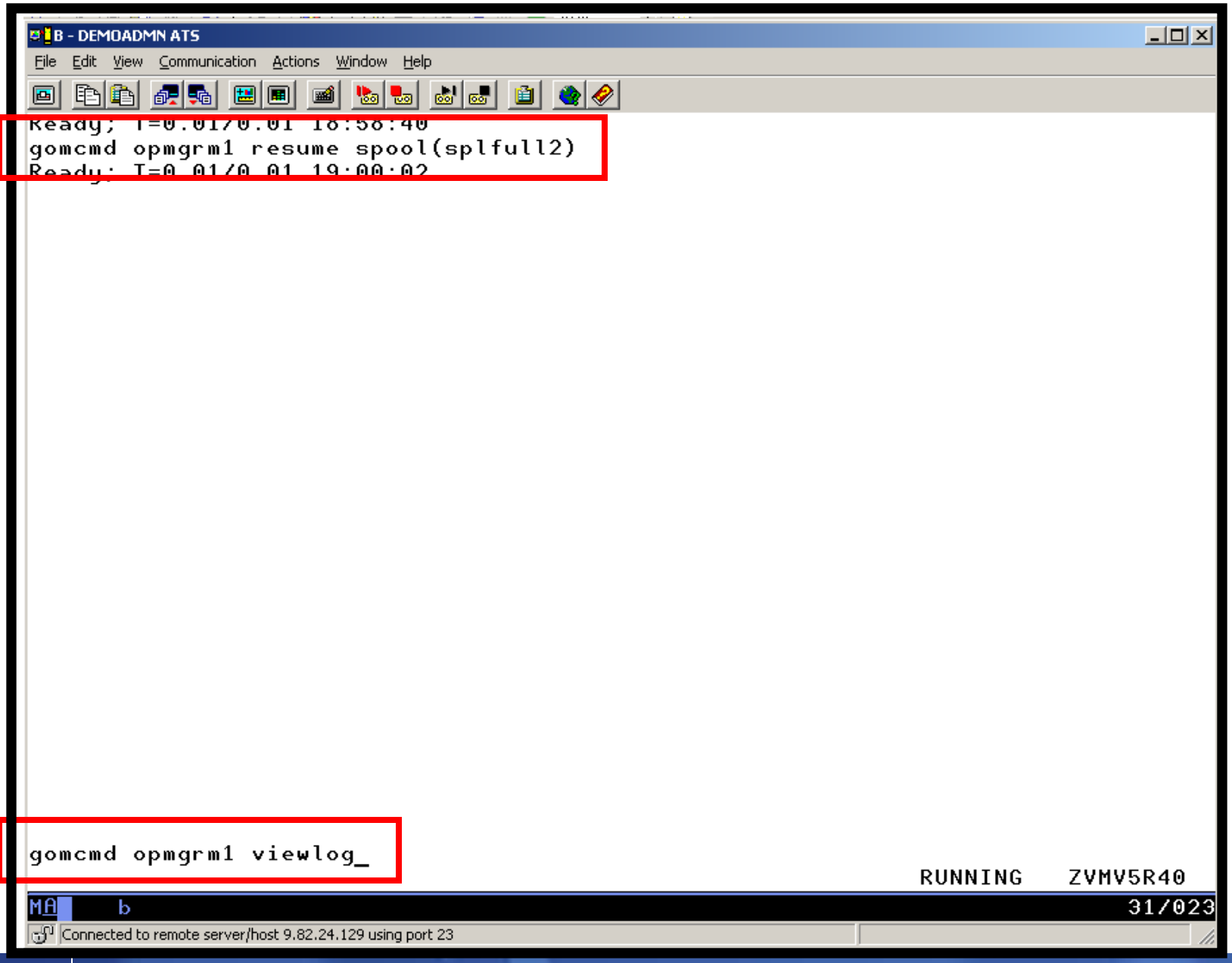

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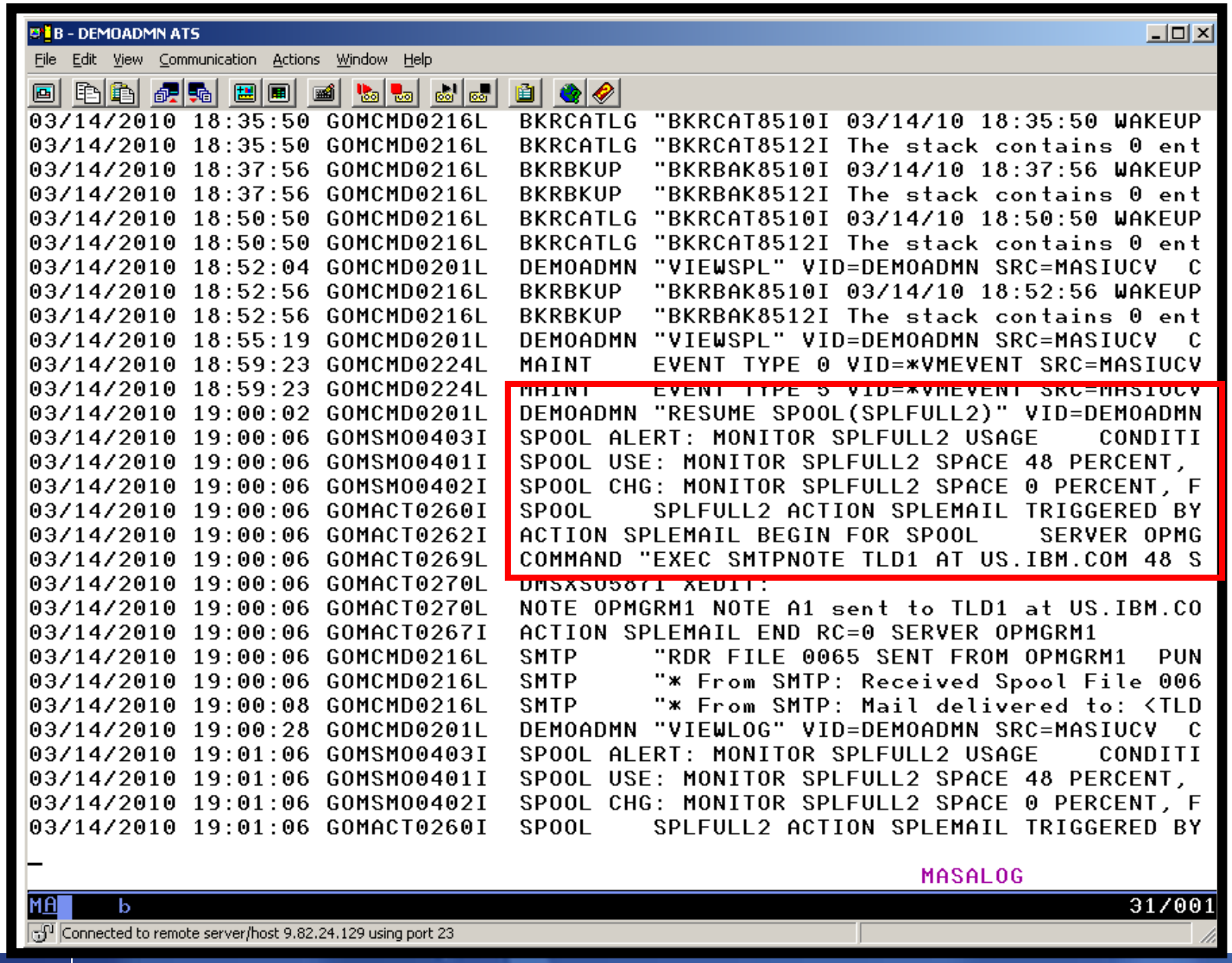

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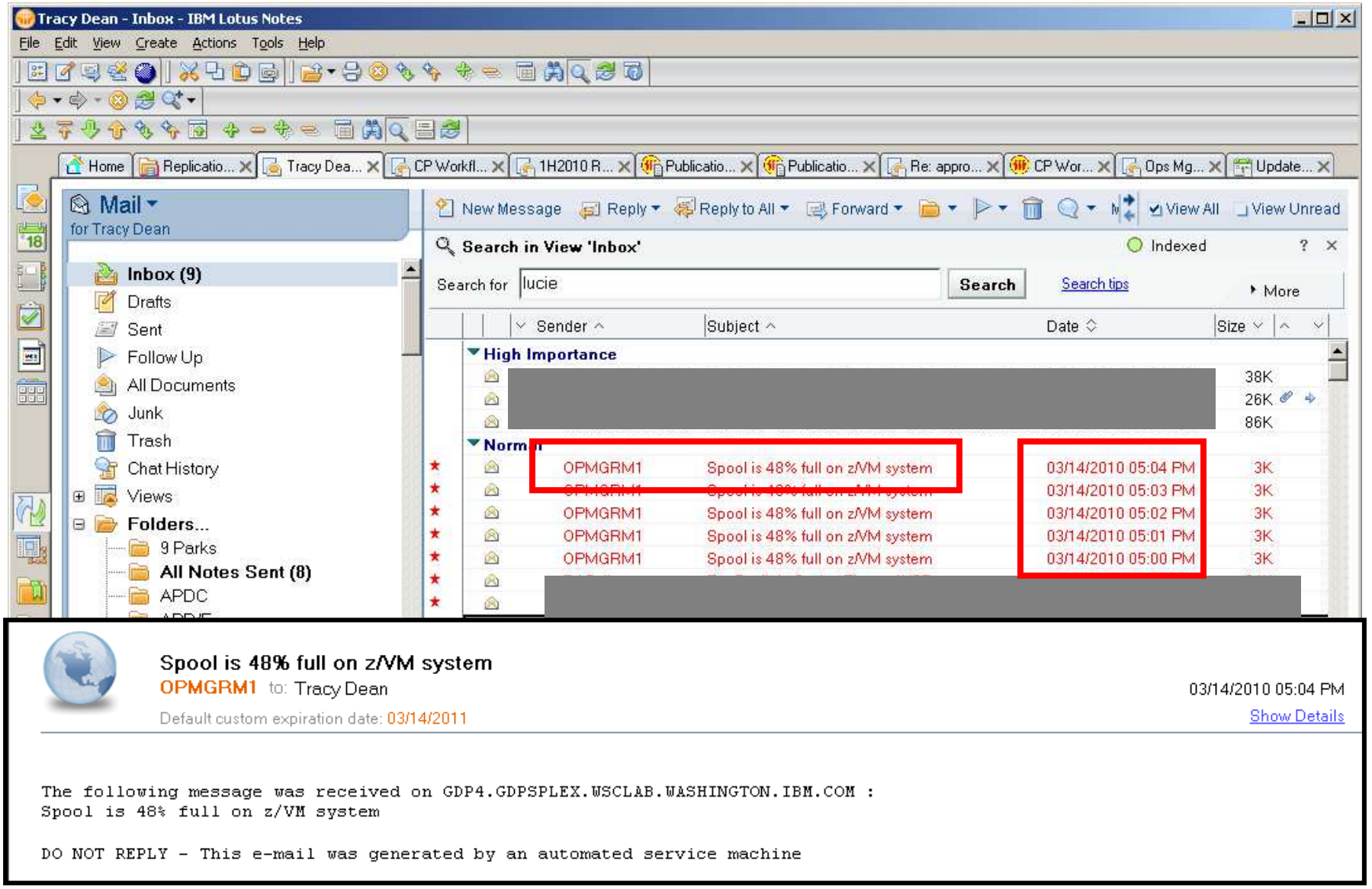

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Scenario 3: How Do You Do That?

Spool monitor and action in Operations Manager:

```
*
*
DEFSMON NAME(SPLFULL2),+
  USAGE(025-099),+
  ACTION(SPLEMAIL),+
  PARM(SPOOL)
*
DEFACTN NAME(SPLEMAIL),+
  COMMAND(EXEC SMTPNOTE tld1 at us.ibm.com &4 &p),+
  ENV(LVM)
```


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Scenario 3: How Do You Do That?

SMTPNOTE EXEC (excerpts)

```
/*  */
Parse arg mail_user dummyat mail_node baduser errtype msgtext
if errtype = 'ABEND' then
  errtext = 'Abend on user ID' baduser 'on z/VM system'
else
  if errtype = 'SPOOL' then do
    errtext = 'Spool is' baduser'% full on z/VM system'
    msgtext = errtext
  end
  else errtext = msgtext /* Construct the e-mail */
line.1 = 'OPTIONS: NOACK    LOG    SHORT   NONOTEBOOK ALL CLASS A'
line.2 = 'Date: ' Date() ',' Time()
line.3 = 'From: Operations Manager for z/VM'
line.4 = 'To:  ' mail_user 'at' mail_node
line.5 = 'Subject: ' errtext
...
line.7 = msgtext
line.8 = ' '
line.9 = 'DO NOT REPLY - This e-mail was generated by an automated service machine
line.0 = 9
'PIPE stem line. | > TEMP NOTE A'
'EXEC SENDFILE TEMP NOTE A (NOTE SMTP'
```


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Scenario 4:
Find and View Spool Files – Clean up the Spool

- **Authorized user specifies spool search criteria**
  - By user ID
  - By date
  - By file size
- **Result list presented**
  - Sort
  - Open/view a specific spool file
  - Purge, modify metadata, or transfer a file

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Scenario 4: Detailed Steps

- **From an authorized VM user ID, view the spool files:**

```
gomcmd opmgrm1 viewspl
```

- **Sort by date**
  - Put cursor on date column header and hit F6
- **Find the spool files just sent and type PURGE next to them**
- **From an authorized VM user ID, view the log to see that the spool monitor is no longer triggered:**

```
gomcmd opmgrm1 viewlog
```


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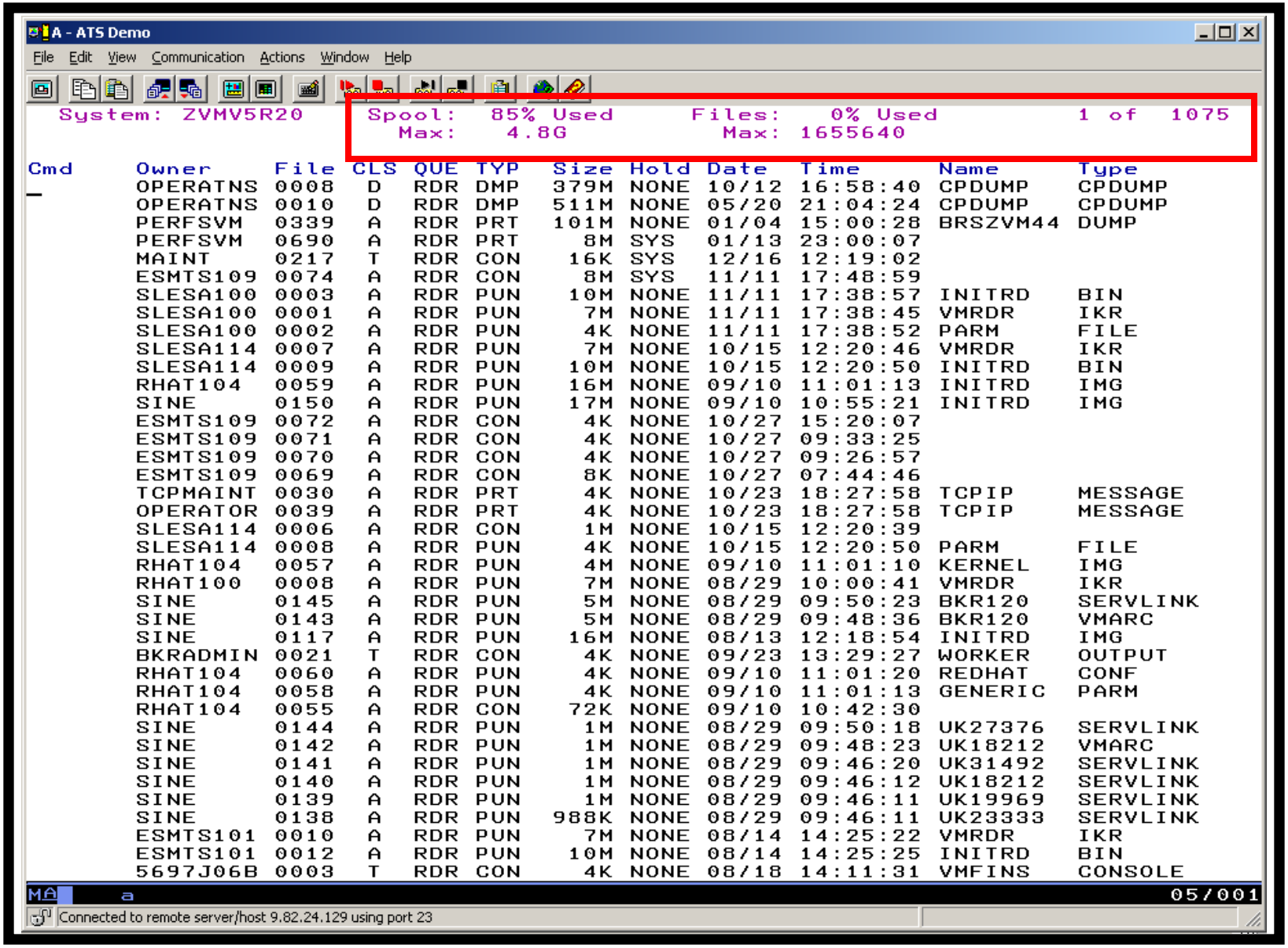

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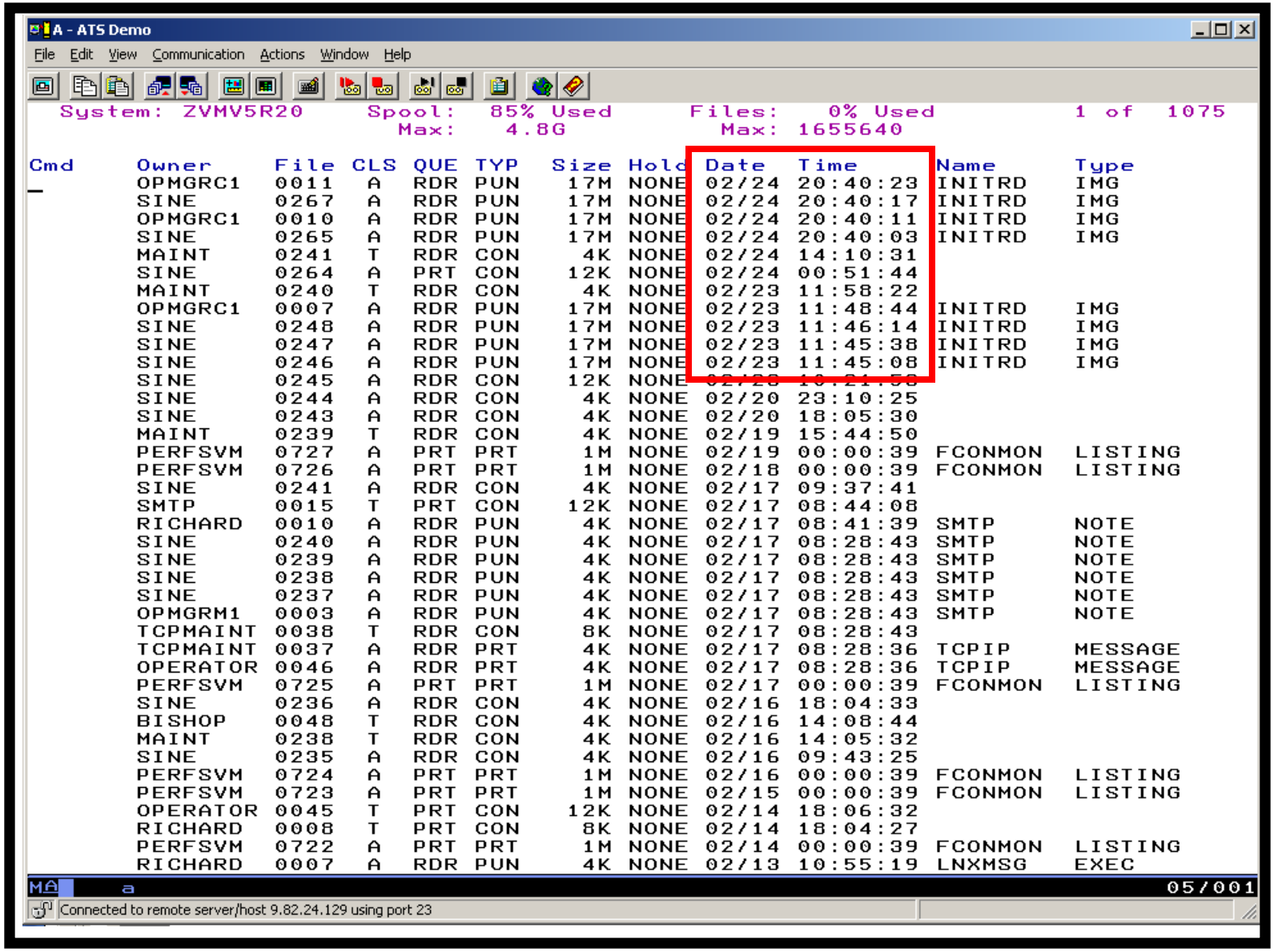

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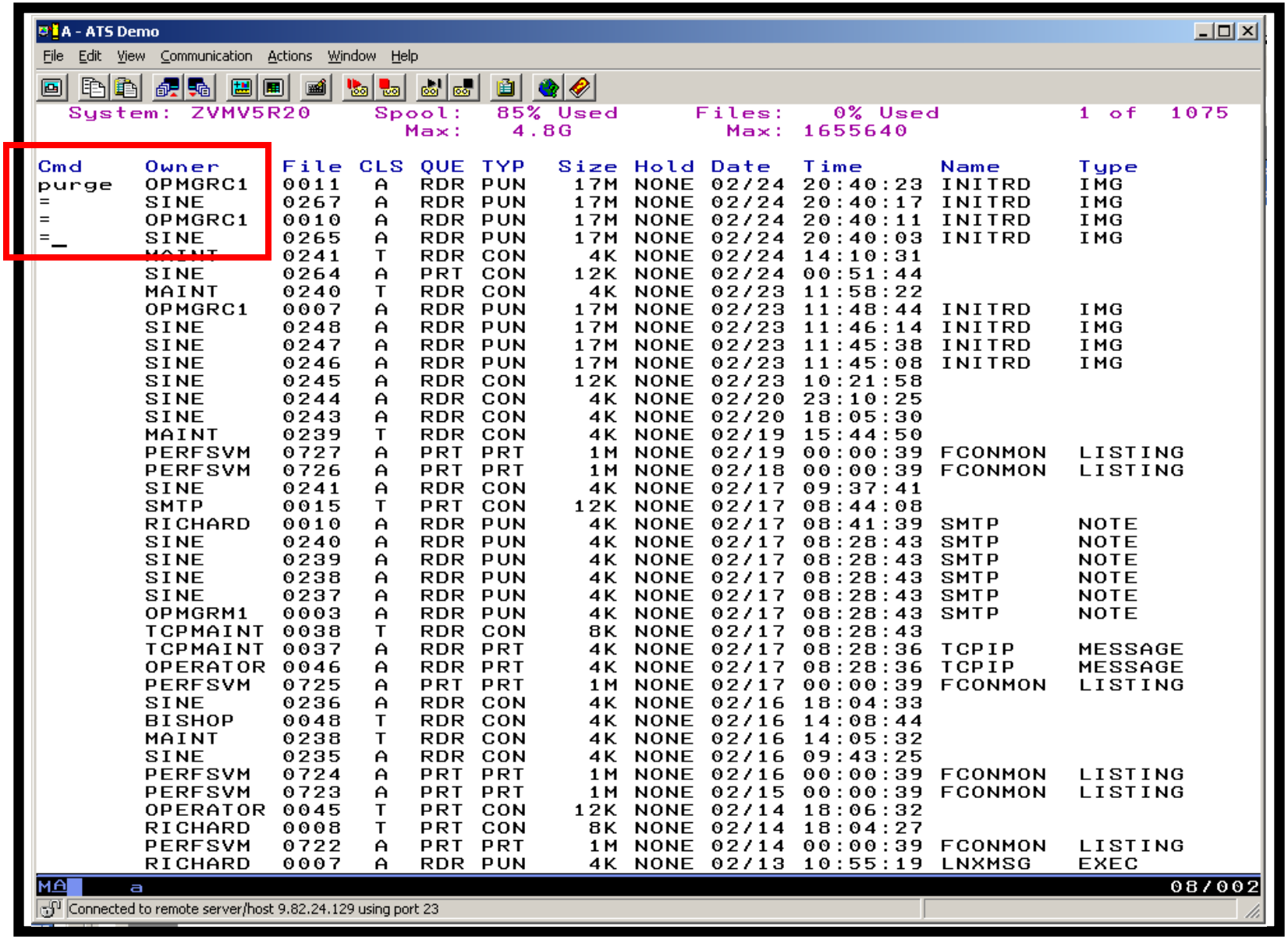

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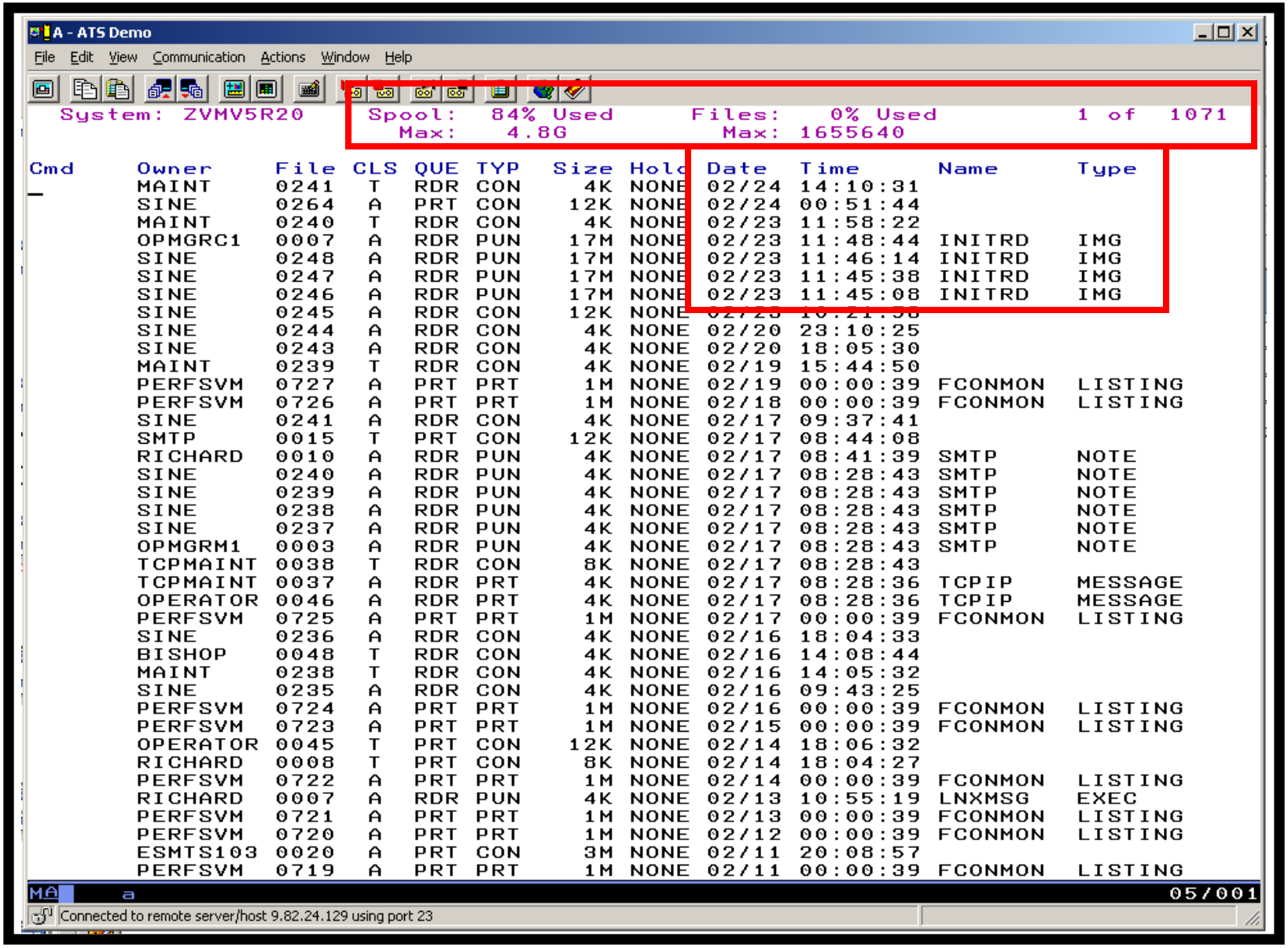

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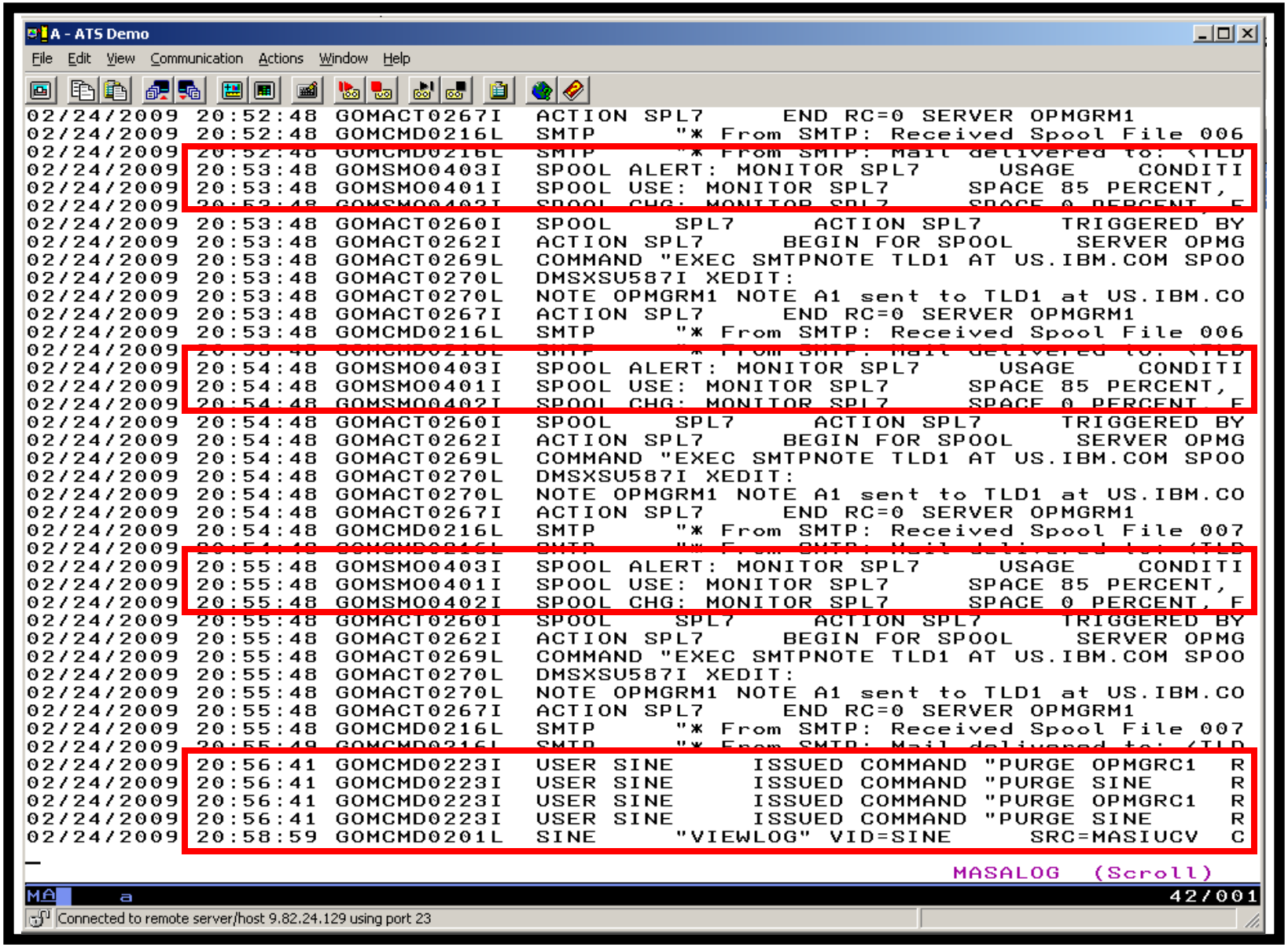

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Scenario 5:
Automated Spool Clean Up

- **Use z/VM SFPURGER utility to manage spool files based on criteria, e.g.**
  - User ID
  - Days in spool
  - Class
  - Number of records
- **Automate SFPURGER execution**
  - Regularly scheduled using Operations Manager
  - Triggered by Operations Manager spool monitor

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Scenario 5: Detailed Steps

- **From an authorized VM user ID, view the spool files for a specific user:**

```
gomcmd opmgrm1 viewspl user(tstadmn2)
```

- **Send a file to this user as class Z**

```
sendfile profile exec a tstadmn2 (class z
```

- **View spool files for this user again to see the new file**

```
gomcmd opmgrm1 viewspl user(tstadmn2)
```

- **Delete any existing schedules called DEMO**

```
gomcmd opmgrm1 delschd name(demo)
```

- **Schedule SFPURGER for execution**
  - It will purge any files of class Z

```
gomcmd opmgrm1 defschd name(demo),action(sfpurger),WHEN(now)
```

- **View spool files for this user again to see the new file is gone**

```
gomcmd opmgrm1 viewspl user(tstadmn2)
```


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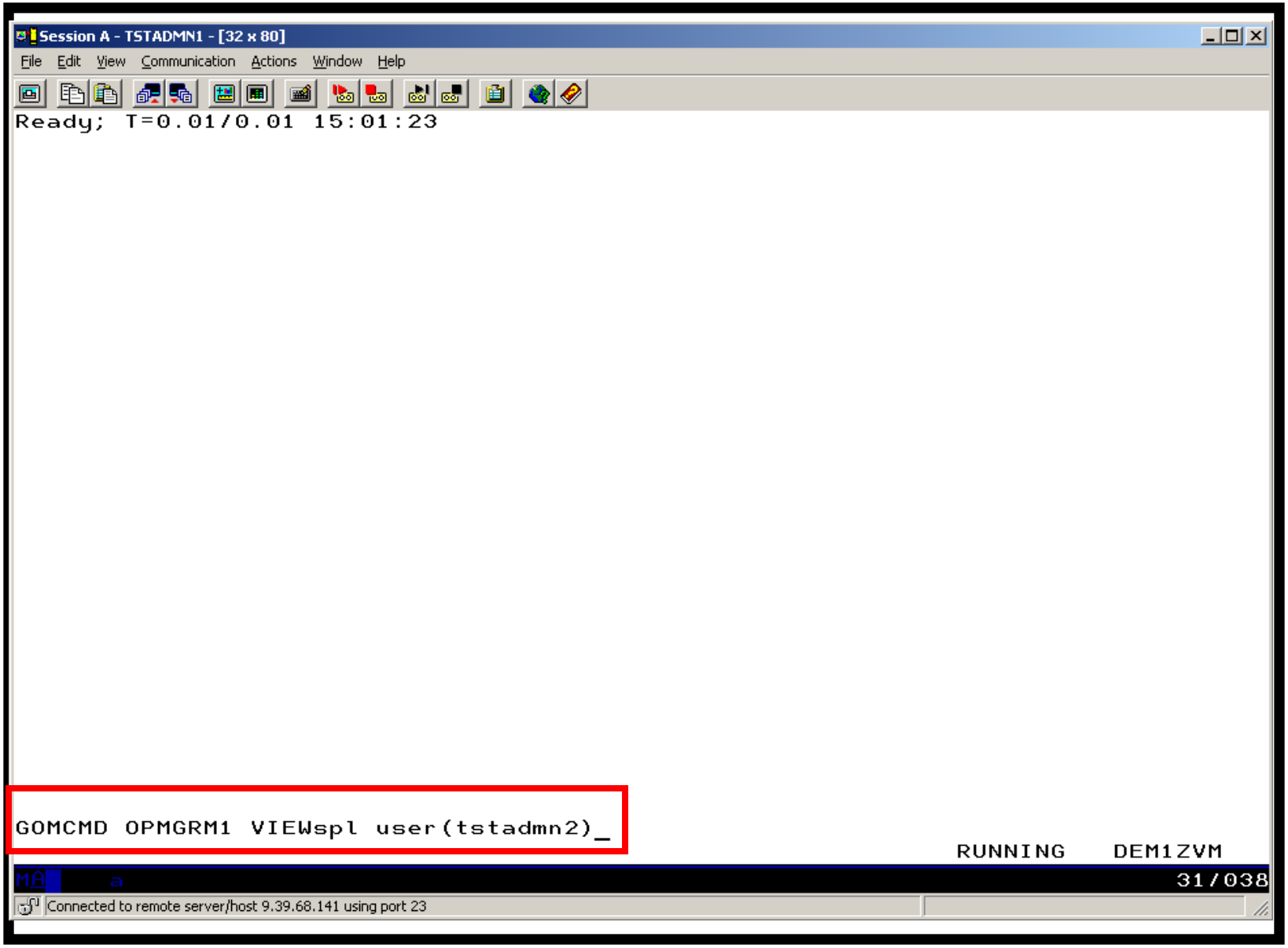

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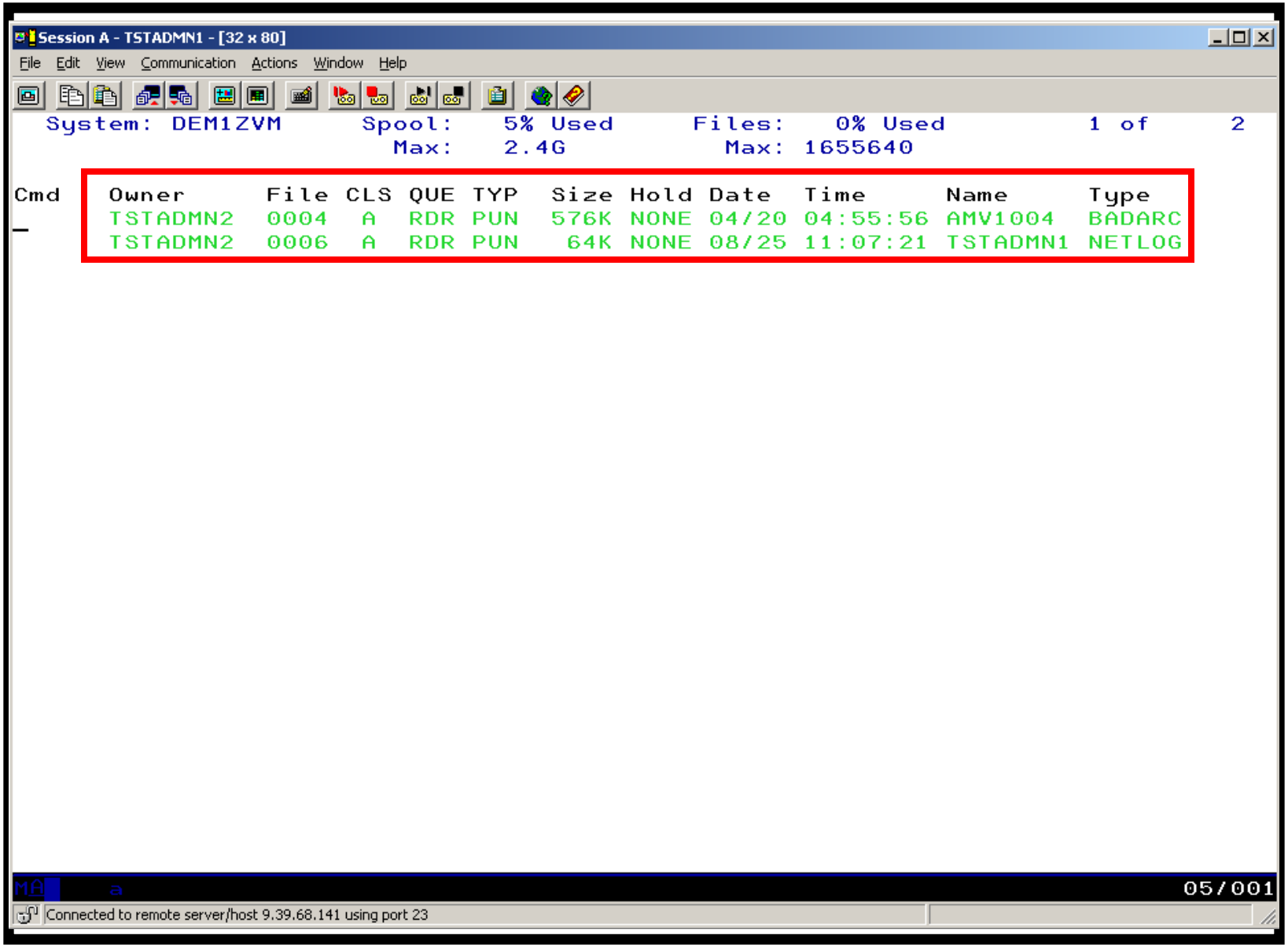

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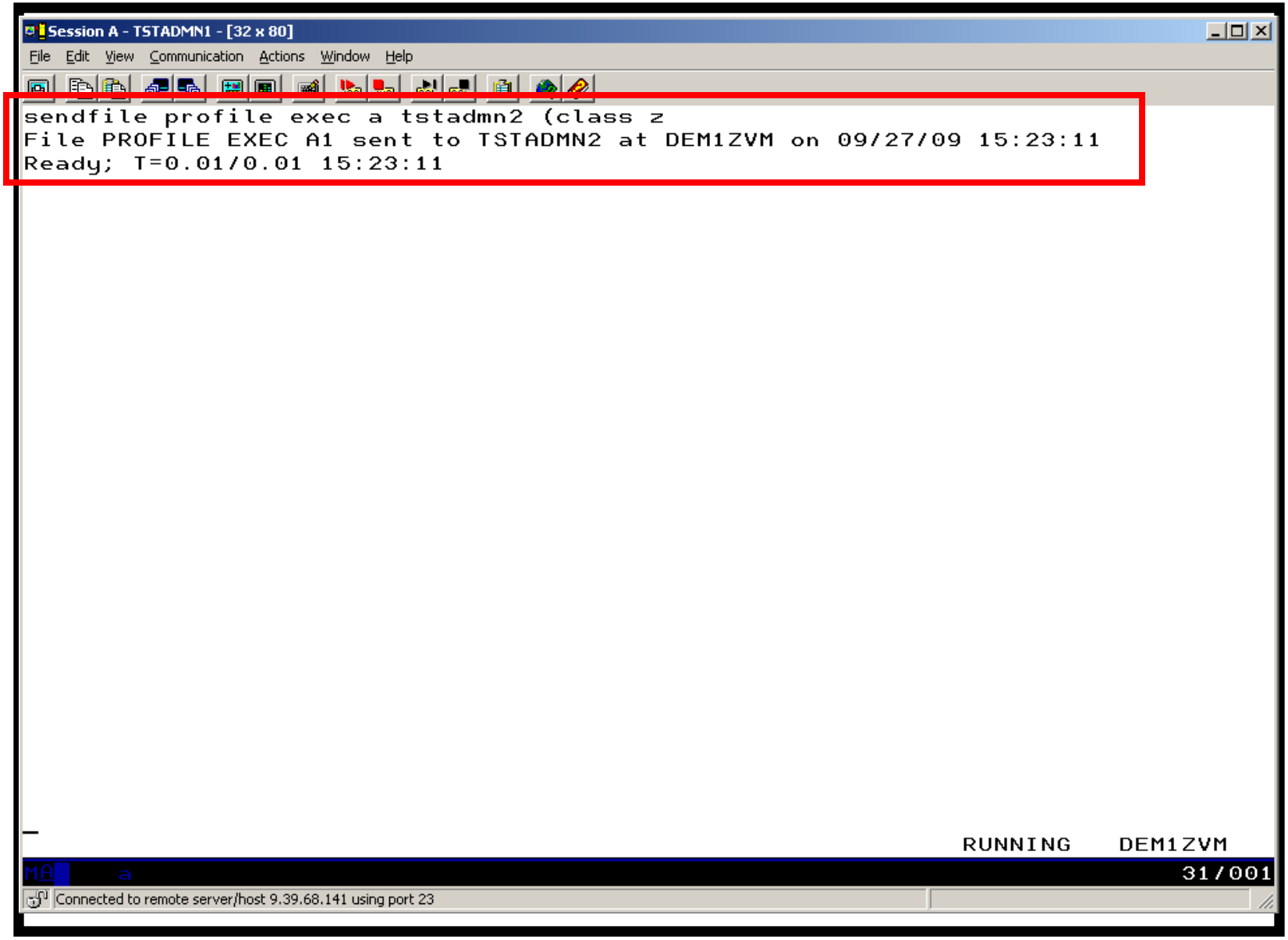

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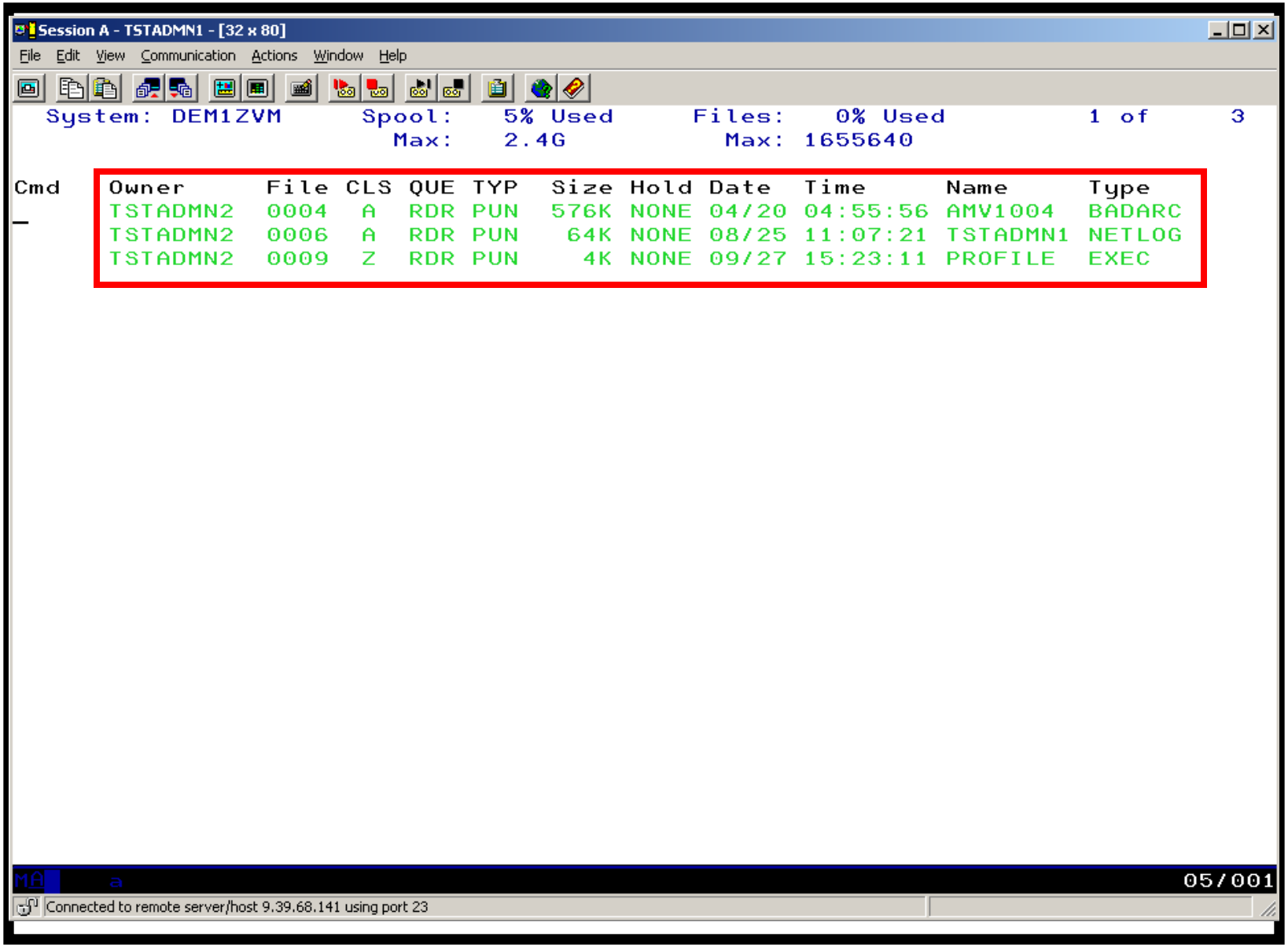

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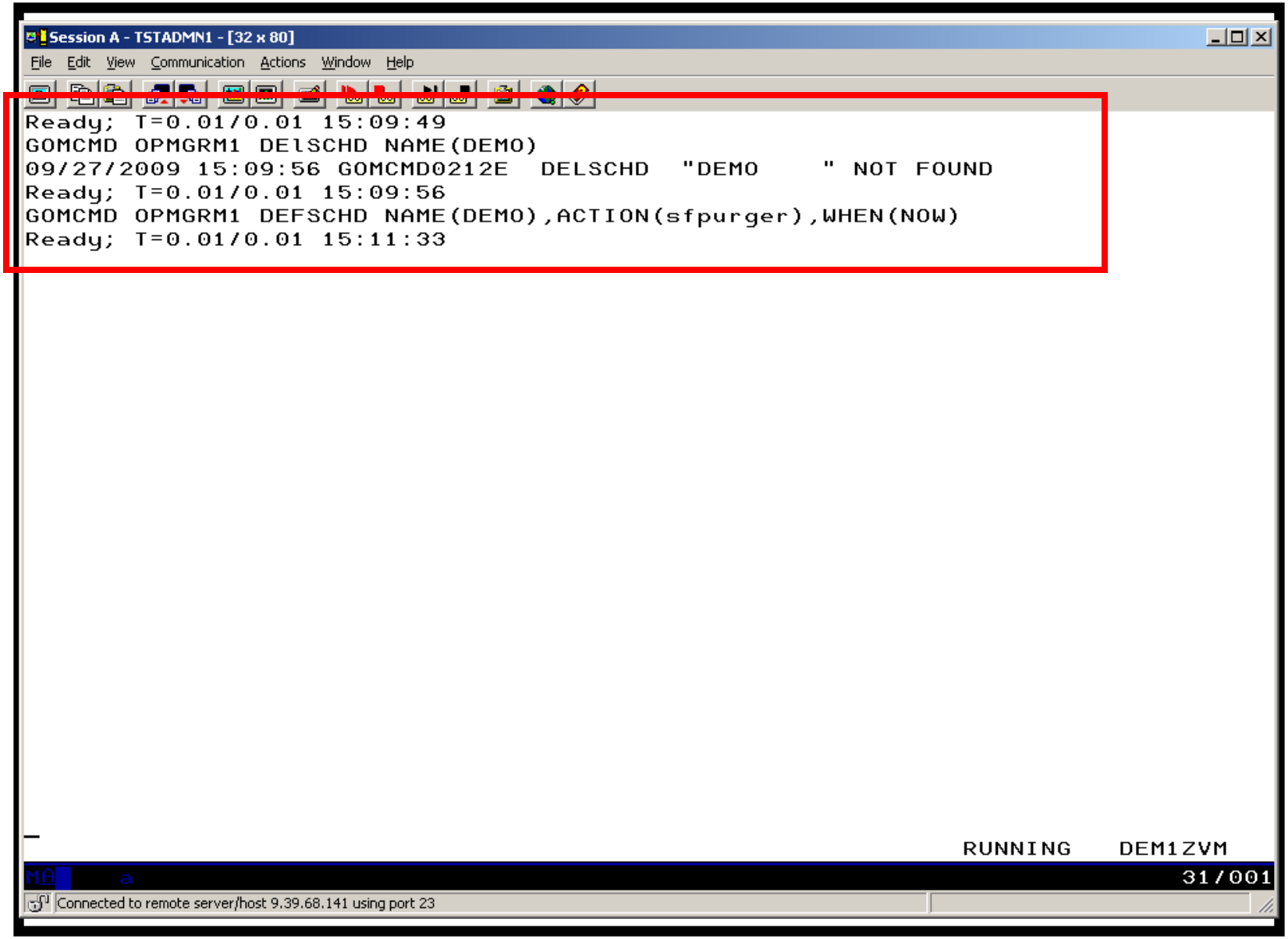

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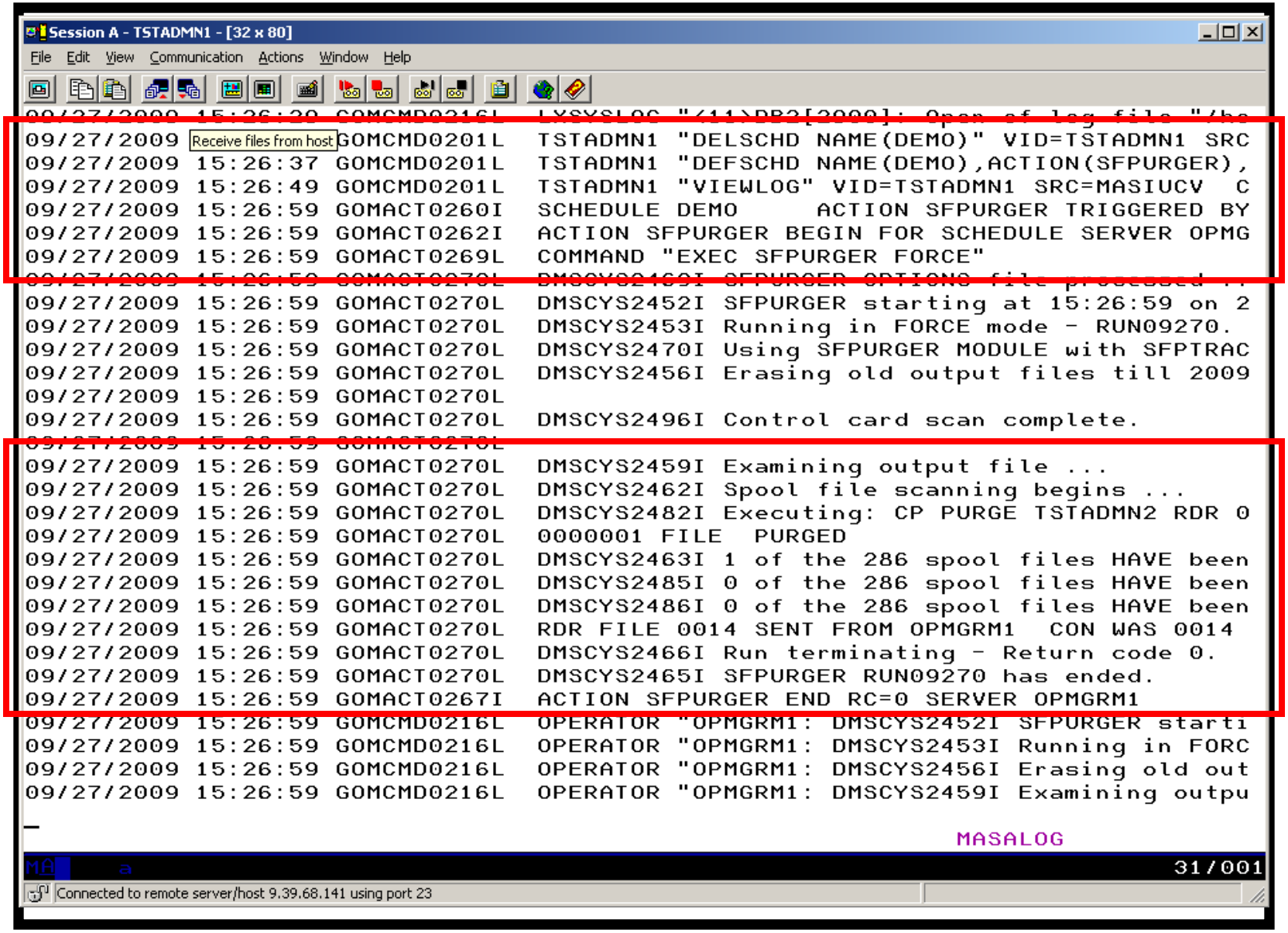

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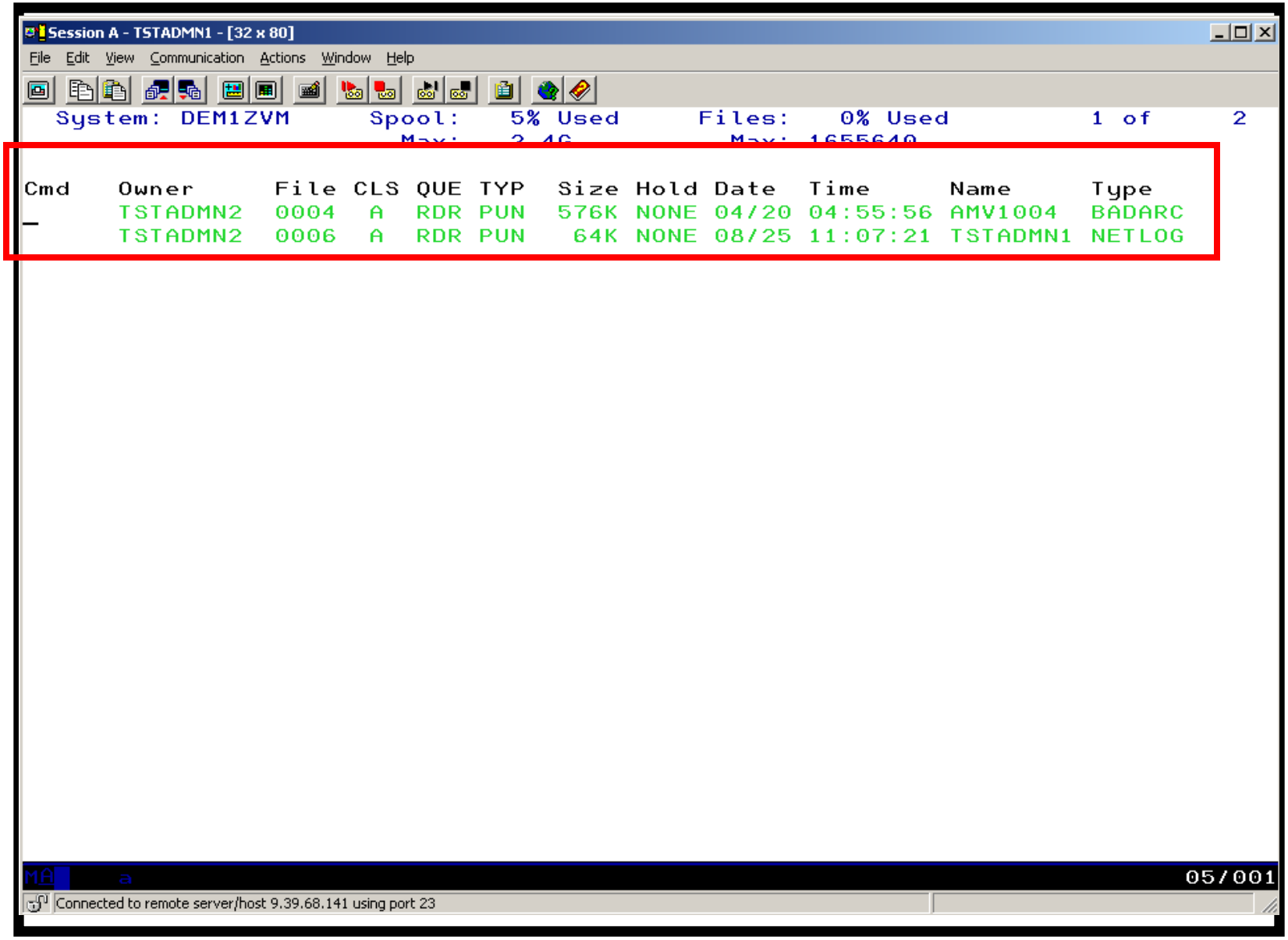

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Scenario 5: How Do You Do That?

Action in Operations Manager to call z/VM's SFPURGER EXEC

```
*
DEFACTN NAME(SFPURGER),+
  COMMAND(EXEC SFPURGER FORCE),+
  OUTPUT(LOG),+
  ENV(LVM)
```

SFPURGER OPTIONS file

```
* Send console log to user ID TSTADMN1 at demo node
CONSOLE   TSTADMN1 DEM1ZVM
* Erase LOG and RUN files that are more than 3 days old
KEEPDAY  21
* Set prime shift start and end times
PRIMSHFT  07:30:00 16:30:00
* Use defaults for the following:
*   MSGTYPE  SORTMOD  SFPCNTL  SOSCNTL  SFPMOD  APPEND
SFPCNTL SFPTRACY
```


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Scenario 5: How Do You Do That?

SFPTRACY CONTROL

```
* Ignore any spool files found in the NSS queue (privilege class E)
QUEUE NSS                                              ACTION IGNORE
*
* Purge any spool files found in class Z
CLASS Z                                                ACTION PURGE
```

Make sure OPMGRM1 links and accesses MAINT 193 disk for access to SFPURGER functions

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Scenario 6:
Detecting Disk Full Conditions of Logging IDs

- **Operations Manager monitors the console of a user ID that does logging**
  - DIRMAINT, for example
- **Disk full or early warning message triggers a rule/action in Operations Manager**
  - Quiesce or shut down DIRMAINT
  - Send the log files to a separate service machine
  - Erase the log files from DIRMAINT's logging disk
  - Restart DIRMAINT
  - Separately, other service machine automatically archives all files it receives (in Archive Manager for z/VM)
  - Log files are safely archived in Archive Manager and DIRMAINT is running with a clean log disk
- **Get a copy of the console for further review/debugging**

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Scenario 6: Detailed Steps

- **From an authorized VM user ID, view the DIRMAINT console:**

```
gomcmd opmgrm1 viewcon user(dirmaint)
```

- **In the console view**
  - Issue CMS commands to copy old (large) log files to DIRMAINT's log disk

```
cms copyfile dirmaint tlog0914 t = tlog0912 h
```

  - Verify the logging disk is more than 75% full

```
cms q disk
```

  - Run DIRMAINT's hourly processing now

```
exec dvhourly
```

  - Verify the logging disk is less than 75% full

```
cms q disk
```

- **Exit the console view and find the files in the archive**

```
amvlist
```

  - Type "archlogs" in the owner field and press ENTER

- **Request a copy of the console for further review/debugging**

```
gomcmd opmgrm1 viewcon user(dirmaint),mode(rdr)
```


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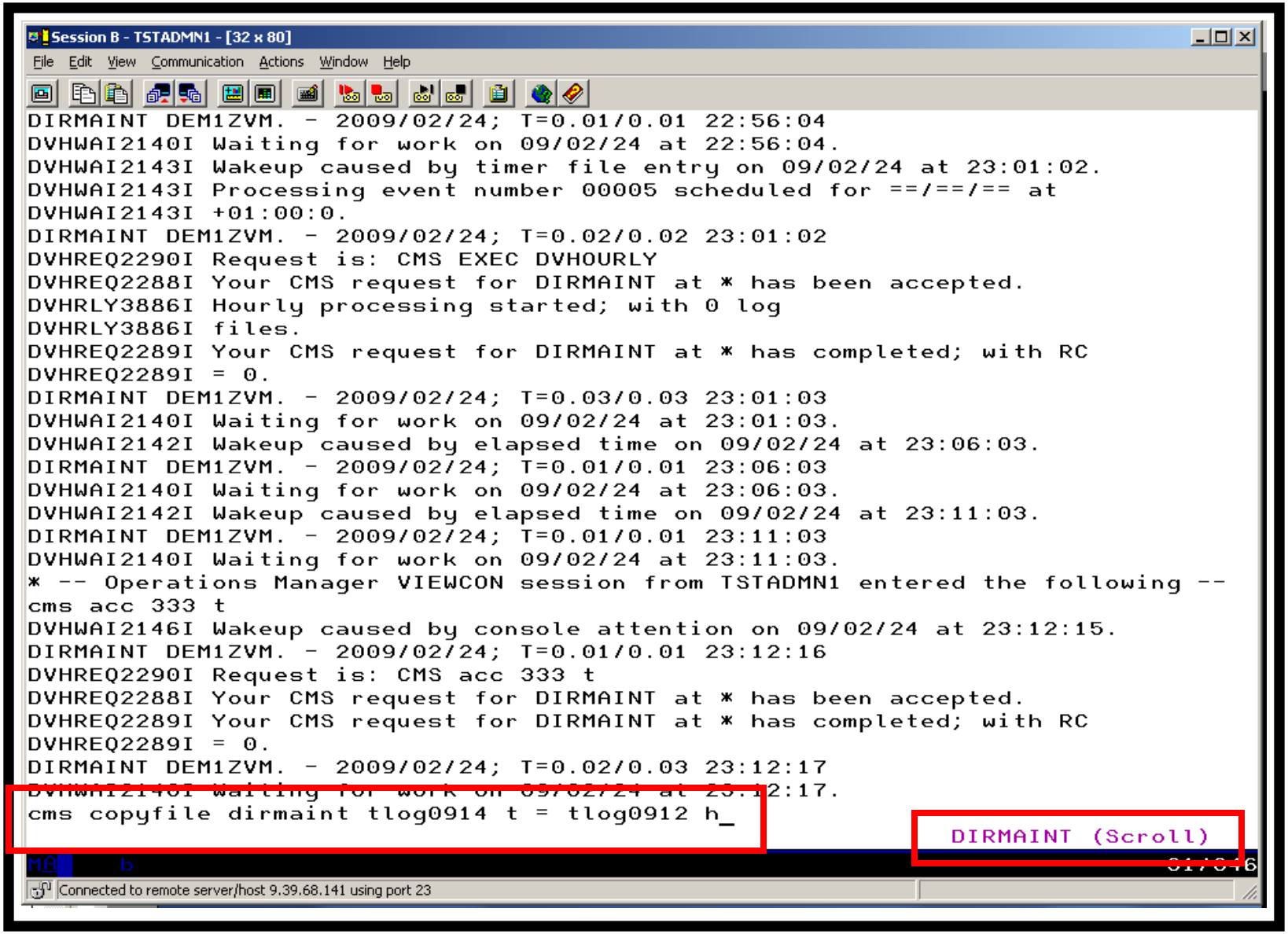

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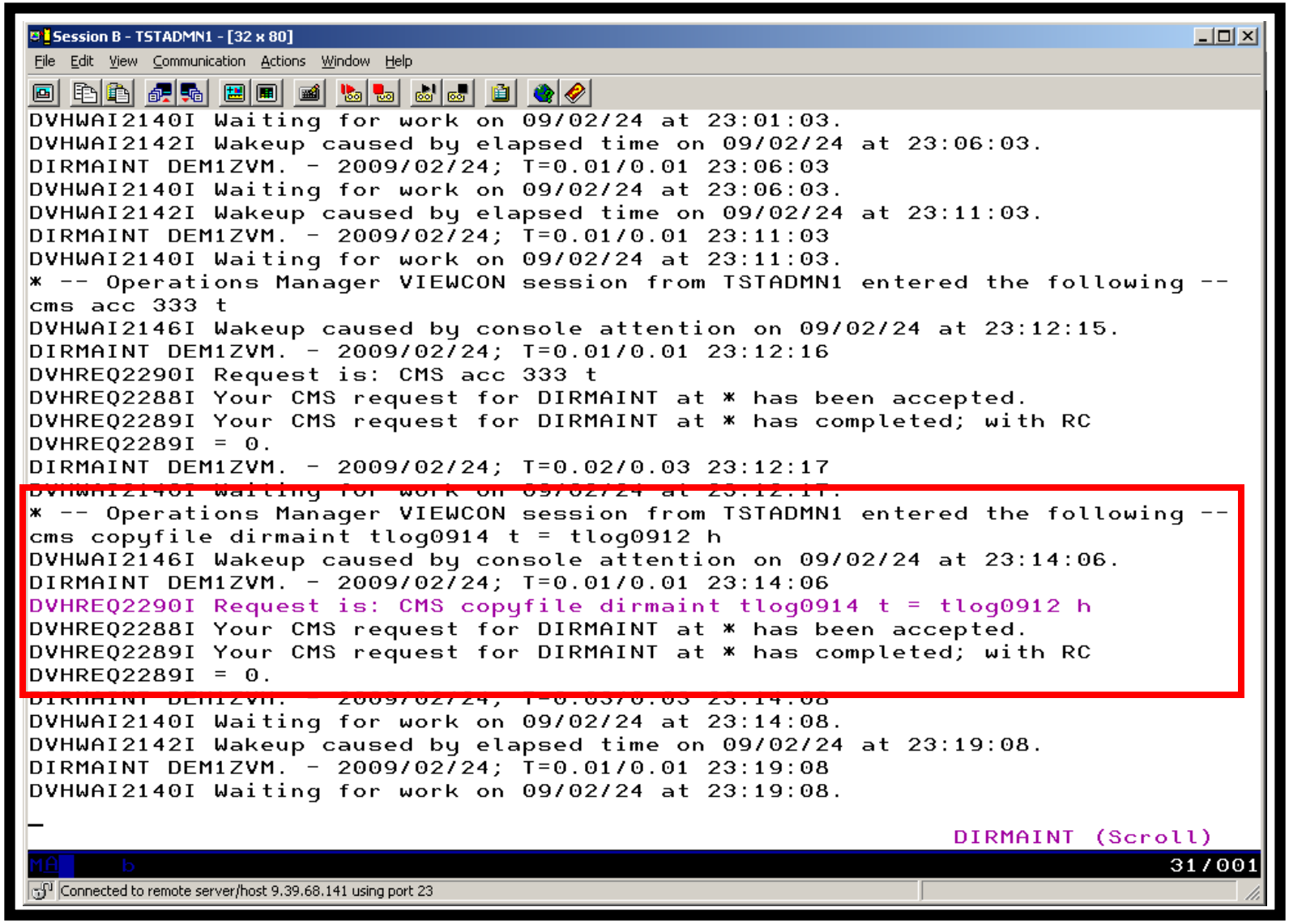

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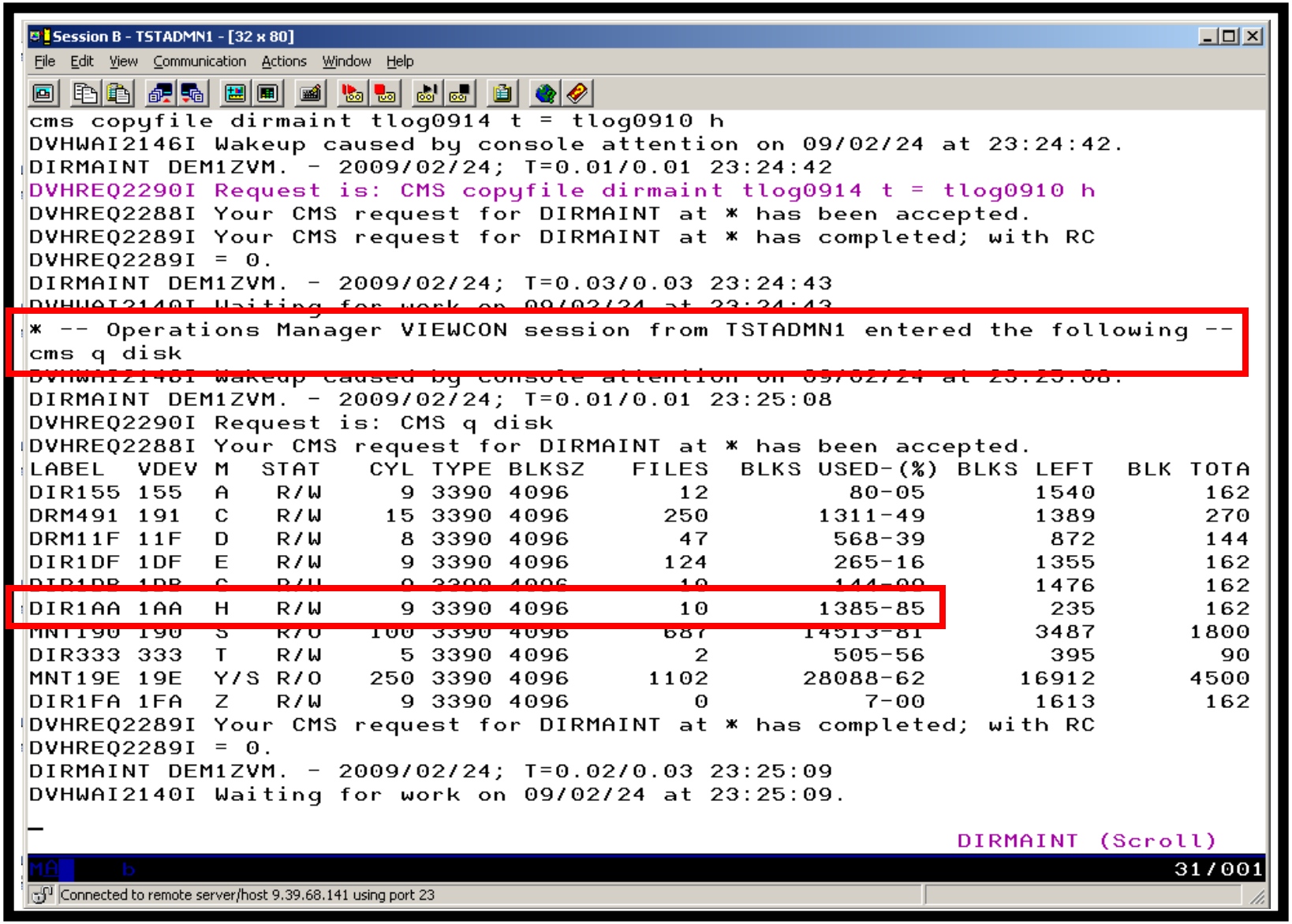

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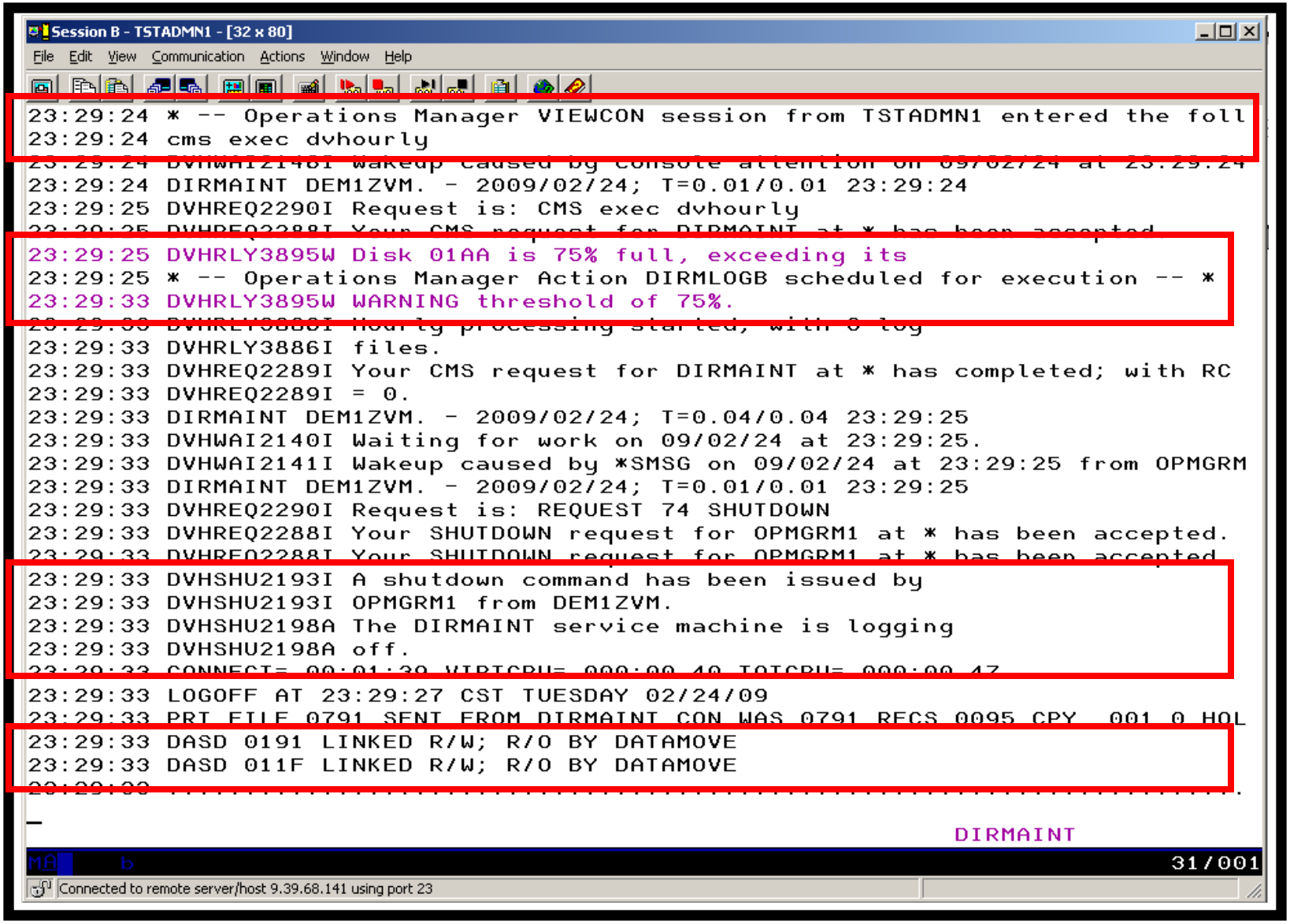

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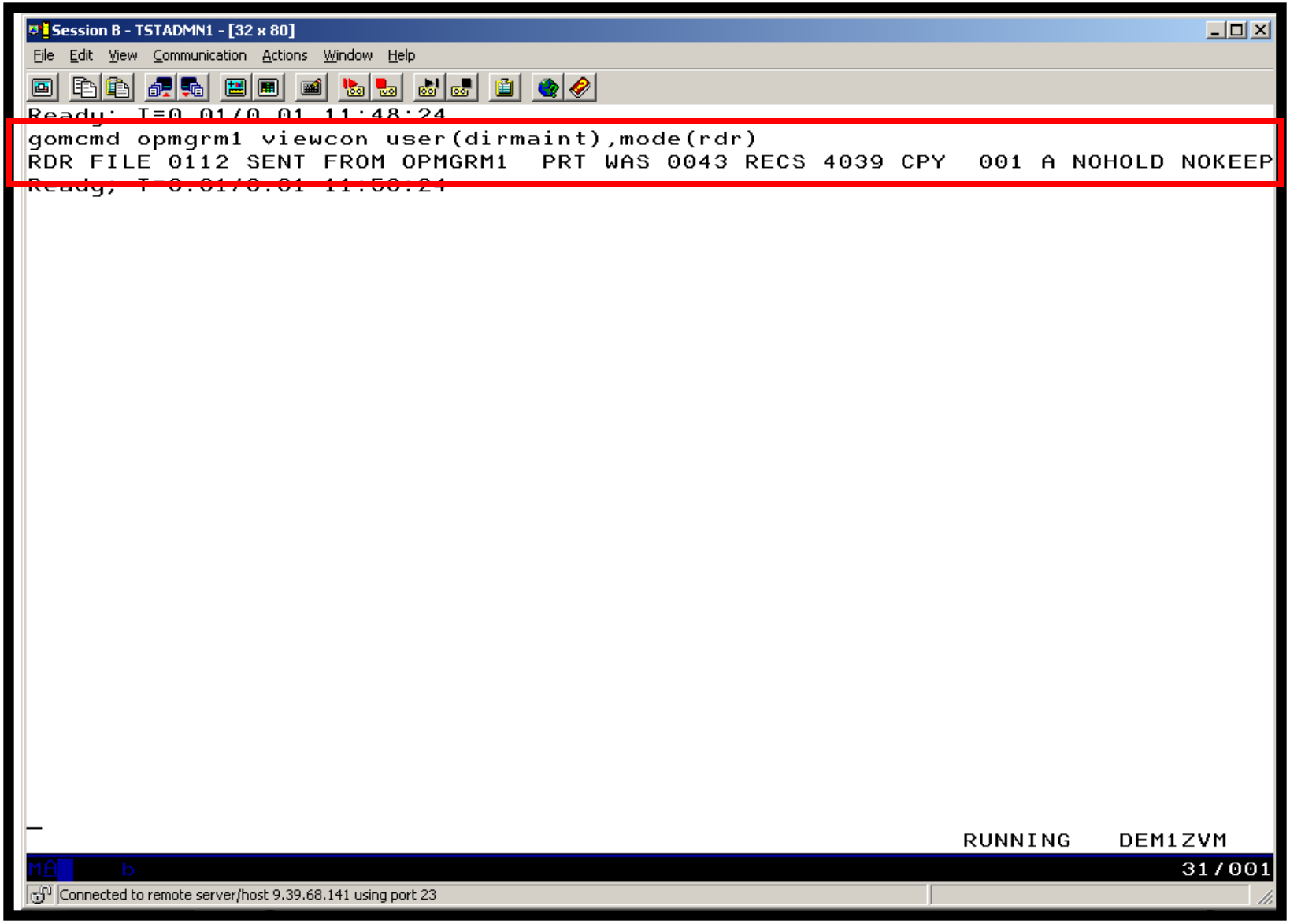

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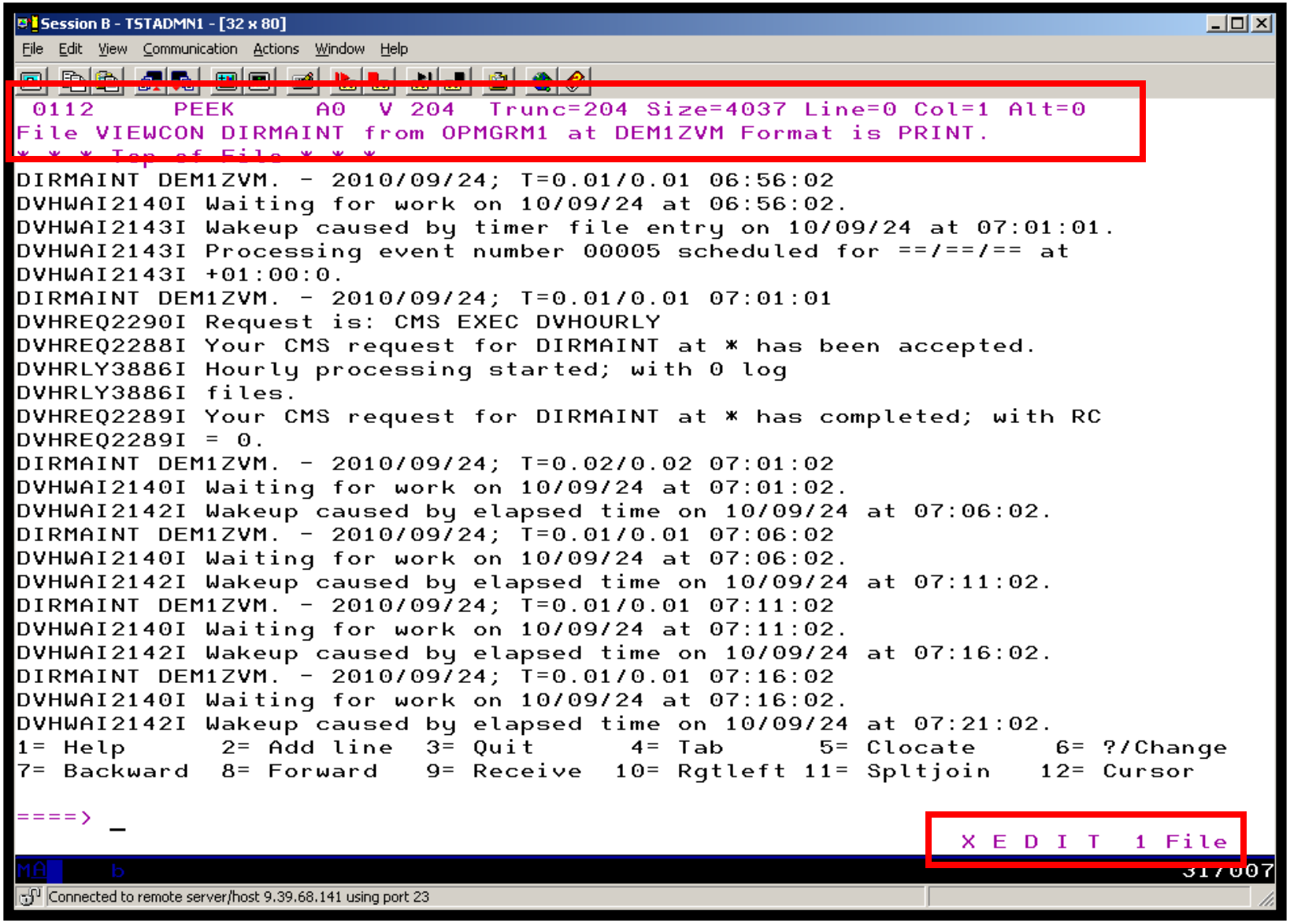

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Scenario 6: How Do You Do That?

Console rule and action in Operations Manager:

```
DEFRULE NAME(DIRMLOG),+
  MATCH(*DVHRLY3895*01AA*),+
  USER(DIRMAINT),+
  ACTION(DIRMLOG)
*
DEFACTN NAME(DIRMLOG),+
  INPUT(AHI),+
  NEXTACTN(DIRMLOGB)
*
DEFACTN NAME(DIRMLOGB),+
  COMMAND(EXEC DIRM1AA &U),+
  ENV(LVM)
```

Authorize Operations Manager to issue DIRM SHUTDOWN – from MAINT issue

```
DIRM AUTHFOR OPMGRM1 CMDLEVEL 150A CMDSET O
```


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Scenario 6: How Do You Do That?

DIRM1AA EXEC (excerpts):

```
Parse Upper Arg Tuser . ;
/* Try to shut DIRMAINT down. */
Say 'DIRM1AA - Issuing DIRM SHUTDOWN ....';
Address CMS 'DIRM SHUTDOWN';

Address Command 'CP LINK' Tuser '1AA' Dev 'MR';
Address CMS 'ACCESS' Dev Fm;

Address Command 'PIPE CMS LISTFILE DIRMAINT *LOG*' Fm '( NOHEADER',
  '| STEM FILES.';
Do I = 1 to Files.0;
  Parse Upper Var Files.I Fn Ft .;
  Address CMS 'SENDFILE' Fn Ft Fm 'TO ARCHLOGS';
  If Rc = 0 then Do;
    Sent = Sent+1;
    Address CMS 'ERASE' Fn Ft Fm;
  End

Address Command 'CP XAUTOLOG' Tuser;
```


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Scenario 7:
Process a File of Test Messages as a Console

- **Create a file containing lines of test messages**
  - Test rules and actions without creating critical conditions
- **Use Operations Manager to send the file for processing**
  - Treat it as the console of one user
  - Send it again treating it as the console of another user
  - Notice triggered rules and actions are different
- **View the “consoles” of these two users**

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Scenario 7: Detailed Steps

- **Create or view a file of test messages**

```
xedit test consdata a
```

  - Notice the “hello” message in the file

- **From a z/VM user ID, send the test file to Operations Manager**
  - Send it twice, specifying two different “owning” user IDs. One generates a message and one doesn’t:

```
gomrsif test consdata a 9.39.64.72 63000 tstadmn8
gomrsif test consdata a 9.39.64.72 63000 tstuser8
```

- **From an authorized z/VM user ID, view the consoles of the owning user IDs:**

```
gomcmd opmgrm1 viewcon user(tstadmn8)
gomcmd opmgrm1 viewcon user(tstuser8)
```


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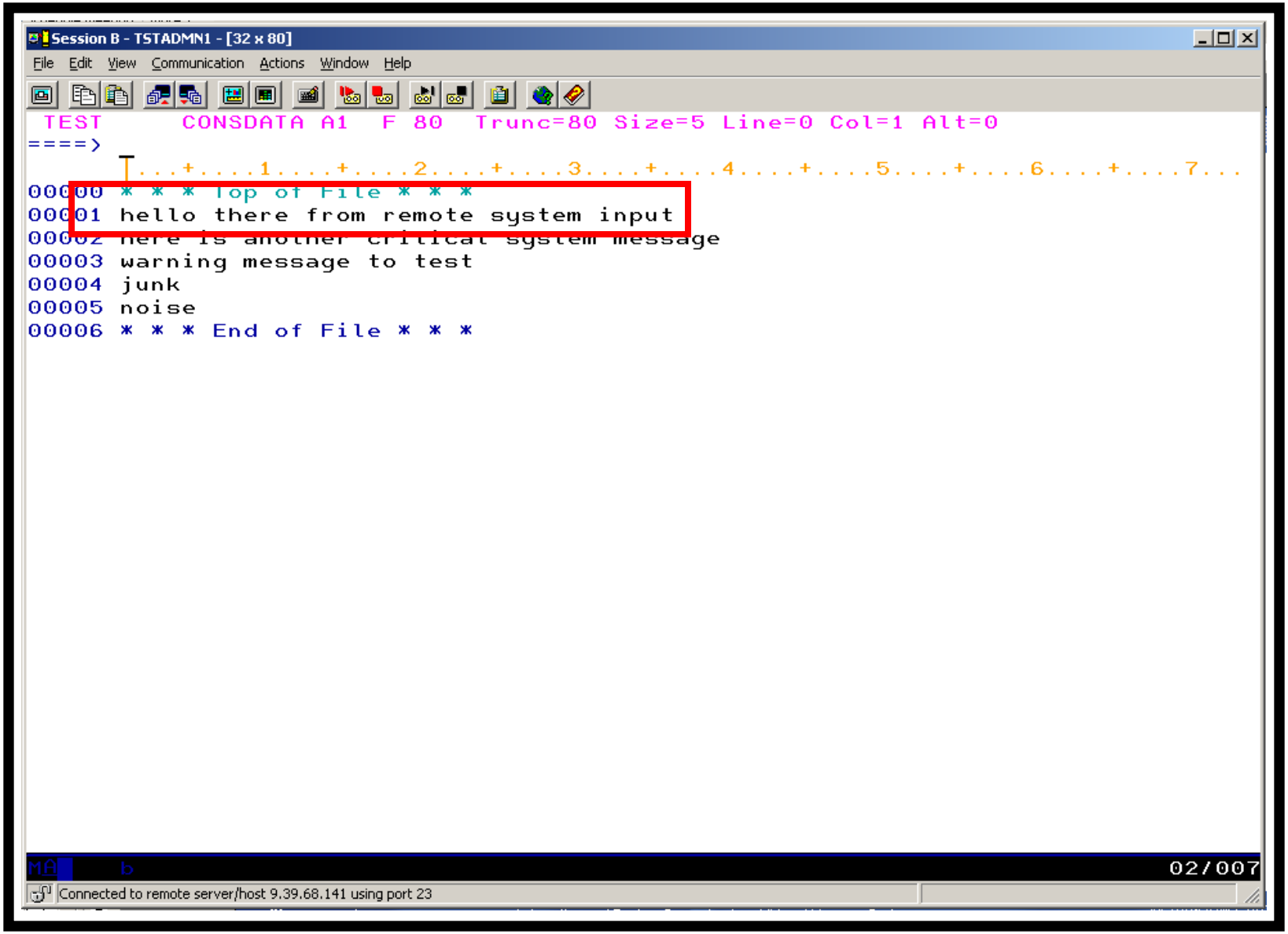

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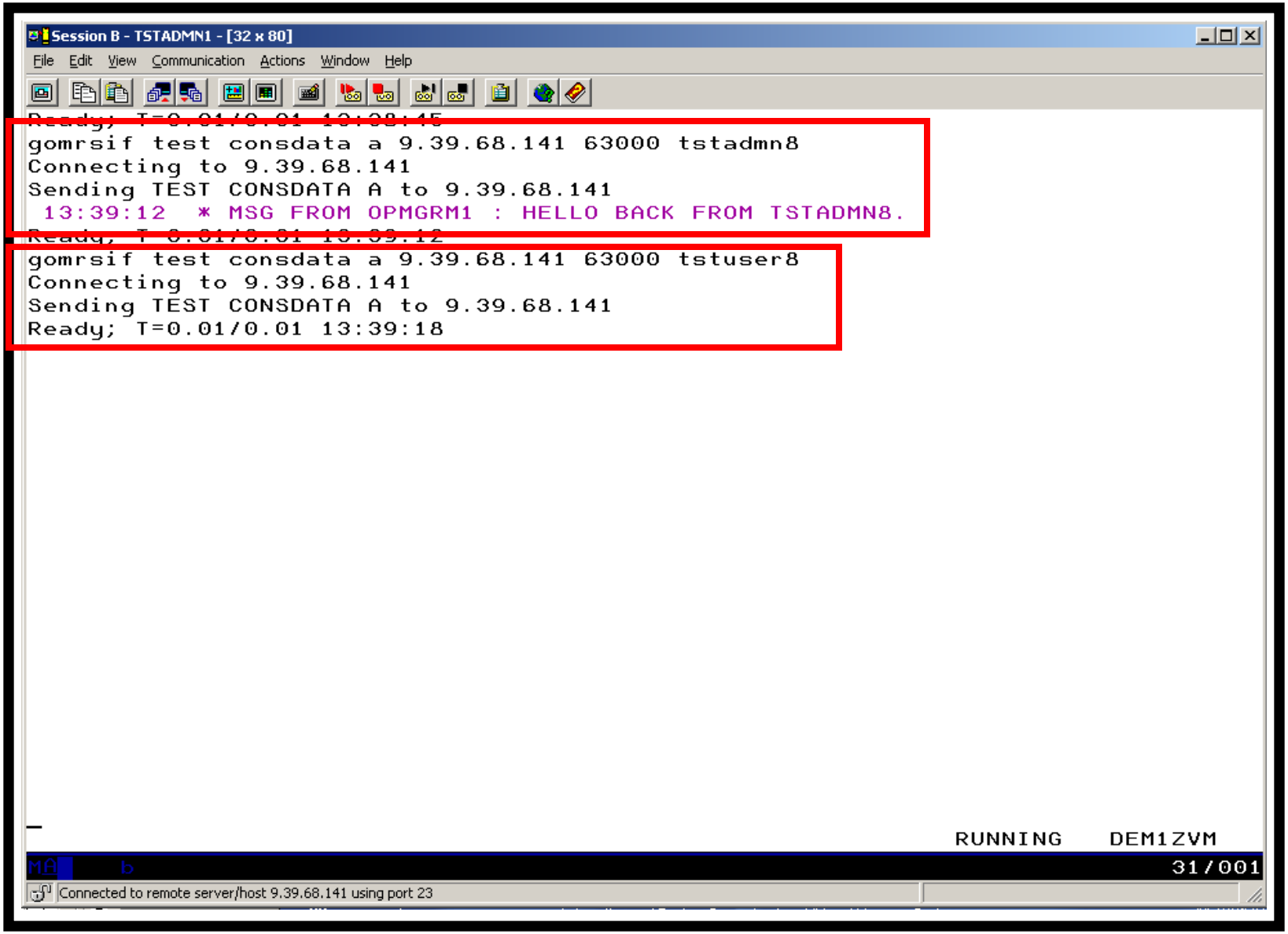

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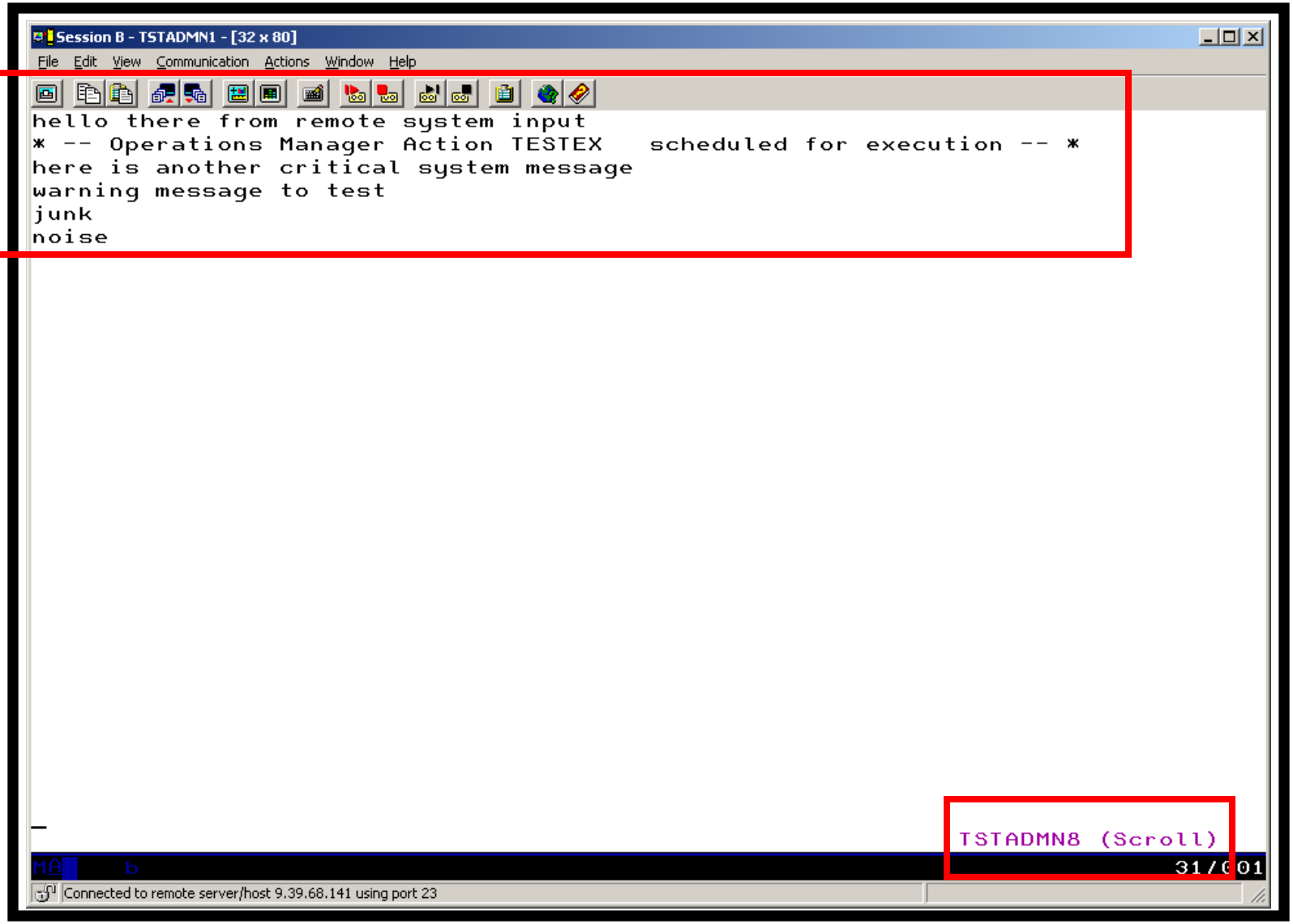

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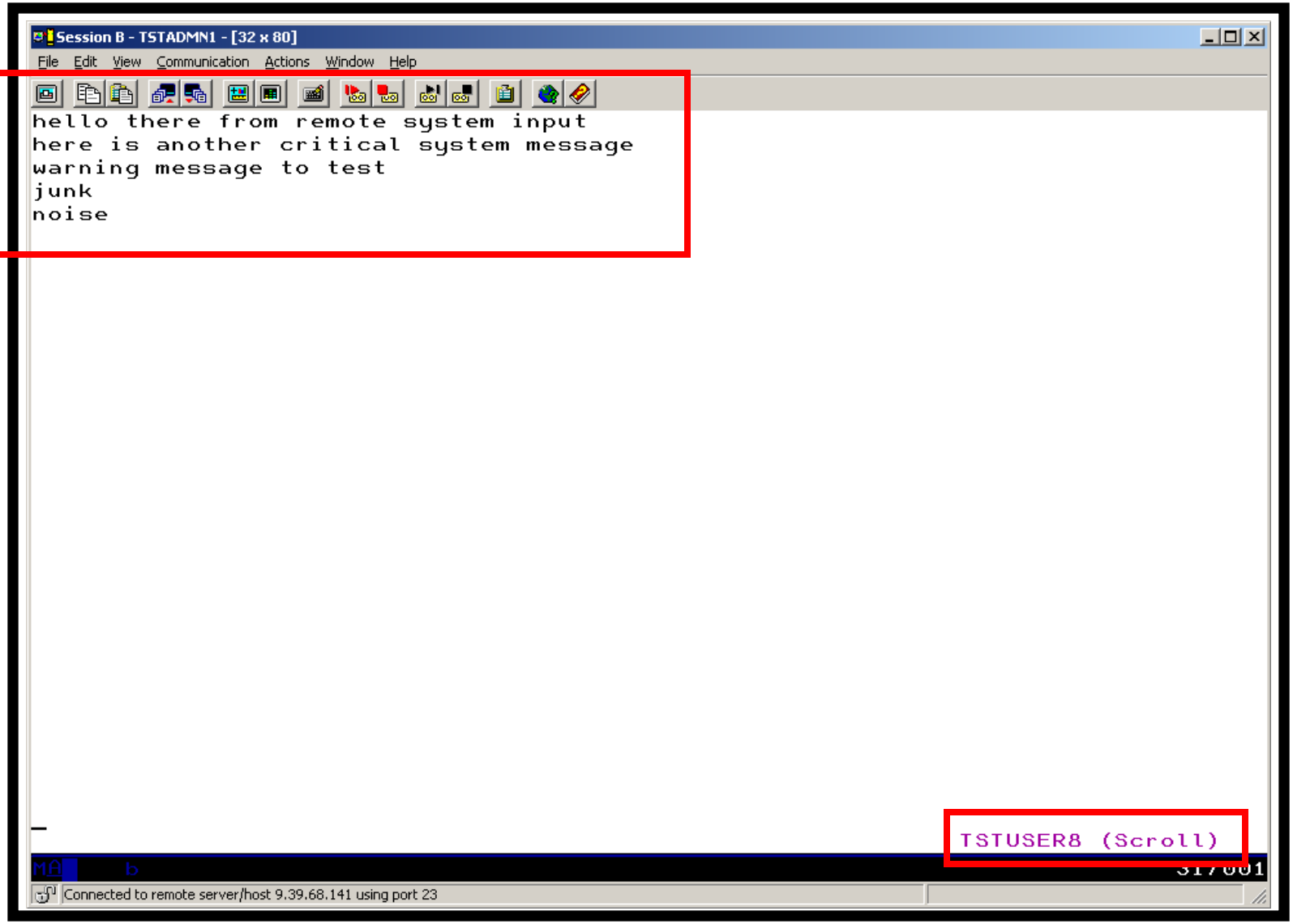

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Scenario 7: How Do You Do That?

Console rule and action in Operations Manager:

```
*
DEFRULE NAME(TESTEX),+
  MATCH(*HELLO*),+
  MCOL(001:030),+
  ACTION(TESTEX),+
  EXGROUP(TSTUSERS)
*
DEFACTN NAME(TESTEX),+
  COMMAND(CP MSG TSTADMN1 HELLO BACK FROM &U.),+
  OUTPUT(LOG),+
  ENV(LVM)
```


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Scenario 7: How Do You Do That?

Set up TCP/IP listener for test data and define group of consoles:

```
*
DEFTCPA NAME(TESTDATA),+
  TCPUSER(TCPIP),+
  TCPAPPL(GOMRSIF),+
  TCPADDR(000.000.000.000),+
  TCPPORT(63000)
*
DEFGROUP NAME(TSTUSERS),+
  USER(TSTUSER*)
```

Update TCP/IP configuration to allow Operations Manager to listen on the specified port

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Scenario 8: Process Linux Syslog Data as a Console

- **Route syslog data from a Linux guest to Operations Manager for z/VM**
  - Supports syslog and syslog-ng
  - syslog-ng includes hostname or IP address in message
- **Treat it as the console of a “fake” user ID**
- **Trigger rules and actions based on syslog data**
- **View the “console” containing syslog data**
- **Option to create one console per syslog or combine multiple syslogs into one console**

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Scenario 8: Detailed Steps

- **From an authorized z/VM user ID, view any syslog data already received**

```
gomcmd opmgrm1 viewcon user(lxsyslog)
```

- **Use PUTTY to connect to a Linux guest**
- **Login as root and issue the command**

```
logger here is a critical test message from SHARE
```

- **Return to the VIEWCON session**
  - See the message in the syslog “console”
  - Using syslog, so no hostname or IP address
- **Repeat from a different Linux guest that uses syslog-ng**

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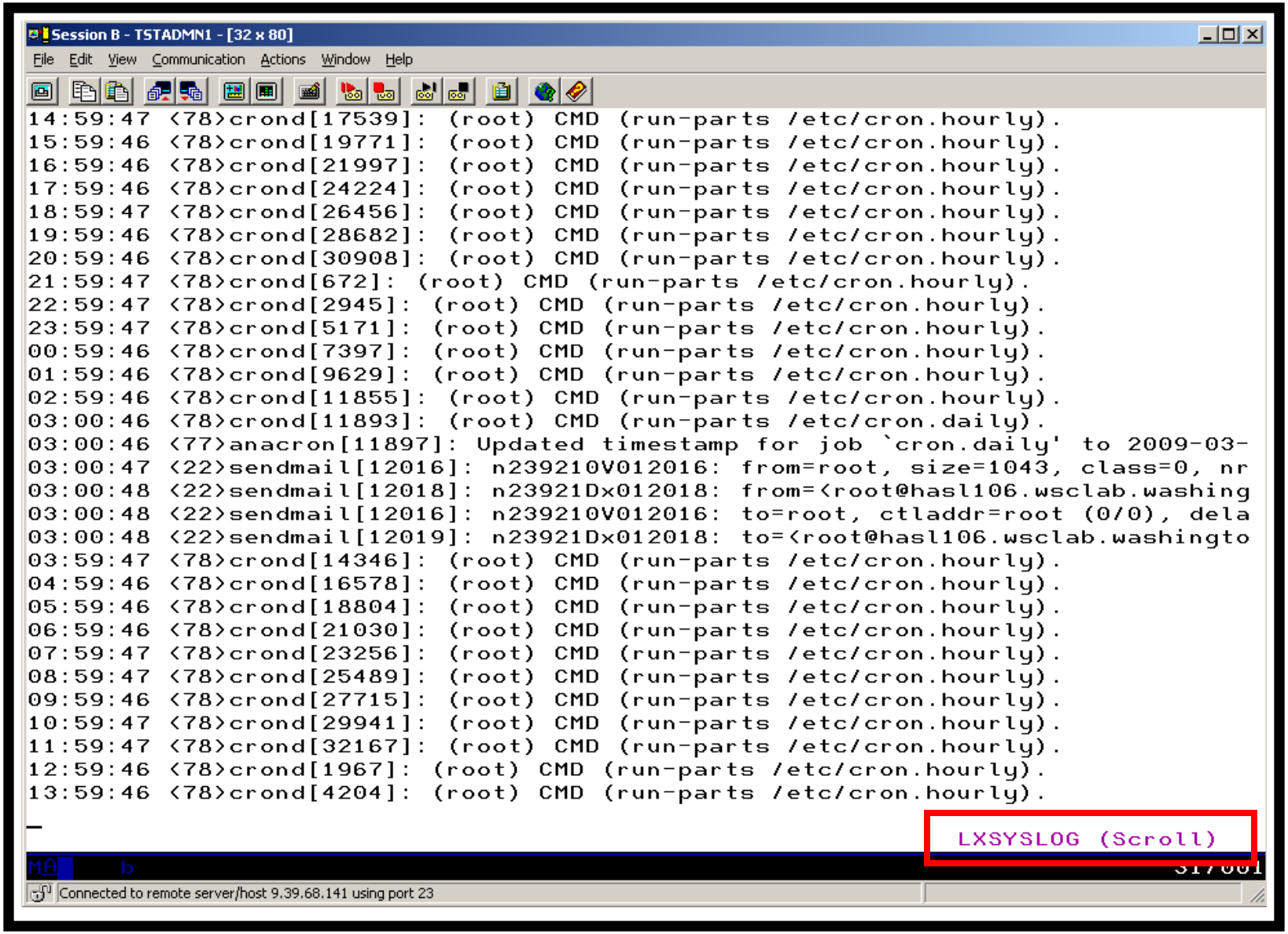

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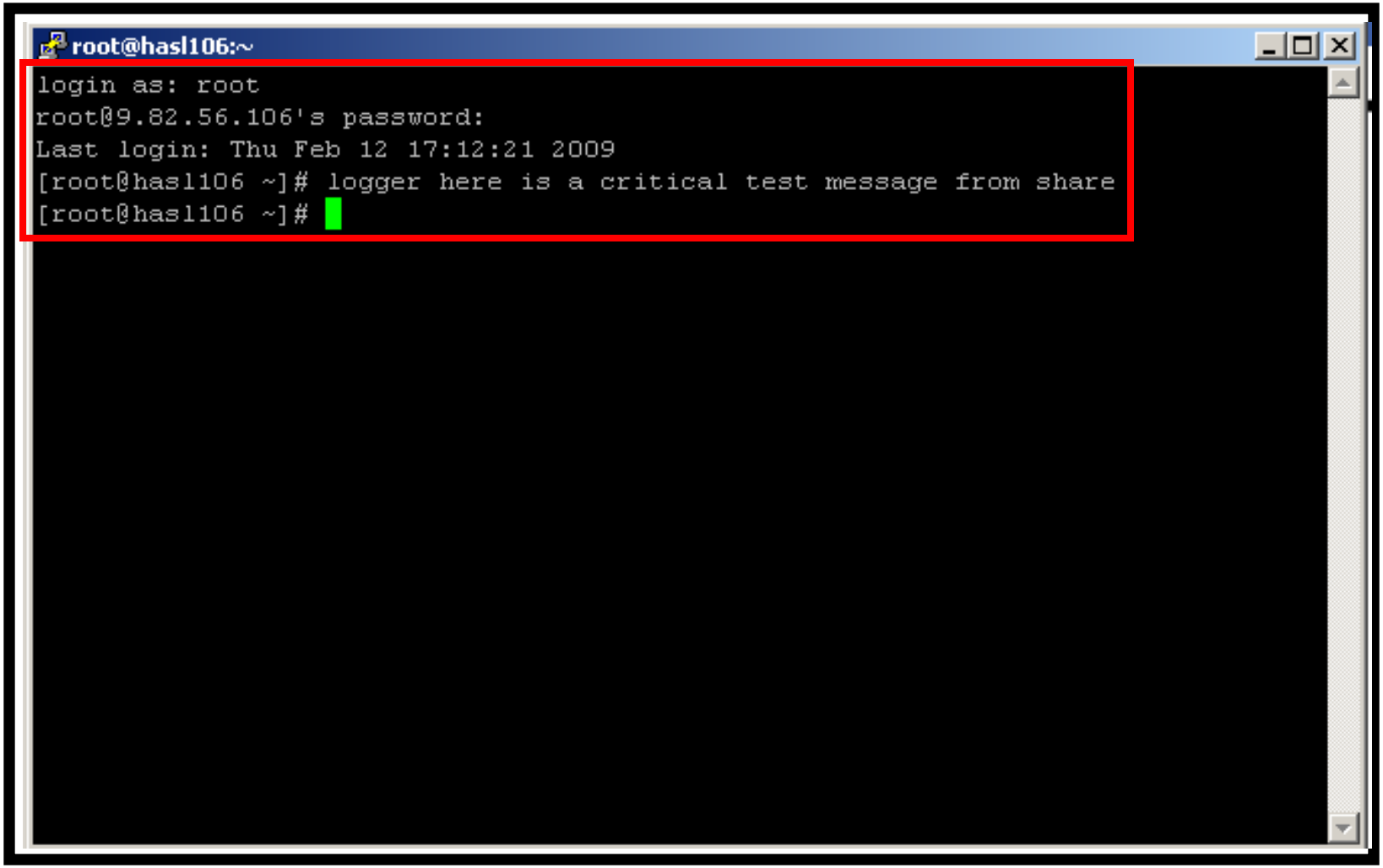

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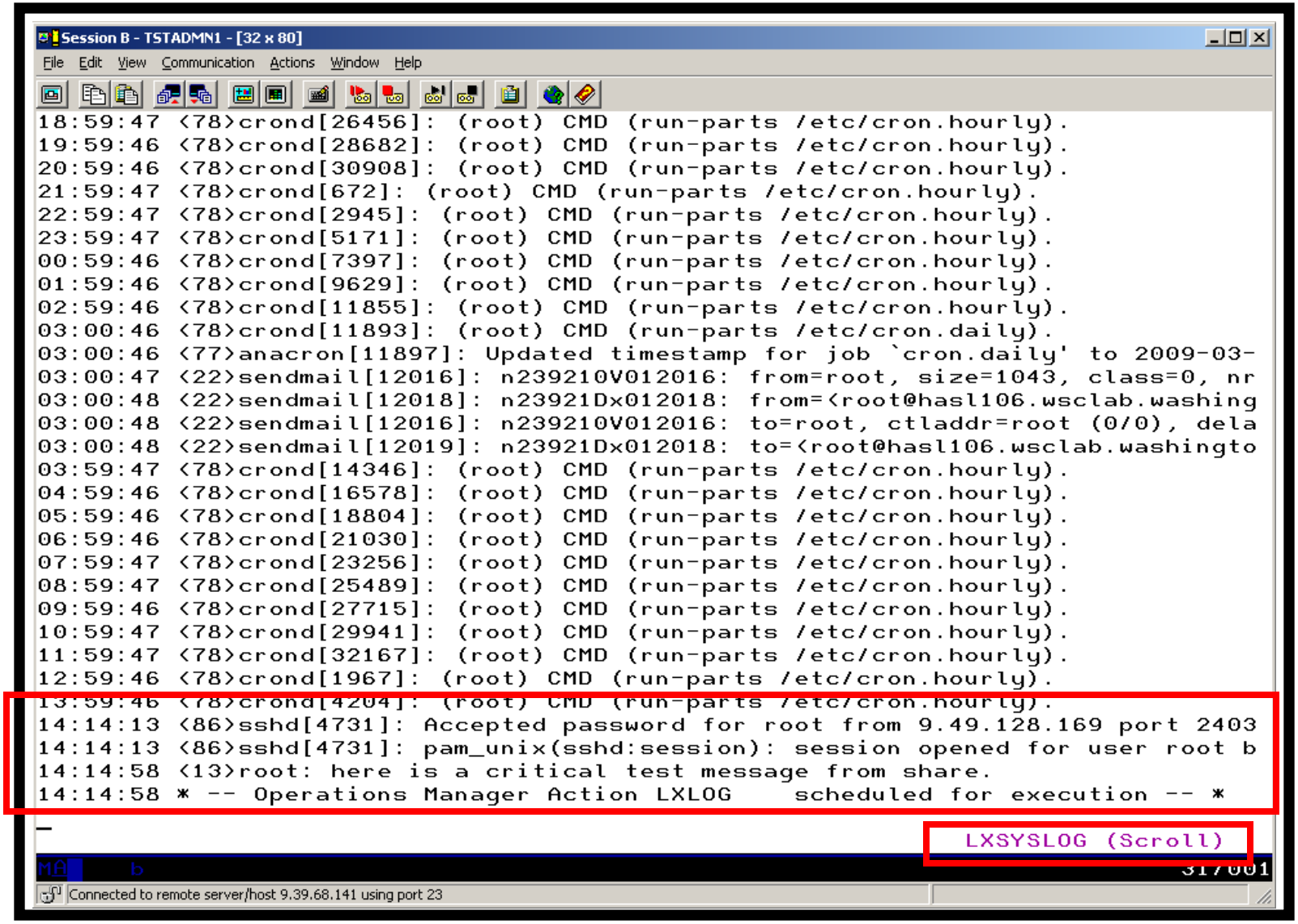

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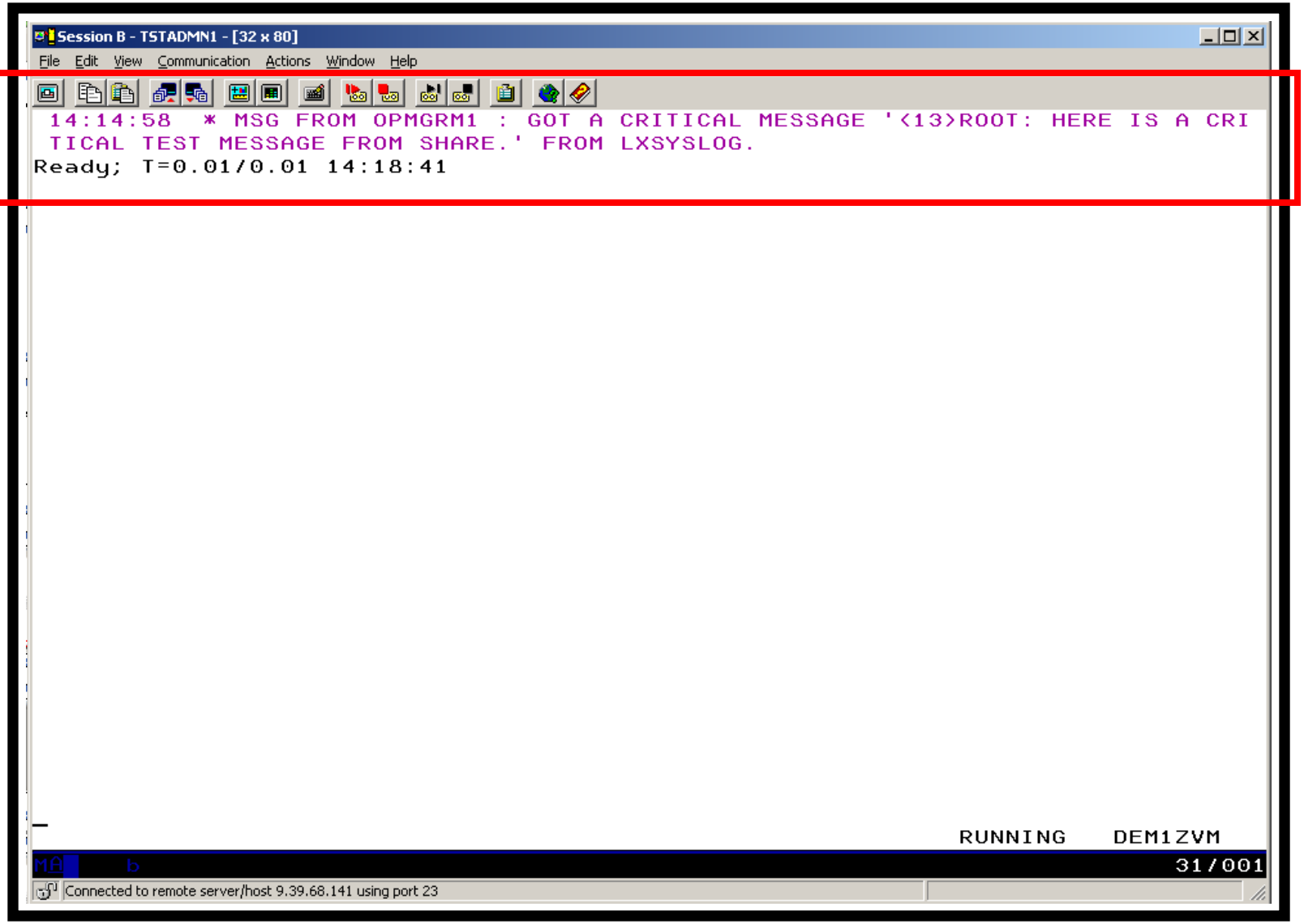

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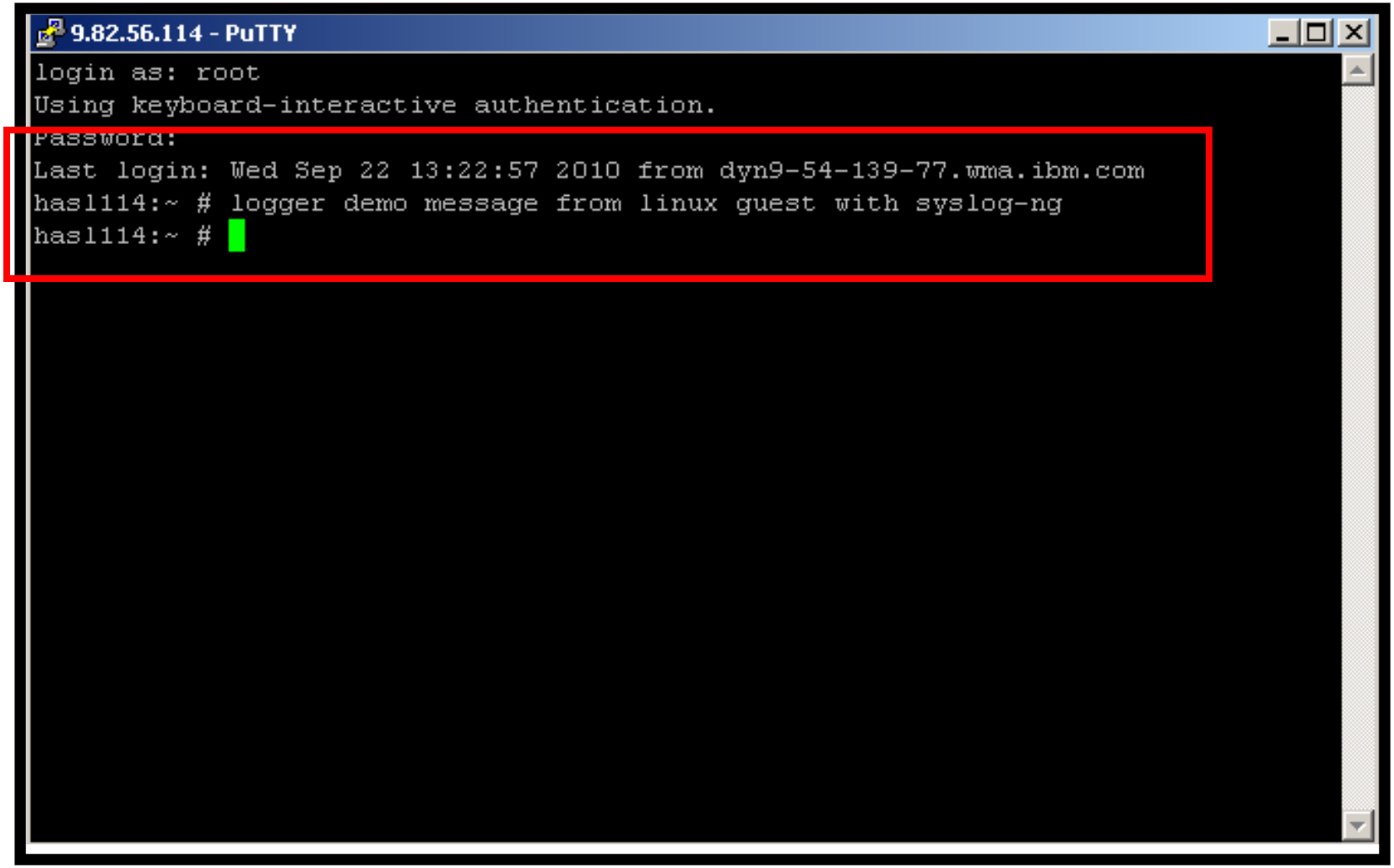

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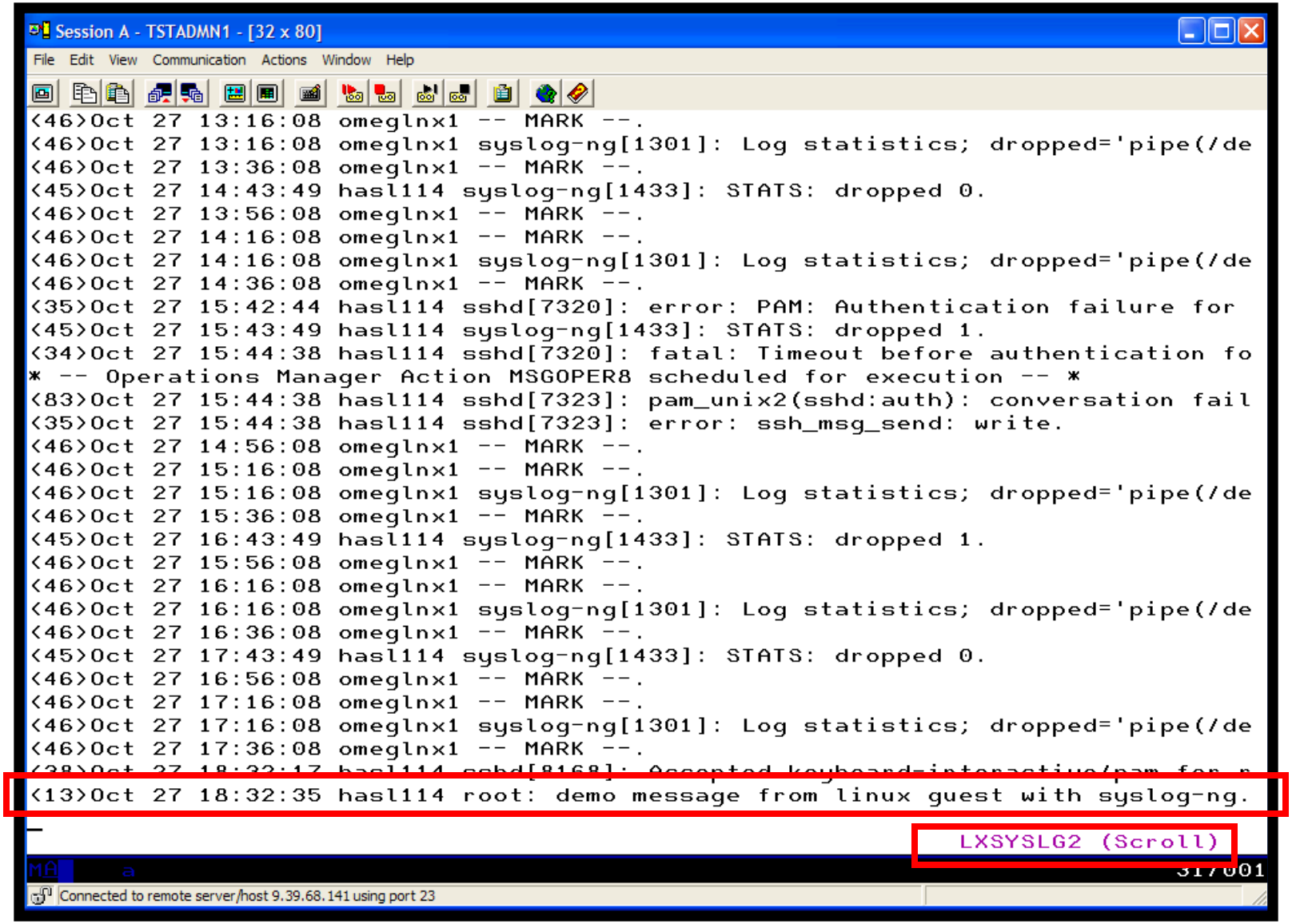

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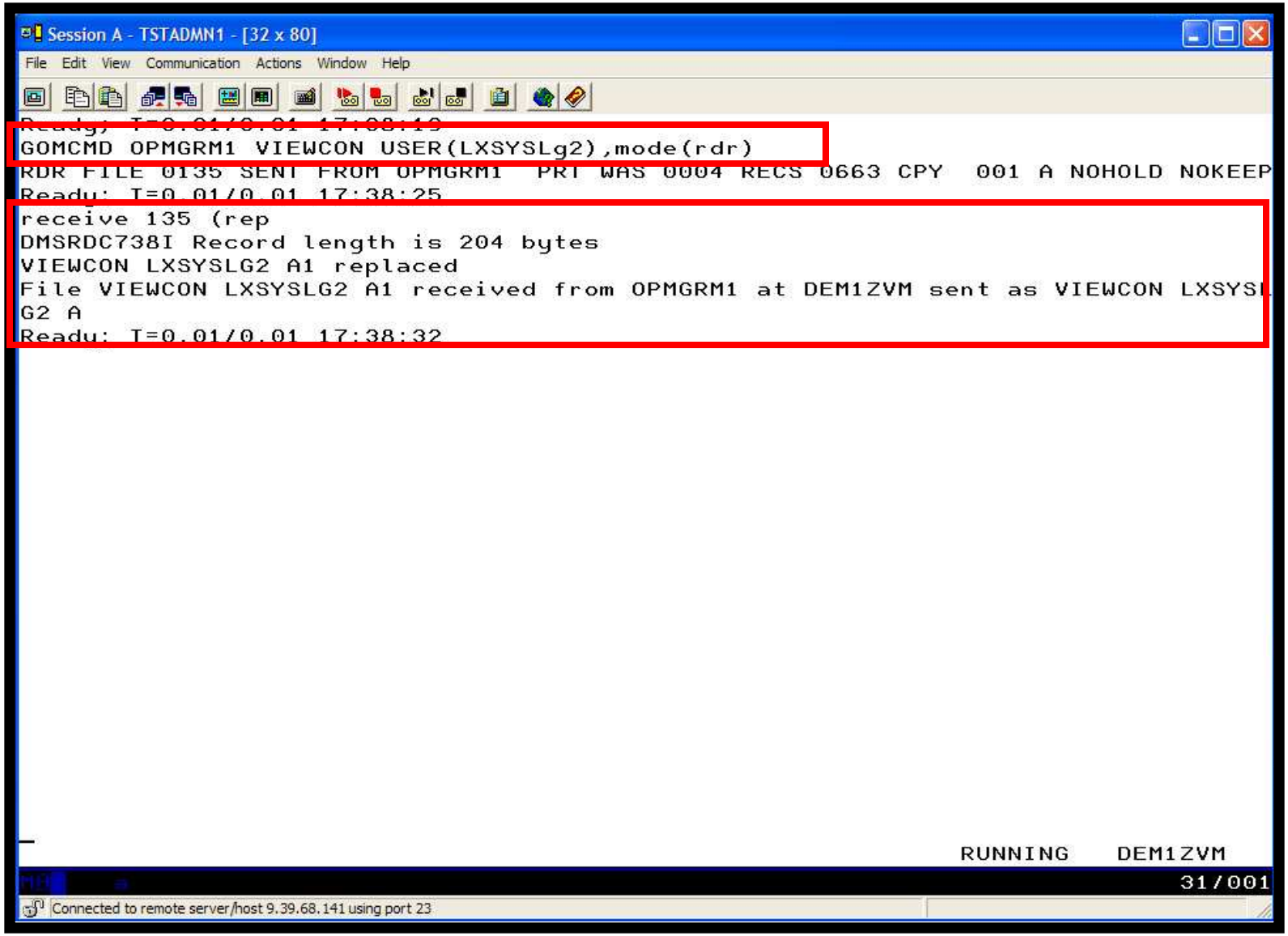

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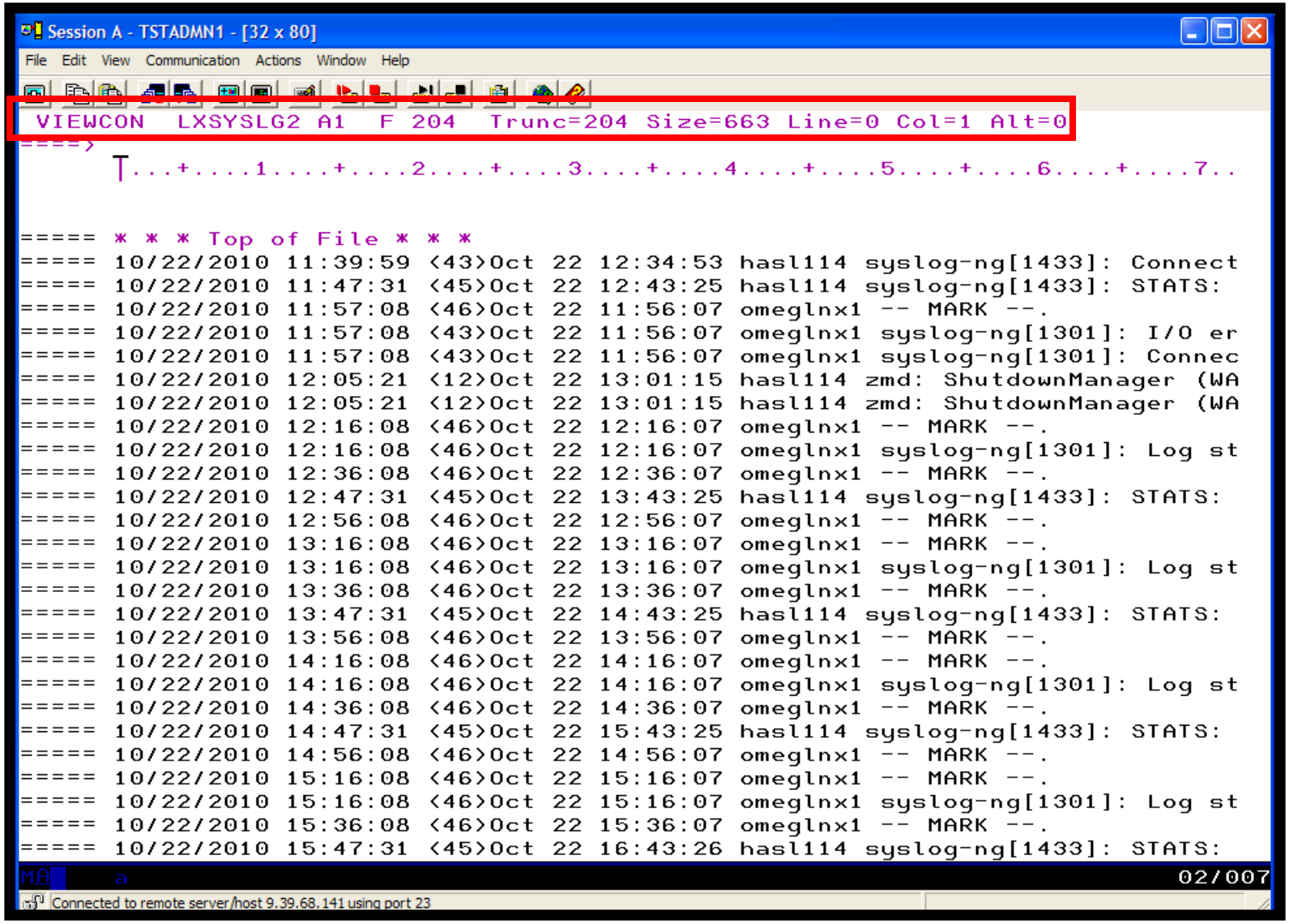

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Scenario 8: How Do You Do That?

Console rule and action in Operations Manager:

```
*
DEFRULE NAME(LXLOG),+
  MATCH(*critical test message*),+
  ACTION(LXLOG),+
  USER(LXSYSLOG)
*
DEFACTN NAME(LXLOG),+
  COMMAND(CP MSG TSTADMN1 Got a critical message '&T' from &U.),+
  OUTPUT(LOG),+
  ENV(LVM)
```


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Scenario 8: How Do You Do That?

- **Set up TCP/IP listener for syslog data**

```
*
DEFTCPA NAME(LNXSYSLG),+
  TCPUSER(TCPIP),+
  TCPAPPL(GOMRSYL),+
  TCPADDR(000.000.000.000),+
  TCPPORT(00514),+
  PARM(LXSYSLOG03330417UTF8)
*
DEFTCPA NAME(LNXSYSL2),+
  TCPUSER(TCPIP),+
  TCPAPPL(GOMRSYL),+
  TCPADDR(000.000.000.000),+
  TCPPORT(00515),+
  PARM(LXSYSLG203330417UTF8)
```

- **Update TCP/IP configuration to allow Operations Manager to listen for UDP traffic on the specified port(s)**
  - Ports 514 and 515 used here
- **Update the Linux guest to send its syslog data to the IP address and port of your z/VM system**

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Scenario 9:
Create a Central Operations Console on One z/VM System

- **Use Operations Manager to watch for error, warning, fatal messages on service machine consoles**
  - DIRMAINT, TCP/IP, RACF, etc.
  - Linux guests
  - Linux syslog
- **Route these messages to a central operations console**
- **Operations staff watches operations console for signs of trouble**
  - View individual service machine consoles for more details when needed

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Scenario 9: Detailed Steps

- **From an authorized z/VM user ID, put “abend”, “fatal”, and error messages on DIRMAINT console**

```
msgnoh dirmaint this is a test abend message
msgnoh dirmaint this is a fake fatal message
msgnoh dirmaint DMSxxxxxxE here is a made-up CMS error msg
```

- **View the “Operations Console” to see the messages**

```
gomcmd opmgrm1 viewcon user(oper8)
```

- **Note the fatal message is red and abend message is highlighted and will be held when other messages come in**

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Scenario 9: Detailed Steps

- **From another user ID, run an EXEC to send multiple messages to the Operations Console**

```
lotsmsgs
```

- **View the “Operations Console” to see the messages**

```
gomcmd opmgrm1 viewcon user(oper8)
```

- **Watch the scrolling, held messages, etc.**

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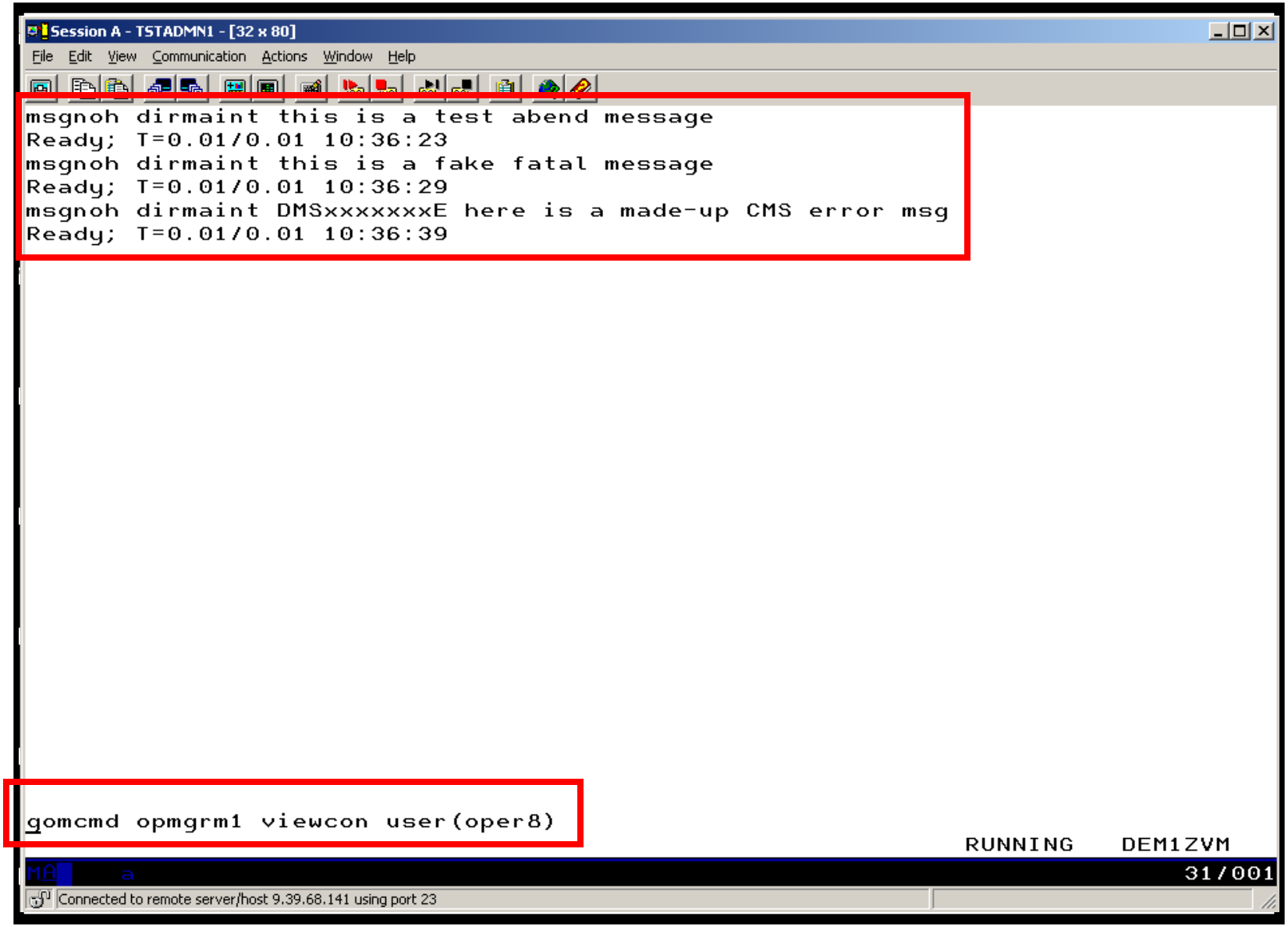

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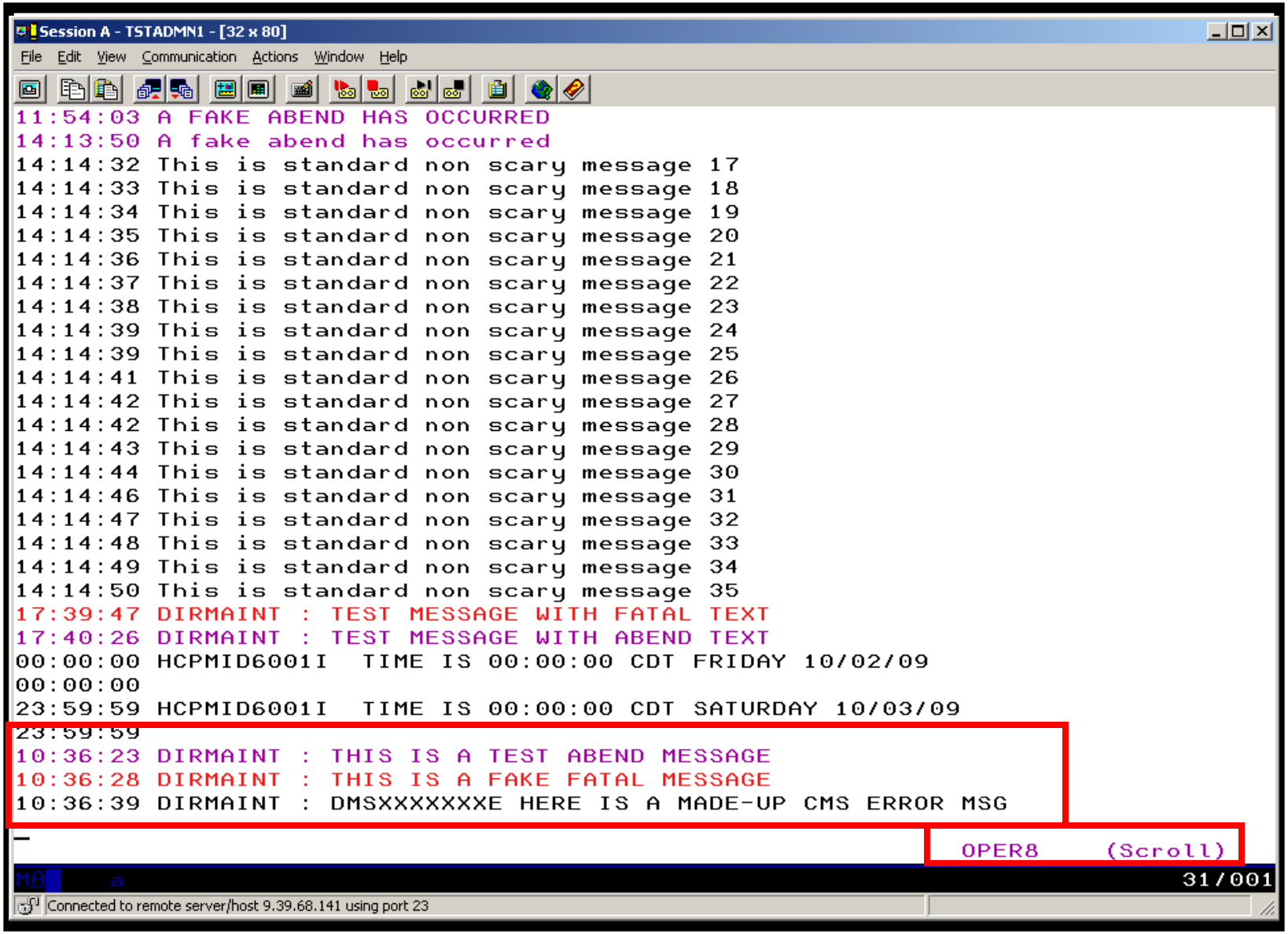

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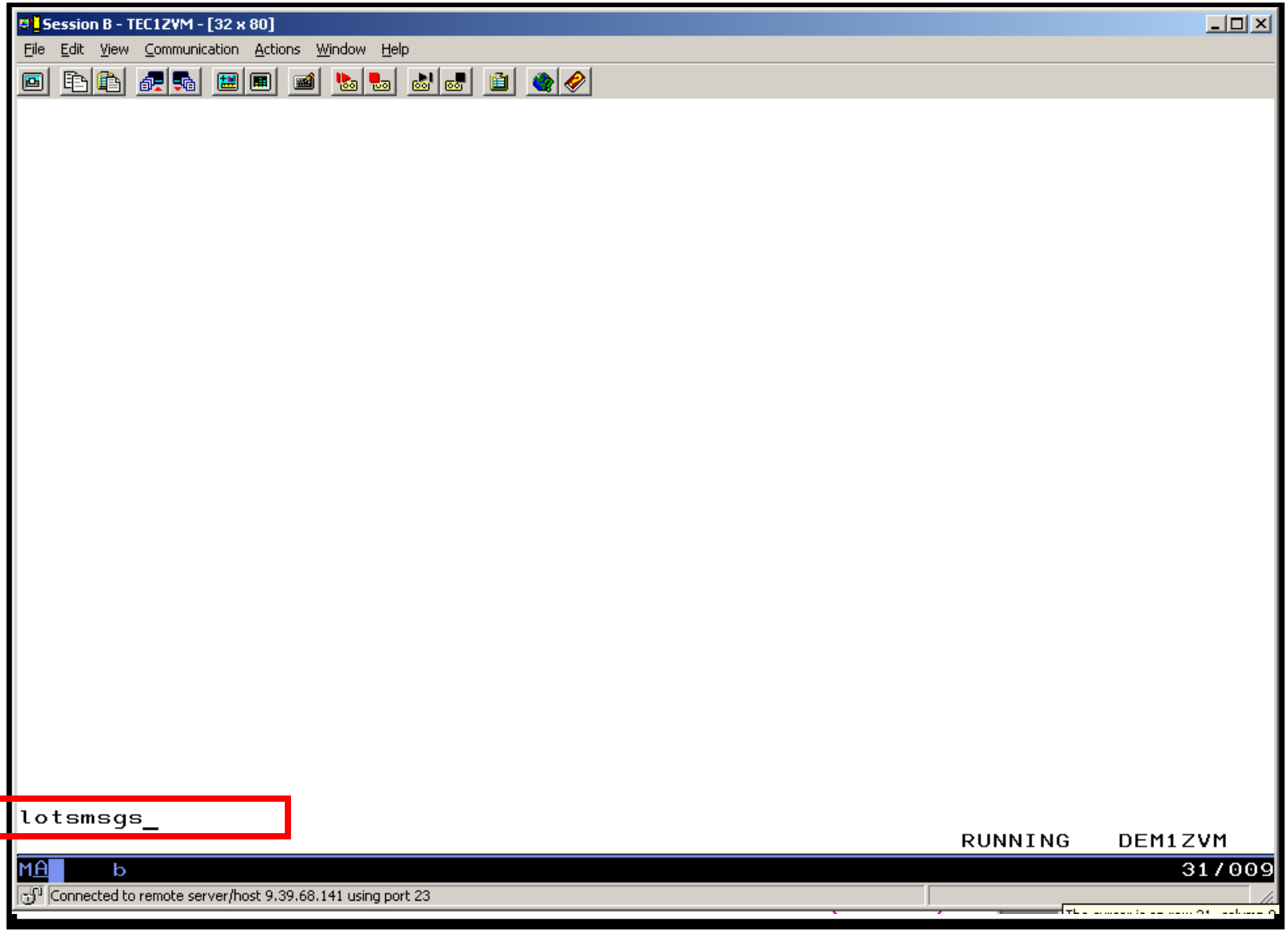

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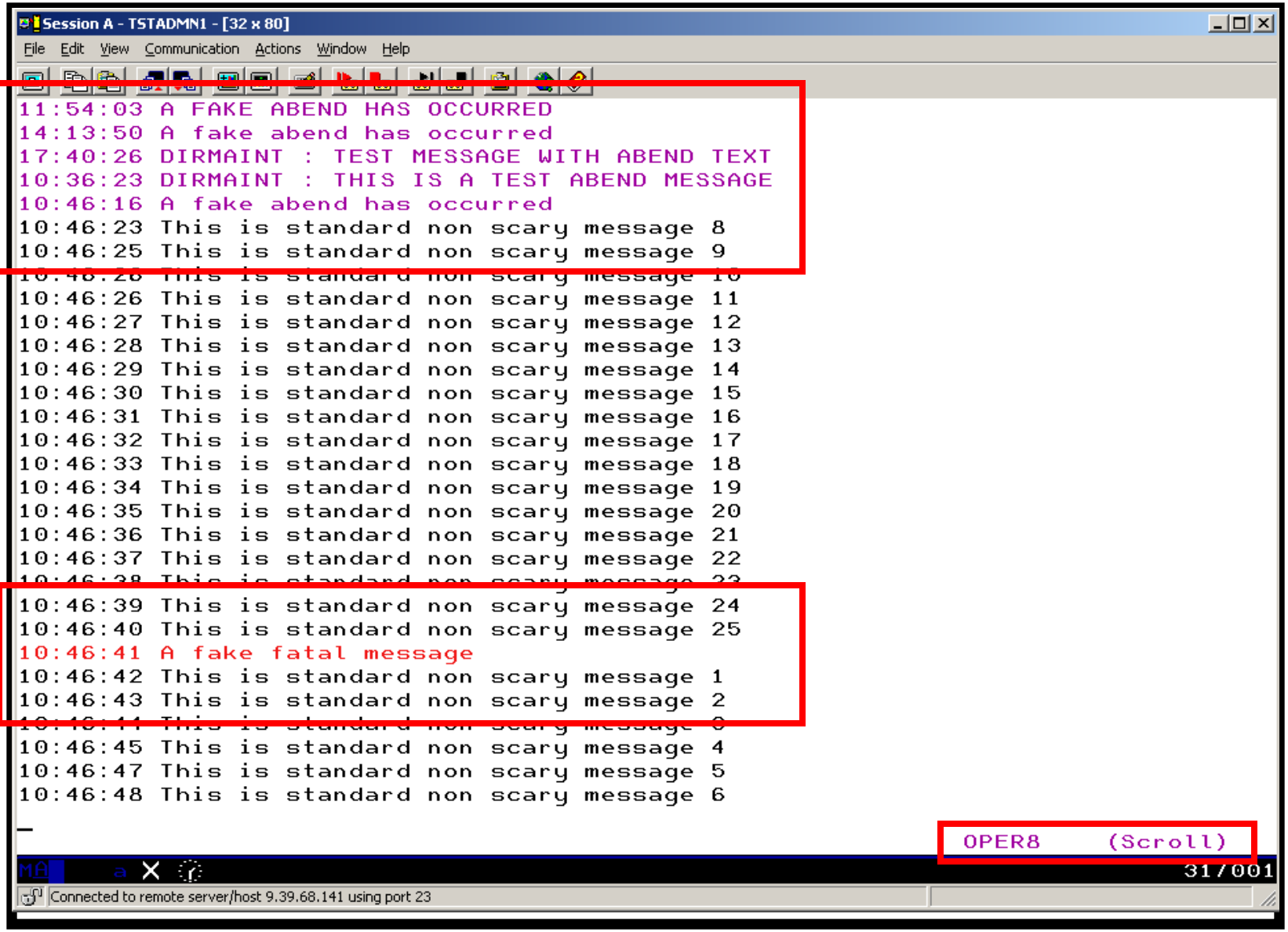

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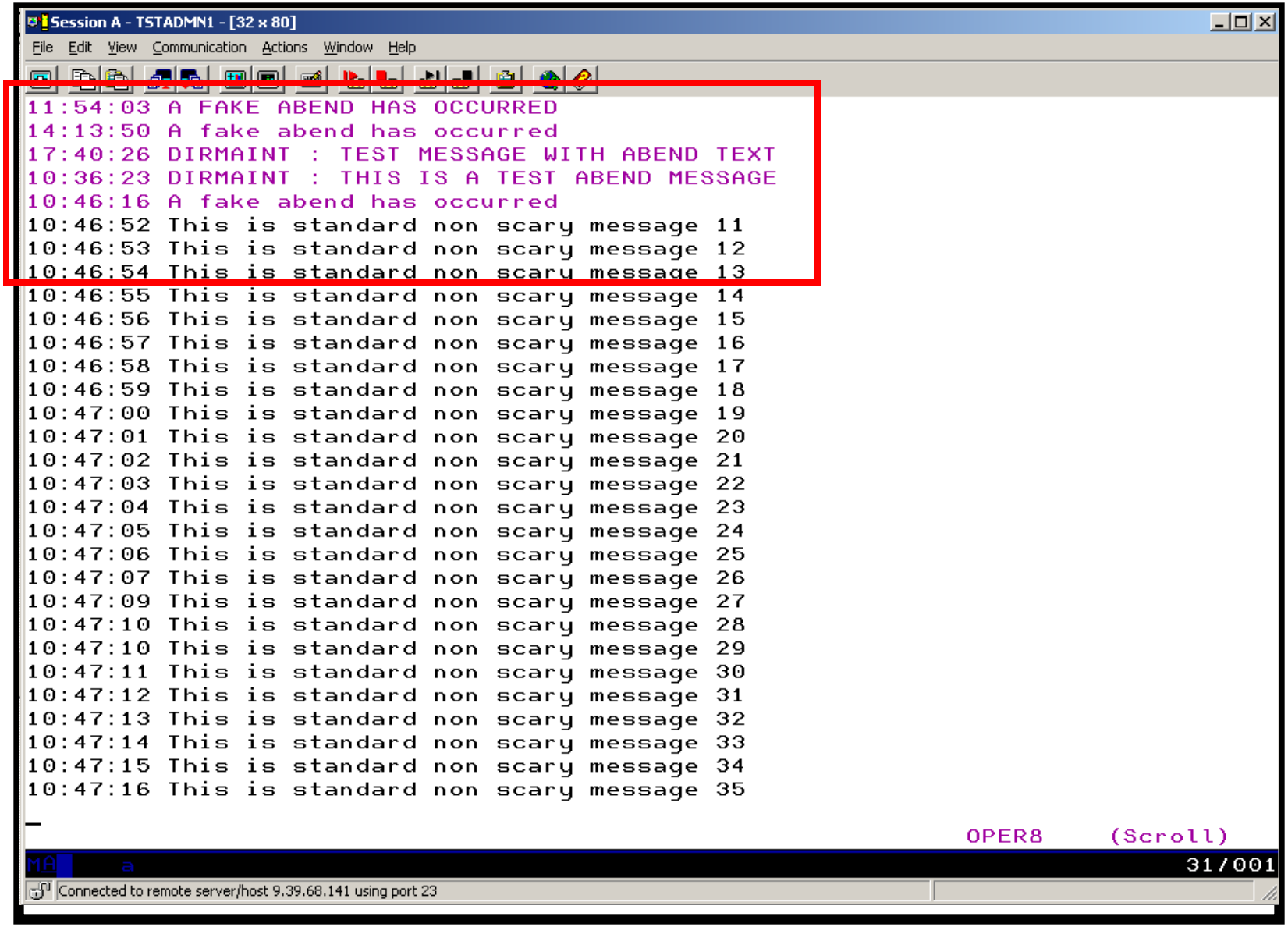

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Scenario 9: How Do You Do That?

Console rules in Operations Manager:

```
*
DEFRULE NAME(ABEND),+
  MATCH(*abend*),+
  EXUSER(OPER8),+
  ACTION(MSGOPER8)
*
DEFRULE NAME(FATAL),+
  MATCH(*fatal*),+
  EXUSER(OPER8),+
  ACTION(MSGOPER8)
*
DEFRULE NAME(EMSGS),+
  MATCH(DMS*E),+
  MCOL(001:011),+
  EXUSER(OPER8),+
  ACTION(MSGOPER8)
```

Action in Operations Manager:

```
*
DEFACTN NAME(MSGOPER8),+
  COMMAND(CP MSGNOH OPER8 &U : &T),+
  OUTPUT(LOG),+
  ENV(LVM)
```


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Scenario 9: How Do You Do That?

Console rules in Operations Manager:

```
*
DEFRULE NAME(ABENDHLT),+
  MATCH(*abend*),+
  USER(OPER8),+
  ACTION(HLTHOLD)
*
DEFRULE NAME(FATALRED),+
  MATCH(*fatal*),+
  USER(OPER8),+
  ACTION(RED)
```

Actions in Operations Manager:

```
*
DEFACTN NAME(HLTHOLD),+
  INPUT(AHI,HLD)
*
DEFACTN NAME(HILITE),+
  INPUT(AHI)
*
DEFACTN NAME(RED),+
  INPUT(CRE)
```


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Scenario 10:
Create a Central Operations Console across multiple z/VM systems

- **Use Operations Manager to watch for error, warning, fatal messages on service machine consoles on one or more systems**
  - OPERATOR, DIRMAINT, TCP/IP, RACF, etc.
  - Linux guests
  - Linux syslog
- **Route these messages to a central operations console on one of the z/VM system**
- **Operations staff watches one operations console for signs of trouble across multiple z/VM systems**
  - View individual service machine consoles for more details when needed

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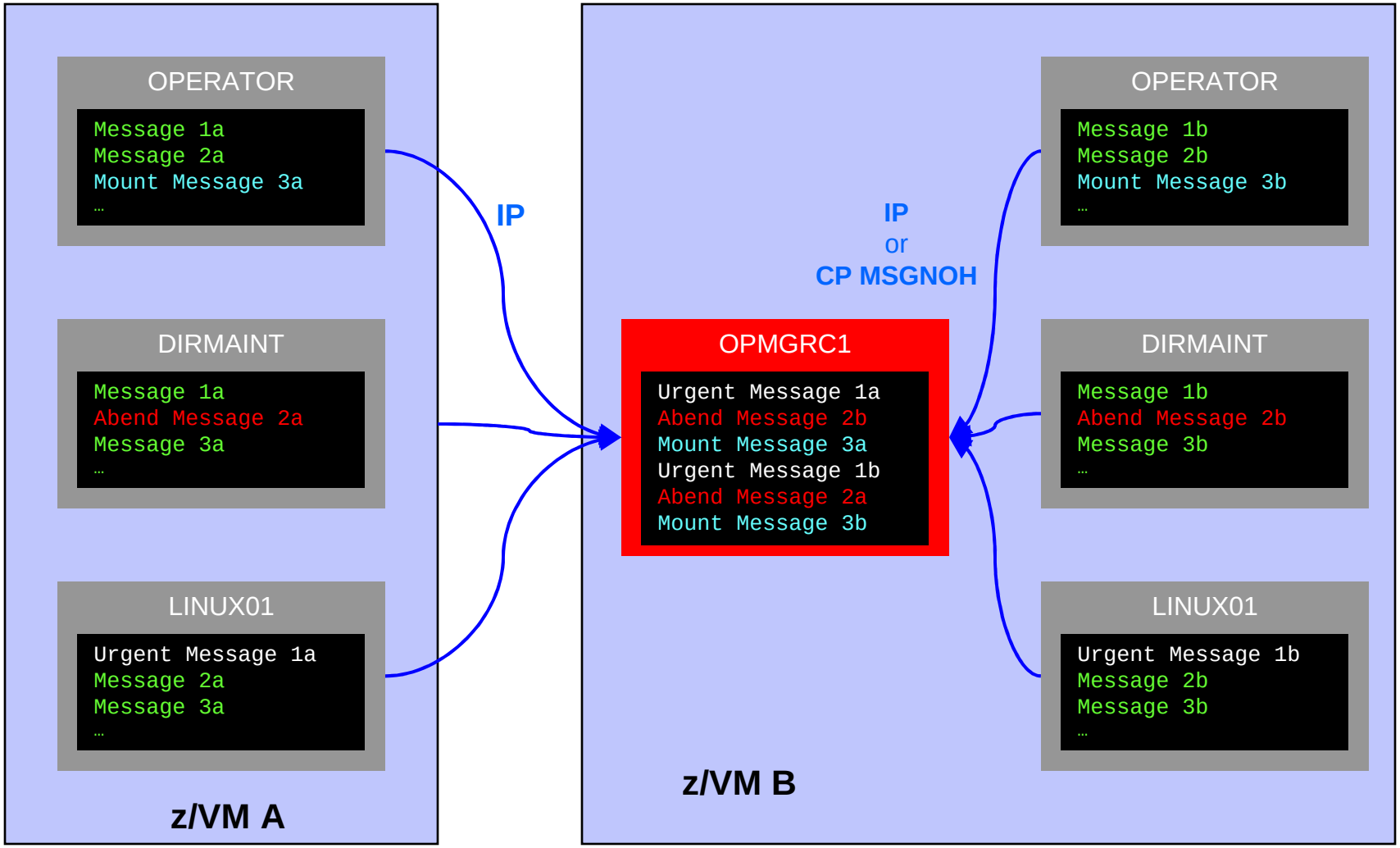
Creating a Central Console Across Multiple LPARs



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Scenario 10: Detailed Steps

- **On System A (DEM1ZVM) put an “error” message on the OPERATOR console**
  - Must contain the text “remote error”

```
msgnoh operator here is a remote error message
```

- **View the “Operations Console” (user ID OPMGRC1) on System B (ZVMV5R40) to see the message**

```
gomcmd opmgrm1 viewcon user(opmgrc1)
```

- **Note the message received on OPMGRC1 on ZVMV5R40 from OPERATOR on DEM1ZVM**

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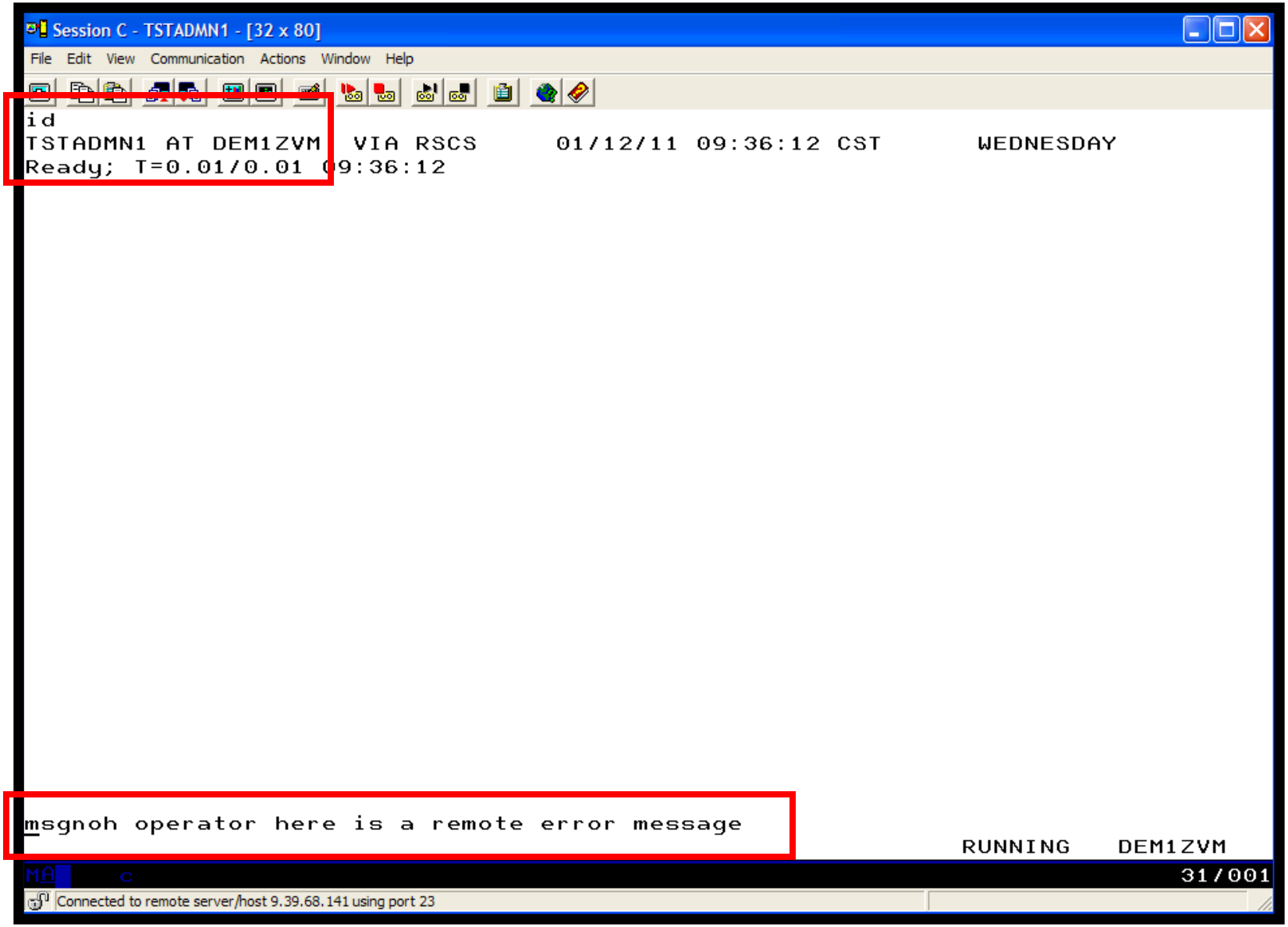

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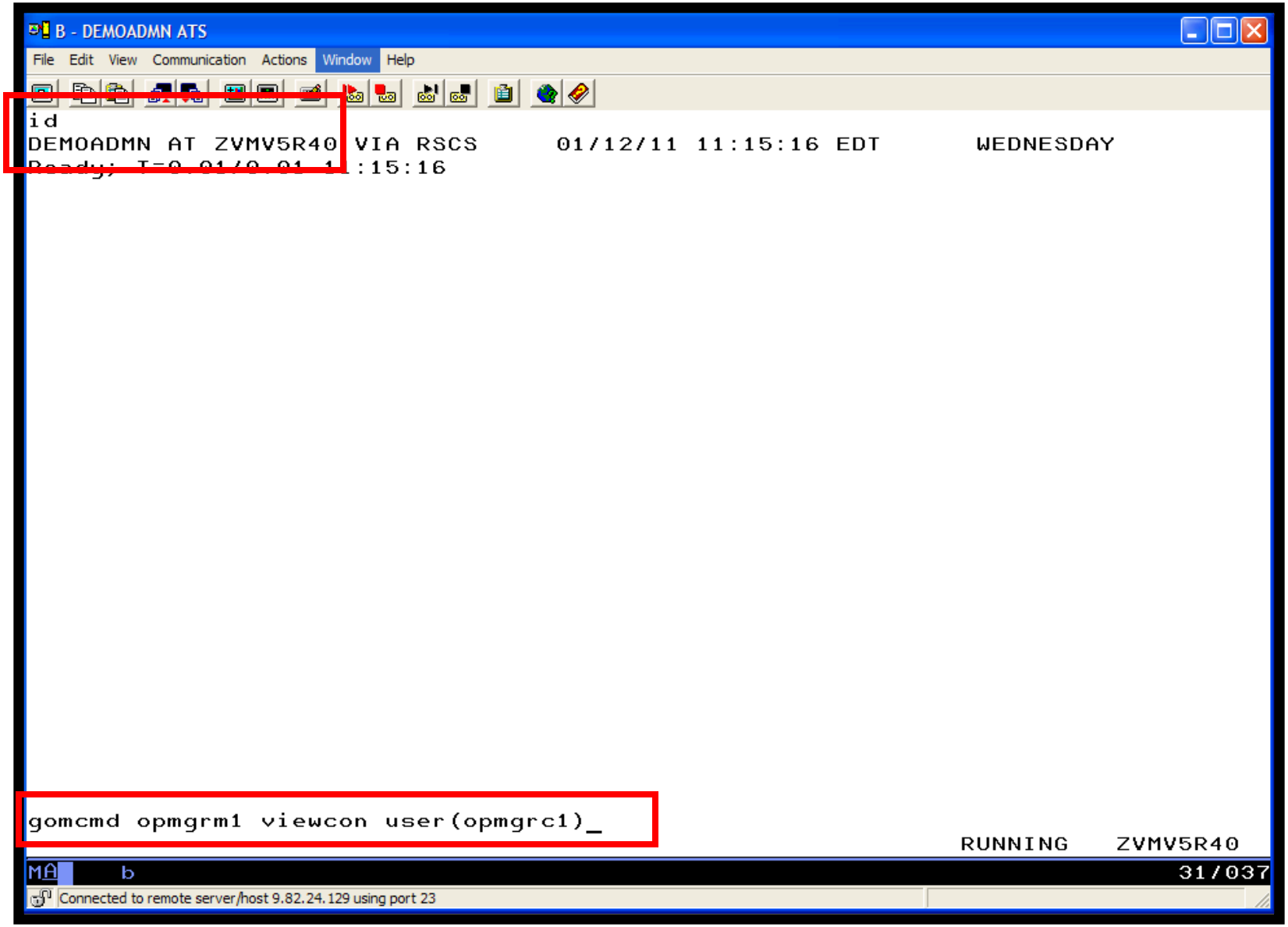

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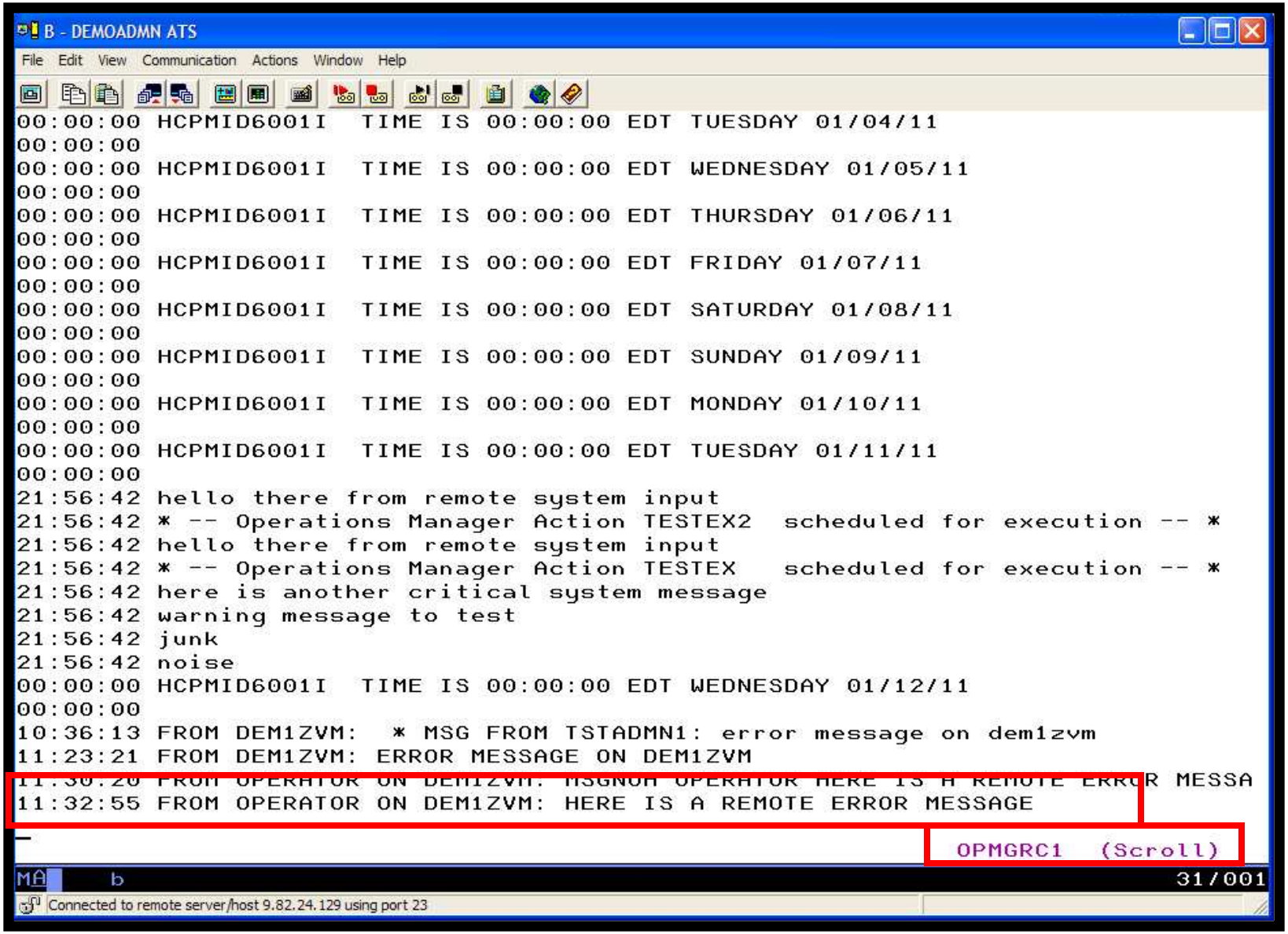

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Scenario 10: How Do You Do That?

Console rule in Operations Manager on System A:

```
*
DEFRULE NAME(OPERMSGS),+
  MATCH(*remote error*),+
  USER(OPERATOR),+
  ACTION(MSG2GBRG)
```

Action in Operations Manager on System A:

```
*
DEFACTN NAME(MSG2GBRG),+
  COMMAND(EXEC MSG2OPS OPMGRC1 From &u on DEM1ZVM: &t),+
  OUTPUT(LOG),+
  ENV(LVM)
```


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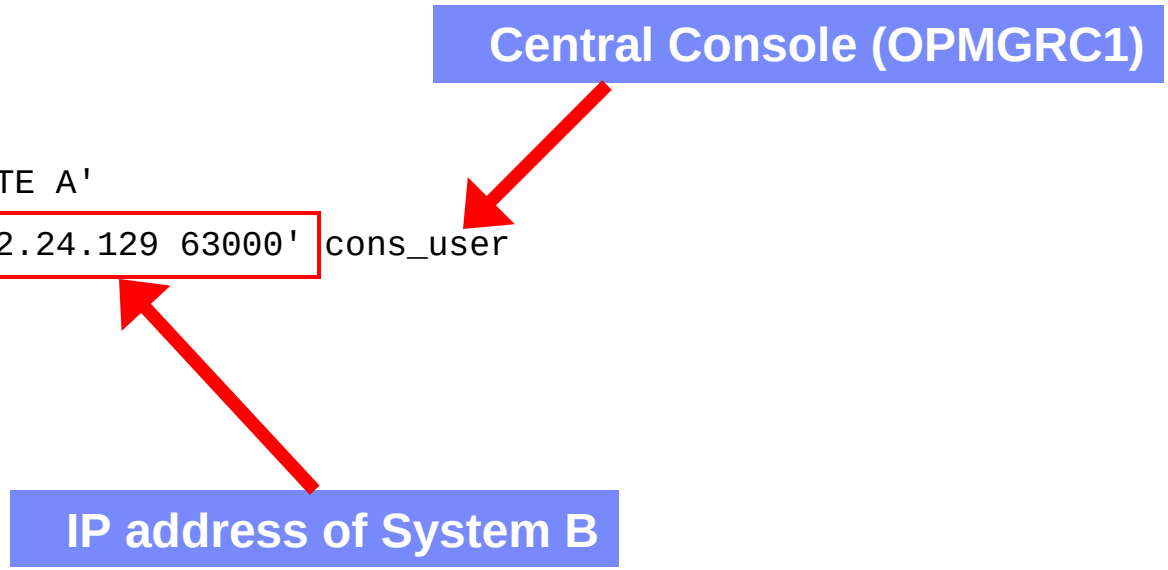
Scenario 10: How Do You Do That?

MSG2OPS EXEC on System A:

```
/*  Send a message to a console in Ops Mgr on another system        */
/*                                                                  */
trace r
Address Command
Parse arg cons_user msgtext
'PIPE var msgtext | > TEMP NOTE A'
'EXEC GOMRSIF TEMP NOTE A 9.82.24.129 63000' cons_user
Exit
```



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Scenario 10: How Do You Do That?

TCP/IP listener definition in Operations Manager on System B:

```
*
DEFTCPA NAME(TESTDATA),+
  TCPUSER(TCPIP),+
  TCPAPPL(GOMRSIF),+
  TCPADDR(000.000.000.000),+
  TCPPORT(63000)
```

- **May also need to update TCP/IP on System B to allow Operations Manager to listen on port 63000**
- **Can alternatively use TELL (instead of GOMRSIF) to send messages from System A to System B, but requires RSCS**

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Scenario 11
Integration with OMEGAMON XE on z/VM and Linux

- **Use Operations Manager to take action based on a triggered situation in OMEGAMON XE on z/VM and Linux**
- **Virtual CPU consumption is high for a Linux guest**
- **OMEGAMON detects the situation, creates an event, and sends message to Operations Manager**
- **Action is triggered by a rule in Operations Manager**
- **Operations Manager checks SHARE status of guest and issues CP commands to tune the guest**
  - SET QUICKDSP
  - SET SHARE
- **Event is resolved in OMEGAMON when virtual CPU consumption of guest is back down**

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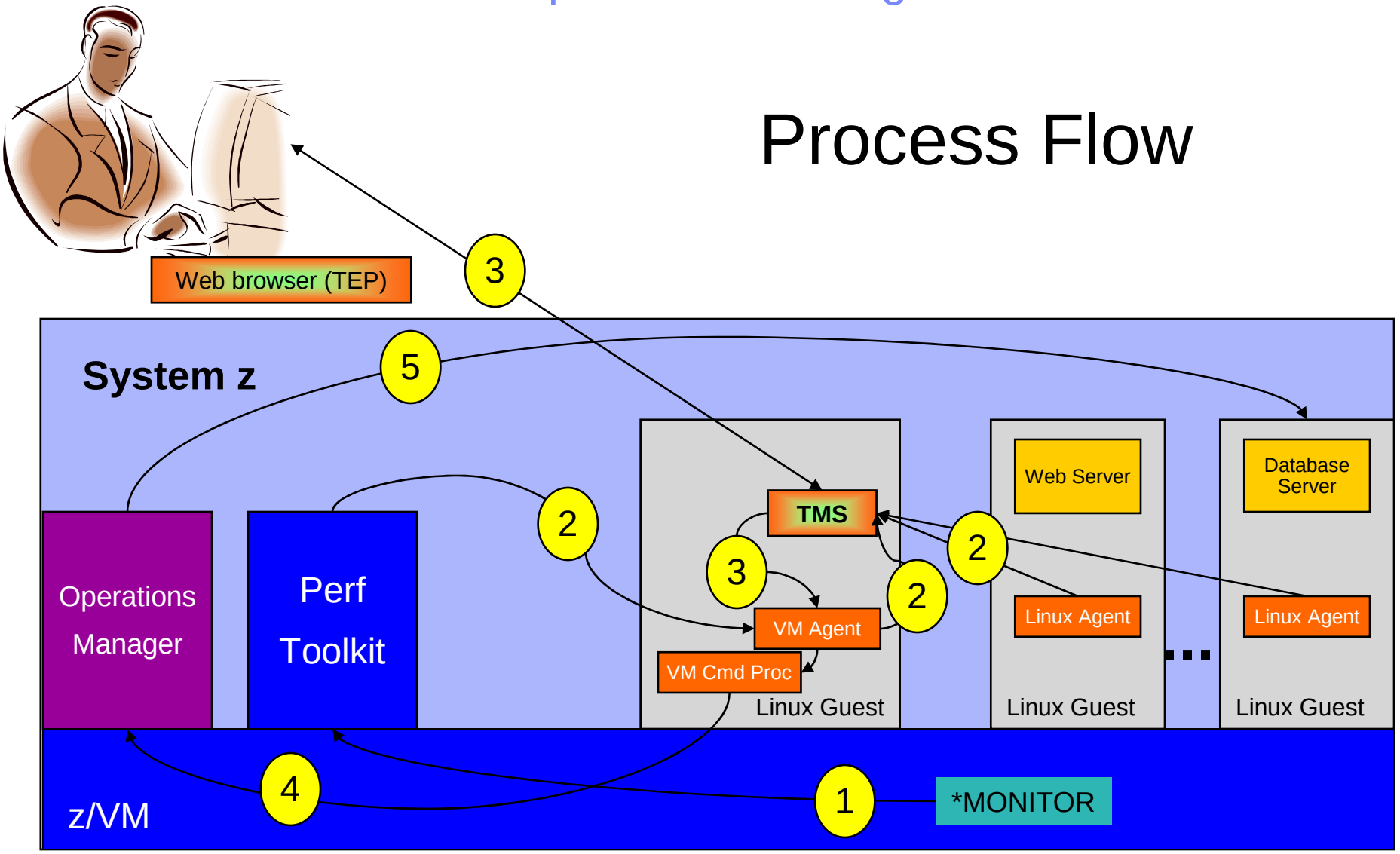
OMEGAMON XE and Operations Manager for z/VM

Process Flow



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Scenario 11: Detailed Steps

- **Create and start an application on a Linux guest that uses more than 20% of virtual CPU**
  - HOG command on our demo system
- **Updates to Tivoli Enterprise Portal**
  - z/VM CPU graph shows guest CPU % as it runs the application
  - Event pops up on situation event console to say higher than 20%
- **Use Operations Manager to watch z/VM user console used by OMEGAMON**
  - Message receive from OMEGAMON to address high CPU on the guest
  - Message from Operations Manager indicating action is triggered
- **Updates on Tivoli Enterprise Portal**
  - CPU used by that guest decreases below 20%
  - Event closed (removed from the event console)

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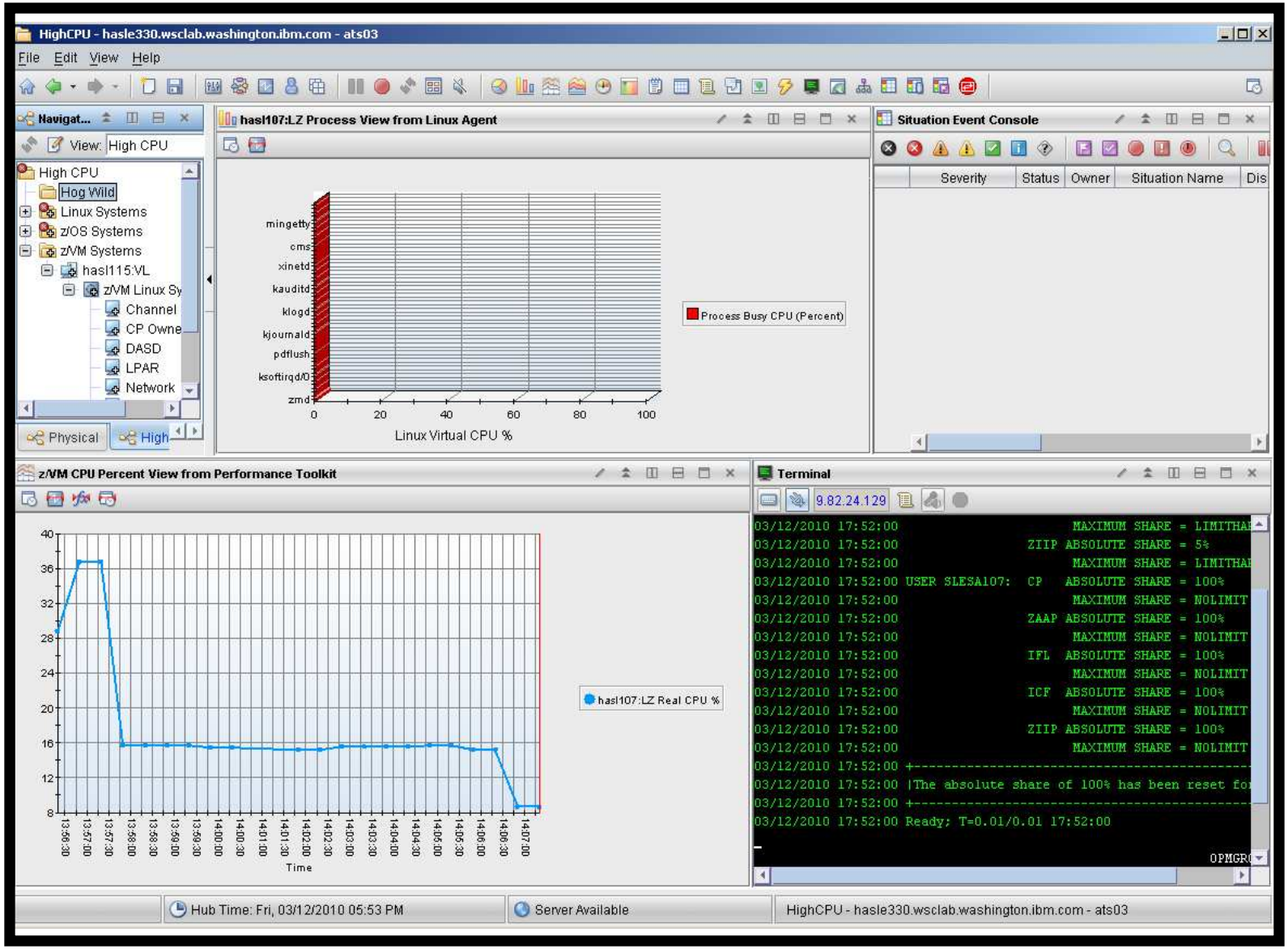

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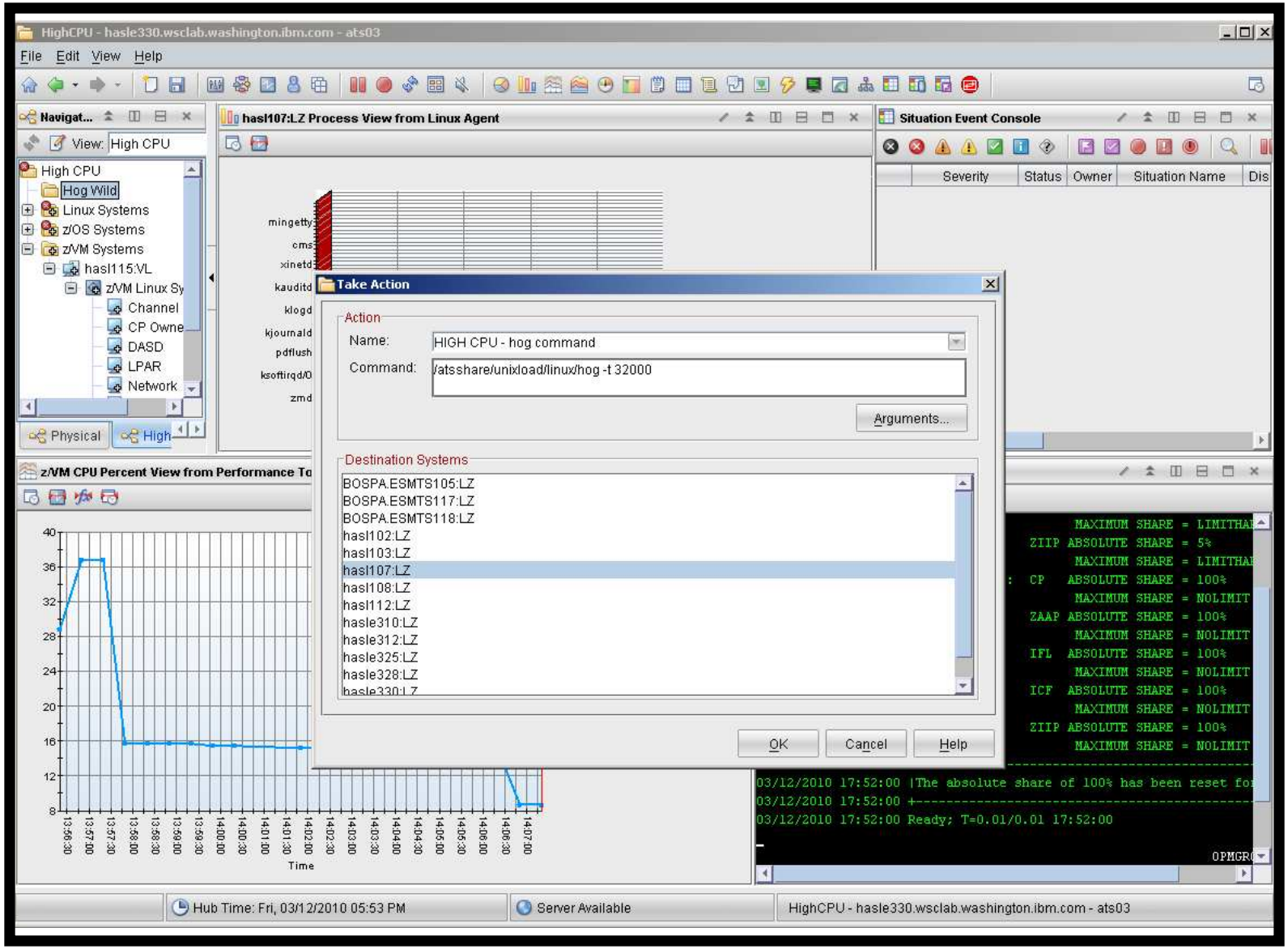

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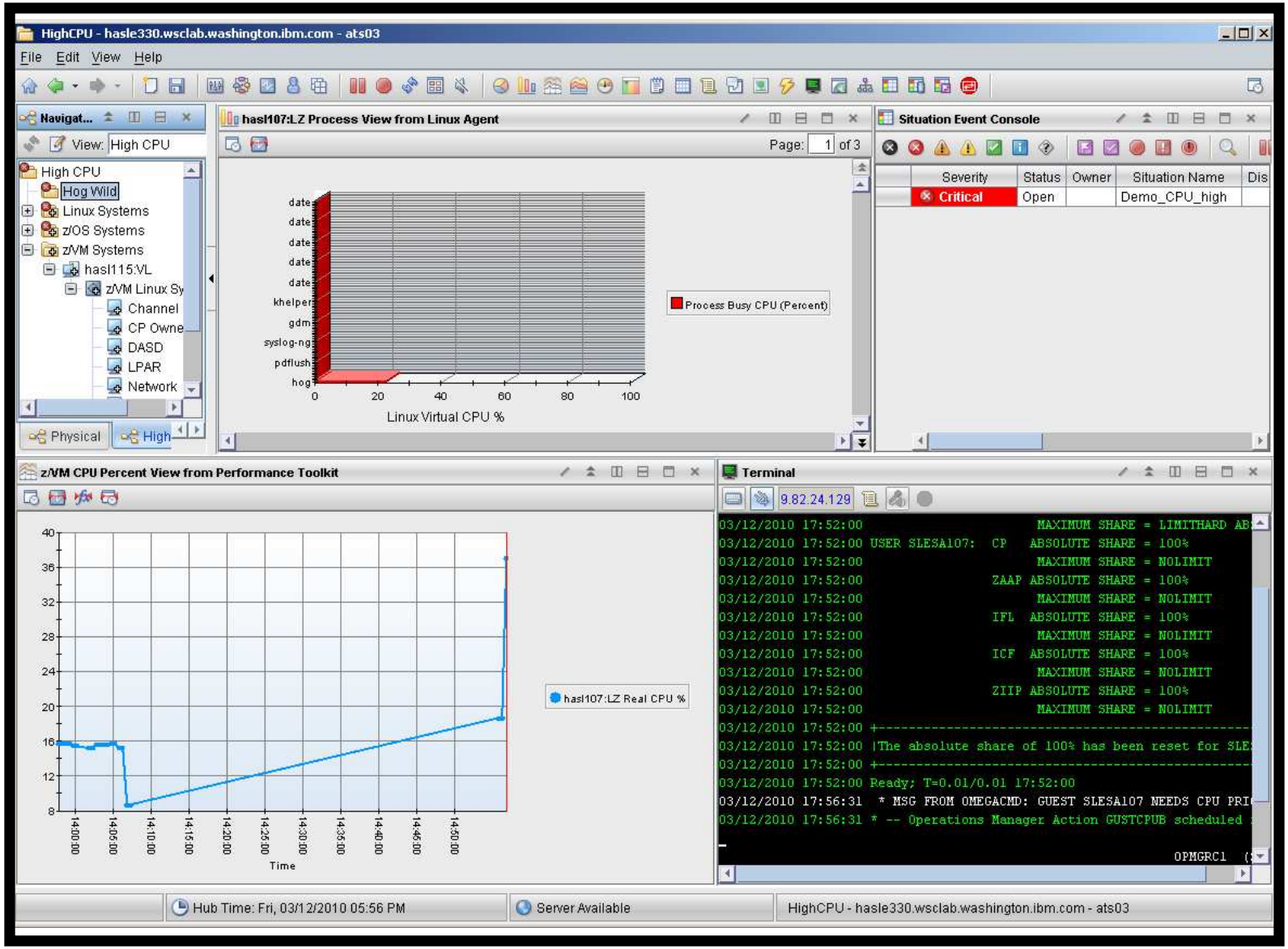

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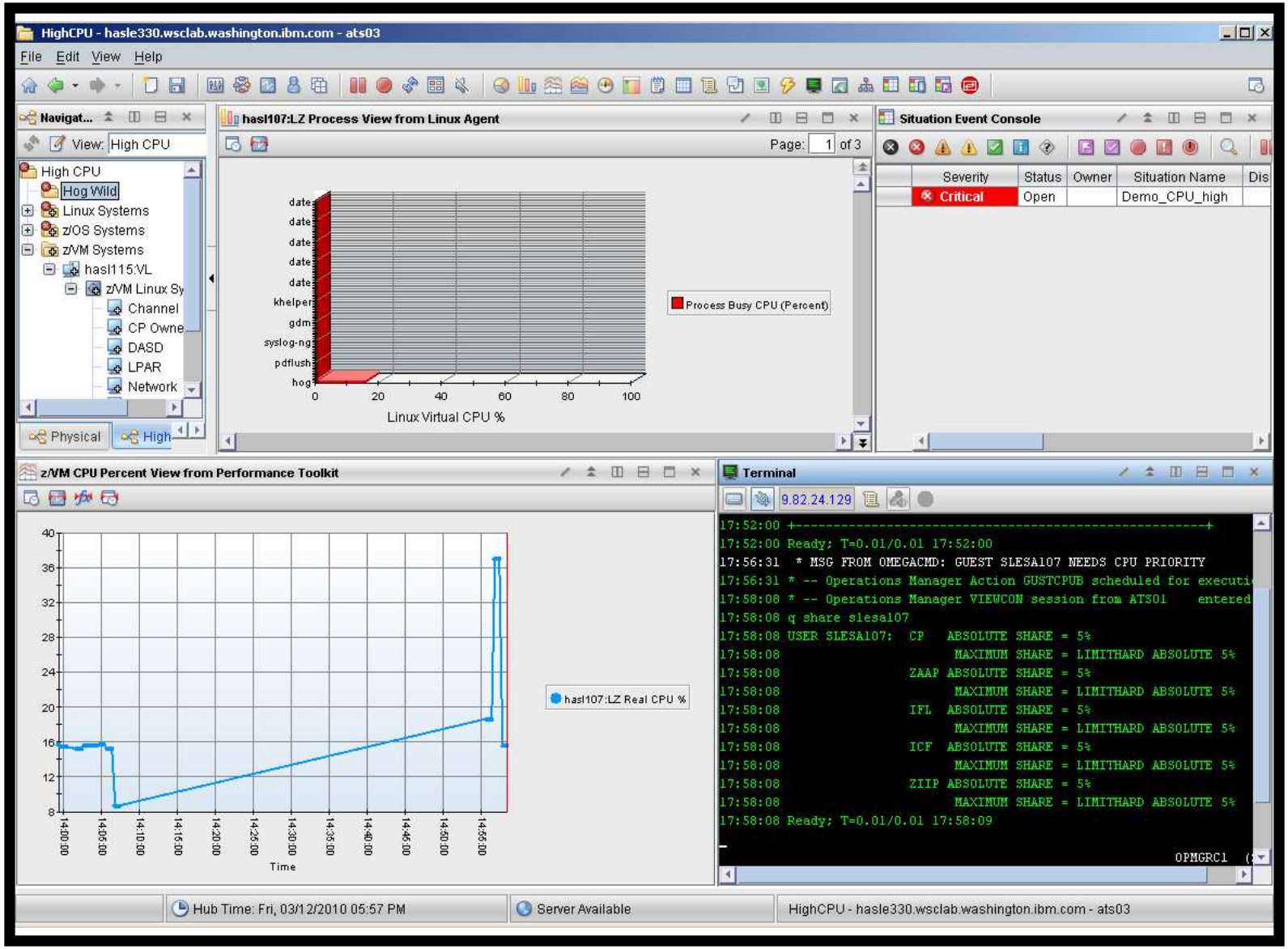

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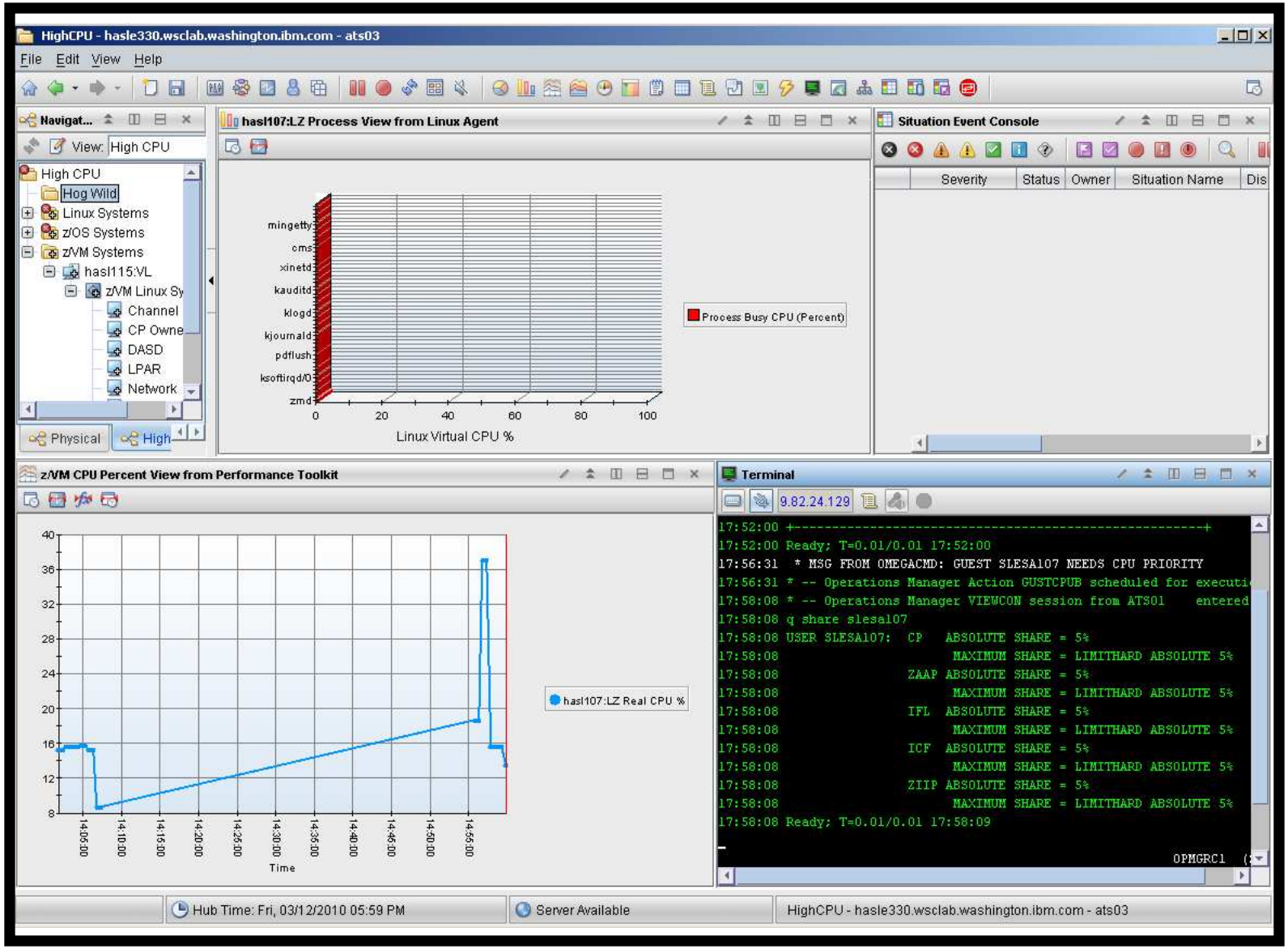

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Scenario 11: How Do You Do That?

Rules in Operations Manager:

```
*
* Adjust SHARE of Linux guest if CPU usage is too high
* Watch for message from OMEGAMON
DEFRULE NAME(GUSTCPU),+
  MATCH(*NEEDS CPU PRIORITY*),+
  ACTION(GUESTCPU)
*
* Highlight message from OMEGAMON and call EXEC to check and adjust
* SHARE of Linux guest
DEFACTN NAME(GUESTCPU),+
  INPUT(AHI),+
  NEXTACTN(GUSTCPUB)
*
DEFACTN NAME(GUSTCPUB),+
  COMMAND(EXEC VCPU &4),+
  ENV(LVM),+
  OUTPUT(LOG)
```


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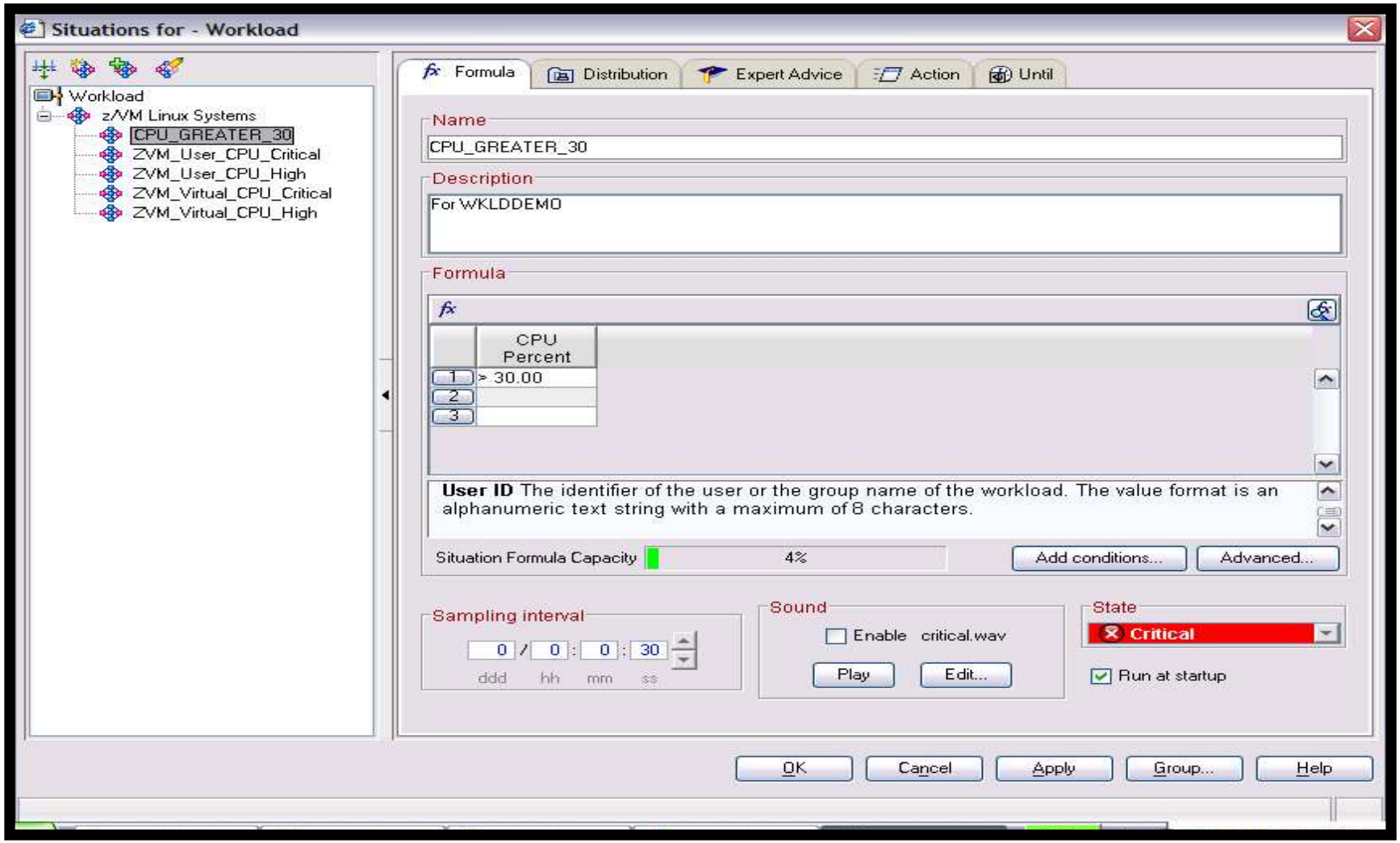
Scenario 11: Detailed Steps
OMEGAMON Configuration



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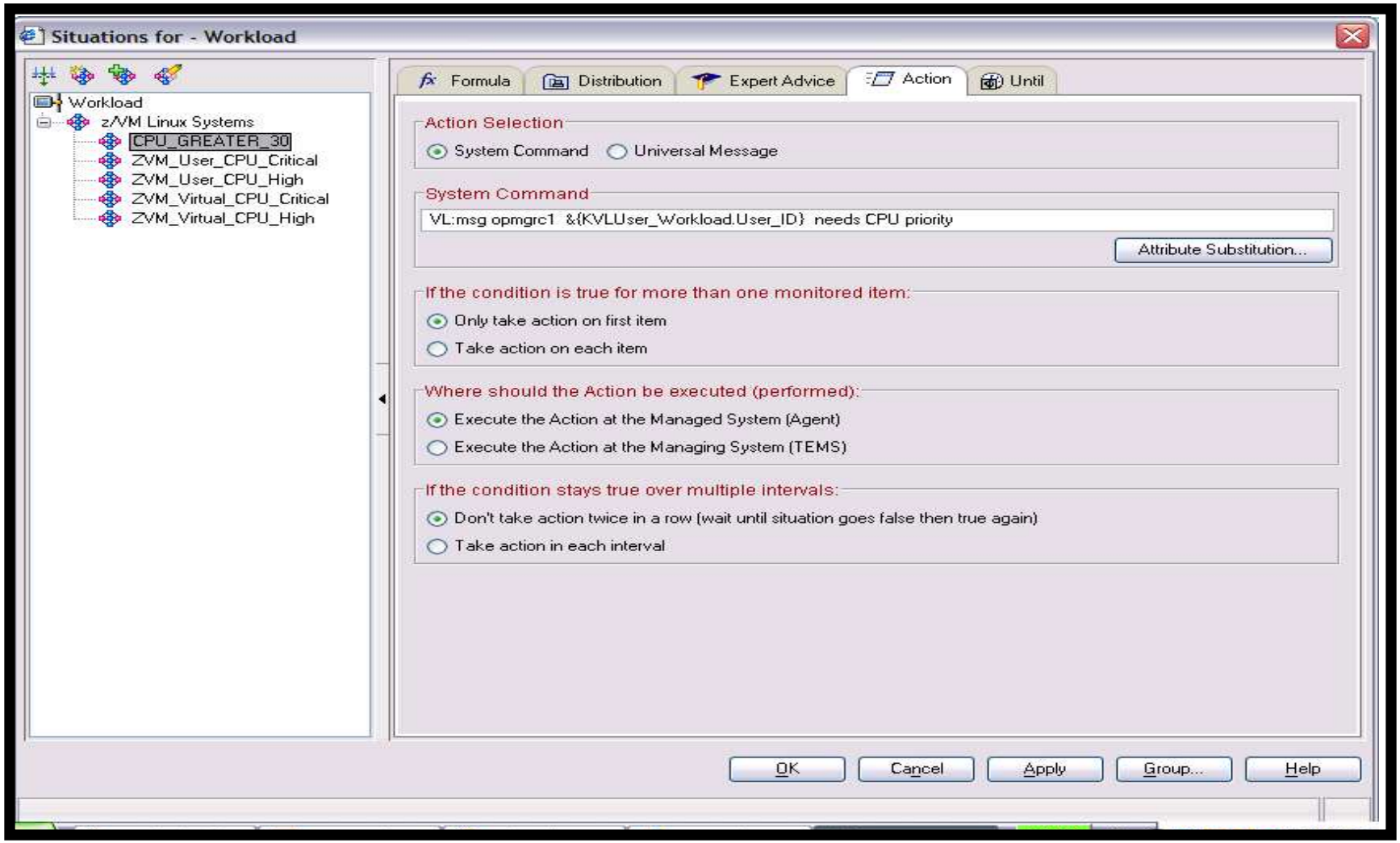
Scenario 11: Detailed Steps
OMEGAMON Configuration



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Scenario 12:
Monitor Service Machines for LOGOFF Status – and AUTOLOG them

- **Monitor specific service machines to make sure they stay logged on**
  - Demo will monitor TSTADMN2 user ID
  - If it changes from logged on to logged off status, then restart it
- **Dynamically pass the user ID to the action**
  - Re-use action for multiple user IDs

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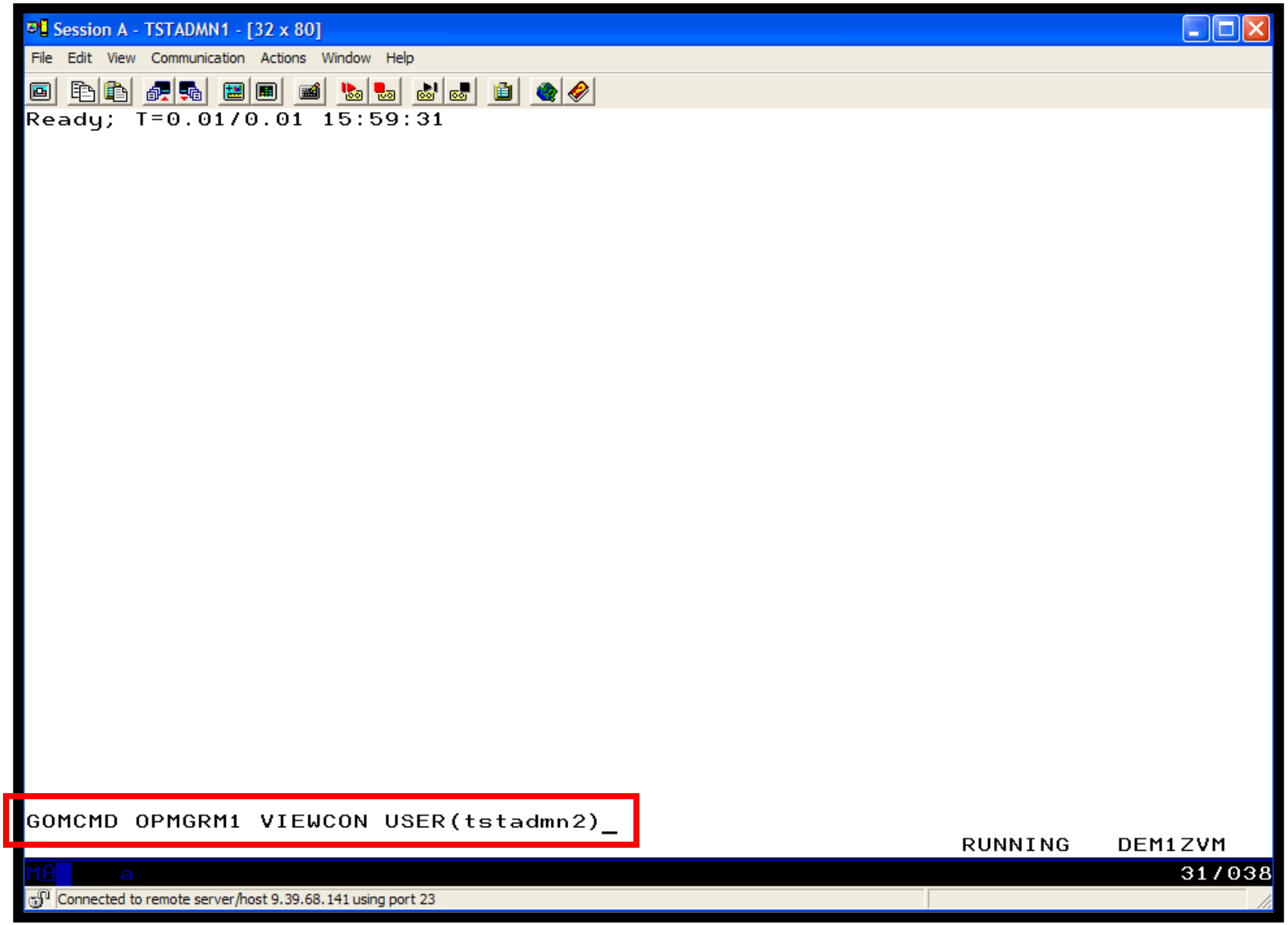

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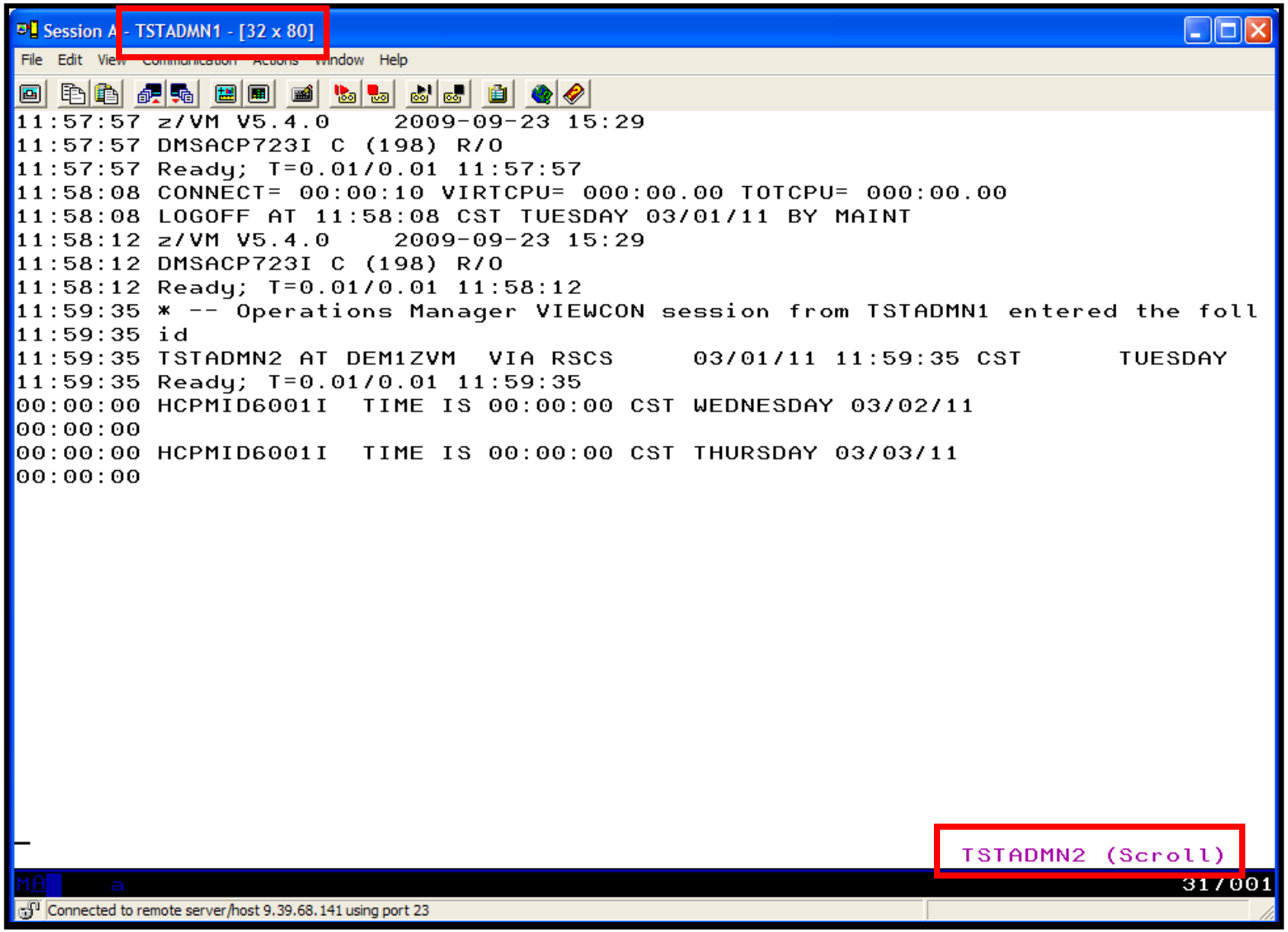

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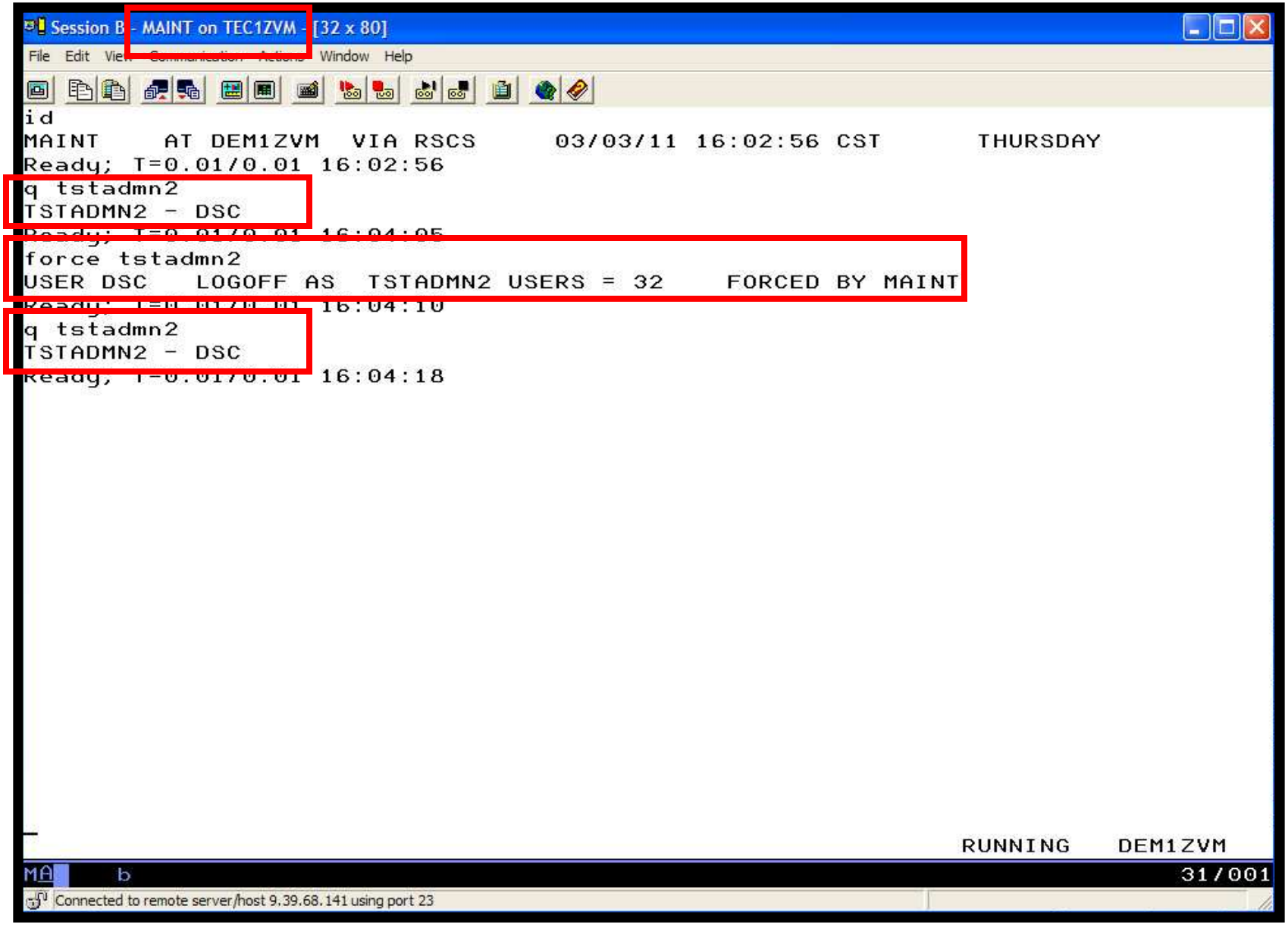

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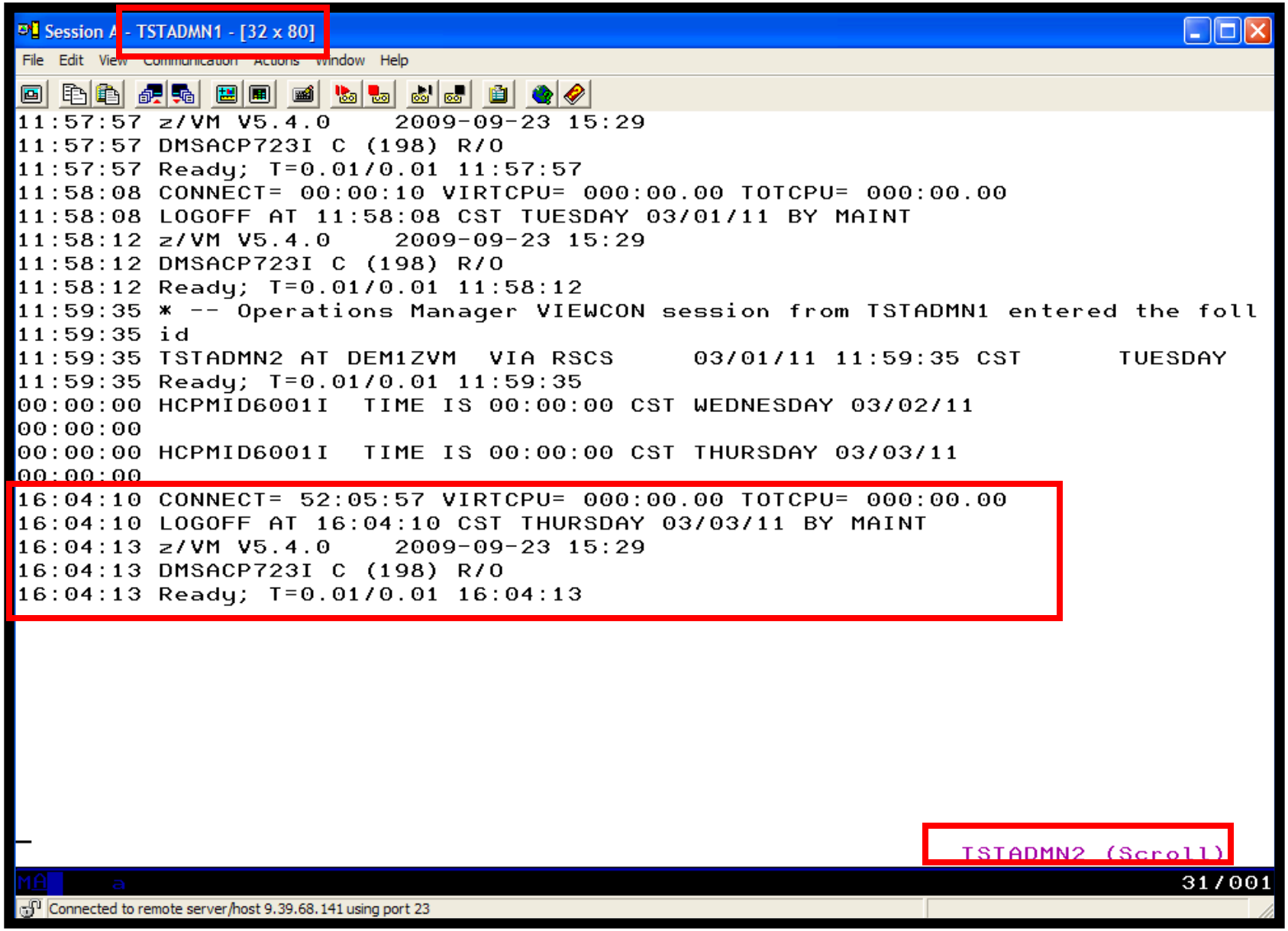

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Scenario 12: How Do You Do That?

Console rule and action in Operations Manager:

```
*
DEFEMON NAME(ADMIN2),+
  TYPE(1),+
  USER(TSTADMN2),+
  ACTION(AUTOLOG1)
*
DEFACTN NAME(AUTOLOG1),+
  COMMAND(CP SLEEP 3 SEC),+
  NEXTACTN(AUTOLOG2),+
  OUTPUT(LOG),+
  ENV(OPMGRS1)
*
DEFACTN NAME(AUTOLOG2),+
  COMMAND(CP XAUTOLOG &3),+
  OUTPUT(LOG),+
  ENV(OPMGRS1)
```


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IBM Software

Backup and Recovery Scenarios
Including Automation

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Scenario 13: 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**

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Scenario 13: 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)
```


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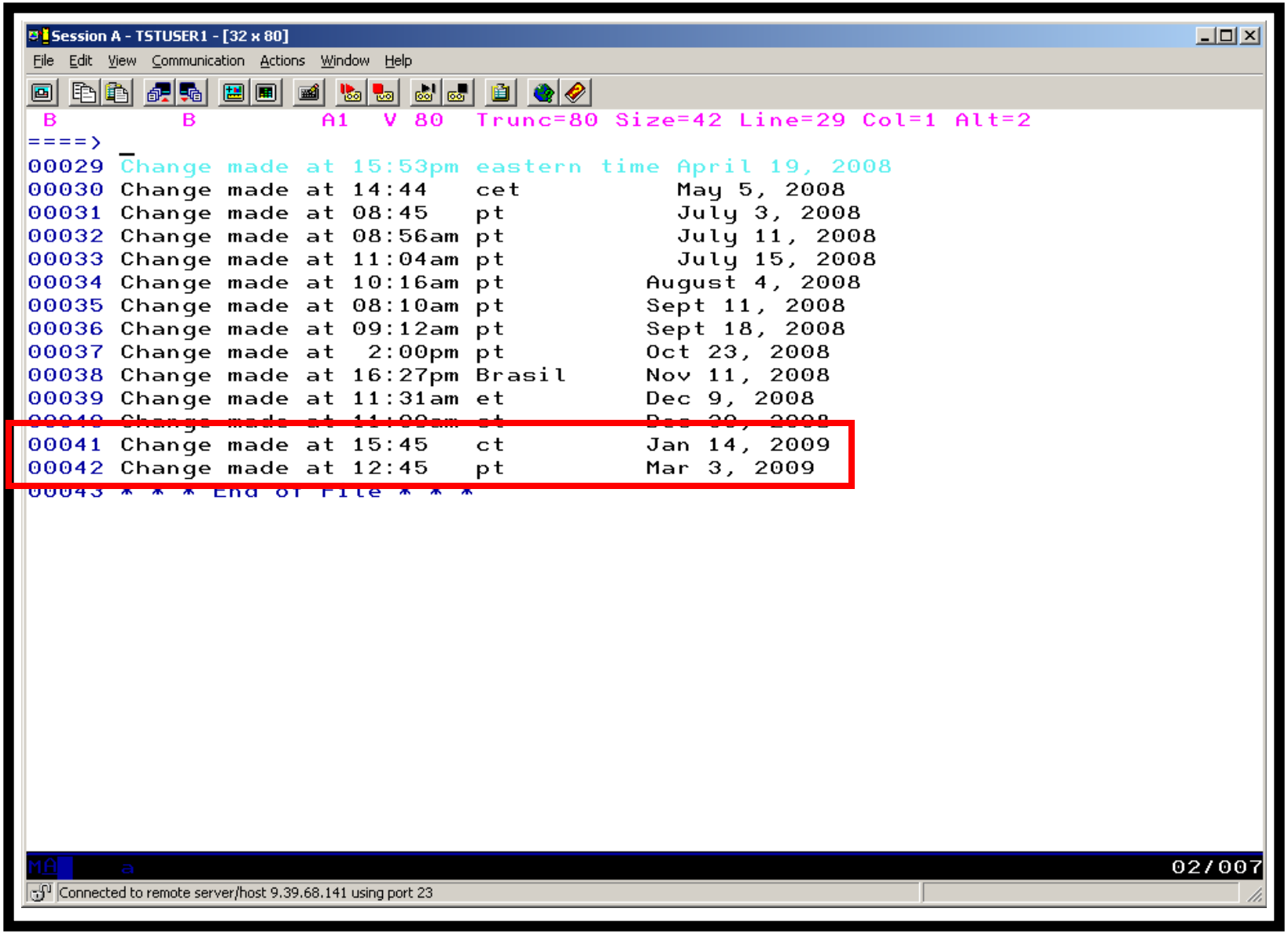

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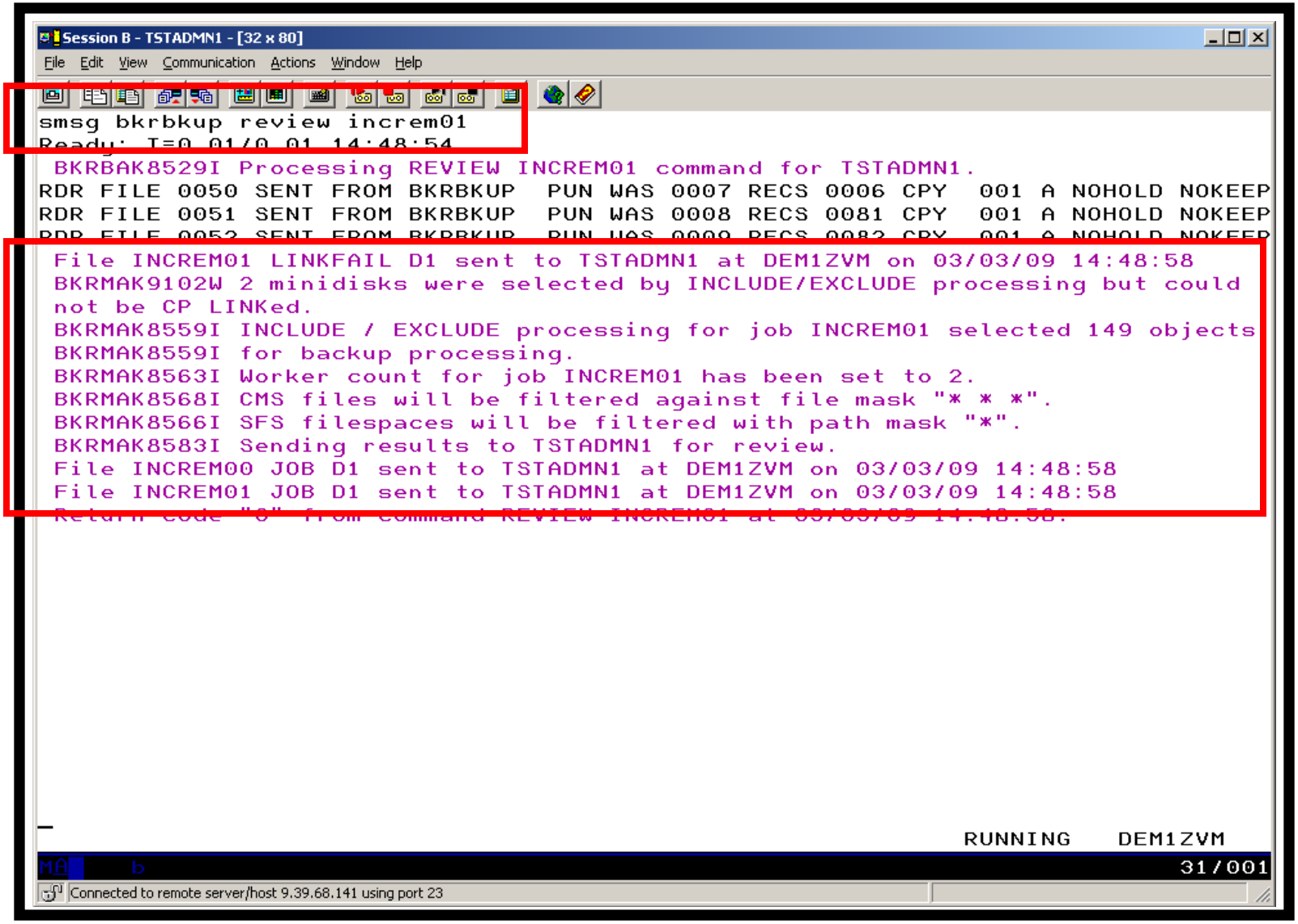

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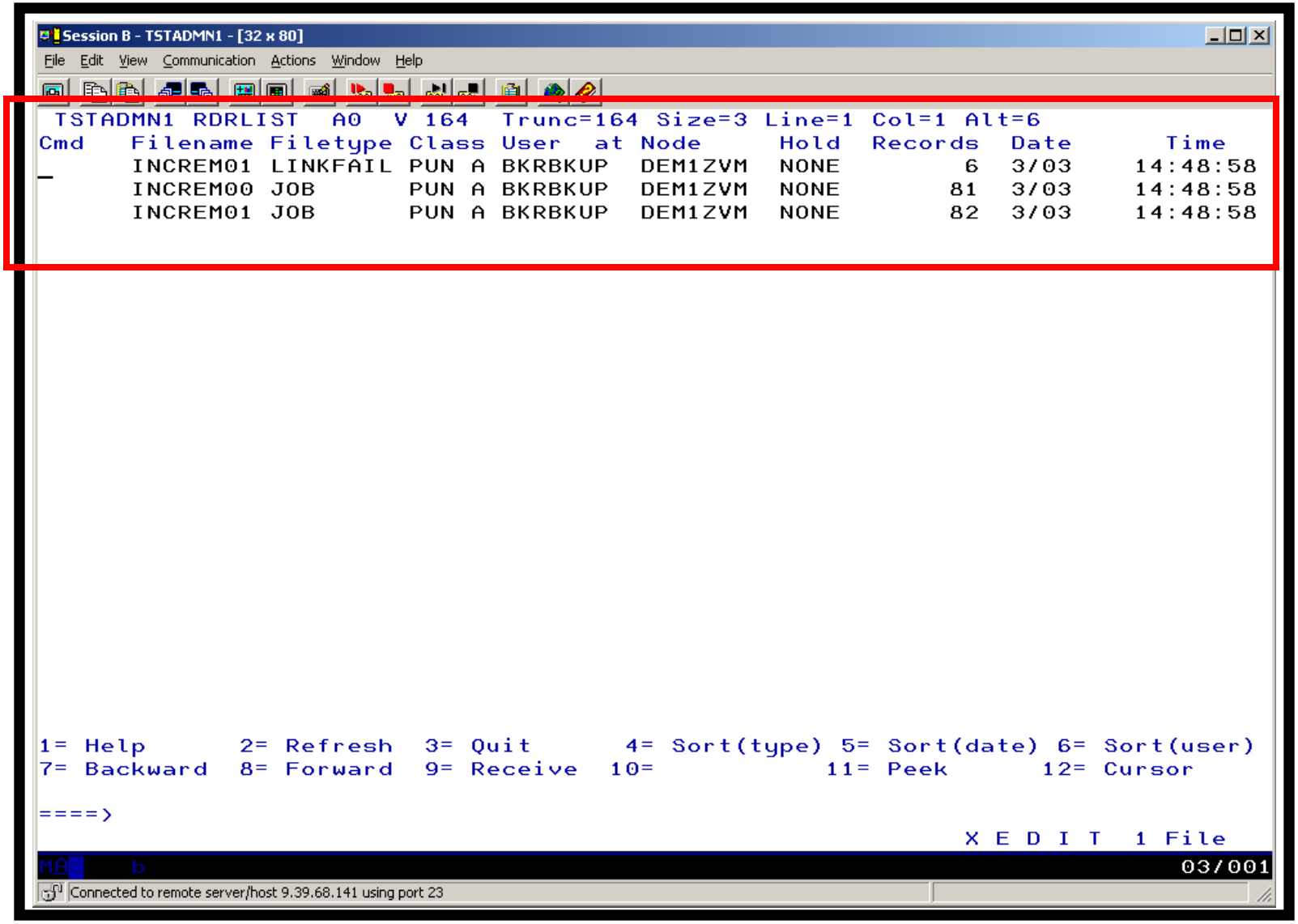

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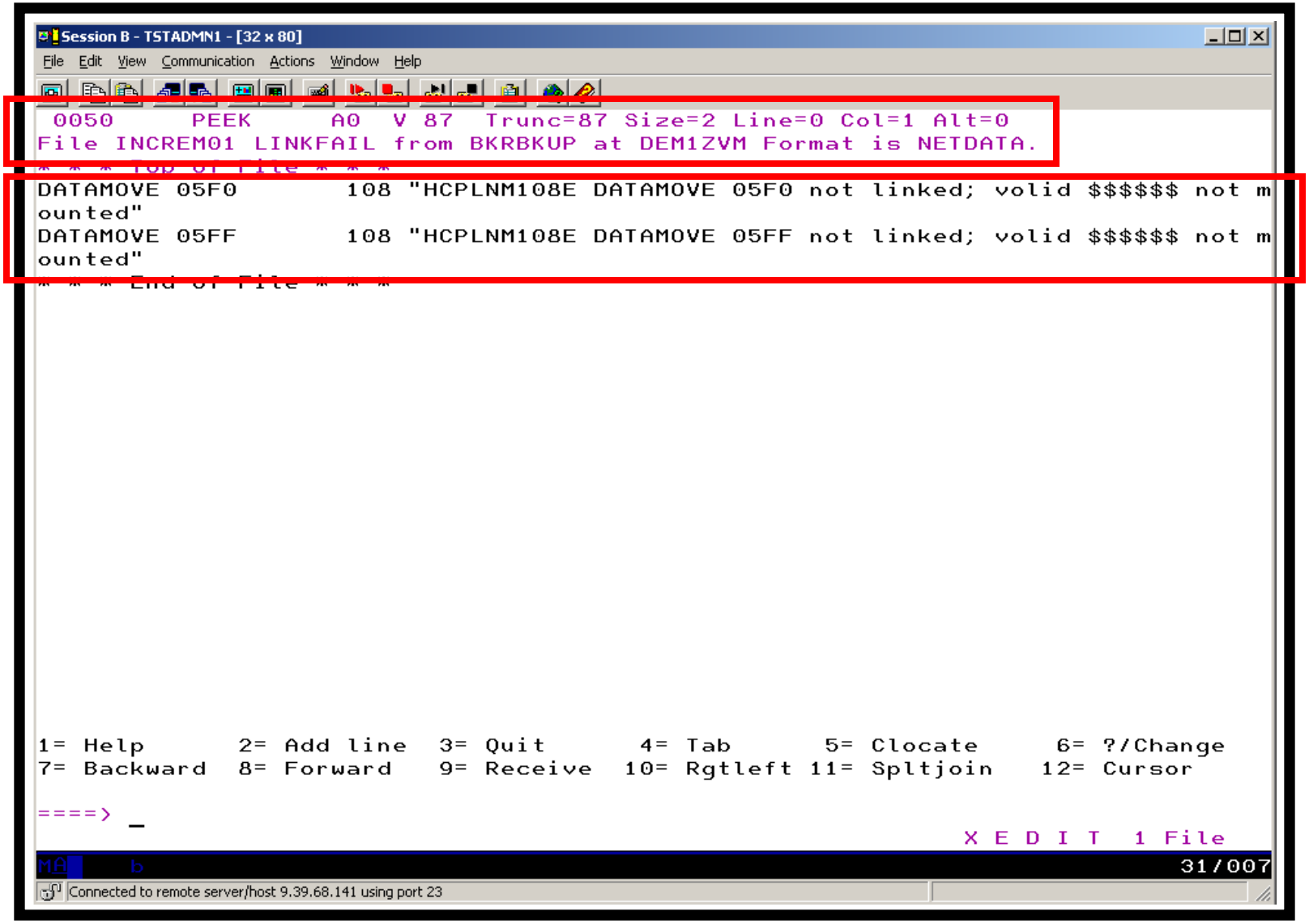

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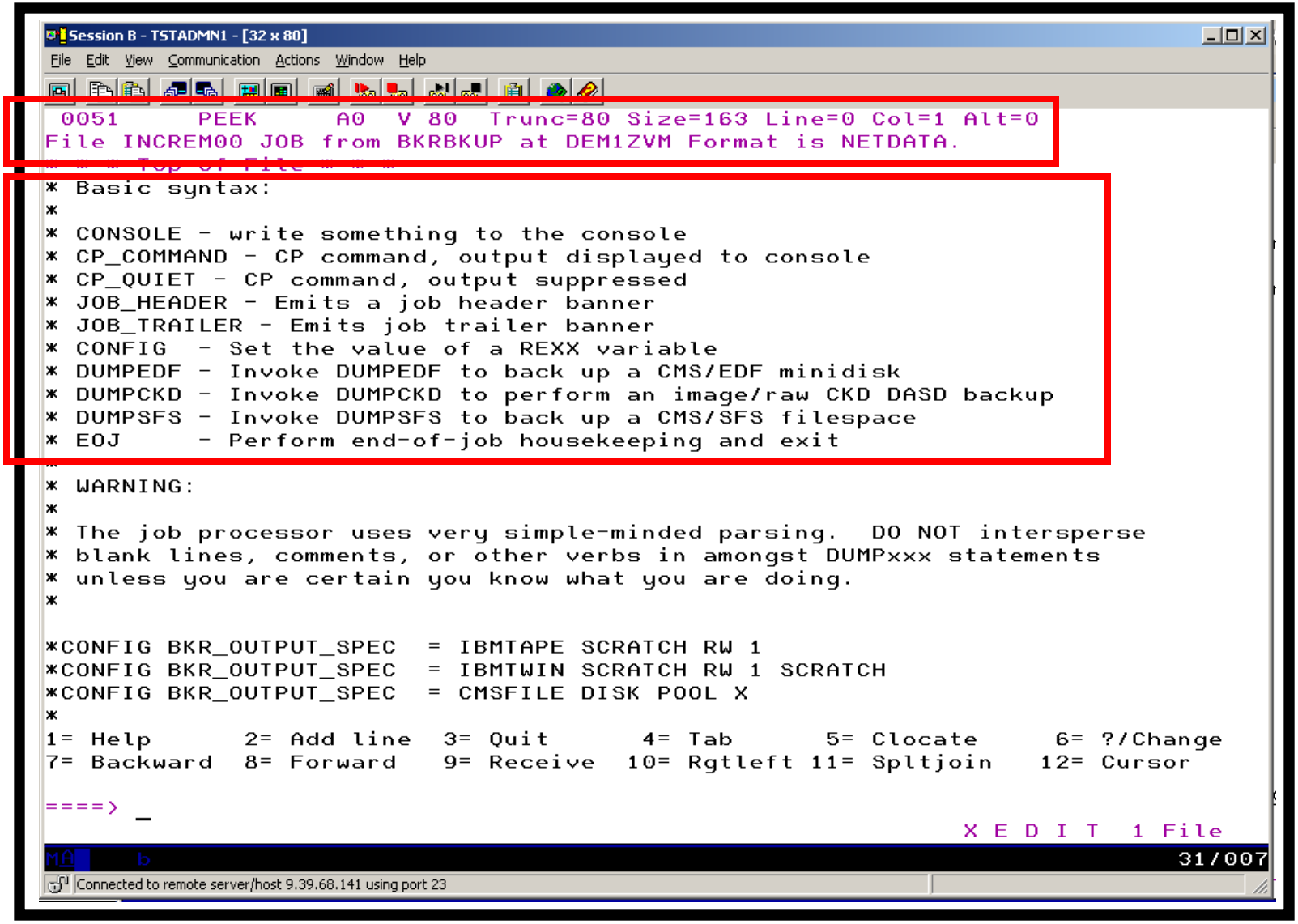

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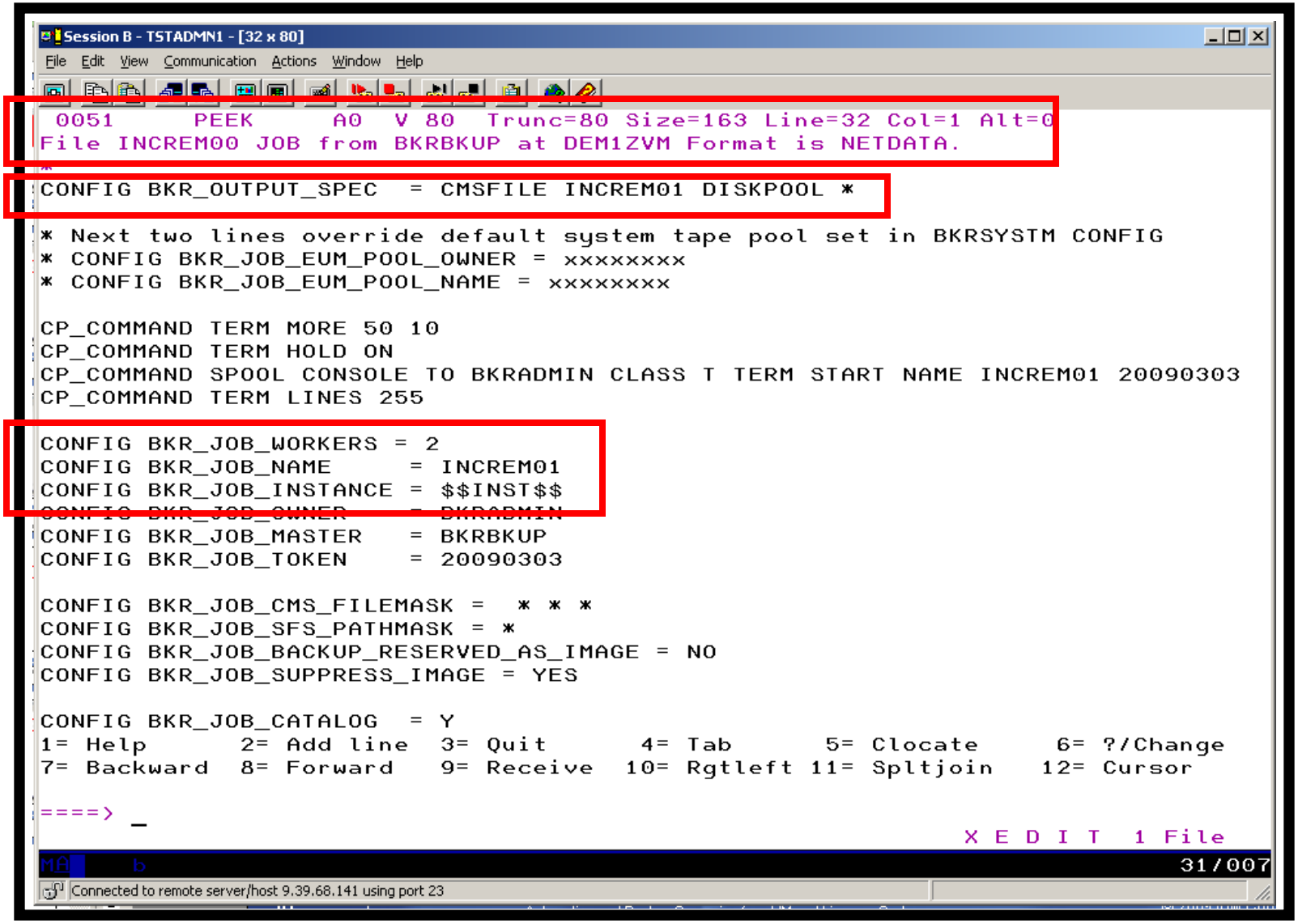

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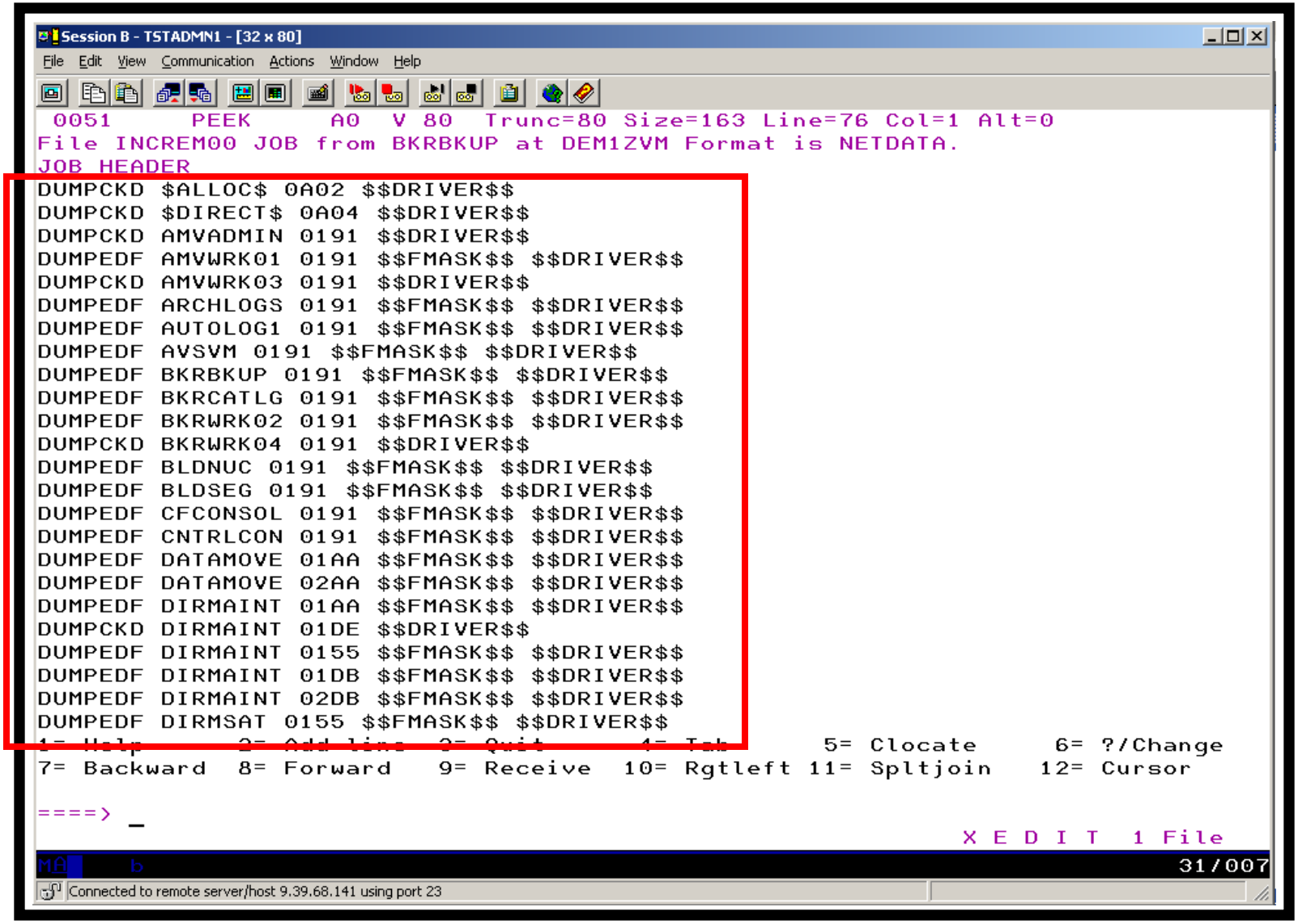

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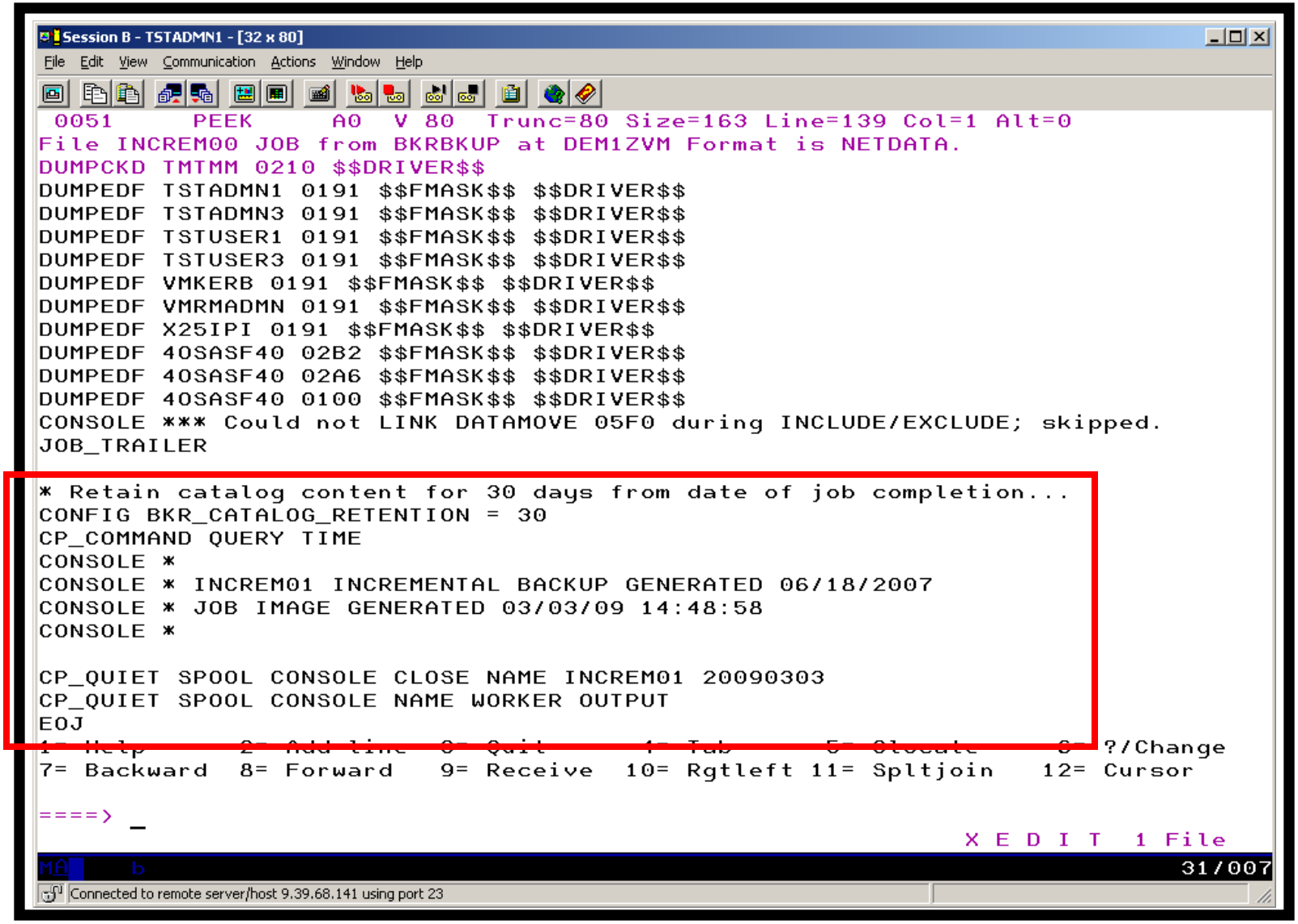

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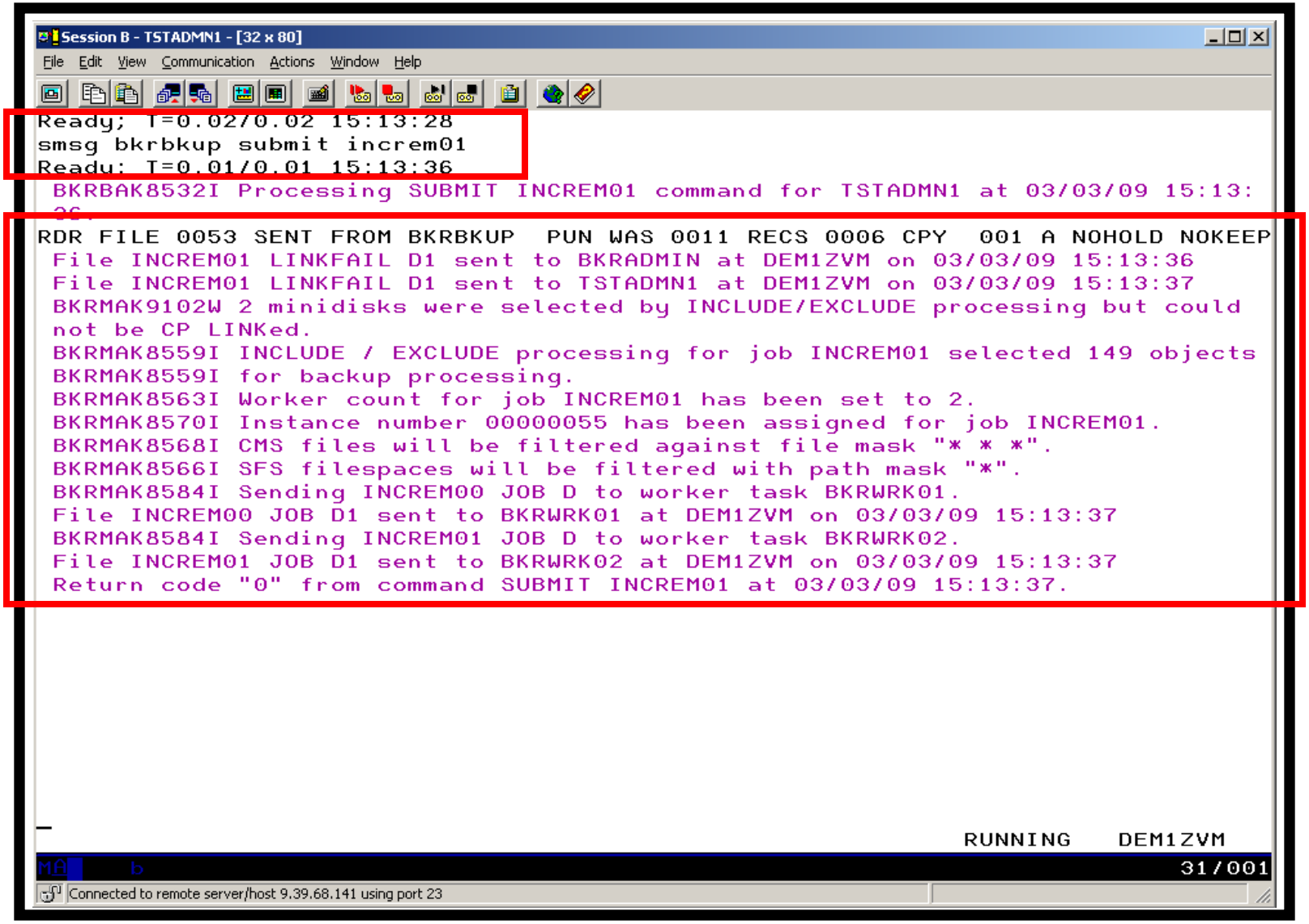

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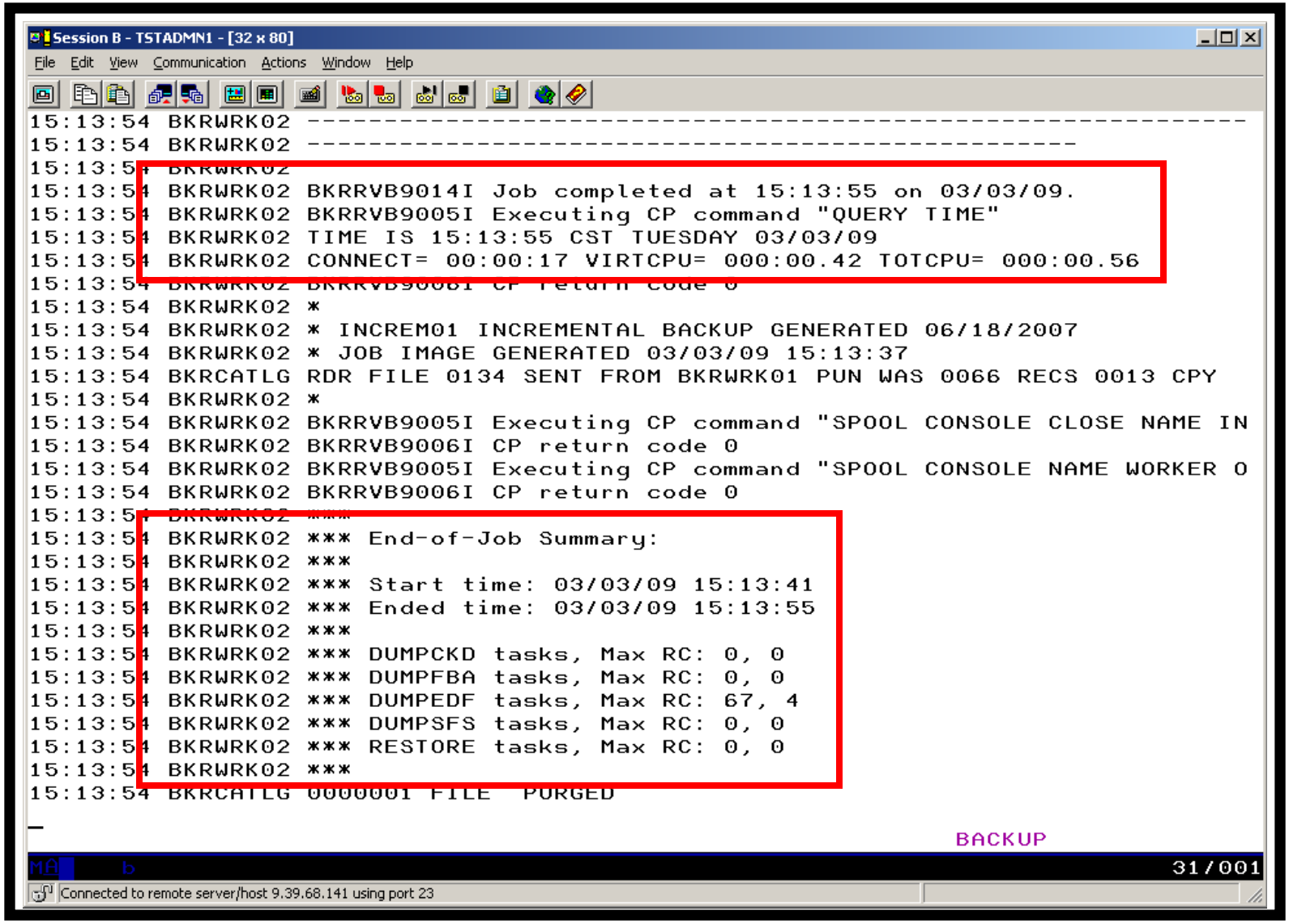

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Scenario 14: Restoring Files from Backup

- **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**

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Scenario 14: Detailed Steps

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

```
bkr list
```

- **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**

```
rdr list
```

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

```
peek
```


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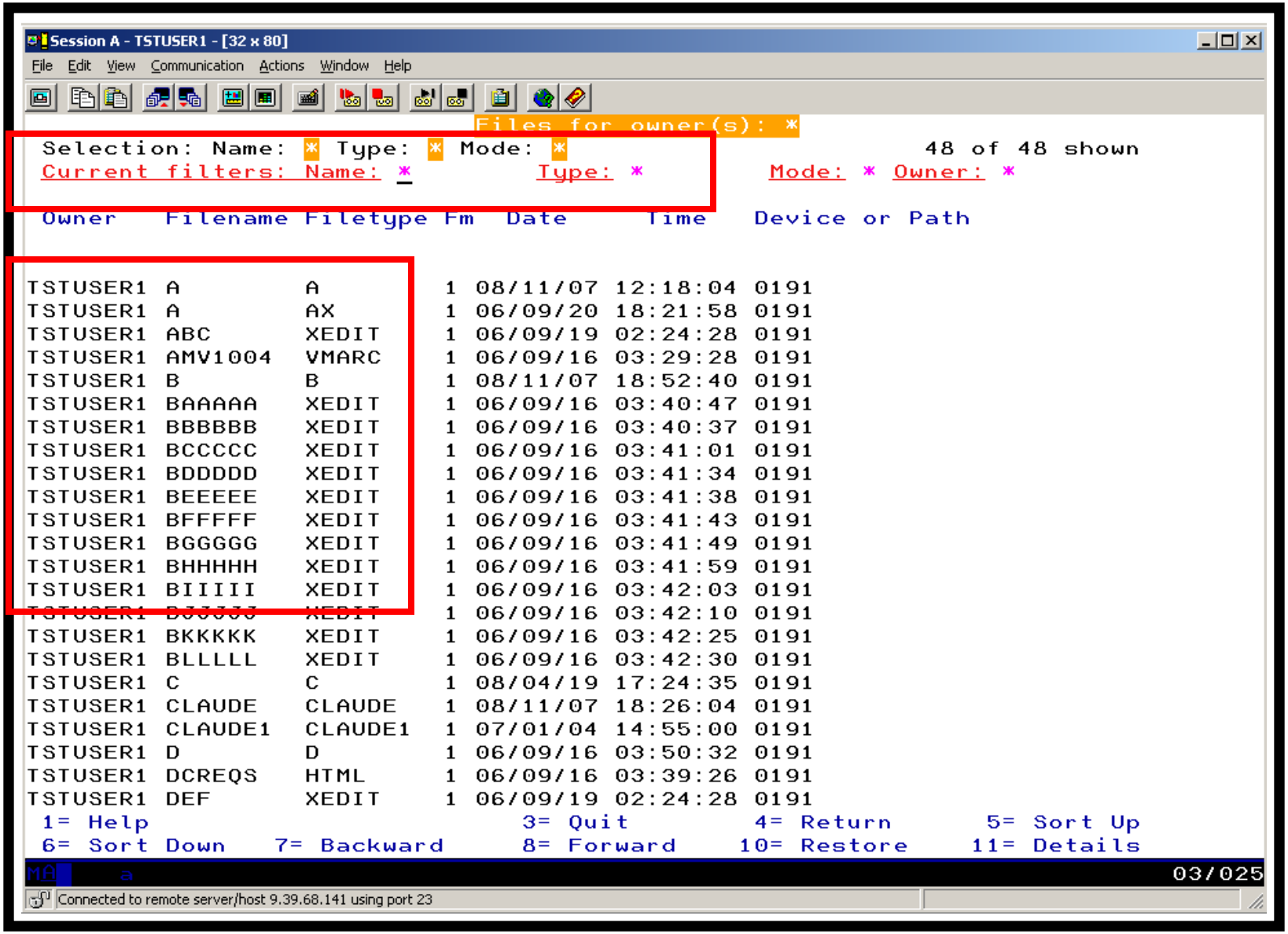

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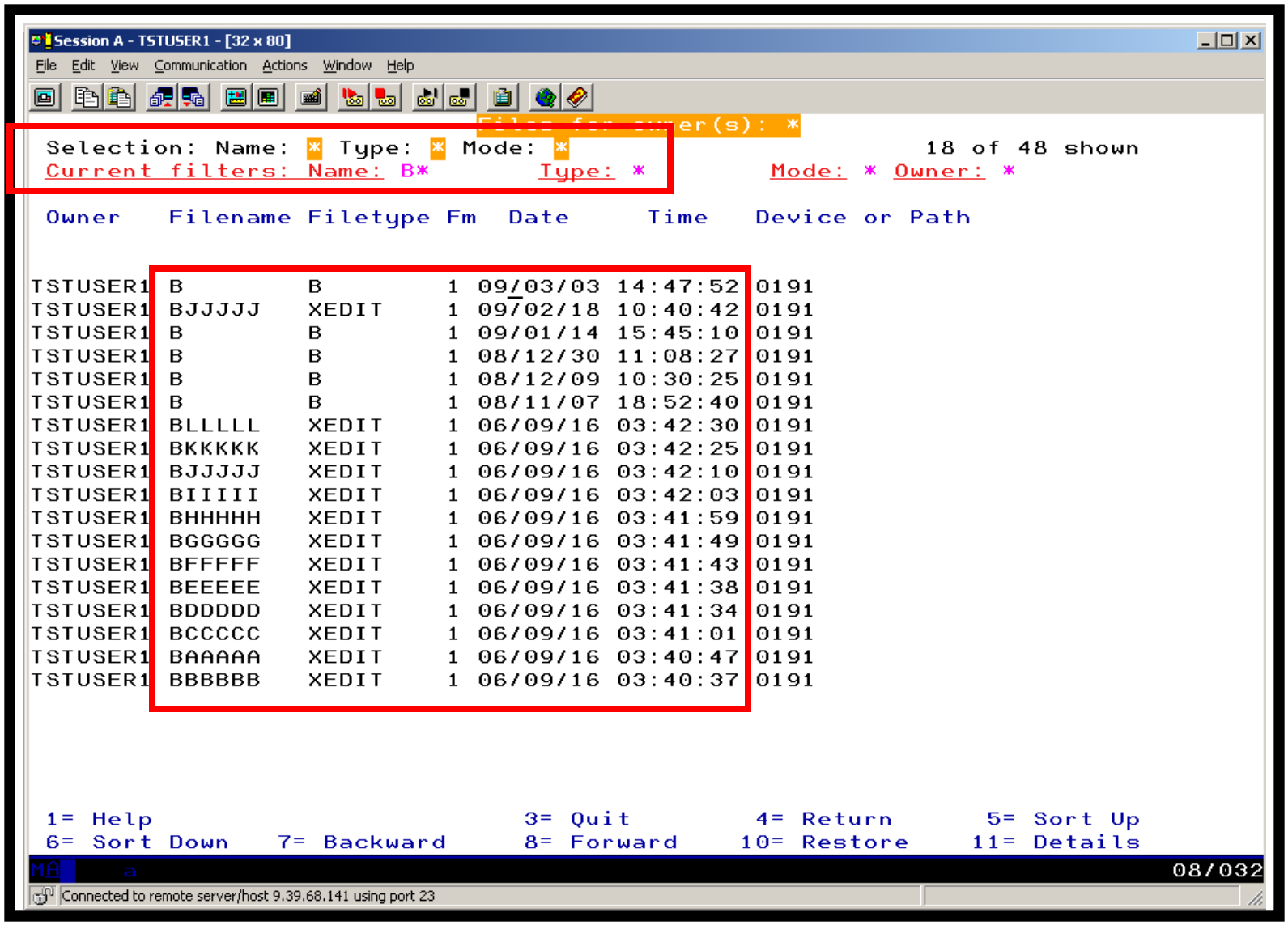

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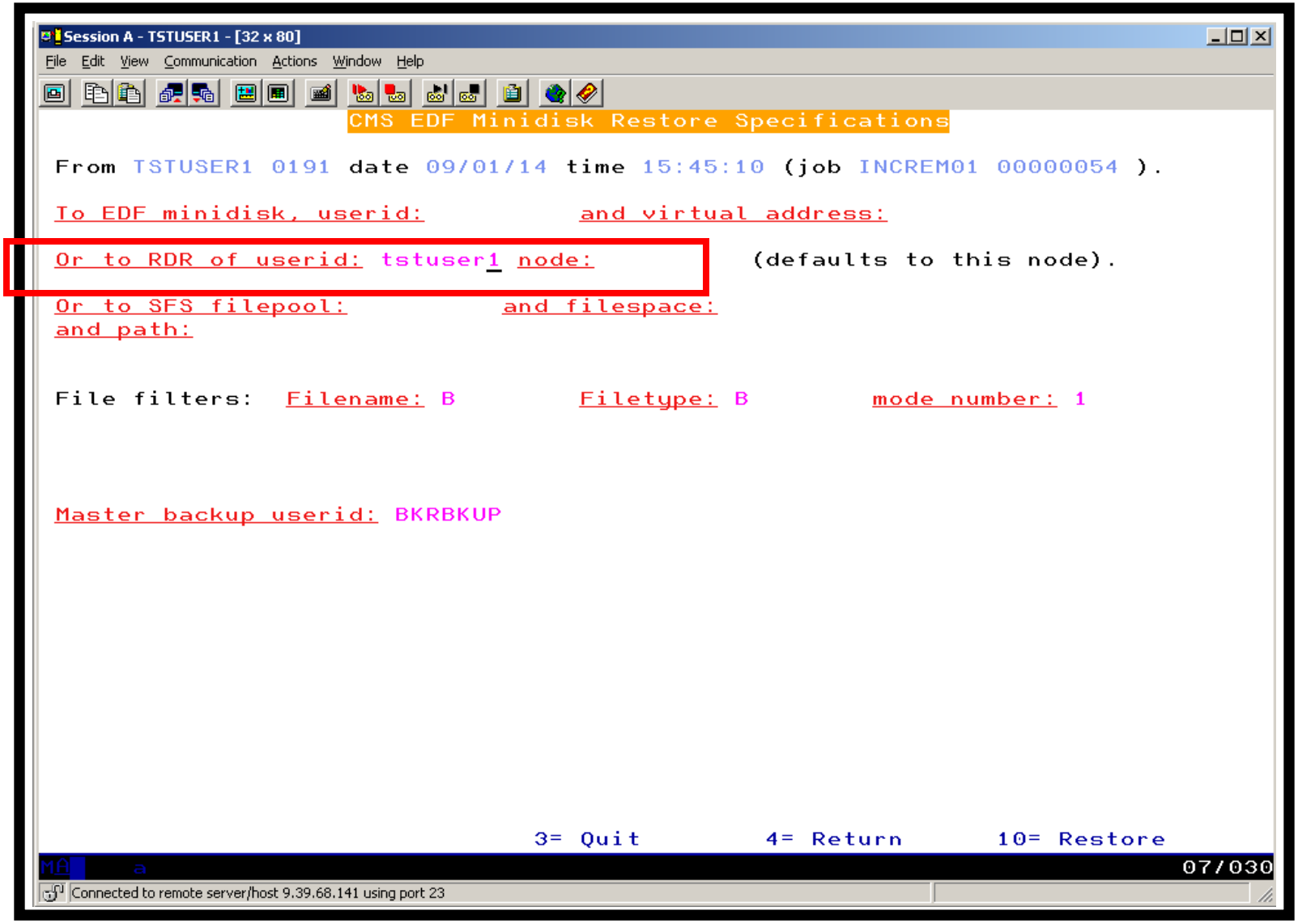

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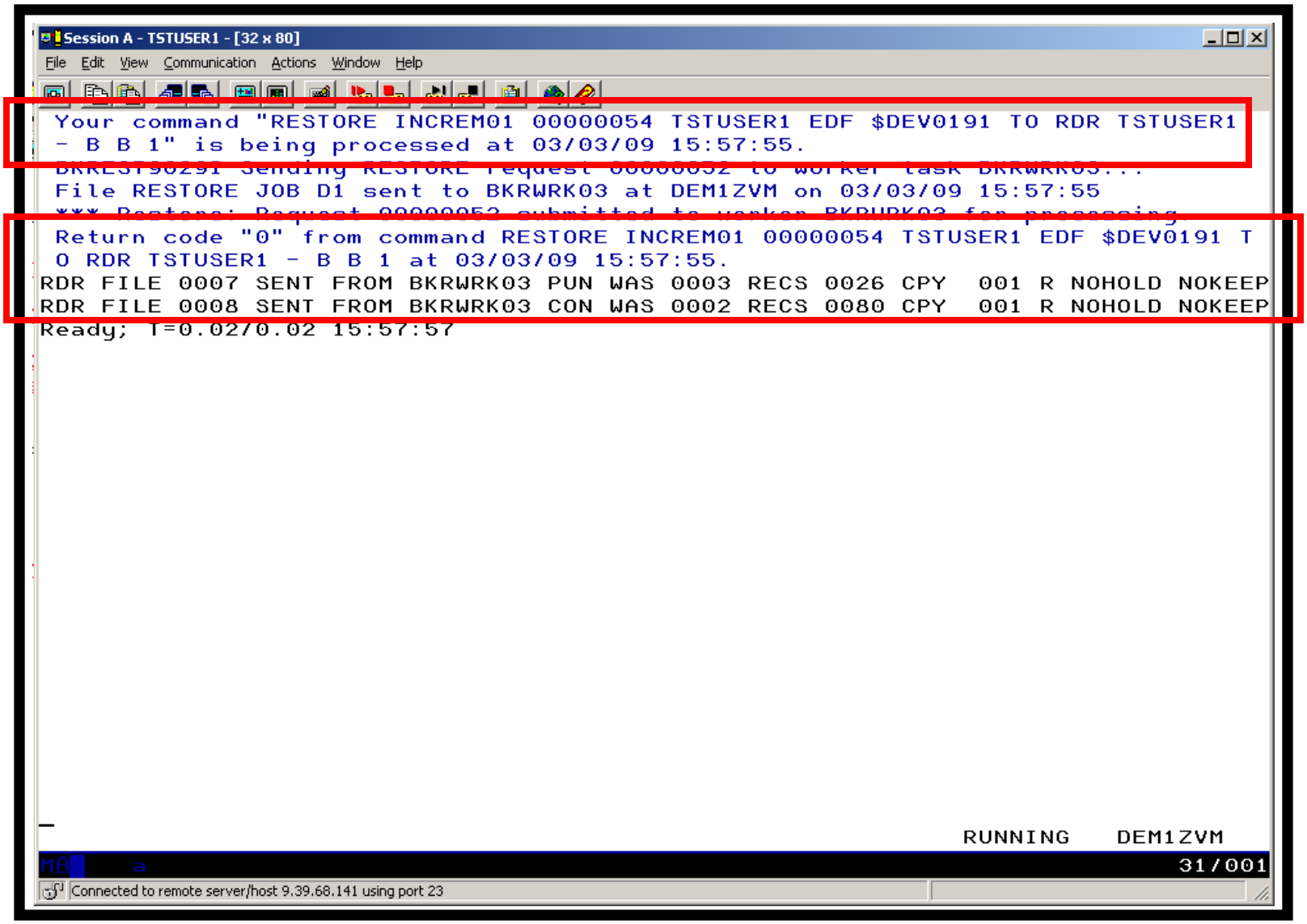

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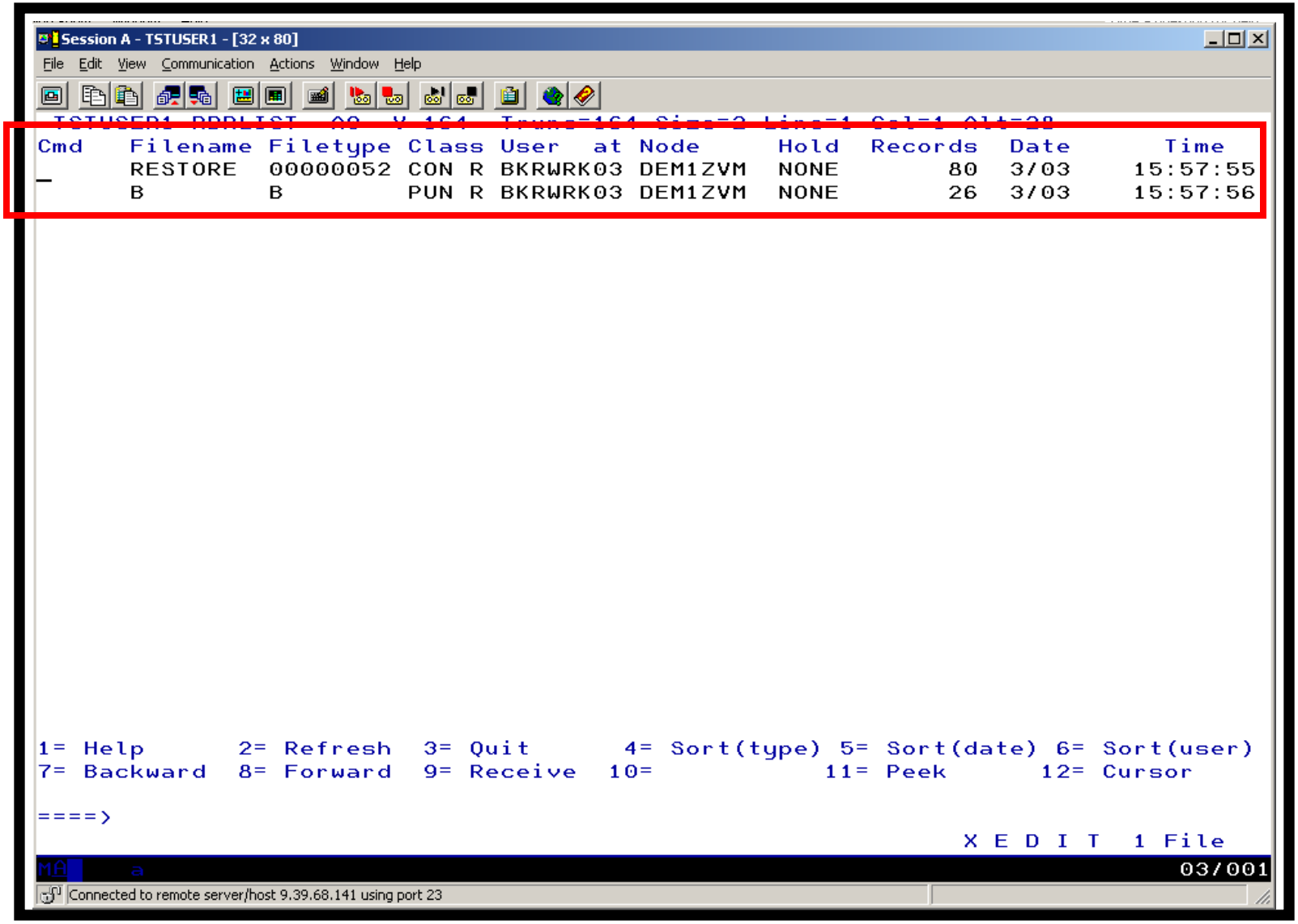

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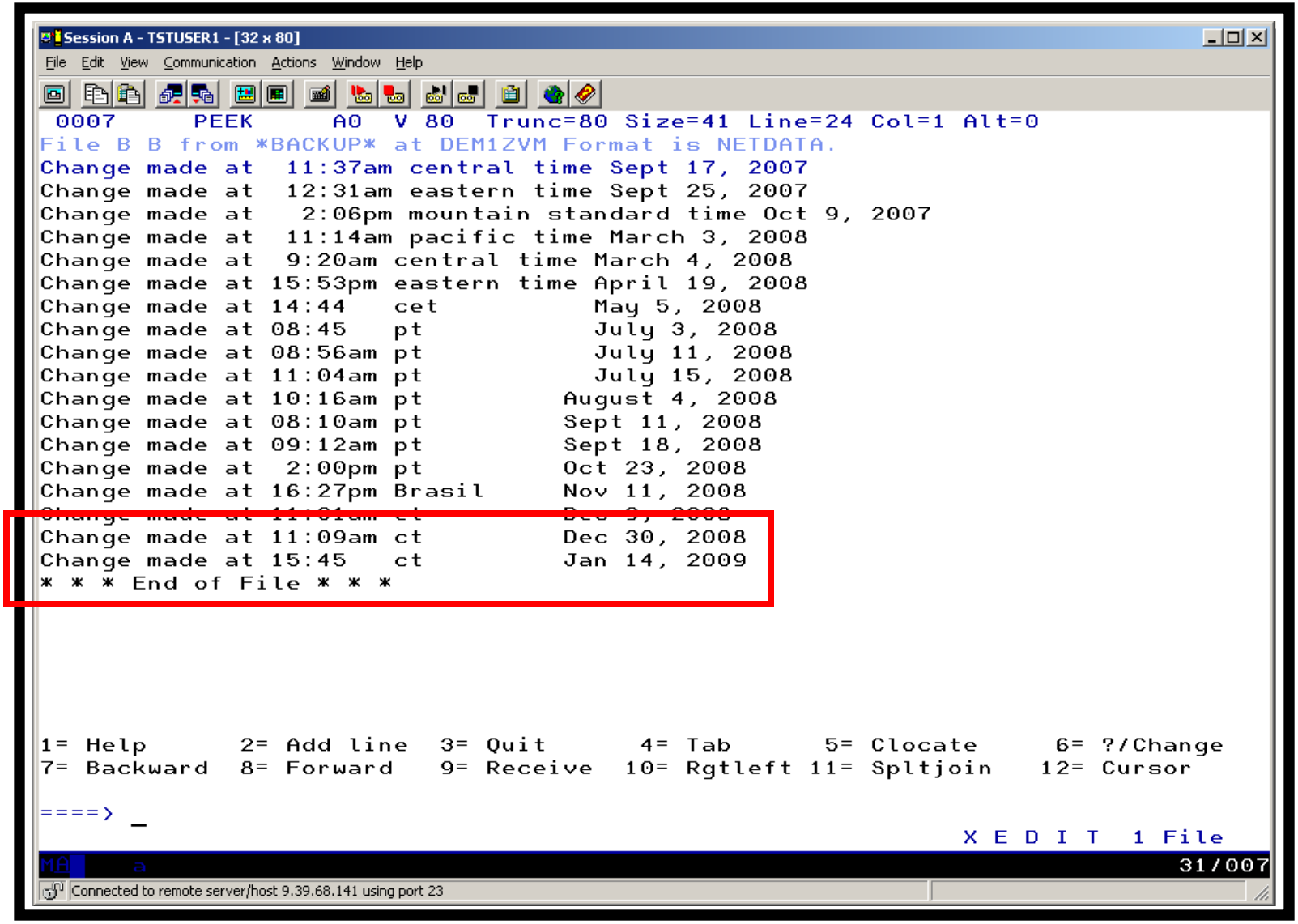

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Scenario 15: Scheduling Image Backups of Linux Guests

- **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

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Scenario 15: Detailed Steps

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

```
gomcmd opmgrm1 defschd name(demo),action(stoplnx),when(now)
```

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

```
gomcmd opmgrm1 viewlog
```

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

```
gomcmd opmgrm1 viewcon user(omeglnx1)
```

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

```
gomcmd opmgrm1 viewcon user(bkrbkup)
```

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

```
gomcmd opmgrm1 viewcon user(bkrwrkxx)
```

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

```
gomcmd opmgrm1 viewcon user(omeglnx1)
```

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

```
bkrjob
```


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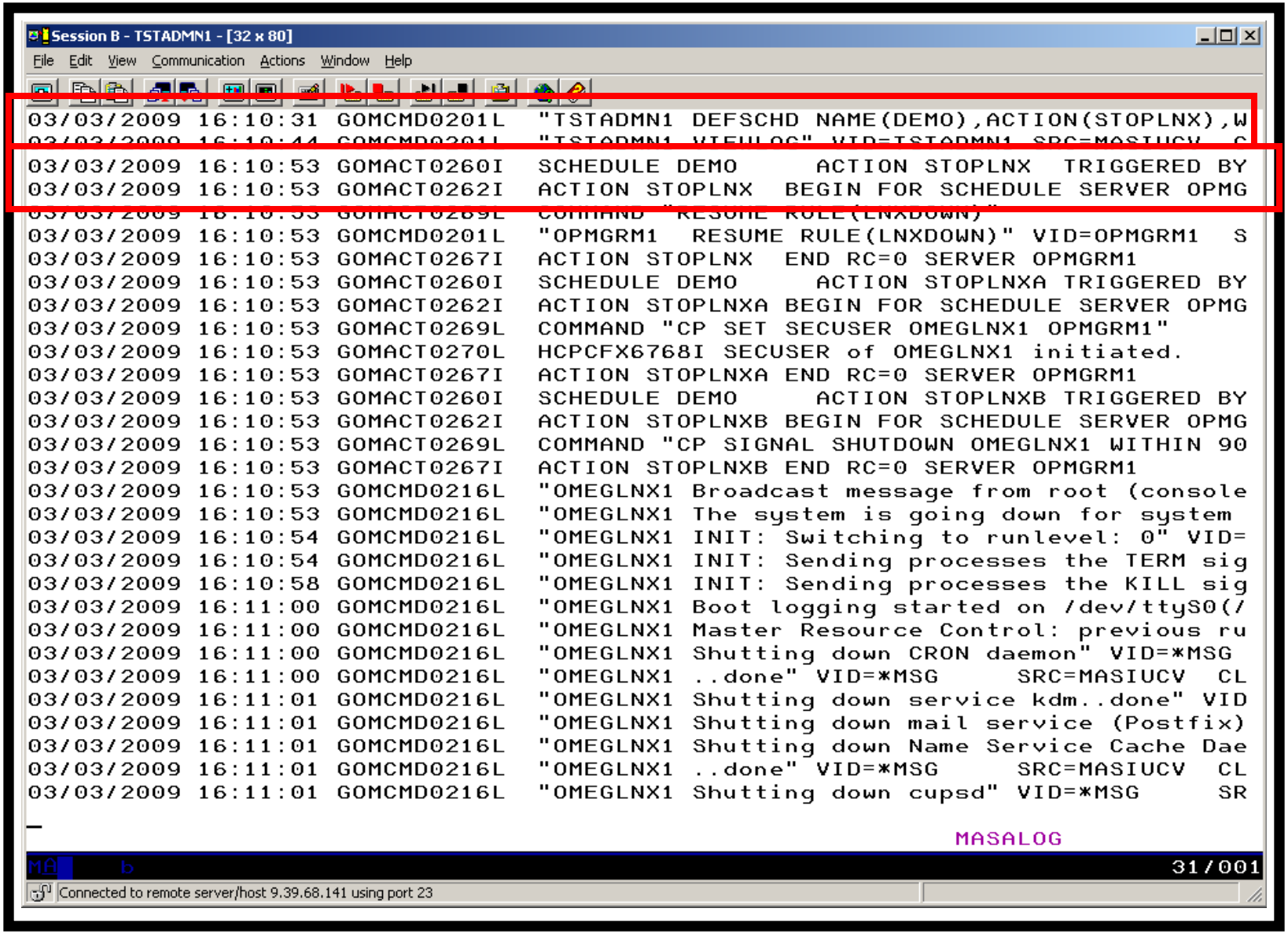

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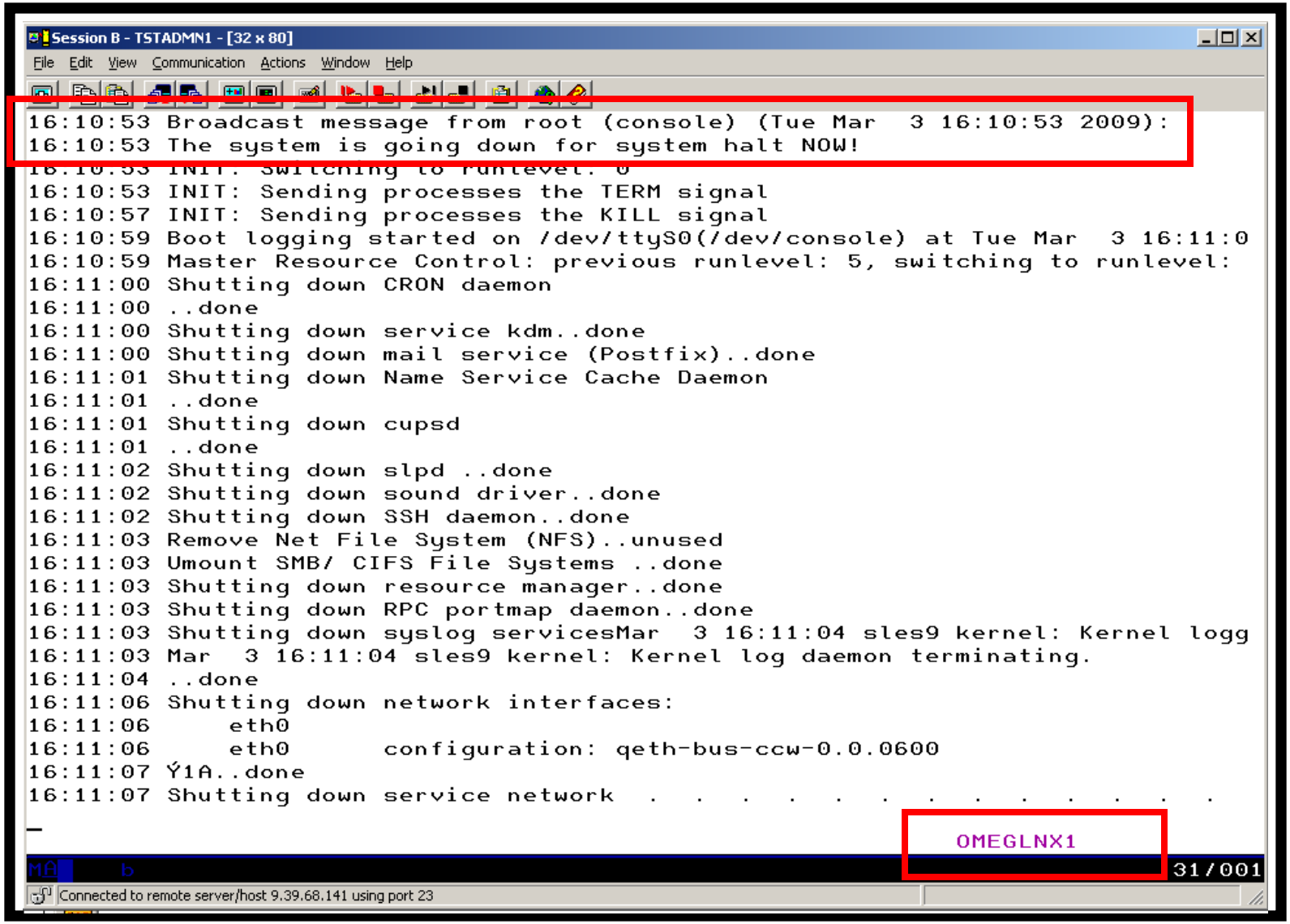

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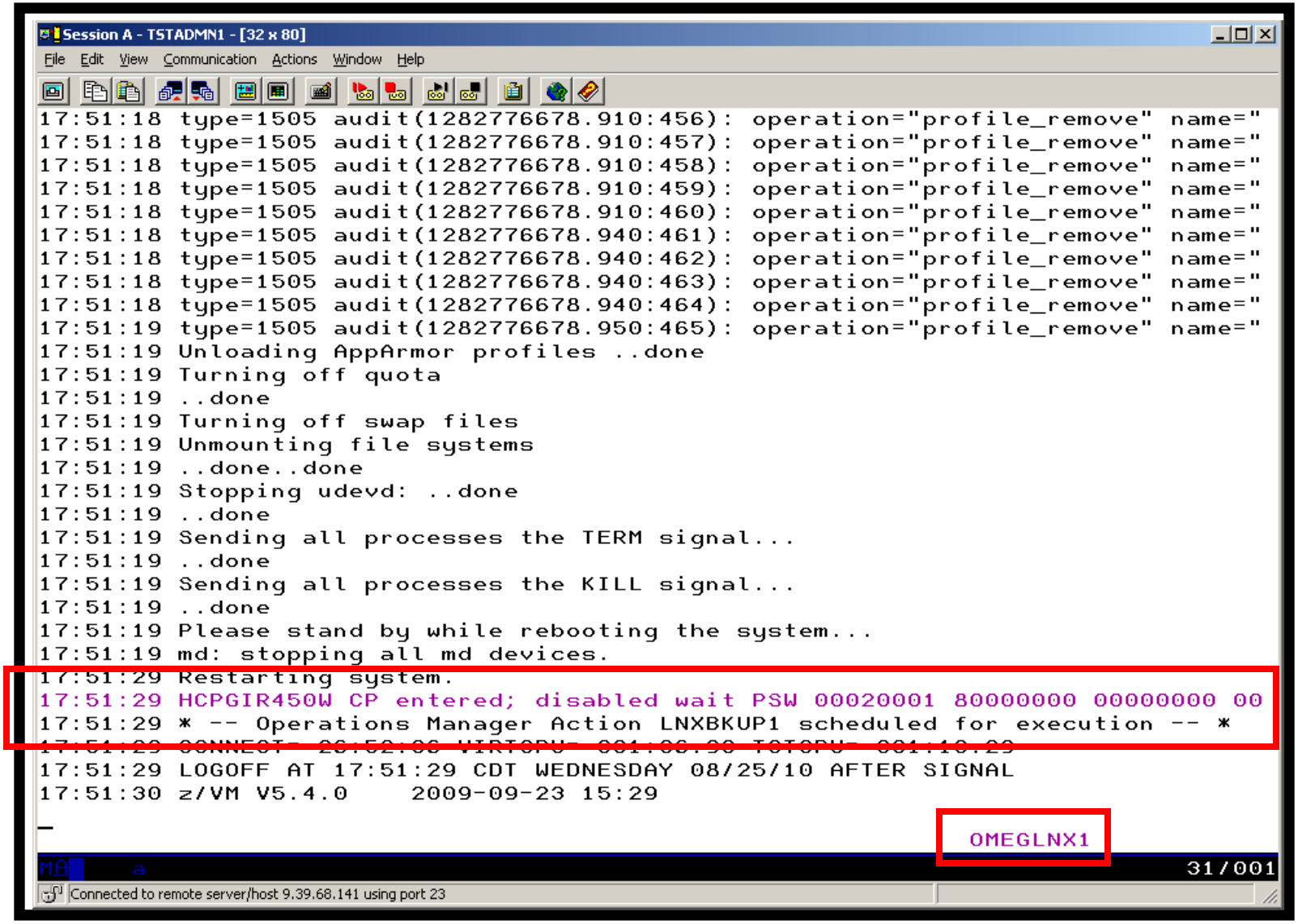

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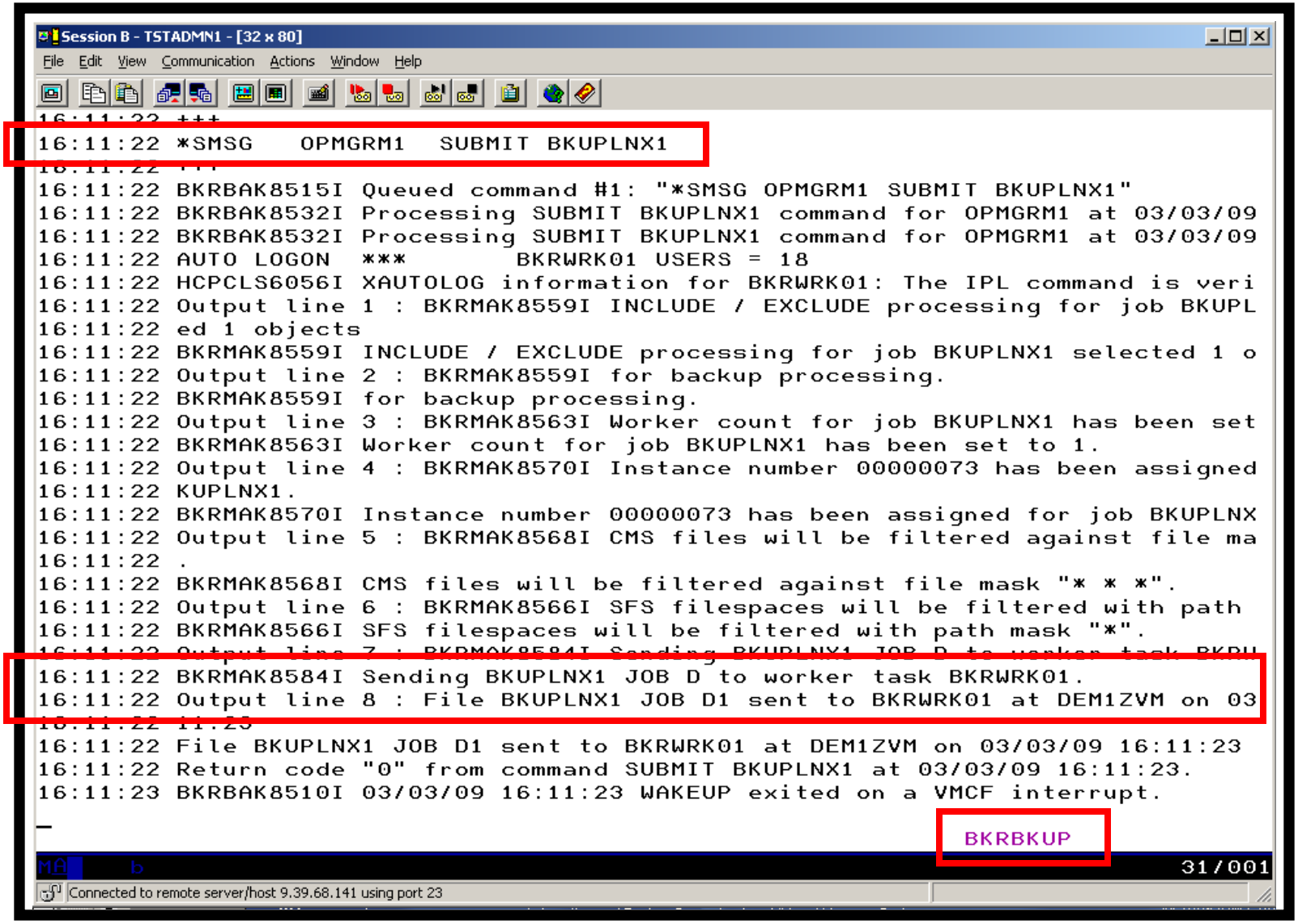

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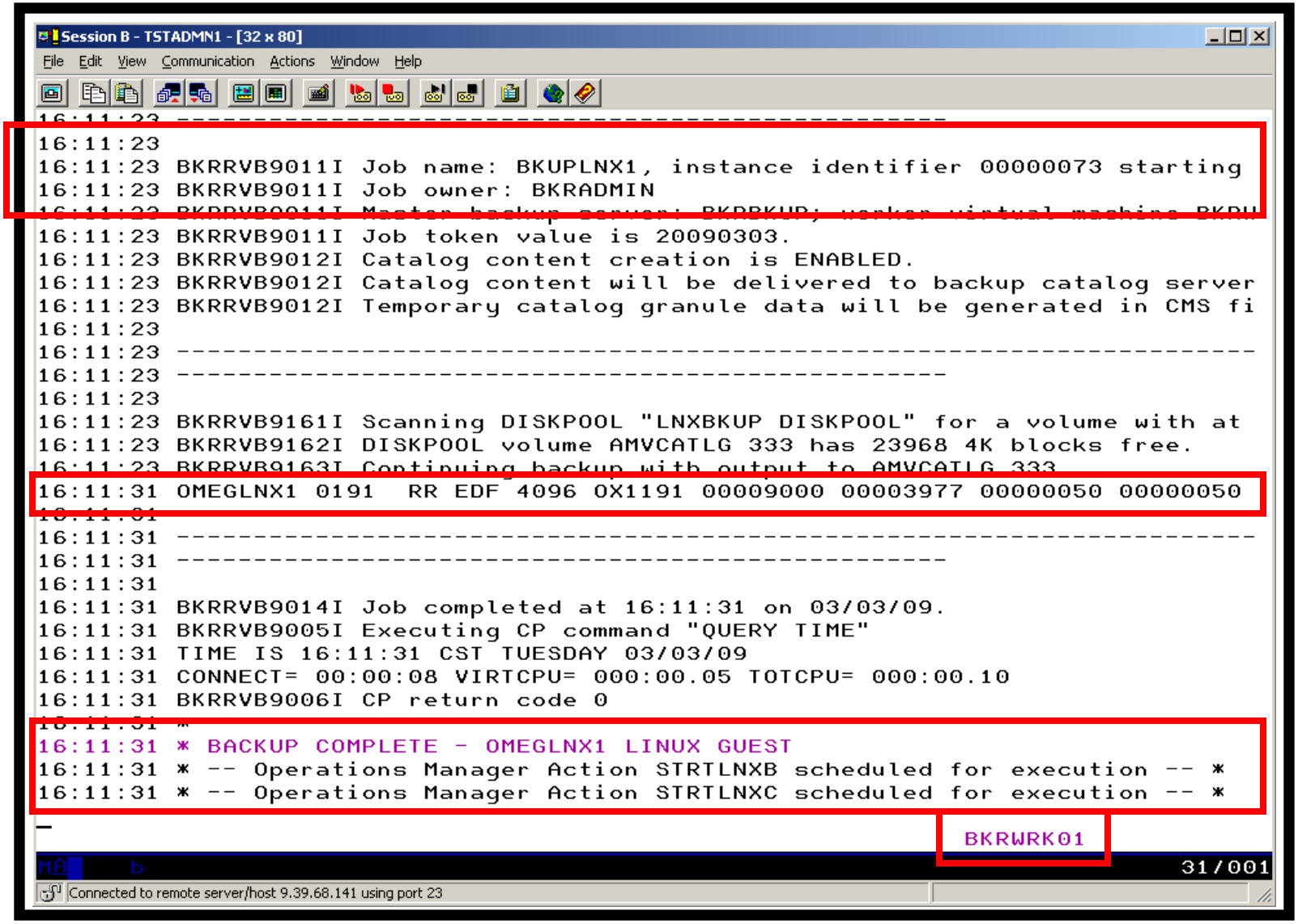

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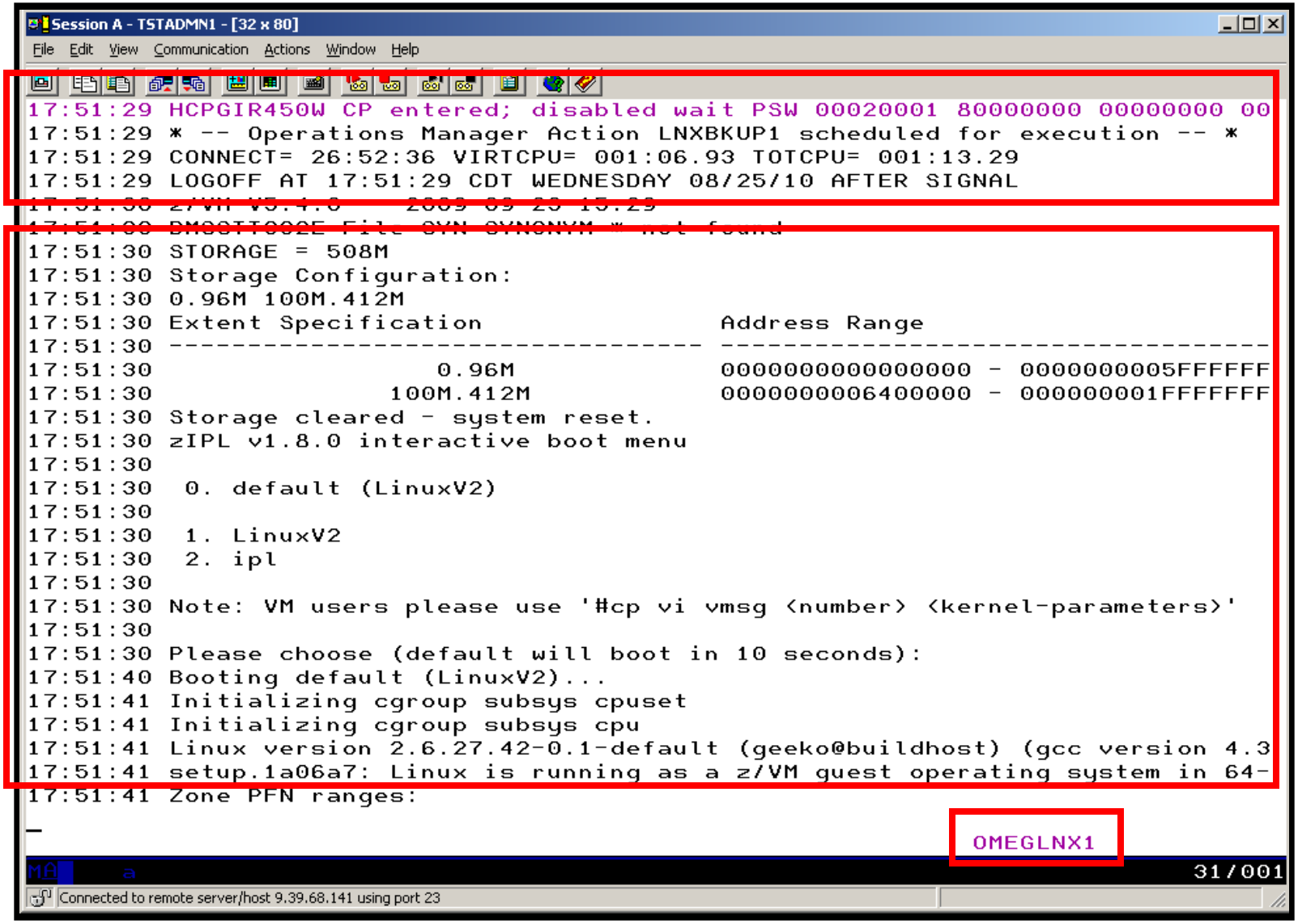

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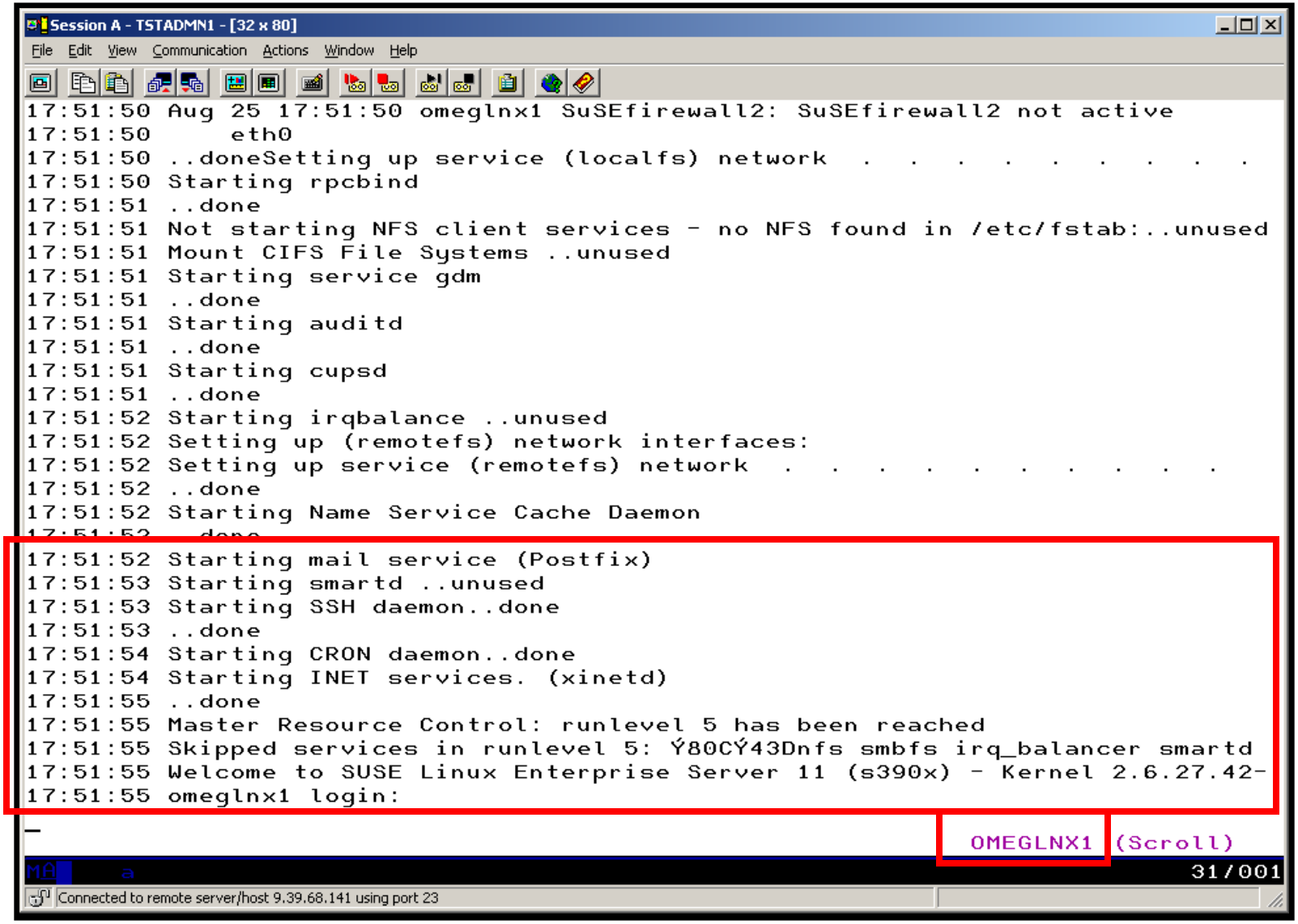

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Scenario 15: How Do You Do That?

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)
```


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Scenario 15: 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)
```


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Scenario 15: 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 BKRBKUP 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)
```


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Scenario 15: 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)
```


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Scenario 16:
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**

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Scenario 16: 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>
```


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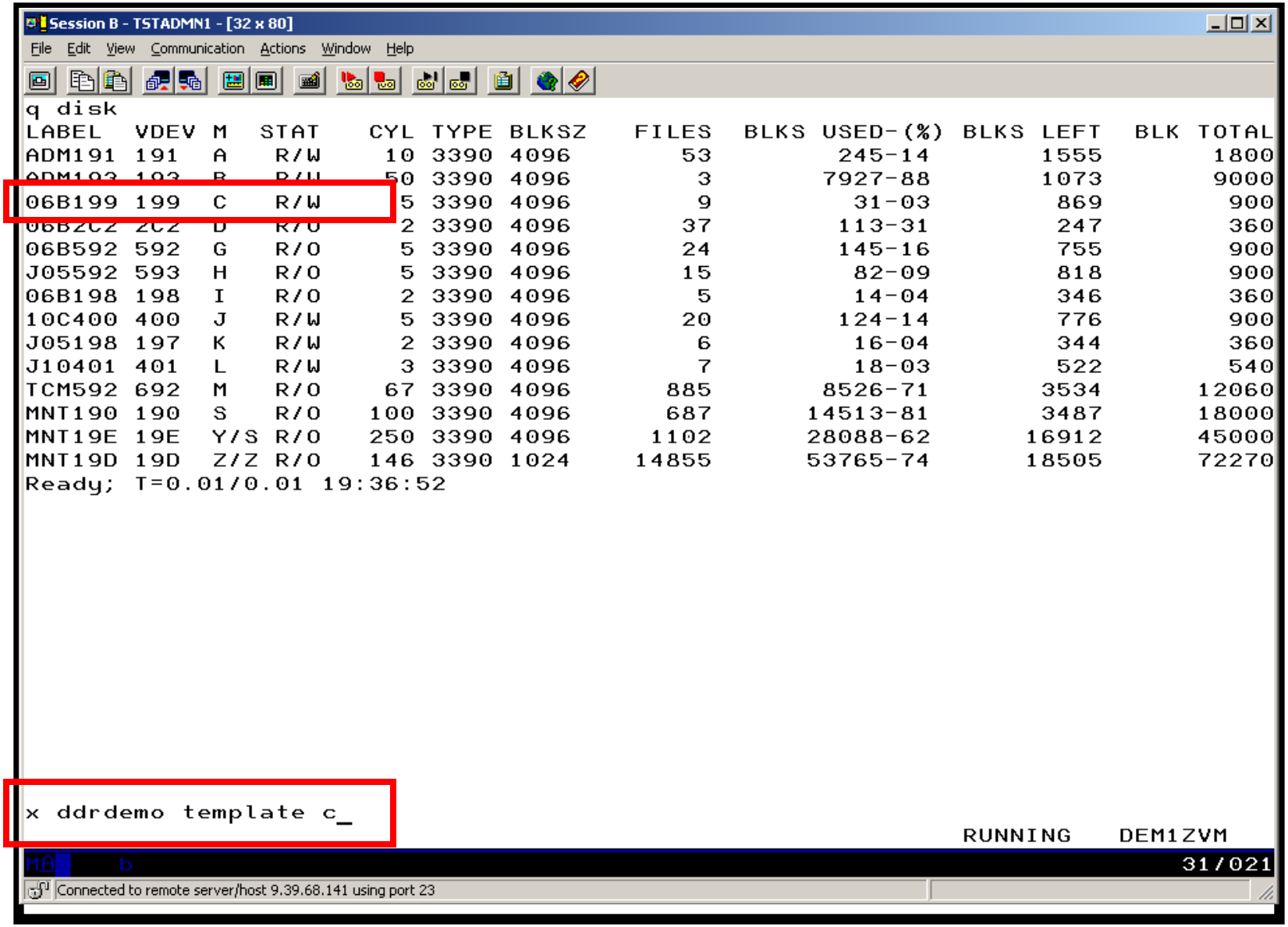

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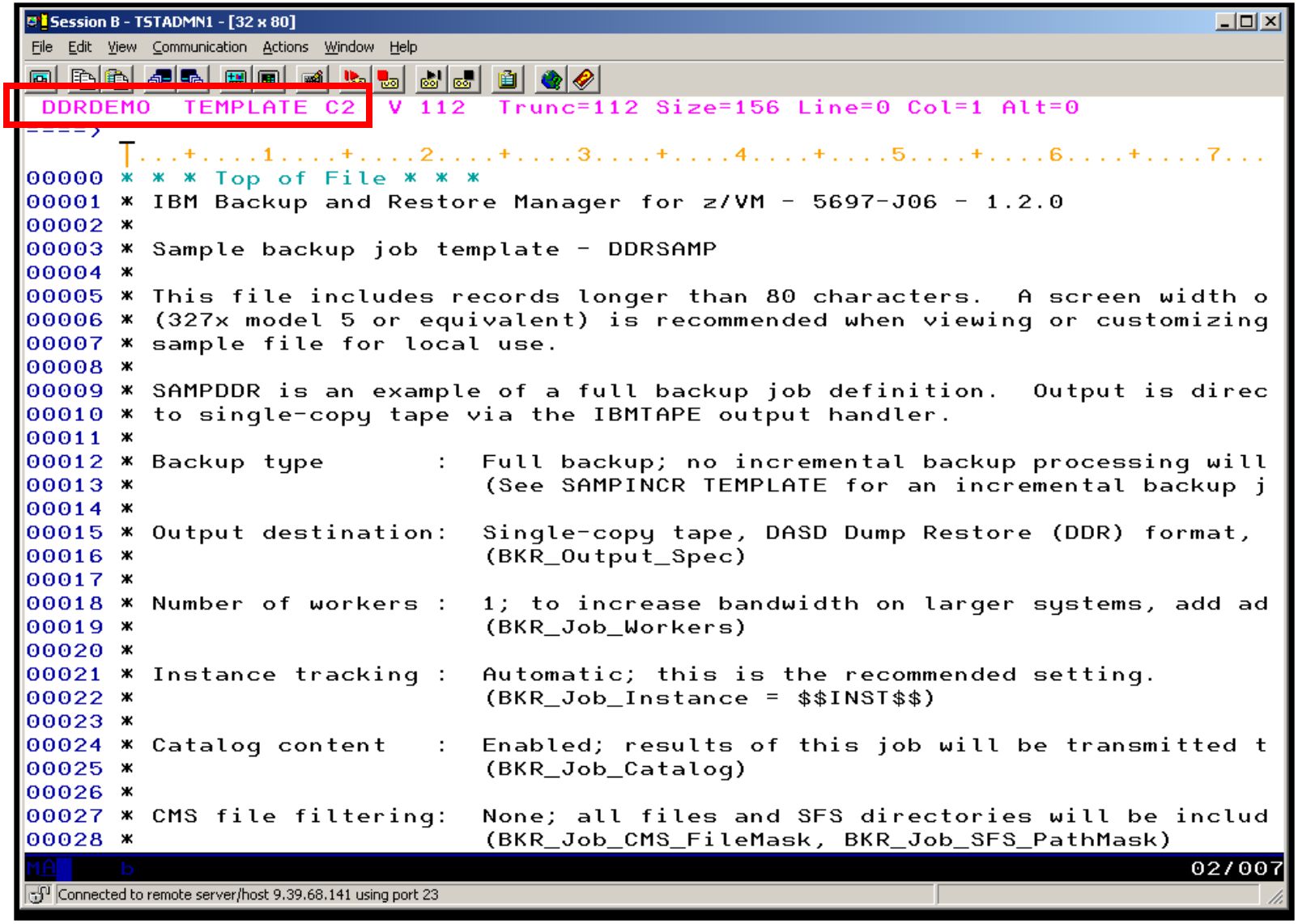

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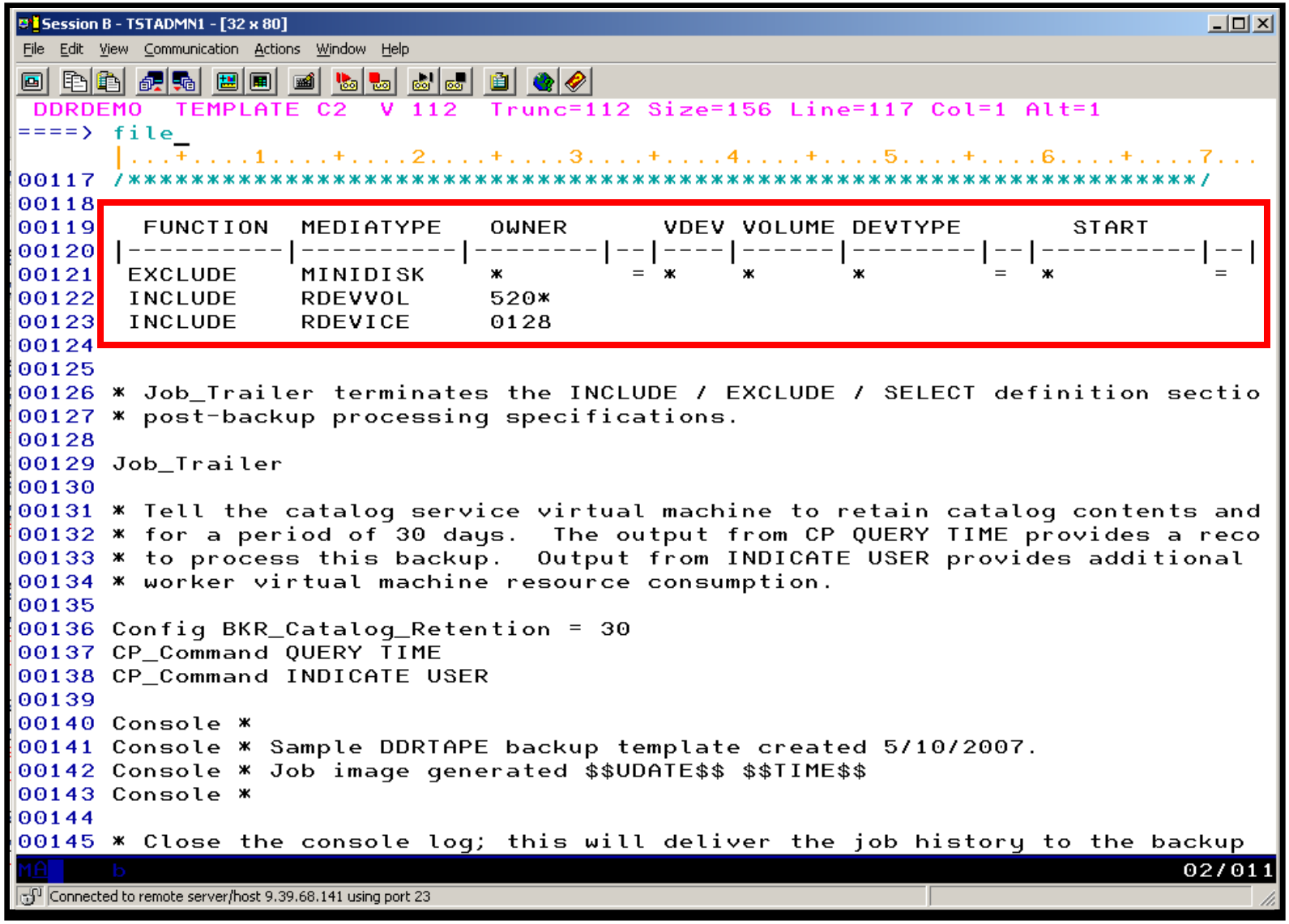

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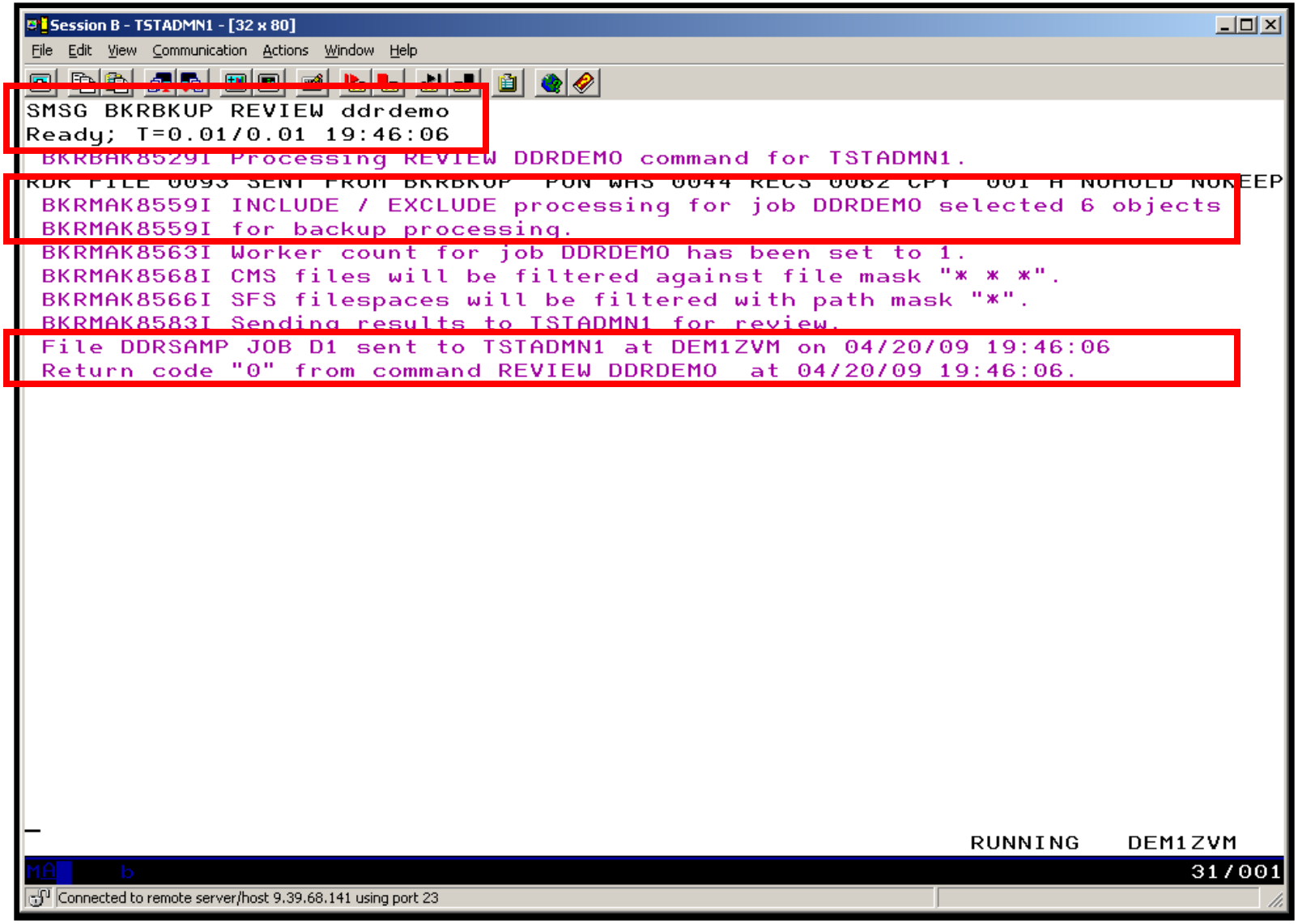

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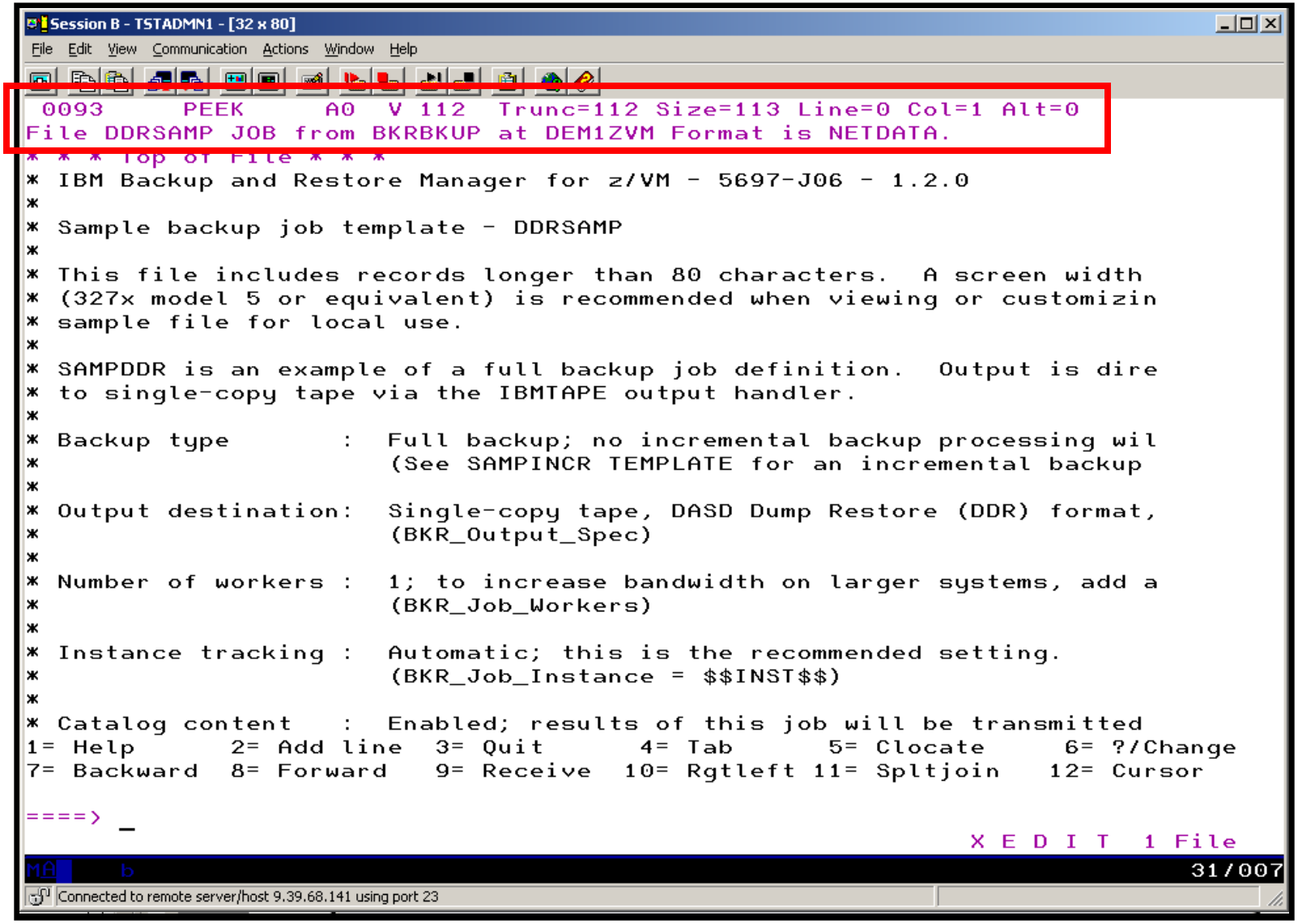

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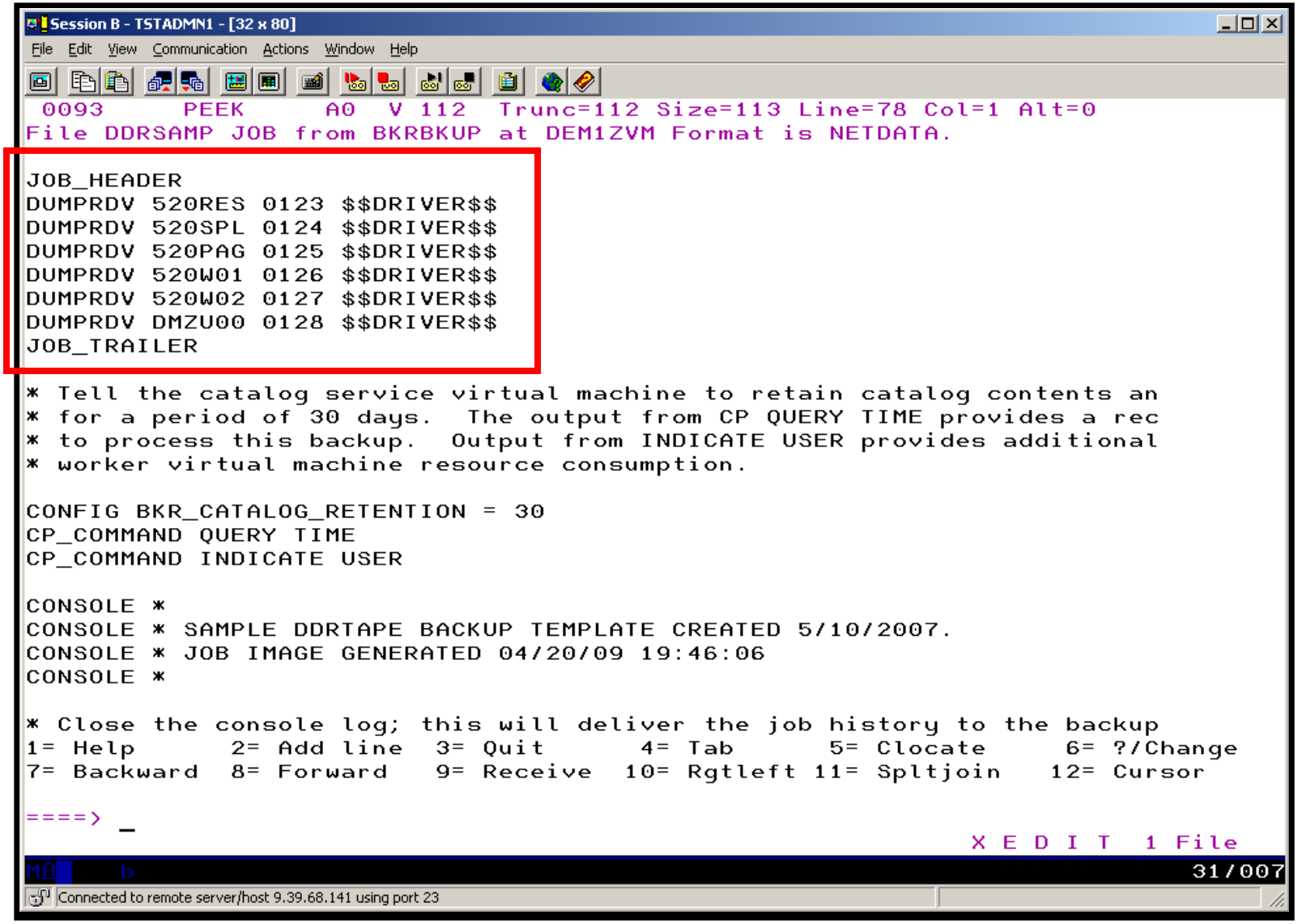

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Scenario 17: Reviewing data in the Backup catalog for recovery

- **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

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Scenario 17: 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**

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