Integrating IBM's Solutions
System and Performance Management of z/VM and Linux on System z

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Agenda

- **Introduction**

- **Architectural overview**

- **Performance management scenarios**

- **System and storage management scenarios**

- **Summary**
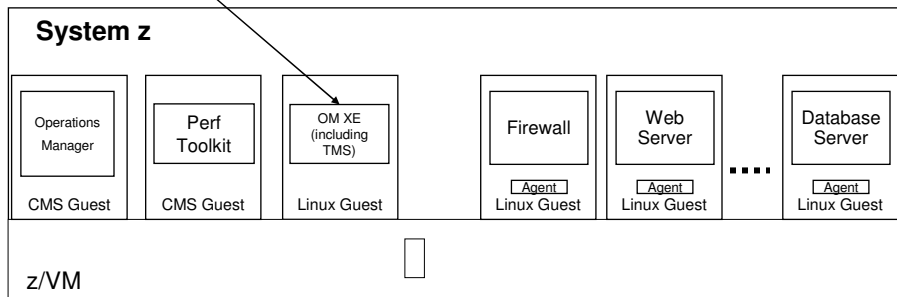
1

Introduction

- **Products**
  - Tivoli OMEGAMON XE on z/VM and Linux
  - Operations Manager for z/VM
  - Backup and Restore Manager for z/VM
  - Tape Manager for z/VM
  - Archive Manager for z/VM
- **Scenarios for system and performance management**
  - z/VM systems with Linux guests
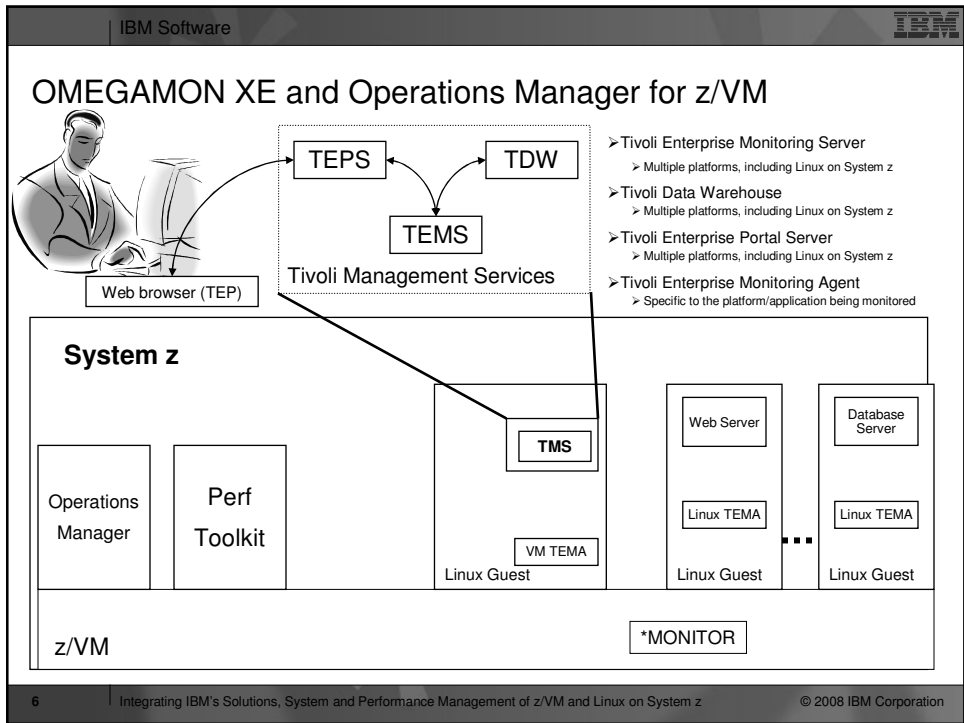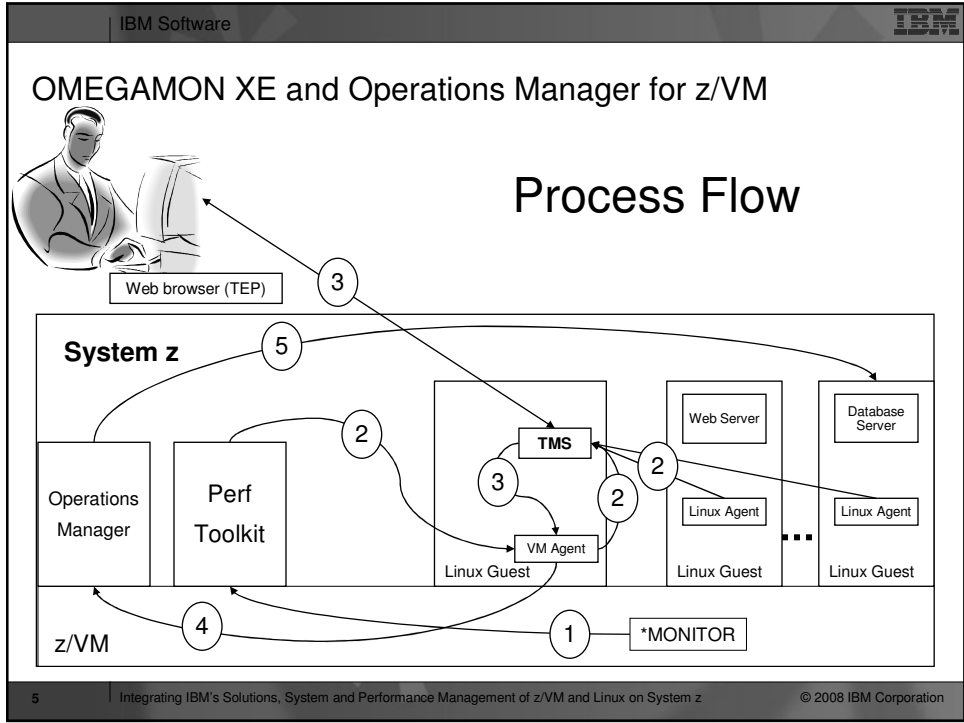 - z/VM systems without Linux guests

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Monitoring and Management of z/VM and Linux Guests

> OMEGAMON XE on z/VM and Linux
> - Performance monitoring for z/VM and Linux guests
> - Part of Tivoli Management Services (TMS) infrastructure
> - Intuitive browser-based user interface
> - Consolidated view of host and guest metrics
>
> Operations Manager for z/VM
> - Monitor consoles of z/VM service machines and guest user IDs
> - Take actions based on console messages
>   - Respond to "take action" requests from OMEGAMON
> - Schedule routine tasks

Tivoli Enterprise Portal (Web browser)

System z

Operations Manager	Perf Toolkit	OM XE (including TMS)		Firewall	Web Server		Database Server
				Agent	Agent	....	Agent
CMS Guest	CMS Guest	Linux Guest		Linux Guest	Linux Guest		Linux Guest

z/VM

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OMEGAMON XE and Operations Manager for z/VM

Process Flow

Web browser (TEP)

System z

Operations Manager

Perf Toolkit

TMS

Web Server

Database Server

Linux Agent

Linux Agent

VM Agent

Linux Guest

Linux Guest

Linux Guest

z/VM

*MONITOR

OMEGAMON XE and Operations Manager for z/VM

TEPS

TDW

TEMS

Tivoli Management Services

Web browser (TEP)

➤Tivoli Enterprise Monitoring Server
  ➤ Multiple platforms, including Linux on System z
➤Tivoli Data Warehouse
  ➤ Multiple platforms, including Linux on System z
➤Tivoli Enterprise Portal Server
  ➤ Multiple platforms, including Linux on System z
➤Tivoli Enterprise Monitoring Agent
  ➤ Specific to the platform/application being monitored

System z

Operations Manager

Perf Toolkit

TMS

Web Server

Database Server

Linux TEMA

Linux TEMA

VM TEMA

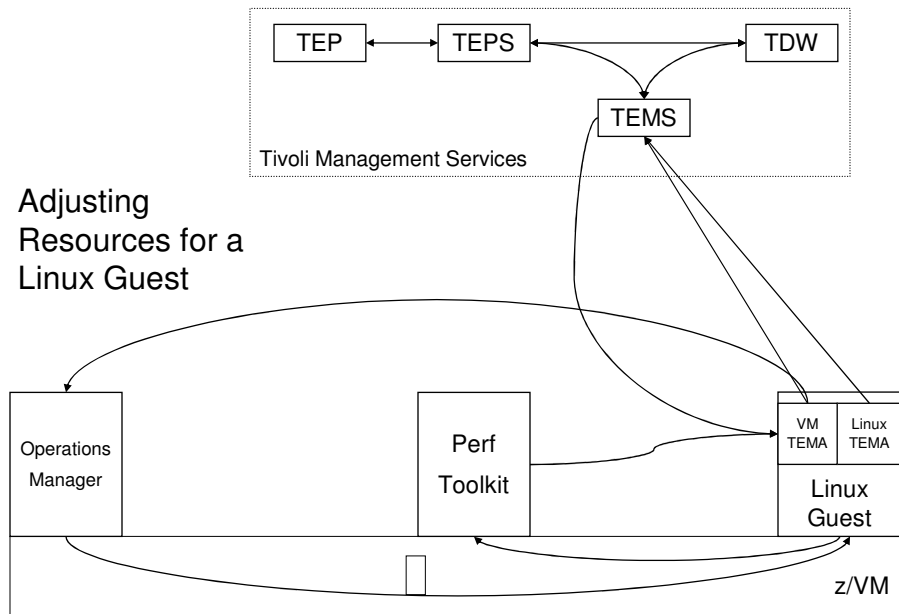Linux Guest

Linux Guest

Linux Guest

z/VM

*MONITOR

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Demo / Screenshots

OMEGAMON and Operations Manager
Performance Management Scenarios

Adjusting Resources for a Linux Guest

- **Virtual CPU consumption is high for a Linux guest**
- **OMEGAMON XE detects the situation**
  - Sends message to Operations Manager
- **Action is triggered by a rule in Operations Manager**
- **Operations Manager issues CP commands to tune the guest**
  - SET QUICKDSP
  - SET SHARE
- **The triggered policy and action are viewable from TEP**

Adjusting
Resources for a
Linux Guest

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System and Storage Management Scenarios
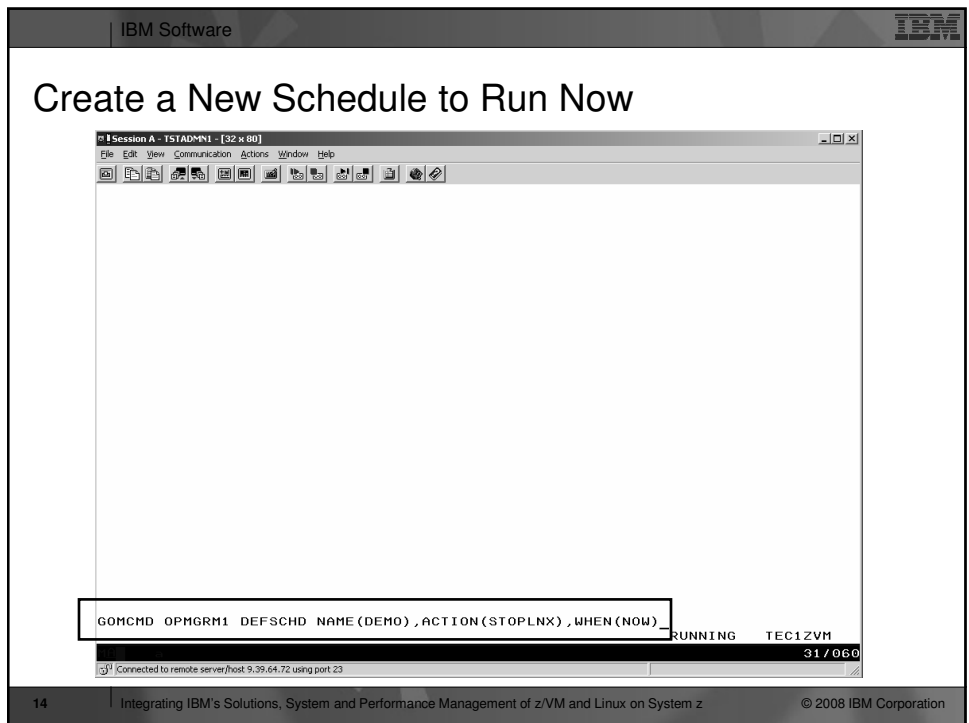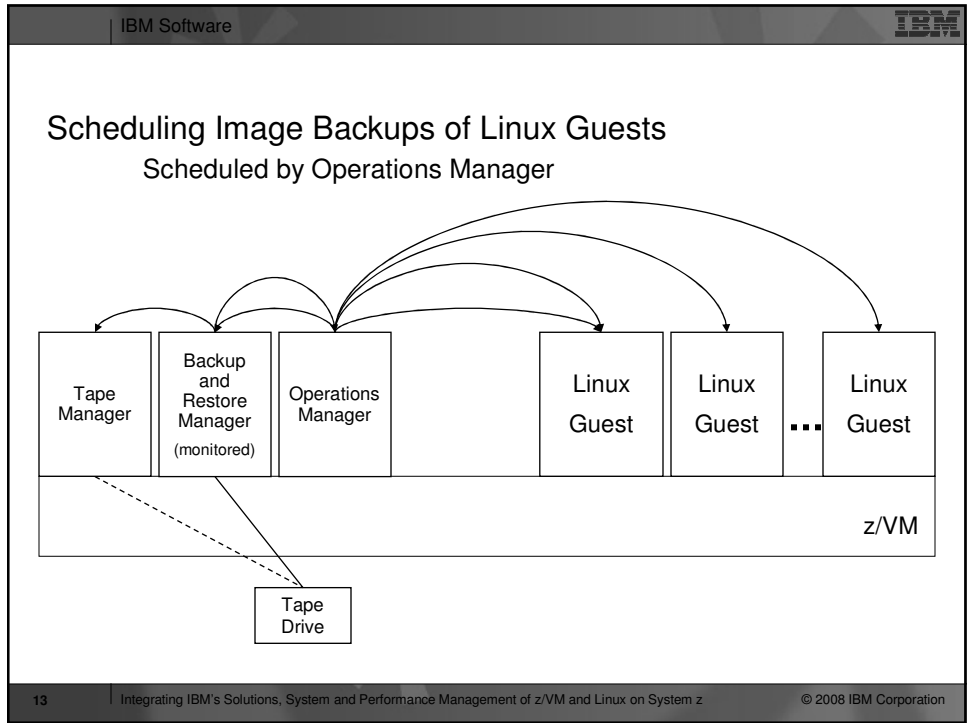

Scheduling Image Backups of Linux Guests

- **Initiated or scheduled by Operations Manager**
  - Schedule defined in Operations Manager to initiate backups at specific times/intervals
    - May include multiple schedules to allow quiescing/backing up one guest at a time
  - Action associated with each schedule
    - Linux guest is quiesced
    - Request sent to Backup and Restore Manager to back up the specific DASD/minidisks requested
    - Operations Manager notified when the action is complete
    - Linux guest is reactivated

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Scheduling Image Backups of Linux Guests
Scheduled by Operations Manager

```
┌──────────┐ ┌──────────┐ ┌──────────┐          ┌──────────┐ ┌──────────┐   ┌──────────┐
│          │ │ Backup   │ │          │          │          │ │          │   │          │
│  Tape    │ │   and    │ │Operations│          │  Linux   │ │  Linux   │   │  Linux   │
│ Manager  │ │ Restore  │ │ Manager  │          │  Guest   │ │  Guest   │...│  Guest   │
│          │ │ Manager  │ │          │          │          │ │          │   │          │
│          │ │(monitored)│ │          │          │          │ │          │   │          │
└──────────┘ └──────────┘ └──────────┘          └──────────┘ └──────────┘   └──────────┘
```

z/VM

```
       ┌────────┐
       │  Tape  │
       │  Drive │
       └────────┘
```

Create a New Schedule to Run Now

Session A - TSTADMN1 - [32 x 80]

File Edit View Communication Actions Window Help

```
GOMCMD OPMGRM1 DEFSCHD NAME(DEMO),ACTION(STOPLNX),WHEN(NOW)
                                                            RUNNING    TEC1ZVM
                                                                       31/060
```

Connected to remote server/host 9.39.64.72 using port 23

View Operations Manager Log to See Schedule Triggered

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

03/01/2008 17:52:21 GOMCMD0201L   "TSTADMN1DEFSCHD NAME(DEMO),ACTION(STOPLNX),WH
03/01/2008 17:52:22 GOMACT0260I   SCHEDULE DEMO     ACTION STOPLNX  TRIGGERED BY
03/01/2008 17:52:22 GOMACT0262I   ACTION STOPLNX  BEGIN FOR SCHEDULE SERVER OPMG
03/01/2008 17:52:22 GOMACT0269I   COMMAND "RESUME RULE(LNXDOWN)"
03/01/2008 17:52:22 GOMCMD0201L   "OPMGRM1 RESUME RULE(LNXDOWN)" VID=OPMGRM1   SR
03/01/2008 17:52:22 GOMACT0267I   ACTION STOPLNX  END RC=0 SERVER OPMGRM1
03/01/2008 17:52:22 GOMACT0260I   SCHEDULE DEMO     ACTION STOPLNXA TRIGGERED BY
03/01/2008 17:52:22 GOMACT0262I   ACTION STOPLNXA BEGIN FOR SCHEDULE SERVER OPMG
03/01/2008 17:52:22 GOMACT0269I   COMMAND "CP SET SECUSER OMEGLNX1 OPMGRM1"
03/01/2008 17:52:22 GOMACT0267I   ACTION STOPLNXA END RC=0 SERVER OPMGRM1
03/01/2008 17:52:22 GOMACT0260I   SCHEDULE DEMO     ACTION STOPLNXB TRIGGERED BY
03/01/2008 17:52:22 GOMACT0262I   ACTION STOPLNXB BEGIN FOR SCHEDULE SERVER OPMG
03/01/2008 17:52:22 GOMACT0269I   COMMAND "CP SIGNAL SHUTDOWN OMEGLNX1 WITHIN 90
03/01/2008 17:52:22 GOMACT0267I   ACTION STOPLNXB END RC=0 SERVER OPMGRM1
03/01/2008 17:52:22 GOMCMD0216L   "OMEGLNX1Broadcast message from root (console)
03/01/2008 17:52:22 GOMCMD0216L   "OMEGLNX1The system is going down for reboot N
03/01/2008 17:52:22 GOMCMD0216L   "OMEGLNX1INIT: Switching to runlevel: 6" VID=*
03/01/2008 17:52:22 GOMCMD0216L   "OMEGLNX1INIT: Sending processes the TERM sign
03/01/2008 17:52:26 GOMCMD0201L   "TSTADMN1VIEWLOG" VID=TSTADMN1 SRC=MASIUCV  CL
03/01/2008 17:52:26 GOMCMD0216L   "OMEGLNX1INIT: Sending processes the KILL sign
03/01/2008 17:52:33 GOMCMD0216L   "OMEGLNX1Boot logging started on /dev/ttyS0(/d
03/01/2008 17:52:36 GOMCMD0216L   "OMEGLNX1Master Resource Control: previous run
03/01/2008 17:52:36 GOMCMD0216L   "OMEGLNX1Shutting down CRON daemon" VID=*MSG
03/01/2008 17:52:36 GOMCMD0216L   "OMEGLNX1..done" VID=*MSG     SRC=MASIUCV  CLS
03/01/2008 17:52:38 GOMCMD0216L   "OMEGLNX1Shutting down mail service (Postfix).
03/01/2008 17:52:39 GOMCMD0216L   "OMEGLNX1Shutting down service kdm" VID=*MSG
03/01/2008 17:52:40 GOMCMD0216L   "OMEGLNX1..done" VID=*MSG     SRC=MASIUCV  CLS
03/01/2008 17:52:41 GOMCMD0216L   "OMEGLNX1Shutting down Name Service Cache Daem
03/01/2008 17:52:42 GOMCMD0216L   "OMEGLNX1..done" VID=*MSG     SRC=MASIUCV  CLS
03/01/2008 17:52:43 GOMCMD0216L   "OMEGLNX1Shutting down cupsd" VID=*MSG     SRC

                                              MASALOG
                                                       31/001
Connected to remote server/host 9.39.64.72 using port 23
```

View Linux Guest Console – Observe Shutdown

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

03/01/2008 17:52:21 Broadcast message from root (console) (Sat Mar  1 11:52:22
03/01/2008 17:52:21 The system is going down for reboot NOW!
03/01/2008 17:52:21 INIT: Switching to runlevel: 6
03/01/2008 17:52:21 INIT: Sending processes the TERM signal
03/01/2008 17:52:26 INIT: Sending processes the KILL signal
03/01/2008 17:52:32 Boot logging started on /dev/ttyS0(/dev/console) at Sat Mar
03/01/2008 17:52:32 Master Resource Control: previous runlevel: 5, switching to
03/01/2008 17:52:35 Shutting down CRON daemon
03/01/2008 17:52:35 ..done
03/01/2008 17:52:37 Shutting down mail service (Postfix)..done
03/01/2008 17:52:38 Shutting down service kdm
03/01/2008 17:52:39 ..done
03/01/2008 17:52:41 Shutting down Name Service Cache Daemon
03/01/2008 17:52:41 ..done
03/01/2008 17:52:42 Shutting down cupsd
03/01/2008 17:52:42 ..done
03/01/2008 17:52:44 Shutting down slpd ..done
03/01/2008 17:52:48 Shutting down sound driver..done
03/01/2008 17:52:48 Shutting down SSH daemon..done
03/01/2008 17:52:50 Remove Net File System (NFS)..unused
03/01/2008 17:52:53 Umount SMB/ CIFS File Systems ..done
03/01/2008 17:52:53 Shutting down resource manager..done
03/01/2008 17:52:53 Shutting down RPC portmap daemon
03/01/2008 17:52:53 ..done
03/01/2008 17:52:55 Shutting down syslog servicesMar  1 11:52:55 sles9 kernel:
03/01/2008 17:52:55 Mar  1 11:52:55 sles9 kernel: Kernel log daemon terminating
03/01/2008 17:52:56 ..done
03/01/2008 17:53:08 Shutting down network interfaces:
03/01/2008 17:53:12     eth0
03/01/2008 17:53:12     eth0        configuration: qeth-bus-ccw-0.0.0600

                                              OMEGLNX1
                                                       31/001
Connected to remote server/host 9.39.64.72 using port 23
```

Wait for System Down or Time Out Message

```
Session A - TSTADMN1 - [32 x 80]                                    _ |□| x|
File  Edit  View  Communication  Actions  Window  Help

03/01/2008 17:53:52 HCPSIG2112I Signal timeout interval has expired
03/01/2008 17:54:05 System Boot Control: Running /etc/init.d/boot
03/01/2008 17:54:05 Mounting /proc filesystem..done
03/01/2008 17:54:05 Mounting sysfs on /sys..done
03/01/2008 17:54:05 Mounting /dev/pts..done
03/01/2008 17:54:05 Boot logging started on /dev/ttyS0(/dev/console) at Sat Mar
03/01/2008 17:54:06 Mounting shared memory FS on /dev/shm..done
03/01/2008 17:54:06 Checking root file system...
03/01/2008 17:54:06 fsck 1.34 (25-Jul-2003)
03/01/2008 17:54:06 Ý/sbin/fsck.ext3 (1) -- /" fsck.ext3 -a /dev/dasda1
03/01/2008 17:54:06 /dev/dasda1: clean, 147891/903168 files, 1161423/1802856 bl
03/01/2008 17:54:06 Ý1A..doneEXT3 FS on dasda1, internal journal
03/01/2008 17:54:06 md: Autodetecting RAID arrays.
03/01/2008 17:54:06 md: autorun ...
03/01/2008 17:54:06 md: ... autorun DONE.
03/01/2008 17:54:06 Activating device mapper...
03/01/2008 17:54:06 device-mapper: 4.1.0-ioctl (2003-12-10) initialised: dm@uk.
03/01/2008 17:54:06 Creating /dev/mapper/control character device with major:10
03/01/2008 17:54:06 ..done
03/01/2008 17:54:06 Scanning for LVM volume groups...
03/01/2008 17:54:06   Reading all physical volumes.  This may take a while...
03/01/2008 17:54:06   No volume groups found
03/01/2008 17:54:06 Activating LVM volume groups...
03/01/2008 17:54:06   No volume groups found
03/01/2008 17:54:06 ..skipped
03/01/2008 17:54:07 Checking file systems...
03/01/2008 17:54:07 fsck 1.34 (25-Jul-2003)
03/01/2008 17:54:07 Checking all file systems.
03/01/2008 17:54:07 Ý/sbin/fsck.ext3 (1) -- /opt" fsck.ext3 -a /dev/dasdc1
03/01/2008 17:54:07 /dev/dasdc1: clean, 51207/903168 files, 365087/1802856 bloc
                                                         OMEGLNX1
                                                              31/001
Connected to remote server/host 9.39.64.72 using port 23
```

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View Backup Manager Console (BKRBKUP)

```
Session A - TSTADMN1 - [32 x 80]                                    _ |□| x|
File  Edit  View  Communication  Actions  Window  Help

+++
*SMSG    OPMGRM1  SUBMIT BKUPLNX1
+++
BKRBAK8515I Queued command #1: "*SMSG OPMGRM1 SUBMIT BKUPLNX1"
BKRBAK8532I Processing SUBMIT BKUPLNX1 command for OPMGRM1 at 03/01/08 17:53:52
AUTO LOGON  ***     BKRWRK01 USERS = 23
HCPCLS6056I XAUTOLOG information for BKRWRK01: The IPL command is verified by t
Output line 1 : BKRMAK8559I INCLUDE / EXCLUDE processing for job BKUPLNX1 selec
ed 1 objects
Output line 2 : BKRMAK8559I for backup processing.
Output line 3 : BKRMAK8563I Worker count for job BKUPLNX1 has been set to 1.
Output line 4 : BKRMAK8570I Instance number 00000058 has been assigned for job
KUPLNX1.
Output line 5 : BKRMAK8568I CMS files will be filtered against file mask "* * *
.
Output line 6 : BKRMAK8568I SFS filespaces will be filtered with path mask "*".
Output line 7 : BKRMAK8584I Sending BKUPLNX1 JOB D to worker task BKRWRK01.
Output line 8 : File BKUPLNX1 JOB D1 sent to BKRWRK01 at TEC1ZVM on 03/01/08 17
53:53
BKRBAK8510I 03/01/08 17:53:55 WAKEUP exited on a VMCF interrupt.
BKRBAK8512I The stack contains 1 entries. There are 0 lines on the console inpu
BKRBAK8513I Program stack entry dump:
+++
*SMSG    BKRWRK01 WRKRSTAT TURNDON
+++
BKRBAK8515I Queued command #1: "*SMSG BKRWRK01 WRKRSTAT TURNDON"
BKRBAK8519I Processing WRKRSTAT command TURNDON from *SMSG BKRWRK01.
BKRBAK8510I 03/01/08 17:53:56 WAKEUP exited on a VMCF interrupt.
BKRBAK8512I The stack contains 1 entries. There are 0 lines on the console inpu
BKRBAK8513I Program stack entry dump:
                                                         BKRBKUP
                                                              31/001
Connected to remote server/host 9.39.64.72 using port 23
```

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View Backup Worker Console (BKRWRK01)

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help
-----------------------------------------------
BKRRVB9011I Job name: BKUPLNX1, instance identifier 00000058 starting at 17:53:
BKRRVB9011I Job owner: BKRADMIN
BKRRVB9011I Master backup server: BKRBKUP; worker virtual machine BKRWRK01.
BKRRVB9011I Job token value is 20080301.
BKRRVB9012I Catalog content creation is ENABLED.
BKRRVB9012I Catalog content will be delivered to backup catalog server BKRCATLG
BKRRVB9012I Temporary catalog granule data will be generated in CMS file BKUPLN

-----------------------------------------------------------------------
-----------------------------------------------------------------------

BKRRVB9161I Scanning DISKPOOL "LNXBKUP DISKPOOL" for a volume with at least 418
BKRRVB9162I DISKPOOL volume AMVCATLG 333 has 7953 4K blocks free.
BKRRVB9163I Continuing backup with output to AMVCATLG 333.
OMEGLNX1 0191   RR EDF 4096 0X1191 00009000 00003974 00000050 00000050 00000011

-----------------------------------------------------------------------
-----------------------------------------------------------------------

BKRRVB9014I Job completed at 17:54:03 on 03/01/08.
BKRRVB9005I Executing CP command  QUERY TIME
TIME IS 17:54:03 UTC SATURDAY 03/01/08
CONNECT= 00:00:09 VIRTCPU= 000:00.04 TOTCPU= 000:00.09
BKRRVB9006I CP return code 0
*
* BACKUP COMPLETE - OMEGLNX1 LINUX GUEST
* BACKUP COMPLETE - OMEGLNX1 LINUX GUEST
CP XAUTOLOG OMEGLNX1
_
                                              BKRWRK01
                                                 31/001
Connected to remote server/host 9.39.64.72 using port 23
```

View the Linux Guest Console – Guest is Restarting

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help
03/01/2008 17:53:52 HCPSIG2112I Signal timeout interval has expired
03/01/2008 17:54:05 System Boot Control: Running /etc/init.d/boot
03/01/2008 17:54:05 Mounting /proc filesystem..done
03/01/2008 17:54:05 Mounting sysfs on /sys..done
03/01/2008 17:54:05 Mounting /dev/pts..done
03/01/2008 17:54:06 Boot logging started on /dev/ttyS0(/dev/console) at Sat Mar
03/01/2008 17:54:06 Mounting shared memory FS on /dev/shm..done
03/01/2008 17:54:06 Checking root file system...
03/01/2008 17:54:06 fsck 1.34 (25-Jul-2003)
03/01/2008 17:54:06 Ý/sbin/fsck.ext3 (1) -- /" fsck.ext3 -a /dev/dasda1
03/01/2008 17:54:06 /dev/dasda1: clean, 147891/903168 files, 1161423/1802856 bl
03/01/2008 17:54:06 Ý1A..doneEXT3 FS on dasda1, internal journal
03/01/2008 17:54:06 md: Autodetecting RAID arrays.
03/01/2008 17:54:06 md: autorun ...
03/01/2008 17:54:06 md: ... autorun DONE.
03/01/2008 17:54:06 Activating device mapper...
03/01/2008 17:54:06 device-mapper: 4.1.0-ioctl (2003-12-10) initialised: dm@uk.
03/01/2008 17:54:06 Creating /dev/mapper/control character device with major:10
03/01/2008 17:54:06 ..done
03/01/2008 17:54:06 Scanning for LVM volume groups...
03/01/2008 17:54:06   Reading all physical volumes.  This may take a while...
03/01/2008 17:54:06   No volume groups found
03/01/2008 17:54:06 Activating LVM volume groups...
03/01/2008 17:54:06   No volume groups found
03/01/2008 17:54:06 ..skipped
03/01/2008 17:54:07 Checking file systems...
03/01/2008 17:54:07 fsck 1.34 (25-Jul-2003)
03/01/2008 17:54:07 Checking all file systems.
03/01/2008 17:54:07 Ý/sbin/fsck.ext3 (1) -- /opt" fsck.ext3 -a /dev/dasdc1
03/01/2008 17:54:07 /dev/dasdc1: clean, 51207/903168 files, 365087/1802856 bloc
_
                                              OMEGLNX1
                                                 31/001
Connected to remote server/host 9.39.64.72 using port 23
```

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View the Linux Guest Console - Startup Complete

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

Mar  1 11:54:20 sles9 kernel: Unable to find swap-space signature
Mar  1 11:54:20 sles9 kernel: NET: Registered protocol family 10
Mar  1 11:54:20 sles9 kernel: IPv6 over IPv4 tunneling driver
Mar  1 11:54:20 sles9 kernel: qeth: loading qeth S/390 OSA-Express driver ($Rev
Mar  1 11:54:20 sles9 kernel: qeth: Device 0.0.0600/0.0.0601/0.0.0602 is a Gues
Mar  1 11:54:20 sles9 kernel: with link type GuestLAN QDIO (portname: dontcare)
Mar  1 11:54:20 sles9 kernel: qeth: IP fragmentation not supported on eth0
Mar  1 11:54:20 sles9 kernel: qeth: VLAN enabled
Mar  1 11:54:20 sles9 kernel: qeth: Multicast enabled
Mar  1 11:54:20 sles9 kernel: qeth: IPV6 enabled
Mar  1 11:54:20 sles9 kernel: qeth: Broadcast enabled
Mar  1 11:54:20 sles9 kernel: qeth: Using SW checksumming on eth0.
Mar  1 11:54:20 sles9 kernel: st: Version 20040318, fixed bufsize 32768, s/g se
Master Resource Control: runlevel 5 has been reached
Failed services in runlevel 5: Ý80CÝ10Dkbd
Skipped services in runlevel 5: Ý80CÝ23Dcmbfs nfs splash

sles9 login:
sles9 login:
EXEC LXLOG OMEGLNX1
root
Password:

You have new mail in /var/mail/root.
Last login: Fri Feb 22 12:02:56 on ttyS0
CP SET SECUSER OMEGLNX1 OMEGACMD
Last login: Fri Feb 22 12:02:56 on ttyS0
SUSPEND RULE(LNXDOWN)
sles9:~ # JBD: barrier-based sync failed on dasdc1 - disabling barriers
Mar  1 11:54:23 sles9 kernel: JBD: barrier-based sync failed on dasdc1 - disabl
HCPCFX6768I Your SECUSER set to OMEGACMD by OPMGRM1.

                                                      OMEGLNX1  (Scroll)
                                                              31/001
Connected to remote server/host 9.39.64.72 using port 23
```

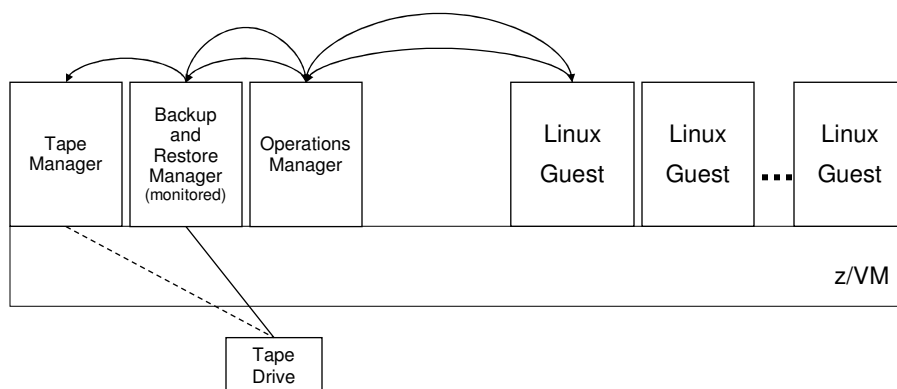## Performing an Image Backup of a Linux Guest

- **Initiated or scheduled by the guest**
  - Linux guest sends message/request to Operations Manager (or any console being monitored)
  - Action is triggered by a rule in Operations Manager
    - Linux guest is quiesced
      - Perhaps quiescing only the application running there
    - Operations Manager sends request to Backup and Restore Manager
      - Back up the specific DASD/minidisks requested
    - Operations Manager monitors the console of the backup server
      - Receives the message when backup is complete
      - Triggers a rule to re-activate the guest and send a message to the Linux guest indicating completion
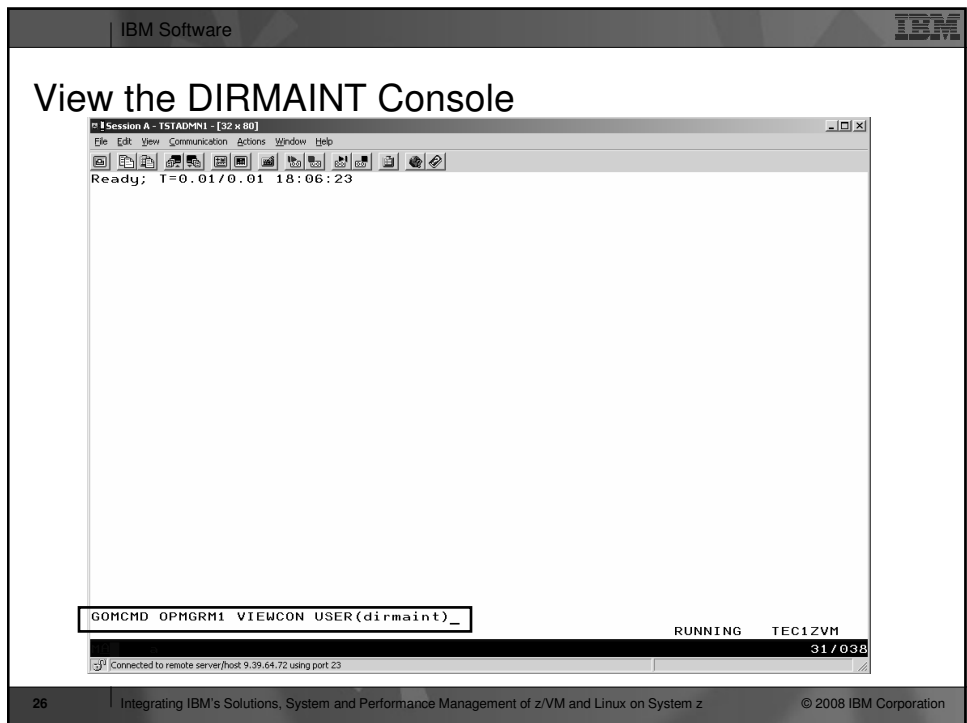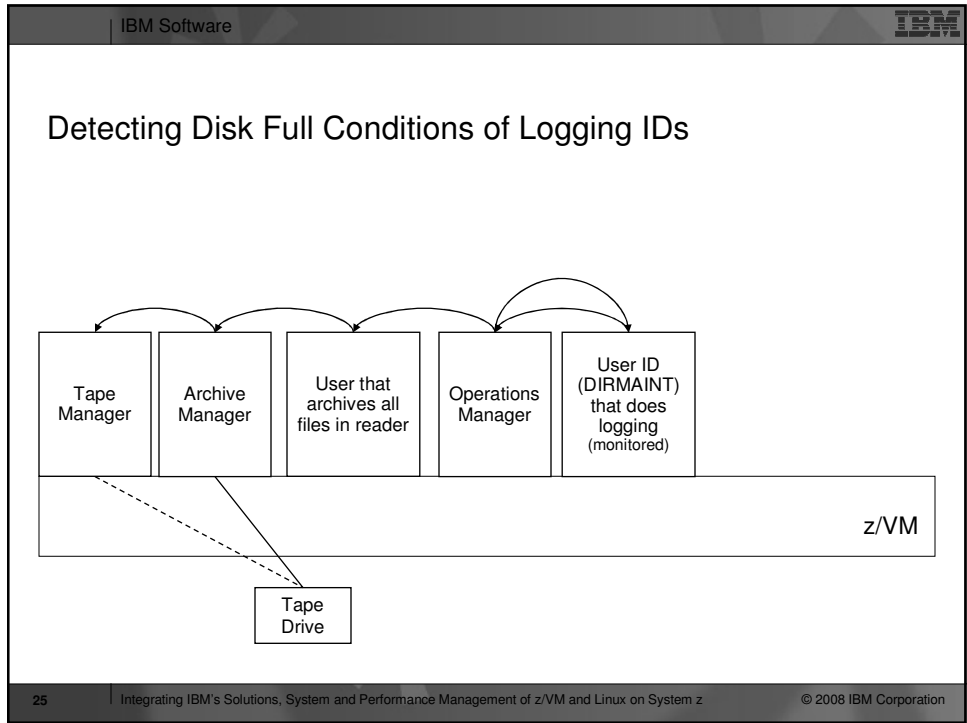
Performing an Image Backup of a Linux Guest
Initiated by the Linux Guest

```
  ┌─────────┐ ┌─────────┐ ┌─────────┐        ┌─────────┐ ┌─────────┐   ┌─────────┐
  │         │ │ Backup  │ │         │        │         │ │         │   │         │
  │  Tape   │ │  and    │ │Operations│       │  Linux  │ │  Linux  │   │  Linux  │
  │ Manager │ │ Restore │ │ Manager │        │         │ │         │...│         │
  │         │ │ Manager │ │         │        │  Guest  │ │  Guest  │   │  Guest  │
  │         │ │(monitored)│ │         │      │         │ │         │   │         │
  └─────────┘ └─────────┘ └─────────┘        └─────────┘ └─────────┘   └─────────┘
  ┌──────────────────────────────────────────────────────────────────────────────┐
  │                                                                          z/VM  │
  └──────────────────────────────────────────────────────────────────────────────┘
              ┌─────────┐
              │  Tape   │
              │  Drive  │
              └─────────┘
```

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**
  – Shut down the service machine
  – Send the log files to a service machine which automatically archives all files it receives
    • May involve Tape Manager if archiving to tape
  – Erase the log files
  – Restart the service machine

Detecting Disk Full Conditions of Logging IDs

Tape Manager	Archive Manager	User that archives all files in reader	Operations Manager	User ID (DIRMAINT) that does logging (monitored)

z/VM

Tape Drive

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---

View the DIRMAINT Console

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

Ready; T=0.01/0.01 18:06:23
```

```
GOMCMD OPMGRM1 VIEWCON USER(dirmaint)_
                                                            RUNNING    TEC1ZVM
                                                                       31/038
Connected to remote server/host 9.39.64.72 using port 23
```

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Issue Commands to Look at Disk Status and Copy Files

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

DVHWAI2140I Waiting for work on 08/03/01 at 18:06:02.
cms acc 333 t
DVHWAI2146I Wakeup caused by console attention on 08/03/01 at 18:08:21.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.01/0.01 18:08:21
DVHREQ2290I Request is: CMS acc 333 t
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.02/0.02 18:08:22
DVHWAI2140I Waiting for work on 08/03/01 at 18:08:22.
cms q disk
DVHWAI2146I Wakeup caused by console attention on 08/03/01 at 18:08:31.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.01/0.01 18:08:31
DVHREQ2290I Request is: CMS q disk
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
LABEL  VDEV M  STAT   CYL TYPE BLKSZ   FILES  BLKS USED-(%) BLKS LEFT  BLK TOTA
DIR155 155  A   R/W     9 3390 4096      11       78-05       1542        162
DRM491 191  C   R/W    15 3390 4096     250     1311-49       1389        270
DRM11F 11F  D   R/W     8 3390 4096      47      568-39        872        144
DIR1DF 1DF  E   R/W     9 3390 4096     122      259-16       1361        162
DIR1DB 1DB  G   R/W     9 3390 4096      10      140-09       1480        162
DIR1AA 1AA  H   R/W     9 3390 4096       8      172-11       1448        162
MNT190 190  S   R/O   100 3390 4096     687    14513-81       3487       1800
DIR333 333  T   R/W     5 3390 4096       2      505-56        395         90
MNT19E 19E  Y/S R/O   250 3390 4096    1100    28061-62      16939       4500
DIR1FA 1FA  Z   R/W     9 3390 4096       0        7-00       1613        162
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.02/0.02 18:08:32
DVHWAI2140I Waiting for work on 08/03/01 at 18:08:32.
CMS COPYFILE DIRMAINT TLOG0914 T = TLOG0912 H_
                                                      DIRMAINT (Scroll)
                                                                   31/046
Connected to remote server/host 9.39.64.72 using port 23
```

Trigger Hourly Disk Check

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

cms q disk
DVHWAI2146I Wakeup caused by console attention on 08/03/01 at 18:11:20.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.01/0.01 18:11:20
DVHREQ2290I Request is: CMS q disk
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
LABEL  VDEV M  STAT   CYL TYPE BLKSZ   FILES  BLKS USED-(%) BLKS LEFT  BLK TOTA
DIR155 155  A   R/W     9 3390 4096      11       78-05       1542        162
DRM491 191  C   R/W    15 3390 4096     250     1311-49       1389        270
DRM11F 11F  D   R/W     8 3390 4096      47      568-39        872        144
DIR1DF 1DF  E   R/W     9 3390 4096     122      259-16       1361        162
DIR1DB 1DB  G   R/W     9 3390 4096      10      140-09       1480        162
DIR1AA 1AA  H   R/W     9 3390 4096      11     1367-84        253        162
MNT190 190  S   R/O   100 3390 4096     687    14513-81       3487       1800
DIR333 333  T   R/W     5 3390 4096       2      505-56        395         90
MNT19E 19E  Y/S R/O   250 3390 4096    1100    28061-62      16939       4500
DIR1FA 1FA  Z   R/W     9 3390 4096       0        7-00       1613        162
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.02/0.03 18:11:21
DVHWAI2140I Waiting for work on 08/03/01 at 18:11:21.
cms exec dvhourly
DVHWAI2146I Wakeup caused by console attention on 08/03/01 at 18:14:09.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.01/0.01 18:14:09
DVHREQ2290I Request is: CMS exec dvhourly
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
DVHRLY3895W Disk 01AA is 84% full, exceeding its
DVHRLY3895W Disk 01AA is 84% full, exceeding its
EXEC DIRM1AA DIRMAINT
DIRM1AA - DIRMAINT log archive started ....
DIRM1AA - Issuing DIRM SHUTDOWN ....
_
                                                      DIRMAINT
                                                                   31/001
Connected to remote server/host 9.39.64.72 using port 23
```

Files Sent to Archiving Server (ARCHLOGS)

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

File DIRMAINT TLOG0801 Z1 sent to ARCHLOGS at TEC1ZVM on 03/01/08 18:14:14
ARCHLOGS: File DIRMAINT TLOG0801 D1 created from DIRMAINT TLOG0801 Z1 received
ARCHLOGS: File DIRMAINT TLOG0801 (spoolid 71) from OPMGRM1  successfully receiv
ARCHLOGS: ng disk.
ARCHLOGS: Calling Archive for DIRMAINT TLOG0801.
ARCHLOGS: AMVARC8031I *** Archive transaction has been submitted for processing
ARCHLOGS: AMVARC8031I ***
ARCHLOGS: AMVARC8031I *** IMPORTANT:  Do not alter or delete objects selected f
ARCHLOGS: AMVARC8031I ***            archive until you receive confirmation th
ARCHLOGS: AMVARC8031I ***            the archive transaction has been successf
ARCHLOGS: AMVARC8031I ***            processed.
ARCHLOGS: RDR FILE 0073 SENT FROM OPMGRM1  PUN WAS 0007 RECS 6925 CPY  001 A NO
File DIRMAINT TLOG0802 Z1 sent to ARCHLOGS at TEC1ZVM on 03/01/08 18:14:14
ARCHLOGS: DMSCYW2245I *MSG AMVARKIV 03/01/08 18:14:16 Archive staging operation
ARCHLOGS: File DIRMAINT TLOG0801 successfully archived.
ARCHLOGS: DMSCYW2245I *MSG AMVARKIV 03/01/08 18:14:16 Your information is in pa
ARCHLOGS: RDR FILE 0074 SENT FROM OPMGRM1  PUN WAS 0008 RECS 020K CPY  001 A NO
File DIRMAINT TLOG0910 Z1 sent to ARCHLOGS at TEC1ZVM on 03/01/08 18:14:14
ARCHLOGS: File DIRMAINT TLOG0802 D1 created from DIRMAINT TLOG0802 Z1 received
ARCHLOGS: File DIRMAINT TLOG0802 (spoolid 73) from OPMGRM1  successfully receiv
ARCHLOGS: ng disk.
ARCHLOGS: Calling Archive for DIRMAINT TLOG0802.
ARCHLOGS: AMVARC8031I *** Archive transaction has been submitted for processing
ARCHLOGS: AMVARC8031I ***
ARCHLOGS: AMVARC8031I *** IMPORTANT:  Do not alter or delete objects selected f
ARCHLOGS: AMVARC8031I ***            archive until you receive confirmation th
ARCHLOGS: AMVARC8031I ***            the archive transaction has been successf
ARCHLOGS: AMVARC8031I ***            processed.
ARCHLOGS: DMSCYW2245I *MSG AMVARKIV 03/01/08 18:14:18 Archive staging operation
ARCHLOGS: DMSCYW2245I *MSG AMVARKIV 03/01/08 18:14:18 Your information is in pa
                                                            DIRMAINT
                                                              31/001
Connected to remote server/host 9.39.64.72 using port 23
```

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Observe DIRMAINT Restarting

```
Session A - TSTADMN1 - [32 x 80]
File  Edit  View  Communication  Actions  Window  Help

PRODUCT:
IBM Directory Maintenance Facility for z/VM (DirMaint)
5739-A05 (C) Copyright IBM Corporation 1979, 2004.
Function Level 510 Service Level 0401.
DMSACC724I 155 replaces A (191)

HCPMFS057I MAINT not receiving; disconnected
HCPMFS057I OPERATOR not receiving; disconnected
HCPMFS057I MAINT not receiving; disconnected
HCPMFS057I OPERATOR not receiving; disconnected

DVHPRO2010I TESTING USE OF MSGNOH ...
DASD 0192 DETACHED
DASD 021F DETACHED
...........................................................................
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.02/0.03 18:14:21
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.09/0.11 18:14:23
DVHWAI2140I Waiting for work on 08/03/01 at 18:14:23.
cms exec dvhourly
DVHWAI2146I Wakeup caused by console attention on 08/03/01 at 18:14:29.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.01/0.01 18:14:29
DVHREQ2290I Request is: CMS exec dvhourly
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.03/0.03 18:14:30
DVHWAI2140I Waiting for work on 08/03/01 at 18:14:30.
                                                            DIRMAINT
                                                              31/001
Connected to remote server/host 9.39.64.72 using port 23
```

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Verify Logging Disk is No Longer Full

```
Session A - TSTADMN1 - [32 x 80]                                    _ |□| x|
File  Edit  View  Communication  Actions  Window  Help
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □
cms exec dvhourly
DVHWAI2146I Wakeup caused by console attention on 08/03/01 at 18:14:29.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.01/0.01 18:14:29
DVHREQ2290I Request is: CMS exec dvhourly
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
DVHRLY3886I Hourly processing started; with 0 log
DVHRLY3886I files.
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.03/0.03 18:14:30
DVHWAI2140I Waiting for work on 08/03/01 at 18:14:30
cms q disk
DVHWAI2146I Wakeup caused by console attention on 08/03/01 at 18:19:21.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.01/0.01 18:19:21
DVHREQ2290I Request is: CMS q disk
DVHREQ2288I Your CMS request for DIRMAINT at * has been accepted.
LABEL   VDEV M  STAT   CYL TYPE BLKSZ    FILES  BLKS USED-(%) BLKS LEFT   BLK TOTA
DIR155  155  A  R/W      9 3390 4096      11       78-05        1542        162
DRM491  191  C  R/W     15 3390 4096     250     1311-49        1389        270
DRM11F  11F  D  R/W      8 3390 4096      47      568-39         872        144
DIR1DF  1DF  E  R/W      9 3390 4096     122      259-16        1361        162
DIR1DB  1DB  G  R/W      9 3390 4096      10      140-09        1480        162
DIR1AA  1AA  H  R/W      9 3390 4096       7       14-01        1606        162
MNT190  190  S  R/O    100 3390 4096     687    14513-81        3487       1800
MNT19E  19E  Y/S R/O   250 3390 4096    1100    28061-62       16939       4500
DIR1FA  1FA  Z  R/W      9 3390 4096       0        7-00        1613        162
DVHREQ2289I Your CMS request for DIRMAINT at * has completed; with RC
DVHREQ2289I = 0.
DIRMAINT TEC1ZVM. - 2008/03/01; T=0.02/0.03 18:19:22
DVHWAI2140I Waiting for work on 08/03/01 at 18:19:22.
_
                                                DIRMAINT (Scroll)
                                                             31/001
Connected to remote server/host 9.39.64.72 using port 23
```

View DIRMAINT Logs in Archive Manager

```
Session A - TSTADMN1 - [32 x 80]                                    _ |□| x|
File  Edit  View  Communication  Actions  Window  Help
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □
                          Files for owner(s): *
Selection: Name: █ Type: █ Mode: █                    36 of 36 shown
Current filters: Name: *        Type: *         Mode: * Owner: *

Owner     Filename Filetype Fm  Date     Time   Device or Path

ARCHLOGS DIRMAINT TRANSLOG 1 08/03/01 18:14:12 192
ARCHLOGS DIRMAINT TLOG0910 1 08/03/01 18:11:14 192
ARCHLOGS DIRMAINT TLOG0911 1 08/03/01 18:10:55 192
ARCHLOGS DIRMAINT TLOG0912 1 08/03/01 18:10:50 192
ARCHLOGS DIRMAINT TLOG0802 1 08/03/01 00:01:06 192
ARCHLOGS DIRMAINT TLOG0801 1 08/02/23 00:01:07 192
ARCHLOGS DIRMAINT TRANSLOG 1 08/02/22 17:55:55 192
ARCHLOGS DIRMAINT TLOG0913 1 08/02/22 17:54:52 192
ARCHLOGS DIRMAINT TLOG0912 1 08/02/22 17:54:46 192
ARCHLOGS DIRMAINT TLOG0801 1 08/02/01 00:01:06 192
ARCHLOGS DIRMAINT TLOG0712 1 08/01/31 00:01:06 192
ARCHLOGS DIRMAINT TRANSLOG 1 08/01/30 17:46:06 192
ARCHLOGS DIRMAINT TLOG0914 1 08/01/30 17:45:24 192
ARCHLOGS DIRMAINT TLOG0913 1 08/01/30 17:45:18 192
ARCHLOGS DIRMAINT TLOG0912 1 08/01/30 17:45:12 192
ARCHLOGS DIRMAINT TLOG0712 1 08/01/26 00:01:06 192
ARCHLOGS DIRMAINT TRANSLOG 1 08/01/25 21:08:07 192
ARCHLOGS DIRMAINT TLOG0911 1 08/01/25 21:07:29 192
ARCHLOGS DIRMAINT TLOG0913 1 08/01/25 21:07:06 192
ARCHLOGS DIRMAINT TLOG0912 1 08/01/25 21:06:55 192
ARCHLOGS DIRMAINT TLOG0712 1 08/01/06 00:01:08 192
ARCHLOGS DIRMAINT TLOG0712 1 08/01/06 00:01:08 192
ARCHLOGS DIRMAINT TLOG0911 1 07/05/17 00:07:55 192
 1= Help                    3= Quit      4= Return     5= Sort Up
 6= Sort Down   7= Backward    8= Forward  10= Recall    11= Details
                                                             09/033
Connected to remote server/host 9.39.64.72 using port 23
```

Summary

- **IBM solutions exist for customers running z/VM and Linux guests**
  - OMEGAMON XE on z/VM and Linux
  - Operations Manager for z/VM
  - Tape Manager for z/VM
  - Backup and Restore Manager for z/VM
  - Archive Manager for z/VM
- **Integrating these solutions can help**
  - Automate daily tasks
  - Deal with predictable situations automatically
  - Schedule events

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