



**SuSE* Linux Enterprise Server
10 SP1 and 10 SP2 (x86 and
x64) Dual SCM (ALUA)
Installation BKM**

Intel Order Number: E37642-005

SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 Dual SCM Installation BKM – Table of contents

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UPGRADING FROM SINGLE SCM TO DUAL SCM

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SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation

- This section covers the steps required to update a SLES 10 SP1 and 10 SP2 Single SCM installation to a Dual SCM configuration.
The steps assume that the installation was performed with default settings for fstab values.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont'd)

Prior to installing the second SCM, perform the following steps:

- Boot the system and log in to the OS
- Type the following: `ls -la /dev/disk/by-id`
- Note the SCSI-ID associated with each partition (`sdx`)
- Edit `/etc/fstab` to reflect the “by-id” references
 - Modify the `/dev/sd*` references with `/dev/disk/by-id/scsi<xxxx>` obtained from the above steps
- Next, edit `/boot/grub/menu.lst`
 - Modify the `/dev/sd*` entries to `/dev/disk/by-id/scsi<xxxx>`



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont'd)

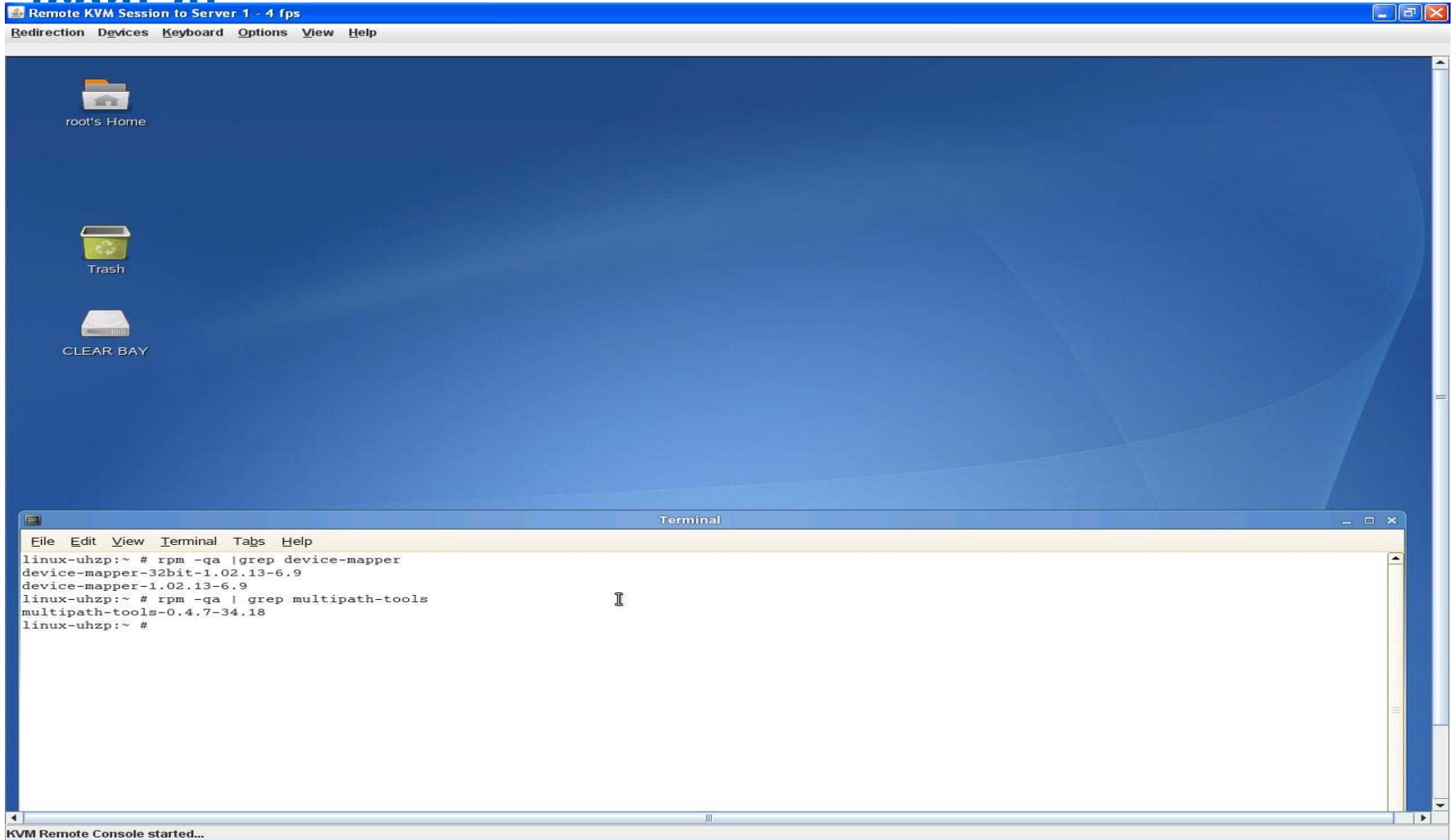
- Verify the installation of packages by typing:
 - `rpm -qa | grep device-mapper`
 - This should return [device-mapper-1.02.13-6.9](#)
 - Version may be slightly different based on the installation package.
 - `rpm -qa | grep multipath-tools`
 - This should return [multipath-tools-0.4.7-34.18](#)
 - Version may be slightly different based on the installation package.

See the screenshot on the next slide for reference.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation

(cont'd)



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SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont'd)

- Update the LSI* MPT SAS driver for SuSE* Linux Enterprise Server 10 SP1 only as follows:
 - Copy the SuSE* Linux Enterprise Server driver package (mptlinux-4.00.36.00-1-sles10.x86_64.rpm) to a known location on the system under test.
 - /temp is assumed for the remainder of the BKM.
 - Open a terminal window
 - cd /temp/
 - Type “rpm -ivh mptlinux-4.00.36.00-1-sles10.x86_64.rpm”

NOTE: You do not need to update the LSI driver for SuSE* Linux Enterprise Server 10 SP2, as it already contains an updated driver.

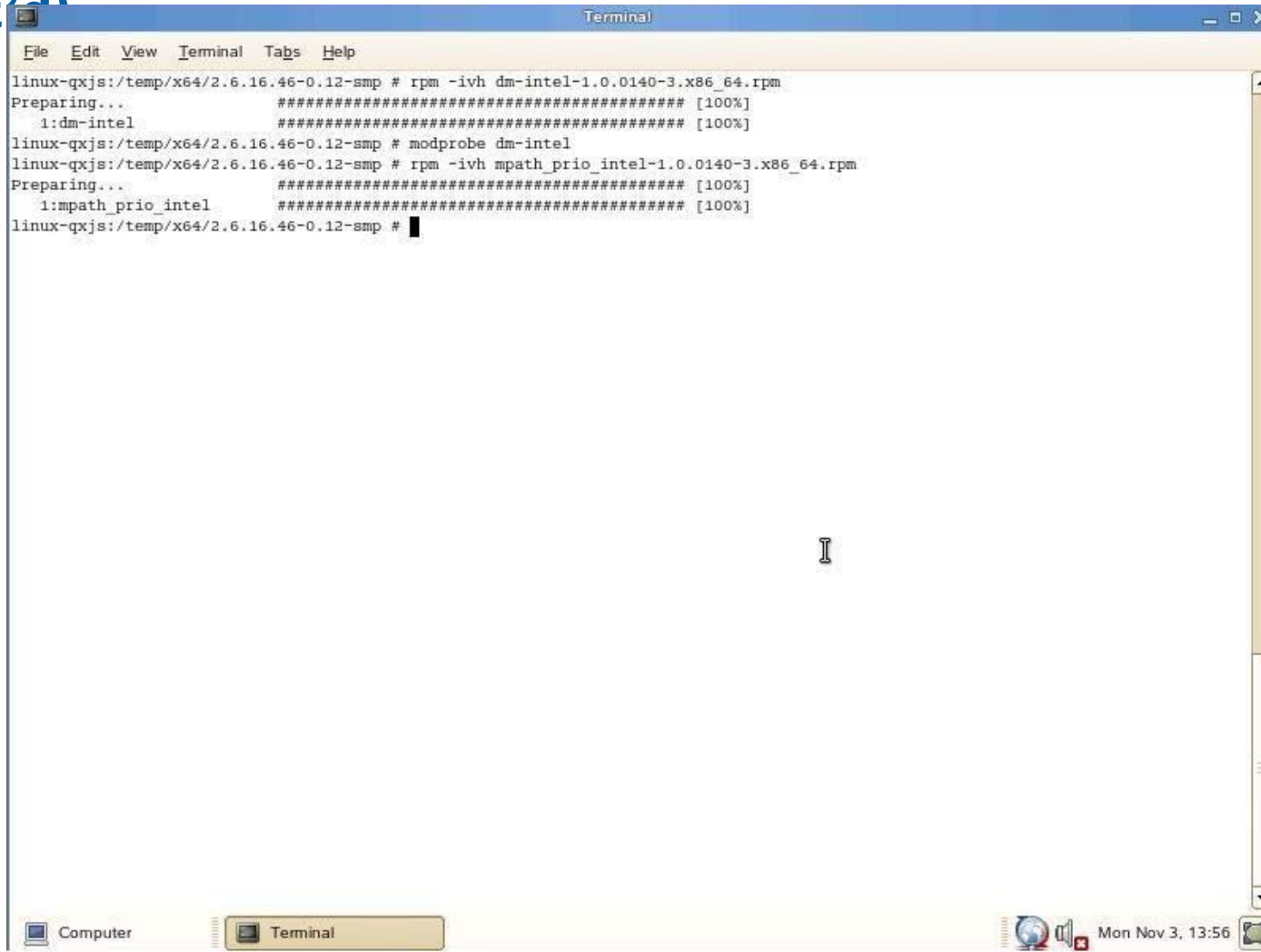


SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont'd)

- Set up Multipath ALUA
 - Copy the SuSE* Linux Enterprise Server driver package to a known location on the system under test
 - /temp is assumed for the remainder of the BKM
 - Open a terminal window
 - `cd /temp/<OS type>/2.6.16.46-0.12-smp`
 - For x86, type “`rpm -ivh dm-intel-1.0.0140-3.i586.rpm`”
 - For x64, type “`rpm -ivh dm-intel-1.0.0140-3.x86_64.rpm`”
 - Type “`modprobe dm-intel`”
 - The system will not return anything, which indicates a successful installation.
 - Verify the module loaded by typing “`lsmod | grep dm_intel`”
 - Load the priority driver by typing:
 - For x86 systems: `rpm -ivh mpath_prio_intel-1.0.0140-3.i586.rpm`
 - For x64 systems: `rpm -ivh mpath_prio_intel-1.0.0140-3.x86_64.rpm`



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont¹)



```
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp # rpm -ivh dm-intel-1.0.0140-3.x86_64.rpm
Preparing...
 1:dm-intel
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp # modprobe dm-intel
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp # rpm -ivh mpath_prio_intel-1.0.0140-3.x86_64.rpm
Preparing...
 1:mpath_prio_intel
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp #
```

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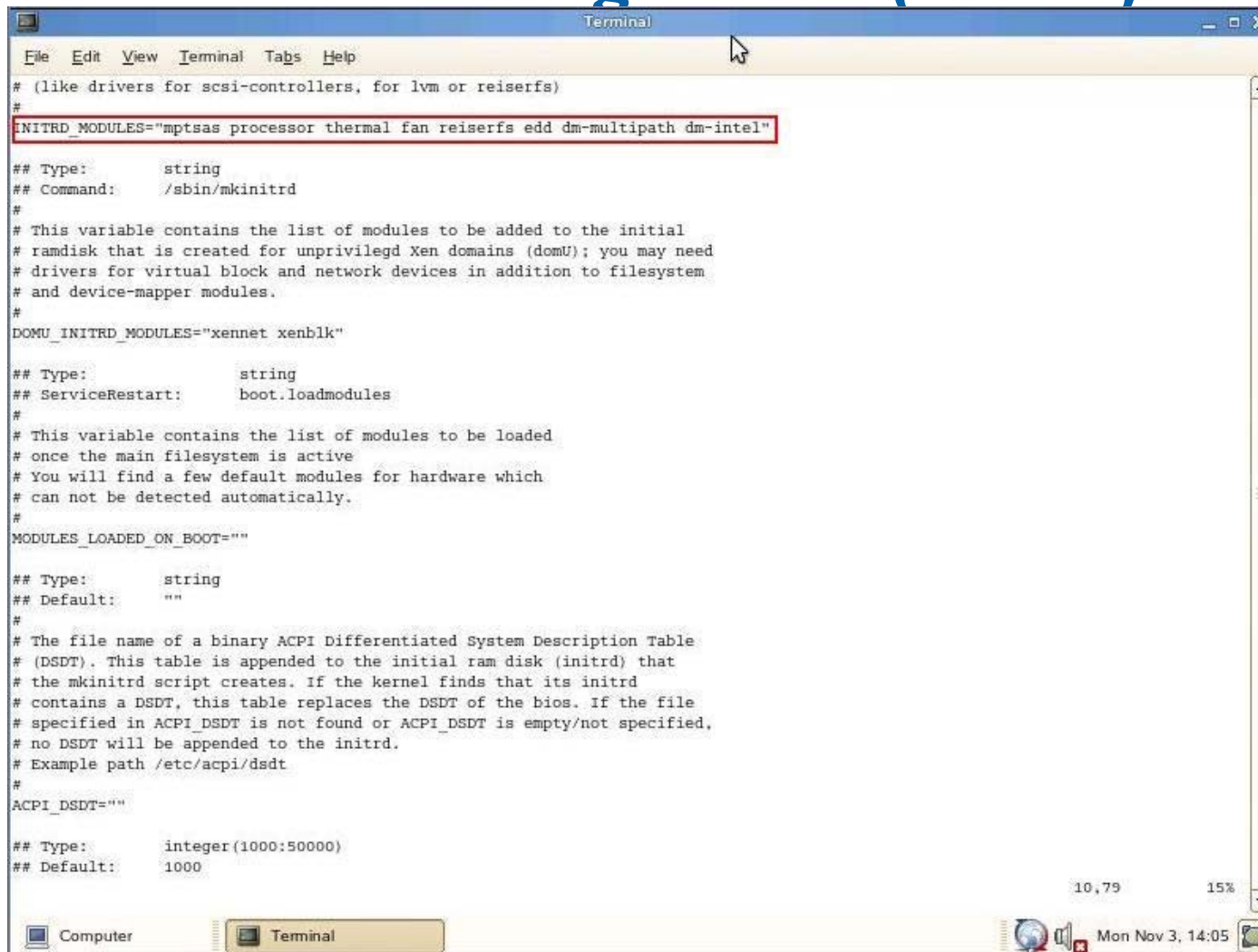


SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont'd)

- Copy “multipath.conf.SLES” to the /etc directory and rename multipath.conf
- Type the following commands:
 - `chkconfig boot.multipath on <return>`
 - `chkconfig multipathd on <return>`
- Edit /etc/sysconfig/kernel by adding “dm-multipath” and “dm-intel” to the INITRD_MODULES section in the mentioned sequence.
 - See the screenshot on the next slide for reference.
- Type the following:
 - `mkinitrd`
This will create a new kernel image file.
- Shut down the compute module and install the second SCM.
- Once the required FW updates have completed on the second SCM, power on the compute module.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)



The image shows a terminal window titled "Terminal" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal content is a configuration file snippet. A red box highlights the line: `INITRD_MODULES="mptsas processor thermal fan reiserfs edd dm-multipath dm-intel"`. Below this, there are comments and metadata for this variable, including its type (string), command (/sbin/mkinitrd), and a description of its purpose. Further down, there are configurations for `DOMU_INITRD_MODULES`, `MODULES_LOADED_ON_BOOT`, and `ACPI_DSDT`.

```
File Edit View Terminal Tabs Help
# (like drivers for scsi-controllers, for lvm or reiserfs)
#
INITRD_MODULES="mptsas processor thermal fan reiserfs edd dm-multipath dm-intel"
## Type:          string
## Command:       /sbin/mkinitrd
#
# This variable contains the list of modules to be added to the initial
# ramdisk that is created for unprivileged Xen domains (domU); you may need
# drivers for virtual block and network devices in addition to filesystem
# and device-mapper modules.
#
DOMU_INITRD_MODULES="xennet xenblk"
## Type:          string
## ServiceRestart: boot.loadmodules
#
# This variable contains the list of modules to be loaded
# once the main filesystem is active
# You will find a few default modules for hardware which
# can not be detected automatically.
#
MODULES_LOADED_ON_BOOT=""
## Type:          string
## Default:       ""
#
# The file name of a binary ACPI Differentiated System Description Table
# (DSDT). This table is appended to the initial ram disk (initrd) that
# the mkinitrd script creates. If the kernel finds that its initrd
# contains a DSDT, this table replaces the DSDT of the bios. If the file
# specified in ACPI_DSDT is not found or ACPI_DSDT is empty/not specified,
# no DSDT will be appended to the initrd.
# Example path /etc/acpi/dsdt
#
ACPI_DSDT=""
## Type:          integer(1000:50000)
## Default:       1000
10,79 15%
Computer Terminal Mon Nov 3, 14:05
```

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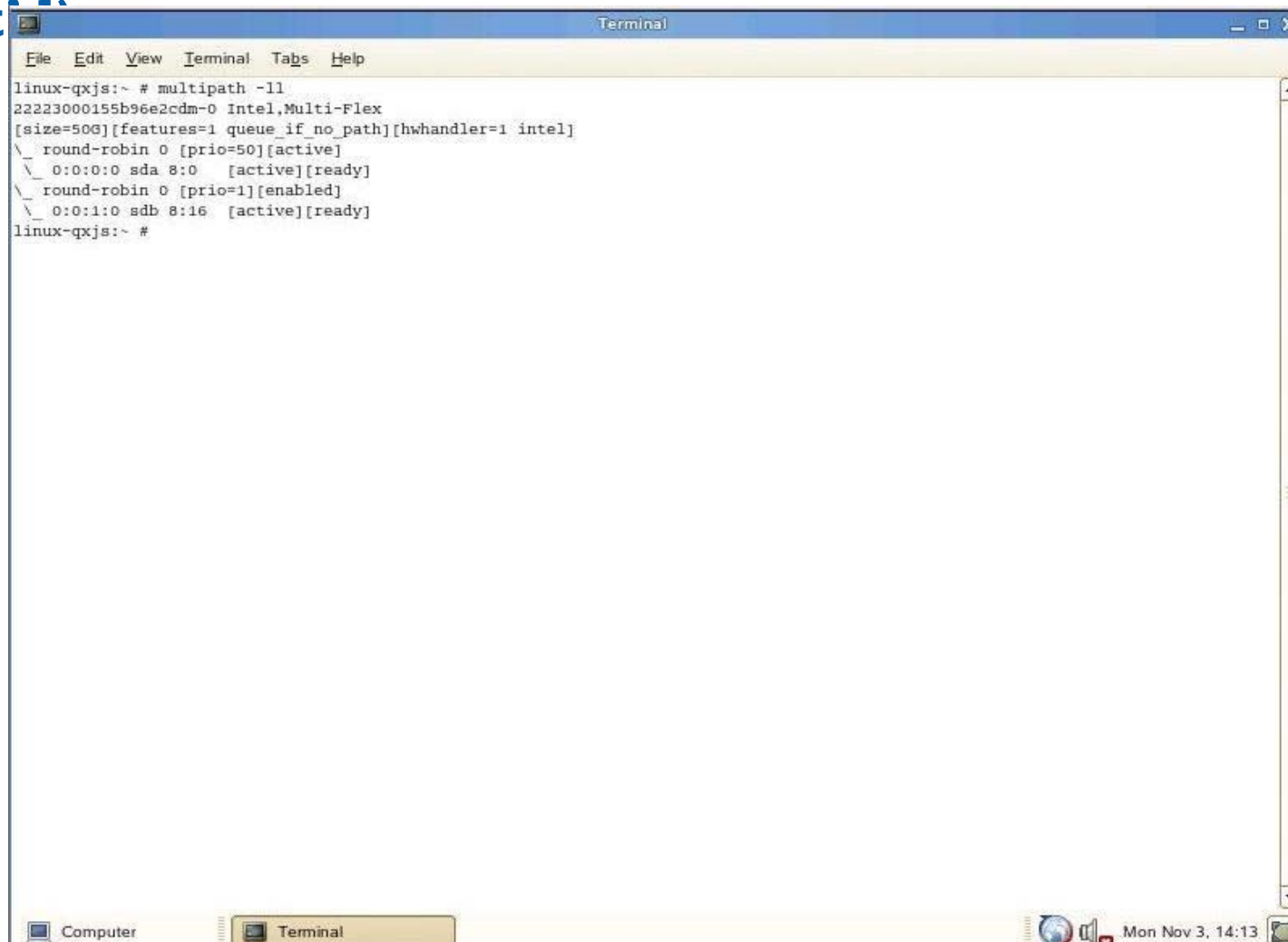


SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont'd)

- To display the topology, type the following command:
 - `multipath -ll`
- See the screenshot on the next slide for a sample output of the “`multipath -ll`” command.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont.)



```
linux-qxjs:~ # multipath -ll
22223000155b96e2cdm-0 Intel,Multi-Flex
[size=50G][features=1 queue_if_no_path][hwhandler=1 intel]
  \_ round-robin 0 [prio=50][active]
     \_ 0:0:0:0 sda 8:0  [active][ready]
     \_ round-robin 0 [prio=1][enabled]
        \_ 0:0:1:0 sdb 8:16 [active][ready]
linux-qxjs:~ #
```

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SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Updating from Single SCM Installation to Dual SCM Installation (cont'd)

- The server is now properly configured for Multipath usage.



NEW OS INSTALLATION IN A DUAL SCM CONFIGURATION

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New Installation in Dual SCM Configuration

- This section covers a fresh install of SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 in a Dual SCM configuration.

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Virtual Drive Creation and Slot Assignment

- Create Storage Pool -> Virtual Drive and assign to a compute module
 - Note which SCM is assigned as the active path (see the red box in the screenshot on the next slide).
 - It is recommended to set controller Affinity to SCM1 during Virtual Drive creation, although installation to a drive with controller Affinity set to SCM2 is also supported.
 - If SCM1 is not the active path, it can be changed by selecting the virtual drive from the Storage tab, then clicking the “affinity” button and choosing SCM1 from the drop-down menu.



Virtual Drive Properties Page Showing SCM1 Affinity/Active Controller

Current user: **admin** | Log off | Help

Dashboard | Chassis Front | Chassis Back | Storage | Events X

System
Servers
Storage
Switches
Reports
Storage Layout
Events
Dashboard
Diagnostics
Settings
Storage
IP Configuration
Date/Time
SNMP
Users
Event Policies
Notification
Language
Firmware
Restore Settings
Dev

Virtual Drives

Name	Size	RAID Level	Status	Server	Drive # (LUN)	Affinity/Active
SLES_10	100.00GB	RAID0	OK	4	0	SCM 1/SCM 1

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Boot Drive Order in System BIOS

- Boot the compute module and enter the system BIOS (press F2 during POST)
 - If the active SCM for LUN 0 is SCM #1, place it first in the HDD boot order. Typically, this will show up as ID00 (LUNs assigned to SCM #1 usually have lower ID values than SCM #2, but not always) LUN0 (see the screenshot on the next slide).
 - If the active SCM for LUN 0 is SCM #2, place it first in the HDD boot order. Typically, this will show up as ID01 (LUNs assigned to SCM #2 usually have higher ID values than SCM #1, but not always) LUN0 (see the screenshot on the next slide).



HDD Ordering Based on Active SCM

```
Aptio Setup Utility - Copyright (C) 2005-2008 American Megatrends, Inc.
Boot Options
Hard Disk #1      [#0400 ID00 LUN0 In...]
Hard Disk #2      [#0400 ID01 LUN0 In...]
Set hard disk boot order by selecting the boot option for this position.

><      Select Screen
↑↓      Select Item
+/-     Change Value
Enter   Select Field
F1      General Help
F9      Optimized Defaults
F10     Save and Exit
ESC     Exit

Version 1.20.1093 Copyright (C) 2005-2008 American Megatrends, Inc.
```

SCM #1 Controller VD

SCM #2 Controller VD

The smaller ID value corresponds to the path to SCM #1 and the bigger value corresponds to the path to SCM #2.



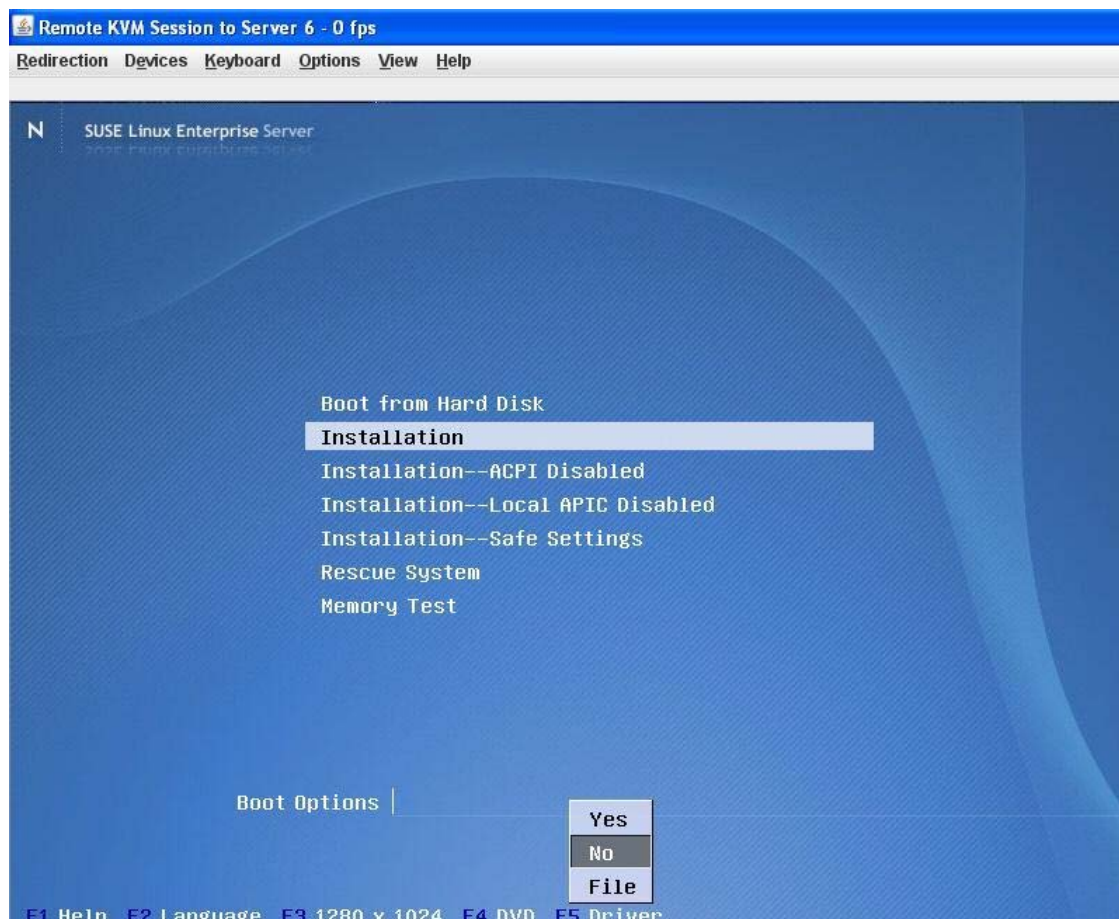
SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 Notes

- It is recommended that you perform the install with only a single VD assigned to the compute module; however, installs may be performed with multiple VDs assigned.
- BIGSMP kernel is NOT supported – if the system is configured with 4 GB memory, it is highly recommended that you install the x64 version.
- LSI SAS driver update procedure is needed for SuSE* Linux Enterprise Server 10 SP1 only. SuSE* Linux Enterprise Server 10 SP2 already has an updated driver (skip slides 24 – 27).



SuSE* Linux Enterprise Server 10 SP1 - Updating LSI* MPT Drivers

- At the initial installation screen, press <F5> and change the selection from “No” to “Yes”.



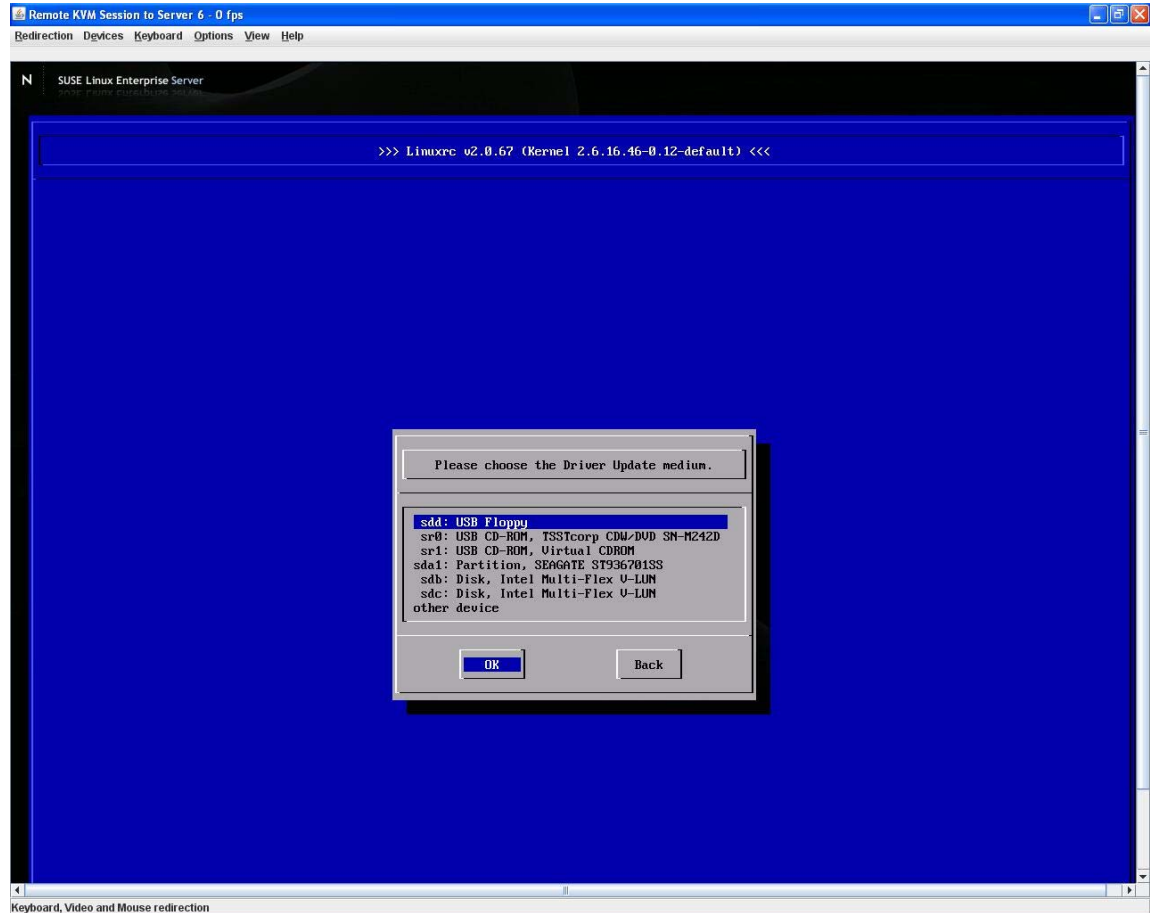
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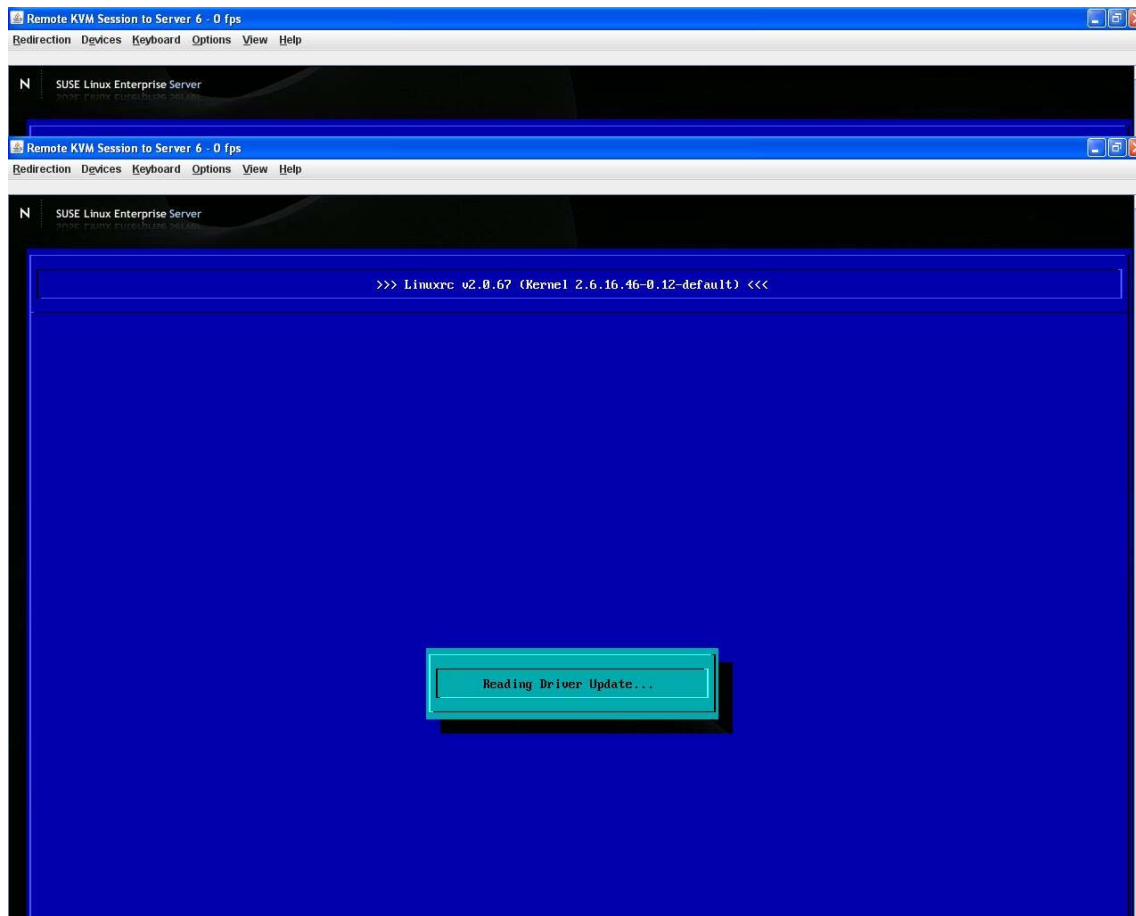
SuSE* Linux Enterprise Server 10 SP1 - Updating LSI* MPT Drivers

- Select the device where the .dd image is located.
In the example shown, the image is located on the USB floppy.



SuSE* Linux Enterprise Server 10 SP1 - Updating LSI* MPT Drivers

Screenshot
showing the image
being read from
the .dd image.



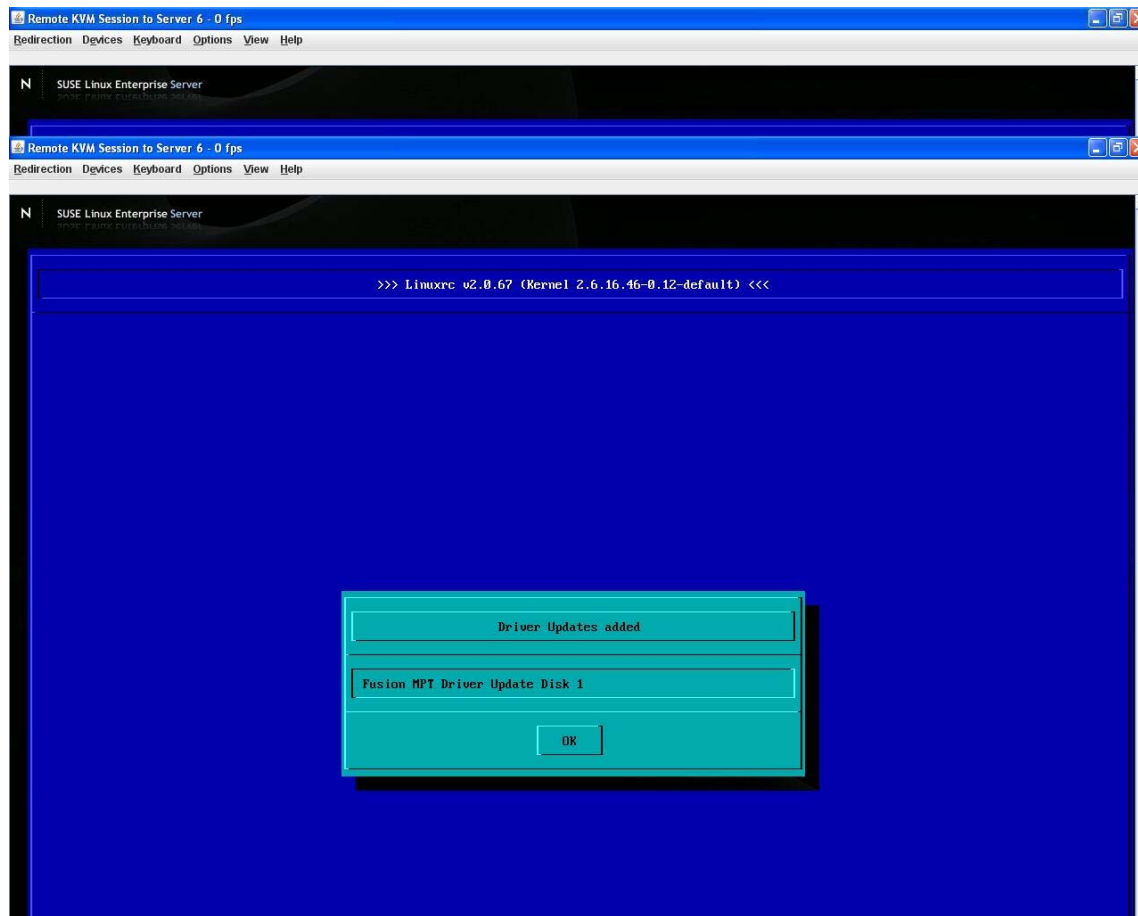
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SuSE* Linux Enterprise Server 10 SP1 - Updating LSI* MPT Drivers

Screenshot
indicating the
completion of the
.dd image
transfer.



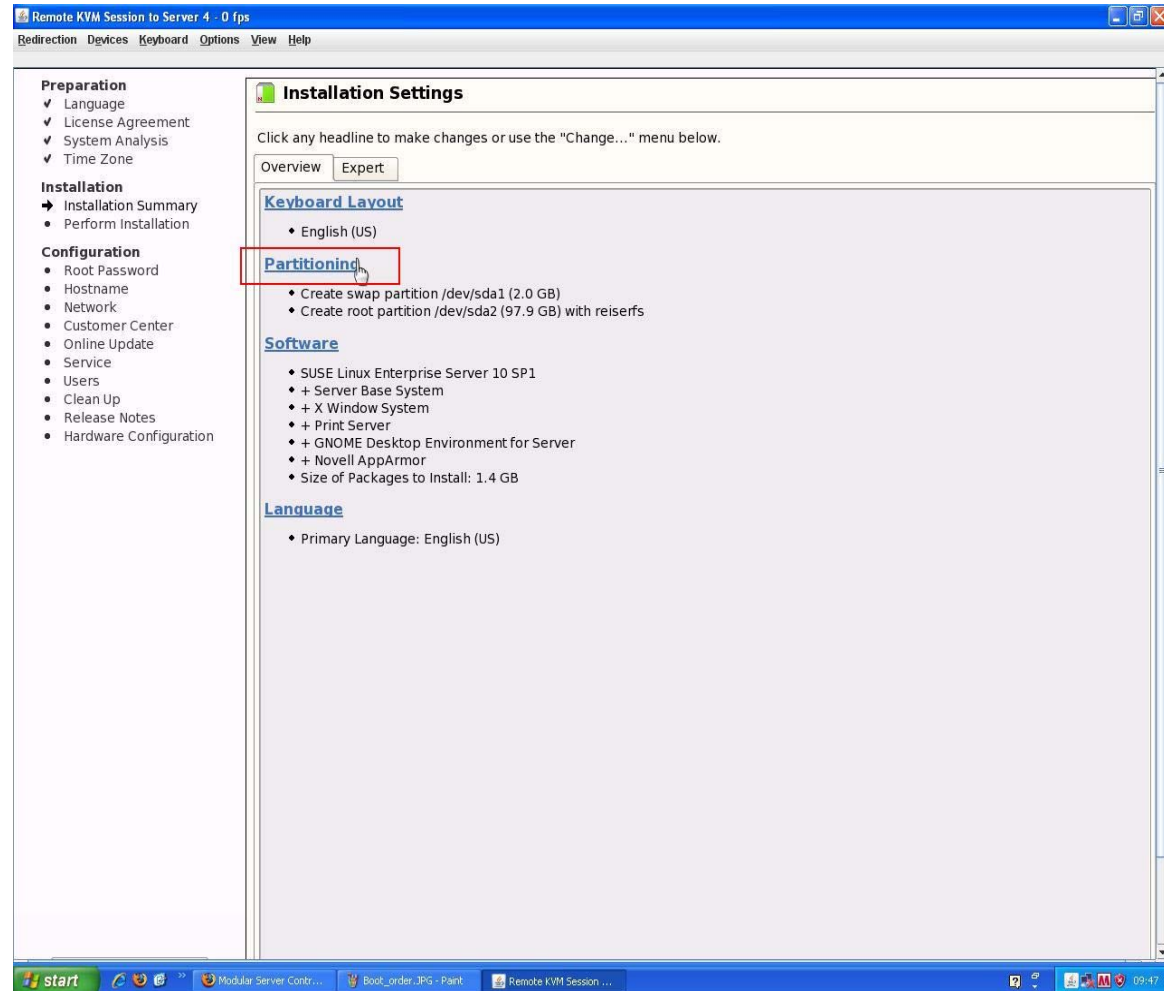
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Changes Required to Partitioning

- Select the appropriate responses to the setup questions based on the system setup.
- On the “Installation Settings” screen (shown on the right), select “Partitioning”.



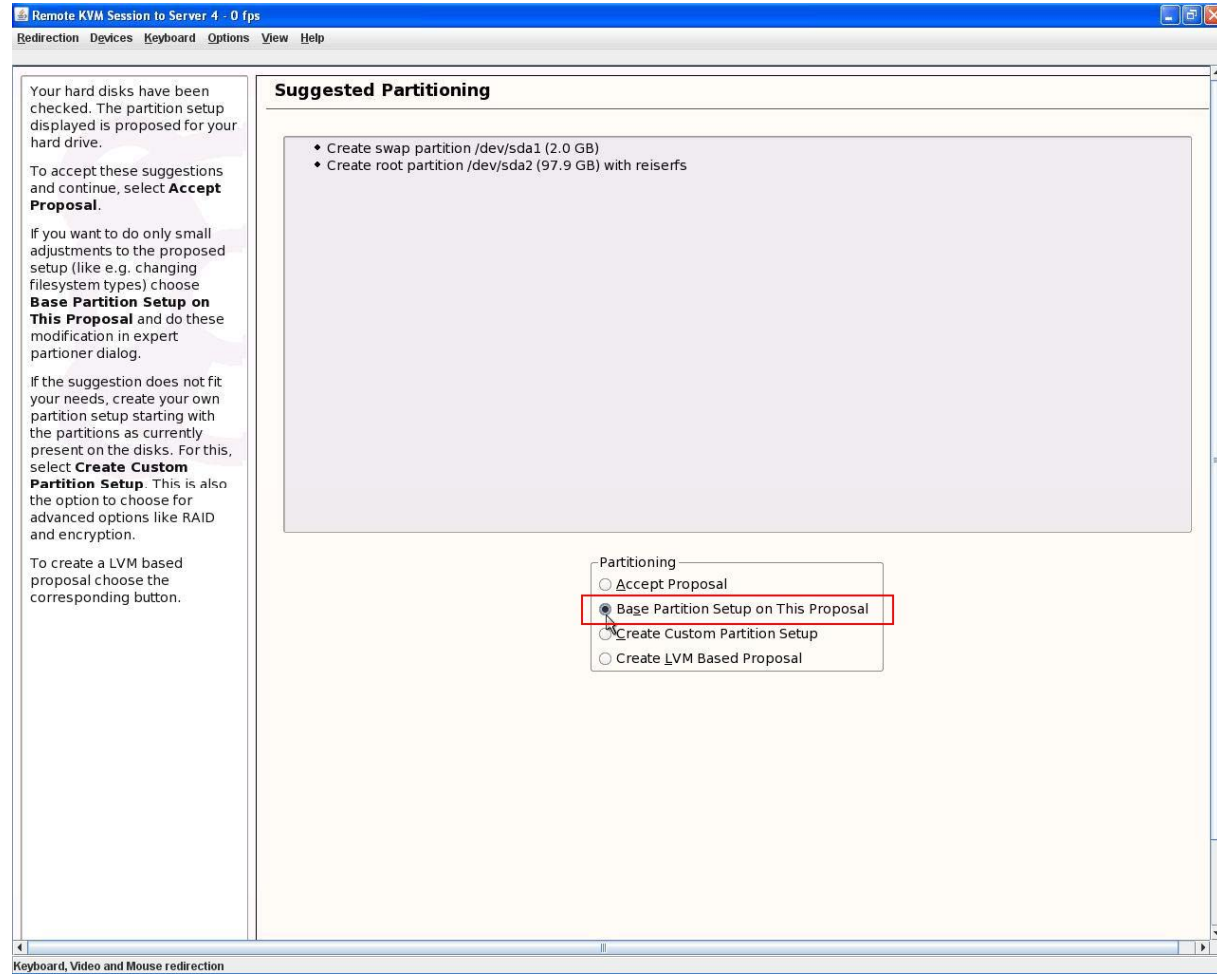
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“Suggested Partitioning” Screen

- After selecting “[Partitioning](#)”, the “Suggested Partitioning” screen will appear.
- Select “[Base Partition Setup on This Proposal](#)” and click the “Next” button at the bottom of the screen (see the screenshot).



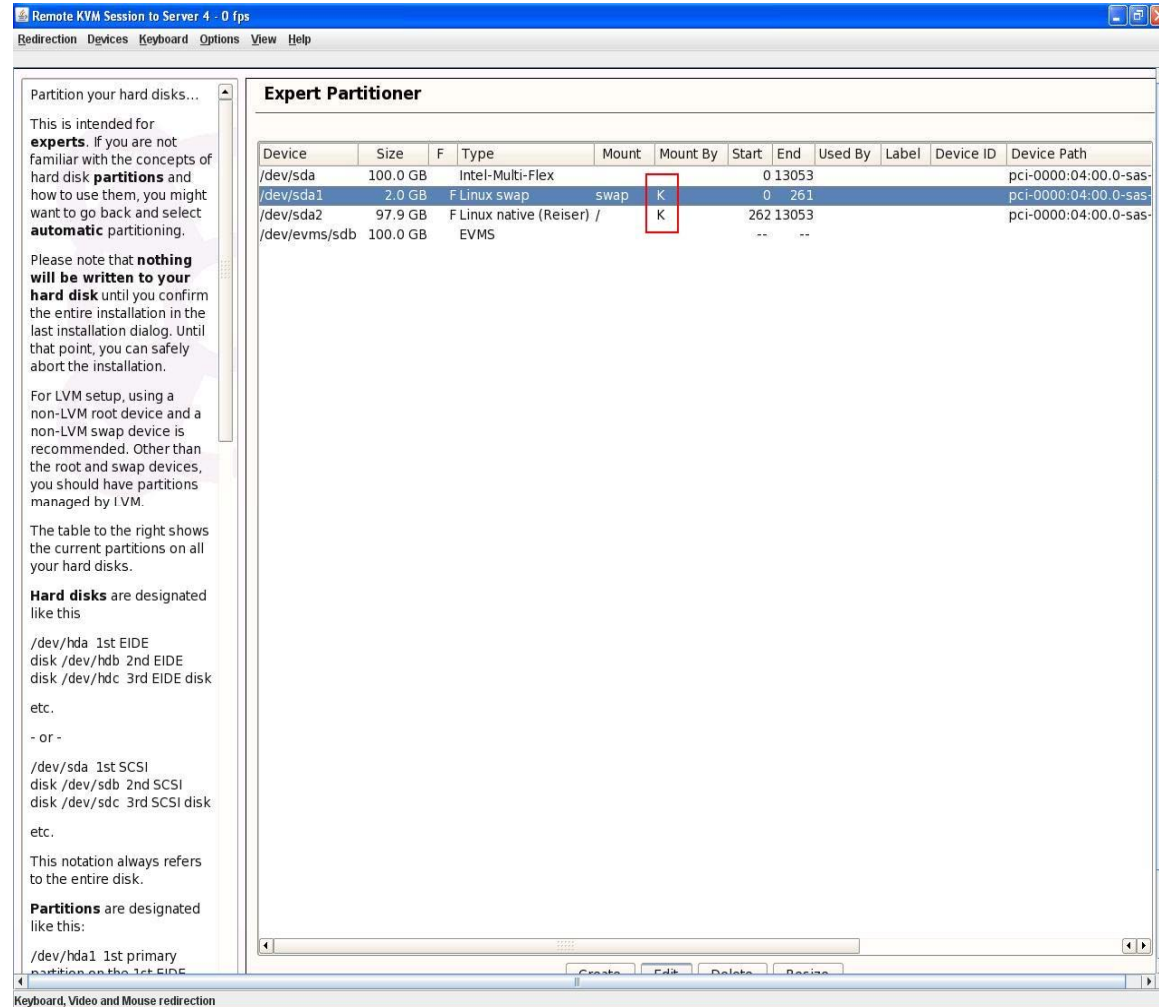
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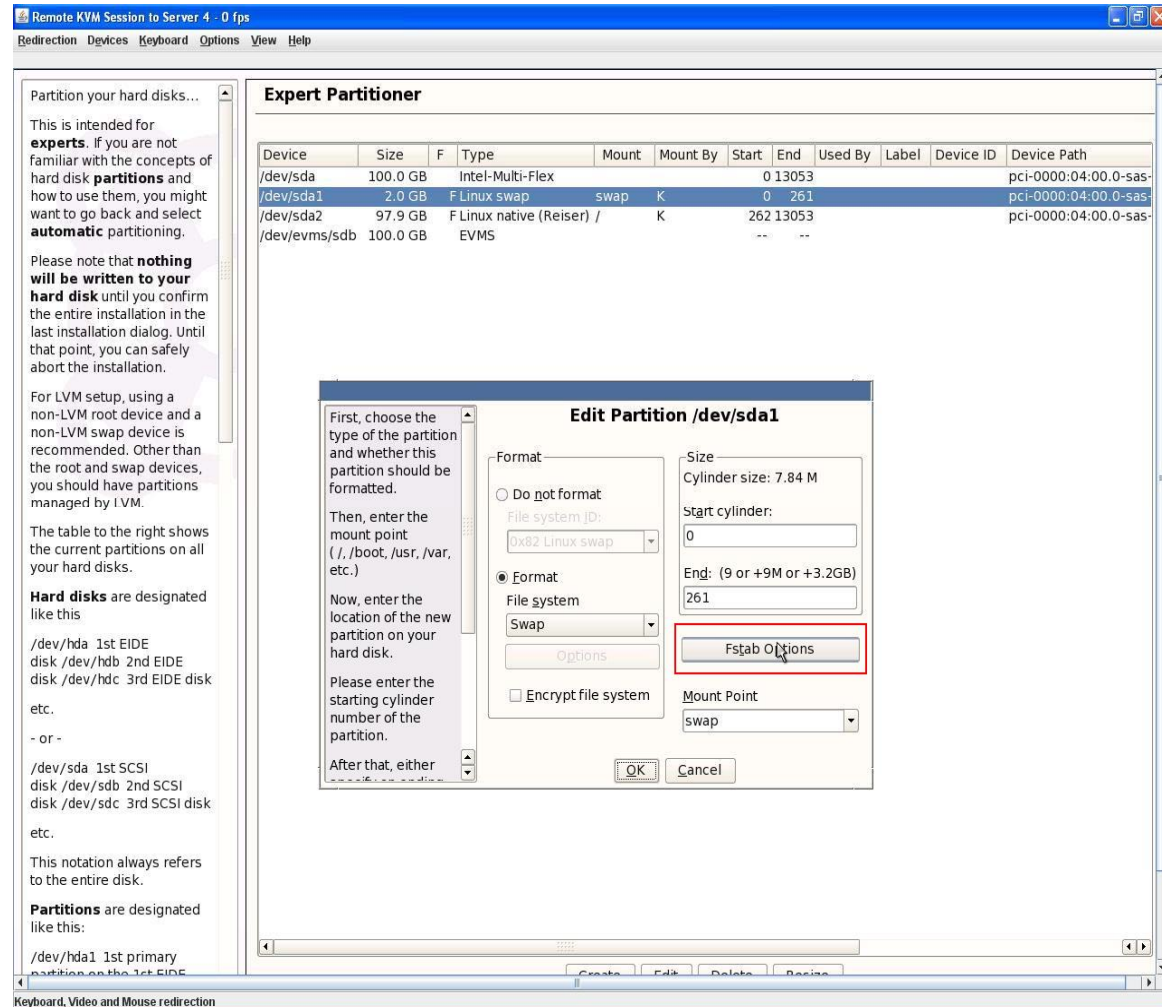
Expert Partitioner Screen

- Clicking “Next” on the “Suggested Partitioning” screen brings up the “Expert Partitioner” screen (see the screenshot).
 - On this screen, note the partitions are mounted by their “Device Name” as indicated by “K” in the highlighted box in screenshot to the right.
- NOTE: If the drives are mounted by ID as the default (indicated by an “I” in the Mount By column), no changes are required.
- Select either the “swap” or “/” partition (“swap” selected in the screenshot) and click the “Edit” button at the bottom of the screen.



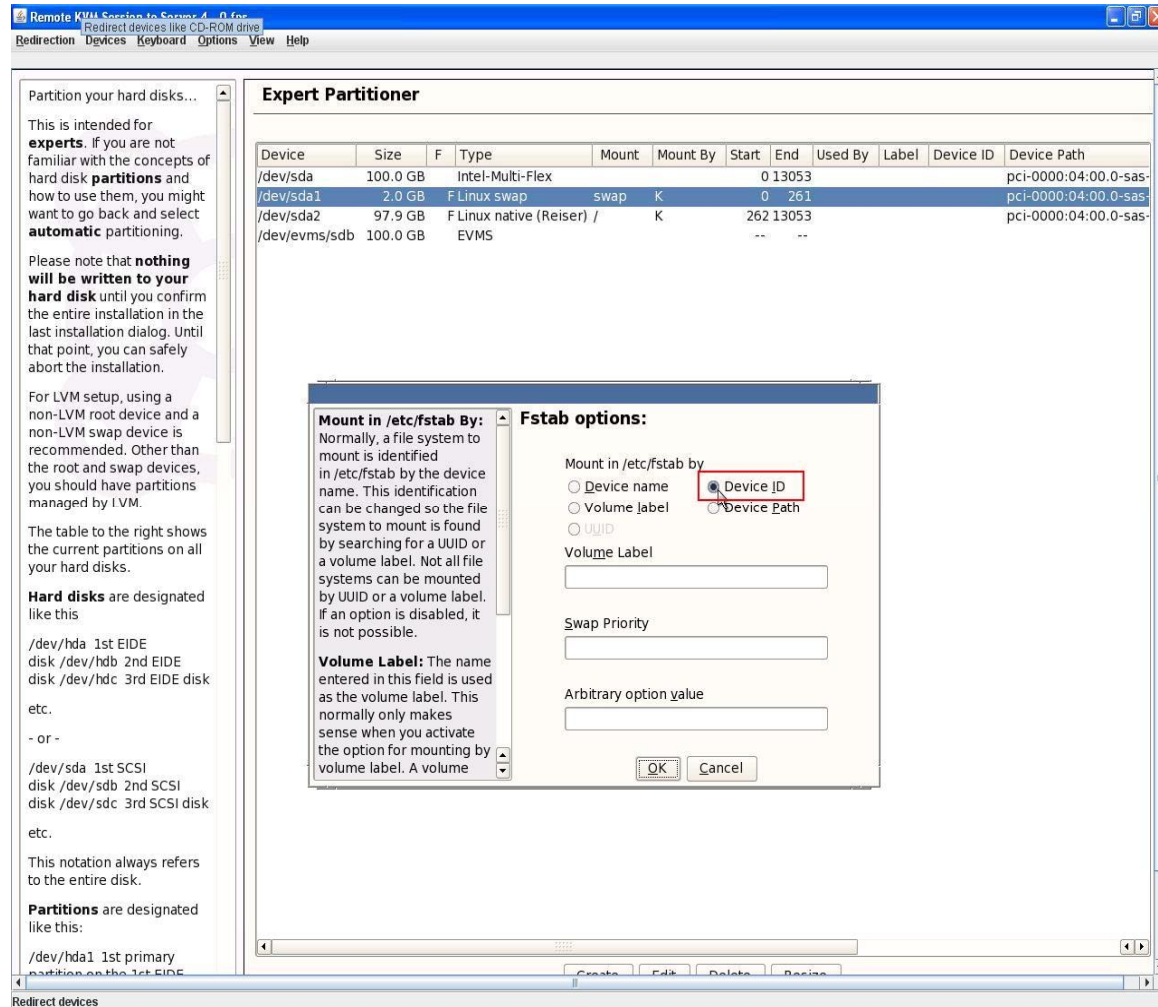
Expert Partitioner Screen – Edit Partition

- Clicking the “Edit” button at the bottom of the screen brings up the “Edit Partition” dialog (see the screenshot).
- In the “Edit Partition” dialog, click the “Fstab Options” button (highlighted in the screenshot).



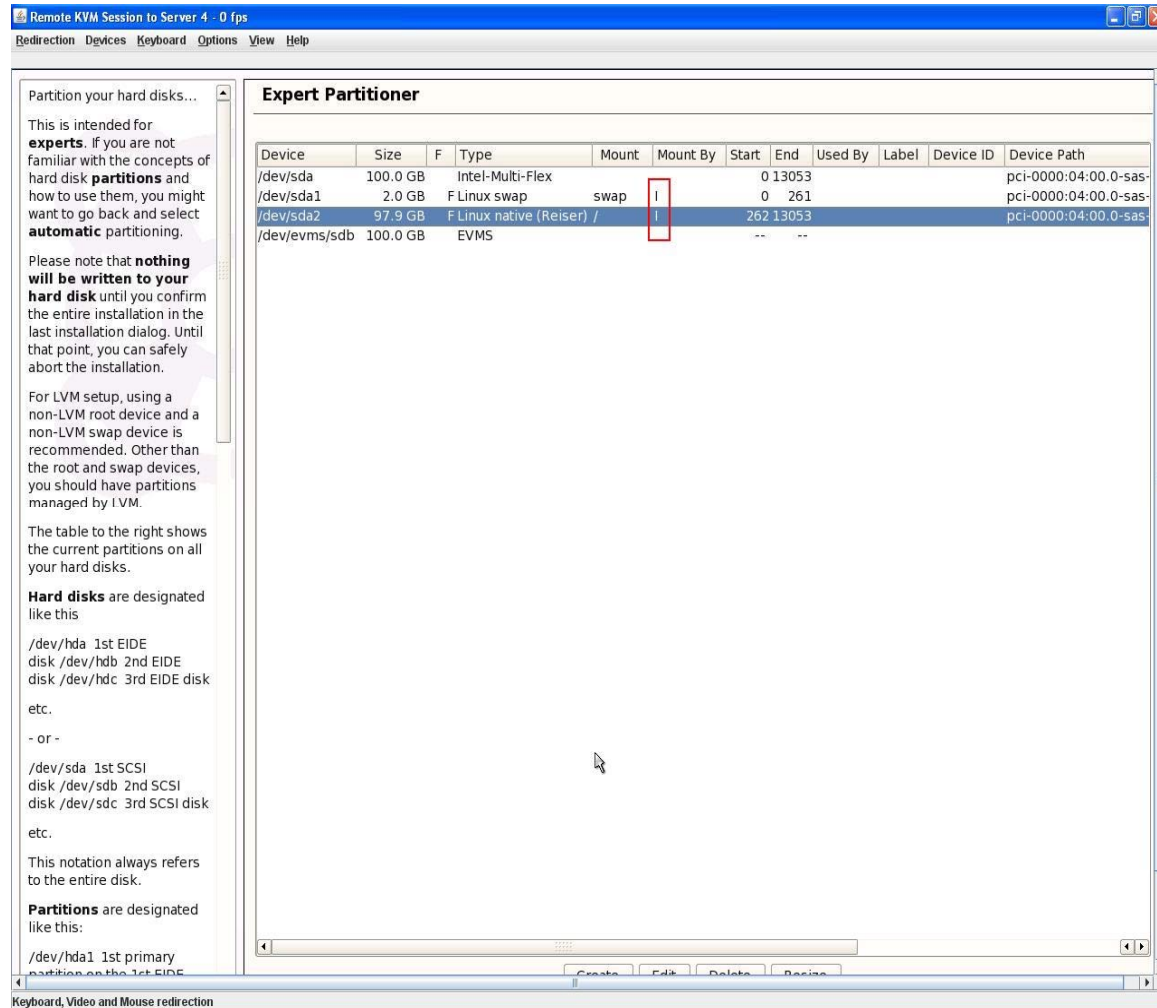
Expert Partitioner Screen – Fstab Options

- In the “Fstab options” dialog, select “Device ID” and click “OK” (see the screenshot).
- Perform the steps on slides 31 and 32 for each of the partitions (“swap” and “/” for most installations or additional ones for expert users).



Expert Partitioner Screen – Completed

- After modifying all the partitions to mount by their “Device-ID”, the “Mount By” column should change to “I” (see the screenshot on the right) from “K” (as seen in the screenshot on slide #30).
- Click the “Finish” button to proceed with the installation.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 Installation

- Complete the installation and reboot the host as instructed via the installation process.

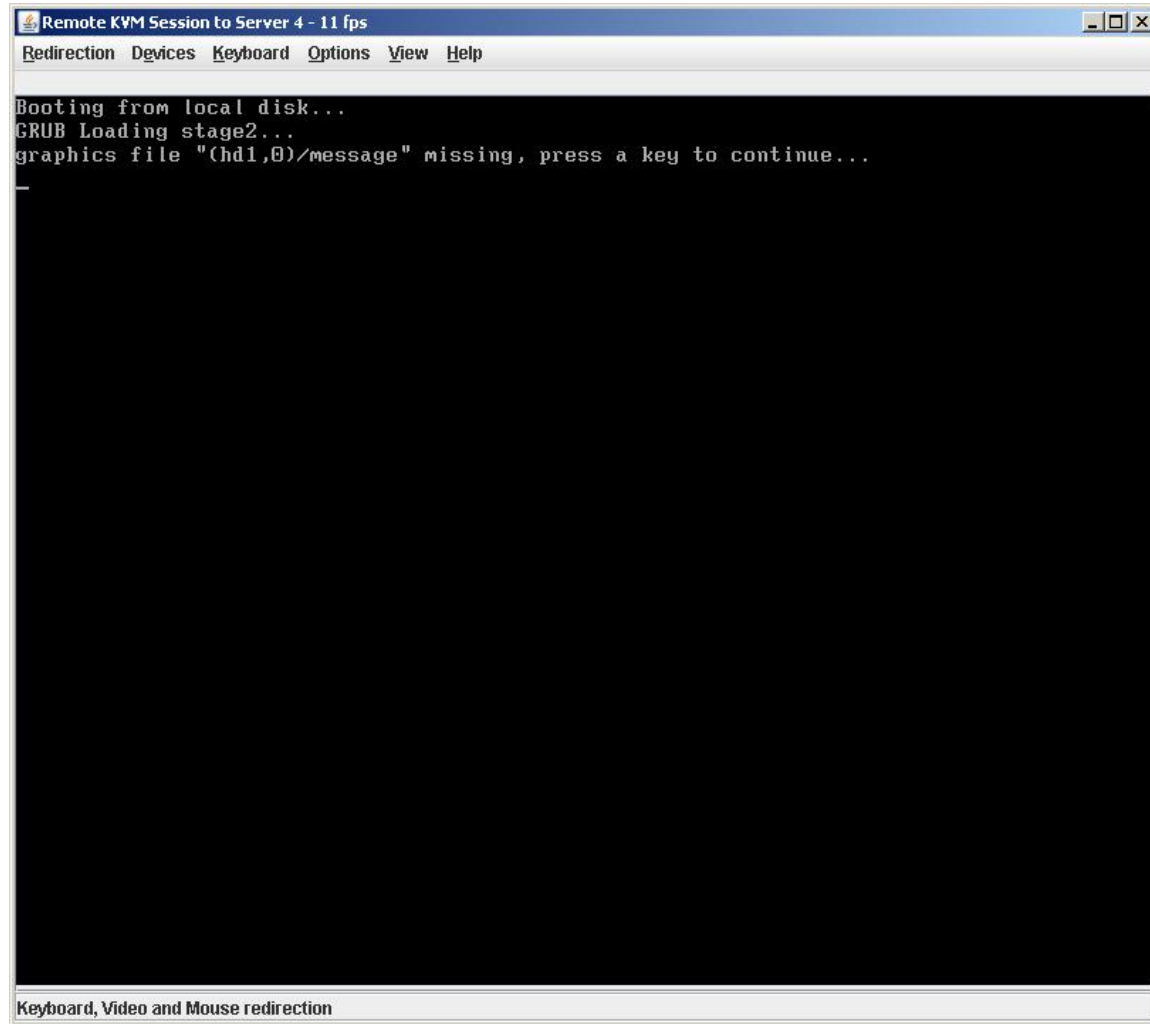
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SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 – Possible Error Scenario #1

- Upon reboot, there is a possibility that it will fail with the message shown in the screenshot.
- If this screenshot appears, press the “Return” key to continue.



The screenshot shows a window titled "Remote KVM Session to Server 4 - 11 fps". The window has a menu bar with "Redirection", "Devices", "Keyboard", "Options", "View", and "Help". The main content area is a black terminal window with white text. The text reads: "Booting from local disk...", "GRUB Loading stage2...", and "graphics file '(hd1,0)/message' missing, press a key to continue...". Below the terminal window, there is a status bar that says "Keyboard, Video and Mouse redirection".

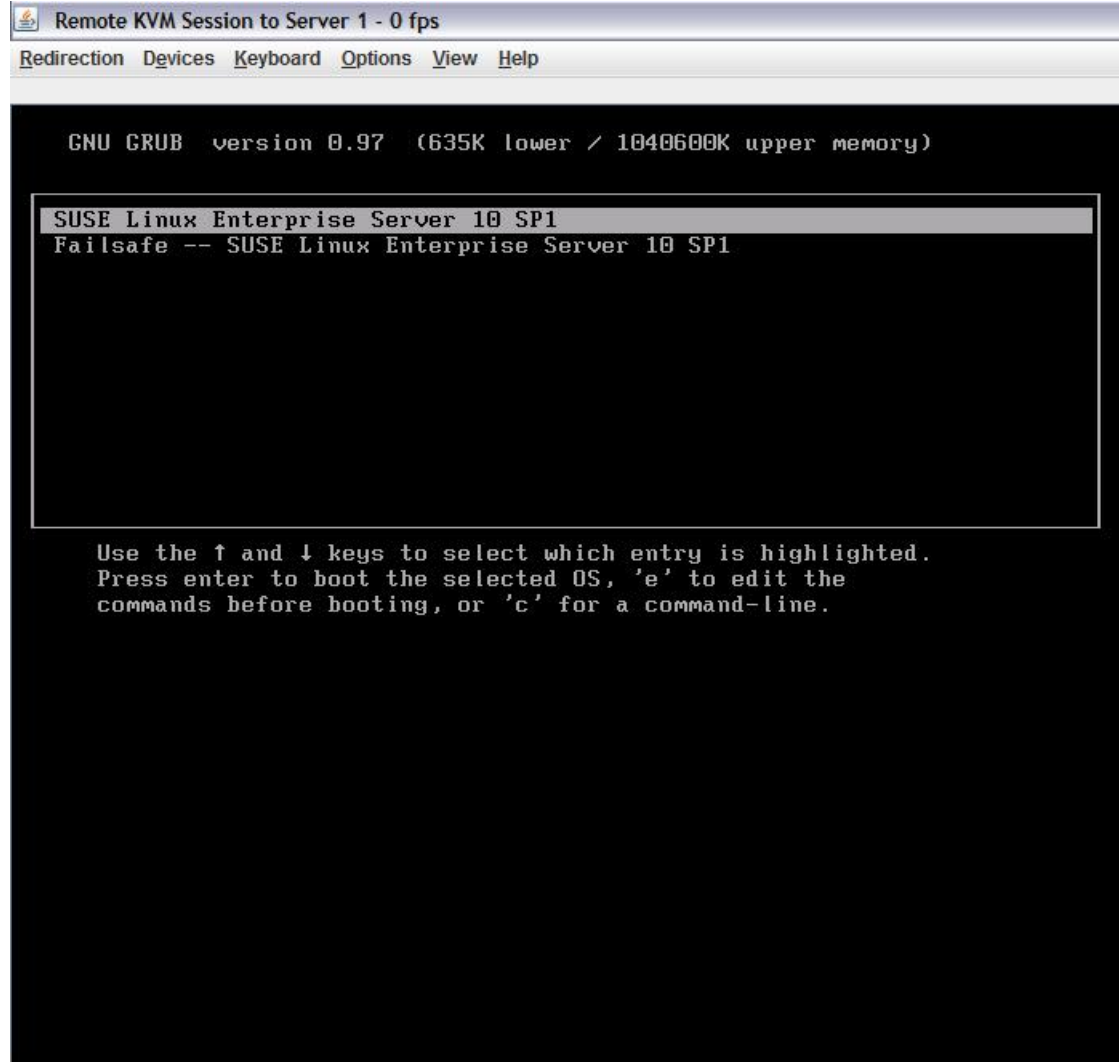
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SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 – Possible Error Scenario #1 (Resolution)

- The GRUB boot order screen appears (see the screenshot).
- Using the arrow keys, highlight the first row as shown in the screenshot and press “e”.



```
Remote KVM Session to Server 1 - 0 fps
Redirection Devices Keyboard Options View Help

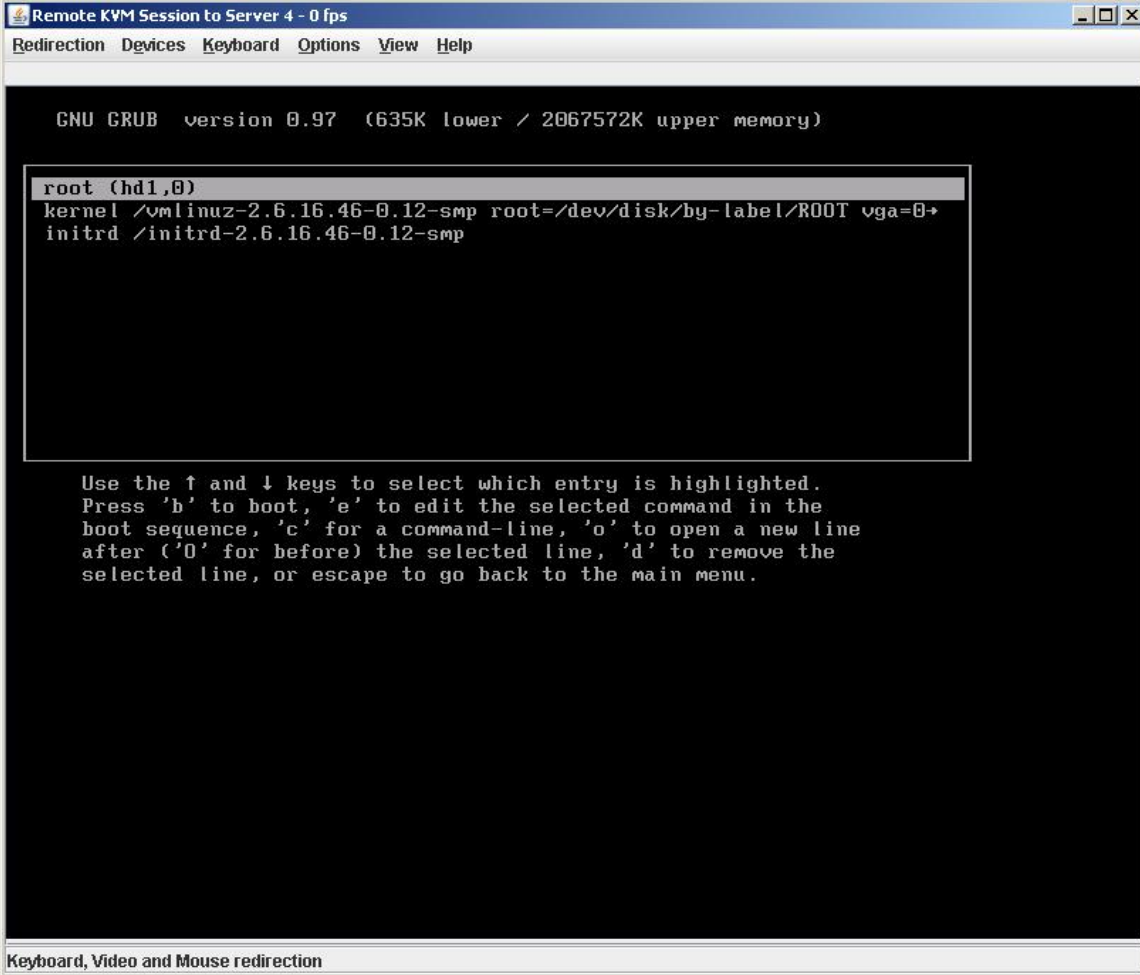
GNU GRUB  version 0.97  (635K lower / 1040600K upper memory)

SUSE Linux Enterprise Server 10 SP1
Failsafe -- SUSE Linux Enterprise Server 10 SP1

Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the
commands before booting, or 'c' for a command-line.
```

SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 – Possible Error Scenario #1 (Resolution)

- The GRUB boot screen appears (see screenshot).
- Using the arrow keys, highlight the “root (hd \underline{x} , 0)” line similar to the one in the screenshot.
- Once highlighted, press the “e” key to edit the command .
- Modify the line as follows:
 - If the line is “root (hd0,0)”, change it to “root (hd1,0)”.
 - If the line is “root (hd1,0)”, change it to “root (hd0,0)”.
 - Press the “Return” key when the modification is complete.
- In some instances, you may need to hit the “Esc” key and “e” key several times before the “root (hd \underline{x} ,0)” line is displayed.
- NOTE: If this step is performed, the menu.lst file will need to be updated to reflect this change once the OS boots.



```
Remote KVM Session to Server 4 - 0 fps
Redirection Devices Keyboard Options View Help

GNU GRUB  version 0.97  (635K lower / 2067572K upper memory)

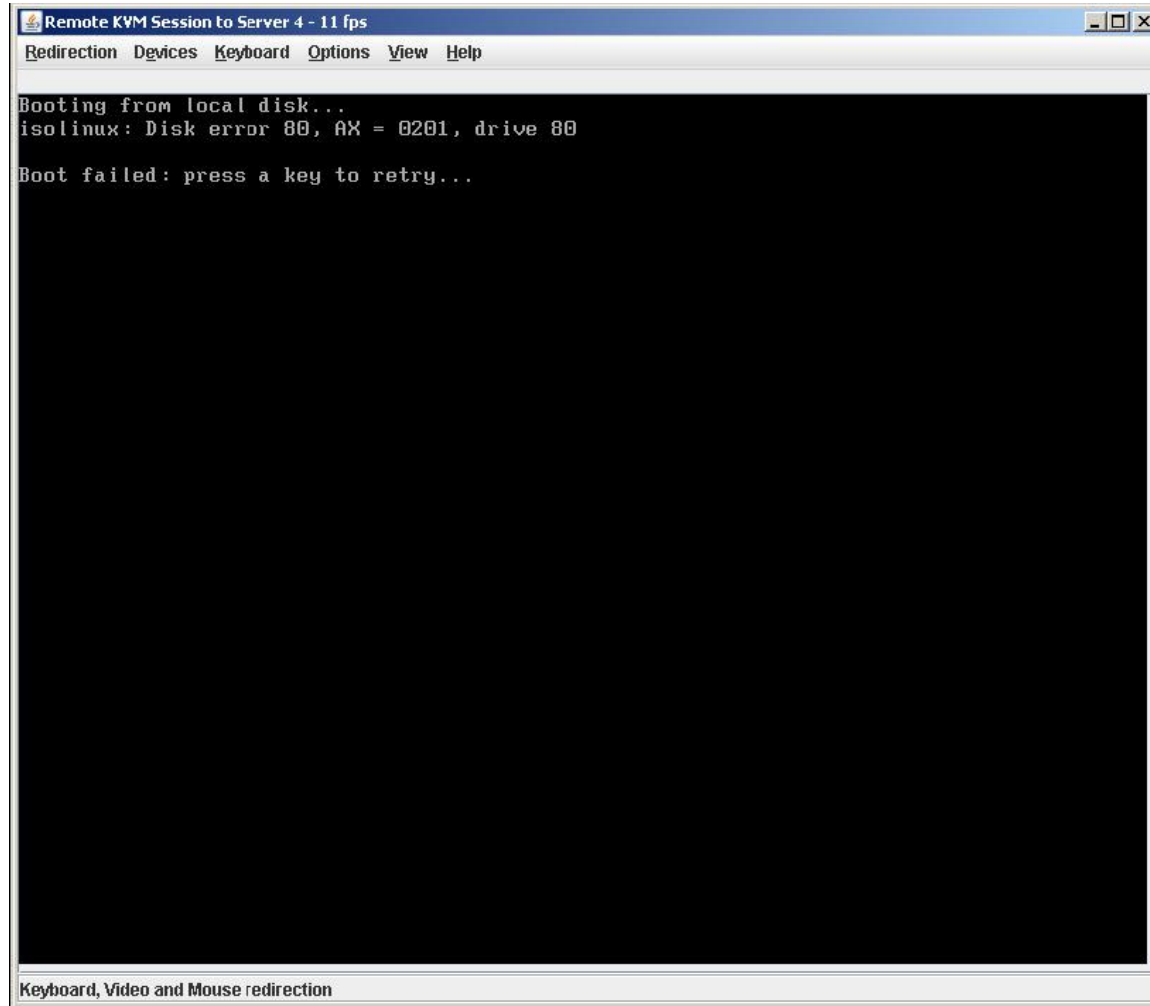
root (hd1,0)
kernel /vmlinuz-2.6.16.46-0.12-smp root=/dev/disk/by-label/ROOT vga=0
initrd /initrd-2.6.16.46-0.12-smp

Use the ↑ and ↓ keys to select which entry is highlighted.
Press 'b' to boot, 'e' to edit the selected command in the
boot sequence, 'c' for a command-line, 'o' to open a new line
after ('0' for before) the selected line, 'd' to remove the
selected line, or escape to go back to the main menu.

Keyboard, Video and Mouse redirection
```

SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 – Possible Error Scenario #2

- If the boot drive order was not set properly prior to OS installation, the error condition in the screenshot will appear.
- If this error condition occurs, reboot the server and enter the system BIOS by pressing “F2” during POST.
 - Once in the system BIOS, swap the HDD boot order.



The screenshot shows a remote KVM session window titled "Remote KVM Session to Server 4 - 11 fps". The window has a menu bar with "Redirection", "Devices", "Keyboard", "Options", "View", and "Help". The main area is a black terminal window with white text. The text reads: "Booting from local disk...", "isolinux: Disk error 80, AX = 0201, drive 80", and "Boot failed: press a key to retry...". At the bottom of the window, there is a status bar that says "Keyboard, Video and Mouse redirection".

SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 – Post Install Configuration

- Once the installation completes, log in to the system.
- Open a terminal window
 - Verify /, /boot, and swap are all referenced by their ID
 - Type “ls -la /dev/disk/by-id”
- Edit /etc/fstab to reflect the “by-id” references
 - Modify the /dev/sd* references with /dev/disk/by-id/scsi<xxxx>
 - For <xxxx>, refer to the red box in the screenshot on the next slide for values on the system under test.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)

```
Remote KVM Session to Server 1 - 4 fps
Redirection Devices Keyboard Options View Help

Terminal
File Edit View Terminal Tabs Help
linux-uhzp:~ # ls -la /dev/disk/by-id/
total 0
drwxr-xr-x 2 root root 300 Feb 14 01:13 .
drwxr-xr-x 5 root root 100 Feb 14 01:12 ..
lrwxrwxrwx 1 root root 9 Feb 14 01:12 edd-int13_dev80 -> ../../sda
lrwxrwxrwx 1 root root 10 Feb 14 01:12 edd-int13_dev80-part1 -> ../../sda1
lrwxrwxrwx 1 root root 10 Feb 14 01:12 edd-int13_dev80-part2 -> ../../sda2
lrwxrwxrwx 1 root root 10 Feb 14 01:12 edd-int13_dev80-part3 -> ../../sda3
lrwxrwxrwx 1 root root 9 Feb 14 01:13 scsi-2222900018530881b -> ../../sdc
lrwxrwxrwx 1 root root 9 Feb 14 01:12 scsi-222450001857b29ba -> ../../sdf
lrwxrwxrwx 1 root root 9 Feb 14 01:12 scsi-2226f000155593266 -> ../../sda
lrwxrwxrwx 1 root root 10 Feb 14 01:12 scsi-2226f000155593266-part1 -> ../../sda1
lrwxrwxrwx 1 root root 10 Feb 14 01:12 scsi-2226f000155593266-part2 -> ../../sda2
lrwxrwxrwx 1 root root 10 Feb 14 01:12 scsi-2226f000155593266-part3 -> ../../sda3
lrwxrwxrwx 1 root root 9 Feb 14 01:13 usb-American_Megatrends_Inc_Virtual_CDROM -> ../../sr1
lrwxrwxrwx 1 root root 9 Feb 14 01:13 usb-LaCie_LaCie_CDRW_USB_10000E00D772A8C -> ../../sr0
linux-uhzp:~ # -

Terminal
File Edit View Terminal Tabs Help
# Modified by YaST2. Last modification on Thu Feb 14 17:09:31 UTC 2008
default 0
timeout 8
gfxmenu (hd0,0)/message
##YaST -- activate

###Don't change this comment - YaST2 identifier: Original name: linux###
title SUSE Linux Enterprise Server 10 SP1
root (hd0,0)
kernel /vmlinuz-2.6.16.46-0.12-smp root=/dev/disk/by-id/scsi-2226f000155593266-part3 vga=0x31a resume=/dev/disk/by-id/scsi-2226f000155593266-part2
splash=silent showopts
initrd /initrd-2.6.16.46-0.12-smp

###Don't change this comment - YaST2 identifier: Original name: failsafe###
title Failsafe -- SUSE Linux Enterprise Server 10 SP1
root (hd0,0)
kernel /vmlinuz-2.6.16.46-0.12-smp root=/dev/sda3 vga=normal showopts ide=nodma apm=off acpi=off noresume edd=off 3
initrd /initrd-2.6.16.46-0.12-smp
~
~
~
13,75 All
```

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SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)

- Next, edit /boot/grub/menu.lst
 - Modify the /dev/sd* entries to /dev/disk/by-id/scsi<xxxx>
 - See the red box in the screenshot on the next slide for reference.
 - If the steps on slide #37 were required to boot, also modify the line “root (hdx,y) to reflect the changes made when booting.



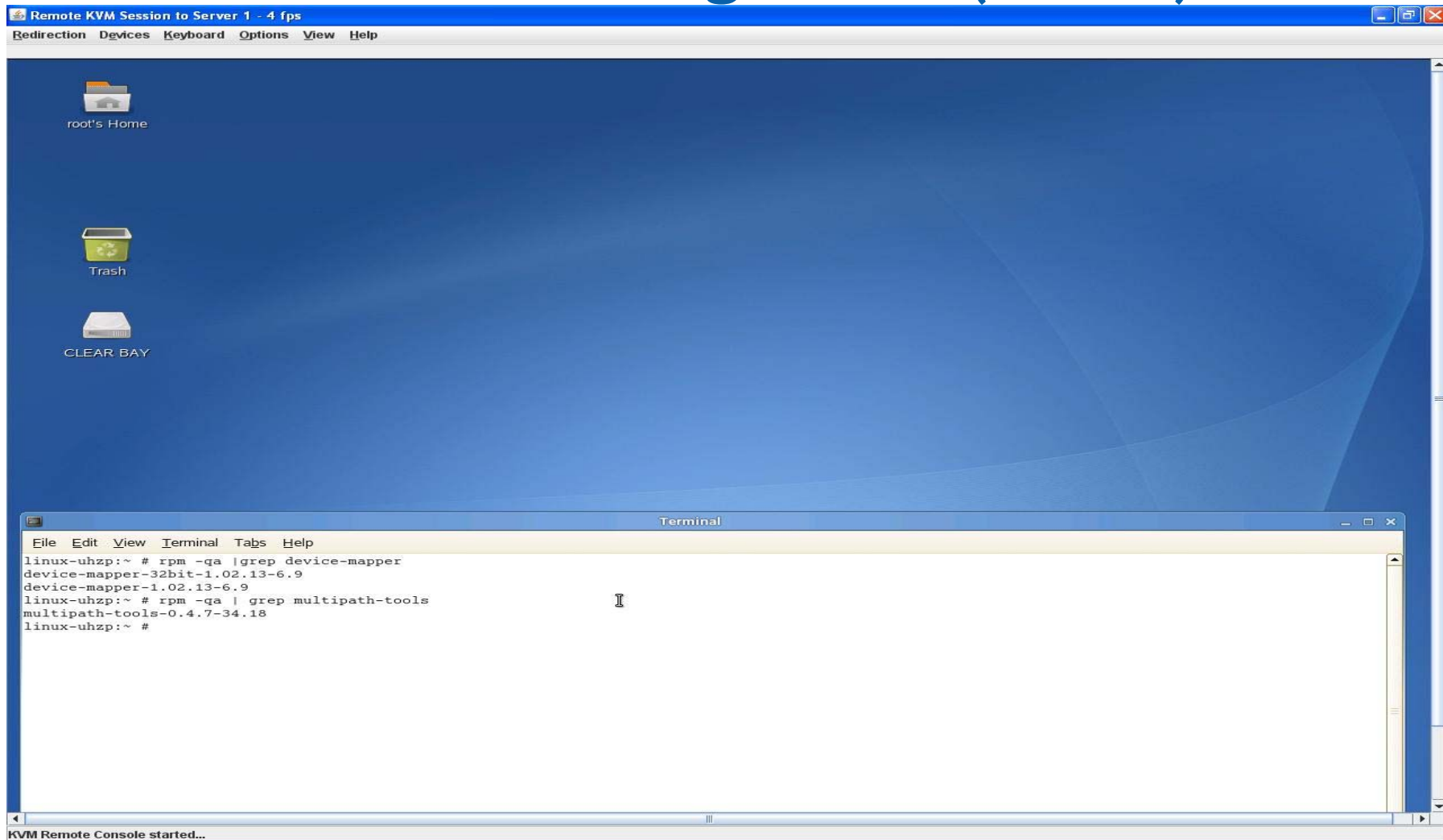
SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)

- Verify the installation of packages by typing:
 - `rpm -qa | grep device-mapper`
 - This should return [device-mapper-1.02.13-6.9](#)
 - Version may be slightly different based on the installation package.
 - `rpm -qa | grep multipath-tools`
 - This should return [multipath-tools-0.4.7-34.18](#)
 - Version may be slightly different based on the installation package.

See the screenshot on the next slide for reference.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)



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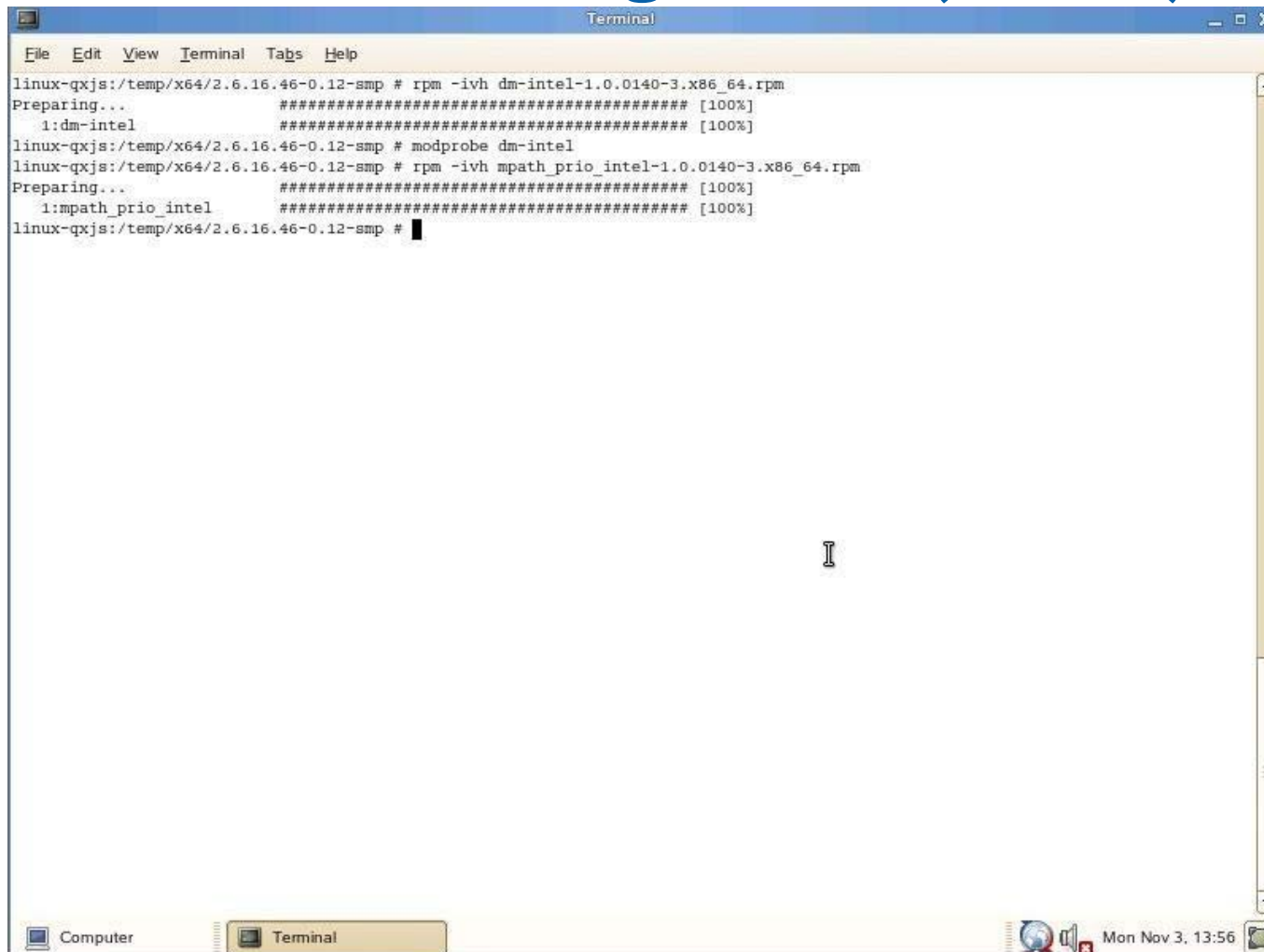


SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)

- Setting up Multipath ALUA
 - Copy the SuSE* Linux Enterprise Server driver package to a known location on the system under test
 - /temp is assumed for the remainder of the BKM
 - Open a terminal window
 - `cd /temp/<OS type>/2.6.16.46-0.12-smp`
 - For x86, type “`rpm -ivh dm-intel-1.0.0140-3.i586.rpm`”
 - For x64, type “`rpm -ivh dm-intel-1.0.0140-3.x86_64.rpm`”
 - Type “`modprobe dm-intel`”
 - The system will not return anything, which indicates a successful installation
 - Verify the module loaded by typing:
`lsmod | grep dm_intel`
 - Load the priority driver by typing:
 - For x86 systems: `rpm -ivh mpath_prio_intel-1.0.0140-3.i586.rpm`
 - For x64 systems: `rpm -ivh mpath_prio_intel-1.0.0140-3.x86_64.rpm`



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)



```
Terminal
File Edit View Terminal Tabs Help
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp # rpm -ivh dm-intel-1.0.0140-3.x86_64.rpm
Preparing... ##### [100%]
 1:dm-intel ##### [100%]
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp # modprobe dm-intel
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp # rpm -ivh mpath_prio_intel-1.0.0140-3.x86_64.rpm
Preparing... ##### [100%]
 1:mpath_prio_intel ##### [100%]
linux-qxjs:/temp/x64/2.6.16.46-0.12-smp # █
```

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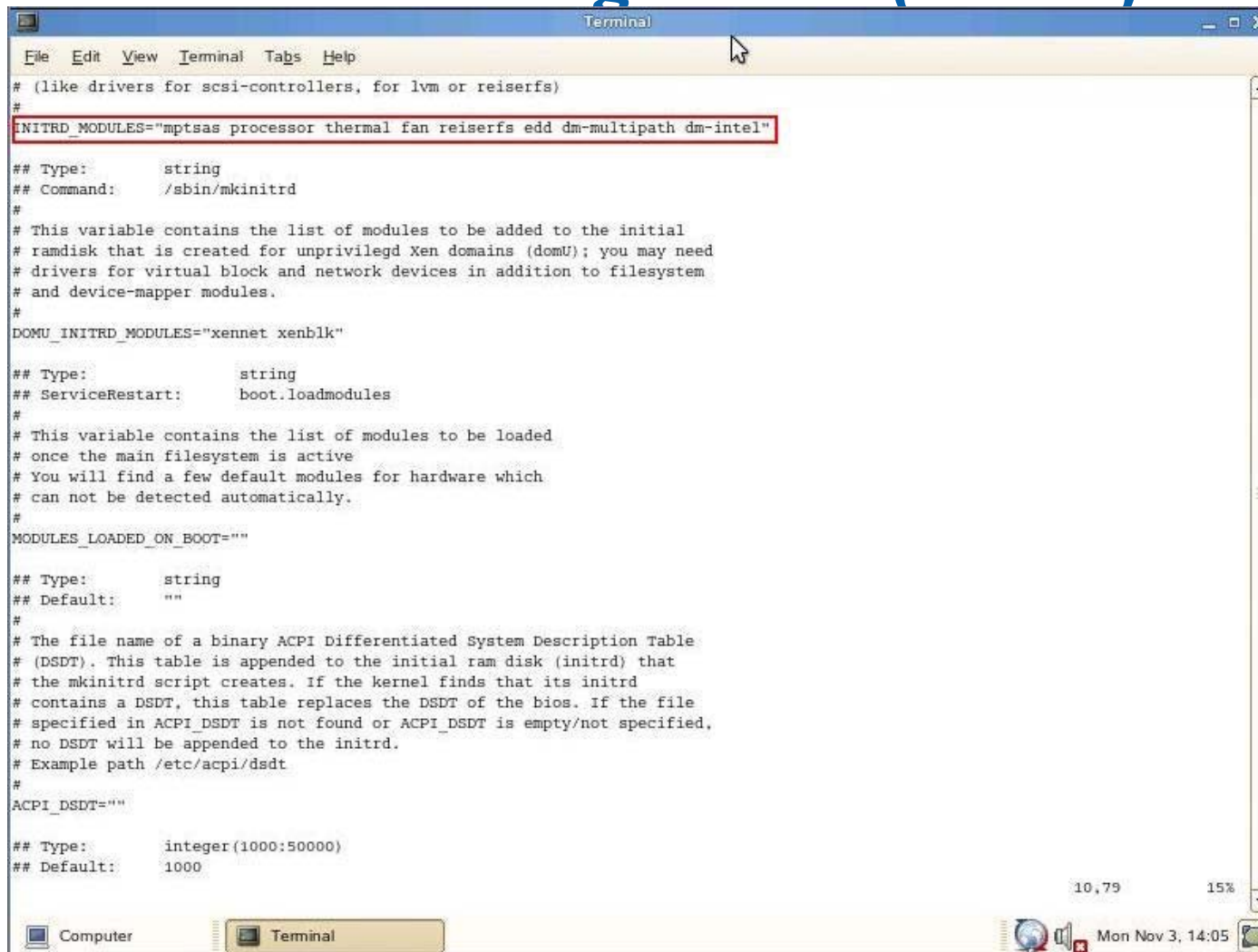


SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)

- Copy “multipath.conf.SLES” to the /etc directory and rename multipath.conf
- Type the following commands:
 - `chkconfig boot.multipath on <return>`
 - `chkconfig multipathd on <return>`
- Edit /etc/sysconfig/kernel by adding “dm-multipath” and “dm-intel” to the INITRD_MODULES section in the mentioned sequence.
 - See the screenshot on the next slide for reference.
- Type the following:
 - `mkinitrd`
This will create a new kernel image file.
- Reboot the server by typing “reboot”.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)



A terminal window titled "Terminal" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal displays configuration text for the INITRD_MODULES variable. The line `INITRD_MODULES="mptsas processor thermal fan reiserfs edd dm-multipath dm-intel"` is highlighted with a red box. The terminal also shows comments about the variable's purpose and other related variables like DOMU_INITRD_MODULES, MODULES_LOADED_ON_BOOT, and ACPI_DSDT.

```
File Edit View Terminal Tabs Help
# (like drivers for scsi-controllers, for lvm or reiserfs)
#
INITRD_MODULES="mptsas processor thermal fan reiserfs edd dm-multipath dm-intel"
## Type:      string
## Command:   /sbin/mkinitrd
#
# This variable contains the list of modules to be added to the initial
# ramdisk that is created for unprivileged Xen domains (domU); you may need
# drivers for virtual block and network devices in addition to filesystem
# and device-mapper modules.
#
DOMU_INITRD_MODULES="xennet xenblk"
## Type:      string
## ServiceRestart:  boot.loadmodules
#
# This variable contains the list of modules to be loaded
# once the main filesystem is active
# You will find a few default modules for hardware which
# can not be detected automatically.
#
MODULES_LOADED_ON_BOOT=""
## Type:      string
## Default:   ""
#
# The file name of a binary ACPI Differentiated System Description Table
# (DSDT). This table is appended to the initial ram disk (initrd) that
# the mkinitrd script creates. If the kernel finds that its initrd
# contains a DSDT, this table replaces the DSDT of the bios. If the file
# specified in ACPI_DSDT is not found or ACPI_DSDT is empty/not specified,
# no DSDT will be appended to the initrd.
# Example path /etc/acpi/dsdt
#
ACPI_DSDT=""
## Type:      integer(1000:50000)
## Default:   1000
10,79 15%
Computer Terminal Mon Nov 3, 14:05
```

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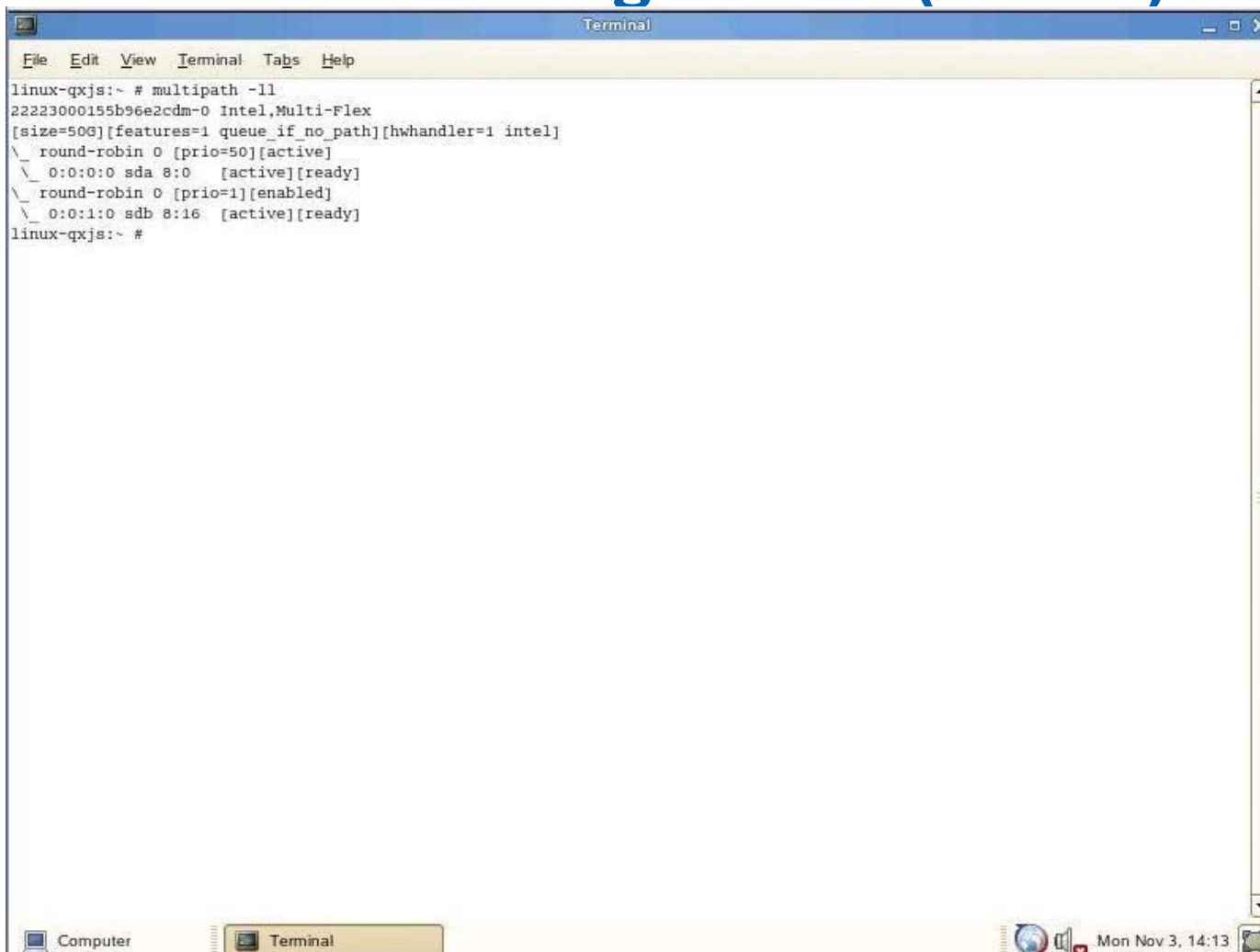


SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)

- To display the topology, type the following command:
 - `multipath -ll`
- See the screenshot on the next slide for a sample output of the “`multipath -ll`” command.



SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)



```
linux-qxjs:~ # multipath -ll
22223000155b96e2cdm-0 Intel,Multi-Flex
[size=50G][features=1 queue_if_no_path][hwhandler=1 intel]
  \_ round-robin 0 [prio=50][active]
     \_ 0:0:0:0 sda 8:0 [active][ready]
     \_ round-robin 0 [prio=1][enabled]
        \_ 0:0:1:0 sdb 8:16 [active][ready]
linux-qxjs:~ #
```

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SuSE* Linux Enterprise Server 10 SP1 and 10 SP2 - Post Install Configuration (cont'd)

- The server is now properly configured for Multipath usage.

