Configuring a Red Hat Linux System

For Multiple RAID-1 Devices

Graham Leach

Managing Partner

TIG – The Imperators Group, Inc.

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Table Of Contents

Why Do This At All?	4
RAID-1 Is A Good Thing	4
Setting up Multiple RAID-1 Devices in Red Hat 7.2	5
The Partitioning Strategy	5
What We're Trying To Achieve	6
The Distribution	7
The BIOS Setup	8
The BIOS Setup Screen	9
Getting Into the IDE Auto Detect Screen	10
Checking the results of the IDE Auto Detect Screen	11
Enable boot from CDROM	12
Saving BIOS Changes	13
Booting From The CD-ROM	14
Loading the Linux Setup Kernel	16
Loading The Linux Kernel From CD-ROM	17
Starting The Anaconda Setup Program, part I	18
Starting The Anaconda Setup Program, part II	19
Seeing X-Windows for the First Time	20
The Red Hat Setup Splash Screen	21
Language Selection	22
Keyboard Configuration	23
Mouse Configuration	24
Select The System Profile	26
Choosing Your Partitioning Strategy	27
Using fdisk	28
Partitioning hda	29
The fdisk Commands	29
How To View Partitions With fdisk	30
How To Delete A Partition With fdisk	31
Creating A 20Mb Boot Partition	32
Making A Partition Bootable With Idisk	33
Creating A Swap Partition	35
How To Create An Extended Partition For Linux	36
How To Create A Logical Drive In An Extended Partition	37
How To Tag A Partition For RAID	38
All Of The RAID Partitions Prepared	39
How To Write The Partition Table	40
Partitioning ndb	41
Make nob An Exact Duplicate Of noa	42
Writing The Partition Table A Second Time	43
Lising Disk Druid To Soften Drives	44
Using Disk Druid 10 Setup Drives	44
How To Configure the ower Partition	40
How To Configure The Swap Partition	40
How To Soloot The Appropriate PAID 1 Partitions for /	41 10
How To Configure the /usr Partition	40
How To Configure the /var Partition	79 50
How To Configure The /home Partition	51
How To Configure The Duplicate /boot Partition	52
How To Verify The RAID Configuration	53
How To Confirm Partition Formatting	54
The Boot Loader	55
How To Configure The System To Use LILO	55

Networking. 57 How To Configure Networking. 57 An Example Network Configuration 58 How To Defer Firewalling. 59 Additional Language Support 60 How To Enable Additional Language Support 60 How To Configure Time Zone Support 61 How To Configure Time Zone Support 61 Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation Process 67 Watching The Package Installation Process 67 Watching The Install. 70 The First Boot 71 The First Post-Installation Boot 71 The Red Hat Boot Disk 69 Concluding The Install. 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the ab	Where To Locate The Boot Code	56
How To Configure Networking 57 An Example Network Configuration 58 How To Defer Firewalling 59 Additional Language Support 60 How To Enable Additional Language Support 60 Time Zone 61 How To Configure Time Zone Support 61 Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation Process 67 Watching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 70 The First Post-Installation Boot 71 The Red Hat Login Screen 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partiti	Networking	57
An Example Network Configuration 58 How To Defer Firewalling 59 Additional Language Support 60 How To Enable Additional Language Support 60 Time Zone 61 How To Configure Time Zone Support 61 Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation Process 67 Watching The Package Installation Process 67 Watching The Package Installation Process 67 Watching The Red Hat Boot Disk 69 Concluding The Install 70 The First Boot 71 The Kenel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 In the above examp	How To Configure Networking	. 57
How To Defer Firewalling 59 Additional Language Support 60 How To Enable Additional Language Support 60 Time Zone 61 How To Configure Time Zone Support 61 Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation Process 67 Watching The Package Installation Process 67 Watching The Red Hat Boot Disk 69 Concluding The Install 70 The First Boot 71 The First Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partition Status in /proc 75 Acknowledgements <	An Example Network Configuration	. 58
Additional Language Support 60 How To Enable Additional Language Support 60 Time Zone 61 How To Configure Time Zone Support 61 Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation 66 Vatching The Package Installation Process 67 Watching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 70 The First Boot 71 The First Post-Installation Boot 71 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 In the above example the mount command was used to display the active partitions 74 Newing RAID Partition Status in /proc	How To Defer Firewalling	. 59
How To Enable Additional Language Support. 60 Time Zone 61 How To Configure Time Zone Support. 61 Accounts And Passwords. 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords. 63 Subsystem Installation. 64 Choosing which Subsystems To Install. 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation 66 Vatching The Package Installation 66 Vatching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 71 The First Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Newing RAID Partition Status in /proc 75 Acknowledgements Error! Bookmark not defined.	Additional Language Support	. 60
Time Zone 61 How To Configure Time Zone Support 61 Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation Process 67 Watching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 71 The First Boot 71 The First Boot 71 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partition Status in /proc 75 Acknowledgements Error! Bookmark not defined.	How To Enable Additional Language Support	. 60
How To Configure Time Zone Support 61 Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation Process 67 Watching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 70 The First Post-Installation Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions. 74 Viewing RAID Partition Status in /proc 75 Acknowledgements Error! Bookmark not defined.	Time Zone	61
Accounts And Passwords 62 Setting the root Password 62 Enabling MD5 And Shadow Passwords 63 Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation 66 Watching The Package Installation Process 67 Watching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 70 The First Boot 71 The First Post-Installation Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions. 74 Viewing RAID Partition Status in /proc 75 Acknowledgements Error! Bookmark not defined.	How To Configure Time Zone Support	61
Setting the root Password62Enabling MD5 And Shadow Passwords63Subsystem Installation64Choosing which Subsystems To Install64X-Windows65Skipping The X-Windows Setup65Initiating The Installation66Launching the Package Installation66Watching The Package Installation Process67Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partition Status in /proc75AcknowledgementsError! Bookmark not defined.	Accounts And Passwords	62
Enabling MD5 And Shadow Passwords63Subsystem Installation64Choosing which Subsystems To Install64X-Windows65Skipping The X-Windows Setup65Initiating The Installation66Launching the Package Installation Process67Watching The Package Installation Process67Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75AcknowledgementsError! Bookmark not defined.	Setting the root Password	. 62
Subsystem Installation 64 Choosing which Subsystems To Install 64 X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation 66 Watching The Package Installation 66 Watching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 70 The First Boot 71 The First Post-Installation Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partition Status in /proc 75 Acknowledgements Error! Bookmark not defined.	Enabling MD5 And Shadow Passwords	. 63
Choosing which Subsystems To Install64X-Windows65Skipping The X-Windows Setup65Initiating The Installation66Launching the Package Installation66Watching The Package Installation Process67Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75AcknowledgementsError! Bookmark not defined.	Subsystem Installation	. 64
X-Windows 65 Skipping The X-Windows Setup 65 Initiating The Installation 66 Launching the Package Installation 66 Watching The Package Installation Process 67 Watching The System Prepare The Installation 68 Creating the Red Hat Boot Disk 69 Concluding The Install 70 The First Boot 71 The First Post-Installation Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions. 74 Viewing RAID Partition Status in /proc 75 Acknowledgements 75	Choosing which Subsystems To Install	. 64
Skipping The X-Windows Setup65Initiating The Installation66Launching the Package Installation66Watching The Package Installation Process67Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75AcknowledgementsError! Bookmark not defined.	X-Windows	. 65
Initiating The Installation66Launching the Package Installation66Watching The Package Installation Process67Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75AcknowledgementsError! Bookmark not defined.	Skipping The X-Windows Setup	. 65
Launching the Package Installation66Watching The Package Installation Process67Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75AcknowledgementsError! Bookmark not defined.	Initiating The Installation	. 66
Watching The Package Installation Process67Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Acknowledgements75	Launching the Package Installation	. 66
Watching The System Prepare The Installation68Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75AcknowledgementsError! Bookmark not defined.	Watching The Package Installation Process	67
Creating the Red Hat Boot Disk69Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75Acknowledgements75	Watching The System Prepare The Installation	. 68
Concluding The Install70The First Boot71The First Post-Installation Boot71Watching The Kernel Boot For The First Time72The Red Hat Login Screen73Verifying the RAID Partitions74In the above example the mount command was used to display the active partitions74Viewing RAID Partition Status in /proc75Acknowledgements75	Creating the Red Hat Boot Disk	. 69
The First Boot 71 The First Post-Installation Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partition Status in /proc 75 Acknowledgements 75	Concluding The Install	. 70
The First Post-Installation Boot 71 Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partition Status in /proc 75 Acknowledgements 75	The First Boot	. 71
Watching The Kernel Boot For The First Time 72 The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partition Status in /proc 75 Acknowledgements Fror! Bookmark not defined.	The First Post-Installation Boot	. 71
The Red Hat Login Screen 73 Verifying the RAID Partitions 74 In the above example the mount command was used to display the active partitions 74 Viewing RAID Partition Status in /proc 75 Acknowledgements 75	Watching The Kernel Boot For The First Time	. 72
Verifying the RAID Partitions	The Red Hat Login Screen	. 73
In the above example the mount command was used to display the active partitions	Verifying the RAID Partitions	. 74
Viewing RAID Partition Status in /proc	In the above example the mount command was used to display the active partitions	. 74
Acknowledgements Error! Bookmark not defined.	Viewing RAID Partition Status in /proc	. 75
	Acknowledgements Error! Bookmark not defin	ned.

Why Do This At All?

Some people would say that enabling multiple RAID-1 devices under Linux is a non-trivial task, some would even describe it as difficult, poorly documented and not worth the trouble. So why bother?

Here are some compelling facts that support the idea that RAID-1 is a good idea.

RAID-1 Is A Good Thing

- 1) RAID raises the dependability of your system.
- 2) RAID can raise the performance of your website.

When a Redundant Array of Inexpensive Disks (RAID) is deployed on a system, the information on that system is **duplicated** on two physically different disk drives. In the event of a failure of one disk, the other is used – increasing the availability of information by 100%.

Because RAID devices can be deployed on multiple I/O channels, they can offer performance gains over disk systems that only use a single channel.

In other words, providing RAID may enhance your reputation and certainly helps to make your customers feel more secure when using your platform.

Setting up Multiple RAID-1 Devices in Red Hat 7.2

The Partitioning Strategy

The first thing that has to be determined when you are going to go with RAID is how the RAID is to be implemented. In the example used in this document, RAID is being used to mirror partitions as opposed to entire drives.

The boot and swap Partitions

Every Linux system needs somewhere to keep its boot files. On older drive (less than 540Mb) this used to be a non-important decision. Boot files were placed subdirectory of root called /boot and never thought about again, except in the case of a kernel rebuild.

With the advent of truly large drives the entire question of booting has became a bit trickier. BIOS restrictions cause a certain rule: The boot files must reside within the first 1024 cylinders of the drive. To accommodate the rule and guarantee a boot we must define a separate partition to hold the boot file. To make this easy, we define the **first** partition on the drive to be /boot.

The next partition is also **really** important. Linux systems use **virtual memory**, a system where sections of the RAM of the computer are swapped on and off the disk drive according to which program is currently active. This is happening even during installation, so the next task is to create the **swap partition** – in our case we anticipate physical RAM reaching 256Mb.

The rule of thumb is to define a swap space that is **twice** that of physical RAM, so our swap partition should be 512Mb.

Here is the partitions we will need for our "housekeeping" partitions:

Partition	Device	Size	Туре
/boot	dev/hda1	20Mb	Linux
<swap></swap>	dev/hda2	512Mb	swap

The third partition is where all of the actual files that compose the Linux system will reside – aside from the kernel itself. But there's a problem, we want to define the following partitions:

/ /home /usr /var

But the partition table can only old a maximum of four (4) entries. Summing up the two "housekeeping" and the "working" paritions gives us a total of six (6) partitions. We don't have enough entries to spare in the partition table to accommodate this scheme!

Fortunately there is a way to get around the four primary partition limit. The **extended** partition was invented for just this reason. Extended partitions contain **logical** partitions inside of them. In this case the **extended** partition is really nothing more than a container for other partitions.

Here is the definition of the extended partition we will need to hold the "working" partitions

Partition	Device	Size	Туре
<extended></extended>	dev/hda3	<rest disk="" of=""></rest>	extended

The Mirrored Partitions

Now that the extended partition has been created, **logical** drives within the partition are defined.

In this scheme we are going to partition the RAID-1 partitions according to the following scheme:

Partition Devic	e Size	туре	
/ /dev/ /home /dev/ /usr /dev/ /var /dev/	md5 4000Mb md6 16000Mb md7 3000Mb md8 5000Mb	Linux Linux Linux Linux Linux	RAID RAID RAID RAID

What We're Trying To Achieve

Here's a picture of what we should arrive at when this setup process is complete:

Command (m for h Disk /tmo/hda: 2	elp): p										
lisk /tmp/hda: 2											
hits = cylinder	Disk /twp/hda: 255 heads, 63 sectors, 1245 cylinders Units = cylinders of 16065 * 512 bytes										
Device Boot tmp/hda1 * tmp/hda2 tmp/hda3 tmp/hda5 tmp/hda6 tmp/hda6 tmp/hda7 tmp/hda8	Start 1 4 70 70 325 517 709	End 3 69 1245 324 516 708 1245	Blocks 24066 530145 9446220 2048256 1542208+ 1542208+ 4313421	Id 83 82 5 fd fd fd fd	System Linux Linux swap Extended Linux raid autodetect Linux raid autodetect Linux raid autodetect Linux raid autodetect						
Command (m for h	elp):										

OK, now that we know what we're targeting, let's make it real!

The Distribution



The BIOS Setup

One of the most important steps in making RAID-1 under Linux a success is the proper setup of the hard disks in the BIOS. If they are not set up properly, this entire exercise fails!

Consider the following:



In the above example the computer is booting and a prompt explains that to enter the BIOS setup the **DEL** key must be pressed.

The BIOS Setup Screen

Consider the following:



In the above example, the BIOS has been entered and the initial screen is being displayed. We want to move to the screen to the **right** of this one, so we press <TAB>.

Getting Into the IDE Auto Detect Screen

Consider the following:



In the above example we are on the upper-right menu and about to invoke the **Detect IDE** utility. This utility will probe the hard drives and obtain their geometry information.

Run the utility by pressing the <ENTER> key.

Checking the results of the IDE Auto Detect Screen

Consider the following:



In the above example the **Detect IDE** utility has been run and the drive geometry for the two drives has been determined and is displayed. Note that each of the drives is **PRIMARY** on their respective IDE bus. I recommend that you make the drives PRIMARY on their own bus and any additional devices (such as CD-ROM) secondary.

The other thing to verify is the two drives are treated **identically** by the BIOS. Make sure that they have the same translation (LBA or NONE) as well as displaying the same cylinders and heads and so forth. In my first two RAID-1 implementations the translation was AUTO – which caused /dev/had to use one kind of translation and /dev/hdb another – an incredibly frustrating and time-consuming problem that **cannot** be resolved within Linux, no matter what parameters you pass to the kernel on boot!

Do the BIOS setup properly or you will be sorry. You have been warned!

Enable boot from CDROM

In the **advanced** section of most BIOS is the ability to choose the first boot device.

Consider the following:



In the above example the **CD-ROM** has been selected as the first boot device. This will enable the installation of Red Hat from CD.

Saving BIOS Changes

Consider the following:

Negatre	an AMIBIOS Setup nds (C)2009, American Megatren	15 Inc.
0.0000000000000000000000000000000000000		00000000000000000000000000000000000000
01010101010101010101010	Setup	
	26262626262	\$*************************************
	Exit Setup	Utility
Standard A	d Save changes and Exit	
		IDE Color Set
Power Ctrl P	C Do not save changes and Exit	200000000000000000000000000000000000000
000000000000000000000000000000000000000	6	Default
200	Continue	Default
AB		
Supervisor		al Optimal
2525	25252	265

After the BIOS settings have been verified (and written down) they are saved to NVRAM and the machine rebooted.

Booting From The CD-ROM

Consider the following:

Hoppy Drive B: : None MHBIOS Date : 06/07/00 Processor Clock : 500MHz Power Management : APM,SMI	Seri Para Exte	al Port(s) : ilel Port(s) : rnal Cache :	03F8 0378 128KB , Enabled
NTA(PI) Device(s) Type Primary Master : Hard Disl Secondary Master : Hard Disl Secondary Slave : ATAPI CD	Size k 10244MB k 10244MB ROM	LBA 32Bit Mode Mode LBA On LBA On	Block PIO UDM Mode Mode Mod 32Sec 4 2 32Sec 4 2 4 N/A
PCI Devices: PCI Onboard PCI Bridge PCI Onboard USB Controller, PCI Onboard Multimedia Devic PCI Bridge VGA	PCI IRQ10 PCI ce, IRQ10 PCI	Onboard Bridge Onboard IDE Slot 1 Etherne:	Device t, [RQ11

In the above example the machine is displaying its configuration – notice that the drives display the same **size**, **translation**, **mode** – in all respects their logical configuration is **identical**. If you do not have this symmetry your install may not be successful!

Note that the second to last message on the screen indicates that the CD-ROM is being booted, the last message is output from the actual boot loader.

The Red Hat 7.2 Installation Start Screen

Consider the following:



In the above example the machine has booted from the CD-ROM and the installation is officially underway! The screen offers a variety of installation options, but we're going to select the default one by pressing **<ENTER>**.

Press <ENTER> to continue

Loading the Linux Setup Kernel



Loading The Linux Kernel From CD-ROM

Consider the following:



In the above example the Red Hat kernel is being loaded – a cute little penguin is displayed on the top of the screen and a bunch of information about system capabilities is output to the screen – in the old days you used to be able to read this, but now it zooms by so quickly that a special utility had to be written to view it! The utility is called **dmesg** and it can be invoked from the command line at any time.

Just sit back and watch the lines fly by – do not be alarmed by anything you see, other than the phrase **kernel panic**. If you see that, there's trouble.

Starting The Anaconda Setup Program, part I

For Microsoft users, the next screen is a bit eerie. Traditionally, a blue screen did not bode well. Fortunately for Red Hat users, this just means that the initial device load is complete and the kernel is now resident in memory. The next thing the install program does after loading the kernel is to load the **anaconda** setup program.

The program is quite large and takes some time to load off of the (comparatively slow) CD-ROM. It is also probing the hardware to determine (as best it can) the monitor, mouse and keyboard attached to the computer

Consider the following:

In the above example the initial kernel load is complete and the **anaconda** program is being loaded from the CD-ROM into memory for execution.

Starting The Anaconda Setup Program, part II

Consider the following:



In the above example,

Seeing X-Windows for the First Time

Consider the following:



In the above example,

The Red Hat Setup Splash Screen

For most Red Hat installers, this is a welcome but somewhat bewildering sight. Anything is better than a blue screen with a single line of text at the bottom, but this splash screen doesn't give **any** information about what's going on – at least with the **anaconda** program there was a promise of progress.

Anyway, after a few moments the splash screen goes away

Consider the following:



In the above example the **anaconda** program has been loaded into memory and the first thing it does is display a splash screen while it performs some setup tasks.

Language Selection

Consider the following:



In the above example the **anaconda** program is prompting the user to supply the language they wish to have displayed during the installation.

Select **English** and the click on the **Next** button to continue. If the mouse is not working, press the **<TAB>** key until the **Next** button is highlighted and then press **<ENTER>**.

Keyboard Configuration

Consider the following:

2	Red Hat Linu
nline Help	Keyboard Configuration
Karaharad	Which model keyboard is attached to the computer?
Configuration	Model
Comguration	Generic 101-key PC
Choose your exact keyboard model if it is listed. If you cannot	Generic 102-key (intl) PC Generic 104-key PC
find an exact match, choose the	Generic 105-key (int) PC Genius Comfy KB-16M
example, Generic 101-key PC).	HP Internet IBM Bapid Access
Hint: A 101-key keyboard is a	Layout
generic keyboard. A 104-key or 105-key keyboard is a keyboard	Swiss German Thai
designed to work with MS Windows 95 and features	Turkish
Windows-specific keys.	U.S. English w/ deadkeys
Choose the layout type for your	U.S. English w/ISO9995-3 Ukrainian
keyboard (for example, U.S. English).	Dead Keys
Entering special characters (such	Dissile dead keys Enable dead keys
as N, O, and C) is done using "dead	
sequences). If you wish to use	Test your selection here:
special characters requiring the	

In the above example the installer is being prompted to supply information about their keyboard type and whether they want to enable extended functionality, called **dead keys**, to allow for the generation of special characters.

Pick the appropriate setting, disable **dead keys** and click on **Next** to continue. If the mouse is not working, press the **<TAB>** key until the **Next** button is highlighted and then press **<ENTER>**.

Mouse Configuration

Consider the following:



For some reason the mouse detection in **anaconda** always mis-identifies the mouse type. Most mice now are **two button**, **PS/2** mice – not three button. If you select a two button mouse, be sure to enable three button functionality with the check box at the bottom of the screen.

Anyway, for your situation pick the appropriate setting and click on Next to continue.

If the mouse is not working, press the **<TAB>** key until the **Next** button is highlighted and then press **<ENTER>**.

Commencement of System Setup

Consider the following:



In the above example the Red Hat setup program is offering an information screen describing what is about to happen in the install, along with some other supporting information.

Click on **Next** to continue.

Select The System Profile

Consider the following:



Select custom and click on Next to continue.

Choosing Your Partitioning Strategy

Consider the following:



Select manually partition using fdisk and click on Next to continue.

Using fdisk

Consider the following:



Select hda and click on Next to continue.

Partitioning hda

The fdisk Commands

fdisk is not the most friendly of programs, but it is quite powerful once the basic commands are mastered.

Consider the following:

NEED SHOT OF HELP SCREEN HERE

In the above example the **fdisk** program has been invoked and the program is running.

Basic fdisk Commands

Character	Function
?	Display help menu
n	New Partition
р	Print the partition table
a	Tag a partition bootable
t	Tag a parition type
w	Write the partition table and exit fdisk

How To View Partitions With fdisk

Consider the following:

Connect (a for la						
Disk /tmp/hda: 25 Units = cylinders	5 heads, 6 of 16065	3 secto # 512 b	rs, 1245 o ytes	ylind	6. 2	
Device Boot /tmp/hda1	Start 1	End 1245	Blocks 10000431	Id 86	System NIFS volume set	
Connand (n for he	alp):					

In the above example the partition table has been printed with the **p** command. In this case, a partition exists on the disk of type **NTFS volume set**. This partition spans the entire disk, from cylinder 1 to cylinder 1245.

This partition must be deleted.

How To Delete A Partition With fdisk

Consider the following:



In the above example the first partition has been deleted from the disk with the d command.

Creating A 20Mb Boot Partition

```
Connand (m for help):

Partition number (1-4): 1

First cylinder (1-1245, default 1): 1

Last cylinder or +size or +sizeM or +sizeK (1-1245, default 1245): +20M

Command (m for help): p

Disk /tmp/hda: 255 heads, 63 sectors, 1245 cylinders

Units = cylinders of 16065 * 512 bytes

Device Boot Start End Blocks Id System

/tmp/hda1 1 3 24066 83 Linux

Command (m for help): ]
```

Making A Partition Bootable With fdisk



Tagging A Partition For Linux

```
Conward (* for help):

Disk /tmp/hda: 255 heads, 63 sectors, 1245 cylinders

Units = cylinders of 16065 * 512 bytes

Device Boot Start End Blocks Id System

/tmp/hdal * 1 3 24066 & 33 Linux

Conward (* for help):
```

Creating A Swap Partition

		Command (n Command (n Command (n Command (n Command (n Command ac e ext p pri p Partition First cyli Using defa Last cylin Command (m	for he for he for he for he tion ended mary pa number nder (4 ult valu der or	Plp): Pl	-4) ault 4): sizeM or	+sizeK (4-12	45, default 1	245): +511	211			
	FHC	Partition number (1-4): 2 Hex code (type L to list codes): 82 Changed system type of partition 2 to 82 (Linux swap)											
	0	Connand (n	for he	lp): p									
	1	Disk /tmp/ Units = cy	hda: 250 linders	5 heads, 63 of 16065	3 sector: * 512 by	s, 1245 cy tes	ylind	lers					
I		Device /tmp/hda1 /tmp/hda2	Boot *	Start 1 4	End 3 69	Blocks 24066 530145	Id 83 82	System Linux Linux swap					
1	-	Command (m	for he	lp): 📕									
								Back	D NEX				

How To Create An Extended Partition For Linux

	Command (m for help): Command (m for help): n Command (m					
	Command (m for help): p					
	Disk /tmp/hda: 255 heads, 63 sectors, 1245 cylinders Units = cylinders of 16065 * 512 bytes					
-	Device Boot /tmp/hda1 * /tmp/hda2 /tmp/hda3	Start 1 4 70	End 3 69 1245	Blocks 24066 530145 9446220	Id System 83 Linux 82 Linux sw 5 Extended	æ
-	Command (m for h	nelp):				
1					Sack	


Command (# for Command (# for Command (# for Command action 1 logical p primary p	help): help): help): n (5 or over) partition ((1-4)				
First cylinder of Last cylinder or	(70-1245, d +size or	efault 7 +sizeM o	0): 70 r +sizeK (70-12	45. default	1255) - 2000
Consend (a for t	elp): p				-1	12457: 12000
Disk /tmp/hda: 2 Units = cylinder	55 heads, 's of 16065	63 secto * 512 b	rs, 1245 c ytes	ylind	kris	
Disk /tmp/hda: 2 Units = cylinder Device Boot /tmp/hda1 * /tmp/hda2 /tmp/hda3 /tmp/hda5	55 heads, 's of 16065 Start 1 4 70 70 70	63 secto * 512 b End 3 69 1245 324	rs, 1245 o gtes 24066 530145 9446220 2048256	ulind 1d 83 82 5 83	Susten Linux Linux swap Extended Linux	
Disk /tmp/hda: 2 Units = cylinder Device Boot /tmp/hda1 = /tmp/hda2 /tmp/hda3 /tmp/hda5 Command (m for f	55 heads, s of 16065 Start 1 4 70 70 70 elp):	63 sector * 512 b End 3 69 1245 324	rs, 1245 c gtes Blocks 24066 530145 9446220 2048256	ulino 1d 83 82 5 83	System Linux Linux swap Extended Linux	

How To Tag A Partition For RAID

Device Boot Start End Blocks Id System /tmp/hda1 * 1 3 24066 83 Linux /tmp/hda2 4 69 530145 82 Linux swep /tmp/hda3 70 1245 9446220 5 Extended /tmp/hda5 70 324 2048256 fd Linux naid autodetect Command (m for help):	0110	intition (lex code () hanged syn baseand (lisk /tmp/ nits = cy	for he type L stem ty for he hda: 25 linders	1p): t (1-5): 5 to list co pe of part 1p): p 5 heads, t of 16065	odes): fr tition 5 53 secto * 512 b	d to fd (Lij rs, 1245 q jtes	nuk r ylind	aid autodetect) kens
Command (m for help):		Device (tmp/hda1 /tmp/hda2 /tmp/hda3 /tmp/hda5	Boot	Start 1 4 70 70	End 3 69 1245 324	Blocks 24066 530145 9446220 2048256	Id 83 82 5 fd	System Linux Linux swep Extended Linux raid autodetact
Q Dark D Nin	-	Connand (n	for he	lp):				
	1						4	I flack De Ninst

All Of The RAID Partitions Prepared

Units = cylinders of 16065 * 512 bytes Device Boot Start End Blocks Id System /tmp/hda1 * 1 3 24066 83 Linux /tmp/hda2 4 69 530145 82 Linux swap /tmp/hda3 70 1245 9446220 5 Extended /tmp/hda5 70 324 2048256 fd Linux raid autodetex /tmp/hda6 325 516 1542208+ fd Linux raid autodetex /tmp/hda7 517 708 1542208+ fd Linux raid autodetex /tmp/hda8 709 1245 4313421 fd Linux raid autodetex	Command (m fo Command (m fo Command (m fo	r help): r help): r help): p	63 sector	- 1245		
Device Boot Start End Blocks Id System /tmp/hda1 1 3 24066 83 Linux /tmp/hda2 4 69 530145 82 Linux /tmp/hda3 70 1245 9446220 5 Extended /tmp/hda5 70 324 2048256 fd Linux rmid autodetec /tmp/hda6 325 516 1542208+ fd Linux rmid autodetec /tmp/hda7 517 708 1542208+ fd Linux rmid autodetec /tmp/hda3 709 1245 4313421 fd Linux rmid autodetec	hits = cylin	ders of 16065	* 512 b	ytes	11.15×	kers
Conserved (a few help):	Device Boo /tmp/hda1 * /tmp/hda2 /tmp/hda3 /tmp/hda5 /tmp/hda6 /tmp/hda7 /tmp/hda8	t Start 1 4 70 70 325 517 709	End 3 69 1245 324 516 708 1245	Blocks 24066 530145 9446220 2048256 1542208* 1542208* 4313421	Id 83 82 5 fd fd fd fd	System Linux Linux swap Extended Linux raid autodetect Linux raid autodetect Linux raid autodetect Linux raid autodetect
command (m for netb):	Connord (n fo	r help): 📕				
Q Dark Dares					-	2 Bars. Dane

How To Write The Partition Table



Partitioning hdb

	Command (m for help): Command (m for help): Command (m for help): Dommand (m for help):	
	Command (m for help): Command (m for help):	
	Command (m for help): p Disk /tmp/hdb: 255 heads, 63 sectors, 12 Units = cylinders of 16065 * 512 bytes Device Boot Start Fod Blox	45 cylinders ts Id System
	Command (m for help):	
tes		I RACK DAME

Make hdb An Exact Duplicate Of hda

lonmand (m lisk /tmp/h	for help db: 255): p heads, 63	sector	rs, 1245 g	lind	kens
hits = cyl Device B /tmp/hdb1 /tmp/hdb2 /tmp/hdb5 /tmp/hdb5 /tmp/hdb5 /tmp/hdb5 /tmp/hdb8	linders o loot S *	f 16065 + tart 4 70 70 325 517 709	512 by End 3 69 1245 324 516 708 1245	8 Locks 24066 530145 9446220 2048256 1542208+ 1542208+ 4313421	10 23 25 55 55 50	System Linux swap Extended Linux raid autodetect Linux raid autodetect Linux raid autodetect Linux raid autodetect
Conward (m	for help): 🔳				
					4	Back D. New

Writing The Partition Table A Second Time

Device Boot (twp/hdb1 # (twp/hdb3 (twp/hdb3 (twp/hdb5 (twp/hdb6 (twp/hdb7 (twp/hdb8	Start 1 4 70 325 517 709	End 3 69 1245 324 516 708 1245	Blocks 24066 530145 9446220 2048256 1542208+ 1542208+ 4313421	Id 83 82 5 fd fd fd fd	System Linux Linux swap Extended Linux raid autodetec Linux raid autodetec Linux raid autodetec Linux raid autodetec
Command (m for h The partition ta Calling ioctl()	elp): w ble has be to re-read	en altere I partitio	od! on table.		
MARNING: If you partitions, ples information, Suncing disks,	have creat ase see the	ed or woo fdisk wa	iified any nual page	pos (for a	5.× additional
				1	Back D Nint

Disk Druid

Using Disk Druid To Setup Drives

			Red Ha	t Linux
Disk Setup				
Drive /dev/hda (Geom: 1245/255	(Model: 3	T310212A)	
2000 ME	1506 MB	1506 MB	4212 WB	
Drive /dev/hdb ()	Geom: 12.45/255	ACOL (Mandred) II	THERE	
Infth 5	htte	http://www.initiation.com	tudat	
2000 MB	1506 MB	1506 MB	4212 8/8	
New	Edit	Delete	Beset	Make BAID
New	Edit	Delete	Reset	Make BAID

New	Ē	tit	De	iete	Reset	Make BAID
Device	Start	End	Size (MB)	Туре	Mount Point	Format
🖶 /dev/hda						Printed and a distance of the local distance
-/dev/hda1	1	3	24	6942		No
-/dev/hda2	4	69	518	SWAD		Ves
🖨 /dev/hda3	70	1245	9225	Extended		
-/dev/hda5	70	324	2000	software RAID		
-/dev/hda6	325	516	1506	software RAID		
-/dev/hda7	517	708	1506	software RAID		
L/dev/hda8	709	1245	4212	software RAID		
₿/dev/hdb						
-/dev/hdb1	1	3	24	vfat		No
-/dev/hdb2	4	69	518	swap		Ves
E /dev/hdb3	70	1245	9225	Extended		
					Contraction of the local division of the loc	
				4	Back	in Next

would like	Mount Point	/boot	-
alled. now to par read the	Original Filesystem Type: Original Filesystem Labet Size (MB):	ext2 About 23	24)
tion Guide tic partitio ept the cur	How would you like to prepare C Leave unchanged (preserv	the filesystem on this partition e data) ext2	17
sing Disk I oning tool d partitionin at define me	C Migrate partition to Check for bad blocks?	2003	C Mount Point

How To Configure the /boot Partition

ould like Red	2000 878	150		1505 81	4212 #	
Mount Point	nt.	«Not A	pplic abl	12	-	ZAJ
read the is in the R Size (MB)	lesystem Type			swap 517		
ang Disk D	L partition as:	swap	•		:	Bes
partitioning define moto		1	OK		Cancel	/boo
You have chosen	-/dev/hit	da5 70 da6 325	324 516	2000	software RAID	

How To Configure The swap Partition



Using Disk Druid To Make A RAID Device



How To Select The Appropriate RAID-1 Partitions for /

How To Configure the /usr Partition



How To Configure the /var Partition

Red	Mount Point:	/var	-	4212 MB	
	Filesystem type:	ext2		: ST310212	A)
rtition	RAID Level:	RAID1		hdb8 4212 MB	
Red nning, rrent t), or Druid	RAID Members: Number of spares:	hda7: 1506 MB hda8: 4212 MB hdb7: 1506 MB hdb8: 4212 MB		2 /DE	Reset Mount Poir
ng with ount Ise the	Format partition	n? QK Cance	,	kt2 wap stended pftware RAID	/boot

like Red	Mount Point:	/home	-	4212 MB	
	Filesystem type:	ext2	• :	ST310212/	3)
o partition	RAID Level:	RAID1		hdb8 4212 MB	
the Red wide.	RAID Members:	hda8: 4212 MB hdb8: 4212 MB			
rtitioning, e current			B		<u>R</u> eset
vext), or Disk Druid, tool.	Number of spares	0		96	Mount P
tioning with he mount hs. Use the	Format partitio	in?		2 ap ended ware RAID	/boot

How To Configure The /home Partition



How To Configure The Duplicate /boot Partition

How To Verify The RAID Configuration

New	Ē	dit	Del	lete		Reset	Make RAID	1
Device	Start	End	Size (MB)	Туре		Mount Point	Eormat	
→ /dev/hdb							- onman	
-/dev/hdb1	1	3	24	ext2			Vac	
-/dev/hdb2	4	69	518	swap			Vas	
🗗 /dev/hdb3	70	1245	9225	Extended	1		103	
-/dev/hdb5	70	324	2000	software	RAID			
-/dev/hdb6	325	516	1506	software	RAID			
-/dev/hdb7	517	708	1506	software	RAID			
L/dev/hdb8	709	1245	4212	software	RAID			
- RAID Device 0			4212	ext2		/home	Yes	
-RAID Device 1			1506	ext2		/usr	Yes	
-RAID Device 2			1506	ext2		/var	Yes	
L RAID Device 3			2000	ext2		1	100	7
					<	Back	> Next	
					_			



How To Confirm Partition Formatting

The Boot Loader

How To Configure The System To Use LILO

	Ked Hat Linux
Boot Loader Configur	ration
Please select the bo default boot loader. H current boot loader, s	ot loader that the computer will use. GRUB is the lowever, if you do not wish to overwrite your select "Do not install a boot loader."
C Use GRUB as the	boot loader
C Use LILO as the I	boot loader
C Do not install a b	oot loader
Install Boot Loader re	ecord on:
Ø /dev/hda Mas	ster Boot Record (MBR)
C /dev/hda1 Fir	rst sector of boot partition
Kernel Parameters:	
Force use of LB/	A32 (not normally required)
Partition: /dev/md3	Type:ext2
✓ Default boot image	ge
Boot label: linux	
Default Device	Partition type Boot label

Where To Locate The Boot Code

I Defau Boot labe	lt boot ima I: linux	ge	Type:ext2
Default	Device	Partition type	Boot label
	/dev/md3	ext2	linux
			Back Next

Networking

How To (Configure	Networking
----------	-----------	------------

	Red Hat Linux
etwork Configuration	
etho	
Configure using DHCP	
Activate on boot	
ID Address	
Notmask	
Network'	
Broadcast	
Hostname:	
Gateway:	
Primary DNS:	
Secondary DNS:	
Ternary DNS:	

An Example Network Configuration

		Red Hat Lin	ux
etwork Configuration			
eth0			
Configure using DH	CP		
Activate on boot			
IP Address: 19216	10.23		
Netmask 255.25	5.255.0		
Network: 192.16	3.0.0		
Broadcast 192.16	8.0.255		
bloadcast. Tistrie			
Hostname:	id.dd-ir[dustries.com		
Gateway:	92.168.0.254		
Primary DNS:	92.168.0.1		
Secondary DNS:			

How To Defer Firewalling

		Red Hat Linux
Firewall Configuration Please choose your security level C High	C Medium	No firewall
C Use default firewall rules		
Customize		
Trusted devices: eth0		
Allow incoming: DHCP SSH Teinet WWW (HTTP) Mail (SMTP) FTP		
Other ports		

Additional Language Support

How To Enable Additional Language Support

	Red H		
Additional Language Support Choose the default language for this system.	English (USA)	-	
Choose additional languages you would like	to use on this system:		
Dutch (Netherlands)	<u> </u>	Select all	
English (Australia) English (Botswana) English (Canada) English (Cenmark) English (Denmark) English (Great Britain) English (Hong Kong) English (Hong Kong) English (Ireland) English (Ireland) English (Philippines) English (Singapore) English (South Africa) English (USA) English (Zimbabwe)		Reset	

Time Zone

How To Configure Time Zone Support

	Red Hat	Linux
fime Zone Selection	Kgr.	
Location UTC Offset		
View: Asia 🗘 🗖 Syste	em clock uses UTC	8
TRUCK STATE OF THE OWNER		~
aller -	1000	Aler -
And the second	and the second	-
Contraction & State		
mi h had		
	13	
Asia/Hong_Kong		
Africa/Addis_Ababa		Î
Africa/Asmera		
Africa/Cairo		
Anica/Dibouti		

Accounts And Passwords

Setting the root Password

	Red Hat Linux
Account Configuration	
Enter the password for the root user (administrative system.	ator) of this
Root Password:	
Confirm:	
Additional accounts can be created for other u system. Such accounts could be for a persona	isers of this I login account, I to use this
system. Use the <add> button to enter addition accounts.</add>	lai user

Enabling MD5 And Shadow Passwords

	Red Hat Linux
Authentication Configuration	
🔽 Enable MD5 passwords	
Finable shadow passwords	
NIS LDAP Kerberos 5 SMB	
Enable NIS	
NIS Domain:	
Use broadcast to find NIS server	
NIS Server:	

Subsystem Installation

Choosing which Subsystems To Install

		Red Hat Linux
	Package Group Selection	
ting Package	Printing Support	
ıps	Classic X Window System	
e package (application) hat you want to install. To package group, click on k box beside it.	F X Window System	
t individual packages, in <i>Select Individual</i> is box at the bottom of the	Laptop Support	
	F7 CONTE	
	E Sound and Multimedia Support	
	F E Network Support	
	Select individual packages Total	install size 827M

X-Windows

Skipping The X-Windows Setup

	All Graphics Xpression		
	ATI Mach32		
100	ATI Mach64		
	ATI Mach64 3D RAGE II		
	ATI Mach64 3D RAGE II+DVD		
	ATI Mach64 3D Rage IIC		
	ATI Mach64 3D Rage Pro		
	ATI Mach64 CT (264CT)		
	ATI Mach64 GT (264GT), aka 3D RAGE		
	ATI Mach64 VT (264VT)		
	ATI Radeon (generic)		
	ATI Radeon AGP		
	ATI Radeon AGP VIVO		
H	Video card RAM: 4 MB	(\$	Restore original values
-	Kip X Configuration		*
1		В	

Initiating The Installation

Launching the Package Installation



Watching The Package Installation Process

Formatting Partitions

	Installing Packages				
	Package: Size:				
g Packages	Summary:				
red all the eded to install Red our system. It may	Package Progress: Total Progress:				
install everything,	Status	Packages	Size	7-1	
led	Total	0	0 M	Con no	
	Completed	0	0 M	0.00.00	
	Rem:	0	0 M		
	ŀ	9 r	e d hat		
? Release Notes			d Back	Next	
				A STREET OF STREET	
		and the second se			

Watching The System Prepare The Installation



Creating the Red Hat Boot Disk

oot Disk Creation	
B	
	The boot disk allows you to boot your Red Hat Linux system from a floppy diskette.
	Please remove any diskettes from the floppy drive and insert a blank diskette. All data will be ERASED during creation of the boot disk.
Skip boot disk c	reation

Concluding The Install



The First Boot

The First Post-Installation Boot



Watching The Kernel Boot For The First Time

Consider the following:

Mounting proc filesystem: Unmounting initrd: Configuring kernel parameters: Setting clock (localtime): Mon Jan 7 22:20:55 HKT 2002 Loading default keymap (us): Setting default font (lat0-sun16): Activating swap partitions: Setting hostname raid dd-industries.com; Setting hostname raid.dd-industries.com: Mounting USB filesystem: Initializing USB controller (usb-uhci): Checking root filesystem /: clean, 16771/256512 files, 24101/512048 blocks E OK] E OK] E OX] Remounting root filesystem in read-write moto Finding module dependencies: Starting up RAID devices: md3 md0 md1 md2 Checking filesystems /boot: clean, 30/6024 files, 2390/24066 blocks /home: clean, 11/539616 files, 16950/1078336 blocks /usr: clean, 37100/192768 files, 163112/385536 blocks /var: clean, 350/192768 files, 9484/385536 blocks Remounting root filesystem in read-write mode: [0K] [0K] [0K] Mounting local filesystems: Enabling local filesystem quotas:

Note the RAID devices md3, md0, md1 and md2 coming up.

Note the partitions coming up clean.
The Red Hat Login Screen

Consider the following:



Verifying the RAID Partitions

Consider the following:

Red Hat Linux release 7.2 (Enigma) Kernel 2.4.7-10 on an 1686 raid login: root Password: [root@raid root]# mount /dev/md3 on / type ext2 (rw) none on /proc type proc (rw) usbdevfs on /proc/bus/usb type usbdevfs (rw) /dev/hda1 on /boot type ext2 (rw) none on /dev/pts type devpts (rw,gid=5,mode=620) /dev/md0 on /home type ext2 (rw) none on /dev/shm type tmpfs (rw) /dev/md1 on /usr type ext2 (rw) /dev/md2 on /var type ext2 (rw) [root@raid root]# _

In the above example the **mount** command was used to display the active partitions.

Viewing RAID Partition Status in /proc

Consider the following:



In the above example, the **cat** command was used to display the contents of the file **/proc/mdsat**, which holds the current status of the raid array.

Everything looks fine - looks like a working system.