



Sample Exam 2

The following questions will help you measure your understanding of the material presented in this book.

As discussed in the introduction, the RHCE exam consists of two different, equally weighted exams: Troubleshooting and System Maintenance (2.5 hours); Installation and Configuration (3.0 hours). There are RHCE and RHCT components to each exam. To earn the RHCE, you need to meet the following requirements.

On the Troubleshooting and System Maintenance exam, you need to

- Successfully complete all five RHCT-level problems within the first hour.
- Answer enough RHCE requirements (three of five) to earn an overall score of 80 (of 100).

On the Installation and Configuration exam:

- Earn a score of 70 or higher on the RHCT section.
- Address enough issues correctly to get a grade of 70 on the RHCE section.

Both exams are “closed book.” However, you are allowed to use any documentation that you can find on the Red Hat Enterprise Linux computer, such as man pages.

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If you pass the RHCT components of both exams, you'll qualify as a Red Hat Certified Technician. If you pass the RHCT and RHCE components of both exams, you will also become a Red Hat Certified Engineer.

Troubleshooting and System Maintenance Exam

For this sample exam, you need a computer that you're willing to dedicate for experimental purposes. Actual troubleshooting questions require the installation of the latest version of Red Hat Enterprise Linux, configured with a specific problem. The exam conditions would delete any and all data that you have on that computer. One option is a virtual machine solution such as that provided by VMWare; as of this writing, 30-day trial subscriptions are available at www.vmware.com.

If possible, get a friend, fellow student, or colleague to help set up the exercises for this exam. That's the best way to simulate real-world conditions. As shown in the RHCE Exam Prep guide at www.redhat.com/training/rhce/examprep.html, you may have to boot into different runlevels, solve networking and hostname problems, configure the GUI, add partitions of various types, and use standard command line tools to analyze and configure your system. You can use any documentation that you can find on your Red Hat Enterprise Linux computer; however, you're not allowed to reinstall Linux to address these problems.

You can't pass either exam unless you solve all of the RHCT-level troubleshooting problems within the first hour. On the other hand, you need to budget your time judiciously; if you can't solve one RHCE-level problem, you may want to give up and move on to the next problem. But you may not be able to go back. You may be able to debug the next problem in just a few minutes. Even if you have time left over at the end of the exam, you can't go back and will not get any credit for the problems that you have abandoned.

These are not actual questions, but exercises consistent with the guidelines in the RHCE Exam Prep guide. As exercises, they have no answers per se; however, they include a lot of information that can help you as a Linux administrator, as well as on the RHCE Troubleshooting and Network Services exam. I've set them up in a format that can allow someone else to set up exercises similar to what you might see on the RHCE exams.

Even for these exercises, *do not use a production computer*. Some or all of these exercises are designed to make Linux unbootable. If you're unable to recover from the steps documented in these exercises, you may need to reinstall Red Hat Enterprise Linux. Saving any data that you have on your computer at that point may not be possible.

exam
watch

One thing that may make this exam more realistic is the help of a friend or classmate, who can configure one of these problems on your computer

without your knowledge. That person can substitute a scenario from a previous chapter; you can find several options in the Scenario and Solution list from Chapter 11.

Troubleshooting and System Maintenance Exam: RHCT Components

There are five problems on the RHCT part of the exam. You have to reconfigure your computer to address all five problems appropriately, within the first hour of this exam. In this exercise, you'll set up five different problems on the same computer.

Ideally, you'll have a friend or classmate who can help you prepare your computer. Assume that you have a network server with the RHEL 3 installation files. After installing RHEL 3, your friend should take the following steps:

1. Install RHEL 3 with at least 256MB of space that is unallocated to any partition.
2. Make sure RHEL 3 boots from the command line. To make sure this happens when the exam candidate runs this system, make sure the first line in `/etc/inittab` points to runlevel 3.
3. Set up Mozilla to open automatically in the default GNOME desktop environment.
4. Make sure the `xfs` service does not run the next time you boot into runlevel 5; one method is to use the following command:

```
# chkconfig --level 5 xfs off
```
5. In the `/etc/sysconfig/network` file, make sure that **NETWORKING=no**.
6. Run the **poweroff** command on the computer. It is now ready for this part of the exam.
7. Have the person taking the exam start the computer. Do not tell the person about the steps you took to prepare this computer. Tell him or her to
 - Allocate the free space on the current drive to another swap partition.
 - Make Linux boot into the GUI. Address any problems you see the next time you boot Linux.

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- Configure the GNOME desktop as the default, and it should open only a command line window when you boot.
- Set up networking.

Troubleshooting and System Maintenance: RHCE Components

There are five problems on the RHCE part of the exam. You have to solve three of these problems correctly. Your time starts after you've answered *all* of the RHCT problems correctly within the required first hour; you'll then have at least 1.5 hours for this part of the exam. Ideally, you'll have a friend or classmate who can help you prepare your computer. Assume that you have a network server with the RHEL 3 installation files.

You may want to have your friend or classmate prepare different questions. Some boot exercises can be easily created from the Scenario and Solution list in Chapter 11. Other exercises on network services can be created based on what you've learned in Chapters 7–10. Exercises related to adding, removing, and resizing logical volumes can be developed from the information in Chapters 3 and 11.

Troubleshooting and System Maintenance: RHCE Exercise I

In this exercise, you'll be working with a RHEL 3 computer with a key file missing. Ideally, you'll have a friend or classmate who can help you prepare your computer. Assume that you have a network server with the RHEL 3 installation files. You'll also need a computer where you can boot directly from your CD drive, so you can use the first Red Hat installation CD. Then take the following steps:

1. Start RHEL 3. Rename your `/etc/passwd` configuration file. One possible name is `/etc/bak.passwd`.
2. Make sure you have a boot disk that can serve as a rescue disk. As the Red Hat Exam Prep guide requires the use of the first RHEL 3 installation CD, as a rescue disk, make sure your computer can boot from this CD.
3. Use the **poweroff** command to stop Linux.
4. Have the person taking the exam start the computer. Do not tell the person about the steps you took to prepare this computer. After the candidate finishes the exercise, make sure to restore the original `/etc/passwd` file.

Troubleshooting and System Maintenance: RHCE Exercise II

In this exercise, you'll be working with a RHEL 3 computer with a key file missing. Ideally, you'll have a friend or classmate who can help you prepare your computer.

Assume that you have a network server with the RHEL 3 installation files. You'll also need a computer where you can boot directly from your CD drive, so you can use the first Red Hat installation CD. Then take the following steps:

1. Start Red Hat Enterprise Linux. Copy and back up your `/etc/inittab` configuration file. One possible name is `/etc/bak.inittab`.
2. Run the `ps aux | less` command. Note the substantial number of running processes. Save this output to a file or send it to a printer.
3. Open your `/etc/inittab` file in a text editor.
4. Change the `x` in the `id:x::initdefault` line to `4`.
5. Comment out the `l4:4:wait:/etc/rc.d/rc 4` line in `/etc/inittab`. Save your changes.
6. Make sure that the Apache, NFS, sendmail, and vsFTP services aren't set to start in runlevel 4. You can use a command such as `chkconfig` for this purpose.
5. Use the `poweroff` command to stop Linux.
6. Have the person taking the exam start the computer. Do not tell the person about the steps you took to prepare this computer. After the candidate finishes the exercise, make sure to restore the original `/etc/passwd` file.

Troubleshooting and System Maintenance: RHCE Exercise III

In this exercise, you'll be practicing with the standard FTP server, vsFTP. Ideally, you'll have a friend or classmate who can help you prepare your computer. The service can be on or off by default. It may be blocked by a firewall. Service may be denied through an `iptables` firewall or through the `tcp_wrappers` files (`/etc/hosts.allow` and `/etc/hosts.deny`). Ideally, you'll be able to check your work through another computer on a LAN. Then take the following steps:

1. Start RHEL 3. Check for the installation of the `vsftpd` RPM package with the `rpm -q vsftpd` command. Install this RPM if required.
2. Check your configuration for a firewall with the `service iptables status` command.
3. If there are `iptables` rules active on your system, you may want to back them up; copy the `/etc/sysconfig/iptables` file to your home directory.
4. Set up a regular standard firewall with the `redhat-config-securitylevel` command. Don't allow in any special traffic.

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5. Check your `/etc/hosts.allow` and `/etc/hosts.deny` files. If there are rules related to **ftpd** or **ALL** services in either file, comment them out.
6. Check the default status of the vsFTP server with the **chkconfig --list vsftpd** command. The response should be off or on. Use **chkconfig** to turn on the vsFTP service if required.
7. Use the **poweroff** command to stop Linux.
8. Have the person taking the exam start the computer. Do not tell the person about the steps you took to prepare this computer. After the candidate finishes the exercise, make sure to restore the original `/etc/sysconfig/iptables` file.

Troubleshooting and System Maintenance: RHCE Exercise IV

In this exercise, you'll be working with a RHEL 3 computer where you want to expand an existing logical volume. Ideally, you'll have a friend or classmate who can help you prepare your computer. Assume that you have a network server with the RHEL 3 installation files. You'll also need a computer where you can boot directly from your CD drive, so you can use the first RHEL 3 installation CD. Then take the following steps:

1. Configure a RHEL 3 computer with some empty space on a hard drive, or a new hard drive. Assume you've configured the `/data` directory on a logical volume with 1000MB of space. For the purpose of this exam, we'll assume that you've configured a computer with another 1000MB of free space.
2. Make sure the computer starts normally. Stop the computer with the **poweroff** command. Tell the RHCE candidate that he or she will need to expand the space available to the `/data` filesystem.

Troubleshooting and System Maintenance: RHCE Exercise V

In this exercise, you'll be working with a RHEL 3 computer with a problem boot loader. Ideally, you'll have a friend or classmate who can help you prepare your computer. Assume that you have a network server with the RHEL 3 installation files. You'll also need a computer where you can boot directly from your CD drive, so you can use the first Red Hat installation CD. Then take the following steps:

1. In RHEL 3, change the following line in your `/etc/grub.conf` configuration file, as shown in bold:

```
kernel /vmlinuz-2.4.21-4.EL ro root=LABEL=/boot
```

2. Use the **poweroff** command to stop Linux.
3. Have the person taking the exam start the computer. Do not tell the person about the steps you took to prepare this computer.

Troubleshooting and System Maintenance Discussion

Naturally, you shouldn't read this discussion until you've had a chance to try out the problems. I describe one possible solution. The solution that you come up with can vary. The method you use doesn't matter; the result is what counts. As of this writing, you can't reinstall RHEL 3 on the target computer, and you can't go to the Internet for help during the exam.

Troubleshooting and System Maintenance Exam: RHCT-Level Problems

Address the problems that you've been given. Not all of the problems have straightforward solutions.

1. When you first start this computer, watch the start messages carefully. Make a note of anything unusual.
2. Log into the RHEL 3 computer as the root user. Generally, if there's a problem with networking, I'll address that first. But the order in which you solve problems isn't always crucial. If you want to use a GUI tool, you'll want to set up GNOME first.
3. Run some basic commands. Most basic is the **ifconfig** command; in this case, you'll see no output, not even for the loopback device. It's easy enough to activate them with the following commands:

```
# ifconfig lo up
# ifconfig eth0 up
```

4. However, that's not good enough. You need to make sure the service starts the next time you boot Linux. First, make sure that the **network** service starts at the appropriate runlevels:


```
# chkconfig --list network
```
5. If that's okay, check the appropriate scripts in the `/etc/sysconfig` directory. You should notice something strange with the **NETWORKING** command in the `/etc/sysconfig/network` script. Make the appropriate change.

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6. To allocate the free space on a hard drive, use the **fdisk** command. First, **fdisk -l** lists currently allocated hard drives and partitions. You should be able to identify a hard drive with free space.
7. If the hard drive with free space is the second SCSI drive (`/dev/scb`), you can open it for editing with the **fdisk /dev/scb** command.
8. Then add the partition, using the techniques described in Chapter 2. The exact steps depend on the current configuration of your hard drive.
9. Make sure the new partition is set to the Linux swap system ID, which is 82 in **fdisk**. Don't forget to write the changes.
10. Add the new partition to `/etc/fstab`. You should already have an existing swap partition that you can use to model the configuration for the new swap partition.
11. Format the new swap partition with the **mkswap** command.
12. It's easy to make Linux boot into the GUI at the next reboot; make sure the **id** command in `/etc/inittab` reads as follows:

```
id:3:initdefault
```
13. Reboot your computer. As suggested, the problem isn't so easy. While you've configured RHEL 3 to start in runlevel 5, it leads to a blinking command line login screen.
14. As stated in the Exam Prep guide, you need to know how to boot into a different runlevel. You know that runlevel 3 worked previously, so reboot (or even reset the power on your computer) and add that command to the kernel from the GRUB menu:

```
grub append> ro root=LABEL=/ 3
```
15. Now you can check for the basic issues associated with a problem logging into the GUI: an inactive **xfs** service, or full partitions associated with the `/tmp` and `/home` directories.
16. You can check whether mounted partitions are full with the **df** command. You can use the **service xfs status** command to see if the X font server is operational. If it isn't, make sure it is after the next reboot with a command such as **chkconfig**.
17. Now you should be able to reboot into the GUI. With the Sessions tool, you can configure the applications that start automatically when you log into the GUI.
18. Show your partner or instructor what you did.

Troubleshooting and System Maintenance: RHCE-Level Exercise I

You'll see what's wrong when you try to log into RHEL 3. Be prepared to use the first RHEL 3 installation CD to rescue this system. If you get instructions for a network source for the RHEL 3 installation files, take careful notes.

1. When you see your boot loader, probably GRUB, select your current version of RHEL 3.
2. It will look like your computer boots normally.
3. Now try to log in. Use any account that you've previously created on this computer. Note what happens.
4. Reboot your computer. Make sure the first RHEL 3 installation CD is installed.
5. When you see the Red Hat Enterprise Linux installation options, type **linux rescue** at the boot prompt. (If you think you'll need to install some of the RHEL 3 installation RPMs, type **linux rescue askmethod**.)
6. Follow the first basic steps toward regular installation of RHEL 3.
7. You'll soon see a Rescue menu. When you do, select Continue and press ENTER. The **linux rescue** mode looks for current installations.
8. Assuming a current RHEL installation is found, select OK and press ENTER to continue.
9. Remember, assuming your normal directories and filesystems are detected, they are mounted on the `/mnt/sysimage` directory.
10. Restore the basic workings of your directory structure with the **chroot /mnt /sysimage** command.
11. Examine the `/etc/passwd-` file. You can use it as a backup; it should contain all but the last entry in your original `/etc/passwd` file.
12. Use the **reboot** command to restart your computer. Remember to remove your installation CD before your computer reboots.
13. Try logging in as root. Log out again.
14. Try logging in as one of the regular users in your `/etc/passwd-` file. Note what happens.
15. Show your partner or instructor what you did.

Troubleshooting and System Maintenance: RHCE-Level Exercise II

You'll see what's wrong when you try to log into RHEL 3. Be prepared to use the first RHEL 3 installation CD to rescue this system. If you get instructions for a network source for the RHEL 3 installation files, take careful notes. You're hearing complaints that a number of services aren't working, such as your Web, FTP, mail, and NFS.

1. Observe the messages as Linux reboots. Note how `inittab` starts your Linux system in runlevel 4.
2. Log in at the text console.
3. You could start services one at a time. You might assume that the services in question aren't set to start in runlevel 3. But when you see with the following command that Apache is active in runlevel 3, you should realize that something else is wrong.

```
# chkconfig --list httpd
```
4. Run the **ps aux** command. Note the relatively small number of running processes.
5. Compare the output to the process list running when you started Linux in runlevel 3.
6. Note the processes that haven't started. Especially if you've already configured network processes such as NFS or Samba, note how those daemons are not active.
7. If you know something about the start process, you'll know that the current runlevel makes all the difference. You can check the current runlevel with the **runlevel** command.
8. If you know a bit more about the boot process, you'll know that the current runlevel, as well as associated services, are initiated through the `/etc/inittab` file.
9. Make any appropriate changes to `/etc/inittab`. Reboot your computer and explain to your partner or instructor what you did.

Troubleshooting and System Maintenance: RHCE-Level Exercise III

You're hearing complaints about your FTP server. You thought you've set it up correctly, but nobody on the network is able to connect to the server. You'll want to make any

necessary changes to your configuration to allow others to connect to your server. One more thing: limit access to the users elizabeth and fred.

1. Make sure the standard Red Hat FTP service, vsFTP, is running. The standard is with the **service vsftpd status** command. Start it if required. Make sure it's set to start at the appropriate runlevels.
2. Try connecting to the vsFTP server. Try it from the local computer with the **ftp localhost** command. You should be able to log in as "anonymous," or with a local username and password.
3. If you can't get in, there may be a firewall such as **iptables** or **/etc/hosts.deny** blocking access locally.
4. If you get a login prompt but can't log in, look at the various vsFTP configuration files. Some can be set to block or allow specific users.
5. See the files you access if you log in as a real user. Repeat again with an anonymous login. Once you're finished browsing, log out of **ftp**.
6. Repeat the **ftp** access request from a remote computer. Use the name or the IP address of the FTP server. If you can't get in, check network connectivity. If it's good, there may be a firewall blocking access.

exam

Watch

You don't have to physically go to a remote computer to see what you can do. You can log in to that remote

computer using a command such as telnet or ssh. Once you're logged in, you can then test your connection from that computer.

7. Check **iptables** and **/etc/hosts.deny** again, this time for traffic coming in from remote computers. You can allow FTP traffic using the customize option associated with the Red Hat Security Level Configuration tool (**redhat-config-securitylevel**).
8. Repeat step 6, to make sure you can get in from a remote computer.
9. Now, limit access to your vsFTP server. You can do so in the **/etc/vsftpd/vsftpd.conf** file with the **userlist_enable**, **userlist_deny**, and **userlist_file** commands. The **vsftpd.conf** man page is fairly clear about how you can use these variables.
10. Run the **service vsftpd reload** command. Now test what you did in step 9. Access should now be limited to users elizabeth and fred.

exam

Watch

You'll normally have access to the man pages during a substantial part of the RHCE exam.

11. Ask your partner or instructor to restore any original firewall.
12. Show your partner or instructor what you did.

Troubleshooting and System Maintenance: RHCE-Level Exercise IV

In this exercise, you'll create a new logical volume for the /data directory. You'll want to configure 100MB of space to this volume. Don't forget to add the configuration to /etc/fstab so it appears on your system the next time you reboot. This assumes that you don't have any valuable data in the current /data directory.

1. Start the RHEL 3 computer. Analyze your current situation. The **df** command can help you see the currently mounted partitions and the free space in each partition. This should correspond to the partitions as configured in the /etc/fstab configuration file.
2. Run the **fdisk -l** command; that will help you review the currently configured partitions. You should be able to find a hard disk with free space.
3. Select a hard disk with an appropriate amount of free space. For example, if it's /dev/sdg, you can start adding partitions with the following command:
fdisk /dev/sdg
4. However, this isn't necessary. You can skip **fdisk** and set up your new LVM partitions as physical volumes (PV) with the following **pvcreeate** command:
pvcreate /dev/sdg
5. Configure a volume group (VG) from your new PVs with the **vgcreate** command. This particular command assigns a VG name of Volume01.
vgcreate Volume01 /dev/sdg
6. Confirm that you have sufficient PEs in this VG; run the **vgdisplay** command.
7. Now you can create a logical volume (LV) of 500MB with the following command:
lvcreate -L500M Volume01 -n LogVol01

8. The LV is now ready for formatting and mounting:

```
# mkfs -j /dev/Volume01/LogVol01
# mount -t ext3 /dev/Volume01/LogVol01 /data
```

9. Finally, you'll need to make sure that the new mounted LV is configured automatically the next time you reboot. First, scan the current LVs with the **vgscan** command.
10. Now add a line similar to the following in your `/etc/fstab` configuration file:


```
/dev/Volume01/LogVol01 /misc ext3 defaults 1 2
```
11. Reboot your computer to test the result. You should be able to see how `/data` is mounted on the LV with the **df** command.
12. Show your partner or instructor what you did. Demonstrate that you've successfully added the LV and configured your system appropriately.

Troubleshooting and System Maintenance: RHCE-Level Exercise V

You'll see what's wrong when you try to log into RHEL 3. Be prepared to use the first RHEL 3 installation CD to rescue this system. If you get instructions for a network source for the RHEL 3 installation files, take careful notes.

1. Boot your RHEL 3 computer. Watch the start messages carefully. In this case, you'll see the following messages, which could intimidate most Linux administrators:


```
Freeing unused kernel memory: 164k freed
Kernel panic: No init found. Try passing init= option to kernel.
```
2. Look at these messages carefully. If you're experienced with Linux, you'll recognize that RHEL 3 experienced a kernel panic just as it's ready to read your Linux kernel. That suggests that either the kernel is missing or your boot loader can't find your kernel.
3. Restart your computer. Insert the first RHEL 3 installation CD, and set your computer to boot from this disk. At the installation prompt, type **linux rescue askmethod**. This assumes you have access to your installation source, just in case you need to reinstall the Linux kernel.
4. Proceed as if you're installing RHEL 3. When you see the Rescue Method screen, point to the installation source server.

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5. When you see the Rescue screen, select Continue. If it doesn't work, you can select one of the other two options.
6. If successful, you'll see a note that your system has been mounted under `/mnt/sysimage`. Click OK, and then run the **chroot /mnt/sysimage** command at the prompt.
7. Now as discussed earlier, make sure that the boot loader can find your kernel. Check your `/boot` directory. In this case, you'll be able to see your kernel, in the `vmlinuz-*` file, as well as the initial RAM disk, in the `initrd-*` file.
8. The next step is to cross-check against the boot loader configuration file. The default is GRUB, located in the `/boot/grub/grub.conf` file. You should be able to verify files and version numbers against the files in the `/boot` directory.
9. Understanding the error in the `grub.conf` file takes some experience. The **key** command may look all right to the less experienced Linux user. If you've studied the `grub.conf` file before, you'll understand that the **root=LABEL** command should be set to the top level root directory (`/`). (I've crossed out "boot" to illustrate the change you need to make.)

```
kernel /vmlinuz-2.4.21-4.EL ro root=LABEL=/boot
```
10. To confirm that your change works, run the **reboot** command. Don't forget to remove the RHEL 3 installation CD.
11. Show your partner or instructor what you did.

Installation and Configuration Exam

The Installation and Configuration exam is the second part of the RHCE exam. You are allowed 3.0 hours to install Red Hat Enterprise Linux and configure it, mostly for different network services. Partial credit is allowed. You have access to the Red Hat Enterprise Linux installation files, either from the CDs or through a network server. Once Red Hat Enterprise Linux is installed, you also have access to the man pages as well as any other documentation that you may have installed.

No specific techniques or commands are required. Any reasonable technique is allowed if it gets you to the objective. For example, if you need to limit access to a specific service with **iptables** or `/etc/hosts.deny`, you can use either system. If successful, either setup can get you full credit for that part of the exam.

You may need to limit access to network servers to specific users or other computers. However, this is a certification exam. Do not expect to have *physical* access to any

other computer to test your settings. You will not have access to any outside networks such as the Internet.

There are RHCT- and RHCE-level skills associated with this exam. Assuming you pass the Troubleshooting and System Maintenance exam, you'll need to get a grade of 70 percent on both levels of the Installation and Configuration exam.

Before you begin this particular exam, add the latest available Samba packages from the Fedora RPMs, available at download.fedora.redhat.com. Copy them to your installation source directory. You'll also need a DHCP and an NIS server to fully execute this exam. While I show you how to create these services in this book, they are not explicitly required per the Red Hat Exam Prep guide.

For most of you, it'll be quite difficult to complete this exercise within three hours. I've deliberately added extra difficulty to this exercise, which will hopefully ease your required effort during the actual RHCE exam. I've also split up this sample exam into RHCT- and RHCE-level skills for your convenience; it may not represent what you'll actually see on the exam (I'm not allowed to tell you about it).

Once you've mastered the skills in this book, try other variations. Practice with different scenarios until you become comfortable with the scenarios described in this book, as well as in the Red Hat Exam Prep guide.

exam

Watch

Read the entire Installation and Configuration exam before you finish installing RHEL 3. It can save time to install required servers during the installation process. And remember, you can start configuring RHEL 3 through the CTRL-ALT-F2 console even while packages are being installed.

Server Installation Problem: RHCT-Level Skills

Install Red Hat Enterprise Linux. The following conditions specify a network server, configured with some very specific partitions. You'll also need to limit access to some or all of your network servers to specific users, computers, entire networks, or more. Assume this computer gets its IP addressing information from a DHCP server. Let users start at a virtual console.

Install Linux with the following partitions shown in Table 1. The sizes shown are minimums. Make sure that the /home directory is configured in a RAID 5 software array with no spare partitions. Leave 1000MB of free, unallocated space on the hard drive.

TABLE 1-1

Required
Partitions

Filesystem	Size
/boot	100MB
/	2000MB
/var	500MB
/home	1000MB
/usr	1000MB

Once RHEL 3 is installed, you'll also want to configure the following:

- Connect to a local printer.
- Set up networking only during working hours (8:00 A.M to 5:00 P.M.).
- Configure your system as an NIS client, on the biglan NIS domain.
- Set up the Automounter to read the CD on the /misc/cd directory.
- Make sure this system supports IP forwarding, as this computer may be a router in the future.
- Update the Samba RPMs to the latest requirements available on your installation source directory.
- Upgrade your Linux kernel to the latest requirements, also from your installation source directory.

Configure a cross-functional group of users for RHEL 3: avionics, vendor, seats, and galleys. Set them up as a group named pcplane. Create a /home/pcplane directory and allow them to share files without having to change permissions or ownership on any file they put in this directory. Do not give vendor read privileges on this directory. Limit each of these users to 100MB of files in this directory.

Set up an appropriate amount of the free space as another spare partition for the /home RAID 5 array.

Server Installation Problem: RHCE-Level Skills

In this part of the exam, you'll configure a number of different servers on the RHEL 3 computer. Assume this computer is on a gateway between your LAN and an external network such as the Internet. Configure /var on an LVM array.

Set up a regular and a secure Web server. Make sure the home pages for each server are different. Limit access to within the LAN, and to the users avionics, seats, and galleys. Create and activate a Web proxy server. Configure a Samba server which allows users to access their home directories from remote computers on the LAN. Create an NFS share, with full privileges, on your /tmp directory.

Set up an FTP server which supports only anonymous access, even from outside your LAN. Configure sendmail to support access from within the LAN; do not require address confirmation from a DNS server. Activate the Secure Shell service, and allow access from inside and outside the LAN.

Edit the Kickstart file that is created; set it up to be usable for other computers with an identical hardware configuration. The Kickstart file should automatically create the same partitions.

Installation Discussion

Since there is no one way to set up a Red Hat Enterprise Linux configuration, there is no one right answer for the listed requirements. But there are some general things to remember. It's normally fastest to install the packages during the installation process. It's easiest (and generally faster) to set up RAID arrays and LVM groups during the installation process. Make sure that the services that you set up are active at the appropriate runlevels.

You can set up DHCP addressing through the Red Hat installation program or in /etc/sysconfig/network. When you set up the firewall on a gateway computer, you'll want to configure the network card that's connected to the local computer as a trusted device. You'll also want to allow incoming connections to your SSH and FTP servers. Alternatively, you can do this with the appropriate **iptables** commands.

You can connect to a local printer by editing the files in /etc/cups or using the Printer Configuration utility. You can limit networking to working hours using appropriate **cron** jobs, stored in the /etc/cron.daily directory. Setting up an NIS client means activating the **ypbind** daemon and using **domainname** to designate the biglan NIS domain, or you can use the Authentication Configuration tool. Before the Automounter works, you have to activate the **autofs** service, as well as the appropriate commands in /etc/auto.master and /etc/auto.misc

To support IP forwarding, you'll need to set the net.ipv4.ip_forward variable in /etc/sysctl.conf and activate it in the /proc/sys/net/ipv4/ip_forward file. You can update the RPMs of your choice, including those related to Samba, with the **rpm -U** command. When you upgrade the Linux kernel however, you should install it with **rpm -i** just

in case the new kernel doesn't work. When you set up users in a special directory, don't forget to set up the directory with the SGID bit.

Remember to set up a regular Web server in `httpd.conf` and a secure Web server in `ssl.conf`. You can set up `index.html` home pages in the appropriate `DocumentRoot` directories; plain text in these files is sufficient. To limit access to specific users, you'll want to set up a group with the **htpasswd** command, and add the group name to the appropriate configuration file with the **AuthUserFile** command.

The Squid Web Proxy server is straightforward; it requires configuration of three commands in your `squid.conf` file: **visible_hostname**, **http_access**, and **acl**. The default Samba server configuration already allows user access to their home directories. You can set up an NFS share through `/etc/exports` or the NFS Server Configuration tool and the appropriate commands.

The vsFTP server already allows only anonymous access by default. To configure sendmail to support access within the LAN, you need to comment out the command in `sendmail.mc` that limits access to the local computer; it's well commented. To activate the Secure Shell service (**sshd**), as well as the others, use the **service** command.

A default Kickstart file is available in the `/root/anaconda-ks.cfg` file. Once you've activated the partition commands and saved it as `ks.cfg`, you can use it to install RHEL 3 on other computers with a nearly identical hardware configuration. If you've saved it on a floppy, you can cite it at the installation boot prompt with the **linux ks=floppy** command.