



Sample Exam I

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:

- 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, such as man pages that you can find on the Red Hat Enterprise Linux computer. You are allowed a pen and paper to make any notes that you might need.

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. 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. However, 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

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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.

Linux. Saving any data that you have on your computer at that point may not be possible.

Troubleshooting and System Maintenance Exercise: 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 your 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. When you install RHEL 3 on this test computer, assume that you're on a network with an IP address of 192.168.10.0 (you can substitute a different network IP address if you desire). Then take the following steps:

1. Configure a RHEL 3 computer with some empty space on a hard drive, or a new hard drive. For the purpose of this exam, we'll assume that you've configured a computer with 2000MB of free space.
2. If you have a DHCP server on your network, disconnect or deactivate it. Make sure this system looks for a DHCP server with the following command on your first Ethernet configuration file, `ifcfg-eth0` in the `/etc/sysconfig/network-scripts` directory (you can also do this with the Red Hat Network Configuration tool, **redhat-config-network**):

```
BOOTPROTO=dhcp
```

3. Set a hostname for your computer in `/etc/hosts` that conflicts with the `HOSTNAME` listed in `/etc/sysconfig/network`.
4. Configure this computer to start in runlevel 3 by changing the appropriate command in `/etc/inittab` to:

```
id:3:initdefault
```

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5. Run the **poweroff** command on the computer. It is now ready for this part of the exam.
6. 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 that there are problems with the configuration of the local Ethernet card and an error with logging into the GUI. This computer should be configured to start the GUI automatically when Linux is booted, and Evolution should start automatically when the user named michael logs into the GUI. Finally, the examinee should dedicate the existing free space on the hard drive to the `/misc` directory.

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; you'll 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/fstab` configuration file. One possible name is `/etc/bak.fstab`.
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 that 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.

Troubleshooting and System Maintenance: 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 RHEL 3 installation CD. Then take the following steps:

1. Start RHEL 3. Back up your `/boot/grub/grub.conf` configuration file. One possible name is `/boot/grub/bak.grub.conf`.
2. Edit the currently existing `/boot/grub/grub.conf` configuration file. Change the entry in the kernel command line for root to the label for a different directory. For example, you might change the first line to the second:

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

3. Save your modified `/boot/grub/grub.conf` configuration file.
4. Use the **poweroff** command to stop your RHEL 3 computer.
5. 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: Exercise III

In this exercise, you'll be working with a RHEL 3 computer with a problem with a network service. 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 a working Apache server. Make sure it works. Start a GUI and navigate to a browser such as Mozilla. Navigate to `http://localhost` to make sure the default Web page shown in Chapter 8 works. Do not activate any DNS server for this network.

2. Change the default hostname in `/etc/hosts/`. The default is associated with the loopback IP address (127.0.0.1). You're setting up a conflict with the hostname shown in `/etc/sysconfig/network`.
3. Restart the network service, as well as the Apache server, with the following commands:

```
# service network restart
# apachectl restart
```
4. Back in the Mozilla browser, navigate to `http://localhost` again. You may need to click the Reload button. You should see an error message to the effect that the connection was refused.
5. Use the **poweroff** command to stop your RHEL 3 computer.
6. Have the person taking the exam start the computer. Do not tell the person about the steps you took to prepare this computer. Just tell him or her that there's a problem with navigating to Web pages from the local Apache server.

Troubleshooting and System Maintenance: Exercise IV

In this exercise, you'll be working with a RHEL 3 computer with a problem with a network service. You'll also need a second Linux computer connected on the local network, also configured with the Secure Shell (SSH) server. It can be a second RHEL 3 computer, or another Red Hat computer such as Red Hat Linux 8 or 9. Ideally, you'll have a friend or classmate who can help you prepare your computers. 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. For the purpose of this exercise, I've added `[localpc]` and `[remotepc]` to the command prompts. Substitute the names of the corresponding computers on your LAN. Then take the following steps:

1. Configure a RHEL 3 computer with a working SSH server. Use Chapter 11 for guidance if required. You can make sure it works with the following command:

```
[localpc]# ssh root@localhost
```
2. Log out of the local SSH server.
3. Configure a standard firewall. You can do this with the Red Hat Security Configuration tool, which you can start with the **redhat-config-securitylevel** command. Do not customize to allow for any incoming services.

4. Make sure your changes have worked. Log in to the remote SSH server. Once you've logged in, you can try logging in to the local SSH server from the remote computer. The commands and responses should appear similar to:

```
[localpc]# ssh root@remotepc
root@remotepc's password:
Last login: Wed Jun 21 11:53:39 2004 from localpc
[remotepc]# ssh root@localpc
ssh: connect to host localpc port 22: No route to host
```

5. Leave the remote computer's SSH server with the **exit** command.
6. Use the **poweroff** command to stop your RHEL 3 computer.
7. Have the person taking the exam start the computer. Do not tell the person about the steps you took to prepare this computer. Just tell him or her that there's a problem with navigating the local Secure Shell (SSH) server.

Troubleshooting and System Maintenance: Exercise V

In this exercise, you'll be working with a RHEL 3 computer where you want to add a logical volume. You forgot to add it during the installation process. 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. 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 have 500MB of free space on a current hard drive. For the purpose of this exercise, we'll assume the space is available on the first IDE hard drive (/dev/hda).
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 configure all available space on the hard drive in a logical volume for the /misc filesystem. This assumes that you don't have any valuable data in the current /misc directory.

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

To review the instructions, there are five problems that you need to solve on this computer:

- Find any problems associated with the configuration of the local Ethernet card.
- Log into the GUI. Identify and address any problems or error messages that you see during the GUI start process.
- Make sure the GUI is started automatically the next time you boot RHEL 3.
- Configure Evolution to start for the user named michael the next time he logs into the GUI.
- Set up a new partition from the existing free space, and dedicate it to the /misc directory.

To accomplish this, take these steps:

1. Watch the start messages carefully. Make a note of anything unusual.
2. Start the GUI. If you're configured to start in runlevel 3, run the **startx** command. You'll see an error message. Make sure your computer is named RHEL3.
3. Take whatever steps are required with your hostname to address the error message. If successful, you won't get an error the next time you log into the Linux GUI.
4. Try connecting to the network server; one way is with the **ping** command. What message do you see? Take whatever steps are required to configure and activate your network on eth0 with the following static IP address: 192.168.10.15, and a network mask of 255.255.255.0.
5. Configure RHEL 3 to start the Evolution e-mail/schedule manager *automatically* the next time you log into the GUI. You can do this by logging in as the user michael and starting the Sessions tool with the Main Menu | Preferences | More Preferences | Sessions command. This allows you to configure Evolution to start the next time michael logs into the GUI. Just add the **evolution** command to the Startup tab list.
6. Set up this computer to start the GUI *automatically*, with appropriate services, the next time you start this computer. You can do this by setting default runlevel to 5 in /etc/inittab.

7. Set up a new partition in the existing free space. Format it appropriately. This is normally done with the **fdisk** command. Set up the `/misc` directory, so it is mounted on this new partition the next time you boot this computer. This means editing the `/etc/fstab` directory.
8. Reboot your computer to make sure your changes have worked.
9. Show your partner or instructor what you did.

Troubleshooting and System Maintenance: RHCE-Level Exercise I

You'll see what's wrong when you boot RHEL 3. Be prepared to use the first RHEL 3 installation CD to rescue this system.

1. When you see your boot loader, select your current version of RHEL 3.
2. Watch the messages as they scroll across the screen. You'll probably see a message similar to:

`WARNING: couldn't open /etc/fstab: No such file or directory`
3. You'll probably be taken to the single-user mode maintenance login prompt. Enter your root password at this prompt.
4. Find your currently configured partitions with the **fdisk -l** command. Make a note of each partition device that is formatted to a Linux filesystem.
5. Check the labels associated with each Linux-formatted partition. For example, if one of the partitions is `/dev/hda1`, run the **e2label /dev/hda1** command. Make a note of the label that you see, such as `/boot` or `/`.
6. If you have a backup of `/etc/fstab`, restore it.
7. Reboot your computer with the first RHEL 3 installation CD. Type **linux rescue** at the boot prompt.
8. Follow the first basic steps toward installation.
9. Direct the installation program toward the source for the RHEL 3 installation files, as required.
10. When you get to the Rescue menu, select Continue and press ENTER.
11. Since Linux still can't find your `/etc/fstab` file, you'll see an error message that suggests that you don't have any Linux partitions. Select OK and press ENTER to continue.

12. You are now in rescue mode. Run the **df** command. You probably won't see any of your normal filesystems mounted anywhere.
13. Try running the **man fstab** command. You probably won't be able to see the man page for the `/etc/fstab` configuration file.
14. Create the `/mnt/sysimage` directory as required with the **mkdir** command.
15. Back in step 8, you found the partition device associated with your root directory. Mount it on the `/mnt/sysimage` directory.
16. Restore the basic workings of your directory structure with the **chroot /mnt /sysimage** command.
17. Now try to rebuild `/etc/fstab`. Run the **man fstab** command. It should work now. Try to remember the settings for each of the columns in `/etc/fstab`. Using the `fstab` man page, and the information you gathered with the **e2label** command, try to rebuild a simple `/etc/fstab` file. Remember, avoid tabs and keep all configuration settings from wrapping to the next line. Create an `/etc/fstab` file with at least the settings for your root (`/`) and `/boot` directories.
18. Remove the installation floppy and/or CD from their drives.
19. Reboot your computer. If it works, congratulations. If it doesn't work, try editing `/etc/fstab` again.
20. When you've had enough, restore your original `/etc/fstab` file from your backup. Reboot your computer to make sure everything is all right.
21. Remember, you don't need to memorize all of the settings for `/etc/fstab`. However, you should recognize what works and what does not work in an `/etc/fstab` configuration file.
22. Show your partner or instructor what you did.

Troubleshooting and System Maintenance:

RHC*E-Level Exercise II

You'll see what's wrong when you boot RHEL 3. Be prepared to use the first RHEL 3 installation CD to rescue this system.

1. Examine the boot messages as they scroll across your screen. If the kernel message points to the wrong partition, you'll get a message such as the following:
`Kernel panic: No init found. Try passing init= option to kernel.`

2. When you see your boot loader, probably GRUB, you'll want to add a message to the kernel command line. In GRUB, enter **p** and type in your password if required. Then enter the **a** command to modify the kernel command line. You should see something like the following:

```
grub append> ro root=/dev/hda1
```
3. Type the word **single** at the end of this command line and press ENTER. See what happens.
4. You probably still have a kernel panic. Try to pass an **init=** option to the kernel. After resetting your computer, wait for the GRUB menu. Add **init=/bin/sh** to the end of the kernel command line. Try booting again.
5. Back in the GRUB menu, edit the kernel command line again. Try editing the command to point root to different partitions and see what happens. Repeat as often as desired.
6. Finally, back in the GRUB menu, point root to the correct partition.
7. Try restoring your `/boot/grub/grub.conf` file from the backup.
8. Try the reboot command again. Linux can now find your root partition and should reboot normally.
9. After Linux reboots, make sure your changes have worked.
10. Show your partner or instructor what you did.

Troubleshooting and System Maintenance: RHCE-Level Exercise III

You should be told what network service has a problem before you have to fix it.

1. You've been told that there are problems navigating to the local Apache server. Naturally, you'll want to check its status with the following command.

```
# chkconfig httpd status
```
2. Try starting Apache with the following command. Confirm with the command described in the previous step.

```
# apachectl start
```
3. Open a browser such as Mozilla. See what happens.
4. Naturally, you should check your error messages. They're located in the `/var/log/httpd` directory. The first logical step is to check the end of the `error_log`

file in this directory. You'll see a message to the effect "unable to find IPv4 address of" *hostname*.

5. That should be your clue that there is a problem with name resolution. There are two standard ways to associate computer names and IP addresses: a DNS server and the */etc/hosts* file.
6. Check the status of the DNS server with the following command:

```
# service named status
```
7. Once you see that the DNS server is not working, you should know to check */etc/hosts* file, and for possible conflicts with the */etc/sysconfig/network* file.
8. Resolve the conflicts between the two files. Restart your network service, and then also the Apache server with the following commands:

```
# service network restart  
# apachectl restart
```
9. Try navigating to <http://localhost> again. You should now have a working Apache server.
10. Show your partner or instructor what you did. Demonstrate the working Apache server.

Troubleshooting and System Maintenance: RHCE-Level Exercise IV

You should be told what network service has a problem before you have to fix it.

1. You've been told that there's a problem with logging into the local Secure Shell (SSH) server. Substitute the name of your computer for *localpc*, and of an available remote SSH server for *remotepc*. You should have instructions as needed during the exam for a remote SSH server.
2. After you start RHEL 3, take this problem step by step. First check to make sure that the Secure Shell (SSH) server is working on the *localpc* computer with the following command:

```
[localpc]# service sshd status
```
3. Try logging in locally to the SSH server:

```
[localpc]# ssh root@localhost
```
4. If it works, leave the local SSH server with the **exit** command.

5. Now try logging into a remote SSH server on your network:

```
[localpc]# ssh root@remotepc
```

6. Once you've logged in, try logging into the local SSH server:

```
[localpc]# ssh root@localpc
ssh: connect to host localpc port 22: No route to host
```

7. Now you see a problem with the connection. Since you're working from a remote computer, you know that your network is working. Return to your local computer with the **exit** command.
8. The next logical step is to check for firewalls. First, inspect your `/etc/hosts.allow` and `/etc/hosts.deny` files. It's possible that your SSH connection has been stopped by a command in one of these files.
9. Next, look in your **iptables** firewall. It's easy to check the current rules with the following command:

```
[localpc]# iptables -L
```
10. You should find a set of firewall rules that reject everything but some IPv6 and ICMP (**ping** command) messages.
11. Open the Red Hat Security Configuration tool. Customize the local firewall, to create a path for SSH access.
12. Now try the previous commands again, to log into the local SSH server from the remote PC. It should now work.
13. Show your partner or instructor what you did.

Troubleshooting and System Maintenance: RHCE-Level Exercise V

In this exercise, you'll create a new logical volume for the `/misc` directory. You'll want to configure 500MB 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 `/misc` 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.

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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/hda`, you can start adding partitions with the following command:

```
# fdisk /dev/hda
```
4. Create two or more partitions for the space you need. Make sure to set it as type 8e, Linux LVM.
5. Write your changes to the hard disk and exit from **fdisk** with the **w** command.
6. Set up your new LVM partitions as physical volumes (PV) with the **pvcreate** command. For example, if you've created `/dev/hda6` and `/dev/hda7` as Linux LVM partitions, you could use the following command:

```
# pvcreate /dev/hda6 /dev/hda7
```
7. 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/hda6 /dev/hda7
```
8. Confirm that you have sufficient PEs in this VG; run the **vgdisplay** command.
9. Now you can create a Logical Volume (LV) of 500MB with the following command:

```
# lvcreate -L500M Volume01 -n LogVol01
```
10. The LV is now ready for formatting and mounting:

```
# mkfs -j /dev/Volume01/LogVol01  
# mount -t ext3 /dev/Volume01/LogVol01 /tmp
```
11. 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.
12. Now add a line similar to the following in your `/etc/fstab` configuration file:

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

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.

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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 3. 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.

Install Linux with the following partitions shown in Table 1. The sizes shown are minimums. Use a reasonable size for the swap partition.

TABLE 1-1

Required
Partitions

Filesystem	Size
/boot	100MB
/	2000MB
/var	1000MB

You'll want a RAID 1 array for the /home directory where your users can store at least 1000MB of data. You'll also want a backup partition in case one of the main RAID 1 partition fails.

Assume this computer has an IP address of 192.168.13.55 on the 192.168.13.0/24 network.

Configure the following users for RHEL 3: nancy, randy, donna, mike. Make nancy and randy part of a group named angels. Create a /home/angels 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 donna or mike read privileges on this directory.

Make gdm the default window manager. Make sure users are directed to the graphical login interface when RHEL 3 starts on this computer.

Set up a job to delete all of the regular files in the /home/mike directory on the second day of every month at 3:50 A.M. Configure the Automounter to connect to the NFS the installation source on the /misc/inst directory. Connect to and configure a remote CUPS printer; make it the default for this computer.

Install the later version of the kernel that's available from the network installation source. You may need to browse through that source to find that kernel. It will install a new option in your boot loader. Set up another option to boot your system in runlevel 3.

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.

Enable ssh logins from *one* other computer on your network. Configure Samba to share the /home/angels directory with the users specified earlier. Configure a vsFTP server. Limit access to the LAN.

Configure an NFS server to share the files in /home/michael only with users on the LAN. Configure Apache to serve an index.html page from within the /home/michael /apache directory. Limit access to the computers on the LAN. Set up a proxy server that can be used by other computers on your LAN.

Set up a Kickstart file, ready to use with a boot CD. Copy it to a floppy disk.

When you reboot your computer, all of the services that you've created and settings that you've made should be enabled automatically.

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. First, make sure that the services that you set up are active at the appropriate runlevels. For example, Apache should be active for runlevels 3 and 5.

You can set up the required partitions through Disk Druid during the RHEL 3 installation process, or with the **fdisk** command after RHEL 3 is installed. For the spare disk in the RAID 1 array, remember to configure the **spare-disk** command. If you don't remember how this is done, RHEL 3 includes several sample `/etc/raidtab` configuration files in the `/usr/share/doc/raidtools-1.00.3/` directory.

Remember your CIDR notation; `192.168.13.0/24` uses a subnet mask of `255.255.255.0`. Use the SGID bit on `/home/angels`, and make sure to assign group ownership of that directory to `angels`. Make your default window manager through the `/etc/X11/preferdm` file. Remember, the GUI login is associated with runlevel 5 in `/etc/inittab`.

Setting up a job to delete files in any specific directory on a periodic basis is a job for the cron daemon. You can create your own job with **crontab**, or you can set it up through a script similar to `/etc/cron.daily/tmpwatch`.

To configure the Automounter to point to the network installation source, you need to configure the `/etc/auto.misc` file to point to your installation source. For example, the following line and an active **autofs** service allows you to automatically mount the network installation source (`/mnt/inst`) from the `instsvr` computer on the `/misc/linux` directory:

```
linux    -ro,soft,intr    instsvr:/mnt/inst
```

It's easiest to install a new printer with the Printer Configuration tool. If it's a remote printer, you'll need the data associated with the source, such as the computer and share names.

When you need to update a Linux kernel, make sure to *install*, and not upgrade the kernel. This allows you to go back to the old working kernel, and automatically adds the option to the boot loader menu. Menu options in the default GRUB boot loader file, `/etc/grub.conf`, are easy to create. The options discussed can be created by adding the number 3 to the appropriate kernel command line.

Configuring the SSH server is straightforward; it's activated through the `sshd` daemon. Sharing `/home/angels` through Samba for specified users means adding them to the Samba authentication list with the **`smbadduser`** and **`smbpasswd`** commands. Limiting vsFTP access to the LAN can be using appropriate commands in the `/etc/hosts.deny` file.

Sharing `/home/mike` through NFS means configuring this directory in `/etc/exports`, and applying **`exportfs -a`**. Make sure that the appropriate NFS daemons are active, including **`portmap`** and **`rpc.mountd`**. Change the `DocumentRoot`, at least for the appropriate virtual server, to make Apache read files from the `/home/michael/apache` directory. You can limit Web access to the LAN using the appropriate **`Allow from`** and **`Deny from`** commands on the server or the appropriate virtual host.

Supplying the `anaconda-ks.cfg` file to all new users is easy. Just copy it to the `/etc/skel` directory.