

SYBEX Bonus Chapter

Mastering™ Red Hat® Linux 9

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Web Chapter 2: Red Hat Certifications

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ISBN: 0-7821-4179-X

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Web Chapter 2

Red Hat Certifications

THERE ARE NOW TWO Red Hat certification exams. The Red Hat Certified Engineer (RHCE) exam is fairly well known as an elite “hands-on” exam. At the beginning of 2003, Red Hat also released an exam for newer Linux users, the Red Hat Certified Technician (RHCT) exam.

The RHCE exam tests more than just knowledge. It tests your competence as a Linux administrator. During the exam, you’re put in front of a computer with realistic problems that you have to debug. You are asked to install Red Hat Linux and a number of services, with challenging specifications.

This exam is not for users who are new to Linux. Red Hat includes a set of broad prerequisites, which seem designed to weed out those who are new to Linux.

But you don’t have to know everything. Many seasoned Linux administrators aren’t experienced in all areas. With a little extra study, they can still succeed on the RHCE exam.

This chapter provides a general overview of the RHCE exam and is not intended as a substitute for a preparation book or Red Hat’s RH300/RH301 exam preparation course. We focus on the RHCE exam, not Linux itself. For more information, chapter references are provided.

The RHCT exam is a subset of the RHCE exam. It is also a “hands-on” exam directed toward administrators who are installing Linux on desktops and workstations. It does not require detailed knowledge of configuring Linux as a network server.

I have written books on several Linux certification programs and believe that you can use this book to help supplement your studies. This chapter covers the following topics:

- ◆ Exploring the RHCE exam
- ◆ Listing the prerequisites
- ◆ Preparing for the Troubleshooting, Multiple Choice, and Installation and Configuration exams
- ◆ Understanding the RHCT exam

Exploring the RHCE Exam

The RHCE exam is a mentally demanding challenge. You're given six hours to complete this exam. It is actually three different exams: Troubleshooting, Multiple Choice, and Installation and Configuration. They are equally weighted. To pass, you need an average score of 80 percent, and you need to score at least 50 percent on all three exams.

NOTE *The Installation and Configuration exam includes RHCT and RHCE skills. To qualify for the RHCE, you now also need a score of at least 70 percent on both parts of the Installation and Configuration exam.*

On the Troubleshooting exam, you're actually put in front of a broken Linux computer. You'll either get or will need to create an appropriate boot or rescue disk, and then you must diagnose and fix any problems. You get two and a half hours to solve four problems and show the solutions to the person supervising the exam. No partial credit for individual problems is allowed; the only possible scores are 0, 25, 50, 75, and 100 percent.

The Multiple Choice portion is fairly straightforward. In fact, if you're experienced with other Linux certification exams, you might be pleasantly surprised. For many, one hour is plenty of time for the 50 questions on this part of the exam. However, do not underestimate the challenge of the RHCE Multiple Choice questions; they do test your knowledge of *Red Hat* Linux.

On the Installation and Configuration exam, you are told to install Red Hat Linux. That's easy enough. But you are also told to install and configure a substantial number of services. This is quite a challenge for many to complete in two and a half hours. However, there are different ways to configure Linux; as long as you meet the specifications set out in the exam question, you'll get credit for what you do. The basic RHCE Exam Prep guide is available online, at www.redhat.com/training/rhce/examprep.html.

The RHCE exams are “closed-book.” You're not allowed to bring any notes with you into the exam room. However, on the Troubleshooting and Installation exams, you are allowed to refer to any man pages and documents that you might find on the computer where you're installing Red Hat Linux during the exam.

The requirements are based on those published for the RHCE 8.0 exam. Updates based on the RHCE 9 exam were not available as of this writing.

Prerequisites

Red Hat has a list of prerequisite topics for people who want to become RHCEs. While these topics are quite broad, they should not intimidate you. Many experienced Linux system administrators don't know every prerequisite topic in depth. With a period of self-study, you can fill in any gaps in your knowledge.

The prerequisites are what Red Hat believes you should know—before taking their RHCE exam preparation course. If you're not comfortable with many of the topics in the list, read the other chapters in this book. Alternatively, you can take one or more of the Red Hat introductory courses on Linux.

RED HAT SKILLS COURSES

Red Hat offers several courses for people who want to prepare for the RHCE exam. These courses include:

RH007, Red Hat Linux Desktop Productivity Essentials, for people who are transitioning from other operating systems and office suites.

RH033, Red Hat Linux Essentials, for people with no experience working at the Linux or Unix command-line interface.

RH131/RH133, Red Hat Linux System Administration, for users who want to build their skills to where they can connect and configure a Linux workstation on an existing network. The RHCT exam is included in RH131.

RH253, Red Hat Linux Networking and Security Administration, for users who want to build their skills at configuring common network and security services.

RH300/RH301, RHCE Rapid Track Course, for users who need a refresher before taking the RHCE exam. The exam is included in RH300.

This is not a full list of the offerings by Red Hat. These courses are offered at a limited number of locations worldwide; for more information, navigate to the Training section of www.redhat.com.

As you'll see in the following sections, the prerequisites run the gamut from basic PC hardware through system administration, network services, and security.

BASIC HARDWARE KNOWLEDGE

Every computer administrator needs some basic knowledge of PC hardware. For example, you should know the standard channels used to communicate on a PC. And before you start organizing partitions, be familiar with how IDE and SCSI hard drives interact with your PC. These topics are covered in Chapter 2.

PC hardware starts with the type of CPU. While most PCs work well with the standard i386 Linux kernel, customized kernels are available for many types of CPUs.

Hardware Communication

PC components communicate with each other in three basic ways: IRQ ports, I/O addresses, and DMA channels. Some IRQ ports are always assigned to key components, such as the system clock. Others are available for less essential parts of the PC. The same is true for I/O addresses. Configuring Linux for your PC is often an exercise in managing these ports, addresses, and channels.

Hard Drives

Two basic types of hard drives are in common use today: IDE and SCSI. The IDE hard drive (Also known as ATA) is the standard that comes with most regular PCs today. Unfortunately, PCs are limited to four IDE drives. SCSI drives are generally faster and more flexible; you can install up to 32 SCSI hard drives on your PC. IEEE 1394 hard drives are a variation on the SCSI standard.

Before installing Linux, you must assign a primary hard drive. That's where you'll install a boot-loader such as GRUB. Next, you can plan how you're going to organize partitions. If you're going to install RAID or Logical Volume Management (LVM), you might even assign a filesystem such as `/home` to partitions on multiple physical hard drives.

BASIC LINUX/UNIX KNOWLEDGE

Red Hat focuses on the `vi` text editor. It may be the only editor available if you ever have to rescue your system using a boot floppy. You may have noted in Web Chapter 1 that the other Linux certification programs also focus on `vi` to the exclusion of more popular text editors.

If you don't know `vi`, learn it, at least to the level described in Chapter 6. When you're editing a configuration file on the RHCE Troubleshooting exam, `vi` could be your only choice for fixing any problems that arise.

FILESYSTEM HIERARCHY

Linux directories are organized into the Filesystem Hierarchy Standard (FHS). When you divide your hard drives into partitions, each partition gets a specific `/dev` file. You can assign different FHS directories to each of these devices.

Other storage media also get their own `/dev` files. When you configure a directory on a partition, the associated device gets a label. You can assign and inspect this label by using the `e2label` command. Partitions can be mounted or unmounted based on related specifications in `/etc/fstab`.

Partitions are organized with Disk Druid during the installation process, or `fdisk` at any time. They are formatted with `mkfs` and checked with `fsck`. With LVM, you can even configure a filesystem such as `/var` on multiple physical drives. More information on these topics is available in Chapters 2, 3, and 7.

BASIC COMMANDS

Two types of basic Linux commands are described in the RHCE prerequisites. One type allows you to navigate, to read and find files, and to manage basic packages. These commands include `cp`, `mv`, `ls`, `more`, `less`, `cd`, `find`, and `tar`.

The other type enables you to filter information. Commands such as `grep`, `wc`, `head`, and `tail` allow you to look through existing files and data for useful information.

To make Linux commands effective, you need to understand Linux wildcard concepts. Key wildcards includes `*` and `?`; it's also possible to specify a group or range of different options in brackets, such as `[135]` or `[a-d]`. These concepts are also known as *globbing*.

These are the commands that you probably use every day as a Linux administrator. For more information, see Chapter 6.

PRINTING

Red Hat has recently changed the default print service from the Line Print Daemon (LPD) to the Common Unix Print System (CUPS). While CUPS is associated with a web browser-based interface, it uses basic commands similar to LPD at the console. For example, while LPD is associated with the `lpq`, `lpr`, and `lprm` commands, CUPS is associated with `lp`, `lpr`, and `lpoptions`. In fact, the

`cups-lpd` `xinetd` service allows older applications that use LPD commands to work with CUPS. Both groups of commands are discussed in Chapter 25.

You should also know how to add printers locally and remotely. The `redhat-config-printers` tool can help you set up LPD printers. Once the CUPS service is active, you can navigate to its configuration tool by directing your browser to `localhost:631`.

UNDERSTANDING THE SHELL

If you're a Linux administrator, you work with the shell. You create your own scripts to automate tasks such as backups. As a skilled administrator, you combine commands. You know how to customize your shell environment to best meet your needs.

Red Hat Linux includes a number of scripts in `/etc/cron.*` directories that are run automatically, per `/etc/crontab`. The structure of the `cron` daemon described in Chapter 13 can help you organize the scripts required to administer a Linux network.

Commands can be combined; data can be taken from or sent to various files. The processes of piping, standard input, standard output, and standard error are described in Chapter 6.

The shell environment includes defaults when you log into Linux, and other variables and parameters that you can set. The RHCE exam assumes that you know this for the `bash` shell. Perhaps the most important parameter is the `PATH`, which determines where Linux searches for commands in your system.

SECURITY

The security prerequisites on the RHCE exam include four basic concepts. These concepts are discussed in more detail in Chapters 6 and 9.

- ◆ The Shadow Password Suite hides user and group passwords in files readable only by the root user.
- ◆ Every file includes a set of permissions for the owner and the group that owns the file. There are also permissions for other users on your system.
- ◆ To understand permissions, you need to understand how users and groups are organized. The files that users create are affected by the applied value of `umask`.
- ◆ Permissions can be modified; the `suid` and `sgid` bits are commonly set when you want to share access to a program or a directory.

SYSTEM ADMINISTRATION

If you're reading this book, you probably want to learn more about administering Linux. This book and the RHCE exam cover all sorts of system administration skills. This section simply includes those topics that are difficult to classify in other areas.

Red Hat Linux allows you to configure a common set of files for all new users in `/etc/skel`. You can add the files and directories that you or your organization may want everyone to have. For more information on how this works, see Chapter 9.

Daemons are processes that usually run in the background. For example, Apache starts a number of daemons; more are started when more users try to connect to your website. Daemons are generally organized in the `/etc/rc.d` directory and managed with tools such as `chkconfig`.

Perhaps the key administrative daemon is `cron`, which can help you schedule jobs to be run at any time, day or night. This is controlled by `/etc/crontab`; alternatively, users can configure and control their own cron jobs with the `crontab -e` command. These jobs are stored in user files in `/var/spool/cron`.

Linux logs are stored in `/var/log`, based mostly on `/etc/syslog.conf`. Log files are normally maintained by the `logrotate` cron daemon. Logging, daemons, and `cron` are discussed in Chapter 13.

With most Linux distributions, even administrators run most commands as regular users. The superuser concept allows you to run a limited number of commands as a root user, limiting your risks. You can assume root privileges with the `su` command (and the root password), or users can obtain limited root privileges with `sudo`, as configured in `/etc/sudoers`.

Linux administrators are often responsible for protecting the data on the computers on a LAN. One way to do this is with backups. Chapter 14 describes various backup methods.

BASIC NETWORKING

The basic protocol stack for Linux is TCP/IP. When you configure a Linux computer for networking, you must know three basic things. Every computer on a TCP/IP network gets its own IP address. You can configure and test the connection with several different commands. The configuration is documented in a series of files in the `/etc` directory. To learn more about IP addressing, the associated commands, and most of the configuration files, see Chapter 21.

An IP address is not enough. Every computer on a TCP/IP network also needs a network address, a broadcast address, and a network mask. It often also needs a gateway address, and maybe even the IP addresses of DNS servers.

While IP version 6 (IPv6) addresses are coming into common use, IP version 4 (IPv4) addresses still work. The concepts of assigning IPv4 addresses are well known and work well on even very large private networks.

There are several key TCP/IP configuration files on a Red Hat Linux computer, including `/etc/hosts`, `/etc/resolv.conf`, `/etc/host.conf`, and `/etc/nsswitch.conf`. Key configuration commands include `ping`, `ifconfig`, and `netstat`.

NETWORK SERVICES

Configuring network services is a key part of the RHCE exam. Before you're ready to prepare for the exam, you need to know some basics of configuring key Linux network services. Several chapters in this book address the topic of configuring these services. Most of these services are controlled by scripts in the `/etc/rc.d/init.d` directory. These services include:

- ◆ NFS allows you to share directories on a network with Linux and Unix computers; the key configuration file is `/etc/exports`.
- ◆ `sendmail` lets you set up a server for outgoing e-mail; the key configuration file is `/etc/mail/sendmail.cf`.
- ◆ POP and IMAP are incoming e-mail server services controlled through a script in the `/etc/xinted.d` directory.

- ◆ FTP allows you to share files with users on other computers. It can be configured for anonymous or user/password access. Several FTP servers are available; we cover Red Hat's vsFTP server in Chapter 27.
- ◆ DNS includes a database of hostnames and IP addresses (usually) on larger networks. DNS servers on the Internet can exchange and refer to each other for more information; the key configuration file is `/etc/named.conf`.
- ◆ DHCP allows you to regulate the use of IP addresses on a network; the key configuration file is `/etc/dhcpd.conf`.
- ◆ SMB can be configured to share directories in a mixed network of Linux and Microsoft Windows computers; the key configuration file is `/etc/samba/smb.conf`.
- ◆ Apache, also known as `httpd`, is the most popular web server on the Internet; the key configuration file is `/etc/httpd/conf/httpd.conf`.
- ◆ NIS allows you to share a common database of configuration files with other Linux and Unix computers; the key configuration file is `/etc/ypserv.conf`.
- ◆ The `xinetd` daemon controls a number of services based on configuration files in the `/etc/xinetd.d` directory; it's the successor to the so-called Internet Super Server (`inetd`).

BASIC NETWORK SECURITY

When you secure a network, you're blocking out unwanted data. Generally, that means that you create a firewall that blocks out all data, opening channels only for the data that you want. These channels normally correspond to the ports associated with the TCP/IP protocol stack. A list of assigned ports is available in `/etc/services`. The concepts of network security are discussed in Chapters 22 and 23.

There are three basic ways to create a Linux firewall. The most common is at the kernel level with the `iptables` command. You can use `iptables` to specify data by port, by protocol, or by computer. Other services can be blocked through commands in `/etc/hosts.allow` and `/etc/hosts.deny`. Several services include their own configuration files, which may block access by user and by computer.

One more way to secure a LAN is to give it private IP addresses. As discussed in Chapter 21, several ranges of private IP addresses are available; using the right `iptables` masquerading commands, you can hide the addresses of the computers on your LAN from the ravages of the Internet.

The Troubleshooting Exam

It's likely that this is the part of the RHCE exam that promotes the most fear among RHCE candidates. If you don't have much in the way of hands-on experience, you probably haven't seen a lot of what can go wrong on Linux. In fact, Linux is so reliable that many administrators are not comfortable with the Troubleshooting exam.

On this exam, you're given up to four challenges, which you need to solve in two and a half hours. You'll also need a few minutes after each challenge to demonstrate your solution to the person running the exam. It also takes a few minutes to set up the next challenge. To have any chance at passing the RHCE exam, you must solve at least two of the challenges.

Judgment and time management skills are required. If you're taking too long on a problem, you may want to give up and move on to the next problem. However, you can't go back. You lose the chance to get any credit for what you've done. And you could just be moments away from solving the problem.

Three skills are involved in the troubleshooting exam: troubleshooting, understanding the boot process, and diagnosing a network.

Because of the nature of this exam, it's not practical to present any sample questions. I'd have to include a Kickstart boot disk that would erase all of the data on your computer.

TROUBLESHOOTING

When you start the Troubleshooting exam, you should have or at least know how to create an installation boot disk. As we discussed in Chapter 11, you can use the Red Hat Linux installation boot disk to start your computer in rescue mode. If your system is fairly intact, you may be able to use rescue mode to boot your current partitions on the `/mnt/sysimage` directory.

If you don't have a boot disk handy, remember that you can often start Linux in single-user mode. This is actually runlevel 1, which starts very few services. If there's a problem with a specific service that keeps Linux from starting properly, single-user mode can be useful.

In the real world there may be a problem with the bootloader. It could be that the kernel file is corrupted; it could be that the Initial RAM disk image is missing. There could even be an error in your bootloader configuration file. Remember, if you have the GRUB password, you can edit various commands in `/boot/grub/grub.conf` before it starts Linux. In this way, you can diagnose a GRUB bootloader problem before even starting the Linux boot process.

TIP To learn how to troubleshoot the boot process, back up key files such as `/etc/fstab`, `/etc/inittab`, and `/boot/grub/grub.conf`. Make a change to a line in one or more of these files. Reboot your computer, and see what happens. You may need to use your rescue disk. Restore the original configuration, and then make a different change.

THE LINUX BOOT PROCESS

One common problem is with the Linux boot process. As you know from Chapter 11, a number of files and services can affect this process. It starts with the bootloader. If you have a problem with GRUB, Linux may not be able to get to the other parts of the boot process.

You can start the boot process in another way, using the rescue mode associated with the Red Hat installation boot disks. This can get you around problems in the Linux boot process, so you can start Linux and fix any files that might not be working.

Once you've started rescue mode, you can look through your Linux system to see what might have gone wrong. For example, your kernel might be missing or corrupted. If Linux can't read your `/etc/fstab` file, it won't know what directories to mount. In fact, if your `mount` command file is corrupted, Linux won't be able to mount your filesystems. If filesystems are corrupted, you'll need to find a way to run `fsck` on the appropriate partition.

If that all works, you could have problems with `/etc/inittab`. If the `id` variable is set to the wrong runlevel, Linux could stop before you have a chance to log in. Errors in the virtual consoles or the `/etc/securetty` file could keep you or your users from logging in.

NOTE *If you have a test computer, where you don't have any valuable data, you can use it to experiment with the boot process. You can create your own boot problems on a test computer. Reboot and then see how it affects the Linux boot process. Again, do not experiment on a computer that holds important data; this kind of tinkering can easily go astray, erasing all of your data.*

NETWORK DIAGNOSIS

Sometimes, you have a network service that isn't working properly. The cause could lie with the configuration of the service, or it could be a problem with one or more of the firewalls described in Chapters 22 and 23. Or you could have one of the network problems described in Chapter 21.

Checking Your Network

Most network problems are physical. Fortunately, the RHCE exam assumes that the physical components of the network are in good working order. Thus, checking your network becomes an exercise in tracing data. As we discussed in Chapter 21, if networking is properly configured, you should be able to ping your local computer, and you should see your network card in the `ifconfig` output. However, not all network tests will work; for example, your attempts to ping a server could be blocked by a firewall.

Checking Firewalls

By default, when you install Red Hat Linux, you get an `iptables` firewall on your computer. If you're installing Linux on a computer that's on a LAN that is already protected by a firewall, you may not need that extra layer of protection. And even the default medium-security firewall can block shared NFS directories.

Your computer could be configured with TCP Wrappers firewalls that can block many network services. Network traffic can be let in through `/etc/hosts.allow`; traffic can be blocked through `/etc/hosts.deny`.

Finally, individual services can be configured with their own firewalls. For example, you can block access to a WU-FTP server to specific users in `/etc/ftppaccess`.

The Multiple Choice Exam

The Multiple Choice portion of the RHCE exam looks somewhat like the other Linux certification exams. The exam contains 50 questions, and you have one hour to answer them all. When I took this part of the RHCE exam, everyone in my group finished in less than an hour.

GENERAL KNOWLEDGE

The questions on this part of the exam test general knowledge of Linux. You may find questions on common Linux commands and configuration files. You could also get questions on daemons, hardware, and logs.

This is the one part of the RHCE exam where you're not allowed to access the regular part of a Linux computer. Unlike the other two parts of the RHCE exam, you aren't permitted to check man pages or documents. In addition, you aren't allowed to test your ideas at a command line or a GUI.

SAMPLE QUESTIONS

Just to give you a general feel for this part of the RHCE exam, here are a couple of sample questions. As far as I know, they do not contain any material from the real RHCE exam.

1. If you want Linux to mount a new filesystem automatically, which of the following files do you edit?
 - a. `/boot/grub/grub.conf`
 - b. `/etc/fstab`
 - c. `/etc/inittab`
 - d. `/etc/mount`

2. Which of the following commands looks for a DHCP server for IP address information?
 - a. `dhcpcd`
 - b. `dhclient`
 - c. `pump`
 - d. `dhcpd`

These questions are basically straightforward, and I believe reflect the tenor of the questions that you might see on the RHCE multiple-choice exam. If you have any doubts about the answer to either of these questions, read Chapters 7 and 24. (The answer to both questions is b.)

The Installation and Configuration Exam

This may be where you feel the most pressure during the RHCE exam. If you don't have a lot of practice configuring services, you may struggle to complete all of the tasks on this exam in time.

On this exam, installing Linux is the easy part. You also need to configure several services. If you forget to install the software associated with a service during installation, you'll need to install it later. For many candidates, the two and a half hours allocated for this exam is not enough time.

***TIP** Red Hat has recently added one more criterion for passing the RHCE exams. The RHCE Installation and Configuration exam includes RHCT- and RHCE-level components. To become a RHCE, you now also need a score of at least 70 percent on both the RHCT and RHCE portions of the RHCE Installation and Configuration exam.*

WHAT YOU CAN EXPECT

On the Installation and Configuration exam, you'll be asked to install Red Hat Linux on your computer. You'll also get a lot of criteria specifying partitions, assigning filesystems, and adding and configuring services, users, and more.

You may also need to configure groups, install another kernel, set up several websites, start a secure FTP server limited to certain users, create a firewall, share NFS directories with certain computers, limit access to shared Samba directories, or set up a DNS and a DHCP server with certain names and IP addresses.

Unlike with the Troubleshooting exam, you can receive partial credit for completing some of the tasks. But remember, time is of the essence. If you know how to configure services in text mode, you may save enough time to configure one more service properly.

In many cases, there may be more than one way to complete a task. There is no “right” way to do something; for example, if you want to block access from a specific network to a Telnet server, you could do so with the proper `iptables` command, or the right commands in `/etc/hosts.deny`.

CONFIGURATION DURING INSTALLATION

On this part of the RHCE exam, you get to install Linux on a computer. No big secret there. However, what you do during the installation process can save or cost you the precious minutes that you may need to complete the tasks on this exam.

If at all possible, install Red Hat Linux using text mode. The computer that you’re using may not be the fastest one available; installing Linux in graphical mode does take extra time. If the installation files are available over a faster network, such as Fast Ethernet, install Red Hat Linux over that connection. You might get Linux installed in less than half the time of an installation from CDs.

Read through the exam. Make careful notes on the desired partitions, if any. While you can configure additional partitions after Linux is installed, the process is at best time-consuming, and at worst fraught with risks.

Make a note of the services that you’ll need. When you select packages, be sure to include those required to support your services. If necessary, include appropriate documentation packages.

If you’re asked to protect your system from access, you may be able to configure a firewall during the installation process. If you learn how to let other services through your firewall during Red Hat Linux installation, that’s one less service you’ll have to configure later.

CONFIGURING NETWORK SERVICES QUICKLY

Generally, you have two choices when you configure network services. You can edit the configuration files directly, or you can edit them using a GUI tool. Your choice depends on your level of knowledge of the associated configuration file.

In other words, if you know a configuration file well, you can save time by editing that file directly. If you’re less comfortable with that service, you may save time by using the appropriate `redhat-config-*` tool.

Whatever you choose, remember to activate the service, now and for the next time you boot that Linux computer. To activate the service now, it’s usually enough to run the `service daemonname start` command. However, to ensure that the service starts the next time Linux reboots, you need to run a command such as `chkconfig --level 235 daemonname on`. Otherwise, you may not get full credit for the work that you’ve done to configure that service.

CONFIGURING OTHER ELEMENTS

You may be asked to configure more than just network services on this exam. You could be asked to configure users and groups with certain privileges on programs or directories. You might have to install a new kernel; be sure you know the difference between installations and upgrades (see Chapter 12).

TIP If you're asked to recompile a kernel, plan your time carefully. The time it takes to run the necessary commands could easily be nearly as long as the time available for this exam. You would then have to configure other services and elements while commands such as `make modules` are at work.

The RHCT Exam

The Red Hat Certified Technician (RHCT) exam explicitly covers only a portion of the requirements of the RHCE exam. The following sections briefly describe what the RHCT exam does and does not cover. Technical details are described earlier in this chapter.

The RHCT exam is based on Red Hat course RH133, Red Hat Linux System Administration. As of this writing, RH133 is a four-and-a-half-day course. The last day includes three hours for the RHCT exam.

NOTE If you don't pass the RHCE exam, you might still score well enough to get the RHCT credential. You need a score of at least 70 percent on the RHCT skills on the Installation and Configuration exam. I anticipate that you'll also need a score of 50 percent on at least the Troubleshooting exam.

RHCT Coverage

As of this writing, the Red Hat website states that the RHCT exam is “a realistic performance-based lab exam” that tests the individual’s “ability to install, configure, and attach a new Red Hat Linux system to an existing production network.”

The RHCT exam consists of two parts. It begins with a one-hour troubleshooting exam with four problems. It ends with a two-hour installation and configuration exam.

For the troubleshooting exam, learn how to use the installation boot disk as a rescue disk. Know how to test your connections from a Linux client computer to various network services. Read your log files to see what might have happened during the boot process.

For the installation and configuration exam, learn how to install Linux in text mode and using a Kickstart floppy. Know how to configure Linux as a client on an established TCP/IP network. Be ready to configure Linux as a client for the major network services, including NFS, Samba, NIS, DNS, and DHCP. Practice configuring basic scripts related to the `at` and `cron` daemons. Learn how to update a kernel using the appropriate Red Hat RPM. The requirements may change; for the latest information, read the syllabus associated with RH133 or RH131 at www.redhat.com.

What the RHCT Exam Does Not Cover

Unlike the RHCE exam, the RHCT exam does not include any multiple-choice questions. It does not require you to configure Linux as a network server. It does not require more than the most basic knowledge of network security (as opposed to host computer security).

As of this writing, Red Hat has stated that the troubleshooting exercises will be simpler. Since only one hour is allowed for the RHCT troubleshooting exam, one might not expect extensive troubleshooting requirements such as detailed log file analysis.

Summary

Red Hat Certified Engineers and Red Hat Certified Technicians are respected in the Linux community. They have passed a hands-on exam that has measured their skills in real-world situations. The material on the RHCE exam is challenging; Red Hat has come up with a series of prerequisites that you should know even before studying for this exam.

While you don't need to know all of the prerequisites to have a chance at passing the RHCE exam, it is a good measure of your basic skills. The prerequisites include: basic hardware knowledge, a basic understanding of the vi editor, and a strong grasp of the Filesystem Hierarchy Standard. You should also know a number of basic bash shell commands as well as LPD and CUPS print commands, and you should understand what you need to do to configure the shell. Other prerequisites address basic password and file security, in addition to system administration skills. Finally, you need a good grounding in TCP/IP networking, IP addressing, as well as network services and security.

The Troubleshooting part of the RHCE exam includes four challenges. You need troubleshooting skills, especially with respect to the Linux boot process. It's also useful to know how to diagnose network problems such as firewalls and service-specific access configuration files.

The Multiple Choice part of the RHCE exam includes 50 questions. It is a fairly straightforward test of your general knowledge of Red Hat Linux.

On the Installation and Configuration part of the RHCE exam, you'll need to install and configure Linux. Time is of the essence on this exam, especially with the list of services, users, and files that you may need to configure.

The RHCT exam covers a subset of the material on the RHCE exam. It is focused on the hands-on skills you may need to install and configure a new Red Hat Linux system on an existing production network.