

RED HAT TRAINING & CERTIFICATION

RHEL6 RHCSA/RHCE UPDATER

VERSION: 1.3
AUTHOR: FLORIAN BRAND

INTRODUCTION

This document assists candidates for the RHCSA and RHCE certification who have studied under Red Hat Enterprise Linux 5 in studying for the version 6 exam. This document does not present a complete list of differences between the releases; rather, it assists RHCSA and RHCE candidates in their preparation for the certification exams. Nor does it contain a discussion of all items new in the RH124, RH134, RH254 or RH199, RH299 courses. Rather, it is aimed specifically at presenting information relevant to continuing or new competencies in the RHCSA and RHCE exam.

This document is divided into two sections: these first few pages give an overview of exam-related changes in version 6. Pages following this give specific details on those changes.

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RHCSA EXAM OBJECTIVES COVERED IN RHEL 5 COURSES

The following objectives were not part of the RHEL 5 RHCT exam objectives, but the subject matter was covered in RH033 or RH133.

- Diagnose and address permissions problems and SELinux policy violations
- **Manage ext4 filesystems: create, label, mount, mount automatically at boot (by UUID or label), unmount** ¹
- Log in as or switch user to the root account
- Locate, read and utilize on-line documentation using man, info, and files in /usr/share/doc
- Locate and analyze system log files
- Manage system resources: identify CPU/memory intensive processes, adjust process priority with renice, kill processes
- Configure a physical machine as a RHEL-based virtualization host
- Manage virtual machines: install/start/stop/configure to start at boot/access a VM's graphical console
- Manage logical volumes: create/remove physical volumes, assign PVs to volume groups, create/delete logical volumes
- **Extend existing unencrypted ext4-formatted logical volumes**
- **Mount and unmount CIFS and NFS network filesystems, manually or by configuring autofs** ²
- **Manage network devices: understand basic IP networking/routing, configure IP addresses/default route statically or dynamically** ³

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- 1 The RHEL 5 objective used ext3, but there is no significant difference in this objective under ext4.
 - 2 This is a poor re-wording of the earlier objective, with the significant difference being "manual" (i.e., non-autofs) mounting. I take this to mean mounting via fstab, which should have been in the earlier objectives.
 - 3 Essentially the same as earlier requirements, but the poorly-stated text regarding routing makes it sound different. This objective will be edited.

- Manage network services: check status, start, stop, configure to start automatically at boot
- **Configure the scheduling of tasks using cron and at**
- Manage local user and group accounts: create, delete, change passwords, adjust password aging, adjust group memberships
- **Use network user and group accounts stored on an existing LDAP directory service**⁴
- Manage standard permissions: list, interpret, change ugo/rwx
- Manage SELinux security: set enforcing/permissive modes, list file and process context, restore default file context, use "booleans" to adjust policy
- *Deploy a VNC server that allows multiple desktops to be shared
- Deploy file sharing services with HTTP/FTP

RHCSA EXAM OBJECTIVES NOT COVERED IN COMPARABLE RHEL 5 COURSES

- Manually open, mount, unmount, and close LUKS-encrypted filesystems
- Create and configure LUKS-encrypted partitions and logical volumes to prompt for password and mount decrypted filesystem at boot
- **Use ssh and VNC to access remote systems**⁵
- Manage default firewall settings with basic tools

RHCE EXAM OBJECTIVES NOT COVERED IN COMPARABLE RHEL 5 COURSES

- Configure system to authenticate using Kerberos
- Build a simple RPM that packages a single file

⁴ The comparable RHEL 5 objective also listed NIS, which has been removed for RHEL 6.

⁵ Ssh is covered in RHEL 5 courseware, but not VNC.

ADDITIONAL READING

Please refer to the RHEL6 release notes and the RHEL6 Migration Planning Guide for additional information.

- Configure a system as an iSCSI initiator that persistently mounts an iSCSI target

SERIAL CONSOLES

If the primary console is set to serial a getty process will automatically be started on that console. (use `console=ttyS0` in `grub.-conf`)

Additional serial consoles can be configured in `/etc/init/` by copying `tty.conf` and specifying the tty to use.

DETAILED CHANGES

Installation

If you want to install Red Hat Enterprise Linux interactively, please use the graphic Installer or the VNC installation method. The interactive text based installer will always install a minimal system with the default partitioning scheme. Kickstart installations work as before and offer the full range of Anaconda features.

NFS GOTCHAS

By default only NFS4 is served. You need to activate the rpcbind service and change settings in `etc/sysconfig/nfs`

The other notable change in the installer is the new dialog for specialized storage devices. This allows the configuration of SAN volumes such as iSCSI, Fiberchannel or Fcoe devices. For most installations you can use the traditional “Basic Storage Devices” dialog.

Kickstart

Kickstart files can be validated with **ksvalidator**. Pre/Post script should end with `%end`. The installation key is no longer supported. You can use label based locations for the kickstart file and installation source (**ks=hd:LABEL=FOOBAR:/path/to/ks.cfg**). Please note that when using usbsticks as an installation media they will be designated **/dev/sda** during installation. You can use the **ignoredisk** command to protect certain disks from repartitioning. Details can be found in chapter 28.3 in the Installation guide⁶.

System Boot

The initial ramdisk (initrd) has been replaced by the dracut and is hardware independent. The main benefit is that the same udev tools and rules are used as later in the start up process. If you need to create a initramfs image manually you can use the dracut tool.⁷

⁶ http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6/html/Installation_Guide/sn-automating-installation.html

⁷ http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6/html/Migration_Planning_Guide/chap-Migration_Guide-System_Monitoring_And_Kernel.html

The init process is now driven by upstart. Upstart offers event driven start up sequence. You will notice that **/etc/inittab** is mostly empty and only contains the default runlevel. All other items are configured in **/etc/init/*.conf**. System V services can be controlled as before with **chkconfig** and **system-config-services**. The graphical startup process (called plymouth) uses kernel mode page setting. If you want to see detailed boot messages press the down button. Emergency mode is no longer supported.

System Services

Cronie replaces the Vixie Cron daemon. It also integrates anacron functionality. The main difference between these packages is how the regular jobs (daily, weekly, monthly) are run. Cronie uses the **/etc/anacrontab** file for these. Entries in **/etc/crontab** will work as before.

Rsyslog replaces Syslog. It supports SSL encrypted remote logging over tcp. The config file is **/etc/rsyslog.conf**. Logrotate now uses logfile-<date> for rotated files.

IP VS IFCONFIG

NetworkManager and other tools use IP Secondaries instead of virtual interfaces to configure additional virtual IP addresses. These addresses do not show up in **ifconfig**. Please always use the tool **ip addr show**

KVM REQUIREMENTS

KVM requires the 64bit version of RHEL and hardware virtualization support. Check for **lm** (64 bit "long mode") and **svm** (AMD) or **vmx** (Intel) flags in **/proc/cpuinfo**

Filesystems / Partitioning

NFS defaults to version 4. The portmapper is not started by default. The portmap service is now called **rpcbind**. Additional settings are found in **/etc/sysconfig/nfs** as before.

Partitions can be created as before. When using **fdisk**, always use **fsck -cu <device>**. This deactivates DOS compatibility mode (Windows will still be able to access partitions on this device) and aligns partitions to sectors not cylinders. Misaligned partitions can severely reduce system performance on certain disks and storage arrays.

Ext4 is used as the default filesystem. Use **mkfs -t ext4** to create file systems. Mounting by UUID is preferred.

Disk partitions can be encrypted with LUKS (Linux Unified Key Setup-on-disk-format). All partitions except **/boot** can be encrypted. Consider encrypting physical volumes, instead of individual filesystems. Anaconda supports this feature during installation and can also create a backup keyphrase. Detailed instructions on how to encrypt a single volume or partition after installation can be found in the Security Guide⁸

⁸ <http://docs.redhat.com/docs/en->

Managing iSCSI is documented in chapter 21 of the Storage Configuration Guide⁹. Additional information can be found in:

/usr/share/doc/iscsi-initiator-utils-6.2.0.872/README

X11

X11 starts on console 1 by default. The config file **xorg.conf** is not created by default. (Use **Xorg -configure** to create one) . **system-config-display** is no longer available and generally not needed.

NOTE

All RHEL6 based courses use the 64bit version of the operating system (x86_64).

Security-Enhanced Linux

While RHEL6 adds exciting new features to SELinux such as sandboxing of applications and confining untrusted guest users, there are no significant changes in the administration.

The `ls -l` command will indicate that file security is managed with selinux with a "." after the other permissions. (ACL managed files are indicated with a "+" as before at the same location. This might affect some poorly written scripts that analyze the output of `ls`.

Additional information can be found in the Security-Enhanced Linux user guide¹⁰

Authentication

Network users are now managed with a new System Security Services Daemon. This daemon can cache network credentials to allow offline LDAP/Kerberos authentication. `pam_sssd` is used instead of `pam_ldap` or similar PAM libraries. The easiest way to configure network authentication is through **system-config-authentication**. While the layout of the tool has changed from earlier versions, the functionality is still the same.

US/Red_Hat_Enterprise_Linux/6/html/Security_Guide/sect-Security_Guide-LUKS_Disk_Encryption.html

⁹ [http://docs.redhat.com/docs/en-](http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6/html/Storage_Administration_Guide/ch-iscsi.html)

US/Red_Hat_Enterprise_Linux/6/html/Storage_Administration_Guide/ch-iscsi.html

¹⁰ http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6/html/Security-Enhanced_Linux/index.html

Networking

Network Manager is now started by default when installed. It supports both user and system wide network configuration. System wide configuration is stored in the standard files in **/etc/sysconfig/network-scripts/ifcfg-<interface>** . Individual devices can be protected from NetworkManager by specifying **NM_CONTROLLED="no"** in the config file. System-config-network is only available for the command line interface. Graphical users can use the NetworkManager applet instead.

Virtualization

Red Hat Enterprise Linux 6 uses kvm for virtualization. If you are using libvirt there are no substantial changes in the administration of virtualization. The most notable change is that KVM uses standard bridges (br0, br1, ..) instead of renaming the eth0 device. For detailed information on the new virtualization features and setup, please refer to the Red Hat Virtualization Guide¹¹.

Firewall

system-config-firewall replaces **system-config-securitylevel** and can now be used to define custom rules. It supports both IPv4 and IPv6. andThe iptables command works as before.

Package Management

Please use yum or its graphical front end PackageKit whenever possible. Use rpm directly only for troubleshooting or querying purposes. Packages built on RHEL6 are not backwards compatible with earlier releases due to stronger package signing. Yum automatically installs required x86_64 or i686 libraries based on the architecture of packages. Libraries can be installed for both architectures at the same time. 64bit libraries are stored in **/lib64/** . **/usr/lib64/** and **/usr/local/lib64**

¹¹ http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6/html/Virtualization/index.html

Building RPM packages is documented in chapter 2.5 of the Red Hat Satellite Deployment Guide¹². You can also find excellent information on the Fedora Wiki¹³. Using **rpmdevtools** as a starting point significantly simplifies the process of creating a spec file.

12 http://docs.redhat.com/docs/en-US/Red_Hat_Network_Satellite/5.3/html/Deployment_Guide/satops-rpm-building.html

13 https://fedoraproject.org/wiki/How_to_create_an_RPM_package