

Exam 101-500

PART

I

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Chapter 1

Topic 101: System Architecture

THE FOLLOWING EXAM OBJECTIVES ARE COVERED IN THIS CHAPTER:

✓ 101.1 Determine and configure hardware settings.

- Key knowledge areas:
 - Enable and disable integrated peripherals.
 - Differentiate between the various types of mass storage devices.
 - Determine hardware resources for devices.
 - Tools and utilities to list various hardware information (e.g. `lsusb`, `lspci`, etc.)
 - Tools and utilities to manipulate USB devices
 - Conceptual understanding of `sysfs`, `udev`, and `dbus`
- The following is a partial list of the used files, terms, and utilities:
 - `/sys/`
 - `/proc/`
 - `/dev/`
 - `modprobe`
 - `lsmod`
 - `lspci`
 - `lsusb`

✓ 101.2 Boot the system.

- Key knowledge areas:
 - Provide common commands to the boot loader and options to the kernel at boot time.
 - Demonstrate knowledge of the boot sequence from BIOS/UEFI to boot completion.





- Understand SysV init and systemd.
- Awareness of Upstart
- Check boot events in the log files.
- The following is a partial list of the used files, terms, and utilities:
 - dmesg
 - journalctl
 - BIOS
 - UEFI
 - bootloader
 - kernel
 - initramfs
 - init
 - SysV init
 - systemd

✓ 101.3 Change runlevels/boot targets and shut down or reboot system.

- Key knowledge areas:
 - Set the default runlevel or boot target.
 - Change between runlevels/boot targets including single-user mode.
 - Shut down and reboot from the command line.
 - Alert users before switching runlevels/boot targets or other major system events.
 - Properly terminate processes.
 - Awareness of acpid
- The following is a partial list of the used files, terms, and utilities:
 - /etc/inittab
 - shutdown
 - init
 - /etc/init.d/



- telinit
- systemd
- systemctl
- /etc/systemd/
- /usr/lib/systemd/
- wall

1. Which of the following commands is used to view kernel-related udev events in real time?
 - A. `udevls all`
 - B. `lsudev -f`
 - C. `udevmon -a`
 - D. `udevadm monitor`
2. Which command enables you to view the current interrupt request (IRQ) assignments?
 - A. `view /proc/irq`
 - B. `cat /proc/interrupts`
 - C. `cat /dev/irq`
 - D. `less /dev/irq`
3. Configuration of udev devices is done by working with files in which directory?
 - A. `/udev/devices`
 - B. `/devices/`
 - C. `/udev/config`
 - D. `/etc/udev`
4. Which command is used to automatically load a module and its dependencies?
 - A. `modprobe`
 - B. `lsmod`
 - C. `insmod`
 - D. `rmmod`
5. Which command is used to obtain a list of USB devices?
 - A. `usb-list`
 - B. `lsusb`
 - C. `ls-usb`
 - D. `ls --usb`
6. When working with hotplug devices, you need to gather more information about them through udevadm. Which udevadm command enables you to query the udev database for information on a device?
 - A. `query`
 - B. `info`
 - C. `getinfo`
 - D. `devinfo`

7. Which command can be used to view the kernel ring buffer in order to troubleshoot the boot process?
 - A. `lsboot`
 - B. `boot-log`
 - C. `krblog`
 - D. `dmesg`
8. During the initialization process for a Linux system using SysV `init`, which runlevel corresponds to single-user mode?
 - A. Runlevel 5
 - B. Runlevel SU
 - C. Runlevel 1
 - D. Runlevel 6
9. On a system using SysV `init`, in which directory are the startup and shutdown scripts for services stored?
 - A. `/etc/init-d`
 - B. `/etc/init`
 - C. `/etc/sysV`
 - D. `/etc/init.d`
10. Which command can be used to reboot a system?
 - A. `init 6`
 - B. `shutdown -h -t now`
 - C. `init 1`
 - D. `refresh-system`
11. When using an SysV `init`-based system, which command would you use if you make changes to the `/etc/inittab` file and want those changes to be reloaded without a reboot?
 - A. `init-refresh`
 - B. `init 6`
 - C. `telinit`
 - D. `reload-inittab`
12. Which command displays the current runlevel for a system?
 - A. `show-level`
 - B. `init --level`
 - C. `sudo init`
 - D. `runlevel`

13. Within which folder are systemd unit configuration files stored?
 - A. /etc/system.conf.d
 - B. /lib/system.conf.d
 - C. /lib/systemd/system
 - D. /etc/sysconfd
14. Which command is used with systemd in order to list the available service units?
 - A. systemd list-units
 - B. systemctl list-units
 - C. systemd unit-list
 - D. systemctl show-units
15. Which option to lspci is used to display both numeric codes and device names?
 - A. -numdev
 - B. -n
 - C. -nn
 - D. -devnum
16. Which command can be used to obtain a list of currently loaded kernel modules?
 - A. insmod
 - B. modlist
 - C. ls --modules
 - D. lsmod
17. Which option to the modprobe command shows the dependencies for a given module?
 - A. --show-options
 - B. --list-deps
 - C. --show-depends
 - D. --list-all
18. Which command can you use to send a message to all users who are currently logged into a system?
 - A. cat
 - B. wall
 - C. tee
 - D. ssh
19. Which of the following is a good first troubleshooting step when a hard disk is not detected by the Linux kernel?
 - A. Unplug the disk.
 - B. Check the system BIOS.

- C. Restart the web server service.
 - D. Run the disk-detect command.
20. Within which directory is information about USB devices stored?
- A. /etc/usbdevices
 - B. /var/usb
 - C. /lib/sys/usb
 - D. /sys/bus/usb/devices
21. If the kernel ring buffer has been overwritten, within which file can you look to find boot messages?
- A. /var/log/bootmessages
 - B. /var/log/mail.info
 - C. /var/adm/log/boot.info
 - D. /var/log/dmesg
22. Which command and option can be used to determine whether a given service is currently loaded?
- A. systemctl --ls
 - B. telinit
 - C. systemctl status
 - D. sysctl -a
23. Which command on a systemd-controlled system would place the system into single-user mode?
- A. systemctl one
 - B. systemctl isolate rescue.target
 - C. systemctl single-user
 - D. systemctl runlevel one
24. Which command on a system controlled by Upstart will reload the configuration files?
- A. initctl reload
 - B. systemd reload
 - C. upstart --reload
 - D. ups -reload
25. When working with a SysV system, which option to chkconfig will display all services and their runlevels?
- A. --reload
 - B. --list
 - C. --all
 - D. --ls

26. A drive connected to USB is considered which type of device?
- A. Medium
 - B. Coldplug
 - C. Hotplug
 - D. Sideplug
27. The system is using a temporary flash USB disk for data mounted at `/dev/sda1`. You need to remove the disk. Which of the following commands will enable the disk to be safely removed from the system?
- A. `usbstop /dev/sda`
 - B. `umount /dev/sda1`
 - C. `unmount /dev/sda1`
 - D. `dev-eject /dev/sda1`
28. You have connected a USB disk to the system and need to find out its connection point within the system. Which of the following is the best method for accomplishing this task?
- A. Rebooting the system
 - B. Viewing the contents of `/var/log/usb.log`
 - C. Connecting the drive to a USB port that you know the number of
 - D. Running `dmesg` and looking for the disk
29. Which of the following commands will initiate an immediate shutdown of the system?
- A. `shutdown -c`
 - B. `halt`
 - C. `systemd stop`
 - D. `stop-system`
30. Which option within a `systemd` service file indicates the program to execute?
- A. `StartProgram`
 - B. `ShortCut`
 - C. `ExecStart`
 - D. `Startup`
31. Which command will display the default target on a computer running `systemd`?
- A. `systemctl defaults`
 - B. `update-rc.d defaults`
 - C. `systemctl runlevel`
 - D. `systemctl get-default`

32. Which option to the `systemctl` command will change a service so that it runs on the next boot of the system?
- A. `enable`
 - B. `startonboot`
 - C. `loadonboot`
 - D. `start`
33. Which of the following best describes the `/proc` filesystem?
- A. `/proc` contains information about files to be processed.
 - B. `/proc` contains configuration files for processes.
 - C. `/proc` contains information on currently running processes, including the kernel.
 - D. `/proc` contains variable data such as mail and web files.
34. Which command will retrieve information about the USB connections on a computer in a tree-like format?
- A. `lsusb -tree`
 - B. `lsusb --tree`
 - C. `lsusb -t`
 - D. `usblist --tree`
35. What is one reason why a device driver does not appear in the output of `lsmod`, even though the device is loaded and working properly?
- A. The use of `systemd` means that drivers are not required for most devices.
 - B. The use of `initramfs` means that support is enabled by default.
 - C. The system does not need a driver for the device.
 - D. Support for the device has been compiled directly into the kernel.
36. Which option to `rmmod` will cause the module to wait until it's no longer in use to unload the module?
- A. `-test`
 - B. `-f`
 - C. `-w`
 - D. `-unload`
37. You are using a storage area network (SAN) that keeps causing errors on your Linux system due to an improper kernel module created by the SAN vendor. When the SAN sends updates, it causes the filesystem to be mounted as read-only. Which command and option can you use to change the behavior of the filesystem to account for the SAN bug?
- A. `mount --continue`
 - B. `tune2fs -e continue`
 - C. `mkfs --no-remount`
 - D. `mount -o remount`

38. Within which directory are rules related to udev stored?
- A. `/etc/udev.conf`
 - B. `/etc/udev.conf.d`
 - C. `/etc/udev/rules.d`
 - D. `/etc/udev.d`
39. Which option to `lspci` displays the kernel driver in use for the given Peripheral Component Interconnect (PCI) device?
- A. `-t`
 - B. `-k`
 - C. `-n`
 - D. `-a`
40. Within which of the following directories will you find blacklist information for modules loaded with `modprobe`?
- A. `/etc/blacklist`
 - B. `/etc/modprobe.d`
 - C. `/etc/blacklist.mod`
 - D. `/etc/modprobe`
41. When working with a CentOS 6 system, which command is used to create the initial RAM disk?
- A. `mkinit`
 - B. `dracut`
 - C. `mkraminit`
 - D. `mkinitfs`
42. Within which file will you find a list of the currently available kernel symbols?
- A. `/proc/kernelsyms`
 - B. `/etc/kernel.conf`
 - C. `/etc/lsyms`
 - D. `/proc/kallsyms`
43. Which of the following commands can be used to show the various information related to a currently loaded module, including core size and settings for options?
- A. `systool -v -m <module>`
 - B. `modinfo -r <module>`
 - C. `lsmod <module>`
 - D. `infmod <module>`

44. Which directory contains various elements and configuration information about the kernel such as the release number, domain name, location of modprobe, and other settings?
- A. `/proc/sys/kmod`
 - B. `/proc/sys/kernel`
 - C. `/proc/kernel`
 - D. `/proc/kernel/sys`
45. Within which directory should systemd unit files that you create be stored?
- A. `/etc/system`
 - B. `/etc/systemd/system`
 - C. `/usr/share/systemd`
 - D. `/usr/share/system`
46. Which of the following commands should you execute after making changes to systemd service configurations in order for those changes to take effect?
- A. `systemd reload`
 - B. `reboot`
 - C. `systemctl daemon-reload`
 - D. `systemctl reboot`
47. Which of the following files contains the runlevels for the system along with a reference to the corresponding rc file?
- A. `/etc/runlevels`
 - B. `/etc/inittab`
 - C. `/etc/rc`
 - D. `/etc/runlevel`
48. Which boot loader can be used for File Allocation Table (FAT) filesystems and might be used for a rescue disk?
- A. SYSBOOT
 - B. SYSLINUX
 - C. TIELINUX
 - D. FATLINUX
49. Which of the following is used to provide an early filesystem-based loading process for key drivers needed to continue the boot process?
- A. `bootrd`
 - B. `driverload`
 - C. `initrd`
 - D. `initdrv`

50. When booting a system you receive an error similar to "No `init` found" and are then placed at an `initramfs` prompt. You need to check the hard drive for errors. Which of the following commands performs an error check on a hard drive partition in Linux?
- A. `defrag`
 - B. `fsck`
 - C. `checkfs`
 - D. `chkfs`
51. Which of the following commands places the system in single-user mode?
- A. `tellinit 1`
 - B. `chginit 1`
 - C. `telinet 1`
 - D. `telinit 1`
52. Which of the following commands changes the boot order for the next boot?
- A. `efibootmgr -c`
 - B. `efibootmgr -b -B`
 - C. `efibootmgr -o`
 - D. `efibootmgr -n`
53. Which boot loader can be used with ISO9660 CD-ROMS?
- A. ISOLINUX
 - B. EFIBOOT
 - C. ISOFS
 - D. BOOTISO
54. Within which directory are systemd user unit files placed by installed packages?
- A. `/usr/lib/systemd/user`
 - B. `/usr/lib/systemd/system`
 - C. `/usr/systemd`
 - D. `/usr/system`
55. When using Unified Extensible Firmware Interface (UEFI), which of the following files can be used as a boot loader?
- A. `shim.uefi`
 - B. `shim.efi`
 - C. `shim.fx`
 - D. `efi.shim`

56. Which directory on a SysV init-based system contains scripts that are used for starting and stopping services?
- A. `/etc/rc.int`
 - B. `/etc/boot`
 - C. `/etc/bootscripts`
 - D. `/etc/init.d`
57. Which of the following commands is used to find overriding configuration files on a systemd-based system?
- A. `diff`
 - B. `systemctl -diff`
 - C. `systemd-delta`
 - D. `systemctl configoverride`
58. Which of the following commands on a Red Hat system lists all of the SysV services set to be executed on boot along with their setting for each runlevel?
- A. `rlevel`
 - B. `chkconfig --list`
 - C. `bootldr --list`
 - D. `init --bootlist`
59. Which of the following commands, executed from within the UEFI shell, controls the boot configuration?
- A. `bootcfg`
 - B. `bcfg`
 - C. `grub-install`
 - D. `grcfg`
60. Which file must exist within `/tftpboot` on the Trivial File Transfer Protocol (TFTP) server for a system that will use PXELINUX for its boot loader?
- A. `pxelinux.tftp`
 - B. `pxelinux.boot`
 - C. `pxelinux.conf`
 - D. `pxelinux.0`
61. Which utility can you use on a Debian or Ubuntu system to manage SysV init scripts, such as setting them to run on boot?
- A. `bootorder`
 - B. `bootloader`
 - C. `configchk`
 - D. `update-rc.d`

62. Which key, pressed during the operating system selection menu, is used to enable editing of the parameters related to boot with GRUB?
- A. v
 - B. e
 - C. r
 - D. y
63. Which `systemctl` subcommand is used to switch runlevels?
- A. switch
 - B. move
 - C. runlevel
 - D. isolate
64. When examining the `/etc/inittab` file, which option signifies the default runlevel to which the system will boot?
- A. default
 - B. defaultboot
 - C. initdefault
 - D. defaulttlvl
65. Which of the following is used instead of `initrd` to provide an early filesystem for essential drivers?
- A. `initnext`
 - B. `initramfs`
 - C. `initialize`
 - D. `initfs`
66. Which of the following commands sets the default `systemd` target to multi-user?
- A. `systemctl set-default multi-user.target`
 - B. `systemd set-default multi-user.target`
 - C. `systemctl set-def muser.target`
 - D. `systemd set-def muser.target`
67. When using a shim for booting a UEFI-based system, which of the following files is loaded after `shim.efi`?
- A. `grubx64.cfg`
 - B. `grub.conf`
 - C. `grubx64.efi`
 - D. `efi.boot`

68. Within which hierarchy are files from `/etc/init.d` linked so that the files are executed during the various runlevels of a SysV system?
- A. `/etc/rc.S`
 - B. `/etc/rc`
 - C. `/etc/boot/rc`
 - D. `/etc/rc.d`
69. What is the name of the unit to which a systemd system is booted in order to start other levels?
- A. `default.target`
 - B. `init.target`
 - C. `initial.target`
 - D. `load.target`
70. When viewing information in `/dev/disk/by-path` using the command `ls -l`, which of the following filenames represents a logical unit number (LUN) from Fibre Channel?
- A. `/dev/fc0`
 - B. `pci-0000:1a:00.0-fc-0x500601653ee0025f:0x0000000000000000`
 - C. `pci-0000:1a:00.0-scsi-0x500601653ee0025f:0x0000000000000000`
 - D. `/dev/fibre0`
71. You have purchased new solid-state drive (SSD) hardware that uses the NVMe (Non-Volatile Memory Express) protocol but cannot find the disks in the normal `/dev/sd*` location in which you have traditionally found such storage. In which location should you look for these drives?
- A. `/dev/nd*`
 - B. `/dev/nvme*`
 - C. `/dev/nv*`
 - D. `/dev/nvme/*`
72. Which file contains information about the current md Redundant Array of Inexpensive Disks (RAID) configuration such as the personalities?
- A. `/proc/raidinfo`
 - B. `/proc/rhyinfo`
 - C. `/proc/mdraid`
 - D. `/proc/mdstat`

73. Which of the following directory hierarchies contains information such as the World Wide Name (WWN) for Fibre Channel?
- A. `/sys/class/wwn`
 - B. `/sys/class/fc_host`
 - C. `/sys/class/fclist`
 - D. `/sys/class/fc/wwn`
74. Information about logical volumes can be found in which of the following directories?
- A. `/dev/lvinfo`
 - B. `/dev/map`
 - C. `/dev/mapper`
 - D. `/dev/lvmap`
75. Which of the following commands will examine the PCI subsystem for NVMe-based devices?
- A. `psnvme`
 - B. `lsnvme`
 - C. `lspci | grep scsi`
 - D. `lspci | grep -i nvme`
76. Which of the following devices is the location of the first Small Computer System Interface (SCSI) tape device detected at boot?
- A. `/dev/st1`
 - B. `/dev/sd0`
 - C. `/dev/sd1`
 - D. `/dev/st0`
77. Which of the following files should be used to display a message to users prior to logging in locally?
- A. `/etc/loginmesg`
 - B. `/etc/logmessage.txt`
 - C. `/etc/issue`
 - D. `/etc/banner`
78. Which file contains a message that is displayed after a successful login?
- A. `/etc/loginbanner`
 - B. `/etc/issue`
 - C. `/etc/motd`
 - D. `/etc/message`

79. Which of the following files can be used to provide a message to users logging in remotely with a protocol such as telnet?
- A. `/etc/telnet.msg`
 - B. `/etc/issue.net`
 - C. `/etc/login.msg`
 - D. `/etc/telnet.login`
80. Which of the following commands turns off the computer, including removing power, if possible?
- A. `systemctl halt`
 - B. `systemctl reboot`
 - C. `systemctl stop`
 - D. `systemctl poweroff`
81. Which of the following shutdown commands reboots the system in 15 minutes?
- A. `shutdown -r +15`
 - B. `shutdown +15`
 - C. `shutdown -15`
 - D. `shutdown -r 00:15`
82. When terminating a process on a SysV `init`-based system, which command can be used to stop the process?
- A. `service`
 - B. `sysv`
 - C. `syscl`
 - D. `servc`
83. Which of the following commands show the boot messages captured by `systemd`?
- A. `journalctl -b`
 - B. `systemctl -b`
 - C. `journalctl -bm`
 - D. `journalctl -l`
84. Which option to the shutdown command halts or stops the system?
- A. `-h`
 - B. `-s`
 - C. `-f`
 - D. `-t`

- 85.** Which signal number is used as SIGKILL when used with the `kill` command?
- A.** 1
 - B.** 4
 - C.** 9
 - D.** 11
- 86.** Which directory contains `rc`-related startup scripts on a legacy Debian system?
- A.** `/etc/init`
 - B.** `/etc/inittab`
 - C.** `/etc/init.d`
 - D.** `/etc/rc.init`
- 87.** When attempting to enable an integrated peripheral on a basic input/output system (BIOS) system, what should be done to determine whether the peripheral has been enabled within the BIOS?
- A.** Examine boot messages to determine if the kernel has detected the peripheral.
 - B.** Examine `/var/log/auth.log` for detection of the peripheral.
 - C.** Reboot the system to determine if the device works.
 - D.** Enable the peripheral by removing it from the blacklisted modules.
- 88.** Which option to the `wall` command suppresses the "Broadcast message" banner that normally displays?
- A.** `-b`
 - B.** `-a`
 - C.** `-n`
 - D.** `-d`