LPIC 1-101 - Linux Server Professional (part 1)

Duration: 4 Days   Course Code: LIN101   Delivery Method: Virtual Classroom

Overview:

The Linux Professional Institute (LPI) has established itself as the standard for distribution independent Linux certification. LPI offers three levels of certification: LPI 1, LPI 2 and LPI 3. LPI 1 is the base level certification that is looked for by professionals that want to validate their skills on Linux but not to one specific Linux distribution. This course will help candidates preparing for the LPIC 101 exam, which is the first out of 2 LPI exams candidates have to take to obtain the certificate.

TopicsSystem ArchitectureLinux Installation and Package ManagementGNU and Unix CommandsDevices, Linux Filesystems, Filesystem Hierarchy Standard

Virtual Learning

This interactive training can be taken from any location, your office or home and is delivered by a trainer. This training does not have any delegates in the class with the instructor, since all delegates are virtually connected. Virtual delegates do not travel to this course, Global Knowledge will send you all the information needed before the start of the course and you can test the logins.

Target Audience:

This course is for IT staff that want to acquire Linux skills. Any experience with the Linux operating system is not required. Typical functions for attendees of this course include support staff and junior system administration.

Objectives:

- **To become LPIC-1 certified the candidate must be able to**:

- understand the architecture of a Linux system;

- install and maintain a Linux workstation, including X11 and setup it up as a network client;

- work at the Linux command line, including common GNU and Unix commands;

- handle files and access permissions as well as system security; and

- perform easy maintenance tasks: help users, add users to a larger system, backup and restore, shutdown and reboot.

Prerequisites:

To attend this course generic IT skills are required.

Testing and Certification

This course prepares for the LPI LPIC-101 (101-500) exam.

Content:

Topic 101: System Architecture

101.1 Determine and configure hardware settings

Description: Candidates should be able to determine and configure fundamental system hardware

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
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- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

101.2 Boot the system

- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
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102.6 Linux as a virtualization guest

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103.8 Basic file editing

Description: Candidates should be able to edit text files using vi. This objective includes vi navigation, vi modes, inserting, editing, deleting, copying and finding text. It also includes awareness of other common editors and setting the default editor.

guide the system through the booting process.

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the implications of virtualization and cloud computing on a Linux guest system.

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- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

101.3 Change runlevels / boot targets and shutdown or reboot system

Description: Candidates should be able to manage the SysVinit runlevel or systemd boot target of the system. This objective includes changing to single user mode, shutdown or rebooting the system. Candidates should be able to alert users before switching runlevels / boot targets and properly terminate processes. This objective also includes setting the default SysVinit runlevel or systemd boot target. It also includes awareness of Upstart as an alternative to SysVinit or systemd.

- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

Topic 103: GNU and Unix Commands

- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

Topic 104: Devices, Linux Filesystems, Filesystem Hierarchy Standard

104.1 Create partitions and filesystems

Description: Candidates should be able to configure disk partitions and then create

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as

103.1 Work on the command line

Description: Candidates should be able to interact with shells and commands using the command line. The objective assumes the Bash shell.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or

filesystems on media such as hard disks. This includes the handling of swap partitions.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
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- Identify shared libraries.
- Identify the typical locations of system libraries.
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- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.

- well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers

- libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
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- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running

- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.

and anchors.

- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

Topic 102: Linux Installation and Package Management

102.1 Design hard disk layout

Description: Candidates should be able to design a disk partitioning scheme for a Linux system.

Key Knowledge Areas:

- Enable and disable integrated peripherals.
- Differentiate between the various types of

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after logout.

- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
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- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.

- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
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- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
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- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

104.2 Maintain the integrity of filesystems

Description: Candidates should be able to maintain a standard filesystem, as well as the extra data associated with a journaling filesystem.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual

- Know the location and purpose of important file and directories as defined in the FHS.

103.2 Process text streams using filters

Description: Candidates should be able to apply filters to text streams.

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.
- 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.
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- Awareness of Upstart.
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- Change between runlevels / boot targets including single user mode.
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Key Knowledge Areas:

- Enable and disable integrated peripherals.
- Differentiate between the various types of mass storage devices.
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- Demonstrate knowledge of the boot sequence from BIOS/UEFI to boot completion.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
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- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity

machines in an IaaS cloud, such as computing instances, block storage and networking.

- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.

- Find packages containing specific files or libraries which may or may not be installed.
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- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
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- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.

- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

102.2 Install a boot manager

Description: Candidates should be able to select, install and configure a boot manager.

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.
- Provide common commands to the boot loader and options to the kernel at boot time.
- Demonstrate knowledge of the boot

- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux

- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
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- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
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- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
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- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
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- Monitor free space and inodes.
- Repair simple filesystem problems.
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- Configure filesystem mounting on bootup.
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- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

104.3 Control mounting and unmounting of filesystems

Description: Candidates should be able to configure the mounting of a filesystem.

Key Knowledge Areas:

sequence from BIOS/UEFI to boot completion.

- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.

system.
- Know the location and purpose of important file and directories as defined in the FHS.

103.3 Perform basic file management

Description: Candidates should be able to use the basic Linux commands to manage files and directories.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.

- 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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific

- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT

- Install, upgrade and uninstall Debian binary packages.
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- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
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- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
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- file comes from.
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- Using find to locate and act on files based on type, size, or time.
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- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special

- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

102.3 Manage shared libraries

Description: Candidates should be able to determine the shared libraries that executable programs depend on and install them when necessary.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command

- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
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- Use the group field to grant file access to group members.
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- Copying versus linking files.
- Use links to support system administration tasks.
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- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

104.4 Removed

104.5 Manage file permissions and ownership

Description: Candidates should be able to control file access through the proper use of permissions and ownerships.

Key Knowledge Areas:

line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the

under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

103.4 Use streams, pipes and redirects

Description: Candidates should be able to redirect streams and connect them in order to efficiently process textual data. Tasks include redirecting standard input, standard output and standard error, piping the output of one command to the input of another command, using the output of one command as arguments to another command and sending output to both stdout and a file.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
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- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
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- Understanding of SysVinit and systemd.
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- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
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- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific

- defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
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- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
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- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
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- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
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- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.

- as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.

- file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
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- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special

- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

102.4 Use Debian package management

Description: Candidates should be able to perform package management using the Debian package tools.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the

- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.

- characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
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- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
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- Manage MBR and GPT partition tables
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- ext2/ext3/ext4
- XFS
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- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
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- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

104.6 Create and change hard and symbolic links

Description: Candidates should be able to create and manage hard and symbolic links to a file.

Key Knowledge Areas:

- Enable and disable integrated peripherals.

- hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.

- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

103.5 Create, monitor and kill processes

Description: Candidates should be able to perform basic process management.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.

- 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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.

- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.

- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
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- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files

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- Invoke commands inside and outside the defined path.
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- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
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- Change the priority of a running process.
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- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.

- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

102.5 Use RPM and YUM package management

Description: Candidates should be able to perform package management using RPM, YUM and Zypper.

- based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
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- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation

- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
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- Insert, edit, delete, copy and find text in vi.
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- Use access modes such as suid, sgid and the sticky bit to maintain security.
- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

104.7 Find system files and place files in the correct location

Description: Candidates should be thoroughly familiar with the Filesystem Hierarchy Standard (FHS), including typical file locations and directory classifications.

Key Knowledge Areas:

- Enable and disable integrated peripherals.
- Differentiate between the various types of

mask.

- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
- Know the location and purpose of important file and directories as defined in the FHS.

103.6 Modify process execution priorities

Description: Candidates should should be able to manage process execution priorities.

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.
- 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.
- Understanding of SysVinit and systemd.
- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and

- 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.
- 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.
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- Awareness of Upstart.
- Check boot events in the log files.
- Set the default runlevel or boot target.
- Change between runlevels / boot targets including single user mode.
- Shutdown and reboot from the command line.
- Alert users before switching runlevels / boot targets or other major system events.
- Properly terminate processes.
- Awareness of acpid.
- Allocate filesystems and swap space to separate partitions or disks.
- Tailor the design to the intended use of the system.
- Ensure the /boot partition conforms to the hardware architecture requirements for booting.
- Knowledge of basic features of LVM.
- Providing alternative boot locations and backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
- Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed).
- Awareness of apt.
- Install, re-install, upgrade and remove packages using RPM, YUM and Zypper.
- Obtain information on RPM packages such as version, status, dependencies, integrity and signatures.
- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual

backup boot options.
- Install and configure a boot loader such as GRUB Legacy.
- Perform basic configuration changes for GRUB 2.
- Interact with the boot loader.
- Identify shared libraries.
- Identify the typical locations of system libraries.
- Load shared libraries.
- Install, upgrade and uninstall Debian binary packages.
- Find packages containing specific files or libraries which may or may not be installed.
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- Determine what files a package provides, as well as find which package a specific file comes from.
- Awareness of dnf.
- Understand the general concept of virtual machines and containers.
- Understand common elements virtual machines in an IaaS cloud, such as computing instances, block storage and networking.
- Understand unique properties of a Linux system which have to changed when a system is cloned or used as a template.
- Understand how system images are used to deploy virtual machines, cloud instances and containers.
- Understand Linux extensions which integrate Linux with a virtualization product.
- Awareness of cloud-init.
- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
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- Use single shell commands and one line command sequences to perform basic tasks on the command line.
- Use and modify the shell environment including defining, referencing and exporting environment variables.
- Use and edit command history.
- Invoke commands inside and outside the defined path.
- Send text files and output streams through text utility filters to modify the output using standard UNIX commands found in the GNU textutils package.
- Copy, move and remove files and directories individually.
- Copy multiple files and directories recursively.
- Remove files and directories recursively.
- Use simple and advanced wildcard specifications in commands.
- Using find to locate and act on files based on type, size, or time.
- Usage of tar, cpio and dd.
- Redirecting standard input, standard output and standard error.
- Pipe the output of one command to the input of another command.
- Use the output of one command as arguments to another command.
- Send output to both stdout and a file.
- Run jobs in the foreground and background.
- Signal a program to continue running after logout.
- Monitor active processes.
- Select and sort processes for display.
- Send signals to processes.
- Know the default priority of a job that is created.
- Run a program with higher or lower priority than the default.
- Change the priority of a running process.
- Create simple regular expressions containing several notational elements.
- Understand the differences between basic and extended regular expressions.
- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform

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- Create simple regular expressions containing several notational elements.
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- Understand the concepts of special characters, character classes, quantifiers and anchors.
- Use regular expression tools to perform searches through a filesystem or file content.
- Use regular expressions to delete, change and substitute text.
- Navigate a document using vi.
- Understand and use vi modes.
- Insert, edit, delete, copy and find text in vi.
- Awareness of Emacs, nano and vim.
- Configure the standard editor.
- Manage MBR and GPT partition tables
- Use various mkfs commands to create various filesystems such as:
- ext2/ext3/ext4
- XFS
- VFAT
- exFAT
- Basic feature knowledge of Btrfs, including multi-device filesystems, compression and subvolumes.
- Verify the integrity of filesystems.
- Monitor free space and inodes.
- Repair simple filesystem problems.
- Manually mount and unmount filesystems.
- Configure filesystem mounting on bootup.
- Configure user mountable removable filesystems.
- Use of labels and UUIDs for identifying and mounting file systems.
- Awareness of systemd mount units.
- Manage access permissions on regular and special files as well as directories.
- Use access modes such as suid, sgid and the sticky bit to maintain security.

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- Know how to change the file creation mask.
- Use the group field to grant file access to group members.
- Create links.
- Identify hard and/or soft links.
- Copying versus linking files.
- Use links to support system administration tasks.
- Understand the correct locations of files under the FHS.
- Find files and commands on a Linux system.
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103.7 Search text files using regular expressions

Description: Candidates should be able to manipulate files and text data using regular expressions. This objective includes creating simple regular expressions containing several notational elements as well as understanding the differences between basic and extended regular expressions. It also includes using regular expression tools to perform searches through a filesystem or file content.

Further Information:

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