

TestOut[®]

TestOut Linux Pro – English 6.0.x

Objective Mappings:

TestOut Linux Pro

CompTIA XK0-005

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LabSim Section to Linux Pro Objective

The TestOut Linux Pro course covers the following TestOut Linux Pro exam objectives:

Section	Title	Objectives
0.0	Linux Pro Introduction	
0.1	Course Introduction	2.2 Manage the file system <ul style="list-style-type: none"> 2.2.1 View information about directories and files in the file system 2.2.3 Create, copy, move, and delete directories in the file system 2.2.4 Create, copy, move, and delete files in the file system
0.2	The TestOut Lab Simulator	
1.0	Linux Overview	
1.1	Linux Introduction	
2.0	Using Linux	
2.1	The Linux Shell	1.2 Configure and use Linux shell environments <ul style="list-style-type: none"> 1.2.1 Manage environment variables 1.2.2 View available shells
2.2	Linux Help	1.1 Use command-line utilities

		1.1.1 Get help for Linux command-line utilities
2.3	Text Editors	1.1 Use command-line utilities 1.1.2 View, search, and edit the contents of text files 2.2 Manage the file system 2.2.4 Create, copy, move, and delete files in the file system
2.4	Aliases	
2.5	Environment Variables	1.2 Configure and use Linux shell environments 1.2.1 Manage environment variables
2.6	Shell Configuration Files	1.2 Configure and use Linux shell environments 1.2.1 Manage environment variables
2.7	Redirection, Piping and Command Substitution	
2.8	Directories	2.2 Manage the file system 2.2.1 View information about directories and files in the file system 2.2.3 Create, copy, move, and delete directories in the file system
2.9	Files	1.1 Use command-line utilities

		<p>1.1.2 View, search, and edit the contents of text files</p> <p>2.2 Manage the file system</p> <p>2.2.1 View information about directories and files in the file system</p> <p>2.2.3 Create, copy, move, and delete directories in the file system</p> <p>2.2.4 Create, copy, move, and delete files in the file system</p>
2.10	Links	<p>2.2 Manage the file system</p> <p>2.2.5 Create and manage hard and symbolic link files</p>
2.11	Filesystem Hierarchy Standard (FHS)	<p>2.2 Manage the file system</p> <p>2.2.2 Use the Linux Filesystem Hierarchy Standard</p>
2.12	Locating and Searching Files	<p>1.1 Use command-line utilities</p> <p>1.1.2 View, search, and edit the contents of text files</p> <p>2.2 Manage the file system</p> <p>2.2.1 View information about directories and files in the file system</p>
2.13	Text Stream Processing	<p>1.1 Use command-line utilities</p> <p>1.1.2 View, search, and edit the contents of text files</p>
3.0	Installation and Localization	

3.1	Linux System Design	
3.2	Linux Installation	
3.3	Localization	
4.0	Boot and Shutdown	
4.1	Linux Boot Process	<p>1.3 Manage system startup and shutdown</p> <p>1.3.1 Manage bootloader configurations</p>
4.2	Bootloaders	<p>1.3 Manage system startup and shutdown</p> <p>1.3.1 Manage bootloader configurations</p> <p>1.4 Manage system processes</p> <p>1.4.3 Manage kernel modules</p>
4.3	systemd Boot Targets	<p>1.3 Manage system startup and shutdown</p> <p>1.3.2 View and manage runlevels or boot targets for system services</p> <p>1.3.3 Set the default system runlevel or boot target</p> <p>1.3.4 Shutdown and restart the system</p>
4.4	System Services	<p>1.4 Manage system processes</p> <p>1.4.1 Start, stop, and restart system services</p>

4.5	System Shutdown	1.3 Manage system startup and shutdown 1.3.4 Shutdown and restart the system
5.0	Graphical User Interfaces and Desktops	
5.1	Graphical User Interfaces	
5.2	Linux Desktops	
5.3	Remote Desktop	4.3 Monitor and manage system access 4.3.3 Manage remote connections
5.4	Accessibility	
6.0	Software Installation	
6.1	Red Hat Package Manager (RPM)	1.5 Use package management 1.5.1 Install, remove, and update packages with the RPM command
6.2	Online Package Installation	1.5 Use package management 1.5.1 Install, remove, and update packages with the RPM command 1.5.2 Install, remove, and update RPM packages with DNF
6.3	Debian Package Manager (dpkg)	1.5 Use package management

		1.5.3 Install, upgrade, and update Ubuntu software packages with apt
6.4	Shared Libraries	
7.0	Users and Groups	
7.1	User and Group Overview	4.1 Manage users and groups 4.1.1 Create and manage groups 4.1.2 Create and manage user accounts
7.2	User Management	4.1 Manage users and groups 4.1.2 Create and manage user accounts 4.1.3 Manage user passwords
7.3	Group Management	4.1 Manage users and groups 4.1.1 Create and manage groups 4.1.4 Manage user access
7.4	Troubleshoot User Issues	
8.0	Disk and File System Management	
8.1	Storage Concepts	2.1 Manage storage devices 2.1.2 Create and manage disk file systems
8.2	MBR Disk Partitions	2.1 Manage storage devices

		<p>2.1.1 Create and manage disk partitions</p> <p>2.1.4 Create and manage swap partitions</p>
8.3	GUID Partitions	<p>2.1 Manage storage devices</p> <p>2.1.1 Create and manage disk partitions</p>
8.4	Logical Volume Manager	<p>2.1 Manage storage devices</p> <p>2.1.5 Configure Logical Volume management</p>
8.5	File Systems	<p>2.1 Manage storage devices</p> <p>2.1.2 Create and manage disk file systems</p> <p>2.1.3 Mount and unmount devices in the file system</p> <p>2.1.4 Create and manage swap partitions</p>
8.6	Mounting File Systems	<p>2.1 Manage storage devices</p> <p>2.1.3 Mount and unmount devices in the file system</p>
8.7	File System Maintenance	<p>2.1 Manage storage devices</p> <p>2.1.2 Create and manage disk file systems</p> <p>2.2 Manage the file system</p> <p>2.2.1 View information about directories and files in the file system</p>
8.8	Disk Quotas	2.2 Manage the file system

		<p>2.2.6 View disk space usage statistics</p> <p>2.2.7 Implement disk quotas</p>
8.9	Ownership	<p>4.2 Manage user and group access</p> <p>4.2.1 Manage directory and file ownership for users and groups</p>
8.10	Permissions	<p>4.2 Manage user and group access</p> <p>4.2.2 Manage directory and file permissions for users and groups</p>
8.11	The umask Command	<p>4.2 Manage user and group access</p> <p>4.2.3 Configure umask values</p>
8.12	Special Permissions	<p>4.2 Manage user and group access</p> <p>4.2.4 Use special permissions</p>
8.13	Access Control Lists	<p>4.2 Manage user and group access</p> <p>4.2.2 Manage directory and file permissions for users and groups</p>
8.14	Archive and Backup	<p>2.2 Manage the file system</p> <p>2.2.8 Create and manage archives and backups</p>

8.15	Troubleshooting Storage	2.1 Manage storage devices 2.1.3 Mount and unmount devices in the file system
9.0	Hardware Installation	
9.1	Device Drivers	1.4 Manage system processes 1.4.2 Monitor and manage running processes 1.4.3 Manage kernel modules
9.2	Kernel Module Management	1.4 Manage system processes 1.4.3 Manage kernel modules
9.3	Hotplug and Coldplug Devices	
10.0	Processes and System Services	
10.1	Processes	1.4 Manage system processes 1.4.2 Monitor and manage running processes
10.2	Process Management	1.4 Manage system processes 1.4.2 Monitor and manage running processes
10.3	Task Management	1.4 Manage system processes 1.4.4 Configure scheduled tasks

10.4	System Time Configuration	
11.0	System Monitoring	
11.1	System Logging	4.3 Monitor and manage system access 4.3.1 Monitor logging
11.2	Resource Monitoring	1.4 Manage system processes 1.4.2 Monitor and manage running processes
12.0	Networking	
12.1	IPv4 Overview	3.1 Configure networking 3.1.3 Configure IP addresses 3.1.4 Troubleshoot an IP configuration
12.2	Network Interface Configuration	3.1 Configure networking 3.1.1 Find the IP address or DNS of a host 3.1.2 Enable or disable network interfaces 3.1.3 Configure IP addresses 3.1.4 Troubleshoot an IP configuration
12.3	NetworkManager	3.1 Configure networking 3.1.3 Configure IP addresses
12.4	IPv6 Overview	3.1 Configure networking

		<ul style="list-style-type: none"> 3.1.1 Find the IP address or DNS of a host 3.1.2 Enable or disable network interfaces 3.1.3 Configure IP addresses 3.1.4 Troubleshoot an IP configuration
12.5	Routing Configuration	
12.6	Hostname and DNS Configuration	<p>3.1 Configure networking</p> <ul style="list-style-type: none"> 3.1.1 Find the IP address or DNS of a host
12.7	Linux Firewalls	<p>3.1 Configure networking</p> <ul style="list-style-type: none"> 3.1.4 Troubleshoot an IP configuration
12.8	Network Troubleshooting	<p>3.1 Configure networking</p> <ul style="list-style-type: none"> 3.1.1 Find the IP address or DNS of a host 3.1.2 Enable or disable network interfaces 3.1.3 Configure IP addresses 3.1.4 Troubleshoot an IP configuration
13.0	Cloud, Containers, and Virtualization	
13.1	Cloud and Virtualization Overview	
13.2	Virtual Machines	
13.3	Sandboxed Applications	
13.4	Containers	

13.5	Virtual Networking	
14.0	Scripting and Automation	
14.1	Bash Shell Scripting	
14.2	Shell Environments, Bash Variables and Parameters	
14.3	Bash Scripting Logic	
14.4	Version Control Using Git	2.2 Manage the file system 2.2.8 Create and manage archives and backups
14.5	Orchestration Processes and Concepts	
15.0	Security	
15.1	Root Usage	4.1 Manage users and groups 4.1.2 Create and manage user accounts 4.1.4 Manage user access 4.1.5 Switch users for access and elevated privilege
15.2	User Security and Restriction	
15.3	Login Blocking	4.1 Manage users and groups 4.1.4 Manage user access 4.3 Monitor and manage system access

		4.3.1 Monitor logging
15.4	Network Security	
15.5	OpenSSH	4.3 Monitor and manage system access 4.3.3 Manage remote connections
15.6	SSH Port Tunneling	
15.7	Security-Enhanced Linux (SELinux)	
15.8	Application Armor (AppArmor)	
15.9	Public Key Authentication	4.3 Monitor and manage system access 4.3.3 Manage remote connections
15.10	VPN Access and Authentication	4.3 Monitor and manage system access 4.3.3 Manage remote connections
15.11	Security Best Practices	
A.0	TestOut Linux Pro - Practice Exams	
A.1	Prepare for TestOut Linux Pro Certification	
A.2	TestOut Linux Pro Exam Domain Review	

B.0	CompTIA Linux+ XK0-005 - Practice Exams	
B.1	Prepare for CompTIA Linux+ Certification	
B.2	CompTIA Linux+ XK0-005 Domain Review (20 Questions)	
B.3	CompTIA Linux+ XK0-005 Domain Practice (All Questions)	

Linux Pro Objective to LabSim Section

The TestOut Linux Pro course and certification exam cover the following TestOut Linux Pro objectives:

#	Domain	Module.Section
1.0	System Administration and Configuration	
1.1	Use command-line utilities 1.1.1 Get help for Linux command-line utilities 1.1.2 View, search, and edit the contents of text files	2.2, 2.3, 2.9, 2.12, 2.13
1.2	Configure and use Linux shell environments 1.2.1 Manage environment variables 1.2.2 View available shells	2.1, 2.5, 2.6

1.3	<p>Manage system startup and shutdown</p> <p>1.3.1 Manage bootloader configurations 1.3.2 View and manage runlevels or boot targets for system services 1.3.3 Set the default system runlevel or boot target 1.3.4 Shutdown and restart the system</p>	4.1, 4.2, 4.3, 4.5
1.4	<p>Manage system processes</p> <p>1.4.1 Start, stop, and restart system services 1.4.2 Monitor and manage running processes 1.4.3 Manage kernel modules 1.4.4 Configure scheduled tasks</p>	4.2, 4.4 9.1, 9.2 10.1, 10.2, 10.3 11.2
1.5	<p>Use package management</p> <p>1.5.1 Install, remove, and update packages with the RPM command 1.5.2 Install, remove, and update RPM packages with DNF 1.5.3 Install, upgrade, and update Ubuntu software packages with apt</p>	6.1, 6.2, 6.3
2.0	Storage and File System Management	
2.1	<p>Manage storage devices</p> <p>2.1.1 Create and manage disk partitions 2.1.2 Create and manage disk file systems 2.1.3 Mount and unmount devices in the file system 2.1.4 Create and manage swap partitions 2.1.5 Configure Logical Volume management</p>	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.15
2.2	<p>Manage the file system</p> <p>2.2.1 View information about directories and files in the file system 2.2.2 Use the Linux Filesystem Hierarchy Standard</p>	0.1 2.3, 2.8, 2.9, 2.10, 2.11, 2.12

	<ul style="list-style-type: none"> 2.2.3 Create, copy, move, and delete directories in the file system 2.2.4 Create, copy, move, and delete files in the file system 2.2.5 Create and manage hard and symbolic link files 2.2.6 View disk space usage statistics 2.2.7 Implement disk quotas 2.2.8 Create and manage archives and backups 	<p>8.7, 8.8, 8.14</p> <p>14.4</p>
3.0	Networking	
3.1	<p>Configure networking</p> <ul style="list-style-type: none"> 3.1.1 Find the IP address or DNS of a host 3.1.2 Enable or disable network interfaces 3.1.3 Configure IP addresses 3.1.4 Troubleshoot an IP configuration 	12.1, 12.2, 12.3, 12.4, 12.6, 12.7, 12.8
4.0	Security and Access Control	
4.1	<p>Manage users and groups</p> <ul style="list-style-type: none"> 4.1.1 Create and manage groups 4.1.2 Create and manage user accounts 4.1.3 Manage user passwords 4.1.4 Manage user access 4.1.5 Switch users for access and elevated privilege 	<p>7.1, 7.2, 7.3</p> <p>15.1, 15.3</p>
4.2	<p>Manage user and group access</p> <ul style="list-style-type: none"> 4.2.1 Manage directory and file ownership for users and groups 4.2.2 Manage directory and file permissions for users and groups 4.2.3 Configure umask values 4.2.4 Use special permissions 	8.9, 8.10, 8.11, 8.12, 8.13

4.3	Monitor and manage system access 4.3.1 Monitor logging 4.3.2 Manage host firewall 4.3.3 Manage remote connections	5.3 11.1 15.3, 15.5, 15.9, 15.10
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LabSim Section to XK0-005 Objective

The TestOut Linux Pro course covers the following CompTIA Linux+ XK0-005 exam objectives:

Section	Title	Objectives
0.0	Linux Pro Introduction	
0.1	Course Introduction	1.2 Given a scenario, manage files and directories 1.2.1 File editing 1.2.1.4 nano 1.2.1.5 vi(m) 1.2.6 File and directory operations 1.2.6.1 mv 1.2.6.2 cp 1.2.6.3 mkdir 1.2.6.4 rmdir 1.2.6.5 ls 1.2.6.6 pwd 1.2.6.7 rm

		<ul style="list-style-type: none"> 1.2.6.8 cd 1.2.6.13 cat 1.2.6.14 touch
0.2	The TestOut Lab Simulator	
1.0	Linux Overview	
1.1	Linux Introduction	<p>1.1 Summarize Linux fundamentals</p> <ul style="list-style-type: none"> 1.1.1 Filesystem Hierarchy 1.1.3 Kernel panic <p>1.5 Given a scenario, use the appropriate networking tools or configuration files</p> <ul style="list-style-type: none"> 1.5.3 Network monitoring 1.5.4 Remote networking tools <ul style="list-style-type: none"> 1.5.4.1 Secure Shell (SSH) <p>1.6 Given a scenario, build and install software</p> <ul style="list-style-type: none"> 1.6.1 Package management <p>1.7 Given a scenario, manage software configurations</p> <ul style="list-style-type: none"> 1.7.3 Configure common system services <ul style="list-style-type: none"> 1.7.3.2 Network Time Protocol (NTP) <p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <ul style="list-style-type: none"> 2.1.1 Managing public key infrastructure (PKI) certificates

		<p>2.1.1.7 Certificate authorities</p> <p>2.1.2 Certificate use cases</p> <p>2.1.2.2 Certificate authentication</p> <p>2.1.3 Authentication</p> <p>2.1.4 Linux hardening</p> <p>2.1.4.3 System logging configurations</p> <p>3.2 Given a scenario, perform basic container operations</p> <p>3.2.1 Container management</p>
2.0	Using Linux	
2.1	The Linux Shell	<p>1.2 Given a scenario, manage files and directories</p> <p>1.2.6 File and directory operations</p> <p>1.2.6.5 ls</p> <p>1.2.6.6 pwd</p> <p>1.2.6.8 cd</p> <p>1.2.6.9 .</p> <p>1.2.6.11 ~</p> <p>2.2 Given a scenario, implement identity management</p> <p>2.2.1 Account creation and deletion</p> <p>2.2.1.2 Default shell</p> <p>2.2.1.3.1 /etc/passwd</p>

		<p>2.4 Given a scenario, configure and execute remote connectivity for system management</p> <p>2.4.2 Executing commands as another user</p> <p>2.4.2.3.3 su –</p> <p>2.5 Given a scenario, apply the appropriate access controls</p> <p>2.5.4 Command-line utilities</p> <p>2.5.4.6 ls</p> <p>3.1 Given a scenario, create simple shell scripts to automate common tasks</p> <p>3.1.1 Shell script elements</p> <p>3.1.1.11.2 echo</p> <p>3.1.3 Environment variables</p> <p>3.1.3.1 \$PATH</p> <p>3.1.3.2 \$SHELL</p>
2.2	Linux Help	
2.3	Text Editors	
2.4	Aliases	<p>1.2 Given a scenario, manage files and directories</p> <p>1.2.6 File and directory operations</p>
2.5	Environment Variables	2.2 Given a scenario, implement identity management

		<p>2.2.1 Account creation and deletion</p> <p>2.2.1.3.4 /etc/profile 2.2.1.3.6 .bash_profile 2.2.1.3.7 .bashrc</p>
2.6	Shell Configuration Files	
2.7	Redirection, Piping and Command Substitution	<p>3.1 Given a scenario, create simple shell scripts to automate common tasks</p> <p>3.1.1 Shell script elements</p> <p>3.1.1.8 Standard stream redirection</p> <p>3.1.1.8.1 3.1.1.8.2 3.1.1.8.3 > 3.1.1.8.4 >> 3.1.1.8.5 < 3.1.1.8.6 << 3.1.1.8.7 & 3.1.1.8.8 && 3.1.1.8.9 Redirecting 3.1.1.8.10 stderr 3.1.1.8.11 stdout</p> <p>3.1.2 Common script utilities</p> <p>3.1.2.4 xargs</p>
2.8	Directories	<p>1.2 Given a scenario, manage files and directories</p> <p>1.2.6 File and directory operations</p> <p>1.2.6.6 pwd 1.2.6.8 cd 1.2.6.9 .</p>

		<ul style="list-style-type: none"> 1.2.6.10 .. 1.2.6.11 ~ 1.2.6.12 tree
2.9	Files	<p>1.2 Given a scenario, manage files and directories</p> <ul style="list-style-type: none"> 1.2.1 File editing 1.2.3 File metadata <ul style="list-style-type: none"> 1.2.3.2 file 1.2.6 File and directory operations <ul style="list-style-type: none"> 1.2.6.1 mv 1.2.6.2 cp 1.2.6.5 ls 1.2.6.7 rm 1.2.6.13 cat 1.2.6.14 touch
2.10	Links	<p>1.2 Given a scenario, manage files and directories</p> <ul style="list-style-type: none"> 1.2.4 Soft and hard links
2.11	Filesystem Hierarchy Standard (FHS)	<p>1.1 Summarize Linux fundamentals</p> <ul style="list-style-type: none"> 1.1.1 Filesystem Hierarchy <ul style="list-style-type: none"> 1.1.1.1 /boot 1.1.1.2 /proc 1.1.1.3 /sys 1.1.1.4 /var 1.1.1.5 /usr 1.1.1.6 /lib 1.1.1.7 /dev

		<ul style="list-style-type: none"> 1.1.1.8 /etc 1.1.1.9 /opt 1.1.1.10 /bin 1.1.1.11 /sbin 1.1.1.12 /home 1.1.1.13 /media 1.1.1.14 /mnt 1.1.1.15 /root 1.1.1.16 /tmp
2.12	Locating and Searching Files	<p>3.1 Given a scenario, create simple shell scripts to automate common tasks</p> <p>3.1.2 Common script utilities</p> <p>3.1.2.3 find</p> <p>3.1.2.5 grep</p> <p>3.1.2.6 egrep</p>
2.13	Text Stream Processing	<p>1.2 Given a scenario, manage files and directories</p> <p>1.2.1 File editing</p> <p>1.2.1.1 sed</p> <p>1.2.1.2 awk</p> <p>3.1 Given a scenario, create simple shell scripts to automate common tasks</p> <p>3.1.2 Common script utilities</p> <p>3.1.2.1 awk</p> <p>3.1.2.2 sed</p> <p>3.1.2.8 wc</p> <p>3.1.2.9 cut</p> <p>3.1.2.10 tr</p>

3.0	Installation and Localization	
3.1	Linux System Design	<p>1.3 Given a scenario, configure and manage storage using the appropriate tools</p> <p style="padding-left: 40px;">1.3.1 Disk partitioning</p> <p>1.6 Given a scenario, build and install software</p> <p style="padding-left: 40px;">1.6.1 Package management</p> <p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p style="padding-left: 40px;">2.1.4 Linux hardening</p> <p style="padding-left: 80px;">2.1.4.2 Secure boot</p>
3.2	Linux Installation	<p>1.3 Given a scenario, configure and manage storage using the appropriate tools</p> <p style="padding-left: 40px;">1.3.1 Disk partitioning</p> <p>1.6 Given a scenario, build and install software</p> <p style="padding-left: 40px;">1.6.1 Package management</p>
3.3	Localization	<p>1.7 Given a scenario, manage software configurations</p> <p style="padding-left: 40px;">1.7.4 Localization</p> <p style="padding-left: 80px;">1.7.4.2 localectl</p>
4.0	Boot and Shutdown	

4.1	Linux Boot Process	<p>1.1 Summarize Linux fundamentals</p> <ul style="list-style-type: none"> 1.1.2 Basic boot process <ul style="list-style-type: none"> 1.1.2.1 Basic input/output system (BIOS) 1.1.2.2 Unified Extensible Firmware 1.1.2.3 Commands <ul style="list-style-type: none"> 1.1.2.3.1 mkinitrd 1.1.2.3.5 dracut 1.1.2.4 initrd.img 1.1.2.5 vmlinuz 1.1.2.7 Boot sources <ul style="list-style-type: none"> 1.1.2.7.1 Preboot eXecution 1.1.2.7.2 Booting from Universal 1.1.2.7.3 Booting from ISO <p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <ul style="list-style-type: none"> 2.1.4 Linux hardening <ul style="list-style-type: none"> 2.1.4.2.1 UEFI
4.2	Bootloaders	<p>1.1 Summarize Linux fundamentals</p> <ul style="list-style-type: none"> 1.1.2 Basic boot process <ul style="list-style-type: none"> 1.1.2.1 Basic input/output system (BIOS) 1.1.2.2 Unified Extensible Firmware 1.1.2.3.2 grub2-install 1.1.2.3.3 grub2-mkconfig 1.1.2.3.4 grub2-update 1.1.2.6 Grand Unified Bootloader

4.3	systemd Boot Targets	<p>4.5 Given a scenario, use systemd to diagnose and resolve common problems with a Linux system</p> <ul style="list-style-type: none"> 4.5.1 Unit files <ul style="list-style-type: none"> 4.5.1.1 Service <ul style="list-style-type: none"> 4.5.1.1.2 ExecStart/ExecStop 4.5.1.1.3 Before/after 4.5.1.1.4 Type 4.5.1.1.6 Requires/wants 4.5.1.2.3 Unit 4.5.1.3 Mount <ul style="list-style-type: none"> 4.5.1.3.4 Type 4.5.1.4 Target <ul style="list-style-type: none"> 4.5.1.4.1 Default 4.5.1.4.2 Multiuser 4.5.1.4.3 Network-online 4.5.1.4.4 Graphical
4.4	System Services	<p>1.4 Given a scenario, configure and use the appropriate processes and services</p> <ul style="list-style-type: none"> 1.4.1 System services <ul style="list-style-type: none"> 1.4.1.1 systemctl <ul style="list-style-type: none"> 1.4.1.1.1 stop 1.4.1.1.2 start 1.4.1.1.3 restart 1.4.1.1.4 status 1.4.1.1.5 enable 1.4.1.1.6 disable 1.4.1.1.7 mask <p>1.7 Given a scenario, manage software configurations</p> <ul style="list-style-type: none"> 1.7.1 Updating configuration files <ul style="list-style-type: none"> 1.7.1.1.1 Restart service

		1.7.1.1.2 Reload service
4.5	System Shutdown	
5.0	Graphical User Interfaces and Desktops	
5.1	Graphical User Interfaces	1.1 Summarize Linux fundamentals 1.1.4 Device types in /dev 1.4 Given a scenario, configure and use the appropriate processes and services 1.4.1 System services
5.2	Linux Desktops	1.1 Summarize Linux fundamentals 1.1.4 Device types in /dev
5.3	Remote Desktop	
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14.1	Bash Shell Scripting	<p>3.1 Given a scenario, create simple shell scripts to automate common tasks</p> <ul style="list-style-type: none"> 3.1.1 Shell script elements <ul style="list-style-type: none"> 3.1.1.5 Variables <ul style="list-style-type: none"> 3.1.1.11.1 read 3.1.1.11.2 echo 3.1.1.11.3 source 3.1.3 Environment variables <ul style="list-style-type: none"> 3.1.3.1 \$PATH 3.1.4 Relative and absolute paths
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15.0	Security	
15.1	Root Usage	<p>1.2 Given a scenario, manage files and directories</p> <ul style="list-style-type: none"> 1.2.6 File and directory operations 1.2.6.6 pwd

		<p>2.4 Given a scenario, configure and execute remote connectivity for system management</p> <p>2.4.2 Executing commands as another user</p> <p>2.4.2.1 /etc/sudoers</p> <p>2.4.2.3 Commands</p> <p>2.4.2.3.1 sudo</p> <p>2.4.2.3.2 visudo</p> <p>2.4.2.3.3 su –</p>
15.2	User Security and Restriction	<p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.3 Authentication</p> <p>2.1.3.3 Pluggable authentication modules (PAM)</p> <p>2.1.3.5 Lightweight Directory Access Protocol (LDAP)</p> <p>2.2 Given a scenario, implement identity management</p> <p>2.2.1 Account creation and deletion</p> <p>2.2.1.1.8 who</p> <p>2.2.2 Account management</p> <p>2.2.2.2 chage</p> <p>2.2.2.3 pam_tally2</p> <p>2.2.2.4 faillock</p> <p>2.5 Given a scenario, apply the appropriate access controls</p> <p>2.5.1 File permissions</p>

		<p>2.5.1.2 Set user ID (SUID)</p> <p>3.1 Given a scenario, create simple shell scripts to automate common tasks</p> <p>3.1.2 Common script utilities</p> <p>3.1.2.3 find</p>
15.3	Login Blocking	<p>1.4 Given a scenario, configure and use the appropriate processes and services</p> <p>1.4.3 Process management</p> <p>1.4.3.7 pkill</p> <p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.3 Authentication</p> <p>2.1.3.3 Pluggable authentication modules (PAM)</p> <p>4.4 Given a scenario, analyze and troubleshoot user access and file permissions</p> <p>4.4.1 User login issues</p>
15.4	Network Security	<p>1.5 Given a scenario, use the appropriate networking tools or configuration files</p> <p>1.5.3 Network monitoring</p> <p>1.5.3.3 netstat</p> <p>1.6 Given a scenario, build and install software</p>

		<p>1.6.1 Package management</p> <p>1.6.1.1 DNF 1.6.1.2 YUM 1.6.1.4 RPM 1.6.1.5 dpkg 1.6.1.6 Zypp</p> <p>1.7 Given a scenario, manage software configurations</p> <p>1.7.2 Configure kernel options</p> <p>1.7.2.1.1 sysctl 1.7.2.1.2 /etc/sysctl.conf</p> <p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.4 Linux hardening</p> <p>2.1.4.1 Security scanning 2.1.4.5 Disabling/removing insecure services 2.1.4.10 Configuring the host firewall</p> <p>4.2 Given a scenario, analyze and troubleshoot network resource issues</p> <p>4.2.6 Testing remote systems</p> <p>4.2.6.1 Nmap</p>
15.5	OpenSSH	<p>1.5 Given a scenario, use the appropriate networking tools or configuration files</p> <p>1.5.4 Remote networking tools</p> <p>1.5.4.1 Secure Shell (SSH) 1.5.4.6 Secure Copy Protocol (SCP)</p>

		<p>1.5.4.7 SSH File Transfer Protocol (SFTP)</p> <p>1.7 Given a scenario, manage software configurations</p> <p>1.7.3 Configure common system services</p> <p>1.7.3.1 SSH</p> <p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.2 Certificate use cases</p> <p>2.1.2.3 Encryption</p> <p>2.4 Given a scenario, configure and execute remote connectivity for system management</p> <p>2.4.1 SSH</p> <p>2.4.1.1 Configuration files</p> <p>2.4.1.1.1 /etc/ssh/sshd_config</p> <p>2.4.1.1.2 /etc/ssh/ssh_config</p> <p>2.4.1.1.3 ~/.ssh/known_hosts</p> <p>2.4.1.1.5 /etc/ssh/sshd_config</p> <p>2.4.1.1.6 /etc/ssh/ssh_config</p> <p>2.4.1.2 Commands</p>
15.6	SSH Port Tunneling	<p>2.4 Given a scenario, configure and execute remote connectivity for system management</p> <p>2.4.1 SSH</p> <p>2.4.1.3 Tunneling</p> <p>2.4.1.3.1 X11 forwarding</p>

		2.4.1.3.2 Port forwarding
15.7	Security-Enhanced Linux (SELinux)	<p>2.5 Given a scenario, apply the appropriate access controls</p> <p>2.5.2 Security-enhanced Linux (SELinux)</p> <p>2.5.2.1 Context permissions</p> <p>2.5.2.2 Labels</p> <p>2.5.2.3 System booleans</p> <p>2.5.2.4 States</p> <p>2.5.2.4.1 Enforcing</p> <p>2.5.2.4.2 Permissive</p> <p>2.5.2.4.3 Disabled</p> <p>2.5.2.5 Policy types</p> <p>2.5.2.5.1 Targeted</p> <p>2.5.4 Command-line utilities</p> <p>2.5.4.7 setenforce</p> <p>2.5.4.8 getenforce</p> <p>2.5.4.12 setsebool</p> <p>2.5.4.13 getsebool</p> <p>2.5.4.14 chcon</p>
15.8	Application Armor (AppArmor)	<p>2.5 Given a scenario, apply the appropriate access controls</p> <p>2.5.3 AppArmor</p> <p>2.5.3.1 Application permissions</p>
15.9	Public Key Authentication	<p>1.5 Given a scenario, use the appropriate networking tools or configuration files</p> <p>1.5.4 Remote networking tools</p>

		<p>1.5.4.1 Secure Shell (SSH)</p> <p>1.7 Given a scenario, manage software configurations</p> <p>1.7.3 Configure common system services</p> <p>1.7.3.1 SSH</p> <p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.1 Managing public key infrastructure (PKI) certificates</p> <p>2.1.1.1 Public key 2.1.1.2 Private key 2.1.1.3 Self-signed certificate 2.1.1.4 Digital signature 2.1.1.6 Hashing</p> <p>2.4 Given a scenario, configure and execute remote connectivity for system management</p> <p>2.4.1 SSH</p> <p>2.4.1.1.1 /etc/ssh/sshd_config 2.4.1.1.4 ~/.ssh/authorized_keys 2.4.1.2.1 ssh-keygen 2.4.1.2.3 ssh-add</p> <p>3.1 Given a scenario, create simple shell scripts to automate common tasks</p> <p>3.1.1 Shell script elements</p> <p>3.1.1.8.4 >></p>
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15.10	VPN Access and Authentication	<p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.2 Certificate use cases</p> <p>2.1.2.1 Secure Sockets Layer (SSL)/Transport Layer Security (TLS)</p>
15.11	Security Best Practices	<p>2.1 Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.1 Managing public key infrastructure (PKI) certificates</p> <p>2.1.1.1 Public key</p> <p>2.1.2 Certificate use cases</p> <p>2.1.2.2 Certificate authentication</p> <p>2.1.4 Linux hardening</p> <p>2.1.4.5 Disabling/removing insecure services</p>
A.0	TestOut Linux Pro - Practice Exams	
A.1	Prepare for TestOut Linux Pro Certification	
A.2	TestOut Linux Pro Exam Domain Review	
B.0	CompTIA Linux+ XK0-005 - Practice Exams	
B.1	Prepare for CompTIA Linux+ Certification	

B.2	CompTIA Linux+ XK0-005 Domain Review (20 Questions)	
B.3	CompTIA Linux+ XK0-005 Domain Practice (All Questions)	

XK0-005 Objectives to LabSim Section

The TestOut Linux Pro course and certification exam cover the following CompTIA Linux+ XK0-005 objectives:

#	Domain	Module.Section
1.0	System Management	
1.1	Summarize Linux fundamentals <ul style="list-style-type: none"> 1.1.1 Filesystem Hierarchy <ul style="list-style-type: none"> ○ 1.1.1.1 /boot ○ 1.1.1.2 /proc ○ 1.1.1.3 /sys ○ 1.1.1.4 /var ○ 1.1.1.5 /usr ○ 1.1.1.6 /lib ○ 1.1.1.7 /dev ○ 1.1.1.8 /etc ○ 1.1.1.9 /opt ○ 1.1.1.10 /bin ○ 1.1.1.11 /sbin ○ 1.1.1.12 /home ○ 1.1.1.13 /media 	1.1 2.11 4.1, 4.2 5.1, 5.2 8.1, 8.2, 8.3 9.1, 9.3 13.1

	<ul style="list-style-type: none"> ○ 1.1.1.14 /mnt ○ 1.1.1.15 /root ○ 1.1.1.16 /tmp <p>1.1.2 Basic boot process</p> <ul style="list-style-type: none"> ○ 1.1.2.1 Basic input/output system (BIOS) ○ 1.1.2.2 Unified Extensible Firmware ○ 1.1.2.3 Commands <ul style="list-style-type: none"> ○ 1.1.2.3.1 mkinitrd ○ 1.1.2.3.2 grub2-install ○ 1.1.2.3.3 grub2-mkconfig ○ 1.1.2.3.4 grub2-update ○ 1.1.2.3.5 dracut ○ 1.1.2.4 initrd.img ○ 1.1.2.5 vmlinuz ○ 1.1.2.6 Grand Unified Bootloader ○ 1.1.2.7 Boot sources <ul style="list-style-type: none"> ○ 1.1.2.7.1 Preboot eXecution ○ 1.1.2.7.2 Booting from Universal ○ 1.1.2.7.3 Booting from ISO <p>1.1.3 Kernel panic</p> <p>1.1.4 Device types in /dev</p> <ul style="list-style-type: none"> ○ 1.1.4.1 Block devices ○ 1.1.4.2 Character devices ○ 1.1.4.3 Special character devices <ul style="list-style-type: none"> ○ 1.1.4.3.1 /dev/null ○ 1.1.4.3.2 /dev/zero ○ 1.1.4.3.3 /dev/urandom <p>1.1.5 Basic package compilation from source</p> <ul style="list-style-type: none"> ○ 1.1.5.1 ./configure ○ 1.1.5.2 make ○ 1.1.5.3 make install <p>1.1.6 Storage concepts</p> <ul style="list-style-type: none"> ○ 1.1.6.1 File storage ○ 1.1.6.2 Block storage ○ 1.1.6.3 Object storage ○ 1.1.6.4 Partition type <ul style="list-style-type: none"> ○ 1.1.6.4.1 Master boot record (MBR) ○ 1.1.6.4.2 GUID [globally unique identifier] Partition Table (GPT) ○ 1.1.6.5 Filesystem in Userspace (FUSE) 	
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	<ul style="list-style-type: none"> ○ 1.1.6.6 Redundant Array of Independent (or Inexpensive) Disks (RAID) levels ○ 1.1.6.6.1 Striping ○ 1.1.6.6.2 Mirroring ○ 1.1.6.6.3 Parity <p>1.1.7 Listing hardware information</p> <ul style="list-style-type: none"> ○ 1.1.7.1 lspci ○ 1.1.7.2 lsusb ○ 1.1.7.3 dmidecode 	
1.2	<p>Given a scenario, manage files and directories</p> <p>1.2.1 File editing</p> <ul style="list-style-type: none"> ○ 1.2.1.1 sed ○ 1.2.1.2 awk ○ 1.2.1.3 printf ○ 1.2.1.4 nano ○ 1.2.1.5 vi(m) <p>1.2.2 File compression, archiving, and backup</p> <ul style="list-style-type: none"> ○ 1.2.2.1 gzip ○ 1.2.2.2 bzip2 ○ 1.2.2.3 zip ○ 1.2.2.4 tar ○ 1.2.2.5 xz ○ 1.2.2.6 cpio ○ 1.2.2.7 dd <p>1.2.3 File metadata</p> <ul style="list-style-type: none"> ○ 1.2.3.1 stat ○ 1.2.3.2 file <p>1.2.4 Soft and hard links</p> <p>1.2.5 Copying files between systems</p> <ul style="list-style-type: none"> ○ 1.2.5.1 rsync ○ 1.2.5.2 scp ○ 1.2.5.3 nc <p>1.2.6 File and directory operations</p> <ul style="list-style-type: none"> ○ 1.2.6.1 mv ○ 1.2.6.2 cp ○ 1.2.6.3 mkdir 	<p>0.1 2.1, 2.4, 2.8, 2.9, 2.10, 2.13</p> <p>8.10, 8.14</p> <p>15.1</p>

	<ul style="list-style-type: none"> ○ 1.2.6.4 rmdir ○ 1.2.6.5 ls ○ 1.2.6.6 pwd ○ 1.2.6.7 rm ○ 1.2.6.8 cd ○ 1.2.6.9 . ○ 1.2.6.10 .. ○ 1.2.6.11 ~ ○ 1.2.6.12 tree ○ 1.2.6.13 cat ○ 1.2.6.14 touch 	
1.3	<p>Given a scenario, configure and manage storage using the appropriate tools</p> <ul style="list-style-type: none"> 1.3.1 Disk partitioning <ul style="list-style-type: none"> ○ 1.3.1.1 Commands <ul style="list-style-type: none"> ○ 1.3.1.1.1 fdisk ○ 1.3.1.1.2 parted ○ 1.3.1.1.3 partprobe 1.3.2 Mounting local and remote devices <ul style="list-style-type: none"> ○ 1.3.2.1 systemd.mount ○ 1.3.2.2 /etc/fstab ○ 1.3.2.3 mount ○ 1.3.2.4 Linux Unified Key Setup (LUKS) ○ 1.3.2.5 External devices 1.3.3 Filesystem management <ul style="list-style-type: none"> ○ 1.3.3.1 XFS tools ○ 1.3.3.2 Ext4 tools ○ 1.3.3.3 Btrfs tools 1.3.4 Monitoring storage space and disk usage <ul style="list-style-type: none"> ○ 1.3.4.1 df ○ 1.3.4.2 du 1.3.5 Creating and modifying volumes using Logical Volume Manager (LVM) <ul style="list-style-type: none"> ○ 1.3.5.1 Commands <ul style="list-style-type: none"> ○ 1.3.5.1.1 pvs ○ 1.3.5.1.2 vgs ○ 1.3.5.1.3 lvs ○ 1.3.5.1.4 lvchange 	<p>3.1, 3.2 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.15</p>

	<ul style="list-style-type: none"> ○ 1.3.5.1.5 lvcreate ○ 1.3.5.1.6 vgcreate ○ 1.3.5.1.7 lvresize ○ 1.3.5.1.8 pvcreate ○ 1.3.5.1.9 vgextend <p>1.3.6 Inspecting RAID implementations</p> <ul style="list-style-type: none"> ○ 1.3.6.1 mdadm ○ 1.3.6.2 /proc/mdstat <p>1.3.7 Storage area network (SAN)/network-attached storage (NAS)</p> <ul style="list-style-type: none"> ○ 1.3.7.1 multipathd ○ 1.3.7.2 Network filesystems ○ 1.3.7.2.1 Network File System (NFS) ○ 1.3.7.2.2 Server Message Block (SMB)/Common Internet File System (CIFS) <p>1.3.8 Storage hardware</p> <ul style="list-style-type: none"> ○ 1.3.8.1 lsscsi ○ 1.3.8.2 lsblk ○ 1.3.8.3 blkid ○ 1.3.8.4 fcstat 	
1.4	<p>Given a scenario, configure and use the appropriate processes and services</p> <p>1.4.1 System services</p> <ul style="list-style-type: none"> ○ 1.4.1.1 systemctl ○ 1.4.1.1.1 stop ○ 1.4.1.1.2 start ○ 1.4.1.1.3 restart ○ 1.4.1.1.4 status ○ 1.4.1.1.5 enable ○ 1.4.1.1.6 disable ○ 1.4.1.1.7 mask <p>1.4.2 Scheduling services</p> <ul style="list-style-type: none"> ○ 1.4.2.1 cron ○ 1.4.2.2 crontab ○ 1.4.2.3 at <p>1.4.3 Process management</p> <ul style="list-style-type: none"> ○ 1.4.3.1 Kill signals ○ 1.4.3.1.1 SIGTERM 	<p>4.4</p> <p>5.1, 5.4</p> <p>8.7</p> <p>10.1, 10.2, 10.3</p> <p>11.2</p> <p>12.2</p> <p>15.3</p>

	<ul style="list-style-type: none"> ○ 1.4.3.1.2 SIGKILL ○ 1.4.3.1.3 SIGHUP ○ 1.4.3.2 Listing processes and open files ○ 1.4.3.2.1 top ○ 1.4.3.2.2 ps ○ 1.4.3.2.3 lsof ○ 1.4.3.2.4 htop ○ 1.4.3.3 Setting priorities ○ 1.4.3.3.1 nice ○ 1.4.3.3.2 renice ○ 1.4.3.4 Process states ○ 1.4.3.4.1 Zombie ○ 1.4.3.4.2 Sleeping ○ 1.4.3.4.3 Running ○ 1.4.3.4.4 Stopped ○ 1.4.3.5 Job control ○ 1.4.3.5.1 bg ○ 1.4.3.5.2 fg ○ 1.4.3.5.3 jobs ○ 1.4.3.5.4 Ctrl+Z ○ 1.4.3.5.5 Ctrl+C ○ 1.4.3.5.6 Ctrl+D ○ 1.4.3.6 pgrep ○ 1.4.3.7 pkill ○ 1.4.3.8 pidof 	
1.5	<p>Given a scenario, use the appropriate networking tools or configuration files</p> <p>1.5.1 Interface management</p> <ul style="list-style-type: none"> ○ 1.5.1.1 iproute2 tools ○ 1.5.1.1.1 ip ○ 1.5.1.1.2 ss ○ 1.5.1.2 NetworkManager ○ 1.5.1.2.1 nmcli ○ 1.5.1.3 net-tools ○ 1.5.1.3.1 ifconfig ○ 1.5.1.3.2 ifcfg ○ 1.5.1.3.3 hostname 	<p>1.1 6.4</p> <p>12.1, 12.2, 12.3, 12.5, 12.6, 12.8</p> <p>15.4, 15.5, 15.9</p>

	<ul style="list-style-type: none"> ○ 1.5.1.3.4 arp ○ 1.5.1.3.5 route ○ 1.5.1.4 /etc/sysconfig/network-scripts/ <p>1.5.2 Name resolution</p> <ul style="list-style-type: none"> ○ 1.5.2.1 nsswitch ○ 1.5.2.2 /etc/resolv.conf ○ 1.5.2.3 systemd ○ 1.5.2.3.1 hostnamectl ○ 1.5.2.3.2 resolvectl ○ 1.5.2.4 Bind-utils ○ 1.5.2.4.1 dig ○ 1.5.2.4.2 nslookup ○ 1.5.2.4.3 host ○ 1.5.2.5 WHOIS <p>1.5.3 Network monitoring</p> <ul style="list-style-type: none"> ○ 1.5.3.1 tcpdump ○ 1.5.3.2 wireshark/tshark ○ 1.5.3.3 netstat ○ 1.5.3.4 traceroute ○ 1.5.3.5 ping ○ 1.5.3.6 mtr <p>1.5.4 Remote networking tools</p> <ul style="list-style-type: none"> ○ 1.5.4.1 Secure Shell (SSH) ○ 1.5.4.2 cURL ○ 1.5.4.3 wget ○ 1.5.4.4 nc ○ 1.5.4.5 rsync ○ 1.5.4.6 Secure Copy Protocol (SCP) ○ 1.5.4.7 SSH File Transfer Protocol (SFTP) 	
1.6	<p>Given a scenario, build and install software</p> <p>1.6.1 Package management</p> <ul style="list-style-type: none"> ○ 1.6.1.1 DNF ○ 1.6.1.2 YUM ○ 1.6.1.3 APT ○ 1.6.1.4 RPM ○ 1.6.1.5 dpkg 	<p>1.1</p> <p>3.1, 3.2</p> <p>6.1, 6.2, 6.3</p> <p>13.3</p> <p>15.4</p>

	<ul style="list-style-type: none"> ○ 1.6.1.6 Zypp <p>1.6.2 Sandboxed applications</p> <ul style="list-style-type: none"> ○ 1.6.2.1 snapd ○ 1.6.2.2 Flatpak ○ 1.6.2.3 Applmage <p>1.6.3 System updates</p> <ul style="list-style-type: none"> ○ 1.6.1.1 Kernel updates ○ 1.6.1.2 Package updates 	
1.7	<p>Given a scenario, manage software configurations</p> <p>1.7.1 Updating configuration files</p> <ul style="list-style-type: none"> ○ 1.7.1.1 Procedures ○ 1.7.1.1.1 Restart service ○ 1.7.1.1.2 Reload service ○ 1.7.1.2 rpmnew ○ 1.7.1.3 rpmsave ○ 1.7.1.4 Repository configuration files ○ 1.7.1.4.1 /etc/apt.conf ○ 1.7.1.4.2 /etc/yum.conf ○ 1.7.1.4.3 /etc/dnf/dnf.conf ○ 1.7.1.4.4 /etc/yum.repo.d ○ 1.7.1.4.5 /etc/apt/sources.list.d <p>1.7.2 Configure kernel options</p> <ul style="list-style-type: none"> ○ 1.7.2.1 Parameters ○ 1.7.2.1.1 sysctl ○ 1.7.2.1.2 /etc/sysctl.conf ○ 1.7.2.2 Modules ○ 1.7.2.2.1 lsmod ○ 1.7.2.2.2 imsmmod ○ 1.7.2.2.3 rmmod ○ 1.7.2.2.4 insmod ○ 1.7.2.2.5 modprobe ○ 1.7.2.2.6 modinfo <p>1.7.3 Configure common system services</p> <ul style="list-style-type: none"> ○ 1.7.3.1 SSH ○ 1.7.3.2 Network Time Protocol (NTP) ○ 1.7.3.3 Syslog 	<p>1.1</p> <p>3.3</p> <p>4.4</p> <p>6.2, 6.4</p> <p>9.1, 9.2</p> <p>10.4</p> <p>11.2</p> <p>12.2</p> <p>15.4, 15.5, 15.9</p>

	<ul style="list-style-type: none"> ○ 1.7.3.4 chrony <p>1.7.4 Localization</p> <ul style="list-style-type: none"> ○ 1.7.4.1 timedatectl ○ 1.7.4.2 localectl 	
2.0	Security	
2.1	<p>Summarize the purpose and use of security best practices in a Linux environment</p> <p>2.1.1 Managing public key infrastructure (PKI) certificates</p> <ul style="list-style-type: none"> ○ 2.1.1.1 Public key ○ 2.1.1.2 Private key ○ 2.1.1.3 Self-signed certificate ○ 2.1.1.4 Digital signature ○ 2.1.1.5 Wildcard certificate ○ 2.1.1.6 Hashing ○ 2.1.1.7 Certificate authorities <p>2.1.2 Certificate use cases</p> <ul style="list-style-type: none"> ○ 2.1.2.1 Secure Sockets Layer (SSL)/Transport Layer Security (TLS) ○ 2.1.2.2 Certificate authentication ○ 2.1.2.3 Encryption <p>2.1.3 Authentication</p> <ul style="list-style-type: none"> ○ 2.1.3.1 Tokens ○ 2.1.3.2 Multifactor authentication (MFA) ○ 2.1.3.3 Pluggable authentication modules (PAM) ○ 2.1.3.4 System Security Services Daemon (SSSD) ○ 2.1.3.5 Lightweight Directory Access Protocol (LDAP) ○ 2.1.3.6 Single sign-on (SSO) <p>2.1.4 Linux hardening</p> <ul style="list-style-type: none"> ○ 2.1.4.1 Security scanning ○ 2.1.4.2 Secure boot <ul style="list-style-type: none"> ○ 2.1.4.2.1 UEFI ○ 2.1.4.3 System logging configurations ○ 2.1.4.4 Setting default umask ○ 2.1.4.5 Disabling/removing insecure services ○ 2.1.4.6 Enforcing password strength ○ 2.1.4.7 Removing unused packages 	<p>1.1</p> <p>3.1</p> <p>4.1</p> <p>7.4</p> <p>8.11</p> <p>11.1</p> <p>15.2, 15.3, 15.4, 15.5, 15.9, 15.10, 15.11</p>

	<ul style="list-style-type: none"> ○ 2.1.4.8 Tuning kernel parameters ○ 2.1.4.9 Securing service accounts ○ 2.1.4.10 Configuring the host firewall 	
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