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## LPIC 2-201 - Linux Network Professional (part 1)

## Duration: 5 Days Course Code: LIN201

#### Overview:

LPIC-2 is the second certification in the multi-level professional certification program of the Linux Professional Institute (LPI). The LPIC-2 will validate the candidate's ability to administer small to medium–sized mixed networks. LPIC-2 exam 201 topicsCapacity PlanningLinux KernelSystem StartupFilesystem and DevicesAdvanced Storage Device AdministrationNetworking ConfigurationSystem Maintenance

## **Target Audience:**

Linux Professionals who want to prepare for the LPIC 201 exam.

## **Objectives:**

- To become LPIC-2 certified the candidate must be able to:
- perform advanced system administration, including common tasks regarding the Linux kernel, system startup and maintenance;
- perform advanced Management of block storage and file systems as well as advanced networking and authentication and system security, including firewall and VPN;
- install and configure fundamental network services, including DHCP, DNS, SSH, Web servers, file servers using FTP, NFS and Samba, email delivery; and
- supervise assistants and advise management on automation and purchases.

#### Prerequisites:

LIN101

## **Testing and Certification**

This course prepares for the LPIC-2 (201-450) exam.

#### Follow-on-Courses:

LIN202

## Content:

Topic 200: Capacity Planning

200.1 Measure and Troubleshoot Resource Usage

Description: Candidates should be able to measure hardware resource and network bandwidth, identify and troubleshoot resource problems.

#### Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
   Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init

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Linux Standard Base Specification (LSB)

#### Key Knowledge Areas:

- Measure CPU usage
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- /proc filesystem
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- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell

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- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
  - daemon/service initialisation and setup

## Key Knowledge Areas:

- Measure CPU usage
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- Graph the trend of capacity usage

Kernel 2.6.x/3.x make targets

Module configuration files

Awareness of dracut

Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti

Customize the current kernel configuration.

Build a new kernel and appropriate kernel

Ensure that the boot manager can locate

Install a new kernel and any modules.

the new kernel and associated files.

Use DKMS to compile kernel modules.

information about the currently running

Manually load and unload kernel modules

Configure the system to load modules by

names other than their file name.

Content of /, /boot/ , and /lib/modules/

about the available hardware

GRUB version 2 and Legacy

hardware initialisation and setup

Tools and utilities to analyze information

Linux Standard Base Specification (LSB)

boot loader start and hand off to kernel

daemon/service initialisation and setup

Know the different boot loader install

locations on a hard disk or removable

Overwrite standard boot loader options

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Determine when modules can be unloadedDetermine what parameters a module

Use command-line utilities to get

kernel and kernel modules

- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
   Kernel Makefiles

modules.

accepts

udev rules

Systemd

SysV init

grub shell

device.

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BIOS and UEFI

NVMe booting

kernel loading

/proc filesystem

- BIOS and UEFI
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- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
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- hardware initialisation and setup
- daemon/service initialisation and setupKnow the different boot loader install
- locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
   Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups

- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces

- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
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- Configuring basic access to wireless networks
- Utilities to manipulate routing tablesUtilities to configure and manipulate
- ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic

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Location and content of access restriction

and using boot loader shells.

- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
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- The concept of the fstab configuration
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- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities

Drives including AHCI and NVMe

system resources (e.g. interrupts)

Tools and utilities for iSCSI

protocols (AoE, FCoE)

Tools in the LVM suite

and physical volumes

Activating volume groups

networks

traffic

files

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network devices

ethernet network interfaces

ethernet network interfaces

uses

 Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
 Tools and utilities to configure Solid State

Tools and utilities to manipulate or analyse

Awareness of sdparm command and its

Awareness of SAN, including relevant

removing logical volumes, volume groups,

Resizing, renaming, creating, and

Creating and maintaining snapshots

Utilities to configure and manipulate

Configuring basic access to wireless

Utilities to manipulate routing tables

Utilities to configure and manipulate

Utilities to analyze the status of the

Utilities to monitor and analyze the TCP/IP

Location and content of access restriction

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Utilities to configure and manipulate

Utilities to manage routing tables

ethernet network interfaces

Utilities to list network states.

- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- ?Automate communication with users through logon messages
- Inform active users of system maintenance

200.2 Predict Future Resource Needs

Description: Candidates should be able to monitor resource usage to predict future resource needs.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O

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- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as

- files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
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- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

202.3 Alternate Bootloaders

Description: Candidates should be aware of other bootloaders and their major features.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O

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- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and

- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
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- Perform partial and manual backups.
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- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

Topic 205: Network Configuration

205.1 Basic networking configuration

Description: Candidates should be able to configure a network device to be able to connect to a local, wired or wireless, and a wide-area network. This objective includes being able to communicate between various subnets within a single network including both IPv4 and IPv6 networks.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O

likely problems

networking

configuration

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Measure firewalling and routing throughput

Match / correlate system symptoms with

Use monitoring and measurement tools to

Observe growth rate of capacity usage

Awareness of monitoring solutions such as

Kernel 2.6.x, 3.x and 4.x documentation

Icinga2, Nagios, collectd, MRTG and Cacti

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Graph the trend of capacity usage

Map client bandwidth usage

Estimate throughput and identify

bottlenecks in a system including

monitor IT infrastructure usage.

Predict capacity break point of a

Icinga2, Nagios, collectd, MRTG and Cacti

- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.Build a new kernel and appropriate kernel
- modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloadedDetermine what parameters a module
- accepts Configure the system to load modules by
- names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
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- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS

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- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities

#### Cacti

- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
   Kernel Makefiles
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- Awareness of ZFS

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- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets

Module configuration files

Awareness of dracut

accepts

udev rules

Svstemd

SysV init

BIOS and UEFI

NVMe booting

kernel loading

grub shell

device.

modes.

UFFI

/proc filesvstem

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Use DKMS to compile kernel modules.

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Manually load and unload kernel modules

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Determine what parameters a module

Content of /, /boot/ , and /lib/modules/

about the available hardware

GRUB version 2 and Legacy

hardware initialisation and setup

and using boot loader shells.

Tools and utilities to analyze information

Linux Standard Base Specification (LSB)

boot loader start and hand off to kernel

daemon/service initialisation and setup

locations on a hard disk or removable

Overwrite standard boot loader options

Use systemd rescue and emergency

SYSLINUX, ISOLINUX, PXELINUX
 Understanding of PXE for both BIOS and

Awareness of systemd-boot and U-Boot

Use of UUIDs for identifying and mounting

Understanding of systemd mount units

Tools and utilities to perform basic Btrfs

operations, including subvolumes and

Tools and utilities to manipulate XFS

Understanding of automount units

UDF and ISO9660 tools and utilities

Awareness of other CD-ROM filesystems

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Tools and utilities to manipulate and ext2,

The concept of the fstab configuration

Tools and utilities for handling swap

partitions and files

file systems

ext3 and ext4

snapshots

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Awareness of ZFS
 autofs configuration files

Know the different boot loader install

Configure the system to load modules by names other than their file name.

Use command-line utilities to get

kernel and kernel modules

- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
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- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
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- System initialization files and their contents (SysV init process)
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- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.

- autofs configuration files
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#### (HFS)

- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
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- Utilities to list network states.
- Utilities to gain information about the network configuration

recognized and used hardware devices

Awareness of NetworkManager and its

Methods of information about the

System initialization files and their

impact on network configuration

Unpack source code using common

compression and archive utilities

compile programs

be include in backups

BackupPC

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Understand basics of invoking make to

Apply parameters to a configure script

Know where sources are stored by default

Knowledge about directories that have to

Awareness of network backup solutions

such as Amanda, Bacula, Bareos and

Knowledge of the benefits and drawbacks

Perform partial and manual backups.

Verify the integrity of backup files.

Partially or fully restore backups.

of tapes, CDR, disk or other backup media

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contents (SysV init process)

- Automate communication with users through logon messages
- Inform active users of system maintenance

Topic 201: Linux Kernel

201.1 Kernel Components

Description: Candidates should be able to utilize kernel components that are necessary to specific hardware, hardware drivers, system resources and requirements. This objective includes implementing different types of kernel images, identifying stable and development kernels and patches, as well as using kernel modules.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as lcinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem

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- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information

- BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

Topic 203: Filesystem and Devices

203.1 Operating the Linux filesystem

Description: Candidates should be able to properly configure and navigate the standard Linux filesystem. This objective includes configuring and mounting various filesystem types.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
   /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut

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Use command-line utilities to get information about the currently running kernel and kernel modules

- Automate communication with users through logon messages
- Inform active users of system maintenance

205.2 Advanced Network Configuration and Troubleshooting

Description: Candidates should be able to configure a network device to implement various network authentication schemes. This objective includes configuring a multi-homed network device and resolving communication problems.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as lcinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.

Use DKMS to compile kernel modules.

information about the currently running

Manually load and unload kernel modules

Configure the system to load modules by

Determine what parameters a module

names other than their file name.

about the available hardware

Content of /, /boot/ , and /lib/modules/

Tools and utilities to analyze information

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Determine when modules can be unloaded

Use command-line utilities to get

kernel and kernel modules

Module configuration files

Awareness of dracut

accepts

udev rules

Systemd

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/proc filesystem

about the available hardware

- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
   Tools and utilities to configure DMA for IDE
- devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups

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 Utilities to configure and manipulate ethernet network interfaces

- Manually load and unload kernel modules
- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
   Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)

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- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell

UFFI

- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
   SYSLINUX, ISOLINUX, PXELINUX

Understanding of PXE for both BIOS and

Awareness of systemd-boot and U-Boot

Use of UUIDs for identifying and mounting

Understanding of systemd mount units

Tools and utilities to manipulate and ext2,

Tools and utilities to perform basic Btrfs

operations, including subvolumes and

Tools and utilities to manipulate XFS

Understanding of automount units

Awareness of CD-ROM filesystem

Software raid configuration files and

Drives including AHCI and NVMe

system resources (e.g. interrupts)

Tools and utilities for iSCSI

protocols (AoE, FCoE)

Tools in the LVM suite

and physical volumes

Activating volume groups

ethernet network interfaces

Awareness of sdparm command and its

Awareness of SAN, including relevant

removing logical volumes, volume groups,

Resizing, renaming, creating, and

Creating and maintaining snapshots

Utilities to configure and manipulate

Configuring basic access to wireless

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Tools and utilities to configure DMA for

IDE devices including ATAPI and SATA

Tools and utilities to configure Solid State

Tools and utilities to manipulate or analyse

UDF and ISO9660 tools and utilities

Awareness of other CD-ROM filesystems

extensions (Joliet, Rock Ridge, El Torito)

Basic feature knowledge of data encryption

The concept of the fstab configuration

Tools and utilities for handling swap

partitions and files

file systems

ext3 and ext4

snapshots

(HFS)

utilities

uses

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Awareness of ZFS

(dm-crypt / LUKS)

autofs configuration files

- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

201.2 Compiling a kernel

Description: Candidates should be able to properly configure a kernel to include or disable specific features of the Linux kernel as necessary. This objective includes compiling and recompiling the Linux kernel as needed, updating and noting changes in a new kernel, creating an initrd image and installing new kernels.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O

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- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with

- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
   Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

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203.2 Maintaining a Linux filesystem?

Description: Candidates should be able to properly maintain a Linux filesystem using system utilities. This objective includes networks

- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

205.3 Troubleshooting Network Issues

Description: Candidates should be able to identify and correct common network setup issues, to include knowledge of locations for basic configuration files and commands.

Measure firewalling and routing throughput

Use monitoring and measurement tools to

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Match / correlate system symptoms with

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage

Map client bandwidth usage

Estimate throughput and identify

bottlenecks in a system including

Measure disk I/O
 Measure network I/O

likely problems

networking

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likely problems

- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as lcinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
   Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
- kernel loading

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- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units

manipulating standard filesystems and monitoring SMART devices.

#### Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
  Measure firewalling and routing
- throughput Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell

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- boot loader start and hand off to kernel
- kernel loading

monitor IT infrastructure usage.

- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as lcinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/

modules.

accepts

udev rules

Systemd

SysV init

arub shell

device.

modes.

UEFI

partitions and files

file systems

ext3 and ext4

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BIOS and UEFI

NVMe booting

kernel loading

/proc filesystem

- Kernel Makefiles
- Kernel 2.6.x/3.x make targets

Module configuration files

Awareness of dracut

Customize the current kernel configuration.Build a new kernel and appropriate kernel

Install a new kernel and any modules.

the new kernel and associated files.

Use DKMS to compile kernel modules.

information about the currently running

Manually load and unload kernel modules

Configure the system to load modules by

Determine what parameters a module

names other than their file name.

Content of /, /boot/ , and /lib/modules/

about the available hardware

GRUB version 2 and Legacy

hardware initialisation and setup

and using boot loader shells.

Tools and utilities to analyze information

Linux Standard Base Specification (LSB)

boot loader start and hand off to kernel

daemon/service initialisation and setup

locations on a hard disk or removable

Overwrite standard boot loader options

Use systemd rescue and emergency

SYSLINUX, ISOLINUX, PXELINUX

Understanding of PXE for both BIOS and

Awareness of systemd-boot and U-Boot

Use of UUIDs for identifying and mounting

Tools and utilities to manipulate and ext2,

Tools and utilities to perform basic Btrfs

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Understanding of systemd mount units

The concept of the fstab configurationTools and utilities for handling swap

Know the different boot loader install

Determine when modules can be unloaded

Use command-line utilities to get

kernel and kernel modules

Ensure that the boot manager can locate

- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default

- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the

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operations, including subvolumes and snapshots

- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
   Awareness of other CD-ROM filesystems
- (HFS) Awareness of CD-ROM filesystem
- extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups

network devices

traffic

files

- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
   Utilities to manipulate routing tables

Utilities to configure and manipulate ethernet network interfaces

Utilities to analyze the status of the

Utilities to monitor and analyze the TCP/IP

Location and content of access restriction

Utilities to configure and manipulate

Utilities to gain information about the

recognized and used hardware devices

Awareness of NetworkManager and its

Understand basics of invoking make to

Apply parameters to a configure script

Know where sources are stored by default

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Knowledge about directories that have to

ethernet network interfaces

Utilities to list network states.

network configuration

compile programs

be include in backups

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Utilities to manage routing tables

Methods of information about the

System initialization files and their

impact on network configuration

Unpack source code using common

compression and archive utilities

contents (SysV init process)

- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- ?Automate communication with users through logon messages
- Inform active users of system maintenance

201.3 Kernel runtime management and troubleshooting

Description: Candidates should be able to manage and/or query a 2.6.x, 3.x or 4.x kernel and its loadable modules. Candidates should be able to identify and correct common boot and run time issues. Candidates should understand device detection and management using udev. This objective includes troubleshooting udev rules.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
   Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut

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- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules

TCP/IP traffic

- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

203.3 Creating and configuring filesystem options

Description: Candidates should be able to configure automount filesystems using AutoFS. This objective includes configuring automount for network and device filesystems. Also included is creating filesystems for devices such as CD-ROMs and a basic feature knowledge of encrypted filesystems.

#### Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O

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- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including

- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

Topic 206: System Maintenance

206.1 Make and install programs from source

Description: Candidates should be able to build and install an executable program from source. This objective includes being able to unpack a file of sources.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as lcinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles

Awareness of dracut

accepts

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- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
   Module configuration files

Use DKMS to compile kernel modules.

information about the currently running

Manually load and unload kernel modules

Determine what parameters a module

Determine when modules can be unloaded

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Use command-line utilities to get

kernel and kernel modules

- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI

 Awareness of SAN, including relevant protocols (AoE, FCoE)

- networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
   Systemd
- SvsV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
   kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configurationTools and utilities for handling swap
- partitions and files
  Use of UUIDs for identifying and

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- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)

boot loader start and hand off to kernel

daemon/service initialisation and setup

locations on a hard disk or removable

Overwrite standard boot loader options

Use systemd rescue and emergency

SYSLINUX, ISOLINUX, PXELINUX
 Understanding of PXE for both BIOS and

Awareness of systemd-boot and U-Boot

Use of UUIDs for identifying and mounting

Tools and utilities to manipulate and ext2,

Tools and utilities to perform basic Btrfs

operations, including subvolumes and

Tools and utilities to manipulate XFS

Understanding of automount units

Awareness of CD-ROM filesystem

Software raid configuration files and

Drives including AHCI and NVMe

system resources (e.g. interrupts) Awareness of sdparm command and its

Awareness of SAN, including relevant

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Tools and utilities for iSCSI

protocols (AoE, FCoE)

Tools in the LVM suite

Tools and utilities to configure DMA for

IDE devices including ATAPI and SATA

Tools and utilities to configure Solid State

Tools and utilities to manipulate or analyse

UDF and ISO9660 tools and utilities

Awareness of other CD-ROM filesystems

extensions (Joliet, Rock Ridge, El Torito)

Basic feature knowledge of data encryption

Understanding of systemd mount units

The concept of the fstab configuration

Tools and utilities for handling swap

partitions and files

file systems

ext3 and ext4

snapshots

(HFS)

utilities

uses

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Awareness of ZES

(dm-crypt / LUKS)

autofs configuration files

Know the different boot loader install

- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy

hardware initialisation and setup

and using boot loader shells.

grub shell

device

modes

UFFI

kernel loading

- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance
- Topic 202: System Startup

202.1 Customizing SysV-init system startup

Description: Candidates should be able to query and modify the behaviour of system services at various targets / run levels. A thorough understanding of the systemd, SysV Init and the Linux boot process is required. This objective includes interacting with systemd targets and SysV init run levels.

- mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
   Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities

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- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

Description: Candidates should be able to use

Measure firewalling and routing throughput

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system tools to back up important system

206.2 Backup operations

Key Knowledge Areas:

Measure CPU usage

Measure disk I/O

Measure memory usage

Measure network I/O

data.

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Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
   Predict capacity break point of a
- configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloaded
   Determine what parameters a module
- accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell

LIN201

- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.

- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

Topic 204: Advanced Storage Device Administration

204.1 Configuring RAID

Description: Candidates should be able to configure and implement software RAID. This objective includes using and configuring RAID 0, 1 and 5.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles

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- Kernel 2.6.x/3.x make targets
   Customize the current kernel
- configuration.
- Build a new kernel and appropriate kernel modules.

- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as lcinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
   Build a new kernel and appropriate kernel modules
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.

information about the currently running

Determine what parameters a module

names other than their file name.

about the available hardware

GRUB version 2 and Legacy

hardware initialisation and setup

Content of /. /boot/ . and /lib/modules/

Tools and utilities to analyze information

Linux Standard Base Specification (LSB)

boot loader start and hand off to kernel

daemon/service initialisation and setup

locations on a hard disk or removable

Overwrite standard boot loader options and using boot loader shells.

Use systemd rescue and emergency

SYSLINUX, ISOLINUX, PXELINUX

Understanding of PXE for both BIOS and

Awareness of systemd-boot and U-Boot

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The concept of the fstab configuration

Tools and utilities for handling swap

Know the different boot loader install

Configure the system to load modules by

Manually load and unload kernel modules

Determine when modules can be unloaded

Use command-line utilities to get

kernel and kernel modules

Awareness of dracut

accepts

udev rules

Systemd

SysV init

BIOS and UEFI

NVMe booting

kernel loading

grub shell

device.

modes

UEFI

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/proc filesystem

- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.

- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices

- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
   Determine when modules can be
- unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
   Tools and utilities to analyze information
- about the available hardware
- Svstemd
- SvsV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- grub shell
- boot loader start and hand off to kernel
   kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device.
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UEFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS

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- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
   Basic feature knowledge of data encryption (dm-crypt / LUKS)

partitions and files

- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- Awareness of ZFS
- autofs configuration files
- Understanding of automount units
- UDF and ISO9660 tools and utilities
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses

Awareness of SAN, including relevant

removing logical volumes, volume groups,

Resizing, renaming, creating, and

Creating and maintaining snapshots

Utilities to configure and manipulate

Utilities to manipulate routing tables

Utilities to configure and manipulate

Utilities to analyze the status of the

Utilities to monitor and analyze the TCP/IP

Location and content of access restriction

Utilities to configure and manipulate

Utilities to gain information about the

System initialization files and their

impact on network configuration

contents (SysV init process)

recognized and used hardware devices

Awareness of NetworkManager and its

Unpack source code using common

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ethernet network interfaces

Utilities to list network states.

network configuration Methods of information about the

Utilities to manage routing tables

Tools and utilities for iSCSI

protocols (AoE, FCoE)

Tools in the LVM suite

and physical volumes

Activating volume groups

networks

traffic

files

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ethernet network interfaces
Configuring basic access to wireless

ethernet network interfaces

network devices

- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

202.2 System Recovery

Description: Candidates should be able to properly manipulate a Linux system during both the boot process and during recovery mode. This objective includes using both the init utility and init-related kernel options. Candidates should be able to determine the cause of errors in loading and usage of bootloaders. GRUB version 2 and GRUB Legacy are the bootloaders of interest. Both BIOS and UEFI systems are covered.

- Software raid configuration files and utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI
- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
   Know where sources are stored by
- defaultKnowledge about directories that have to
- be include in backups
   Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages

compression and archive utilities

- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
  - Knowledge about directories that have to be include in backups
  - Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
  - Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
  - Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- Automate communication with users through logon messages
- Inform active users of system maintenance

206.3 Notify users on system-related issues

Description: Candidates should be able to notify the users about current issues related to the system.

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as lcinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules

Inform active users of system maintenance

204.2 Adjusting Storage Device Access

Description: Candidates should be able to configure kernel options to support various drives. This objective includes software tools to view ; modify hard disk settings including iSCSI devices

Key Knowledge Areas:

- Measure CPU usage
- Measure memory usage
- Measure disk I/O
- Measure network I/O
- Measure firewalling and routing throughput
- Map client bandwidth usage
- Match / correlate system symptoms with likely problems
- Estimate throughput and identify bottlenecks in a system including networking
- Use monitoring and measurement tools to monitor IT infrastructure usage.
- Predict capacity break point of a configuration
- Observe growth rate of capacity usage
- Graph the trend of capacity usage
- Awareness of monitoring solutions such as Icinga2, Nagios, collectd, MRTG and Cacti
- Kernel 2.6.x, 3.x and 4.x documentation
- /usr/src/linux/
- Kernel Makefiles
- Kernel 2.6.x/3.x make targets
- Customize the current kernel configuration.
- Build a new kernel and appropriate kernel modules.
- Install a new kernel and any modules.
- Ensure that the boot manager can locate the new kernel and associated files.
- Module configuration files
- Use DKMS to compile kernel modules.
- Awareness of dracut
- Use command-line utilities to get information about the currently running kernel and kernel modules
- Manually load and unload kernel modules
- Determine when modules can be unloaded
- Determine what parameters a module accepts
- Configure the system to load modules by names other than their file name.
- /proc filesystem
- Content of /, /boot/ , and /lib/modules/
- Tools and utilities to analyze information about the available hardware
- udev rules

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- /proc filesystem
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- udev rules
- Systemd
- SysV init
- Linux Standard Base Specification (LSB)
- BIOS and UEFI
- NVMe booting
- GRUB version 2 and Legacy
- arub shell
- boot loader start and hand off to kernel
- kernel loading
- hardware initialisation and setup
- daemon/service initialisation and setup
- Know the different boot loader install locations on a hard disk or removable device
- Overwrite standard boot loader options and using boot loader shells.
- Use systemd rescue and emergency modes.
- SYSLINUX, ISOLINUX, PXELINUX
- Understanding of PXE for both BIOS and UFFI
- Awareness of systemd-boot and U-Boot
- The concept of the fstab configuration
- Tools and utilities for handling swap partitions and files
- Use of UUIDs for identifying and mounting file systems
- Understanding of systemd mount units
- Tools and utilities to manipulate and ext2, ext3 and ext4
- Tools and utilities to perform basic Btrfs operations, including subvolumes and snapshots
- Tools and utilities to manipulate XFS
- autofs configuration files
- Understanding of automount units
- Awareness of other CD-ROM filesystems (HFS)
- Awareness of CD-ROM filesystem extensions (Joliet, Rock Ridge, El Torito)
- Basic feature knowledge of data encryption (dm-crypt / LUKS)
- utilities
- Tools and utilities to configure DMA for IDE devices including ATAPI and SATA
- Tools and utilities to configure Solid State Drives including AHCI and NVMe
- Tools and utilities to manipulate or analyse system resources (e.g. interrupts)
- Awareness of sdparm command and its uses
- Tools and utilities for iSCSI

- Awareness of ZFS

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- Awareness of SAN, including relevant protocols (AoE, FCoE)
- Tools in the LVM suite
- Resizing, renaming, creating, and removing logical volumes, volume groups, and physical volumes
- Creating and maintaining snapshotsActivating volume groups
- Utilities to configure and manipulate

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- Tools in the LVM suite
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- Creating and maintaining snapshots
- Activating volume groups
- Utilities to configure and manipulate ethernet network interfaces
- Configuring basic access to wireless networks
- Utilities to manipulate routing tables
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to analyze the status of the network devices
- Utilities to monitor and analyze the TCP/IP traffic
- Location and content of access restriction files
- Utilities to configure and manipulate ethernet network interfaces
- Utilities to manage routing tables
- Utilities to list network states.
- Utilities to gain information about the network configuration
- Methods of information about the recognized and used hardware devices
- System initialization files and their contents (SysV init process)
- Awareness of NetworkManager and its impact on network configuration
- Unpack source code using common compression and archive utilities
- Understand basics of invoking make to compile programs
- Apply parameters to a configure script
- Know where sources are stored by default
- Knowledge about directories that have to be include in backups
- Awareness of network backup solutions such as Amanda, Bacula, Bareos and BackupPC
- Knowledge of the benefits and drawbacks of tapes, CDR, disk or other backup media
- Perform partial and manual backups.
- Verify the integrity of backup files.
- Partially or fully restore backups.
- ?Automate communication with users through logon messages
- Inform active users of system maintenance

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204.3 Logical Volume Manager

Description: Candidates should be able to create and remove logical volumes, volume groups, and physical volumes. This objective includes snapshots and resizing logical volumes.

## Further Information:

For More information, or to book your course, please call us on 00 966 92000 9278 training@globalknowledge.com.sa www.globalknowledge.com/en-sa/

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