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# LCE500 - Course Presentation

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  - Prerequisites
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## Prerequisites

### Hardware

- A computer running either MacOS, Linux, Windows™ or Solaris™ ,
- QWERTY US Keyboard,
- 4 GB of RAM,
- Headphones,
- A mic (optional).

### Software

- Web Chrome version 72+ or
- Microsoft Edge version 79+ or
- Firefox version 65+.

## Internet

- A fast, **direct** (no proxy or VPN), Internet connection (4G minimum),
- Access to : <https://itraining.network> and subdomains thereof.
- Accessible ports : 80, 443.

## Training Program

- **LCE500 - CentOS 8 Linux (RHEL 8 / Oracle Linux 8) - System Administrator**
  - Prerequisites
  - Training Program
- **LCE501 - Managing Users and Groups**
  - Presentation
    - /etc/nsswitch.conf
    - The getent Command
    - The /etc/group and /etc/gshadow files
    - The /etc/passwd and /etc/shadow files
  - Commands
    - Groups
      - groupadd
      - groupdel
      - groupmod
      - newgrp
      - gpasswd
    - Users
      - useradd
      - userdel
      - usermod
      - passwd
      - chage
  - Configuration

- LAB #1 - Managing Users and Groups
- LAB #2 - su and su -
- sudo

- **LCE502 - Package Management**

- LAB #1 - Compiling Software
  - 1.1 - ./configure
  - 1.2 - make
  - 1.3 - make check
  - 1.4 - make install
- LAB #2 - The rpm Command
  - 2.1 - Configuration
  - 2.2 - Usage
- LAB #3 - The dnf Command
  - 3.1 - Presentation
  - 3.2 - Configuration
  - 3.3 - Repositories
  - 3.4 - Searching for Packages
  - 3.5 - Viewing Information on and Downloading a Package
  - 3.6 - Installing a Package
  - 3.7 - Updating Packages
  - 3.8 - Deleting Packages
- Shared Libraries
  - Presentation
    - Introduction
    - Shared Object Locations
    - ld-linux.so.2
  - The ldd Command
  - The /etc/ld.so.conf File
  - The ldconfig Command

- **LCE503 - Managing File Permissions**

- Presentation
- Preparation
- LAB #1 - Basic Unix File Permissions

- 1.1 - Changing Permissions with chmod
  - Symbolic Mode
  - Octal Mode
  - The umask Command
- 1.2 - Changing the Owner or the Group with chown and chgrp
  - The chown Command
  - The chgrp Command
- LAB #2 - Advanced Unix Permissions
  - 2.1 - SUID/SGID bit
  - 2.2 - Inheritance Flag
  - 2.3 - Sticky bit
- LAB #3 - Extending Linux Permissions using ACLs and Attributes
  - 3.1 - ACLs
  - 3.2 - Attributes

- **LCE504 - Managing Disks and Filesystems**

- Peripherals
- Partitions
- Partitioning
  - LAB #1 - Partitioning your Disk with the fdisk Command
  - LAB #2 - Modifier les Drapeaux des Partitions avec fdisk
- Logical Volume Manager (LVM)
  - LAB #3 - Linear Logical Volumes
    - Physical Volumes (PV)
    - Volume Groups (VG) and Physical Extents (PE)
    - Logical Volumes (LV)
  - LAB #4 - Grow a Volume
  - LAB #5 - Snapshots
  - LAB #6 - Deleting Volumes
  - LAB #7 - Mirrored Volumes
  - LAB #8 - Changing LVM Attributes
  - LAB #9 - Striped Volumes
  - LAB #10 - Managing Meta-data
- Journaled Filesystems

- Ext3
  - Managing Ext3
  - LAB #11 - Converting Ext3 to Ext2
  - LAB #12 - Converting Ext2 to Ext3
  - LAB #13 - Using another PArtition for the Journal
  - LAB #14 - Changing the File System Check interval on an ext3 Filesystem
- Ext4
  - LAB #15 - Creating an Ext4 Filesystem
  - LAB #16 - Adding a Label to an Ext4 Filesystem
  - LAB #17 - Converting Ext3 to Ext4
- XFS
  - LAB #18 - Creating an XFS Filesystem
  - LAB #19 - Adding a Label to an XFS Filesystem

- **LCE505 - Process Scheduling**

- cron
  - The /etc/crontab file
  - Time Fields
  - User Crontabs
- anacron
- at

- **LCE506 - Archiving and Compression**

- Traditional Backup Tools
  - Preparation
  - The tar Command
    - Presentation
    - LAB #1 - Working with the tar Command
    - The GPL tar Commande and Compression
  - The cpio Command
    - Presentation
    - LAB #2 - Working with the cpio Command
  - The dd Command
    - Presentation
    - LAB #3 - Working with the dd Command

- The dump et restore Commands
  - Presentation
- LAB #4 - System Backups
  - Backing up the Installed Package List
  - Backing up the Disk Structure
  - Backing up Mount Points
  - Backing up the Boot Loader
    - GRUB Legacy
    - GRUB 2 on BIOS
    - GRUB 2 on EFI
  - Backing up User Files
- Rsync
  - Presentation
  - LAB #5 - Working with the rsync Command
- Compression
  - The gzip Command
    - Presentation
    - LAB #4 - Working with the gzip Command
  - The bzip2 Command
    - Presentation
    - LAB #5 - Working with the bzip2 Command
  - The xz Command
    - Presentation
    - LAB #6 - Working with the xz Command
  - Other Compression Utilities

- **LCE507 - Process Management**

- Presentation
- Process Types
- Process Commands
  - The ps Command
  - The pgrep Command
  - The pstree Command
  - The top Command

- The fg, bg and jobs Commands
- The wait Command
- The nice Command
- The renice Command
- The nohup Command
- The kill Command
- The pkill Command

- **LCE508 - Managing Logs**

- Presentation
- The dmesg Command
- Security Logging
  - The last Command
  - The lastlog Command
  - The lastb Command
  - The /var/log/secure File
- The /var/log/audit/audit.log File
  - Managing Audit Events
    - auditd
    - auditctl
  - Viewing Audit Events
    - The aureport Command
    - The ausearch Command
- The /var/log/messages File
- Applications
- rsyslog
  - Priorities
  - Facilities
  - The /etc/rsyslog.conf File
    - Modules
    - Global Directives
    - Rules
      - Facility.Priority
      - Facility!Priority

- Facility=Priority
- Using the \* Wildcard
- n Facilities with Identical Priorities
- n Selectors with Identical Actions
- The logger Command
- The logrotate Command
- journald
  - Using Journald
    - Application Specific Messages
    - Boot Messages
    - Priority Specific Messages
    - Messages from a Specific Date Range
    - Real Time Messages
    - Searching with Key Words

- **LCE509 - Printer Management**

- Cups
  - Protocols
  - Packages
  - Daemon
  - The /etc/cups/cupsd.conf File
  - Filters
  - Backends
  - Logs
  - Printers
  - Administration
    - The lpstat Command
    - The lpadmin Command
    - The accept et cupsenable Commands
    - Classes
    - The /etc/cups/printers.conf File
    - The /etc/cups/classes.conf File
    - The cancel Command
    - The lpmove Command



- Web Interface

- **LCE510 - System Startup and Shutdown**

- System Startup
  - Boot Loader
    - BIOS Systems
    - EFI Systems
    - GRUB 2
      - The /boot/grub/grub.cfg File
      - The /etc/default/grub file
      - Files in the /etc/grub.d directory
  - Initramfs
    - The init Script
  - Kernel Booting Process
- Systemd
  - LAB #1 - The systemctl Command
  - LAB #2 - Configuration Files
    - 2.1 - Default Configuration Files
    - 2.1 - Overloading Default Configuration Files
  - LAB #3 - The systemd-analyze Command
  - LAB #4 - Targets
    - 4.1 - Checking the Target Dependencies
    - 4.2 - The Default Target
      - Checking the Default Target
      - Changing the Default Target
      - Changing the Default Target for the Current Session
  - LAB #5 - Managing Services
    - 5.1 - Single Service Instances
    - 5.2 - Multiple Instance Services
    - 5.3 - Disallowing Modifications to a Service Status
- LAB #6 - System Shutdown
  - 6.1 - The shutdown Command
  - 6.2 - The reboot Command
  - 6.3 - The halt Command

- 6.4 - The poweroff Command

- **LCE601 - Managing Integrated Peripherals**

- Special Files
- LAB #1 - Commands
  - 1.1 - The lspci Command
  - 1.2 - The lsusb Command
  - 1.3 - The dmidecode Command
- LAB #2 - The sysctl Command
  - 2.1 - The /proc Directory
    - Files
      - /proc/cpuinfo
      - /proc/interrupts
      - /proc/dma
      - /proc/ioports
      - /proc/devices
      - /proc/module
      - /proc/diskstats
      - /proc/partitions
      - /proc/swaps
      - /proc/loadavg
      - /proc/meminfo
      - /proc/version
    - Directories
      - ide/scsi
      - acpi
      - bus
      - net
      - sys
  - 2.2 - Using the sysctl Command
- LAB #3 - Interpreting Information in /proc
  - 3.1 - free
  - 3.2 - uptime ou w
  - 3.3 - iostat

- 3.4 - hdparm
  - 3.5 - vmstat
  - 3.6 - mpstat
  - 3.7 - sar
- USB Modules
- udev
  - The udevadm Command
- The /sys Filesystem
- LAB #4 - Limiting Ressources
  - 4.1 - ulimit
  - 4.2 - CGroups
    - Limiting Memory Usage
    - The cgcreate Command
    - The cgdelete Command
    - The /etc/cgconfig.conf File
    - The cgconfigparser Command
- **LCE602 - Compiling the Kernel and Managing Quotas**
  - The Linux Kernel
  - LAB #1 - Modules
  - LAB #2 - Compiling and Installing a Kernel and Modules
    - 2.1 - Move /home
    - 2.2 - Preparing the Environment
    - 2.3 - Preparing the Kernel Source Tree
      - The .config file
      - The Makefile file
    - 2.4 - Configuring the Kernel
    - 2.5 - Compiling the Kernel
    - 2.6 - Installing the Kernel
  - LAB #3 - Managing Quotas
    - 3.1 - The quotacheck Command
    - 3.2 - The edquota Command
    - 3.3 - The quotaon Command
    - 3.4 - The repquota Command

- 3.5 - The quota Command
- 3.6 - The warnquota Command

- **LCE603 - Managing the Network**

- Presentation
  - The nmcli Command
- LAB #1 - Configuring the Network
  - 1.1 - Connections and Profiles
  - 1.2 - Name Resolution
  - 1.3 - Adding a Second IP Address to a Profile
  - 1.4 - The hostname Command
  - 1.5 - The ip Command
  - 1.6 - Manually Activating and Disactivating a Device
  - 1.7 - Static Routing
    - The ip Command
    - Disactivating/Activating Internal Routing on a Server
- LAB #2 - Diagnostics
  - 2.1 - The ping Command
  - 2.2 - The netstat Command
  - 2.3 - The traceroute Command
- LAB #3 - SSH
  - 3.1 - Presentation
    - SSH-1
    - SSH-2
  - 3.2 - Configuring the Server
  - 3.3 - Configuring the Client
  - 3.4 - SCP
    - Presentation
    - Usage
  - 3.5 - Authentication with Asymmetric Keys

- **LCE511 - Training Validation**

- Course Materials
- Reminder of the Training Program
  - Day #1

- Day #2
  - Day #3
  - Day #4
  - Training Evaluation
  - Exam - Acquired knowledge
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