

# Debian Linux : System Administration

## Presentation

**Objectives** : Learn Debian Linux system administration.

**Who can benefit**: Linux users and technicians / Windows™, Mac and Unix users/administrators.

**Prerequisites**: Computer literacy.

**Learning technique** : Clear, theoretical course content divided into lessons and extensive LABS available on-line 24/24 7/7.

**Duration** : 35 hours.

**Instructor** : Certified [LPI](#).

**Student Progression** : Student progression is monitored both in terms of effective course duration and in terms of student comprehension using self-assessment tests.

**Resources** : Debian 8 Virtual Appliance.

## Cursus

- **Managing Users and Groups**

- Groups
- Users
- Commands
  - Groups
    - groupadd
    - groupdel
    - groupmod
    - newgrp
    - gpasswd
  - Users
    - useradd
    - userdel

- usermod
- passwd
- Configuration
- LAB #1 - Managing Groups and Users
- su et su -
- sudo
- **Commands** : getent, grpck, grpconv, grpunconv, pwck, pwconv, pwunconv, groupadd, groupdel, groupmod, newgrp, gpasswd, useradd, userdel, usermod, passwd, id, groups, su, sudo.

## • Package Management

- Compiling Software the Old Way
  - ./configure
  - make
  - make check
  - make install
- The dpkg Command
- Advanced Package Tool
  - Configuration
  - Repositories
  - Usage
  - LAB #1 - Working with Apt
- Shared Libraries
  - Presentation
    - Introduction
    - Shared Object Locations
    - ld-linux.so.2
    - The ldd Command
    - The /etc/ld.so.conf File
    - The ldconfig Command
- **Commands** : dpkg, apt-get, apt-cache, mc, wget, configure, make, ldd, ldconfig.

## • Managing File Permissions

- Preparation
- Basic Unix File Permissions
  - Changing Permissions with chmod

- Symbolic Mode
- Octal Mode
- The umask command
- Changing the Owner or the Group with chown and chgrp
- Advanced Unix Permissions
  - SUID/Sgid bit
  - Inheritance Flag
  - Sticky bit
- ACLs
  - Commande Line Switches
- Ext2/Ext3/Ext4 Attributes
- **Commands** : chmod, umask, chown, chgrp, setfacl, getfacl, chattr, lsattr.

## • Managing Disks and Swap Space

- Block Devices
- Partitions
  - Master Boot Record
  - Apple Partition Map
  - GUID Partition Table
- Partitioning
  - LAB #1 - Using fdisk and parted
- Journaled Filesystems
  - Presentation
  - Ext3
  - Ext4
  - ReiserFS
  - XFS
  - JFS
  - Btrfs
- Swap Space
  - Swap Size
  - Swap Partitions
  - The swapon Command
  - The swapoff Command

- The /etc/fstab file
- Swap Files
- Logical Volume Manager (LVM)
  - Physical Volumes (PV)
  - Volume Groups (VG) and Physical Extents (PE)
  - Logical Volumes (LV)
  - Administration
  - Snapshots
  - Deleting Volumes
  - Mirrored Logical Volumes
  - Attributes
  - Striped Logical Volumes
  - Metadata
- **Commands** : fdisk, gdisk, parted, swapon, swapoff, mkswap, dumpe2fs, tune2fs, mke2fs, mkfs.ext3, e2fsck, resize2fs, debugfs, e2label, mkfs.ext4, mkfs.xfs, xfs\_check, xfs\_repair, xfs\_admin, xfs\_growfs, xfs\_info, xfs\_metadump, xfs\_db, xfs\_admin, mkfs.reiserfs, mkreiserfs, reiserfsck, reiserfstune, resize\_reiserfs, debugreiserfs, mkfs.jfs, jfs\_tune, jfs\_fsck, jfs\_febugfs, btrfs-balance, btrfs-check, btrfs-device, btrfs-filesystem, btrfs-inspect-internal, btrfs-property, btrfs-qgroup, btrfs-quota, btrfs-qgroup, btrfs-receive, btrfs-replace, btrfs-rescue, btrfs-restore, btrfs-scrub, btrfs-send, btrfs-subvolume, pvcreate, vgcreate, lvcreate, pvdisplay, vgdisplay, lvdisplay, lvextend, lvreduce, resize2fs, lvs, lvremove, vgremove, pvremove, lvconvert, vgs, pvs, lvchange, vgcfgbackup, vgcfgrestore.

- **Process Scheduling**

- cron
- anacron
- at
- **Commands** : cron, anacron, at.

- **Archiving and Compression**

- Archiving
  - tar
    - Presentation
    - LAB #1 - Using tar
  - cpio
    - Presentation
    - Command Line Switches
    - LAB #2 - Using cpio

- dd
  - Presentation
  - Command Line Switches
  - LAB #3 - Using dd
- dump and restore
  - Presentation
- Compression
  - gzip
    - Presentation
    - LAB #4 - Using gzip
  - bzip2
    - Presentation
    - LAB #5 - Using bzip2
  - XZ
    - Presentation
    - LAB #5 - Using xz
  - Other Tools
- **Commands** : tar, cpio, dd, dump, restore, gzip, gunzip, bzip2, bunzip2, xz, compress, uncompress, rar, unrar, zip, unzip.

## • Process Management

- Process Types
- Process priorities
- Synchronous and Asynchronous
- Process Commands
  - The ps Command
  - The pstree Command
  - The top Command
  - The fg and bg Commands
  - The wait Command
  - The nice Command
  - The renice Command
  - The nohup Command
  - The kill Command
- **Commands** : ps, pstree, top, fg, bg, wait, nice, renice, nohup, kill.

- **Managing Logs**

- The /var/log/messages file
- The /bin/dmesg Command
- The /var/log/audit/audit.log file
  - Managing Audit Events
    - auditd
    - auditctl
    - audispd
  - Viewing Audit Events
    - The aureport Command
    - The ausearch Command
- Applications
- rsyslog
  - Priorities
  - Facilities
  - /etc/rsyslog.conf
    - Modules
    - Global Directives
    - Rules
      - Facility.Priority
      - Facility!Priority
      - Facility=Priority
      - Using the \* Wildcard
      - n Facilities with Identical Priorities
      - n Selectors with Identical Actions
- /usr/bin/logger
- /usr/bin/logrotate
- Journald
  - Viewing logs
  - Viewing logs of a specific application
  - Viewing the logs of the last boot process
  - Viewing logs of a specific priority
  - Viewing logs over a date period
  - Viewing logs in real time

- Viewing logs using keywords
- **Commands** : dmesg, auditd, auditctl, audeispd, aureport, ausearch, rsyslog, logger, logrotate, journalctl.

## • Printer Management

- Introduction
  - Protocols
  - Daemon
- Configuration
  - /etc/cups/cupsd.conf
  - Filters
  - Backends
  - Logs
  - Printers
- Administration
  - The lpstat Command
  - The lpadmin Command
  - The accept and cupsenable Commands
  - Setting Up the Default Printer
  - Using a .ppd File to Add a Printer
  - Classes
  - The /etc/cups/printers.conf File
  - The /etc/cups/classes.conf File
  - The cancel Command
  - The lpmove Command
  - Destroying a Class
- Web Interface
- Graphical Interface
- **Commands** : lpadmin, accept, reject, cupsenable, cupsdisable, lpstat, cancel, lpmove, lpinfo, lppasswd, lp.

## • System Startup and Shutdown

- System Startup
  - Boot Loader
    - BIOS Systems
    - EFI Systems
- GRUB 2

- The /boot/grub/device.map file
- The /etc/default/grub file
- Files in the /etc/grub.d directory
  - /etc/grub.d/10\_Linux
  - /etc/grub.d/30\_os-prober
  - /etc/grub.d/40\_custom
  - /etc/grub.d/41\_custom
  - Password protection
- Initramfs
  - The mkinitramfs Command
- Kernel Booting Process
- The Systemd startup process
  - The systemctl command
  - Configuration files
  - The systemd-analyze command
  - Managing systemd services
- System Shutdown
  - The shutdown Command
  - The reboot command
  - The halt Command
  - The poweroff Command
- **Commands** : grub\_install, runlevel, init, telinit, chkconfig, update-rc.d, mkinitramfs, systemctl, systemd-analyze, shutdown, halt, reboot, poweroff.

- **Managing Integrated Peripherals**

- Special Files
- Commands
  - The lspci Command
  - The lsusb Command
  - The dmidecode Command
- The /proc Directory
  - Sub-directories
    - ide/scsi
    - acpi

- bus
- net
- sys
- The sysctl Command
- Files
  - /proc/cpuinfo
  - /proc/interrupts
  - /proc/dma
  - /proc/ioports
  - /proc/devices
  - /proc/modules
  - /proc/diskstats
  - /proc/partitions
  - /proc/swaps
  - /proc/loadavg
  - /proc/meminfo
  - /proc/version
- Interpreting Information in /proc
  - Commands
    - free
    - uptime or w
    - iostat
    - vmstat
    - mpstat
    - sar
  - Production Environments
    - Identifying a System with a CPU Bottleneck
    - Identifying a Memory Problem
    - Identifying I/O Bottlenecks
  - USB Modules
  - udev
    - The udevadm Command
  - The /sys Filesystem
  - Planning resources - the collectd command

- Limiting Resources
  - ulimit
  - Control groups
- **Commands:** lspci, lsusb, dmidecode, free, uptime, w, iostat, vmstat, mpstat, sar, udevadm, collectd, sysctl.

## • Managing a the Network

- Communication models
  - OSI
    - NDIS and ODI
  - TCP/IP
    - Messages, Datagrams and Segments
    - Establishing a TCP connection
    - The TCP header
    - The UDP header
    - Fragmentation and Re-encapsulation
    - TCPv4 Classes
    - Subnet Masks
      - Variable Length Subnet Masks - VLSM
    - Ports and sockets
- Configuring a Network Client under Linux
  - /etc/services
  - Ethernet address resolution with arp
- Configuring TCP/IP on Debian 6
  - DHCP
    - /etc/network/interfaces
  - Fixed IP Address
    - /etc/network/interfaces
  - The hostname command
  - The ifconfig command
  - Manually bringing up and down a network interface
  - The /etc/networks file
  - IP address resolution
    - /etc/resolv.conf
    - /etc/nsswitch.conf

- /etc/hosts
- Configuring TCP/IP on Debian 8
  - The nmcli command
  - Connections and Profiles
  - Adding a second IP address to an existing profile
  - The hostname command
  - The ip command
  - Manually bringing up and down a network interface
- Network Services
  - xinetd
  - TCP Wrapper
- Network Diagnostic Commands
  - ping
  - ping6
  - netstat-i
  - traceroute
  - traceroute 6
  - tracepath6
- Static Routing Tables on Debian 6
  - The route Command
  - The netstat Command
  - Turning routing ON/OFF
- Static Routing Tables on Debian 8
  - The ip Command
  - Turning routing ON/OFF
- Remote Administration
  - Telnet
  - ssh
  - wget
  - ftp
  - scp
- Administrating an NFS server
  - Presentation
  - NFSv3 services and processes

- Basic commands
- Server installation on Debian 6
- Client installation on Debian 6
- Server installation on Debian 8
- Client installation on Debian 8
- The rpcinfo command
- The nfsstat command
- Packet Sniffers
  - TCPdump
  - Wireshark
- Port Scanners
  - nmap
  - netcat
- The Netfilter Firewall
  - Introduction
  - Configuration using scripts on Debian 6
  - Configuration using firewalld on Debian 8
- Cryptologie
  - GnuPG
  - Public Key Infrastructures
    - X509 Certificates
  - SSH and SCP
  - SSH Tunneling
- **Commands** : netstat, arp, nslookup, dig, ifconfig, ifup, ifdown, ifstatus, NetworkManager, hostname, uname, nmcli, ip, network-manager, ping, ping6, Traceroute, Traceroute6, Tracepath6, tcpd, xinetd, route, ntpd, telnet, wget, ftp, tcpdump, wireshark, nmap, netcat, iptables, gpg, firewall-cmd, ssh, scp.

From:

<https://ittraining.team/> - **www.ittraining.team**

Permanent link:

<https://ittraining.team/doku.php?id=elearning:debianen:start>

Last update: **2020/01/30 03:27**



