

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
 - Command 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
- Journalized 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_fdebugfs, 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, audoispsd, 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.

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