

Linux System Administration

Presentation

Objectives: Learn Basic System Administration on Linux.

Delivery mechanism: Classroom Training

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

Prerequisites: Computer literacy.

Learning technique: Clear, theoretical course content divided into lessons and extensive LABS both available on-line 24/24 7/7 and downloadable in PDF format.

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

Operating Systems covered by this course: CentOS/Redhat, Debian, openSUSE.

Duration: 35 hours over 5 days.

Contents

- **Managing Users and Groups**
 - Groups
 - Users
 - Commands
 - Groups
 - groupadd
 - Command Line Switches
 - groupdel
 - Command Line Switches
 - groupmod
 - Command Line Switches
 - newgrp

- Command Line Switches
- gpasswd
 - Command Line Switches
- Users
 - useradd
 - Command Line Switches
 - userdel
 - Command Line Switches
 - usermod
 - Command Line Switches
 - passwd
 - Command Line Switches
- Configuration
- LAB #1 - Managing Groups and Users
- su et su -
- sudo
- **Commands** : 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 rpm Command with Red Hat and OpenSUSE
- Yellow Dog Updater Modified and Red Hat
 - Configuration
 - Repositories
 - Usage
 - LAB #1 - Working with Yum
- Zypper and OpenSUSE
 - Configuration
 - Repositories

- Usage
- LAB #2 - Working with Zypper
- The dpkg Command
- Advanced Package Tool and Debian
 - 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** : rpm, yum, dpkg, apt-get, apt-cache, zypper, mc, wget, configure, make, ldd, ldconfig.

- **Managing File Permissions**

- Preparation
- Basic Unix File Permissions
 - Changing Permissions with chmod
 - Symbolic Mode
 - Octal Mode
 - Command Line Switches
- The umask command
 - Command Line Switches
- Changing the Owner or the Group with chown and chgrp
 - Command Line Switches
- 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
- Journaled Filesystems
 - Presentation
 - Ext3
 - Ext4
 - ReiserFS
 - XFS
 - JFS
- Swap Space
 - Swap Size
 - Swap Partitions
 - The swapon Command
 - Command Line Switches
 - The swapoff Command
 - Command Line Switches
- The /etc/fstab file
- Swap Files
- **Commands** : fdisk, mke2fs, tune2fs, dumpe2fs, mkfs.xfs, xfs_info, xfs_admin, mkfs.reiserfs, debugreiserfs, reiserfstune, mkfs.jfs, jfs_tune, mkswap, swapon, swapoff.

- **Process Scheduling**

- cron
- anacron
- at

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

- **Archiving and Compression**

- Archiving
 - tar
 - Presentation
 - Command Line Switches
 - LAB #1 - Exercises
 - cpio
 - Presentation
 - Command Line Switches
 - LAB #2 - Exercises
 - dd
 - Presentation
 - Command Line Switches
 - LAB #3 - Exercises
 - dump and restore
 - Presentation
- Compression
 - gzip
 - Presentation
 - Command Line Switches
 - LAB #4 - Exercises
 - bzip2
 - Presentation
 - Command Line Switches
 - LAB #5 - Exercises
 - Other Tools
- **Commands** : tar, cpio, dd, dump, restore, gzip, gunzip, bzip2, bunzip2, xz, compress, uncompress, rar, unrar, zip, unzip.

- **Process Management**

- Process Types
- Process Commands
 - The ps Command
 - Command Line Switches

- The pstree Command
 - Command Line Switches
- The top Command
- The fg and bg Commands
 - Command Line Switches
- The wait Command
- The nice Command
 - Command Line Switches
- The renice Command
 - Command Line Switches
- The nohup Command
 - Command Line Switches
- 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
 - Command Line Switches
 - audispd
 - Viewing Audit Events
 - The aureport Command
 - Command Line Switches
 - The ausearch Command
 - Command Line Switches
- 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
 - Command Line Switches
- **Commands** : dmesg, auditd, auditctl, audoispd, aureport, ausearch, rsyslog, logger, logrotate.

• 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
 - GRUB LEGACY on Red Hat/CentOS
 - GRUB LEGACY on OpenSUSE
 - GRUB 2 on Debian Squeeze
 - The /boot/grub/device.map file
 - The /etc/default/grub file
 - Files in the /etc/grub.d directory
- Initramfs
 - Initramfs on Redhat / CentOS
 - The init Script
 - The dracut Command
 - Initramfs on Debian Squeeze
 - The init Script
 - The mkinitramfs Command
 - Initramfs on openSUSE
 - The init Script
 - The mkinitrd Command
- Kernel Booting Process
- The Init Process
- RUNLEVELS
- Unix System V Startup Scripts
 - Debian Squeeze
 - Inittab
 - The /etc/init.d directory

- Le script rc.S
- The /etc/rcX.d Directories
- The update-rc.d Command
- The chkconfig Command
- openSUSE
- Upstart Startup Scripts
 - Red Hat/CentOS 6
 - System Initialisation
 - Runlevels
 - [CTL]-[ALT]-[DEL]
 - mingetty
 - rc.sysinit
 - The /etc/rc.d/init.d Directory
 - The /etc/rc.d/rcX.d Directories
 - La commande chkconfig
- System Shutdown
 - The shutdown Command
 - The reboot command
 - The halt Command
 - The poweroff Command
- **Commands** : grub_install, runlevel, init, telinit, chkconfig, update-rc.d, dracut, mkinitramfs, mkinitrd, shutdown, halt, reboot, poweroff.

• Managing Integrated Peripherals

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

- acpi
- bus
- net
- sys
- The sysctl Command
 - Command Line Switches
- 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

- Command Line Switches
- The /sys Filesystem
- Limiting Resources
- **Commands:** lspci, lsusb, dmidecode, free, uptime, w, iostat, vmstat, mpstat, sar, udevadm.

• Managing a TCPv4 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
 - Command Line Switches
- Configuring TCP/IP v4
 - Red Hat
 - DHCP
 - /etc/sysconfig/network
 - /etc/sysconfig/network-scripts/ifcfg-ethX (où X=0,1 ...)
 - Fixed IP Address
 - /etc/sysconfig/network
 - /etc/sysconfig/network-scripts/ifcfg-ethX (où X=0,1 ...)
 - Debian
 - DHCP
 - /etc/network/interfaces

- Fixed IP Address
 - /etc/network/interfaces
- openSUSE
 - DHCP
 - /etc/sysconfig/network/config
 - /etc/sysconfig/network/dhcp
 - /etc/sysconfig/network/ifcfg-ethX (où X=0,1 ...)
 - Fixed IP Address
 - /etc/sysconfig/network/ifcfg-ethX (où X=0,1 ...)
- The /etc/networks file
- IP address resolution
 - /etc/resolv.conf
 - /etc/nsswitch.conf
 - /etc/hosts
- Network Services
 - xinetd
 - TCP Wrapper
- Basic Networking Commands
 - hostname
 - Command Line Switches
 - ifconfig
 - Command Line Switches
 - ping
 - Command Line Switches
 - netstat -i
 - Command Line Switches
- Static Routing Tables
 - The route Command
 - Command Line Switches
 - The netstat Command
 - Command Line Switches
 - The traceroute Command
 - Command Line Switches
- Turning routing ON/OFF

- Manually bringing up and down a network interface
- Remote Administration
 - Telnet
 - Command Line Switches
 - ssh
 - Command Line Switches
 - wget
 - Command Line Switches
 - ftp
 - Command Line Switches
 - scp
 - Command Line Switches
- **Commands:** netstat, arp, nslookup, dig, ifconfig, ifup, ifdown, ifstatus, NetworkManager, hostname, uname, ping, tcpd, xinetd, route, traceroute, telnet, ssh, wget, ftp, scp.

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