SUSE Linux Enterprise Server (SLES) : System Administration

Presentation

Objectives : Learn SUSE Linux Enterprise Server 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 : SLES 12 Virtual Appliances.

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 rpm command
  - Zypper
    - Configuration
    - Repositories
    - Usage
    - LAB #1 - Working with Zypper
  - 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, zypper, 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, audoispd, 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

- GRUB LEGACY on RHEL 6
- GRUB 2 on RHEL 7, Debian 8, Ubuntu 16.04 and SLES 12
  - 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 dracut Command
  - The mkinitrd Command
- Kernel Booting Process
- SysVinit startup process
  - The Init Process
  - RUNLEVELS
  - Unix System V Startup Scripts
  - Inittab
  - The /etc/init.d directory
  - The rcX.d Directories
  - The chkconfig Command
  - openSUSE
- Upstart startup process
  - System Initialisation
  - Runlevels
  - [CTL]-[ALT]-[DEL]
  - mingetty
  - rc.sysinit
  - The /etc/rc.d/init.d Directory
  - The /etc/rc.d/rcX.d Directories
  - Managing Upstart services
- 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, dracut, mkinitrd, initctl, start, stop, restart, 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 Environements
      - 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 SLES 12
  - 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 Diagostic Commands
  - ping
  - ping6
  - netstat-i
  - traceroute
  - traceroute 6
  - tracepath6
- Static Routing Tables on SLES 12
  - 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
    - Client installation
    - The rpcinfo command
    - The nfsstat command
  - Packet Sniffers
    - TCPdump
    - Wireshark
  - Port Scanners
    - nmap
    - netcat
  - The Netfilter Firewall
    - Introduction
    - Configuration using firewalld on SLES 12
  - Cryptologie
    - GnuPG
    - Public Key Infrastructures
      - X509 Certificates
    - SSH and SCP
    - SSH Tunneling
- **Commands** : netstat, arp, nslookup, dig, ifconfig, 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.