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.