



CURRICULUM

» IPv4 ADDRESSING

- IP address
- IP Addressing
- Version of IP Address
- Public
- Private IP Address
- Network Mask
- Role Network mask in IP Addressing
- Default Mask of Classful IP Address
- IP Address is combination of Network bits & Host bits
- Network ID or Network Address
- Broadcast ID or Broadcast Address
- No. of Network ID's & Valid IP Address in Class A , Class B , Class C
- Design & Implementation of Network Scenario with Classful Network

» IPV4 Saving Techniques

- Subnetting
- VLSM
- NAT
- Subnetting & its advantages
- How to proceed for Subnetting & VLSM
 - Design & Implementation of Network Scenario with Subnetted Network & VLSM
 - Network Address, Broadcast Address
 - First Valid IP address,
 - Last valid IP address,
 - Valid range of IP address,
 - Sub netmask,
 - Block size,
 - Next Network Address,

» Cisco Router Introduction Theory:

- Introduction to Cisco Router
- General port diagram of Cisco Routers
- Cable & Connection.
- Connectivity diagram of Cisco Routers with Network Devices
- Describe the boot process of Cisco IOS routers
 - POST
 - Booting Process of Routers
 - Boot preferences
 - Cisco IOS image(s)
- How to access Cisco Router Console
- Basic Management mode & Commands of Cisco Router

» IP ROUTING Theory:

- Basic Routing Concept
- Routed & Routing Protocols
 - Types of Routing & Protocols.
 - Static Routing.
 - Static Route
- Default route
- Differentiate terms:
 - Next hop
 - AD
 - Metric
 - Destination NID
 - Route Codes
 - Outgoing Interface
- AD & Metrics of Different Routing Protocols

LAB :

- Configure and verify Static Route
- Configure and verify Default Route

» DYNAMIC PROTOCOLS & DYNAMIC ROUTING

Theory:

- Types of dynamic protocols
- IGP vs EGP protocols
- Static vs. Dynamic
- Link state vs. Distance Vector

» OSPF (Open Shortest Path First)

Theory:

OSPF Terminology

Link-states Advertisement

Router ID & its selection.

Loopback Interface & Loopback Interface

- Hello Timer & Dead Timer
- Concept of Area in OSPF & its Advantages
- Backbone area
- Types of Area's in OSPF
- OSPF router interface Priority
- DR & BDR Concept
- Process ID
- Concept of Wild Card Mask
- ABR & ASBR
- Passive Interface
- AD & Metric

Neighbor adjacency components

OSPF router states

Discuss OSPF single & multi area

Type of Tables in OSPF

- Neighbor Table
- Topology Table
- Routing Table

LAB:

- Configure and verify ospfv2 single area
- Configure and verify ospfv2 multi area
- Verify ospf metric calculation.
- Modify OSPF Parameter.

Helpful Command use in LAB

- show ip interface brief
- show protocols
- show running-config
- show ip route
- show ip route connected
- show ip route ospf

» EIGRP (Enhanced Interior Gateway Routing Protocol)

Theory :

- Characteristics of EIGRP
- Feasible Distance / Feasible Successors /Administrative distance
- Feasibility condition
- Metric composition
- Router ID
- Auto summary & no auto summary
- Multicast address of eigrp
- Hello & Hold timer
- AD's of eigrp
- Passive interface
- Wild card mask
- Types of eigrp tables.
 - Neighbor Table
 - Topology Table
 - Routing Table
- Neighbor adjacency Parameter
 - Hello
 - ASN
 - METRIC

LAB:

- Configure and verify EIGRP
- Configure and verify Redistribution with non-eigrp
- Stop unwanted Traffic on LAN segment (using passive-interface.)
- Modify EIGRP Parameter.

Helpful Command use in LAB

- show ip interface brief
- show protocols
- show running-config
- show ip route
- show ip route eigrp
- show ip eigrp neighbour
- show ip eigrp topology

» HOW TO MANAGE CISCO DEVICES

Theory :

- Cisco Discovery Protocol (CDP)
- Introduction
- How to enable & disable CDP on Router & Interface
- Password recovery procedure
- Backup & Up gradation of IOS
- Backup & Up gradation of Configuration File

Describe following terms:

- Ping
- Traceroute
- Tracert
- Debug IP Packet
- Debug IP ICMP

LAB:

- Verify CDP to find out information of directly connected Cisco devices
- Disable CDP on router and interface
- Modify CDP Timers.
- Configure and verify of Advance Telnet feature.
- Configure & Verify HOST Resolving.
- Backup of IOS File
- Backup of Configuration File.
- Restoring of IOS File
- Restoring of Configuration File.
- Cisco router Password recovery & Recovery of NVRM File.

» IP SERVICES DHCP

- DHCP Server (IOS Router)
- DHCP Client
- DHCP Pool
- Default Router

Packet Filtering via ACL

- Describe the types, features, and applications of ACLs
- Standard
- Sequence numbers
- Editing
- Extended
- Numbered
- Log option
- Inbound & Outbound ACL
- Drawback of Standard & Extended ACL
- How to overcome Drawback of Standard & Extended ACL
- ACL Implementation Rules
- Identify the basic operation of NAT
- Purpose
- Pool
- Static (fixed – One Private IP need One Public IP)
- 1 to 1 (variable– One Private IP need One Public IP)
- Overloading (Group of Private IP Address need one Public IP)
- Source addressing (bi-directional)
- One way NAT (uni-directional)

NTP

- NTP Server
- NTP Client

ADVANCE TOPICS

- VRRP
- HSRP
- GLBP
- Concept of Syslog server

LAB:

- Configure and verify Static (fixed) NAT.
- Configure and verify Static (with pool) NAT
- Configure and verify PAT (Overloading)
- Configure and verify Numbered Standard & Named Standard ACL
- Configure and verify Numbered Extended & Named Extended ACL.
- Configure and verify NTP Server and Client.
- configuring and verify router interfaces to use DHCP
- configuring and verify DHCP

» LAN Switching Technology

- Introduction of Cisco Switches
- Collision Domain & Broadcast Domain
- Bridges and Hubs
- Types of switching

Bridge & its Function

- Forwarding
- Filtering
- Flooding

Formation of MAC Table or CAM Table

VLAN & its Advantage

- Network segmentation
- Security
- Enhanced performance

How to creates VLAN

Types of VLAN membership

Access port & Access link

Trunk port & Trunk link

How to form trunk & its requirements

Trunking Protocols ISL & dot1q

Frame Forwarding Techniques in Switch

Inter-Vlan Routing

STP

STP Convergence Components

- lowest Bridge ID
- lowest RPC
- lowest Sender BID
- lowest Sender Port ID

STP Convergence Steps:

- Election of Root Bridge.
- Election of Root Port.
- Election of Designated Port

Spanning Tree Mode

Concept of Etherchannel

LAB:

- Configure and verify initial switch configuration
- Verify CAM Table.
- Configure and verify VLANs
- Configure and verify trunking on Cisco switches
- Configure and verify interVLAN routing (Router on a stick)
- sub interfaces

» Network Device Security Configure and verify network device security features such as

- Device password security
- Enable secret vs enable
- Transport
- Disable telnet
- SSH
- VTYS
- Physical security
- Service password

Configure and verify Switch Port Security features such as

Sticky MAC

MAC address limitation

Static / dynamic

» WAN Technologies

- WAN Connection types
- WAN Protocols
- Introduction of HDLC

Introduction of PPP & its feature

- PPP sub Protocols
- PPP session establishment

PPP authentication methods

Understanding Frame-Relay
Fundamentals

How to make Router as a FRAME_RELAY
Switch

Frame-Relay logical Topologies

- Hub & Spoke
- Full Mesh
- Partial Mesh

Virtual Private Network

Basic fundamentals of VPN

LAB :

- Configure and verify a basic WAN serial connection
- Configure and verify a PPP connection between Cisco routers
- Configure and verify PPP Authentication
- Configure and verify Frame Relay on Cisco routers

» Ipv6

- Introduction of Ipv6
- Need of Ipv6

Ipv6 addressing

- Link Local address
- Site local address
- Global Unicast Address
- Multicast Address
- eui 64
- autoconfiguration

Ipv6 packet type

- Unicast
- Multicast
- Anycast

Ipv6 supporting protocols (RIPng, OSPFv3, EIGRPv6, MP-BGP)

LAB :

- Configuring & Verify IPV6 Address
- Configure & verify OSPFv2

» OSI (Open System Interconnection) & TCP/IP

- Introduction to OSI or Layered Structure model

Data encapsulation & De-encapsulation Process

PDU form of Data at each layer

Role of OSI layers

- Application
- Presentation
- Session
- Transport
- Network
- Data link
- Physical

Introduction of Protocols & Network Devices per layer

OSI peer to peer communication diagram

OSI Vs TCP/IP

TCP/IP Layers



Red Hat System Administration I

RHEL7 (Rh124) For RHCSA (RH-124+RH134)

► Course Outline

► Access the command line

- ✍ Log in to a Linux system and run simple commands using the shell.

► Manage files from the command line

- ✍ Copy, move, create, delete, and organize files from the bash shell prompt.

► Getting help in Red Hat Enterprise Linux

- ✍ Resolve problems by using online help systems and Red Hat support utilities.

► Create, view, and edit text files

- ✍ Create, view, and edit text files from command output or in an editor.

► Manage local Linux users and groups

- ✍ Manage local Linux users and groups, and administer local password policies.

► Control access to files with Linux file system Permission

- ✍ Set Linux file system permissions on files and interpret the security effects of different permission settings.

► Monitor and manage Linux processes

- ✍ Obtain information about the system, and control processes running on it.

➡ **Control services and daemons**

✍ Control and monitor network services and system daemons using systemd.

➡ **Configure and secure Open SSH service**

✍ Access and provide access to the command line on remote systems securely using OpenSSH.

➡ **Analyze and store logs**

✍ Locate and accurately interpret relevant system log files for troubleshooting purposes.

➡ **Manage Red Hat Enterprise Linux networking**

✍ Configure basic IPv4 networking on Red Hat Enterprise Linux systems.

➡ **Archive and copy files between systems**

✍ Archive files and copy them from one system to another .

➡ **Install and update software packages**

✍ Download, install, update, and manage software packages from Red Hat and yum package repositories.

➡ **Access Linux file systems**

✍ Access and inspect existing file systems on a Red Hat Enterprise Linux system.

➡ **Use virtualized systems**

✍ Create and use Red Hat Enterprise Linux virtual machines with KVM and libvirt.

➡ **Manage Physical Storage II**

✍ Manage filesystem attributes and swap space

➡ **Comprehensive review**

✍ Practice and demonstrate the knowledge and skills learned in this course.

Red Hat System Administration II

RHEL7 (RH134)

➡ **Automate installation with Kickstart**

✍ Automate the installation of Red Hat Enterprise Linux systems with Kickstart.

➡ **Use regular expressions with grep**

✍ Write regular expressions that, when partnered with grep, will allow you to quickly isolate or locate content within text files.

➡ **Create and Edit text files with vim**

✍ Introduce the vim text editor , with which you can open, edit, and save text files.

➡ **Schedule future Linux tasks**

✍ Schedule tasks to automatically execute in the future.

➡ **Manage priority of Linux processes**

✍ Influence the relative priorities at which Linux processes run.

➡ **Control access to files with access control lists (ACL)**

✍ Manage file security using POSIX access control lists.

➡ **Manage SELinux security**

✍ Manage the Security Enhanced Linux (SELinux) behavior of a system to keep it secure in case of a network service compromise.

➡ **Connect to network-defined users and groups**

✍ Configure systems to use central identity management services

➡ **Add disks, partitions, and file systems to a Linux system**

🔗 Manage simple partitions and file systems.

➡ **Manage logical volume management (LVM) storage**

🔗 Manage logical volumes from the command line.

➡ **Access networked attached storage with network file system (NFS)**

🔗 Access (secure) NFS shares.

➡ **Access networked storage with SMB**

🔗 Use autofs and the command line to mount and unmount SMB file systems.

➡ **Control and troubleshoot the Red Hat Enterprise Linux boot process**

🔗 Limit network communication with firewall Configure a basic firewall.

➡ **Comprehensive review**

🔗 Practice and demonstrate knowledge and skills learned in this course.

Red Hat System Administration III

For RHCE RHEL7 (RH 254)

➡ **Control services and daemons**

🔗 Review how to manage services and the boot-up process using systemctl.

➡ **Manage IPv6 networking**

🔗 Configure and troubleshoot basic Ipv6 networking on Red Hat Enterprise Linux systems

➡ **Configure link aggregation and bridging**

🔗 Configure and troubleshoot advanced network interface functionality including bonding, teaming, and local software bridges.

➡ **Control network port security**

🔗 Permit and reject access to network services using advanced SELinux and firewalld filtering techniques.

➡ **Manage DNS for servers**

🔗 Set and verify correct DNS records for systems and configure secure DNS caching.

➡ **Configure email delivery**

🔗 Relay all email sent by the system to an SMTP gateway for central delivery .

➡ **Provide block-based storage**

🔗 Provide and use networked iSCSI block devices as remote disks.

➡ **Provide file-based storage**

🔗 Provide NFS exports and SMB file shares to specific systems and users.

➡ **Configure MariaDB databases**

🔗 Provide a MariaDB SQL database for use by programs and database administrators.

➡ **Provide Apache HTTPD web service**

🔗 Configure Apache HTTPD to provide Transport Layer Security (TLS)-enabled websites and virtual hosts.

➡ **Write Bash scripts**

🔗 Write simple shell scripts using Bash.

➡ **Bash conditionals and control structures**

- ✍ Use Bash conditionals and other control structures to write more sophisticated shell commands and scripts.

➡ **Configure the shell environment**

- ✍ Customize Bash startup and use environment variables, Bash aliases, and Bash functions.

➡ **Linux containers preview**

- ✍ Preview the capabilities of Linux containers, Docker , and other related technologies in Red Hat Enterprise Linux 7.

➡ **Comprehensive review**

- ✍ Practice and demonstrate knowledge and skills learned in Red Hat System Administration III.

Partners :



Java



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