

Basics

09 August 2024 20:32

OS Types:

1. Client OS
 - Perform basic Operation
 - End user application
 - E.g. Windows 11
2. Server OS
 - We choose depending on weight (resources they use)
 - E.g. Ubuntu
3. Embedded OS
 - phone, smart watch

Who authenticates the user password on a standalone system?

- Authentication is for user logging in
- Authorization Checking for privileges

What does your refresh button do in your system?

- OS services load and then application services load
- It removes any unwanted junk that stores from ram during startup

Hyper-V

22 July 2024 20:37

Virtualization:

- Deals with logic Hypervisors
 - Type 1 Hypervisors (BareMetal Hypervisor)
 - Type2 hypervisor (Hosted Hypervisor)

Hyper-V:

- Hyper-V is both Type1 and Type2
- To open Hyper-V -> Wind+r -> virtmgmt.msc
- Import VM -> Any existing machine we can connect

Types of Network Switches:

1. **Internal**
 - VM3 VM4 (Internal) These systems can communicate among themselves and they can communicate with the host
2. **Private**
 - VM1 VM2(private) These can't communicate with our host
3. **External**
 - VM5 VM6 (external) These can access internet and

Create VM:

- Create path to store VM
 - New-> create Vm -> / -> create folder in c drive -> inside that 2 folder (VM and Hard disk)
- Steps to create
 - Virtual switch manager-> private -> name -> create -> browse -> select the folder -> Gen1 or Gen2 (gen1) -> network -> private switch -> hard disk -> install os later -> create
- In dynamic memory it utilizes min memory to boot up, in 10GB ram 4GB is allocated to VM , in host if the 6gb ram is done and it requires more ram then it pulls back the 4GB ram from
- hard disk is also dynamic and it has 3 types
 - a. Dynamic
 - b. Thick Sized
 - c. Differencing
- 2 extensions vhd and vhdx
 - vhd max is 2TB
 - vhdx max is 16TB

OS Installation on VM:

- connect -> file -> media -> dvd drive -> insert -> open
or
- file -> settings -> dvd drive

Client OS:

- start -> repair or install (install) -> custom or upgrade(custom) -> partition (if we don't do entire storage will go under c drive) -> installation starts

Server Manager

23 July 2024 21:30

Setup Dc server

- Create VM
- Select Server-OS
- Select data center edition with windows feature
- Custom

Server Manager

- Roles and Features
 - Roles are services that you would like to host on server
 - Features includes dependencies and management tools for the roles
 - Roles are dependent on features whereas features are no dependent on roles
- Add other server toy
 - Connect multiple servers for working
- Create a new group
 - We can group the servers like DHCP servers, DNS servers etc.
- Connect server to cloud server
 - If we are having servers on cloud we can connect to them using this
- Refresh Button
 - Default time server refresh is 10min, so to immediately view them
- **Flags**
 - a. Black Notification: The process is completed
 - b. Yellow Notification: Configurations is required
 - c. Red notification: Immediate action is required(Failure or alert notifications)
- Tools
 - All administrative tools is available here

To Change Computer Name:

- It will be IND-BLR-Whitefield-rackname-web1
- To change the computer name: click, change, name, restart

WORKGROUP:

- Every user will be administrator of the system
- No centralized management

DOMAIN:

- We will be having centralized management, every minute operations(like disabling, refresh) can be controlled.
- Domain is a logical boundary(Its virtual that's why it is not physical)

APIPA (Automatic Private Internet Protocol Address)IP of VM:

- Ethernet -> click -> details
- The APIPA range starts with 169.254.X.X
- The APIPA range in IPV6 starts with fe80

ADDS and DC

09 August 2024 21:53

Domain Controller:

Machine that hosts and controls the domain(centralized management system with a logical boundary)

Prerequisites To Promote a server to DC:

1. Server OS (Only server OS is required)
2. Valid name(Optional)
3. Valid IP(Static IP)
4. ADDS Role has to be installed(Active Directory Domain Service)

Assign Static IP:

- Select ethernet -> properties -> ipv4 -> properties -> assign by us -> 192.168.1.1(No prod server will have 1)
- Default gateway: Any packet that goes or comes is gateway
- DNS Server : same as IP(192.168.1.1)

Install ADDS:

- Dashboard , add roles and machine, select role based
- There are total 23 roles
- Select ADDS
- Next and install
- Yellow flag (Conf required)

Promoting To Domain Controller:

- Click on flag, promote it to DNS server
- Select new forest -> root name(no special char and no space)

Assignments

09 August 2024 12:13

1. What is Super netting

- Combining of smaller network into a large network

2. Difference between super netting and subnetting

- Opposite of each other

3. What is MTU ? Can we increase the size of MTU

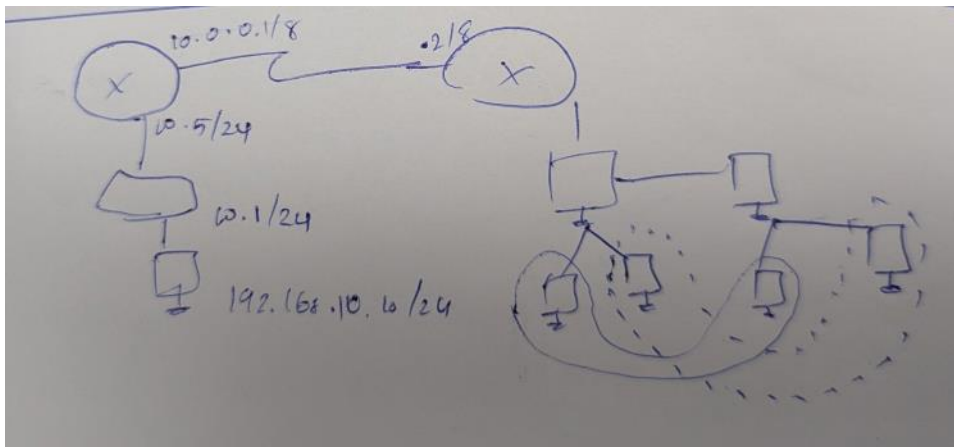
- Maximum Transition Unit
- Largest size of the packet that can be transmitted as a single entity in a network
- We can Increase the size

4. Difference between Layer2 and Layer3 switches

5. What are 3 A's in ADDS and explain?

- a. Authentication
- b. Authorization
- c. Accounting

6. Practical



Basics and References

09 August 2024 10:47

References:

- [CCNA Routing & Switching Lab Workbook | Free CCNA Workbook](#)

Network:

- Sharing the data between 2 nodes
- Different modes to share data (Wired and Wireless)

PPT Tips

- Introduce what that topic is
- In depth
- Architecture (gif)
- Advantages and Disadvantages
- Then Screenshots of working

IP Address

1. Static
2. DHCP
3. APIPA (169.254.X.X)

Networks

1. LAN
2. MAN
3. WAN

Repeaters

- It amplifies the signal
- Advantages and Disadvantages

Hub

- Used to connect LAN's

Bridges

- It connects 2 subnetworks

Public IP can communicate with Public IP

Public IP can communicate with Private IP but only using NAT Gateway

Cisco Packet Tracer

10 August 2024 14:16

Cisco Packet Tracer

Simulator, which cisco allows us to do simulation .

Any network devices(Desktop can be added and we can perform

[Cisco Packet Tracer - Networking Simulation Tool \(netacad.com\)](https://www.netacad.com/cisco-packet-tracer-networking-simulation-tool)

Install and open cisco packet tracer

- [Cisco Packet Tracer - Networking Simulation Tool \(netacad.com\)](https://www.netacad.com/cisco-packet-tracer-networking-simulation-tool)
- Login, Download from resources and install

Networking Devices

Routers

PT Empty

End devices

PC

Laptop

Server

TV

Home

IOT devices

Connections

Automatically choose cone

Router to router

Router to pc

Loopback = 127.0.0.0 - 127.255.255.255

APIPA = 169.254.0.0 - 169.254.255.255

IP Address Ranges:

- Class A = 10.0.0.0 - 10.255.255.255
- Class B = 172.16.0.0 - 172.16.255.255
- Class C = 192.168.1.0 - 192.168.1.255

In Azure

192.168.0.0/16 -> 65536

192.168.1.0/24 -> 256

192.168.1.1 - 192.168.1.3 -> Gateways

VM -> 192.168.1.4

NAT Gateway

It converts private IP to Public IP and Vice versa

OSI and TCP/IP

12 August 2024 10:48

OSI Layers

1. Application Layer:

- Applications create the data

2. Presentation Layer:

- Data is formatted and encrypted
- SSL/TLS, JPEG, MPEG, ASCII

3. Session Layer:

- Connections are established and managed
- NFS, NetBIOS,
- Modes
 - Simplex: One Way
 - Half Duplex: Bidirectional but not simultaneously
 - Full Duplex: Bidirectional and simultaneously

4. Transport Layer:

- Data is broken into segments for reliable delivery
- It controls reliability of communication through
 - Segmentation
 - Flow control
 - Error control
- TCP and UDP
- UDP
 - No feedback
 - Faster than TCP because no acknowledgement is sent back
 - DNS, Radio, Online Games
- TCP
 - Send Feedback
 - Slower in Nature
 - World wide web, FTP, Emails

5. Network Layer:

- Segments are packaged into packets and routed
- Packets
- Path Determination
- It is responsible for
 - Logical Addressing
 - Packet Forwarding
 - Fragmentation
 - Handling traffic control
- Supported Protocols
 - IP
 - ICMP (Internet control message protocol)
 - RIP (Routing Information Protocol)
 - MPLS (Multiprotocol Label Switching)

- BGP (Border Gateway Protocol)
- OSPF (Open Shortest Path First)

6. Data Link Layer:

- Packets are framed and sent to the next device
- Packets are encoded in Bits Format
- Protocols
 - ARP
 - PPP
 - Token Ring
 - L2TP

7. Physical Layer:

- Frames are converted into bits and transmitted physically
- Data is converted into Signals
- Protocols
 - Ethernet
 - Bluetooth
 - USB
 - Infrared

TCP/IP Model

1. Application Layer

- Application, Presentation and Session Layer of the OSI Model
- HTTP/HTTPS, FTP, SMTP, DNS, Telnet, DNS, SNMP

2. Transport Layer

- Data transfer between devices
- Establishes, maintains and terminates connection between devices
- Segments and reassembles data into a format that can be transmitted
- Provides flow control to prevent network congestion
- Offers error-checking mechanisms to detect and recover
- TCP and UDP

3. Internet Layer

- Equivalent to the Network Layer

4. Network Access Layer

Switch

12 August 2024 12:30

Basics of Switching

- A network switch can work in three ways
 1. Edge switches:
 - Also known as access switch
 - It link various devices, including personal computers and
 2. Aggregation switches
 - Connecting one pc to another
 - These connect to edge switches which may transmit traffic
 3. Core switches
 - Backbone of entire network
 - Core switches centralize multiple aggregation switches to the core and implement LAN routing

MAC/CAM Table

- Content Addressable Memory / Media Access Control
- Ethernet switches store the MAC addresses of all connected devices in a table known as CAM or MAC address table
- The CAM table is also known as
 - MAC forward table
 - MAC Filter table
 - MAC address table
 - Switching table
 - Bridging table
- A CAM table uses entries to store information in two ways
 - Static and Dynamic

Components of Switch

1. Switching Fabric:
 - Internal connection that allows data to be transferred between ports
2. Ports:
 - Physical interfaces where network cables connect
 - It supports different speed like 10/100 MBPS
3. MAC Address Table:
 - This table stores the MAC addresses of devices connected to the switch
4. Central Processing Unit (CPU)
5. Memory (Ram and Flash)
 - RAM is used for running switch's OS and for temporarily storing data during operations
 - Flash memory contains switch's OS, config files and other essential data

6. Power Supply
 - It provides necessary power to all the internal components of switch
7. Cooling System
 - Switches often have fans or heat sinks to dissipate heat generated by the internal components

Booting Process of Switch

1. POST
 - Checks the hardware
2. ROM
 - The ROM loads the Bootstrap program and searches for the OS
3. Flash
 - IOS from flash is loaded
4. NVRAM
 - The startup configuration is loaded from the NVRAM
5. RAM
 - Boot process is completed as everything is loaded into the RAM\

Hands-On

Drag and drop a switch -> Got to CLI -> last line -> enter -> Normal user (>) -> configure terminal -> error -> en -> enter -> switch to privileged user (#) -> exit

Cisco IOS

- It's a CLI OS
- IOS (Internetwork Operating System)
- It's a context -sensitive OS
 - > User-mode
 - # User-Privileged mode
 - (config) # global configuration mode
- Cisco basically manages this OS
- Earlier it uses **Monolithic kernel** but now it uses **Modular Design**
- Cisco SmartNet
 - It's a subscription for the PRODUCTION ENV (not for testing)
 - It's a paid subscription

Hands-On

- Changing the banner on Cisco IOS
 - banner motd #
 - switch -> en -> conf t -> banner motd # -> hello# -> exit -> exit -> enter
- When we restart, the data will be deleted, so we use < wr > to store data in NVRAM
 - copy run startup-config is same as wr
- Configuring Password
 - En -> Conf t -> line console 0 -> passwd abcd -> login -> exit -> exit
 - Login is to mention to enter password at the time of login

- This password is set for default user
- Configuring Username and Password
 - enable -> conf t -> line console 0 -> login local -> exit -> username jeetu password singh -> exit -> exit
 - When we enable this user we can switch back to privileged mode, but need to overwrite the user===++

13-08-2024

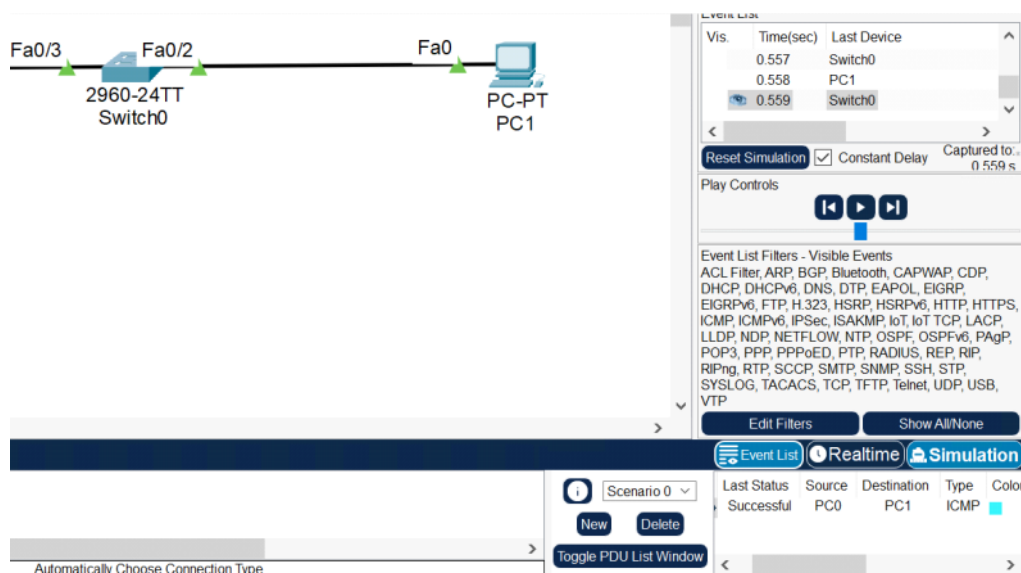
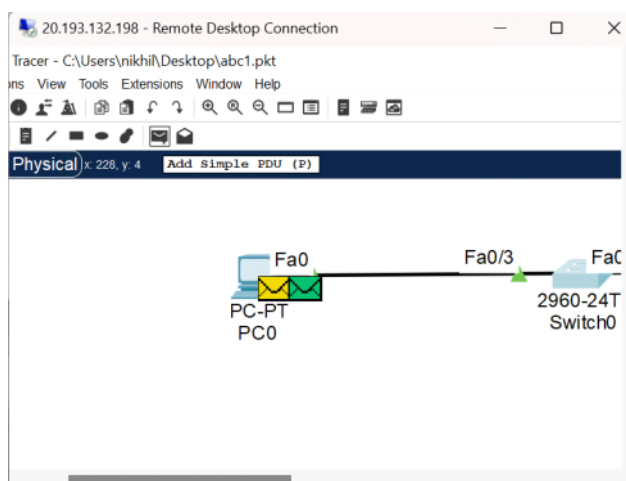
Hands ON

Options -> preferences -> always show port table -> enable -> to view port

ADD 2 PC and connect them to switch, give a static IP to both PC

Add a switch -> add 2 pc -> connect pc to switch through automatic cable -> desktop -> IP config -> edit ->

Add a packet on PC 1 (Sender) -> click on PC2 (Receiver) -> simulation -> run



After the packet is sent and acknowledgment is received -> open cli of switch ->
show mac address-table

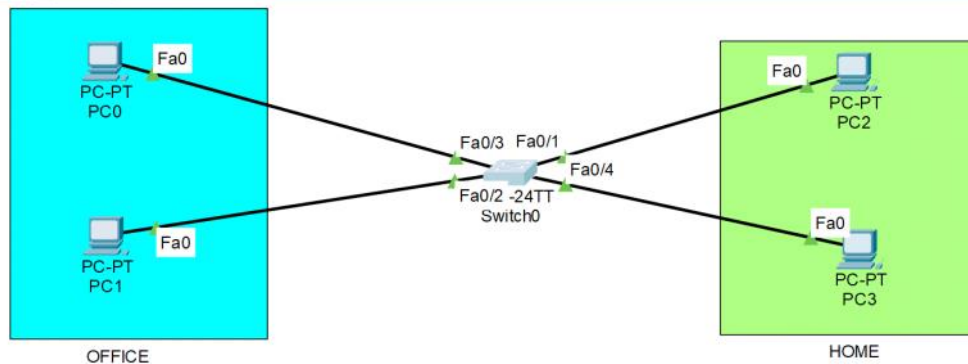
The image shows a network diagram on the left and a CLI window for Switch0 on the right. The diagram illustrates a connection between a PC (PT C0) and a switch (2960-24TT Switch0) via a line labeled Fa0/3. The switch has two other ports labeled Fa0 and Fa0/2. The CLI window displays the following commands and output:

```
SW1>en
SW1>enable
SW1#show mac
SW1#show mac add
SW1#show mac address-table
Mac Address Table
-----
Vlan    Mac Address      Type    Ports
----
SW1#show mac address-table
Mac Address Table
-----
Vlan    Mac Address      Type    Ports
----
1       0001.9782.2d81   DYNAMIC Fa0/2
1       000c.8509.b377   DYNAMIC Fa0/3
SW1#
```

Below the CLI window, there are buttons for 'Copy' and 'Paste'.

VLAN

12 August 2024 18:09



Create VLAN

Switch

- (config) # vlan 100
- (config-vlan) # name office
- (config-vlan) # exit
- (config) # vlan 101
- (config-vlan) # name home
- (config-vlan) # exit
- (config) # show vlan (To Verify)

Access: Switch to PC that

Switch: To connect Switch to Switch is Trunk

To connect PC0 to VLAN

- (config) # interface fastEthernet 0/3 (Selecting Ethernet)
- (config-if) # switchport mode access (to change the interface between access/trunk)
- (config-if) # switchport access vlan 100 (To give access to vlan 100)
- (config-if) # exit

To connect PC1 to VLAN

- (config) # interface fastEthernet 0/2
- (config-if) # switchport mode access
- (config-if) # switchport access vlan 100
- (config-if) # exit

To connect PC2 to VLAN

- (config) # interface fastEthernet 0/1
- (config-if) # switchport mode access
- (config-if) # switchport access vlan 101
- (config-if) # exit

To connect PC3 to VLAN

- (config) # interface fastEthernet 0/4
- (config-if) # switchport mode access
- (config-if) # switchport access vlan 101
- (config-if) # exit

Deleting VLAN

- (config) # no vlan 101

(To delete vlan of home)

DTP, VTP & STP

13 August 2024 11:56

Dynamic Trunking Protocol

- Manual is not recommended so we use DTP
 1. Auto
 - It will form a trunk if the neighbor switch port is set to trunk or desirable
 - Trunk will not be formed if both sides are set to auto
 - Default on newer switches
 2. Desirable
 - Will form a trunk if the neighbor switch port is set to trunk, desirable or auto
 - Default on older switches
 3. No negotiate
 - Disabled DTP
- show interfaces fastEthernet 0/1 switchport

VTP (VLAN Trunking Protocol)

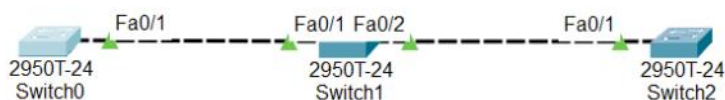
When we have multiple switches with us , and we want to create VLAN on all switches,

If there are S1, S2 and S3. S1 updates info quickly to S2, but it takes time to update to S3
So we keep S1 in the middle, S1 will update with same speed.

Modes of VTP

1. Client
2. Server
3. Transparent

Hands-ON



- Switch1# show vtp status
- Switch1# show interfaces trunk

[If we are not having trunking]

- Switch1(config)# interface fastEthernet 0/1
- Switch1(config-if)# switchport mode trunk
- Switch1# show interfaces trunk

[Creating Domain]

- Switch(config)# vtp domain abcd
- Switch1# show vtp status

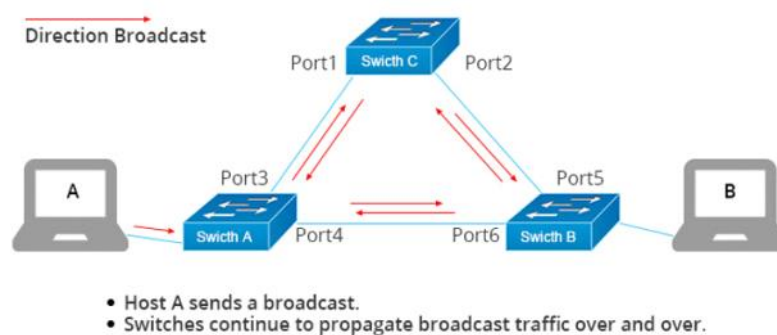
[Creating VLAN]

- Switch1(config)# vlan 101
- Switch1(config-vlan)# name testvtp
- Switch1(config-vlan)# exit
- Switch1# show vlan

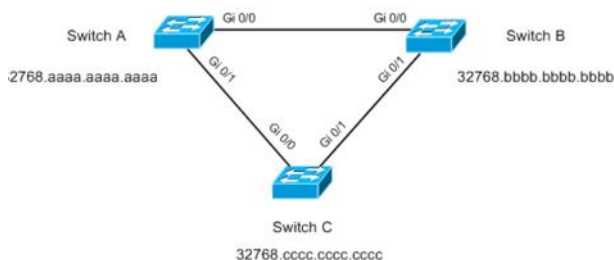
[Verify on other switches]

- Switch1# show vlan
- Switch1# show vtp status

Spanning Tree Protocol (STP)



- All switches are connected to each other and has its own computer, if one sends data , the data gets struck in loop and this situation is called **Broadcast Storm**
- The main purpose of STP is to ensure that you **do not create loops** when you have redundant paths in your network
- Switches send probe into the network periodically to discover loops
- It detect the loop when the switch receives the same package which is sent by itself
- These probes are called **BPDU** (Bridge Protocol Data Unit), that contains the details of a sender switch
- Which switch will break the loop?
 - Election will happen
 - One of them will be elected as root switch
 - The switch with the lowest BPDU ID is elected as root bridge
 - BPDU ID = Bridge Priority + MAC address
 - The oldest switch wins the race with MAC address
 - If all are new, then the least value will be elected



- Here Switch A has the least value, so it will be the root

- **Port Rules**

1. **Root Port:** Used to reach the bridge
2. **Designated Port:** Forwarding Port
3. Blocking / Non designation Port

Aging Time 20

Interface	Role	Sts	Cost	Prio.Nbr	Type
-----	-----	-----	-----	-----	-----
Fa0/1	Root	FWD	19	128.1	P2p
Fa0/3	Desg	FWD	19	128.3	P2p
Fa0/2	Desg	FWD	19	128.2	P2p

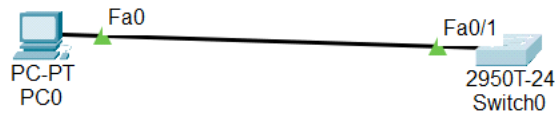
Types of STP

1. STP
2. PVST (Per VLAN Spanning Tree)
3. RSTP (Rapid Spanning Tree Protocol)
4. Rapid PVST

Port Security and Backup of Switch

14 August 2024 11:50

Hands- on



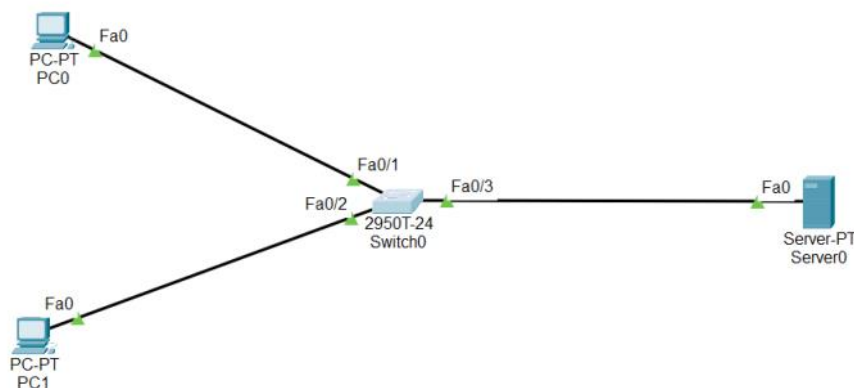
- Switch(config)# interface fastEthernet 0/1
- Switch(config-if)# switchport mode access
- Switch(config-if)# switchport port-security mac-address ?
- Switch(config-if)# switchport port-security (To Enable Port Security)

[2 Types, allow only 1 mac or generate errors]

- Switch(config-if)# switchport port-security mac-address 0010.1166.AEDA
- [or]
- Switch(config-if)# switchport port-security mac-address 0000.0000.0001
- Switch(config-if)# switchport port-security violation ?
 - protect Security violation protect mode
 - restrict Security violation restrict mode
 - shutdown Security violation shutdown mode
- Switch# show port-security

Backup of Switch

- There will be a TFTP server which contains backup of switch, if anything goes wrong, we can revert back



[Changing Ip of Switch]

- Switch(config)# interface vlan 1
- Switch(config-if)# ip address 192.168.10.20 255.255.255.0
- Switch(config-if)# no shutdown
- Switch# show interfaces vlan 1

[Copy the files to TFTP server]

- Switch# copy running-config tftp:
- Address or name of remote host []? 192.168.10.12
- Destination filename [Switch-config]? myfile

[check if the backup is working or not]
[changing the ip again]

- Switch(config)# interface vlan 1
- Switch(config-if)# ip address 192.168.10.30 255.255.255.0
- Switch(config-if)# no shutdown
- Switch# show interfaces vlan 1

[To revert back to the old IP]

- Switch# copy tftp: run
- Address or name of remote host []? 192.168.10.12
- Source filename []? myfile
- Destination filename [running-config]?

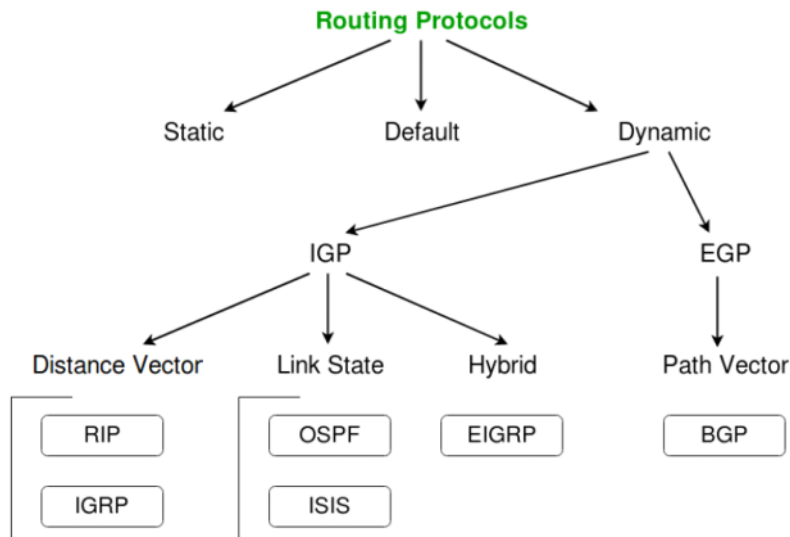
Router

14 August 2024 16:42

Networking Device to allow communication between 2 or more network

1. Branch

Routing Protocol



Types of Routing

1. Static

- a. All the entries should be manually enter the network details and next hop
- b. Cheap, No bandwidth, No overhead
- c. Difficult for large networks,

2. Default

3. Dynamic

- a. Routing is the process where routers automatically discover and adapt network paths
- b. Types
 - i. IGP
 - 1) Distance Vector (RIP & IGRP)
 - 2) Link State (OSPF) By default we will get load balancer
 - 3) Hybrid (EIGRP)
 - ii. EGP
 - 1) Path Vector (BGP)

IGP

- RIP (Routing Information Protocol)
- OSPF (Open shortest Path First)
- EIGRP (Enhanced Interior Gateway Routing Protocol)
- IS-IS (Intermediate System to Intermediate System)

RIP & IGRP

17 August 2024 09:47

RIP (Routing Information Protocol)

- It has 2 versions V1 and V2
- Subnetting is not allowed
 - Only Fixed length subnet mask(FLSM) is allowed and not variable LSM(VLSM)
- Updates are **broadcasted via 255.255.255.255**
 - R0, R1, R2 are there, R1 and R2 are configured with RIP, R0 is not
 - Still R0 receives the update
- Metric based on Hop count
- Maximum hops allowed is **15**
- Max routers allowed is 16 (1+15)
- It supports loads balancing
- Entire routing table is exchanged after every **30 seconds**

RIP Timer

1. Update Timer

- a. Time between consecutive updates
- b. 30 seconds

2. Invalid Timer

- a. Time that router waits to hear updates
- b. It waits for 180 seconds , it might reply and then sends to flush time

3. Flush Timer

- a. Time before the invalid route is purged/removed from the routing table
- b. It waits up to 240 seconds
- c. That particular router will be removed from network itself

Advantages

- Easy to Configure
- No design constraints
- No complexity
- Less overhead

Disadvantages

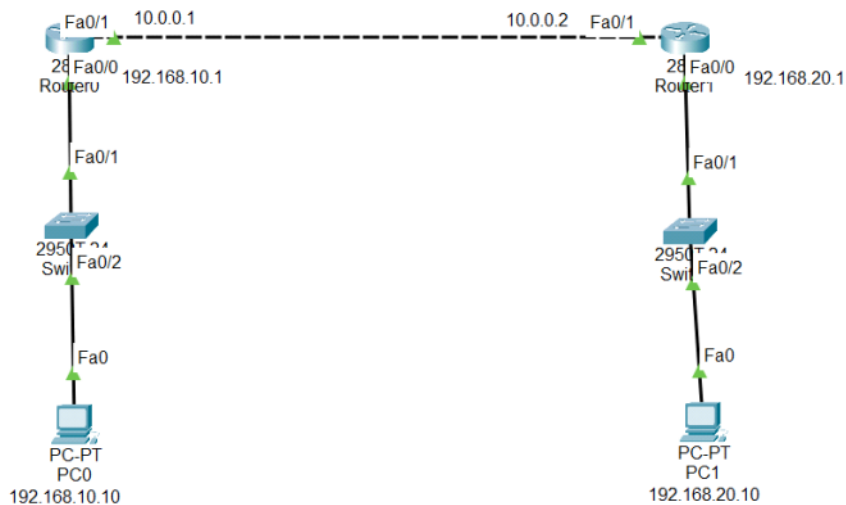
- Bandwidth utilization (is very high as broadcast for every 30 sec)
- Works only on hop count
- No scalable (As hop count is only 15)

RIP V2

- Supports VLSM
- Trigger Updates

- Uses multicast address 224.0.0.9
- Supports Authentication
- Supports classless routing protocol

Hands-On 1



To add RIP on router0

- Router(config)# router rip
- Router(config-router)# network 192.168.10.0
- Router(config-router)# network 10.0.0.0

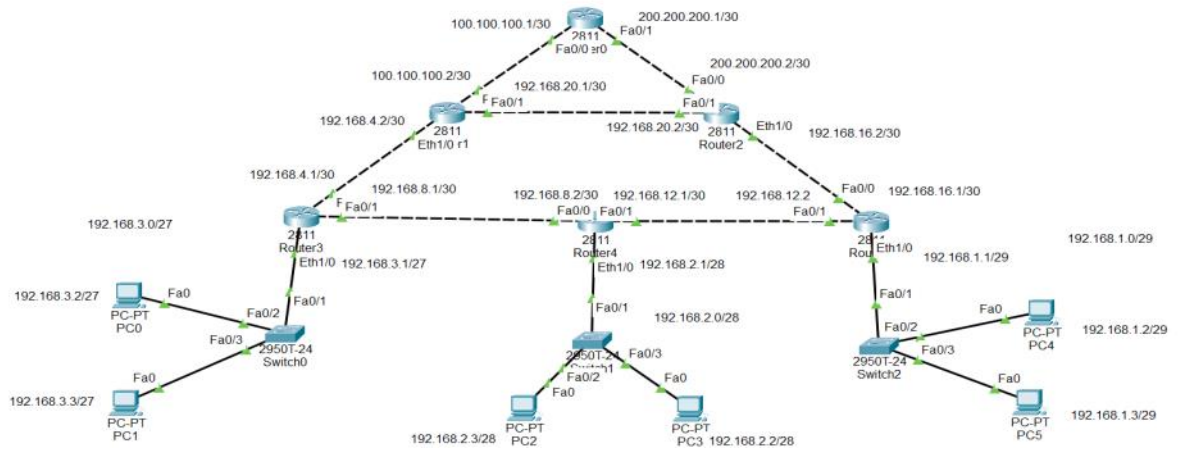
To add RIP on router1

- Router(config)# router rip
- Router(config-router)# network 192.168.20.0
- Router(config-router)# network 10.0.0.0

To Shift to RIP V2

- Router(config)# router rip
- Router(config-router)# version 2

Hands-On 2



Subnet Masks

/32	255	/24	255	/16	255	/8	255
/31	254	/23	254	/15	254	/7	254
/30	252	/22	252	/14	252	/6	252
/29	248	/21	248	/13	248	/5	248
/28	240	/20	240	/12	240	/4	240
/27	224	/19	224	/11	224	/3	224
/26	192	/18	192	/10	192	/2	192
/25	128	/17	128	/9	128		

IGRP

- Interior Gateway Routing Protocol
- It supports a maximum of 100 routers
- Metric based on bandwidth, delay, reliability, load, MTU size
- Its classful routing protocol
- Consumes more bandwidth than EIGRP
- IGRP is **not supported after IOS 12.3** release

EIGRP

17 August 2024 15:44

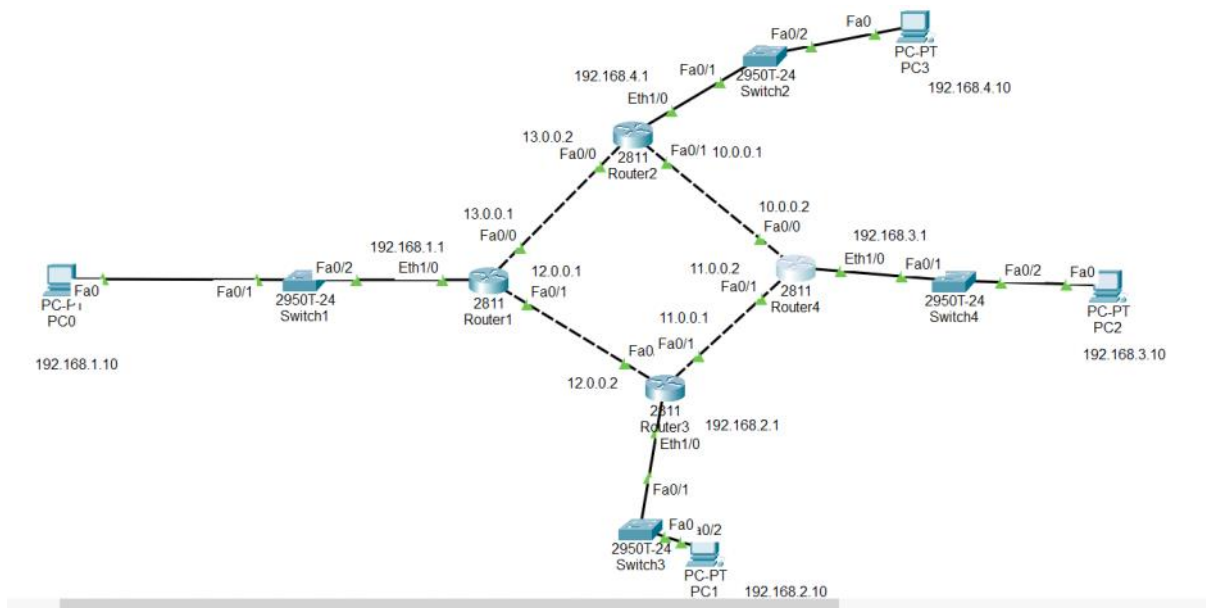
- Enhanced Interior gateway Routing Protocol
- It's a hybrid routing protocol and has both characteristics of
 - Distance Vector Routing Protocol
 - Link State
- It's Cisco proprietary product
- It's successor of IGRP
- Metric based on Bandwidth, Delay, Load, Reliability
- Convergence is faster as it uses DUAL
- Packet delivery is handled using
 - RTP
 - Reliable multicast on 224.0.0.10
 - EIGRP uses IP protocol number 88
- Uses Variable length subnet mask
- Classless routing protocol
- Loop free topology

Hands-On



- Router1(config)# router eigrp 1
- Router1(config-router)# net
- Router1(config-router)# network 192.168.1.0 255.255.255.0
- Router1(config-router)# network 10.0.0.0 255.0.0.0
- Router1(config-router)# exit
- Router2(config)# router eigrp 1
- Router2(config-router)# net
- Router2(config-router)# network 192.168.2.0 255.255.255.0
- Router2(config-router)# network 10.0.0.0 255.0.0.0
- Router2(config-router)# exit

2.



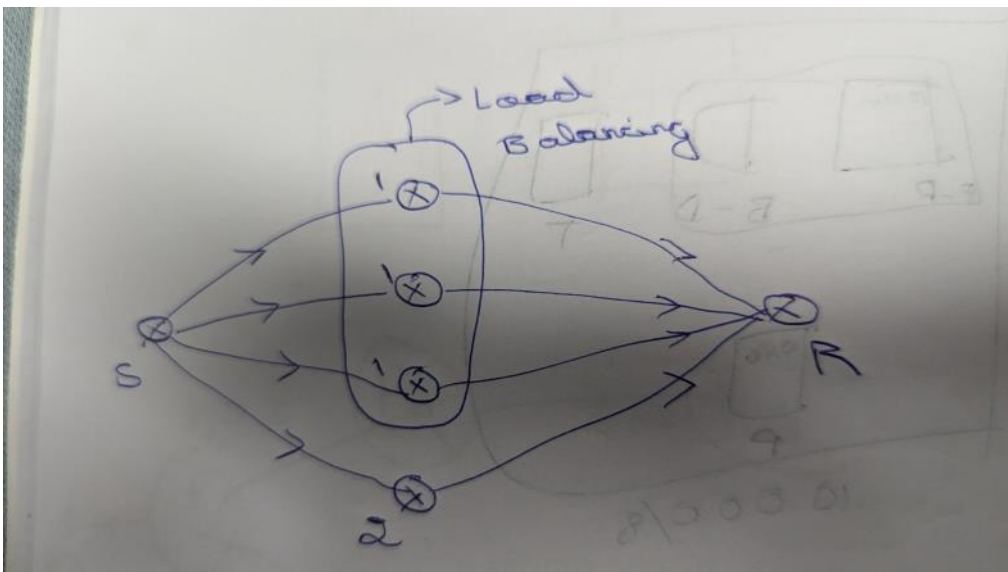
OSPF

19 August 2024 09:12

- Open shortest path first
- Widely used protocol (We all want to reach the packet in shortest way)
- LSA is the main important component of OSPF
- It sends LSA (Link State Advertisements), to get info about
 - Subnet
 - Router
 -
- OSPF stores all the LSA information in a database called **LSDB**, which is present in all the routers

Steps of OSPF Working

1. Becoming Neighbors:
 - 2 routers running on the same link agree to form a neighbor relationship
 2. Exchange Database Information
 - Neighbor routers swap their LSDB information with each other
 3. Choose the best Routes
 - Each router choose the best routes based on the learned LSDB information
- It Uses SPF(Shortest Path First) or **DIJKASTRA Algorithm**
 - **Unlimited hop** count
 - It supports **equal load balancing** (If all the routers have same cost, it distributes the load)

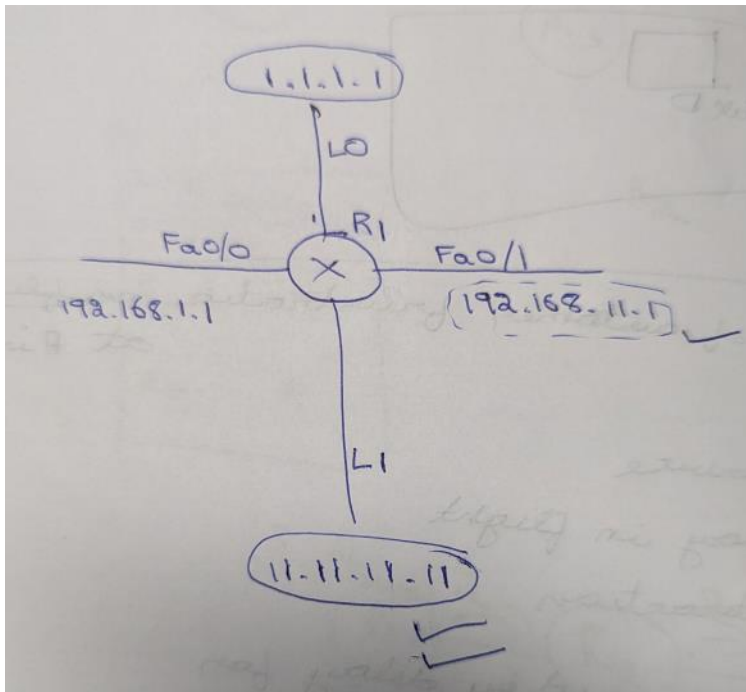


- All areas must be connected to area 0
- Supports authentication
- Uses multicast address: 224.0.0.5 & 224.0.0.6

Router ID in OSPF

- The highest IP address of the active physical interface of the router ID becomes the Router ID

- If there is any loopback that will be router ID
- If there are 2 loopbacks, the greater loopback will be the Router



OSPF Tables

It maintains 3 tables

1. Neighbor table

- This table contains information about the directly connected OSPF neighbors forming adjacency

2. Database table

- This table contains the information about the entire view of the topology with respect to each other

3. Routing Information table

- Routing table contains information about the best path calculated by the shortest path algo in database table

Wildcard

- It is the opposite of Subnet Mask

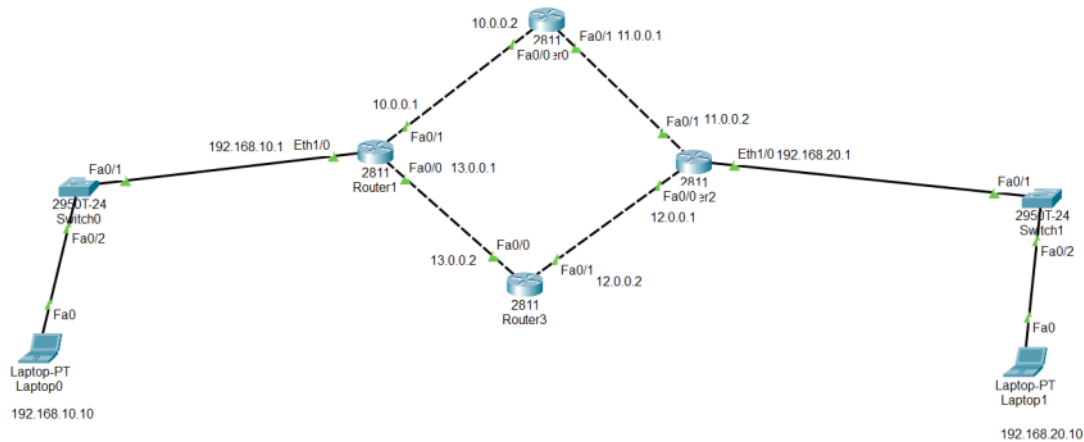
	Subnet Mask	Wildcard Mask
Class A	255.0.0.0	0.255.255.255
Class B	255.255.0.0	0.0.255.255
Class C	255.255.255.0	0.0.0.255

- If it is 128..
 - $255.255.255.255 - 255.255.255.128 = 0.0.0.127$

Syntax of OSPF Command

- `network < ip addr range > < wildcard mask > area 0`

Hands ON 1



1. Router 0

- Router(config)# router ospf 1
- Router(config-router)# network 10.0.0.0 0.255.255.255 area 0
- Router(config-router)# network 11.0.0.0 0.255.255.255 area 0
- Router(config-router)#
- 03:26:01: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.10.1 on FastEthernet0/0 from LOADING to FULL, Loading Done

2. Router 1

- router(config)# router ospf 1
- router(config-router)# network 192.168.10.0 0.0.0.255 area 0
- router(config-router)# network 10.0.0.0 0.255.255.255 area 0
- router(config-router)# network 13.0.0.0 0.255.255.255 area 0

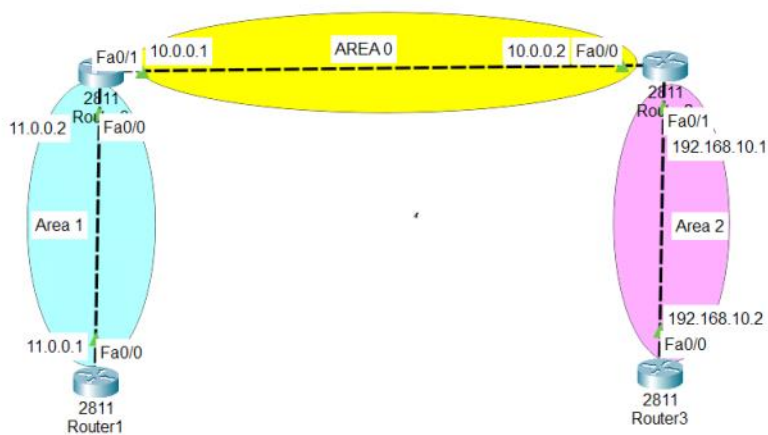
3. Router 2

- Router(config)# router ospf 1
- Router(config-router)# network 192.168.20.0 0.0.0.255 area 0
- Router(config-router)# network 11.0.0.0 0.255.255.255 area 0
- Router(config-router)# network 12.0.0.0 0.255.255.255 area 0

4. Router 3

- Router(config)# router ospf 1
- Router(config-router)# network 12.0.0.0 0.255.255.255 area 0
- Router(config-router)# network 13.0.0.0 0.255.255.255 area 0

Hands-on 2



Router 1

- Router(config)# router ospf 1
- Router(config-router)# network 11.0.0.0 0.255.255.255 area 1
- Router# show ip ospf neighbour

Neighbor ID	Pri	State	Dead Time	Address	Interface
11.0.0.2	1	FULL/BDR	00:00:36	11.0.0.2	FastEthernet0/0

Router 0

- Router(config)# router ospf 1
- Router(config-router)# network 11.0.0.0 0.255.255.255 area 1
- Router(config-router)# network 10.0.0.0 0.255.255.255 area 1
- Router# show ip ospf neighbour

Neighbor ID	Pri	State	Dead Time	Address	Interface
11.0.0.1	1	FULL/BDR	00:00:36	11.0.0.1	FastEthernet0/0
192.168.10.1	1	FULL/BDR	00:00:30	10.0.0.2	FastEthernet0/1

Router 2

- Router(config)# router ospf 1
- Router(config-router)# network 10.0.0.0 0.255.255.255 area 0
- Router(config-router)# network 192.168.10.0 0.0.0.255 area 2

Router 3

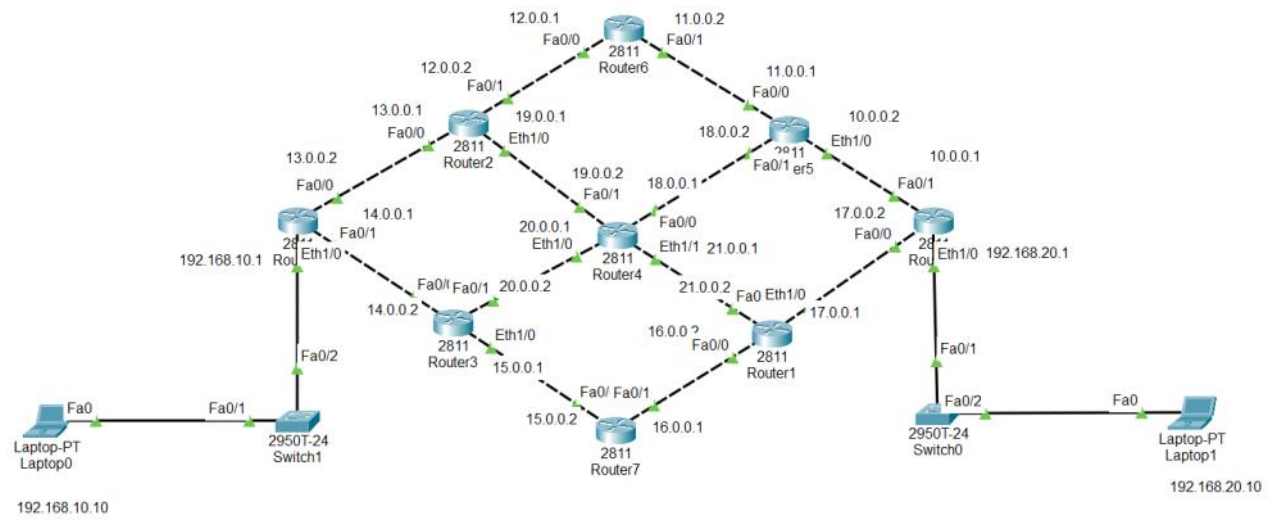
- Router(config)# router ospf 1
- Router(config-router)# network 192.168.10.0 0.0.0.255 area 2

On Any Router type

- Router# show ip route

O IA 11.0.0.0/8 [110/2] via 10.0.0.1, 00:56:45, FastEthernet0/0
 192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks

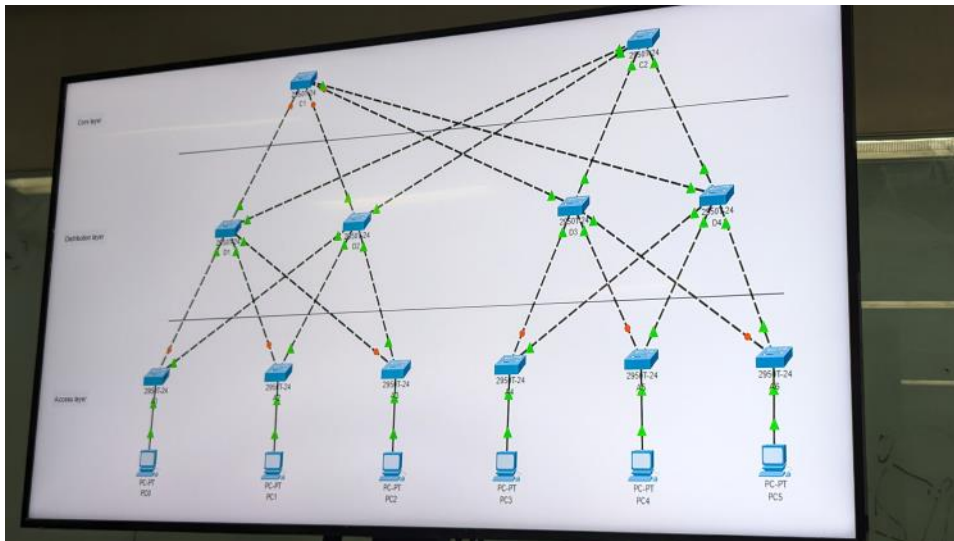
Hands- ON 3



Redundancy

20 August 2024 10:07

Basics



TASK - 2

1. Capture ARP details from PC2 to PC4 for the following network.
2. Delete the uplink between A1 & D2 switches and ping from PC0 to PC5
3. Delete the uplink between C1 & D4 & ping PC0 to PC5.
4. Delete D4 uplink & ping PC0 to PC5.
5. Delete C1 uplink & ping PC0 to PC5.

Note: for every task, create a new scenario.

Scenario 2

Scenario 0

New Scenario 1

Scenario 2

Toggle PDU List Window

End Result

