VISVESVARAYA TECHNOLOGICAL UNIVERSITY

JNANA SANGAMA, BELAGAVI -590 014

Internship Seminar Report on

"Securing VTP Domains"

Submitted in partial fulfilment of the requirement for the award of

BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE AND ENGINEERING

Submitted by:

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2021-2022

S.J.M VIDYAPEETHA ®

S.J.M INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Affiliated to Visvesvaraya Technological University, Belagavi, Recognized by AICTE, New Delhi and Approved by Government of Karnataka)

NAAC Accredited with 'B^{++}' Grade

P.B. No. 73, NH4 By-pass, Chitradurga -577502, Karnataka State, INDIA.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

C E R T I F I C A T E

This is to certify that the project work on entitled "**Securing VTP Domains**" is a bonafide work carried out by MOHAMMED NAYAZ (4SM18CS029) in partial fulfillment for the award of degree of **Bachelor of Engineering in Computer Science & Engineering** of the **Visvesvaraya Technological University, Belagavi** during the academic year **2021-2022**. It is certified corrections/suggestions indicated during Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as if satisfies the academic requirements in respect of project work prescribed for the Bachelor of Engineering Degree.

Signature of the Guide	**Signature of the H.O.D**	**Signature of the Principal**
Asso.Prof., Dept of CS&E, SJMIT, Chitradurga	Gururaj T **Asso.Prof., Dept of CS&E,** SJMIT, Chitradurga	Dr. B C Shanthappa **Principal** SJMIT, Chitradurga

External Viva:

Name of the Examiners	**Signature with Date**
1)……	**……**
2)……	**……**

“About CISCO”

Cisco Networking Academy

Cisco is the acknowledged world leader in **networking** technology. Its comprehensive **Networking Academy** education program brings research and outcome based courses to schools, colleges, universities, and non profits worldwide. **Cisco** develops the content and provides 24/7 teaching and learning resources.

Cisco Networking Academy is an innovative Cisco education initiative that delivers information and communication technology skills to improve career and economic opportunities around the world. The Academy provides online courses, interactive tools, and lab activities to prepare individuals for information technology and networking careers in virtually every industry.

Background

Cisco Systems was founded in December 1984 by Sandy Lerner along with her husband Leonard Bosack. Lerner was the director of computer facilities for the Stanford University Graduate School of Business. Bosack was in charge of the Stanford University computer science department's computers.

Although Cisco was not the first company to develop and sell dedicated network nodes, it was one of the first to sell commercially successful routers supporting multiple network protocols. Classical, CPU-based architecture of early Cisco devices coupled with flexibility of operating system IOS allowed for keeping up with evolving technology needs by means of frequent software upgrades. Some popular models of that time (such as Cisco 2500) managed to stay in production for almost a decade virtually unchanged. The company was quick to capture the emerging service provider environment, entering the SP market with product lines such as Cisco 7000 and Cisco 8500.

Between 1992 and 1994, Cisco acquired several companies in Ethernet switching, such as Kalpana, Grand Junction and most notably, Mario Mazzola's Crescendo Communications, which together formed the Catalyst business unit. At the time, the company envisioned layer 3 routing and layer 2 (Ethernet, Token Ring) switching as complementary functions of different intelligence and architecture—the former was slow and complex, the latter was fast but simple. This philosophy dominated the company's product lines throughout the 1990s.

Networking courses

Cisco Systems Inc. specializes in **networking** and communications products and services.To ensure that IT professionals have the skills and knowledge necessary to support **Cisco** products and solve customers' technology problems on many fronts, the **Cisco** Career Certification program is all-embracing

CCNA Training

CCNA Training Provided by Mindmajix is a required course for network engineers that facilitates them to install, control and troubleshoot networks. This training discusses methods for configuring the devices. In this course, you will learn the concepts like Functions of Routers and switches, Bridges and Hubs, TCP/IP Model, Data Flow between hosts, etc. With the support of this training, you can observe how information is transmitted through routers and switches. This course helps you in achieving Cisco Certified Network Associate Certification.

Teaching Tools

With Cisco Networking Academy expanding into many different nations, some without the infrastructure present in western nations, Cisco has worked with a business partner to create a remote access router system (Net lab+) as well as collaborating with over 200 academies world wide to test and aid the development of the Packet Tracer application, which offers students and education a free networking education tool . These are available in addition to the in-class practical labs for the Cisco courses.

TASK PERFORMED / ACTIVITY

RECORD OF TASK PERFORMED

SL NO	DATE	TASK
01	08-09-2021	Internship Overview Meet & greet the coordinator
02	13-09-2021	Introduction to Networks.
03	14-09-2021	Cables
04	15-09-2021	Assignment 1 - Determine the IP Address Configuration of a Computer
05	16-09-2021	OSI & TCP-IP IP Addressing
06	17-09-2021	Assignment 2 - My Local Network
07	18-09-2021	Networking Device
08	19-09-2021	Assignment 3 - Build a Simple Network
09	20-09-2021	Complete Guide
10	21-09-2021	Problem statement- Securing VTP Domains

INDEX

Chapter 1

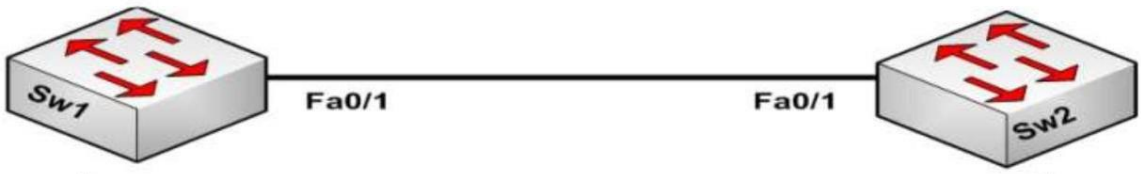
Objective

The objective of this exercise is for you to learn and understand how to secure VTP domains using Cisco catalyst switches. By default, VTP domains are not password-protected

Purpose

Securing the VTP is a fundamental skill. When VTP domains are not configured with a password, rough switches can be added to the network and disrupt service. As a Cisco engineer, as well as in the Cisco CCNA exam, you will be expected to know how to configure VTP password

Lab topology



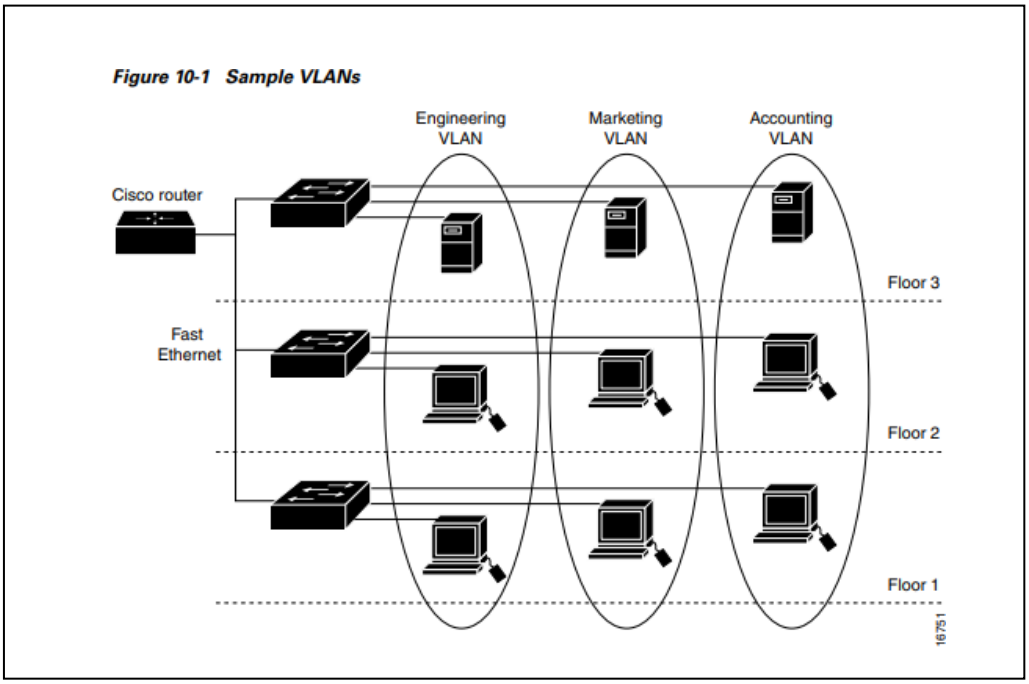
VLAN Number	VLAN Name	Port
10	SALES	FastEthernet0/5
20	MANAGERS	FastEthernet0/6
30	ENGINEERS	FastEthernet0/7
40	SUPPORT	FastEthernet0/8

Chapter 2

Prerequisites terminologies

VLAN

A VLAN is a group of devices on one or more LANs that are configured to communicate as if they were attached to the same wire, when in fact they are located on a number of different LAN segments. Because VLANs are based on logical instead of physical connections, they are extremely flexible.



VLANs define broadcast domains in a Layer 2 network. A broadcast domain is the set of all devices that will receive broadcast frames originating from any device within the set. Broadcast domains are typically bounded by routers because routers do not forward broadcast frames. Layer 2 switches create broadcast domains based on the configuration of the switch. Switches are multiport bridges that allow you to create multiple broadcast domains. Each broadcast domain is like a distinct virtual bridge within a switch.

You can define one or many virtual bridges within a switch. Each virtual bridge you create in the switch defines a new broadcast domain (VLAN). Traffic cannot pass directly to another VLAN (between broadcast domains) within the switch or between two switches. To interconnect two

different VLANs, you must use routers or Layer 3 switches. See the "Overview of Layer 3 Interfaces" section on page 23-1 for information on inter-VLAN routing on Catalyst 4500 series switches. Figure 10-1 shows an example of three VLANs that create logically defined networks.

VLANs are often associated with IP subnet works. For example, all of the end stations in a particular IP subnet belong to the same VLAN. Traffic between VLANs must be routed. You must assign LAN interface VLAN membership on an interface-by-interface basis (this is known as interface-based or static VLAN membership). You can set the following parameters when you create a VLAN in the management domain:

• VLAN number
• VLAN name
• VLAN type
• VLAN state (active or suspended)
• Maximum transmission unit (MTU) for the VLAN
• Security Association Identifier (SAID)
• VLAN number to use when translating from one VLAN type to another.

VTP CONFIGURATION

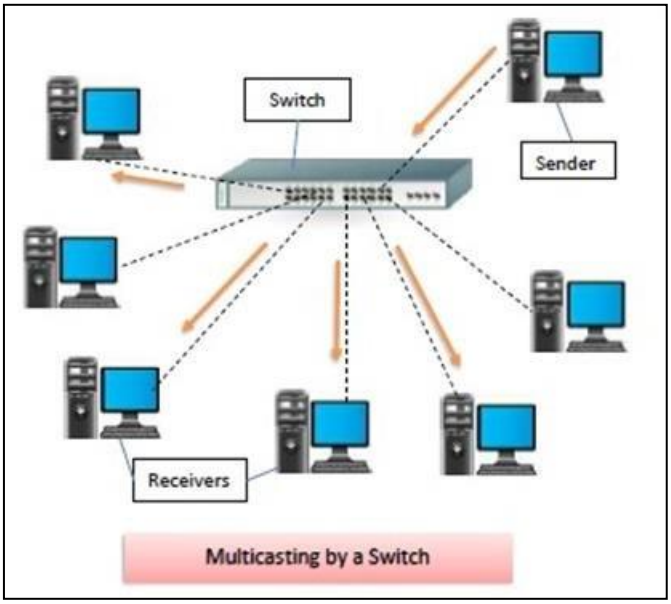
We've learned that using VTP makes it is possible to make configuration changes on one or more switches and have those changes automatically advertised to all the other switches in the same VTP domain. In a typical network some switches are configured as VTP servers and other switches are configured as VTP clients. A VLAN created on a VTP server switch is automatically advertised to all switches inside the same VTP domain.

To exchange VTP messages, five requirements must be met:

1. a switch has to be configured as either a VTP server or VTP client
2. the VTP domain name has to be the same on both switches
3. if present, the VTP domain password has to be the same
4. VTP versions have to match
5. the link between the switches has to be a trunk link

SWITCHES

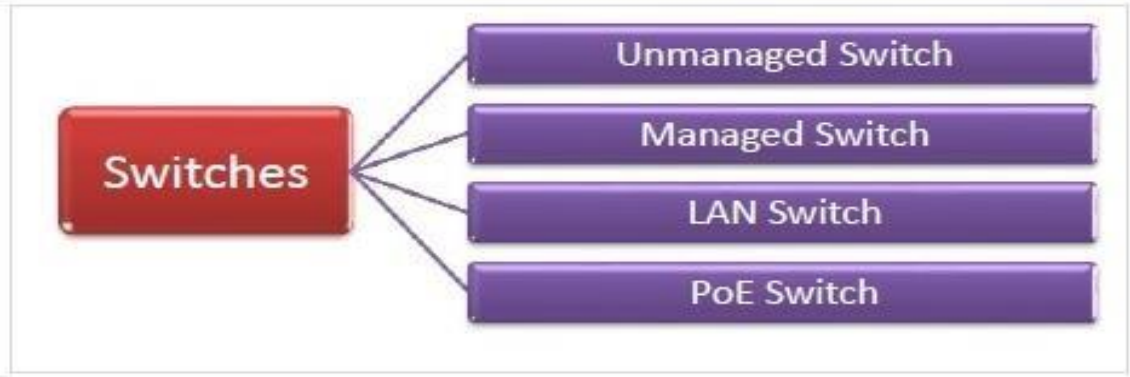
Switches are networking devices operating at layer 2 or a data link layer of the OSI model. They connect devices in a network and use packet switching to send, receive or forward data packets or data frames over the network.



A switch has many ports, to which computers are plugged in. When a data frame arrives at any port of a network switch, it examines the destination address, performs necessary checks and sends the frame to the corresponding device(s).It supports unicast, multicast as well as broadcast communications.

Types of Switches

There are variety of switches that can be broadly categorised into 4 types −



- **Unmanaged Switch** − These are inexpensive switches commonly used in home networks and small businesses. They can be set up by simply plugging in to the network, after which they instantly start operating. When more devices needs to be added, more switches are simply added by this plug and play method. They are referred to as u managed since they do not require to be configured or monitored.
- **Managed Switch** − These are costly switches that are used in organisations with large and complex networks, since they can be customized to augment the functionalities of a standard switch. The augmented features may be QoS (Quality of Service) like higher security levels, better precision control and complete network management. Despite their cost, they are preferred in growing organizations due to their scalability and flexibility. Simple Network Management Protocol (SNMP) is used for configuring managed switches.
- **LAN Switch** − Local Area Network (LAN) switches connects devices in the internal LAN of an organization. They are also referred as Ethernet switches or data switches. These switches are particularly helpful in reducing network congestion or bottlenecks. They allocate bandwidth in a manner so that there is no overlapping of data packets in a network.
- **PoE Switch** − Power over Ethernet (PoE) switches are used in PoE Gogabit Ethernets. PoE technology combine data and power transmission over the same cable so that devices connected to it can receive both electricity as well as data over the same line. PoE switches offer greater flexibility and simplifies the cabling connections

VTP Server

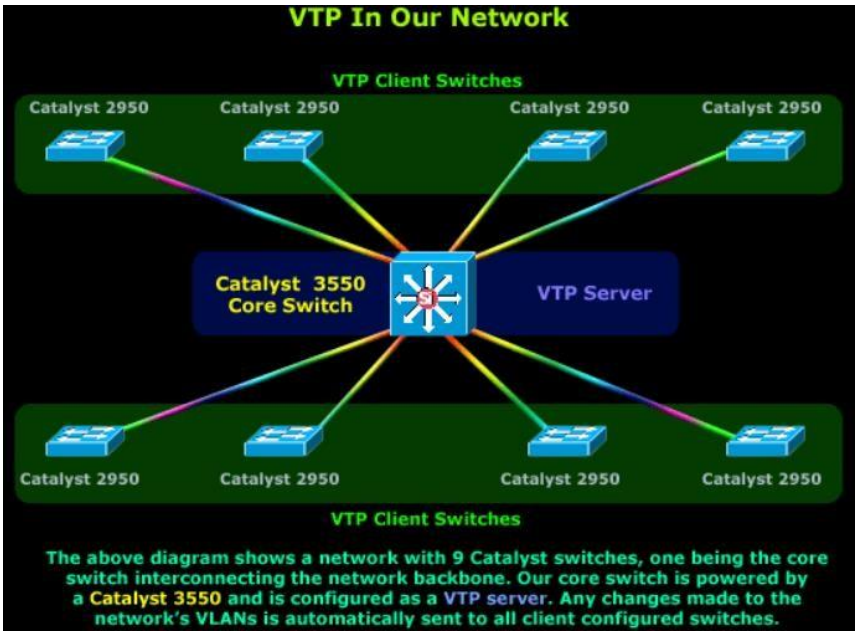
he VTP protocol is a fairly complex protocol, but easy to understand and implement once you get to know it. Currently, 3 different versions of the protocol exist, that is, version 1, 2 (adds support for Token Ring networks) and 3, with the first version being used in most networks.

Despite the variety of versions, it also operates in 3 different modes: Server, client and transparent mode, giving us maximum flexibility on how changes in the network effect the rest of our switches. To help keep things simple and in order to avoid confusion, we will work with the first version of the VTP protocol - VTP v1, covering more than 90% of networks.

Below you'll find the 3 modes the VTP protocol can operate on any switch throughout the network:

- VTP Server mode
- VTP Client mode
- VTP Transparent mode

Each mode has been designed to cover specific network setups and needs, as we are about to see, but for now, we need to understand the purpose of each mode and the following network diagram will help us do exactly that.



A typical setup involves at least one switch configured as a VTP Server, and multiple switches configured as VTP Clients. The logic behind this setup is that all information regarding VLANs is stored only on the VTP Server switch from which all clients are updated. Any change in the VLAN database will trigger an update from the VTP Server towards all VTP clients so they can update their database.

Lastly, be informed that these VTP updates will only traverse Trunk links. This means that you must ensure that all switches connect to the network backbone via Trunk links, otherwise no VTP updates will get to your switches.

Let's now take a closer look at what each VTP mode does and where it can be used.

VTP Mode	Description
VTP Server	The default mode for all switches supporting VTP. You can create, modify, and delete VLANs and specify other configuration parameters (such as VTP version) for the entire VTP domain. VTP servers advertise their VLAN configurations to other switches in the same VTP domain and synchronize their VLAN configurations with other switches based on advertisements received over trunk links. VLAN configurations are saved in NVRAM.
VTP Client	Behaves like a VTP server, but you cannot create, change, or delete VLANs on a VTP client. VLAN configurations are saved in NVRAM.
VTP Transparent	Does not advertise its VLAN configuration and does not synchronize its VLAN configuration based on received advertisements. However, they will forward VTP advertisements as they are received from other switches. You can create, modify, and delete VLANs on a switch in VTP transparent mode. VLAN configurations are saved in NVRAM, but they are not advertised to other switches.

Fast Ethernet

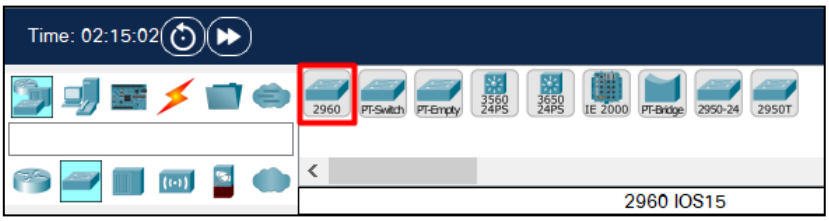
In computer networking, **Fast Ethernet** physical layers carry traffic at the nominal rate of 100 Mbit/s. The prior Ethernet speed was 10 Mbit/s. Of the Fast Ethernet physical layers, **100BASE-TX** is by far the most common.

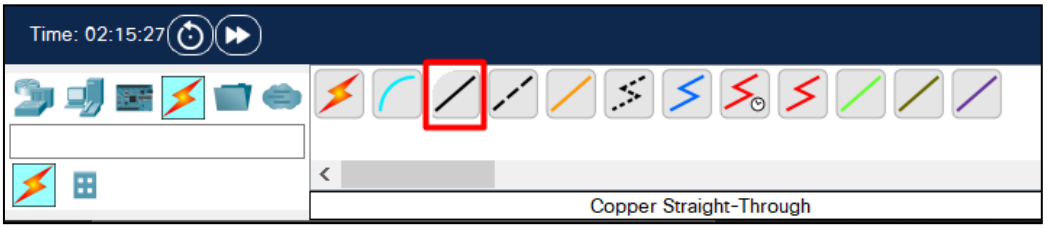
Fast Ethernet was introduced in 1995 as the **IEEE 802.3u** standard and remained the fastest version of Ethernet for three years before the introduction of Gigabit Ethernet The acronym *GE/FE* is sometimes used for devices supporting both standards.

Chapter 3

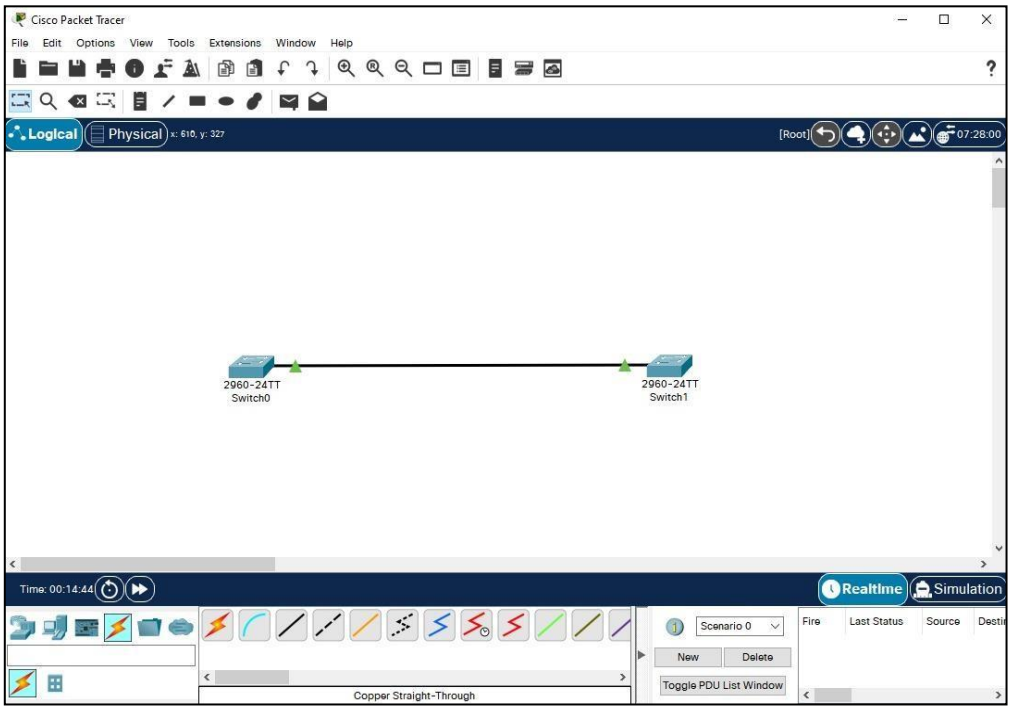
Task 1

1. In preparation for VLAN configuration, configure a hostname on Sw1 and as depicted in the topology.

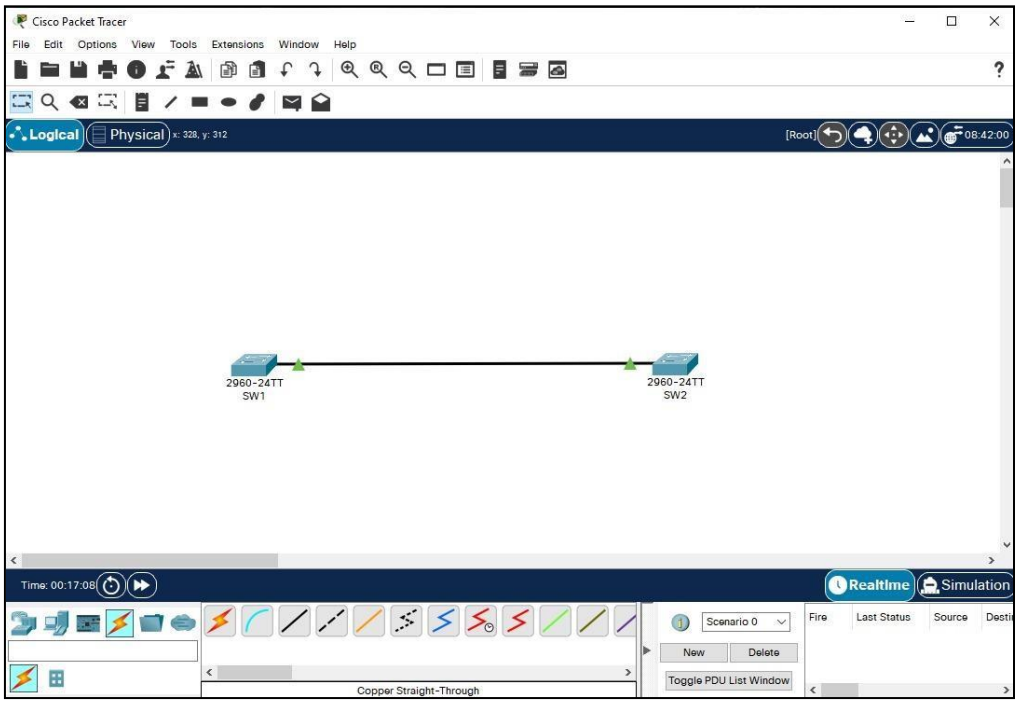




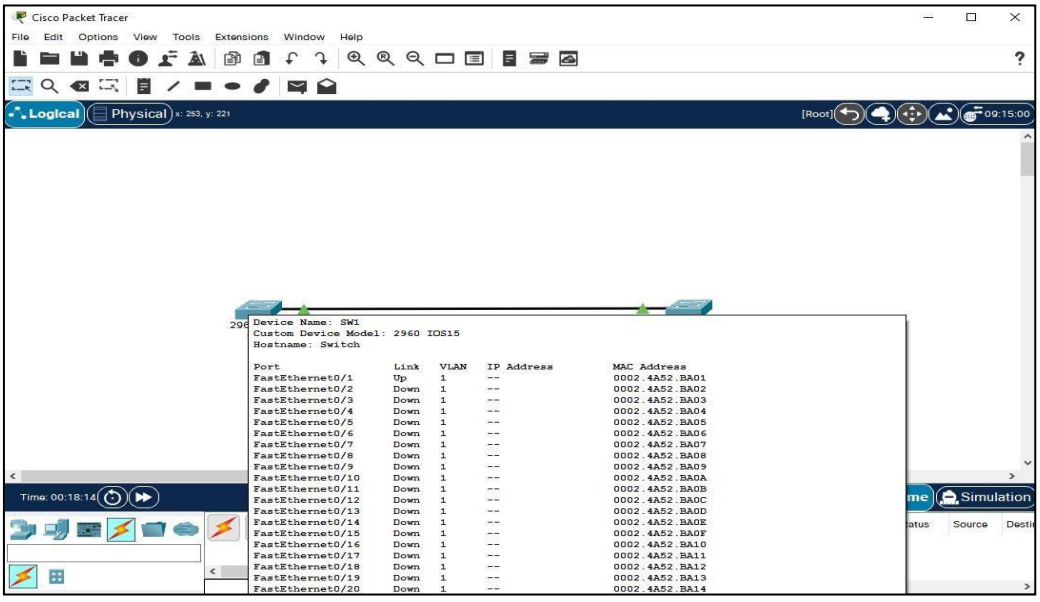
2. Take two switches 2960 and place them on the screen. Connect them with the copper straight through wire.



3. Rename the switches from switch0 switch1 as Sw1 and Sw2

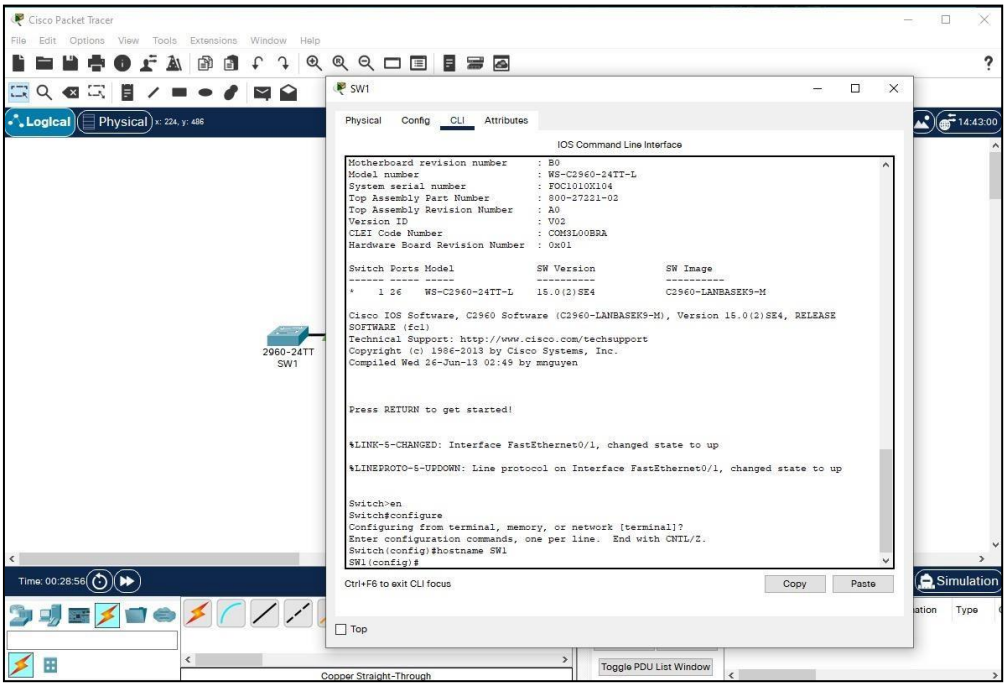


4. The cable connected to the two ports are set the FastEthernet0/1



5. Now we configure the hostname to SW1 with the following commands

- Click on SW1
- Go to CLI tab
- Press Enter button
- Where will get switch>
- Type switch>en
- Switch#configure
- Now you will get configuring from terminal, memory, or network [terminal]?
- Enter configuration commands, one per line. End with CNTL/Z
- Switch (config)# hostname SW1
- SW1 (config)#



Now the hostname on SW1 is configured

Task 2

6. Configure and verify sw1 as a VTP server switch and configure SW2 as a VTP client switch. Both switches should be in the VTP domain name CISCO. Secure VTP message with the VTP password CISCO.

In CLI give the following commads

- SW1#

  %LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

  %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

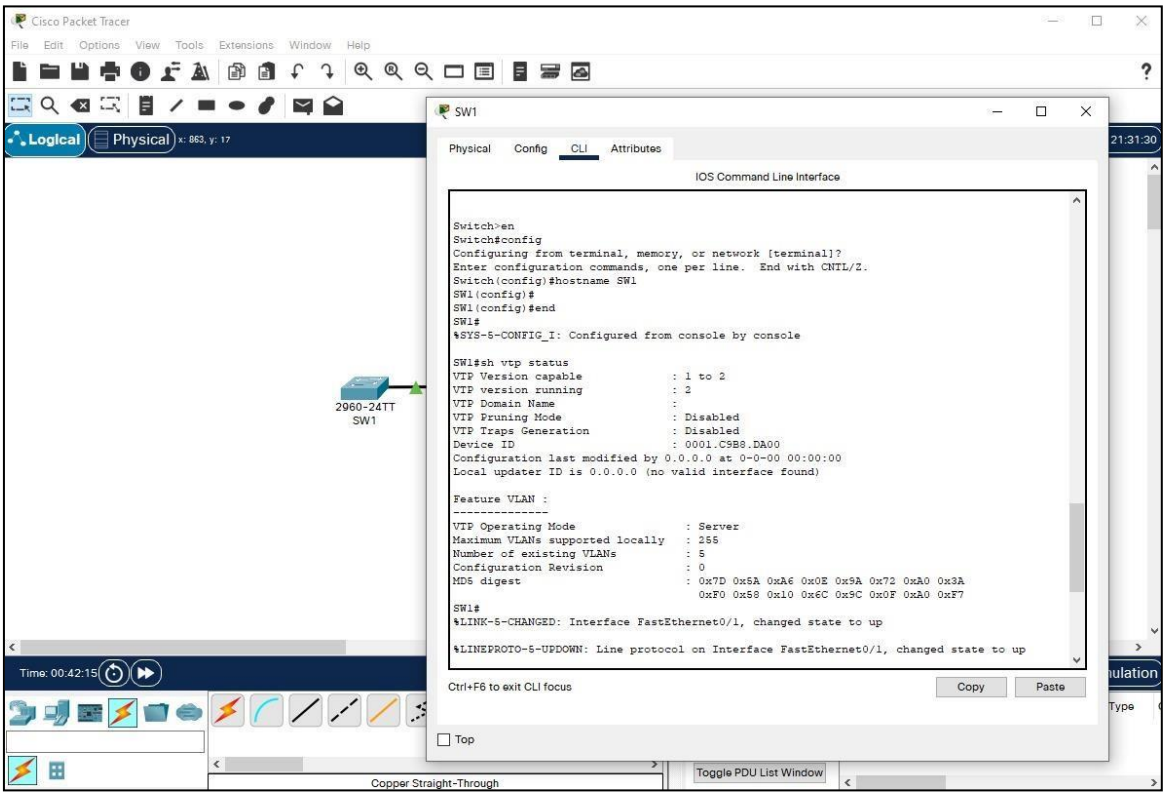
- SW1#sh vtp status

  We get

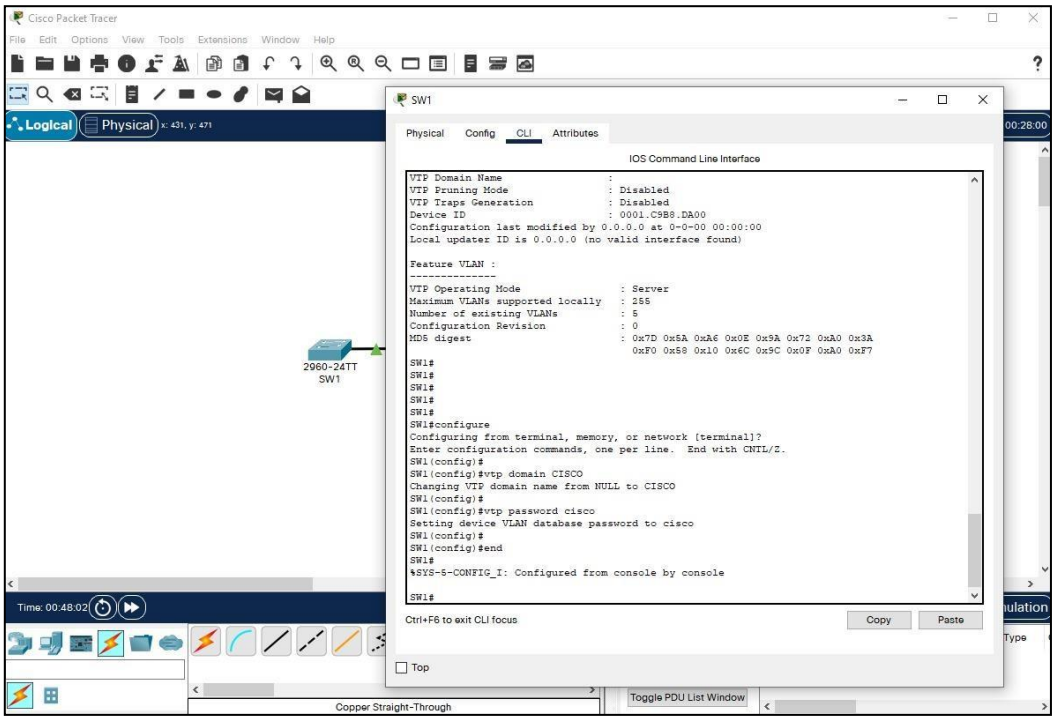
```
VTP Version capable             : 1 to 2
VTP version running              2
VTP Domain Name                  :
VTP Pruning Mode                : Disabled
VTP Traps Generation             : Disabled
Device ID                  : 0001.C9B8.DA00
Configuration last modified by 0.0.0.0 at 0  0-00 00:00:00
Local updater ID is 0.0.0.0 (no valid interface found)

Feature VLAN :
---------
VTP Operating Mode              : Server
Maximum VLANs supported locally  : 255
Number of existing VLANs         5
Configuration Revision           0
MD5 digest                  : 0x7D 0x5A 0xA6 0x0E 0x9A 0x72 0xA0 0x3A
                              0xF0 0x58 0x10 0x6C 0x9C 0x0F 0xA0 0xF7
SW1#
```

Now we have configured SW1 as a VTP server

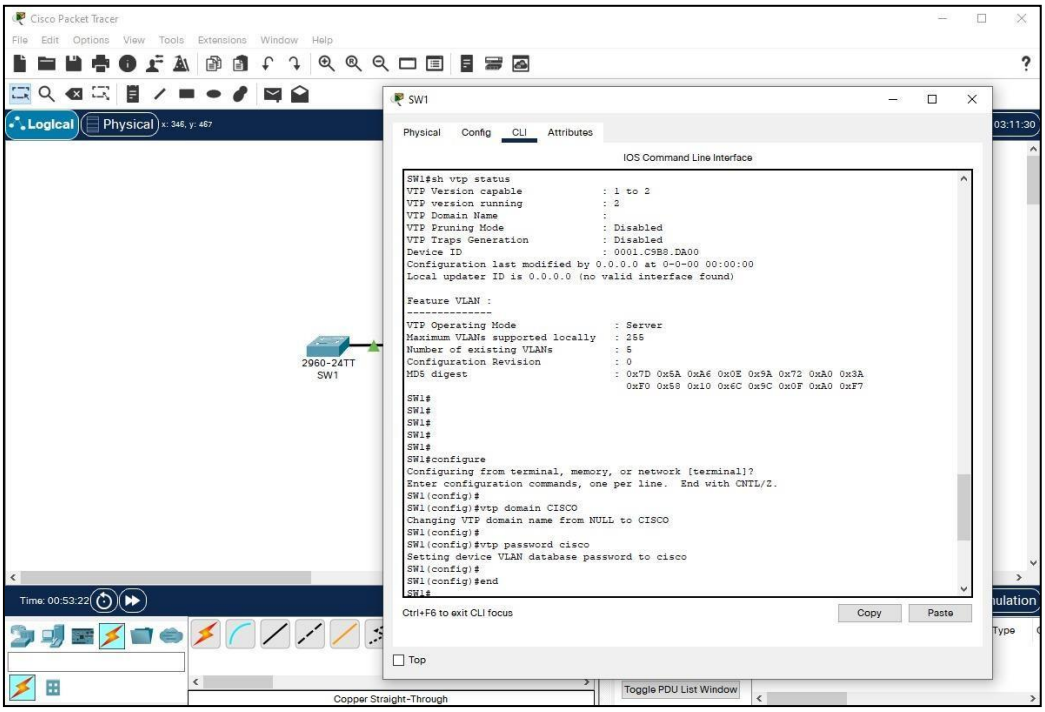


7. Configuring SW1 as, VTP domain name CISCO and we secure VTP message with the VTP password as CISCO



Command to check the VTP status

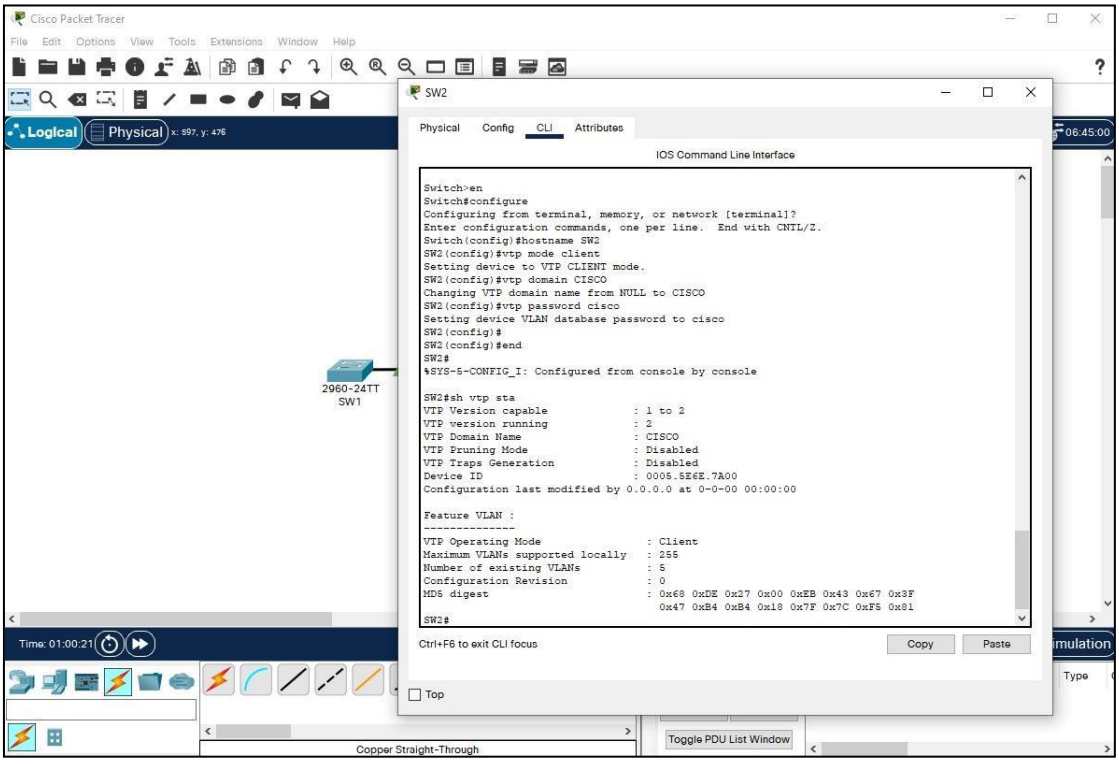
- SW1#sh vtp status



- Now we have verified and validated the VTP status that is we have set, VTP domain name as CISCO and VTP operating mode as Server.

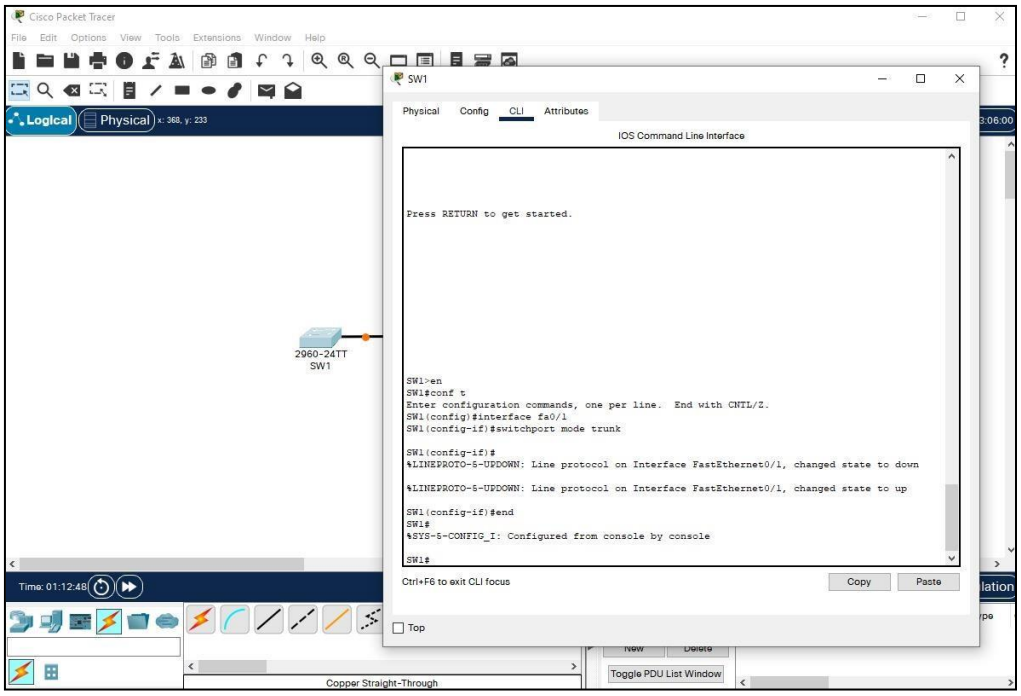
- Now we do the same procedure for the switch2(SW2) and we set the host name to client such that switch1(SW 1) is server and switch2 (SW2) is client,

- Now we set the VTP domain name Cisco and secured the VTP pass message with the VTP password CISCO

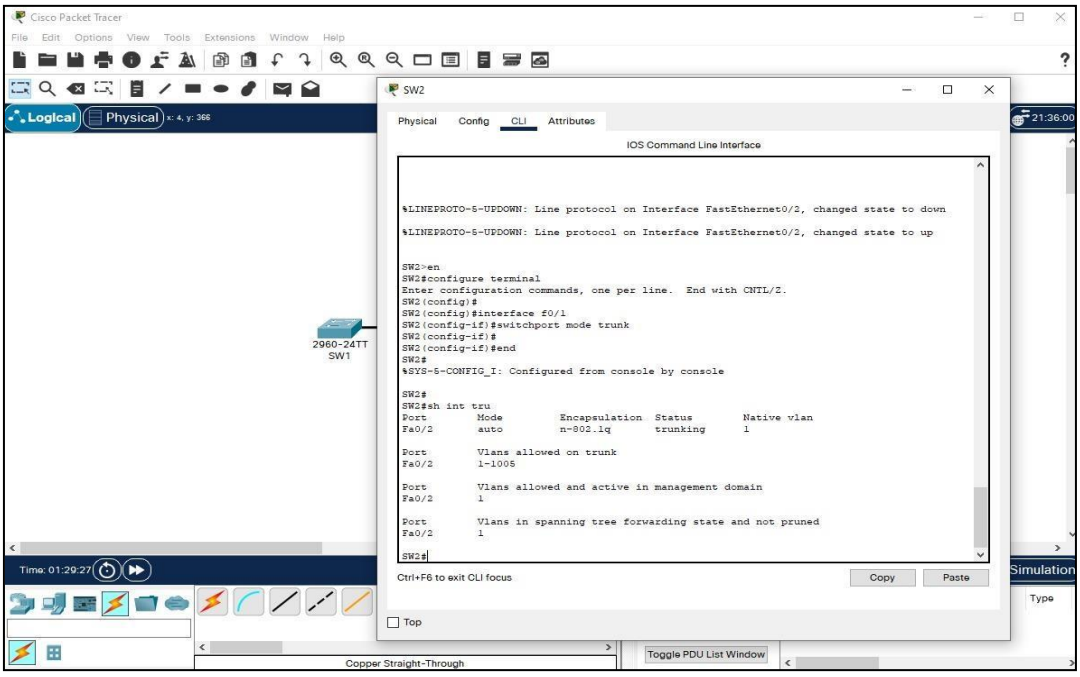


Task 3

8. Configure and verify fastEthernet 0/1 between SW1 and SW2 as an 802.1q trunk.



Now we configure switch 1 SW1 and set aside the switch port to mode trunk and we verify.



Now we configure switch 2 SW2 and set aside the switch port to mode trunk and we verify.

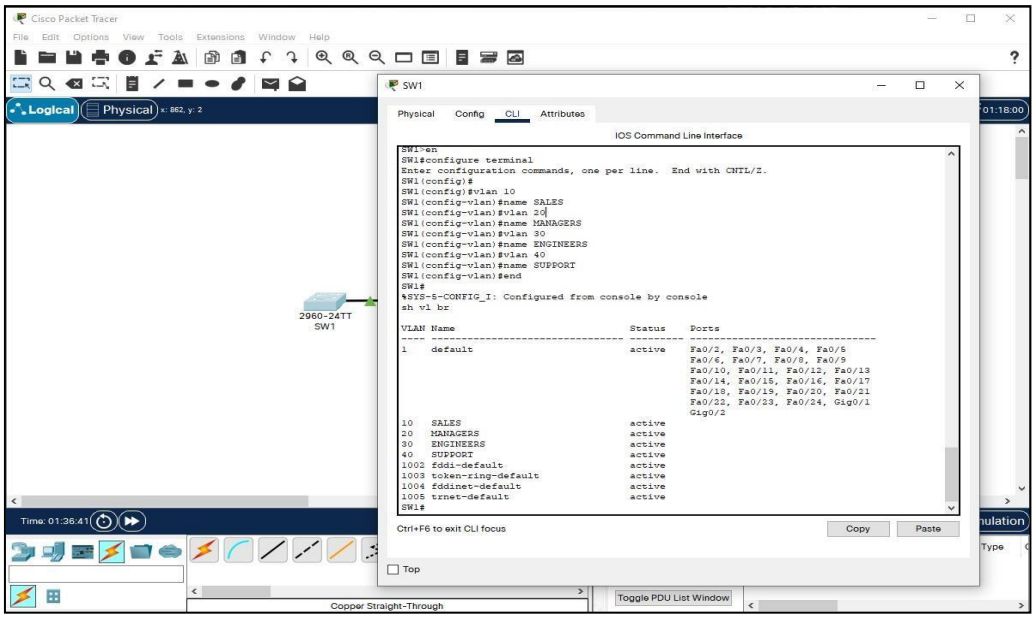
Task 4

9. Configure and verify VLANs 10 and 20 on SW1 with the names provided above. Validate that these VLANs are still propagated to SW3 after VTP has been secured.

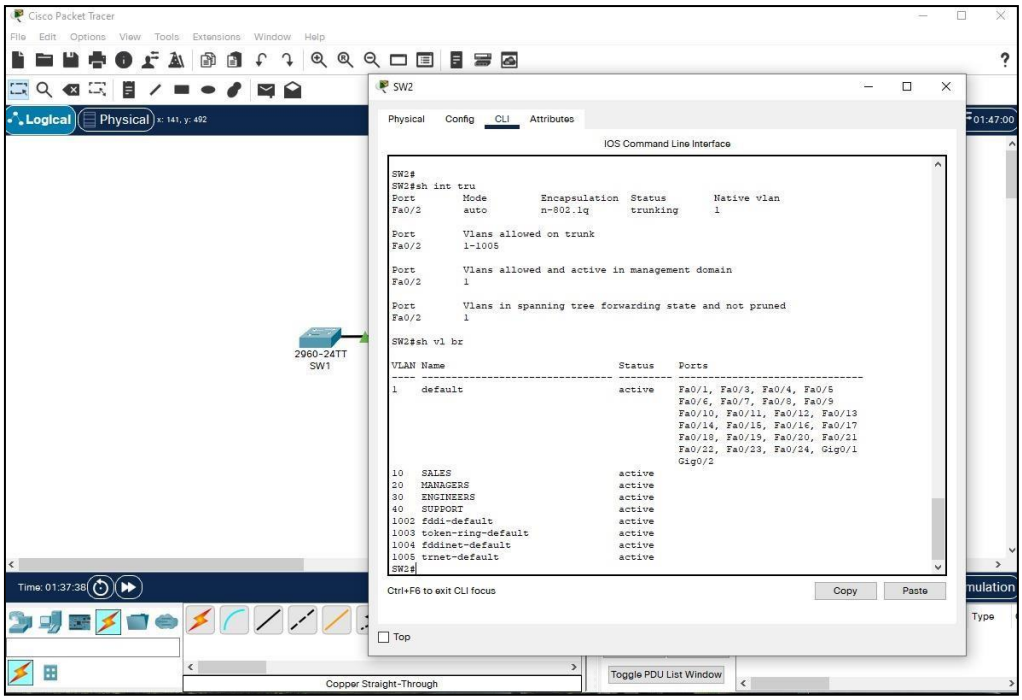
Commands in CLI

- SW1>
- SW1>en
- SW1#configure terminal
- Enter configuration commands, one per line. End with CNTL/Z.
- SW1(config)#
- SW1(config)#vlan 10
- SW1(config-vlan)#name SALES
- SW1(config-vlan)#vlan 20
- SW1(config-vlan)#name MANAGERS
- SW1(config-vlan)#vlan 30
- SW1(config-vlan)#name ENGINEERS
- SW1(config-vlan)#vlan 40
- SW1(config-vlan)#name SUPPORT
- SW1(config-vlan)#end
- SW1#
  %SYS-5-CONFIG_I: Configured from console by console
- sh vl br

Validating the SW1

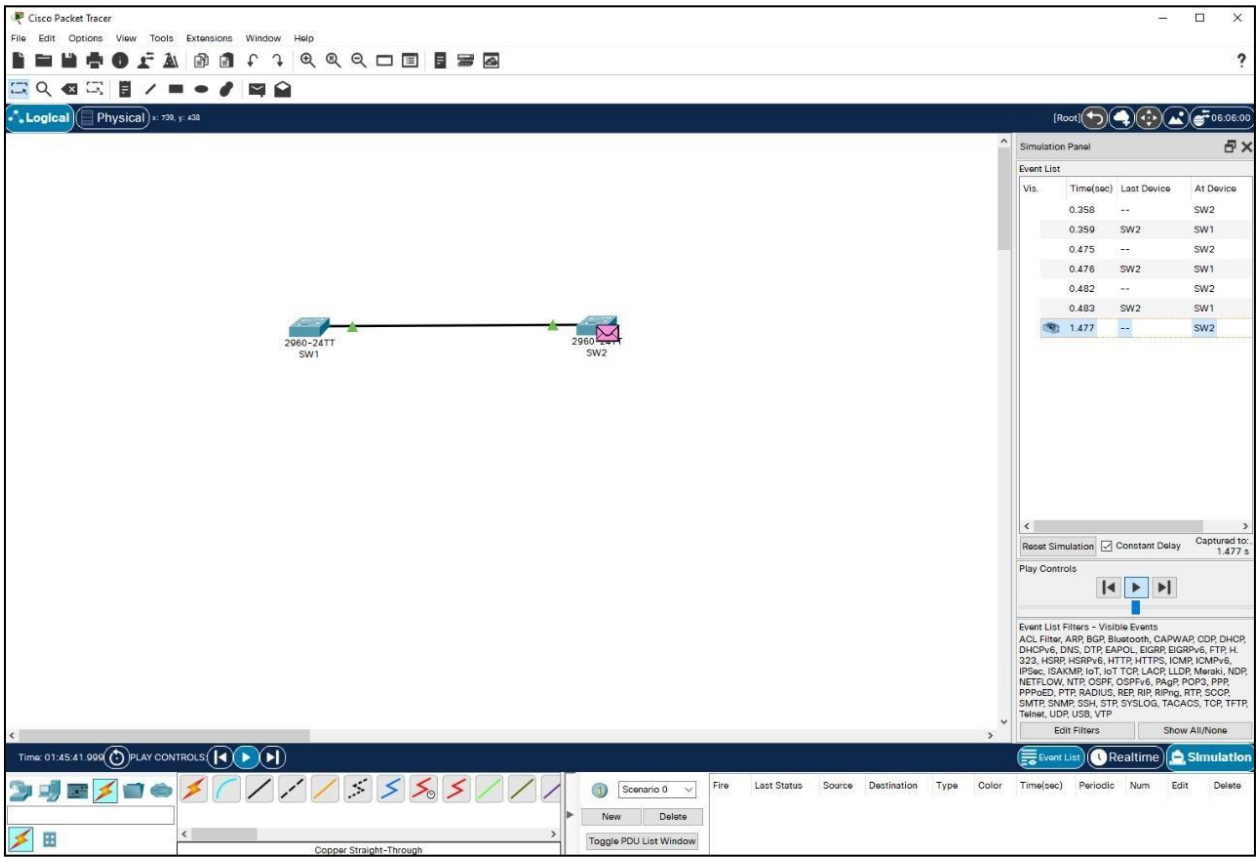


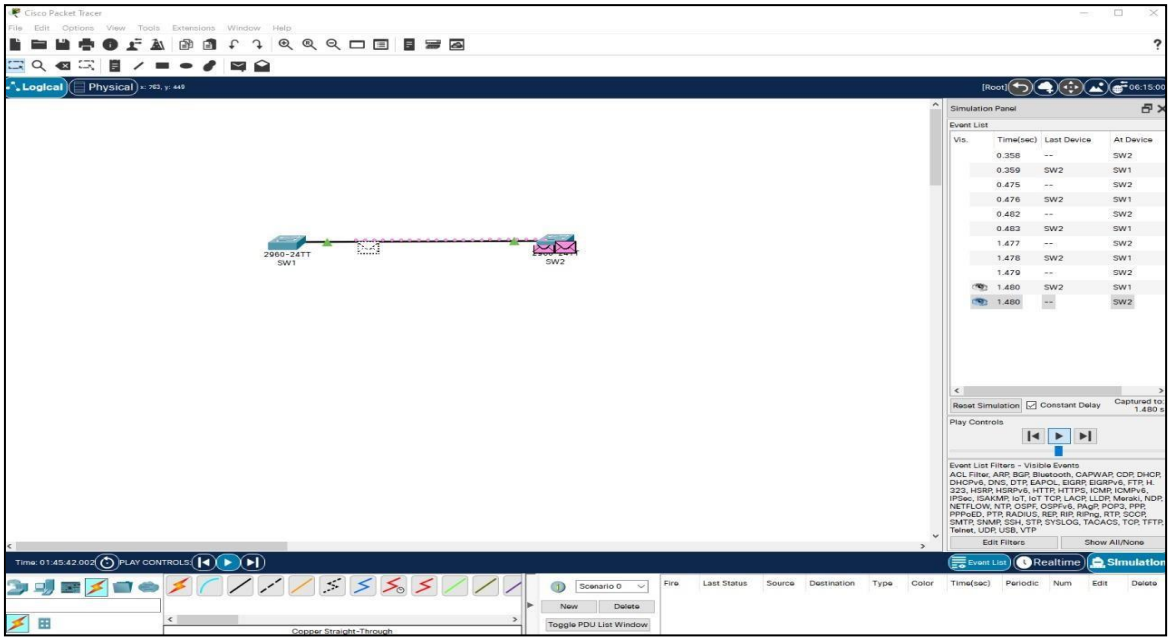
Validating the SW2

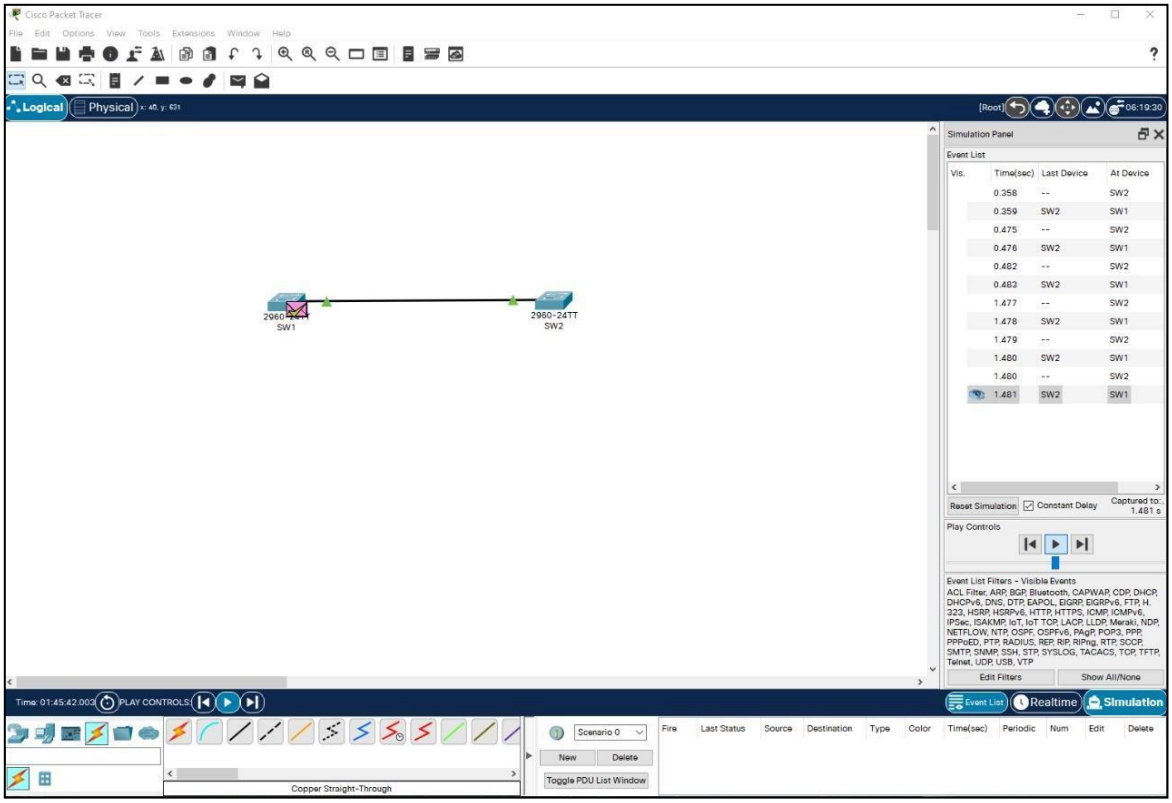


Now we have configure VLANs 10 20 30 & 40 to sales, managers, Engineers and supports As provided in the problem statement and we have validated these lines and are still propagated to SW2 after VTP has been secured.

Simulation Snapshots






Cisco Packet Tracer
Logical
Physical
SW1
SW2
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Reset Simulation
Constant Delay
Play Controls
Edit Filters
Show All/None
Realtime
Simulation
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete

Chapter 4:

CONCLUSION

The environment in an organization is totally different from what we experience in our colleges and classrooms. There, the people are busily working towards achieving the targets given to them. Even a small careless mistake may lead to loss for the company. So, the workers/employees must be efficient enough to make a bold move to finish the work within stipulated time to achieve the target.

I am glad to inform you that I got an internship at Cisco Networking Academy. I started my internship on 8th September 2021. I had worked with the team for an entire one month. I was glad to be a part of this team. I was supported by the whole team of Cisco Networking Academy As days passed there were so many presentation which had to presented to the whole team and we had meeting which were fixed and some developments of the resources which I had to do to improve the meeting register .At the end of the day I had to submit the report of the day work to the head of the department. And then come the weekends where we had off and fun activities.

REFERENCE

Websites

1. www.cisco.com
2. www.netacad.com
3. www.firewall.cx