Fortinet Cybersecurity Engineer

وزارة الاتصالات وتكنولوجيا المعلومات

رواد مصر الرقمية

balding network topology for e-commerce company

Using Cisco Packet Tracer

Networking Academy

FORTINET Training Institute

Presented To DEPI

29,NOV 2024

About us

I’m interns at **DEPI** in Fortinet **Cybersecurity Engineer** group **ONL1_ISS8_S1e**

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Introduction

This project involves the design, implementation, and security of a network infrastructure for a e-commerce company using Cisco Packet Tracer. The campus network must support multiple users, including students, faculty, and administrative staff, while ensuring secure and efficient connectivity across various buildings and departments.

The project will be completed in four phases:

01 **Network Design and Configuration:** Developing the network topology and configuring IP addressing and devices.

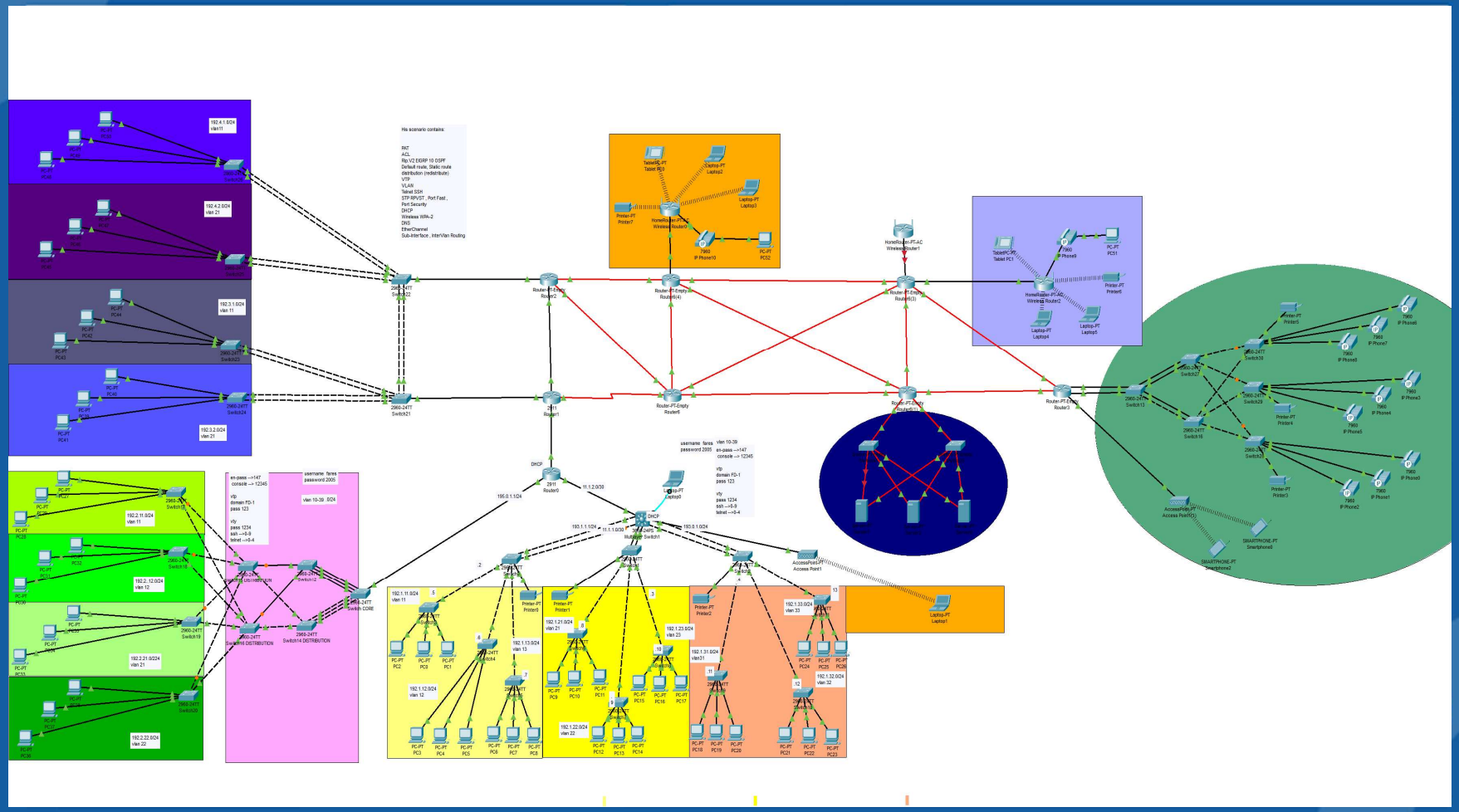
02 **VLAN and Inter-VLAN Routing:** Setting up VLANs to segment different user groups and configuring inter-VLAN routing for seamless communication.

03 **Network Security Implementation:** Applying security measures such as ACLs, port security, and firewalls to protect sensitive data and ensure network integrity.

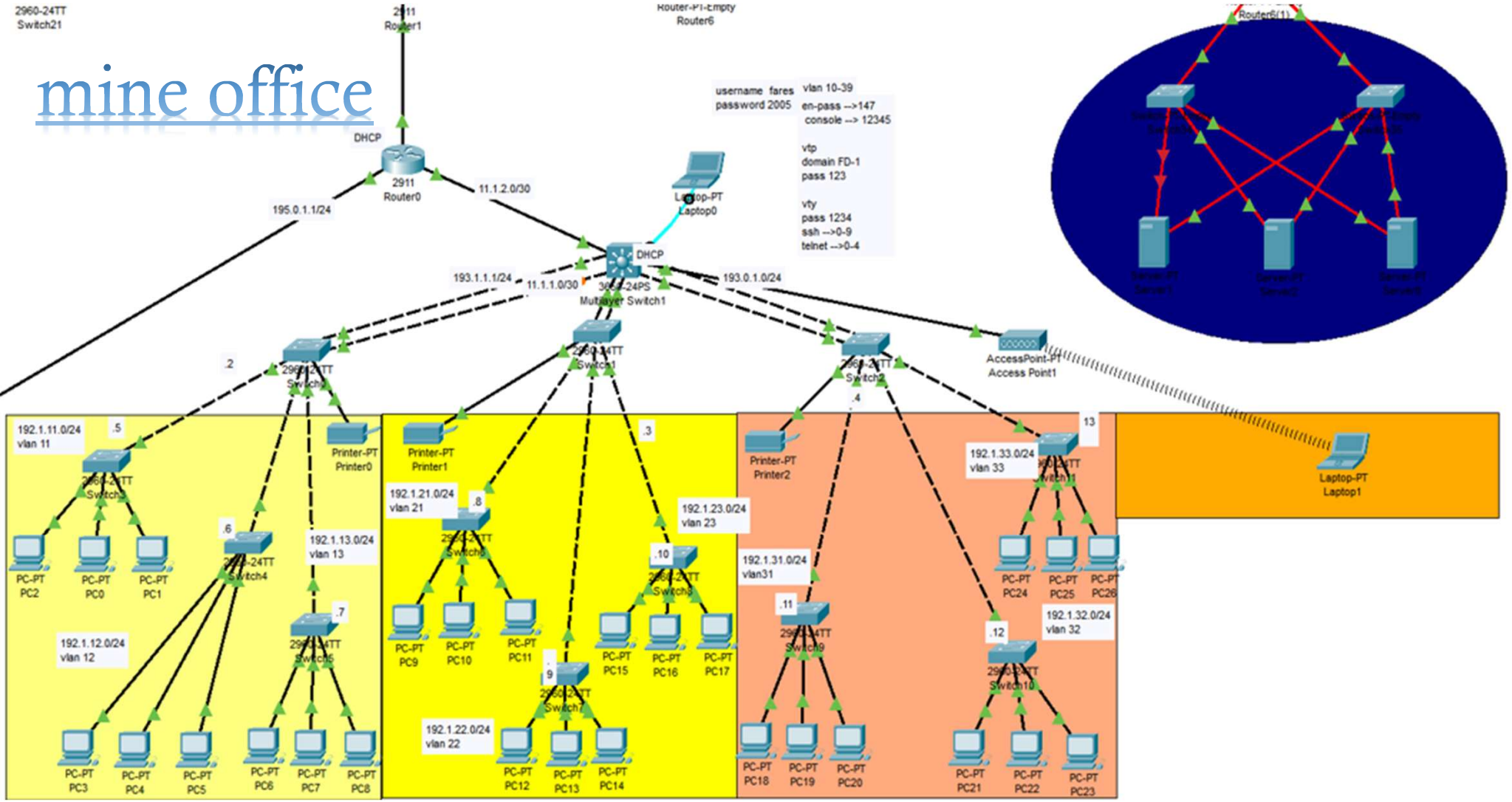
04 **Final Testing and Reporting:** Testing the network's functionality, performance, and security, and documenting the results for presentation.

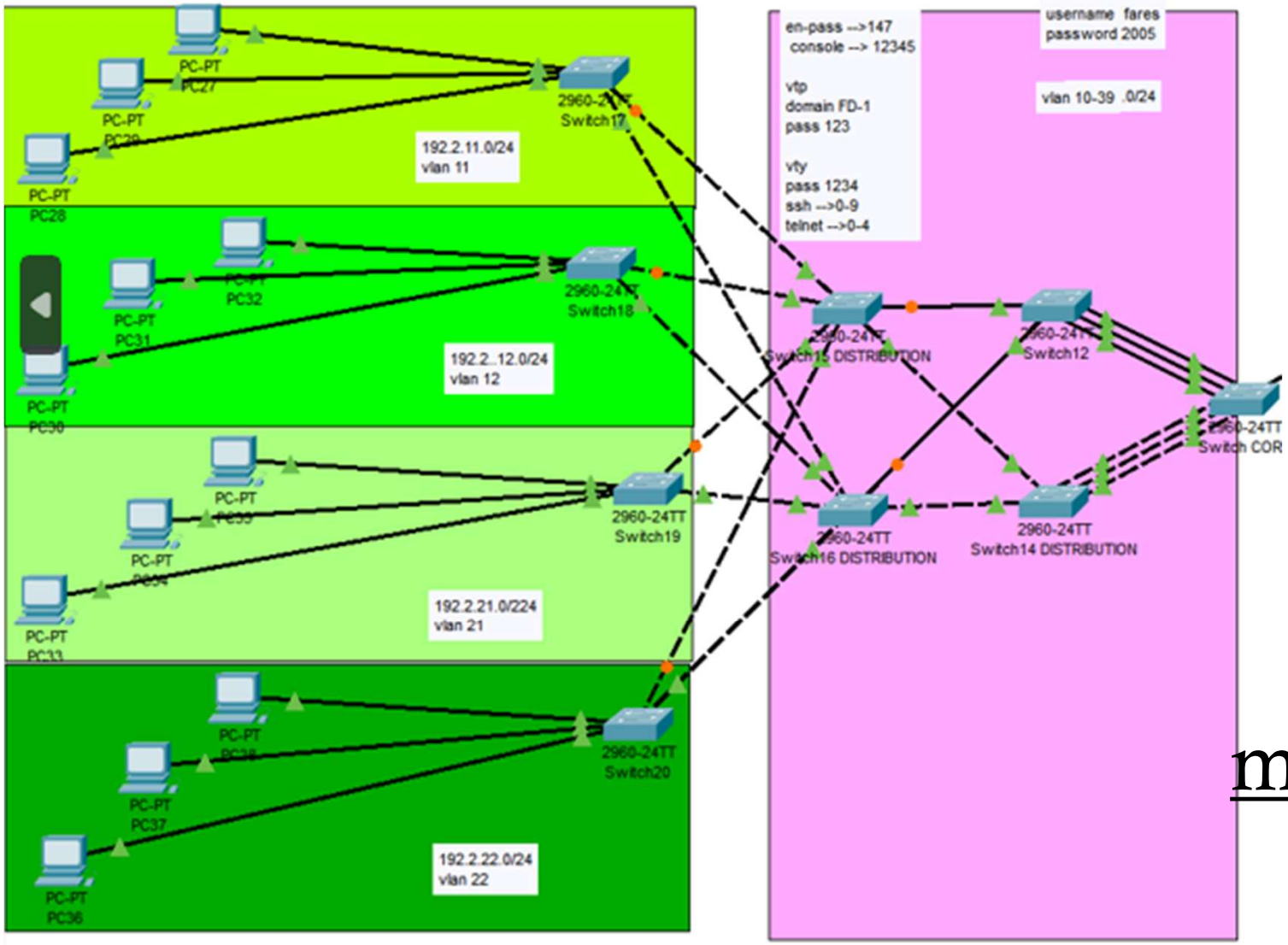
1. Network Design and Configuration

Network Topology

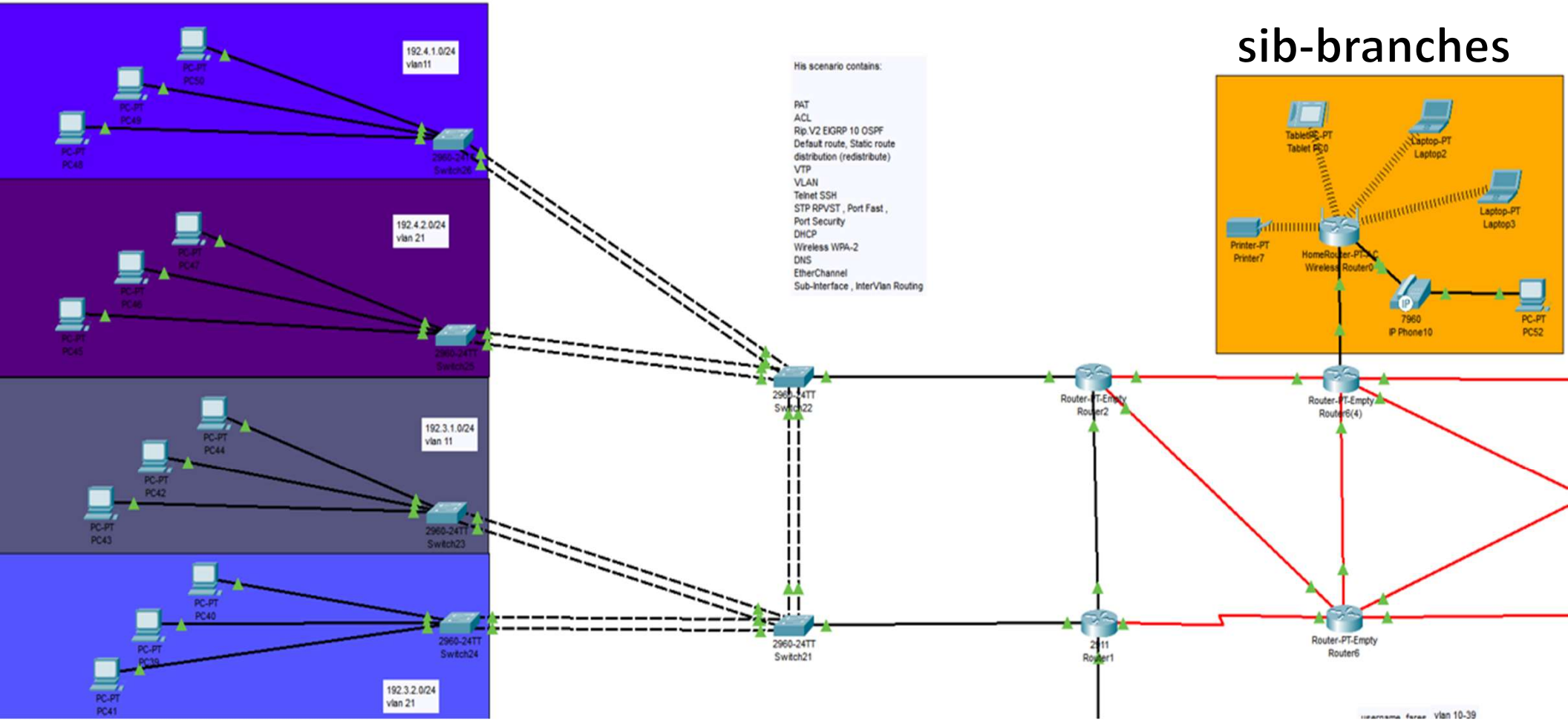


mine office

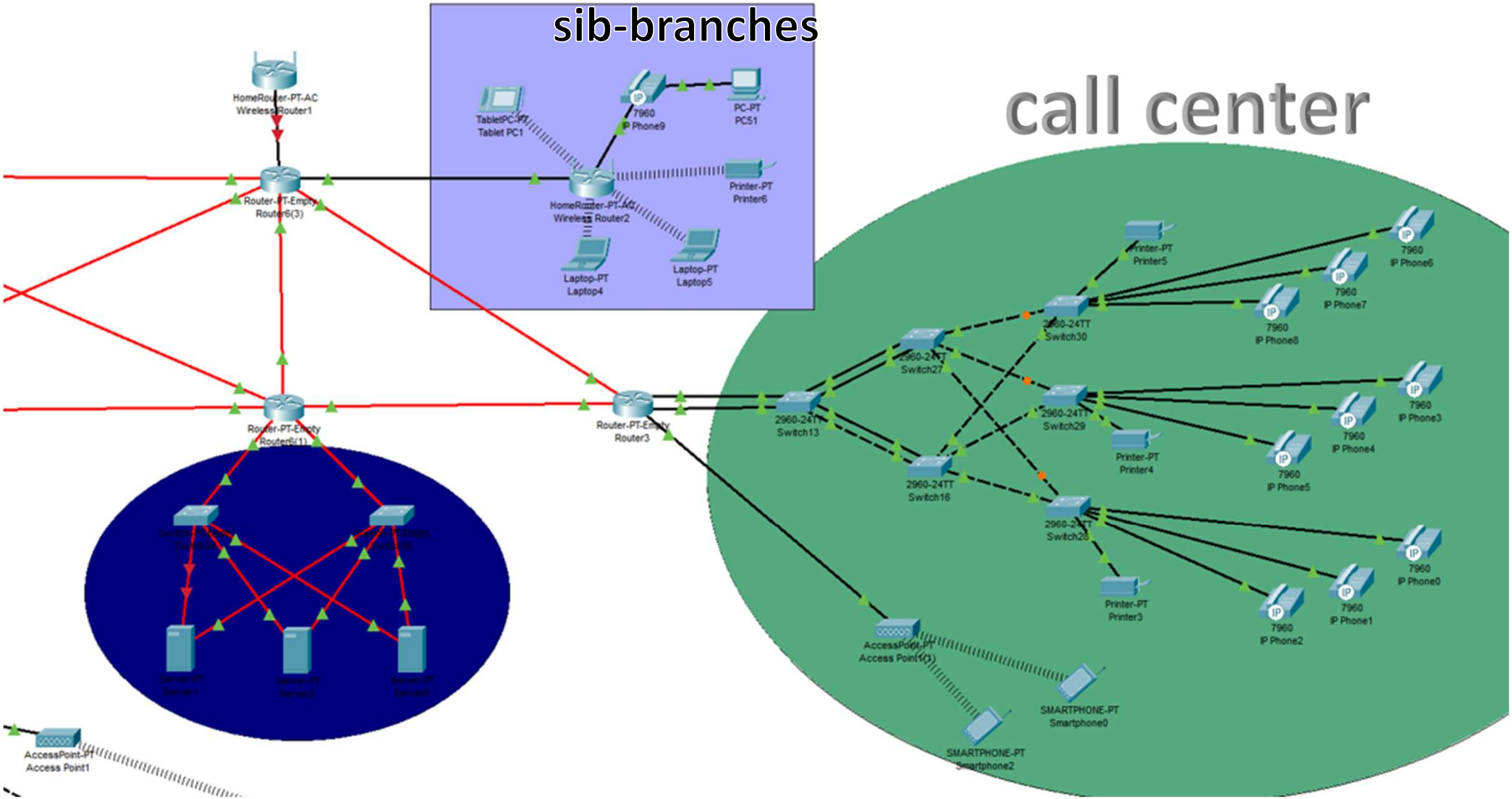

2960-24TT
Switch21
2911
Router1
Router-PT-Empty
Router6
DHCP
2911
Router0
195.0.1.1/24
11.1.2.0/30
Laptop-PT
Laptop0
username fares
password 2005
vlan 10-39
en-pass -->147
console --> 12345
vtp
domain FD-1
pass 123
vty
pass 1234
ssh -->0-9
telnet -->0-4
DHCP
193.1.1.1/24
11.1.1.0/30
Multilayer Switch1
193.0.1.0/24
AccessPoint-PT
Access Point1
192.1.11.0/24
vlan 11
Printer-PT
Printer0
PC-PT
PC2
PC-PT
PC0
PC-PT
PC1
192.1.13.0/24
vlan 13
192.1.12.0/24
vlan 12
PC-PT
PC3
PC-PT
PC4
PC-PT
PC5
PC-PT
PC6
PC-PT
PC7
PC-PT
PC8
Printer-PT
Printer1
192.1.21.0/24
vlan 21
192.1.23.0/24
vlan 23
PC-PT
PC9
PC-PT
PC10
PC-PT
PC11
PC-PT
PC15
PC-PT
PC16
PC-PT
PC17
192.1.22.0/24
vlan 22
PC-PT
PC12
PC-PT
PC13
PC-PT
PC14
Printer-PT
Printer2
192.1.33.0/24
vlan 33
Laptop-PT
Laptop1
192.1.31.0/24
vlan31
PC-PT
PC24
PC-PT
PC25
PC-PT
PC26
192.1.32.0/24
vlan 32
PC-PT
PC18
PC-PT
PC19
PC-PT
PC20
PC-PT
PC21
PC-PT
PC22
PC-PT
PC23


PC-PT
PC27
PC-PT
PC29
PC-PT
PC28
Switch17
192.2.11.0/24
vlan 11
PC-PT
PC32
PC-PT
PC31
PC-PT
PC30
Switch18
192.2..12.0/24
vlan 12
PC-PT
PC35
PC-PT
PC34
PC-PT
PC33
2960-24TT
Switch19
192.2.21.0/224
vlan 21
PC-PT
PC38
PC-PT
PC37
PC-PT
PC36
2960-24TT
Switch20
192.2.22.0/24
vlan 22
en-pass -->147
console --> 12345
vtp
domain FD-1
pass 123
vty
pass 1234
ssh -->0-9
telnet -->0-4
username fares
password 2005
vlan 10-39 .0/24
Switch15 DISTRIBUTION
Switch12
Switch COR
2960-24TT
Switch16 DISTRIBUTION
2960-24TT
Switch14 DISTRIBUTION

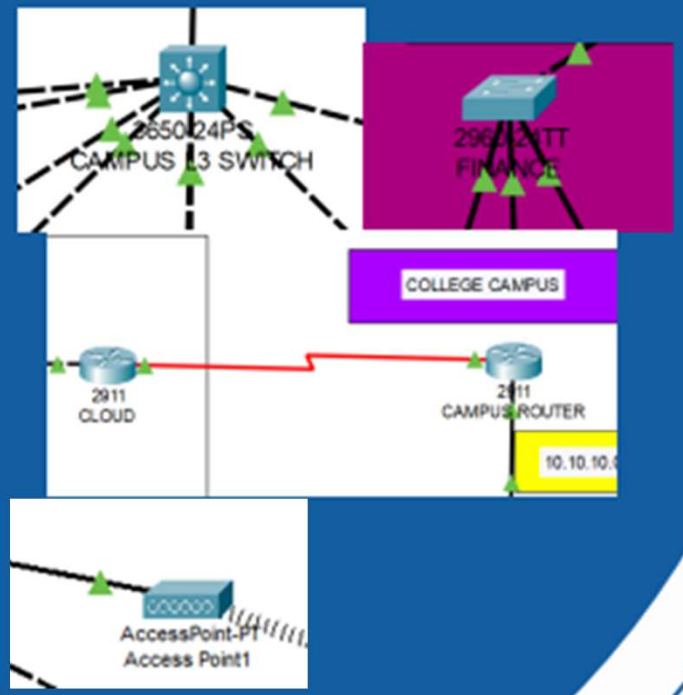
mine office


sib-branches
192.4.1.0/24
vlan11
192.4.2.0/24
vlan 21
192.3.1.0/24
vlan 11
192.3.2.0/24
vlan 21
His scenario contains:
PAT
ACL
Rip.V2 EIGRP 10 OSPF
Default route, Static route
distribution (redistribute)
VTP
VLAN
Telnet SSH
STP RPVST , Port Fast ,
Port Security
DHCP
Wireless WPA-2
DNS
EtherChannel
Sub-Interface , InterVlan Routing
Laptop-PT
Laptop2
Laptop-PT
Laptop3
Printer-PT
Printer7
7960
IP Phone10
PC-PT
PC52
2960-24TT
Switch21
Router-PT-Empty
Router2
Router-PT-Empty
Router6(4)
Router-PT-Empty
Router6
vlan 10-39

branches


sib-branches
call center
HomeRouter-PT-AC
Wireless Router1
Router-PT-Empty
Router6(3)
TabletPC-PT
Tablet PC1
7960
IP Phone9
PC-PT
PC51
HomeRouter-PT-AC
Wireless Router2
Printer-PT
Printer6
Laptop-PT
Laptop4
Laptop-PT
Laptop5
Router-PT-Empty
Router6(1)
Router-PT-Empty
Router3
2960-24TT
Switch13
2960-24TT
Switch27
2960-24TT
Switch30
2960-24TT
Switch29
2960-24TT
Switch16
Printer-PT
Printer5
Printer-PT
Printer4
Printer-PT
Printer3
7960
IP Phone6
7960
IP Phone7
7960
IP Phone8
7960
IP Phone3
7960
IP Phone4
7960
IP Phone5
7960
IP Phone0
7960
IP Phone1
7960
IP Phone2
SMARTPHONE-PT
Smartphone0
SMARTPHONE-PT
Smartphone2
AccessPoint-PT
Access Point1

List of Network Devices:



01 End Devices:

- PCs
- Printers
- Servers such as (Web server, FTP server and Email server.

02 Intermediary Devices:

- Layer 3 Switch (3650-24PS)
- Switch 2960
- Router 2911
- . Access point PT

2. VLAN and Inter-VLAN Routing

VLAN Configuration scripts :

L3 SWITCH

```
Switch>en
Switch#config t
Switch(config)#vlan 10
Switch(config-vlan)#name admin
Switch(config-vlan)#exit
Switch(config)#vlan 20
Switch(config-vlan)#name hr
Switch(config-vlan)#exit
```

VLAN Trunk Configuration :

L3 SWITCH

```
Switch(config)#int g1/0/1
Switch(config-if)#sw
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet1/0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet1/0/1, changed state to up

Switch(config-if)#no shut
Switch(config-if)#exit
```

3. Network Security Implementation

Network Security Implementation :

Security Configuration :

```
Switch>
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with
CNTL/Z.
Switch(config)#hostna
Switch(config)#hostname s-engineering
s-engineering(config)#line con
s-engineering(config)#line console 0
s-engineering(config-line)#pass
s-engineering(config-line)#password ciscoroot
s-engineering(config-line)#login
s-engineering(config-line)#exit
s-engineering(config)#cry
s-engineering(config)#crypto k
s-engineering(config)#crypto key g
s-engineering(config)#crypto key generate r
s-engineering(config)#crypto key generate rsa
```

```
% Please define a domain-name first.
s-engineering(config)#ip domain-n
s-engineering(config)#ip domain-name project.com
s-engineering(config)#crypto key generate rsa
The name for the keys will be: s-engineering.project.com
Choose the size of the key modulus in the range of 360 to
4096 for your
  General Purpose Keys. Choosing a key modulus greater
than 512 may take
  a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-
exportable...[OK]
```

Network Security Implementation :

SSH security Configuration :

```
s-engineering(config)#ip s
*Mar 2 1:19:49.895: %SSH-5-ENABLED: SSH 1.99 has been enabled
s-engineering(config)#ip ssh
s-engineering(config)#ip ssh v
s-engineering(config)#ip ssh version 2
s-engineering(config)#line vty 0 4
s-engineering(config-line)#login local
s-engineering(config-line)#trans
s-engineering(config-line)#transport input ssh
s-engineering(config-line)#exit
s-engineering(config)#username admin secret ciscorootssh
```

Network Security Implementation :

Port security Configuration :

```
s-engineering(config)#interface range fa0/1-24
s-engineering(config-if-range)#switchport mode access
s-engineering(config-if-range)#switchport port-security maximum 2
s-engineering(config-if-range)#switchport port-security violation restrict
s-engineering(config-if-range)#switchport port-security mac-address sticky
s-engineering(config-if-range)#exit
```

In conclusion, this project successfully achieved the objective of designing, building, and securing a small network. Through the step-by-step implementation process, we were able to:

- Establish a robust network infrastructure using Cisco devices with proper configuration of VLANs, IP addressing, and inter-VLAN routing to ensure efficient and segmented communication within the network.
- Implement essential security features, including Access Control Lists (ACLs) and port security.
- Verify the network's functionality.

Suggestions for Future Enhancements:

- **Integrating advanced security measures** such as firewalls and intrusion detection systems (IDS) can further strengthen the network's defense.
- **Implementing Quality of Service (QoS)** mechanisms to prioritize critical traffic and improve network performance under high load.

THANK YOU!

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