Secure Company Network Design

(Cisco Packet Tracer)

GitHub Repository : Click Here

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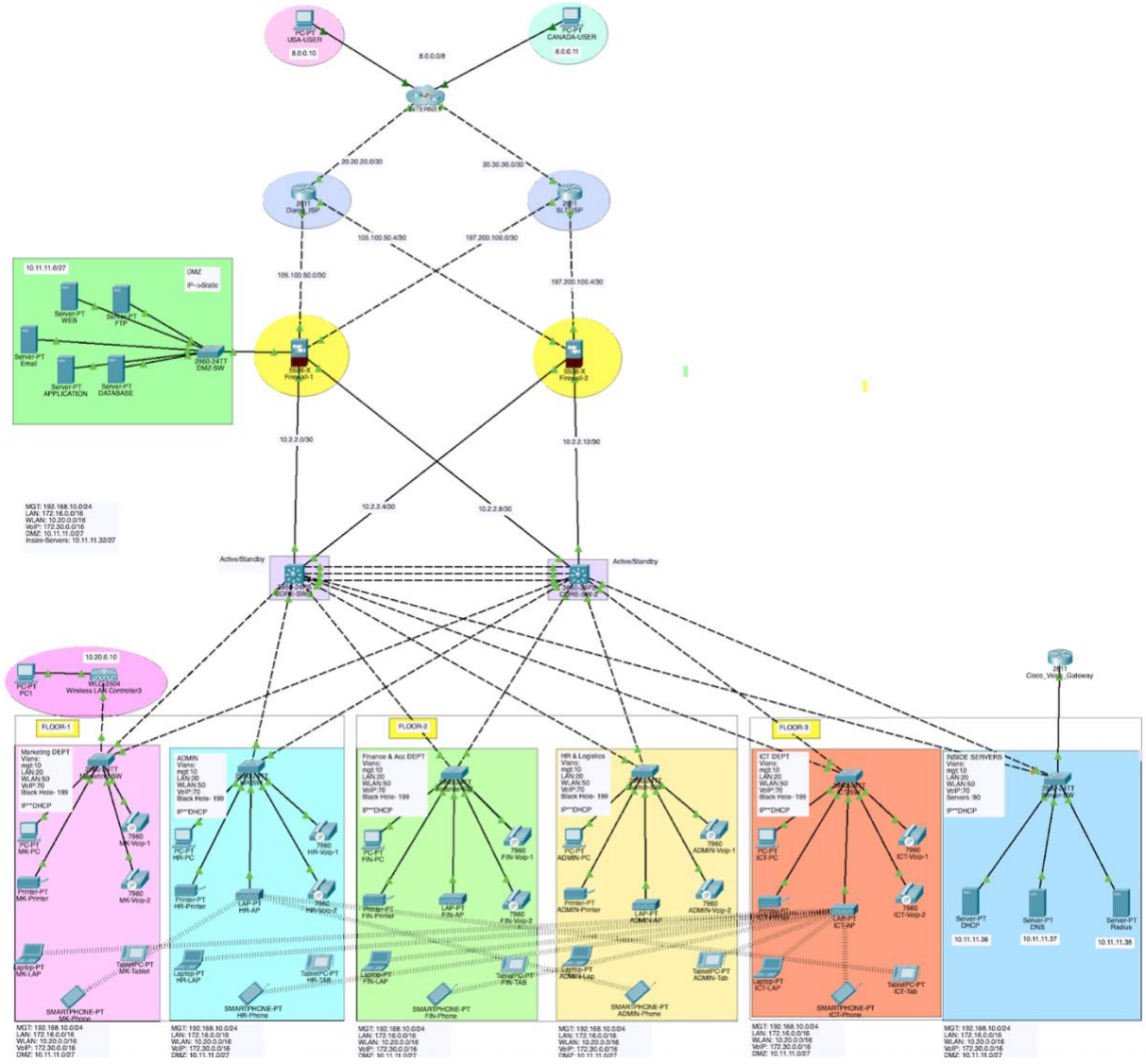
Introduction

This document describes the design and implementation of a Secure Company Network using Cisco Packet Tracer, following a hierarchical network design with redundant, scalable, and secure infrastructure. The project meets the technical requirements outlined for supporting multiple departments, VLAN segmentation, inter-VLAN routing, wireless connectivity, and security controls.

Technical Requirements

- Hierarchical Design – Core Layer , Distribution Layer and Access Layer
- ISP Connection – Dual ISP links
- WLC – Wireless Lan Controller used to manage and distribute WLANS
- VLAN & inter VLAN Routing- For Each Building
- EtherChannel – Between 2 L3 Switches
- VoIP – Connectivity between departments
- STP & BPDU Guard – Spanning tree Features
- Subnetting – Necessary IP address implementation
- Basic Settings – Security Implementations(Passwords) , Port Security and ACL
- IP Assignment and Sec - DHCP & DHCP Snooping
- Routing - OSPF

Network Topology



IP Addressing Scheme

For Vlans

Vlan Name	Network & Subnet	Broadcast	Default Gateway	Host range
Management	192.168.10.0/24	192.168.10.255	192.168.10.1	192.168.10.1 192.168.10.254
Wireless-LAN	10.20.0.0/16	10.20.255.254	10.20.0.1	10.20.0.1 10.20.255.254
LAN	172.16.0.0/16	172.16.255.255	172.16.0.1	172.16.0.1 172.16.255.254
VoIP	172.30.0.0/16	172.30.255.255	172.30.0.1	172.30.0.1 172.30.255.254
Demilitarized Zone	10.11.11.0/27	10.11.11.31	10.11.11.1	10.11.11.1 10.11.11.30
LAN Servers	10.11.11.32/27	10.11.11.63	10.11.11.33	10.11.11.11.33 10.11.11.62

For Routers,Firewalls,Multilayer Switch

Interfaces	Network Address & Subnet
Cloud	8.0.0.0/8
ISP1 - Internet	20.20.20.0/30
ISP2 - Internet	30.30.30.0/30
ISP1 - FWL1	105.100.50.0/30

Device Configuration

All Config Files are available in my GitHub page -:

Routing Protocols

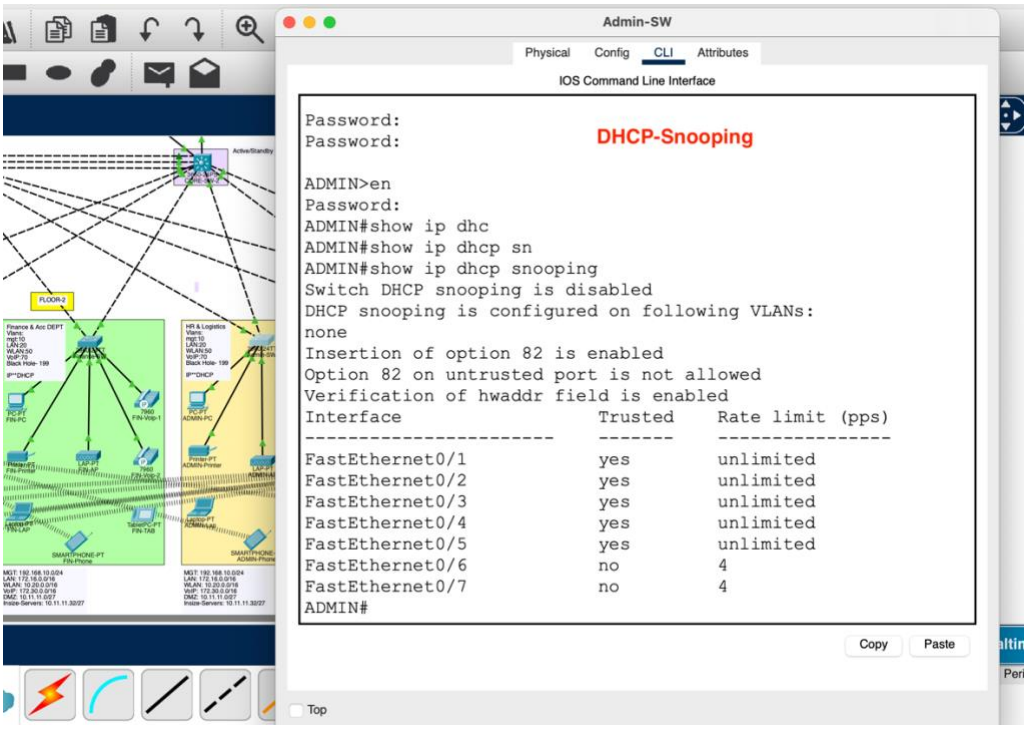
- Configured OSPF for internal dynamic routing
- Summarized routes where applicable
- Neighbor relationships confirmed

```
CS-1#show ip os
CS-1#show ip ospf ne
CS-1#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
1.1.2.2           1   FULL/DR         00:00:39    192.168.10.2    Vlan10
1.1.2.2           1   FULL/DR         00:00:39    172.16.0.2      Vlan20
1.1.2.2           1   FULL/DR         00:00:39    10.20.0.3       Vlan50
1.1.2.2           1   FULL/DR         00:00:39    10.11.11.35     Vlan90
1.1.8.8           1   FULL/DR         00:00:39    10.2.2.2        GigabitEthernet1/0/1
CS-1#
```

Security Implementations

- Enable Secret
- Console Login
- Password-Encryption
- DHCP Snooping
- Port-Security
- BPDU Guard
- SSH Based Switch Management
- Cisco ASA Firewall Configurations
- Access Control Lists


Admin-SW
Physical
Config
CLI
Attributes
IOS Command Line Interface
DHCP-Snooping
Password:
Password:
ADMIN>en
Password:
ADMIN#show ip dhc
ADMIN#show ip dhcp sn
ADMIN#show ip dhcp snooping
Switch DHCP snooping is disabled
DHCP snooping is configured on following VLANs:
none
Insertion of option 82 is enabled
Option 82 on untrusted port is not allowed
Verification of hwaddr field is enabled
Interface Trusted Rate limit (pps)
FastEthernet0/1 yes unlimited
FastEthernet0/2 yes unlimited
FastEthernet0/3 yes unlimited
FastEthernet0/4 yes unlimited
FastEthernet0/5 yes unlimited
FastEthernet0/6 no 4
FastEthernet0/7 no 4
ADMIN#
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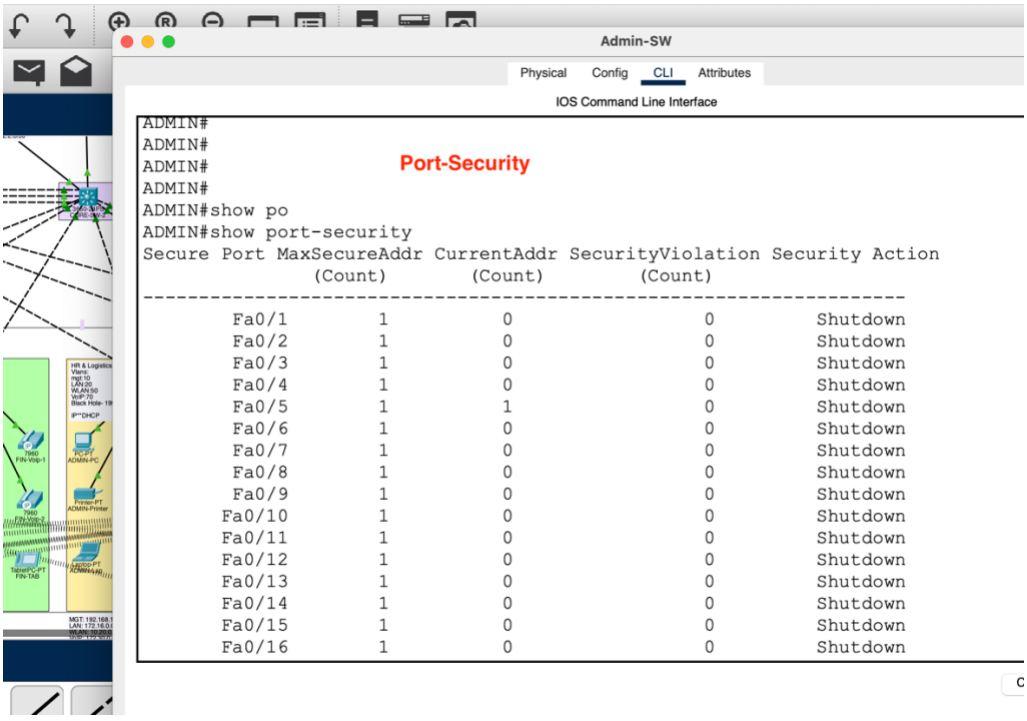
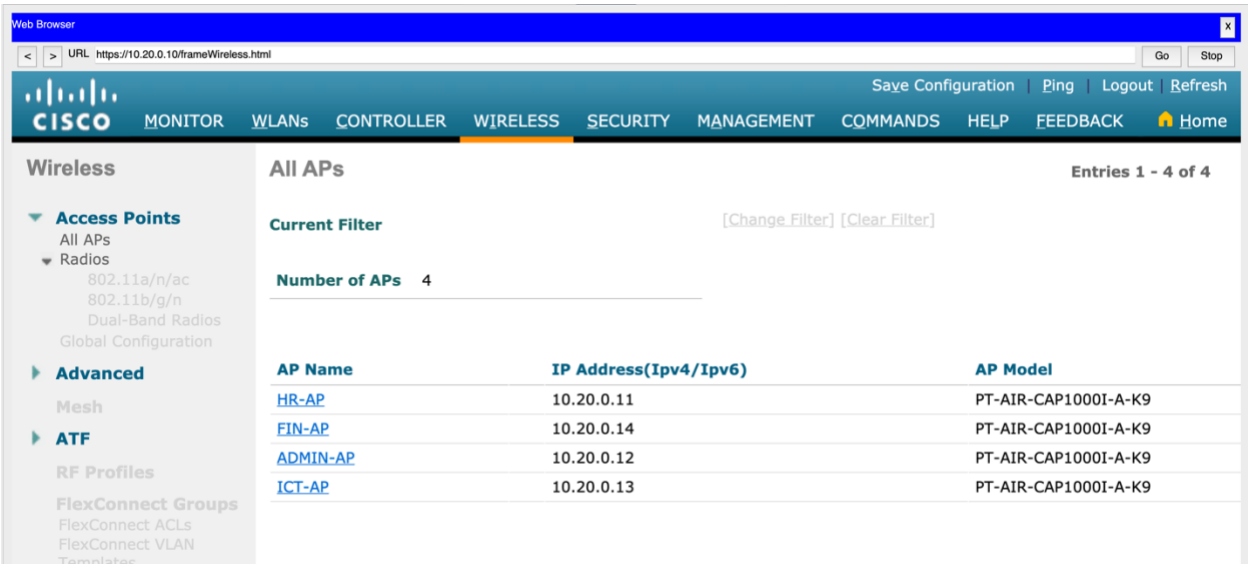
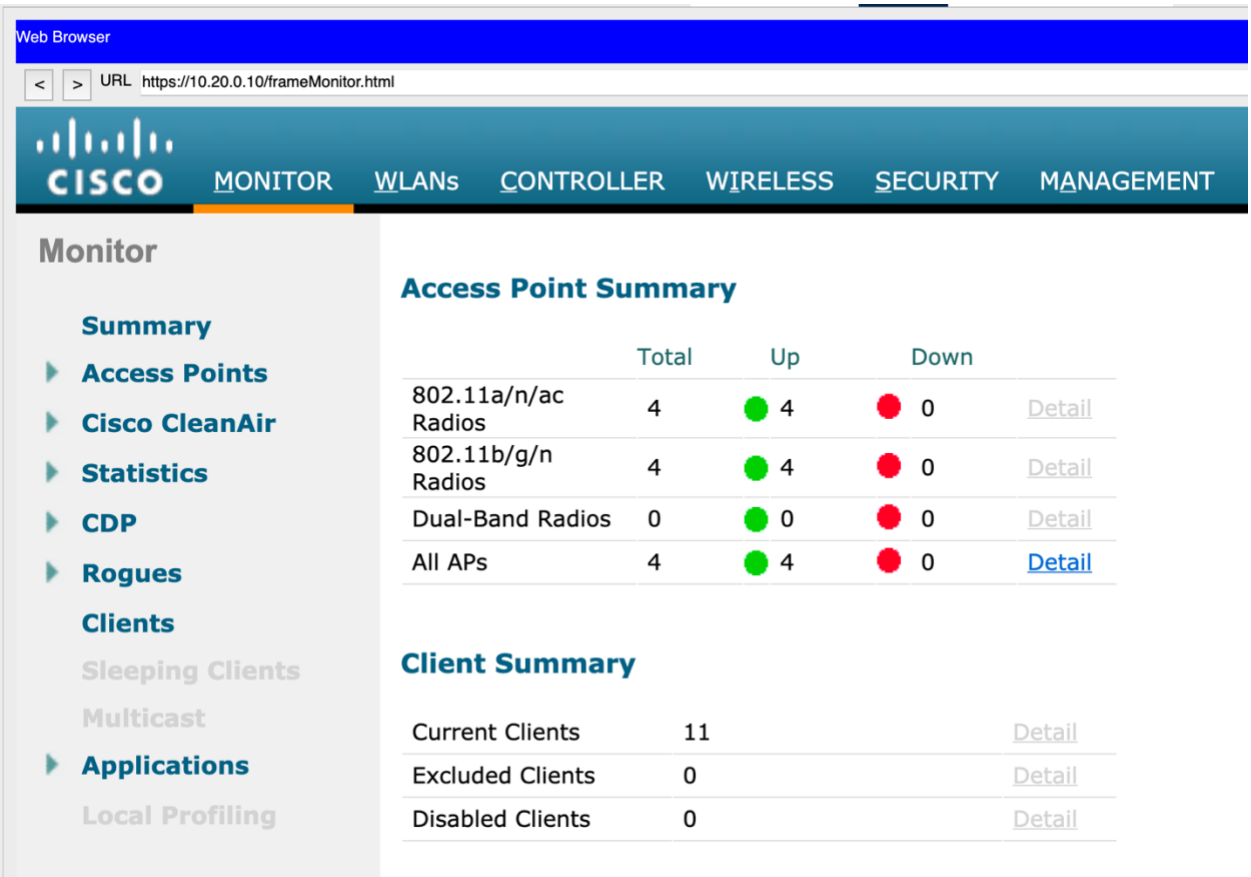
Paste
Top


Admin-SW
Physical
Config
CLI
Attributes
IOS Command Line Interface
Port-Security
ADMIN#
ADMIN#
ADMIN#
ADMIN#
ADMIN#show po
ADMIN#show port-security
Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
(Count) (Count) (Count)
Fa0/1 1 0 0 Shutdown
Fa0/2 1 0 0 Shutdown
Fa0/3 1 0 0 Shutdown
Fa0/4 1 0 0 Shutdown
Fa0/5 1 1 0 Shutdown
Fa0/6 1 0 0 Shutdown
Fa0/7 1 0 0 Shutdown
Fa0/8 1 0 0 Shutdown
Fa0/9 1 0 0 Shutdown
Fa0/10 1 0 0 Shutdown
Fa0/11 1 0 0 Shutdown
Fa0/12 1 0 0 Shutdown
Fa0/13 1 0 0 Shutdown
Fa0/14 1 0 0 Shutdown
Fa0/15 1 0 0 Shutdown
Fa0/16 1 0 0 Shutdown

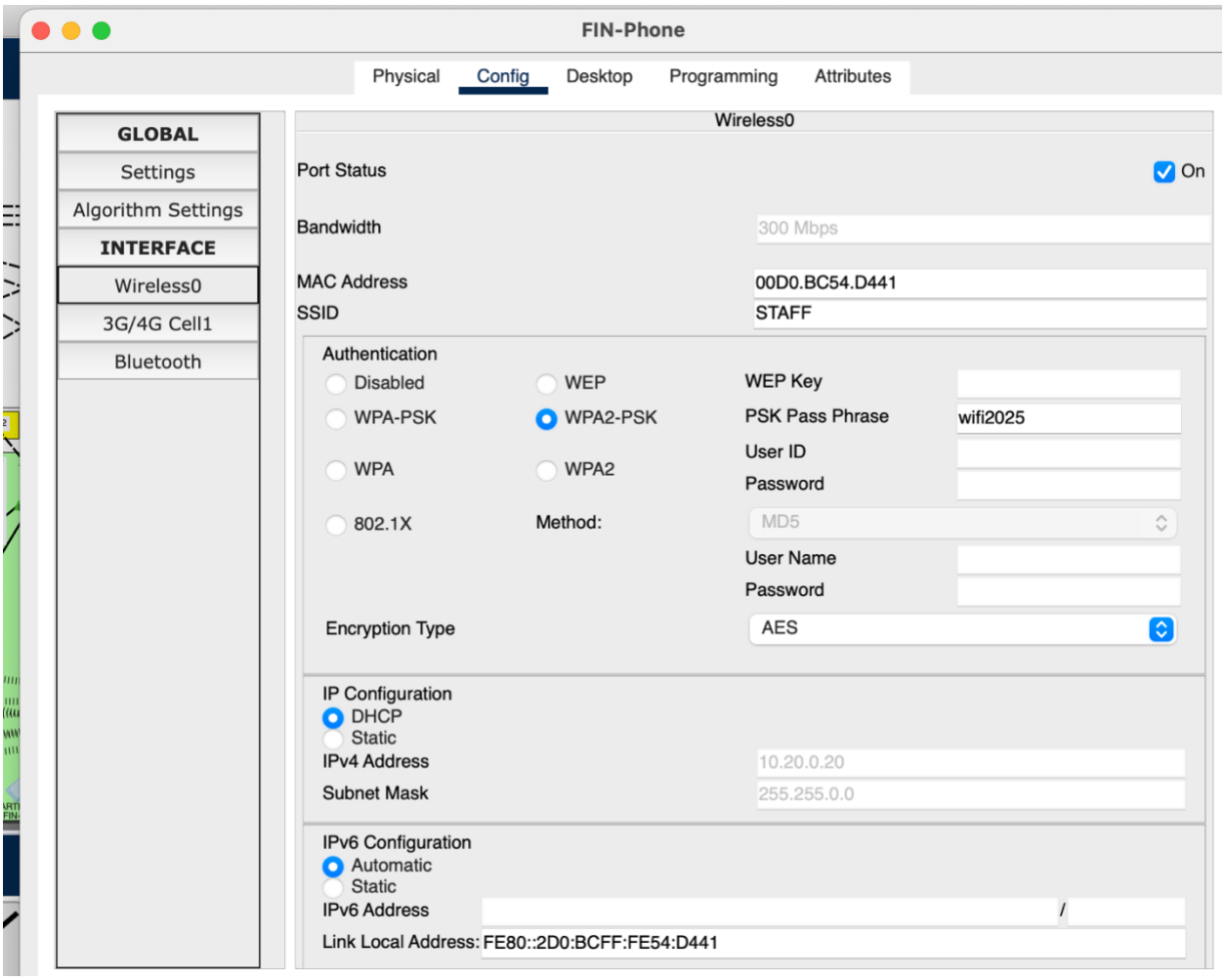
Testing and Verification

Wireless LAN

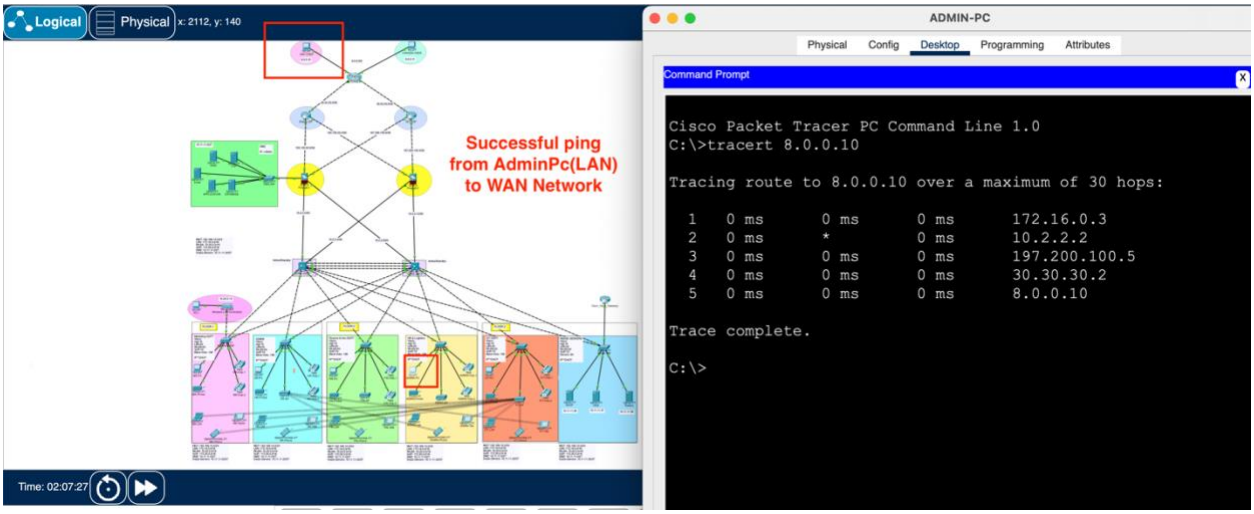




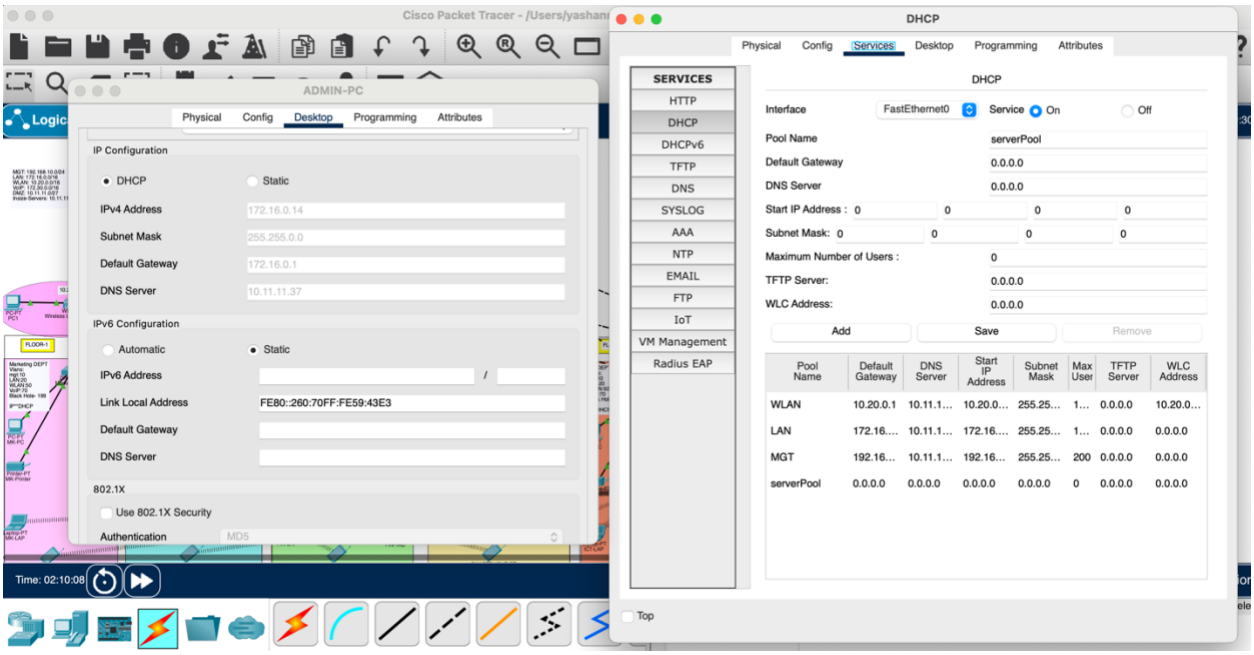
WLAN - Connectivity Test (Staff Mobile)



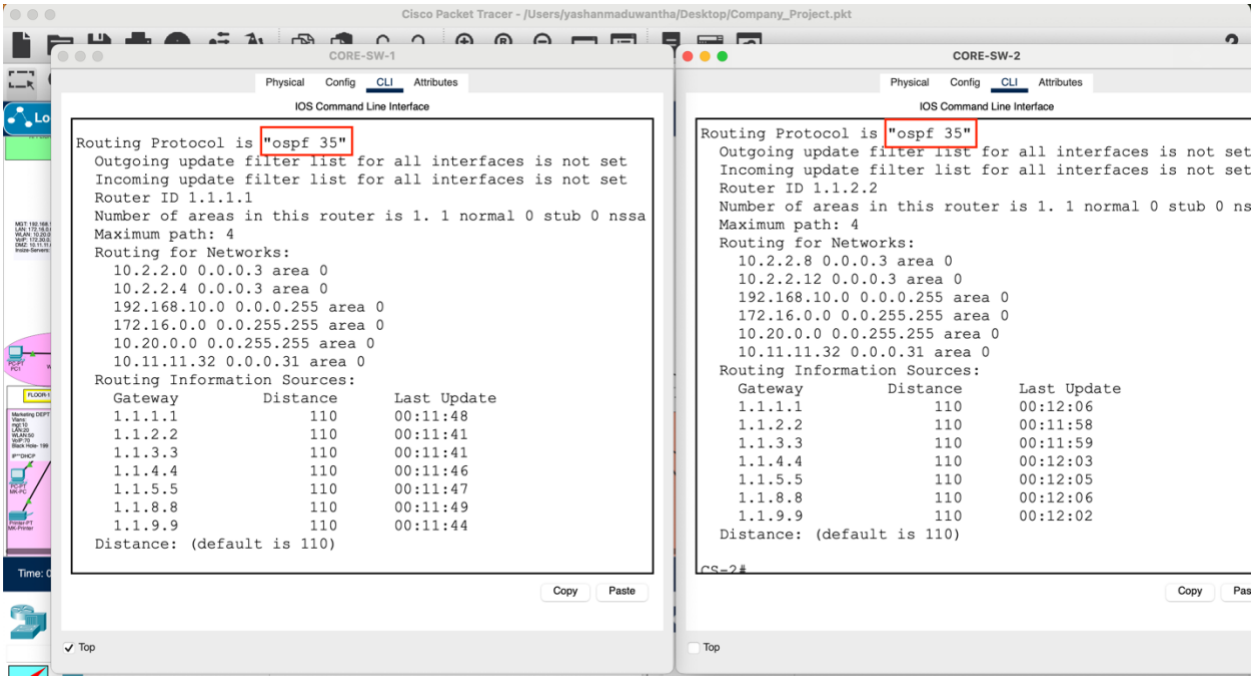
Ping and Tracert Testing



DHCP



OSPF


Cisco Packet Tracer - /Users/yashanmaduwantha/Desktop/Company_Project.pkt
CORE-SW-1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Routing Protocol is "ospf 35"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 1.1.1.1
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
10.2.2.0 0.0.0.3 area 0
10.2.2.4 0.0.0.3 area 0
192.168.10.0 0.0.0.255 area 0
172.16.0.0 0.0.255.255 area 0
10.20.0.0 0.0.255.255 area 0
10.11.11.32 0.0.0.31 area 0
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:11:48
1.1.2.2 110 00:11:41
1.1.3.3 110 00:11:41
1.1.4.4 110 00:11:46
1.1.5.5 110 00:11:47
1.1.8.8 110 00:11:49
1.1.9.9 110 00:11:44
Distance: (default is 110)
Copy
Paste
Top
CORE-SW-2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Routing Protocol is "ospf 35"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 1.1.2.2
Number of areas in this router is 1. 1 normal 0 stub 0 ns
Maximum path: 4
Routing for Networks:
10.2.2.8 0.0.0.3 area 0
10.2.2.12 0.0.0.3 area 0
192.168.10.0 0.0.0.255 area 0
172.16.0.0 0.0.255.255 area 0
10.20.0.0 0.0.255.255 area 0
10.11.11.32 0.0.0.31 area 0
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:12:06
1.1.2.2 110 00:11:58
1.1.3.3 110 00:11:59
1.1.4.4 110 00:12:03
1.1.5.5 110 00:12:05
1.1.8.8 110 00:12:06
1.1.9.9 110 00:12:02
Distance: (default is 110)
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