COMPUTER & DATA NETWORKS
SELF LEARNING ASSIGNMENT
EC4060

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2021/E/169
GROUP EG18
SEMESTER 04
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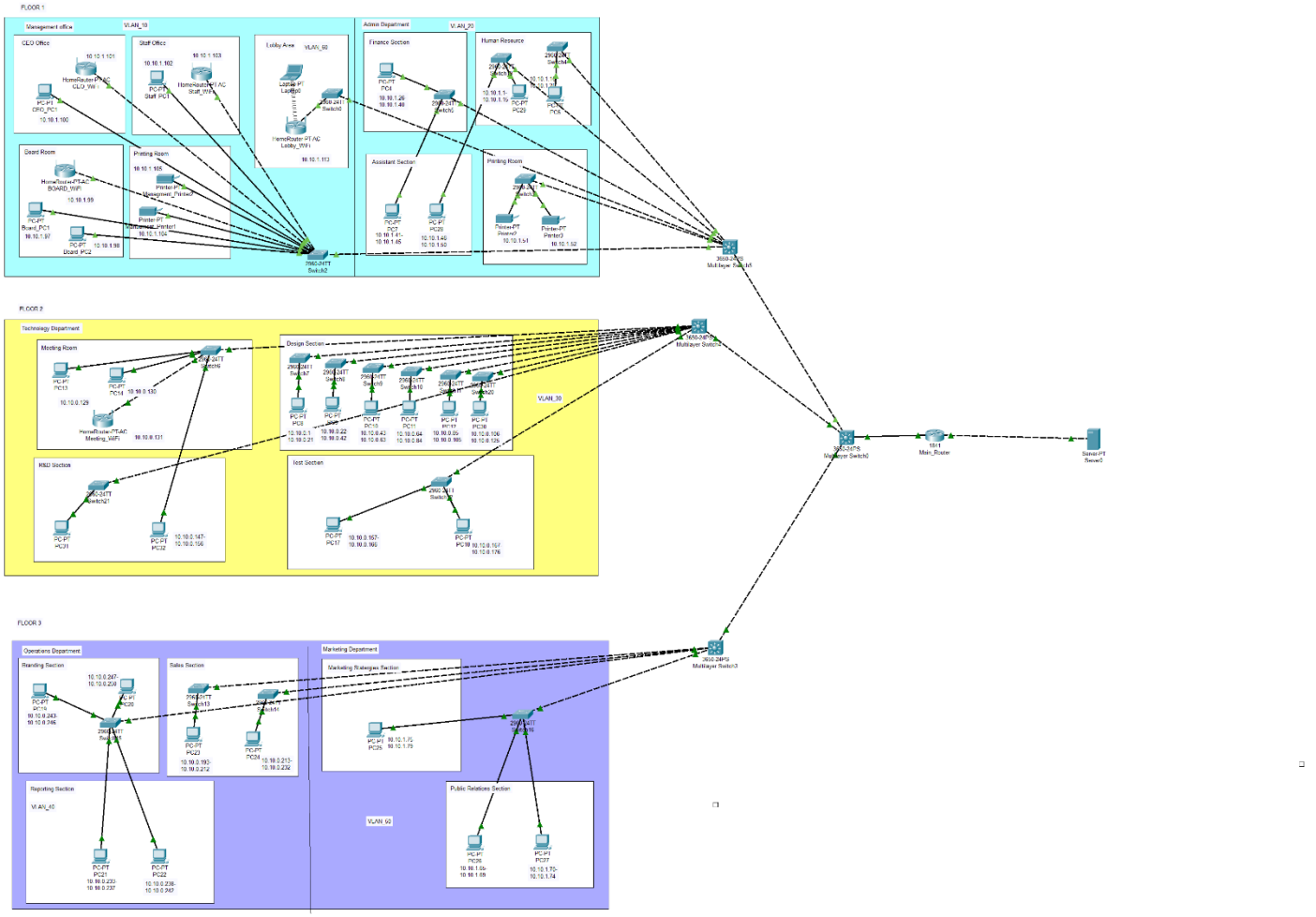
OBJECTIVE:

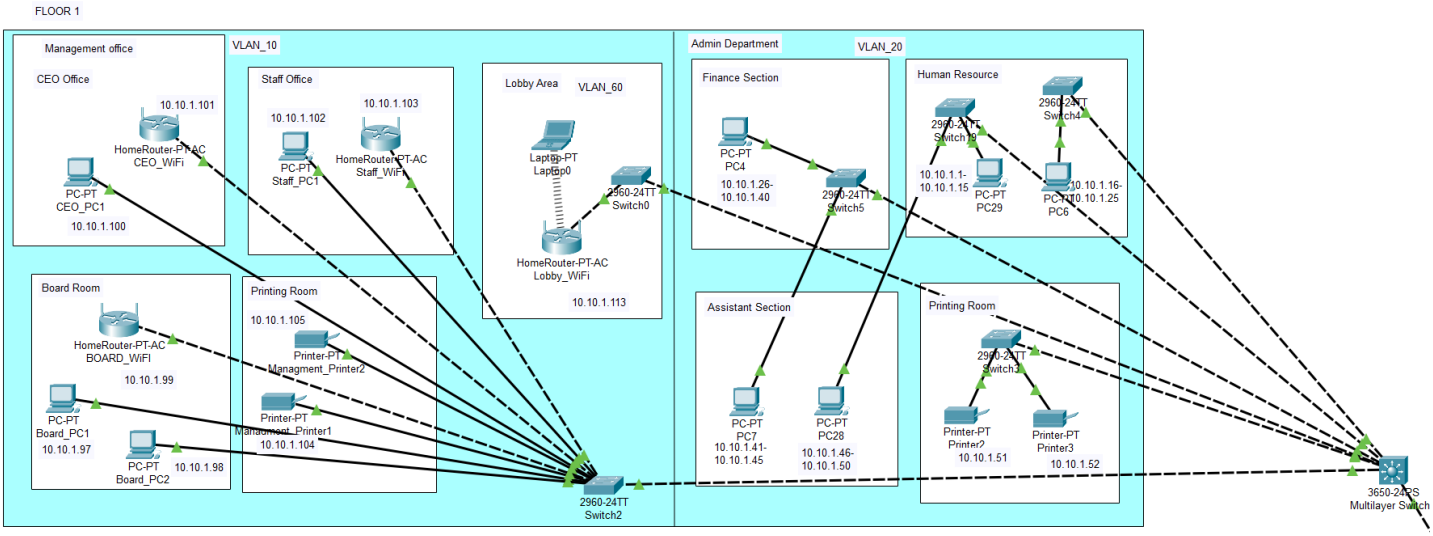
- Multinational Corporation IT company want to establish a new overseas branch in Sri Lank This company newly constructed a three-story building: Length: 60 meters, Width: 30 meters, Height: each floor 4 meters.
- You are requested to design a computer network to this company building with optimum use of network IP addresses. Available IP address range is 10.10.0.0/16.
- You should submit a report with the following details:
  - Network diagram (subnets and VLANs – provide IP addresses for each of them)
  - Write the steps on how to configure Routers and switches.
  - Wi-Fi Access points configuration details

DIAGRAM PLAN:

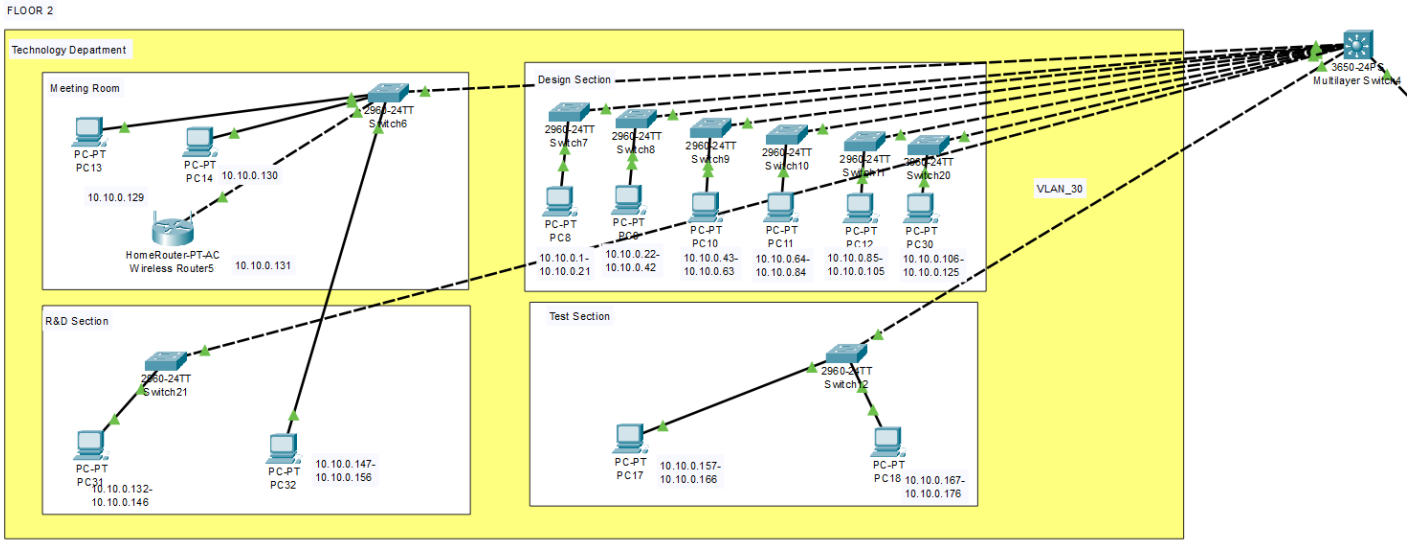
FLOOR	OFFICE/DEPARTMENT	SECTIONS	DATA POINTS	WIFI
1	Management Office	CEO office	1	1
		Staff office	1	1
		Board Room	2	1
		Lobby Area		1
		Printing Room	2	
	Admin	Finance Section	15	
		Human Resource	25	
		Assistant Section	10	
		Printing Room	2	
2	Technology	Meeting Room	2	1
		R&D Section	25	
		Design Section	125	
		Test Section	20	
3	Operations	Branding Room	8	
		Reporting Room	10	
		Sales Section	40	
	Marketing	Marketing Strategies	5	
		Public Relations section	10	



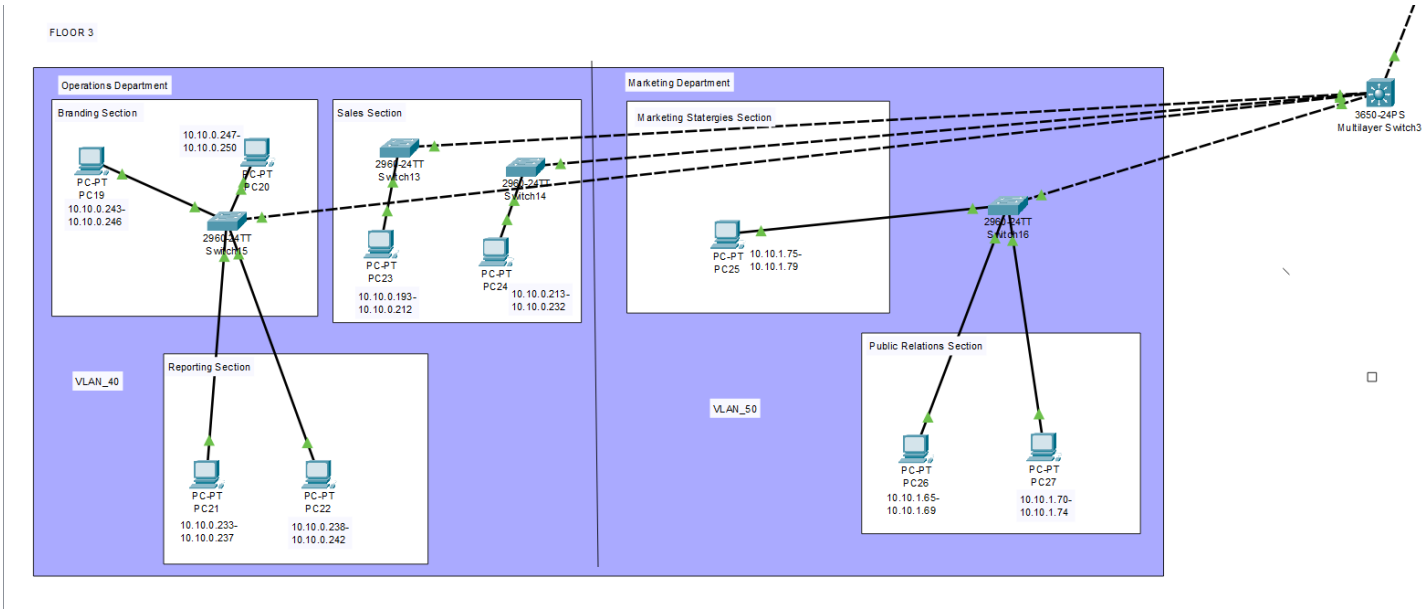
FULL NETWORK DIAGRAM



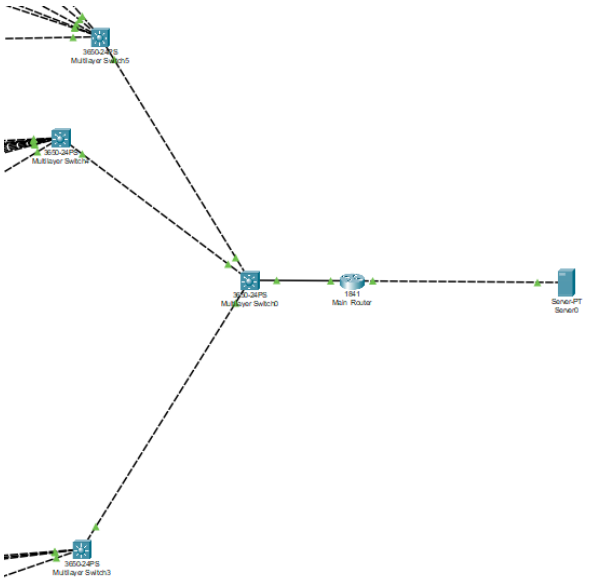
FLOOR 1: MANAGEMENT OFFICE, ADMIN DEPARTMENT



FLOOR 2: TECHNOLOGY DEPARTMENT



FLOOR 3: OPERATION DEPARTMENT, MARKETING DEPARTMENT



MAIN CONNECTION: MULTILAYER SWITCHES TO MAIN MULTILAYER SWITCH.

MAIN MULTILAYER SWITCH TO ROUTER

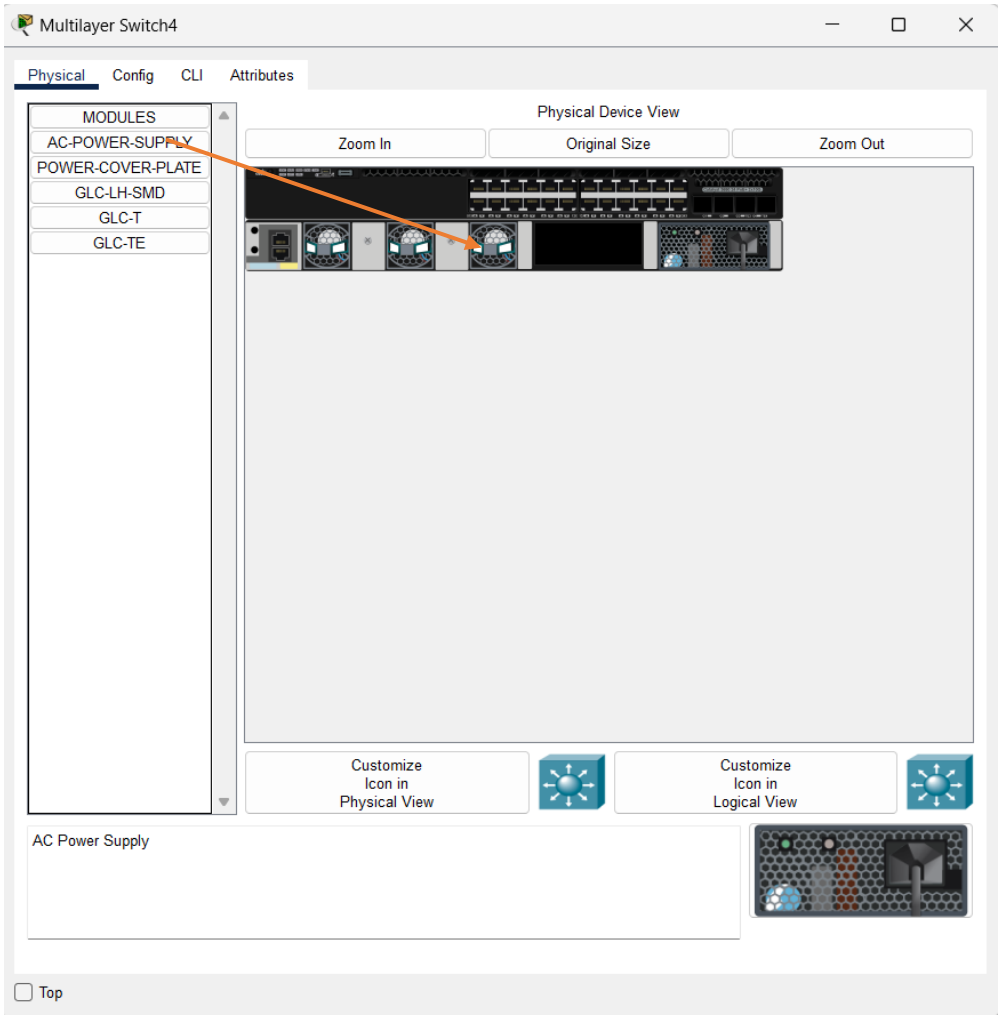
ROUTER TO SERVER

SUBNETTING AND VLAN DETAILS

NAME	SIZE	ALLOCATED SIZE	CIDR	SUBNET MASK	NETWORK ADDRESS	RANGE	BROADCASY
TECHNOLOGY	125	126	/25	255.255.255.128	10.10.0.0	10.10.0.1-10.10.0.125	10.10.0.127
	48	62	/26	255.255.255.192	10.10.0.128	10.10.0.129-10.10.0.176	10.10.0.191
OPERATIONS DEPARTMENT	58	62	/26	255.255.255.192	10.10.0.192	10.10.0.193-10.10.0.250	10.10.0.255
ADMIN DEPARTMENT	52	62	/26	255.255.255.192	10.10.1.0	10.10.1.1-10.10.1.52	10.10.1.63
MARKETING DEPARTMENT	15	30	/27	255.255.255.224	10.10.1.64	10.10.1.65-10.10.1.79	10.10.1.95
MANGEMENT OFFICE	8	14	/28	255.255.255.240	10.10.1.96	10.10.1.97-10.10.1.105	10.10.1.111
LOBBY	1	2	/30	255.255.255.252	10.10.1.112	10.10.1.113	10.10.1.115

VLAN NO	OFFICE/DEPARTMENT	VLAN NAME	SIZE	RANGE
10	Management Office	CEO office	2	10.10.1.100-10.10.1.101
		Staff office	2	10.10.1.102-10.10.1.103
		Board Room	3	10.10.1.97-10.10.1.99
		Printing Room	2	10.10.1.104-10.10.1.105
20	Admin	Finance Section	15	10.10.1.26-10.10.1.40
		Human Resource	25	10.10.1.1-10.10.1.25
		Assistant Section	10	10.10.1.41-10.10.1.50
		Printing Room	2	10.10.1.51-10.10.1.52
30	Technology	Meeting Room	3	10.10.0.129-10.10.0.131
		R&D Section	25	10.10.0.132-10.10.0.156
		Design Section	125	10.10.0.1-10.10.0.125
		Test Section	20	10.10.0.157-10.10.0.176
40	Operations	Branding Room	8	10.10.0.243-10.10.0.250
		Reporting Room	10	10.10.0.233-10.10.0.242
		Sales Section	40	10.10.0.193-10.10.0.232
50	Marketing	Marketing Strategies	5	10.10.1.75-10.10.1.79
		Public Relations Section	10	10.10.1.65-10.10.1.74
60	Management Office	Lobby	1	10.10.1.113

Turn on Multilayer Switch



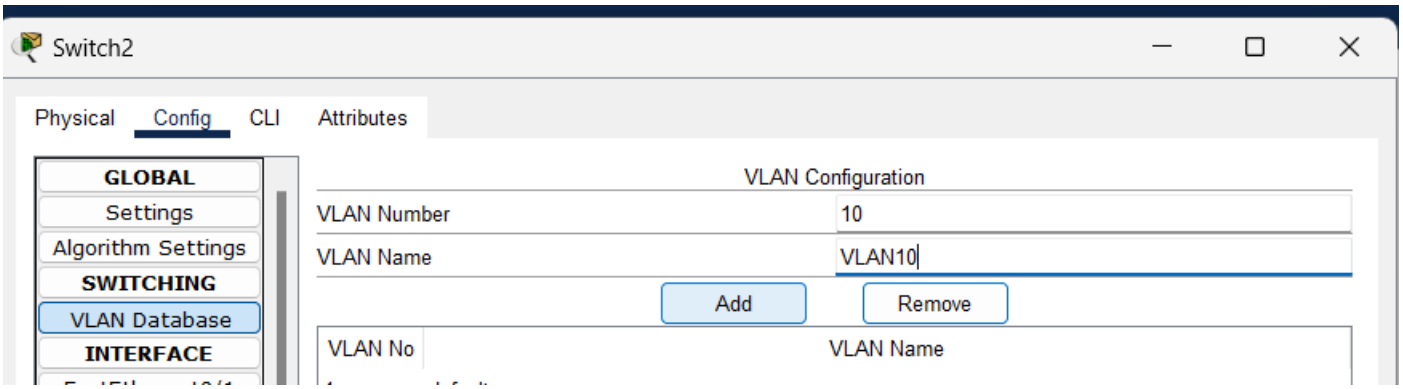
MULTILAYER SWITCH AND VLAN SWITCH CONNECTING POINT CONFIGURATION

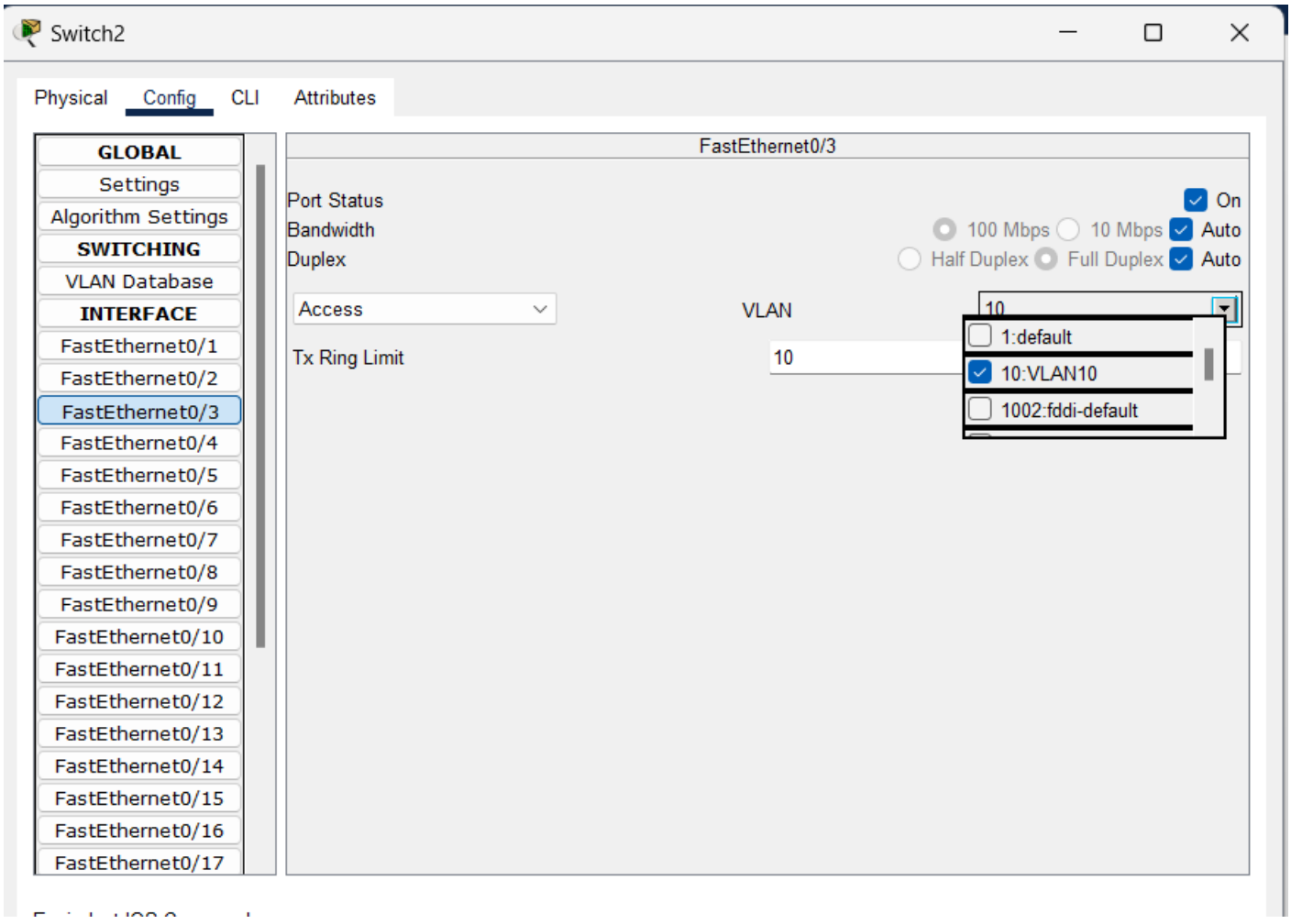
```
Switch>enable
Switch#
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#router rip
IP routing not enabled
Switch(config)#
%LINK-3-UPDOWN: Interface GigabitEthernet1/0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to down

%LINK-5-CHANGED: Interface GigabitEthernet1/0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to up

%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on GigabitEthernet1/0/2 (1), with Switch FastEthernet0/10 (10).

%LINK-3-UPDOWN: Interface GigabitEthernet1/0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to down

%LINK-5-CHANGED: Interface GigabitEthernet1/0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to up

Switch(config)#interface GigabitEthernet1/0/1
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/0/2
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/0/3
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/0/4
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/0/3
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/0/2
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface GigabitEthernet1/0/4
Switch(config-if)#
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on GigabitEthernet1/0/2 (1), with Switch FastEthernet0/10 (10).
```

ROUTER CONFIGURATION

```
Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Main_Router
Main_Router(config)#line console 0
Main_Router(config-line)#password Connect_123
Main_Router(config-line)#login
Main_Router(config-line)#exit
Main_Router(config)#vty 0 4
                    ^
% Invalid input detected at '^' marker.

Main_Router(config)#line vty 0 4
Main_Router(config-line)#password Connect_123
Main_Router(config-line)#login
Main_Router(config-line)#exit
Main_Router(config)#enable secret Main_Router
Main_Router(config)#banner motd "Main Router, No unauthorized login!"
Main_Router(config)#exit
Main_Router#
%SYS-5-CONFIG_I: Configured from console by console
```

VLAN CONFIGURATION





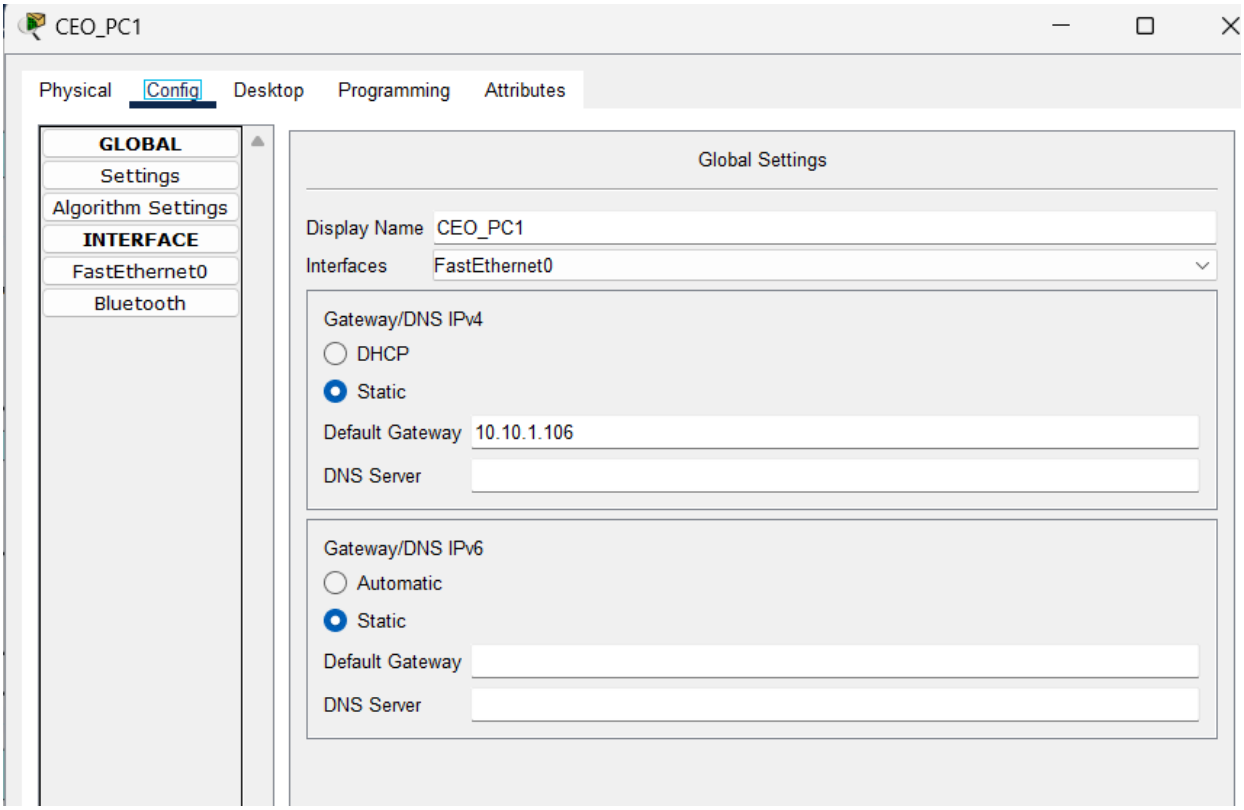
```
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to up


Switch>enable
Switch#
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface FastEthernet0/3
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#interface FastEthernet0/3
Switch(config-if)#
Switch(config-if)#exit
Switch(config)#
Switch(config)#vlan 10
Switch(config-vlan)# name VLAN10
Switch(config-vlan)#
Switch(config-vlan)#end
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface FastEthernet0/3
Switch(config-if)#
%SYS-5-CONFIG_I: Configured from console by console

Switch(config-if)#
Switch(config-if)#switchport access vlan 10
Switch(config-if)#
```

CONFIGURING FAST0/3 PORT TO VLAN10

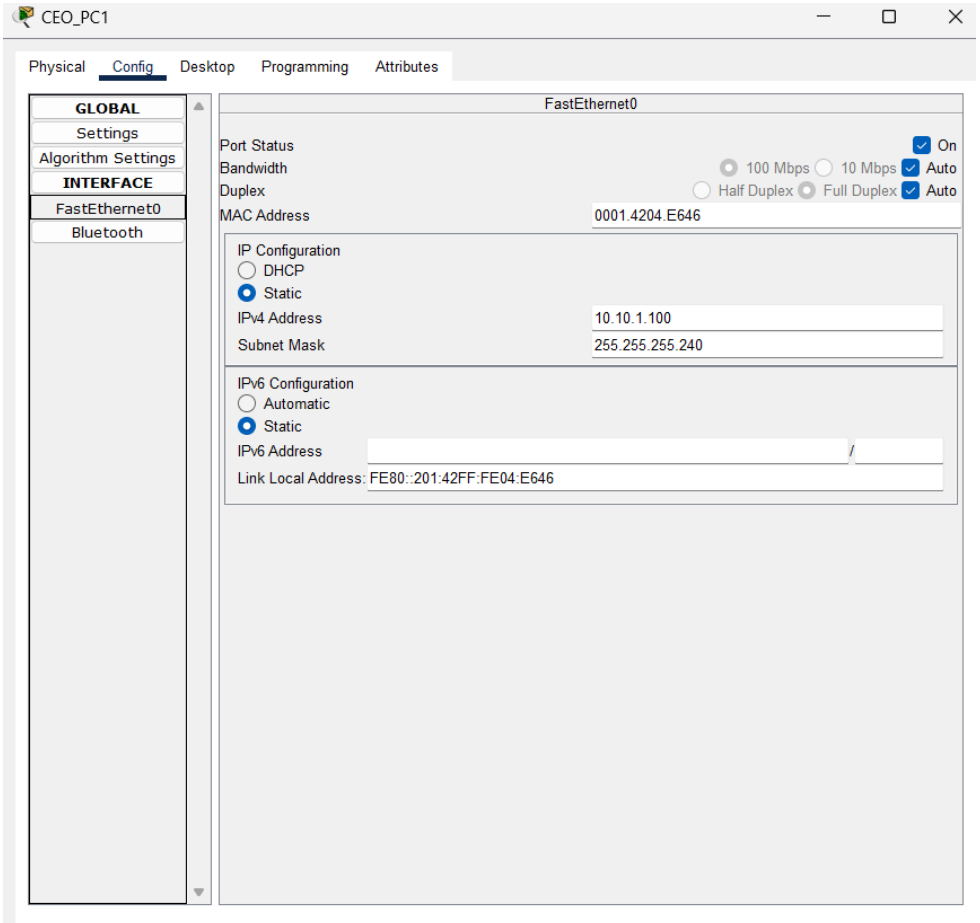
```
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#write memory
Building configuration...
[OK]
Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Fa0/24, Gig0/1, Gig0/2
10   VLAN10                           active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
 --More--
```

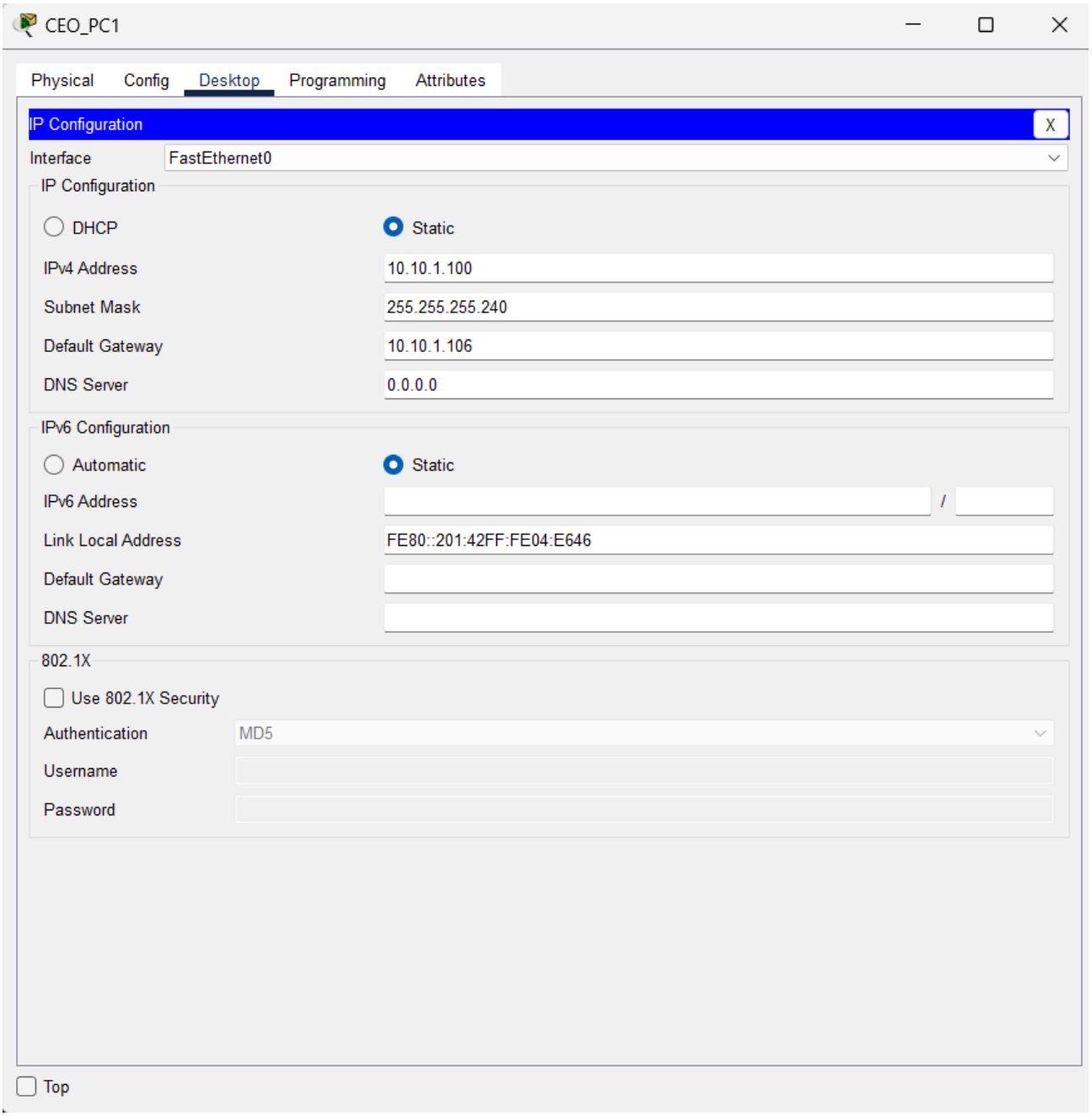
IN VLAN10 ALL PORTS ARE CONNECTED TO VLAN10

LOW-END DEVICE CONFIGURATION (PC & PRINTERS)

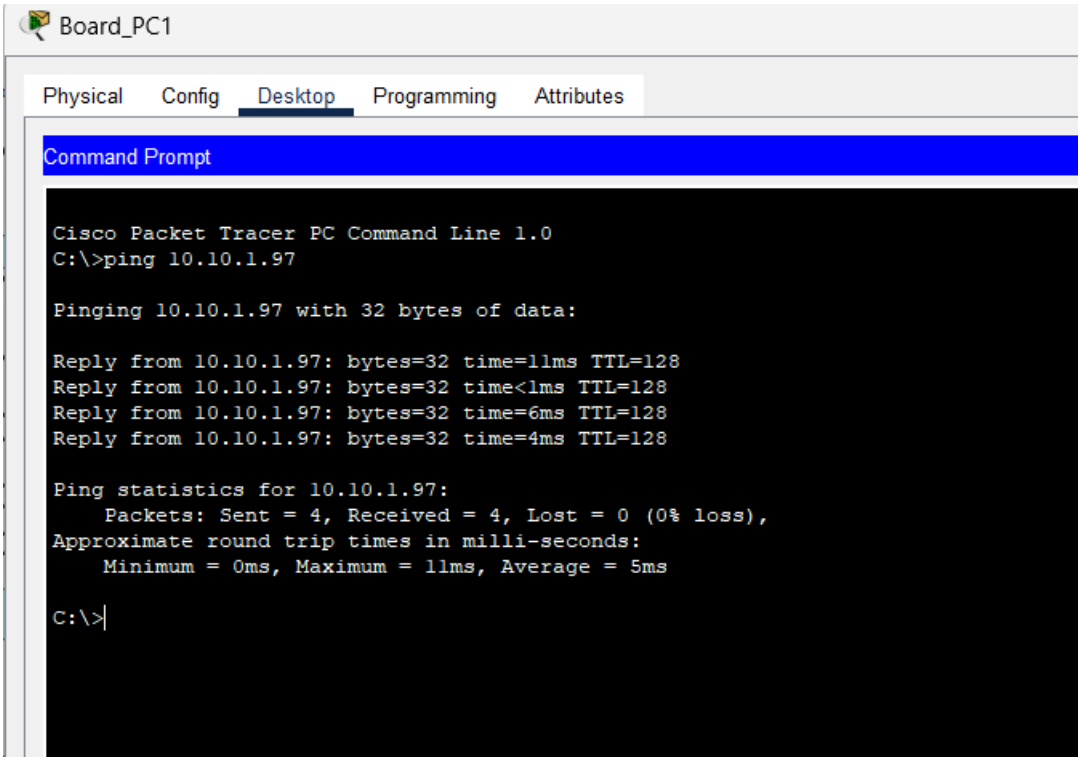


A PC IN THE CEO'S OFFICE: ASSIGNING DEFAULT GATEWAY

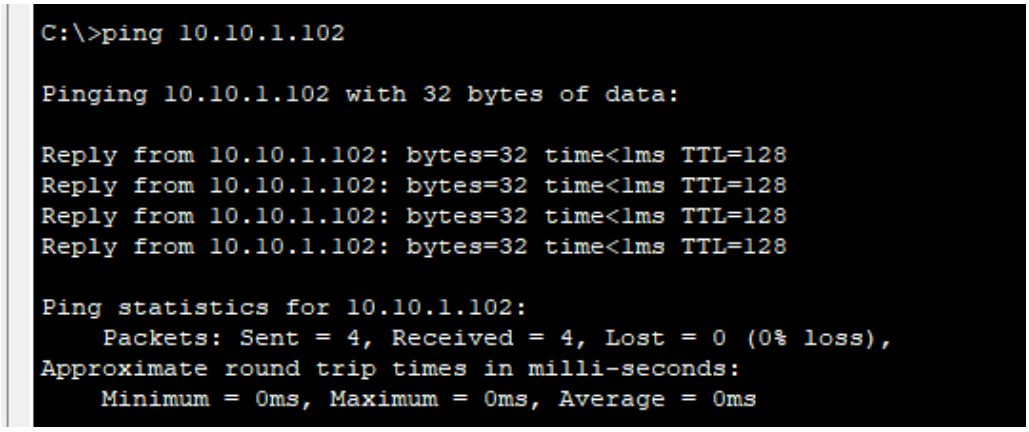




A PC IN THE DIRECTORS OFFICE: ASSIGNING IP ADDRESS & SUBNET

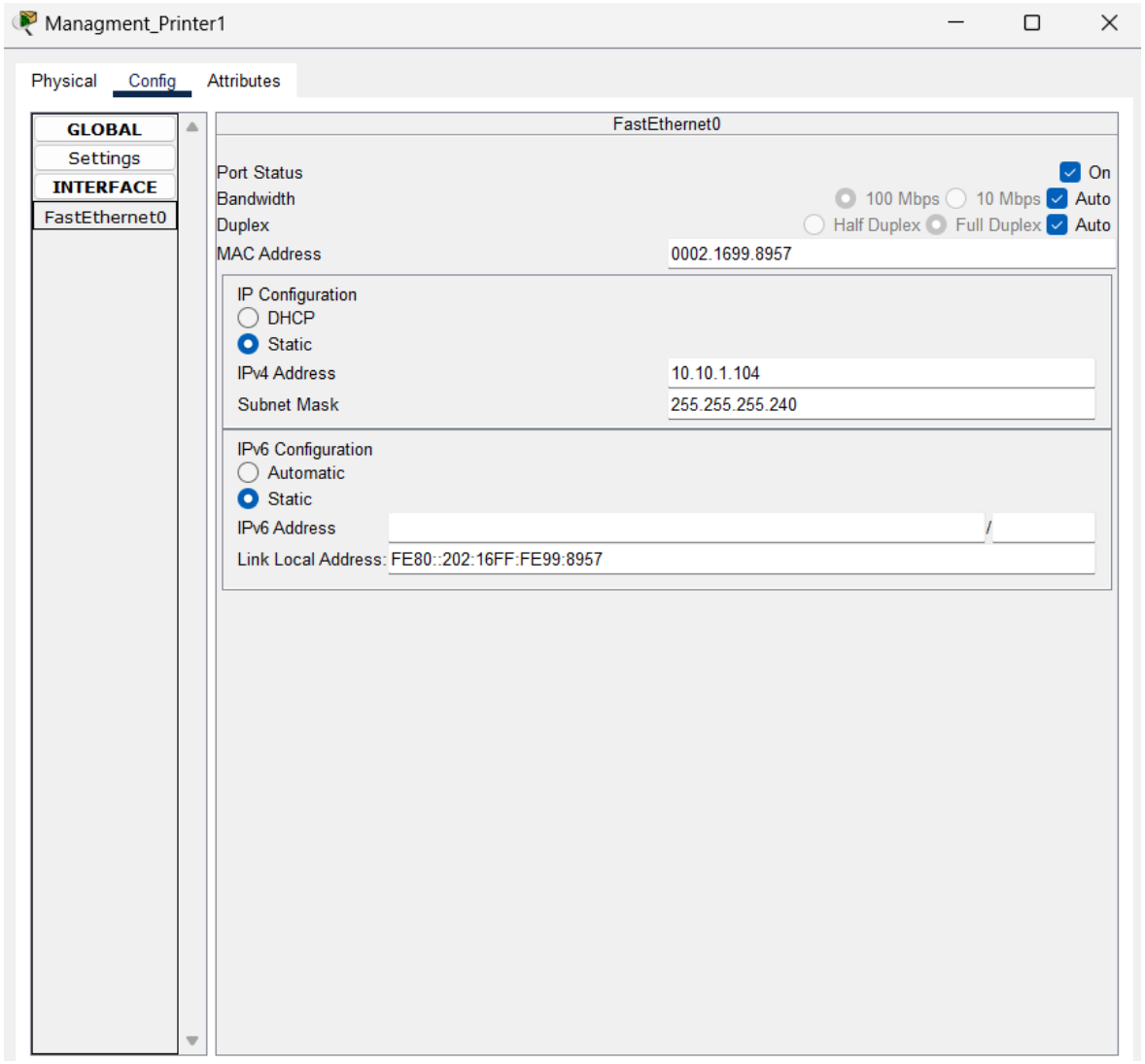


A PC IN THE DIRECTOR'S OFFICE: VERFING CONNECTION BY PINGING THE SAME PC



A PC IN THE COMPUTER LAB 1: VERFING CONNECTION BY PINGING OTHER PC

PRINTER



A PRINTER IN THE PRINTING OFFICE: BASE CONFIGURATION

```
C:\>ping 10.10.1.104

Pinging 10.10.1.104 with 32 bytes of data:

Reply from 10.10.1.104: bytes=32 time<1ms TTL=128
Reply from 10.10.1.104: bytes=32 time<1ms TTL=128
Reply from 10.10.1.104: bytes=32 time<1ms TTL=128
Reply from 10.10.1.104: bytes=32 time=11ms TTL=128

Ping statistics for 10.10.1.104:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>
```

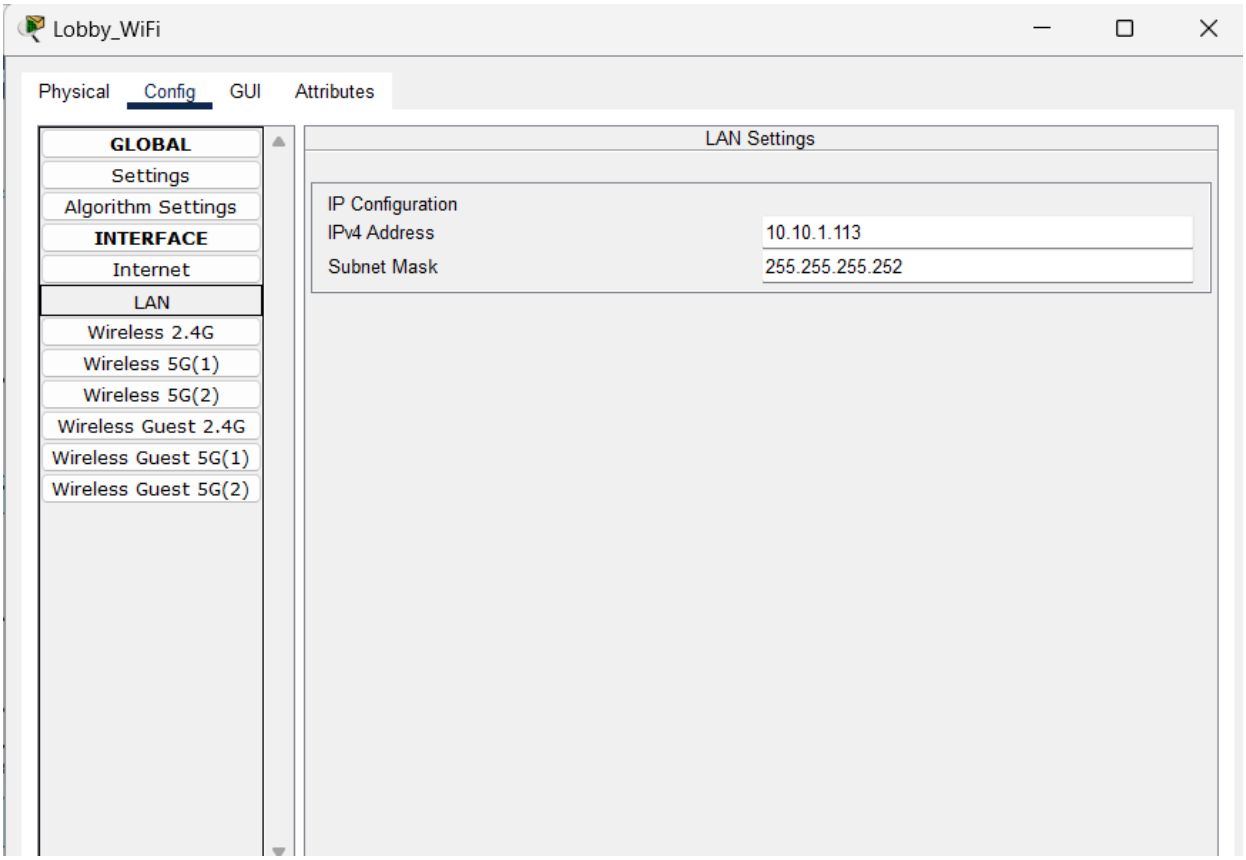
```
C:\>ping 10.10.1.52

Pinging 10.10.1.52 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.10.1.52:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

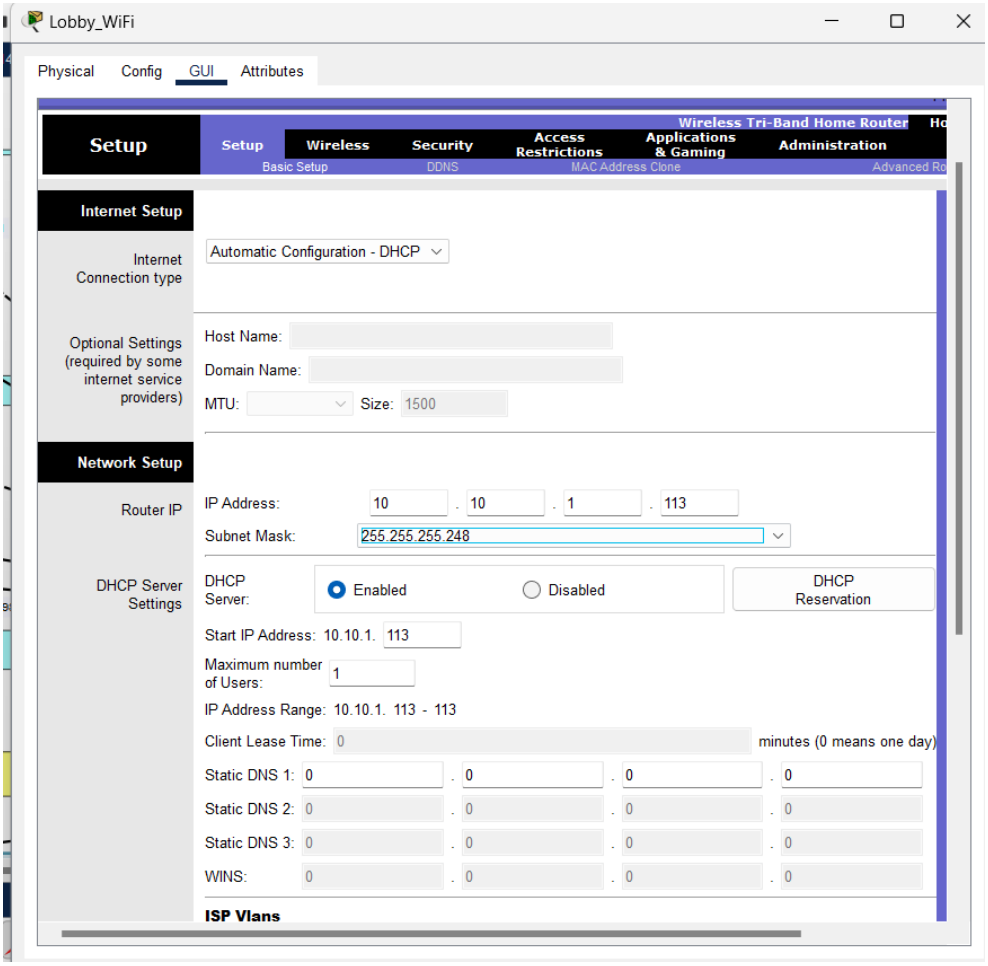
Printers available at the admin department can't access by the other department.

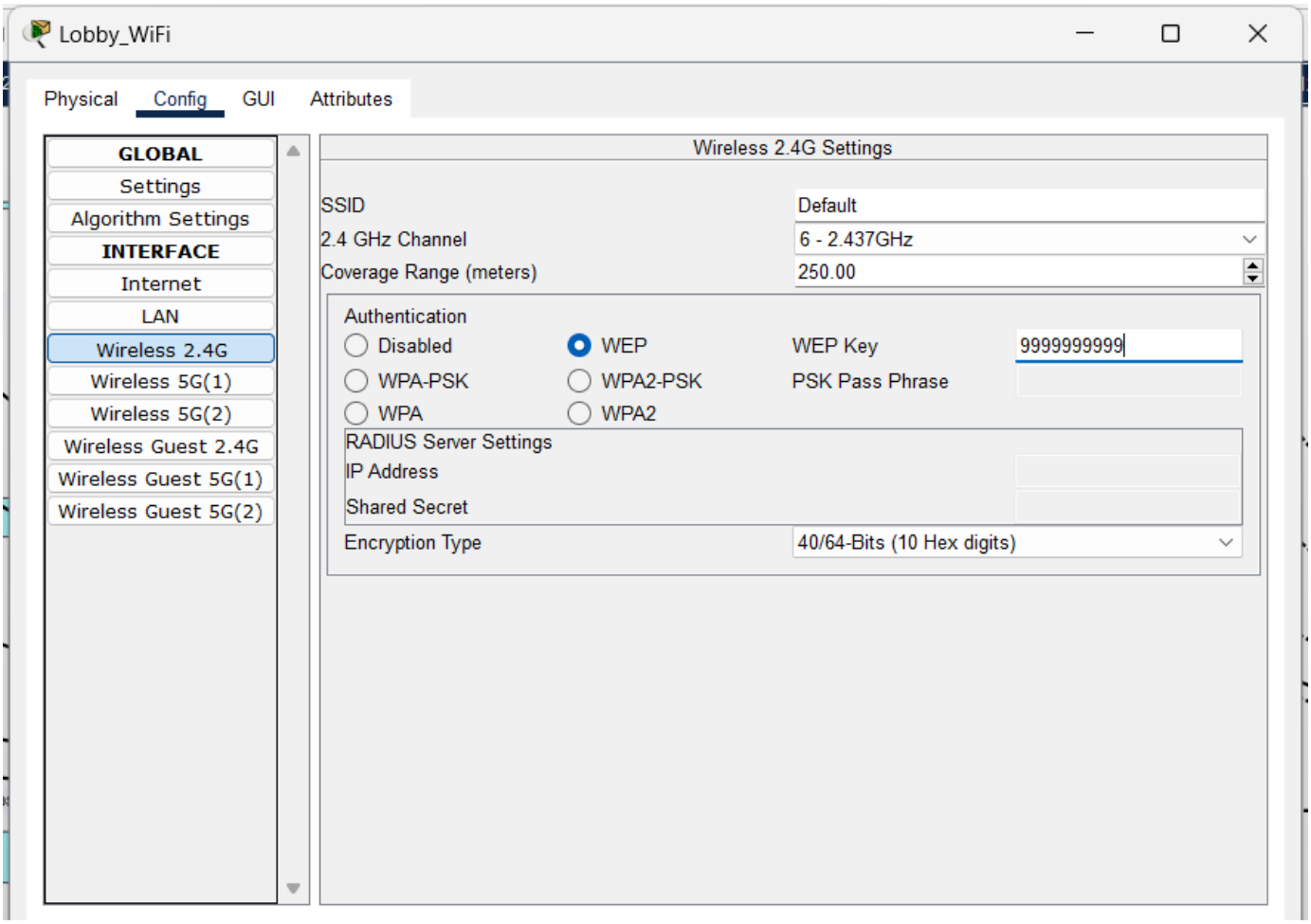
```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.10.1.104

Pinging 10.10.1.104 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.10.1.104:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

Printer available at the management office printing room can't access by any other departments.

WIRELESS ROUTER CONFIGURATION

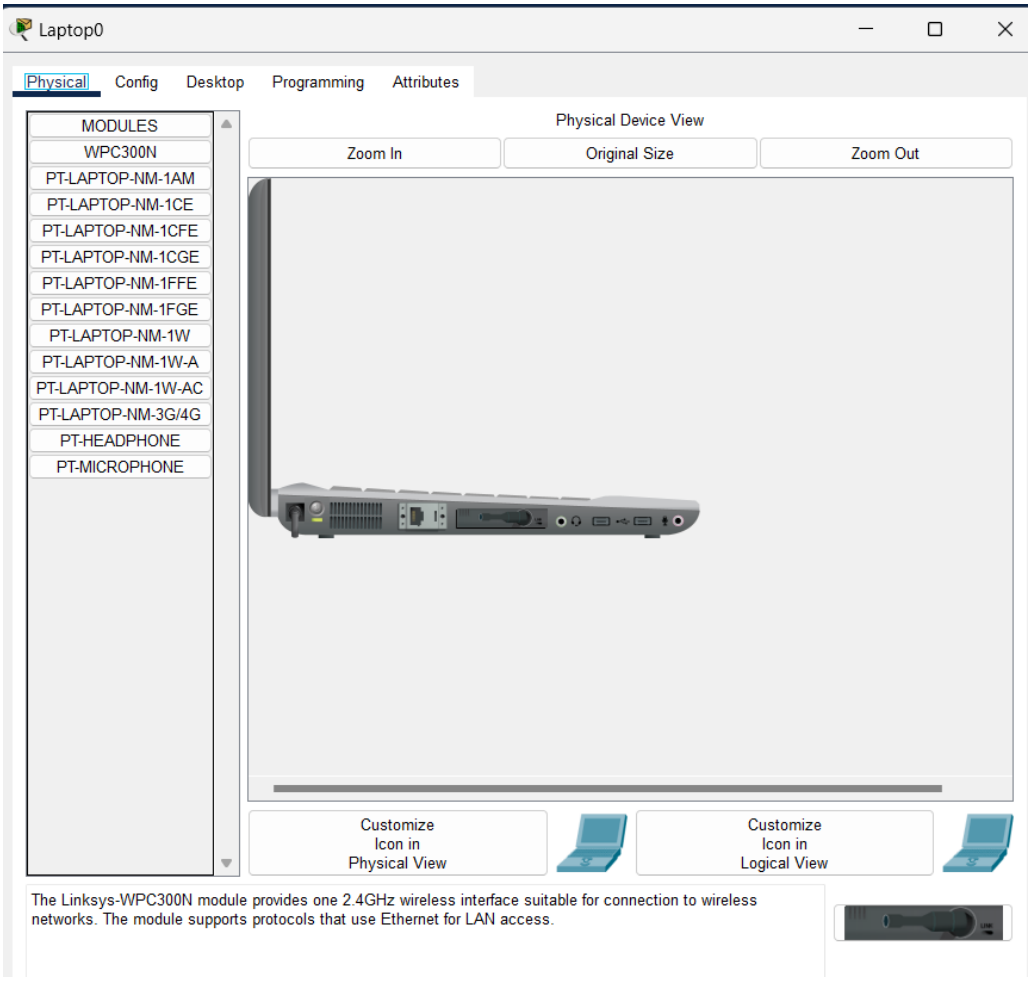


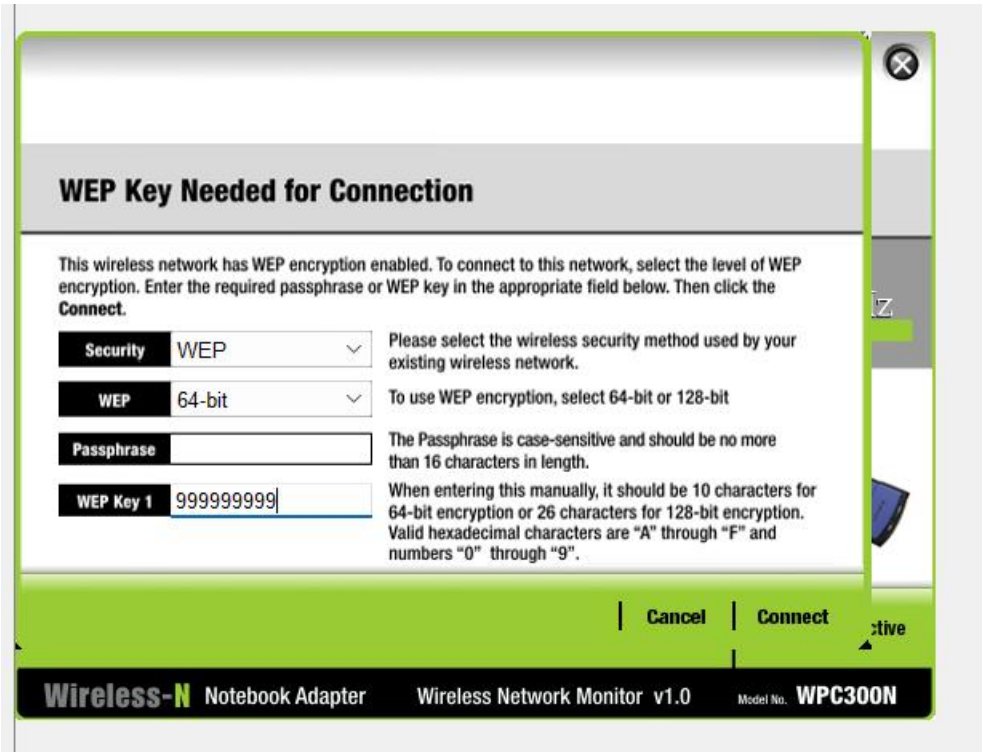


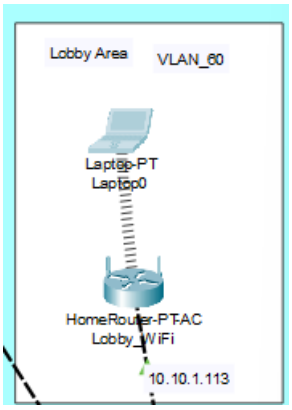


ASSSIGN WEP KEY FOR WIFI CONNECTION

LAPTOP WIFI CONFIGURATION




WEP Key Needed for Connection
This wireless network has WEP encryption enabled. To connect to this network, select the level of WEP encryption. Enter the required passphrase or WEP key in the appropriate field below. Then click the Connect.
Security
WEP
Please select the wireless security method used by your existing wireless network.
WEP
64-bit
To use WEP encryption, select 64-bit or 128-bit
Passphrase
The Passphrase is case-sensitive and should be no more than 16 characters in length.
WEP Key 1
999999999
When entering this manually, it should be 10 characters for 64-bit encryption or 26 characters for 128-bit encryption. Valid hexadecimal characters are "A" through "F" and numbers "0" through "9".
Cancel
Connect
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
Model No. WPC300N


Lobby Area
VLAN_60
Laptop-PT
Laptop0
HomeRouter-PT-AC
Lobby_WiFi
10.10.1.113