**105042014_Ass_3**
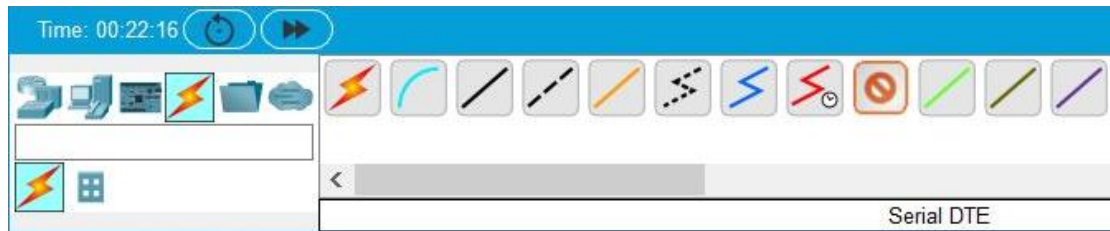
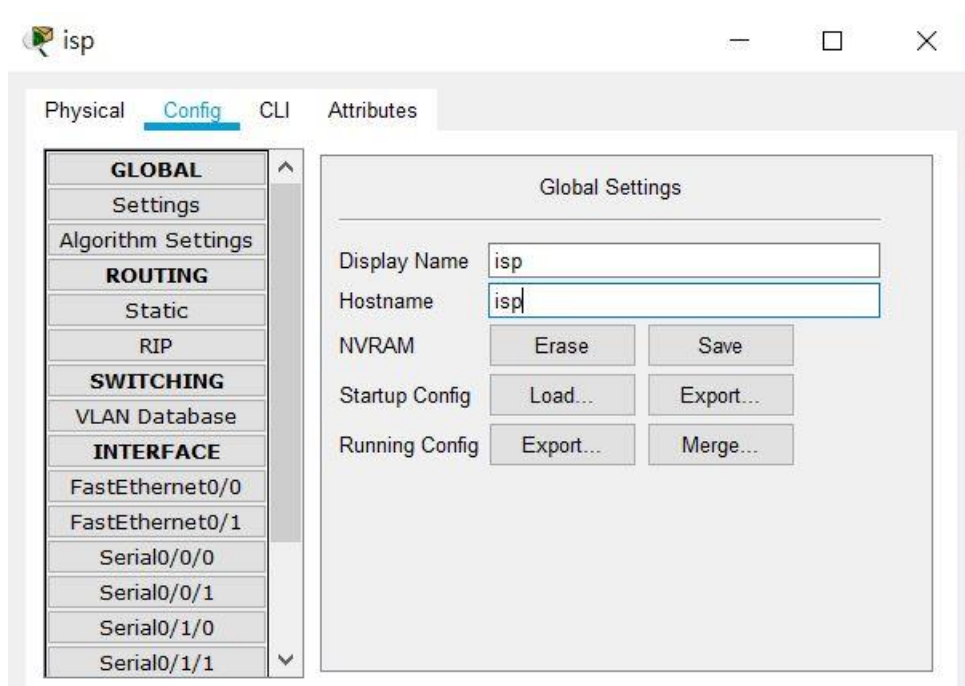**Part 1: OSPF**

Step 1: Configure ISP and the network equipment.

1. Give the network with a ISP router.
2. Connect all the routers with DTE interfaces.



3. Give the name of each router and click "save" to save it.



Step 2: Configure network between Taipei, Australia, Singapore, Russia

1. Between Taipei and ISP, the network is 1.0.0.0/8. The ISP serial 0/3/0 is 1.0.0.1/8. The Taipei serial 0/3/0 is 1.0.0.2/8.
2. Between Australia and ISP, the network is 2.0.0.0/8. The ISP serial 0/0/0 is 2.0.0.1/8. The Australia serial 0/0/0 is 2.0.0.2/8.
3. Between Singapore and ISP, the network is 3.0.0.0/8. The ISP serial 0/1/1 is 3.0.0.1/8. The Singapore serial 0/1/1 is 3.0.0.2/8.
4. Between Russia and ISP, the network is 4.0.0.0/8. The ISP serial 0/2/0 is 4.0.0.1/8. The Russia serial 0/2/0 is 4.0.0.2/8.
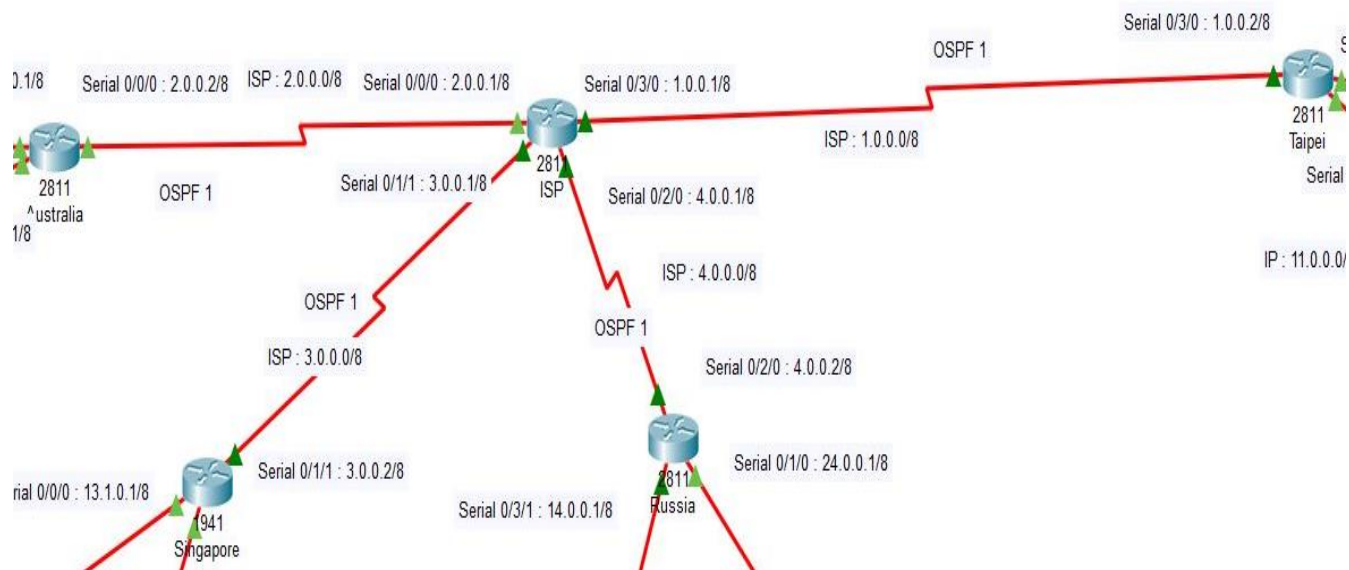
Step 3: configure OSPF area 0

1. Into router configuration, with command, "**conf t**."
2. into router ospf configuration, with command, "router ospf 1". The number of ospf is not limited to a certain number but has to be the same on the network we would like to connect with. I choose "OSPF 1".

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
```

3. Input the networks next to the router we configure.

   For Taipei router, the network we need to input is 1.0.0.0/8.

   For Australia router, the network we need to input is 2.0.0.0/8.

   For Singapore router, the network we need to input is 3.0.0.0/8.

   For Russia router, the network we need to input is 4.0.0.0/8.

   We have to input the wild card subnet, which is the complement of the subnet IP address. Take the network 3 for example, the IP address is 3.0.0.0/8, which means the IP of subnet is 255.0.0.0. Therefore, we input the 0.255.255.255. The area has to be consistent with all the network we would like to connect to. In this assignment, we choose area 0.

```
Router(config-router)#network 3.0.0.0 0.255.255.255 area 0
Router(config-router)#network 1.0.0.0 0.255.255.255 area 0
```

4. Copy the configuration.

   Input "Ctrl + Z" to leave the configuration.

   And we copy the running configuration to startup configuration.

```
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy ru
Router#copy running-config st
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

5. Check the configuration.

Input the command "sh run" to check the configuration in OSPF 1.

The following is the configuration of ISP.

```
router ospf 1
 log-adjacency-changes
 network 2.0.0.0 0.255.255.255 area 0
 network 3.0.0.0 0.255.255.255 area 0
 network 1.0.0.0 0.255.255.255 area 0
 network 4.0.0.0 0.255.255.255 area 0
```

**Part 2: EIGRP**

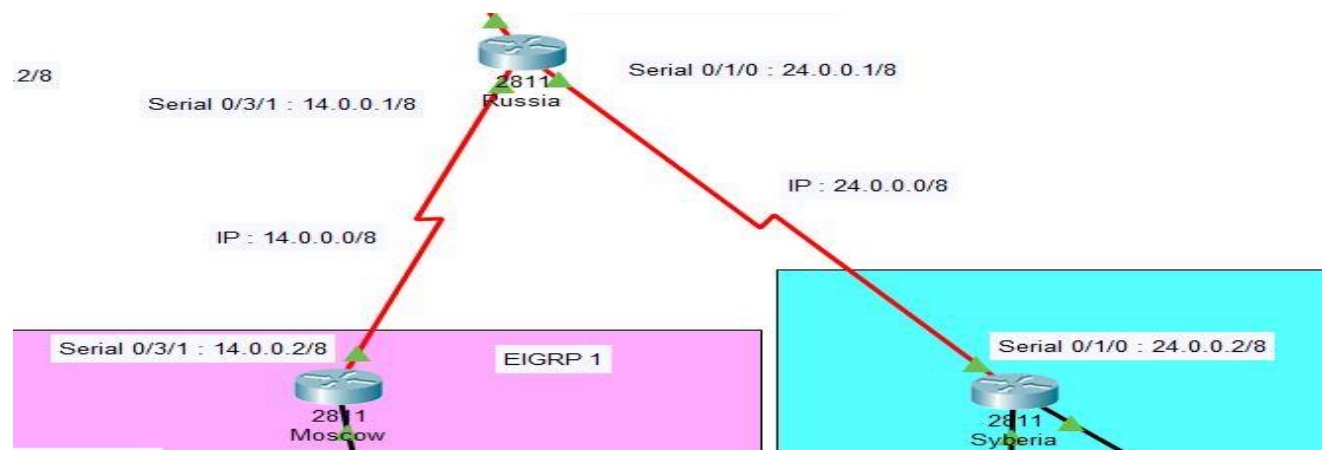Step 1: Give Routers for local cities.

Take Taipei for example.

Step 2: Configure network between the router of the country and the city

1. Taoyuan and Taipei use the network 21.0.0.0/8. The serial 0/0/0 of Taoyuan is 21.0.0.2/8. The serial 0/0/0 of Taipei is 21.0.0.1/8.

2. Taichung and Taipei use the network 11.0.0.0/8. The serial 0/1/0 of Taichung is 11.0.0.2/8. The serial 0/1/0 of Taipei is 11.0.0.1/8.

3. Taichung and Taoyuan use the network 31.0.0.0/8. The serial 0/3/0 of Taoyuan is 31.0.0.2/8. The serial 0/3/0 of Taichung is 31.0.0.1/8.

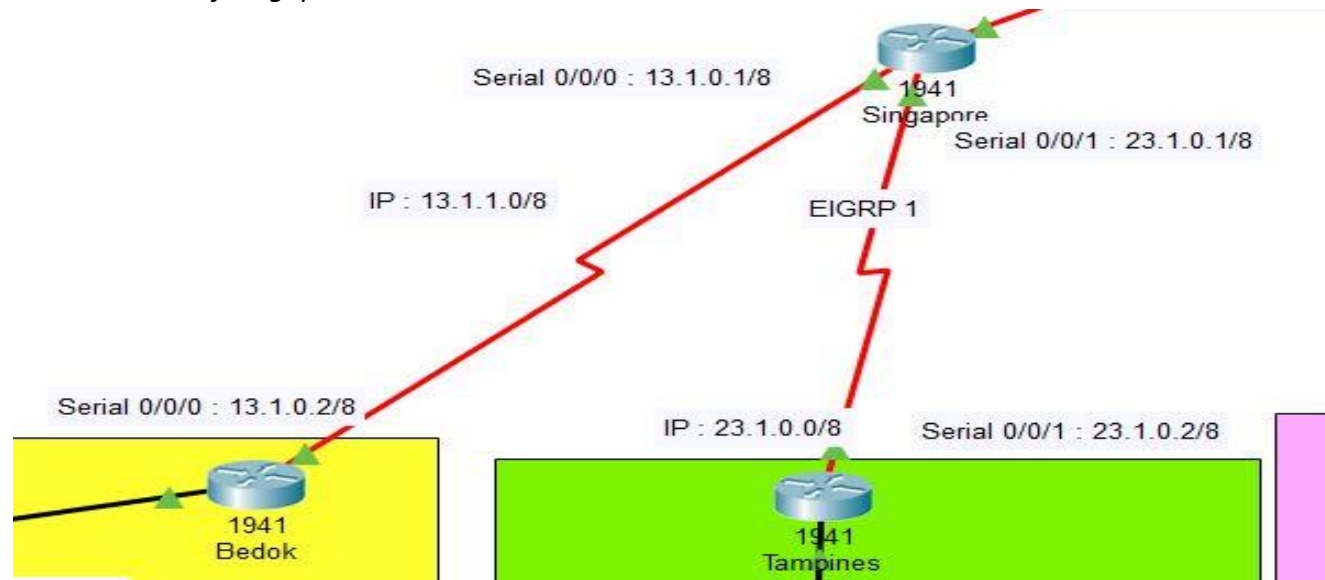4. We also configure the other three local network in this way.

   *#The network of Taipei*

*#The network of Russia*

Serial 0/3/1 : 14.0.0.1/8

Serial 0/1/0 : 24.0.0.1/8

.2/8

2811
Russia

IP : 24.0.0.0/8

IP : 14.0.0.0/8

Serial 0/3/1 : 14.0.0.2/8    EIGRP 1

Serial 0/1/0 : 24.0.0.2/8

2811
Moscow

2811
Syberia

*#The network of Singapore*

Serial 0/0/0 : 13.1.0.1/8

1941
Singapore

Serial 0/0/1 : 23.1.0.1/8

IP : 13.1.1.0/8

EIGRP 1

Serial 0/0/0 : 13.1.0.2/8

IP : 23.1.0.0/8    Serial 0/0/1 : 23.1.0.2/8

1941
Bedok

1941
Tampines

*#The network of Australia*

ISP : 12.1.0.0/8    Serial 0/1/0 : 12.1.0.1/8    Se

4

Serial 0/1/0 : 12.1.0.2/8

1941
Perth

IP : 128.2.1.1

EIGRP 1

2811
^ustralia

Serial 0/0/1 : 22.2.0.1/8

IP : 131.2.2.1/24    ISP : 22.2.0.0/8

Serial 0/0/1 : 22.2.0.2/8

1941
Cairns

19
Sin

Step 3: configure EIGRP

1. Into the configuration mode by command, "enable", "conf t" respectively.

2. Configure router EIGRP 1. The number following EIGRP can be any number but has to be consistent for all the networks we would like the connect to.

3. Input the network IP without subnet. We have to input all the networks surrounding the router but the OSPF ones.
   *#Take Taipei for example. The network next to router Taipei is 21.0.0.0/8, 11.0.0.0/8 and 1.0.0.0/8. In this case, we input the network of 21.0.0.0 and 11.0.0.0. Do not input 1.0.0.0 since it belongs to OSPF 1.*
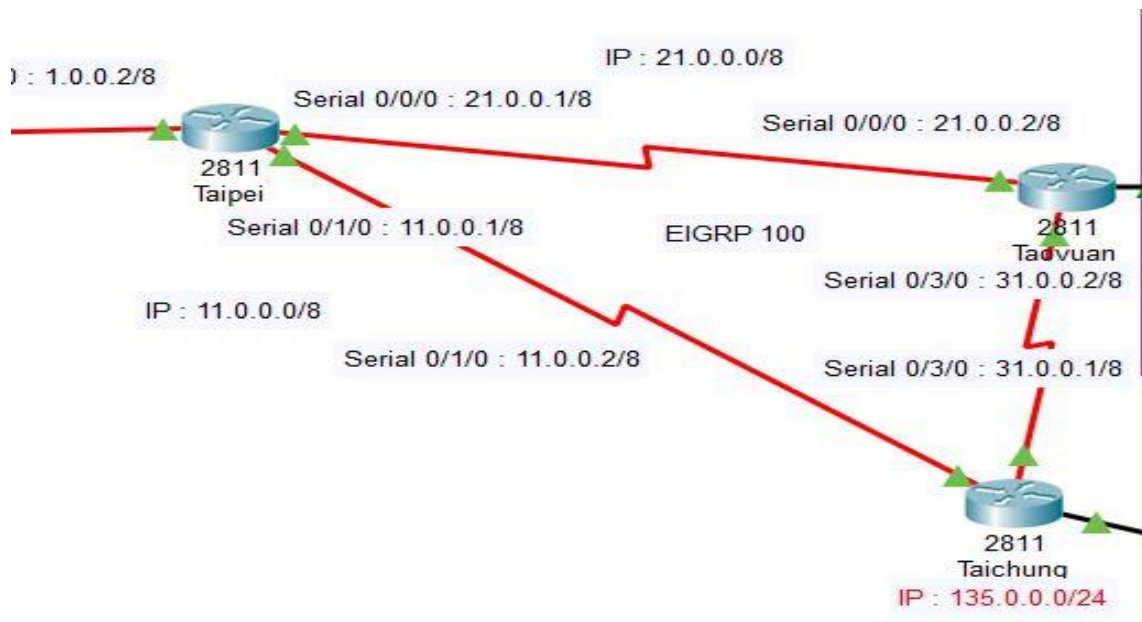


```
Router(config)#router eigrp 1
Router(config-router)#network 11.0.0.0
Router(config-router)#network 21.0.0.0
```

4. <u>Copy the configuration.</u>
   Input "Ctrl + Z" to leave the configuration.
   And we copy the running configuration to startup configuration.

```
Router(config-router)#e^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy run
Router#copy running-config st
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

5. <u>Check the configuration.</u>
   Input the command "sh run" to check the configuration in EIGRP 1.
   The following is the configuration of router Taipei.

```
router eigrp 1
 network 11.0.0.0
 network 21.0.0.0
 auto-summary
```

**Part 3: DHCP routers configuration**

Step 1: Configure the network

1. Enter the interface.
2. Set up IP address and subnet.
3. Turn on with the command "no shutdown".

```
Router#
Router#en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 128.0.0.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
```

Step 2: Configure DHCP routers

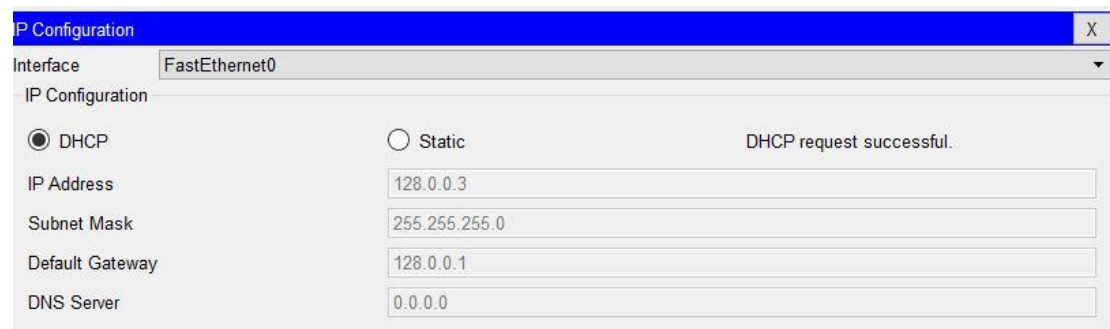1. Configure DHCP pool and give the default-router.
2. exit

```
Router(config)#ip dhcp pool Perth
Router(dhcp-config)#network 128.0.0.0 255.255.255.0
Router(dhcp-config)#default-router 128.0.0.1
Router(dhcp-config)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 3: check the DHCP configuration.

1. Enter the enable mode and check the configuration by the command, "show run"

```
ip dhcp pool Perth
 network 128.0.0.0 255.255.255.0
 default-router 128.0.0.1
```

2. Check one of the computer and DHCP request.

| P Configuration | | | X |
|---|---|---|---|
| Interface | FastEthernet0 | | ▼ |

IP Configuration

- ● DHCP        ○ Static        DHCP request successful.

| IP Address | 128.0.0.3 |
|---|---|
| Subnet Mask | 255.255.255.0 |
| Default Gateway | 128.0.0.1 |
| DNS Server | 0.0.0.0 |

**Part 4: Configure DHCP servers**

Step 1: Configure the network

1. Same as part 3 step 1.
2. And plus one sever for DHCP.

Step 2: Configure DHCP servers

1. Give the server an IP address. The default gateway is the port of the network.



2. Configure the DHCP server.
   The default gateway is the port of the network router. The Start IP address is 129.0.0.3 since 129.0.0.2 is the IP of the DHCP server and 129.0.0.1 is the IP of the port of the network router.
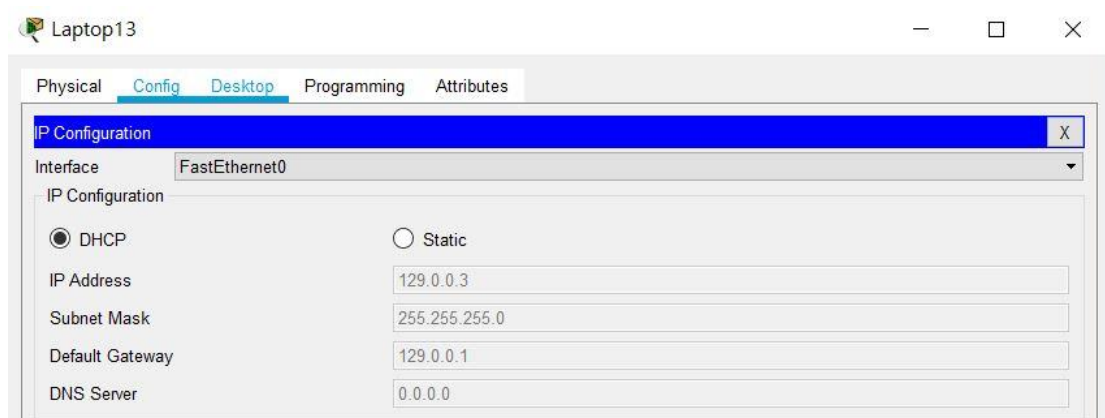


Step 3: The router configuration

1. Go to the router and configure the IP helper



```
Router(config)#int fa0/0
Router(config-if)#ip helper-address 129.0.0.2
Router(config-if)#ex
Router(config)#do wr
Building configuration...
[OK]
```

Step 4: Check the DHCP configuration.

1. Check one of the computer and DHCP request.

**Part 5: Redistribution between OSPF and EIGRP**

Step 1: Click one of the country routers, which has both EIGRP and OSPF protocol.



IP : 21.0.0.0/8

) : 1.0.0.2/8

Serial 0/0/0 : 21.0.0.1/8

Serial 0/0/0 : 21.0.0.2/8

2811
Taipei

Serial 0/1/0 : 11.0.0.1/8    EIGRP 100

2811
Taoyuan

Serial 0/3/0 : 31.0.0.2/8

IP : 11.0.0.0/8

Serial 0/1/0 : 11.0.0.2/8    Serial 0/3/0 : 31.0.0.1/8

Step 2: Configure the redistribution between OSPF and EIGRP.

1. Enter the interface and configure OSPF 1.
2. Enter the interface and configure EIGRP 1.
3. Copy the running configuration to the startup configuration.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#redistribute eigrp 1 subnets
Router(config-router)#exit
Router(config)#router eigrp 1
Router(config-router)#redistribute ospf 1 metric 1544 100 255 1
100
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#copy run
Router#copy running-config sta
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Step 3: Check by ping.

1. Ping from the network with EIGRP to the network with OSPF.



```
C:\>ping 1.0.0.1

Pinging 1.0.0.1 with 32 bytes of data:

Reply from 1.0.0.1: bytes=32 time=2ms TTL=253
Reply from 1.0.0.1: bytes=32 time=19ms TTL=253
Reply from 1.0.0.1: bytes=32 time=2ms TTL=253
Reply from 1.0.0.1: bytes=32 time=11ms TTL=253

Ping statistics for 1.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 19ms, Average = 8ms
```
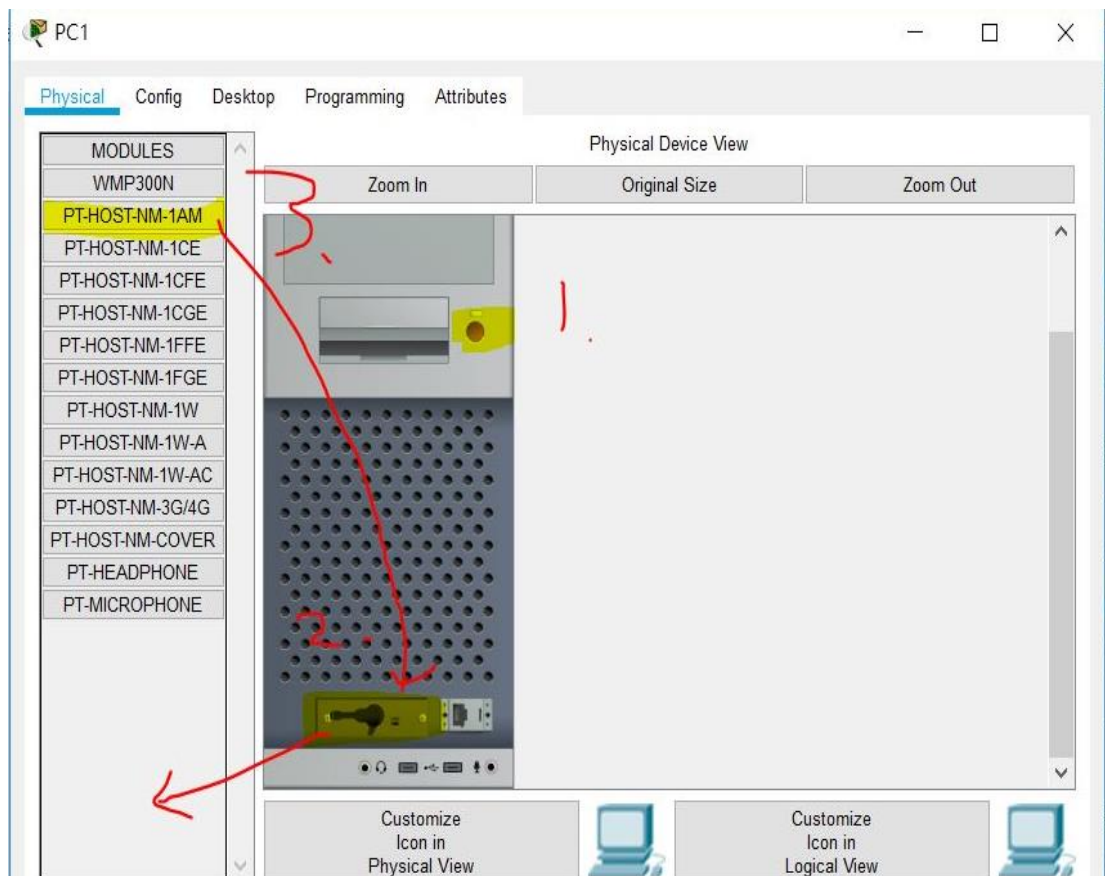
**Part 6: Mobility (WIFI)**

Step 1: Choose a wireless switch
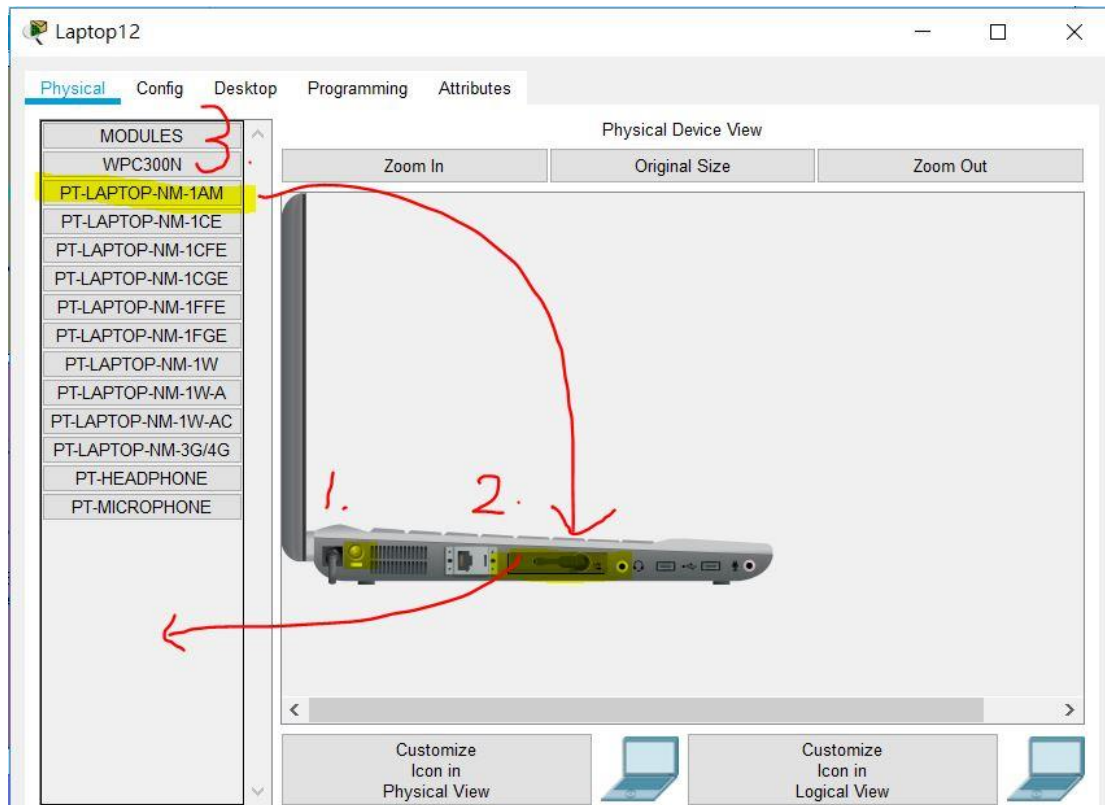


Step 2: Set up all the devices

1. Choose one of the network and give the wireless switch.
2. Smartphones and tablets will automatically connect to the switch.
3. Configure Desktop (1) turn off the power (2) drag the card to discard it (3) drag an interface to the desktop

4. Configure Desktop (1) turn off the power (2) drag the card to discard it (3) drag an interface to the laptop.
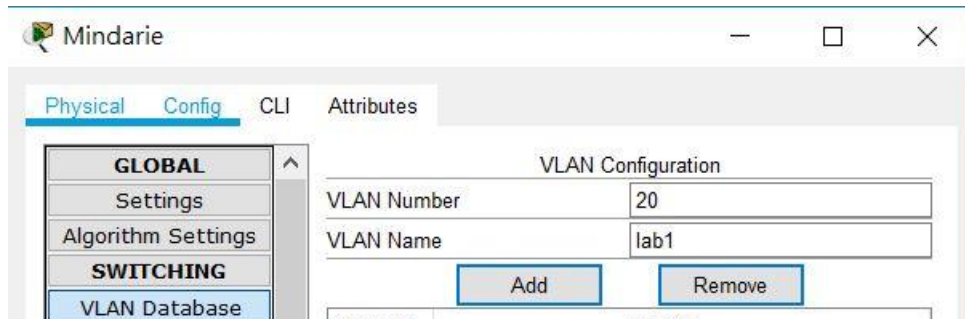


Step 3: Wait for the connections.
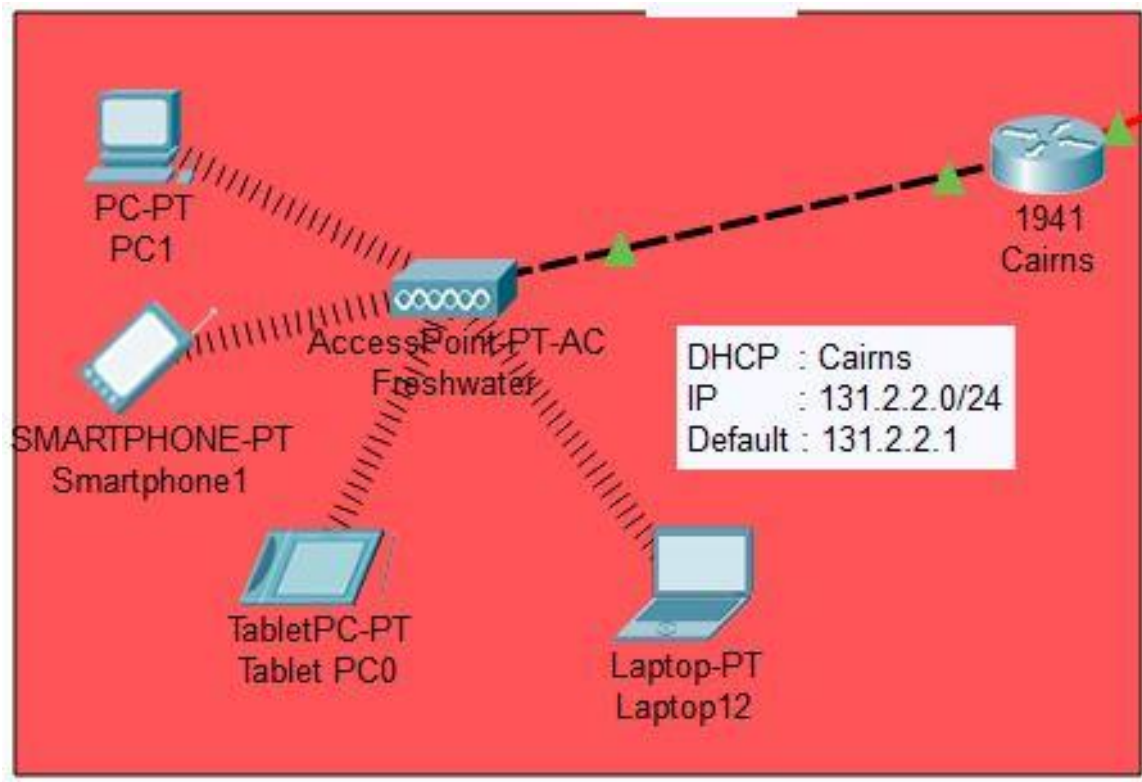
## Part 7: Availability (VLAN)

Step 1: Configure a switch

1. Choose a switch.
2. Enter the VLAN number and its name. Add it.



3. Enter the interface which connects to the router and set the trunk mode.
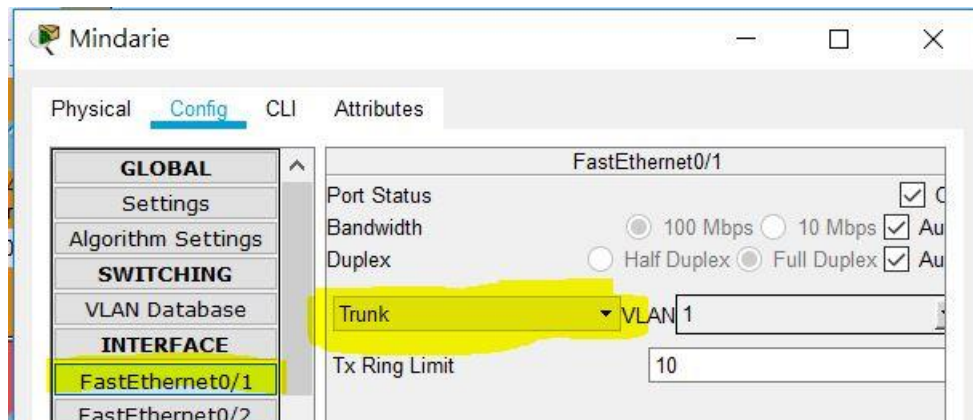


4. (1) (2) Enter the interface which connects to the VLAN. (3) Change it into VLAN mode we just have configured.



Step 2: Configure a router

1. Enter the interface, "int g0/.1
2. Encapsulation [name] [number of VLAN]
3. Setup the IP address and its subnet.

```
Perth(config)#int g0/0.1
Perth(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.1, changed state to
up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0.1, changed state to up

Perth(config-subif)#encapsulation dot1q 20
Perth(config-subif)#ip address 128.2.10.1 255.255.255.0
Perth(config-subif)#exit
```
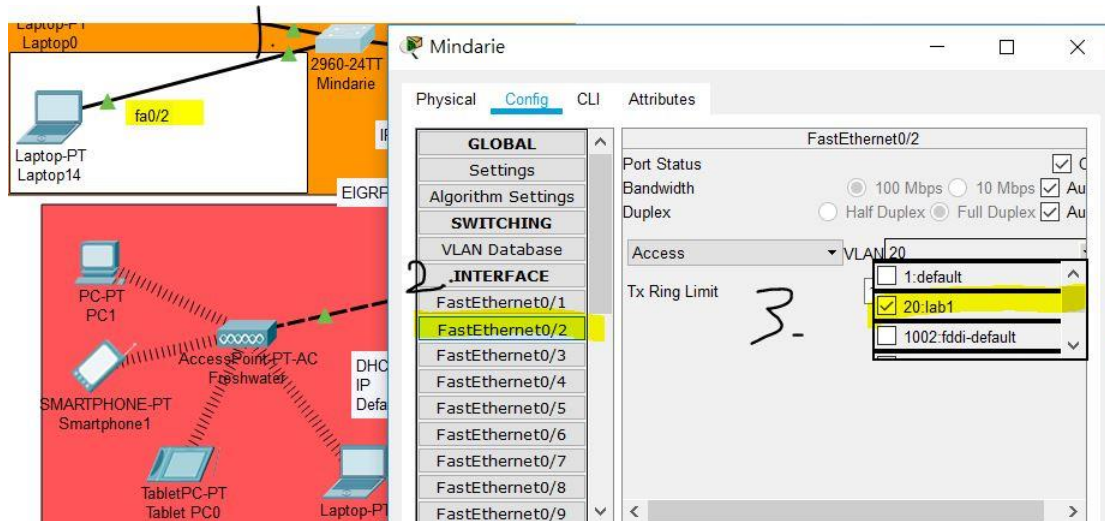
Step 3: Configure its DHCP

1. IP DHCP pool [pool name]

2. Input, "network [IP] [subnet]

3. Input, "default-router"

4. Do write memory and exit

```
Perth(config)#ip dhcp pool vlan1
Perth(dhcp-config)#ip address 128.2.10.0 255.255.255.0
                     ^
% Invalid input detected at '^' marker.

Perth(dhcp-config)#network 128.2.10.0 255.255.255.0
Perth(dhcp-config)#default-router 128.2.10.1
Perth(dhcp-config)#do wr
Perth(dhcp-config)#exit
```

Step 4: Configure its EIGRP

1. Command, "router eigrp 1"

2. Input the VLAN network, "128.2.10.0"

3. Exit

```
Perth(config)#router eigrp 1
Perth(config-router)#network 128.2.10.0
Perth(config-router)#exit
Perth(config)#exit
```

Step 4: check by ping

```
C:\>ping 2.0.0.2

Pinging 2.0.0.2 with 32 bytes of data:

Reply from 2.0.0.2: bytes=32 time=1ms TTL=254
Reply from 2.0.0.2: bytes=32 time=1ms TTL=254
Reply from 2.0.0.2: bytes=32 time=2ms TTL=254
Reply from 2.0.0.2: bytes=32 time=1ms TTL=254

Ping statistics for 2.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>ping 24.0.0.2

Pinging 24.0.0.2 with 32 bytes of data:

Reply from 24.0.0.2: bytes=32 time=6ms TTL=251
Reply from 24.0.0.2: bytes=32 time=4ms TTL=251
Reply from 24.0.0.2: bytes=32 time=4ms TTL=251
Reply from 24.0.0.2: bytes=32 time=4ms TTL=251
```
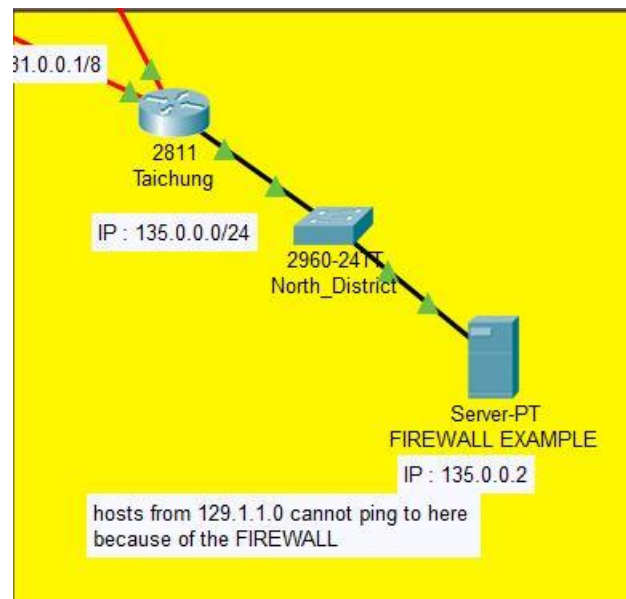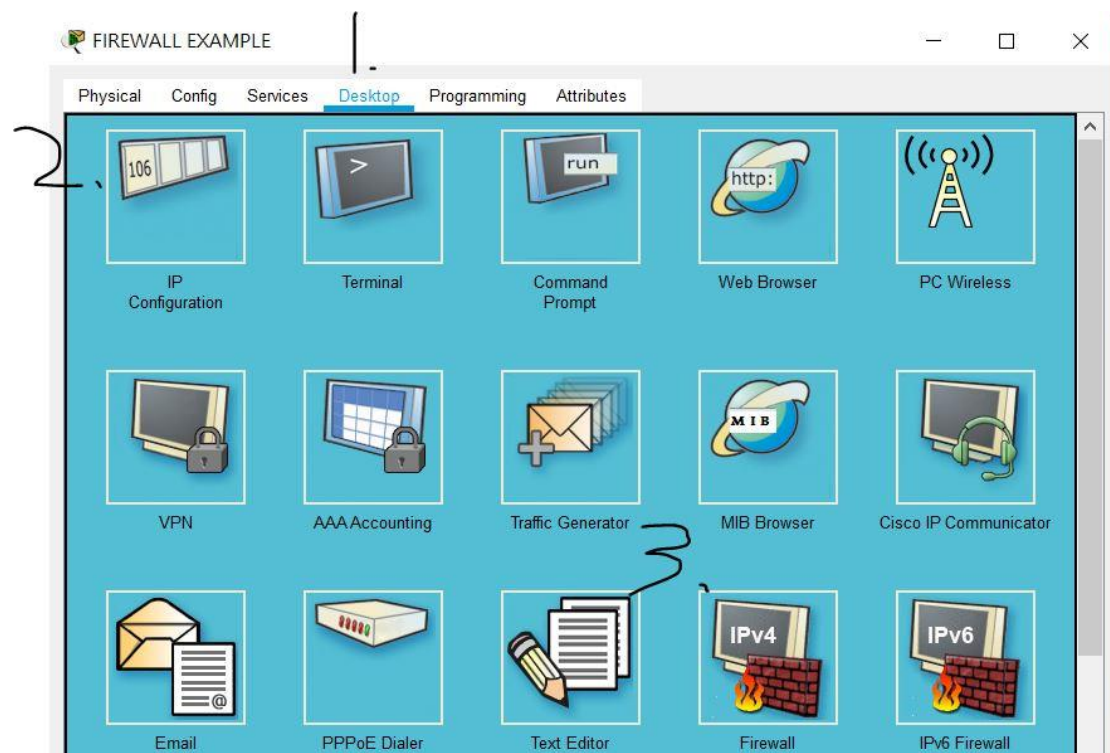
**Part 8: Security (Firewall Server)**
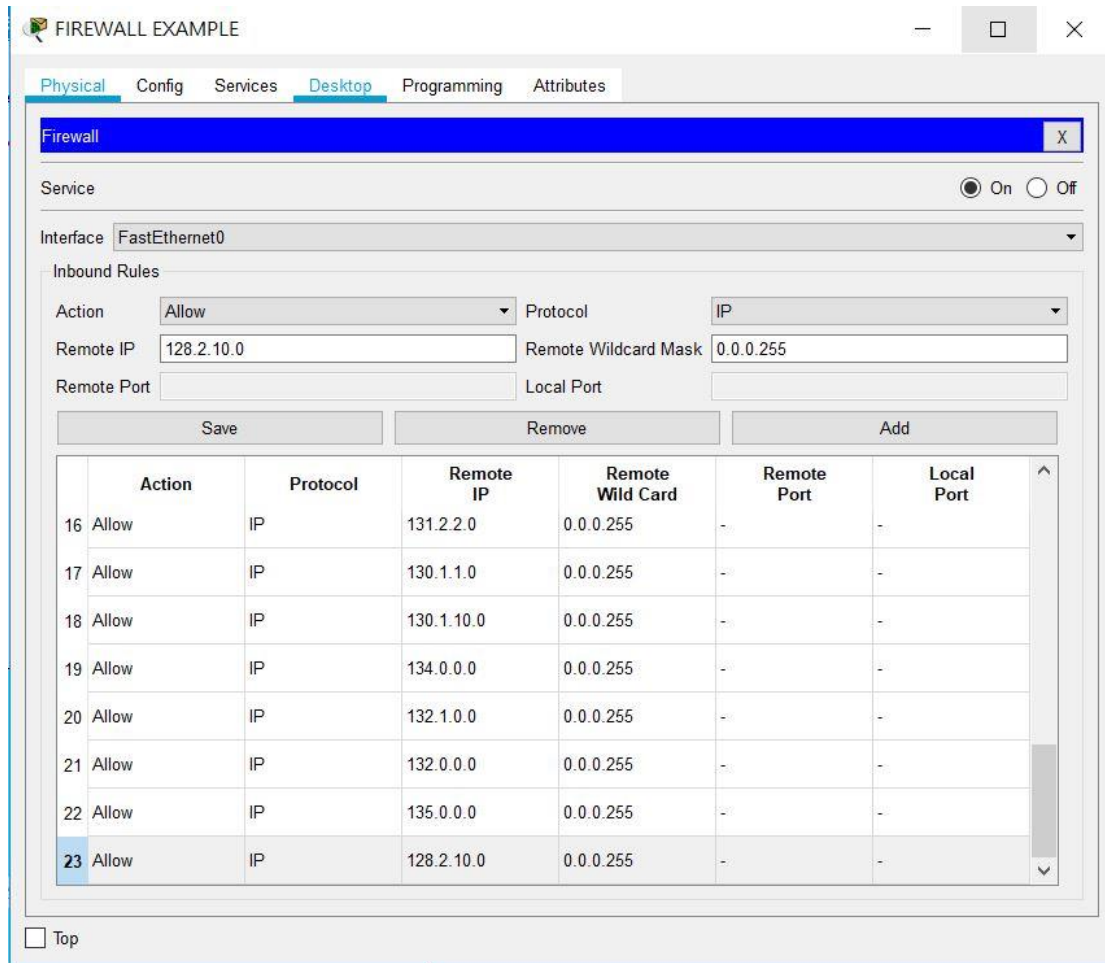


Step 1: Configure the server with IP



Step 2: Setup the firewall table

1. Allow all the networks we would like to access.
2. Input the remote IP and Wildcard Mask.
3. Add them all and save it.
4. Turn on the firewall.

*#The firewall example with no 129.1.1.0/24 allow*

## FIREWALL EXAMPLE

Physical   Config   Services   **Desktop**   Programming   Attributes

| Firewall | X |
|---|---|

| Service | ⦿ On ◯ Off |
|---|---|

Interface  FastEthernet0 ▼

**Inbound Rules**

| Action | Allow ▼ | | Protocol | IP ▼ |
|---|---|---|---|---|
| Remote IP | 128.2.10.0 | | Remote Wildcard Mask | 0.0.0.255 |
| Remote Port | | | Local Port | |

| Save | Remove | Add |
|---|---|---|

| | Action | Protocol | Remote IP | Remote Wild Card | Remote Port | Local Port | |
|---|---|---|---|---|---|---|---|
| 16 | Allow | IP | 131.2.2.0 | 0.0.0.255 | - | - | |
| 17 | Allow | IP | 130.1.1.0 | 0.0.0.255 | - | - | |
| 18 | Allow | IP | 130.1.10.0 | 0.0.0.255 | - | - | |
| 19 | Allow | IP | 134.0.0.0 | 0.0.0.255 | - | - | |
| 20 | Allow | IP | 132.1.0.0 | 0.0.0.255 | - | - | |
| 21 | Allow | IP | 132.0.0.0 | 0.0.0.255 | - | - | |
| 22 | Allow | IP | 135.0.0.0 | 0.0.0.255 | - | - | |
| 23 | Allow | IP | 128.2.10.0 | 0.0.0.255 | - | - | |

☐ Top

### Step 3: check by ping

Laptop2 — □ ×

Physical   Config   **Desktop**   Programming   Attributes

Command Prompt    X

```
Packet Tracer PC Command Line 1.0
C:\>show ip
Invalid Command.

C:\>ping 128.2.10.1

Pinging 128.2.10.1 with 32 bytes of data:

Reply from 128.2.10.1: bytes=32 time=5ms TTL=251
Reply from 128.2.10.1: bytes=32 time=5ms TTL=251
Reply from 128.2.10.1: bytes=32 time=7ms TTL=251
Reply from 128.2.10.1: bytes=32 time=11ms TTL=251

Ping statistics for 128.2.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 5ms, Maximum = 11ms, Average = 7ms

C:\>ping 135.0.0.2

Pinging 135.0.0.2 with 32 bytes of data:

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

Ping statistics for 135.0.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

☐ Top

1941
Singapore
0/0 : 13.1.0.1/8    Serial 0/0/1 : 23.1.0.1/8

EIGRP 1

IP : 23.1.0.0/8    Serial 0/0/1 : 23.1.0.2/8

1941
Tampines

: 129.1.1.1/24

DHCP : Tampines
IP     : 129.1.1.0/24
Default : 129.1.1.1

fa0/0 : 13

2960-24TT
Tampines_Mall

DHCP_SER

DHCP
IP
Defau

Laptop-PT
Laptop2

PC-PT
PC0

[Root]

2811
Taichung

IP : 135.0.0.0/24

2960-24TT
North_District

Server-PT
FIREWALL EXAMP

IP : 135.0.0.2

hosts from 129.1.1.0 cannot ping to here
because of the FIREWALL

<u>Step 4:</u>

Setup all the network to the firewall.

Reference

DHCP router

https://www.youtube.com/watch?v=Pbu0rbCNJrA&t=13s

DHCP server

https://www.youtube.com/watch?v=GCaR8e-16bs

OSPF setup

https://www.youtube.com/watch?v=jukXAHKQxZc&t=15s

EIGRP configuration

https://www.youtube.com/watch?v=Np_VuQeLS44&t=2s

VLAN

https://www.youtube.com/watch?v=WMbXgtxTrBY&t=14s

Redistribution between EIGRP and OSPF

https://www.youtube.com/watch?v=Mc4RczaLKyQ&feature=youtu.be&fbclid=IwAR2
6RqQ4-FedyPuasbG9b8u8C8scKxywvkp6ty-gc0f78-hu_Sboa8xjSzA

Firewall

https://www.youtube.com/watch?v=5Q09-
Nao0oY&feature=youtu.be&fbclid=IwAR03d8z-ZkEdY-
u9le6u0QhDmQj2QN9CXGqlWHLmNlX5Y979_nB850_HvNU