

Network Simulation Report

Name: Chaoren Wang
Student ID: 122090513
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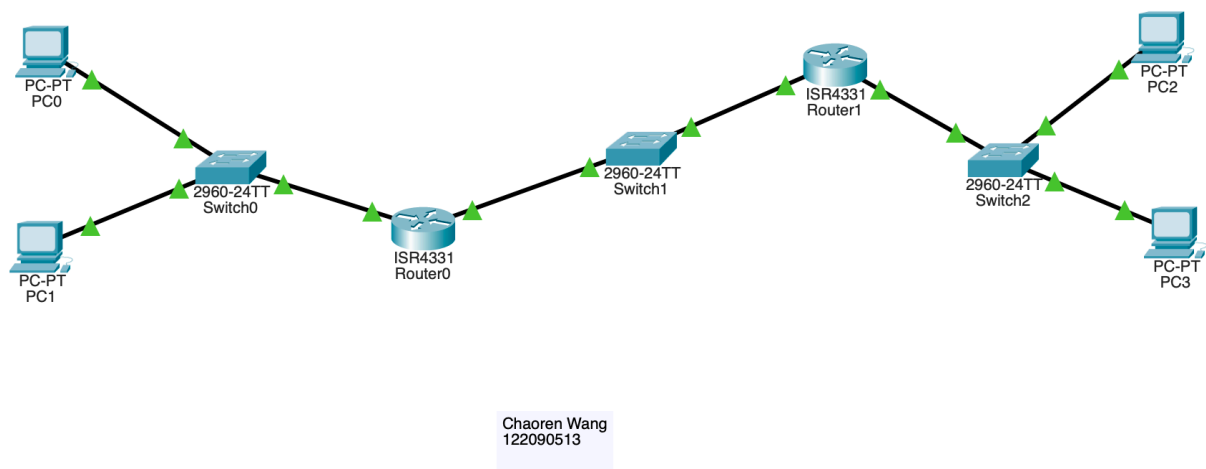
Task 1: Network Topology Design

Description

The network topology consists of the following components:

- **Devices:** 2 Routers, 3 Switches, 4 PCs
- **Connections:**
 - Switches connected to routers via Ethernet.
 - PCs connected to switches.
 - Routers interconnected via a core switch.

Configuration



Router Configuration

- **Router Models:** ISR4331
- **IP Address Configuration:**
 - **Router 0:**
 - Interface GigabitEthernet0/0: 192.168.1.1/24
 - Interface GigabitEthernet0/1: 192.168.2.1/24
 - Routing: Static routing 192.168.3.0/24 via 192.168.2.2
 - **Router 1:**
 - Interface GigabitEthernet0/0: 192.168.2.2/24
 - Interface GigabitEthernet0/1: 192.168.3.1/24
 - Routing: Static routing 192.168.1.0/24 via 192.168.2.1

Switch Configuration

- **Switch Models:** 2960-24TT
- Configured standard connections between PCs and routers.

PC Configuration

- **IP Addresses:**
 - PC0: 192.168.1.10/24
 - PC1: 192.168.1.11/24
 - PC2: 192.168.3.10/24
 - PC3: 192.168.3.11/24
- Gateway configured to corresponding router interfaces.
 - PC0, PC1: Router 0, i.e., 192.168.1.1
 - PC2, PC3: Router 1, i.e., 192.168.3.1

Network Connectivity Results

#	Source Device	Destination Device	Ping Result	Test Type
1	PC0	PC1	Success	Subnet connectivity
2	PC0	Router1	Success	Default gateway
3	PC1	PC3	Success	Cross-subnet connectivity
4	PC3	PC1	Success	Cross-subnet connectivity in reverse direction

Screenshot for test 1 and 2:

```
C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=3ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Screenshot for test 3:

```
C:\>ping 192.168.3.10

Pinging 192.168.3.10 with 32 bytes of data:

Reply from 192.168.3.10: bytes=32 time=15ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.3.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 15ms, Average = 3ms

C:\>
```

Screenshot for test 4:

```
C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=3ms TTL=126
Reply from 192.168.1.11: bytes=32 time<1ms TTL=126
Reply from 192.168.1.11: bytes=32 time=17ms TTL=126
Reply from 192.168.1.11: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 17ms, Average = 5ms

C:\>|
```

All tests are successful, showing the network connectivity is working as expected.

Conclusion and Challenges

Conclusion

The topology was successfully configured. All devices were able to communicate, confirming the validity of the setup.

Challenges

1. Before the gateway was configured, only first type of tests were successful. This problem was solved after the gateway was configured on every PC.
2. Only Router 0 was configured to route requests to the other subnet, causing the failure of ping test, after adding the routing configuration on Router 1, the problem was solved.

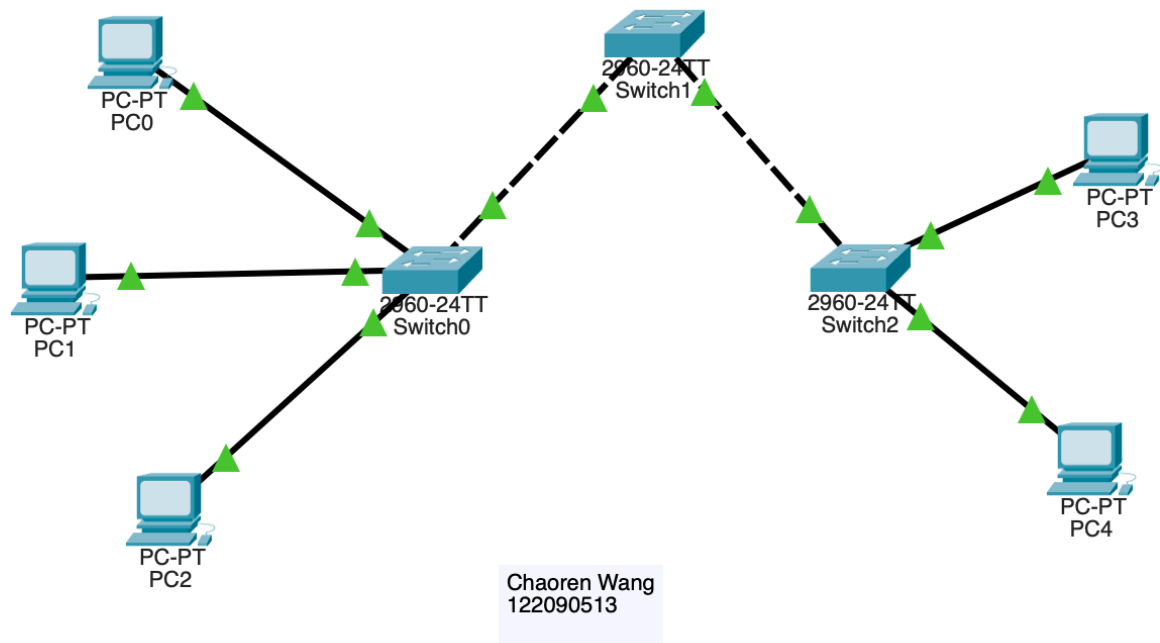
Task 2: VLAN Configuration

Description

This task focused on creating VLANs and assigning access ports for logical groupings.

- **VLANs and Corresponding IP Addresses:**
 - VLAN 10: 192.12.10.0/24
 - VLAN 20: 192.12.20.0/24

Configuration Details



Switch Configuration

- **Switch Models:** 2960-24TT
- **VLANs Created:**
 - VLAN 10 (Access): Assigned to PCs 0, 1, and 3.
 - VLAN 20 (Access): Assigned to PCs 2 and 4.
 - VLANs 10 and 20 (Trunk): Configured between three switches.

PC Configuration

- **IP Addresses:**
 - PC0: 192.12.10.11/24, VLAN 10
 - PC1: 192.12.10.12/24, VLAN 10
 - PC2: 192.12.20.13/24, VLAN 20
 - PC3: 192.12.10.14/24, VLAN 10
 - PC4: 192.12.20.15/24, VLAN 20

Connectivity Testing Results

#	Source Device	Destination Device	Ping Result	Test Type
1	PC0 (VLAN 10)	PC1 (VLAN 10)	Success	Same-VLAN
2	PC0 (VLAN 10)	PC3 (VLAN 10)	Success	Same-VLAN
3	PC0 (VLAN 10)	PC2 (VLAN 20)	Fail	Cross-VLAN
4	PC0 (VLAN 10)	PC4 (VLAN 20)	Fail	Cross-VLAN
5	PC3 (VLAN 10)	PC0 (VLAN 10)	Success	Same-VLAN in reverse direction

```
C:\>ping 192.12.10.12
```

```
Pinging 192.12.10.12 with 32 bytes of data:
```

```
Reply from 192.12.10.12: bytes=32 time=1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 192.12.10.12:
```

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

```
C:\>ping 192.12.10.14
```

```
Pinging 192.12.10.14 with 32 bytes of data:
```

```
Reply from 192.12.10.14: bytes=32 time=2ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 192.12.10.14:
```

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

```
C:\>ping 192.12.20.13
```

```
Pinging 192.12.20.13 with 32 bytes of data:
```

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

```
Ping statistics for 192.12.20.13:
```

```
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\>ping 192.12.20.15
```

```
Pinging 192.12.20.15 with 32 bytes of data:
```

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

```
Ping statistics for 192.12.20.15:
```

```
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
C:\>
```

Screenshot for test 5:

```
C:\>ping 192.12.10.11

Pinging 192.12.10.11 with 32 bytes of data:

Reply from 192.12.10.11: bytes=32 time=2ms TTL=128
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Reply from 192.12.10.11: bytes=32 time=1ms TTL=128

Ping statistics for 192.12.10.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>|
```

Conclusion and Challenges

Conclusion

The VLANs were configured successfully. Devices within the same VLAN communicated seamlessly, and inter-VLAN communication was blocked, as expected.

Challenges

1. Ethernet ports were not configured correctly, causing the failure of ping test.
2. VLANs 10 and 20 needed to be manually created, and trunk ports were required to connect switches.