Internet routing

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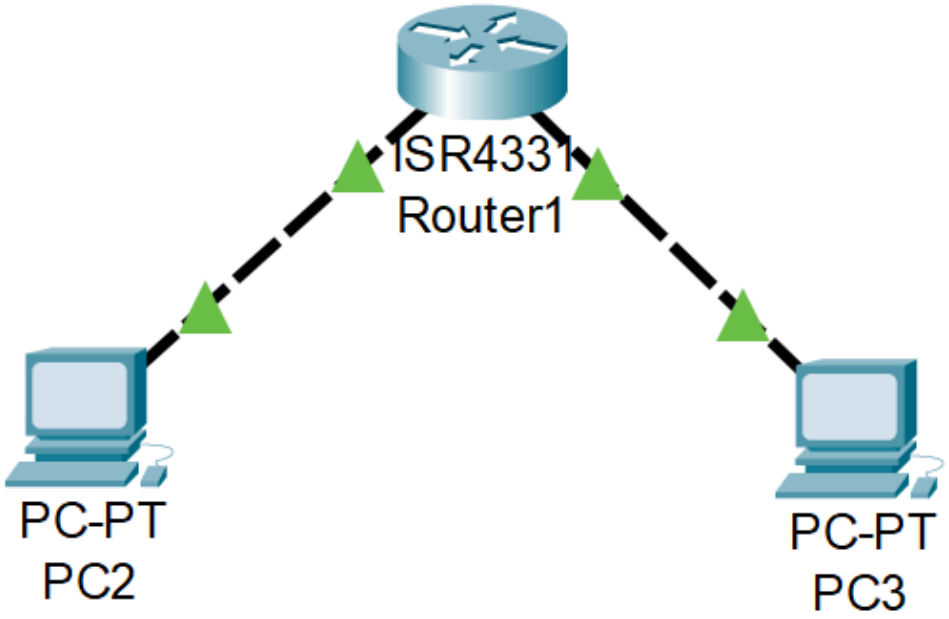
Introduction

This lab explores network configurations, subnetting, and routing principles using routers and PCs. We tested connectivity via ICMP pings and analyzed routing tables to understand how packets traverse different networks. The tasks align with lecture concepts, such as gateway configuration and dynamic routing protocols like RIP.

Task 1

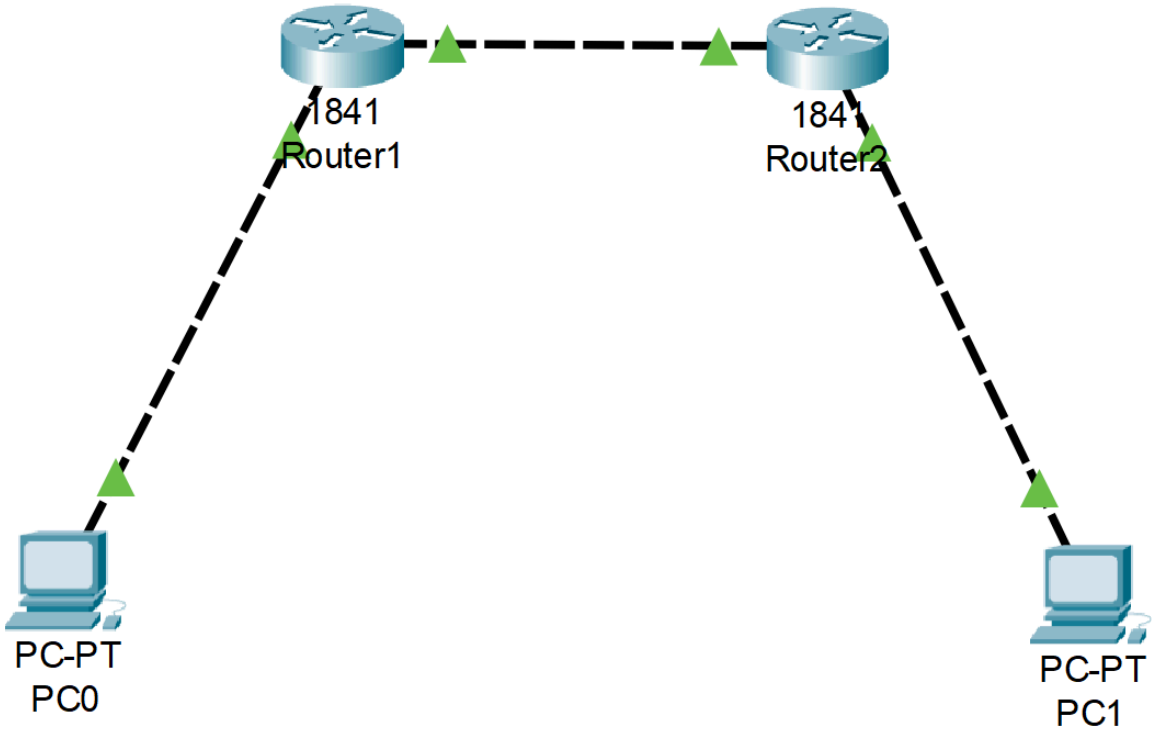


```
C:\>ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255
Reply from 10.1.1.2: bytes=32 time=4ms TTL=255
Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms

C:\>ping 10.1.1.1

Pinging 10.1.1.1 with 32 bytes of data:

Reply from 10.1.1.1: bytes=32 time=14ms TTL=128
Reply from 10.1.1.1: bytes=32 time=7ms TTL=128
Reply from 10.1.1.1: bytes=32 time=8ms TTL=128
Reply from 10.1.1.1: bytes=32 time=5ms TTL=128

Ping statistics for 10.1.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 5ms, Maximum = 14ms, Average = 8ms

C:\>ping 10.1.2.2

Pinging 10.1.2.2 with 32 bytes of data:

Reply from 10.1.2.2: bytes=32 time<1ms TTL=255
Reply from 10.1.2.2: bytes=32 time<1ms TTL=255
Reply from 10.1.2.2: bytes=32 time<1ms TTL=255
Reply from 10.1.2.2: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC2	PC3	ICMP		0.000	N	0
	Successful	PC3	PC2	ICMP		0.000	N	1

We configured two separate networks (10.1.1.0 and 10.1.2.0) and connected them via a router. Each host was assigned IP addresses, and routing was verified using ping.

Task 2



```
C:\>ping 10.1.1.5

Pinging 10.1.1.5 with 32 bytes of data:

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255
Reply from 10.1.1.5: bytes=32 time<1ms TTL=255
Reply from 10.1.1.5: bytes=32 time<1ms TTL=255
Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.1.1.6

Pinging 10.1.1.6 with 32 bytes of data:

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254
Reply from 10.1.1.6: bytes=32 time<1ms TTL=254
Reply from 10.1.1.6: bytes=32 time<1ms TTL=254
Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Ping statistics for 10.1.1.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
Device Name: PC0
Device Model: PC-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     10.1.1.1/30       <not set>                               00E0.F925.9B47
Bluetooth       Down   <not set>         <not set>                               0001.C718.C811

Gateway: 10.1.1.2
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > PC0
```

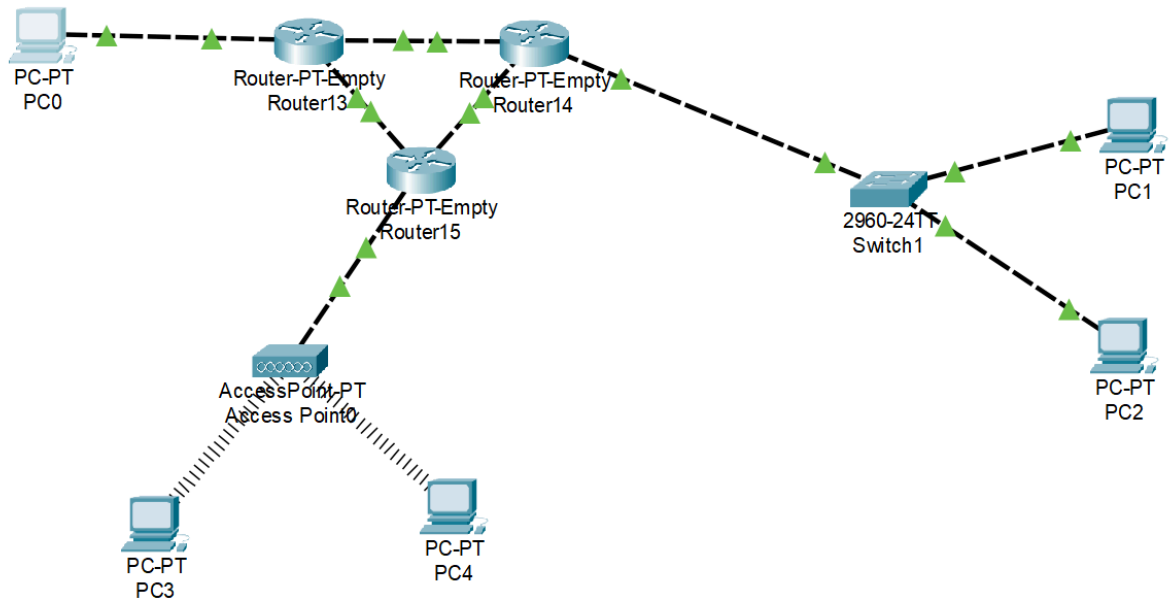
```
Device Name: Router1
Device Model: 1841
Hostname: Router

Port              Link   VLAN   IP Address        IPv6 Address                          MAC Address
FastEthernet0/0   Up     --     10.1.1.2/30       <not set>                             0005.5EEA.0301
FastEthernet0/1   Up     --     10.1.1.5/30       <not set>                             0005.5EEA.0302
Vlan1             Down   1      <not set>         <not set>                             0001.4326.6C8D

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router1

Device Name: Router2
Device Model: 1841
Hostname: Router

Port              Link   VLAN   IP Address        IPv6 Address                          MAC Address
FastEthernet0/0   Up     --     10.1.1.6/30       <not set>                             00D0.BCB5.5201
FastEthernet0/1   Up     --     10.1.1.9/30       <not set>                             00D0.BCB5.5202
Vlan1             Down   1      <not set>         <not set>                             0001.4356.2D41

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router2
```

```
Device Name: PC1
Device Model: PC-PT

Port            Link   IP Address        IPv6 Address                              MAC Address
FastEthernet0   Up     10.1.1.10/30      <not set>                                 0090.2BC6.972C
Bluetooth       Down   <not set>         <not set>                                 0090.2B69.1D53

Gateway: 10.1.1.9
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > PC1
```

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC0	PC1	ICMP		0.000	N	0

Using subnetting with a /30 mask, we created small point-to-point networks and connected multiple routers between two computers.

Task 3



```
C:\>ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:

Reply from 10.1.1.2: bytes=32 time<1ms TTL=254
Reply from 10.1.1.2: bytes=32 time=15ms TTL=254
Reply from 10.1.1.2: bytes=32 time=25ms TTL=254
Reply from 10.1.1.2: bytes=32 time<1ms TTL=254

Ping statistics for 10.1.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 25ms, Average = 10ms
```

```
C:\>ping 10.1.3.2

Pinging 10.1.3.2 with 32 bytes of data:

Reply from 10.1.3.2: bytes=32 time=1ms TTL=125
Reply from 10.1.3.2: bytes=32 time<1ms TTL=125
Reply from 10.1.3.2: bytes=32 time<1ms TTL=125
Reply from 10.1.3.2: bytes=32 time<1ms TTL=125

Ping statistics for 10.1.3.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	PC0	PC2	ICMP		0.000	N	0
	Successful	PC3	PC4	ICMP		0.000	N	1
	Successful	PC1	PC0	ICMP		0.000	N	2

We examined a larger network with multiple subnets (10.1.1.0 to 10.1.6.0). Static routes were set up to handle data exchange between networks. RIP protocol was later introduced to automate routing, showing how dynamic routing simplifies network management.