

Atma Ram Sanatan Dharma College

Delhi University

Computer Networks

Project: Cisco Packet Tracer

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1. Ipconfig:

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings.

```
Windows PowerShell

Windows IP Configuration

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . : Google
    IPv6 Address. . . . . : 2405:201:4023:710f:ed46:8131:a2e9:6feb
    Temporary IPv6 Address. . . . . : 2405:201:4023:710f:5175:b24a:f0aa:89e6
    Link-local IPv6 Address . . . . . : fe80::9a5:9ddd:f8e7:b312%12
    IPv4 Address. . . . . : 192.168.29.131
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::2289:8aff:feab:2661%12
                                192.168.29.1

PS C:\Users\rishi>
```

2. Hostname:

Provides the hostname of the host.

```
PS C:\Users\rishi> hostname
rishi_xd
PS C:\Users\rishi> |
```

3. Ping:

The ping command is a [Command Prompt command](#) used to test the ability of the source computer to reach a specified destination computer. It's a simple way to verify that a computer can communicate with another computer or network device.

```
Windows PowerShell
Link-local IPv6 Address . . . . . : fe80::9a5:9ddd:f8e7:b312%12
IPv4 Address. . . . . : 192.168.29.131
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : fe80::2289:8aff:feab:2661%12
                             192.168.29.1
PS C:\Users\rishi> ping www.google.com

Pinging www.google.com [2404:6800:4002:816::2004] with 32 bytes of data:
Reply from 2404:6800:4002:816::2004: time=10ms
Reply from 2404:6800:4002:816::2004: time=13ms
Reply from 2404:6800:4002:816::2004: time=10ms
Reply from 2404:6800:4002:816::2004: time=10ms

Ping statistics for 2404:6800:4002:816::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 13ms, Average = 10ms
PS C:\Users\rishi> ping 192.168.29.1

Pinging 192.168.29.1 with 32 bytes of data:
Reply from 192.168.29.1: bytes=32 time=5ms TTL=64
Reply from 192.168.29.1: bytes=32 time=5ms TTL=64
Reply from 192.168.29.1: bytes=32 time=8ms TTL=64
Reply from 192.168.29.1: bytes=32 time=2ms TTL=64

Ping statistics for 192.168.29.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 8ms, Average = 5ms
PS C:\Users\rishi> |
```

4. Nslookup:

Nslookup (stands for “Name Server Lookup”) is a useful command for getting information from the DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record. It is also used to troubleshoot DNS-related problems.

```
Windows PowerShell
PS C:\Users\rishi> nslookup www.linkedin.com
Server:  reliance.reliance
Address:  2405:201:4023:710f::c0a8:1d01

DNS request timed out.
    timeout was 2 seconds.
DNS request timed out.
    timeout was 2 seconds.
Non-authoritative answer:
Name:     l-0005.l-msedge.net
Addresses: 2620:1ec:21::14
           13.107.42.14
Aliases:  www.linkedin.com
          www-linkedin-com.l-0005.l-msedge.net

PS C:\Users\rishi> |
```

5. Tracert:

Tracert command prints the route that a packet takes to reach the host. This command is useful when you want to know about the route and about all the hops that a packet takes. It also prints detail about all the hops that it visits in between.

```
PS C:\Users\rishi> tracert 192.168.29.1

Tracing route to reliance.reliance [192.168.29.1]
over a maximum of 30 hops:

  1      2 ms      3 ms      1 ms  reliance.reliance [192.168.29.1]

Trace complete.
PS C:\Users\rishi> |
```

6. Netstat:

Netstat command displays various network related information such as network connections, routing tables, interface statistics, masquerade connections, multicast memberships etc.

```
Windows PowerShell
PS C:\Users\rishi> netstat

Active Connections

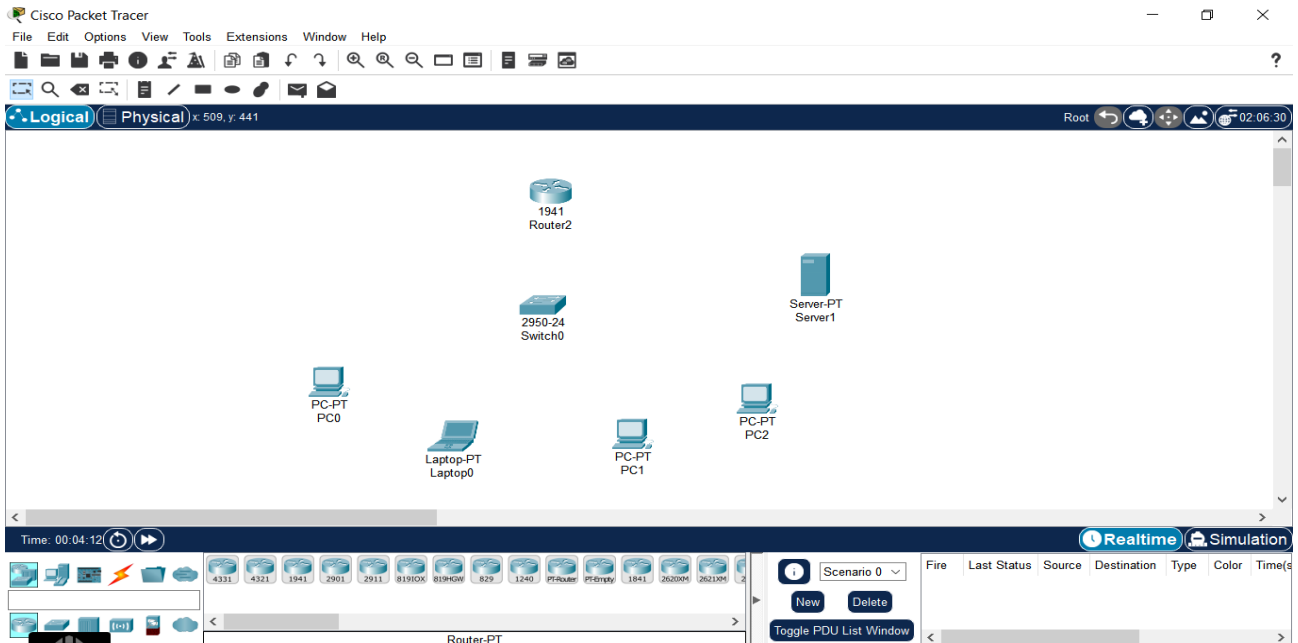
Proto Local Address           Foreign Address         State
TCP    192.168.29.131:49240     20.198.119.84:https     ESTABLISHED
TCP    192.168.29.131:49270     103-10-124-125:27038    ESTABLISHED
TCP    192.168.29.131:49502     199.232.22.137:https    ESTABLISHED
TCP    192.168.29.131:49606     49.44.168.203:https     ESTABLISHED
TCP    192.168.29.131:49627     20.189.173.3:https      TIME_WAIT
TCP    192.168.29.131:49653     20.50.73.10:https       ESTABLISHED
TCP    192.168.29.131:49658     server-13-224-22-202:https ESTABLISHED
TCP    192.168.29.131:49671     a23-210-69-62:https     ESTABLISHED
TCP    192.168.29.131:49673     49.44.117.176:https     ESTABLISHED
TCP    192.168.29.131:49676     a104-112-104-79:https   ESTABLISHED
TCP    192.168.29.131:49678     21:https                ESTABLISHED
TCP    192.168.29.131:49679     a23-58-106-129:https    ESTABLISHED
TCP    192.168.29.131:49682     server-108-158-245-122:https ESTABLISHED
TCP    192.168.29.131:49684     ec2-46-51-132-41:https  ESTABLISHED
TCP    192.168.29.131:49685     server-108-158-245-122:https ESTABLISHED
TCP    192.168.29.131:49686     ec2-46-51-132-41:https  ESTABLISHED
TCP    192.168.29.131:49687     ionos:https             CLOSE_WAIT
TCP    192.168.29.131:49688     ionos:https             ESTABLISHED
TCP    192.168.29.131:49692     ionos:https             CLOSE_WAIT
TCP    192.168.29.131:49694     ec2-3-6-97-173:https    ESTABLISHED
TCP    192.168.29.131:49696     ec2-15-207-11-192:https ESTABLISHED
TCP    192.168.29.131:49697     var:https               CLOSE_WAIT
TCP    192.168.29.131:49698     whstatic:https          ESTABLISHED
TCP    192.168.29.131:49703     ip-66-117-22-166:https  ESTABLISHED
TCP    192.168.29.131:49704     frontend-services:https ESTABLISHED
TCP    192.168.29.131:49708     frontend-services:https ESTABLISHED
TCP    192.168.29.131:49709     t-bs:https              ESTABLISHED
TCP    192.168.29.131:49712     server-108-158-245-115:https ESTABLISHED
TCP    192.168.29.131:49713     13.107.42.14:https      ESTABLISHED
TCP    192.168.29.131:49715     tif-bap:https           ESTABLISHED
TCP    192.168.29.131:49717     74.208.4.66:https       CLOSE_WAIT
TCP    192.168.29.131:49718     pixel:https             ESTABLISHED
TCP    192.168.29.131:49719     131:https               CLOSE_WAIT
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49408 [2620:1ec:21::14]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49453 [2603:1046:c04:838::2]:https ESTABLISHED

TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49558 [2001:4860:4802:36::36]:https TIME_WAIT
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49661 g2600-140f-dc00-01a3-0000-0000-0000-1e89:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49663 g2600-140f-dc00-018b-0000-0000-0000-0b3a:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49672 [2606:4700:90c1:3653:c464:1:6810:cb16]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49674 g2600-140f-dc00-018b-0000-0000-0000-0b3a:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49675 [2620:1ec:12::239]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49677 [2606:4700:90c1:49:9664:1:6810:7aaf]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49681 [2620:1ec:c11::200]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49683 [2620:1ec:c11::200]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49702 [2606:4700:9641:4205:c864:6:6811:d2cc]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49705 [2606:4700:9642:e6b6:d464:6:6811:e6cc]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49706 [2606:4700:9642:a0f2:a764:4:5f4c:e2a8]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49707 [2606:4700:9643:1e6d:b30c:6:6811:70b0]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49710 [2606:4700:9640:32be:6464:4:6811:c8cc]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49720 [2620:1ec:49::68]:https ESTABLISHED
TCP    [2405:201:4023:710f:5175:b24a:f0aa:89e6]:49723 [2405:200:1604::312c:5fa2]:https ESTABLISHED

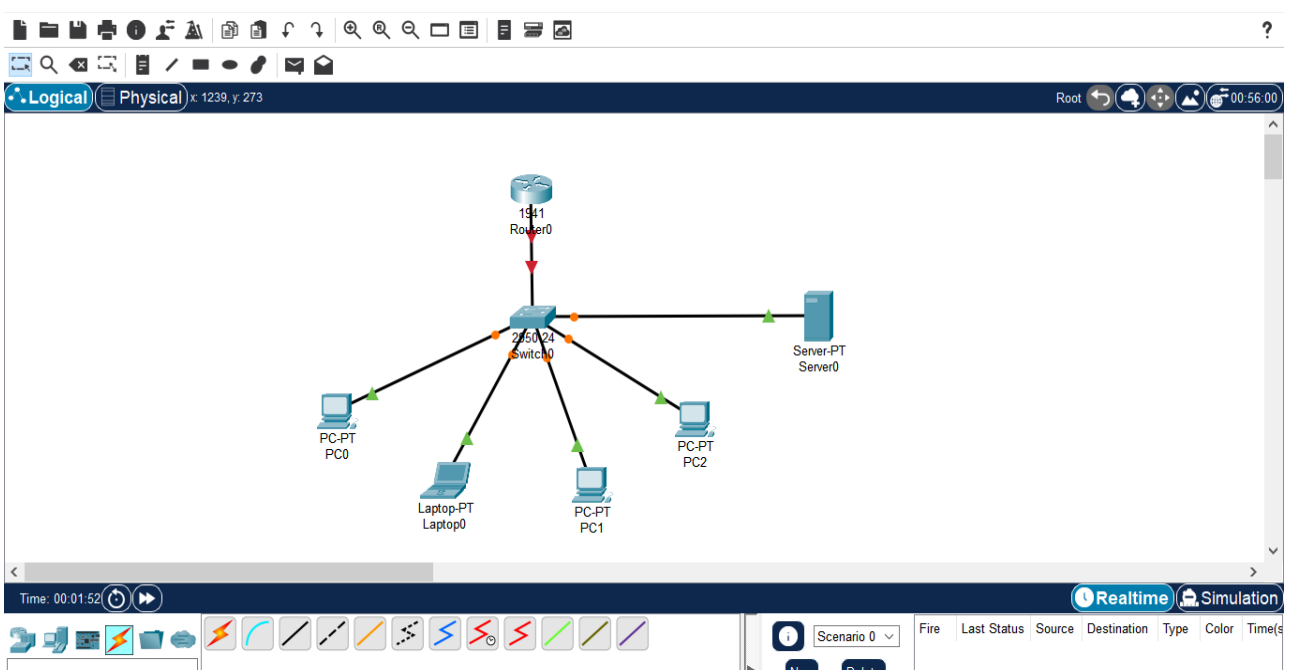
PS C:\Users\rishi>
```

Simple LAN Network Using DHCP Protocol

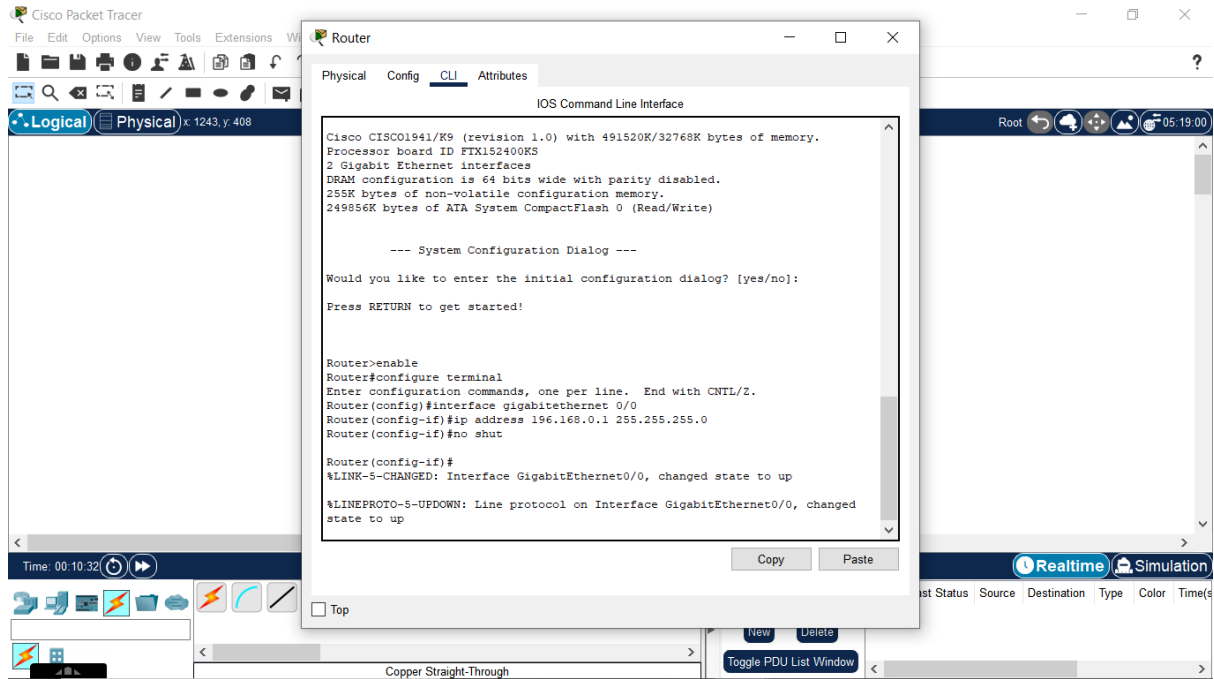
- This is the interface of Cisco Packet Tracer. We have inserted a router 1941, switch 2950-24, three PCs- PC0, PC1 and PC2, a laptop and a server into our network environment.



- Then we connect the router to switch and all other devices on the network to the switch.

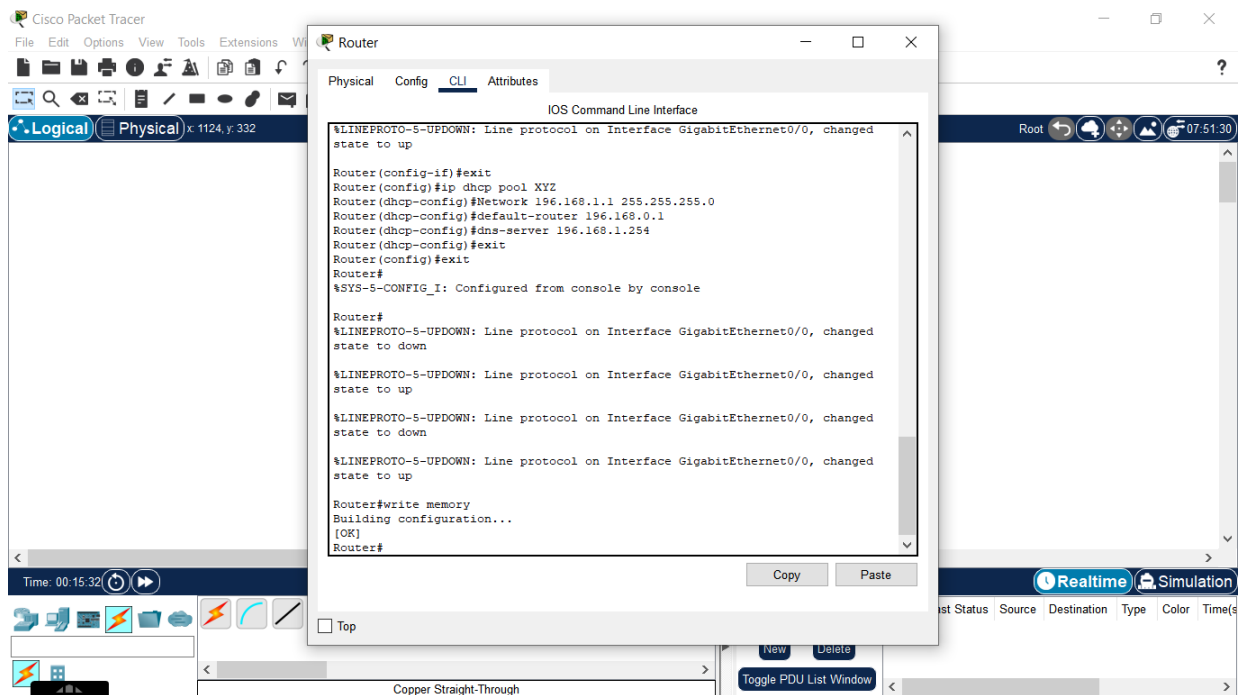


- To establish a connection between router and switch, we need to configure the router settings and assign IP address using following commands.
 1. Enable
 2. Configure terminal
 3. Interface gigabitethernet 0/0
 4. IP address 196.168.0.1 255.255.255.0
 5. No shut



- We also need to configure the DHCP protocol in the router using following commands.
 1. IP DHCP pool XYZ
 2. Network 196.168.1.1 255.255.255.0
 3. Default-router 196.168.0.1
 4. DNS-Server 196.168.1.254
 5. Exit

Then, we run command write memory to write the changes in the memory, so that they can come into effect.



- Now, we will assign IP addresses to the end devices using DHCP Protocol. In this method, IP address and MAC address are automatically derived from the DHCP protocol defined in the router.

PC0

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static Requesting IP Address

IPv4 Address:

Subnet Mask:

Default Gateway:

DNS Server:

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::201:63FF:FEFA:D629

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Top

PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address: 196.168.0.3

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.0.254

DNS Server: 192.168.0.1

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::201:43FF:FEA9:2D34

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Top

PC2

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address: 196.168.0.4

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.0.254

DNS Server: 192.168.0.1

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::2E0:F7FF:FED3:B52A

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Top

Server0

Physical Config Services **Desktop** Programming Attributes

IP Configuration

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 196.168.0.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.0.254

DNS Server 192.168.0.1

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::209:7CFF:FE85:30CA

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Top

Laptop0

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 196.168.0.6

Subnet Mask 255.255.255.0

Default Gateway 192.168.0.254

DNS Server 192.168.0.1

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::260:5CFF:FE74:EE0A

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

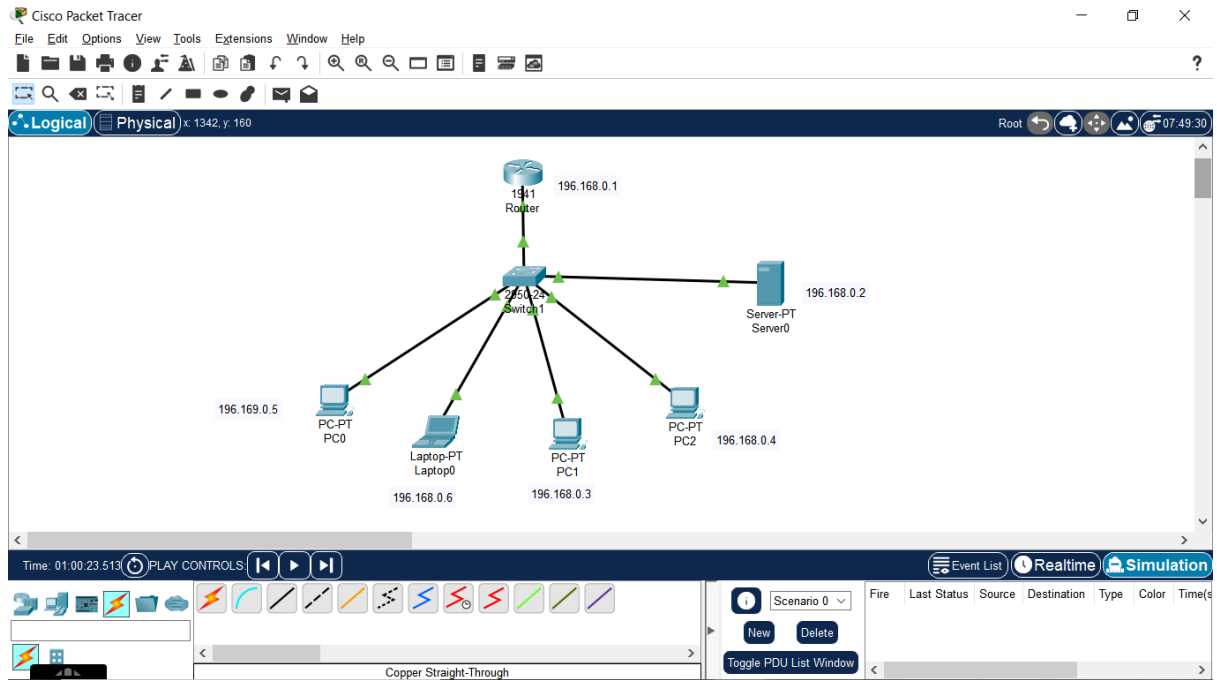
Authentication MD5

Username

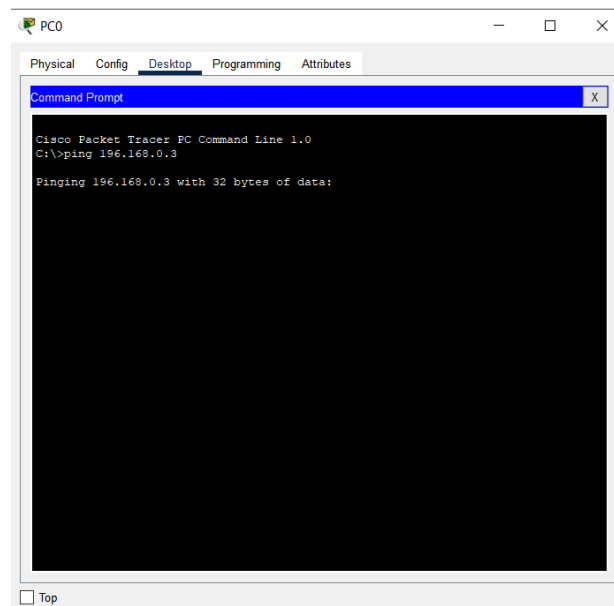
Password

Top

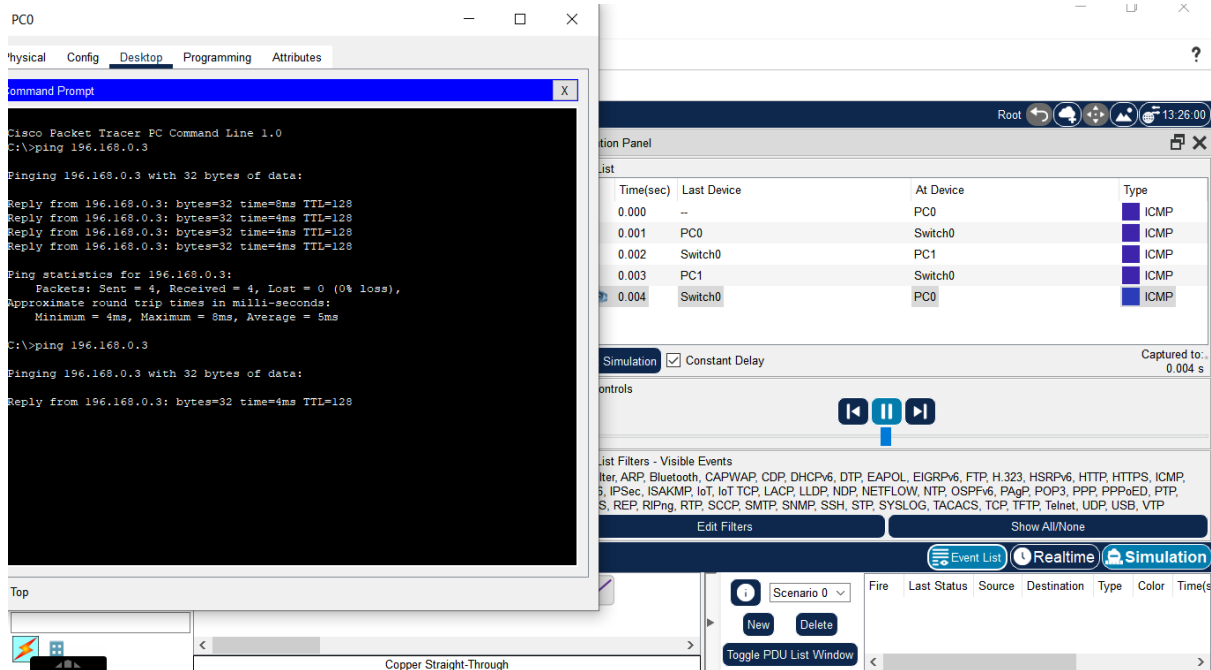
- A network has been established with all the devices having their IP addresses.



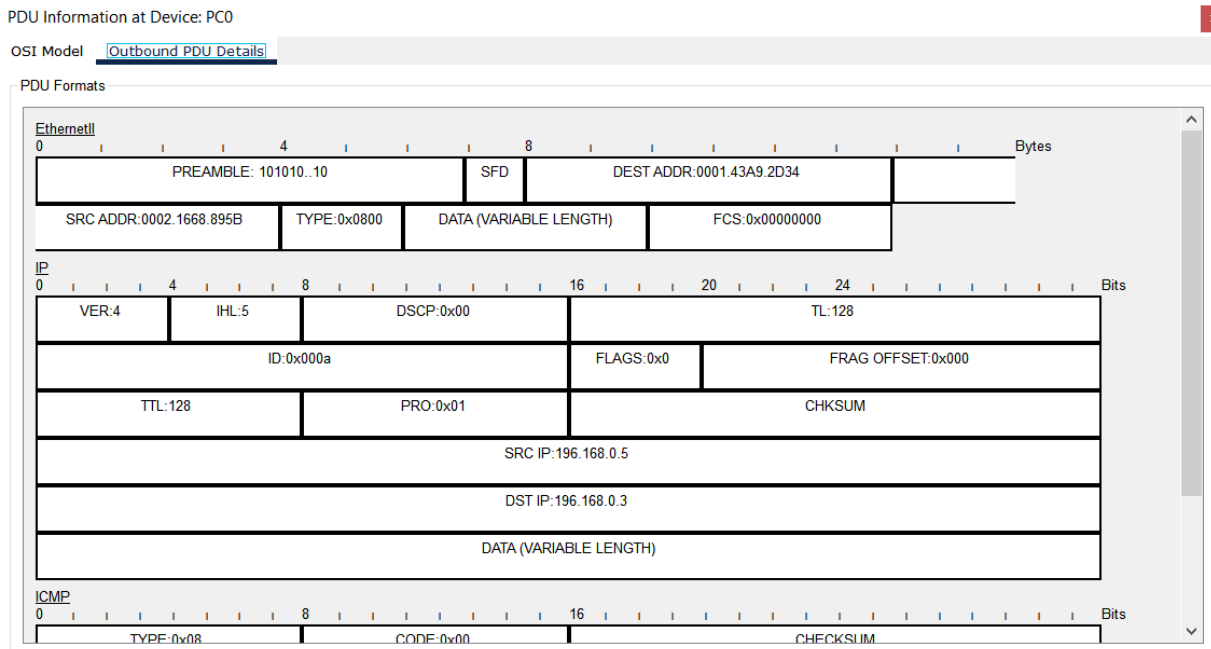
- Now, we simulate the network by sending a ping from one device to another.



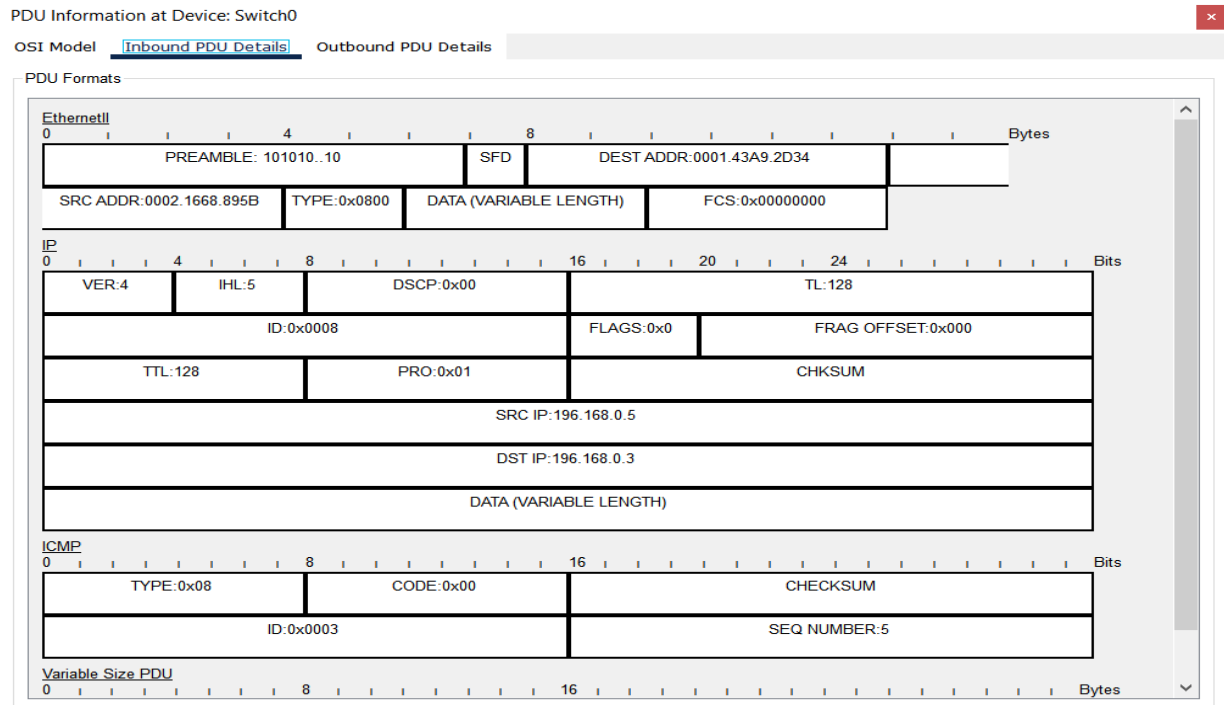
- In the simulation panel, we can see the packet being created at PC0.
- Then it is passed onto switch from where it gets the MAC address of the destination.
- The switch updates the MAC Address of the destination i.e. PC1.
- PC1, on receiving the packet sends the reply.
- The switch gets the reply and send it to the source, PC0.



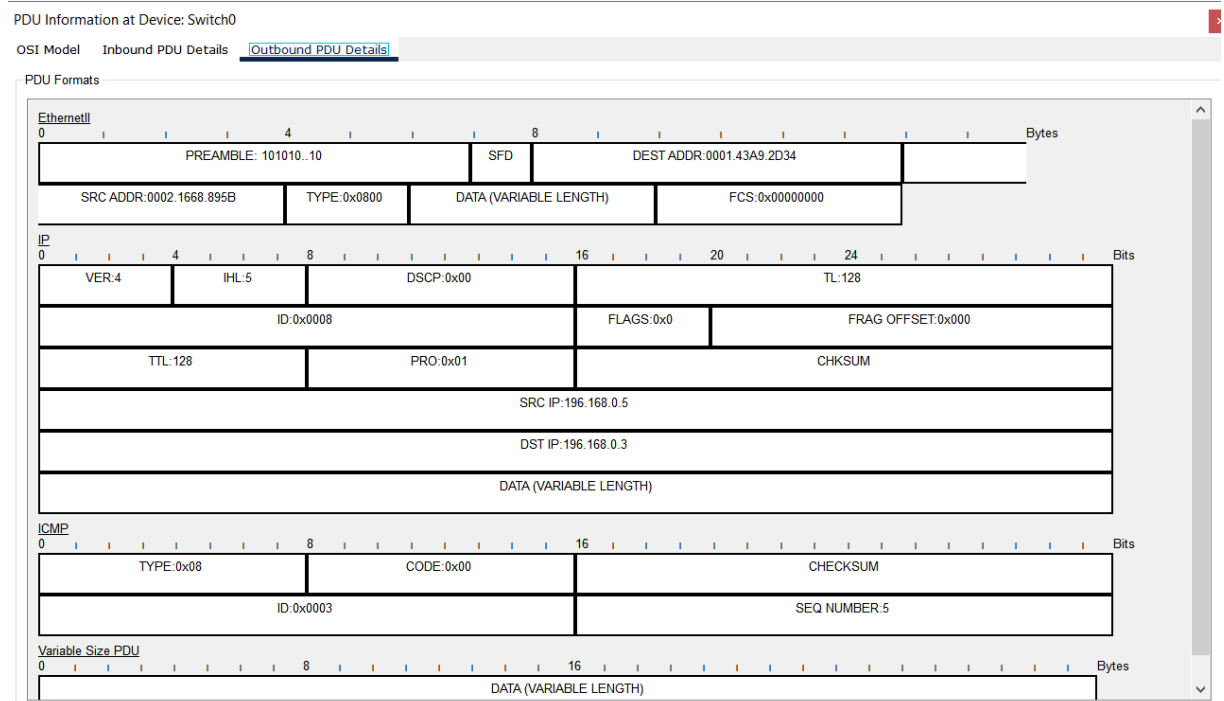
- Outgoing packet details from PC0 to switch



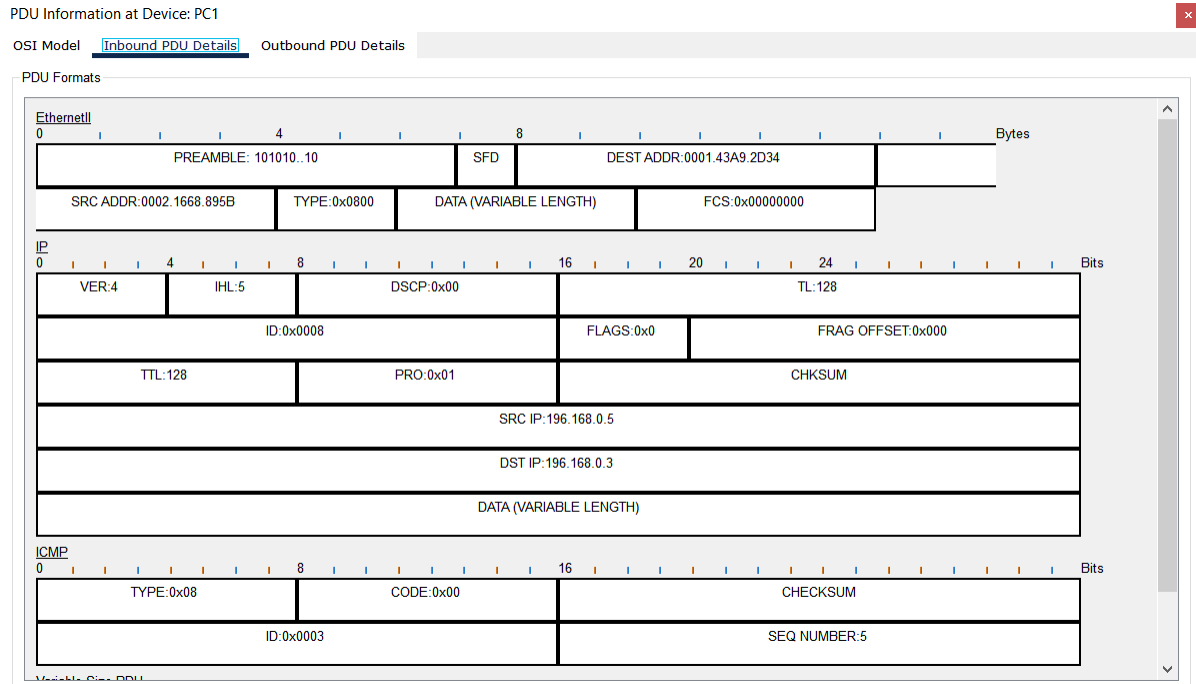
- Incoming packet details to switch



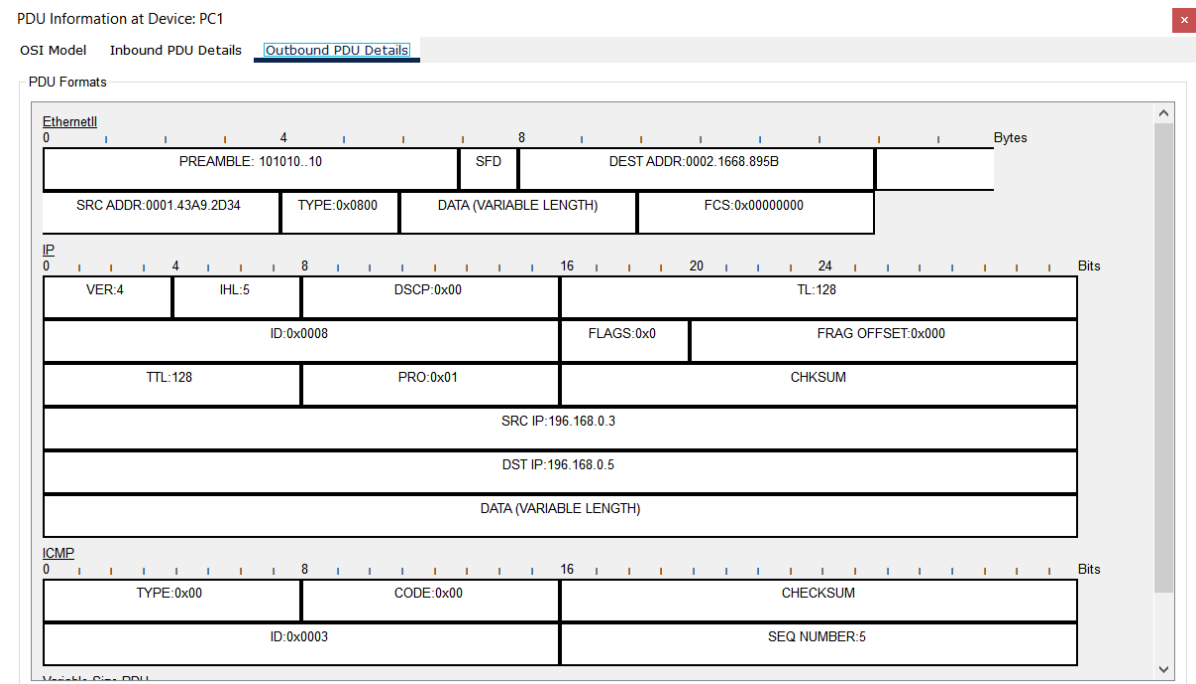
- Outgoing packet details from switch to PC1



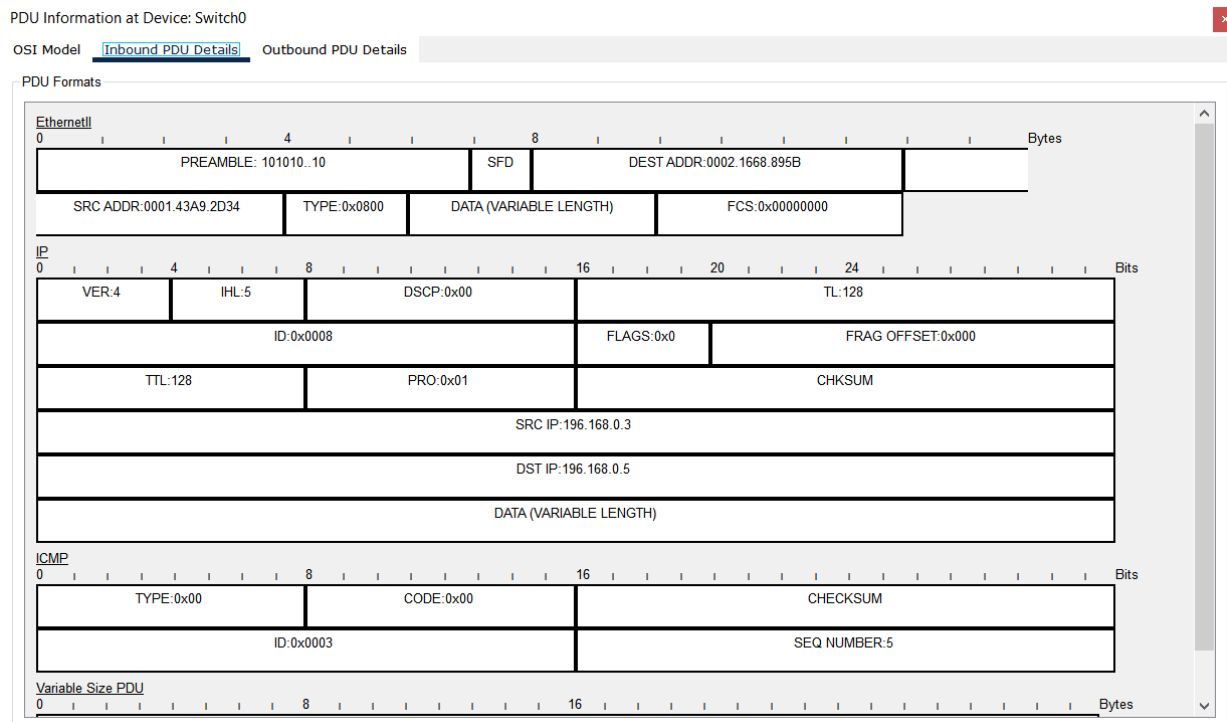
- Incoming packet details from switch to PC1



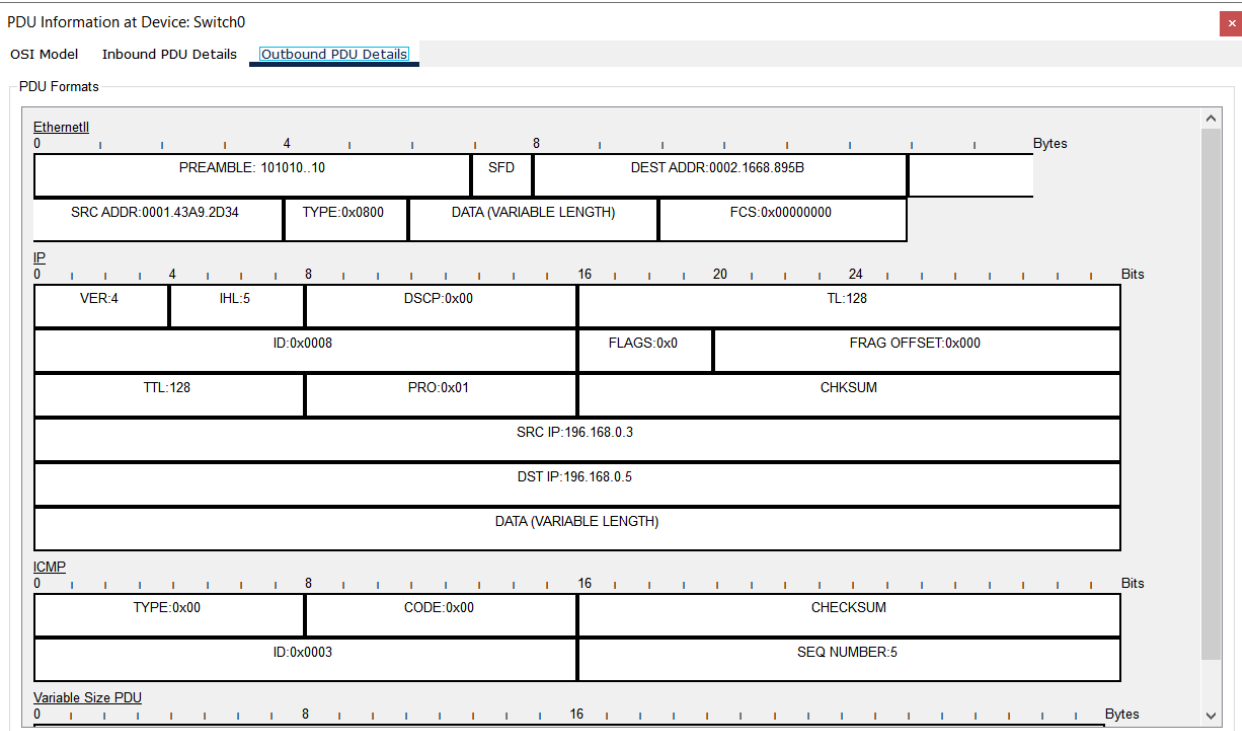
- Outgoing packet details from PC1 to switch



- Incoming packet details from PC1 to switch



- Outgoing packet details from switch to PC0



- Incoming packet details from switch to PC0

PDU Information at Device: PC0

OSI Model [Inbound PDU Details](#)

PDU Formats

