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Group B

Internet Technology 2

Lab 5

2 March 2023

Addressing Table for the Network

Host Name	IP Addressing (Unique)	Mask
PC0	192.168.0.2	255.255.255.0
Laptop0	192.168.0.3	255.255.255.0
Server	192.168.0.4	255.255.255.0
WRT300N Wireless Router0	192.168.0.1 (**Default Gateway**)	255.255.255.0

The network has one PC and a laptop which are connected to a wireless router and the router is connected to a server. As connection type, a copper straight-through cable was used between the PC0, wireless router0 and the server. The laptop0 connected wirelessly to the network.

PC0 and the server used the port FastEthernet0, router used port Ethernet1. To identify each device, a unique IP address had to be assigned to each device. A static method was used to set all the addresses for the network.

Instead of letting the router to assign whatever IP address is available, the static method allows you to assign specific IP addresses to every device you access frequently. So, I've set the PC0 to 192.168.0.2 and laptop0 to 192.168.0.3 etc.

The alternative for static is the DHCP (Dynamic Host Configuration Protocol) method. When using this method, the DHCP server on the router will assign an IP address to each device.

Image of the network created

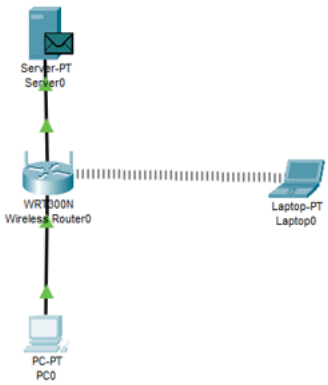


Image of pinging the server from the PC0

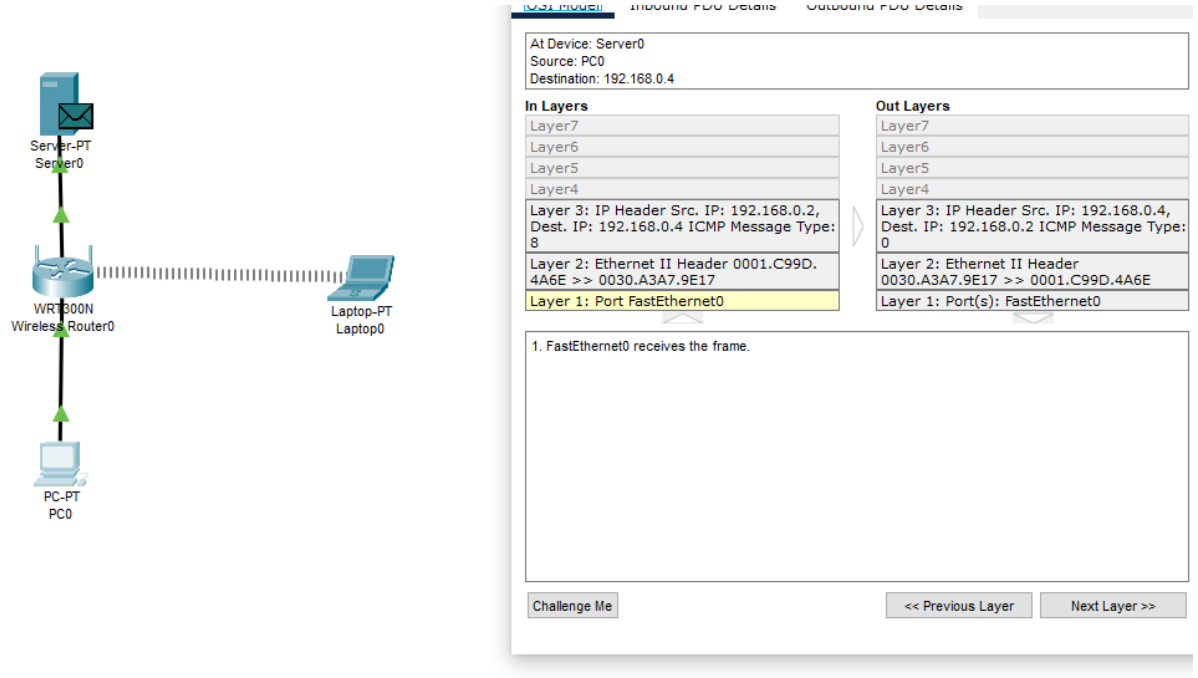
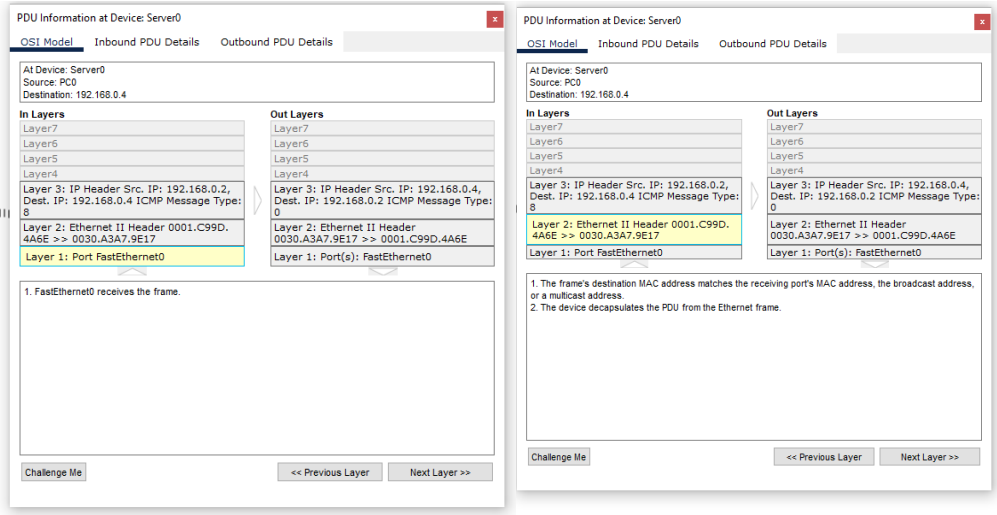


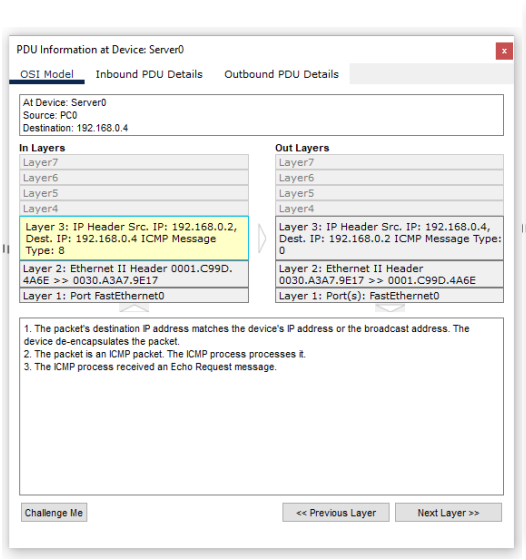
Image Above

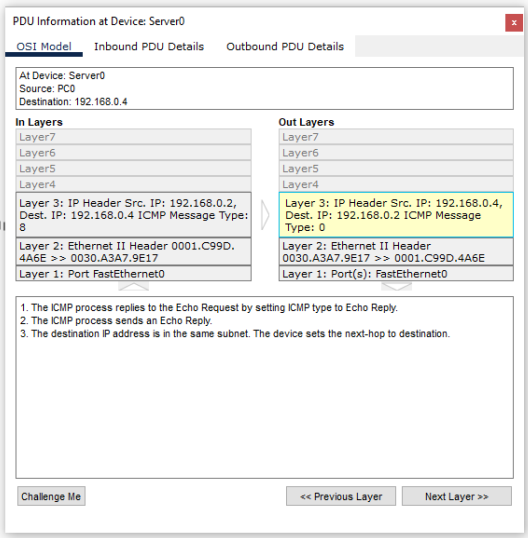
Message sent from PC0 to the server. When the message is generated, it is sent through the router to both the server and the laptop. The laptop will recognize that the message was not meant for it so it will ignore the message.

When you want to send a message, firstly the information is broken up into packets, which are smaller blocks of data. A packet must contain information on the source and destination IP addresses. This helps to identify the sending and the receiving device. The other part of the packet is the payload data.

The images below help to explain how messages are transported through the network.




PDU Information at Device: Server0
OSI Model
Inbound PDU Details
Outbound PDU Details
At Device: Server0
Source: PC0
Destination: 192.168.0.4
In Layers
Out Layers
Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 192.168.0.2, Dest. IP: 192.168.0.4 ICMP Message Type: 8
Layer 3: IP Header Src. IP: 192.168.0.4, Dest. IP: 192.168.0.2 ICMP Message Type: 0
Layer 2: Ethernet II Header 0001.C99D.4A6E >> 0030.A3A7.9E17
Layer 2: Ethernet II Header 0030.A3A7.9E17 >> 0001.C99D.4A6E
Layer 1: Port FastEthernet0
Layer 1: Port(s): FastEthernet0
1. The packet's destination IP address matches the device's IP address or the broadcast address. The device de-encapsulates the packet.
2. The packet is an ICMP packet. The ICMP process processes it.
3. The ICMP process received an Echo Request message.
Challenge Me
<< Previous Layer
Next Layer >>


PDU Information at Device: Server0
OSI Model
Inbound PDU Details
Outbound PDU Details
At Device: Server0
Source: PC0
Destination: 192.168.0.4
In Layers
Out Layers
Layer7
Layer6
Layer5
Layer4
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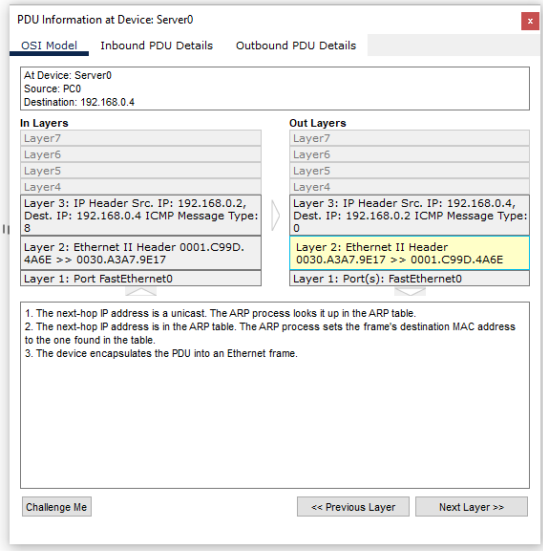
Layer 3: IP Header Src. IP: 192.168.0.4, Dest. IP: 192.168.0.2 ICMP Message Type: 0
Layer 2: Ethernet II Header 0001.C99D.4A6E >> 0030.A3A7.9E17
Layer 2: Ethernet II Header 0030.A3A7.9E17 >> 0001.C99D.4A6E
Layer 1: Port FastEthernet0
Layer 1: Port(s): FastEthernet0
1. The ICMP process replies to the Echo Request by setting ICMP type to Echo Reply.
2. The ICMP process sends an Echo Reply.
3. The destination IP address is in the same subnet. The device sets the next-hop to destination.
Challenge Me
<< Previous Layer
Next Layer >>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Outbound PDU Details
At Device: Server0
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Destination: 192.168.0.4
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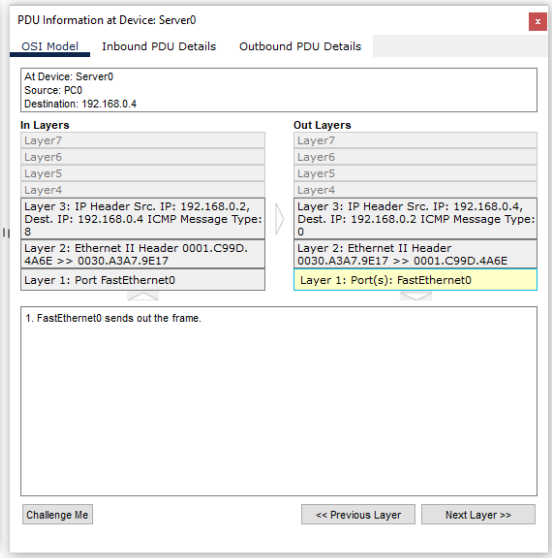
Layer 2: Ethernet II Header 0030.A3A7.9E17 >> 0001.C99D.4A6E
Layer 1: Port FastEthernet0
Layer 1: Port(s): FastEthernet0
1. The next-hop IP address is a unicast. The ARP process looks it up in the ARP table.
2. The next-hop IP address is in the ARP table. The ARP process sets the frame's destination MAC address to the one found in the table.
3. The device encapsulates the PDU into an Ethernet frame.
Challenge Me
<< Previous Layer
Next Layer >>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At Device: Server0
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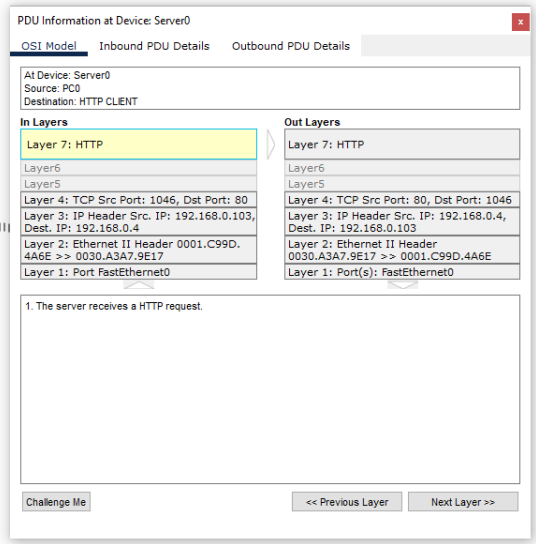
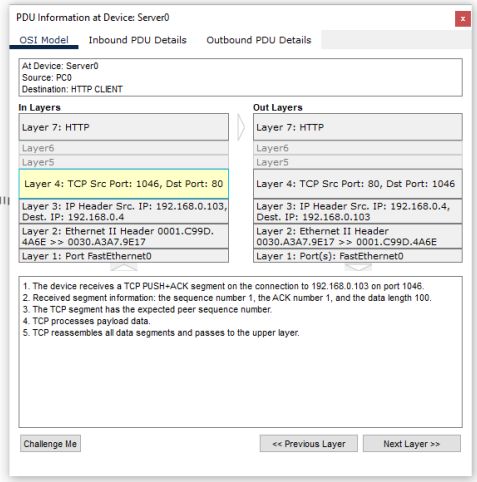
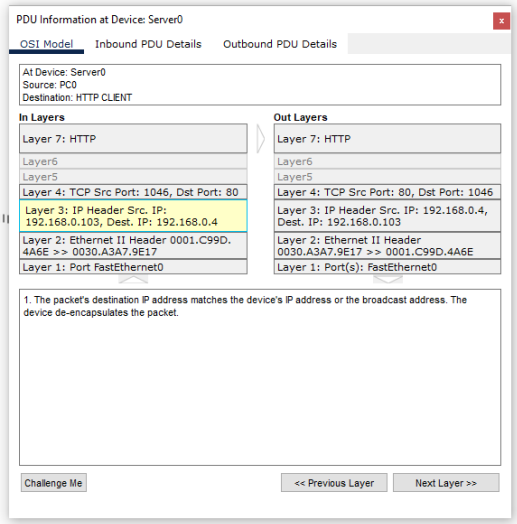
Layer 1: Port FastEthernet0
Layer 1: Port(s): FastEthernet0
1. FastEthernet0 sends out the frame.
Challenge Me
<< Previous Layer
Next Layer >>

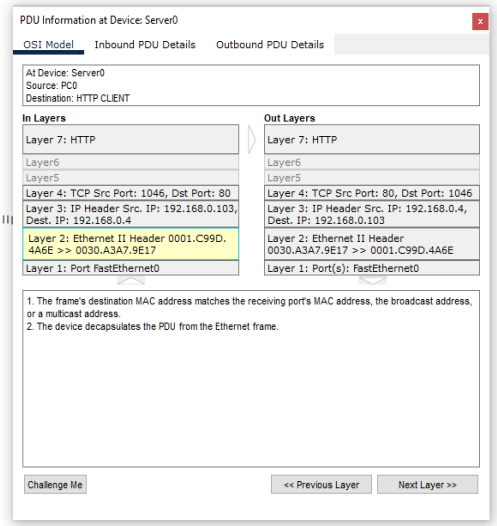
HTTP message and the layers. The following images contain information on the packets sent.

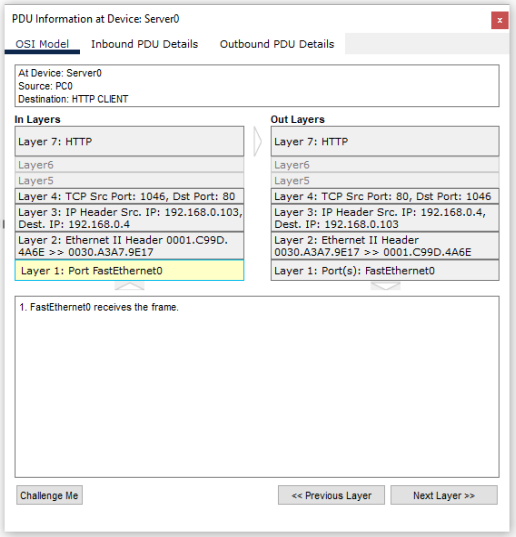
The HTTP message is generated in the layer 7 – application layer. Then it's sent to layer 4 – transport layer where data is segmented. After that the packets are sent to the network layer- layer 3. The network layer breaks the segments into packets. Then, the packets are sent to the data link layer- layer 2. Data link layer breaks down the packets into frames. Finally, the physical layer-layer 1 receives the frame.

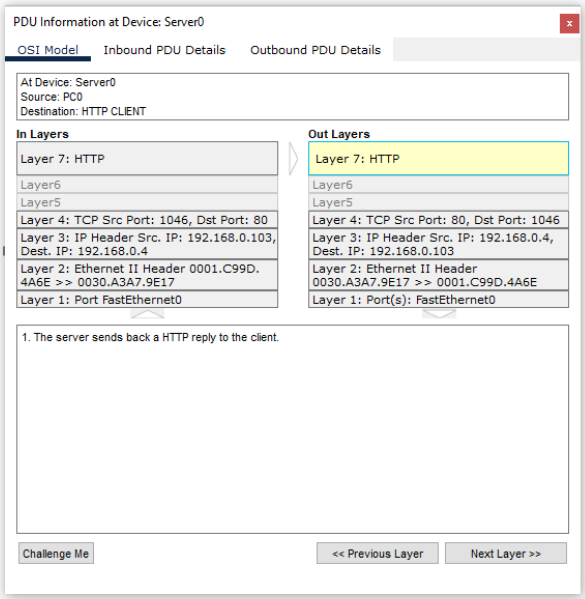









PDU Information at Device: Server0
OSI Model
Inbound PDU Details
Outbound PDU Details
At Device: Server0
Source: PC0
Destination: HTTP CLIENT
In Layers
Out Layers
Layer 7: HTTP
Layer 7: HTTP
Layer6
Layer5
Layer 4: TCP Src Port: 1046, Dst Port: 80
Layer 4: TCP Src Port: 80, Dst Port: 1046
Layer 3: IP Header Src. IP: 192.168.0.103, Dest. IP: 192.168.0.4
Layer 3: IP Header Src. IP: 192.168.0.4, Dest. IP: 192.168.0.103
Layer 2: Ethernet II Header 0001.C99D.4A6E >> 0030.A3A7.9E17
Layer 2: Ethernet II Header 0030.A3A7.9E17 >> 0001.C99D.4A6E
Layer 1: Port FastEthernet0
Layer 1: Port(s): FastEthernet0
1. FastEthernet0 receives the frame.
Challenge Me
<< Previous Layer
Next Layer >>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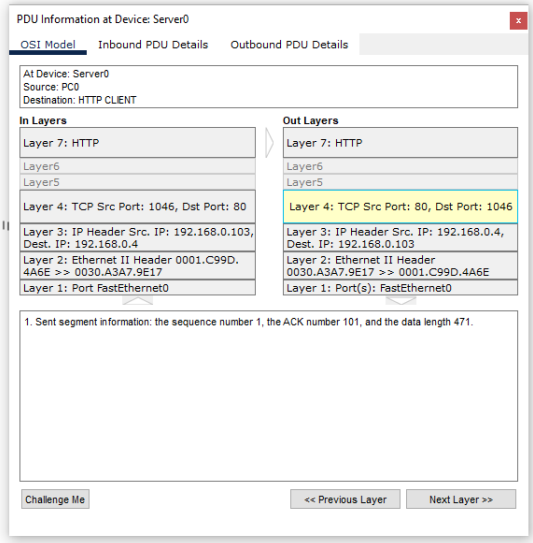
Layer 2: Ethernet II Header 0030.A3A7.9E17 >> 0001.C99D.4A6E
Layer 1: Port FastEthernet0
Layer 1: Port(s): FastEthernet0
1. The server sends back a HTTP reply to the client.
Challenge Me
<< Previous Layer
Next Layer >>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Layer 3: IP Header Src. IP: 192.168.0.4, Dest. IP: 192.168.0.103
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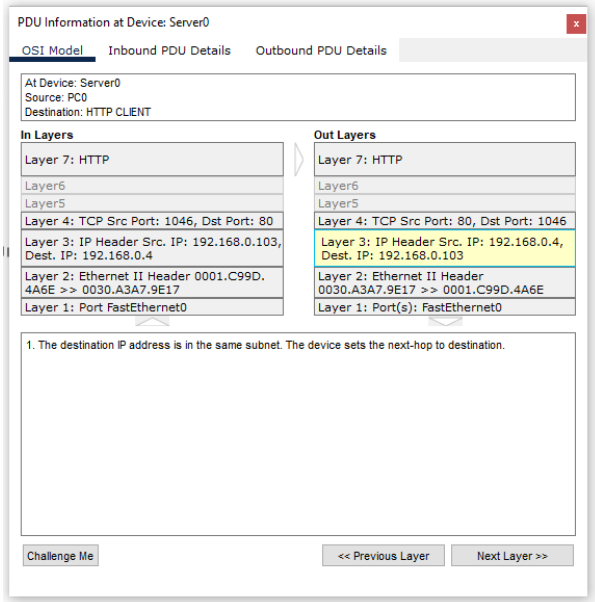
Layer 2: Ethernet II Header 0030.A3A7.9E17 >> 0001.C99D.4A6E
Layer 1: Port FastEthernet0
Layer 1: Port(s): FastEthernet0
1. Sent segment information: the sequence number 1, the ACK number 101, and the data length 471.
Challenge Me
<< Previous Layer
Next Layer >>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1. The destination IP address is in the same subnet. The device sets the next-hop to destination.
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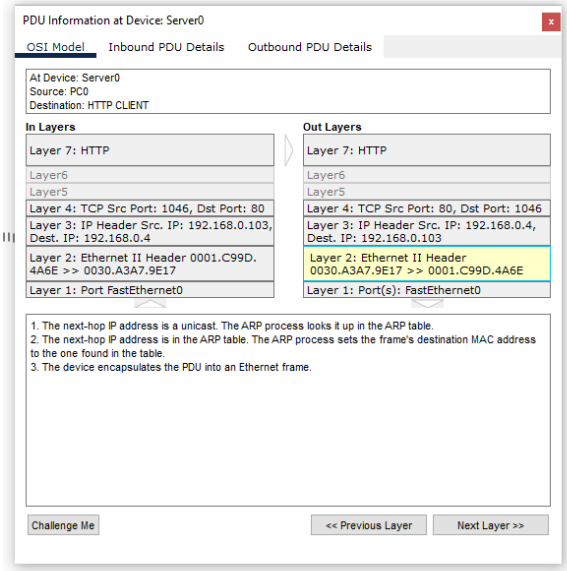

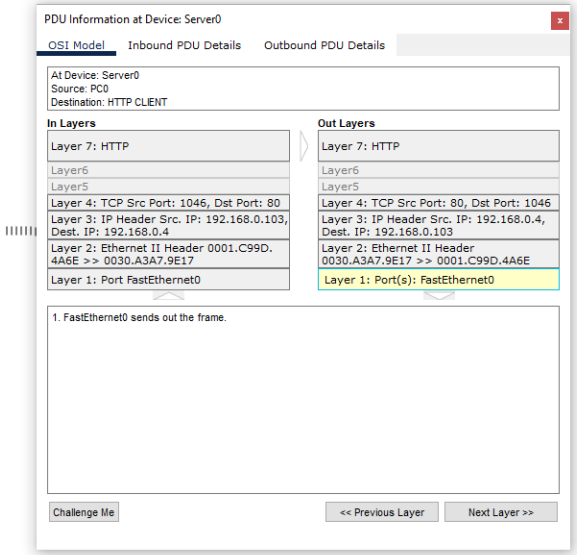

Image Below

1 packet is transferred with a HTML page with just text.

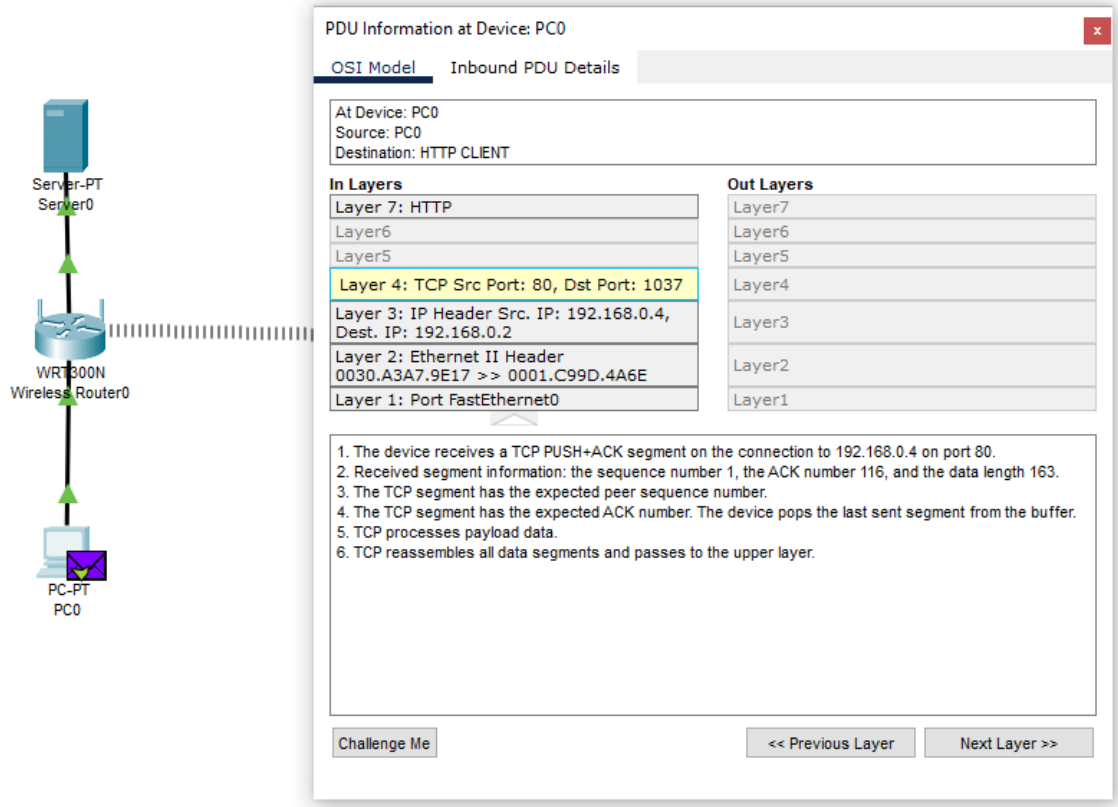

Image Below

The number of packets in a transmission = $\frac{Sequence\ Number}{Data\ Length}$.

The number of packets for a JPEG = $\frac{10009}{556}$ = 18 packets. 556 is the original data length.