Pandit Deendayal Energy University
School of Technology
Department of ICT
Academic Year: 2022-23
Computer Communication and Networking Lab
20IC306P

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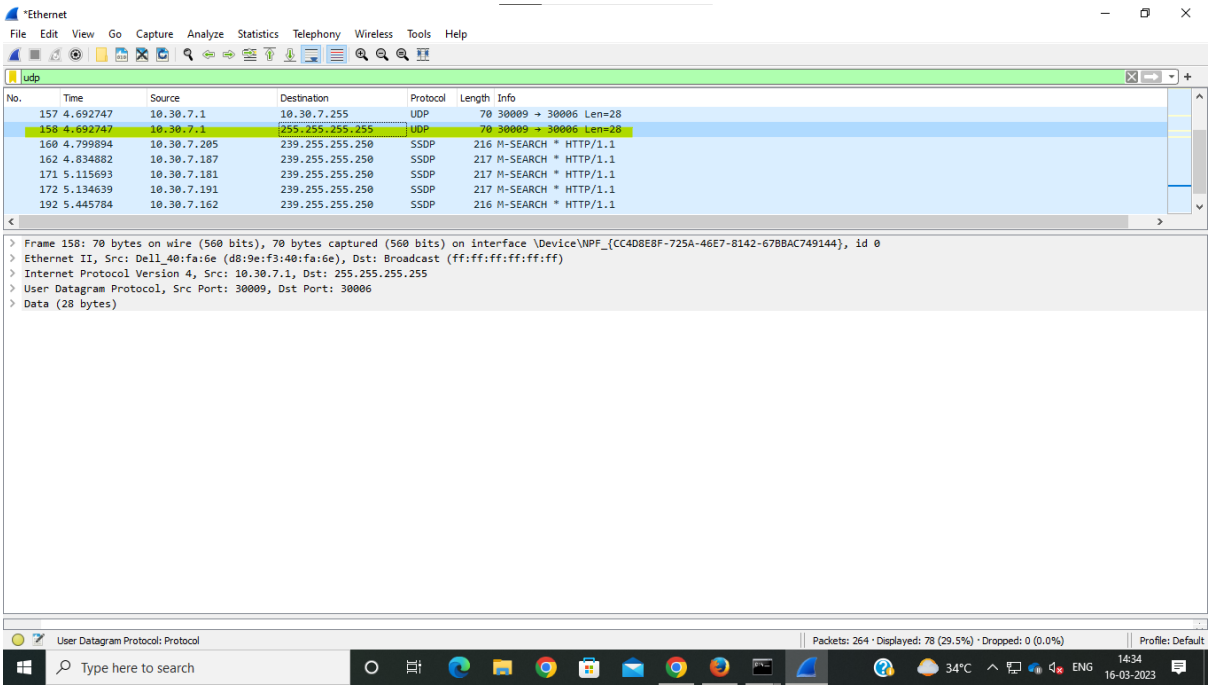
Experiment 6:

Aim: To understand the working of UDP by using wire shark and packet tracer.
Software Tools required: - Wire-shark and Cisco packet tracer

Task 1: To study about UDP by using wire shark.

Answer the following questions[1]. If you're doing this lab as part of class, your teacher will provide details about how to hand in assignments, whether written or in an LMS.

1. Select the first UDP segment in your trace. What is the packet number[2] of this segment in the trace file? What type of application-layer payload or protocol message is being carried in this UDP segment? Look at the details of this packet in Wireshark. How many fields there are in the



UDP header? (You shouldn't look in the textbook! Answer these questions directly from what you observe in the packet trace.) What are the names of these fields?

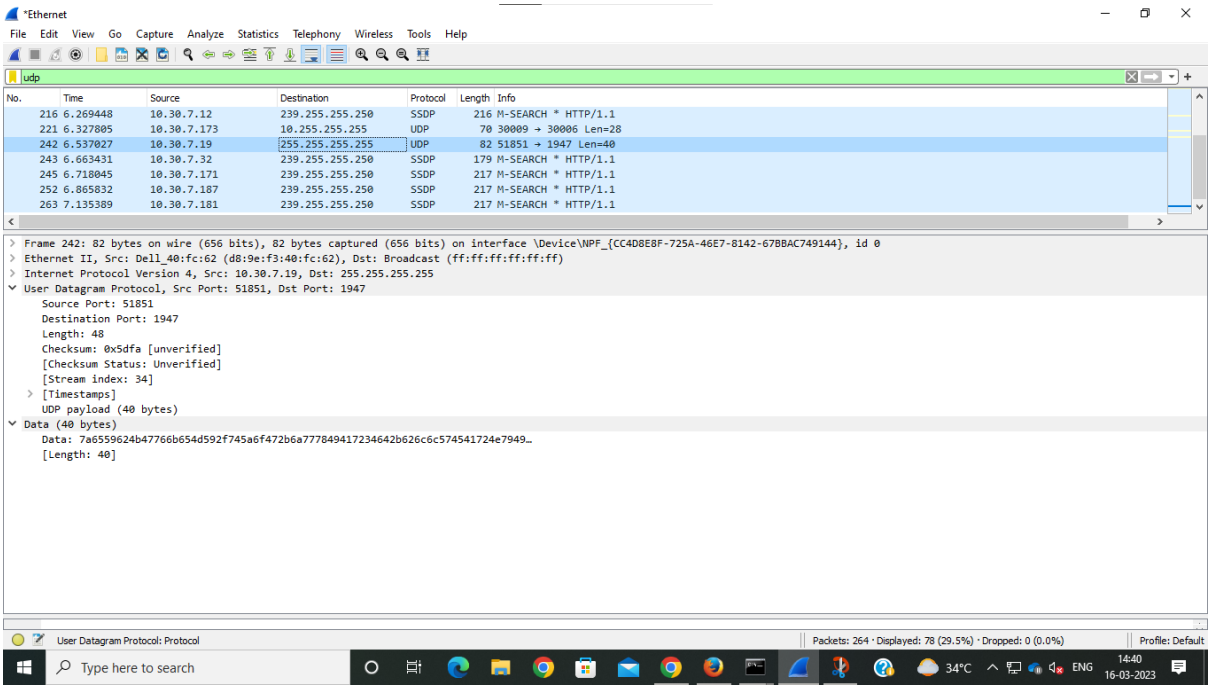
1

2

Ans:

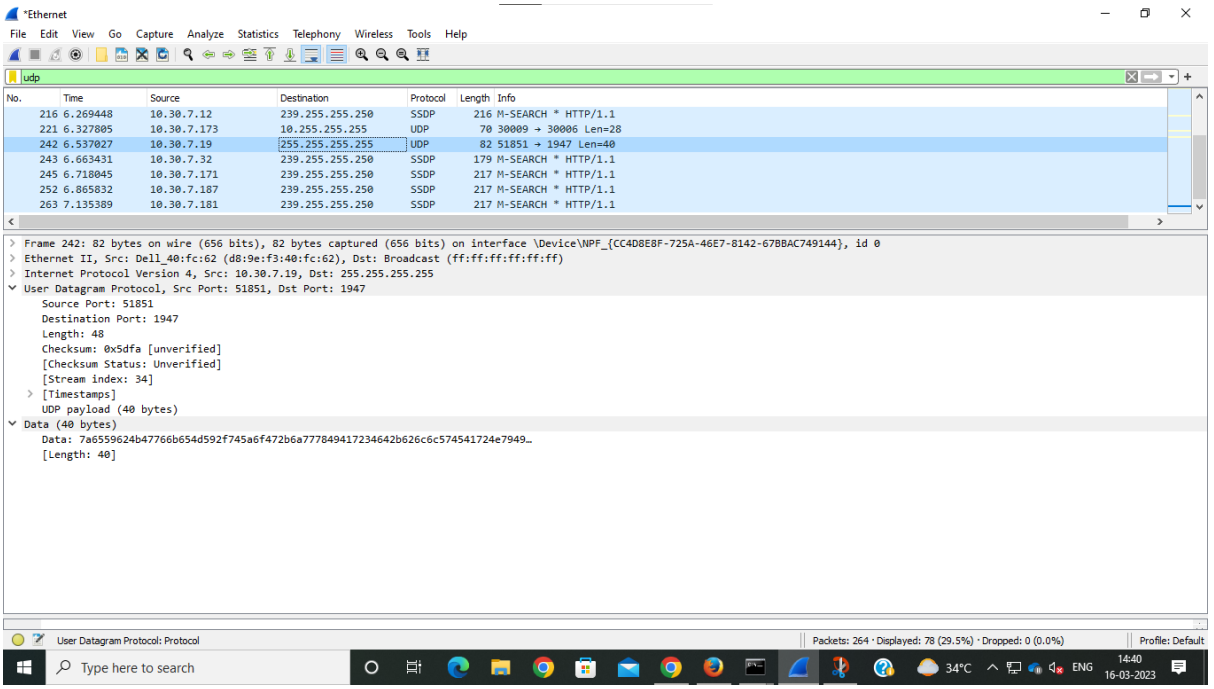
Packet Number is 158.

2. By consulting the displayed information in Wireshark's packet content field for this packet (or by consulting the textbook), what is the length (in bytes) of each of the UDP header fields?
Ans: the length of UDP segment is 48 bytes and UDP payload length is 40 bytes so header is 8 bytes.



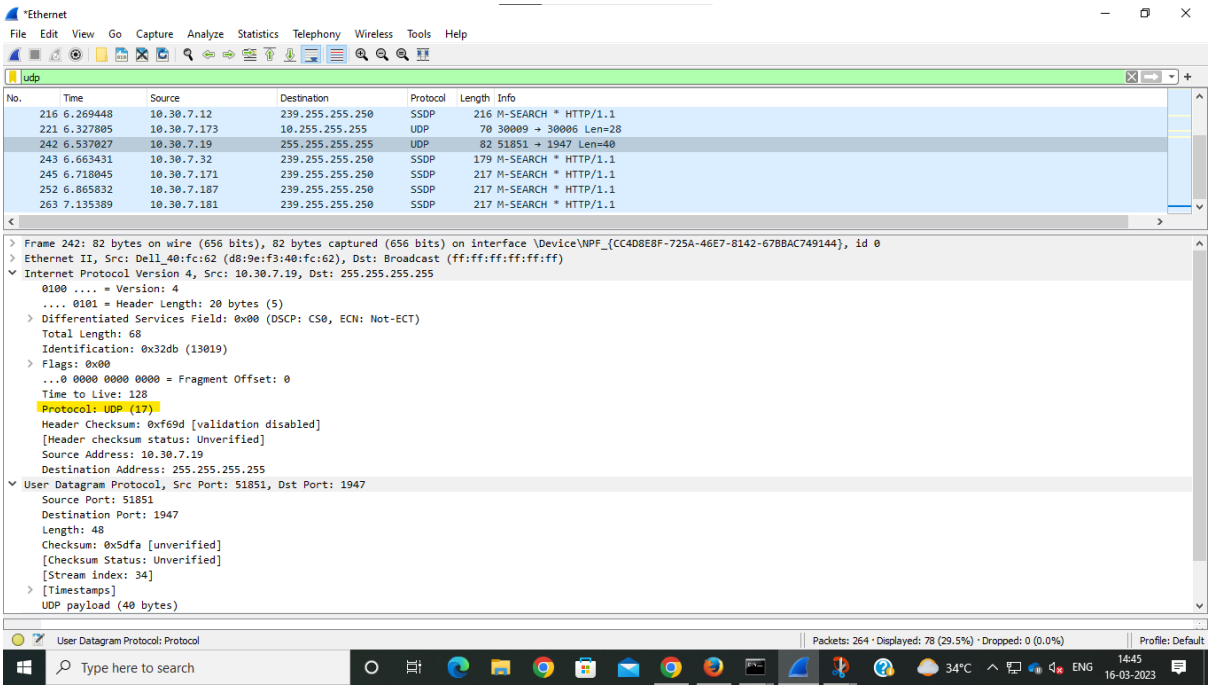
3. The value in the Length field is the length of what? (You can consult the text for this answer). Verify your claim with your captured UDP packet.
Ans: User Datagram Protocol. It is the length of the UDP **Segment** (UDP header + Application Data).

4. What is the maximum number of bytes that can be included in a UDP payload? (Hint: the answer to this question can be determined by your answer to 2. above)
Ans: Maximum bytes of UDP payload are $(2^{16} - 1) - 8 =$ **65527 bytes**.



5. What is the largest possible source port number? (Hint: see the hint in 4.)
   Ans: It has range 1-65535

6. What is the protocol number for UDP? Give your answer in decimal notation. To answer this question, you'll need to look into the Protocol field of the IP datagram containing this UDP segment (see Figure 4.13 in the text, and the discussion of IP header fields).
   Ans: Protocol number of UDP is 17.



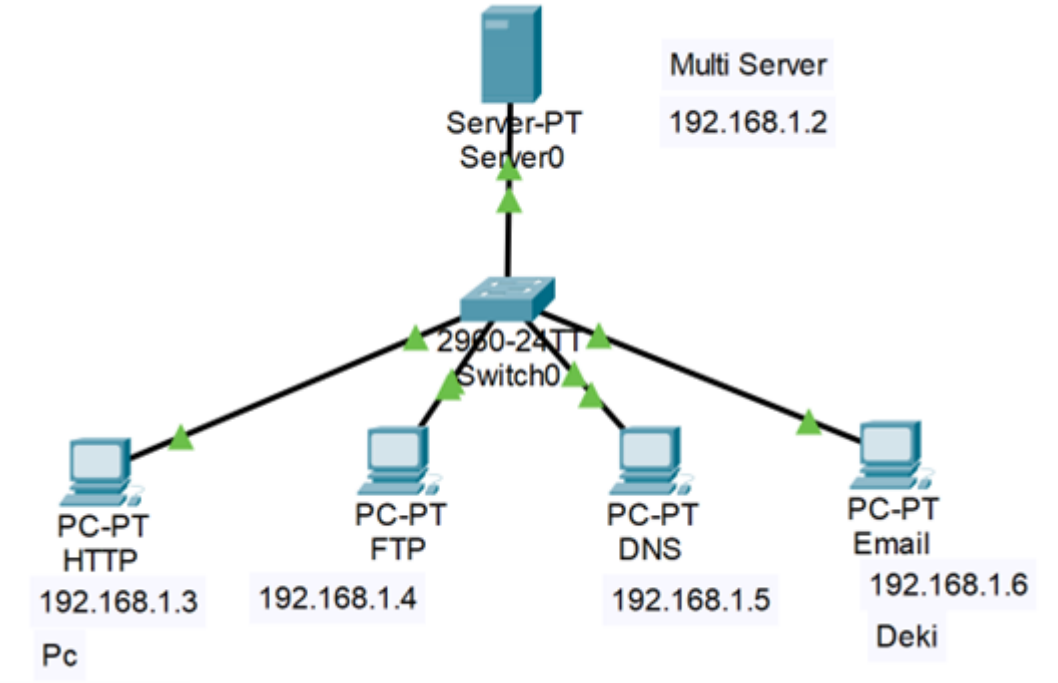
7. Examine the pair of UDP packets in which your host sends the first UDP packet and the second UDP packet is a reply to this first UDP packet. (Hint: for a second packet to be sent in response to a first packet, the sender of the first packet should be the destination of the

second packet). What is the packet number[3] of the first of these two UDP segments in the trace file? What is the packet number[4] of the second of these two UDP segments in the trace file? Describe the relationship between the port numbers in the two packets.
Ans: Consecutive packet numbers.

That's it! As a streamlined, no-frills protocol , UDP deserves a streamlined, no-frills Wireshark Lab ☺.

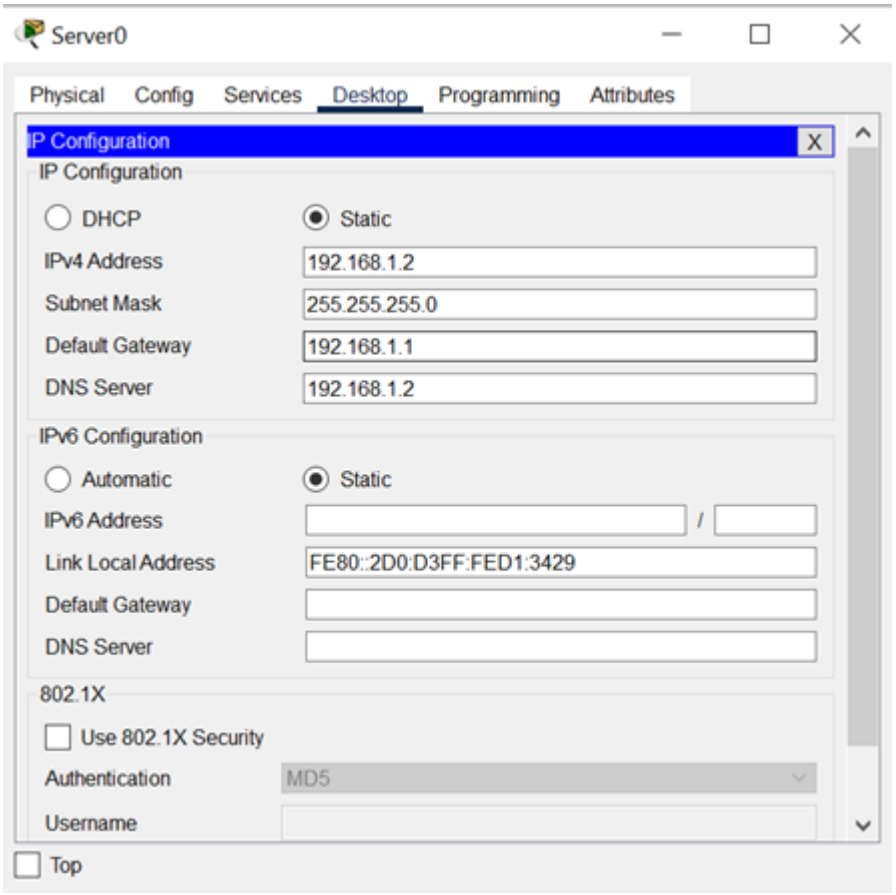
Task 2: To study about UDP by using packet tracer.

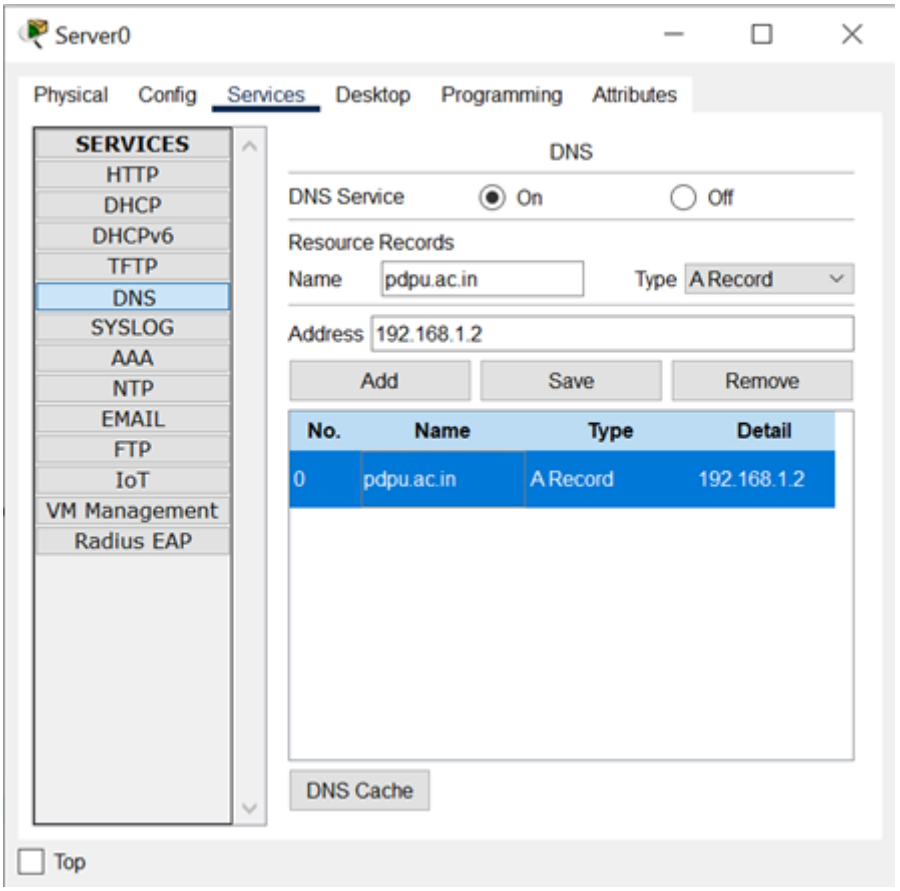
Connecting systems.

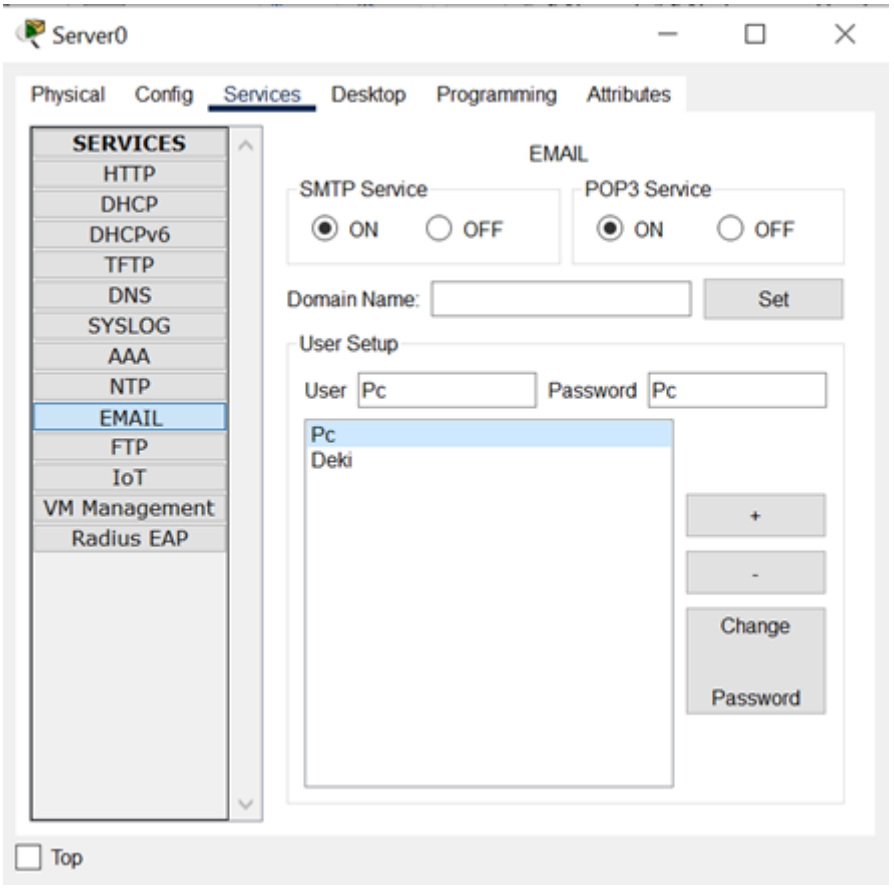


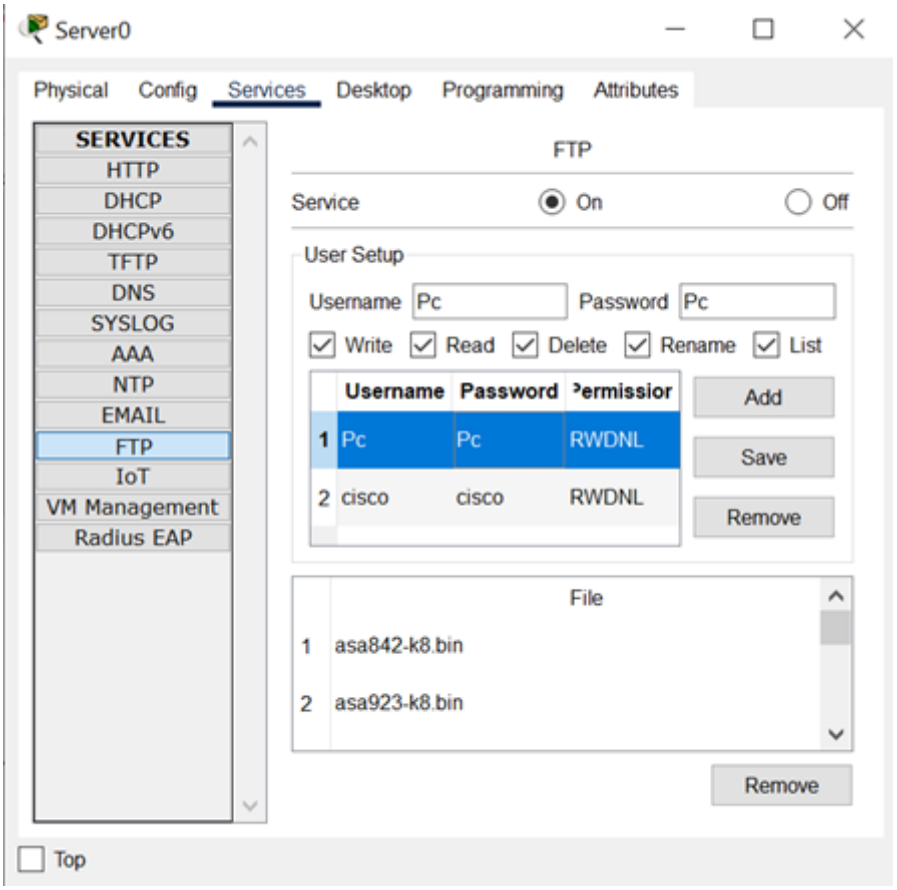
Configuring all IPs and Server.

[3] Remember that this "packet number" is assigned by Wireshark for listing purposes only; it is NOT a packet number contained in any real packet header.
[4] Remember that this "packet number" is assigned by Wireshark for listing purposes only; it is NOT a packet number contained in any real packet header.

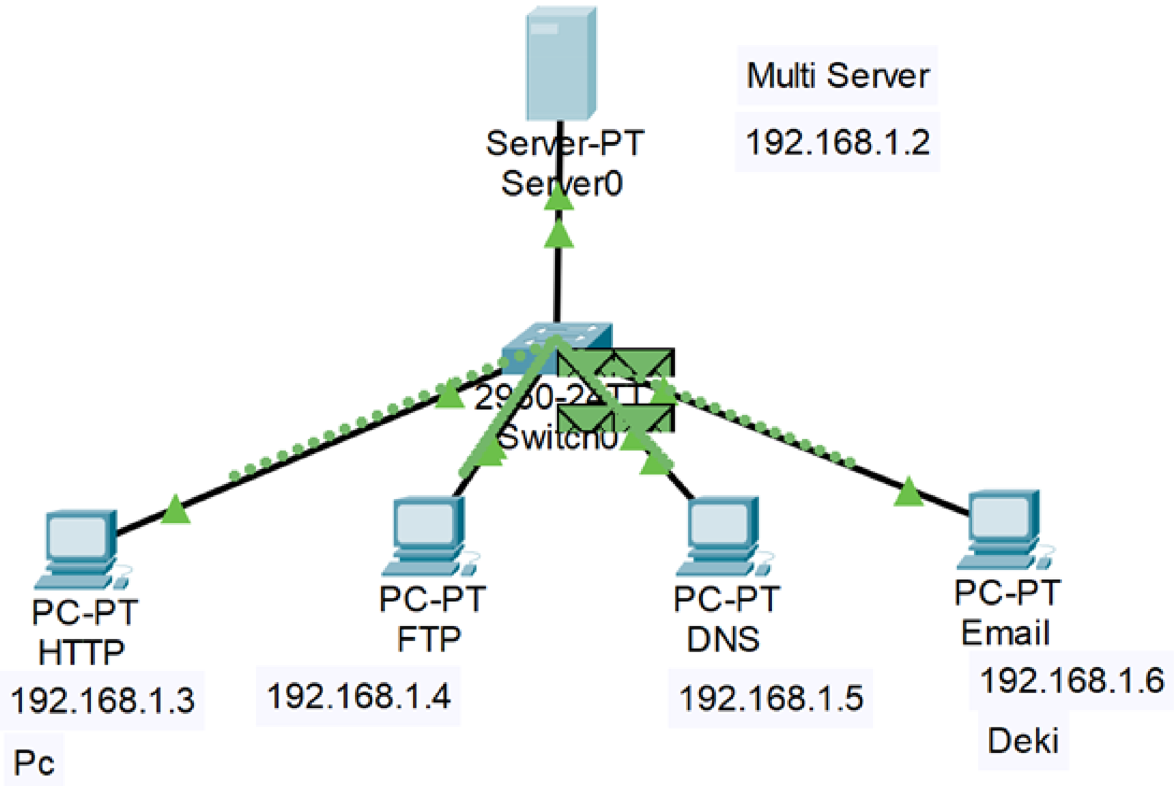

Server0
Physical
Config
Services
Desktop
Programming
Attributes
IP Configuration
X
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.1.1
DNS Server
192.168.1.2
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address
FE80::2D0:D3FF:FED1:3429
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Top

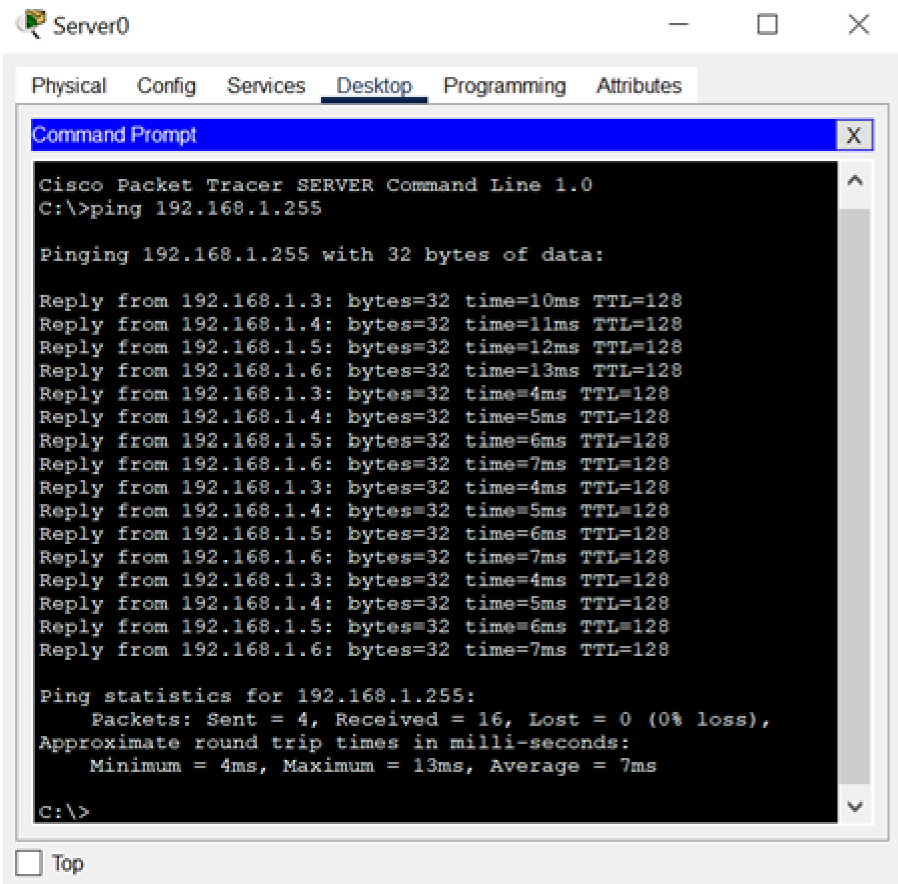

Server0
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DNS
DNS Service
On
Off
Resource Records
Name
pdpu.ac.in
Type
A Record
Address
192.168.1.2
Add
Save
Remove
No.
Name
Type
Detail
0
pdpu.ac.in
A Record
192.168.1.2
DNS Cache
Top


Server0
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
EMAIL
SMTP Service
ON
OFF
POP3 Service
ON
OFF
Domain Name:
Set
User Setup
User
Pc
Password
Pc
Pc
Deki
+
-
Change
Password
Top

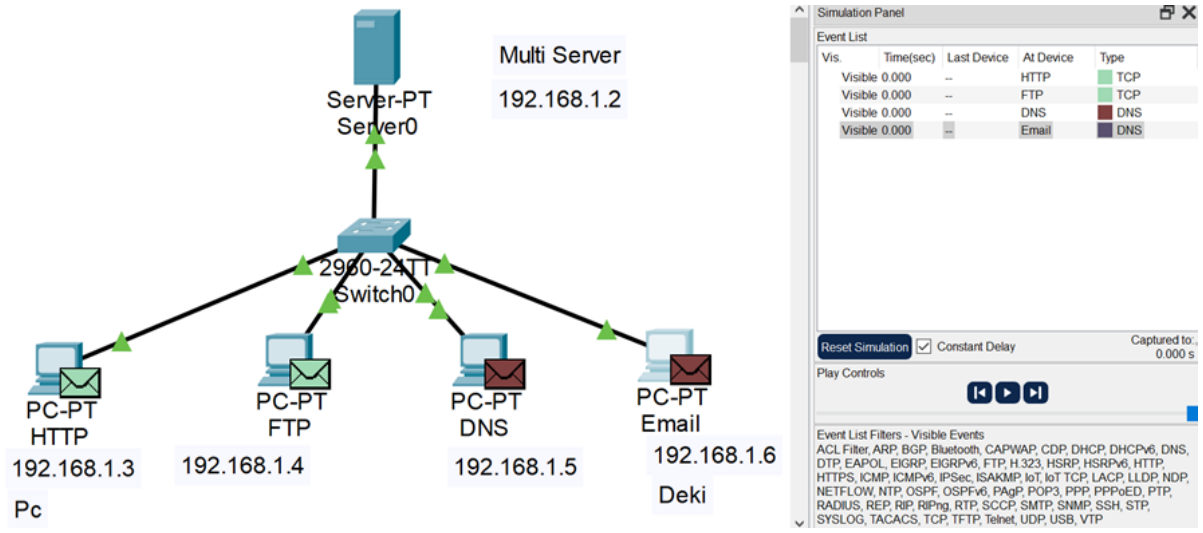

Server0
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
FTP
Service
On
Off
User Setup
Username
Pc
Password
Pc
Write
Read
Delete
Rename
List
Username
Password
ermissior
1
Pc
Pc
RWDNL
2
cisco
cisco
RWDNL
Add
Save
Remove
File
1
asa842-k8.bin
2
asa923-k8.bin
Remove
Top

Ping all devices in simulation

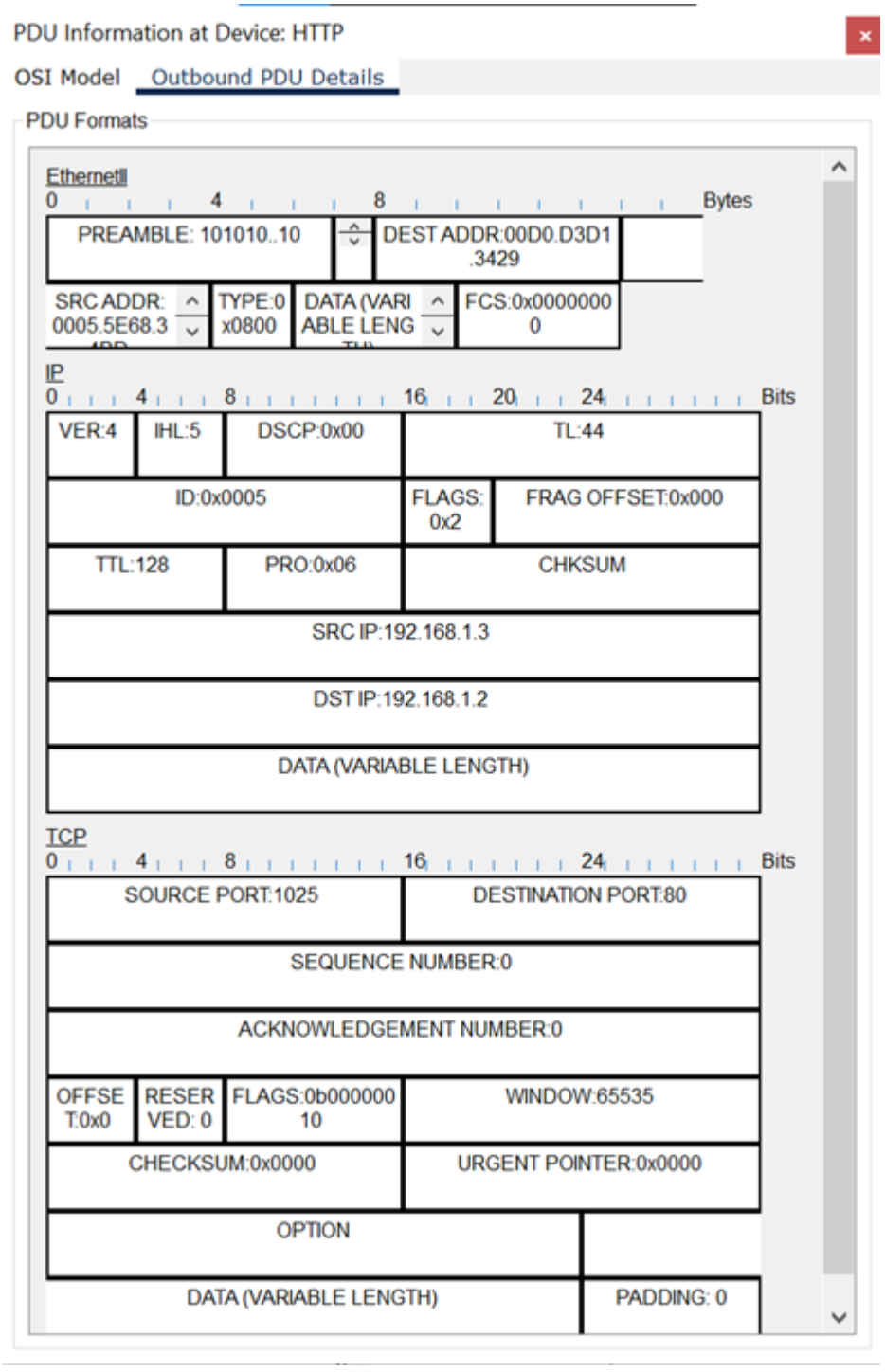


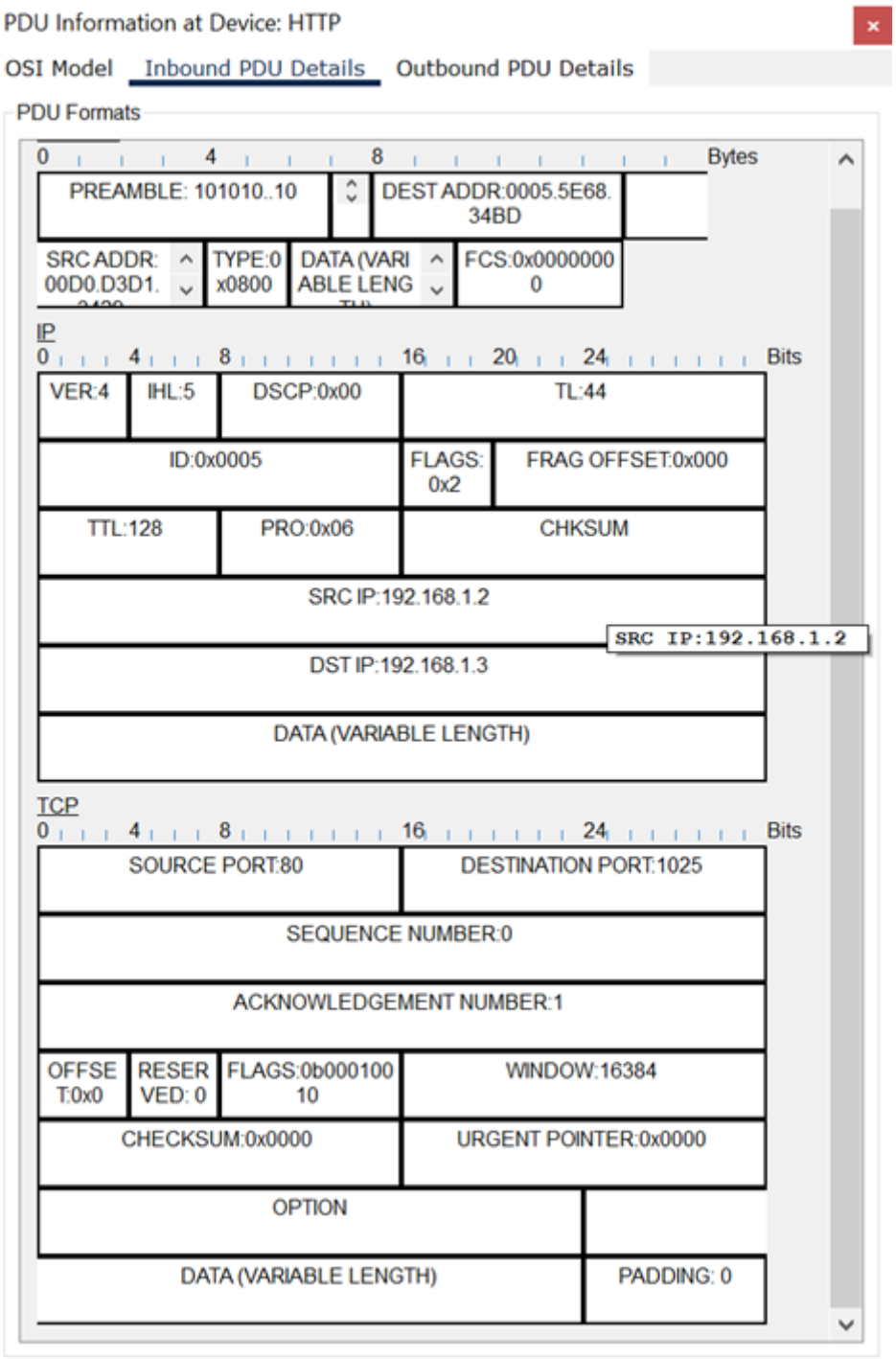


Observing 4 packets from 4 clients

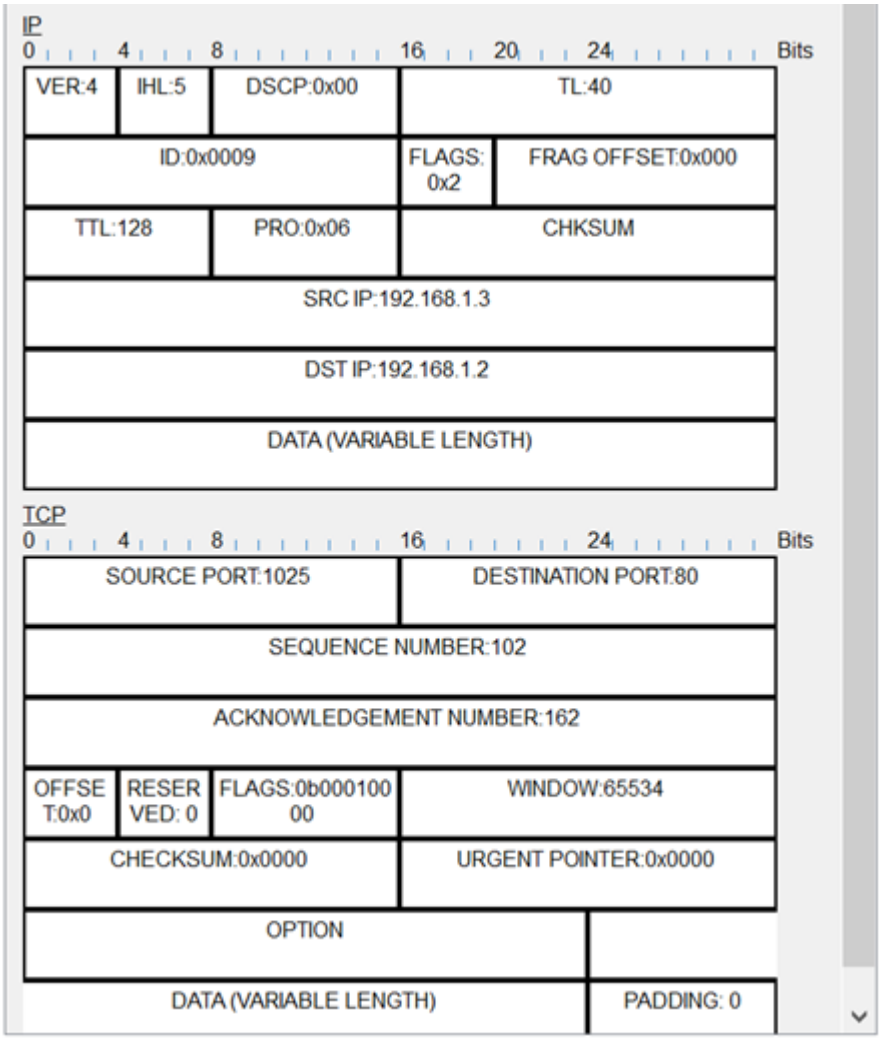


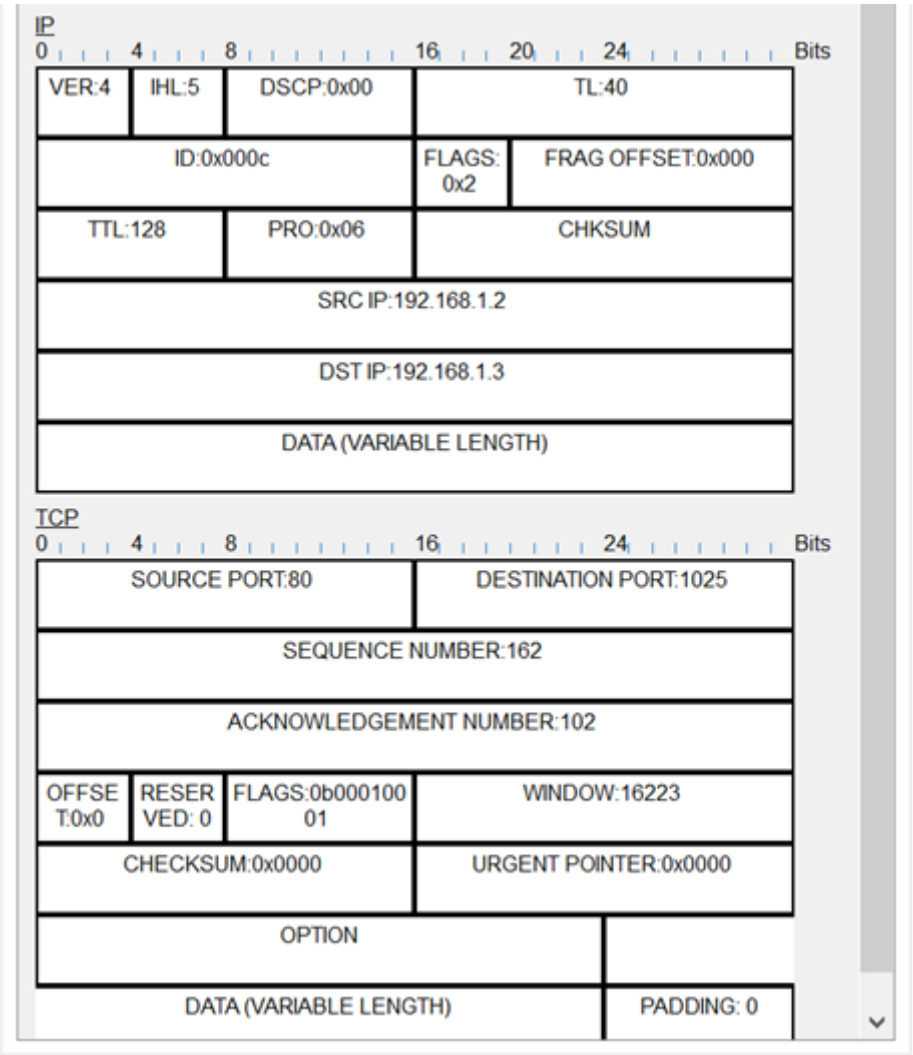
First HTTP communication from HTTP client and from Server.


PDU Information at Device: HTTP
OSI Model
Outbound PDU Details
PDU Formats
Ethernetll
0
4
8
Bytes
PREAMBLE: 101010..10
DEST ADDR:00D0.D3D1.3429
SRC ADDR: 0005.5E68.3
TYPE:0x0800
DATA (VARIABLE LENG
FCS:0x00000000
IP
0
4
8
16
20
24
Bits
VER:4
IHL:5
DSCP:0x00
TL:44
ID:0x0005
FLAGS: 0x2
FRAG OFFSET:0x000
TTL:128
PRO:0x06
CHKSUM
SRC IP:192.168.1.3
DST IP:192.168.1.2
DATA (VARIABLE LENGTH)
TCP
0
4
8
16
24
Bits
SOURCE PORT:1025
DESTINATION PORT:80
SEQUENCE NUMBER:0
ACKNOWLEDGEMENT NUMBER:0
OFFSET:0x0
RESERVED: 0
FLAGS:0b000000 10
WINDOW:65535
CHECKSUM:0x0000
URGENT POINTER:0x0000
OPTION
DATA (VARIABLE LENGTH)
PADDING: 0

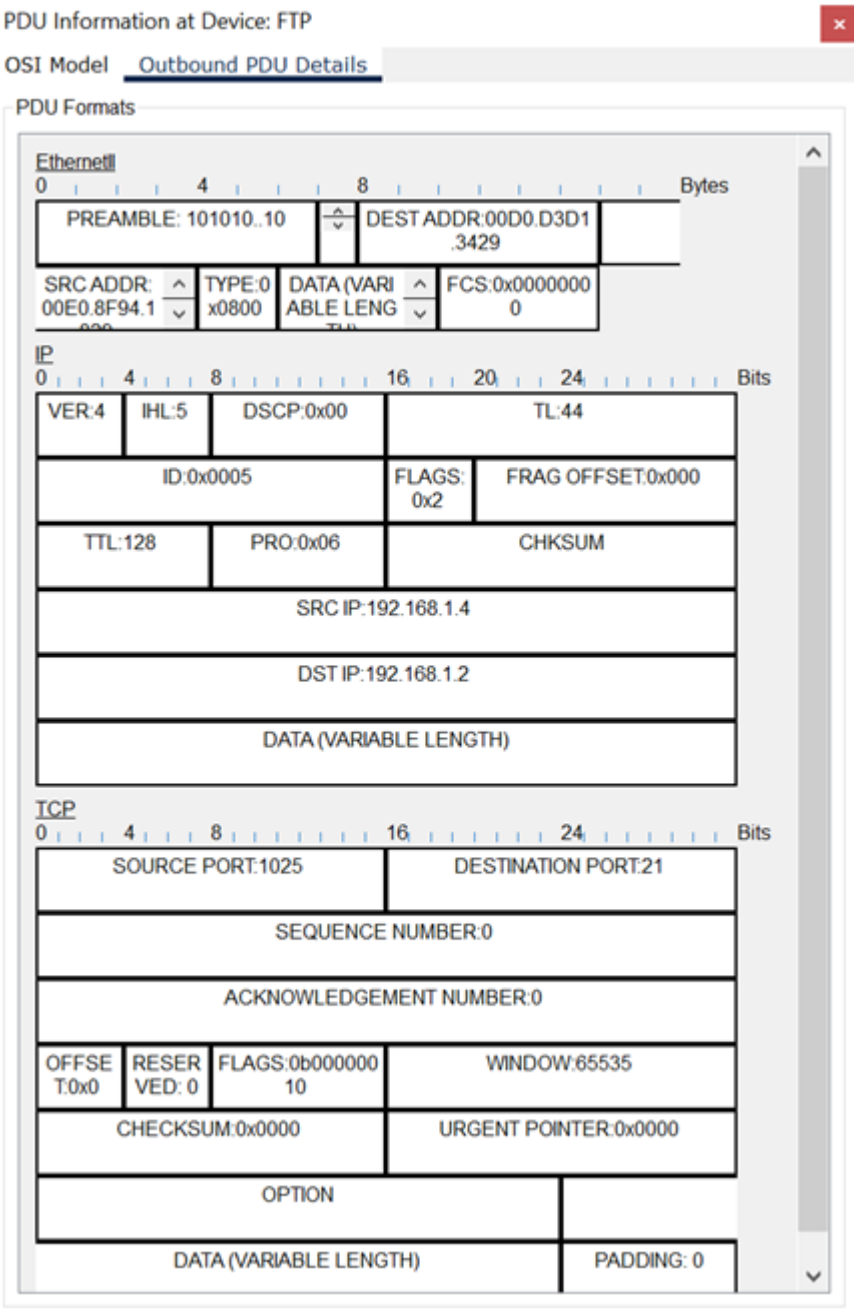


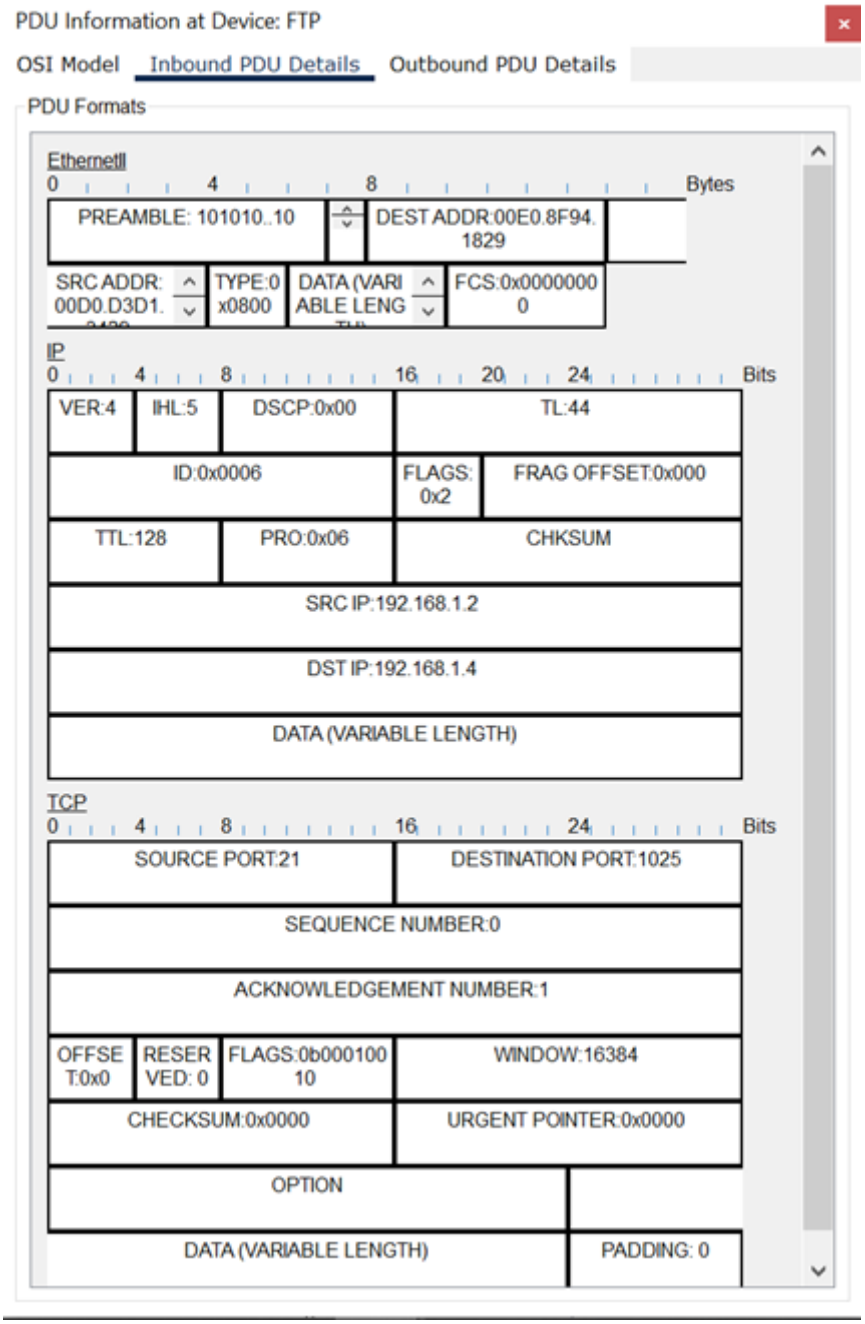
Last HTTP communication from HTTP client and from Server.


IP
0
4
8
16
20
24
Bits
VER:4
IHL:5
DSCP:0x00
TL:40
ID:0x0009
FLAGS: 0x2
FRAG OFFSET:0x000
TTL:128
PRO:0x06
CHKSUM
SRC IP:192.168.1.3
DST IP:192.168.1.2
DATA (VARIABLE LENGTH)
TCP
0
4
8
16
24
Bits
SOURCE PORT:1025
DESTINATION PORT:80
SEQUENCE NUMBER:102
ACKNOWLEDGEMENT NUMBER:162
OFFSET:0x0
RESERVED: 0
FLAGS:0b000100 00
WINDOW:65534
CHECKSUM:0x0000
URGENT POINTER:0x0000
OPTION
DATA (VARIABLE LENGTH)
PADDING: 0

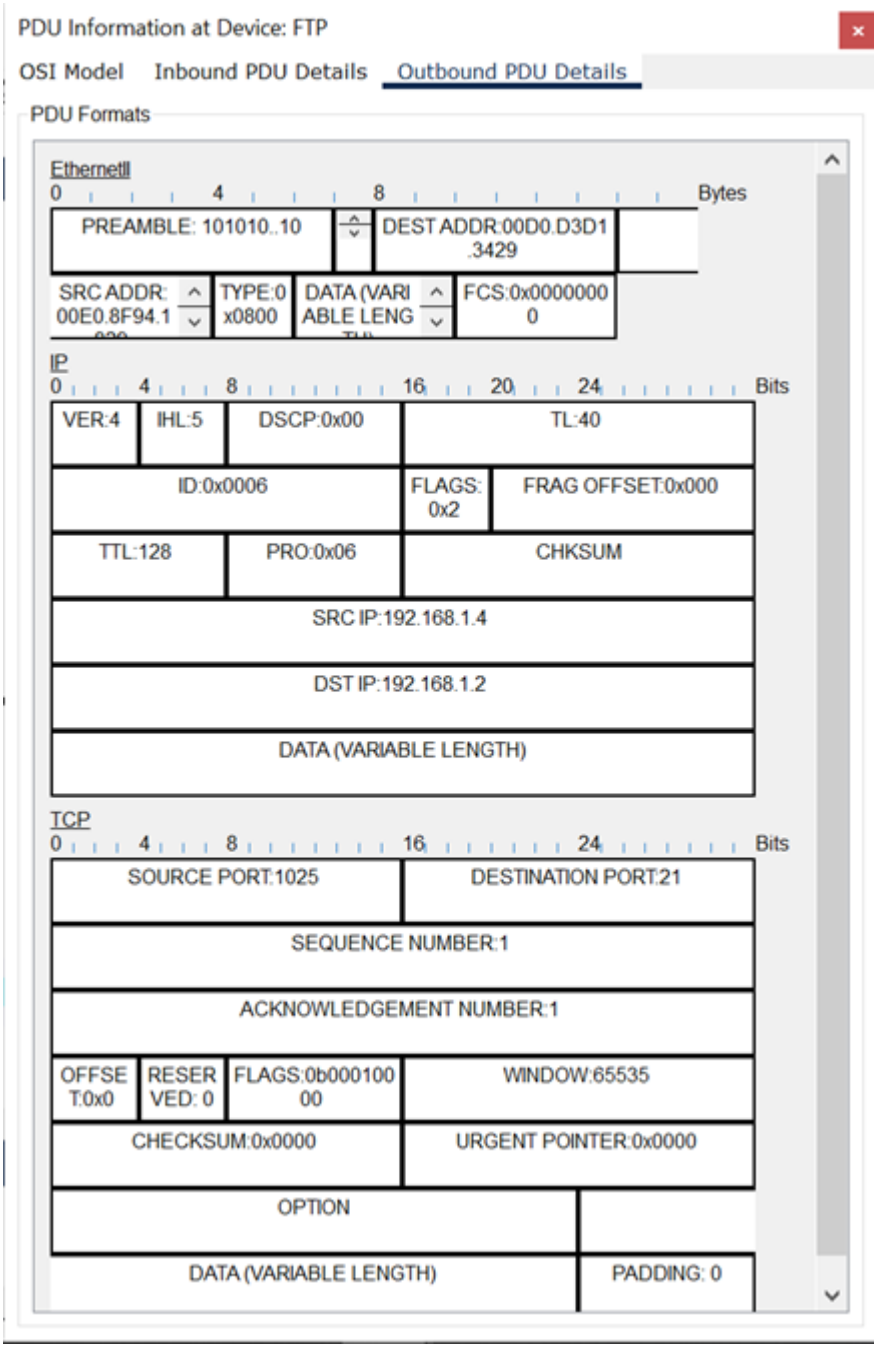


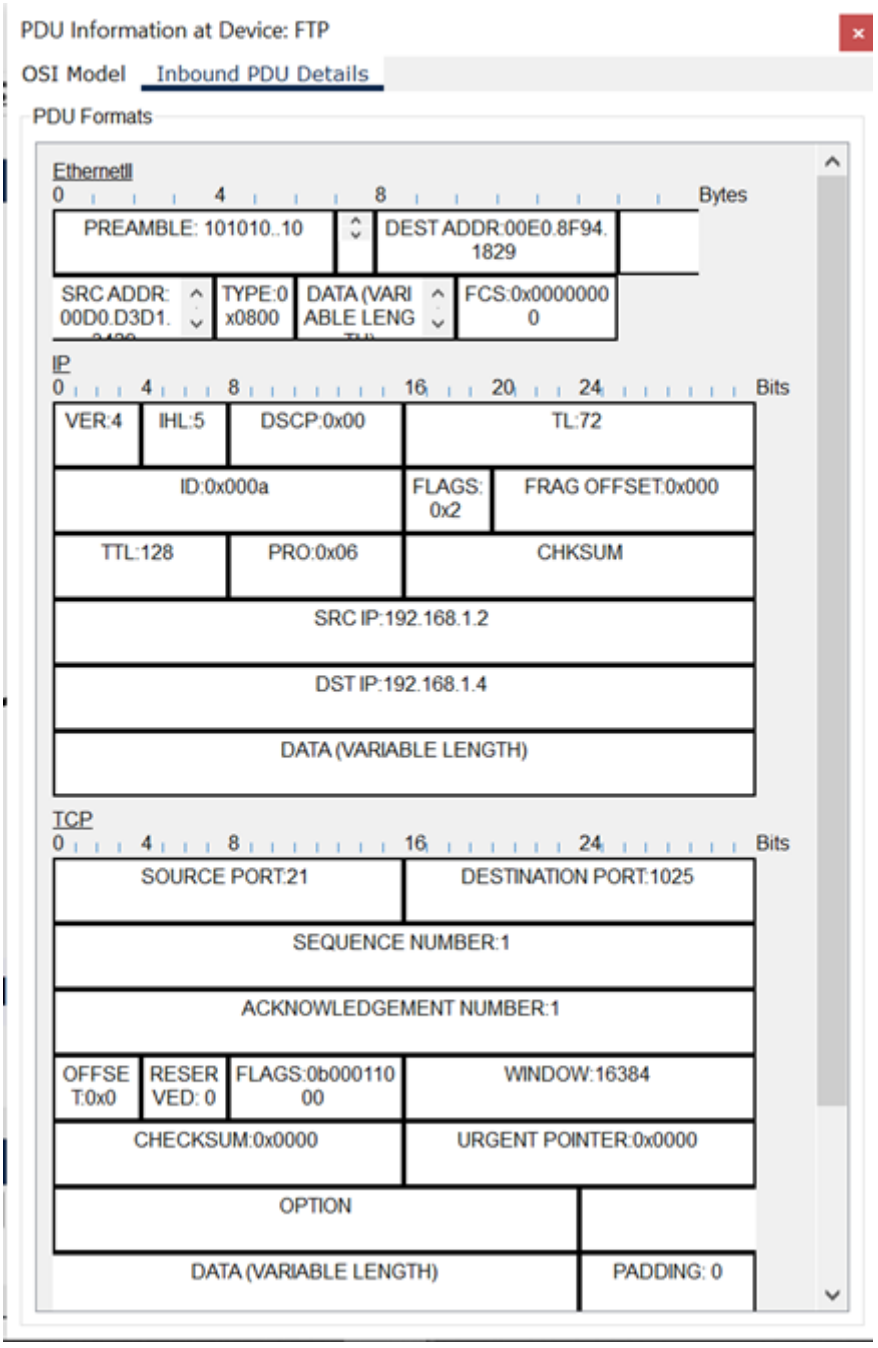
First FTP communication from FTP client and from Server.


PDU Information at Device: FTP
OSI Model
Outbound PDU Details
PDU Formats
Ethernetll
0
4
8
Bytes
PREAMBLE: 101010..10
DEST ADDR:00D0.D3D1.3429
SRC ADDR: 00E0.8F94.1
TYPE:0x0800
DATA (VARIABLE LENG
FCS:0x00000000
IP
0
4
8
16
20
24
Bits
VER:4
IHL:5
DSCP:0x00
TL:44
ID:0x0005
FLAGS: 0x2
FRAG OFFSET:0x000
TTL:128
PRO:0x06
CHKSUM
SRC IP:192.168.1.4
DST IP:192.168.1.2
DATA (VARIABLE LENGTH)
TCP
0
4
8
16
24
Bits
SOURCE PORT:1025
DESTINATION PORT:21
SEQUENCE NUMBER:0
ACKNOWLEDGEMENT NUMBER:0
OFFSET:0x0
RESERVED: 0
FLAGS:0b000000 10
WINDOW:65535
CHECKSUM:0x0000
URGENT POINTER:0x0000
OPTION
DATA (VARIABLE LENGTH)
PADDING: 0

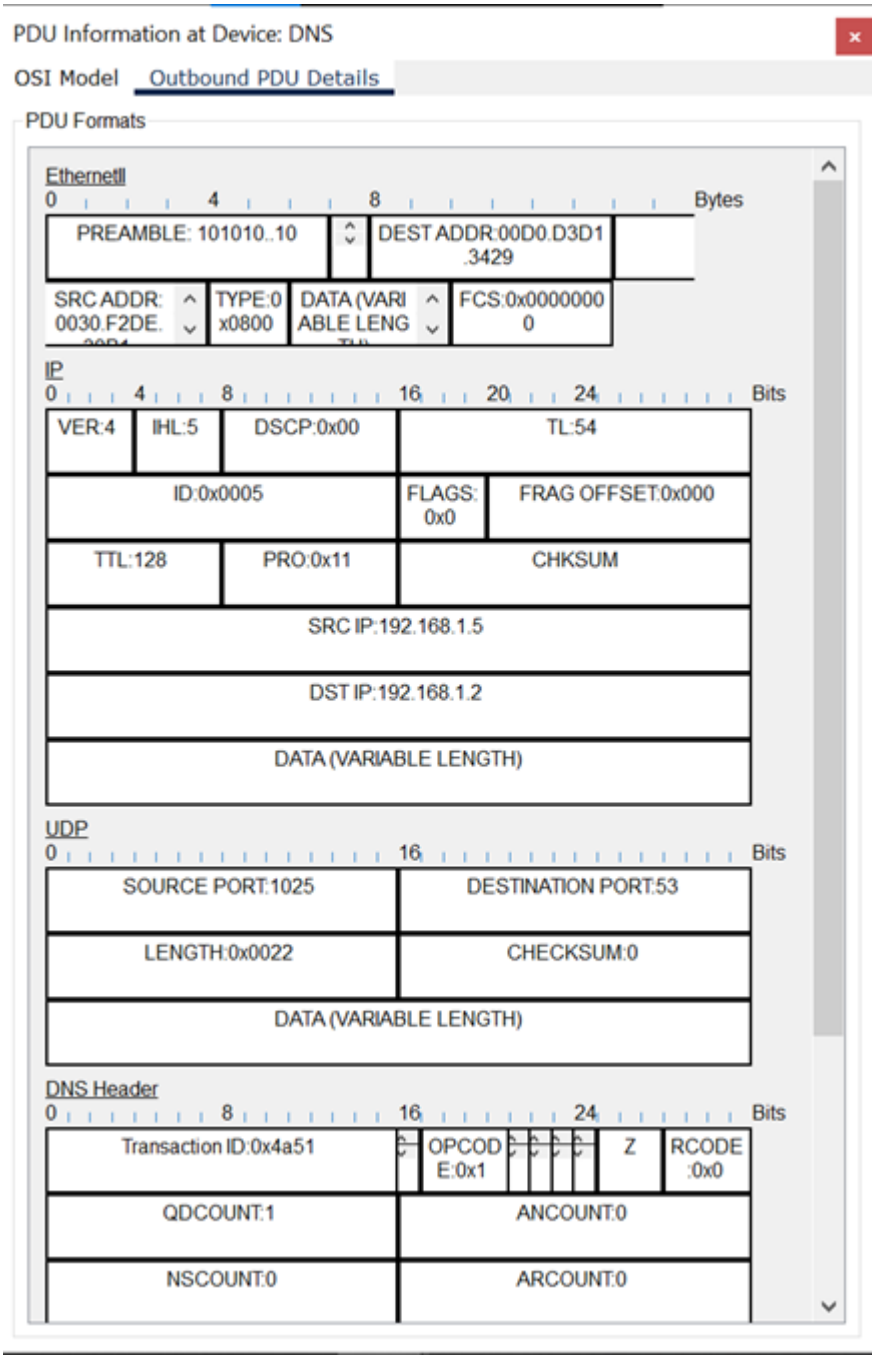


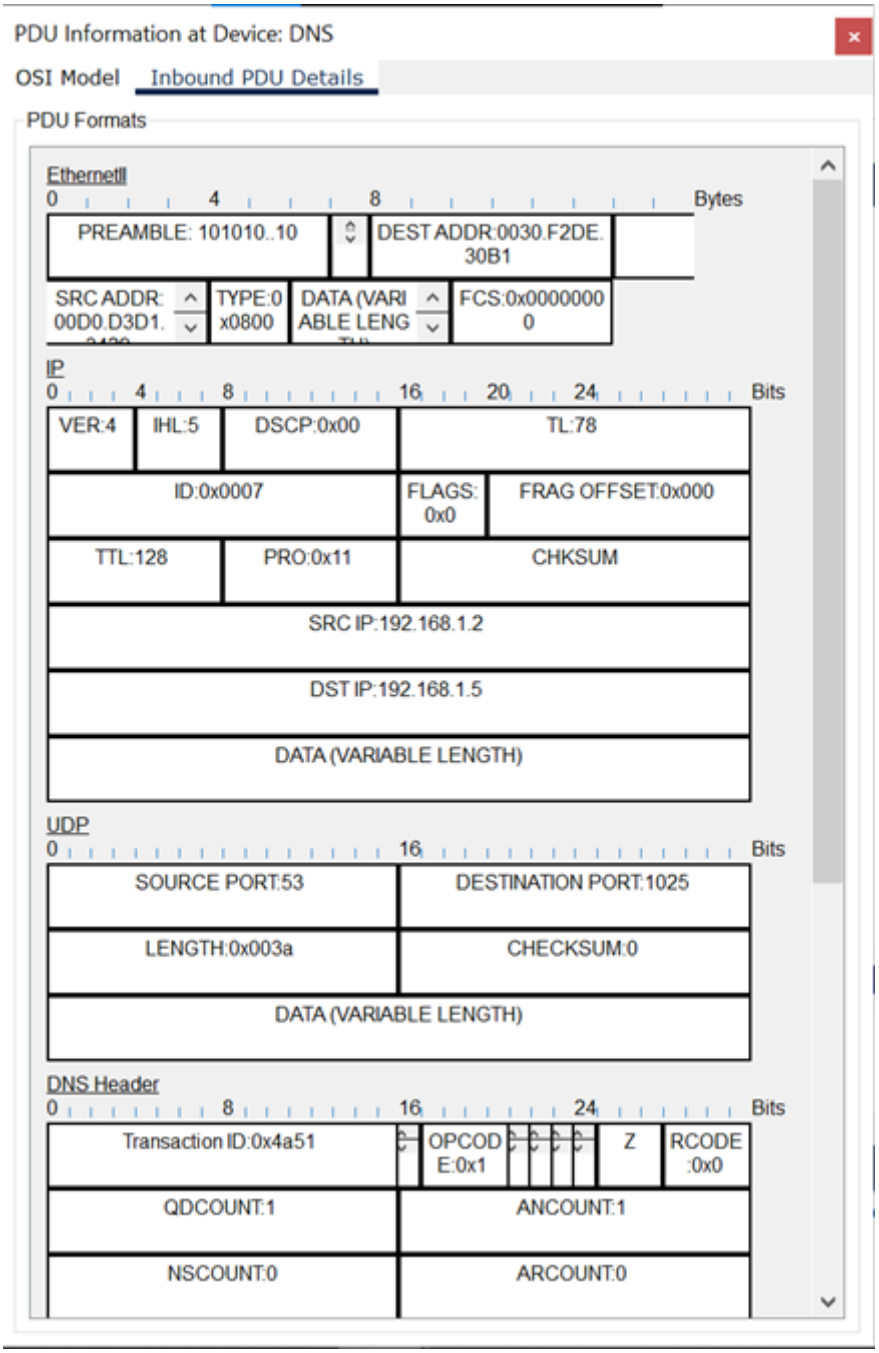
Last FTP communication from FTP client and from Server.


PDU Information at Device: FTP
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
EthernetII
0
4
8
Bytes
PREAMBLE: 101010..10
DEST ADDR:00D0.D3D1.3429
SRC ADDR: 00E0.8F94.1
TYPE:0x0800
DATA (VARIABLE LENG
FCS:0x00000000
IP
0
4
8
16
20
24
Bits
VER:4
IHL:5
DSCP:0x00
TL:40
ID:0x0006
FLAGS: 0x2
FRAG OFFSET:0x000
TTL:128
PRO:0x06
CHKSUM
SRC IP:192.168.1.4
DST IP:192.168.1.2
DATA (VARIABLE LENGTH)
TCP
0
4
8
16
24
Bits
SOURCE PORT:1025
DESTINATION PORT:21
SEQUENCE NUMBER:1
ACKNOWLEDGEMENT NUMBER:1
OFFSET:0x0
RESERVED: 0
FLAGS:0b000100 00
WINDOW:65535
CHECKSUM:0x0000
URGENT POINTER:0x0000
OPTION
DATA (VARIABLE LENGTH)
PADDING: 0

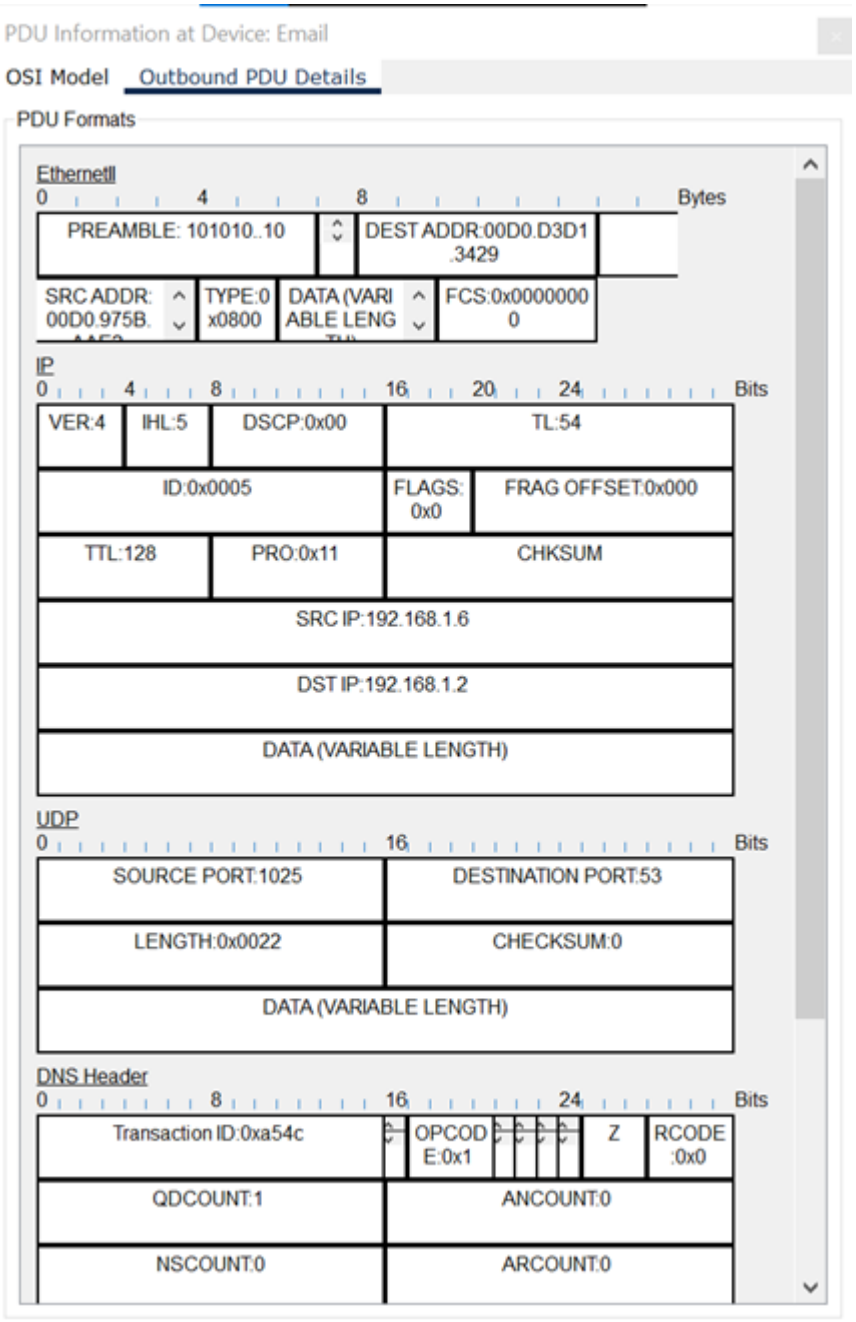


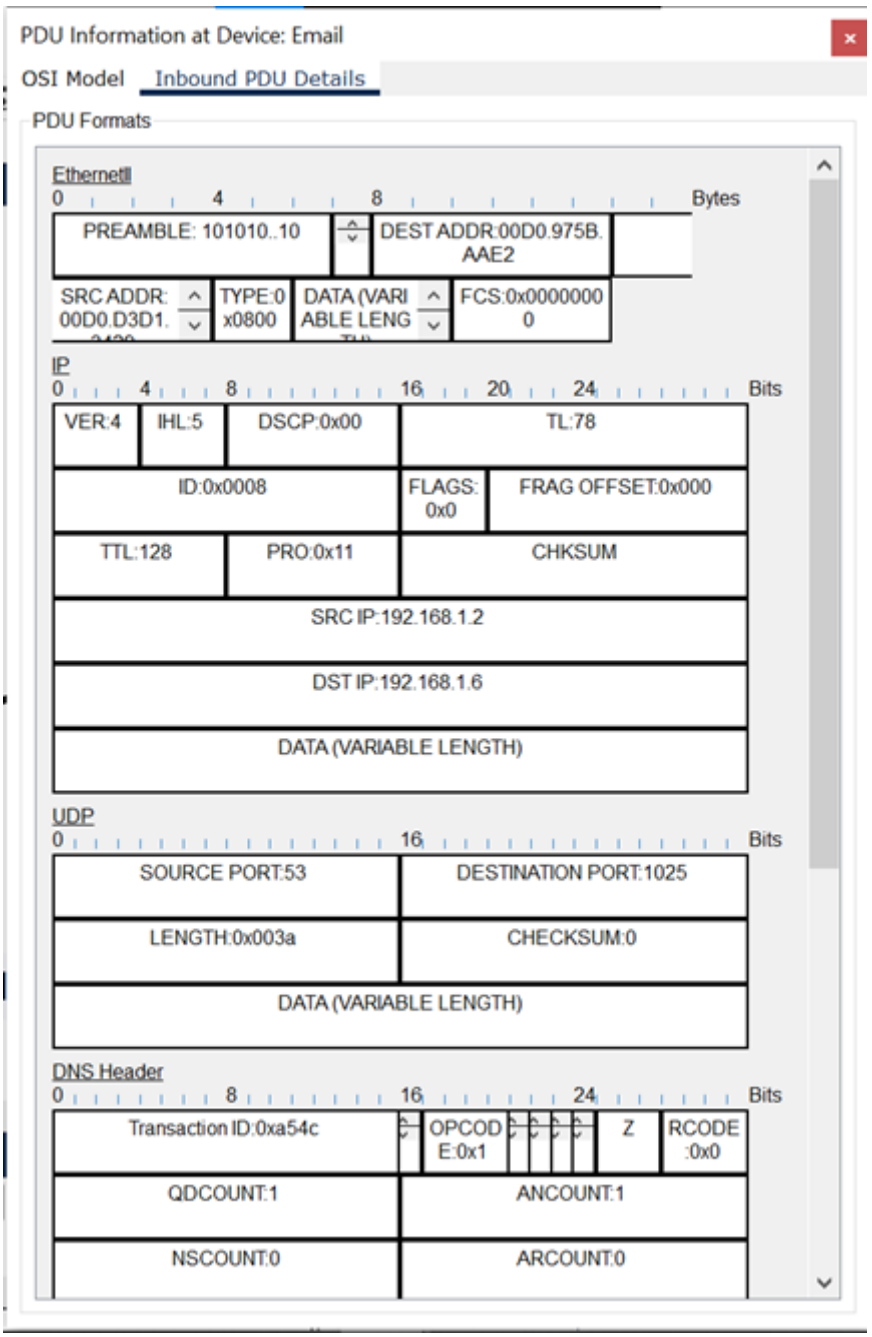
DNS communication from DNS client and Server.


PDU Information at Device: DNS
OSI Model
Outbound PDU Details
PDU Formats
Ethernetll
0
4
8
Bytes
PREAMBLE: 101010..10
DEST ADDR:00D0.D3D1.3429
SRC ADDR: 0030.F2DE.
TYPE:0x0800
DATA (VARIABLE LENG
FCS:0x00000000
IP
0
4
8
16
20
24
Bits
VER:4
IHL:5
DSCP:0x00
TL:54
ID:0x0005
FLAGS: 0x0
FRAG OFFSET:0x000
TTL:128
PRO:0x11
CHKSUM
SRC IP:192.168.1.5
DST IP:192.168.1.2
DATA (VARIABLE LENGTH)
UDP
0
16
Bits
SOURCE PORT:1025
DESTINATION PORT:53
LENGTH:0x0022
CHECKSUM:0
DATA (VARIABLE LENGTH)
DNS Header
0
8
16
24
Bits
Transcription ID:0x4a51
OPCODE:0x1
Z
RCODE:0x0
QDCOUNT:1
ANCOUNT:0
NSCOUNT:0
ARCOUNT:0

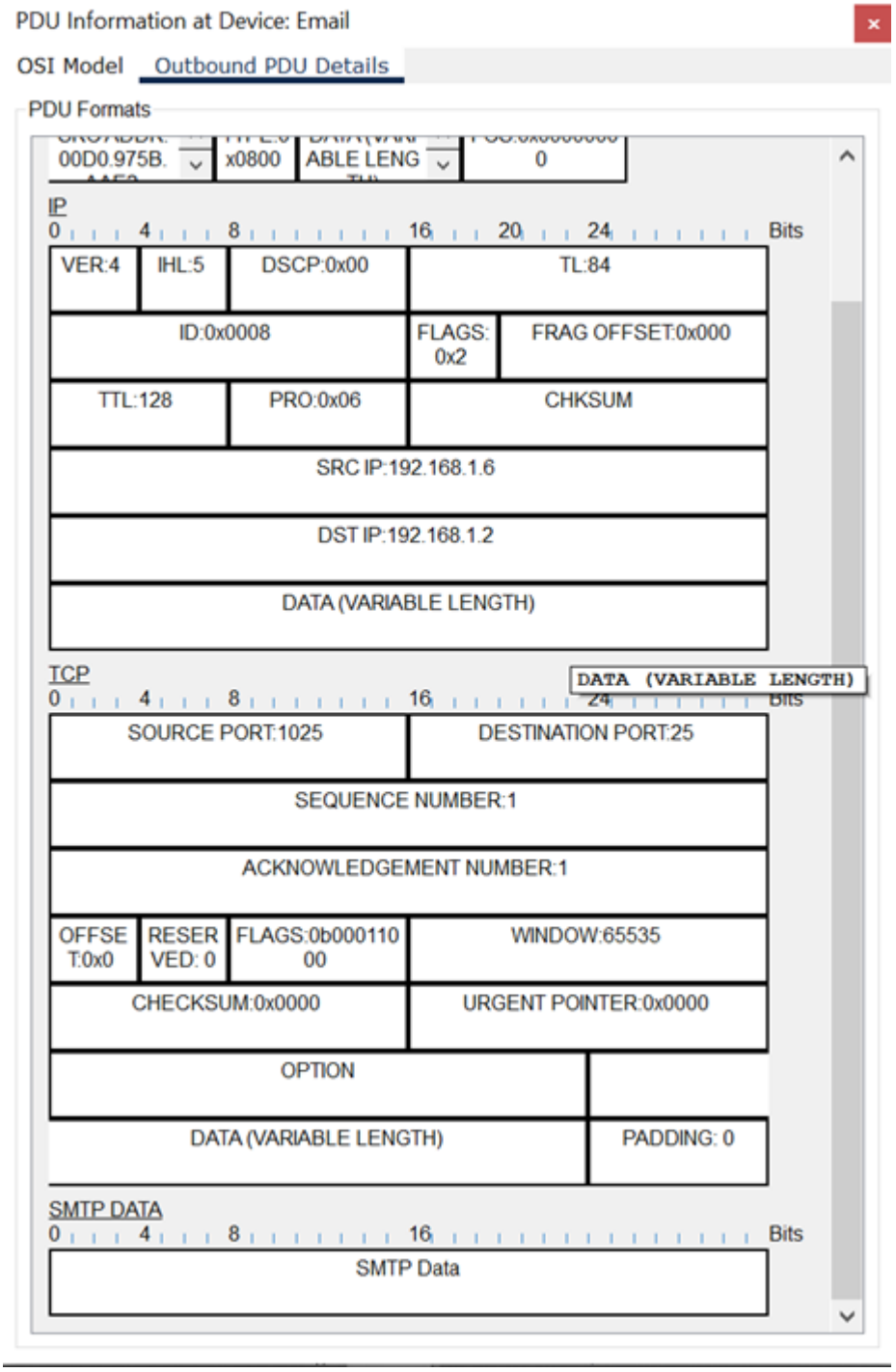


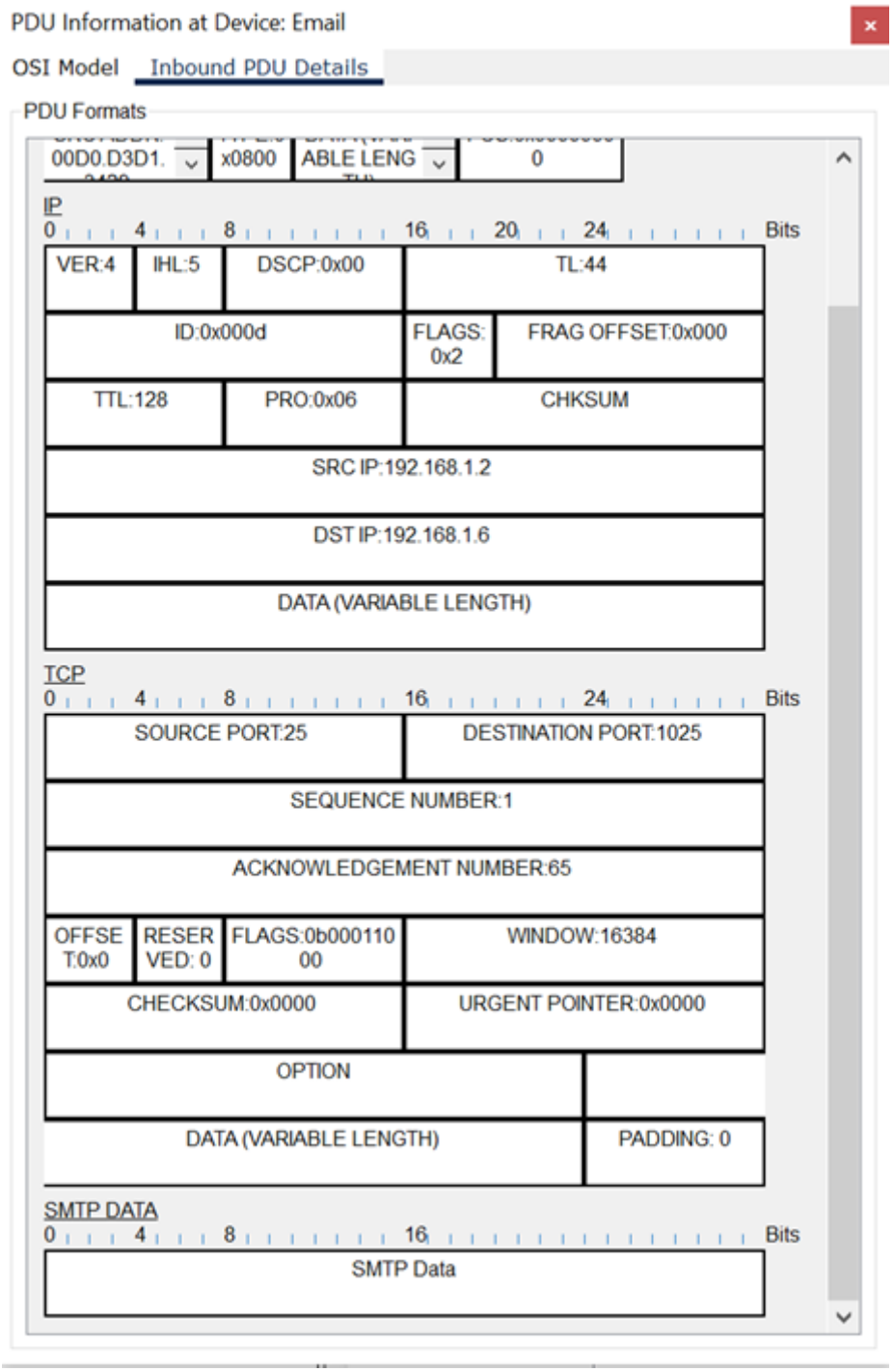
DNS communication from Email client and Server.


PDU Information at Device: Email
OSI Model
Outbound PDU Details
PDU Formats
EthernetII
0
4
8
Bytes
PREAMBLE: 101010..10
DEST ADDR:00D0.D3D1.3429
SRC ADDR: 00D0.975B.
TYPE:0x0800
DATA (VARIABLE LENG
FCS:0x00000000
IP
0
4
8
16
20
24
Bits
VER:4
IHL:5
DSCP:0x00
TL:54
ID:0x0005
FLAGS: 0x0
FRAG OFFSET:0x000
TTL:128
PRO:0x11
CHKSUM
SRC IP:192.168.1.6
DST IP:192.168.1.2
DATA (VARIABLE LENGTH)
UDP
0
16
Bits
SOURCE PORT:1025
DESTINATION PORT:53
LENGTH:0x0022
CHECKSUM:0
DATA (VARIABLE LENGTH)
DNS Header
0
8
16
24
Bits
Transaction ID:0xa54c
OPCODE:0x1
Z
RCODE:0x0
QDCOUNT:1
ANCOUNT:0
NSCOUNT:0
ARCOUNT:0



SMTP communication from Email client and Server.


PDU Information at Device: Email
OSI Model
Outbound PDU Details
PDU Formats
00D0.975B.
x0800
ABLE LENG
0
IP
0 4 8 16 20 24 Bits
VER:4
IHL:5
DSCP:0x00
TL:84
ID:0x0008
FLAGS: 0x2
FRAG OFFSET:0x000
TTL:128
PRO:0x06
CHKSUM
SRC IP:192.168.1.6
DST IP:192.168.1.2
DATA (VARIABLE LENGTH)
TCP
DATA (VARIABLE LENGTH)
0 4 8 16 24 Bits
SOURCE PORT:1025
DESTINATION PORT:25
SEQUENCE NUMBER:1
ACKNOWLEDGEMENT NUMBER:1
OFFSET:0x0
RESERVED: 0
FLAGS:0b000110 00
WINDOW:65535
CHECKSUM:0x0000
URGENT POINTER:0x0000
OPTION
DATA (VARIABLE LENGTH)
PADDING: 0
SMTP DATA
0 4 8 16 Bits
SMTP Data



[CISCO Packet Tracer: TCP and UDP Communication]