CCNA ITN Lab 1 **Homework** **Deadline: 23.11.2020**

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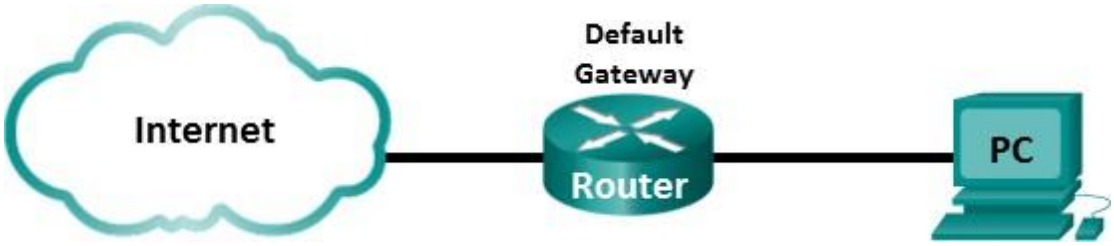
Simple Network and Internet Access Analysis



PrepExam: ITN Module Group Exams
1-3 ITN Module Group
Exams 4-7

Tasks: **Ideas about some delays in networks IP addressing of a host computer Wireshark packet capture**

Examine ICMP Message Types Examine DHCP

Homework / Preparation

Ideas about some delays in networks

Read the NP lecture chapter 1 (1. Grundlagen), and calculate the following delays.

a) Propagation delay

In our DN.Lab we have Cat5e twisted pair cabling (signal transmission speed c = 2/3 c0) with 100BASE-Tx Ethernet technology using a data rate of R = 100 Mbps. Calculate the propagation delay tpdof an Ethernetlink with a length of 55m

Propagation delay = length of link/ signal velocity , length of link = 55m , signal velocity = (2/3* c_0, where c_0= $3*10^8$ m/s =2/3* $3*10^8$=$2*10^8$m/s) so,Propagation delay= 55m/($2*10^8$ m/s)= $278*10^{-9}$=278 ns

Calculate the propagation delay tpdof a similar link, which would run from TH Köln IWZ to Berlin (~ 600km).

Propagation delay= ($600*10^3$)/($2*10^8$)=$3*10^6$=3ms

b) Transmission time

Transmission time is the time for serial (Bit by Bit) transmission of a data frame. Calculate the transmissiontime ttof a 100BASE-Tx NIC transmitting a minimum sized Ethernet frame with a length of 64 Bytes and amaximum sized Ethernet frame with a length of 1518 Bytes.

64 Byte Ethernet frame

Transmission line= packet size/bit rate, packet size =64 byte = 64*8 bits= 512 bits,bit rate =100mbit=100*10^6 bit/s, transmission line=512/(100*10^6)=5.12 ms

1518 Byte Ethernet frame

transmission line=(1518*8)bits/(100*10^6)bits/s=121.44 μs

IP addressing of a hostcomputer

There are different ways to configure IP connectivity in Windows or Linux-based PCs from a shell / terminal window / consolewindow.

Research how to configure IP connectivity in PCs.

a)Windows PC

Which command is used to set an IP address and subnet mask?

#netsh interface ipv4 show config

#netsh interface ipv4 set address name= “YOUR INTERFACE NAME” static IP_ADDRESS SUBNET_MASK GATEWAY

For Example:

#netsh interface ipv4 set address name= “Wi-Fi” static 192.168.3.8 255.255.255.0 192.168.3.1

Which command displays all IP settings?

#ipconfig/all

When you open the network configuration tab in your control panel GUI, which options must be configured or are available when configuring IPv4 of an Interface?

IP Setting automatically/manually.

1.Obtain IP automatically

2.Use the following Ip

IP Address:

Subnet mask:

Default gateway:

b) Linux PC

Which command is used tosetan IP address and subnet mask?

Sudo ipconfig interface netmask subnet

For example.

Sudo ipconfig etho 192.168.3.8 netmask 255.255.255.0

Which command displays all IP settings?

ifconfig

c) Networking tools

Which tool (command) shows, whether a host reachable or not?

Ping

Which tool (command)lists all routers in the path from your host to a destination?

Start > Programs > Accessories > Command Prompt.>tracert, followed by a space, then the domain name

Which tool (command) displays all sockets used on your computer (Windows and Linux)?

Netstat -a -o -n

Which tool (command) displays the mapping a domain name to an IP address?

At the command prompt, type the following comman ,replace *example.com* with the domain name

nslookup example.com

Wireshark packet capture

a) Read the Wireshark manual and answer the following question

If you want to filter PING traffic in your capture, what must done after you captured all packets, sent and received by your host?

After starting capture, create network traffic/ping capturing.Finally filtering ICMP packets to analysis.

b)Review the Ethernet II header field descriptions and lengths.

Background / Scenario

When upper layer protocols communicate with each other, data flows down the Open Systems Interconnection (OSI) layers and is encapsulated into a Layer 2 frame. The frame composition is dependent on the media access type. For example, if the upper layer protocols are TCP and IP and the media access is Ethernet, then the Layer 2 frame encapsulation will be Ethernet II. This is typical for a LAN environment.

Looking at the Ethernet II frame format, answer the question

Preamble	Destination Address	Source Address	Frame Type	Data	FCS
8 Bytes	6 Bytes	6 Bytes	2 Bytes	46 – 1500 Bytes	4 Bytes

The preamble represents no bits and provides no header information!!!

It is only used for physical signal transmission of Ethernet frames over LAN cables. Which function does the Ethernet preamble have?

A **preamble** is a signal used in **network** communications to synchronize transmission timing between two or more systems. "The **role of the preamble** is to define a specific series of transmission criteria that is understood to mean "someone is about to transmit data"

How many Bytes do we have in the Ethernet II header?

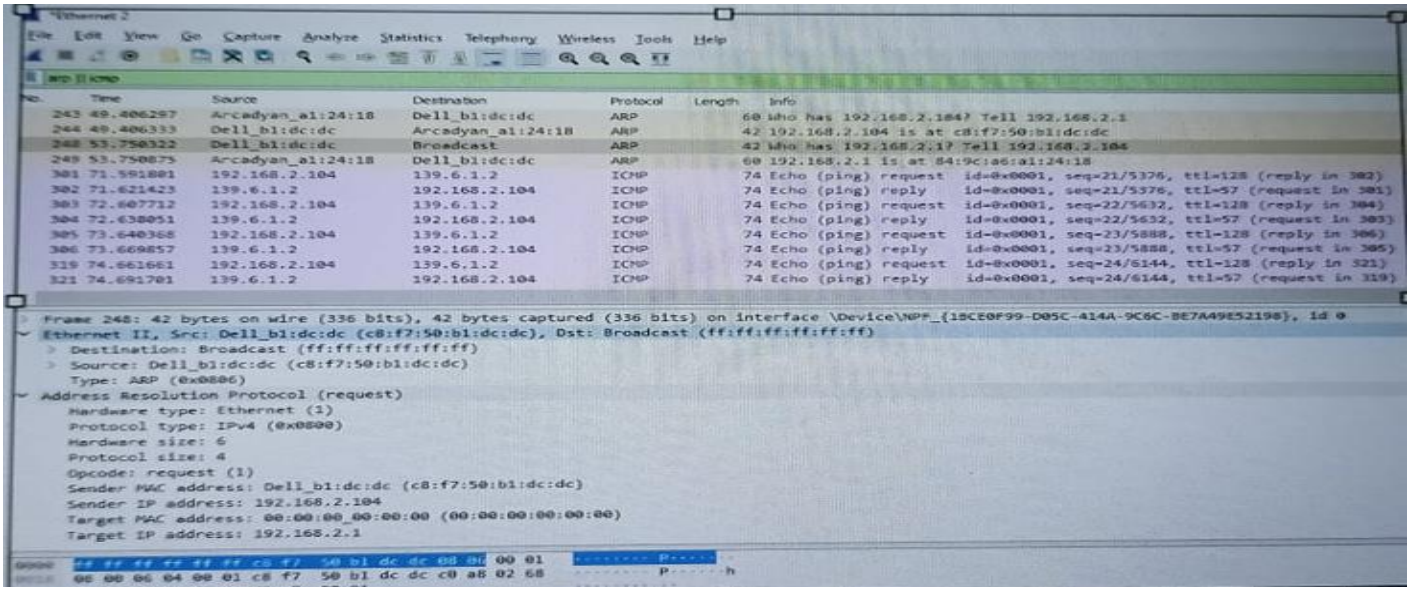
14 bytes

How many Bytes do we have in the Ethernet II trailer?

4 bytes

2. Examine Ethernet frames in a Wireshark capture

The Wireshark capture below shows the packets generated by a ping being issued from a PC host to its default gateway. A filter has been applied to Wireshark to view the ARP and ICMP protocols only. The session begins with an ARP query for the MAC address of the gateway router, followed by four ping requests and replies.



a) Check frame #248. In the shown hex dump at the bottom of the Wireshark window you see all bytes displayed by Wireshark. Is the Ethernet II trailer shown in the Wireshark capture? Explain your answer.

No,The Ethernet II trailer isn't shown in the Wireshark capture. Because ARP sends broadcast request packet . trailer negotiation is performed at the time that ARP is used to discover the link-layer address of a destination system.

b) ARP – Address Resolution Protocol. Check frames #248 and #249.

b.1) Which IP source address is used in the ARP request?

192.168.2.104

b2) Which type (unicast, multicast, broadcast) of MAC address is used as the MAC destination address in the ARP request?

broadcast

b3) The MAC address of which network device is given back by the ARP respons

84 :9c:a6:a1:24:18

c) What is the Vendor ID (OUI) of the Source's NIC?

Dell_b1:dc:dc (c8:f7:50:b1:dc:dc)

What is the Source's NIC serial number?

b1:dc:dc

Examine ICMP Message Types

Check information about the ICMP protocol, e.g. using www.wikipedia.com. Which function is provided by the following ICMP message?

ICMP Type 8: Echo Request code:0 Echo request (used to ping)

ICMP Type 0: Echo Reply code:0 Echo reply (used to **ping**)

ICMP Type 11: Time Exceeded code 0: TTL expired in transit

code 1 : Fragment reassembly time exceeded

ICMP Type 3 code 0: Destination network unreachable

ICMP Type 3 Code 1: Destination host unreachable

ICMP Type 3 Code 3: Destination port unreachable

ICMP Type 3 Code 4: Fragmentation required, and DF flag set

Any idea why the PC sends out a broadcast ARP prior to sending the first ping request?

Before the PC can send a ping request to a host, it needs to determine the destination MAC address before it can build the frame header for that ping request. The ARP broadcast is used to request the MAC address of the host with the IP address contained in the ARP.

Examine DHCP

Check information about the DHCP protocol, e.g. using www.wikipedia.com. Describe briefly the task of DHCP (Dynamic Host Configuration Protocol)

Dynamic Host Configuration Protocol (DHCP) is a network management protocol used to automate the process of configuring devices with IP address, thus allowing them to use network services such as DNS, NTP, and any communication protocol based on UDP or TCP. DHCP is an enhancement of an older protocol called BOOTP.

b. Which eight DHCP messages are available in this protocol?

DHCPDiscover **Message**.,DHCPOffer **Message**.,DHCPRequest **Message,**DHCPAcknowledgment **Message**,DHCPNak **Message**,DHCPDecline **Message**,DHCPRelease **Message**,DHCPInform **Message**.

Which DHCP messages are used to acquire an IP address from DHCP server?

DHCP discover, **DHCP** offer