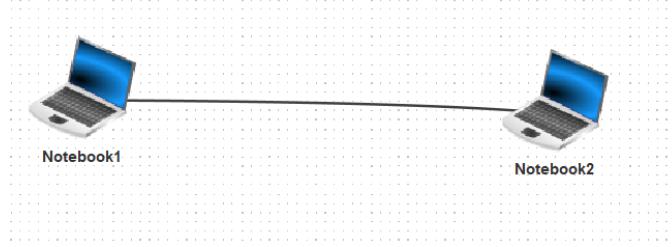


Network Lab 1

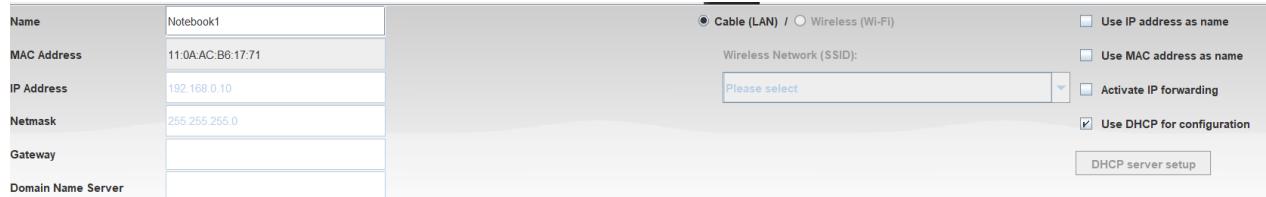
Lab Pre-requisites: Install the filius network simulator (G-drive) or download from <https://www.lernsoftware-filius.de/Herunterladen>

Task 1

1. Using the filius network simulator in design mode , create the following network:



Each of the Notebook computer should be configured as follows:



2. Run the simulator by changing to simulation mode 

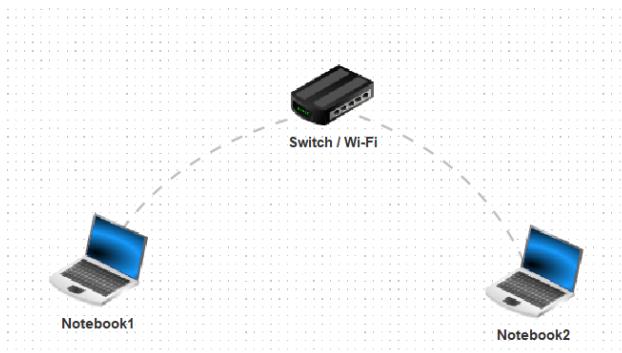
- a. Right click on any of the notebook computers and select **show data exchange**

No	Time	Source	Destination	Protocol	Layer	Comment / Details
1	09:25:41.256	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=29:76:2B:44:8E:1D
2	09:25:43.331	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=11:0A:AC:B6:17:71
3	09:25:46.008	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=29:76:2B:44:8E:1D
4	09:25:46.066	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=11:0A:AC:B6:17:71
5	09:25:46.769	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=29:76:2B:44:8E:1D
6	09:25:48.826	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=11:0A:AC:B6:17:71
7	09:25:51.533	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=29:76:2B:44:8E:1D
8	09:25:51.589	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=11:0A:AC:B6:17:71
9	09:25:54.288	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=29:76:2B:44:8E:1D
10	09:25:54.345	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=11:0A:AC:B6:17:71
11	09:25:57.040	0.0.0.0:68	255.255.255.255:67	DHCP	Application	DHCPDISCOVER yiaddr=0.0.0.0 chaddr=29:76:2B:44:8E:1D

- b. These are the network packets being exchanged (send/receive) by the notebook computer.
- c. Stop the simulation by switching back to design mode.

Task 2:

- 1.** Remove the network cable between the 2 notebook computers and connect them using a wireless access point (WAP). In the filius simulator it is displayed as Switch/Wi-Fi. The network should be configured as follows by making the necessary configuration changes on the two notebook computers:



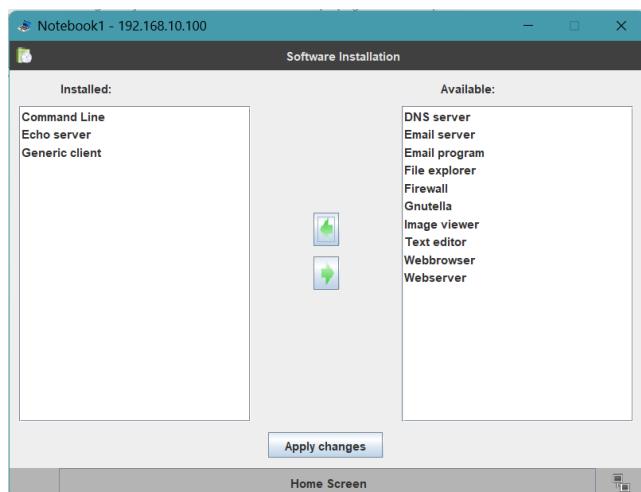
- a.** Run the simulator and then click on the switch/Wi-fi to display the switching or mac-address table:

SAT table Switch / Wi-Fi		
MAC	Port	Last Update
29:76:2B:44:8E:1D	Port 2	09:54:10
11:0A:AC:B6:17:71	Port 1	09:54:04

- b.** Verify that the two mac-addresses belong to the two notebook computers.

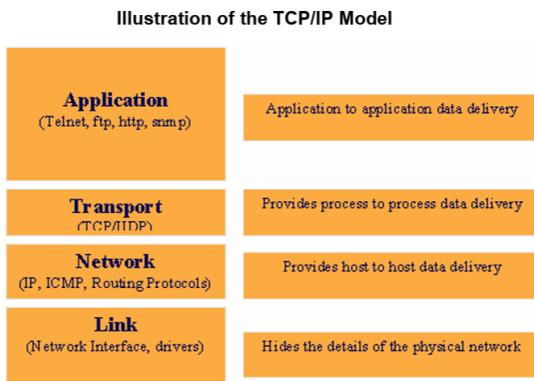
If you don't see the correct mac-address on the table, it means that the notebook computers are not able to connect to the switch/wi-fi.

- c.** Install the following software on both notebook computers.



Task 3:

The TCP/IP stack on your computers consists of the following layers:



Right now, your laptop computers are configured to operate only at the DataLink/Physical layer (Layer 1). The network switch/Wi-Fi only operates at the DataLink layer (i.e. It only processes the data packets by examining the information provided by the DataLink layer. Mac-addresses are information embedded at the DataLink layer. The switch/Wi-Fi uses this information to forward or switch network packets between its network ports by maintaining a switching/mac-addresses table.

Most of the applications running on the computers require the network layer (Layer 2) to be configured.

1. Switch the simulator to design mode and configure the two notebook computers with unique IP addresses as follows (**DO NOT USE DHCP yet**):

a. Notebook 1:

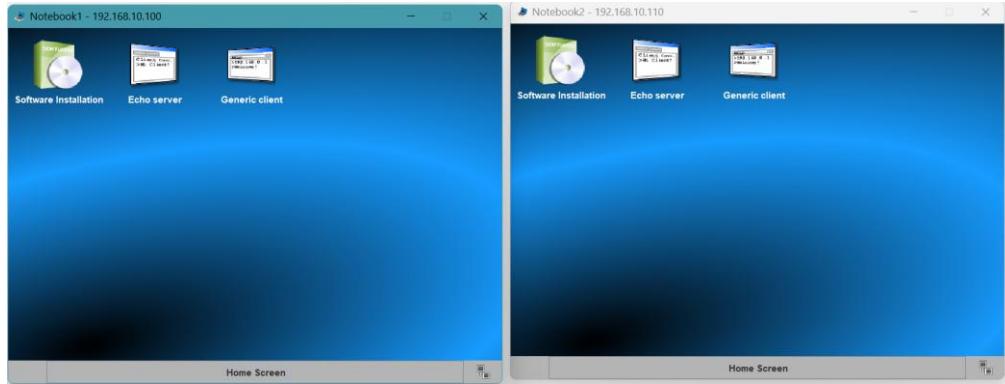
Name: Notebook1
MAC Address: 11:0A:AC:B6:17:71
IP Address: **192.168.10.100**
Netmask: 255.255.255.0
Gateway:
Domain Name Server:
Cable (LAN) / Wireless (Wi-Fi)
Wireless Network (SSID): e3b399
 Use IP address as name
 Use MAC address as name
 Activate IP forwarding
 Use DHCP for configuration

b. Notebook 2:

Name: Notebook2
MAC Address: 29:76:2B:44:8E:1D
IP Address: **192.168.10.110**
Netmask: 255.255.255.0
Gateway:
Domain Name Server:
Cable (LAN) / Wireless (Wi-Fi)
Wireless Network (SSID): e3b399
 Use IP address as name
 Use MAC address as name
 Activate IP forwarding
 Use DHCP for configuration

Task 4:

1. Run the simulator and open the two notebook computers side by side as follows:



2. Run and **start** the echo server on Notebook1 and run the Generic client on Notebook2
3. Send a message from Notebook2 to Notebook1. The echo server should be able to receive the message. If you are unable to receive the message on Notebook1, check your configuration again.
4. You have just set up a client/server application on your local area network.
5. You can also use the command line tool to ping the other notebook computer's IP address and get an acknowledgement.

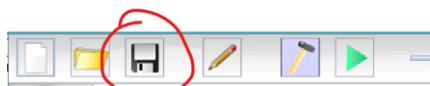
```
S&S~SP S&S S&S      S&S S&S      S&S  `S&S
S&S      S&S S&S      S&S S&S      S&S  'S&S
S*b      S*S S*b      S*S S*b      d*S   1*S
S*S      S*S S*S.    S*S S*S.    .S*S   .S*P
S*S      S*S SSSbs   S*S SSSbs_sdSS sSS*s
S*S      S*S YSSP   S*S YSSP-YSSY   YSS'
SP       SP          SP
Y        Y           Y

=====
Use command 'help' to show list of available commands
or 'help <command>' for further information on the command.
=====

/> ping 192.168.10.110
PING 192.168.10.110 (192.168.10.110)
From 192.168.10.110: icmp_seq=1 ttl=64 time=251ms
From 192.168.10.110: icmp_seq=2 ttl=64 time=250ms
From 192.168.10.110: icmp_seq=3 ttl=64 time=250ms
From 192.168.10.110: icmp_seq=4 ttl=64 time=253ms
--- 192.168.10.110 packet statistics ---
4 packet(s) transmitted, 4 packet(s) received, 0% packet loss
/> |
```

The screenshot shows a terminal window titled "Notebook1 - 192.168.10.100". It displays a series of ASCII art characters representing a ping command being sent to an IP address. Below this, a standard ping command is shown, indicating four packets were transmitted to 192.168.10.110 with no packet loss.

6. Save your Lab file as filius_lab1.flx



Task 5 (Optional):

The Gnutella software uses peer-to-peer application architecture. Install the Gnutella software on the laptop computers and share files with each other. You may add another computer into the network to explore how the file sharing scale using the peer-to-peer architecture.

Task 6 (Optional)

You can attempt to set up a physical LAN using the actual Switch/WIFI.

You need to have a physical RJ-45 port on your laptop to configure the switch.

