



Networking

U3L5 Lab:
Assigning IP
Addresses



Assigning IP Addresses

Guiding Question: How do network administrators assign and manage IP addresses to ensure reliable communication between devices on a network?

Students will:

- Compare static and dynamic methods of assigning IP addresses.
- Convert a static network to one using DHCP.
- Understand how to set the parameters for a DHCP server.



Assigning IP Addresses Materials

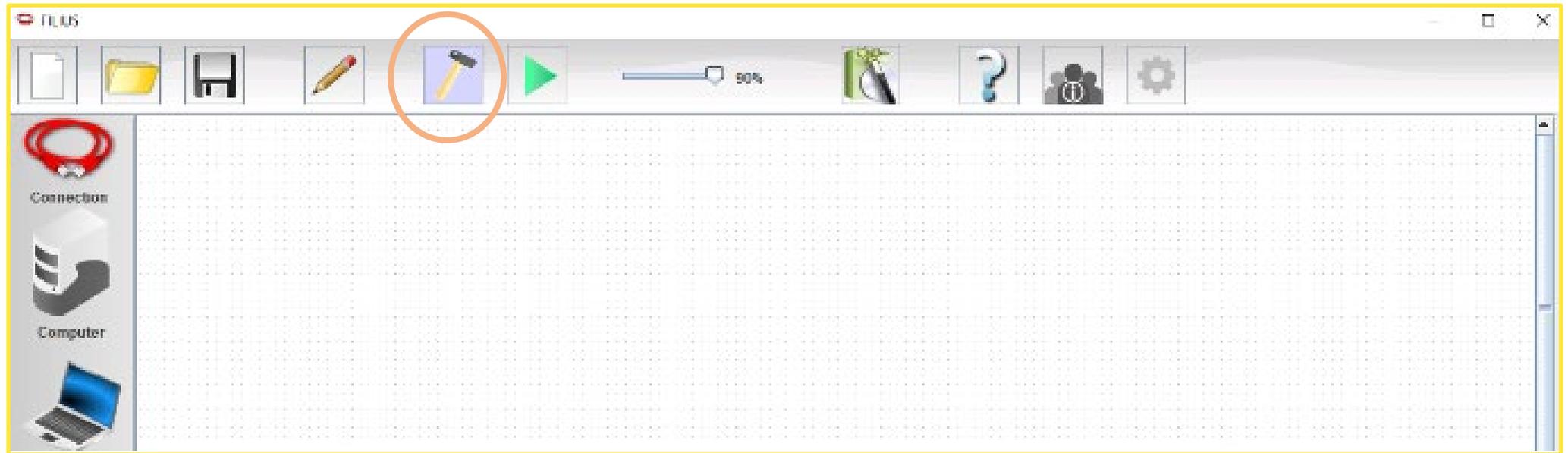
- Materials Needed
 - Windows Server 2022 Machine
- Software Tools Used
 - Filius Network Simulator
- Filius File
 - *LANwithServer.flc*

Required knowledge: how to configure addressing on devices and confirm connectivity in Filius. Refer to *U1L3 Lab Filius Simple Network Creation* if needed.



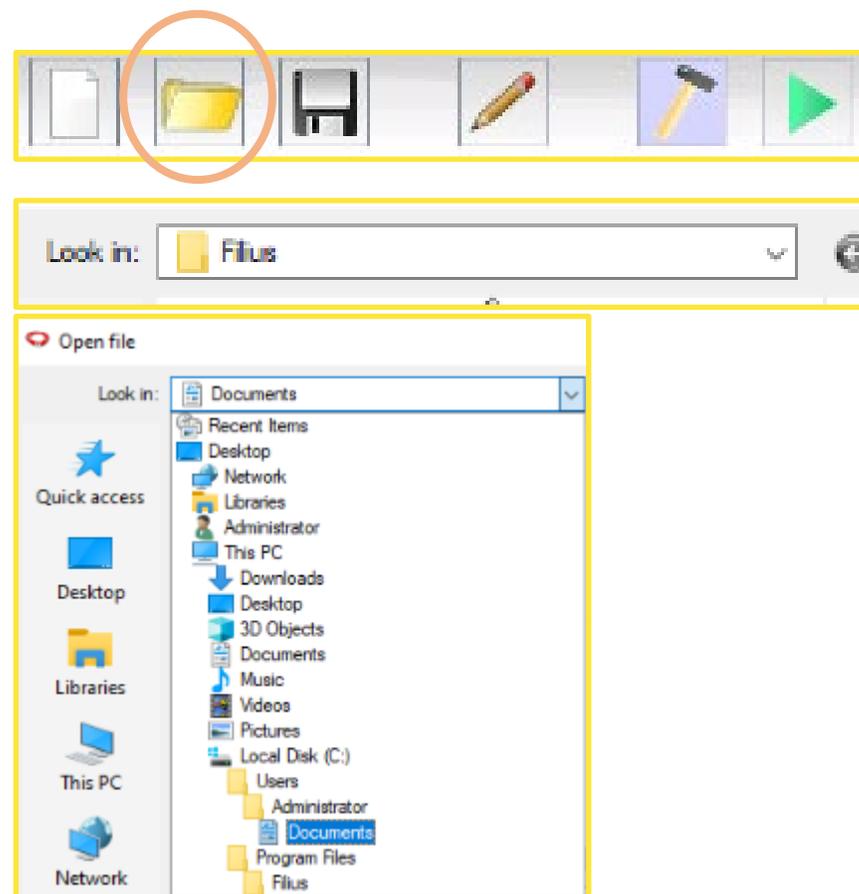
Opening Filius

- Connect to the WinServer 2022 machine and open Filius.
 - Click the Search bar, type "Filius," and select Filius
- Click the “**Design Mode**” button in the top toolbar (The hammer icon)



Opening Files in Filius

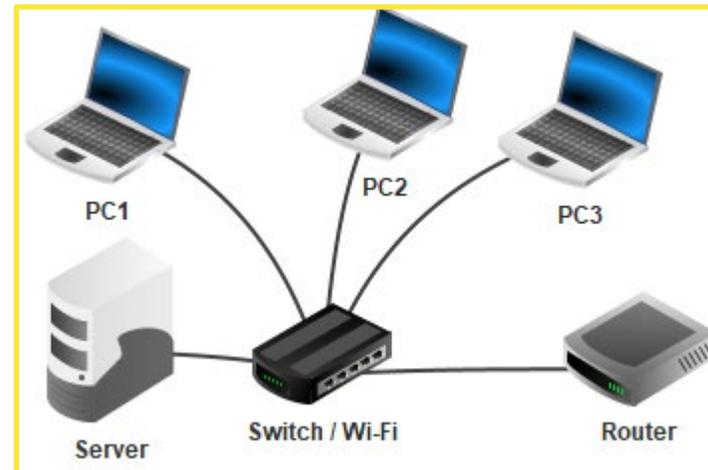
- Click the folder icon
- Click on the dropdown arrow next to *Look In*
- Navigate to *C:\Users\Administrator\Documents\Networking Files*
- **Select** *LANwithServer.flx*



Explore and Test Connectivity

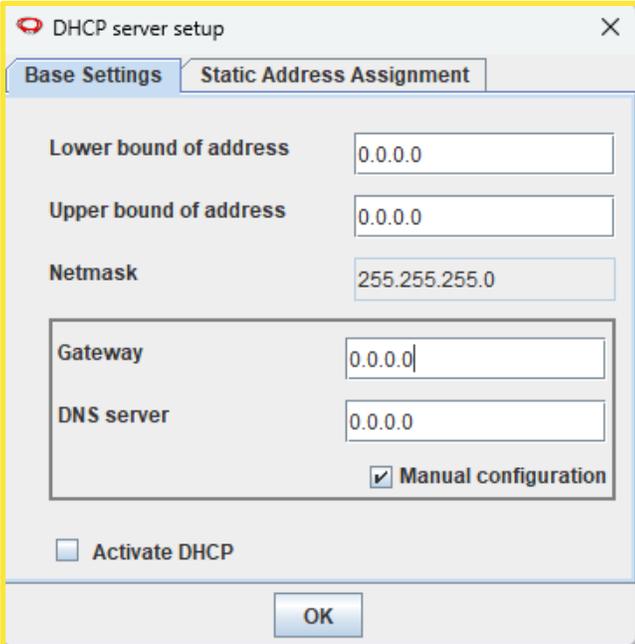
The network is currently configured with static IP addressing which means the IT administrator has manually entered IP address info on each device. The IT admin must keep track of which device has which IP address AND make sure there is no duplication.

- Click on each laptop to observe the IP address configuration.
- Click “**Simulation Mode**” in the top toolbar. [Green arrow]
- Click on PC1, confirm connectivity by using command line to ping:
 - PC2
 - PC3
 - the Server



Convert to Dynamic Addressing

- Click the “**Design Mode**” button in the top toolbar.
- Click on the Server, then click on **DHCP server setup** in the bottom right.
- The *Base Settings* tab is where we can set the parameters for distributing addresses to client devices.
- The Server and the Router will keep their static IP addresses.
- Think:
 - what is the lowest number address we can give to the laptop devices?
 - what is the highest number address we can give?
 - what should the Gateway address be?



The screenshot shows a window titled "DHCP server setup" with two tabs: "Base Settings" (selected) and "Static Address Assignment". The "Base Settings" tab contains the following fields and options:

- Lower bound of address: 0.0.0.0
- Upper bound of address: 0.0.0.0
- Netmask: 255.255.255.0
- Gateway: 0.0.0.0
- DNS server: 0.0.0.0
- Manual configuration
- Activate DHCP
- OK button

Convert to Dynamic Addressing

- Fill in the “Lower bound of address” with **192.168.0.15**
 - The router has 192.168.0.1 and the server has 192.168.0.2 so those are taken but we will leave a few others available in the lower range in case we add servers, printers or other devices which should have a static IP address.
- Fill in the “Upper bound of address” with **192.168.0.254**
 - This is the highest number we can assign for the 192.168.0 network ID
- Fill in the “Gateway” with **192.168.0.1**
 - The router is our exit (aka gateway) to other networks or the Internet.
- Leave the “DNS” section with **0.0.0.0**
- Click to check “Activate DHCP” and Click OK



Convert to Dynamic Addressing

Now it's time to set the client devices (the laptops) to use DHCP.
For each PC:

1. Click to open the device configuration.
2. On the right-hand side, click "Use DHCP for configuration".
3. Also click "Use IP address as name".

IMPORTANT: the IP addresses won't change yet, it will just make them grey. That's because the DHCP server doesn't run until you use Simulation Mode.

- Click the Green Arrow (Simulation) and notice the immediate change in the laptop IP addresses.



Testing the LANs

- Click on PC1, confirm connectivity by using command line to ping:
 - PC2
 - PC3
 - the Server
 - the Router
- Bonus Question: if the cable on PC3 was cut and it couldn't communicate with the server, what should its IP address be the next time it is turned on?

