

Building a Peer-to-Peer Network

Estimated time: 60 min.

Objectives:

- Create a simple LAN with two PCs using a single crossover cable to connect the workstations
- Create a simple LAN with two PCs using an Ethernet hub and two straight-through cables to connect the workstations
- Map a logical Drive and use Universal Naming Conventions (UNC) to share available resources
- Use the Control Panel / Network utility to verify and configure the network settings
- Use the ICMP Ping command to verify the TCP/IP connection between the two workstations
- Use the WINIPCFG.EXE (Windows 95 or 98) or IPCONFIG.EXE (Windows NT or 2000) utility to verify all IP configuration settings

Background:

In this lab you learn how to connect two PCs to create a simple Peer-to-Peer LAN or workgroup. The instructions for this lab focus on the Windows 2000 operating system. You will share a folder on one workstation and connect to that folder from the other workstation. This lab is divided into two exercises as follows:

Exercise A -- The two PCs (or workstations) will be connected directly to each other from one Network Interface card (NIC) to the other NIC using a crossover cable. This can be useful to allow you to create a minilab for testing purposes without the need for a hub. Since the NICs on the workstations are directly connected you will not be able to connect any additional workstations.

Exercise B -- The two PCs will be connected with a hub between them. Using a hub allows for more than just two workstations to be connected depending on the number of ports on the hub.

Tools / Preparation:

It is best to start with a fresh install of the Windows operating system. The workstations should have Network Interface Cards (NIC) installed with the proper drivers (floppy disk or CD) available. The following resources will be required:

- Two Pentium-based workstations with a NIC in each (NIC drivers should be available)
- Exercise A - One CAT 5 Crossover cable to connect the workstations without a hub
- Exercise B - An Ethernet hub (12 or 24 port) and two CAT 5 straightthrough cables
- Windows operating system CD-ROM to do fresh install or to use when network setting changes are made

In this lab you will set up a small peer-to-peer Ethernet LAN workgroup using two workstations. Answer the following questions with each step as you check and/or configure the necessary components.

NOTE:

Steps 1 and 2 (physical LAN connections) will be different between exercises A and B. The steps from 3 on should be the same since they relate only to the workstations and should be performed on both workstations.

Step 1 - Check Local Area Network (LAN) Connections

Task: Verify the cables

Explanation: You should check the cables to verify that you have good Layer 1 physical connections

Exercise A - A single CAT 5 crossover cable is used to connect the workstations together. Verify that the pins are wired as a crossover by holding both RJ-45 connectors side by side with the clip down and inspect them. Pairs 2 and 3 should be reversed.

Exercise B - Check each of the two CAT 5 cables from each workstation to the hub. Verify that the pins are wired straight-through by holding the two RJ-45 connectors for each cable side by side with the clip down and inspect them. All pins should have the same color wire on the same pin at both ends of the cable (pin 1 should match pin 1 and pin 8 should match pin 8, and so on).

1. Are the cable(s) wired correctly? _____

Step 2 - Plug in and connect the equipment

Task: Check the workstations (and hub for exercise B)

Explanation:

Exercises A and B - Check to make sure that the NICs are installed correctly in each workstation. Plug in the workstations and turn them on.

Exercise B - Plug the Hub or its AC adapter into a power outlet. Plug the straight through cable from workstation 1 into port 1 of the hub and the cable from workstation 2 into port 2 . After the workstations have booted, check the green link light on the back of each NIC and the green lights on ports 1 and 2 of the hub to verify that they are communicating. This also verifies a good physical connection between the hub and the NICs in the workstations (OSI Layers 1 and 2). If the link light is not on it usually indicates a bad cable connection, an incorrectly wired cable or the NIC or hub may not be functioning correctly.

1. Are the NIC and hub link lights on? _____

Step 3 - Network Adapters and Protocols.

Task: Check the Network Adapter (Lowest # NIC): Right -click on my computer icon, select the hardware tab, click on the device manager button, then click on network adapters. Right click the NIC adapter in use. Click Properties to see if the device is working properly.

Explanation: If there is a problem with the NIC or driver, the icon will show a yellow circle with an exclamation mark in it with (possible resource conflict) or a red X indicating a serious problem (device could cause Windows to lock up).

1. What does the NIC properties window say about the Network Adapter?

Step 4 - Change the NetBIOS Name:

Right-click my computer icon and choose properties. Select the network identification tab. Click the properties button. In the computer name textbox, change the name to Station# (where # could be anything from 1-24 depending on the location of the PC). Leave the default workgroup name as WORKGROUP.

Step 5 - Check the TCP/IP Protocol Settings:

Task: Use the Control Panel, Network and dialup connections utility and select the TCP/IP protocol from the Configuration Tab and click on properties. Check the IP Address and Subnet mask for both workstations on the IP Address Tab.

Explanation: The IP addresses can be set to anything as long as they are compatible and on the same network. Record the existing settings before making any changes in case they need to be set back (for instance, they may be DHCP clients now). For this lab, use the Class C network address of 200.150.100.0 and set workstation 1 to a static IP address 200.150.100.1 and set workstation 2 to 200.150.100.2. Set the default subnet mask on each workstation to 255.255.255.0.

1. Have the IP addresses and Subnet mask been set? _____

Step 6 - Check the TCP/IP Settings with the IPconfig /all Utility

Task: Use the WINIPCFG.EXE (Windows 95 or 98) or IPCONFIG.EXE (Windows NT or 2000) command to see your TCP/IP settings on one screen. Click on Start, Programs and then select the MS-DOS Prompt.

Explanation: Enter the ipconfig /all command to see all TCP/IP related settings for your workstation.

1. Fill in the blanks below using the results of the IPCONFIG command from each workstation:

	Station 1	Station 2
IP Address		
NetBIOS Name		
Subnet Mask		
Default Gateway		
Mac Address		

Step 7 - Check the network connection with the Ping Utility

Task: Use the Ping Command to check for basic TCP/IP connectivity. Click on Start, Programs and then the MS-DOS Prompt. Enter the Ping command followed by the IP address of the other workstation (Example - **ping 200.150.100.1**).

Explanation: This will verify that you have a good OSI Layers 1 thru 3 connection.

4. What was the result of the Ping command? _____

Step 8 - Windows Networking Options

Task: Check Network Configuration: Use the Control Panel, Network and dialup connections, Configuration Tab and check to be sure that you have the following networking Components installed:

1. Client for Microsoft Networks.
2. The NIC adapter (small NIC icon).
3. The TCP/IP Protocol (small network cable connection icon).
4. File and Printer Sharing for Microsoft Networks

There may be other adapters and protocols listed but these are the ones required for this lab.

Step 9 - Creating and Sharing File Folders

Task: Set up a file folder to share: On your workstation

- ✓ Right-click on my computer icon and choose explore for the short-cut menu.
- ✓ Select local disk (C:)
- ✓ From the file menu select new then folder. When the new folder is created, name it using your first initial and your last name.
- ✓ Right-click on the folder and select share
- ✓ Select the share this folder option button
- ✓ Click on the Permissions button and change Everyone's permission to read only.
- ✓ Open notepad and create a new file. Name the file using your NetBIOS name_Test. Save the file in the shared folder.

Step 10 - Finding Other Computers and Sharing Resources on a Peer-To-Peer Network

- Sharing Resources by using Universal Naming Convention (UNC):
 - ✓ From Start select Run
 - ✓ In the provided textbox type the path to the shared resources that you want to access on your neighbor's machine, using the following format :
 \\NetBIOS name\folder name\file name
- Sharing resources through mapping logical network drives:
 - ✓ Right-click my computer icon, then select map a network drive
 - ✓ Select P as the drive letter, then click on the browse button
 - ✓ Double-click on the VMWARE workgroup to collapse it
 - ✓ Select your neighbor's station then select the shared folder. Click OK, then Finish
 - ✓ Double-click on my computer icon to make sure that the logical drive has been created
 - ✓ If the need for connection to your neighbor's PC ceases to exist, then you could disconnect the logical drive by right-clicking on the logical drive icon from my computer window, then selecting disconnect.
- Searching for computers on the network:
 - ✓ Right-click on my network places, then select search for computers
 - ✓ In the computer's name text box type the name of your neighbor's computer that you are trying to find
- Viewing all the machines in your workgroup:
 - ✓ To view all the PCs in your workgroup double-click on my network places, then select entire network.
 - ✓ Double-click on entire network. Double click on Microsoft Windows Network, then click on VMWARE workgroup button.

Step 11 Managing Resources on a Peer-To-Peer Network

Using Notepad create a file and save it to the logical drive that you have created. Name the file test2. Were you able to save the file? _____. Why not? _____