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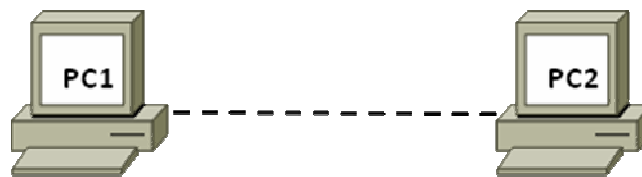Mind Wide Open™

Lab 3.5.2 IP Addresses and Network Communication

Objectives

- Build a simple peer-to-peer network and verify physical connectivity.
- Assign various IP addresses to hosts and observe the effects on network communication

Background / Preparation

In this lab, you will build a simple peer-to-peer network using two PCs and an Ethernet crossover cable. You will assign various compatible and non-compatible IP addresses to the hosts and determine the effects on their ability to communicate.

The following resources are required:

NOTE: You may use the small peer-to-peer network that was built in Lab 3.1.5

- Two Windows XP Professional PCs, each with an installed and functional Network Interface Card (NIC)
- An Ethernet cross-over cable to connect the PCs (provided by instructor)
- (Optional lab setup) A hub or switch and two straight-through cables to connect the PCs (provided by instructor)

Step 1: Connect the PCs to create a peer-to-peer network

a. Obtain an Ethernet crossover cable provided by the instructor to connect the two PCs.

   NOTE: (optional lab setup) The PCs may be connected to a hub (or switch) using two straight-through cables. The following instructions assume you are using a crossover cable.

b. Plug one end of the cable into the Ethernet NIC of PC1. Plug the other end of the cable into the Ethernet NIC of PC2. As you insert the cable, you should hear a click which indicates that the cable connector is properly inserted into the port.

Step 2: Verify physical connectivity

a. After the Ethernet crossover cable is connected to both PCs, take a close look at each Ethernet port. A link light (usually green or amber) indicates that physical connectivity has been established between the two NICs. Try unplugging the cable from one PC then reconnecting it to verify that the light goes off then back on.

b. Go to the **Control Panel**, double click the **Network Connections** icon, and confirm that the local area connection is established. The following figure shows an active local area connection. If physical connectivity problems exist, you will see a red **X** over the Local Area Connection icon with the words **Network cable unplugged**.
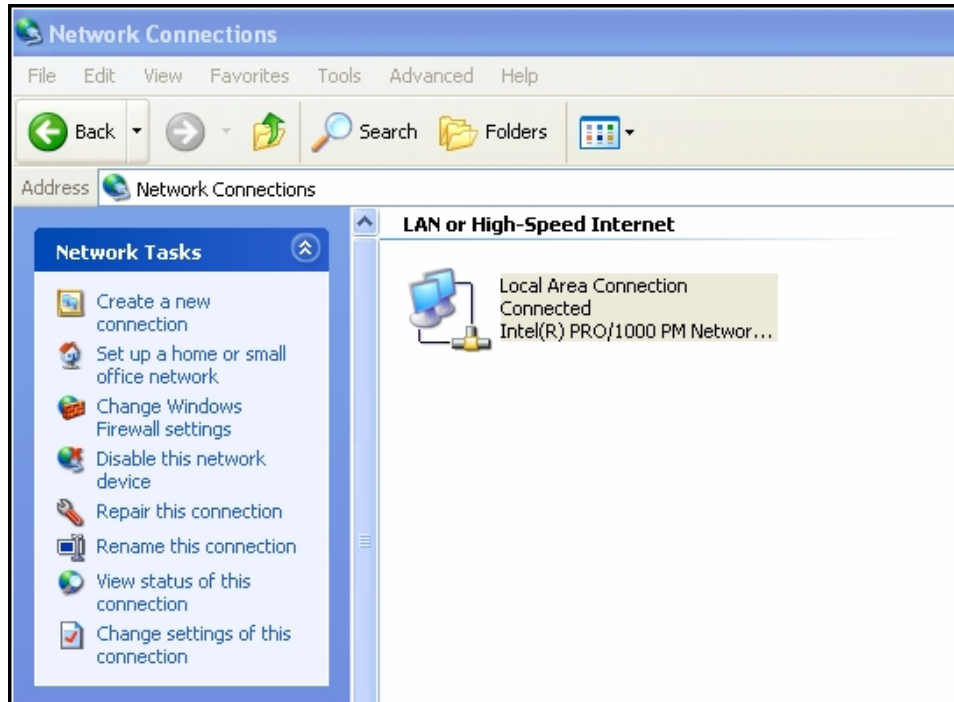

c. If the Local Area Connection does not indicate that it is connected, troubleshoot by repeating Steps 1 and 2. You may also want to ask your instructor to confirm that you are using an Ethernet crossover cable.
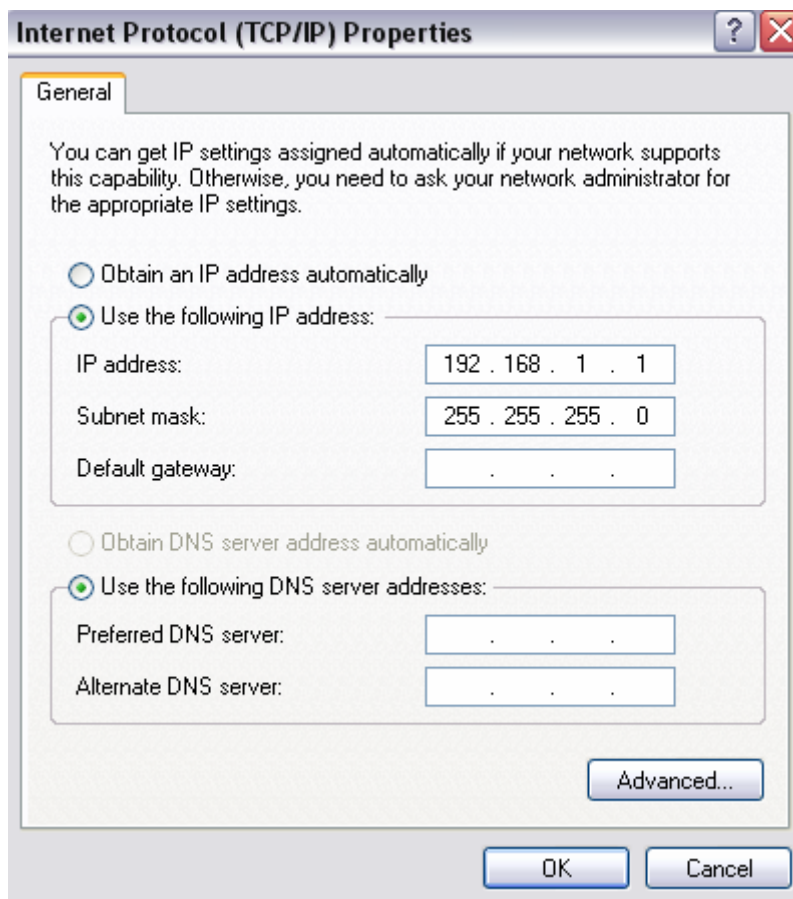
Step 3: Configure IP settings for the two PCs

a. Configure the logical IP addresses for the two PCs so that they are able to communicate using TCP/IP. On PC1, go to the Control Panel, double click the Network Connections icon, and then right click the connected Local Area Connection icon. Choose Properties from the pull-down menu.

b. Using the scroll bar in the Local Area Connection Properties window, scroll down to highlight Internet Protocol (TCP/IP). Click the Properties button.
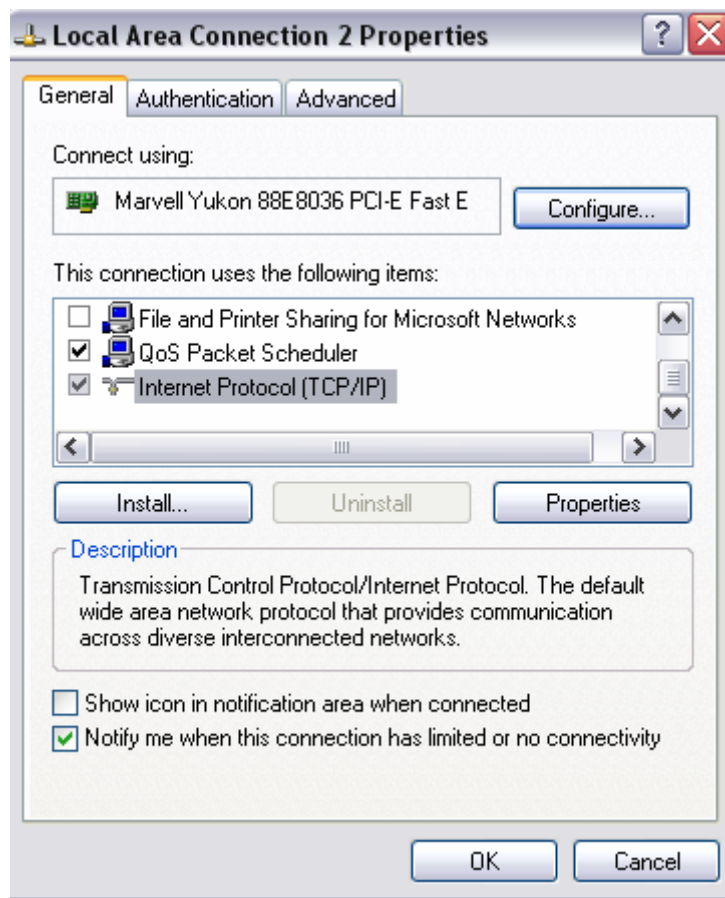
c. Select the **Use the following IP address** radio button and enter an IP address of 192.168.1.1 and a subnet mask of 255.255.255.0. With this IP address and subnet mask, the network number the host is on is 192.168.1.0 and 192.168.1.1 is the first host on the 192.168.1.0 network :

IP Address	192.168.1.1
Subnet Mask	255.255.255.0

d. Click **OK**, which will close the **Internet Protocol (TCP/IP) Properties** window. Click the **Close** button to exit the **Local Area Connection Properties** window.

e. Repeat steps 3a – 3d for the PC2 using an IP address of 192.168.1.2 and a subnet mask of 255.255.255.0. The network number this PC is on is 192.168.1.0 and 192.168.1.2 is the second host on the 192.168.1.0 network.
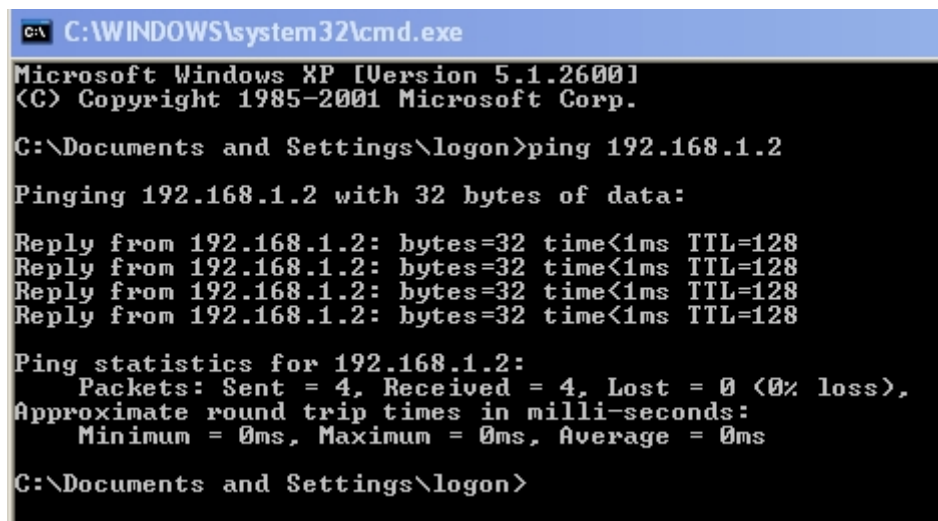
IP Address	192.168.1.2
Subnet Mask	255.255.255.0

Step 4: Verify IP connectivity between the two PCs

NOTE: To test TCP/IP connectivity between the PCs, Windows Firewall must be disabled temporarily on both PCs. Windows Firewall should be re-enabled after the tests have been completed.

a. On each PC, on the Windows XP desktop, click **Start**. From the Start menu, select **Control Panel**, and double-click **Network Connections**.

b. Right-click the Local Area Connection icon and select **Properties**. Click the **Advanced** tab. Locate and click the **Settings** button.

c. Make a note of whether the firewall settings are ENABLED (ON) for the Ethernet port or DISABLED (OFF) for the Ethernet port. _____

d. If the firewall settings are enabled, click the **Off (not recommended)** radio button to disable the firewall. The setting will be re-enabled in a later step. Click **OK** in this dialog box and the following to apply this setting. Repeat Steps 4a-4d on the second PC.

e. Now that the two PCs are physically connected and configured correctly with IP addresses, we need to make sure they communicate with each other. The **ping** command is a simple way to accomplish this task. The **ping** command is included with the Windows XP operating system.

f. On PC1, go to **Start**, then **Run**. Type **cmd**, and then click **OK**. A Window command prompt window will appear as shown in the following figure.

g. At the **>** prompt, type **ping 192.168.1.2** and press **Enter**. A successful **ping** will verify the IP connectivity. It should produce results similar to those shown in the figure that follows.

h. Repeat this procedure for PC2 but **ping** 192.168.1.1.

i. Close the Windows command prompt window on both PCs.

Step 5: Change IP address for PC2

a. On PC2, go to the Control Panel, double click the Network Connections icon, and then right click the connected Local Area Connection icon. Choose Properties from the pull-down menu.

b. Using the scroll bar in the Local Area Connection Properties window, scroll down to highlight Internet Protocol (TCP/IP). Click the Properties button.

c. Change the logical IP address for PC2 from 192.168.1.2 to 192.168.2.2 and leave the subnet mask set to 255.255.255.0. On what network is PC2 now? _____

d. Click **OK**, which will close the **Internet Protocol (TCP/IP) Properties** window. Click the **Close** button to exit the **Local Area Connection Properties** window.

e. Refer back to Step 3c. On what network is PC1? _____

f. The two PCs are still on the same physical Ethernet network. Are they on the same logical IP network? _____

Step 6: Test network connectivity between the 2 PCs

a. On PC1, go to **Start**, then **Run**. Type **cmd**, and then click **OK**. A Window command prompt window will appear.

b. At the **>** prompt, type **ping 192.168.2.2** and press **Enter**. Was it successful? _____

   Why or why not? _____

c. What type of networking device would allow the PCs to communicate? _____

Step 7: Change IP address for PC1

a. Using the procedure previously described, change the logical IP address for PC1 from 192.168.1.1 to 192.168.2.99 and leave the subnet mask set to 255.255.255.0. On what network is PC1 now?
   _____

b. Click **OK**, which will close the **Internet Protocol (TCP/IP) Properties** window. Click the **Close** button to exit the **Local Area Connection Properties** window.

c. The two PCs are still on the same physical Ethernet network. Are they on the same logical IP network now? _____

Step 8: Test network connectivity between the 2 PCs

a. On PC2, go to **Start**, then **Run**. Type **cmd**, and then click **OK**. A Window command prompt window will appear.

b. At the **>** prompt, type **ping 192.168.2.99** and press **Enter**. Was it successful? _____

   Why or why not? _____

Step 9: (Optional – Use only if the Firewall was originally ENABLED) Re-enable the firewall

a. If you disabled the Windows Firewall in Step 4, click **Start**, select **Control Panel**, and click **Network Connections**.

b. Right-click the Ethernet network connection icon and select **Properties**. Click the **Advanced** tab. Locate and click **Settings**.

c. If the firewall settings are disabled (and they were enabled before this lab began), click the **On** radio button to enable the firewall. Click **OK** in this dialog box and the following one to apply this setting.