Lab 9.3.5 DHCP Client Setup

Objective

The purpose of this lab is to introduce Dynamic Host Configuration Protocol (DHCP) and the process for setting up a network computer as a DHCP client to use DHCP services.

Background / Preparation

DHCP provides a mechanism for dynamically assigning IP addresses and other information. A DHCP server device located on the LAN or at the ISP can respond to a host request and furnish all of the following required information:

- IP address

- Subnet mask

- Default gateway

- Domain Name System (DNS) server

- Other resource addresses

Without DHCP all of the above information would have to be manually configured on each host individually.

The DHCP device is typically a network server.

In small networks, DHCP services can be provided by a small router. This includes many home networks with DSL, cable, or wireless connections. Cisco and many other manufacturers offer small routers that include the following features:

- An Internet or WAN connection

- A small built-in hub or switch

- A DHCP server service

This lab will focus on setting up a computer to use the DHCP services provided.

This lab assumes the PC is running any version of Windows. Ideally, this lab will be done in a classroom or other LAN connected to the Internet. It can also be done from a single remote connection via a modem or DSL-type connection.

> **Note:** If the network that the computer is connected to is using static addressing, follow the lab and view the various screens. **Do not** try to change settings on these machines. The static settings will be lost and would require reconfiguration.

Step 1 Establish a network connection

If the connection to the Internet is dialup, connect to the ISP to ensure that the computer has an IP address. In a TCP/IP LAN with a DHCP server it should not be necessary to do this step.

Step 2 Access a command prompt

Windows NT, 2000, and XP users will use the **Start** menu to open the **Command Prompt** window. The Command Prompt window is like the MS-DOS Prompt window for other Windows versions:

Start > **Programs** > **Accessories** > **Command Prompt** or **Start** > **Programs** > **Command Prompt**

To open the MS-DOS Prompt window, Windows 95, 98, and ME users will use the Start menu:

Start > **Programs** > **Accessories** > **MS-DOS Prompt** or **Start** > **Programs** > **MS-DOS Prompt**

Step 3 Display IP settings to determine if the network is using DHCP
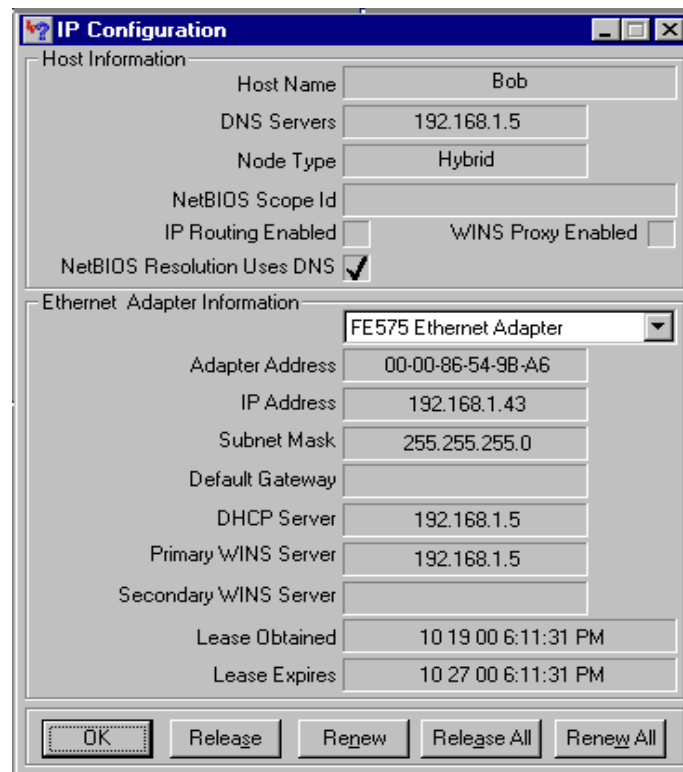
Windows 95/98/ME users:

Type `winipcfg` and press **Enter**, then click the **More Info** button.

The example below indicates that DHCP is in fact being used by the entries in the following boxes:

- **DHCP Server IP address**

- **Lease Obtained**

- **Lease Expires**

These entries would be blank in a statically configured device. DHCP also supplied the DHCP and WINS server addresses. The missing default gateway indicates a proxy server.

IP Configuration

Host Information

Host Name	Bob
DNS Servers	192.168.1.5
Node Type	Hybrid
NetBIOS Scope Id	
IP Routing Enabled	WINS Proxy Enabled
NetBIOS Resolution Uses DNS	✓

Ethernet Adapter Information

FE575 Ethernet Adapter

Adapter Address	00-00-86-54-9B-A6
IP Address	192.168.1.43
Subnet Mask	255.255.255.0
Default Gateway	
DHCP Server	192.168.1.5
Primary WINS Server	192.168.1.5
Secondary WINS Server	
Lease Obtained	10 19 00 6:11:31 PM
Lease Expires	10 27 00 6:11:31 PM

OK   Release   Renew   Release All   Renew All

Windows NT / 2000 / XP users:

Type `ipconfig/all` and press **Enter**.

The following Windows NT, 2000, and XP example indicates that DHCP is in fact being used by the **DHCP enabled** entry. The entries for the **DHCP Server**, **Lease Obtained**, and **Lease Expires** confirm this fact. These last three entries would not exist in a statically configured device and **DHCP enabled** would say **No**.

```
Command Prompt                                                    _ □ ×
C:\>ipconfig /all

Windows 2000 IP Configuration

        Host Name . . . . . . . . . . . . : thunder
        Primary DNS Suffix  . . . . . . . :
        Node Type . . . . . . . . . . . . : Hybrid
        IP Routing Enabled. . . . . . . . : No
        WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        Description . . . . . . . . . . . : LNE100TX Fast Ethernet Adapter Version 1.0
        Physical Address. . . . . . . . . : 00-A0-CC-23-FE-40
        DHCP Enabled. . . . . . . . . . . : Yes
        Autoconfiguration Enabled . . . . : Yes
        IP Address. . . . . . . . . . . . : 192.168.1.10
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . : 192.168.1.1
        DHCP Server . . . . . . . . . . . : 192.168.1.1
        DNS Servers . . . . . . . . . . . : 24.0.224.33
                                            24.0.224.34
        Lease Obtained. . . . . . . . . . : Tuesday, January 09, 2001 10:56:19 AM
        Lease Expires . . . . . . . . . . : Monday, January 15, 2001 10:56:19 AM

C:\>
```

Is DHCP running on the network? _____

Ask the instructor or lab assistant for help if it is hard to tell whether or not the DHCP is actually running.

What is the length of the DHCP lease? _____

DHCP servers provide IP addresses for a limited time, usually several days. However, the actual length of time can be configured by the network administrator. If a lease expires, the IP address is returned to the pool to be used by others. This allows DHCP to recapture inactive IP addresses without humans having to update the records. An organization that lacks enough IP addresses for every user may use very short lease durations, so that they are reused even during brief periods of inactivity.

When a computer stays connected to the network and remains powered on, it will automatically request that the lease be extended. This helps a computer avoid an expired lease as long as it is used regularly.

Sometimes a computer is moved from one network to another where the network portion of the IP address is different. When this happens, the computer may still retain its settings from the old network and be unable to connect to the new network. One solution is to release and renew the lease. Statically configured computers can do this, but there will be no change. Computers connected directly to an ISP may lose connection and have to replace their call, but no permanent changes will occur. Follow these steps to release and renew the DHCP lease:

Windows NT/2000/XP users:

Type **ipconfig/release** and press **Enter**. Look over the results and then type **ipconfig /renew**.

Since the machine did not actually change locations as described above, the same settings as before will probably appear. If the machine had been moved as described above, a new settings would appear.

Windows 95/98/ME users:

Click on the **Release All** button. Look over the results and then click on the **Renew All** button.

Since the machine did not actually change locations as described above, the same settings as before will probably appear. If the machine had been moved as described above, new settings would appear.
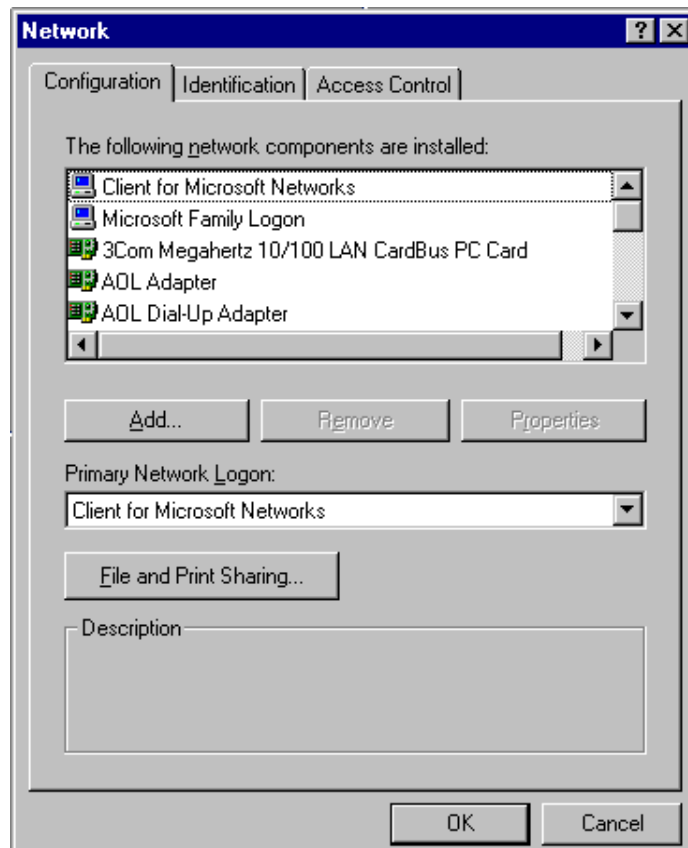
Step 4 Accessing the network configuration window

On the desktop, right click on the **Network Neighborhood** or **My Network Places** icon and choose **properties**. If neither icon on the machine, try using the Start button:

Start > **Settings** > **Control Panel**

Then double click on the **Network** icon.

Some users will see a screen like the Network properties box shown below:

Different versions of Windows will have slightly different tabs and the current configuration of the computer will determine the items included in the Network Components box. However, the box should still look similar to the one above.

Most Windows 95, 98, and ME systems should see the Network Properties at this point. So, if a Network window similar to the one above is shown, skip to the next numbered step.

Windows 2000 and XP users need to do two more things.

In the window, double-click on **Local Area Connection**.

When the **Local Area Connection Status** window appears, click on the **Properties** button. That will bring up a **Local Area Connection Properties** similar to the one shown in the next step.
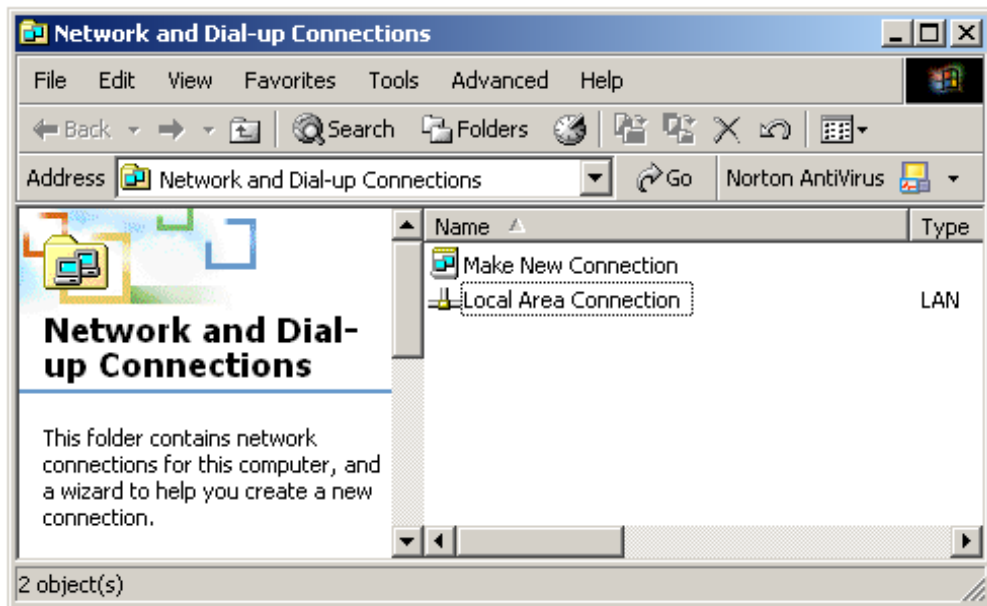
In the network properties window scroll through the listed components and find a listing for TCP/IP. If there is more than one listing, find the one for the current network connection, such as NIC or modem. In Windows 2000 and XP it will look like the following:
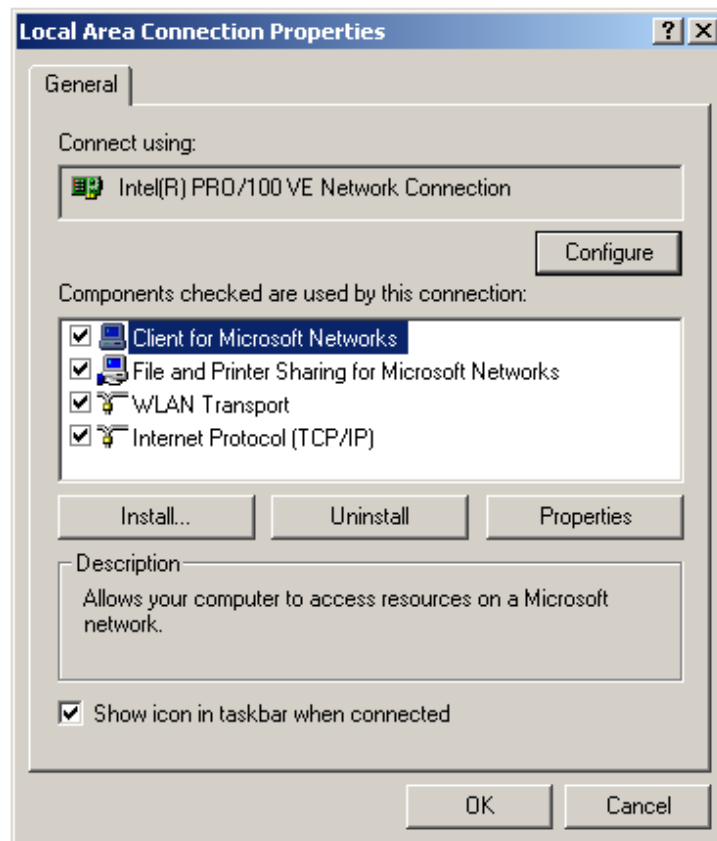
Select the appropriate TCP/IP entry and click on the **Properties** button or double-click directly on the TCP/IP entry. The screen that will appear next depends again on the version of Windows being used, but the process and concepts are the same. The screen below should look very similar to what Windows 2000 and XP users are seeing. First thing that should be noted on the example computer is that it is configured for Static addressing.
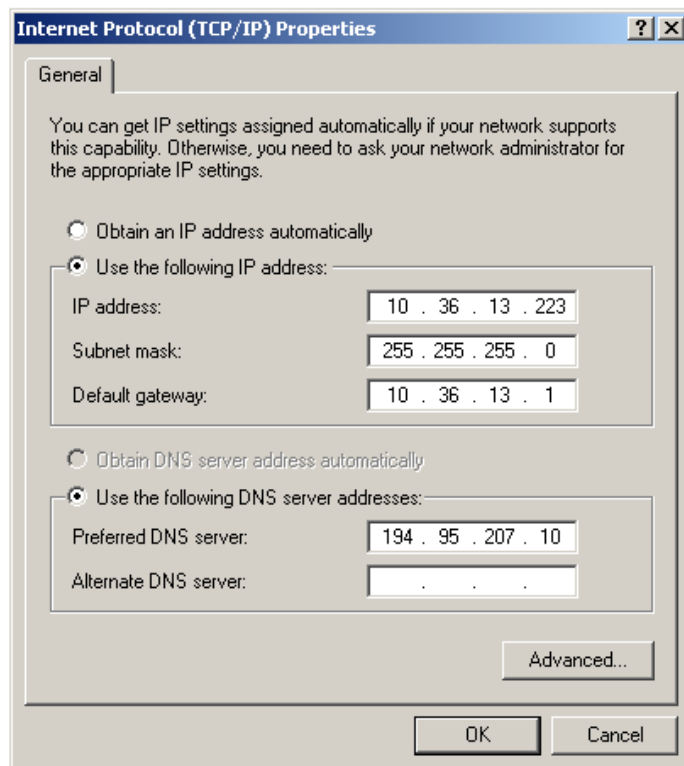
Step 5 Enable DHCP

To enable DHCP, select **Obtain an IP address automatically** and typically select **Obtain DNS server address automatically**. The various settings will blank out as these options are selected. If the computer had Static addressing and it needs to be restored, click on the **Cancel** button. To keep the changed settings click **OK.**

Older versions of Windows have multiple tabs and require selecting **Obtain an IP address automatically** on this tab and then going to the **DNS Configuration** tab to select **Obtain DNS server address automatically**.

If this computer was really being converted from static to DHCP, any entries in the **Gateway** and **WINS Configuration** tabs would need to be removed.

If the computer had Static addressing and it needs to be restored, click on the **Cancel** button.

To keep these settings click **OK**.
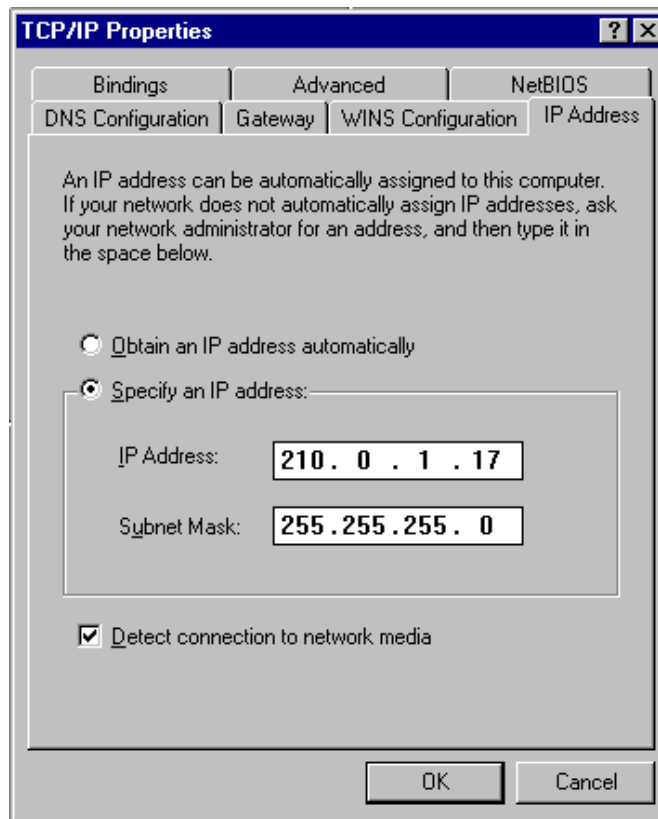
Older versions of Windows will say that it is necessary to restart the computer. Windows 2000 and XP typically do not require a restart.

Windows 95 might even ask for the installation CD-ROM to complete the process.

If the computer was really being changed over to DHCP, Step 3 would be repeated to confirm the valid set of configurations.

Reflection

Why might a network administrator prefer that various network profiles be used to hide the above options and screens, thereby preventing users from making any changes?

_____

As a network administrator what would be some of the potential benefits of using a DHCP server within a network?

_____

Note: Many small routers that are supplied for cable, DSL, or ISDN connections have DHCP configured by default. This allows additional computers to share the network connection through the use of a hub or switch. Each computer would need to be configured like in the lab. Typically, DHCP will assign addresses using one of the private networks, such as 192.168.1.0, that are set-aside for this purpose. While it is common to allow these settings to be changed, read and understand the instruction manual first. Learn where the **Reset Defaults** button is located.