

# Module 3: Configuring a Client IP Address

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## Instructor Notes

**Presentation:**  
60 minutes**Lab:**  
00 minutes

This module provides students with the information they need to configure an Internet Protocol (IP) address for a client computer running Microsoft® Windows® Server 2003. An IP address is required for each computer and device on a network that is running the suite of Transmission Control Protocol/IP (TCP/IP) protocols. The IP address identifies a computer's location on the network. When system administrators assign an IP address to a client, they are ensuring that the client can be accurately identified on the network when it sends and receives data.

After completing this module, students will be able to:

- Configure a client to use a static IP address.
- Configure a client to obtain an IP address automatically by using Dynamic Host Configuration Protocol (DHCP).
- Configure a client to obtain an IP address automatically by using Alternate Configuration.

**Required materials**

To teach this module, you need the Microsoft PowerPoint® file 2276A\_03.ppt.

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**Important** It is recommended that you use PowerPoint 2002 or later to display the slides for this course. If you use PowerPoint Viewer or an earlier version of PowerPoint, all the features of the slides may not be displayed correctly.

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**Preparation tasks**

To prepare for this module:

- Read all of the materials for this module.
- Complete the practices.
- Review the referenced Request for Comments (RFCs).

## How to Teach This Module

This section contains information that will help you to teach this module.

### Lesson: Configuring a Client to Use a Static IP Address

This section describes the instructional methods for teaching this lesson.

#### **Static and Dynamic IP Addresses**

To illustrate the need for a static IP address, explain to students that, because the London computer is configured as a DHCP server for the classroom setup, it requires a static IP address. Emphasize to students that typically address schemes are determined by system engineers. As a system administrator, their role will most likely be to implement addresses that have already been determined elsewhere.

#### **How to Manually Assign a Static IP Address**

Briefly review this procedure, but demonstrate it only if reinforcement is necessary because students will perform this procedure in the practice. This should be straightforward for most students.

#### **Viewing Static TCP/IP Configuration Using Ipconfig**

Show students how to use Ipconfig. Delay showing them the `/all` switch because it will introduce many terms and concepts not yet covered. Ipconfig is covered in more depth later in the course.

#### **Practice: Manually Assigning and Viewing an IP address.**

Be sure to tell students the network number that *x* represents.

### Lesson: Configuring a Client to Obtain an IP Address Automatically

This section describes the instructional methods for teaching this lesson.

#### **Multimedia: The Role of DHCP in the Network Infrastructure**

This presentation describes how DHCP responds to requests for IP addresses. Emphasize that students do not need a comprehensive understanding of how DHCP works. Discuss the presentation with students and make sure they understand the reasons for configuring the router to connect to the DHCP server.

#### **Renewing an IP Address**

Use the animated graphic to describe how DHCP automatically renews IP addresses.

#### **Releasing, Renewing and Verifying an IP Address**

Ask students where else they can view this information, and confirm that they can use Network Monitor.

## Lesson: Using Alternate Configuration

This section describes the instructional methods for teaching this lesson.

### **How Alternate Configuration Assigns IP Addresses**

Make sure students understand Alternate Configuration is used when a client is configured to obtain an IP address automatically using DHCP, but a DHCP server cannot be located. Emphasize that two options for Alternate configuration are available: Automatic Private IP Addressing (APIPA), and user configuration.

### **Practice: Configuring Alternate Configuration**

Point out to students that there are four steps in the procedure where they must wait for you to complete the steps. Demonstrate the steps to disable Alternate Configuration before students complete the procedure. Note that performing the steps to disable Alternate Configuration disables both APIPA and user configuration options. During the practice, students are instructed to export the registry key they are changing in order to restore, it if necessary. Caution students to follow directions very carefully when they use Registry Editor.

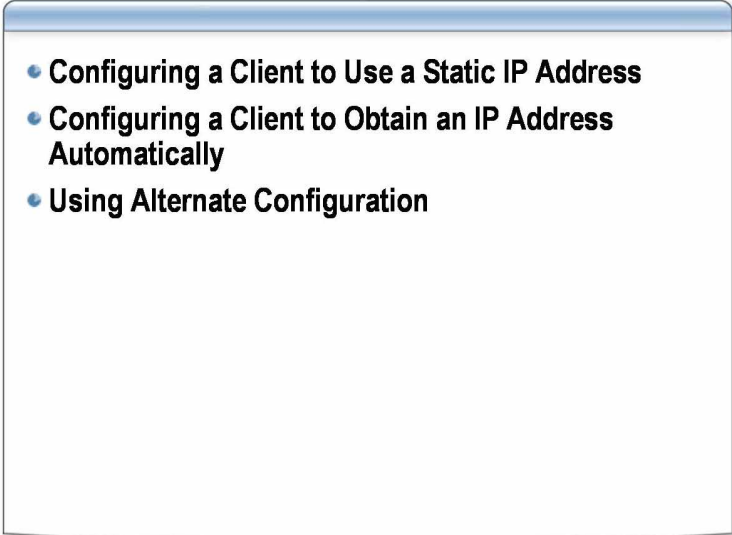
## Customization Information

This section identifies the lab setup requirements for a module and the configuration changes that occur on student computers during the labs. This information is provided to assist you in replicating or customizing Microsoft Official Curriculum (MOC) courseware.

There are no labs in this module, and as a result, there are no lab setup requirements or configuration changes that affect replication or customization.



# Overview

- 
- **Configuring a Client to Use a Static IP Address**
  - **Configuring a Client to Obtain an IP Address Automatically**
  - **Using Alternate Configuration**

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## Introduction

The information in this module describes how to configure an Internet Protocol (IP) address for a client computer running Microsoft® Windows® Server 2003. An IP address is required for each computer and device on a network that is running the suite of Transmission Control Protocol/IP (TCP/IP) protocols. The IP address identifies a computer's location on the network. When you assign an IP address to a client, you are ensuring that the client can be accurately identified on the network when it sends and receives data.

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**Note** In this module, the term *client* refers to a computer running a Windows operating system on a network running TCP/IP. The term *host* includes clients and refers to any device on the network that has an IP address.

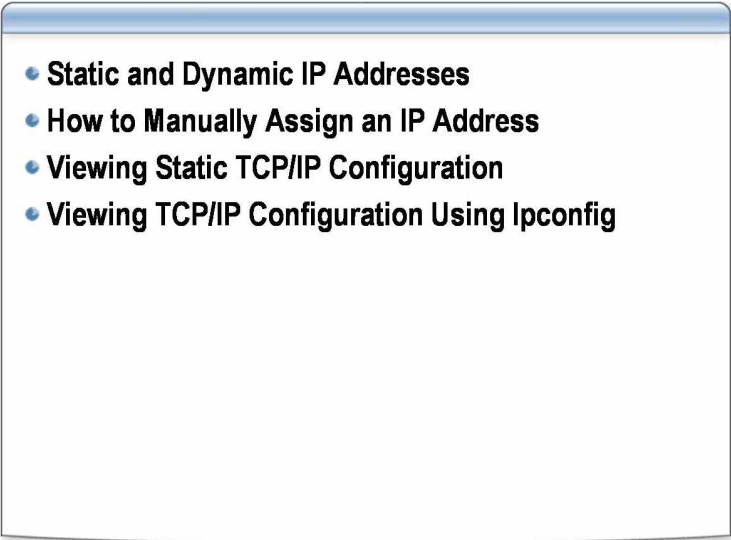
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## Objectives

After completing this module, you will be able to:

- Configure a client to use a static IP address.
- Configure a client to obtain an IP address automatically by using Dynamic Host Configuration Protocol (DHCP).
- Configure a client to obtain an IP address automatically by using Alternate Configuration.

## Lesson: Configuring a Client to Use a Static IP Address

- 
- Static and Dynamic IP Addresses
  - How to Manually Assign an IP Address
  - Viewing Static TCP/IP Configuration
  - Viewing TCP/IP Configuration Using Ipconfig

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### Introduction

Assigning an IP address is a fundamental procedure for you to establish client network connectivity. By default, Windows Server 2003 is configured to obtain an IP address automatically by using DHCP. However, there will be instances where it is necessary for you to manually assign and confirm the assignment of an IP address. An IP address that is manually assigned is referred to as a static address.

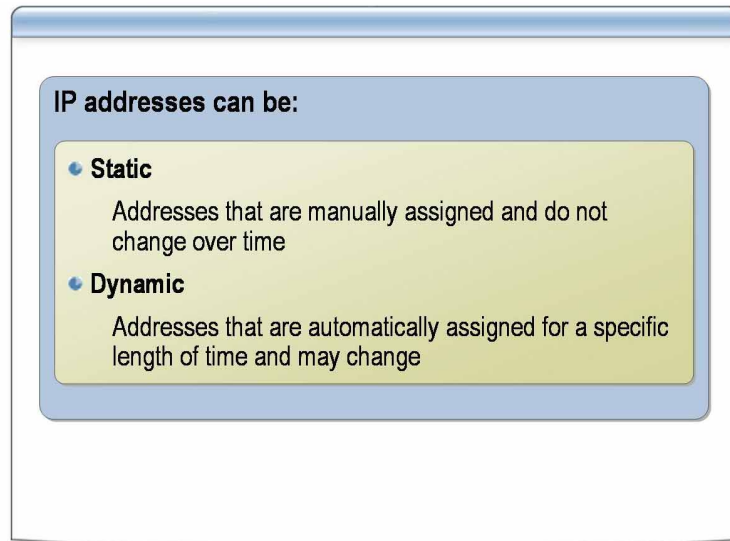
### Lesson objectives

After completing this lesson, you will be able to:

- Describe a static IP address.
- Describe a dynamic IP address.
- Manually assign a static IP address.
- View static TCP/IP configuration.
- View TCP/IP configuration using Ipconfig.



## Static and Dynamic IP Addresses



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### Introduction

You can assign either static or dynamic IP addresses for client computers depending on your network configuration and on the computer's function.

### What is a static IP address?

A static IP address is an address that always remains the same and must be manually configured. When you assign static IP addresses, you must manually configure the address for each computer on your network.

### When to use a static IP address

You use a static IP address when:

- A client or server is using an application that requires an IP address that does not change.
- You do not have a DHCP server on your network.
- You are isolating network connectivity issues for a client computer, and want to determine if a DHCP server is incorrectly configured.

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**Caution** Although manually assigned addresses may provide some benefit, there is the potential for manually assigning duplicate addresses. Assigning the same IP address to more than one client will result in loss of network connectivity.

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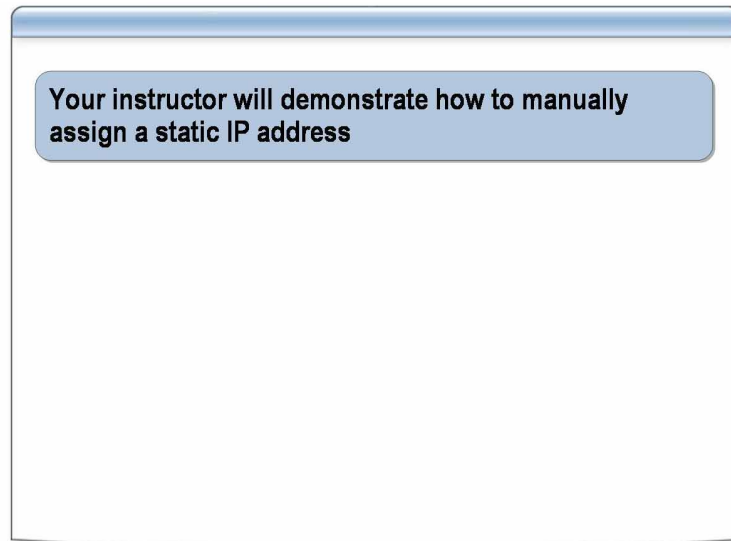
### What is a dynamic IP address?

A dynamic address is an address that changes over time and is automatically assigned. You use DHCP to assign dynamic addresses. When you assign IP addresses automatically, you can configure the addresses for an entire network from a single location and then dynamically assign them to each computer.

### Managing IP addresses

Every host on your TCP/IP network must have a unique IP address. This requirement complicates the process of configuring the TCP/IP client. You must be sure that every computer is configured correctly, which means that you must keep track of the IP address assignments. On a small network, configuring the individual TCP/IP hosts, and keeping track of their IP addresses, is relatively straightforward, whether you use static or dynamic addresses. However, on a large network, managing IP addresses can be challenging, and in this case, you can use DHCP to simplify the task.

## How to Manually Assign a Static IP Address



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### Introduction

When you assign a static IP address to a client on your network, you must configure the address manually. To assign a static IP address you use the **Internet Protocol (TCP/IP) Properties** dialog box in Windows Server 2003. To perform this procedure, you must be a member of the Administrators group or the Network Configuration Operators group on the local computer.

### Procedure

To open the **Internet Protocol (TCP/IP) Properties** dialog box:

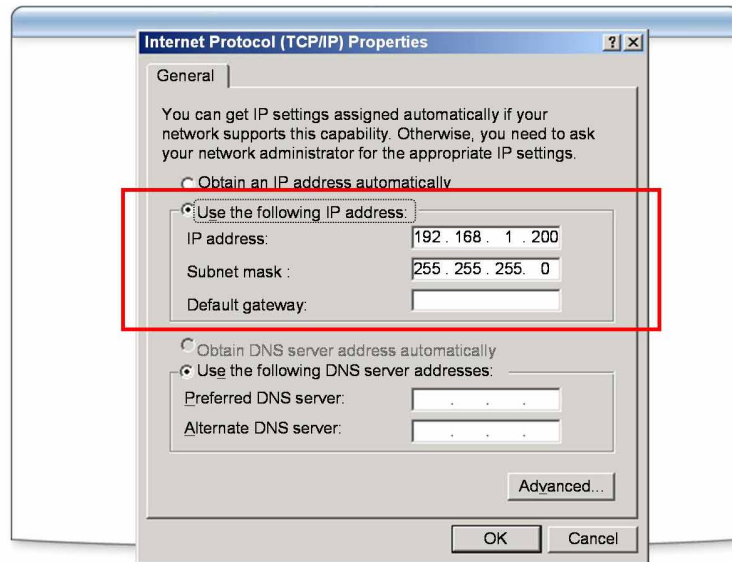
1. From the **Start** menu, point to **Control Panel**, point to **Network Connections**, and then click **Local Area Connection**.
2. In the Local Area Connection Status window, click **Properties**.
3. In the **Local Area Connection Properties** dialog box, click **Internet Protocol (TCP/IP)**, and then click **Properties** to display the **Internet Protocol (TCP/IP) Properties** dialog box. In this dialog box, click **Use the following IP address** to enter values for the IP address, subnet mask, and default gateway. At a minimum, the IP address and subnet mask are required for configuration of a client.

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**Note** In general, most computers have only one network adapter installed and therefore require only a single IP address. When a device, such as a router, has multiple network adapters installed, each enabled adapter needs its own IP address. In some instances, a client may have multiple network adapters.

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## Viewing Static TCP/IP Configuration



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### Introduction

In some situations, you may need to view the IP address information for a specific client. For example, a client on your network may not be able to communicate with other computers on the network. In this situation, you must know the IP addresses of the other computers in order to identify the problem.

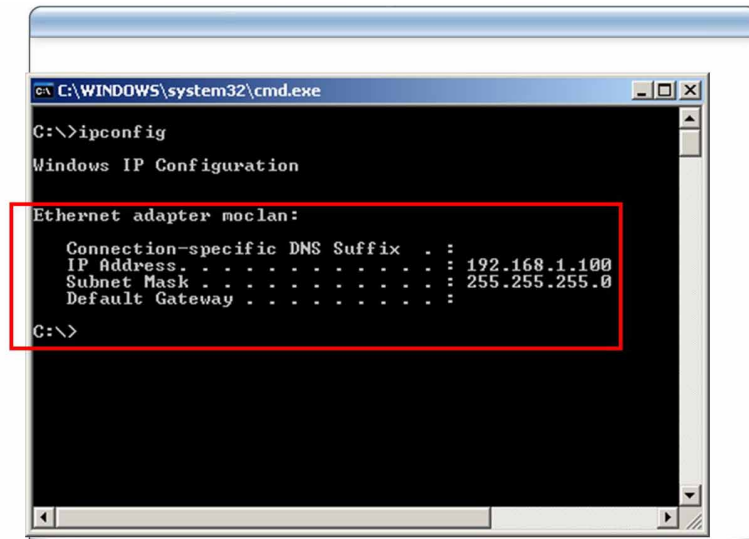
### How to view a static IP address

You can use the **Internet Protocol (TCP/IP) Properties** dialog box to view static TCP/IP information.

Using the **Internet Protocol (TCP/IP) Properties** dialog box, you can determine whether the IP address configuration has been performed dynamically or statically. However, if the IP address has been configured dynamically using DHCP or Automatic Private IP Addressing (APIPA), you cannot determine the values of the TCP/IP configuration options by using this property page. These options include the IP address, subnet mask, and default gateway. You can determine these values by using this property page only if the configuration has been done manually.

You can also use the **Support** tab from the **Local Area Connection Status** dialog box to view IP address information. If the interface has a static configuration, the **Address Type** will indicate **Manually Configured**.

## Viewing TCP/IP Configuration Using Ipconfig



```
C:\WINDOWS\system32\cmd.exe
C:\>ipconfig

Windows IP Configuration

Ethernet adapter noclan:

    Connection-specific DNS Suffix  . : 
    IP Address. . . . .               : 192.168.1.100
    Subnet Mask . . . . .             : 255.255.255.0
    Default Gateway . . . . .         : 

C:\>
```

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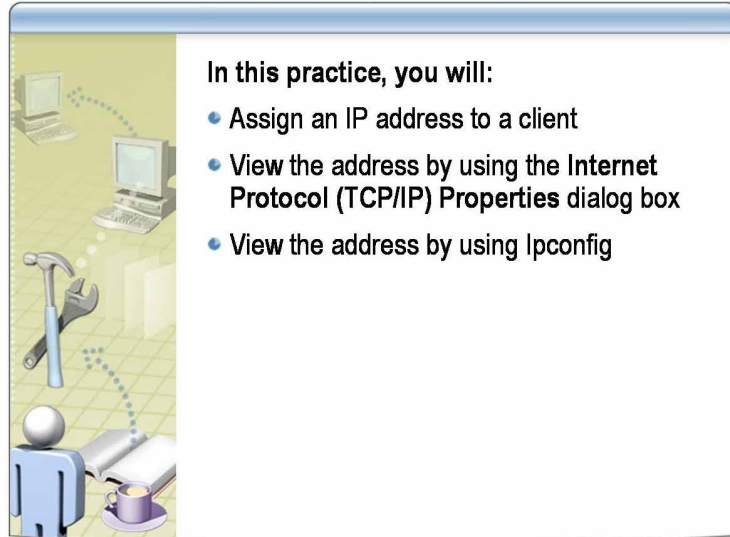
**Introduction** When you want to obtain information about dynamic IP addresses, you can use Ipconfig. You can also use Ipconfig to view information about static IP addresses not provided when you use the **Internet Protocol (TCP/IP) Properties** dialog box.

**What is Ipconfig** Ipconfig is a command-line utility in Windows Server 2003. You can use this utility to view but not set, the TCP/IP configuration options on a client, including the IP address, subnet mask, and default gateway. The **Internet Protocol (TCP/IP) Properties** dialog box merely displays the specified IP address. Ipconfig provides information such as media state (connected or disconnected).

**How to use Ipconfig to view IP addresses** The command syntax for this utility is **ipconfig**. To start the Ipconfig utility, type **ipconfig** at the command prompt. The values of the three primary configuration parameters are displayed.

If you use the **Support** tab from the **Local Area Connection Status** dialog box to view the IP address, the **Address Type** will indicate **Assigned by DHCP** if the client has a dynamic TCP/IP configuration.

## Practice: Manually Assigning and Viewing an IP Address



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### Introduction

In this practice, you will configure a client to use a static IP address and use the Ipconfig utility to confirm the address assignment.

### Scenario

You are part of a client deployment team that is configuring network connection settings. Although most of the clients will require dynamic IP address configurations, a small number of the clients that you are configuring require static IP addresses. Your responsibility is to assign the addresses and verify configuration by using Ipconfig.

### Practice

#### ► Assign a static IP address

1. Log on as *Computer*\Administrator with a password of **P@ssw0rd** (where *Computer* is the name of your computer).
2. Click **Start**, point to **Control Panel**, point to **Network Connections**, and then click **Local Area Connection**.

The **Local Area Connection Status** dialog box appears.

3. Click **Properties**.

The **Local Area Connection Properties** dialog box appears.

4. Click **Internet Protocol (TCP/IP)**, and then click **Properties**.

The **Internet Protocol (TCP/IP) Properties** dialog box appears.

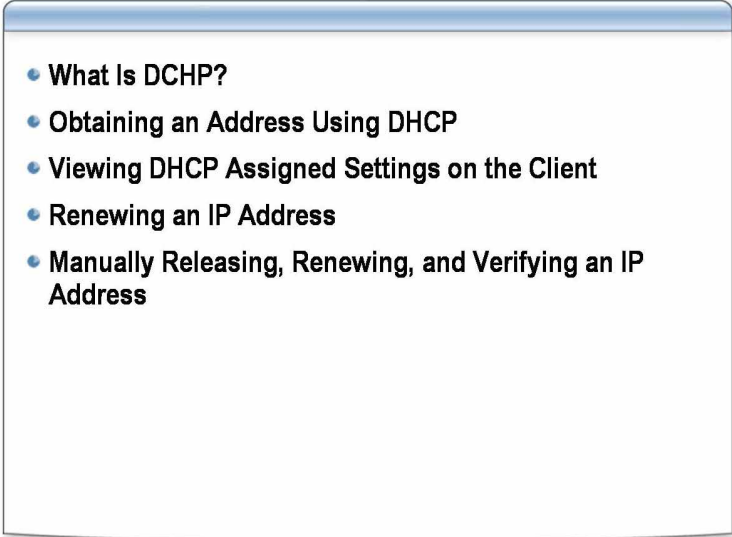
5. Click **Use the following IP address**.

6. In the **IP address** box, type the IP address that corresponds to your computer name in the table below (where *x* is the network number indicated by your instructor).

Computer Name	IP Address
Vancouver	192.168.x.11
Denver	192.168.x.12
Perth	192.168.x.13
Brisbane	192.168.x.14
Lisbon	192.168.x.15
Bonn	192.168.x.16
Lima	192.168.x.17
Santiago	192.168.x.18
Bangalore	192.168.x.19
Singapore	192.168.x.20
Casablanca	192.168.x.21
Tunis	192.168.x.22
Acapulco	192.168.x.23
Miami	192.168.x.24
Auckland	192.168.x.25
Suva	192.168.x.26
Stockholm	192.168.x.27
Moscow	192.168.x.28
Caracas	192.168.x.29
Montevideo	192.168.x.30
Manila	192.168.x.31
Tokyo	192.168.x.32
Khartoum	192.168.x.33
Nairobi	192.168.x.34

7. Press TAB and verify that the subnet mask box displays **255.255.255.0**
8. To close the **Internet Protocol (TCP/IP) Properties** dialog box, click **OK**.
9. In the **Microsoft TCP/IP** message box, click **OK**.
10. To close the **Local Area Connection Properties** dialog box, click **Close**.
11. To close the **Local Area Connection Status** dialog box, click **Close**.
12. At the command prompt, type **ipconfig** and press ENTER.
13. Verify that the IP Address attribute matches what you entered in Step 5.
14. Verify that the Subnet Mask attribute is **255.255.255.0**.

# Lesson: Configuring a Client to Obtain an IP Address Automatically

- 
- What Is DHCP?
  - Obtaining an Address Using DHCP
  - Viewing DHCP Assigned Settings on the Client
  - Renewing an IP Address
  - Manually Releasing, Renewing, and Verifying an IP Address

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## Introduction

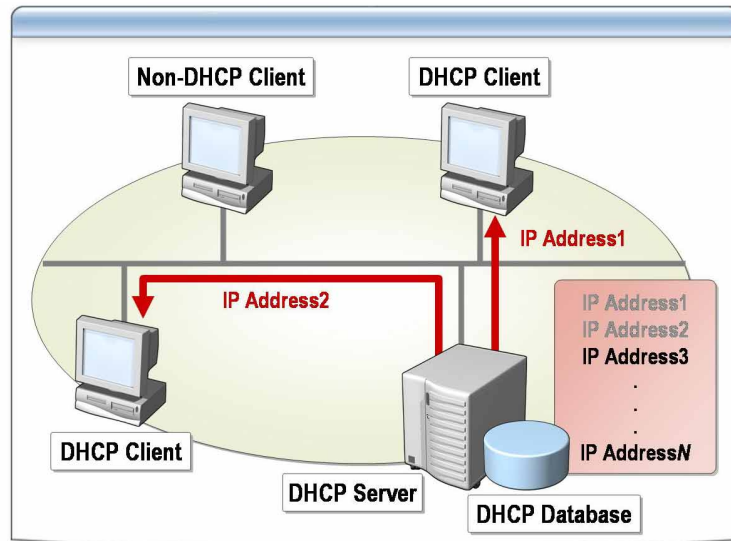
Windows Server 2003 includes DHCP, a TCP/IP standard that you can use to automatically assign dynamic IP addresses and other TCP/IP configuration parameters to client computers on your network. When you use DHCP, you centralize the management of IP addresses and other TCP/IP configuration settings, thereby simplifying your administrative tasks.

## Lesson objectives

After completing this lesson, you will be able to:

- Describe DHCP.
- Configure a client to use DHCP.
- Manually release and renew and verify an IP address.

## What Is DHCP?



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### Introduction

By default, Windows Server 2003 is configured to obtain an IP address automatically by using DHCP. The DHCP Server service in Windows Server 2003 is integrated with the Active Directory® directory service and Domain Name System (DNS) service.

### What is DHCP?

DHCP is a service and a protocol that work together to automatically assign IP addresses and other configuration settings to the computers on a network. DHCP dynamically assigns IP addresses to clients from a pool of addresses.

### Benefits of using DHCP

When you use DHCP, you:

- Do not have to manually configure each client with an IP address.
- No longer have to maintain a record of each individual IP addresses that you have assigned.
- Can automatically assign a new IP address when you move a client from one subnet to another.
- Can release the IP address of a computer that is offline for a specific amount of time, and then reassign the address to another computer.
- Reduce the possibility of address duplication because DHCP automatically tracks IP address assignments.
- Can rely on the DHCP server to detect unauthorized DHCP servers on the network.



**How DHCP works**

When a DHCP server receives a request from a DHCP client, it selects an IP address from a pool of addresses (called a scope) defined in its database and offers it to the DHCP client. If the client accepts the offer, the IP addressing information is leased to the client for a specified period of time. As the lease interval progresses, the client renews the address assignment each time it logs on to the network. If the lease expires without a renewal, the IP address is returned to the pool for reassignment. Certain addresses in the scope may be excluded from distribution because they are already assigned as static addresses.

The DHCP server provides the client with the following basic information:

- IP address
- Subnet mask
- Default gateway

Other information can be distributed by using DHCP as well, such as DNS server addresses and Windows Internet Name Service (WINS) server addresses.

**How to enable DHCP**

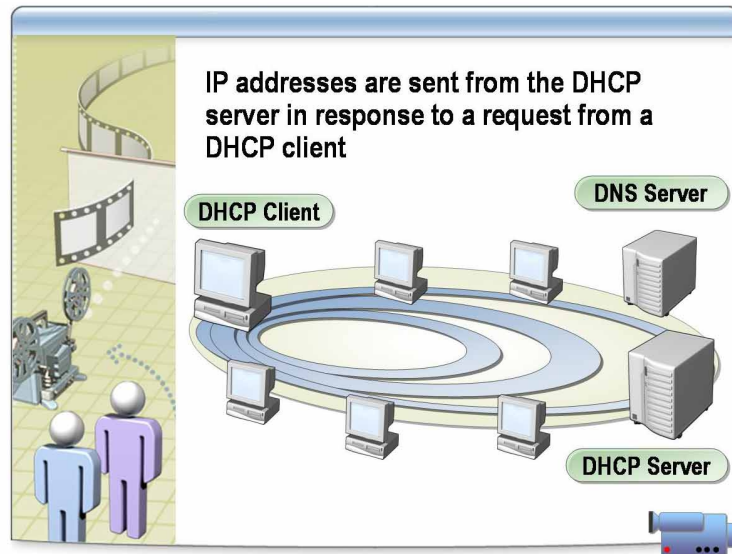
You must enable clients in the network to use DHCP by clicking **Obtain an IP address automatically** in the **Internet Protocol (TCP/IP) Properties** dialog box, which is selected by default in Windows Server 2003.

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**Note** For more information about DHCP, see Request for Comments (RFC) 2131 under **Additional Reading** on the Student Materials compact disc, and Course 2277B, *Implementing, Managing, and Maintaining a Microsoft Windows Server 2003 Network Infrastructure: Network Services*.

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## Multimedia: The Role of DHCP in the Network Infrastructure



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### File location

To view the multimedia presentation, *The Role of DHCP in the Network Infrastructure*, open the Web page on the Student Materials compact disc, click **Multimedia**, and then click the title of the presentation.

### Objectives

At the end of this presentation, you will be able to describe how DHCP:

- Assigns TCP/IP configuration data to clients.
- Manages IP address allocation.
- Ensures IP address conflicts do not occur.
- Provides configuration data for a specific period of time.

## Viewing DHCP Assigned Settings on the Client

```

c:\ Command Prompt
C:\Documents and Settings\Administrator>ipconfig/all

Windows IP Configuration

Host Name . . . . . : Denver
Primary Dns Suffix . . . . . :
Node Type . . . . . : Peer-Peer
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter moclant:

Connection-specific DNS Suffix . :
Description . . . . . : Intel 21140-Based PCI Fast Ethernet Adapter
(Generic)
Physical Address. . . . . : 00-03-FF-A5-08-F9
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : No
IP Address. . . . . : 192.168.0.6
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1
DHCP Server . . . . . : 192.168.0.1
DNS Servers . . . . . : 151.164.1.8
Primary WINS Server . . . . . : 151.164.1.201
Lease Obtained. . . . . : Thursday, March 06, 2003 9:17:07 AM
Lease Expires . . . . . : Sunday, March 09, 2003 9:17:07 AM

C:\Documents and Settings\Administrator>

```

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### Introduction

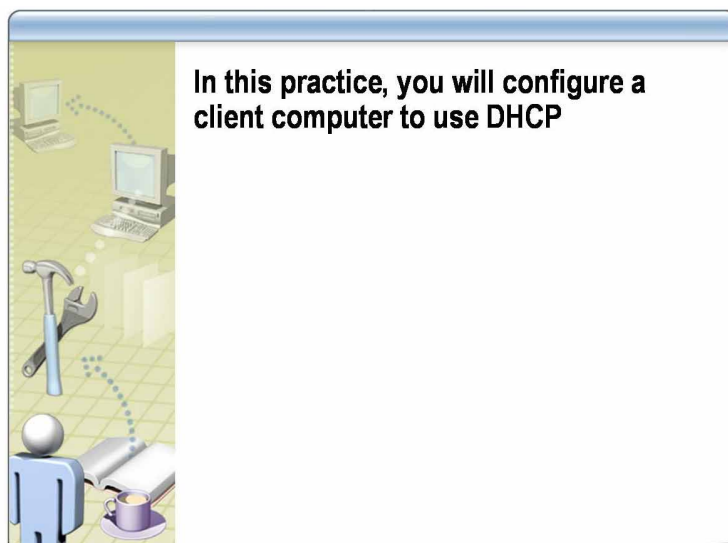
When you want to confirm that information configured on the DHCP server has been successfully distributed to a client, you can use the Ipconfig utility that is included in Windows Server 2003. By using this utility, you can view the parameters assigned by DHCP and thereby ensure that IP addresses for client computers are configured correctly.

### How to obtain DHCP information by using Ipconfig

You can obtain more detailed information about how a client is using DHCP by using the Ipconfig utility and specifying the **/all** switch. To use the Ipconfig utility with this switch, type **ipconfig /all** at the command prompt. The screen displays the information about all TCP/IP configuration options. You can now determine whether DHCP is enabled. If the value of the **DHCP Enabled** attribute is **Yes**, and a DHCP server IP address is displayed, then the IP address has been obtained by using DHCP.

A DHCP server leases an IP address to a client for a specific length of time. The **Lease Obtained** and **Lease Expires** attributes display information on when the lease was obtained and when it will expire. If a DHCP server is unavailable to assign an IP address and the IP address is assigned automatically, the word **autoconfiguration** precedes the value for the IP address of the computer. In this case, the **Autoconfiguration Enabled** value would be **Yes**. The DHCP server IP address attribute would not be displayed.

## Practice: Configuring a Client to Use DHCP



\*\*\*\*\*ILLEGAL FOR NON-TRAINER USE\*\*\*\*\*

### Introduction

In this practice, you will configure a client to use a dynamic IP address.

### Scenario

You are part of a client deployment team that is configuring network connection settings. Your team is responsible for implementing a change from a static addressing scheme to using DHCP. One of the clients has been configured to use a static IP address and you must change it to obtain an address by using DHCP.

### Practice

#### ► Configure a client to use DHCP

1. Click **Start**, point to **Control Panel**, point to **Network Connections**, and then click **Local Area Connection**.

The **Local Area Connection Status** dialog box appears.

2. Click **Properties**.

The **Local Area Connection Properties** dialog box appears.

3. Click **Internet Protocol (TCP/IP)**, and then click **Properties**.

The **Internet Protocol (TCP/IP) Properties** dialog box appears.

4. Click **Obtain an IP address automatically**.
5. Click **Obtain DNS server address automatically**, and then click **OK**.
6. To close the **Local Area Connection Properties** dialog box, click **Close**.
7. To close the **Local Area Connection Status** dialog box, click **Close**.
8. Open a command prompt, type **ipconfig /all** and press ENTER.
9. Locate the line in the output that reads **DHCP Enabled**.

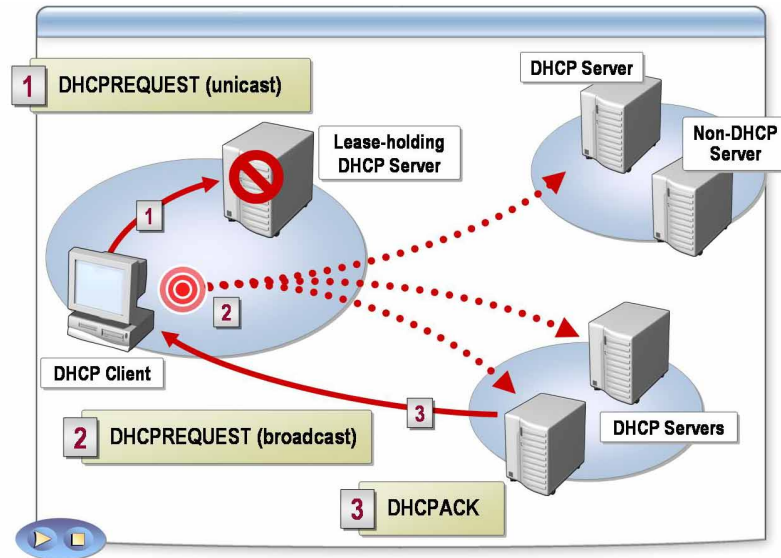
Is the IP address dynamic or static?

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**Answer: Dynamic. The DHCP enabled attribute is Yes.**

10. Close all windows and log off.

## Renewing an IP Address



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### Introduction

When you identify a connectivity issue with a client on your network, often an effective first step is to manually release and renew the IP address. This action frequently resolves the issue. For example, when you move a client from one subnet to another, the IP address may not be automatically updated for the new subnet. In this case, releasing and renewing the IP address may be all you need to do to solve the problem.

### Automatic renewal of IP addresses

In most cases, the client retains the settings assigned to it by the DHCP server until someone explicitly changes them or forces a reassignment. However, when the server dynamically allocates settings, the client leases its IP address for a certain period of time (configured at the server) and must renew the lease to continue using it.

The length of an IP address lease is typically measured in days, and is generally based on whether computers are frequently moved around the network or whether IP addresses are in short supply. Shorter leases generate more network traffic, but enable DHCP servers to reclaim unused addresses faster. For a relatively stable network, longer leases reduce the amount of traffic that DHCP generates.

**The lease renewal process**

The lease renewal process begins when a *bound client* (a DHCP client with a leased address) reaches what is known as the *renewal time value*, or *T1 value*, of its lease. By default, the renewal time value is 50 percent of the lease period. When a client reaches this point, it enters the *renewing* state and begins generating DHCPREQUEST messages as follows:

1. The client transmits a unicast DHCPREQUEST messages to the server that holds the lease.

If the server is available to receive the message, it responds with either a DHCPACK message, which renews the lease and restarts the lease time clock, or a DHCPNACK message, which terminates the lease and forces the client to begin the address assignment process again from the beginning.

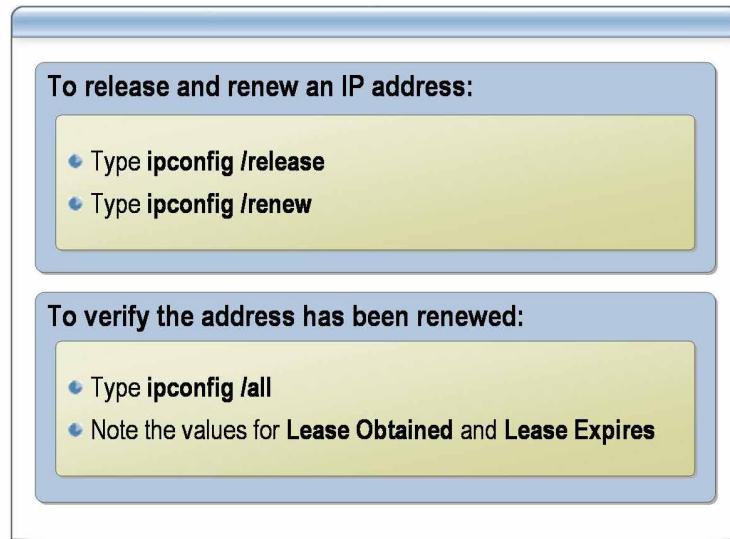
A DHCPREQUEST to the server that holds the lease is also sent by the client when the client is restarted. If the IP address is available, the lease will be treated like a renewal. If the address is not available, the client receives a DHCPNAK and restarts the lease process.

2. If the server does not respond to the DHCPREQUEST unicast message, the client continues to send them until it reaches the *rebinding time value* or *T2 value*, which defaults to 87.5 percent of the lease period. At this point, the client enters the *rebinding* state and begins transmitting broadcast DHCPREQUEST messages, soliciting an address assignment from any DHCP server on the network.

3. A server can respond with either a DHCPACK or DHCPNACK message.

If the lease time expires with no response from any DHCP server, the client's IP address is released and all of its TCP/IP communication ceases, except for the transmission of broadcast DHCPDISCOVER messages. The DHCPDISCOVER broadcasts are used to request configuration parameters from a DHCP server.

## Manually Releasing, Renewing, and Verifying an IP Address



\*\*\*\*\*ILLEGAL FOR NON-TRAINER USE\*\*\*\*\*

### Introduction

In some instances, you will need to manually release and renew an IP address, and then verify that the address has been renewed. For example, when you need to move a client from one subnet to another and the IP address may not automatically update.

### How to manually release and renew an address

A client can release an IP address at any time by transmitting a DHCPRELEASE message. You can do this manually by using the Ipconfig.exe utility in Windows Server 2003, Windows XP Professional Edition, Windows 2000, and Microsoft Windows NT®.

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**Note** In Microsoft Windows Me, Microsoft Windows 98, and Microsoft Windows 95, you use the Winipcfg.exe utility.

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To manually release and renew an IP address:

1. At the command prompt, type **ipconfig /release** and then press ENTER.
2. Type **ipconfig /renew** and press ENTER again.

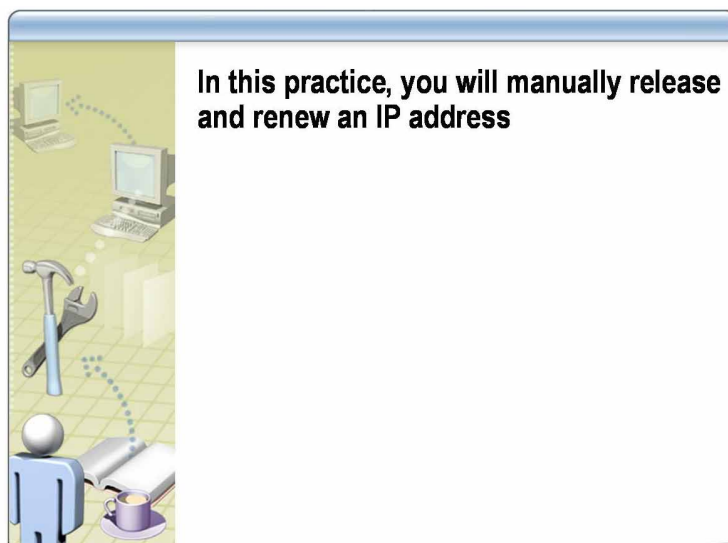
### How to verify an address

To verify an address has been renewed, either manually or automatically after passing the T1 or T2 time points, and to view the lease expiration date and time, type **ipconfig /all**, press ENTER, and note the values for **Lease Obtained** and **Lease Expires**.

### Example of ipconfig/all information

```
Lease Obtained. . . . . : Tuesday, May 14, 2003 4:59:26 PM
Lease Expires . . . . . : Friday, May 17, 2003 4:59:26 PM
```

## Practice: Manually Releasing and Renewing an Address



\*\*\*\*\*ILLEGAL FOR NON-TRAINER USE\*\*\*\*\*

### Introduction

In this practice, you will manually release and renew an IP address.

### Scenario

A systems engineer has modified DHCP scope settings. A few of the clients have not received the new scope settings. The systems engineer has requested that you release and renew the address leases for those clients.

### Practice

#### ► Release and renew an IP address

1. Log on as *ComputerUser* with a password of **P@ssw0rd** (where *Computer* is the name of your computer).
2. Using Run as, open a command prompt as *Computer\*Administrator.
3. At the command prompt, type **ipconfig /all** and press ENTER.
4. Verify that the **DHCP enabled** attribute is **Yes** and that you have an IP address.
5. At the command prompt, type **ipconfig /release** and press ENTER.  
The IP address and subnet mask of your adapter should read **0.0.0.0**. You may receive an error message stating the local area connection is unavailable.
6. At the command prompt, type **ipconfig /renew** and press ENTER.  
The IP address and subnet mask of your adapter should be a valid IP address that begins with 192.168.x.
7. At the command prompt, type **ipconfig /all** and press ENTER.
8. Note the time of the **Lease Obtained** attribute. What date and time does it show?

---

**Answer:** The date and time should be the date and time at which the **ipconfig /renew** was issued.

9. Close all windows and log off.



## Lesson: Using Alternate Configuration

- 
- How Alternate Configuration Assigns IP Addresses
  - How APIPA Assigns IP Addresses

\*\*\*\*\*ILLEGAL FOR NON-TRAINER USE\*\*\*\*\*

### Introduction

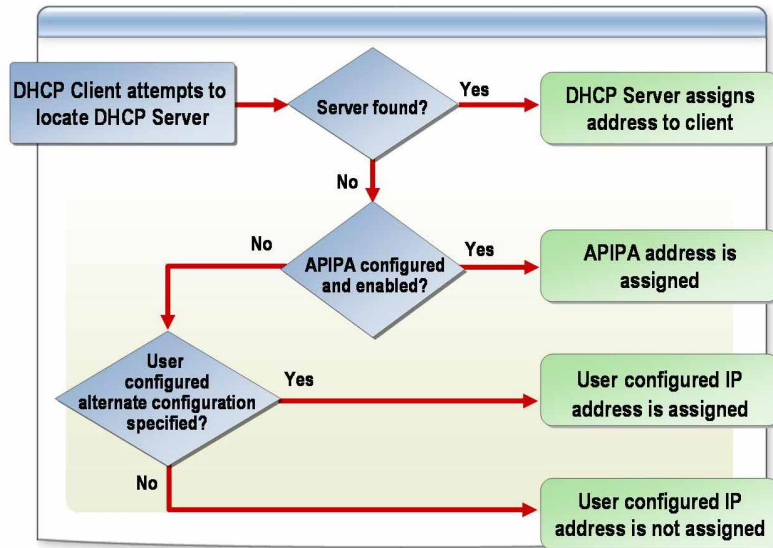
Alternate Configuration is a feature of Windows Server 2003 that you can use to streamline multiple-network connectivity. Alternate Configuration is useful when you are using a computer on more than one network and at least one of the networks does not have a DHCP server. Mobile computer users can use Alternate Configuration to automatically assign IP addresses on both office and home networks without having to manually reconfigure TCP/IP settings.

### Lesson objectives

After completing this lesson, you will be able to:

- Describe Alternate Configuration.
- Decide which Alternate Configuration method to use.
- Disable Alternate Configuration.

## How Alternate Configuration Assigns IP Addresses



\*\*\*\*\*ILLEGAL FOR NON-TRAINER USE\*\*\*\*\*

### Introduction

Using Alternate Configuration is another way to automatically assign dynamic IP addresses. Understanding how to use Alternate Configuration will help you determine how a client received a particular IP address.

### User configured Alternate Configuration

Alternate Configuration provides two methods of automatically assigning an IP address. User configured Alternate Configuration and APIPA.

### How to determine which Alternate Configuration method to use

User configured Alternate Configuration provides more detailed parameters than APIPA. In situations where you require a specific IP address and subnet mask for a client, or if you require a default gateway, DNS server, or WINS server, you should use Alternate Configuration. In this case, you must supply the required information for the user configured alternate configuration.

APIPA is most useful in situations where a reserved IP address in the range from 169.254.0.1 through 169.254.255.254 is acceptable, and you do not need access to a default gateway, DNS server, or WINS server.

### How Alternate Configuration works

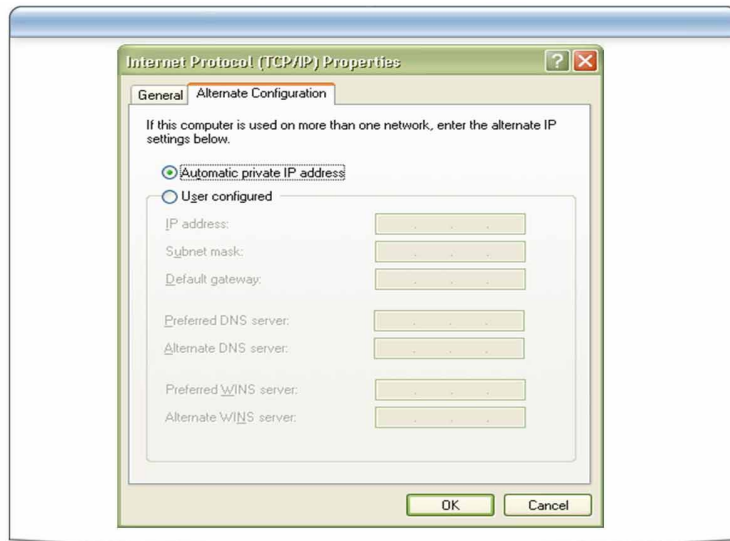
By default, a computer running Windows Server 2003 first tries to contact a DHCP server on the network to dynamically obtain configuration for each installed network connection. When the client contacts the server:

- If a DHCP server is reached and the leased configuration is successful, TCP/IP configuration is completed.
- If a DHCP server is not reached, by default the computer instead uses either APIPA or a user configured alternate configuration to automatically configure TCP/IP.

When specifying a user configured alternate configuration, you may also specify a default gateway, WINS servers, and DNS servers.

The **Alternate Configuration** tab is visible only if **Obtain an IP address automatically** is selected on the **General** tab of the **Internet Protocol (TCP/IP) Properties** dialog box.

## How APIPA Assigns IP Addresses



\*\*\*\*\*ILLEGAL FOR NON-TRAINER USE\*\*\*\*\*

### Introduction

APIPA is one of two Alternate Configuration features that you can use to specify an alternate configuration. You only use this method for a network that consists of a single subnet. When you use APIPA, you can create a functioning, single subnet TCP/IP network without having to manually configure the TCP/IP protocol or set up a DHCP server.

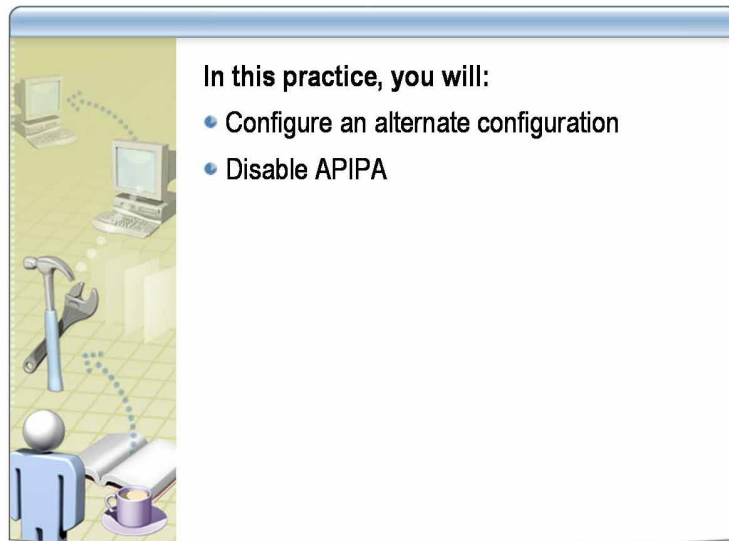
### What is APIPA?

APIPA is a feature in Windows Server 2003 that automatically configures an IP address. APIPA eliminates errors associated with missing IP addresses that often occur in single-network small office or home office networks that are not connected to the Internet.

### How APIPA works

If a DHCP server cannot be reached to assign an IP address automatically and APIPA has been selected as the mode of alternate configuration, Windows Server 2003 selects an address in the reserved IP-addressing class that ranges from 169.254.0.1 through 169.254.255.254 and assigns the subnet mask of 255.255.0.0. This method of obtaining an IP address is termed *Automatic Private IP Addressing*. In this method, DNS, WINS, or a default gateway are not assigned.

## Practice: Configuring Alternate Configuration



\*\*\*\*\*ILLEGAL FOR NON-TRAINER USE\*\*\*\*\*

### Introduction

In this practice, you will configure a client to use a user-configured Alternate Configuration and disable APIPA.

### Scenario

Bob, a laptop user, complains of the difficulty in constantly changing the network configuration when going from work to home and of occasionally receiving an IP address that begins with 169. Bob would like to prevent the 169 address from being assigned to his laptop. While at work, Bob's laptop obtains an IP address using DHCP. At home, Bob's laptop uses a static IP address that Bob must manually configure. You inform Bob that Windows XP has an alternate configuration feature that will allow him to continue network connectivity when going between work and home, without manually reconfiguring the network **Properties** page.

### Practice

#### ► Assign a static IP address

1. Log on as *Computer\Administrator* with a password of **P@ssw0rd** (where *Computer* is the name of your computer).
2. Click **Start**, point to **Control Panel**, point to **Network Connections**, and then click **Local Area Connection**.

The **Local Area Connection Status** dialog box appears.

3. Click **Properties**.

The **Local Area Connection Properties** dialog box appears.

4. Click **Internet Protocol (TCP/IP)**, and then click **Properties**.

The **Internet Protocol (TCP/IP) Properties** dialog box appears.

5. Click the **Alternate Configuration** tab.
6. Click **User Configured**.

7. Use the following tables to complete the Alternate Configuration property page (where  $x$  is the number of the network).

Computer Name	IP Address
Vancouver	192.168.x.11
Denver	192.168.x.12
Perth	192.168.x.13
Brisbane	192.168.x.14
Lisbon	192.168.x.15
Bonn	192.168.x.16
Lima	192.168.x.17
Santiago	192.168.x.18
Bangalore	192.168.x.19
Singapore	192.168.x.20
Casablanca	192.168.x.21
Tunis	192.168.x.22
Acapulco	192.168.x.23
Miami	192.168.x.24
Auckland	192.168.x.25
Suva	192.168.x.26
Stockholm	192.168.x.27
Moscow	192.168.x.28
Caracas	192.168.x.29
Montevideo	192.168.x.30
Manila	192.168.x.31
Tokyo	192.168.x.32
Khartoum	192.168.x.33
Nairobi	192.168.x.34

Property	Value
IP address	See table above
Subnet mask	255.255.255.0
Default gateway	192.168.x.1
Preferred DNS server	192.168.x.200
Alternate DNS server	192.168.x.201
Preferred WINS server	192.168.x.200
Alternate WINS server	192.168.x.201

8. To close the **Internet Protocol (TCP/IP) Properties** dialog box click **OK**.
9. To close the **Local Area Connection Properties** dialog box, click **Close**.
10. To close the **Local Area Connection Status** dialog box, click **Close**.

► **Verify alternate configuration settings**

1. Open a command prompt.
2. Type **ipconfig /all** and press ENTER, locate the **DHCP enabled** attribute. What is its value?

**Yes. DHCP is enabled.**

3. Locate the **Autoconfiguration Enabled** attribute. What is its value?

**Yes. Autoconfiguration is enabled.**

4. Note the IP address below:
- 



**Wait for your instructor to disable the LONDON network interface.**

5. At the command prompt, type **ipconfig /release** and press ENTER.

6. At the command prompt, type **ipconfig /renew** and press ENTER.

The following error message is displayed: **An error occurred while renewing interface Local Area Connection: unable to contact your DHCP server. Request has timed out.**

7. At the command prompt, type **ipconfig /all** and press ENTER.

8. Locate the **IP address** attribute.

How does the attribute read?

**Answer: Autoconfiguration IP Address. The attribute indicates that the address was not obtained using a DHCP server, but rather was obtained from the alternate configuration feature.**

9. Locate the **DHCP enabled** attribute.

What is its value?

**Answer: Yes. The client computer is still enabled for DHCP even though it cannot locate a DHCP server, therefore the parameter remains Yes.**

10. Locate the **Autoconfiguration enabled** attribute.

What is its value?

**Answer: Yes. In this practice you enabled autoconfiguration.**



**Wait for your instructor to enable the LONDON network interface.**

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► **Disable APIPA on the entire computer**

1. Click **Start**, click **Run**, type **regedit** and then click **OK**.
2. Use Registry Editor to navigate to the following registry key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters
```

3. On the **File** menu, click **Export**.
4. In the **File name** box, type **c:\tcpip\_parameters** and click **Save**.  
A copy of the registry key is exported. Use this to restore the key if necessary.
5. On the **Edit** menu, point to **New**, and then click **DWORD Value**.
6. Type **IPAutoconfigurationEnabled** and press ENTER.

---

**Note** Registry keys are often case-sensitive. Be sure to type the key exactly as shown.

---

7. Verify that **0x00000000 (0)** appears in the data column.
8. Close Registry Editor.

---

**Note** If the IPAutoconfigurationEnabled entry is not present, a default value of 1 is assumed, which indicates that APIPA is enabled.

---

9. Restart the computer using the information in the following table.

Parameter	Value
Option	Operating System: Reconfiguration (Planned)
Comment	Disabled APIPA

► **Verify Alternate Configuration is disabled**

1. Log on as *Computer\Administrator* with a password of **P@ssw0rd** (where *Computer* is the name of your computer).
2. Open a command prompt, type **ipconfig/all** and press ENTER.
3. Locate the **Autoconfiguration enabled** attribute.

What is its value?

**Answer: No**



**Wait for your instructor to disable the LONDON network interface.**

4. At the command prompt, type **ipconfig /release** and press ENTER.
5. At the command prompt, type **ipconfig /renew** and press ENTER.  
The following error message is displayed: An error occurred while renewing interface local Area Connection: unable to contact your DHCP server. Request has timed out.
6. At the command prompt, type **ipconfig /all** and press ENTER.
7. Locate the **IP address** attribute.

How does the attribute read?

**Answer: IP Address: 0.0.0.0. Alternate configuration has been disabled and no DHCP server is available to provide an IP address therefore the IP address reads 0.0.0.0.**

► **Renew the client's IP address**

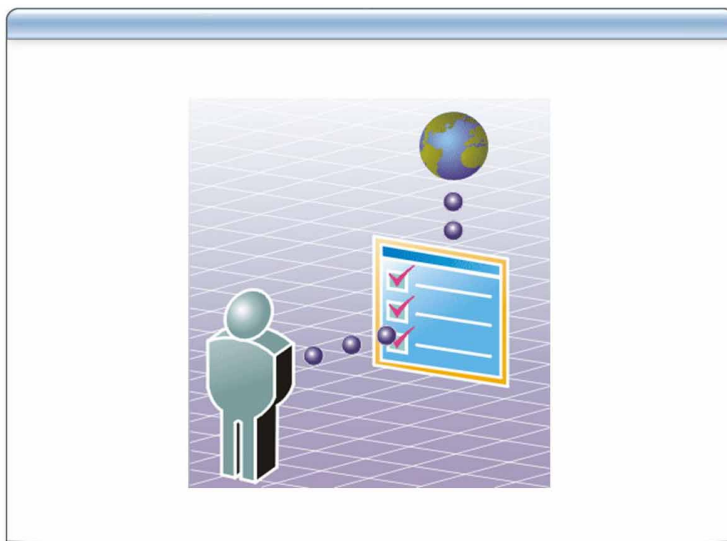


**Wait for your instructor to enable the London network interface.**

1. At the command prompt, type **ipconfig /renew** and press ENTER.
2. Verify that you have received an IP address.



## Course Evaluation



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Your evaluation of this course will help Microsoft understand the quality of your learning experience.

At a convenient time before the end of the course, please complete a course evaluation, which is available at <http://www.CourseSurvey.com>.

