Exit

Exits DHCP Manager.

Activate and Deactivate

Activate starts lease distribution, and Deactivate starts lease recall on the selected scope. You must activate a scope to make it available for use by DHCP clients. Do not activate a scope until all the desired options have been specified for the scope.

You must deactivate a scope before deleting it to enable the DHCP clients using the scope to seek leases for their IP addresses on another scope on the subnet. Otherwise, the clients lose their leases.

The DHCP server sends NACKs (negative acknowledgments) to DHCP clients that seek renewals of their leases from the deactivated scope. When the DHCP clients receive the NACKs, the clients return to the initialization phase and attempt to acquire new IP address leases from another active scope on the subnet.

Important

- Before deactivating a scope, a replacement scope should be active on the subnet. The replacement scope can be on a different DHCP server than the deactivated scope as long as the replacement scope is on the same subnet.
- Do not use Deactivate to pause a scope; this command should only be used before deleting a scope.
- By the time a scope has been deactivated for half its lease time, all clients that are up and running should have been forced to seek leases from the other active scope on the DHCP server.

Scope

An administrative grouping of computers running the DHCP Client service. The administrator creates a scope for each subnet on the network to define parameters for that subnet. A scope has the following properties:

- A unique subnet mask to determine the subnet related to a given IP address.
- A scope name assigned when the scope is created.
- Lease duration values to be assigned to DHCP clients that receive dynamically allocated IP addresses.

Delete

Deletes the selected scope.

Introduction to DHCP Servers

A Dynamic Host Configuration Protocol (DHCP) server is a computer running Windows NT Server, Microsoft TCP/IP, and the DHCP server software. DHCP is defined in Requests for Comments (RFCs) 1533, 1534, 1541, and 1542. Configuring DHCP servers for a network provides these benefits:

- The administrator can centrally specify global and subnet-specific TCP/IP parameters for the entire internetwork and define parameters for clients using reserved addresses.
- Client computers do not require manual TCP/IP configuration. When a client computer moves between subnets, it is automatically reconfigured for TCP/IP when the computer is started.

Important

- If you want to use a DHCP server to support subnets that span multiple routers, you may need a firmware upgrade for your routers. Your routers must support RFCs 1533, 1534, 1541, and 1542. To find out about DHCP-relay agent support, contact your router vendor. For more information, refer to RFC1542.TXT available via anonymous FTP from ftp.internic.net:/rfc.

See Also

Overview of DHCP Clients and Servers

Overview of DHCP Clients and Servers

DHCP uses a client-server model. The network administrator establishes one or more DHCP servers that maintain TCP/IP configuration information and provide it to clients. The server database includes the following:

- Valid configuration parameters for all clients on the internetwork.
- Valid IP addresses maintained in a pool for assignment to clients, plus reserved addresses for manual assignment.
- Duration of leases offered by the server. The lease defines the length of time for which the assigned IP address can be used.

A computer running Windows NT becomes a DHCP client if **Obtain an IP address from a DHCP server** is selected in Windows NT TCP/IP. When a DHCP client computer is started, it communicates with a DHCP server to receive the required TCP/IP configuration information. This configuration information includes at least an IP address and submask plus the lease associated with the configuration.

Configuring DHCP servers for a network provides the following benefits:

- The administrator can specify global and subnet-specific TCP/IP parameters centrally for the entire internetwork.
- Client computers do not require manual TCP/IP configuration.
- When a client computer moves between subnets, the old IP address is freed for reuse, and the client is reconfigured for TCP/IP automatically when the computer is started.
- Most routers can forward DHCP configuration requests, so DHCP servers are not required on every subnet in the internetwork.

Lease

The length of time for which a dynamically assigned IP address can be used. Before the lease expires, the DHCP client must renew the lease with the DHCP server.

Using DHCP Manager

DHCP Manager is added to Administrative Tools (Common) when you install the DHCP server service. After you install a DHCP server, you must use DHCP Manager to perform these basic tasks:

- Create DHCP Scopes and Superscopes. This performs all the tasks necessary to begin providing DHCP services.
- Define Properties for Scopes. This includes the IP address ranges to be distributed to potential DHCP clients by servers in the scope.
- View DHCP Server Properties. This includes options for logging DHCP server activity, conflict detection, and configuring the BOOTP Table.
- Configure DHCP Option Types. This includes defining default values for DHCP options such as lease durations, or add any custom options.

Important

- When you are working with DHCP Manager, all computer names are Domain Name System (DNS) names only. The full path specification may be used, such as **accounting.trey.com**, or a name may be specified relative to the local domain.

  In the previous example, other computers in the **trey.com** DNS domain can refer simply to **accounting**. The DNS host name is not necessarily the same as the NetBIOS computer name used in Windows NT networking.

See Also

Create DHCP Scopes

Define Properties for Scopes

DHCP Option Types

DHCP Option

The configuration parameters that a DHCP server assigns to a client.

Most options are predefined, based on the parameters defined in RFC 1542.

The administrator assigns options by choosing commands on the **DHCP Options** menu.

BOOTP Table

The BOOTP table lists the names of boot file types requested by BOOTP clients and the names of files and the servers where these files can be retrieved by BOOTP clients.

Starting DHCP Manager

To start DHCP Manager

1 Click **Start,** point to **Programs**, then to **Administrative Tools (Common)**, and then click **DHCP Manager**.

You automatically connect to the servers and scopes to which you were last connected. The DHCP Manager window shows a list of the scopes for the current server. You can connect to additional servers.

To connect to a DHCP server

1 On the **Server** menu, click **Add**.

2 Type the DHCP Server name or IP address, and click **OK**.

To disconnect from a selected DHCP server

On the **Server** menu, click **Remove**.

Starting and Stopping the DHCP Server Service

To start or stop the DHCP Server service

1 In Control Panel, double-click the Services icon.

2 In the **Service** list, click **Microsoft DHCP Server**, then click **Start**, **Stop**, **Pause** or **Continue**.

Notes

- You can also start and stop the DHCP Server service at the command prompt using the commands **net start dhcpserver**, **net stop dhcpserver**, **net pause dhcpserver**, or **net continue dhcpserver**.
- By default, the Microsoft DHCP Server service starts automatically when the computer is started.

Viewing DHCP Server Properties

To view the DHCP server properties

- On the **Server** menu, click **Properties**.

Note

- Properties is disabled unless a server address is selected.
- Properties include logging DHCP server activity, detecting potential address conflicts, and configuring information in the BOOTP table is available in this dialog box. By default, these options are not enabled.

See Also

General Server Properties

BOOTP Table

General Server Properties

Use this dialog box to log DHCP server activity and to detect potential address conflicts.

Fields

DHCP Logging

Conflict Detection

DHCP Logging

Select this check box if you want to log the activity of the DHCP server in a text file (.log). The file can be useful if it is necessary to troubleshoot the DHCP server.

Conflict Detection

Use this option to specify the number of times the DHCP server should test an IP address before offering a DHCP lease for the address.

BOOTP Table

Records can be added, removed, and edited in the BOOTP table.

BOOTP is a predecessor to DHCP with the important difference that BOOTP does not support the concepts of address leases and lifetimes. A BOOTP client assumes the IP address granted it through a BOOTP exchange has an infinite lifetime.

BOOTP address management is similar to DHCP address management for hosts that need permanent reservations.

BOOTP clients are configured in the same manner as DHCP reserved clients. For more information about reserving clients, see Managing Client Reservations.

If a host requires a particular filename and/or a file server returned in a BOOTP request, the administrator can set DHCP options 066 and 067 (**Boot Server Host Name** and **Bootfile Name** respectively) using one of the configuration parameters in the **DHCP Options** menu.

Fields

Add

Remove

Edit

See Also

Managing Client Reservations

DHCP Options

Add

Click this button to add an entry to the BOOTP table. You must specify the boot image, filename, and file server of the IP address.

The boot image is the type of file the BOOTP client requests which identifies its machine type. The filename returned by the DHCP server to the BOOTP client is the name of file on the specified file server where the client can receive a boot image of the requested boot image type.

Remove

Use this button to remove an entry from the BOOTP table.

Edit

Use this button to edit a BOOTP table entry.

Add BOOTP Entry

Use this dialog box to add the following information required by BOOTP clients to the BOOTP table.

- The boot image is the type of file the BOOTP client requests that identifies its machine type.
- The filename returned by the DHCP server to the BOOTP client.
- The server where the boot image resides.

Introduction to DHCP Scopes

A DHCP scope is a grouping of computers running the DHCP client service in a subnet. The scope is used to define parameters for each subnet.

Each scope has the following properties:

- A unique subnet mask used to determine the subnet related to a given IP address.
- A scope name assigned by the administrator when the scope is created.
- Lease duration values to be assigned to DHCP clients with dynamic addresses.

See Also

Creating Scopes

Changing Scope Properties

Removing a Scope

Creating and Deleting Superscopes

Creating Scopes

You must use DHCP Manager to create, manage, or remove scopes. and superscopes.

To create a new DHCP scope

1. In the **DHCP Servers** list in the DHCP Manager window, select the server for which you want to create a scope.
2. On the **Scope** menu, click **Create**.
3. To define the available range of IP addresses for the scope, type the beginning and ending IP addresses for the range in the **Start Address** and **End Address** boxes.

   You must supply this information to activate the scope on the primary server.
4. In the **Subnet Mask** box, DHCP Manager proposes a subnet mask, based on the values of the **Start Address** and **End Address**. Accept the proposed value, unless you know that a different value is required.
5. To define excluded addresses within the IP address pool range, use the **Exclusion Range** controls, as follows:

- Type the first IP address of the excluded range in the **Start Address** box, type the last IP address of the excluded range in the **End Address** box, and then click **Add**. Continue to define any other excluded ranges in the same way.
- To exclude a single IP address, type the number in the **Start Address** box. Leave the **End Address** box empty.
- To remove an IP address or a range from the excluded range, click it in the **Excluded Addresses** box, and then click **Remove**. The excluded ranges should include all IP addresses that you assigned manually to other DHCP servers, non-DHCP clients, diskless workstations, or RAS and PPP clients.

6. To specify the lease duration for IP addresses in the scope, click **Limited To,** and then type values defining the number of **Days**, **Hours**, and **Seconds** for the length of the address lease.

   If you do not want IP address leases in the scope to expire, click **Unlimited**. Unlimited, or infinite, leases should be used with caution.
7. In the **Name** box, type a scope name of up to 128 characters.

   This is any name you want to use to describe the subnet. The name can include any combination of letters, numbers, and hyphens.
8. Optionally, in the **Comment** box, type any string to describe the scope.

Notes

- When you finish creating a scope, a message reminds you that the scope has not been activated and allows you to click **Yes** to activate the scope immediately. However, you should not activate a new scope until you have specified the DHCP options for this scope.
- The IP address range includes the Start and End values. This range should not include addresses of existing statically configured computers. Either these static addresses should be outside the range for the scope, or they should be immediately excluded from the range. Because the DHCP server itself is statically configured, be sure that its IP address is outside of, or excluded from, the range of the scope.

To activate a DHCP scope

- On the **Scope** menu, click **Activate**.

  The menu command name changes to **Deactivate** when the selected scope is currently activated.

See Also

Creating and Deleting Superscopes

Superscopes

Superscopes add another level of hierarchy to DHCP servers. Superscopes are nested beneath the server pane. Superscopes enable DHCP servers to manage multiple logical IP subnets on a single physical subnet such as an Ethernet segment. Superscopes are useful if more hosts must be added on a wire than originally planned or if the network is renumbered.

Distinct scopes can be grouped within a single superscope. The scopes are then referred to as child scopes.

Changing Scope Properties

The subnet identifiers and address pool make up the properties of scopes.

You can change the properties of an existing scope.

You cannot exclude a range of addresses that includes an active lease. You must first delete the active lease, and then retry the exclusion.

You can extend the address range of the scope, but you cannot reduce it. You can, however, exclude any unwanted addresses from the range.

To define the properties of a DHCP scope

1 In the **DHCP Servers** list in the DHCP Manager window, select the scope for which you want to change properties.
2 On the **Scope** menu, click **Properties**.
3 For more information on changing scope values, see Creating Scopes.

See Also

Managing Client Leases

Removing a Scope

When a subnet is no longer in use, or any other time you want to remove an existing scope, you can remove it using DHCP Manager. If any IP address in the scope is still leased or in use, you must first activate the scope until the client's lease expires or the client's lease extension request is denied.

When a scope is deactivated, it does not acknowledge lease or renewal requests, so existing clients lose their leases at renewal time and reconfigure with another available DHCP server. To ensure that all clients migrate smoothly to a new scope, you should deactivate the old scope for at least half of the lease time, or until all clients have been moved off the scope manually. To move a client manually, type **ipconfig /renew** at the Command Prompt of the client computer, and then restart the computer if necessary.

To remove a scope

1 In the **Scopes** list in the DHCP Manager window, select the scope you want to remove.

   The scope should be deactivated until you are sure the scope is not in use.

2 On the **Scope** menu, click **Deactivate**.

   The command name changes to **Activate** when the scope is deactivated.

3 On the **Scope** menu, click **Delete**.

Creating and Deleting Superscopes

Superscopes enable DHCP servers to manage multiple logical IP subnets on a single physical subnet such as an Ethernet segment. Superscopes are useful if more hosts must be added on a wire than originally planned or if the network is renumbered because several distinct scopes can be added to a single superscope. Scopes that are within superscopes are called child scopes.

To create a superscope

1 On the **Scope** menu, click **Superscopes**.

2 Click **Create Superscope**.

3 Type the name of a superscope and then click **OK**.

To delete a superscope

1 In the **Superscope Name** list, select the name of the superscope that you want to delete**.**

2 Click **Delete Superscope**.

Note

- Deleting a superscope does not delete its child scopes.

See Also

Adding and Removing Scopes from Superscopes

Adding and Removing Scopes from Superscopes

To add a scope to a superscope

1 On the **Scope** menu, click **Superscopes**.

2 In the **Superscope Name** list, select the name of the superscope to which you are adding scopes**.**

3 In the **Available Scopes** list, select a scope, and then click **Add**.

To remove a scope from a superscope

In the **Child Sub-Scopes** list, select the scope and then click **Remove**.

Create Superscope

Enter the name of a superscope.

Introduction to DHCP Option Types

The configuration parameters that a DHCP server assigns to a client are defined as DHCP options using DHCP Manager. Most options you will want to specify are predefined, based on standard parameters defined by the Internet Network Working Group in RFC 1541.

When you configure a DHCP scope, you can assign option types to govern all configuration parameters. You can also define, edit, or delete option types.

See Also

Assigning DHCP Configuration Options

Predefined DHCP Client Configuration Options

Adding New Option Types

Assigning DHCP Configuration Options

Besides the IP addressing information, other DHCP options to be passed to DHCP clients must be configured for each scope.

Options can be defined globally for all scopes, specifically for a selected scope, or for individual DHCP clients:

- Active global option types always apply, unless overridden by scope or DHCP client settings.
- Active option types for a scope apply to all computers in that scope, unless overridden for an individual DHCP client.

The Microsoft DHCP network packet allocates 312 bytes for DHCP options. That is more than enough for most option configurations. With some DHCP servers and clients, you can allocate unused space in the DHCP packet to additional options. This feature, called option overlay, is not supported by Microsoft DHCP Server. If you attempt to use more than 312 bytes, some options settings will be lost. In that case, you should delete any unused or low-priority options.

If you are using a third-party DHCP server, be aware that Microsoft DHCP clients do not support options overlays, either. If your option set is larger than 312 bytes, be sure that the settings used by Microsoft DHCP clients are included at the beginning of the option list. Settings beyond the first 312 bytes are not read by Microsoft DHCP clients.

To assign DHCP configuration options

1. In the **DHCP Servers** list in the DHCP Manager window, select the scope you want to configure.
2. On the **DHCP Options** menu, click **Global** or **Scope**, depending on whether you want to define option settings for all scopes on the currently selected server or the scope currently selected in the DHCP Manager window.
3. In the **Unused Options** list, select the name of the DHCP option that you want to apply, and then click **Add** to move the name to the **Active Options** list.

   This list shows both predefined options and any custom options that you created. For example, if you want to specify DNS servers for computers, click **DNS Servers** in the **Unused Options** list, and then click **Add**.

   If you want to remove a DHCP option that has been assigned for this class, click its name in the **Active Options** box, and then click **Remove**.
4. To define the value for an active option, click its name in the **Active Options** box, click **Values**, and then edit the information in the **Current Value** box, depending on the data type for the option, as follows:
   - For an IP address, type the assigned address for the selected option.
   - For a number, type an appropriate decimal or hexadecimal value for the option.
   - For a string, type an appropriate ASCII string containing letters and numbers for the option.

   For example, to specify the DNS name servers to be used by DHCP clients, click **DNS Servers** in the **Active Options** list, and then type a list of IP addresses for DNS servers in the **Current Value** box. The list should be in the order of preference, so that the first server in the list is the first server to be consulted.

Changing Option Values

You can change the values for the predefined and custom DHCP option types.

Options that take an array of IP addresses have a default value of 0.0.0.0. You should reset the default value of any such options you intend to use, or be sure to set a different value when you assign the option either globally or for a selected scope as described in Assigning DHCP Configuration Options.

To change an option type value

1. On the **DHCP Options** menu, click **Defaults**.
2. In the **Option Class** list, click the option class for which you want to change values.
3. If you want to change the default value for an option, click the option you want to change in the **Option Name** list, click **Edit**, and then type a new value in the **Default Value** box.

   Clicking **Edit** displays a special dialog box for editing strings, arrays of IP addresses, or binary values.
4. If you want to change basic elements of a custom option, click it in the **Option Name** list, and then click **Change**.

   You can change the name, data type, identifier, and comment for an option type, following the procedures described earlier in Adding New Option Types.

Adding New Option Types

You can add custom parameters to include with DHCP client configuration information. You can also change values or other elements of the predefined DHCP option types.

To add new option types

1. On the **DHCP Options** menu, click **Defaults**.
2. In the **Option Class** list, click the class for which you want to add new option types, and then click **New**.
   The option class can include the DHCP standard option types or any custom option types that you add.
3. In the **Name** box, type a new option name.
4. In the **Data Type** list, click the data type for this option as described in the following list.
   Binary = Value expressed as a binary array
   Byte = An 8-bit, unsigned integer
   Encapsulated = An array of unsigned bytes
   IP address = An IP address of the form w.x.y.z
   Long = A 32-bit, signed integer
   Long integer = A 32-bit, unsigned integer
   String = An ASCII text string
   Word = A 16-bit, unsigned integer
5. If the data type represents an array, click **Array**.
6. In the **Identifier** box, type a unique code number to associate with the option type.
   Be careful to enter a unique number. DHCP Manager does not check for duplicate entries.
7. In the **Comment** box, type a description of the option type, and then click **OK**.
8. In the **Value** box of the **DHCP Options: Default Values** dialog box, type the value to be configured by default for this option type.

To delete an option type

1. On the **DHCP Options** menu, click **Defaults**.
2. In the **Option Class** list, click the related option class.
3. In the **Option Name** list, click the option you want to delete, and then click **Delete**.

Note

- You can delete custom option types, but you cannot delete any predefined option types.

Defining Options for Reservations

You can assign DHCP options and specify custom values for DHCP clients that use reserved IP addresses. Reservations are created in the **Add Reserved Client** dialog box.

To change options for reservations

1. On the **Scope** menu, click **Active Leases**.
2. In the **IP Address** list, click the reservation address that you want to change, click **Properties**, and then click **Options**.

   The **Options** button is only available for reserved addresses; it is not available for DHCP clients with dynamic addresses.
3. In the **DHCP Options: Reservation** dialog box, click an option name in the **Unused Options** list, and then click **Add** to move the name to the **Active Options** list.

   If you want to remove an option type that has been assigned to the scope, click its name in the **Active Options** box, and then click **Remove**.
4. To change a value for an option selected in the **Active Options** list, click **Value**, and then enter a value in the **Current Value** box.

Reservation

A specific IP address that is reserved for a specific DHCP client. An entry in the DHCP database is created for a reserved client by clicking **Add Reservations** on the **Scope** menu.

Predefined DHCP Client Configuration Options

The following topics describe the predefined DHCP options provided for DHCP configuration, which are defined in RFC 1533.

Basic Options

IP Layer Parameters per Host

IP Parameters per Interface

Link Layer Parameters per Interface

TCP Parameters

Application Layer Parameters per Interface

Vendor-Specific Information (NetBIOS Over TCP/IP and X Windows)

Basic Options

You can use Microsoft DHCP Server to set any of the options whose code and option name are listed in *italic type*. If you have third-party DHCP clients, you can set any option listed that is supported by the third-party client software.

An asterisk (*) denotes that the list is specified in order of preference, so that the first in the list is the first to be used.

0 = Pad

Causes subsequent fields to align on word boundaries.

255 = End

Indicates end of options in the DHCP packet.

1 = Subnet mask

Specifies the subnet mask of the client subnet. This option is defined in the **Create Scope or Scope Properties** dialog box. It cannot be set directly in an Option dialog box.

2 = Time offset

Specifies the Universal Coordinated Time (UCT) offset in seconds.

3 = Router

Specifies a list of IP addresses for routers on the client's subnet.*

4 = Time server

Specifies a list of IP addresses for time servers available to the client.*

5 = Name servers

Specifies a list of IP addresses for name servers available to the client.*

6 = DNS servers

Specifies a list of IP addresses for DNS name servers available to the client.* Multihomed computers can have only one list per computer, not one per adapter card.

7 = Log servers

Specifies a list of IP addresses for MIT_LCS User Datagram Protocol (UDP) log servers available to the client.*

8 = Cookie servers

Specifies a list of IP addresses for RFC 865 cookie servers available to the client.*

9 = LPR servers

Specifies a list of IP addresses for RFC 1179 line-printer servers available to the client.*

10 = Impress servers

Specifies a list of IP addresses for Imagen Impress servers available to the client.*

11 = Resource location servers

Specifies a list of RFC 887 Resource Location servers available to the client.*

12 = Host name

Specifies the host name of up to 63 characters for the client. The name must start with a letter, end with a letter or digit, and have as interior characters only letters, numbers, and hyphens. The name can be qualified with the local DNS domain name.

13 = Boot file size

Specifies the size of the default boot image file for the client, in 512-octet blocks.

14 = Merit dump file

Specifies the ASCII path name of a file where the client's core image is dumped if a crash occurs.

15 = Domain name

Specifies the DNS domain name the client should use for DNS host name resolution.

16 = Swap server

Specifies the IP address of the client’s swap server.

17 = Root path

Specifies the ASCII path name for the client’s root disk.

18 = Extensions path

Specifies a file retrievable via TFTP containing information interpreted the same as the vendor-extension field in the BOOTP response, except the file length is unconstrained and references to Tag 18 in the file are ignored.

IP Layer Parameters per Host

The following lists IP layer parameters on a per-host basis.

19 = IP layer forwarding

Enables or disables forwarding of IP packet for this client. 1 enables forwarding; 0 disables it.

20 = Nonlocal source routing

Enables or disables forwarding of datagrams with non-local source routes. 1 enables forwarding; 0 disables it.

21 = Policy filter masks

Specifies policy filters that consist of a list of pairs of IP addresses and masks specifying destination/mask pairs for filtering nonlocal source routes. Any source routed datagram whose next-hop address does not match a filter will be discarded by the client.

22 = Max datagram reassembly size

Specifies the maximum size datagram that the client can reassemble. The minimum value is 576.

23 = Default time-to-live

Specifies the default time-to-live (TTL) that the client uses on outgoing datagrams. The value for the octet is a number between 1 and 255.

24 = Path MTU aging timeout

Specifies the timeout in seconds for aging Path Maximum Transmission Unit (MTU) values (discovered by the mechanism defined in RFC 1191).

25 = Path MTU plateau table

Specifies a table of Maximum Transmission Unit (MTU) sizes to use when performing Path MTU Discovered as defined in RFC 1191. The table is sorted by size from smallest to largest. The minimum MTU value is 68.

IP Parameters per Interface

The following lists IP parameters on a per-interface basis. These options affect the operation of the IP layer on a per-interface basis. A client can issue multiple requests, one per interface, to configure interfaces with their specific parameters.

26 = Interface MTU

Specifies the Maximum Transmission Unit (MTU) discovery size for this interface. The minimum MTU value is 68.

27 = All subnets are local

Specifies whether the client assumes that all subnets of the client's internetwork use the same MTU as the local subnet where the client is connected. 1 indicates that all subnets share the same MTU; 0 indicates that the client should assume some subnets may have smaller MTUs.

28 = Broadcast address

Specifies the broadcast address used on the client's subnet.

29 = Perform mask discovery

Specifies whether the client should use Internet Control Message Protocol (ICMP) for subnet mask discovery. 1 indicates the client should perform mask discovery; 0 indicates the client should not.

30 = Mask supplier

Specifies whether the client should respond to subnet mask requests using ICMP. 1 indicates the client should respond; 0 indicates the client should not respond.

31 = Perform router discovery

Specifies whether the client should solicit routers using the router discovery method in RFC 1256. 1 indicates that the client should perform router discovery; 0 indicates that the client should not use it.

32 = Router solicitation address

Specifies the IP address to which the client submits router solicitation requests.

33 = Static route

Specifies a list of IP address pairs that indicate the static routes the client should install in its routing cache. Any multiple routes to the same destination are listed in descending order or priority. The routes are destination/router address pairs. The default route of 0.0.0.0 is an illegal destination for a static route.

Link Layer Parameters per Interface

The following lists link layer parameters per interface. These options affect the operation of the data link layer on a per-interface basis.

34 = Trailer encapsulation

Specifies whether the client should negotiate use of trailers (RFC 983) when using the ARP protocol. 1 indicates the client should attempt to use trailer; 0 indicates the client should not use trailers.

35 = ARP cache timeout

Specifies the timeout in seconds for ARP cache entries.

36 = Ethernet encapsulation

Specifies whether the client should use Ethernet v. 2 (RFC 894) or IEEE 802.3 (RFC 1042) encapsulation if the interface is Ethernet. 1 indicates that the client should use RFC 1042 encapsulation; 0 indicates the client should use RFC 894 encapsulation.

TCP Parameters

The following shows TCP parameters. These options affect the operation of the TCP layer on a per-interface basis.

37 = Default time-to-live

Specifies the default TTL the client should use when sending TCP segments. The minimum value of the octet is 1.

38 = Keepalive interval

Specifies the interval in seconds the client TCP should wait before sending a keepalive message on a TCP connection. A value of 0 indicates that the client should not send keepalive messages on connections unless specifically requested by an application.

39 = Keepalive garbage

Specifies whether the client should send TCP keepalive messages with an octet of garbage data for compatibility with older implementations. 1 indicates that a garbage octet should be sent; 0 indicates that it should not be sent.

Application Layer Parameters per Interface

The following list defines application layer parameters. These are miscellaneous options that are used to configure applications and services.

An asterisk (*) denotes that the list is specified in order of preference, so that the first in the list is the first to be used.

40 = NIS domain name

Specifies the name of Network Information Service (NIS) domain as an ASCII string.

41 = NIS servers

Specifies a list of IP addresses for NIS servers available to the client.*

42 = NTP servers

Specifies a list of IP addresses for Network Time Protocol (NTP) servers available to the client.*

Vendor-Specific Information

The following options are for vendor-specific information. You can use Microsoft DHCP Server to set any of the options shown whose code and option name are *listed in italic type*. If you have third-party DHCP clients, you can set any option listed that is supported by the third-party client software.

An asterisk (*) denotes that the list is specified in order of preference, so that the first in the list is the first to be used.

43 = Vendor specific info

Binary information used by clients and servers to exchange vendor-specific information. Servers not equipped to interpret the information ignore it. Clients that expect but don't receive the information attempt to operate without it.

NetBIOS over TCP/IP

44 = WINS/NBNS servers

Specifies a list of IP addresses for NetBIOS name servers (NBNS).*

45 = NetBIOS over TCP/IP NBDD

Specifies a list of IP addresses for NetBIOS datagram distribution servers (NBDD).*

46 = WINS/Netbt node type

Allows configurable NetBIOS over TCP/IP clients to be configured as described in RFC 1001/1002, where 1=b-node, 2=p-node, 4=m-node, and 8=h-node. On multihomed computers, the node type is assigned to the entire computer, not to individual adapter cards.

47 = NetBIOS scope ID

Specifies a string that is the NetBIOS over TCP/IP Scope ID for the client, as specified in RFC 1001/1002. On multihomed computers, the scope ID is assigned to the entire computer, not to individual adapter cards.

48 = X Window system font

Specifies a list of IP addresses for X Window font servers available to the client.*

49 = X Window system display

Specifies a list of IP addresses for X Window System Display Manager servers available to the client.*

DHCP Extensions

51 = Lease time

Specifies the time in seconds from address assignment until the client's lease on the address expires. Lease time is specified in the **Create Scope** or **Scope Properties** dialog box. It cannot be set directly in a **DHCP Options** dialog box.

58 = Renewal (T1) time value

Specifies the time in seconds from address assignment until the client enters the renewing state. Renewal time is a function of the lease time option, which is specified in the **Create Scope** or **Scope Properties** dialog box. It cannot be set directly in a **DHCP Options** dialog box.

59 = Rebinding (T2) time value

Specifies the time in seconds from address assignment until the client enters the rebinding state. Rebinding time is a function of the lease time option, which is specified in the **Create Scope** or **Scope Properties** dialog box. It cannot be set directly in a **DHCP Options** dialog box.

Introduction to Administering DHCP Clients

After you have established the scope and defined the range of available and excluded IP addresses, DHCP-enabled clients can begin using the service for automatic TCP/IP configuration.

You can use DHCP Manager to manage individual client leases, including adding and managing reservations for clients.

Managing Client Leases

The lease for the IP address assigned by a DHCP server has an expiration date, which the client must renew if it is going to continue to use that address. You can view the lease duration and other information for specific DHCP clients and add and change configuration settings for reserved DHCP clients.

Information about active leases in the currently selected scope is shown in the **Active Leases** dialog box. In addition to information on individual leases and reservations, the **Active Leases** dialog box also shows the total number of addresses in the scope, the number and percentage of addresses that are currently unavailable because they are active or excluded, and the number and percentage of addresses that are currently available.

Because the count of active leases and excluded addresses is an aggregate, it may not tell you what you want to know about only the active leases. The Active/Excluded count when a scope is deactivated reflects only excluded addresses. To determine the number of active leases and reservations, compare the Active/Excluded count before and after the scope is activated.

Leases are retained in the DHCP server database approximately one day after expiration. This grace period protects a client's lease in case the client and server are in different time zones, the two computers' clocks are not synchronized, or the client computer is off the network when the lease expires. These expired leases are included in the aggregate Active/Excluded count, as well as in the list of active clients in the **Active Leases** dialog box. They are distinguished by a dimmed icon.

You can delete the lease of any DHCP client in the scope. The main reason for doing so is to remove a lease that conflicts with an IP address exclusion or a client reservation that you want to add. Deleting a lease has the same effect as if the client's lease expired: the next time that client computer starts, it must enter the initialization state and obtain new TCP/IP configuration information from a DHCP server. There is nothing, however, to prevent the client from obtaining a new lease for the same IP address. You must make the address unavailable before the client requests another lease.

Delete only entries for clients that are no longer using the assigned DHCP lease or that are to be moved immediately to a new address. Deleting an active client could result in duplicate IP addresses on the network, because deleted addresses will be assigned to new active clients. After you delete a client's lease and set a reservation or exclusion, you should always use **ipconfig /release** on the client computer to force the client to free its IP address.

To view client lease information

1. In the **DHCP Servers** list in the DHCP Manager window, click the scope for which you want to view or change client information.
2. On the **Scope** menu, click **Active Leases**.
3. Select the computer whose lease you want to view in the **Client** list, and then click **Properties**. Or, if you want to view only clients that use reserved IP addresses, click **Show Reservations Only**.
4. In the **Client Properties** dialog box, you can view the **Unique Identifier** and other client information, including the lease expiration date.

   You can only edit values or click **Options** in the **Client Properties** dialog box for clients with reserved IP addresses. For information about the **Options** button in this dialog box, see Defining Options for Reservations.

To delete a client's lease

1. In the **IP Address** list, click the client lease you want to cancel, and then click **Delete**. Or, if you want to cancel leases for all clients in the scope, click **Delete All**.
2. Make a reservation with the IP address, or exclude it from the range.
3. Force the client with the existing lease to give it up. At the command prompt on the client computer, type **ipconfig /release**
4. If you want, give this client a new IP address. At the command prompt on the client computer, type **ipconfig /renew**.

Managing Client Reservations

You can reserve a specific IP address for a client. Typically, you will need to do this if the client uses an IP address that was assigned using another method for TCP/IP configuration.

If multiple DHCP servers are distributing addresses in the same scope, the client reservations on each DHCP server should be identical. Otherwise, the DHCP reserved client will receive different IP addresses, depending on the responding server.

If you want to change a reserved IP address for a client, you have to remove the old reserved address, and then add a new reservation. You can change any other information about a reserved client while keeping the reserved IP address.

Reserving an address does not automatically force a client who is currently using the address to move elsewhere. If you are reserving a new address for a client, or an address that is different from the client's current one, you should verify that the address has not already been leased by the DHCP server. If the address is already in use, the client that is using it must release the address by issuing a release request. To make this happen, at the command prompt of the client computer, type **ipconfig /release**. Clients using MS-DOS, and possibly clients using third-party operating systems, will have to restart their computers for the change to take effect. Because the client's current address is now reserved, the client is moved to a different address.

Reserving an address also does not force the client for whom the reservation is made to move to the reserved address. In this case, too, the client must issue a renewal request. At the command prompt of the client computer, type **ipconfig /renew**, and then restart the computer if necessary. The DHCP server will note that the client has a reserved address and will move the client.

After the IP address is reserved in DHCP Manager, restart the client computer to configure it with the new IP address.

To add a reservation for a client

1. On the **Scope** menu, click **Add Reservations**.
2. Type information to identify the first reserved client:
   - **IP Address** specifies an address from the reserved address pool. You can specify any reserved, unused IP address. DHCP Manager checks and warns you if a duplicate or non-reserved address is entered.
   - **Unique Identifier** specifies the media access control (MAC) address for the client computer's network adapter card. You can determine this address by typing **net config wksta** at the command prompt on the client computer.
   - **Client Name** specifies the computer name for the client. This is used for identification purposes only and does not affect the actual computer name for the client.
   - **Client Comment** is any optional text that you enter to describe the client.
3. Click **Add** to add the reservation to the DHCP database. You can continue to add reservations without closing this dialog box.

To change the reserved IP address

1. In the **Active Leases** dialog box, click the reserved IP address, click **Delete**, and then click **OK**.
2. On the **Scope** menu, click **Add Reservations**, and then enter information for a new reservation as described earlier in this section.

To change basic information for a reserved client

1. On the **Scope** menu, click **Active Leases**.
2. In the **IP Address** list, click the address of the reserved client that you want to change, and then click **Properties**.
3. In the **Client Properties** dialog box, change the **Unique Identifier**, **Client Name**, or **Comment**, and then click **OK**. You can only change values in the **Client Properties** dialog box for reserved clients.

Note

- You can also view and change the DHCP option types that define configuration parameters for clients with reservations, as described in Defining Options for Reservations.

Remove

Removes the selected DHCP server from the list in the DHCP Manager window.

Add DHCP Server To Server List

Use the **Add DHCP Server To Server List** dialog box to specify the name of the DHCP server you want to connect to. This dialog box appears when you click **Add** on the **Server** menu.

To add a DHCP Server to the list

- Type the DHCP Server name or IP address, and then click **OK**.

Create Scope and Scope Properties

Use the **Create Scope** dialog box to create a new scope for a subnet. This dialog box appears when you click **Create** on the **Scope** menu.

Use the **Scope Properties** dialog box to change the address pool for a scope. This dialog box appears when you click **Properties** on the **Scope** menu.

Fields

IP Address Pool Start and End

Subnet Mask

Exclusion Range Start and End

Excluded Addresses

Lease Duration: Unlimited or Limited To

Name

Comment

Lease Duration: Unlimited or Limited To

If you do not want leases to expire for this scope, click **Unlimited**.

To define when leases should expire for this scope, use the boxes to specify the number of **Days**, **Hours**, and **Minutes** that the lease will last before expiring.

Subnet ID

To identify the subnet associated with this scope, in the **Subnet ID** box, type the first IP address for the related subnet.

Subnet Mask

In the **Subnet Mask** box , type the subnet mask for the related subnet.

This is 255.0.0.0 for a Class A address, 255.255.0.0 for a Class B address, and 255.255.255.0 for a Class C address.

IP Address Pool Start and End

To define the available range of IP addresses for this scope, type the beginning and ending IP addresses for the range in the **Start Address** and **End Address** boxes.

The pool includes the addresses entered for the Start and End values.

Note that you must supply this information to activate the scope on the primary server.

Exclusion Range Start and End

To define excluded addresses within the IP address pool range, use the **Exclusion Range** controls, as follows:

- In **Start Address**, type the first IP address in the excluded range. In **End Address**, type the last IP address in the excluded range. Click **Add**. Continue to define any other excluded ranges in the same way.
- To exclude a single IP address, type the IP address in **Start Address**, and leave **End Address** empty.

The excluded ranges should include all IP addresses that you assigned manually to other DHCP servers, non-DHCP clients, diskless workstations, or RAS clients. These addresses are not available for automatic DHCP configuration.

Excluded Addresses

To remove an IP address, click the IP Address, and then click **Remove**.

Name

Type a scope name of up to 128 characters.

This is any name you want to use to describe the subnet. The name can include any combination of letters, numbers, and hyphens.

Comment

Type any string to describe the scope.

Sort Order

If you want the Client list to appear in IP address order, click **Sort Leases By IP Address**.

If you want to view the list by DNS name, click **Sort Leases By Name**.

Active Leases

Use this dialog box to view or change client information for the scope selected in the DHCP Manager window. To display this dialog box, on the **Scope** menu, click **Active Leases**.

Fields

Client

Properties

Delete

Reconcile

Show Reservations Only

Sort Order

Options

Lease Expires

Reconcile

Runs the reconcile program to reconcile the DHCP database with the Registry. When you reconcile the DHCP database with the Registry, a consistency check is done on the DHCP database. All inconsistent IP addresses are listed. Inconsistent IP addresses are addresses that the Registry says are leased but the DHCP database does not reflect this information. The consistency check is performed at the scope level. Therefore, if a server is configured with multiple scopes, reconcile should be run separately for each scope.

Run the reconcile program whenever a DHCP database is restored from a backup copy or after a system crash. It is also a good idea to run the reconcile program periodically to keep the DHCP database clean.

IP Address

In the **IP Address** list, click the computer whose lease you want to view or change.

Lease Expires

For the selected client, shows the date and time set for the current IP address lease to expire.

Client Identifier

Shows the unique identifier that specifies the media access control (MAC) address for the client computer's network adapter card.

You can view this address on the client computer by typing **net config wksta** at the command prompt.

Client Name

Type a new name in the **Client Name** box to change the identifier for the selected client.

This is used for identification purposes only and does not affect the actual computer name for the client.

Comment

Type any text to describe the selected client.

Show Reservations Only

To view only clients that use reserved IP addresses, click **Show Reservations Only**.

Options

To change the option types for reserved clients, in the **IP Address** list, click a reserved client, and then click **Options** to display the **DHCP Options: Reservation** dialog box.

This button only appears for reserved clients.

Properties

To change the properties for reserved clients, in the **IP Address** list, click a reserved client, and then click **Properties** to display the **Client Properties** dialog box.

Delete

To cancel a client's DHCP configuration, in the **IP Address** list, click the client you want to cancel, and then click **Delete**.

Add Reserved Clients: Client Properties

Use this dialog box to add, view, or change information for a specified client. To display this dialog box for adding a new reservation, click **Add Reservations** on the **Scope** menu. To display this dialog box for viewing information or changing information for a reserved client, in the **Client** dialog box, click the client name, and click **Properties**.

Fields

IP Address

Unique Identifier

Client Name

Client Comment

Options

IP Address

Type a unique IP address from the reserved address pool.

You can specify any reserved, unused IP address when you are adding a new reservation.

You cannot change the reserved IP address when you are changing information about a reserved client. To change the address for a reserved client, you must delete it in the **Client** dialog box, and then add a new reservation by clicking **Add Reservations** on the **Scope** menu.

Unique Identifier

Type a unique identifier that specifies the media access control (MAC) address for the client computer's network adapter card.

You can determine this address by typing **net config wksta** at the command prompt on the client computer.

Client Name

Type the computer name for this client.

This is used for identification purposes only and does not affect the actual computer name for the client.

Client Comment

Type any optional text that you want to describe this client.

DHCP Options: Global, Scope, or Reservation

Use this dialog box to assign DHCP options for all scopes on a DHCP server or for a selected scope. To display this dialog box, on the **DHCP Options** menu, click either **Global** or **Scope**.

You can also use this dialog box to change option types for reservations. To display this dialog box for reserved clients, on the **Scope** menu, click **Active Leases**, and in the **Client** list, click the reservation address that you want to change. Click **Properties**, and then click **Options**. For a new reserved client, click **Options** in the **Add Reservations** dialog box.

Fields

Options For

Unused Options

Active Options

Value

Current Value

Value Button

Click **Value** to display or edit the current value for the selected option.

Option Class

Shows the Option type for which these settings apply -- standard or reservations.

Options For

Shows the unique identifier for the DHCP server where these option types are defined.

Active Options

If you want to remove an option type that has been assigned for this class, click its name in the **Active Options** box, and then click **Remove**.

Unused Options

In the **Unused Options** list, click the name of the option type that you want to apply, and then click **Add** to move the name to the **Active Options** list.

This list shows both predefined options and any custom options that you add. For example, if you want to allow the computers in a selected scope to be able to request specific lease durations, click **Address Lease Time** in the **Unused Options** list, and then click **Add**.

Current Value

To define the value for an active option, click its name in the **Active Options** box, and then edit the information in the **Current Value** box, depending on the data type for the option, as follows:

For an IP address, type the assigned address for the selected option.

For a number, type an appropriate decimal or hexadecimal value for the option.

For a string, type an appropriate ASCII string containing letters and numbers for the option.

For example, to specify the DNS name servers to be used by the clients in a scope, click **DNS Server** in the **Active Options** list, and then type a list of IP addresses for DNS servers in the **Current Value** box.

Add or Edit Option Type

Use this dialog box to add or edit custom DHCP option types.

To display this dialog box, click **Defaults** on the **DHCP Options** menu , and then click the class you want to change. To add a new option type, click **New**. To edit an existing custom option type, click the **Option Name** you want to edit, and then click **Properties**.

Fields

Class

Name

Data Type

Array

Identifier

Comment

Class

Describes the **Option Class** selected in the **DHCP Options: Default Values** dialog box.

Name

In the **Name** box, type a new option name.

Data Type

In the **Data Type** list, click a data type for this option:

Binary = Value expressed as an array of bytes

Byte = An 8-bit, unsigned integer

Encapsulated = An array of unsigned bytes

IP address = An IP address of the form w.x.y.z

Long = A 32-bit, signed integer

Long integer = A 32-bit, unsigned integer

String = An ASCII text string

Word = A 16-bit, unsigned integer

Array

If this data type represents an array, click **Array**.

Identifier

In the **Identifier** box, type a unique code number to be associated with this option type.

Comment

Type a description of the option type.

DHCP Options: Default Values

Use this dialog box to change the default value for selected DHCP option types, and to add, delete, or edit custom option types. To display this dialog box, click **Defaults** on the **DHCP Options** menu.

Fields

Option Class

Option Name

Default Value

Comment

New

Delete

Change

Edit

Option Class

In the **Option Class** list, click the option class of the option type that you want to view or change.

Option Name

In the **Option Name** list, click the option type you want to view or change.

Default Value

In this box, type the value to be configured by default for this option type, then click **OK**.

If the data type for this option requires binary input or is an array, the **Edit** button appears so that you can display a special dialog box for editing the default value.

Comment

Shows the comment defined in the **Add Option Type** dialog box for the selected option.

New

To add a new custom option type, click **New**. Then you can define a **Name**, **Data Type**, and **Identifier** in the **Add Option Type** dialog box.

Delete

To delete an option type, in the **Option Name** list, click the option you want to delete, and then click **Delete**.

Change

To change the value for an option type selected in the **Option Name** list, click **Change**. Then click **Edit** and enter the appropriate information.

Edit and Data Type

The data type displayed is the type that was predefined for this option or that was defined in **the Add Option Type** dialog box. The **Edit** button appears if the value for the selected option is an array.

Click **Edit** to display the **IP Array Edit** dialog box or the **Binary Editor** dialog box, depending on the data type of the selected option.

IP Address Array Editor

Use this dialog box to change the default IP address values for a selected option type. To display this dialog box, click an **Option Name** in the **DHCP Options: Default Values** dialog box that is an array and that uses IP addresses as its data type. Then click **Edit**.

Fields

Application and Option

New IP Address

IP Addresses

Server Name

Resolve

Application and Option

Specifies **Global**, **Scope**, **Reservation** as a class type, and specifies the selected option being edited.

New IP Address

Type a new IP address to add to the list, and then click **Add** to move it to the IP Addresses list.

IP Addresses

Shows the IP addresses that are part of the array that makes up the current default value.

To add a new value to the list, type an address in the **New IP Address** box, and then click **Add**. Or, to remove an address, click it, and then click **Remove**.

For most IP address values, the list is specified in order of preference, so that the first in the list is the first to be used. To change the order of an address in the list, click it, and then click **Up** or **Down** to move it to a new position.

Server Name

To specify the DHCP server where these IP addresses are defined, type a name or IP address in the box. To resolve a name, click **Resolve**.

Resolve

To resolve a server name as an IP address, click **Resolve**.

Numeric Value Array Editor

Use this dialog box to change the default values for a selected option type. To display this dialog box, click an **Option Name** in the **DHCP Options: Default Values** dialog box that is an array and that uses numeric values as its data type. Then click **Edit**.

Fields

Application and Option

Unit Size

New Value

Current Values

Data Entry Mode

Unit Size

Specifies the data size for the value, in octets.

New Value

Specifies a new value to be added to the array.

Type a value in the **New Value** box, and then click **Add** to move the value to the **Current Values** list.

Current Values

Shows the values that are part of the array that makes up the current default value.

To add a new value to the list, type a number in the **New Value** box, and then click **Add**.

To remove an address, click it and click **Remove**.

For most values, the list is specified in order of preference, so that the first in the list is the first to be used. To change the order of a value in the list, click it, and then click **Up** or **Down** to move it to a new position.

Data Entry Mode

To specify how you want to enter values, click **Decimal** or **Hexadecimal**.

Next Pane

Moves the active working area to the other pane in the DHCP Manager window.

Split

Allows you to move the split bar between the panes in the DHCP Manager window. Drag the mouse, and then click when the bar is in the position you want.

Status Bar

Displays the status bar at the bottom of the DHCP Manager window. The status bar shows information about the currently selected command or the current activity, and it also shows whether a selected scope is activated.

Click **Help Topics** to see a list of Help topics.