

DHCP Server (Dynamic Host Configuration Protocol)



The Dynamic Host Configuration Protocol (DHCP) is an Internet Engineering Task Force (IETF) standard designed to reduce the administration burden and complexity of configuring hosts on a Transmission Control Protocol/Internet Protocol (TCP/IP)-based network, such as a private intranet.

By using DHCP server computers to centrally manage IP addresses and other related configuration parameters, using DHCP client computers to request and accept TCP/IP configuration information from DHCP servers, and using DHCP relay agents to pass information between DHCP clients and servers, the process of configuring TCP/IP on DHCP clients is automatic.

Benefits of DHCP

In Windows Server 2003, the DHCP Server service provides the following benefits:

- **Reliable IP address configuration.** DHCP minimizes configuration errors caused by manual IP address configuration, such as typographical errors, or address conflicts caused by the assignment of an IP address to more than one computer at the same time.
- **Reduced network administration.** DHCP includes the following features to reduce network administration:
 - Centralized and automated TCP/IP configuration.
 - The ability to define TCP/IP configurations from a central location.
 - The ability to assign a full range of additional TCP/IP configuration values by means of DHCP options.
 - The efficient handling of IP address changes for clients that must be updated frequently, such as those for portable computers that move to different locations on a wireless network.
 - The forwarding of initial DHCP messages by using a DHCP relay agent, thus eliminating the need to have a DHCP server on every subnet.

Why use DHCP

Every device on a TCP/IP-based network must have a unique unicast IP address to access the network and its resources. Without DHCP, IP addresses must be configured manually for new computers or computers that are moved from one subnet to another, and manually reclaimed for computers that are removed from the network.

DHCP enables this entire process to be automated and managed centrally. The DHCP server maintains a pool of IP addresses and leases an address to any DHCP-enabled client when it starts up on the network. Because the IP addresses are dynamic (leased) rather than static (permanently assigned), addresses no longer in use are automatically returned to the pool for reallocation.

The network administrator establishes DHCP servers that maintain TCP/IP configuration information and provide address configuration to DHCP-enabled clients in the form of a lease offer. The DHCP server stores the configuration information in a database, which includes:

- Valid TCP/IP configuration parameters for all clients on the network.
- Valid IP addresses, maintained in a pool for assignment to clients, as well as excluded addresses.
- Reserved IP addresses associated with particular DHCP clients. This allows consistent assignment of a single IP address to a single DHCP client.
- The lease duration, or the length of time for which the IP address can be used before a lease renewal is required.

A DHCP-enabled client, upon accepting a lease offer, receives:

- A valid IP address for the subnet to which it is connecting.
- Requested DHCP options, which are additional parameters that a DHCP server is configured to assign to clients. Some examples of DHCP options are Router (default gateway), DNS Servers, and DNS Domain Name. For a full list of DHCP options, ***Study “DHCP Tools and Settings.”***