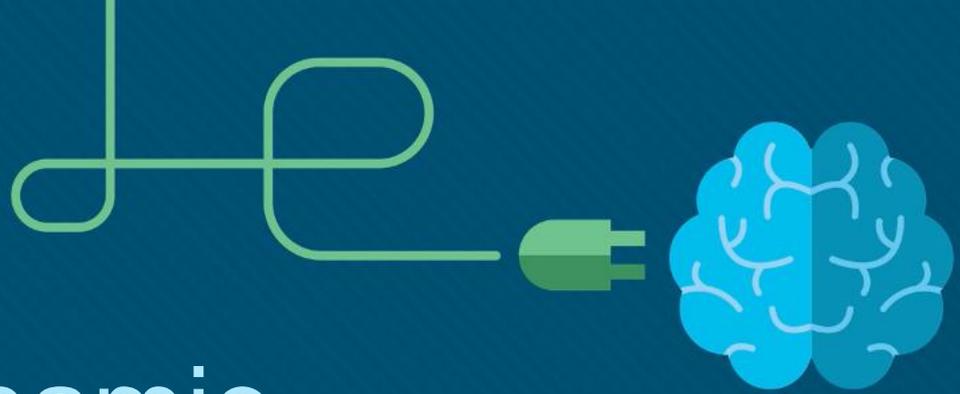




Module 9: Dynamic Addressing with DHCP

Networking Essentials (NETESS)



Module Objective

Module Title: Dynamic Addressing with DHCP

Module Objective: Configure a DHCP server.

Topic Title	Topic Objective
Static and Dynamic Addressing	Compare static and dynamic IPv4 addressing.
DHCPv4 Configuration	Configure a DHCPv4 server to dynamically assign IPv4 addresses.

9.1 Static and Dynamic Addressing

Static and Dynamic Addressing

Static IPv4 Address Assignment

- IPv4 addresses can be assigned either statically or dynamically.
- With a static assignment, the host IPv4 address must be configured manually, together with subnet mask, default gateway, and DNS server address.
- Static addresses are typically assigned for printers, servers, and other networking devices that need to retain a fixed IP address to provide services.
- Static assignment can be time consuming to implement. It is prone to errors because manual configuration is required.

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

Obtain an IP address automatically

Use the following IP address:

IP address: 192 . 168 . 1 . 32

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 1 . 1

Obtain DNS server address automatically

Use the following DNS server addresses:

Preferred DNS server: 172 . 16 . 33 . 5

Alternate DNS server: 172 . 16 . 33 . 6

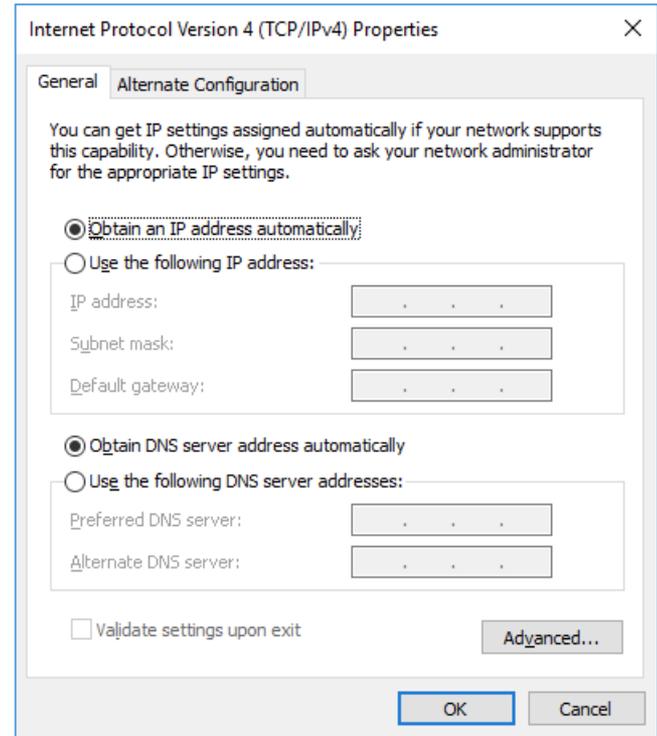
Validate settings upon exit

Advanced...

OK Cancel

Dynamic IPv4 Address Assignment

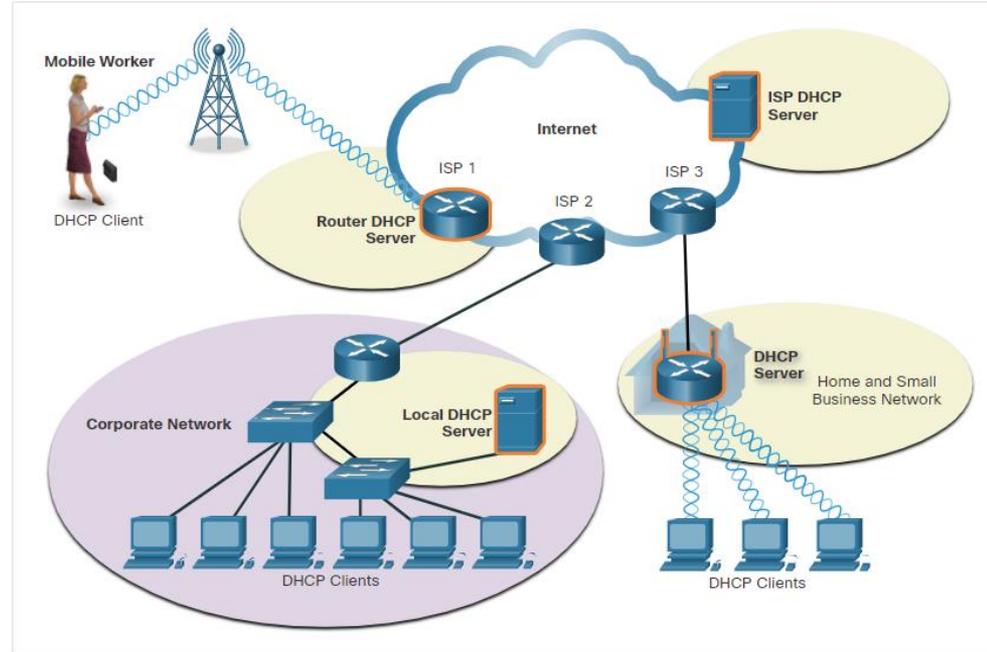
- IPv4 addresses can be dynamically assigned to end devices through an application protocol known as Dynamic Host Configuration Protocol (DHCP).
- DHCP automatically assigns addressing information such as IPv4 address, subnet mask, default gateway, and other configuration information.
- Benefits of using DHCP include:
 - Reduces the burden on network support staff and virtually eliminates entry errors.
 - A dynamic IP address is not permanently assigned to a host but is only leased for a period of time.



Static and Dynamic Addressing

DHCP Servers

- A device can be a DHCP server if it is running the DHCP service software.
- DHCPv4 servers are typically connected to a LAN because it uses broadcast. DHCPv4 servers deployed outside of a LAN will require relay service.
- In a home network or SOHO, a wireless router provides DHCP service to end devices. It is also a DHCP client to get IPv4 address from ISP.



9.2 DHCPv4 Configuration

DHCPv4 Configuration

Video - DHCPv4 Operation

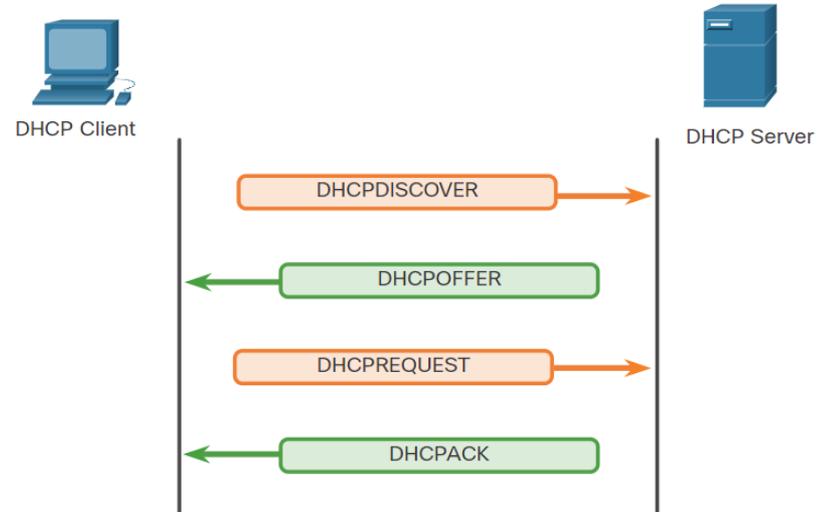
The video player interface features a grid of images including birch trees, a group of people, a woman's portrait, a network diagram, and a circuit board. A black title bar contains the Cisco logo and the text "Networking Essentials | How Does IPv4 DHCP Work?". The bottom control bar includes a play button, a progress bar at 0:01, and icons for Creative Commons, volume, settings, and full screen.



DHCPv4 Configuration

DCHPv4 Operation

- When a host is configured using DHCP, it will try to obtain an IPv4 address, subnet mask, default gateway, and DNS server from a DHCP. The process is as follows:
 - The client sends a DHCPDISCOVER message using broadcast.
 - A DHCP server responds with a DHCPOFFER message with a set of IPv4 addressing information.
 - The client then sends a DHCPREQUEST message to request the use of IPv4 addressing information offered by the DHCP server.
 - The DHCP server responds with a DHCPACK message to grant the request from the client.



DHCPv4 Configuration

Video - DHCP Service Configuration

The video player interface shows a collage of images. The central text reads "Networking Essentials | DHCP Service Configuration". The video player controls at the bottom include a play button, a progress bar at 0:01, and icons for closed captions, volume, settings, and full screen.



DHCPv4 Configuration

DHCP Service Configuration

- To configure a home wireless router, access its graphical web interface by opening the browser and entering the router default IPv4 address: 192.168.0.1 in the IP Address field.
- The IPv4 address of 192.168.0.1 and subnet mask of 255.255.255.0 are the defaults for the internal router interface. This is the default gateway for all hosts on the local network. Ensure the DHCP server is enabled.
- Specify the DHCP IPv4 address range with a starting address (**do not use 192.168.0.1** because the router is assigned this address) and the number of addresses to be assigned.

The screenshot displays the configuration page for a Wireless Router. The interface is titled "Wireless Router1" and shows the "Setup" tab selected. The "Internet Setup" section is active, with "Automatic Configuration - DHCP" selected. The "Network Setup" section is also visible, showing the Router IP configuration. The DHCP Server Settings are configured as follows:

Field	Value
Router IP	192.168.0.1
Subnet Mask	255.255.255.0
DHCP Server	Enabled
Start IP Address	192.168.0.100
Maximum number of Users	50
IP Address Range	192.168.0.100 - 149

Packet Tracer - Configure DHCP on a Wireless Router

In this activity, you will complete the following objectives:

- Connect 3 PCs to a wireless router.
- Change the DHCP setting to a specific network range.
- Configure the clients to obtain their address via DHCP.

9.3 Dynamic Addressing with DHCP Summary

What Did I Learn in this Module?

- IPv4 addresses can be assigned either statically or dynamically.
- A static assignment must be manually configured on a host.
- When using static IPv4 addressing, maintain an accurate list of which IPv4 addresses are assigned to which devices is difficult.
- Dynamic addressing uses DHCP to provides automatic assignment of addressing information such as IPv4 address, subnet mask, default gateway, and other IPv4 networking parameters.
- DHCP can allocate IP addresses for a configurable period of time, called a lease period.
- Many networks use both DHCP and static addressing. DHCP is used for general purpose hosts, such as end user devices. Static addressing is used for network devices, such as gateway routers, switches, servers, and printers.
- A DHCPv4 client and DHCPv4 servers use DHCP messages to initiate and complete a dynamic IPv4 addressing assignment.

Module 9 - Dynamic Addressing with DHCP

New Terms and Commands

- DHCP protocol
- DHCP client
- DHCP server
- DHCP operation
- DHCP range
- DHCPDISCOVER
- DHCPOFFER
- DHCPREQUEST
- DHCPACK

