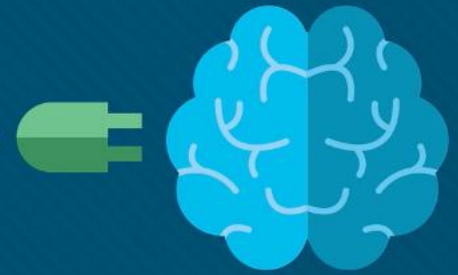


Module 9: Dynamic Addressing with DHCP

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.

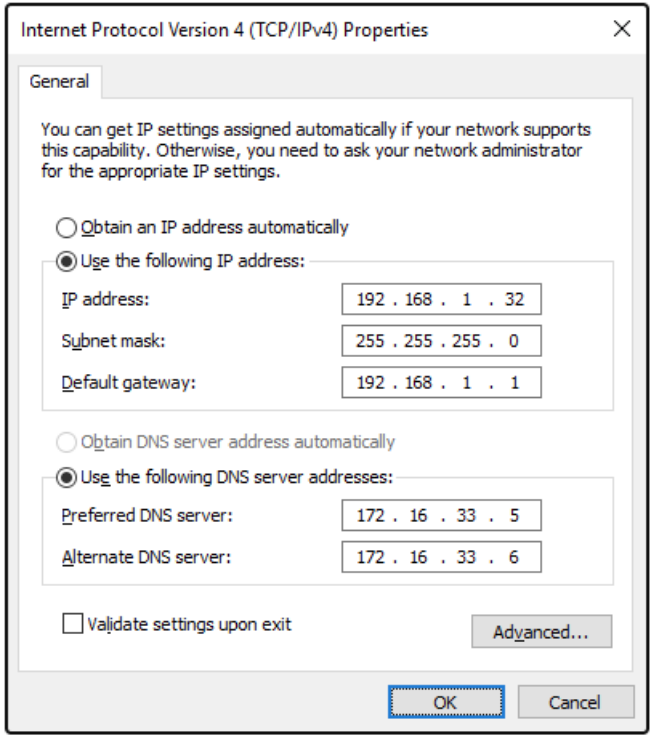
© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

9.1 Static and Dynamic Addressing

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

Static IPv4 Address Assignment

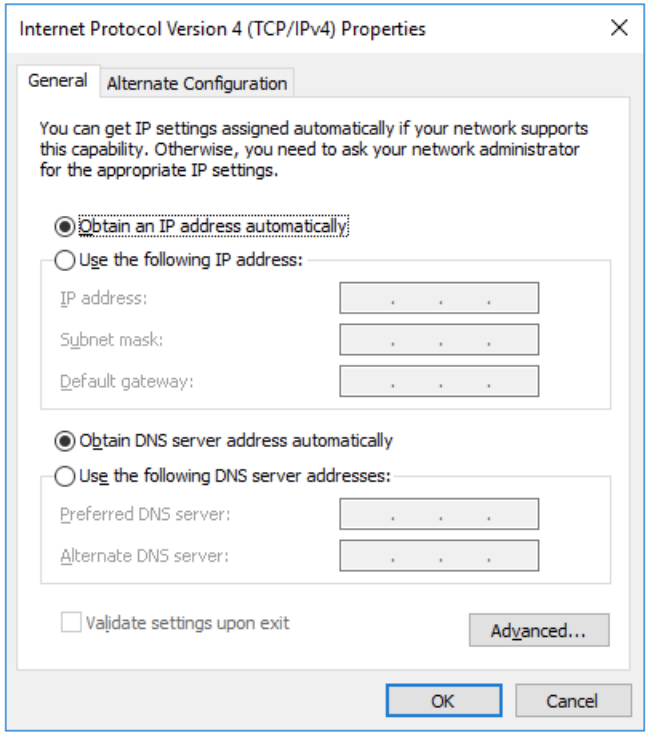
- IPv4 addresses can be assigned either statically or dynamically.
- With a static assignment, the host IPv4 address must be configured manually, together with subnet mask, default gateway, and DNS server address.
- Static addresses are typically assigned for printers, servers, and other networking devices 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.



© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

Dynamic IPv4 Address Assignment

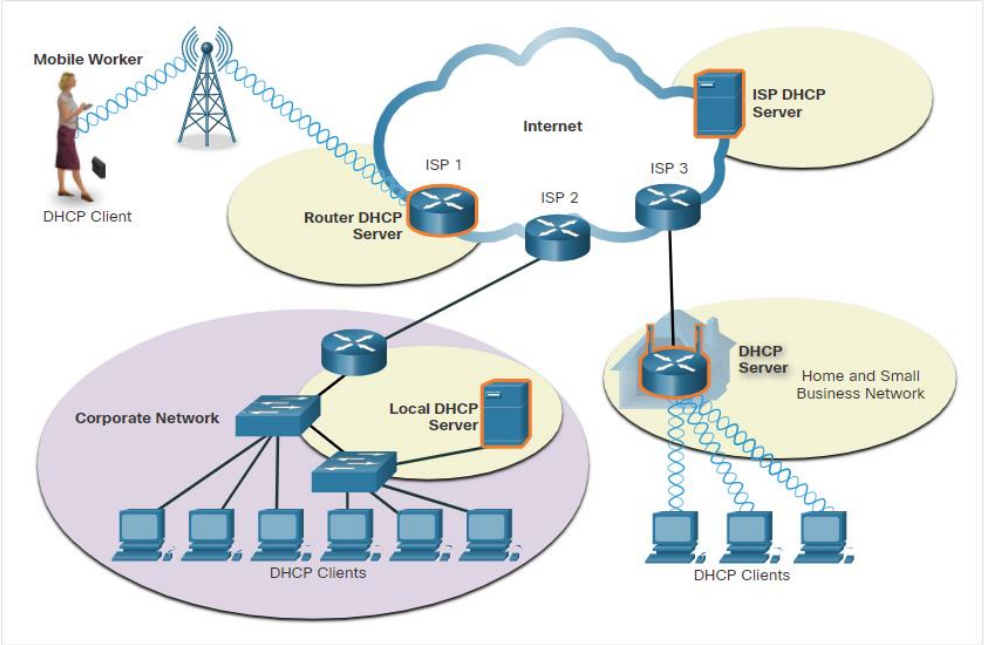
- IPv4 addresses can be dynamically assigned to end devices through an application protocol known as Dynamic Host Configuration Protocol (DHCP).
- DHCP automatically assigns addressing information such as IPv4 address, subnet mask, default gateway, and other configuration information.
- Benefits of using 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.



© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

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.

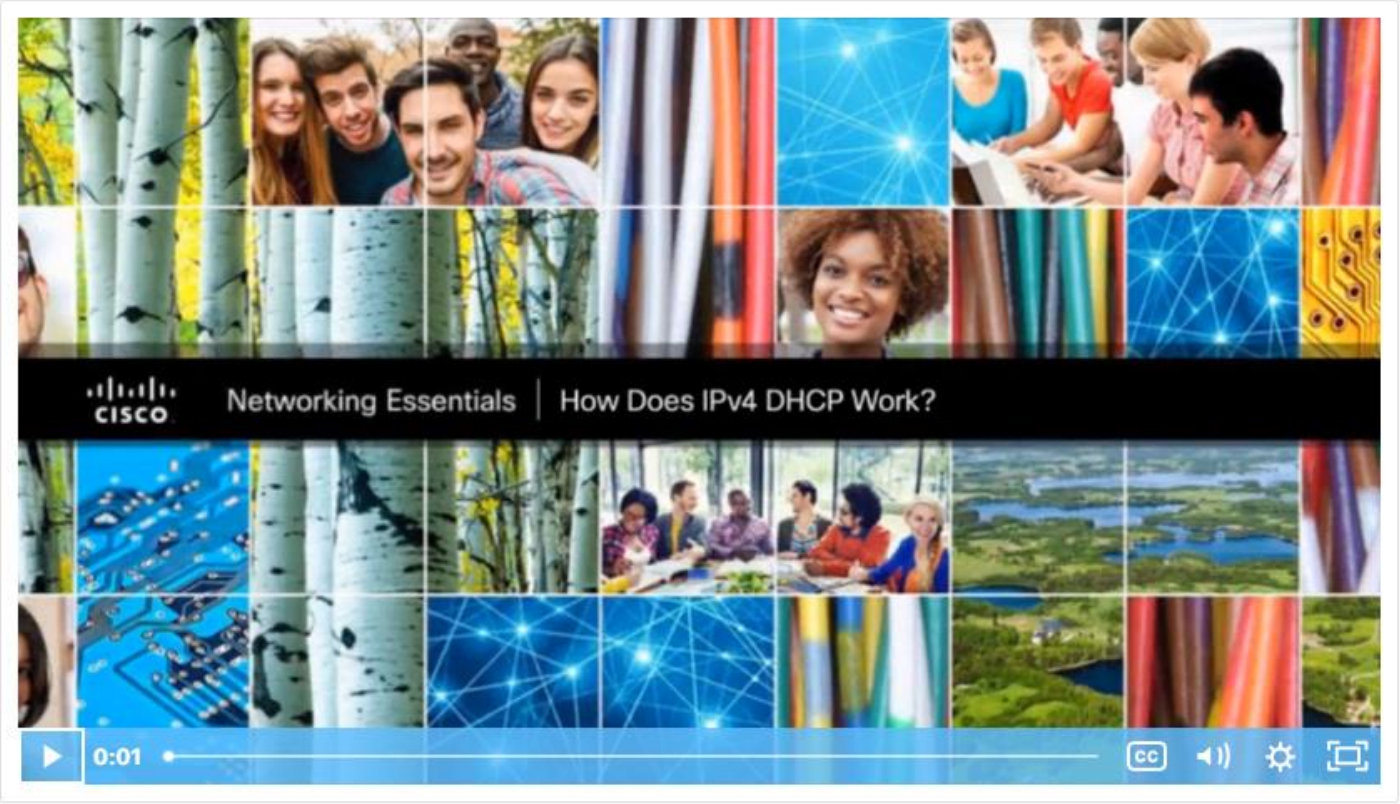


© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

9.2 DHCPv4 Configuration

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

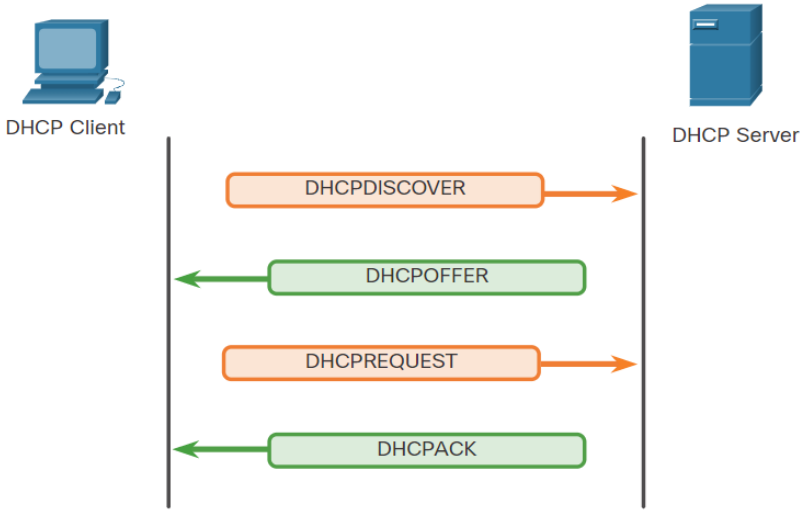
Video - DHCPv4 Operation



© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

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 SHCP server.
  - The DHCP server responds with a DHCPACK message to grant the request from the client.



© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

Video - DHCP Service Configuration

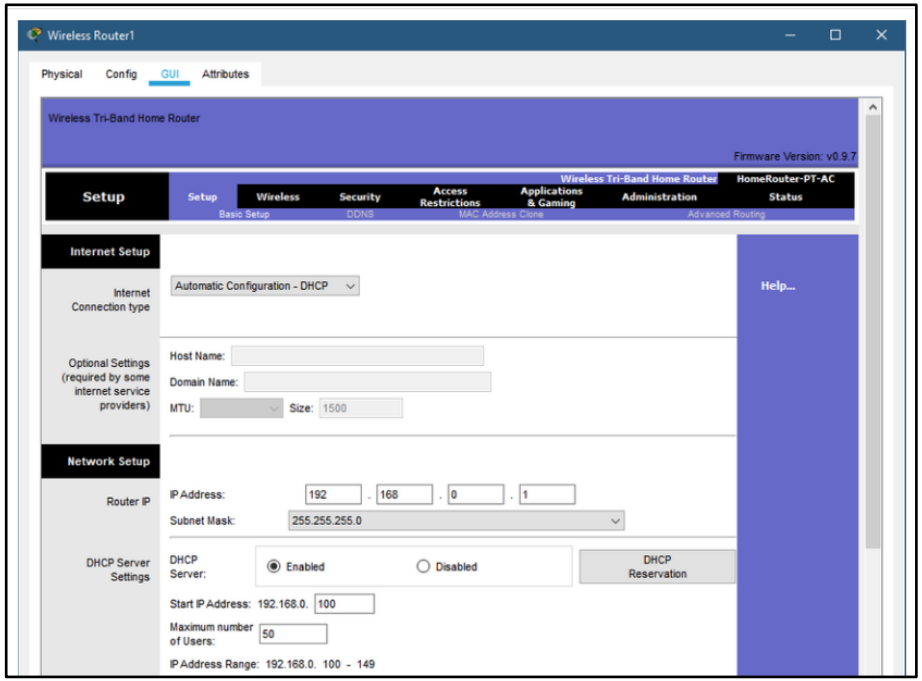
© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

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.



© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

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.

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

9.3 Dynamic Addressing with DHCP Summary

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

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.

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

Module 9 - Dynamic Addressing with DHCP

New Terms and Commands

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

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

CISCO