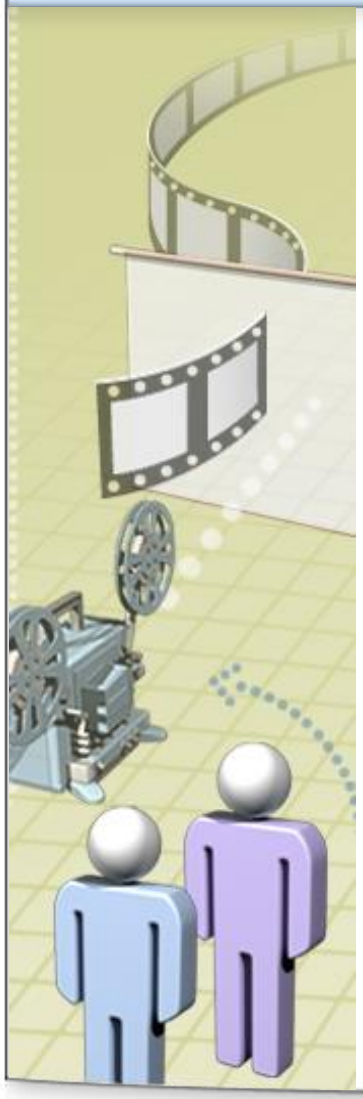
CHƯƠNG 13
Dynamic Host Configuration Protocol

Overview

- Multimedia: The Role of DHCP in the Network Infrastructure
- Adding and Authorizing the DHCP Server Service
- Configuring a DHCP Scope
- Configuring DHCP Reservations and Options
- Configuring a DHCP Relay Agent

Multimedia: The Role of DHCP in the Network Infrastructure



- **The objective of this presentation is to provide a high-level overview of DHCP in the network infrastructure**
- **At the end of this presentation, you will be able to:**
  - Explain what DHCP is
  - Describe how DHCP works
  - Explain how routers can forward DHCP broadcast packets
  - Describe how a DHCP relay agent works

Lesson: Adding and Authorizing the DHCP Server Service

- Why Use DHCP?
- What Is Automatic Private IP Addressing?
- How DHCP Allocates IP Addresses
- How the DHCP Lease Generation Process Works
- How the DHCP Lease Renewal Process Works
- How a DHCP Server Service Is Authorized
- Practice: Adding and Authorizing a DHCP Server Service

Why Use DHCP?

DHCP reduces the complexity and amount of administrative work by using automatic TCP/IP configuration

Manual TCP/IP Configuration

- IP addresses are entered manually
- IP address could be entered incorrectly
- Communication and network issues can result
- Frequent computer moves increase administrative effort

Automatic TCP/IP Configuration

- IP addresses are supplied automatically
- Correct configuration information is ensured
- Client configuration is updated automatically
- A common source of network problems is eliminated

What Is Automatic Private IP Addressing?

APIPA automatically self-configures addresses when there is no DHCP server available

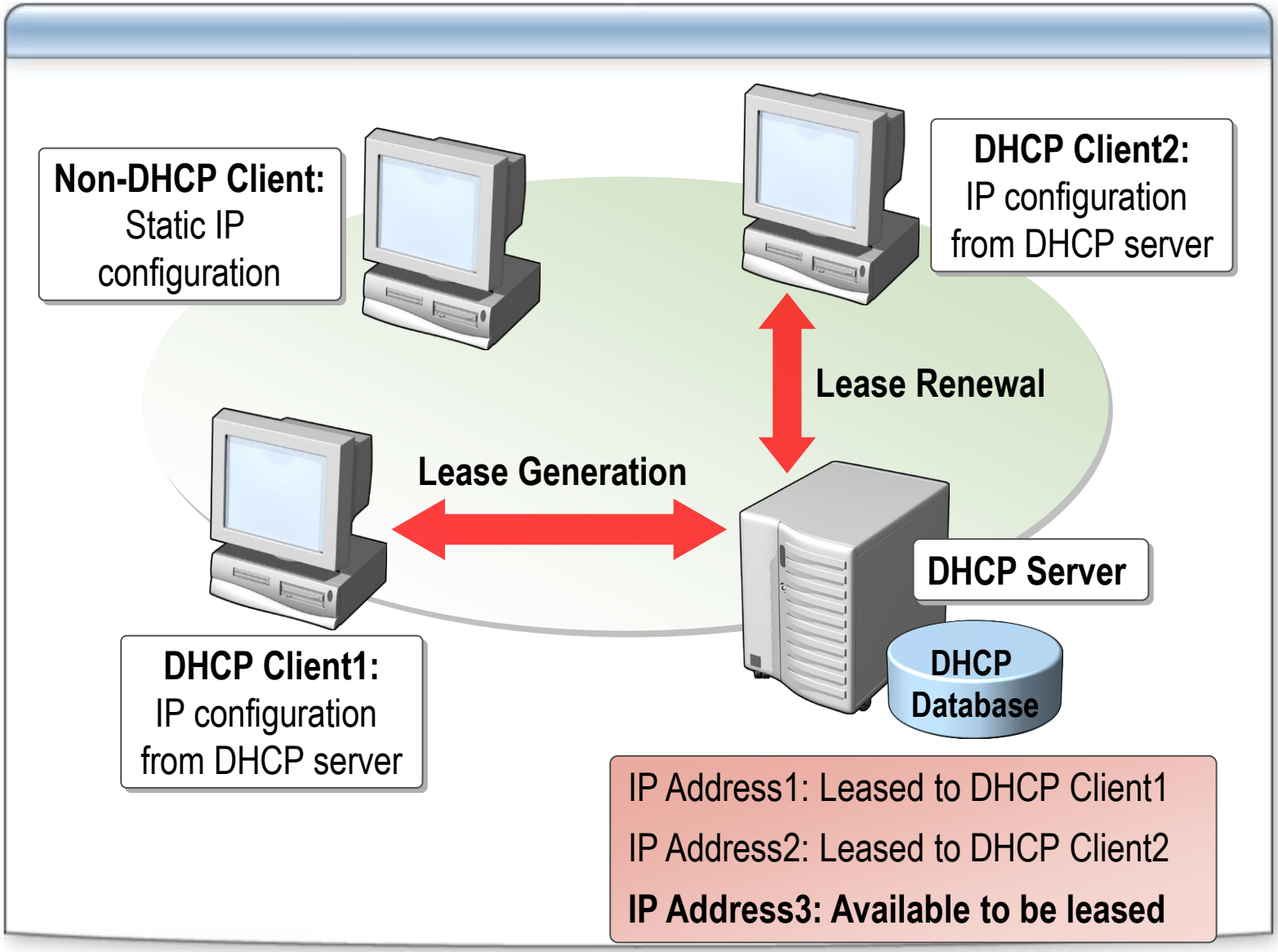
Advantages

- Serves as a DHCP server failover mechanism for small networks
- Automatically assigns an IP address in a specific range

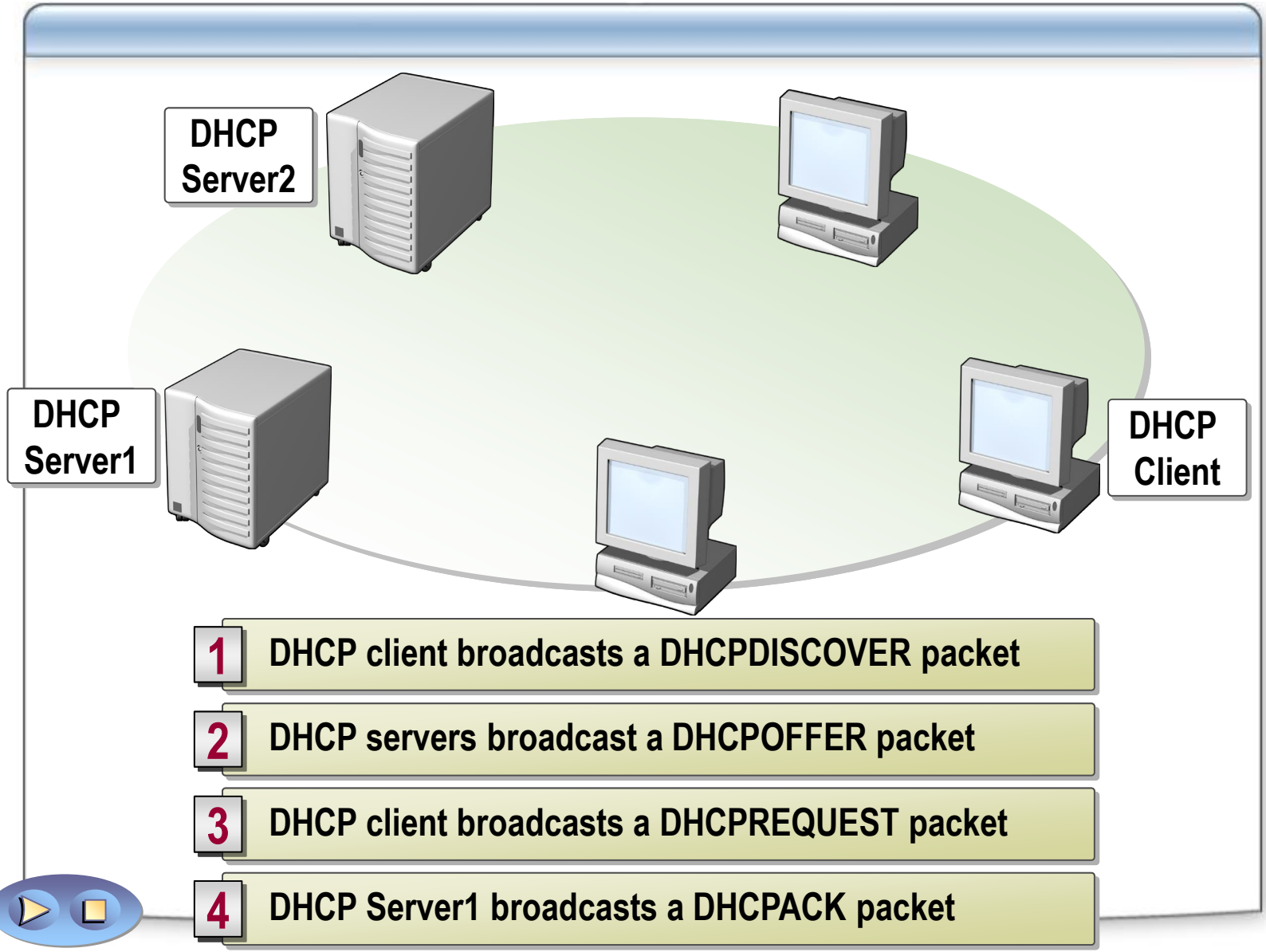
Disadvantages

- Forces assignment of addresses typically not used
- Conceals possible connectivity problems
- Does not work outside 169.254.x.x subnet
- Is not routable

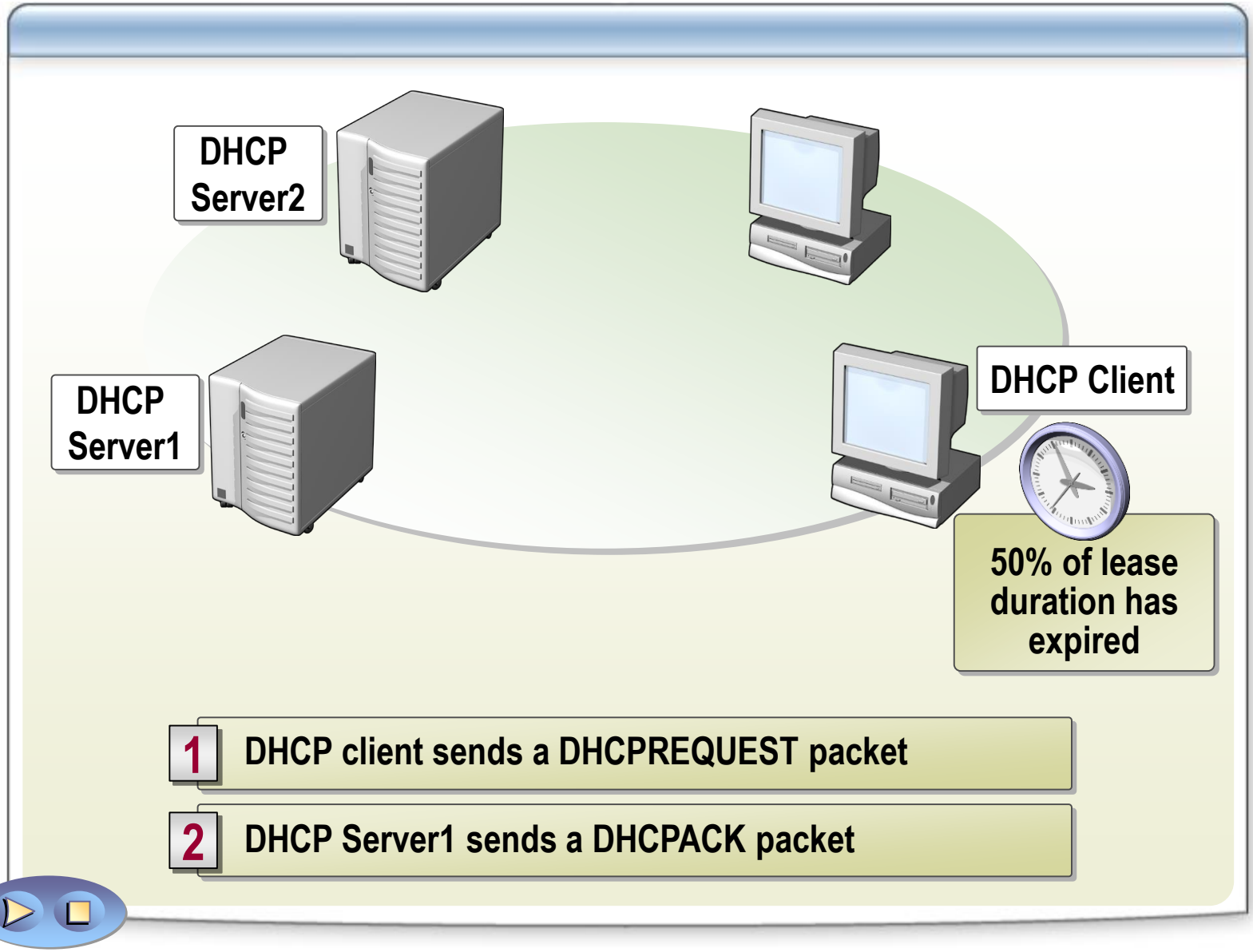
How DHCP Allocates IP Addresses



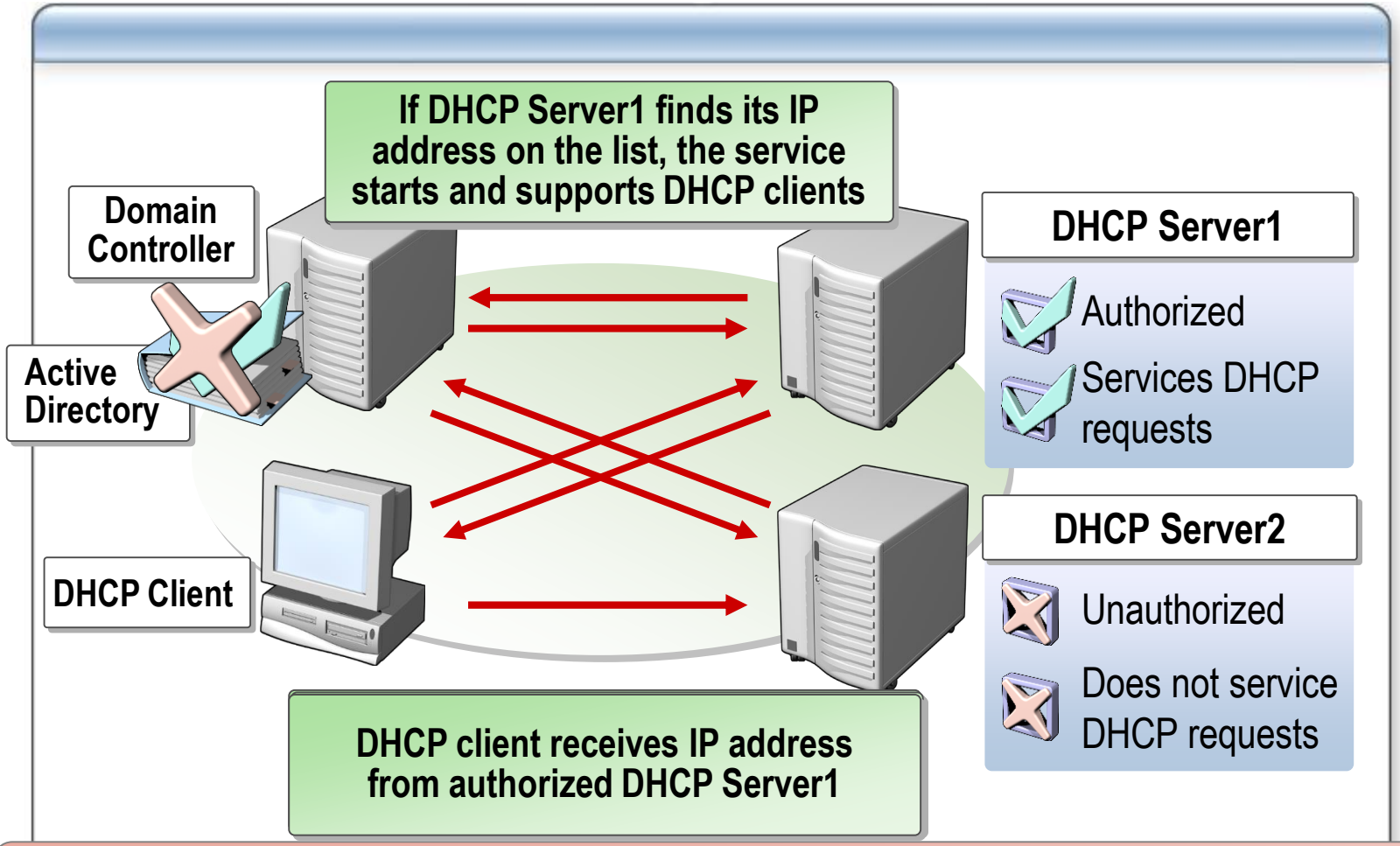
How the DHCP Lease Generation Process Works



How the DHCP Lease Renewal Process Works



How a DHCP Server Service Is Authorized



DHCP authorization **is the process of registering the DHCP Server service in the Active Directory domain to support DHCP clients**

Practice: Adding and Authorizing a DHCP Server Service

In this practice, you will:

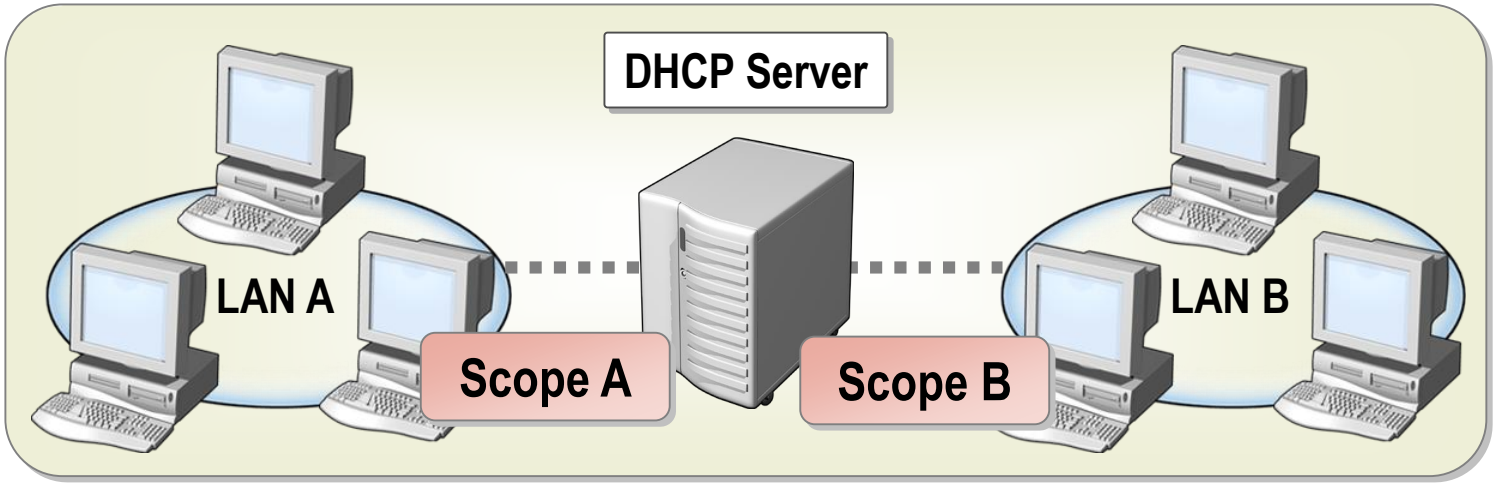
- Add a DHCP server
- Authorize the DHCP Server service

Lesson: Configuring a DHCP Scope

- What Are DHCP Scopes?
- Demonstration: Configuring a DHCP Scope
- What Are Superscopes and Multicast Scopes?
- What Is Network Monitor?
- Practice: Configuring a DHCP Scope

What Are DHCP Scopes?

A *scope* is a range of IP addresses that are available to be leased



Scope Properties

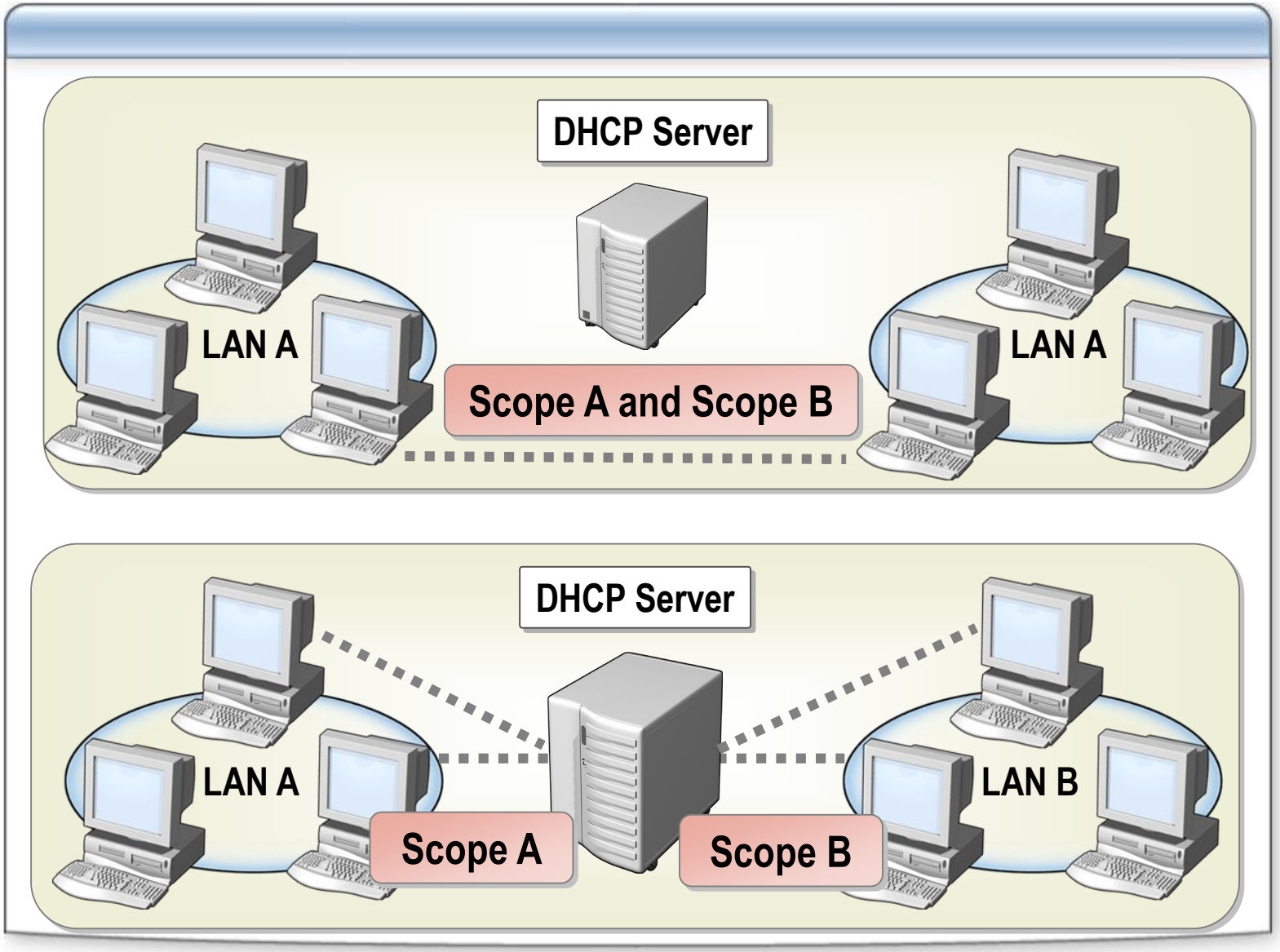
- Network ID
- Subnet mask
- Lease duration
- Network IP address range
- Scope name
- Exclusion range

Demonstration: Configuring a DHCP Scope

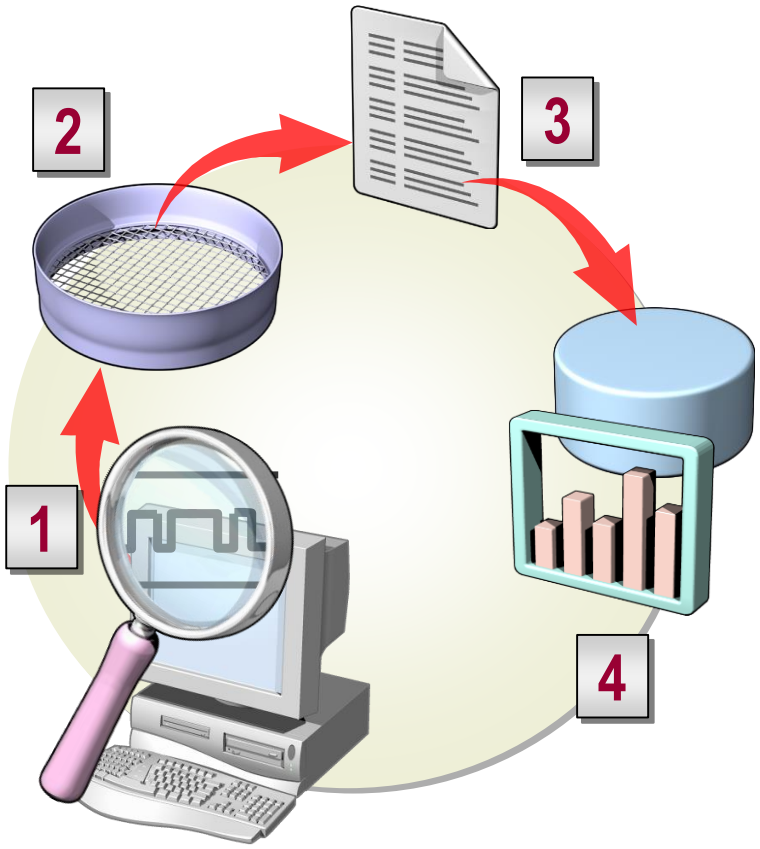
Your instructor will demonstrate how to:

- Configure a DHCP scope
- Activate a DHCP scope

What Are Superscopes and Multicast Scopes?



What Is Network Monitor?



Network Monitor:

- Captures a sample of network traffic
- Uses filters to select specific packets
- Decodes the packets
- Compiles network statistics

Practice: Configuring a DHCP Scope

In this practice, you will:

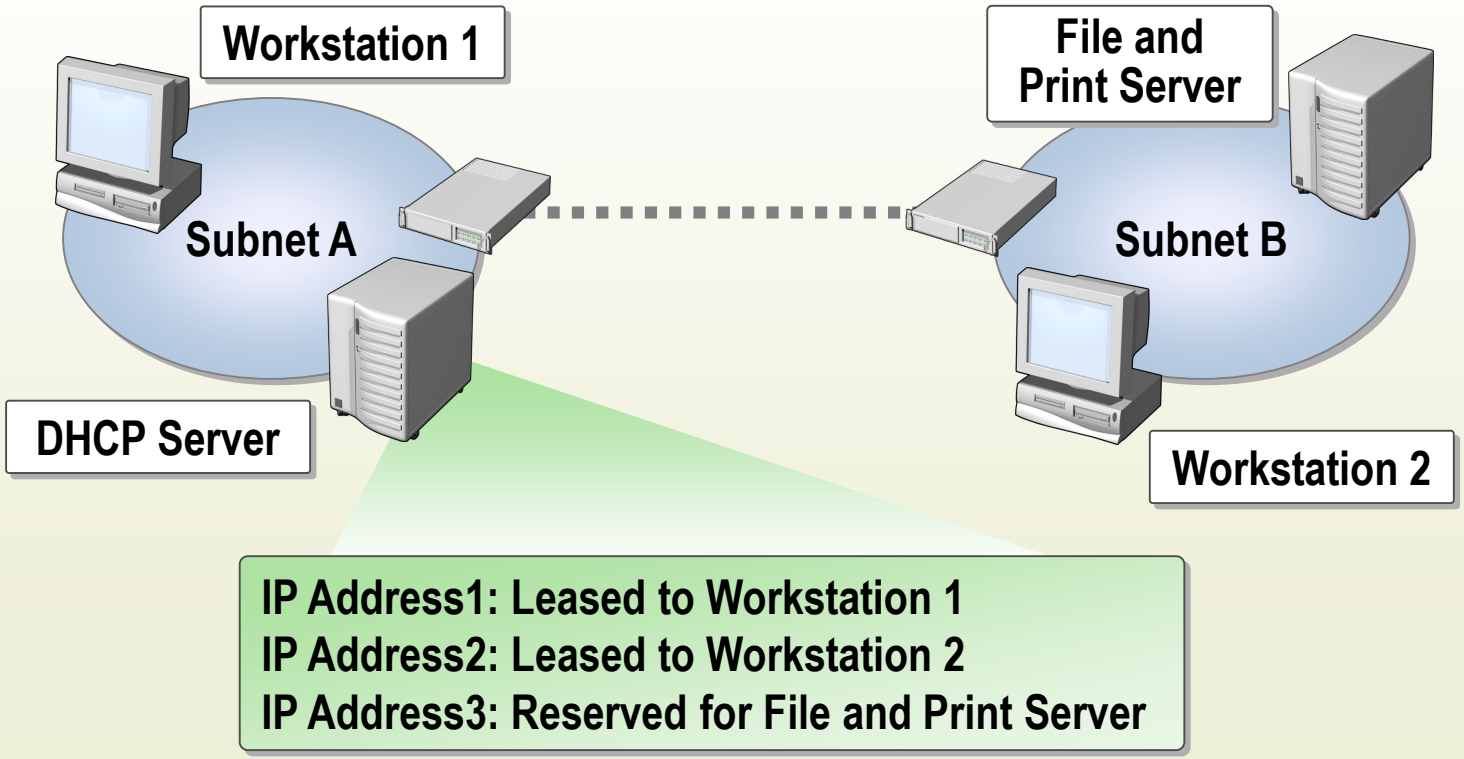
- Configure two DHCP scopes
- Configure a DHCP superscope
- Verify IP address allocation by using Network Monitor

Lesson: Configuring DHCP Reservations and Options

- What Is a DHCP Reservation?
- What Are DHCP Options?
- Demonstration: Configuring DHCP Reservations and Options
- How DHCP-Server, Scope, and Reserved-Client Options Are Applied
- How DHCP Class-Level Options Are Applied
- Practice: Configuring DHCP Reservations Options

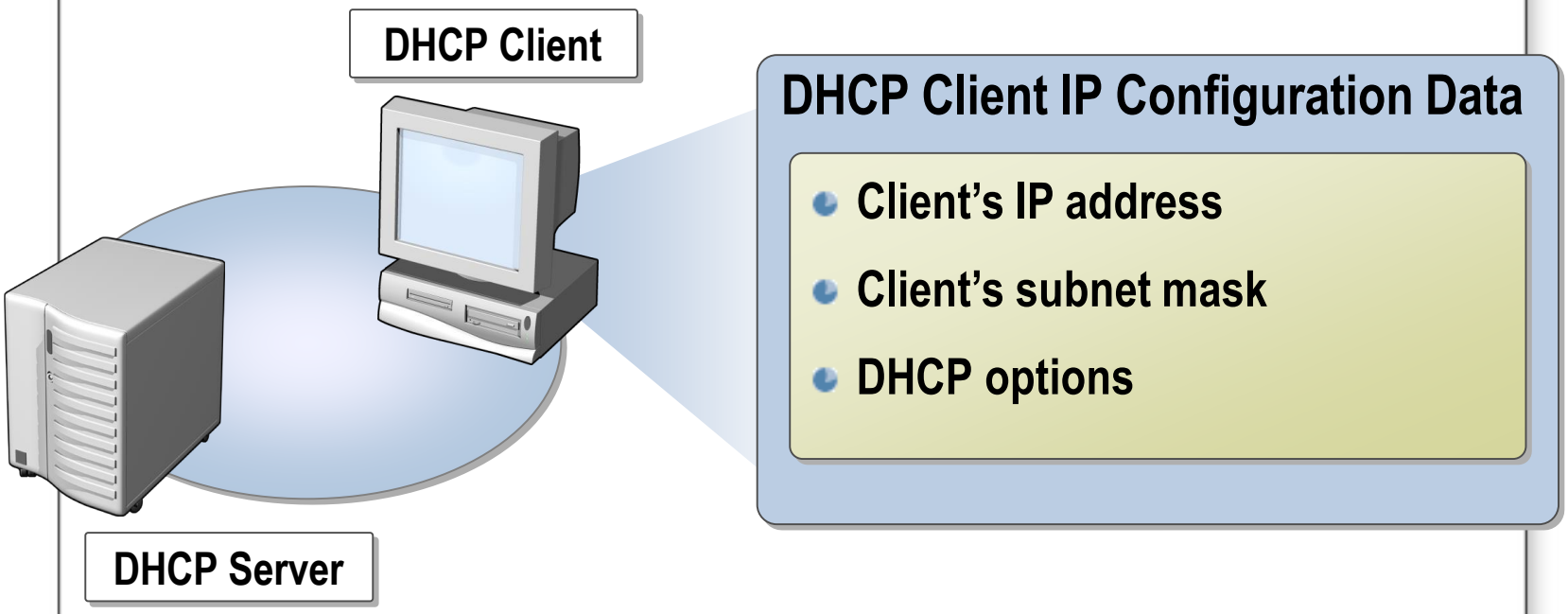
What Is a DHCP Reservation?

A *reservation* is a specific IP address, within a scope, that is permanently reserved for lease to a specific DHCP client



What Are DHCP Options?

DHCP options **are configuration parameters that a DHCP server assigns to clients**

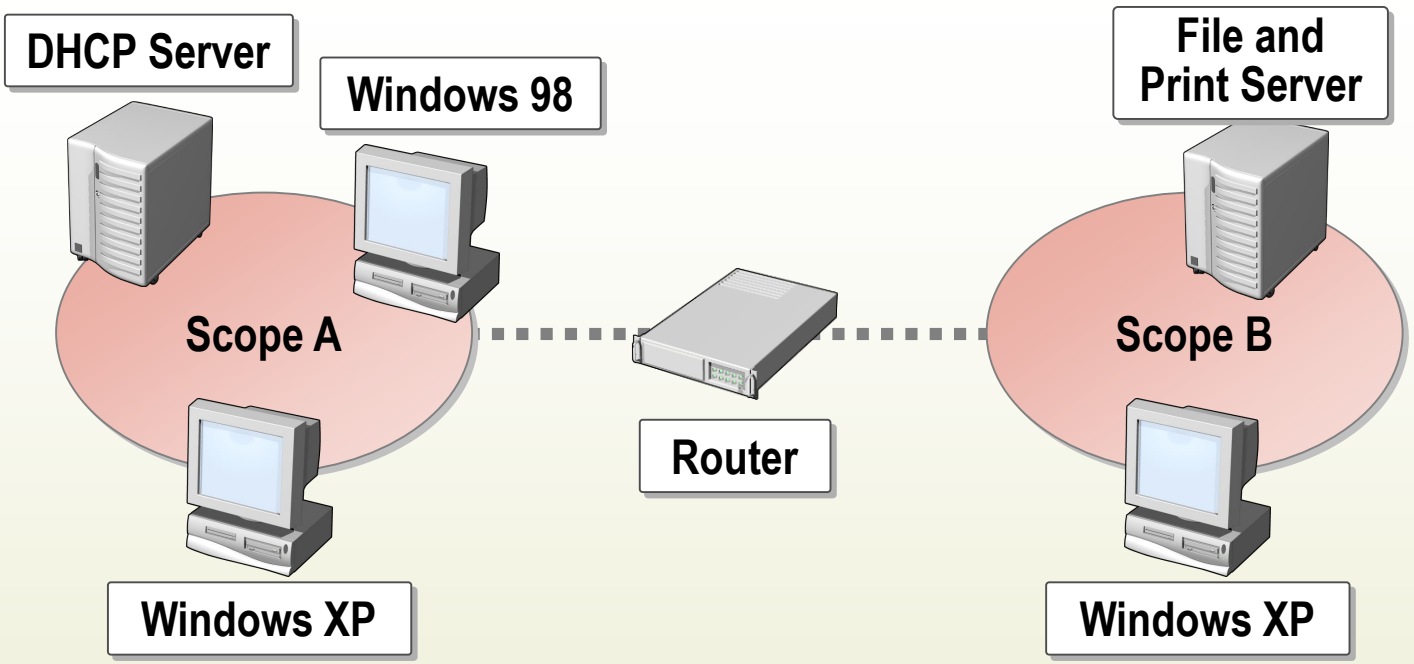


Demonstration: Configuring DHCP Reservations and Options

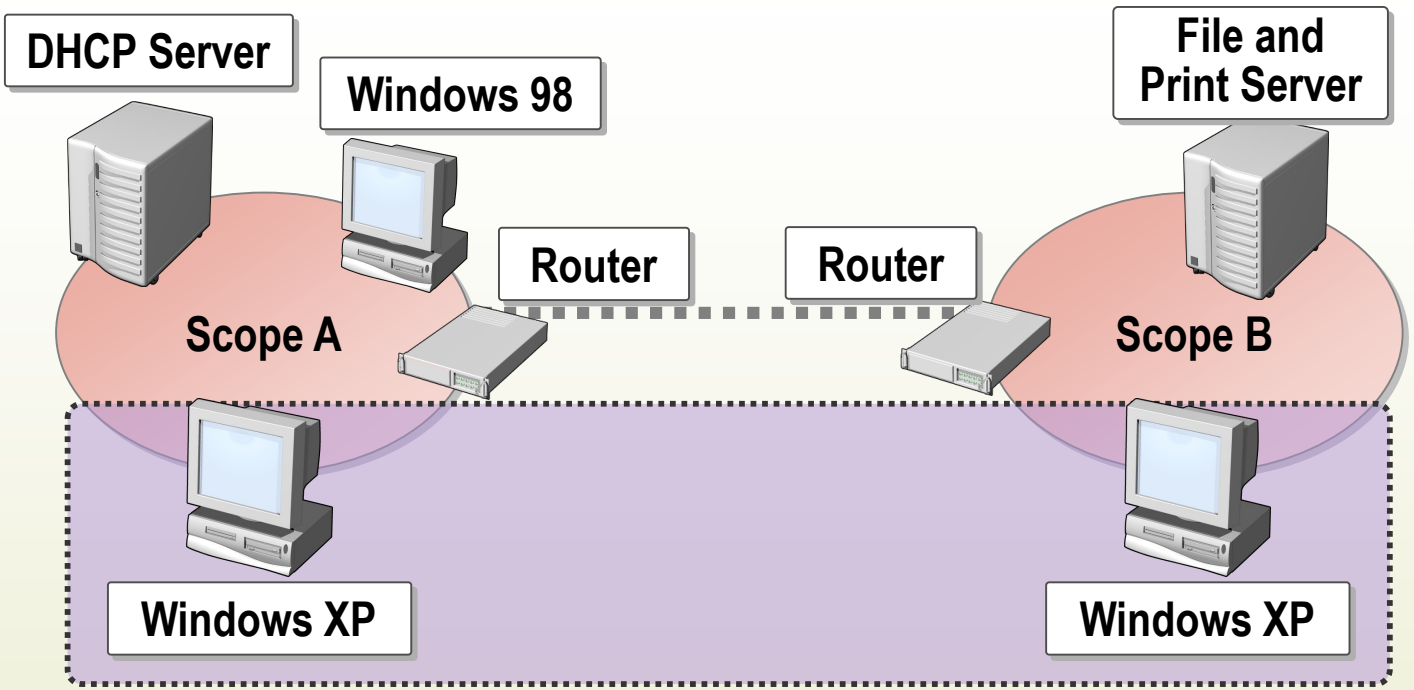
Your instructor will demonstrate how to:

- Configure a DHCP reservation
- Configure a DHCP server option
- Configure a DHCP scope option

How DHCP-Server, Scope, and Reserved-Client Options Are Applied



How DHCP Class-Level Options Are Applied



DHCP option applied at the *class level*

Practice: Configuring DHCP Options

In this practice, you will:

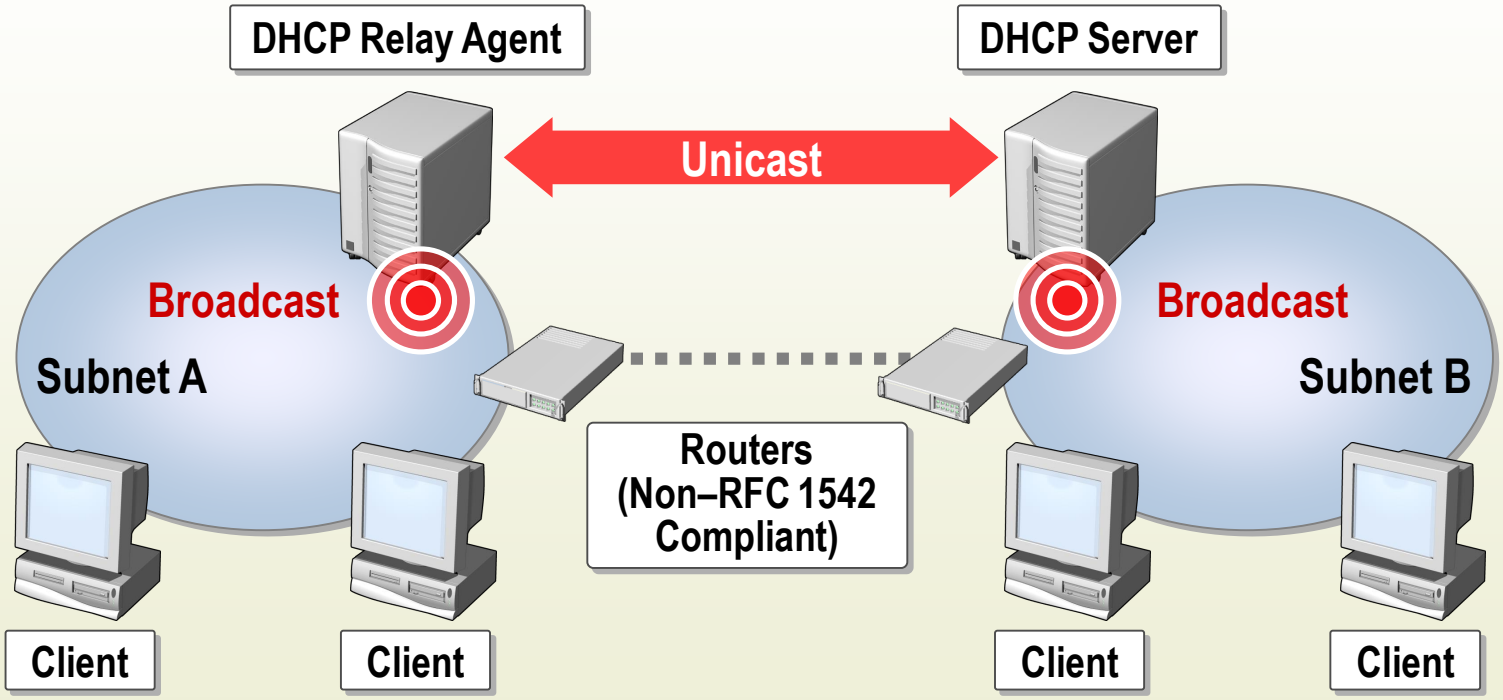
- Configure and test a DHCP reservation
- Configure DHCP server and scope options
- Configure and test a new DHCP user class

Lesson: Configuring a DHCP Relay Agent

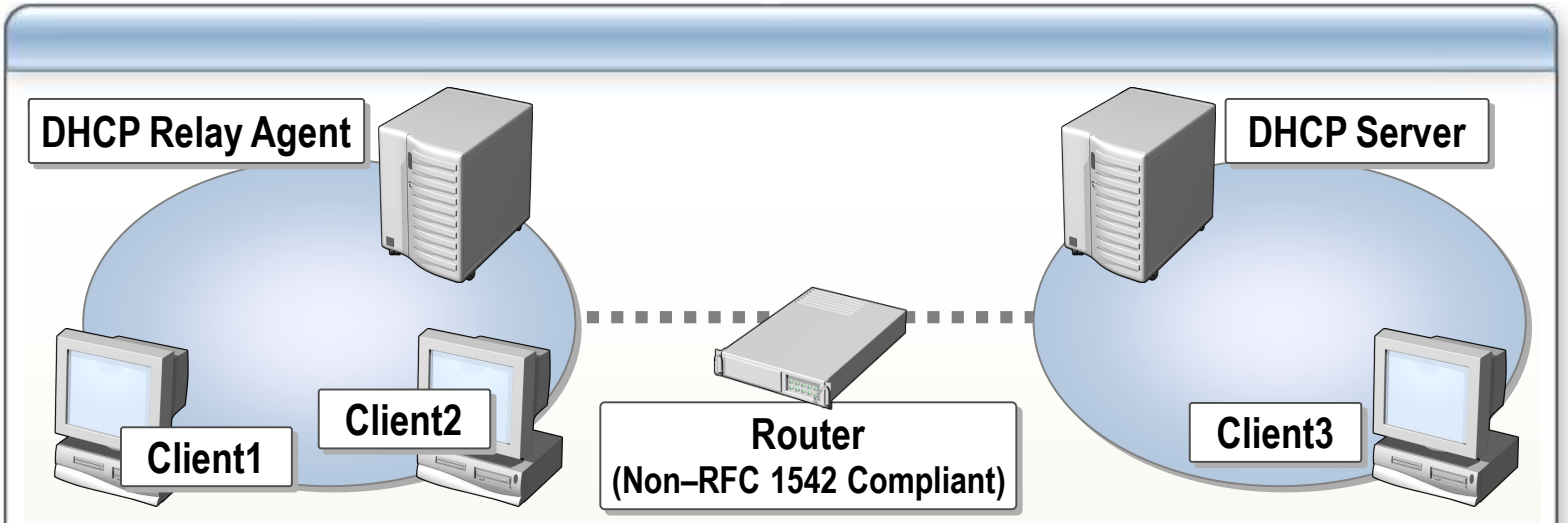
- What Is a DHCP Relay Agent?
- How a DHCP Relay Agent Works
- How a DHCP Relay Agent Uses Hop Count
- How a DHCP Relay Agent Uses Boot Threshold
- Practice: Configuring a DHCP Relay Agent

What Is a DHCP Relay Agent?

A DHCP *relay agent* is a computer or router that listens for DHCP/BOOTP broadcasts from DHCP clients and then relays those messages



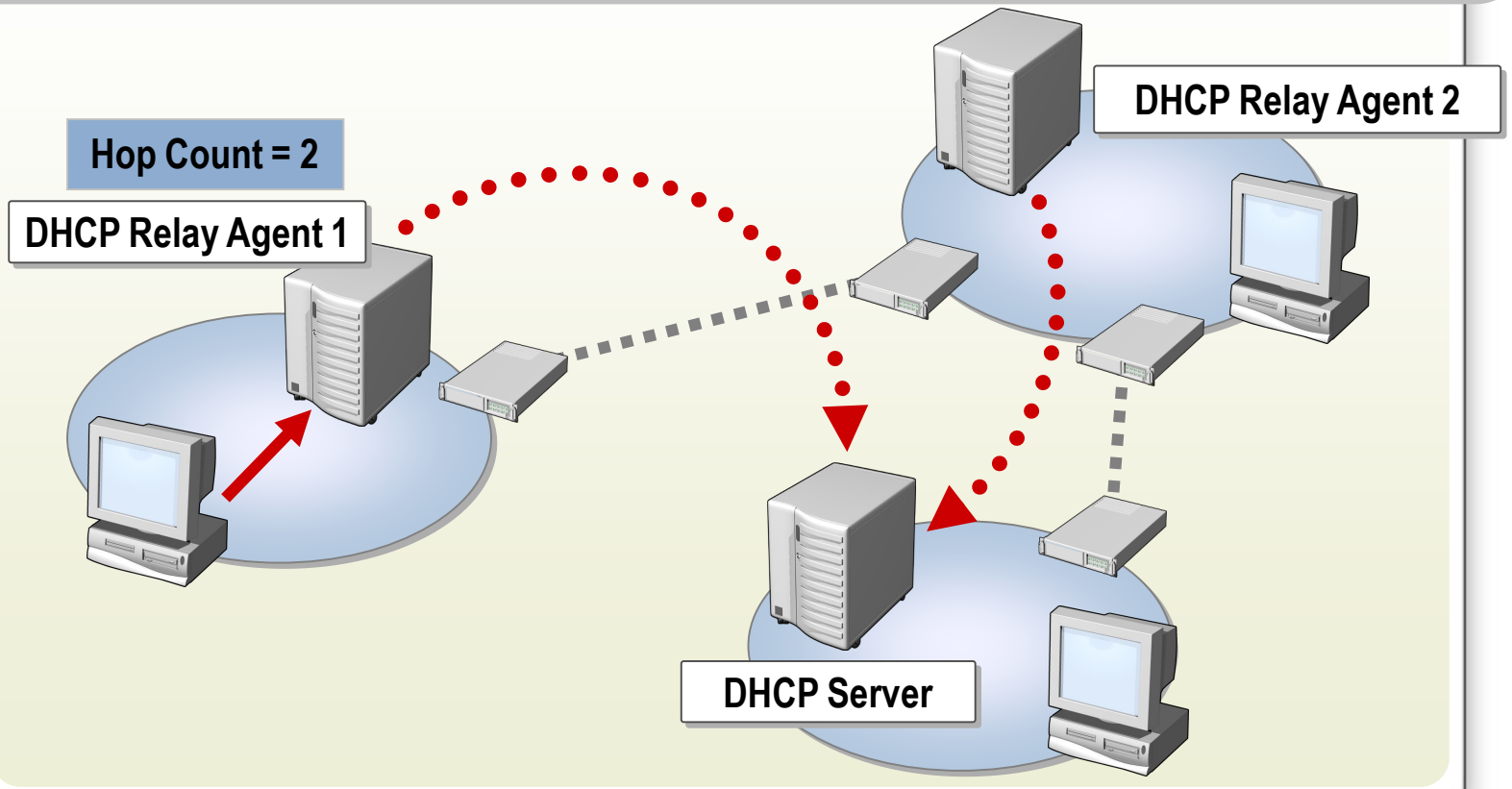
How a DHCP Relay Agent Works



1. Client1 broadcasts a DHCPDISCOVER packet
2. Relay agent forwards the DHCPDISCOVER message to the DHCP server
3. Server sends a DHCPOFFER message to the DHCP relay agent
4. Relay agent broadcasts the DHCPOFFER packet
5. Client1 broadcasts a DHCPREQUEST packet
6. Relay agent forwards the DHCPREQUEST message to the DHCP server
7. Server sends a DHCPACK message to the DHCP relay agent
8. Relay agent broadcasts the DHCPACK packet

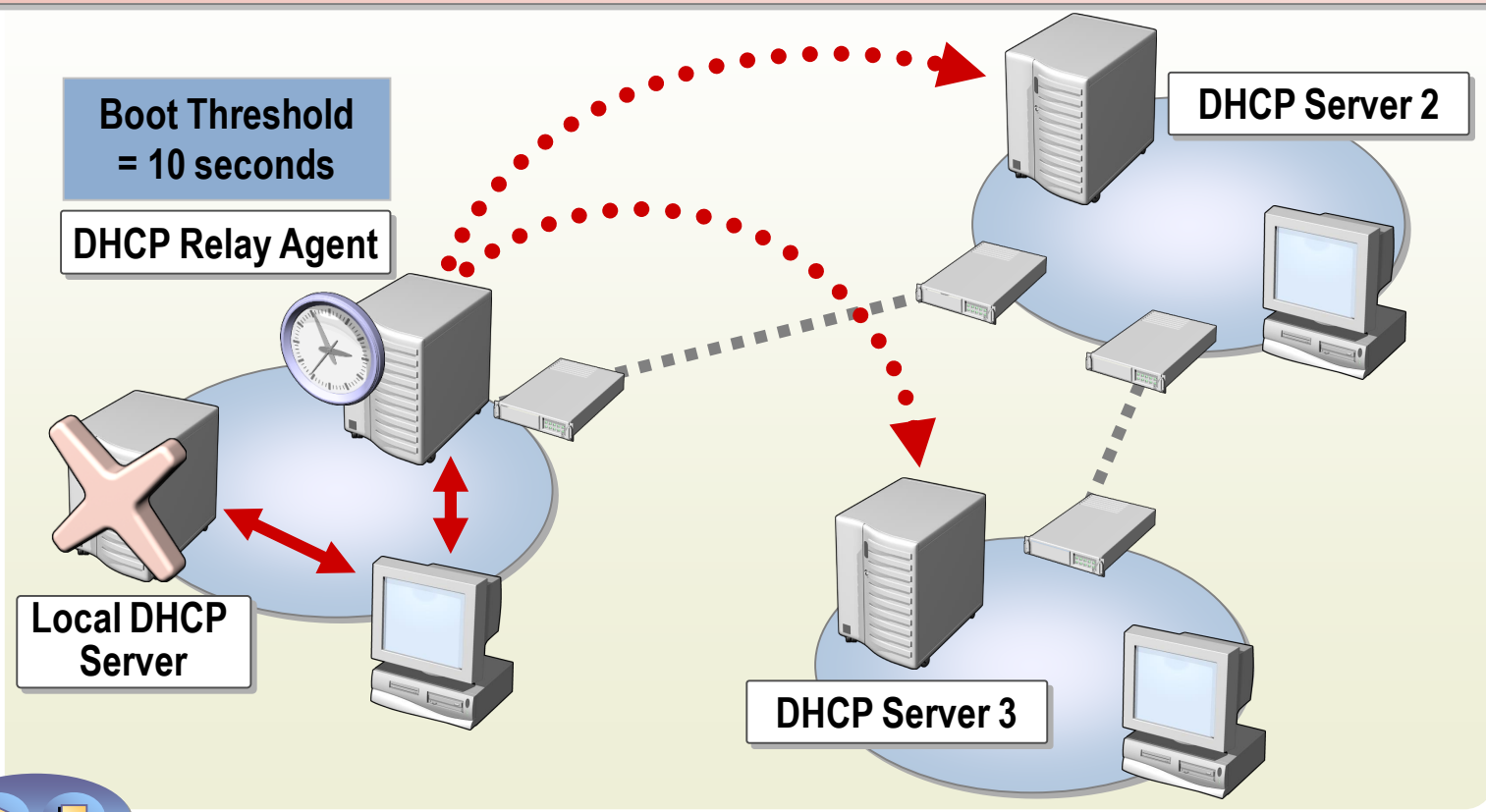
How a DHCP Relay Agent Uses Hop Count

The hop count threshold is the number of routers through which the packet can be transmitted before it is discarded



How a DHCP Relay Agent Uses Boot Threshold

The *boot threshold* is the time the DHCP relay agent will wait for a DHCP server response before forwarding the request



Practice: Configuring a DHCP Relay Agent

In this practice, you will:

- Install and configure LAN routing
- Configure a DHCP relay agent

Lab: Allocating IP Addressing by Using Dynamic Host Configuration Protocol

In this lab, you will identify and resolve common problems in allocating IP addressing by using DHCP