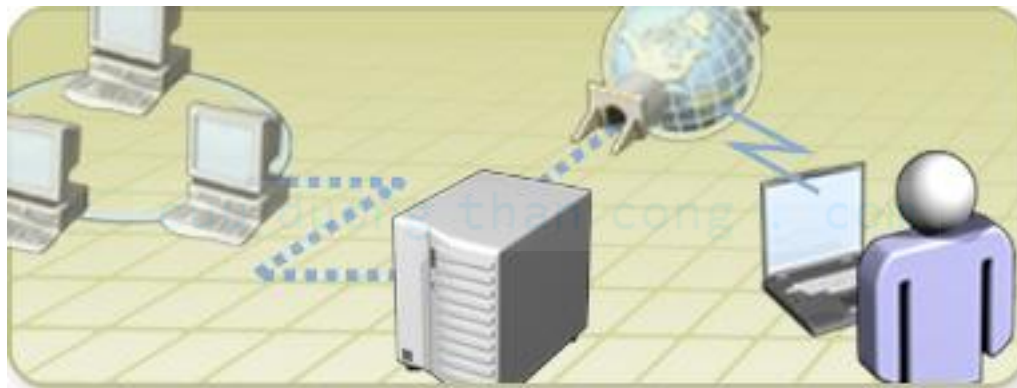


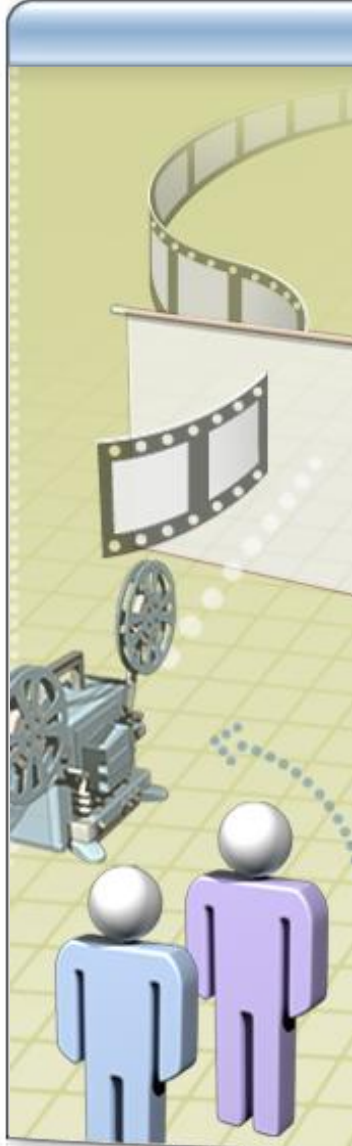
Module 5: Resolving Host Names by Using Domain Name System (DNS)



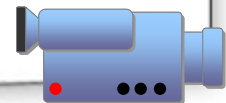
Overview

- **Multimedia: The Role of DNS in the Network Infrastructure**
- **Installing the DNS Server Service**
- **Configuring the Properties for the DNS Server Service**
- **Configuring DNS Zones**
- **Configuring DNS Zone Transfers**
- **Configuring DNS Dynamic Updates**
- **Configuring a DNS Client**
- **Delegating Authority for Zones**

Multimedia: The Role of DNS in the Network Infrastructure



- **The objective of this presentation is to provide a high-level overview of DNS in the network infrastructure**
- **At the end of this presentation, you will be able to:**
 - Explain the role and benefits of DNS in the network infrastructure
 - Define the key components of DNS
 - Discuss the DNS domain namespace
 - Discuss DNS zones and zone transfer
 - Discuss DNS name servers
 - Explain how the hosts name resolution process works
 - Explain forward lookup queries



Lesson: Installing the DNS Server Service

- Overview of Domain Name System
- What Is a Domain Namespace?
- Standards for DNS Naming
- How to Install the DNS Server Service

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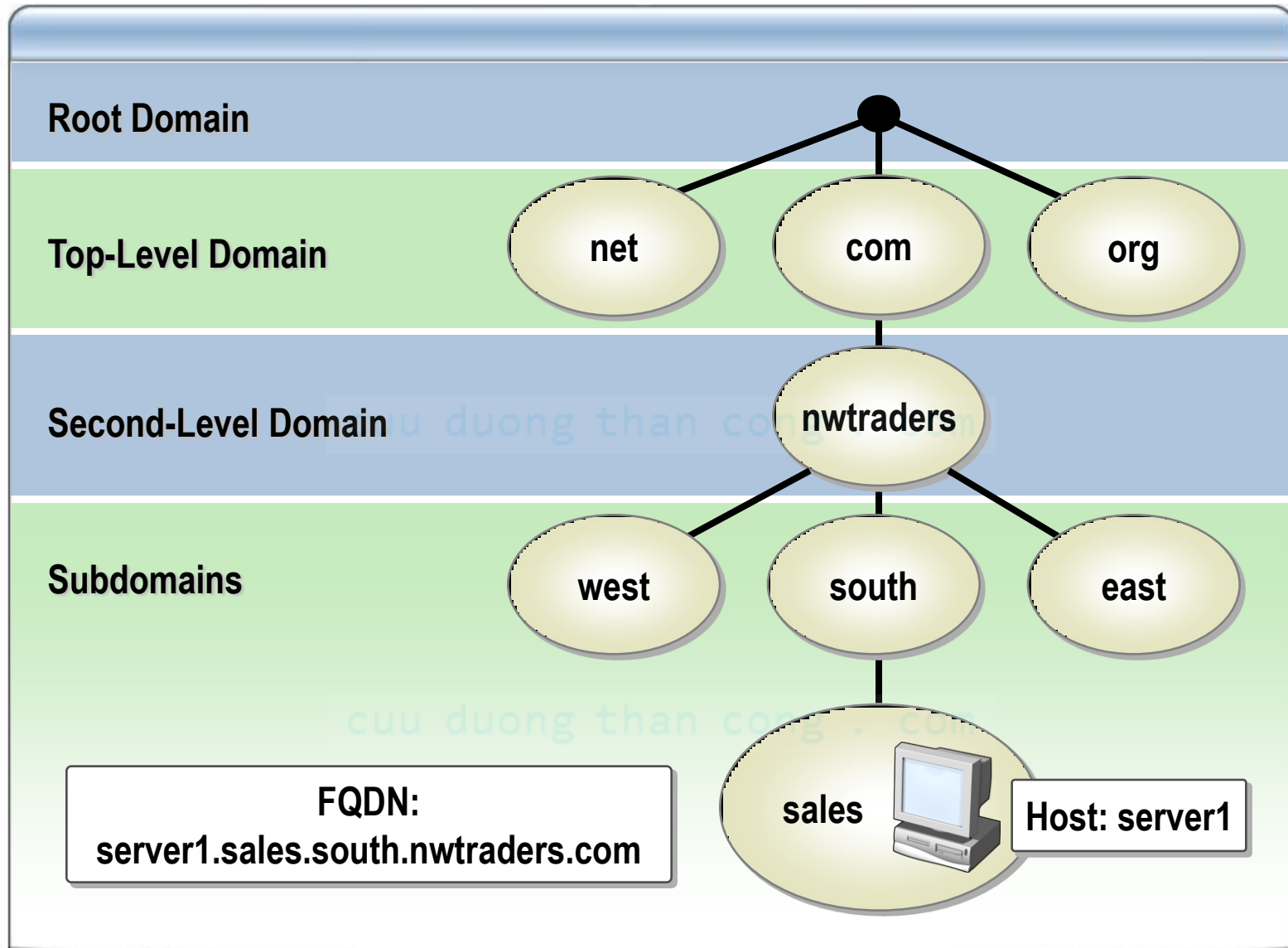
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Overview of Domain Name System

***Domain Name System (DNS)* is a hierarchical, distributed database that contains mappings of DNS domain names to various types of data, such as IP addresses**

- DNS is the foundation of the Internet naming scheme and the foundation of an organization's naming scheme
- DNS supports accessing resources by using alphanumeric names
- InterNIC is responsible for delegating administrative responsibility for portions of the domain namespace and for registering domain names
- DNS was designed to solve issues that arose when there was an increase in the:
 - Number of hosts on the Internet
 - Traffic generated by the update process
 - Size of the Hosts file

What Is a Domain Namespace?



Standards for DNS Naming

The following characters are valid for DNS names:

- A-Z
- a-z
- 0-9
- Hyphen (-)

The underscore (_) is a reserved character

How to Install the DNS Server Service

Your instructor will demonstrate how to install the DNS Server service

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Practice: Installing the DNS Server Service



In this practice, you will install the DNS Server service

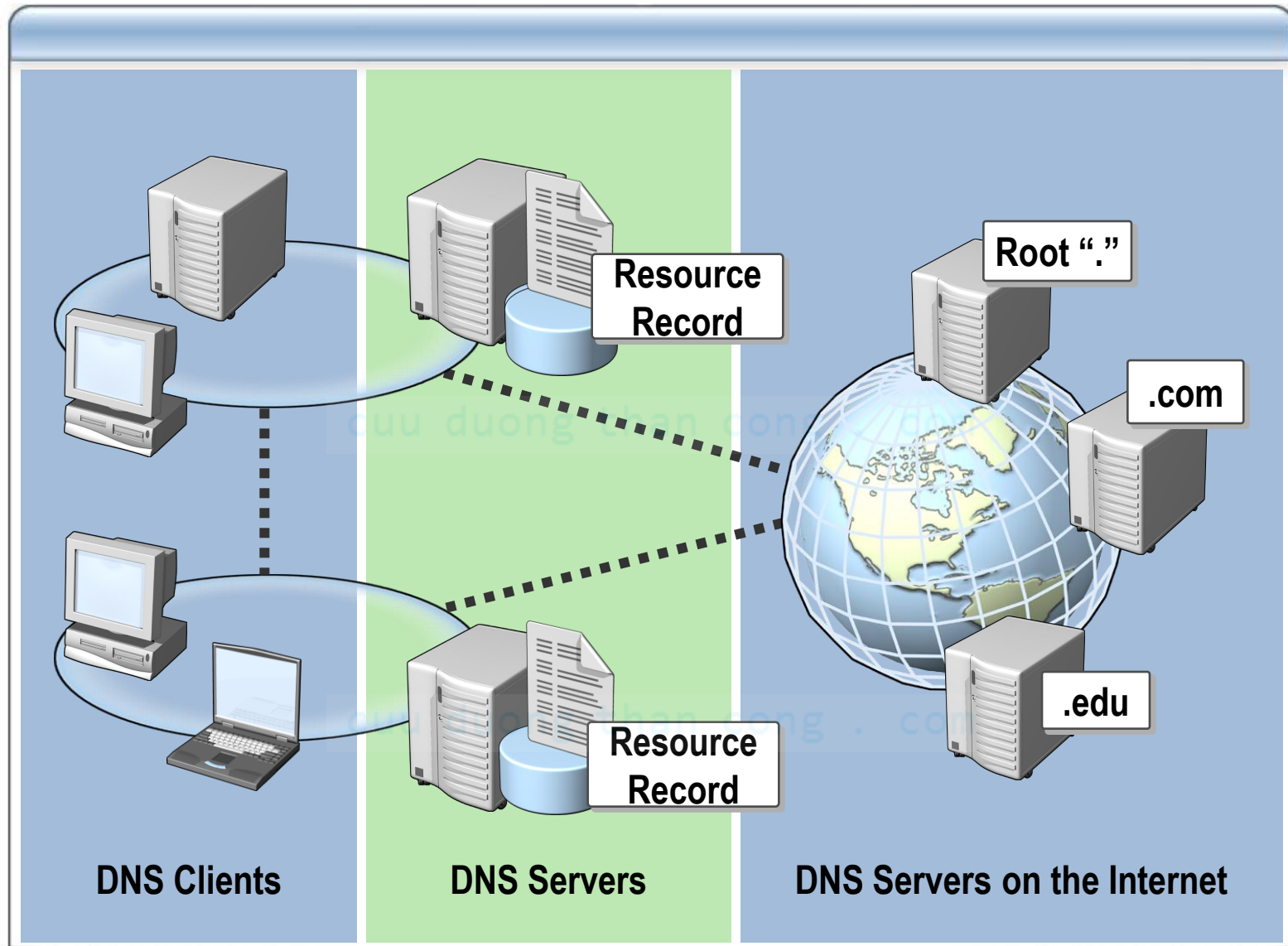
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Lesson: Configuring the Properties for the DNS Server Service

- What Are the Components of a DNS Solution?
- What Is a DNS Query?
- How Recursive Queries Work
- How a Root Hint Works
- How Iterative Queries Work
- How Forwarders Work
- How DNS Server Caching Works
- How to Configure the Properties for the DNS Server Service

What Are the Components of a DNS Solution?



What Is a DNS Query?

A *query* is a request for name resolution to a DNS server. There are two types of queries: recursive and iterative

- **DNS clients and DNS servers both initiate queries for name resolution**
- **An authoritative DNS server for the namespace of the query will either:**
 - Check the cache, check the zone, and return the requested IP address
 - Return an authoritative, “No”
- **A non-authoritative DNS server for the namespace of the query will either:**
 - Forward the unresolvable query to a specific query server called a Forwarder
 - Use root hints to locate an answer for the query

How Recursive Queries Work

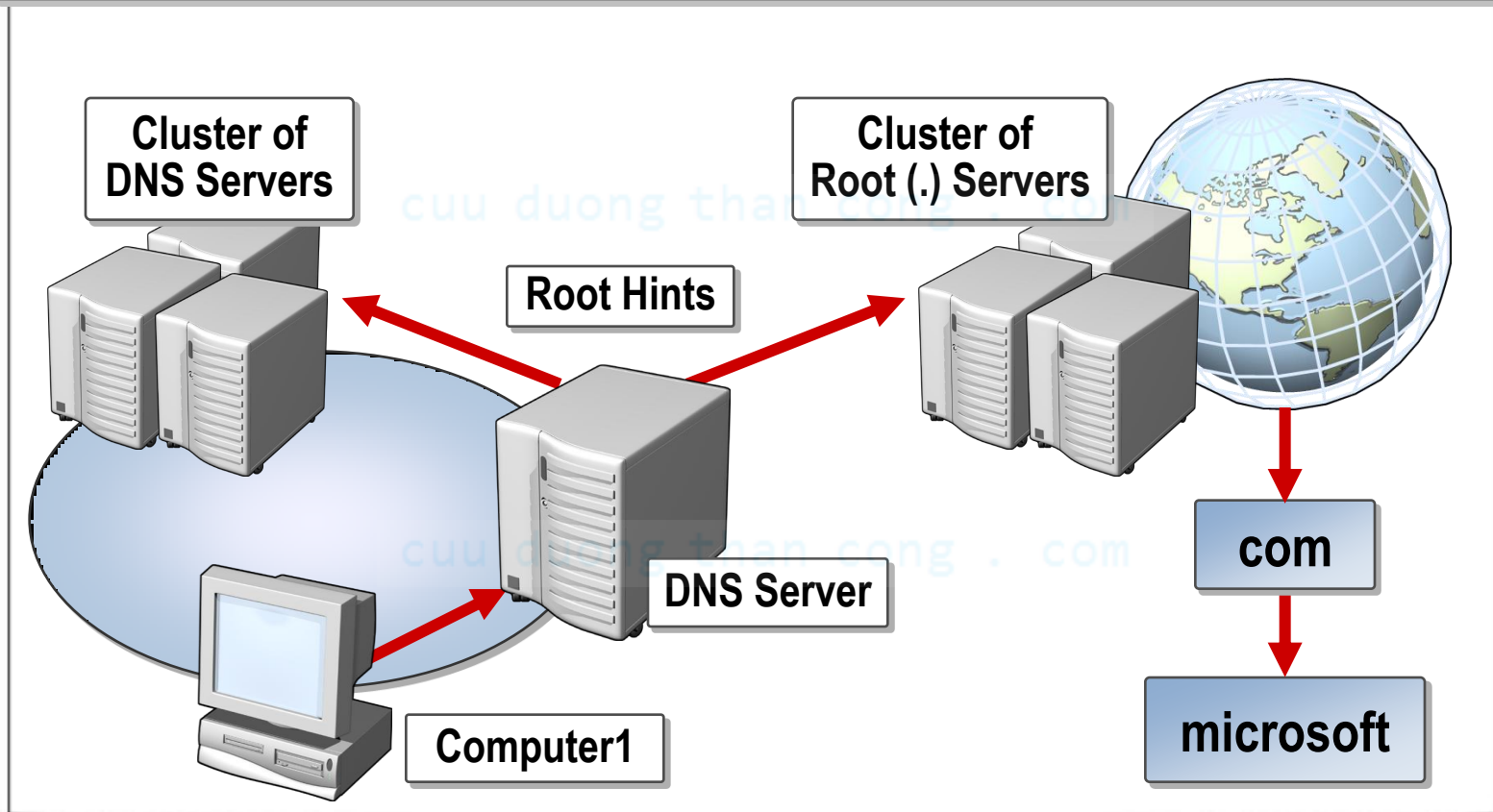
A *recursive query* is a query made to a DNS server, in which the DNS client asks the DNS server to provide a complete answer to the query

DNS server checks the forward lookup zone and cache for an answer to the query



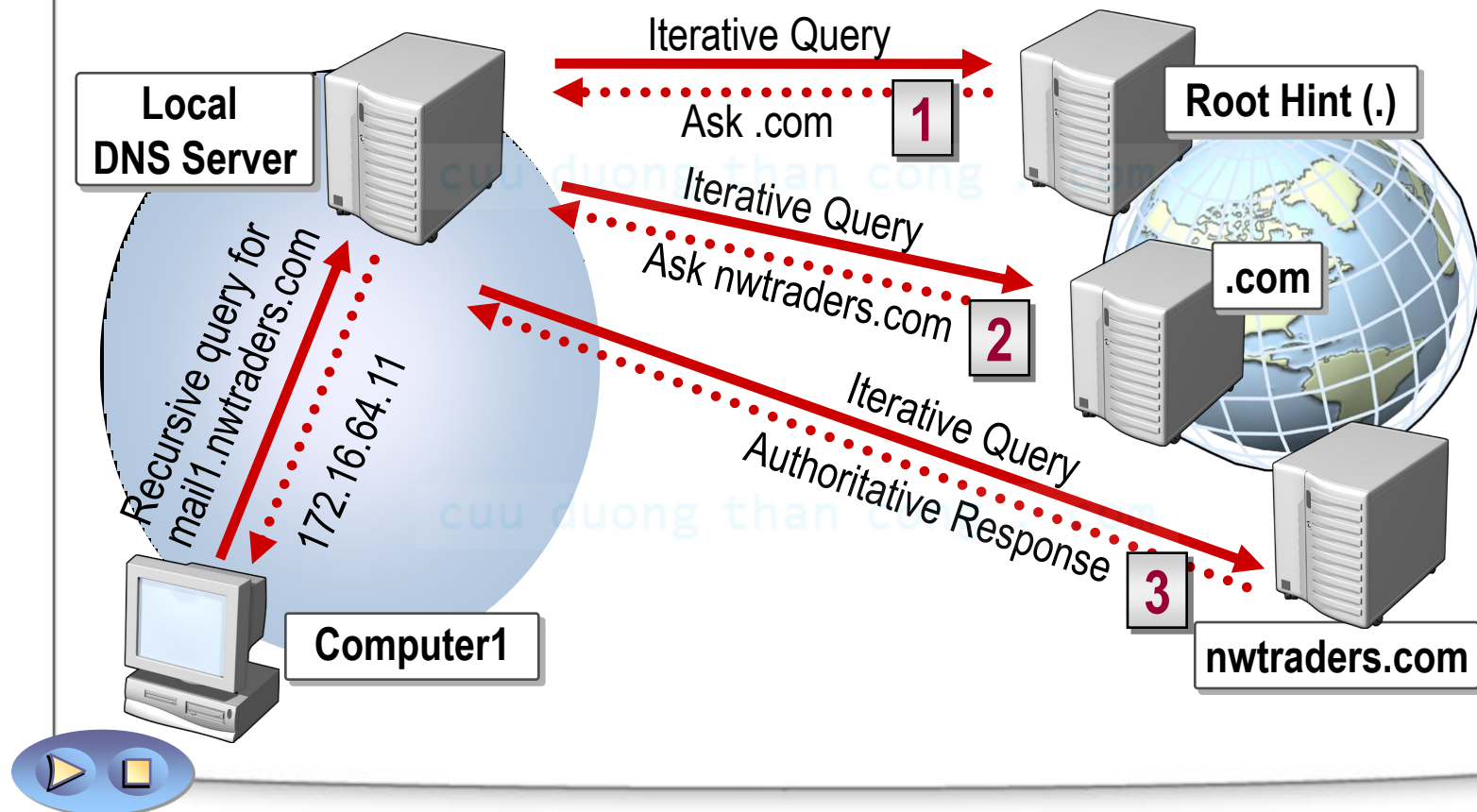
How Root Hint Works

Root hints are DNS resource records stored on a DNS server that list the IP addresses for the DNS root servers



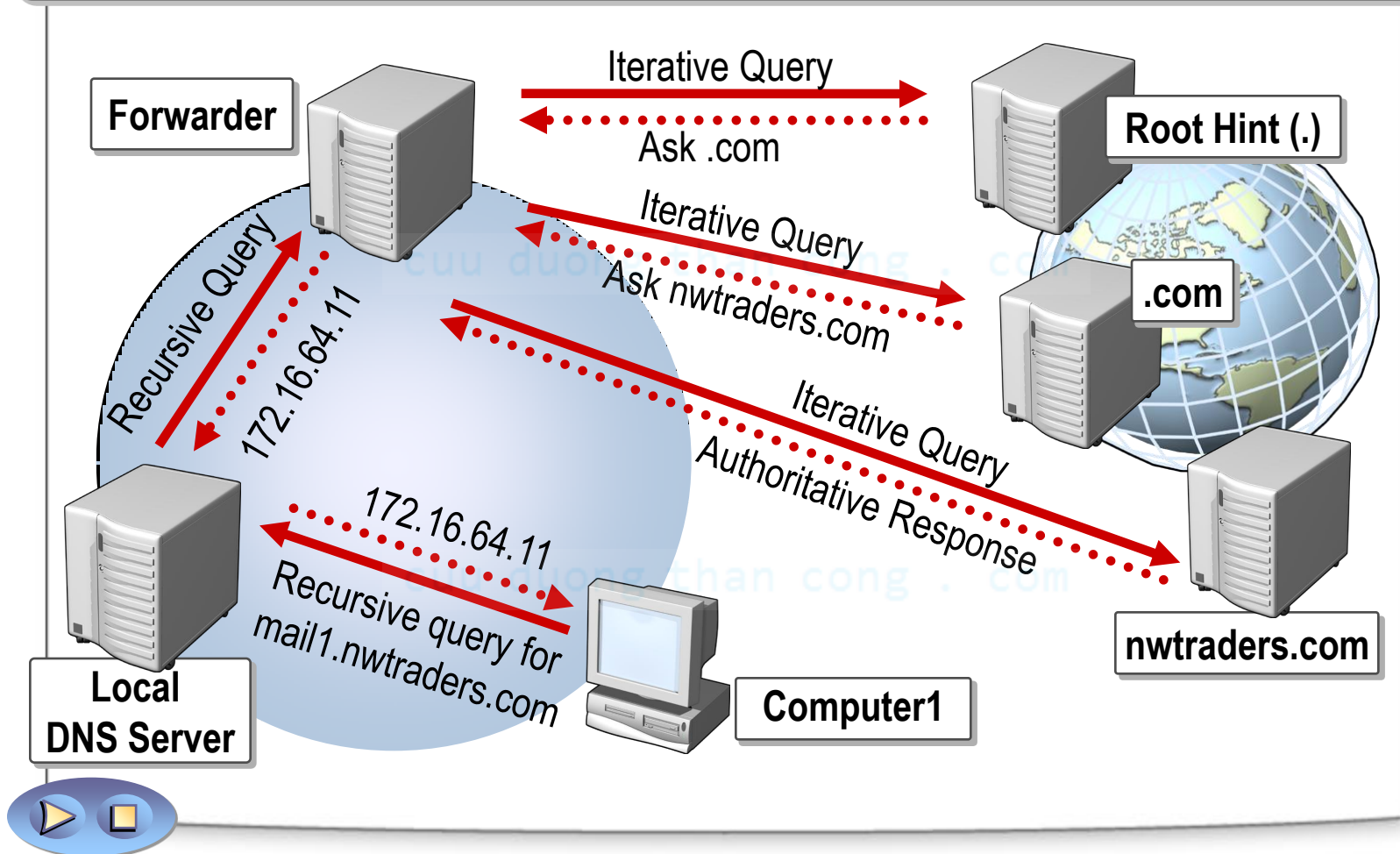
How Iterative Queries Work

An *iterative* query is a query made to a DNS server in which the DNS client requests the best answer that the DNS server can provide without seeking further help from other DNS servers. The result of an iterative query is often a referral to another DNS server lower in the DNS tree



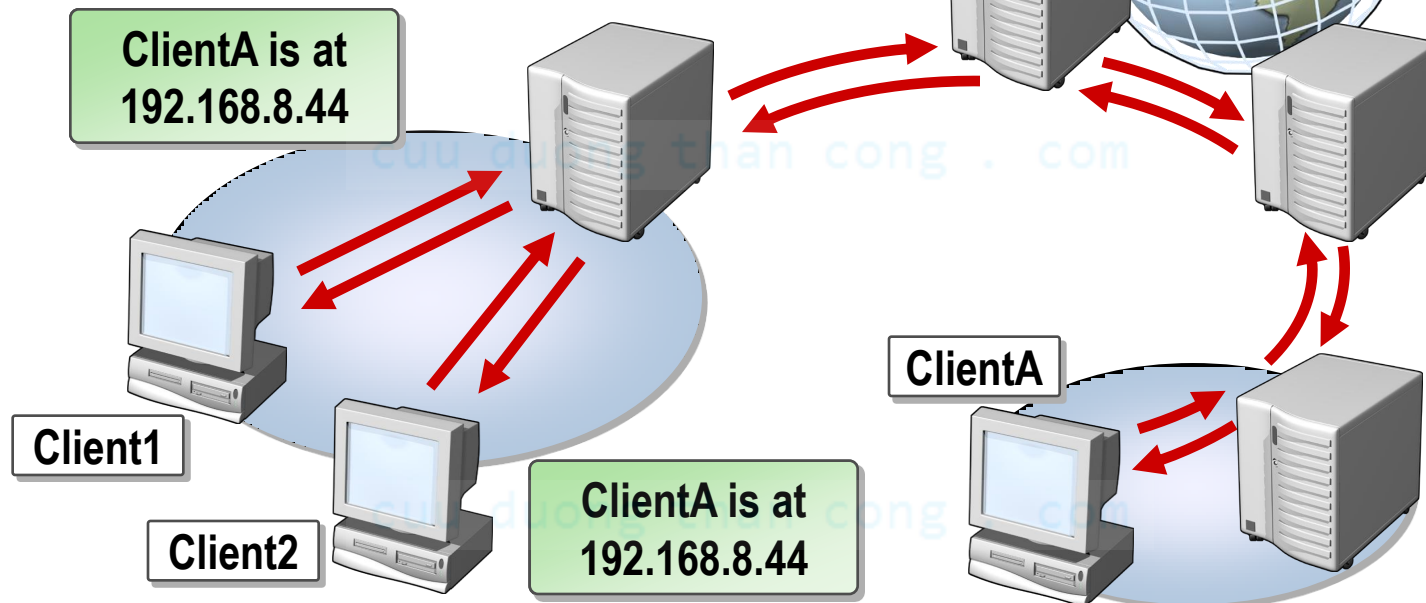
How Forwarders Work

A *forwarder* is a DNS server designated by other internal DNS servers to forward queries for resolving external or offsite DNS domain names



How DNS Server Caching Works

Caching Table		
Host Name	IP Address	TTL
clientA.contoso.msft.	192.168.8.44	28 seconds



Caching is the process of temporarily storing recently accessed information in a special memory subsystem for quicker access



How to Configure Properties for the DNS Server Service

Your instructor will demonstrate how to:

- **Update root hints on a DNS server**
- **Configure a DNS server to use a forwarder**
- **Clear the DNS server cache by using the DNS console**
- **Clear the DNS server cache by using the DNSCmd command**

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Practice: Configuring Properties for the DNS Server Service



In this practice, you will configure the properties for the DNS Server service

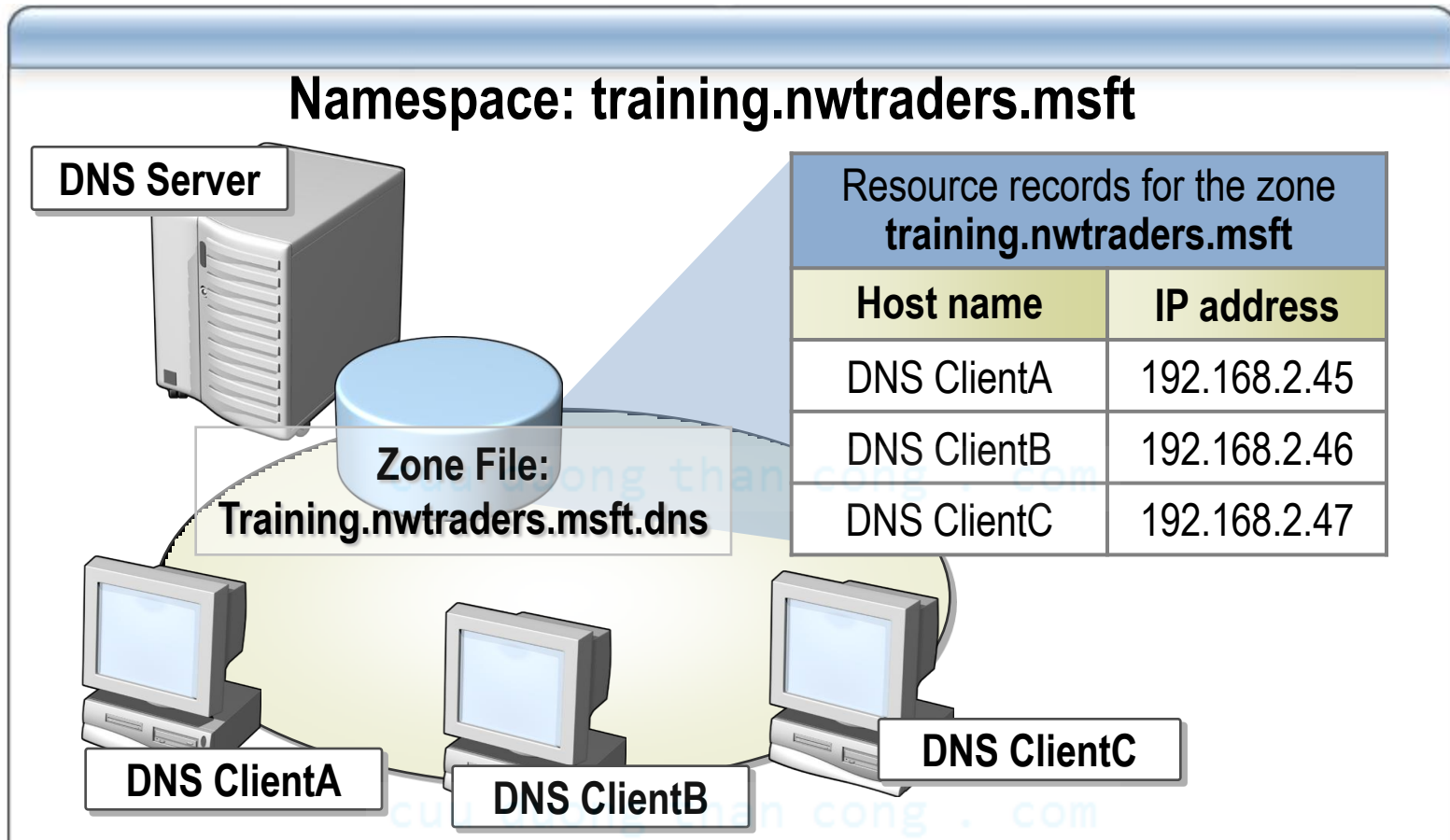
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Lesson: Configuring DNS Zones

- **How DNS Data Is Stored and Maintained**
- **What Are Resource Records and Record Types?**
- **What Is a DNS Zone?**
- **What Are DNS Zone Types?**
- **How to Change a DNS Zone Type**
- **What Are Forward and Reverse Lookup Zones?**
- **How to Configure Forward and Reverse Lookup Zones**

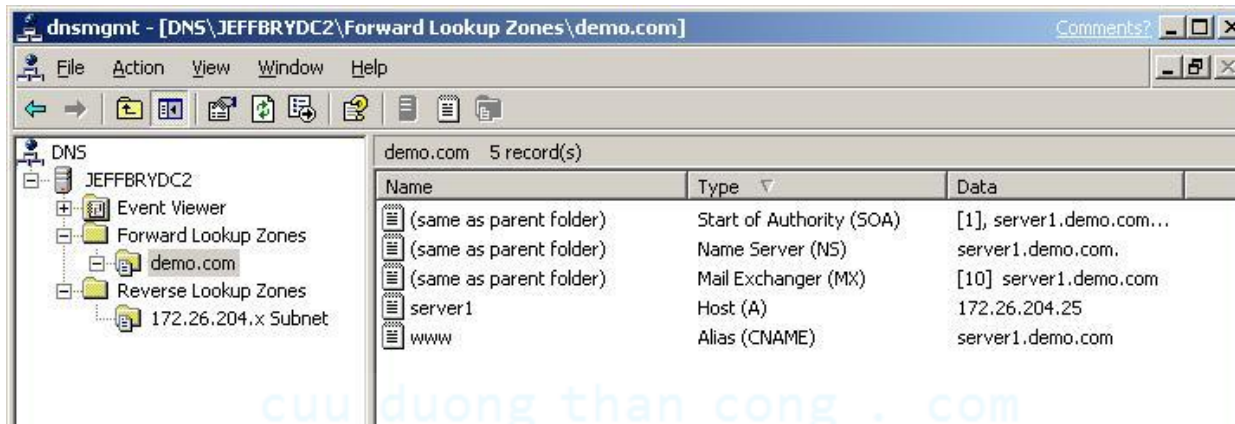
How DNS Data Is Stored and Maintained



A *resource record (RR)* is a standard DNS database structure containing information used to process DNS queries

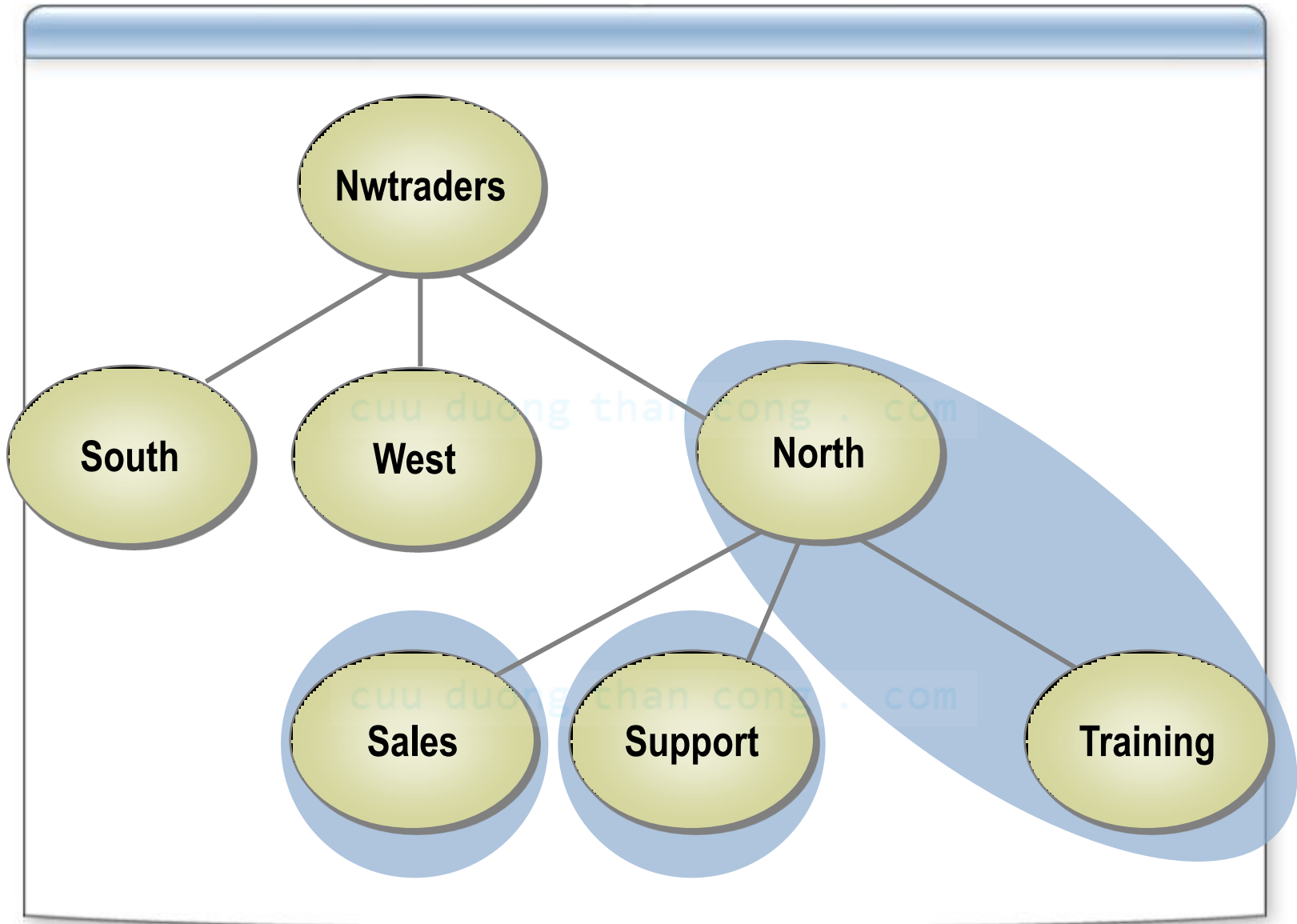
A *zone* is a portion of the DNS database that contains the resource records with the owner names that belong to the contiguous portion of the DNS namespace

What Are Resource Records and Record Types?

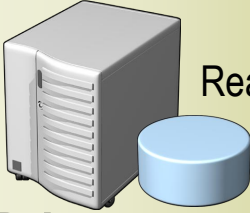
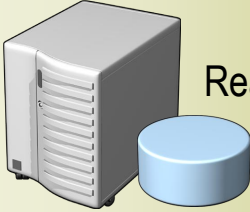
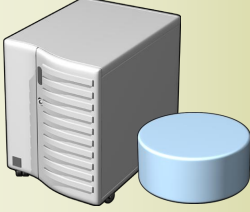


Record type	Description
A	Resolves a host name to an IP address
PTR	Resolves an IP address to a host name
SOA	The first record in any zone file
SRV	Resolves names of servers providing services
NS	Identifies the DNS server for each zone
MX	The mail server
CNAME	Resolves from a host name to a host name

What Is a DNS Zone?



What Are DNS Zone Types?

Zones	Description
 Primary Read/Write	Read/write copy of a DNS database
 Secondary Read-Only	Read-only copy of a DNS database
 Stub Copy of limited records	Copy of a zone containing limited records

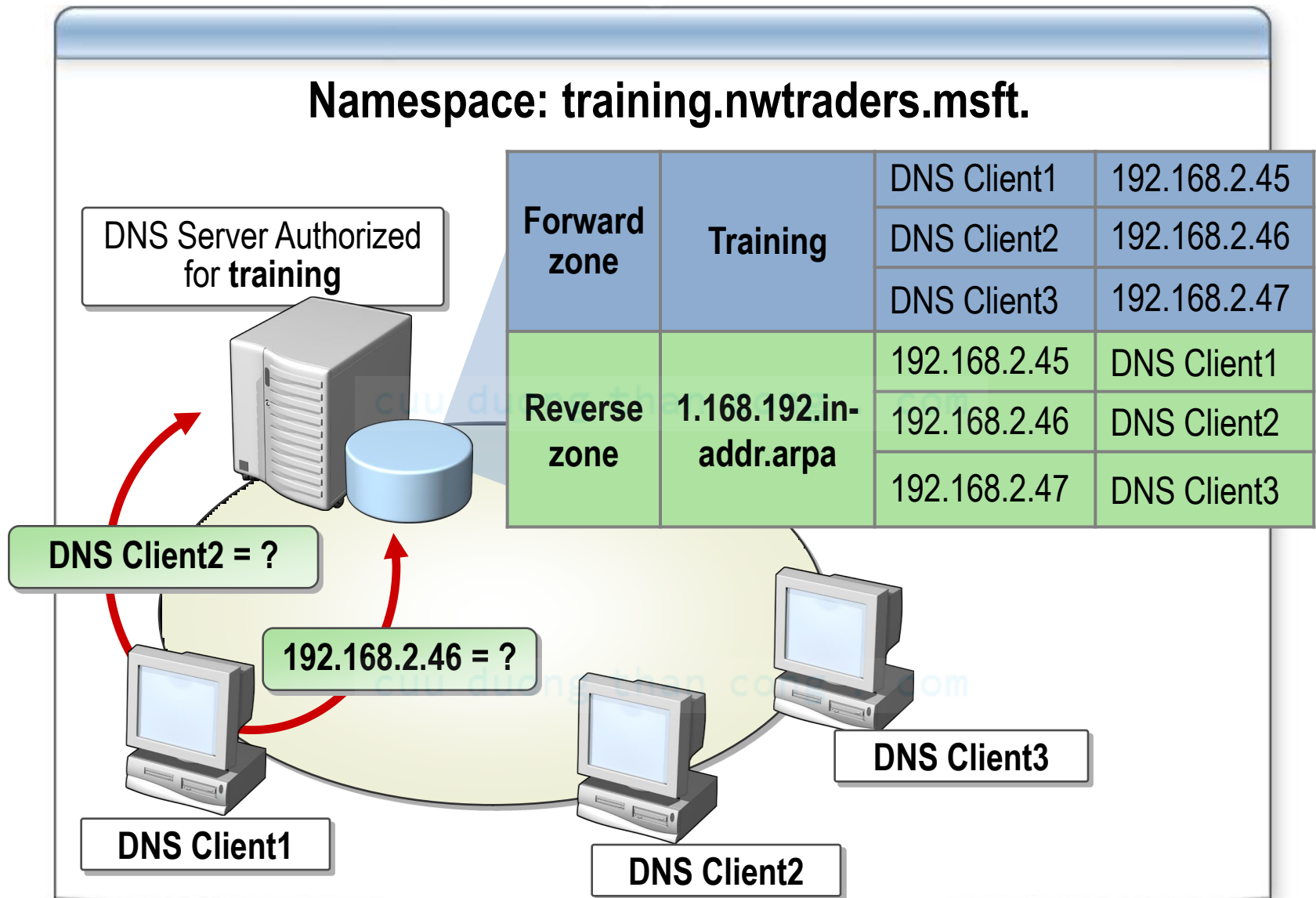
How to Change a DNS Zone Type

Your instructor will demonstrate how to change a DNS zone type

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What Are Forward and Reverse Lookup Zones?



How to Configure Forward and Reverse Lookup Zones

Your instructor will demonstrate how to:

- **Configure a forward lookup zone on a primary zone type**
- **Configure a forward lookup stub zone**
- **Configure a forward lookup zone on a secondary zone type**
- **Configure a reverse lookup zone on a primary zone type**
- **Configure a reverse lookup zone on a secondary zone type**

Practice: Configuring a DNS Zone



In this practice, you will the configure DNS zones

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Lesson: Configuring DNS Zone Transfers

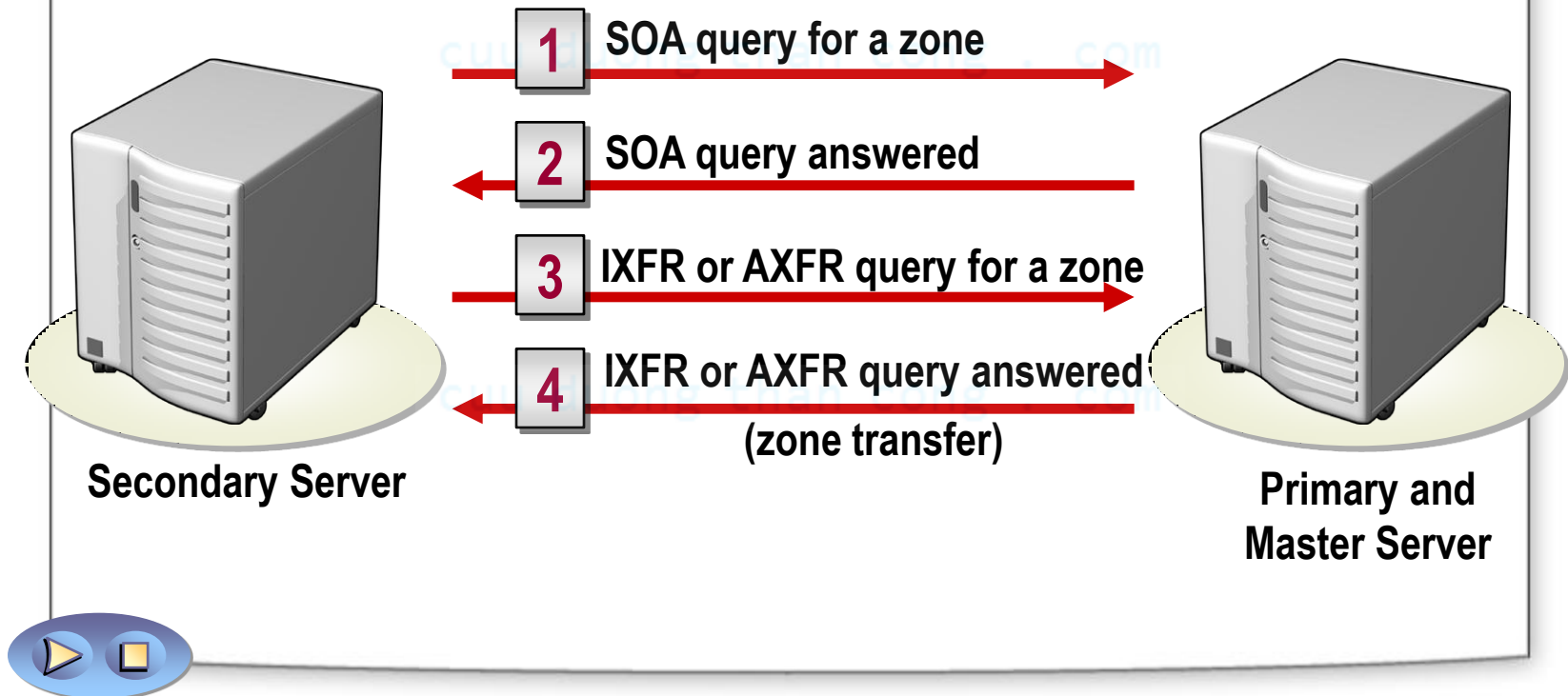
- **How DNS Zone Transfers Work**
- **How DNS Notify Works**
- **How to Configure DNS Zone Transfers**

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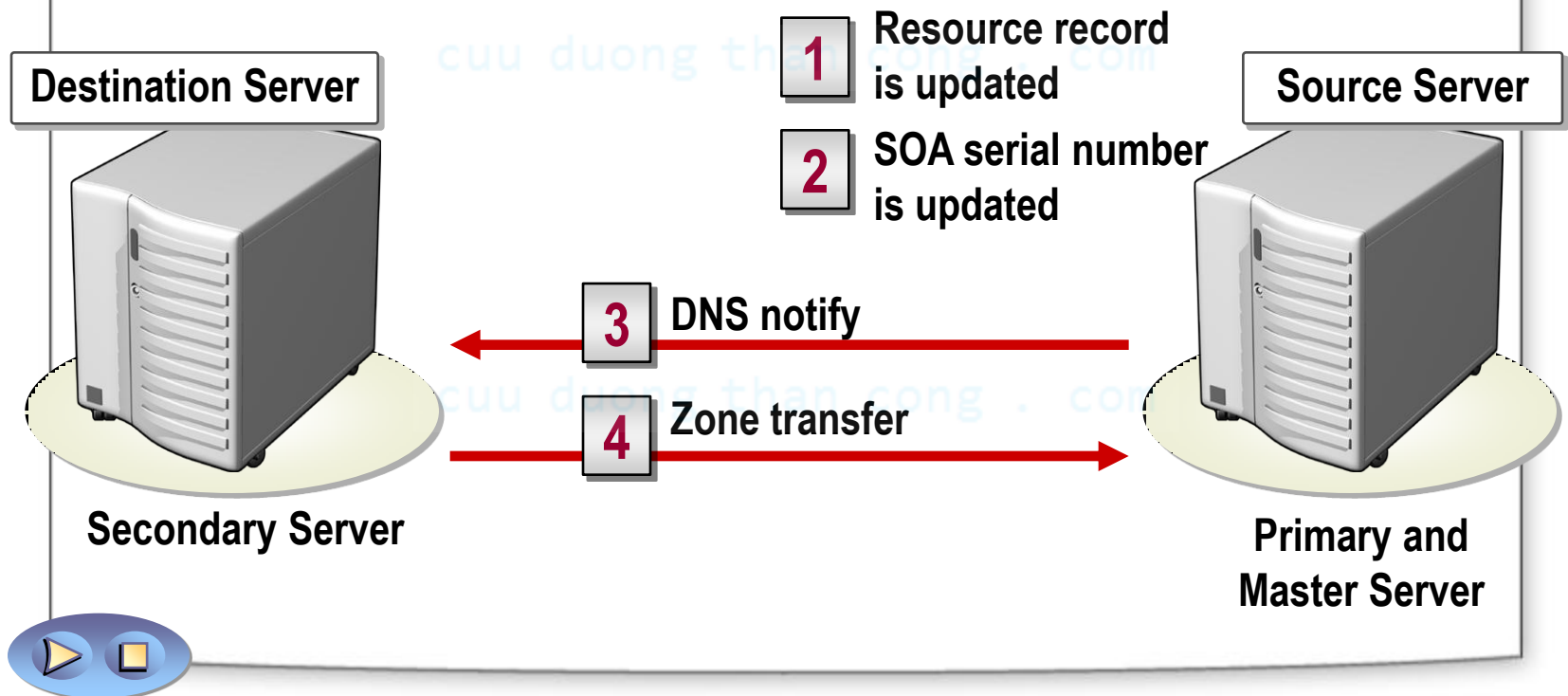
How DNS Zone Transfers Work

A *DNS zone transfer* is the synchronization of authoritative DNS zone data between DNS servers



How DNS Notify Works

A *DNS notify* is an update to the original DNS protocol specification that permits notification to secondary servers when zone changes occur



How to Configure DNS Zone Transfers

Your instructor will demonstrate how to configure a DNS zone transfer and DNS notify

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Practice: Configuring DNS Zone Transfers



In this practice, you will configure DNS zone transfers

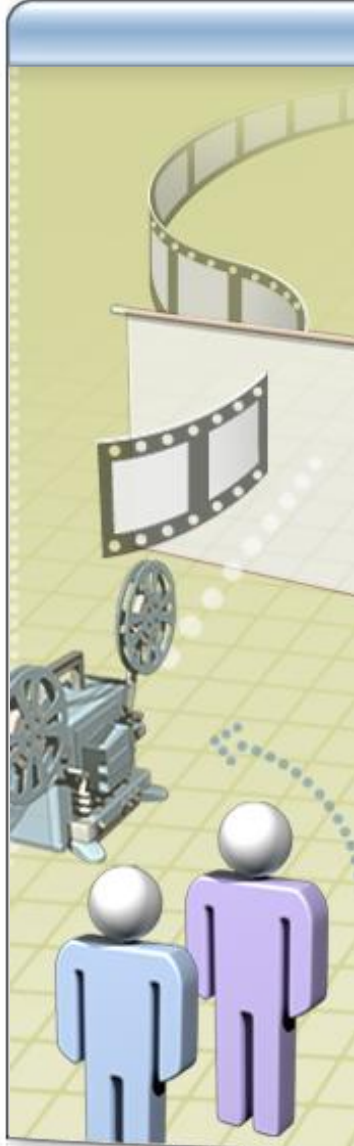
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Lesson: Configuring DNS Dynamic Updates

- **Multimedia: Overview of DNS Dynamic Updates**
- **What Are Dynamic Updates?**
- **How DNS Clients Register and Update Their Own Resource Records by Using Dynamic Updates**
- **How a DHCP Server Registers and Updates Resource Records by Using Dynamic Updates**
- **How to Configure DNS Manual and Dynamic Updates**
- **What Is an Active Directory-Integrated DNS Zone?**
- **How Active Directory-Integrated DNS Zones Use Secure Dynamic Updates**
- **How to Configure Active Directory-Integrated DNS Zones to Allow Secure Dynamic Updates**

Multimedia: Overview of DNS Dynamic Updates



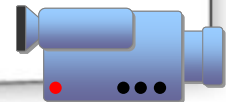
- The objective of this presentation is provide a high-level overview of DNS dynamic updates
- At the end of this presentation, you will be able to:

Explain why DNS dynamic updates are important

Explain the difference between manual and dynamic updates

Explain that client computers can either dynamically update resource records in DNS themselves or have DHCP perform dynamic updates in DNS on their behalf

Explain what secure dynamic updates are



What Are Dynamic Updates?

A *dynamic update* is the process of a DNS client dynamically creating, registering, or updating its records in zones that are maintained by DNS servers that can accept and process messages for dynamic updates

A *manual update* is the process of an administrator manually creating, registering, or updating the resource record

- **Dynamic update enables DNS client computers to interact automatically with the DNS server to register and update their own resource records**

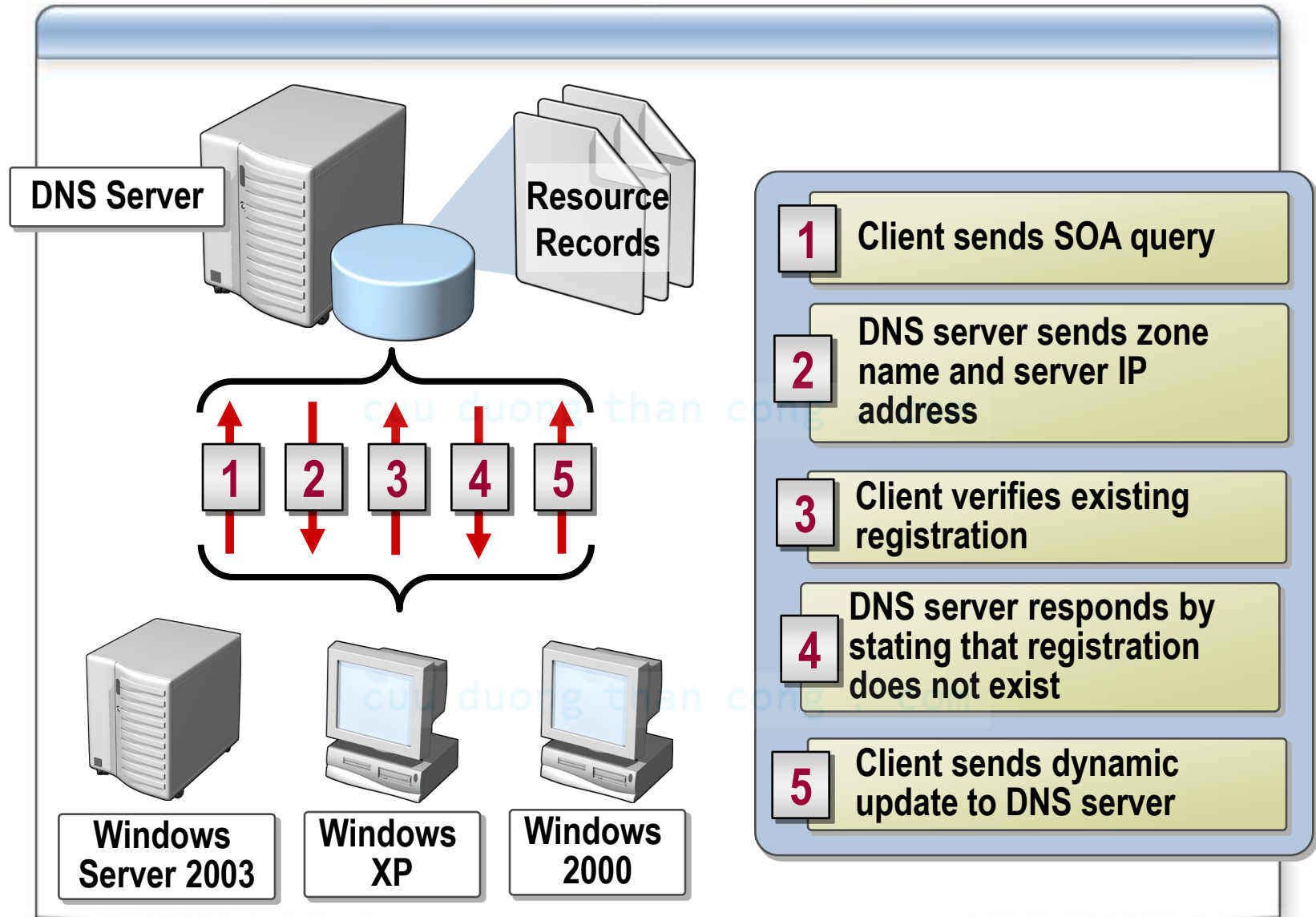
Organizations that have dynamic changes can benefit from the dynamic method of updating DNS resource records

- **Organizations may benefit from manual update if they:**

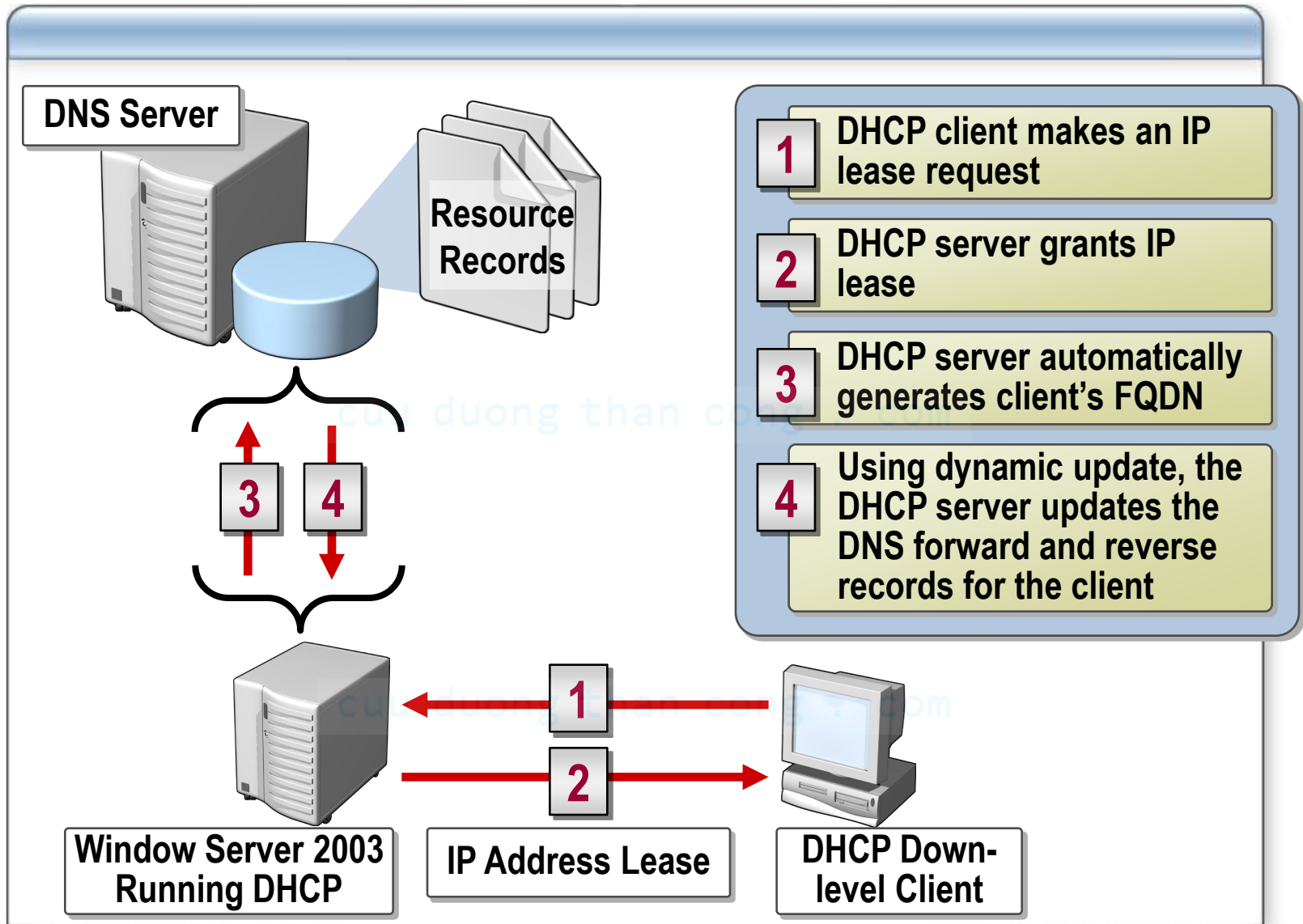
Are in a smaller environment that has few changes to their resource records

Have isolated instances, such as when a larger organization chooses to control every address on every host.

How DNS Clients Register and Update Their Own Resource Records by Using Dynamic Updates



How a DHCP Server Registers and Updates Resource Records by Using Dynamic Updates



How to Configure DNS Manual and Dynamic Updates

Your instructor will demonstrate how to:

- **Configure a DNS server running Windows Server 2003 to accept dynamic updates of DNS resource records**
- **Configure a Windows XP Professional client to dynamically update its DNS resource records in DNS**
- **Configure a DHCP server running Windows Server 2003 to dynamically update DNS resource records in DNS on behalf of DHCP clients**
- **Manually create a DNS resource record**

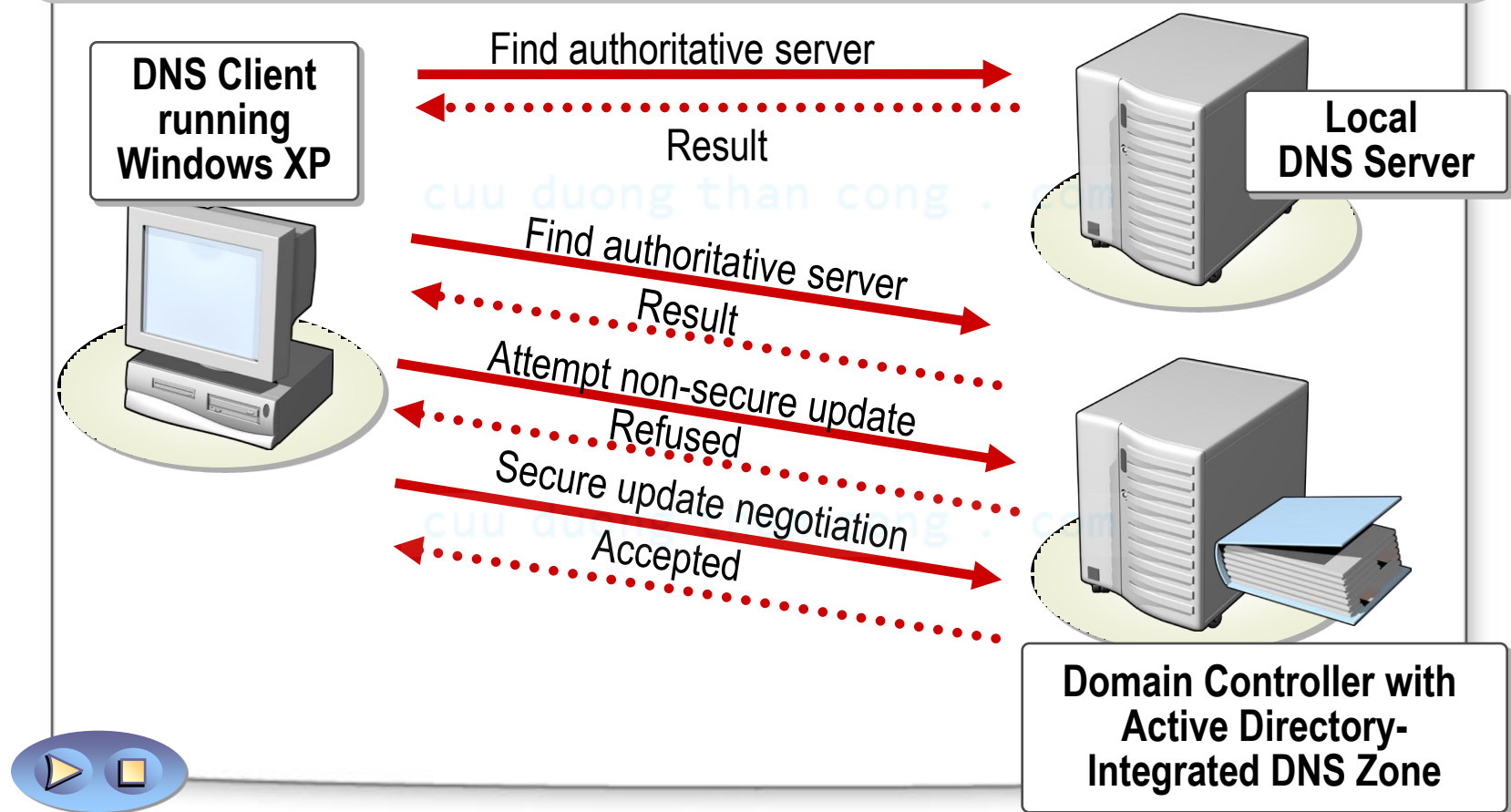
What Is an Active Directory-Integrated DNS Zone?

DNS zone type	Benefit
Non Active Directory-integrated zone	<ul style="list-style-type: none">• Does not require Active Directory
Active Directory-integrated zone	<ul style="list-style-type: none">• Stores DNS zone data in Active Directory and is thus more secure• Uses Active Directory replication instead of zone transfers• Allows only secure dynamic updates• Uses multi-master instead of single master structure

An Active Directory-integrated DNS zone is a DNS zone stored in Active Directory

How Active Directory-Integrated DNS Zones Use Secure Dynamic Updates

A *secure dynamic update* is a process in which a client submits a dynamic update request to a DNS server, and the server attempts the update only if the client can prove its identity and has the proper credentials to make the update



How to Configure Active Directory-Integrated DNS Zones to Allow Secure Dynamic Updates Only

Your instructor will demonstrate how to:

- **Configure Active Directory-integrated DNS zones to allow secure dynamic updates**
- **Configure security on an Active Directory-integrated DNS zone**

Practice: Configuring DNS Dynamic Updates



In this practice, you will configure DNS dynamic updates

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Lesson: Configuring a DNS Client

- **How Preferred and Alternate DNS Servers Work**
- **How Suffixes Are Applied**
- **How to Configure a DNS Client**

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How Preferred and Alternate DNS Servers Work

Internet Protocol (TCP/IP) 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

1. The preferred DNS server is the one that the client tries first

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 10 . 1 . 1 . 10

Alternate DNS server: . . .

2. If the preferred server fails, the client tries the alternate DNS server

Advanced TCP/IP Settings

IP Settings DNS WINS Options

DNS server addresses, in order of use:

10.1.1.10

3. Optionally, you can enter a whole list of alternate DNS servers

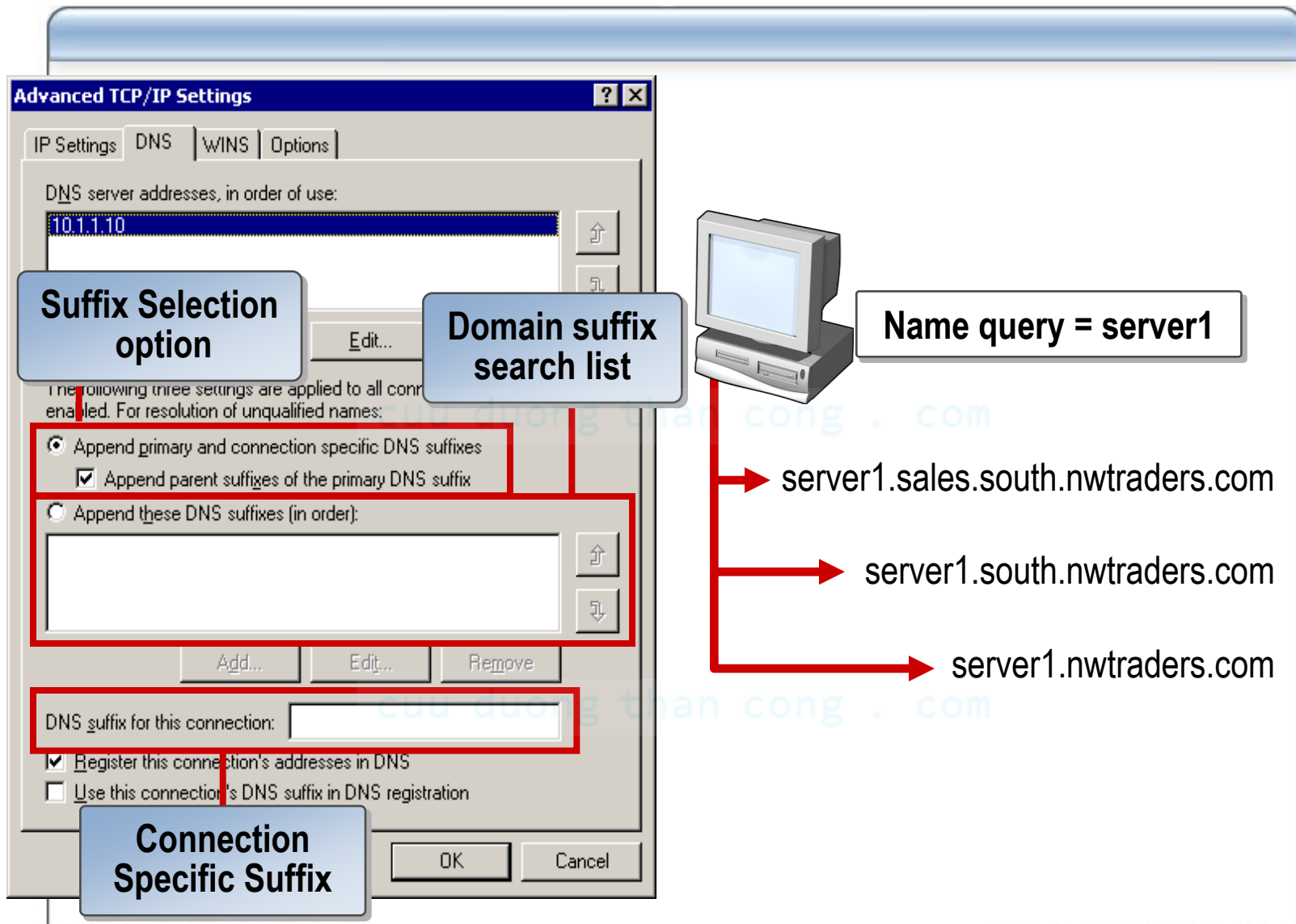
4. The preferred and alternate DNS servers specified on the Properties page automatically appear at the top of this list, and preferred and alternate servers are queried in the order they are listed

The following three settings are applied to all connections with TCP/IP enabled. For resolution of unqualified names:

☒ Register this connection's addresses in DNS

☐ Use this connection's DNS suffix in DNS registration

How Suffixes Are Applied



How to Configure a DNS Client

Your instructor will demonstrate how to:

- **Manually configure a DNS client to use preferred and alternate DNS servers**
- **Configure the DNS server option and the DNS suffix option in DHCP**

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Practice: Configuring a DNS Client



In this practice, you will configure a DNS client

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Lesson: Delegating Authority for Zones

- **What Is Delegation of a DNS Zone?**
- **How to Delegate a Subdomain to a DNS Zone**

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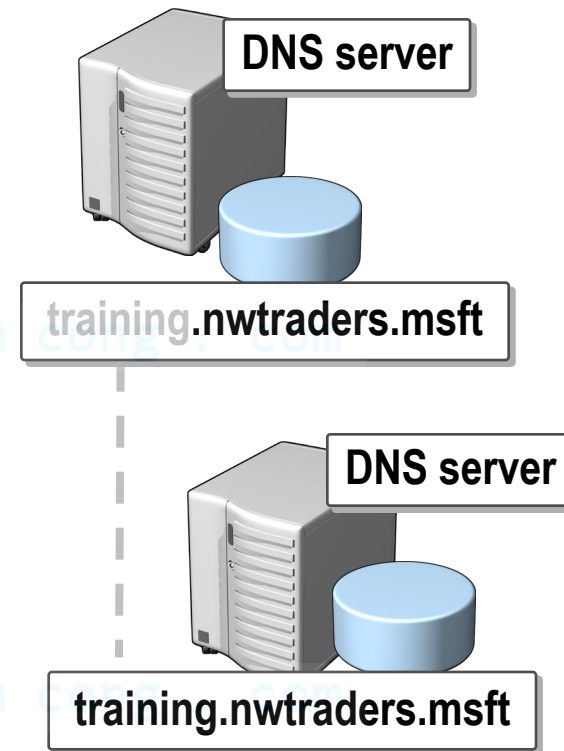
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What Is Delegation of a DNS Zone?

Namespace: training.nwtraders.msft

The administrator, at the nwtraders.com level of the namespace, delegates authority for training.nwtraders.com and offloads administration of DNS for that part of the namespace

Training.nwtraders.com now has its own administrator and DNS server to resolve queries in that part of the namespace/organization



Delegation is the process of assigning authority over child domains in your DNS namespace to another entity by adding records in the DNS database

How to Delegate a Sub-domain to a DNS Zone

Your instructor will demonstrate how to delegate a sub-domain to a DNS zone

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Lab A: Resolving Host Names by Using Domain Name System



In this lab, you will resolve host names by using DNS

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