



# Passerelles numériques

*A Gateway for Life*

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## Basic Microsoft System Administration

### Chapter 07: DNS Server



# Remember



**175.28.1.102**

=> *Google*

**31.13.77.6**

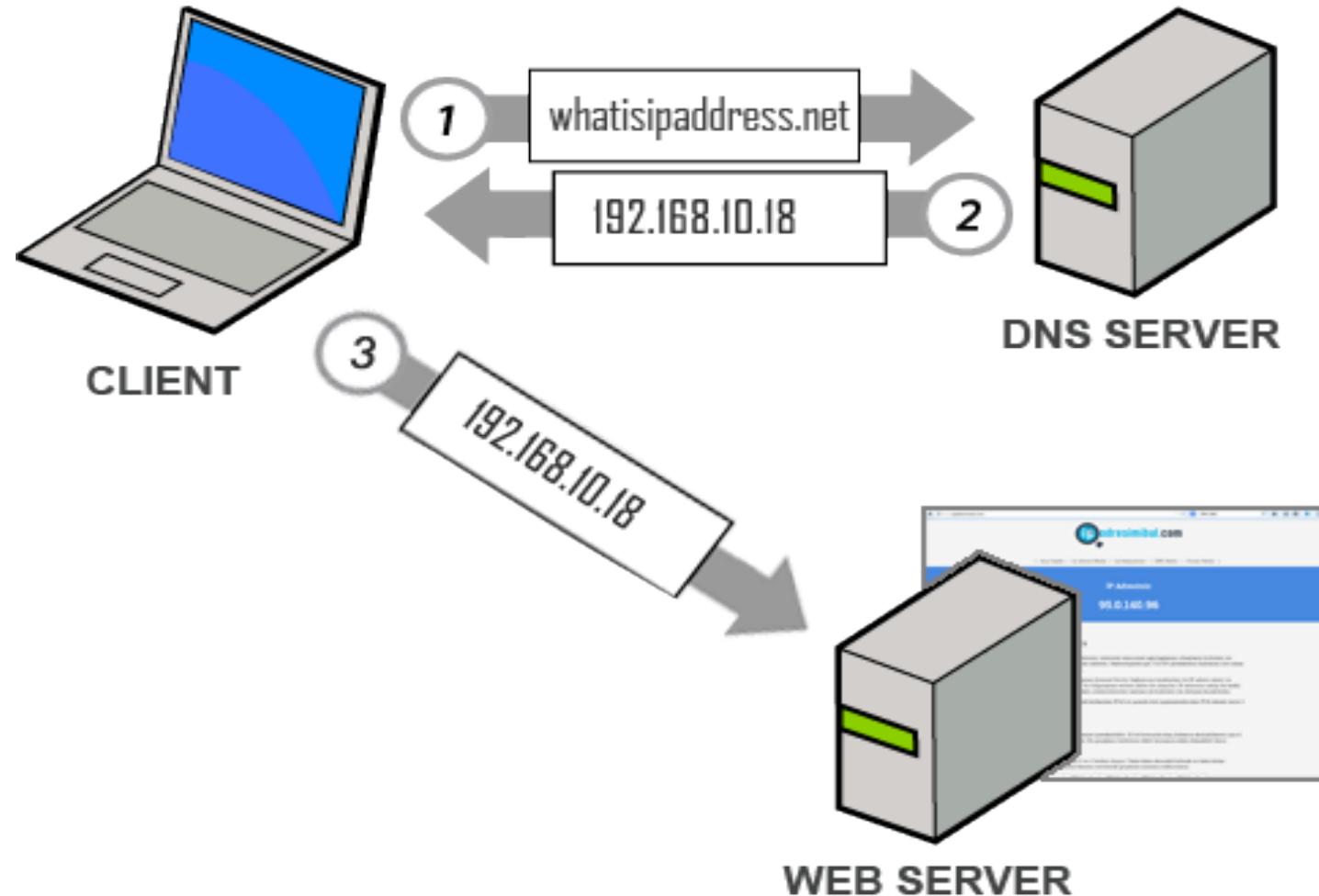
=> *Facebook*

**98.138.253.109**

=> *Yahoo*



# DNS SERVER



# OVERVIEW

Role of DNS in the network Infrastructure

Installing the DNS Server

Configure DNS Zone in DNS

Configure DNS Client

Delegating Authority for Zone

Configuring the Time-To-Live value

Configure Aging and Scavenging

Troubleshooting Name Resolution

# Installing the DNS Server Service

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

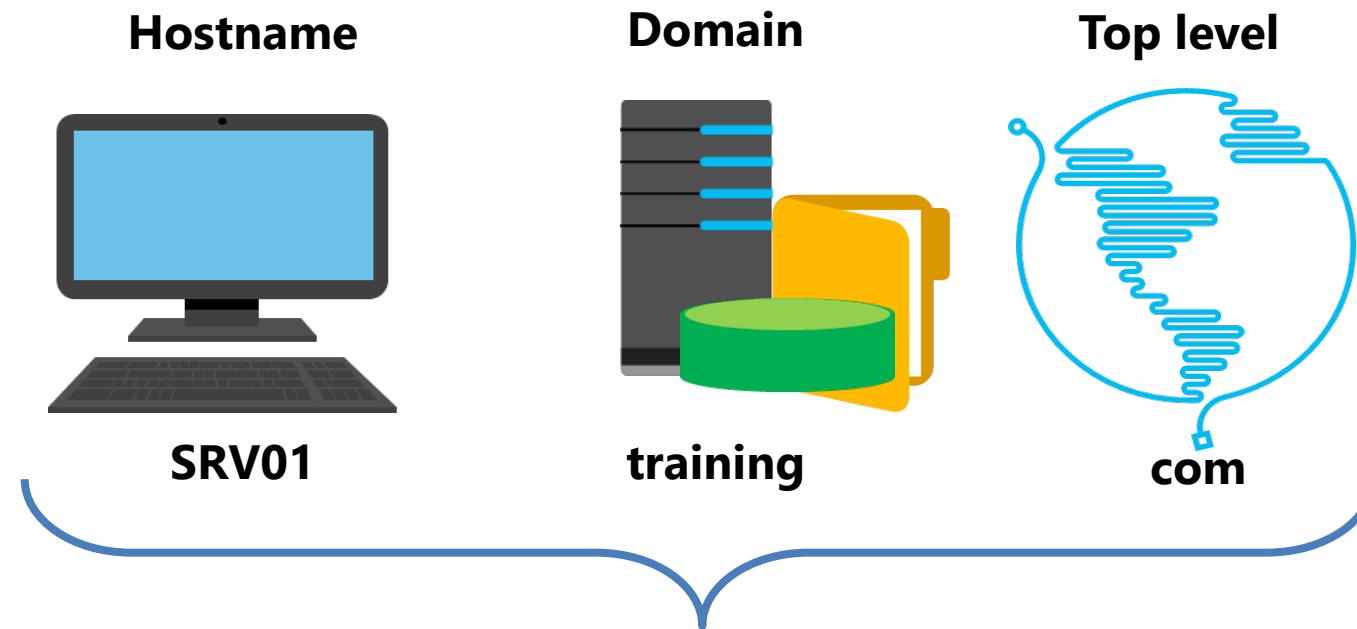
# Overview of Domain Name System

**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 supports accessing resources by using **domain names**
- **InterNIC (Internet Network Information Center)** is an organization created providing Internet information and domain name registering and maintaining the **com**, **net**, and **org** **top-level domain** name on the World Wide Web.
- DNS was designed to solve issues when there was an increase in the:
  - Number of hosts on the Internet
  - Traffic generated by the update process
  - Size of the Hosts file

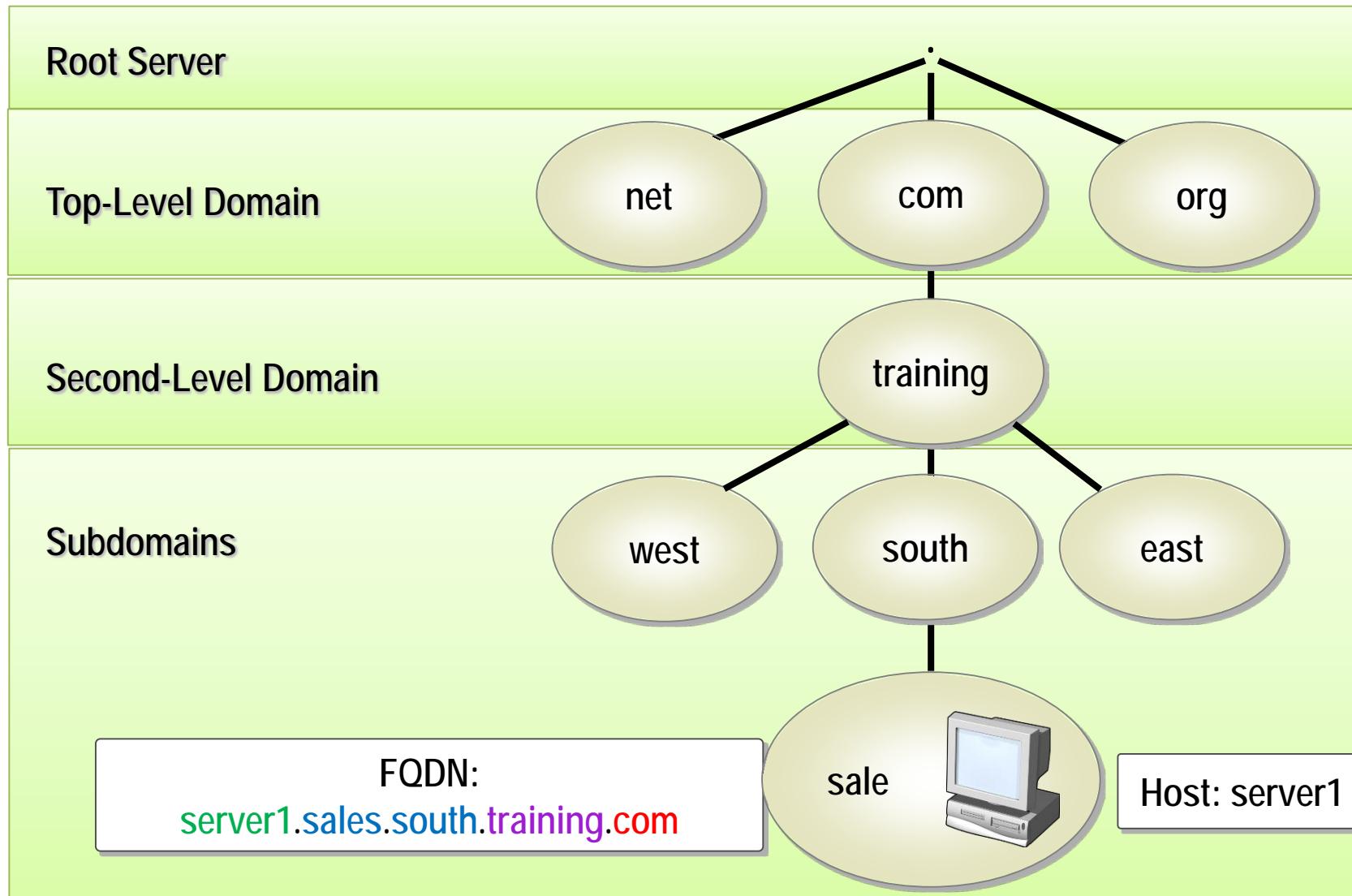
# What Is a Domain Namespace?

A **hostname** is a computer name that is added to a domain name and top level domain to make a **fully qualified domain name** (FQDN).



**Fully qualified domain name = SRV01.training.com**

# What Is a Domain Namespace?

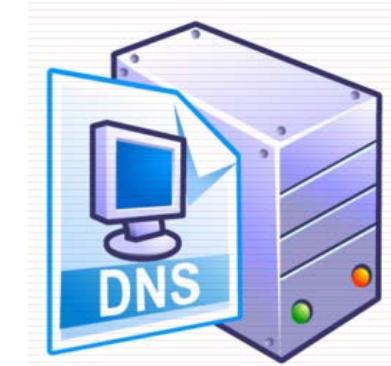


# DNS Components

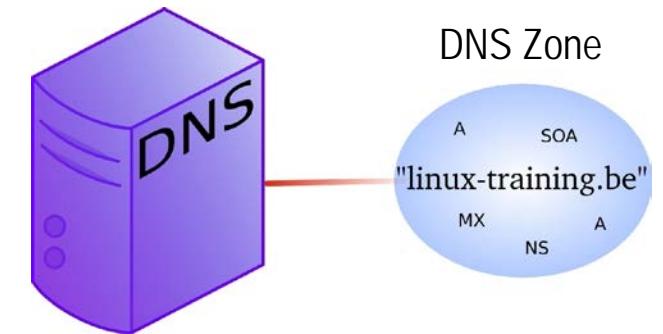
- **DNS namespace** is a hierarchical naming structure that provides multiple identifiers for each network node that can be identified relative to the root server.

SRV01.unitedstates.microsoft.com

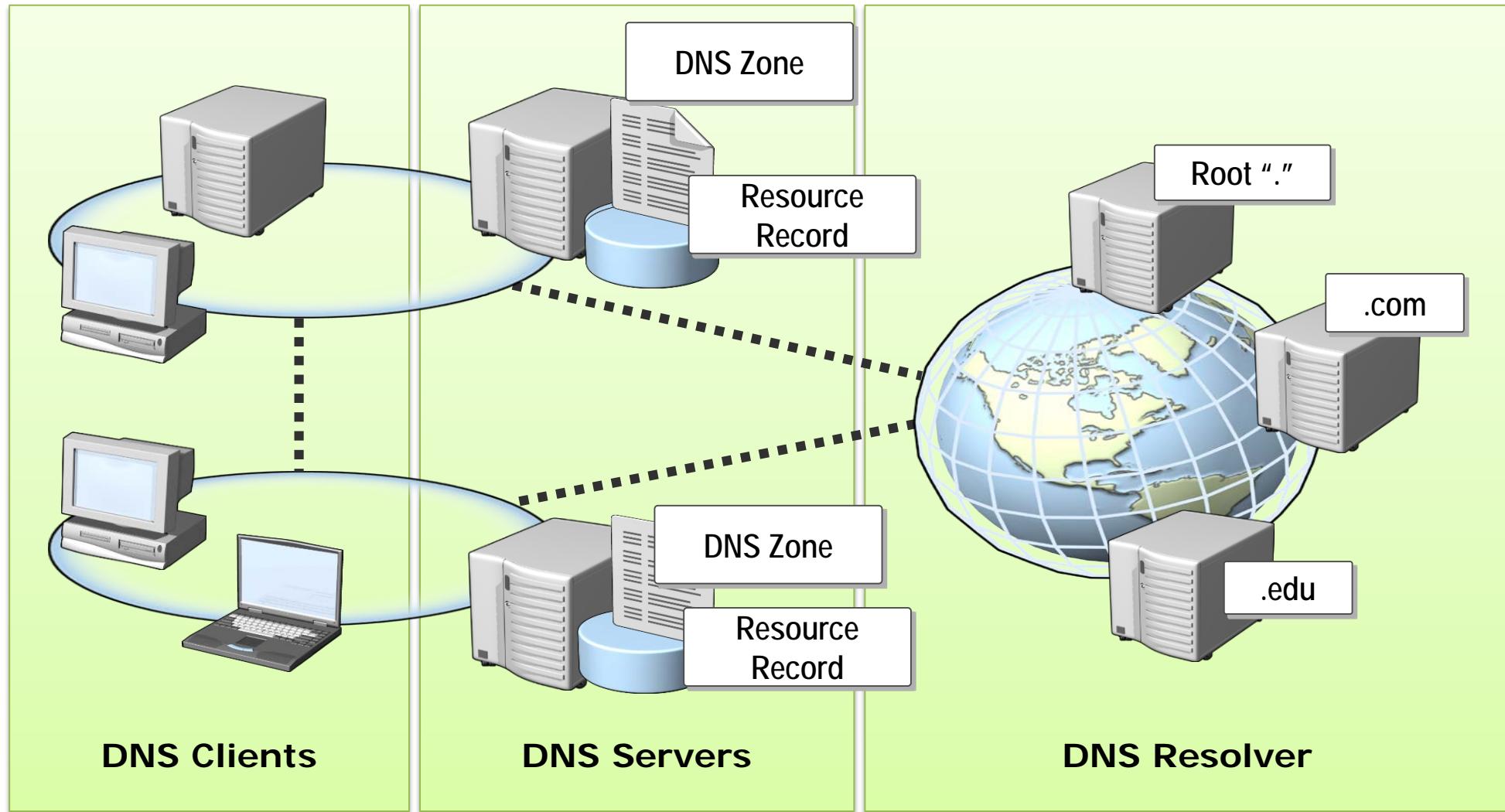
- DNS infrastructure components include:
  - **DNS server**
  - **DNS zone**
  - **DNS resolvers**
  - **Resource records**



DNS Resolvers



# DNS Components



# Standards for DNS Naming



The following characters are valid for DNS names:

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

# How to Install the DNS Server Service

Your instructor will demonstrate how to install the DNS Server service

## Step to Install and Configure DNS Server

- Assign Static IP address on Server
- Assign proper hostname to Server
- Add DNS Server Role
- Create Forward Lookup Zone
- Adding Host Record (A record) in Forward Lookup Zone
- Create Reverse Lookup Zone, then create a PTR record



# Practice: Installing the DNS Server Service



# Configuring the Properties for the DNS Server Service

- 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

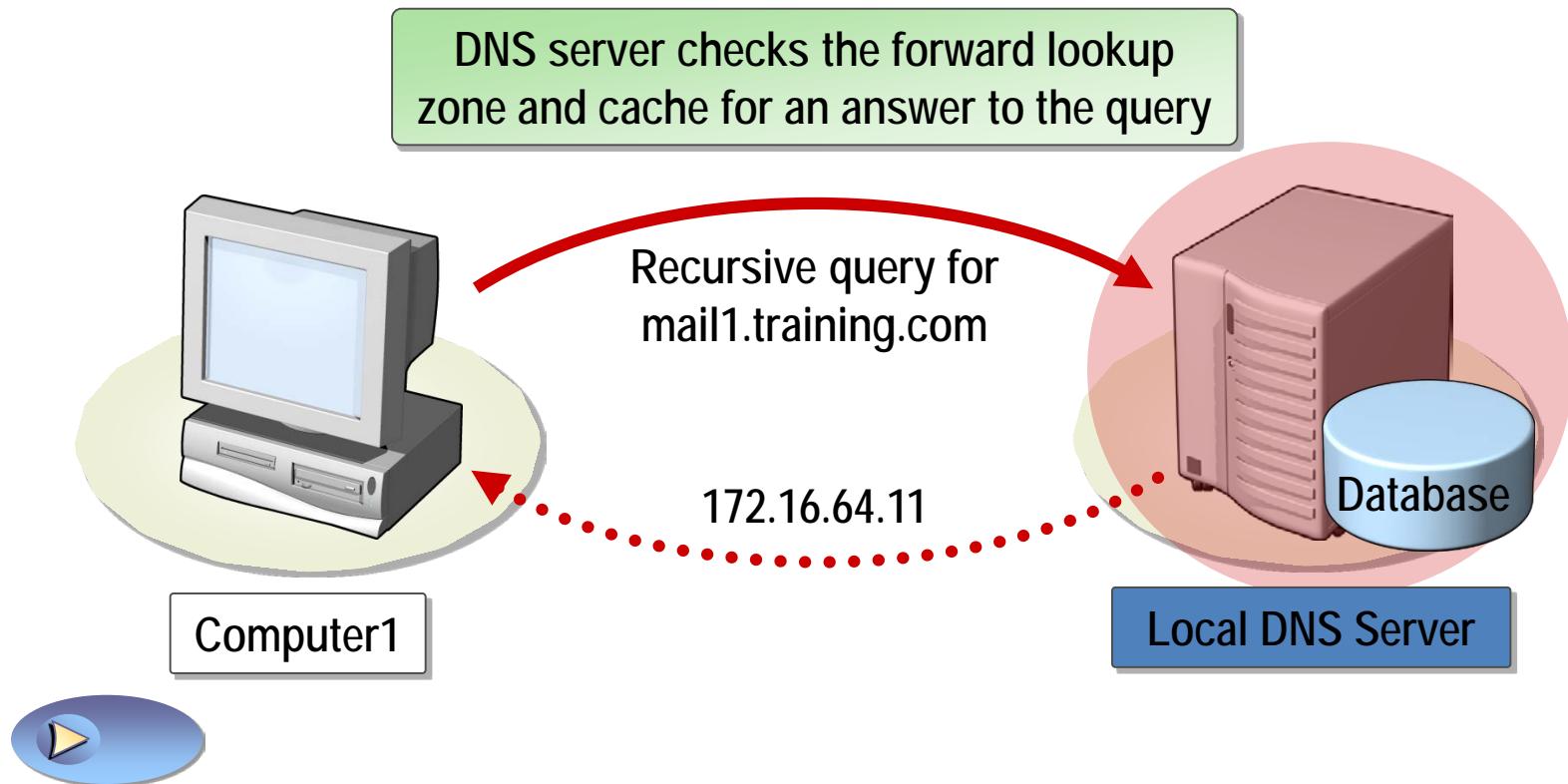
# What Is a DNS Query?

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

- ❖ An **authoritative DNS server** for the namespace of the query will either:
  - Check the **cache**, check the **zone**, and return the requested **IP address** to domain name
- ❖ 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

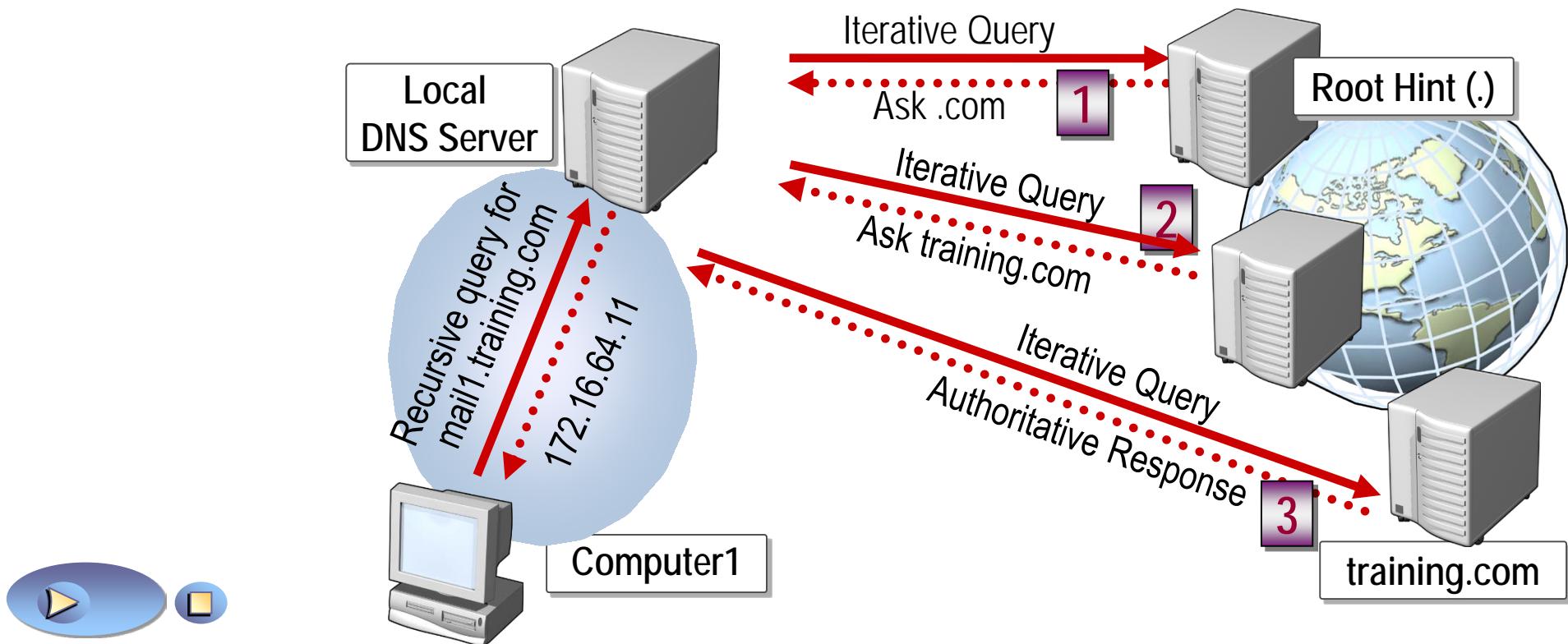
# How Recursive Queries Work

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



# How Iterative Queries Work

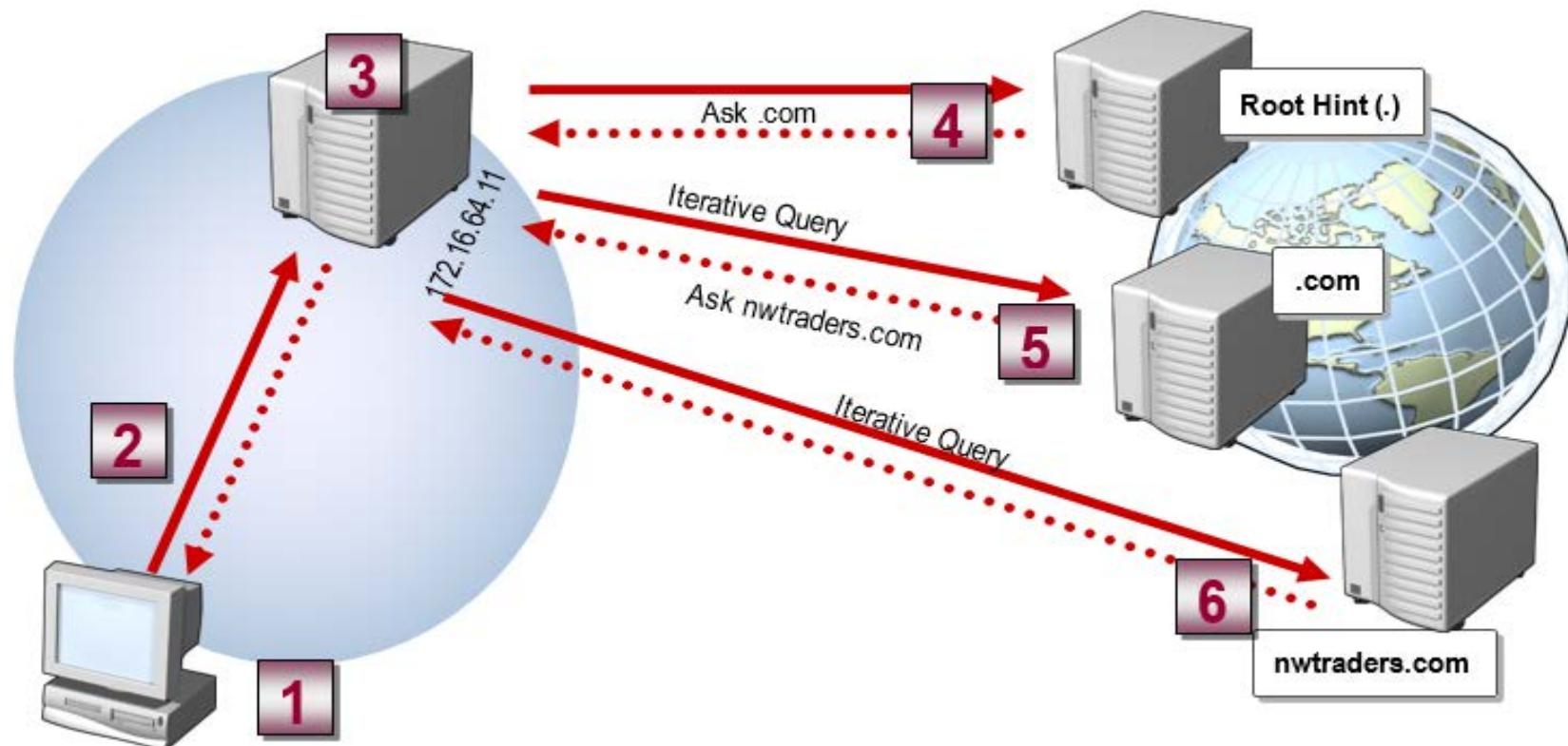
An iterative query (non-recursive) where the complete answer MAY be returned or a referral provided to another DNS. All DNS servers must support Iterative queries.



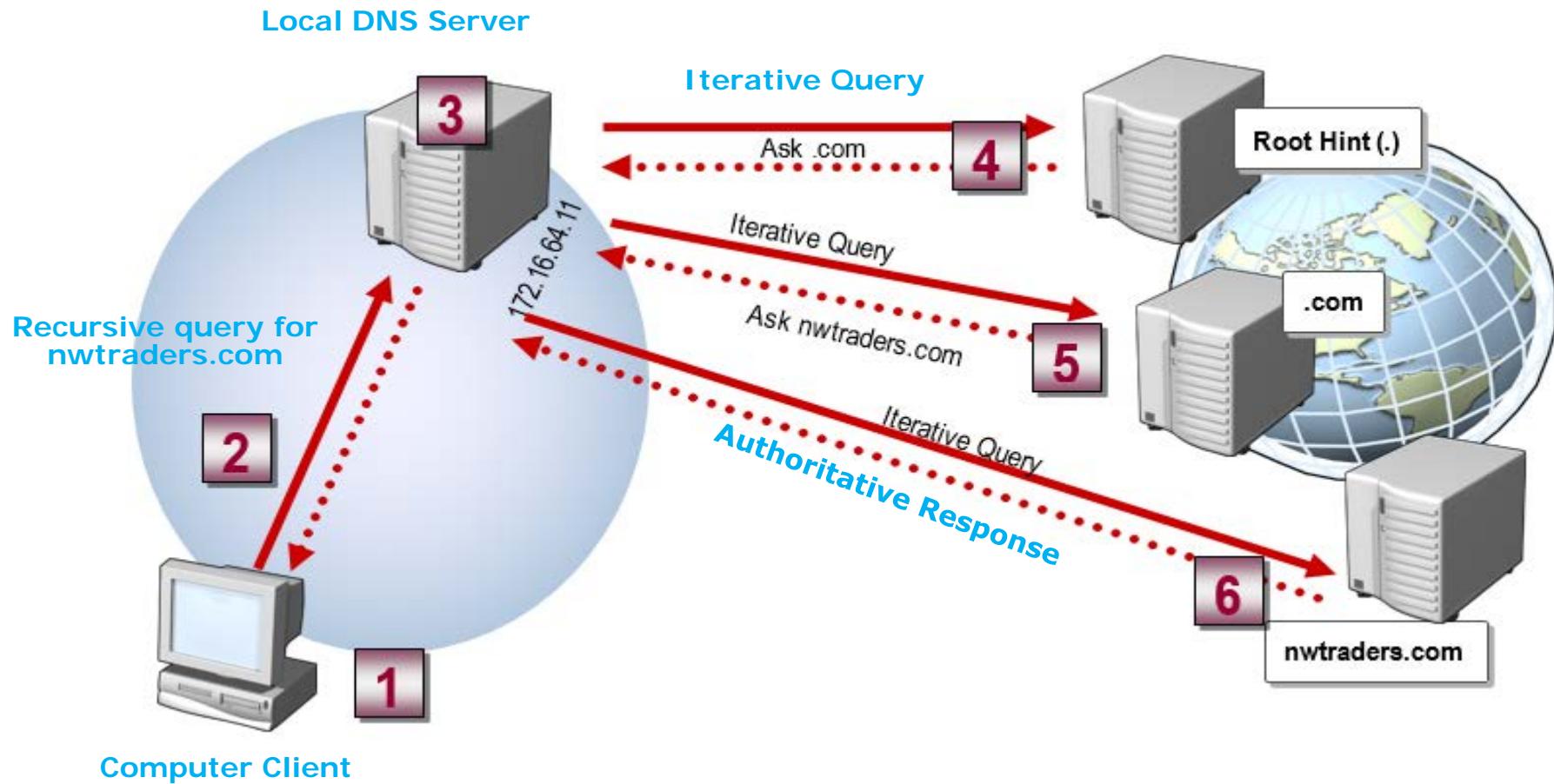
## Activity2 : Match the keywords with number below



Local DNS Server    Iterative Query    Authoritative Response    Computer Client    Recursive query for nwtraders.com

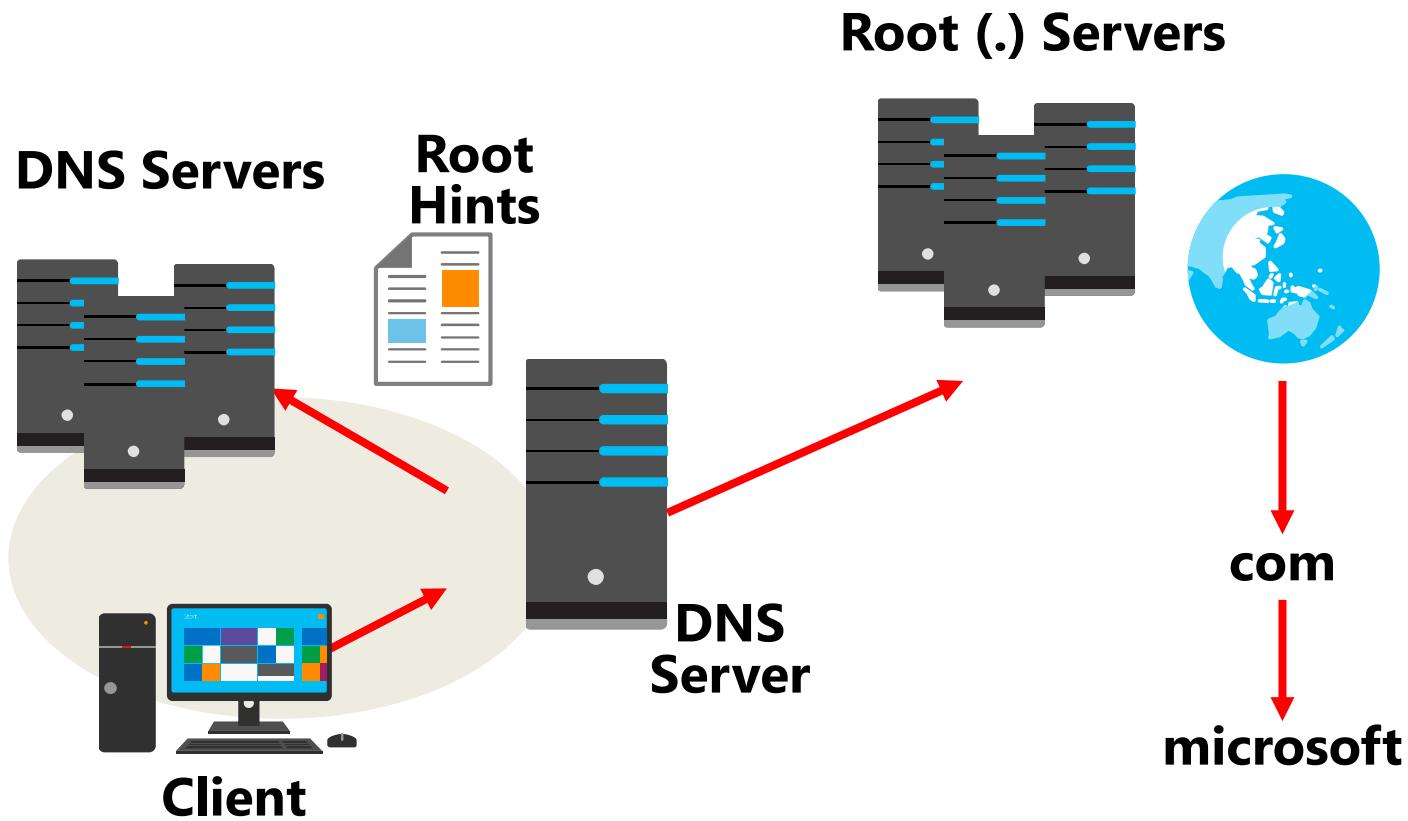


## Activity2 : Match the keywords with number below



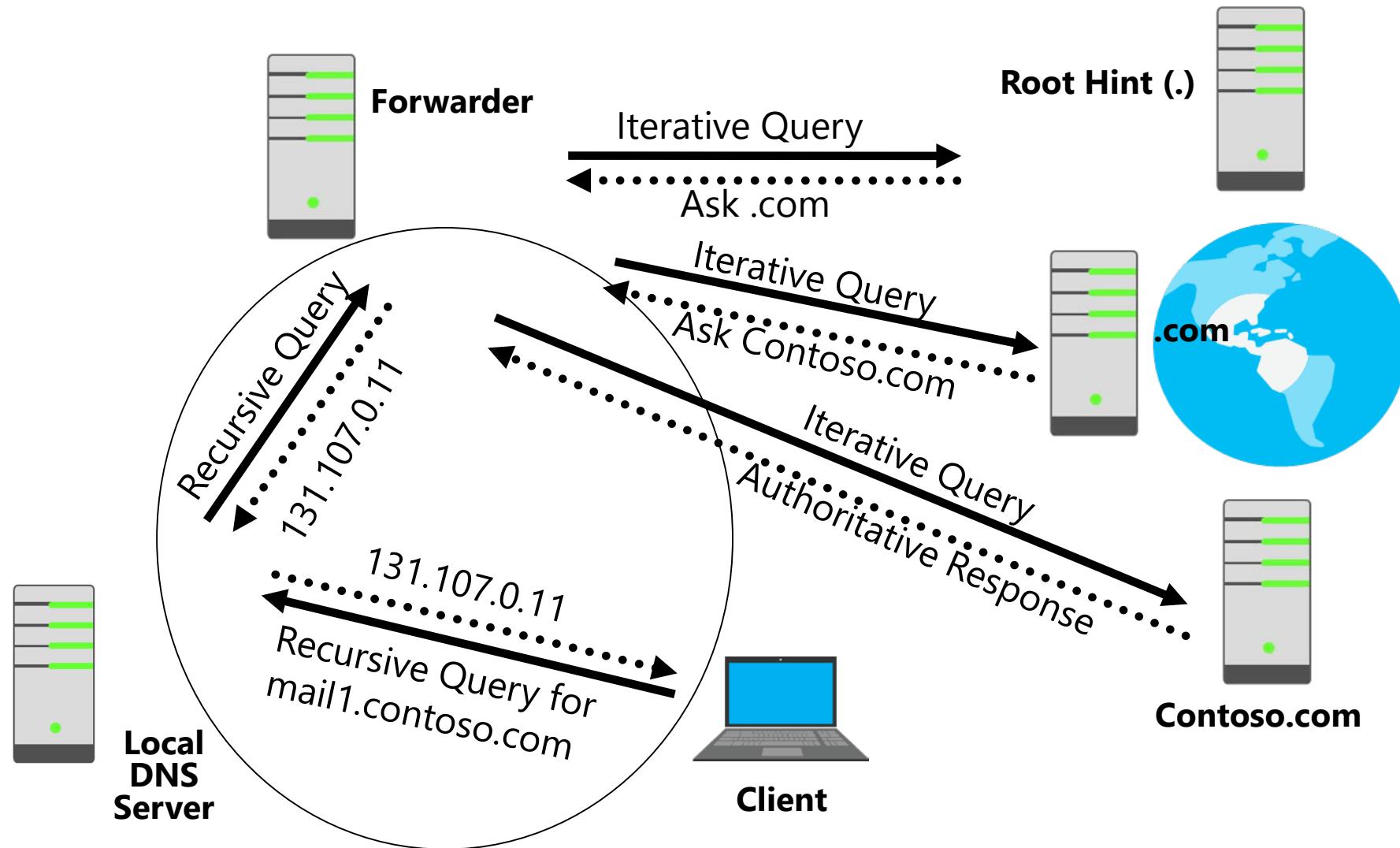
# How Root Hint Works

**Root hints** contain the IP addresses for DNS root servers



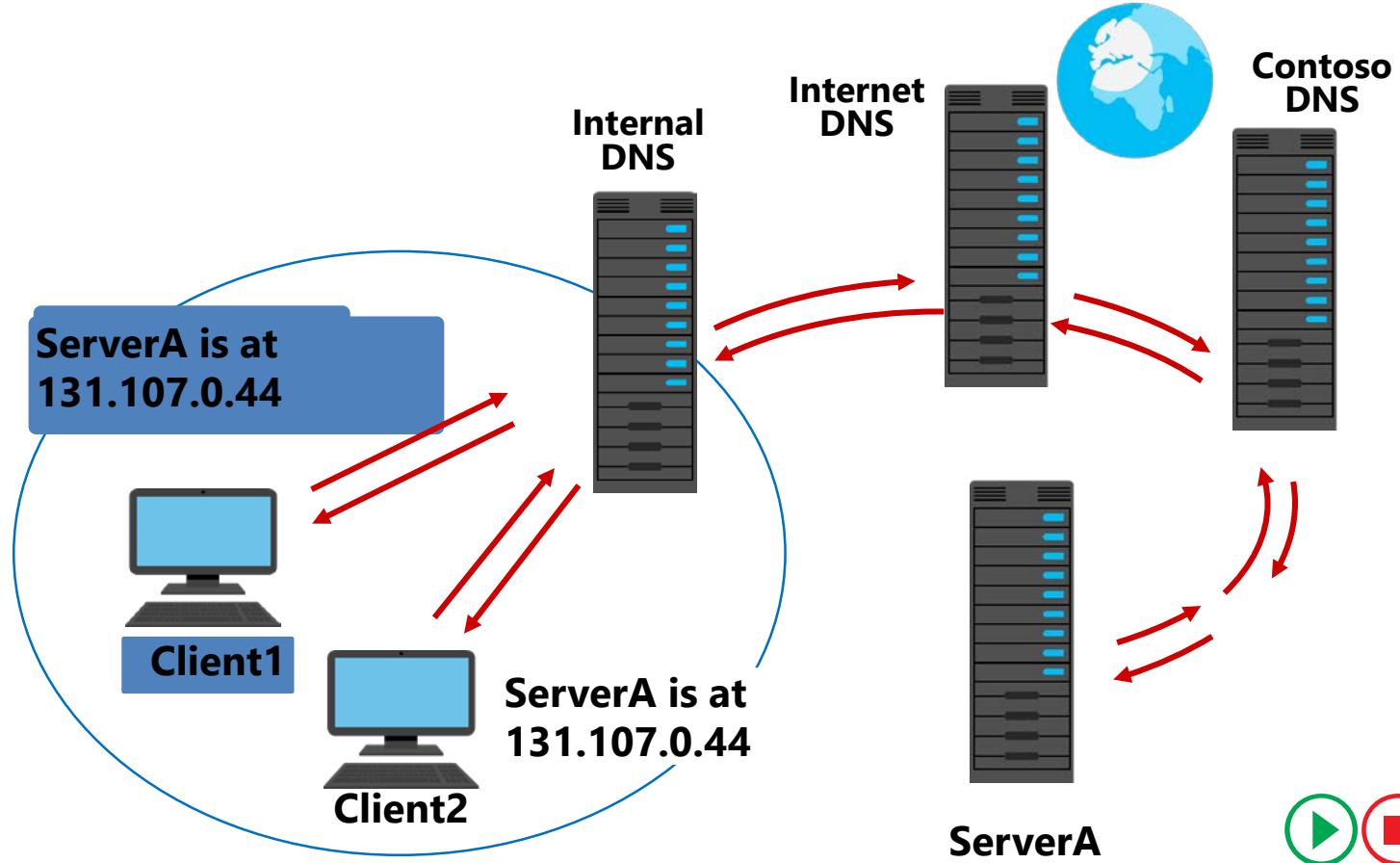
# What is DNS forwarding?

A **forwarder** is a DNS server that is designated to resolve external or offsite DNS domain names



# What is DNS caching?

DNS server cache		
Host name	IP address	TTL
ServerA.contoso.com	131.107.0.44	28 seconds



# 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



# Practice: Configuring Properties for the DNS Server Service



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



# Configuring DNS Zones

- ❖ 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

# What are DNS zones and records?

A **DNS zone** is a specific portion of DNS namespace that contains DNS records.

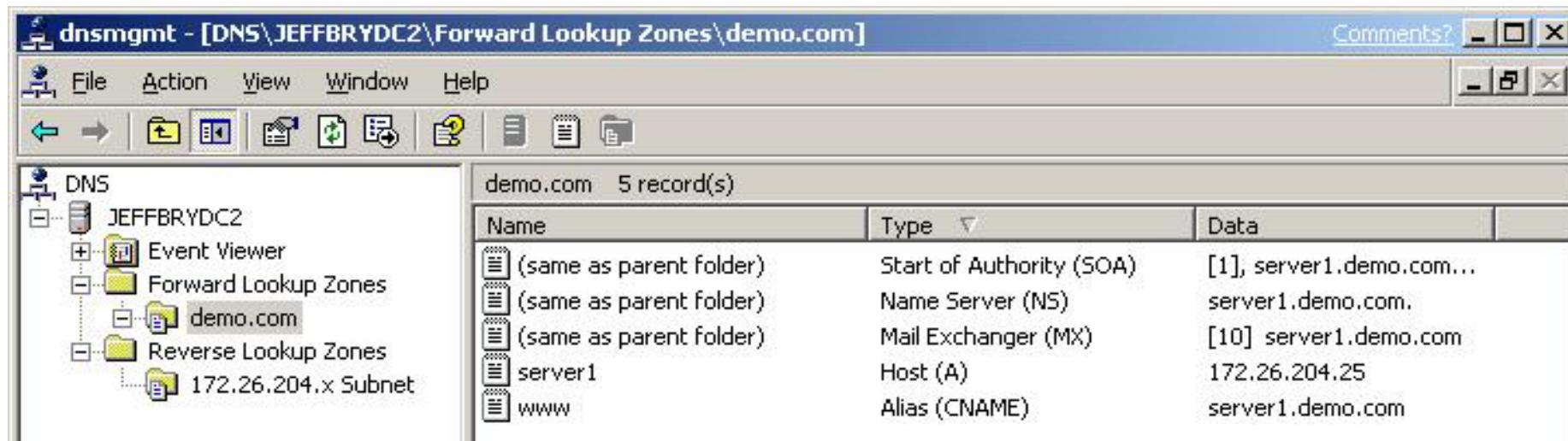
Zone types:

- Forward lookup zone
- Reverse lookup zone

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

- Resource records in forward lookup zones include: A, MX, NS, SOA, and CNAME
- Resource records in reverse lookup zones include: PTR

# DNS resource record types

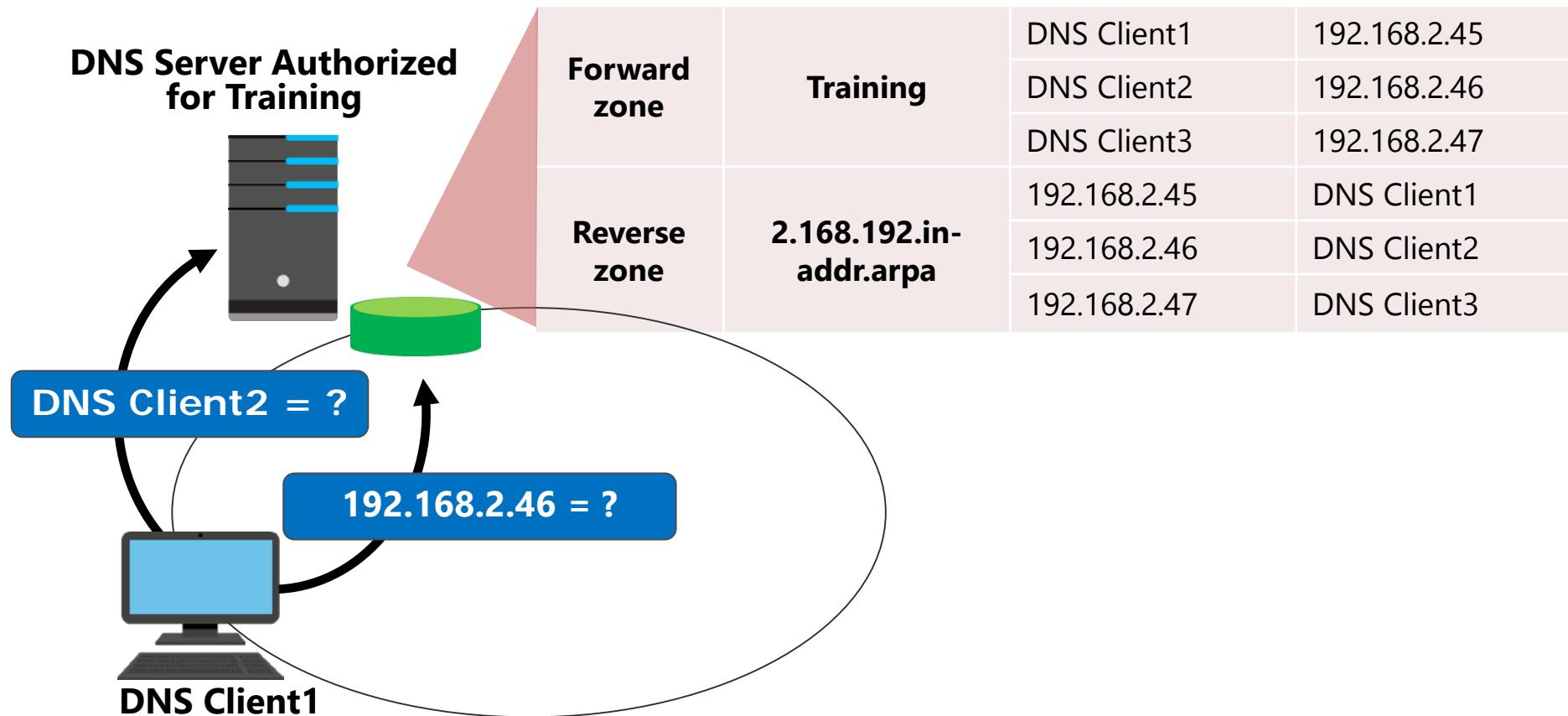


Record type	Description
A (IPv4 Address Mapping)	Resolves a host name to an IPv4 address
PTR (Pointer)	Resolves an IP address to a host name
SOA (Start of Authority)	The first record in any zone file
NS (Name Server)	Identifies the DNS server for each zone
MX (Mail Exchange)	Mail exchange resource record
CNAME (Canonical Name)	Resolves from a host name to a host name

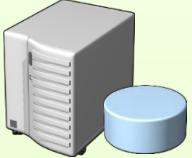
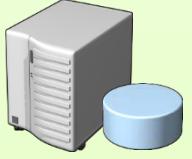
# Configuring DNS zones



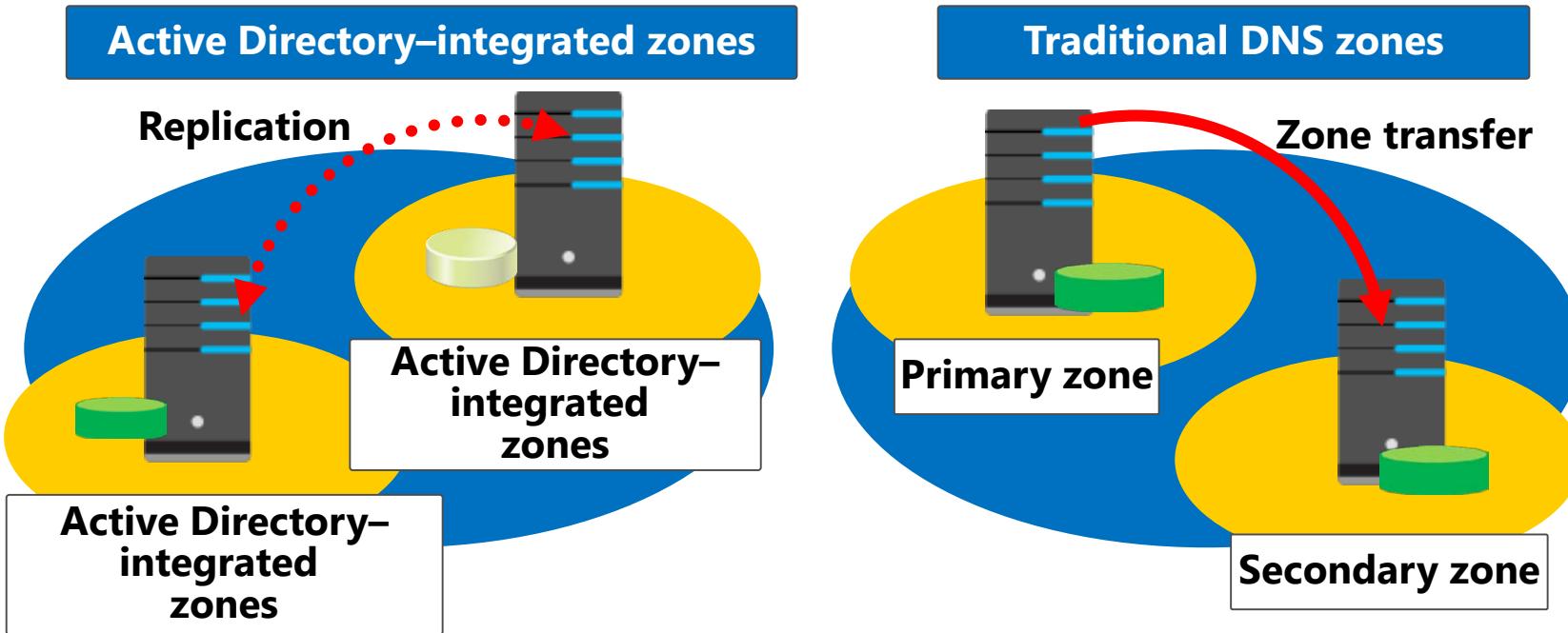
Namespace: training.contoso.com



# 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
 Active Directory-Integrated	Zone data is stored in AD DS rather than in zone files

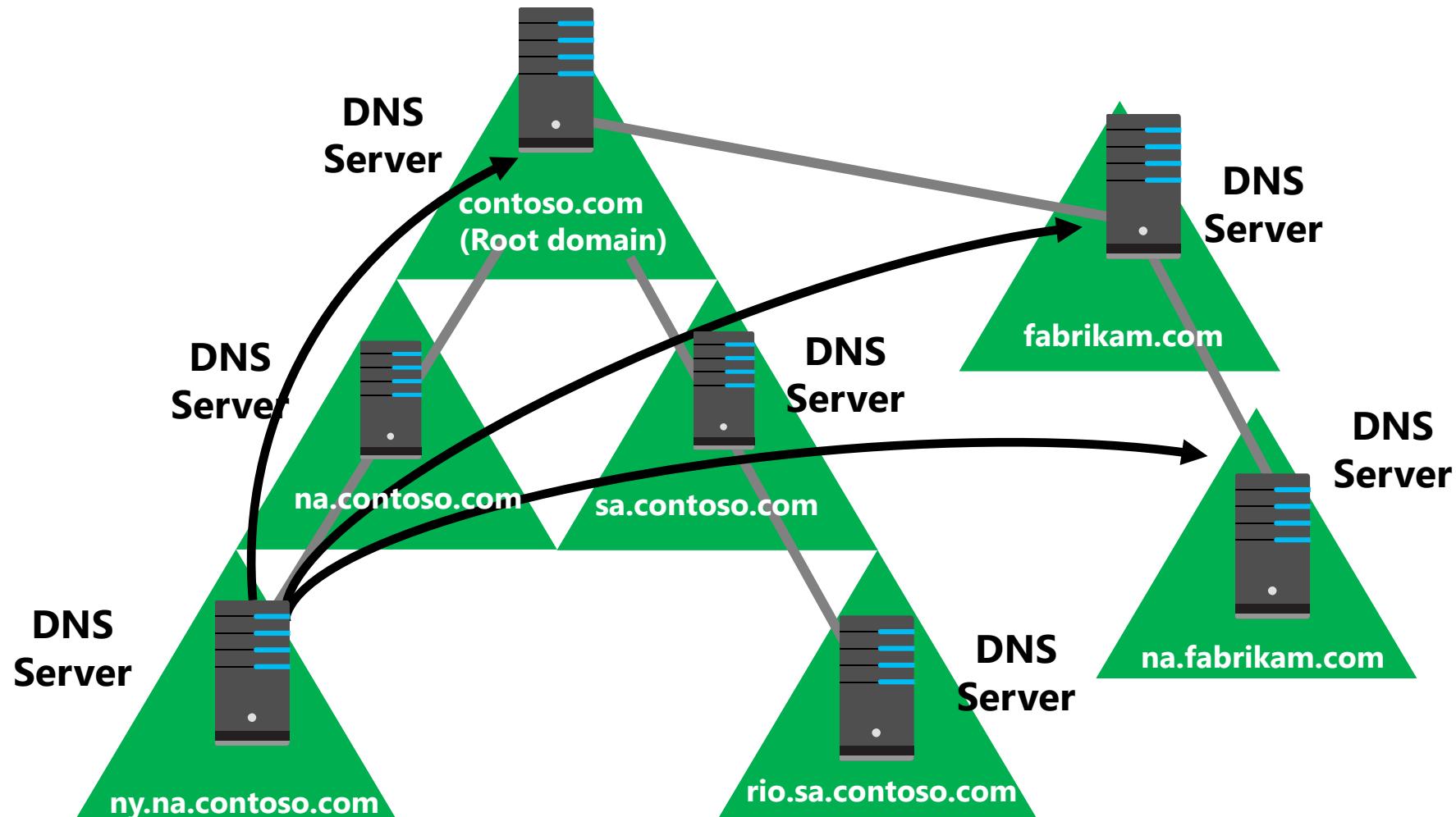
# Configuring zone replication



Zones	Description
Active Directory-integrated zones	<ul style="list-style-type: none"><li>• Perform incremental replication between DNS servers</li><li>• Adjust the Active Directory replication schedule</li></ul>
Traditional DNS zones	<ul style="list-style-type: none"><li>• Replicate between primary and secondary zones</li><li>• Perform an incremental rather than a complete zone transfer</li></ul>

# What is a stub zone?

Without stub zones, the ny.na.contoso.com server must query several servers to find the server that hosts the na.fabrikam.com zone



# DNS forwarding and stub zone guidance

- When to use conditional forwarding
  - Points to a different domain name
  - Name can even be in a different top level
  - When you want all name resolution for that name to take a particular path
- When to use stub zones
  - Usually when the domain name is below a higher level

# How to Change a DNS Zone Type

Your instructor will demonstrate how to change a DNS zone type



# 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 configure DNS zones

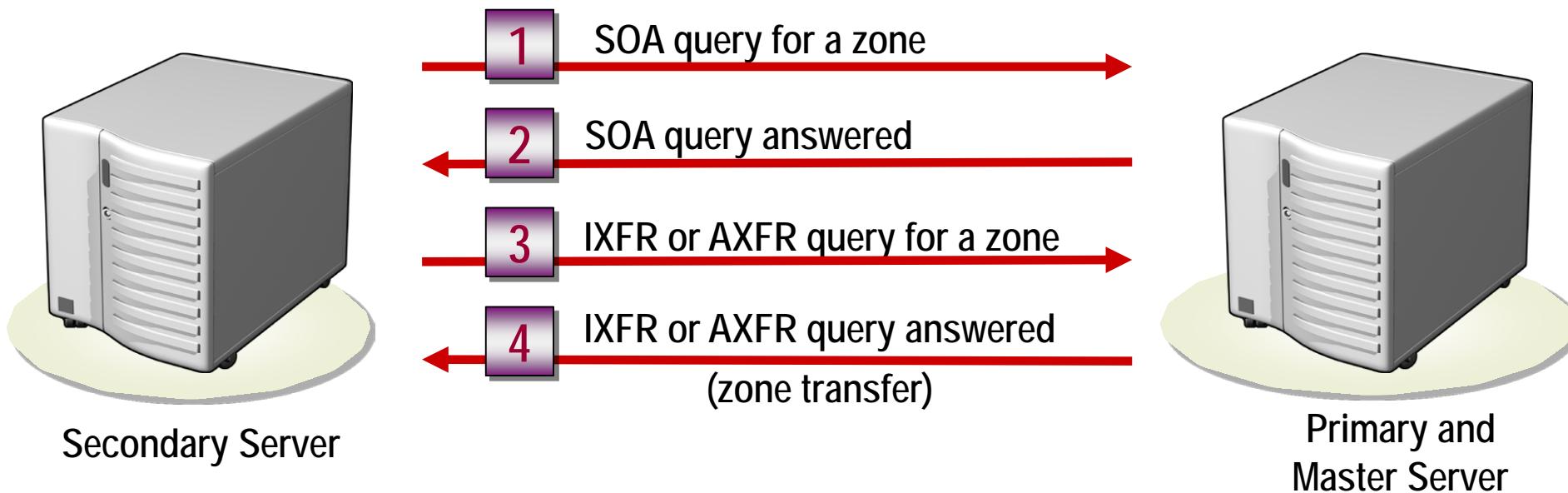


# Configuring DNS Zone Transfers

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

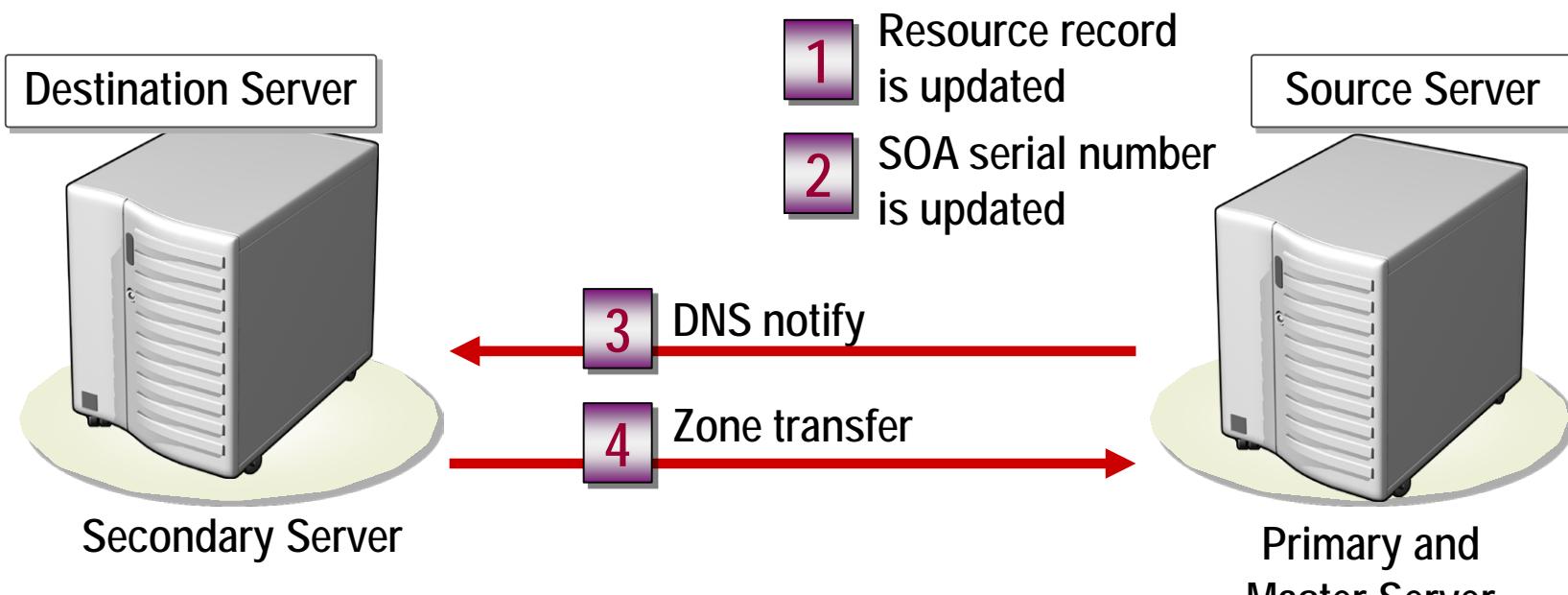
# How DNS Zone Transfers Work

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



# Practice: Configuring DNS Zone Transfers



In this practice, you will configure DNS zone transfers



# 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 Dynamic DNS
- 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

# Group Discussion

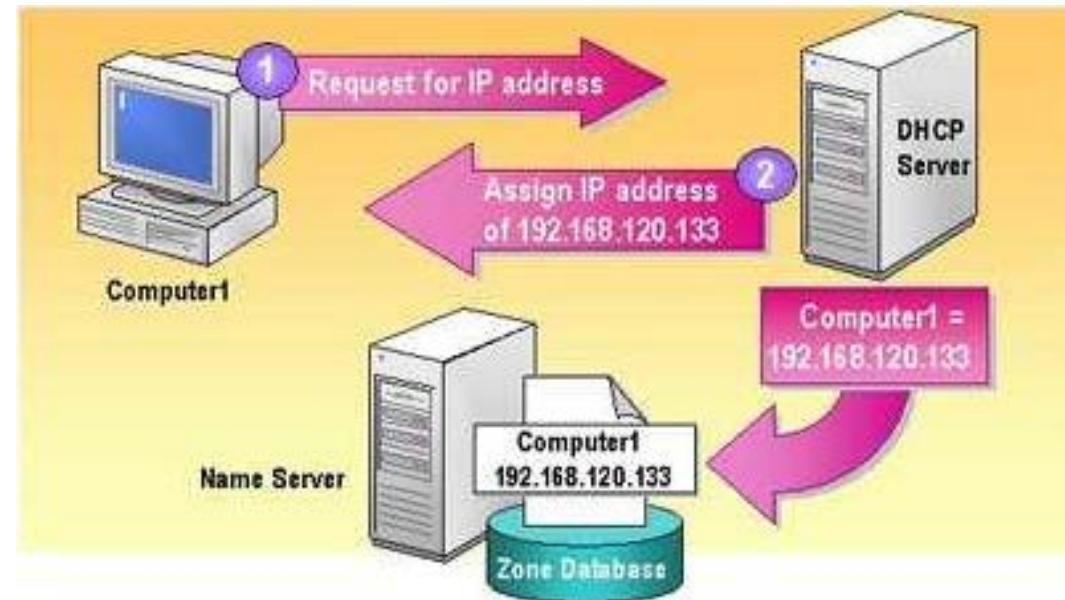
*A dynamic update*

*Manual update*



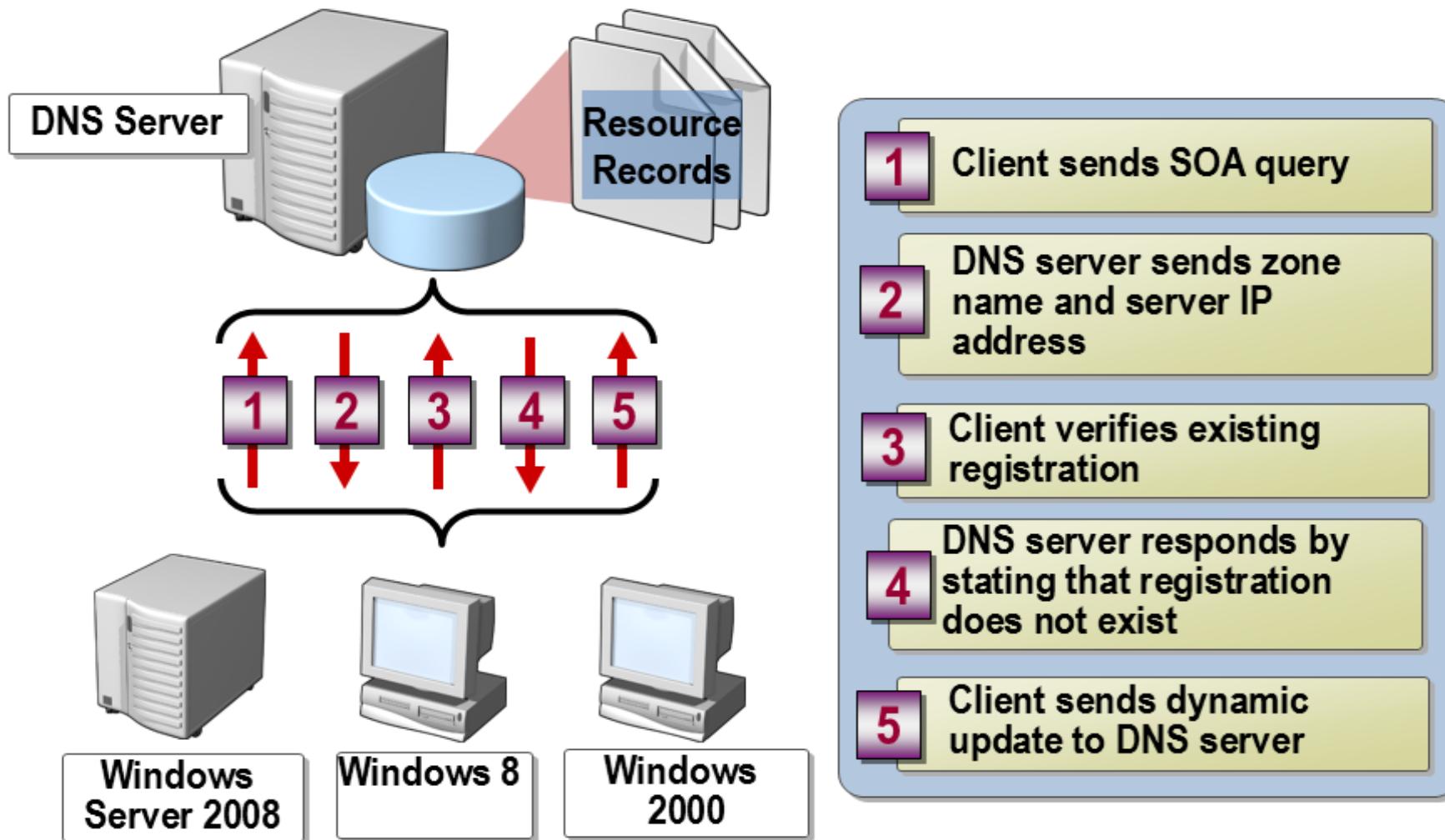
# What Are Dynamic Updates?

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

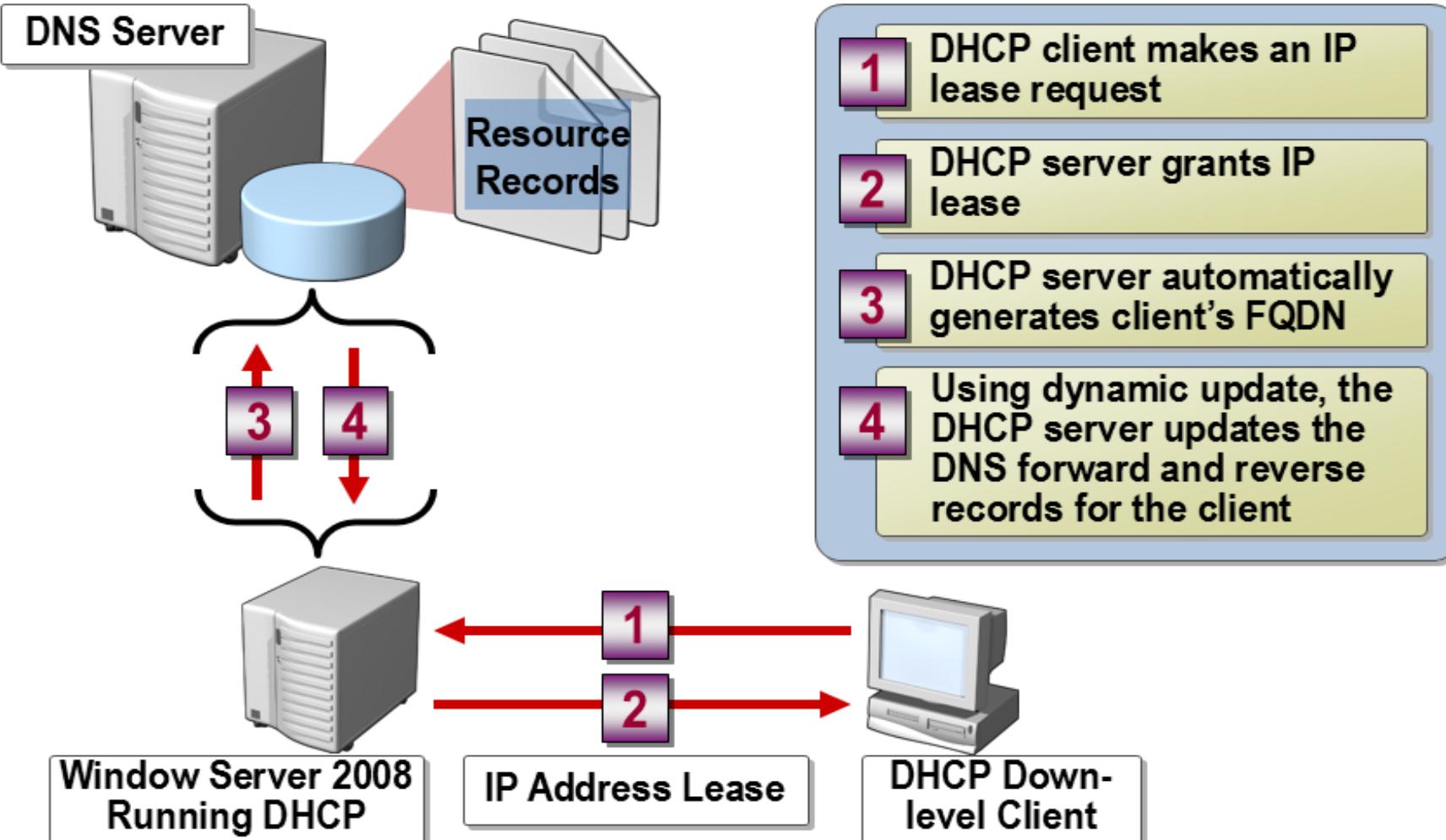


A **manual update** is the process of an administrator manually creating, registering, or updating the resource record

# 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



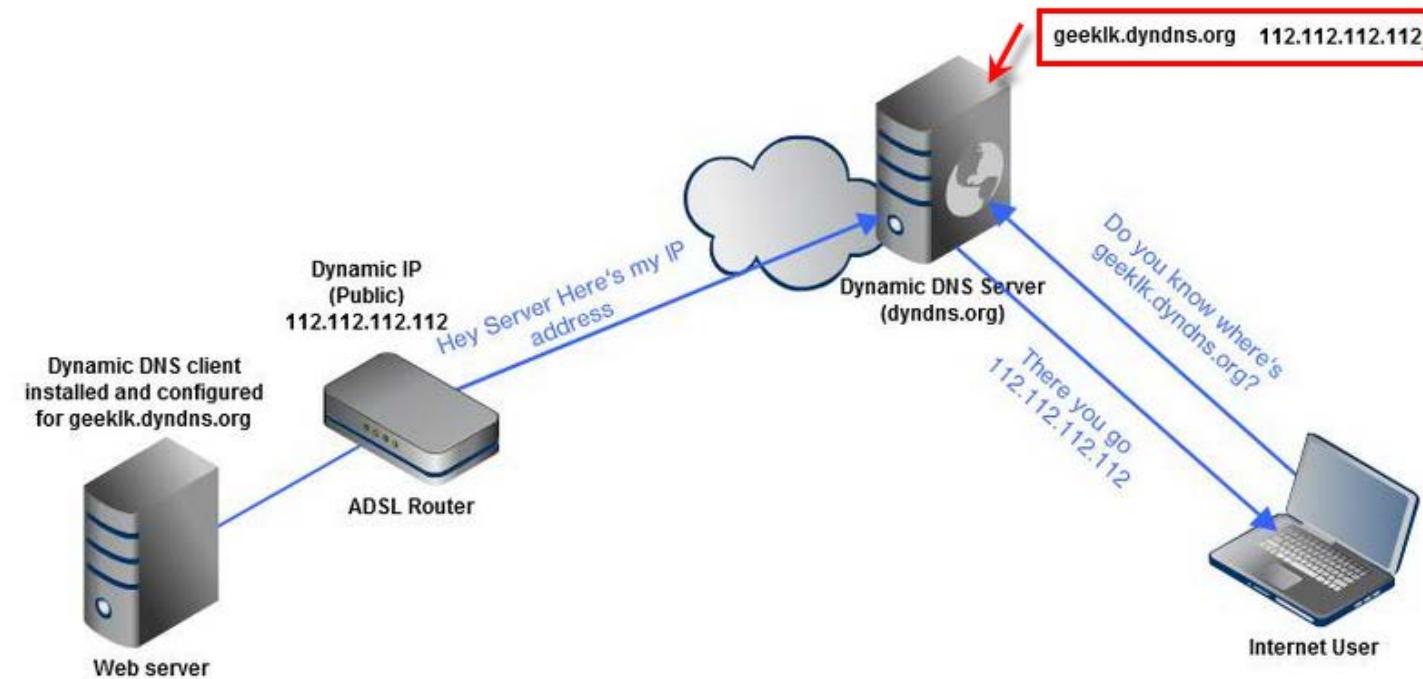
# How to Configure DNS Manual and Dynamic Updates

**Your instructor will demonstrate how to:**

- Configure a DNS server running Windows Server 2008 to accept dynamic updates of DNS resource records
- Configure a Windows 8 client to dynamically update its DNS resource records in DNS
- Configure a DHCP server running Windows Server 2008 to dynamically update DNS resource records in DNS on behalf of DHCP clients
- Manually create a DNS resource record

# What is Dynamic DNS?

A **Dynamic DNS (DDNS or DynDNS)** is a method of automatically updating a name server in the Domain Name System (DNS), often in real time, with the Global DNS(ISP) configured hostnames, addresses or other information on the Root Domain.



# Practice: Configuring DNS Dynamic Updates



In this practice, you will configure DNS dynamic updates



# Configuring a DNS Client

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

# 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

# Configuring DNS clients

The image shows two Windows dialog boxes side-by-side. The left dialog is titled "Internet Protocol Version 4 (TCP/IPv4) Properties" and the right one is titled "Advanced TCP/IP Settings".

**Internet Protocol Version 4 (TCP/IPv4) Properties (Left Dialog):**

- General:** Shows options for getting IP settings assigned automatically or using a static IP address. The "Use the following IP address" option is selected, with IP address set to 172.16.0.50, Subnet mask to 255.255.255.0, and Default gateway to 172.16.0.1.
- DNS:** Shows options for obtaining DNS server addresses automatically or using specific addresses. The "Use the following DNS server addresses" option is selected, with Preferred DNS server set to 172.16.0.10 and Alternate DNS server set to 172.16.0.21.
- Buttons:** Includes "Validate settings upon exit" (unchecked), "Advanced...", "OK", and "Cancel".

**Advanced TCP/IP Settings (Right Dialog):**

- IP Settings:** Shows the IP configuration settings from the left dialog.
- DNS:** Shows the DNS server addresses: 172.16.0.10 and 172.16.0.21. It includes "Add...", "Edit...", and "Remove" buttons, and up/down arrows for reordering.
- WINS:** Not visible in the screenshot.
- DNS suffix for this connection:** An empty text input field.
- Checkboxes:** Includes "Register this connection's addresses in DNS" (checked) and "Use this connection's DNS suffix in DNS registration" (unchecked).
- Buttons:** Includes "OK" and "Cancel".

```
Set-DnsClientServerAddress -InterfaceIndex 12 -ServerAddresses ("172.16.0.10","172.16.0.21")
```

# Practice: Configuring a DNS Client

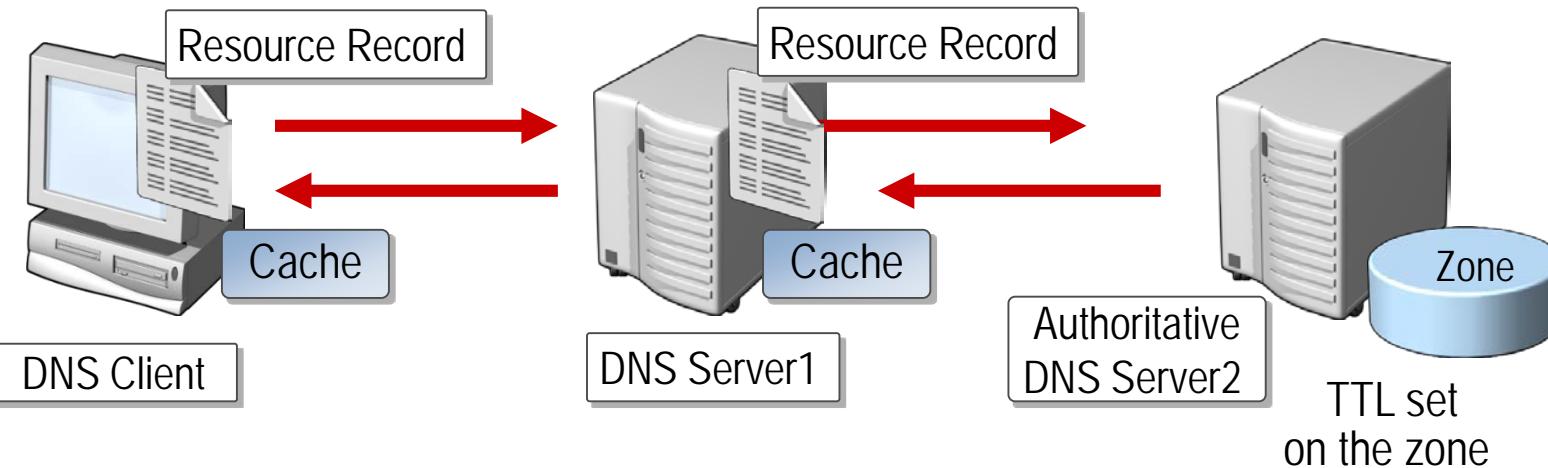


# Configuring the Time-to-Live Value

- ❑ How the Time-to-Live Value Works
- ❑ How to Configure the Time-to-Live Value

# How the Time-to-Live Value Works

The Time-to-Live (TTL) value is a time-out value expressed in seconds that is included with DNS records that are returned in a DNS query.



- 1 The records in the zone are sent to other DNS servers and clients in response to queries
- 2 DNS servers and DNS clients that store the record in their cache hold the record for the TTL period supplied in the record
- 3 When the TTL expires, the record is removed from the cache

# How to Configure the Time-to-Live Value

Your instructor will demonstrate how to:

- Adjust the TTL value for a zone
- Adjust the TTL value for a resource record

Windows



# Verifying that a Resource Record Exists by Using Nslookup,

Nslookup is a command-line utility used to diagnose DNS infrastructure

```
c:\ Command Prompt - nslookup
C:\>nslookup
Default Server: london.nwtraders.msft
Address: 192.168.1.17

> set type=a
> lisbon
Server: london.nwtraders.msft
Address: 192.168.1.17

Name: lisbon.nwtraders.msft
Addresses: 192.168.1.81, 192.168.1.20

> set type=srv
> _ldap._tcp.dc._msdcs.nwtraders.msft
Server: london.nwtraders.msft
Address: 192.168.1.17

_ldap._tcp.dc._msdcs.nwtraders.msft      SRV service location:
    priority      = 0
    weight        = 100
    port          = 389
    svr hostname = london.nwtraders.msft
london.nwtraders.msft  internet address = 192.168.1.33
london.nwtraders.msft  internet address = 192.168.1.17
>
```

# Any Question?

