Microsoft® Official Course

Module 7

Implementing DNS

Microsoft®

Module Overview

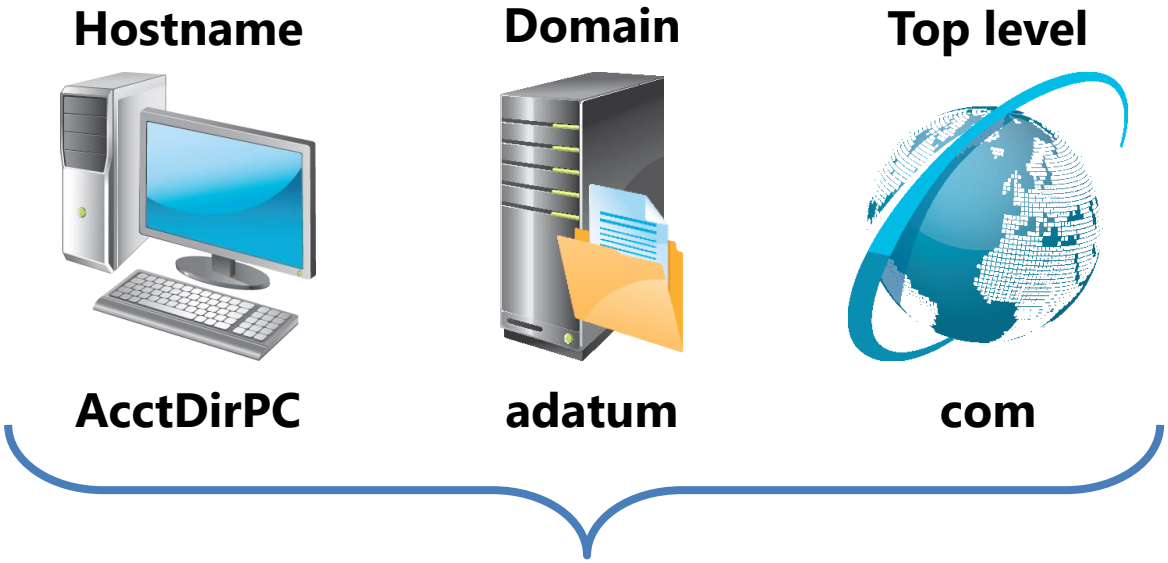
- Name Resolution for Windows Clients and Servers
- Installing a DNS Server
- Managing DNS Zones

Lesson 1: Name Resolution for Windows Clients and Servers

- What Are the Computer Names Assigned to Computers?
- What Is DNS?
- DNS Zones and Records
- How Internet DNS Names Are Resolved
- What Is Split DNS?
- What Is Link-local Multicast Name Resolution?
- How a Client Resolves a Name
- Troubleshooting Name Resolution
- Demonstration: Troubleshooting Name Resolution

What Are the Computer Names Assigned to Computers?

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 = AcctDirPC.adatum.com

NetBIOS names are rarely used and are being deprecated in Windows operating systems

What Is DNS?

DNS can be used to:

- Resolve host names to IP addresses
- Locate domain controllers and global catalog servers
- Resolve IP addresses to host names
- Locate mail servers during email delivery

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

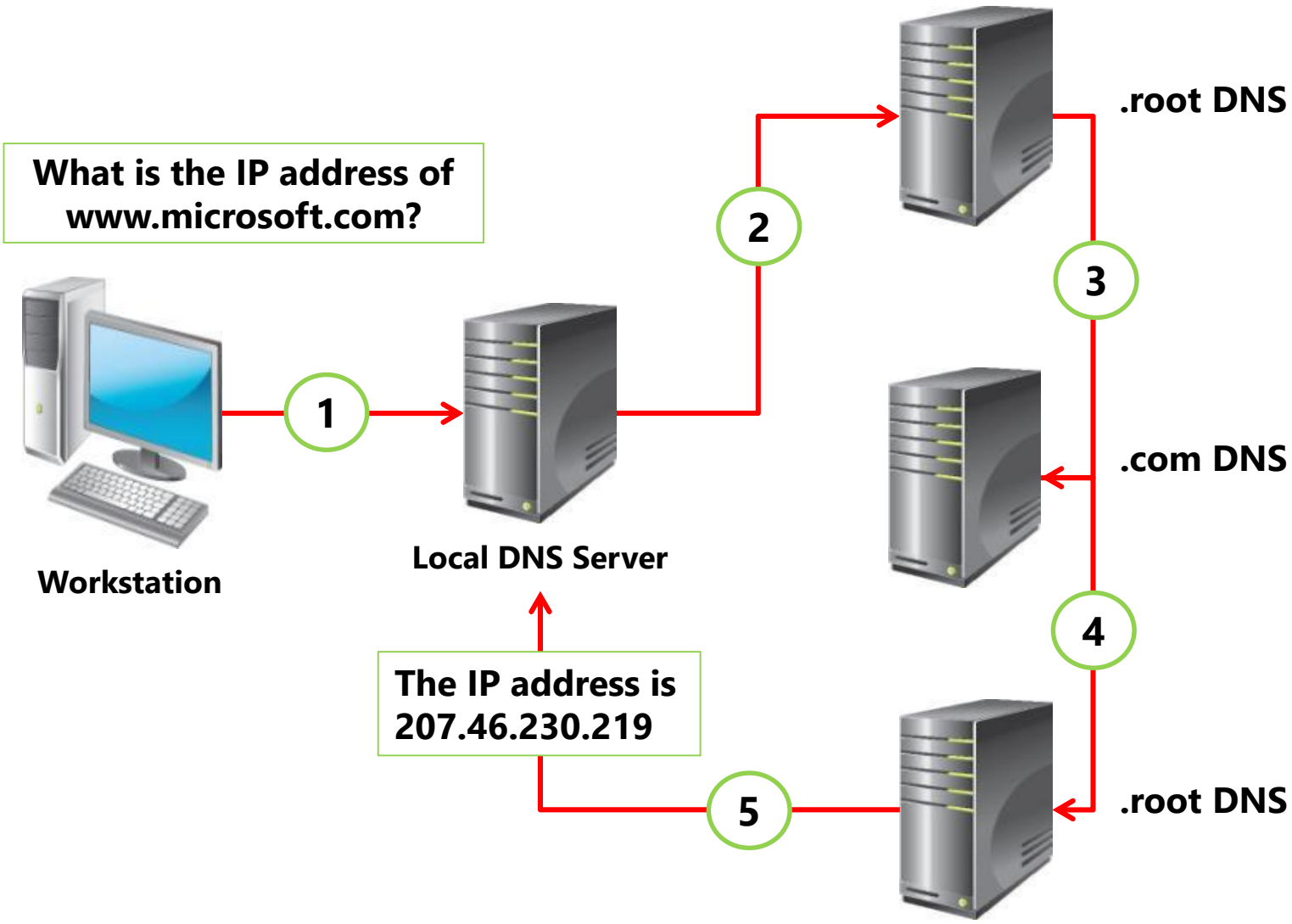
Resource records in forward lookup zones include:

- A, MX, SRV, NS, SOA, and CNAME

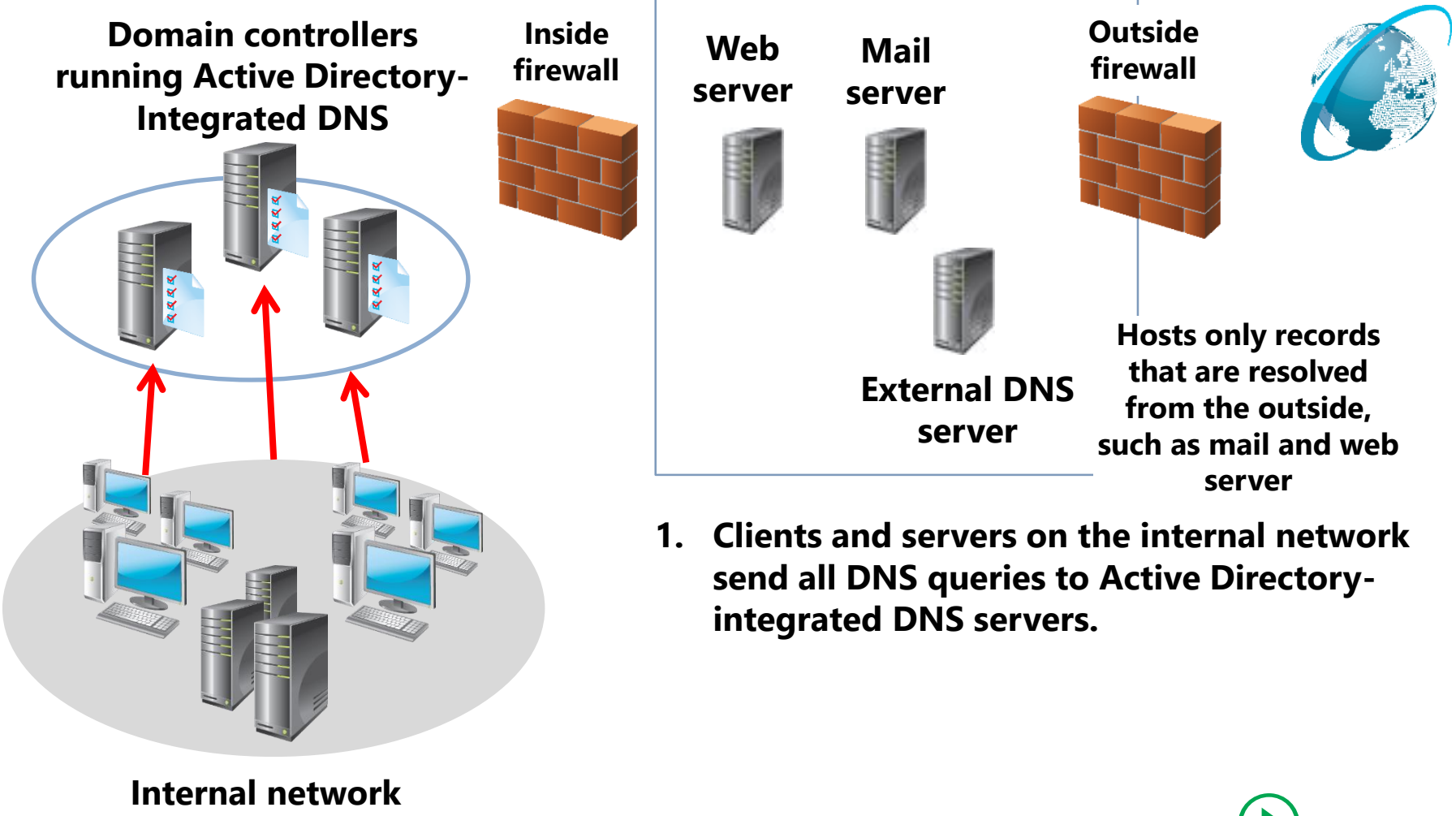
Resource records in reverse lookup zones include:

- PTR

How Internet DNS Names Are Resolved

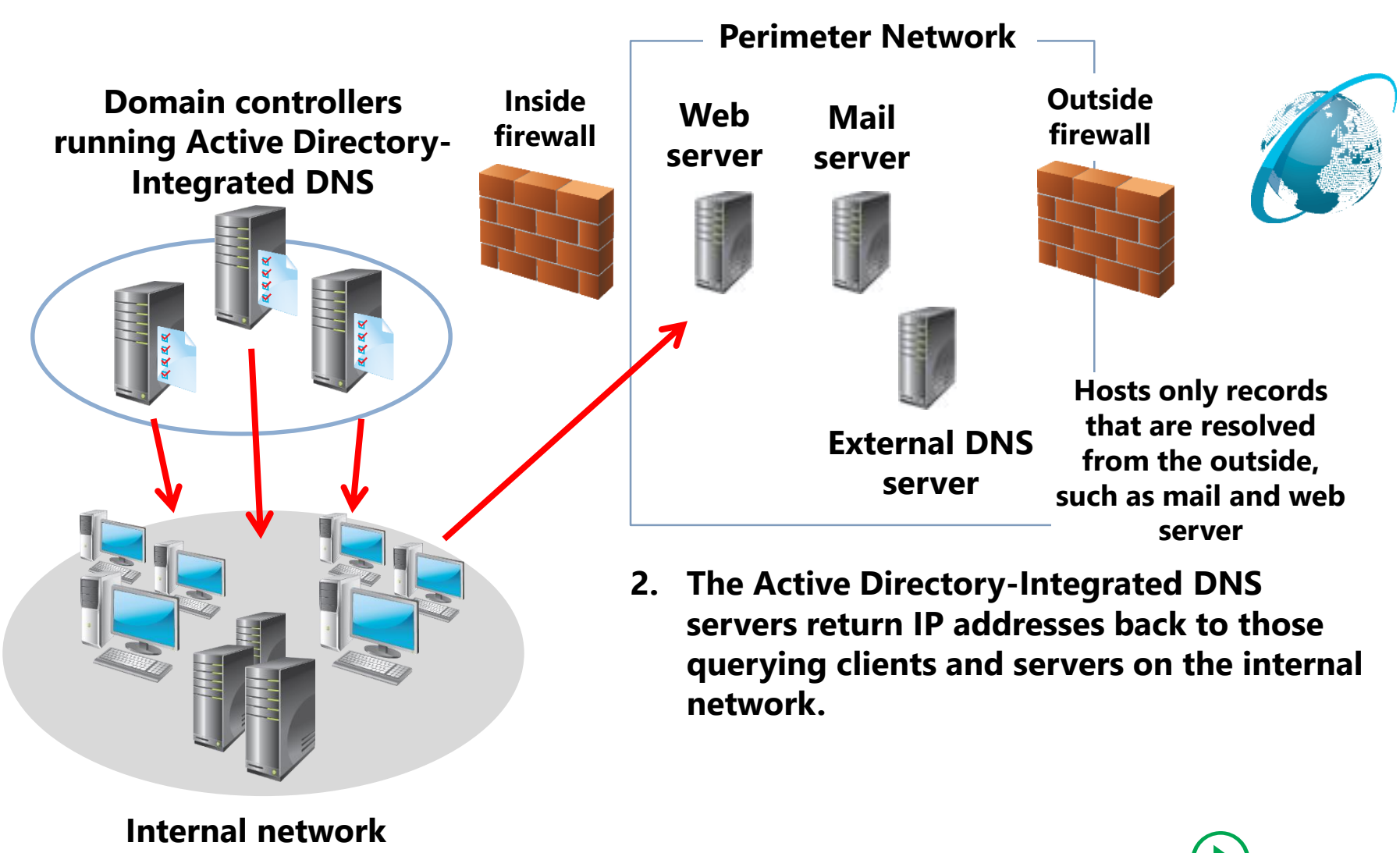


What Is Split DNS?



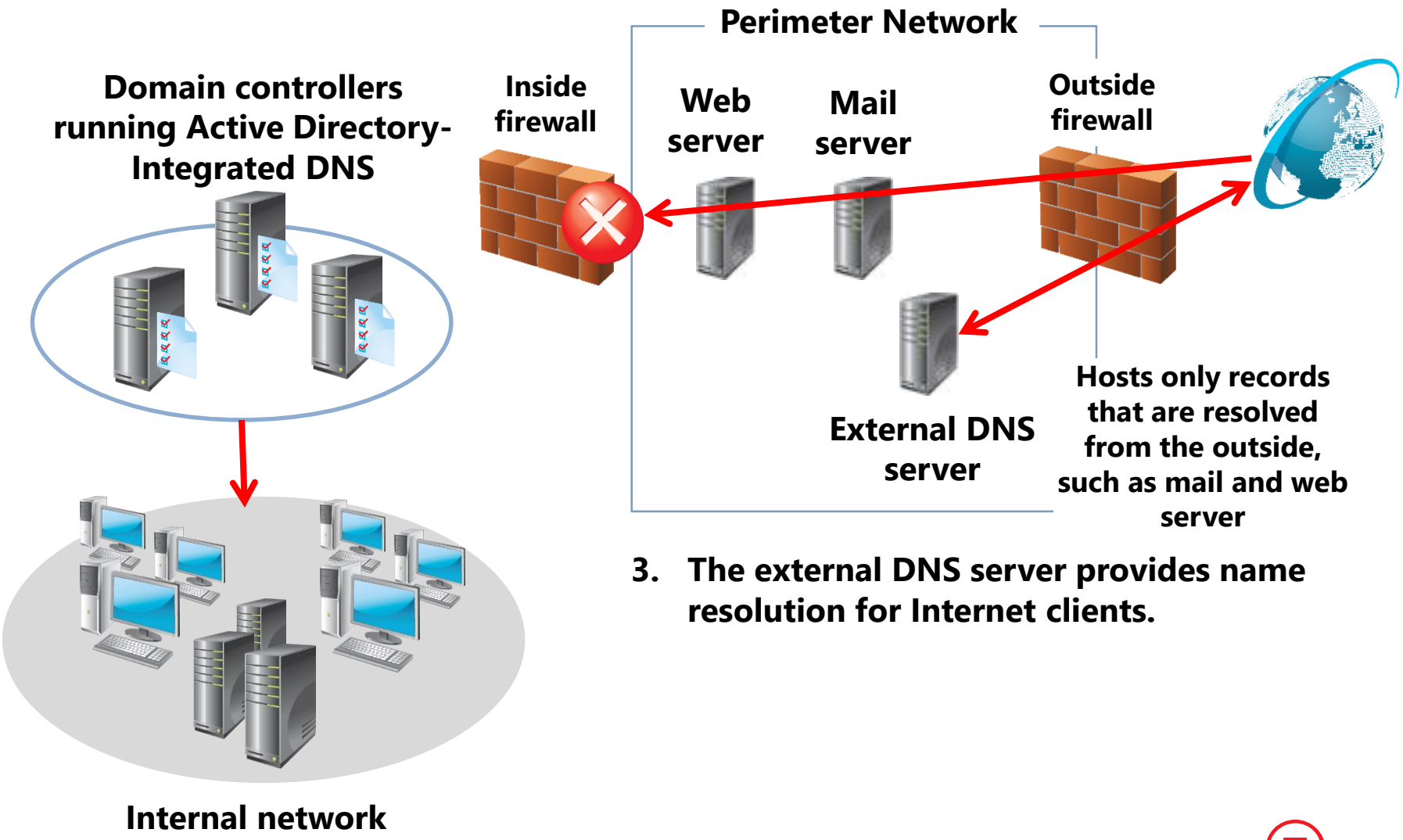
1. Clients and servers on the internal network send all DNS queries to Active Directory-integrated DNS servers.

What Is Split DNS?



2. The Active Directory-Integrated DNS servers return IP addresses back to those querying clients and servers on the internal network.

What Is Split DNS?



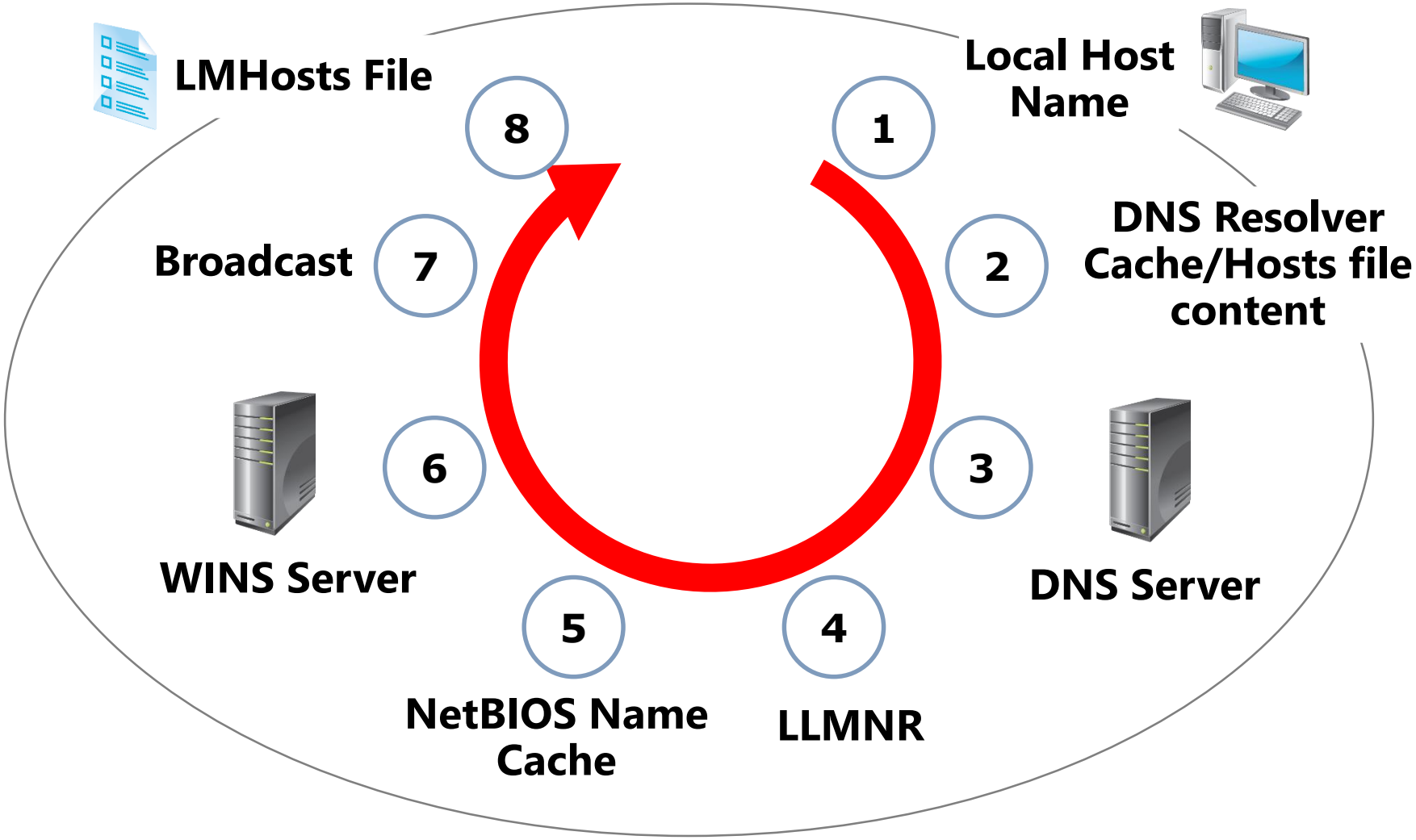
3. The external DNS server provides name resolution for Internet clients.

What Is Link-local Multicast Name Resolution?

LLMNR is an additional method for name resolution that does not use DNS or WINS

- LLMNR is designed for IPv6
- Works only on Windows Vista, Windows Server 2008, and all newer Windows operating systems
- Network Discovery must be enabled
- Can be controlled via Group Policy

How a Client Resolves a Name



Troubleshooting Name Resolution

A new Windows PowerShell DNS module with numerous cmdlets was introduced with Windows Server 2012 R2, including the Get-DNSServerStatistics cmdlet

```
$statistics = Get-DnsServerStatistics –ZoneName Adatum.com
$statistics.ZoneQueryStatistics
$statistics.ZoneTransferStatistics
$statistics.ZoneUpdateStatistics
```

Command-line tools to troubleshoot configuration issues:

- **Nslookup**
- **DNSCmd**
- **Dnslint**
- **Ipconfig**

The troubleshooting process:

- Identify client DNS server with nslookup or Resolve-DnsName
- Communicate via ping
- Use nslookup to verify records

Demonstration: Troubleshooting Name Resolution

In this demonstration, you will see how to:

- Use Windows PowerShell cmdlets to troubleshoot DNS
- Use command-line tools to troubleshoot DNS

Lesson 2: Installing a DNS Server

- What Are DNS Queries?
- What Are Root Hints?
- What Is Forwarding?
- How DNS Server Caching Works
- How to Install the DNS Server Role
- Demonstration: Installing the DNS Server Role

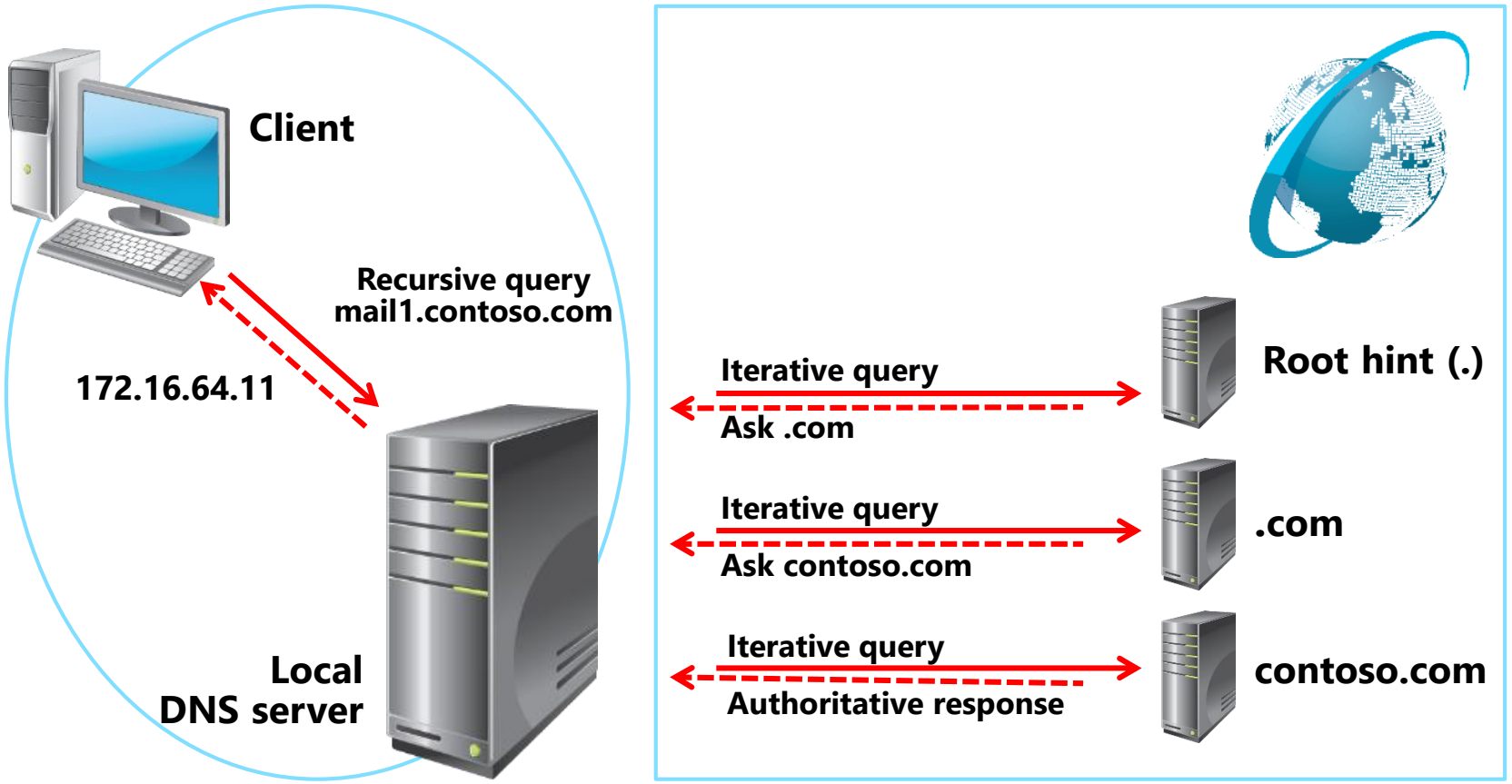
What Are DNS Queries?

- Queries are recursive or iterative
- DNS clients and DNS servers initiate queries
- DNS servers are authoritative or non-authoritative for a namespace
- An authoritative DNS server for the namespace either:
  - Returns the requested IP address
  - Returns an authoritative “No, that name does not exist”
- A non-authoritative DNS server for the namespace either:
  - Checks its cache
  - Uses forwarders
  - Uses root hints

What Are DNS Queries?

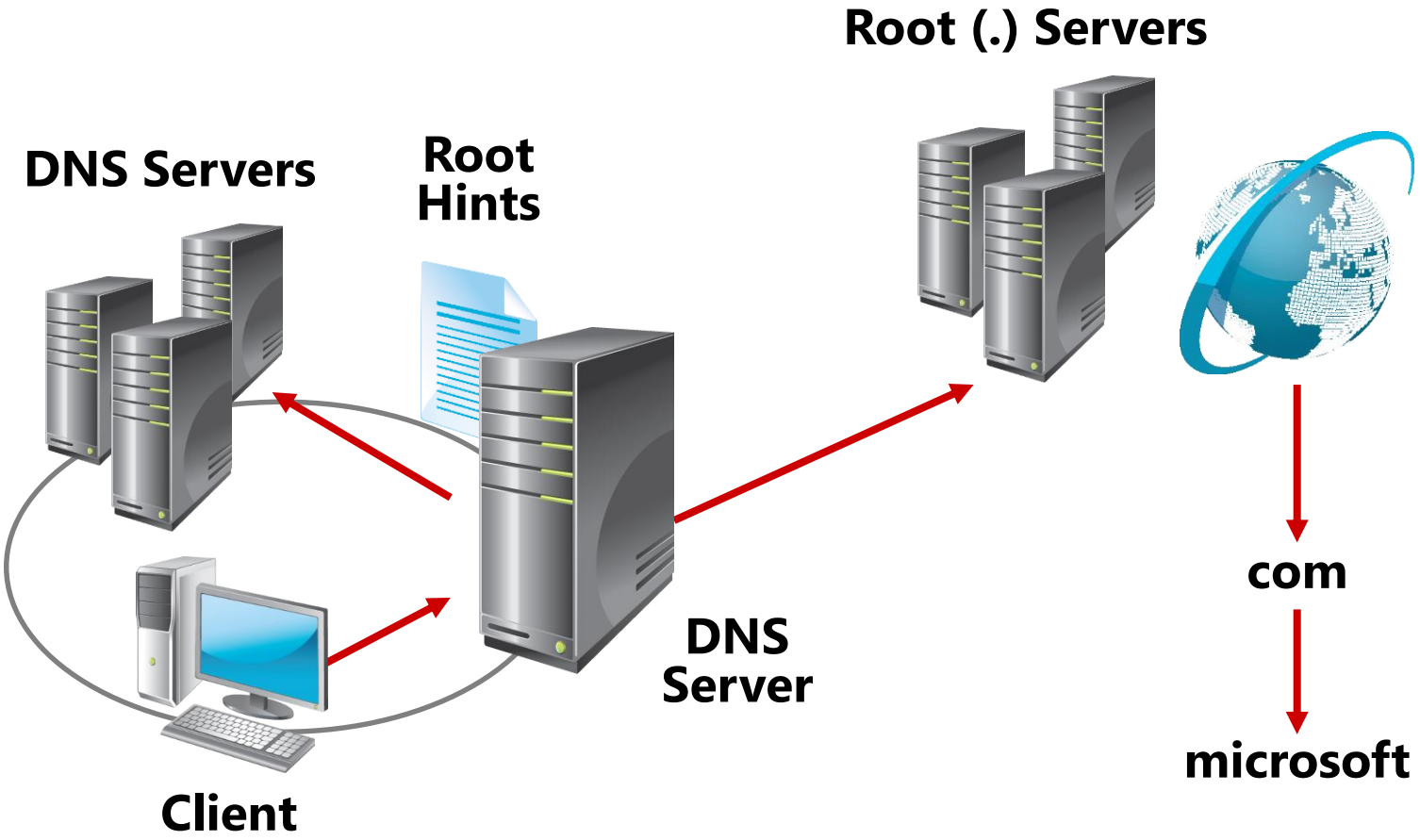
A *recursive query* is sent to a DNS server and requires a complete answer

What Are DNS Queries?



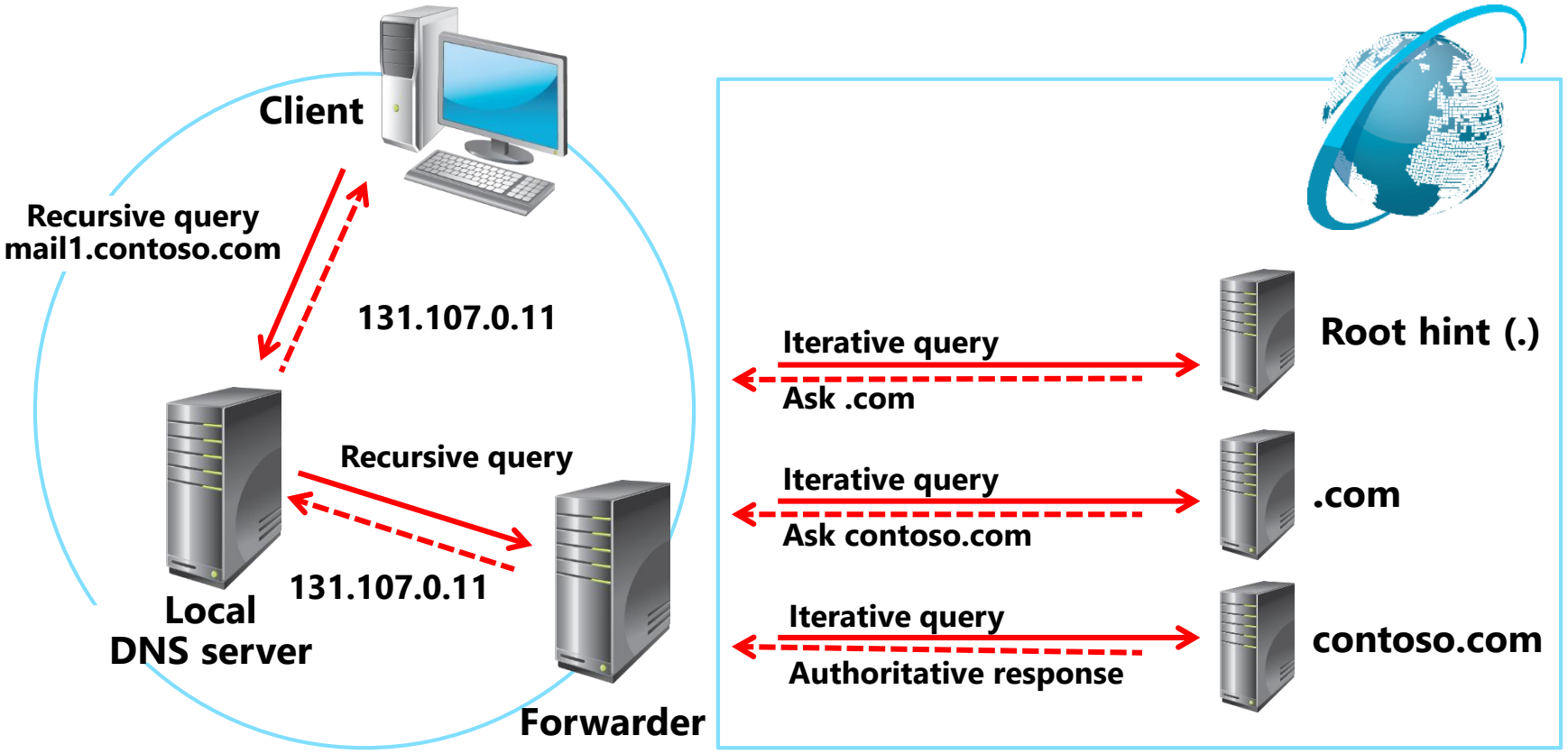
What Are Root Hints?

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



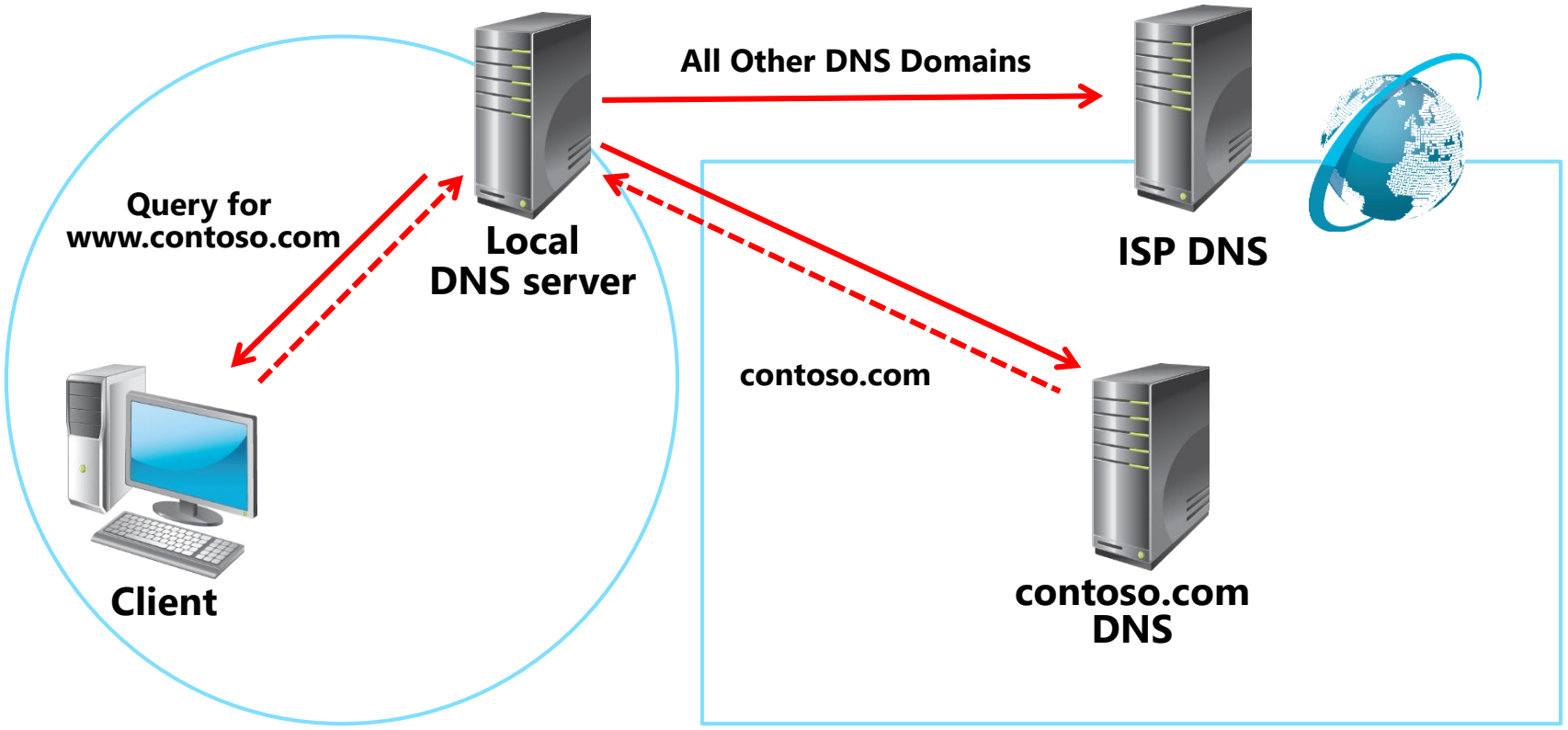
What Is Forwarding?

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



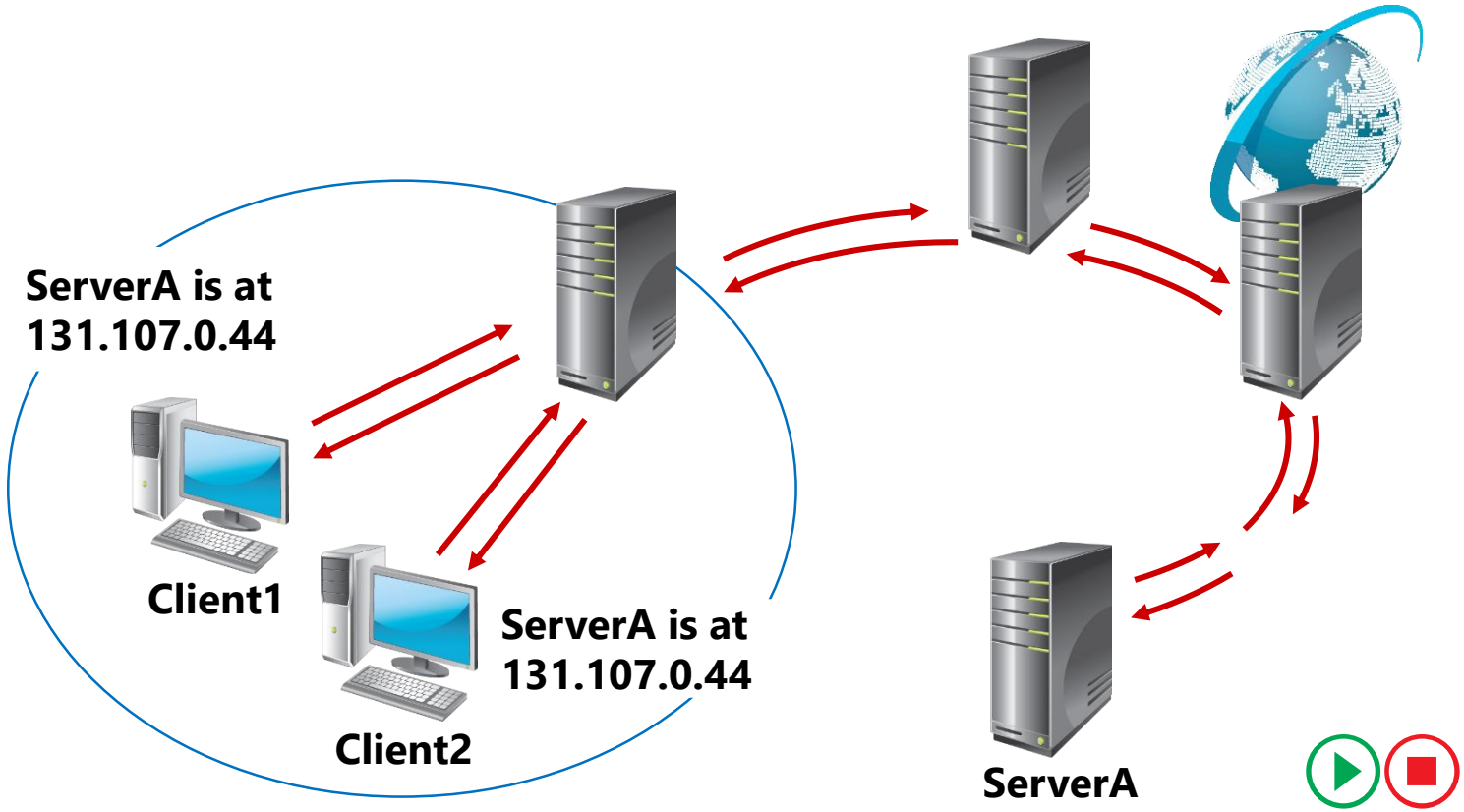
What Is Forwarding?

Conditional forwarding **forwards requests using a domain name condition**



How DNS Server Caching Works

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



How to Install the DNS Server Role

DNS server installation methods:

- Server Manager
- Active Directory Domain Services Installation Wizard

Tools available to manage DNS Server:

- DNS Manager snap-in
  - Server Manager
  - DNS Manager console (dnsmgmt.msc)
- DNSCmd command-line tool
- Windows Powershell
- Remote Server Administrative Tools

Demonstration: Installing the DNS Server Role

In this demonstration, you will see how to:

- Install a second DNS server
- Create a forward lookup zone by using Windows PowerShell
- Configure forwarding

Lesson 3: Managing DNS Zones

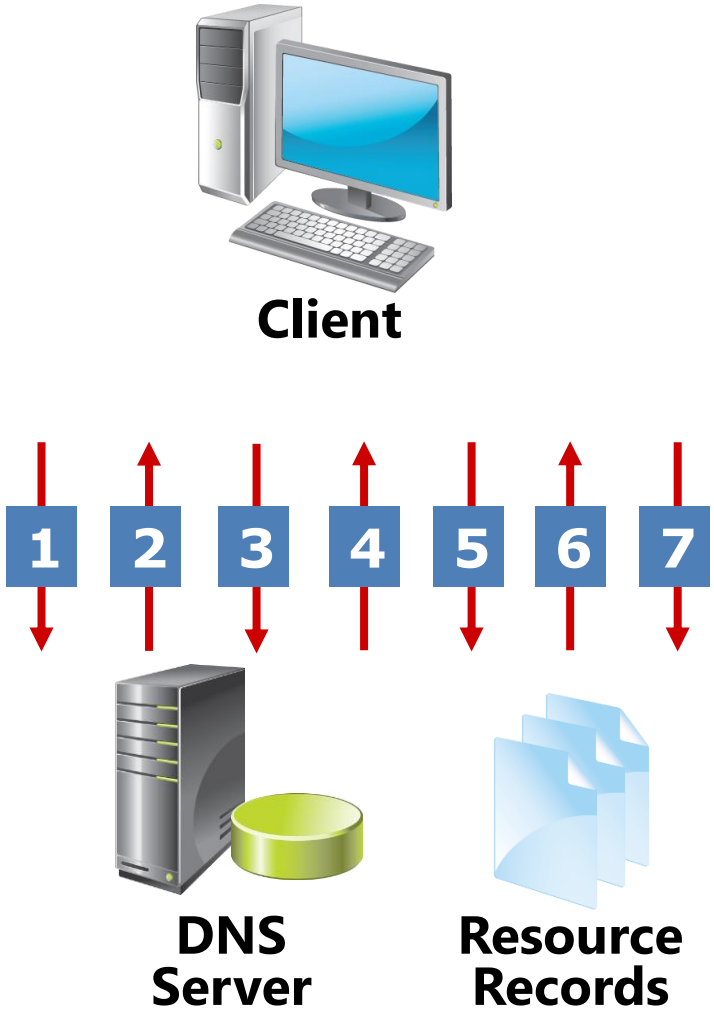
- What Are DNS Zone Types?
- What Are Dynamic Updates?
- What Are Active Directory–Integrated Zones?
- Demonstration: Creating an Active Directory–Integrated Zone

What Are DNS Zone Types?

Zones	Description
Primary	Read/write copy of a DNS database
Secondary	Read-only copy of a DNS database
Stub	Copy of a zone that contains only records used to locate name servers
Active Directory-integrated	Zone data is stored in AD DS rather than in zone files

What Are Dynamic Updates?

1. The client sends an SOA query
2. The DNS server returns an SOA resource record
3. The client sends dynamic update request(s) to identify the primary DNS server
5. The DNS server responds that it can perform an update
6. The client sends unsecured update to the DNS server
7. If the zone permits only secure updates, the update is refused
8. The client sends a secured update to the DNS server



What Are Active Directory–Integrated Zones?

Benefits of an Active Directory–integrated zone:

- Allows multi-master writes to zone
- Replicates DNS zone information by using AD DS replication
  - Leverages efficient replication topology
  - Uses efficient incremental updates for Active Directory replication processes
- Enables secure dynamic updates
- Delegates zones, domains, resource records for increased security

Demonstration: Creating an Active Directory–Integrated Zone

In this demonstration, you will see how to:

- Promote a server as a domain controller
- Create an Active Directory–integrated zone
- Create a record
- Verify replication to a second DNS server

Lab: Implementing DNS

- Exercise 1: Installing and Configuring DNS
- Exercise 2: Creating Host Records in DNS
- Exercise 3: Managing the DNS Server Cache

Logon Information

Virtual machines	**20410D-LON-DC1** **20410D-LON-SVR1** **20410D-LON-CL1**
User name	**Adatum\Administrator**
Password	**Pa$$w0rd**

Estimated Time: 60 minutes

Lab Scenario

Your manager has asked you to configure the domain controller in the branch office as a DNS server. You also have been asked to create some new host records to support a new app that is being installed. Finally, you need to configure forwarding on the DNS server in the branch office to support Internet name resolution.

Lab Review

- Can you install the DNS server role on a server that is not a domain controller? If yes, are there any limitations?
- What is the most common way to carry out Internet name resolution on a local DNS?
- How can you browse the content of the DNS resolver cache on a DNS server?

Module Review and Takeaways

- Review Questions
- Best Practices
- Common Issues and Troubleshooting Tips
- Tools