Injibara University

College of Engineering and Technology

Department of Information Technology

Network and System Administration (CoSc 4036)

Chapter Five: Installation of Application server and management

Contents

- Dynamic Host Configuration Protocol
- File and Printer Sharing
- Domain Name System (DNS)

Dynamic Host Configuration Protocol (DHCP)

- The **Dynamic Host Configuration Protocol** (**DHCP**) is a set of rules used by a communications device such as a computer, router or network adapter to allow the device to **request and obtain an IP address from a server** which has a list of addresses available for assignment.
- It prevents **IP address conflict** and helps conserve the use of client IP address on the network.
- DHCP reduces the complexity and amount of **administrative work** by assigning TCP/IP configuration automatically to the clients.

Cont …

- IP addresses and other parameters such as the **default gateway, subnet mask, and IP addresses of DNS servers** can be assigned by the DHCP server.
- The DHCP server ensures that all IP addresses are unique.
- DHCP functionally became **a successor** to the older BOOTP (**Bootstrap protocol**), whose **does not support options** (DNS, Router, addresses).

DHCP Process

- IP address assignment occurs when the DHCP client **regains connectivity** to the network.
- The DHCP client **sends out a query** requesting **a response** from a DHCP server.
- The DHCP server then replies to the client with its assigned IP address, subnet mask, DNS server and default gateway information.
- The assigned IP address generally **expires** after a predetermined period of time, at which point the DHCP client and server renegotiate a new IP address from the server's predefined pool of addresses.

What a DHCP server can provide?

- DHCP servers are used to automatically provide client computers and other TCP/IP based network devices with **valid IP addresses**.
- You can also provide the additional configuration parameters these clients and devices need, called **DHCP options** that allow them to connect to other network resources, such as DNS servers.
- DHCP is a client-server technology that allows **DHCP servers** to assign IP addresses to computers and other devices that are enabled as **DHCP clients.**

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- With DHCP, you can do the following:
  - ✓ **Assign IP addresses** for a specific amount of time to DHCP clients, and then automatically renew the IP addresses when the **client requests a renewal.**
  - ✓ Update **DHCP client parameters automatically** by changing a server or scope option **at the DHCP server** rather than performing this action individually on all DHCP clients.

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- **Exclude** IP addresses or address ranges from distribution by the DHCP server so that these IP addresses and ranges can be used to **statically configure servers, routers**, and other devices that require static IP addresses.
- Configure the DHCP server to perform **DNS name registration services** for DHCP clients.
- Provide **multicast address** assignment for IP-based DHCP clients.

Benefits of DHCP

The DHCP Server service provides the following benefits:

- **Reliable IP address configuration:** DHCP minimizes **configuration errors** caused by manual IP address configuration, such as typographical errors, or address conflicts caused by the assignment of an IP address to more than one computer at the same time.
- **Reduced network administration.** DHCP includes the following features to reduce network administration:
  - ✓ Centralized and automated configuration.
  - ✓ The ability to define configurations from **a central location**.
  - ✓ The ability to assign a full range of **additional configuration values** by means of **DHCP options**.

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- The efficient handling of **IP address changes** for clients that must be updated frequently, such as those for portable computers that move to different locations on a wireless network.

DHCP Configuration settings

- **Scope:** A scope is the full consecutive **range of possible IP addresses** for a network.
  - ✓ Scopes typically define a **single physical subnet** on your network to which DHCP services are offered.
- **Exclusion range:** is a limited sequence of IP addresses within a scope, excluded from DHCP service offerings.
  - ✓ Exclusion ranges assure that **any addresses** in these ranges are not offered by the server to **DHCP clients in the network**.

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- **Address pool:** After you define a DHCP scope and apply exclusion ranges, the remaining addresses form the **available address pool** within the scope.
  - ✓ Pooled addresses are eligible for **dynamic assignment** by the server to DHCP clients on your network.
- **Lease:** is a **length of time** that a DHCP server specifies, during which a client computer can use an assigned IP address.
  - ✓ When a lease is made to a client, the lease is *active*.
  - ✓ Before the lease expires, the client typically needs to **renew its address** lease assignment with the server.
  - ✓ A lease becomes *inactive* when it expires or is deleted at the server.

Cont …

- **Reservation:** you use a reservation to create **a permanent address lease assignment** by the DHCP server.
  - ✓ Reservations assure that a specified hardware device on the subnet can always use the **same IP address**.
  - ✓ This is done by mapping the MAC address to an IP.

Network printing

- Network printing is the collection of **software components** that provide network printing services for client computers.
- In some small offices, it might be practical to have a **printer attached to every computer**, but in an organization consisting of more than a few computers, sharing printing resources is desirable.
- The printer can be **connected to the print server** through internal network adapters, external network adapters, or another server.
- Network administrators must manage **network printing, printer availability, and printer security**.
- A shared printer is an object that can be shared with other network users.

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- **Print devices**:
  - ✓ Can be attached to servers or client workstations.
  - ✓ Can connect directly to the network with no attached computer.
- **A print device can be accessed through a print server.**
  - ✓ Using a local print device.
  - ✓ Using network print devices.
- The principal distinction between **network printers and local printers**, in Microsoft terminology, is where the spooling takes place.
  - ✓ Local printers spool to a location on the local hard disk.
  - ✓ Network printers spool to a location on the **network print server**.

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Installing a Network Printer

- Creating a network printer.
  - ✓ Install the **printer locally** on the computer.
  - ✓ Share the printer to make it accessible to users over the network.
    - Connect the print device to the local print server.
    - Install the printer software (the printer).
  - ✓ To install local printers, use the **Add Printer Wizard** on your local computer.

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Controlling Access to Printers

- For security reasons, you may decide to **restrict certain types of printer** usage to certain users.
- Printer permissions.
  - ✓ Restrict who can print to a printer.
  - ✓ Restrict who can manage a printer.
  - ✓ Restrict who can manage the documents sent to a printer.
- Printer permissions are assigned on the Security tab in the **printer's Properties dialog box.**

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Understand Network Printing Concepts

- The network should be configured for **sharing printers** to enable network printing.
- **Local printer, shared printer, and network printer** are the three basic printing configurations used while designing a network and configuring printers.
- Basic printing configurations for networked computers.

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Local Print Devices

- A printer is referred to as the print device, and is used for **providing printed outputs**.
- It is essential to install the **necessary drivers** to ensure proper working of the print device.
- Software called **printer** is required to control the **printing process**.
- The printer determines where and when the output should be sent.
- Local print devices provide the most convenient way of printing **from a workstation computer**.

Shared print devices

- Sharing a locally attached printer.
- Sharing print devices directly connected to the network.

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Sharing a locally attached printer

- Repeated interruptions by multiple users may affect the productivity of the user.
- There is a reduction in speed and response time.

Sharing Print Devices Directly Connected to the Network

- Print devices connected to the network have their own **internal network interface** card that provides network identification to the device.
- Print devices are configured on a **centralized network** to provide convenient access to multiple users.

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- Sharing of print devices decreases the purchase, installation, and maintenance **cost of the printer**.
- The following information has to be provided while installing a **network-capable print device.**
  - ✓ The print device’s IP address.
  - ✓ The print device’s manufacturer and printer type.
  - ✓ A share name for the print device.

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How can I share a printer between multiple computers?

- Users who have multiple computers in their home or work environment may wish to **share a printer**.
- Before setting up the printer to be shared on a network, you must decide **what setup** you plan on doing.
- Below are the **different setups** and their advantages and disadvantages.

Printer connected to computer or server

- Connecting a printer to a computer and sharing the printer from that computer is the most common solution.
- The primary **disadvantage** of this is that the computer must always be **on** in order for the printer to work.
- Although this solution may not be the best solution for everyone it is usually **the easiest and cheapest** solution.

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Network printer

- Some printers, often **high-end printers** have the capability to connect directly to a network or have **hardware installed into them** that enables the printer to be connected to the network.
- If your printer supports this option and has the necessary hardware, you should be able to connect the printer directly to the network and have it **detected by the computers**.
- When these printers are connected to a network you'll often be required to enter the **network information** such as the networks gateway, printer IP, etc.

Permissions

- Permission is the type of access **granted to a user, group, or computer** to access resources.
- Permission can be applied to resources such files, folders and printers like privilege to read a file, delete a file, or to create a new file in folder.

Types of permission

- Security level permission
- Share level permissions

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Security level permission

- ✓ Security or permission can set on drives, folders and files.
- ✓ By default, security permissions will be inherited from its **parent drive or folder**.
- ✓ Creators of files and folders are owners.
- ✓ Security permissions include :
- ✓ Full control, read and execute, modify, write, read, and list folder contents

Share level permission

- ✓ Can be set on **drives and shared folders** but not files.
- ✓ Shared folders can be accessed from networks.
- ✓ Share permissions include reader, owners and contributors.

Domain Name System (DNS)

- It translates domain names (computer hostnames) to IP addresses.
- DNS defines a **hierarchical namespace** where each level of the namespace is separated by a “**.**”.
- The domain name space consists of a **tree of domain names**.
- Each node or leaf in the tree has **one or more resource records**, which hold information associated with the domain name.
- The tree subdivides into **zones**.
- A zone consists of a collection of connected nodes served by a DNS name server.
- The name space is divided into **nonoverlapping parts**, called zones in DNS.
- A zone is a part of the name space that is implemented by a **separate name server**

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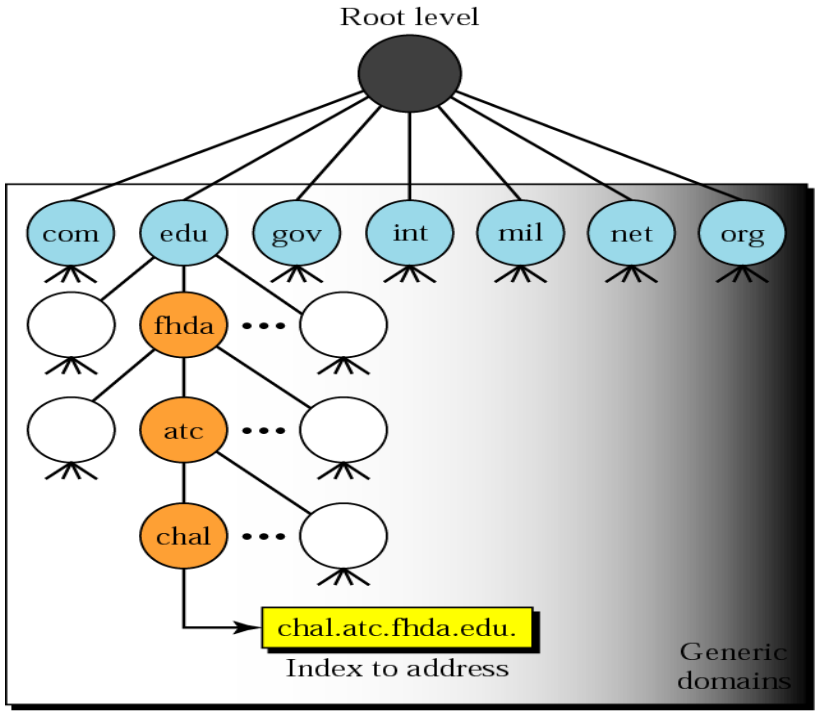
- Each node has a domain name.
- A **full domain name** is a sequence of labels separated by **dots** (**the last character is a dot;** null string is nothing)
- domain names are read from the **node up to the root.**



Label	Description
com	Commercial organizations
edu	Educational institutions
gov	Government institutions
int	International organizations
mil	Military groups
net	Network support centers
org	Nonprofit organizations

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- Newly introduced first-level domains

Label	Description
aero	Airlines and aerospace companies
biz	Businesses or firms (similar to com)
coop	Cooperative business organizations
info	Information service providers
museum	Museums and other nonprofit organizations
name	Personal names (individuals)
pro	Professional individual organizations

Cont …

- A resolver (DNS server) **looks up** the information associated with nodes.
- A resolver knows how to communicate with name servers by sending **DNS requests, and heeding DNS responses.**
- A domain name usually consists of two or more parts (technically ***labels***), separated by dots.
- For example **wikipedia.org**.
- The **rightmost** label conveys the **top-level domain.**

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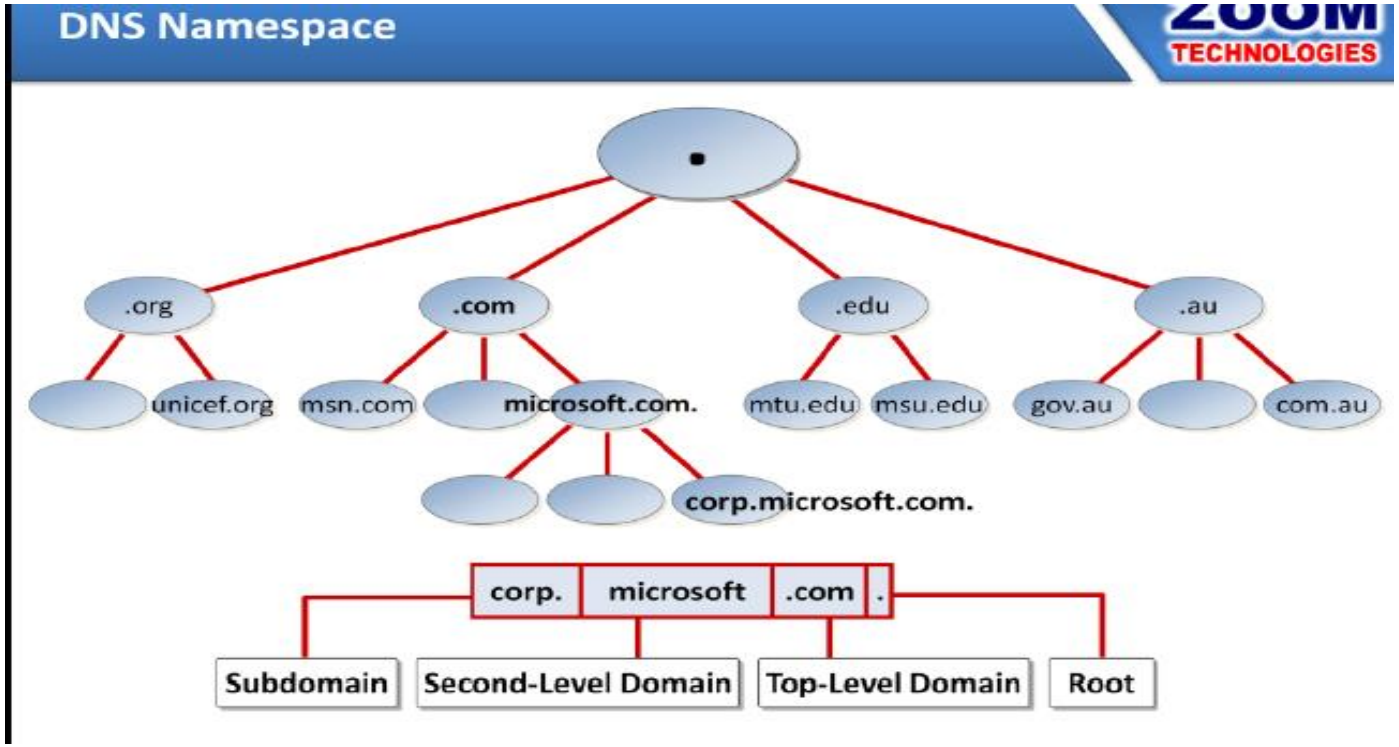
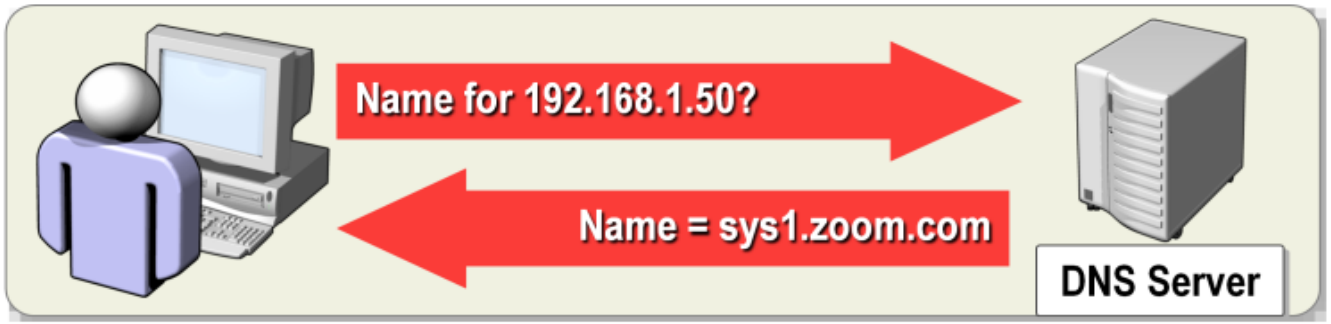
- For example, the address **en.wikipedia.org** has the top level domain **org**.
- Each domain or subdomain has one or more **authoritative DNS servers** that publish information about that domain and the name servers of any domains.



DNS Look up Zone types

- **Forward Lookup**
  - Requests Name-to-IP Address resolution

- **Reverse Lookup**
  - Requests IP Address-to-Name resolution



Types of DNS zone

1. **Primary zone:** it is the **master copy** of all zone information.
2. **Secondary zone:** is a type of zone that install in addition to primary zone for the purpose of **fault tolerance** when primary zone fails.
3. **Stub zone:** it locates the domain name server.