Experiment No. 12

Date - 25/06/2021

Configure a network with multiple subnets

Aim:

Design and configure a network with multiple subnets with wired and wireless LANs using required network devices. Configure the following services in the network - TELNET, SSH, FTP server, Web server, File server, DHCP server and DNS server.

THEORY:

● Subnet

A subnet can be defined as a network inside a large network.The goal of subnetting is to create a fast, efficient and resilient network.This subnetting provides efficient routes. If all network traffic was traveling across the system at the same time using the same route, bottlenecks and congestion would occur.A subnet reduces the number of routers that a packet needs to travel. Subnets are the logical groups of addresses that we use to separate networks. A single network can also be subnetted. Subnetting takes a single network and subdivides it into smaller networks.

● Telnet

Telnet is an application protocol used on the Internet or local area network to provide a bidirectional interactive text-oriented communication facility using a virtual terminal connection. User data is interspersed in-band with Telnet control information in an 8-bit byte oriented data connection over the Transmission Control Protocol (TCP). Telnet allows you to access another computer on the Internet or local area network by logging in to the remote system.

● Secure Shell (SSH)

SSH encrypts all traffic to prevent attacks like hijacking and eavesdropping while offering different authentication methods. Secure Shell enables two remotely connected

users to perform network communication and other services on top of an unsecured network.

● File Transfer Protocol(FTP)

FTP is a standard protocol used for uploading and downloading files between two computers in a network.To use FTP we need to install ftp server and client softwares in the machines.

● Web Server

A web server is a computer that runs websites. It's a computer program that distributes web pages as they are requisitioned. The basic objective of the web server is to store, process and deliver web pages to the users. This intercommunication is done using Hypertext Transfer Protocol (HTTP). These web pages are mostly static content that includes HTML documents, images, style sheets

● File server

A file server is a central server in a computer network that provides file systems or at least parts of a file system to connected clients. File servers therefore offer users a central storage place for files on internal data media, which is accessible to all authorized clients.

● Dynamic Host Configuration Protocol server (DHCP)

It is a network server that automatically assigns IP addresses and network parameters to client devices.It works using the DHCP.This server assigns each client with a unique IP address, which changes after the lease period of the client with that ip.

● Domain Name System(DNS) server

DNS server is used to map the domain name to the IP address of the server.

When we search using a domain name the DNS resolver receives the request to resolve the domain name with the IP address.

The root server receives the first request, and returns a result to let the DNS resolver know the address of the Top Level Domain (TLD) server that stores the information about the site.

The DNS resolver then queries the Top level domain server, which will return the Authoritative Name Server where the site is actually returned.

Algorithm

E.g. :- Programmatic Algorithm for Telnet

- *Telnet*

1. Create a socket using the socket () function
2. Connect the socket to the server using the connect () function
3. Send and receive data by using the read () and write () functions
4. Close the connection by using the close () function

The steps involved in establishing a TCP socket on the server side are as follows:

1. Create a socket with the socket () function
2. Binding the socket to an address using the bind () function
3. Listen for connections with the listen () function
4. Accept a connection with accept () function system call
5. Send and receive data by using send () and receive ()
6. Close the connection by using the close () function

Client

1. Start the program
2. Include necessary packages
3. To create a socket from client to server.
4. Client establishes a connection to the server.
5. Client accept the connection and to send the data from client to server and vice versa
6. The client communicate the server to send the end of the message
7. Stop the program.

Server

1. Start the program
2. Include necessary packages
3. To create a socket in server to client
4. Server establishes a connection to the client
5. Server accepts the connection and sends the data from server to client and vice versa
6. The server communicates to the client to send the end of the message
7. Stop the program.

Program

● SSH

SSH can be installed using:

```
$ sudo apt install openssh-server
```

To configure firewall so that it allows the wanted access,we can use

```
$ sudo ufw allow ssh
```

To connect to a remote system, we can use

```
$ ssh username@address
```

● Telnet

Telenet can be installed using the command

```
$ sudo apt install telnet
```

A telnet server can be started using the command

```
$ telnet Hostname/IP
```

● FTP

Installation

```
$ sudo apt install vsftpd
```

After installation we need to configure the vsftpd.conf file so always keep a backup of the config file.

Launch the service with:

```
$ sudo systemctl start vsftpd
```

● DHCP

Installing DHCP server

```
$ sudo apt install isc-dhcp-server
```

Like the FTP server this too have a config file named dhcpd.conf

Result

Successfully learnt and configured TELNET, SSH, FTP server, Web server, File server, DHCP server and DNS server in a network with multiple subnets.