MWENGE CATHOLIC UNIVERSITY (MWECAU)

FACULTY OF SCIENCE

DEPATMENT OF NATURAL SCIENCE AND INFORMATION TECHNOLOGY

COURSE TITLE: LINUX OPERATING SYSTEM AND NETWORK MANAGEMENT

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QUESTION

Title: file transfer utility over LAN description:

Build a command-line tool to send and receive files over a LAN.

The sender selects a file and destination ip; the receiver saves it to a specified path.

Features:

- CLI interface with arguments for sending/receiving.
- Support for large and multiple files.
- Error handling and log output on success/failure

OVERVIEW OF FILE TRANSFER UTILITY

Creating a command-line tool for file transfer over a local area network (LAN) can be an exciting project. This utility allows a sender to select files and specify a destination IP for the receiver to save those files.

KEY COMPONENTS OF FILE TRANSFER UTILITY

i. Command-Line Interface (CLI):

The utility will have a CLI for users to send or receive files easily. This interface would capture arguments like the source file path, destination IP address, and the desired save path for the receiver.

Component. Cont……

ii. File support

It’s crucial to support both large files and multiple files to cater to various user needs. The utility should efficiently handle the transfer without significant performance setbacks.

Component. Cont……

iii. **Error handling**

Implementing robust error handling is essential.

The utility should log any issues encountered during file transfer, alongside success messages.

This logging can be invaluable for debugging.

How to Structure the Tool.

- **Sending Files:**

i. Collect arguments for the source file(s) and destination IP.

ii. Open a file stream and send the data using sockets.

iii. Handle potential errors during the transfer and log them.

➢Receiving Files:

i. Set up a listener socket on the specified IP.

ii. Wait for incoming connections, and upon connection, receive the file data.

iii. Save the data to the specified path and log any success or failure messages.

IMPLEMENTATION CONSIDERATIONS

i. Networking Basics:

Understanding TCP/IP communication is essential to establishing connections between sender and receiver using sockets.

IMPLEMENTATION Cont…..

ii. Concurrency

If multiple files need to be transferred simultaneously, consider using threads or asynchronous programming to handle multiple connections without blocking operations.

iii. Logging Functions:

Use system logging functions (like `syslog` on Linux) to record success and error messages. Maintain clear logs for troubleshooting.

FTP (FILE TRANSFER PROTOCOL)

FTP is a standard network protocol used for the transfer of computer files between a client and a server on a computer network. It operates on a client-server model, using two TCP connections: one for control (commands)

and another for data transfer. To facilitate FTP file transfer between a Windows host and a Kali Linux virtual machine, several steps and considerations are necessary. This process involves configuring both the Kali Linux environment and the Windows host to enable communication and file sharing.

Install an ftp server: the first step is to install an ftp server on the kali linux virtual machine. a popular choice is vsftpd (very secure ftp daemon) due to its security and ease of use. you can install it using the following command in the kali linux terminal:

```
sudo apt update
sudo apt install vsftpd
```

CONT;

Configure vsftpd: after installation, you need to configure vsftpd. The configuration file is typically located at /etc/vsftpd.Conf. You'll need to edit this file to allow for the desired functionality, such as enabling local user access, allowing write permissions, and specifying the directory for file transfers.

Common configurations include

- anonymous_enable=NO: Disables anonymous FTP access.
- local_enable=YES: Enables local user logins.
- write_enable=YES: Allows users to upload files.
- local_umask=022: Sets the umask for uploaded files.
- chroot_local_user=YES: Chroots local users to their home directories for security.

After making changes, restart the vsftpd service: sudo systemctl restart vsftpd.

After making changes, restart the vsftpd service: sudo systemctl restart vsftpd.

Firewall configuration:

Ensure that the firewall on the kali linux VM allows FTP traffic. The default FTP port is 21 (for control) and a range of ports for data transfer (passive mode). You might need to open these ports using iptables or ufw (uncomplicated firewall). For example, to allow FTP traffic using ufw:

Configuring the windows host

```
sudo ufw allow 20/tcp
sudo ufw allow 21/tcp
sudo ufw allow 1024:65535/tcp
sudo ufw enable
```

Network configuration:

Ensure the virtual machine and the windows host are on the same network. This can be achieved by using a bridged network adapter in the virtual machine settings. This allows the VM to obtain an IP address from the same network as the host machine. Alternatively, you can use a NAT (network address translation) configuration, but you'll need to configure port forwarding on the host machine to allow FTP traffic to the VM. Firewall configuration (windows): the windows firewall might block FTP traffic. You need to create an inbound rule to allow FTP traffic on port 21 and the passive mode data transfer ports (typically a range like 1024-65535).

i. Establish connection:

the FTP client initiates a connection to the FTP server, typically on port.

ii. Authentication

The client authenticates with the server using a username and password.

cont

iii. Navigation and Commands: Once authenticated, the client can use commands like **ls** (list directory contents), **cd** (change directory), **pwd** (print working directory), etc., to navigate the server's file system.

iv. File transfer (put and get)

put: The **put** command is used to upload a file from the client to the server. The client sends the file data over the data connection.

get: The **get** command is used to download a file from the server to the client. The server sends the file data over the data connection.

v. Termination: The client can close the connection using the **quit** or **bye** command.

ftp <ftp_server_address>

Authenticate with username and password

put myfile.txt

bye OR quit

The **ftp** command-line utility in Linux provides a way to interact with FTP servers. For example, to upload a file named **myfile.txt** to an FTP server, you would typically:

put and get Commands within FTP

put and get commands

put and **get** are commands within the FTP protocol, not standalone commands in the Linux shell. They are used after establishing an FTP connection with the **ftp** command. The **put** command uploads a file from the client's current directory to the server's current directory, and the **get** command downloads a file from the server's current directory to the client's current directory.

sudo netdiscover -r (network discovery)

netdiscover is a command-line tool used for network reconnaissance. It passively detects online hosts on a network or actively searches for them by sending ARP requests. The **sudo** command is used to execute a command with elevated privileges (typically root).

How it works on a LAN:

i. **netdiscover Functionality: netdiscover** sends ARP (Address Resolution Protocol) requests to discover active hosts on the network. ARP is used to map IP addresses to MAC addresses within a local network.

How it works on a LAN. Cont……

i. **-r Option (Range Scan):** The **-r** option specifies an IP address range to scan. For example, **sudo netdiscover -r 192.168.1.0/24** would scan the 192.168.1.0/24 subnet. This option allows you to define the network range to be scanned.

ii. **ARP Requests and Responses: netdiscover** sends ARP requests to the specified IP addresses. Active hosts on the network will respond to these ARP requests, revealing their MAC addresses and IP addresses.

iii. **Output: netdiscover** displays the discovered hosts, including their IP addresses, MAC addresses, and sometimes vendor information.

Mode of operations

When you run **sudo netdiscover -r <IP_range>** on a machine connected to a LAN, **netdiscover** sends ARP requests to the specified IP addresses within that LAN. Any device on the LAN that is active and configured to respond to ARP requests will reply, allowing **netdiscover** to identify it. This is a fundamental step in network mapping and reconnaissance.

- **FTP:** A protocol for transferring files. Uses **put** to upload and **get** to download files *after* establishing a connection to an FTP server.
- **sudo netdiscover -r:** A command-line tool used to discover active hosts on a LAN by sending ARP requests. The **-r** option specifies the IP address range to scan.

SUMMARY

Step 1: Discover Devices on Your Network with

netdiscover

First, use netdiscover to scan your local network and identify devices (e.g., an FTP server IP).

sudo netdiscover -r 192.168.1.0/24

-r 192.168.1.0/24 specifies the subnet range to scan.

this will return a list of ip addresses and mac addresses of devices on the network.

step 2: connect to an ftp server

Use the ftp command followed by the **server IP address**:

ftp 192.168.1.100

. Replace 192.168.1.100 with the actual IP of the FTP server (found via netdiscover).

. You'll be prompted to enter a username and password.

step 3: download files

Using get

Once connected via FTP:

ftp> get filename.txt

. Downloads filename.txt from the server to your local machine.

. The file will be saved in the current directory you're in when you started FTP.

To download to a specific local filename:

ftp> get serverfile.txt localcopy.txt

step 4: upload files using put

To upload a file **from your machine to the server**:

ftp> put localfile.txt

This uploads localfile.txt to the current directory on the server.

To upload and rename on the server:

ftp> put localfile.txt remotefile.txt

step 5: close the ftp

Session

After transferring files, exit the FTP session:

ftp> bye

Or:

ftp> quit

USING AN FTP CLIENT (FILEZILLA)

- Obtain Kali Linux IP Address: Determine the IP address of the Kali Linux VM. You can find this by using the ip addr or ifconfig command in the Kali Linux terminal.
- Connect to the FTP Server: Open FileZilla and enter the following information:
- Install FileZilla on Windows: Download and install FileZilla on your Windows host from the official website: FileZilla.

click "quickconnect" to establish the connection.
host:the ip address of your kali linux vm.
username: the username of a valid user on your kali linux system.
password: the password for the user.
port: 21 (the default ftp port).

file transfer: once connected, you can browse the kali linux file system (based on the user's permissions) and transfer files between your windows host and the kali linux vm. the left pane in filezilla displays your local files, and the right pane displays the files on the kali linux server. you can drag and drop files to transfer them.
filezilla simplifies the ftp file transfer process by providing a user-friendly graphical interface. instead of using command-line ftp clients, which can be less intuitive, filezilla offers a visual way to manage files, making it easier to:

Importance of filezilla in the process

i. **Connect to the ftp server**: filezilla handles the connection details, including the host ip, username, password, and port.

ii. **Browse the file system**: it allows you to easily navigate the directories on both the local machine and the remote server.

iii. **Transfer files**: filezilla supports drag-and-drop functionality for easy file uploads and downloads.

iv. M**onitor transfer progress**: it provides a clear view of the file transfer status, including progress bars and error messages.

v.M**anage multiple connections**: filezilla can handle multiple ftp connections simultaneously.

Filezilla is particularly important for users who are not familiar with command-line interfaces or who prefer a more visual approach to file management. it streamlines the process, making it more accessible and efficient for transferring files between a windows host and a kali linux virtual machine.

The process involves setting up an ftp server on the kali linux vm, configuring the network and firewall settings on both the vm and the windows host, and then using an ftp client like filezilla to facilitate the file transfer.

CONCLUSION

This file transfer utility over LAN will serve as a practical tool for users wanting to send and receive files quickly and efficiently, while also ensuring that ample error handling is put in place. A well-designed CLI, combined with robust error logging, will significantly enhance user experience.

REFERENCE

McCarty, J. (2021). *Linux Networking Cookbook*. Packt Publishing.

Nemeth, E., Snyder, G., & Hein, T. R. (2020). *Linux Administration Handbook*.Prentice Hall.

Sobell, M. G. (2021). *A Practical Guide to Linux Commands and Shell Programming*. Prentice Hall.

Das, S. (2022). *Mastering Linux Networking*. Packt Publishing.

Kearns, J. (2023). *Linux Networking: A Beginner's Guide.* McGraw-Hill Education.

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