



Analysis of FTP and TFTP Protocols

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Abstract- This paper presents our approach to study the storage and retrieval of information between a router and a server in a simulated network on CISCO Packet Tracer. Current approach uses File Transfer Protocol (FTP) and Trivial File Transfer Protocol (TFTP) as supporting file transfer protocols for backing-up and restoring information. We study the procedure and analyze the key features of both the transferring protocols and observe the time taken to transfer the running configuration and the internetwork operating system files of the router using both the protocols for backing up as well as restoring.

I. INTRODUCTION

Data loss and its recovery has been a matter of high concern during this era of digitization. Loss of crucial data or unintended deletion may happen due to human error, malicious intent, system failure or natural disaster. A 2008 survey found that 66% of respondents had lost files on their home PC [1]. This inspired us to study the process of backing up crucial information and retrieving it later on if required to ensure the integrity and reliability of networking. After studying the processes and possibilities to do so, this paper shall demonstrate the transferring of vital data such as the ios-files and the running configuration of a router between itself and a provided server. The simulation of the router, server and the rest of the network components was successfully carried out using Cisco Packet Tracer [5].

II. SYSTEM OVERVIEW

As shown in fig. 1, our network has several components configured to the network. The network consists of switches, routers, a dedicated server, fast access cable, serial cable and cross-over cable.

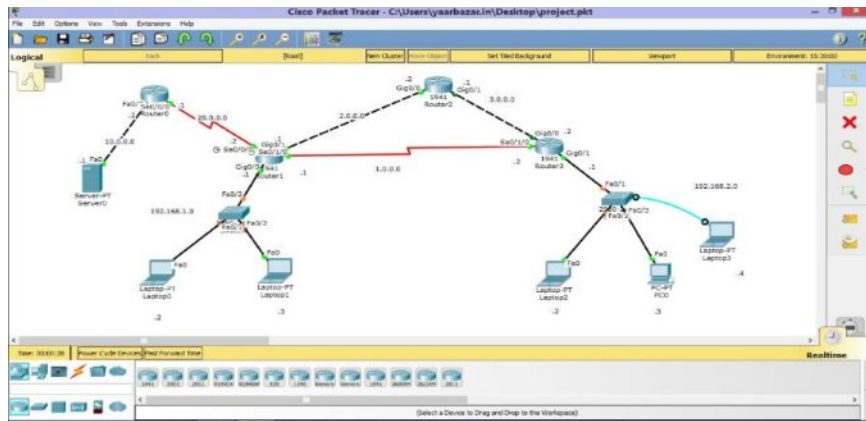


Figure 1: Simulated Network on CISCO Packet Tracer=]

III. WORK DONE

The work done can be shown in the form of an algorithm given below:

1.) Steps for TFTP server to backup and restore a configuration:

a) At the Router > prompt, issue the enable command , and provide the required password when prompted. The prompt changes to *Router#*, which indicates that the router is now in privileged mode.

b) Copy the running configuration file to the TFTP server:

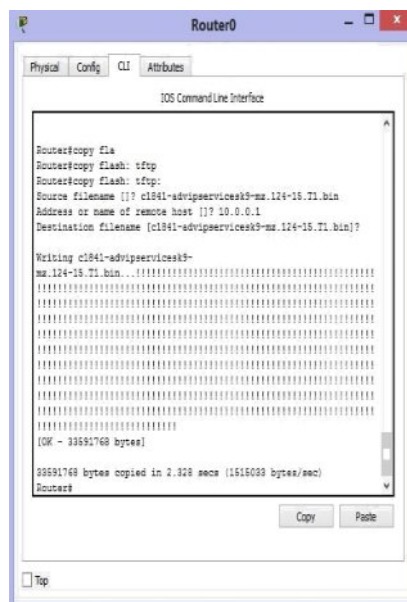
```
CE_2#copy running-config tftp:
Address or name of remote host []? 64.104.207.171
Destination filename[ce_2-config]?
backup_cfg_for_my_route    !!
1030 bytes copied in 2.489 secs (395 bytes/sec)
CE_2#
```

c) Open the configuration file with a text editor. Search for and remove any line that starts with "AAA".

Note: This step is to remove any security commands that can lock you out of the router.

d) Copy the configuration file from the TFTP server to a new router in privileged (enable) mode which has a basic configuration.

These steps can be shown in the following figures.



The screenshot shows a Cisco Router CLI interface. At the top, there's a title bar with a small icon and the text "Router0". Below the title bar is a tabbed interface with four tabs: "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is selected. The main window displays the following text:

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
changed state to up

Router>en
Router#copy runni
Router#copy running-config start
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#copy runni
Router#copy running-config tftp
Router#copy running-config tftp:
Address or name of remote host []? 10.0.0.1
Destination filename [Router-config]?

Writing running-config....!!
```

[illegible]

2) Steps for FTP Server to Backup and Restore a Configuration:

In this procedure, an FTP server can be used in place of a TFTP server.

(a) At the Router> prompt, issue the enable command, and provide the required password when prompted.

The prompt changes to Router#, which indicates that the router is now in privileged mode.

(b) Configure the FTP username and password:

```
CE_2#config terminal
CE_2(config)#ip ftp username cisco
CE_2(config)#ip ftp password cisco
CE_2(config)#end
CE_2#
```

(c) Copy the configuration to the FTP server:

```
Router#copy running-config ftp:
Address or name of remote host []? 10.0.0.1
Destination filename [Router-config]?
Writing running-config---
33591768 bytes copied in 5.379 secs (655697 bytes/sec)
Router#
```

(d) Open the configuration file with a text editor. Search for and remove any line that starts with "AAA".

Note: This step is to remove any security commands that can lock you out of the router.

(e) Copy the configuration file from the FTP server to a router in privileged (enable) mode which has a basic configuration.

```
Router#copy ftp: running-config
Address or name of remote host [10.0.0.1]?
Source filename []? Router0_running-config
Destination filename [running-config]?
Accessing ftp://10.0.0.1/Router0_running-config...
Loading backup_cfg_for_router !
[OK - 1030 bytes]
1030 bytes copied in 9.612 (107 bytes/sec)
Router#
```

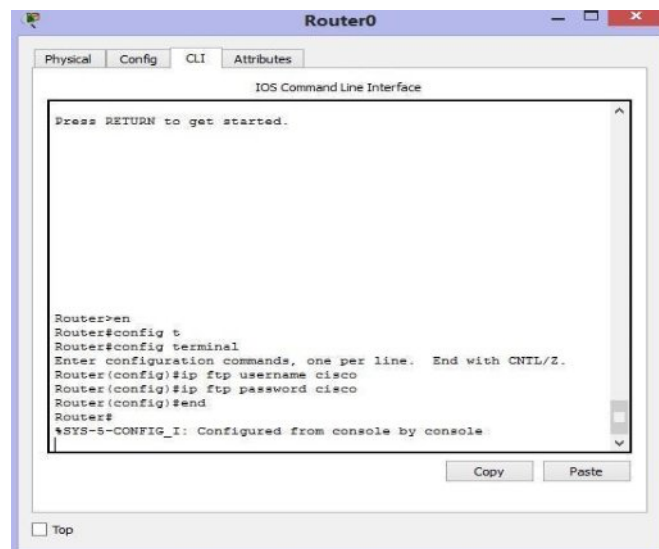


Figure 5: Configuring ftp username and password.



Figure 6: Copying/storing running configuration to the server

IV. RESULT

After execution we obtained the following result:

TABLE 1: Results of TFTP

TFTP				
BACKING-UP				
S.NO.	FILE	SIZE(bytes)	TIME(sec)	RATE(bytes/sec)
1.	IOS	33591768	2.328	1615033
2.	Running Configuration	1030	2.607	395
RESTORING				
1.	IOS	33591768	5.379	655697
2.	Running Configuration	1030	9.612	107

TABLE 2: Results of FTP

FTP				
BACKING-UP				
S.NO.	FILE	SIZE(bytes)	TIME(sec)	RATE(bytes/sec)
1.	Running Configuration	1030	3.341	308
RESTORING				
1.	Running Configuration	1030	13.213	78

V. ANALYSIS

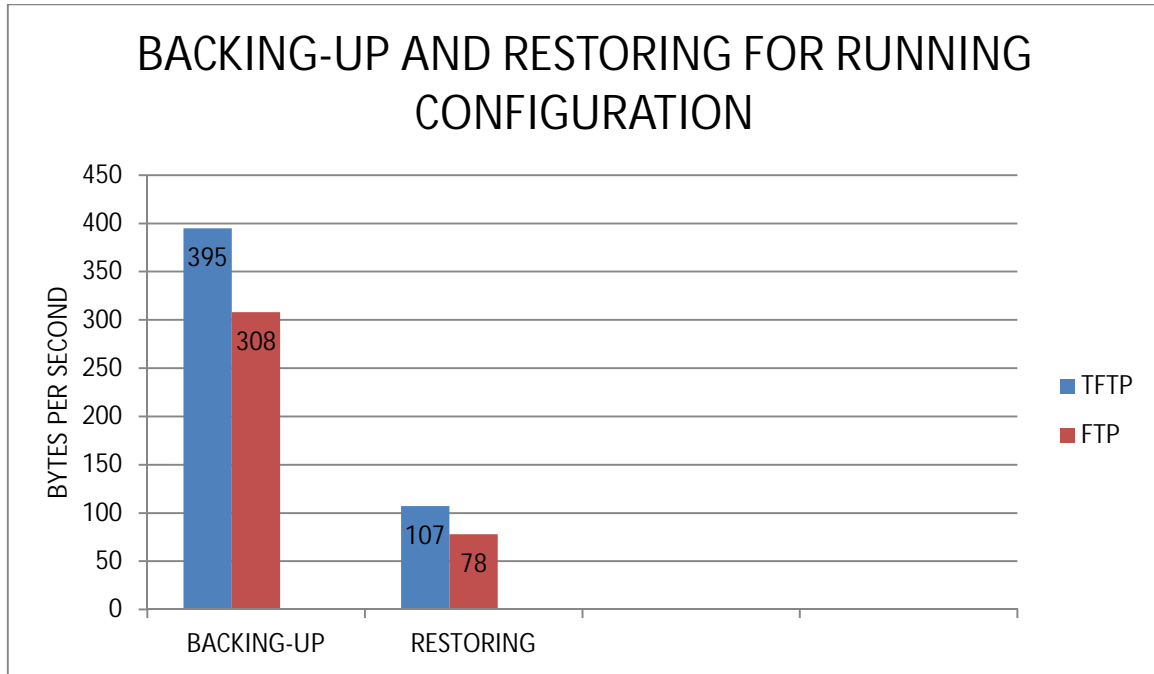


Figure 7: Comparison of transferring rate observed in both protocols.

Time taken by TFTP [3, 4] to complete the transfer was lesser as compared to FTP. However user authentication adds to the advantages of FTP. **TFTP uses UDP as a transport, as opposed to TCP which FTP uses, and works on port 69 [2, 6, 7]. The speed of copying files from the router to the server was found to be higher than that of restoring the same files. Such observations were made as the ios-files and configuration are stored in the flash memory and random access memory of the router.**

VI. CONCLUSION

While studying the procedure and implementing the same we came to the conclusion that FTP should be preferred when security is desirable since TFTP does not use any kind of password protection. However, TFTP proved to be faster and easier to implement. TFTP can be referred to as a simplified version of FTP. TFTP is used mostly for backing up router configuration files like Cisco and its IOS images. FTP is widely used and preferred for transferring other files.

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