

Data Transfer using Pendrives

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ABSTRACT

In the modern era, computers and laptops has become an inseparable part of our busy life. One of the commonly used device for data transfers is Universal Serial Bus(USB) flash drives. Due to emerging technology, USB devices are shrinking in size day by day, but not the equipments which is required to access them. Data transfer using portable devices is the most important factor of today's scenario. Data transfer between two pen drives is generally done using laptops or desktops. But it is not always possible to carry such a large size device to the particular location. So to overcome this problem, a hardware which is more compact to carry anywhere is designed. This paper ensures essential transfer of data which can be monitored by using web application. Here the transfer of data is done between two pen drives without using any computers or laptops. Using this system, the transfer of files can be done from any place in the world. The important criteria is to make sure that the two pen drives which are connected to two of the raspberry pies must be in the same network. This system even requires a good and stable internet for transfer of files.

Keywords

USB, SCP, TCP, GUI

1. INTRODUCTION

The mechanism of data transfer has been taken looking at the problems faced by the users in daily life[1]. Transferring data via a laptop involves a lot of power wastage and moreover wastage of precious time, because to use a computer for data transfers, it needs to boot up the system first. The USB disks are slave devices which means that they cannot initiate data transfers on their own. These slave devices needs a master controller(PC or Laptop) which commands them to do appropriate operations on the data. The master controller cannot be eliminated and the only thing which can be done is to reduce the size of master controller and make it portable, quick and user-friendly for access[2-3].

2. SYSTEM OVERVIEW

The basic block diagram of the data transfer system is shown in Figure 1.1. The initial setup demands for a criteria that both the raspberry pies in which pen drives are inserted should be in a same network and connected to the internet. After the setup has been created a python program is written in the raspberry pi to communicate with the server and the raspberry pi is booted to run the program. Once the process is completed a connection is created between the raspberry pi and server. The server acts as a mediator between the user and the raspberry pi. It consists of all the programs to view a web application to user. It allows the user to access the web application to transfer or delete a file. Once the contents of a particular pen drive is selected in the web application for transfer or delete operation, it is uploaded to the server. The server asks the raspberry pi to do the operation. In order to

transfer or delete a file between the two pen drives, a connection is required between the two raspberry pies. It is created using Secure Shell(SSH) and Secure Copy Protocol(SCP).

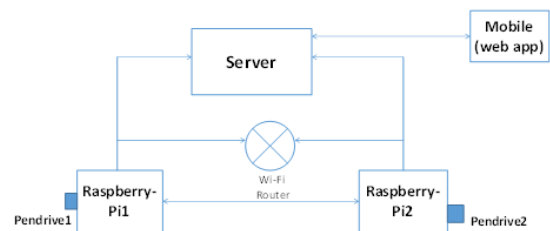


Figure 1.1: Block Diagram of Data Transfer System

A. Secure Shell:

Secure Shell(SSH) provides a secure channel over an unsecured network (internet) by providing cryptographic techniques. In general there are two types of SSH connections namely SSH version-1 and SSH version-2. The difference between two versions of SSH is that dual keys are sent from the server to client at the beginning in version-1 where as only single key is used in version 2. Some of the client authentication methods supported by SSH are listed.

B. Secure Copy Protocol:

SSH is engaged with Secure Copy Protocol (SCP) which is used for transferring files between a local host and a remote host. It mainly works on the SSH and uses Transmission Control Protocol (TCP). The client initiates the SSH connection to the remote host and requests a SCP process to be started on the remote server. The remote SCP process can operate in one of the two modes.

1. Source mode - It reads files and sends them back to the client.
2. Sink mode - It accepts the files sent by the client and write them on the remote host. Sink mode is used in this approach. Every message and every finished file data transfer from the provider must be confirmed by the SCP process that runs in the sink mode. The consumer can reply in three different messages, that is binary 0 corresponds to "ok", binary 1 corresponds to "warning" and binary 2 corresponds to "fatal error". Message 1 and 2 can be followed by a text message to be printed on the other side, followed by a new line character. The new line character is mandatory whether the text is empty or not.

3. WEB APPLICATION AND RASPBERRY PI

Web application allows the user to monitor and control the contents of the two pen drives. Web application is created in order to monitor the contents of the pen drives and to control the data flow. PHP and HTML code are dumped in a software which in turn creates a Graphical User Interface(GUI).

A. Creation of Web Application:

Web application is created using cPanel. cPanel is a Linux-based web hosting control panel that provides a graphical interface and automation tools designed to simplify the process of hosting a web site. The steps to be followed are :-

1. A cPanel account will be provided to the user by web hosting service with a username and a password.
2. The user needs to log in into this account in any browser.
3. Then "File Manager" icon is selected in the main page and it is opened.
4. The HTML and PHP codes are dumped here which are previously written.
5. The desired web page will appear when these codes are executed in the _le manager.

B. Web Server

Web server is a software which is present in the main server. The purpose of these web servers is to store web sites, so that people can access them through internet. Web application which is developed using HTML is stored in the web server "www.emwios.com". The files stored on web servers are read by browsers such as firefox, chrome etc which convert these files into images and texts for user view. Web servers communicate with many browsers and many computers at the same time. Their purpose is to serve files as requested. The transfer rate and the number of files handling the different computers for a server depends on factors like hardware and processor speed.

C. Functioning of Raspberry pi:

Raspberry pi is a credit card sized single board system. It is a small, powerful, light weight and ARM based computer which can do many of the things a desktop or a PC can do. The powerful graphics capabilities and High-Definition Multimedia Interface (HDMI) video output makes it ideal for multimedia applications[4]. The Raspberry pi is based on Broadcom BCM2835 chip. It does not feature a built-in hard disk, instead relying on a SD card for booting and long term storage. Commands given by the user are decoded by Raspberry pi.

The Raspberry pi has no internal storage or built-in operating system. Hence it requires a Micro SD Card of at least 8 GB memory to boot the Raspberry pi. SD card is inserted onto the raspberry pies and the operating system such as NOOBS, RASPBIAN WHEEZY are installed. A monitor is required for booting process. NOOBS operating system consists of pre installed drivers. GUI is directly appeared in NOOBS. Direct access of Wi-Fi is one of the interesting features of this operating system.

D. Working Principle

Wi-Fi is a high speed internet connection without the use of any cables or wires. The

wireless network is operating three essential elements which are radio signals, antenna and router. The radio waves are keys which make the Wi-Fi network possible. The computers and cell phones are ready with Wi-Fi cards. Wi-Fi allows the

person in order to get access to web any place in the actual provided area. There will be a wireless connection between a system and a server. A system can be generated within resorts, library, schools, colleges, campus, personal institutes. It can also be used in open public places. The radio signals are transmitted from antennas and routers and these signals are picked up by Wi-Fi receivers, such as computers and cell phones that are ready with Wi-Fi cards. Whenever the computer receives the signals within the range of 100-150 feet for router, it connects the device immediately. The range of the Wi-Fi depends upon the environment. The Wi-Fi cards will read the signals and create an internet connection between user and network. The speed of the device using Wi-Fi connection increases as the computer gets closer to the main source and speed decreases when the computer gets further away.

The two raspberry pie boards are connected to a common Wi-Fi. By this, the connection between raspberry pie and server is established. Internet connection is checked after this. The Internet Protocol(IP) addresses of two raspberry pies are observed. The IP address of one raspberry pie are used in the other raspberry pie to make sure that they are always connected. The IP address used is dynamic type. Each time when the two raspberry pies are connected to a new network, different dynamic IP addresses are generated.

4. EXPERIMENTAL RESULTS

This section contains the results obtained in the web application page. Here the user gets clear picture of how the data is actually transferred and also the user can be able to monitor it.

A. Login Page:

A web application is developed to monitor and control the contents of two pen drives. Initially, the user has to come through a login page(Figure 4.1). Here the user should enter the email and password to see the contents in the pen drives. The email ID is "user" and the password is "pendrive".

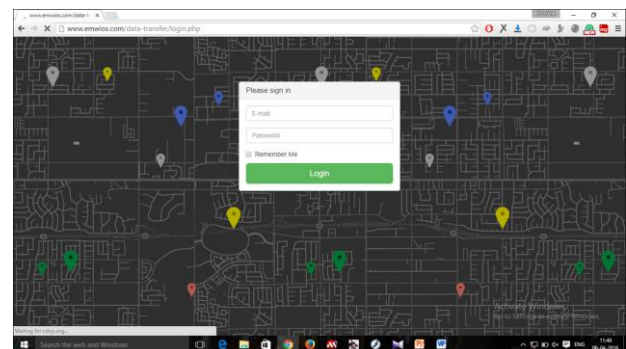


Figure 4.1: Login Page.

B. Index Page:

After the login page, the contents of both the pen drives will be shown in the index page(Figure 4.2). Here the user should first select the pen drive. Then the user should select either copy or delete option which is developed in the web application. Once the user selects the copy or delete option, the file is either automatically transferred to the other pen drive or deleted respectively.

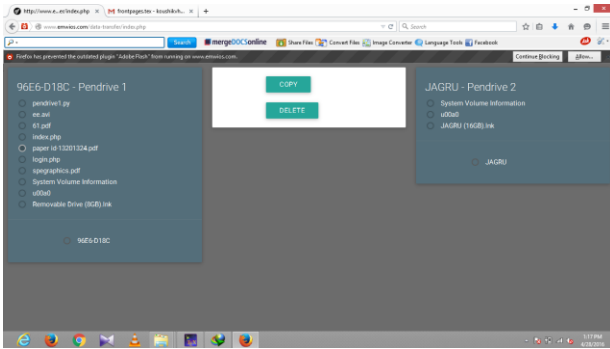


Figure 4.2: Index Page.

C. Updated Index Page:

The contents of pen drive 1 and pen drive 2 are displayed in the web application (Figure 4.2). The pen drive from which copy or delete operations are to be performed is selected first. Then, copy or delete operation of a particular file of any type is selected. There are 10 files which are present in pen drive 1 in which 4 files are selected one after the other for copy operation (Figure 4.3). The names of those files are index.php (30 KB), ee.avi (100 MB), login.php (60KB), pendrive1.py (300 KB). Once the copy operation is completed, the files which are selected for copy operation are transferred to pen drive 2 (Figure 5.4). The contents in the pen drive 2 are updated stating a message that “File/Folder Copied Successfully” as shown in Figure 4.3. Similarly for delete operation, there are 9 files which are present in pen drive 1 in which 1 file is selected for delete operation (Figure 4.5). The selected file is spegraphics.pdf (600 KB). Once the delete operation is completed, the files which are selected for delete operation are deleted in pen drive 1 (Figure 4.7). The contents in the pen drive 1 are updated stating a message that “File/Folder deleted Successfully” as shown in Figure 4.6.

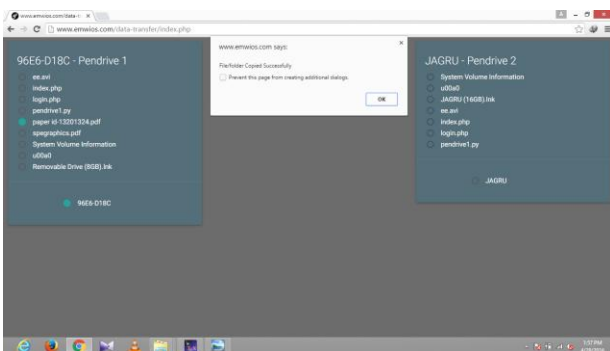


Figure 4.3: Copy Operation Successful.

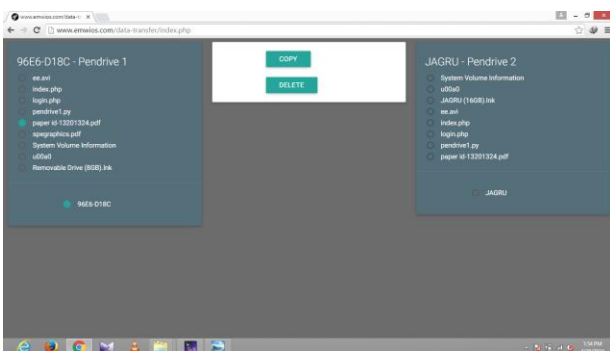


Figure 4.4: Updated After Copy Operation.

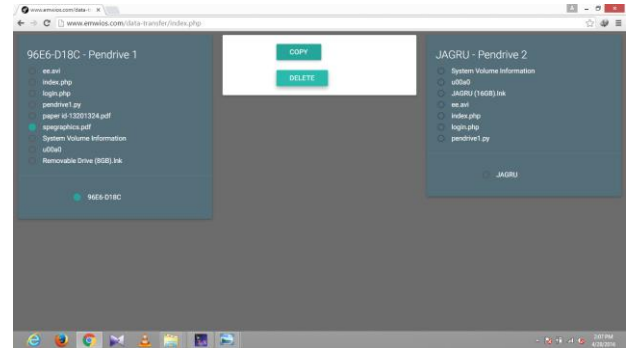


Figure 4.5: Delete Operation.

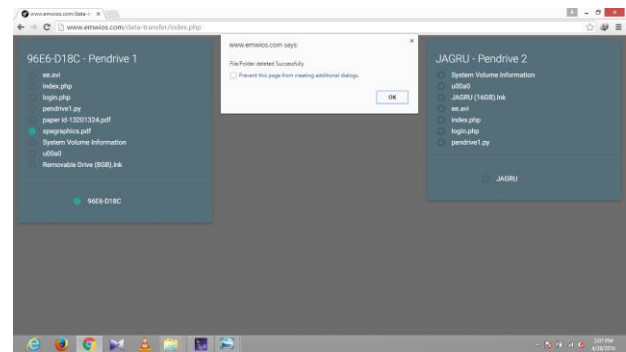


Figure 4.6: Delete Operation Successful.

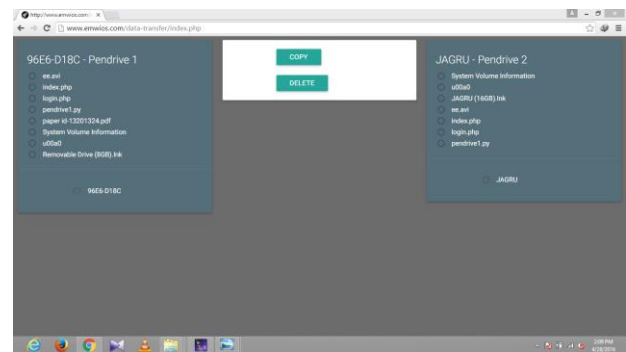


Figure 4.7: Updated After Delete Operation.

5. RESULT ANALYSIS

Data rate is around 600 KB/s. It takes around 2 minutes for a 97 MB video file to be copied from one pen drive to another which are placed in electronics department. When one of the pies is placed in the other department, it takes 2 minutes and 5 seconds for copy operation. Even the delete operation requires very less time. So this system is hardly time dependent, as long as both the raspberry pies are connected to the same network. Multiple selection of files is not possible.

6. CONCLUSION

The needs of the current generation that requires portable means of data transfer is successfully satisfied. The important thing is that data transfer is done without the involvement of PC. It also provides higher security as Linux is a secured Operating System. It has been developed by integrating features of all the hardware components and software used. Highly advanced raspberry pi board is used. The advantage of this device is that the user can select and transfer particular files from anywhere in the world.

7. REFERENCES

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