**A**

**Project Report**

**On**

**LAN Based Shared Storage System**

**SUBMITTED BY**

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**INTRODUCTION**

LAN-based storage is an idea that intends to use the hard disk capacity wasted from every pc that is connected in the network and access that using suitable application as a single logical storage. The components involved are:

**Samba Server**

Samba is an Open Source/Free Software suite that provides seamless file and print services to SMB/CIFS clients. Samba is freely available, unlike other SMB/CIFS implementations, and allows for interoperability between Linux/Unix servers and Windows-based clients. Samba is software that can be run on a platform other than Microsoft Windows, for example, UNIX, Linux, IBM System 390, OpenVMS, and other operating systems. Samba uses the TCP/IP protocol that is installed on the host server. When correctly configured, it allows that host to interact with a Microsoft Windows client or server as if it is a Windows file and print server. As of version 4, it supports Active Directory and Microsoft Windows NT domains.

Samba is a suite of UNIX applications that speak the Server Message Block (SMB) protocol. Microsoft Windows operating systems and the OS/2 operating system use SMB to perform client-server networking for file and printer sharing and associated operations. By supporting this protocol, Samba enables computers running UNIX to get in on the action, communicating with the same networking protocol as Microsoft Windows and appearing as another Windows system on the network from the perspective of a Windows client. A Samba server offers the following services:

* Share one or more directory trees.
* Share one or more Distributed filesystem (DFS) trees.
* Share printers installed on the server among Windows clients on the network.
* Assist clients with network browsing.
* Authenticate clients logging onto a Windows domain.
* Provide or assist with Windows Internet Name Service (WINS) name-server resolution.

**Mhddfs**

Mhddfs is a driver for Linux that combines several mount points into one virtual disk. It is a fuse based driver, which provides an easy solution for large data storage. It combines all small file systems to create a single big virtual filesystem which contains every particle of its member filesystem including files and free spaces.

All your storage devices create a single virtual pool and it can be mounted right at the boot. This small utility takes care of, which drive is full and which is empty and to write data to what drive, intelligently. Once you create virtual drives successfully, you can share your virtual filesystem using SAMBA. Your client will always see a huge drive and lots of free space.

Features of Mhddfs :

1. Get attributes of the file system and system information.

2. Set attributes of the file system.

3. Create, Read, Remove and write Directories and files.

4. Support for file locks and Hardlinks on single device.

**Fstab**

The fstab (or file systems table) file is a system configuration file commonly found at /etc/fstab on Unix and Unix-like computer systems. In Linux it is part of the util-linux package. The fstab file typically lists all available disk partitions and other types of file systems and data sources that are not necessarily disk-based, and indicates how they are to be initialized or otherwise integrated into the larger file system structure.

The fstab file is read by the mount command, which happens automatically at boot time to determine the overall file system structure, and thereafter when a user executes the mount command to modify that structure. It is the duty of the system administrator to properly create and maintain the fstab file.

While fstab is still used for basic system configuration, for other uses it has been superseded by automatic mounting mechanisms.

The file has other names on some versions of Unix; for example, it is found at /etc/fstab on Solaris systems.

**BACKGROUND & MOTIVATION OF PROJECT**

There are number of computers connected in a network having different storages. All this storage is not utilized by every machine, so there is wastage of storage. So there is need of a system which will allow us to utilize this wasted storage collectively and effectively. The main objective of the project is to use the hard disk capacity wasted from every pc that is connected in the network and access that as a single logical storage using suitable application.

**PROBLEM STATEMENT**

**LAN Based Storage:**

Sharing the storage available in PC’s which are connected in network and collectively using that shared storage as a single logical storage.

**PROPOSED SYSTEM**

The proposed system, to meet the needs of achieving complete storage space by using the storage from all the PC’s connected in network collectively.

**DETAIL DESIGN**

**Hardware requirements:**

The hardware requirement to run the mini-project is three working pc’s with Ubuntu or linux environment or OS.

**Software requirements:**

The software requirements to run the mini-project are as follows:

1. Samba Server 4.4.6.

2. SMB Client.

3. Ubuntu 15.04.

4. Mhddfs Package.

**IMPLEMENTATION**

The implementation can be done on any number of PC’s. But for testing phase we are taking 3 PC’s where Two are client and One is Server.

**1. Execute This Instructions on 2 client PC’s**

All commands must be done as root (precede each command with 'sudo' or use 'sudo su').

Install Samba

sudo apt-get update

sudo apt-get install samba

Set a password for your user in Samba

sudo smbpasswd -a client1

Note: Samba uses a separate set of passwords than the standard Linux system accounts (stored in /etc/samba/smbpasswd), so you'll need to create a Samba password for yourself.

Create a directory to be shared

mkdir /home/client1/project

Configure the samba config file

Edit the file "/etc/samba/smb.conf"

sudo gedit /etc/samba/smb.conf

Once "smb.conf" has loaded, add this to the very end of the file:

[project]

path = /home/client1/project

read only = no

writable = yes

guest ok = no

valid users = client1, client2, server

[Params]

guest ok = yes

— Guest accounts are OK to use the share; aka: no passwords.

guest only = yes

— Only guests may use the share.

writable = yes

— The share will allow files to be written to it.

read only = yes

— Files cannot be written to the share, just read.

force user = username

— Act as this user when accessing the share, even if a different user/pass is provided.

force group = groupname — Act as this usergroup when accessing the share. username = username, username2, @groupname

— If the password matches one of these users, the share can be accessed.

valid users = client1,cli @groupname

— Like above, but requires users to enter their username.

Tip: There Should be in the spaces between the lines, and note que also there should be a single space both before and after each of the equal signs.

Restart Samba:

sudo service smbd restart

Once Samba has restarted, use this command to check your smb.conf for any syntax errors

testparm

To access your network share

sudo apt-get install smbclient

# List all shares:

smbclient -L //192.168.5.153/project -U client1

# Connect:

smbclient //192.168.5.153/project -U client1

Installation & Configuration of Samba server is Complete.

Execute this instruction to create .img file on every client PC. For share create a device file on each share , execute on all nodes change [X] to match node number the size is bs\*count , in this case 1024M

sudo dd if=/dev/zero of=~/client1/project/share1.img bs=1M count=256

**2. Move to Server PC**

Mount this shares to central server, run only on master server.

Make directory to hold all smb mounts.

sudo mkdir -p /21/node{1,2}

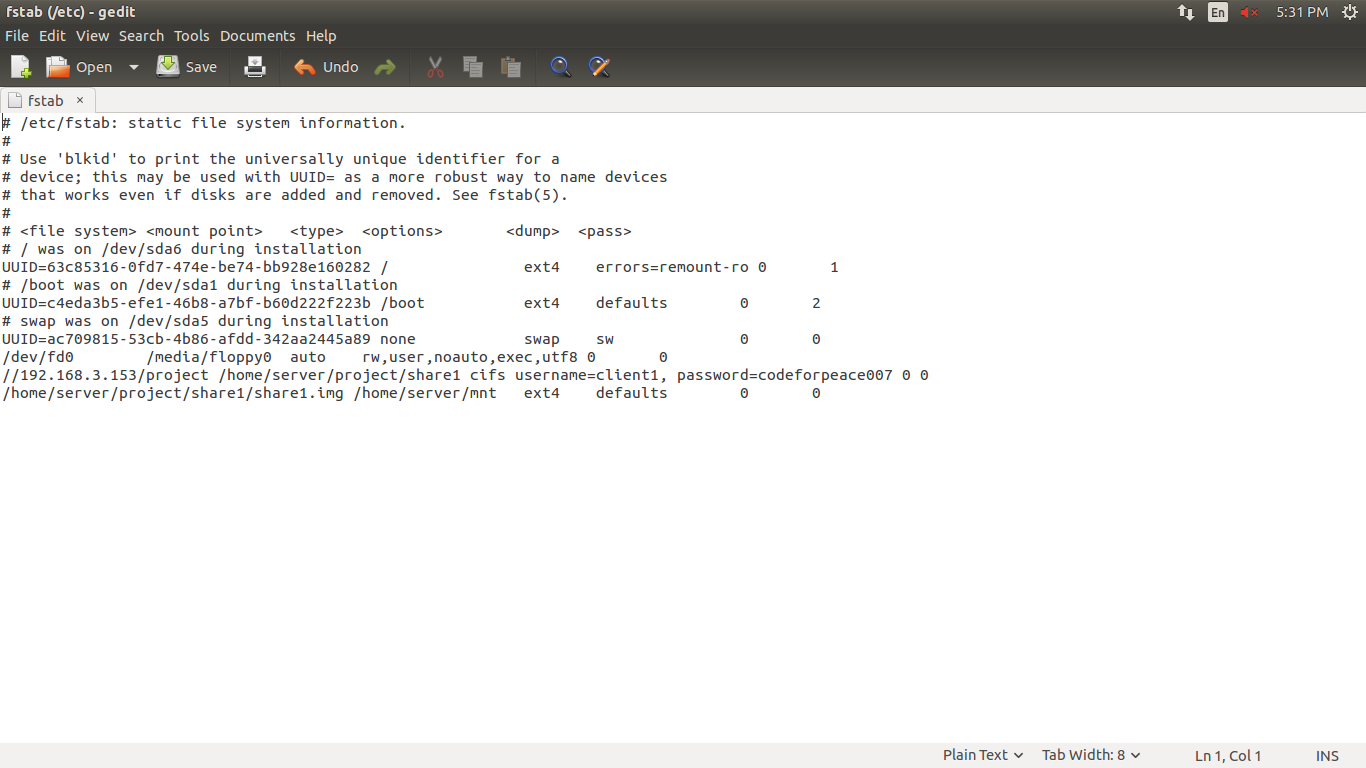
Mount each share into its own directory , note that the password is the one chosen on smbpasswd command sudo mount -t cifs -o username = client1 //192.168.5.153/project /home/server/project/share1

sudo mount -t cifs -o username = client2 //192.168.5.151/project /home/server/project/share2

Install mhddfs package using following command.

sudo apt-get update && apt-get install mhddfs

Now checking the filesystem which are present



# Get into share1 folder and do this (image needs to be formatted in some file format (ext4, fat32, ntfs and so on )

mkfs ext3 -F share1.img(path to client1 image file)

Similarly do it for share 2

Mounting the img file on created folder

sudo mount -o loop,rw,sync /home/server/share/share1.img /home/server/project

sudo mount -o loop,rw,sync /home/server/share/share2.img /home/server/project

Making folder for mounting the combined img files

sudo mkdir /mnt/combine

Combine above created memory and mount to combine folder

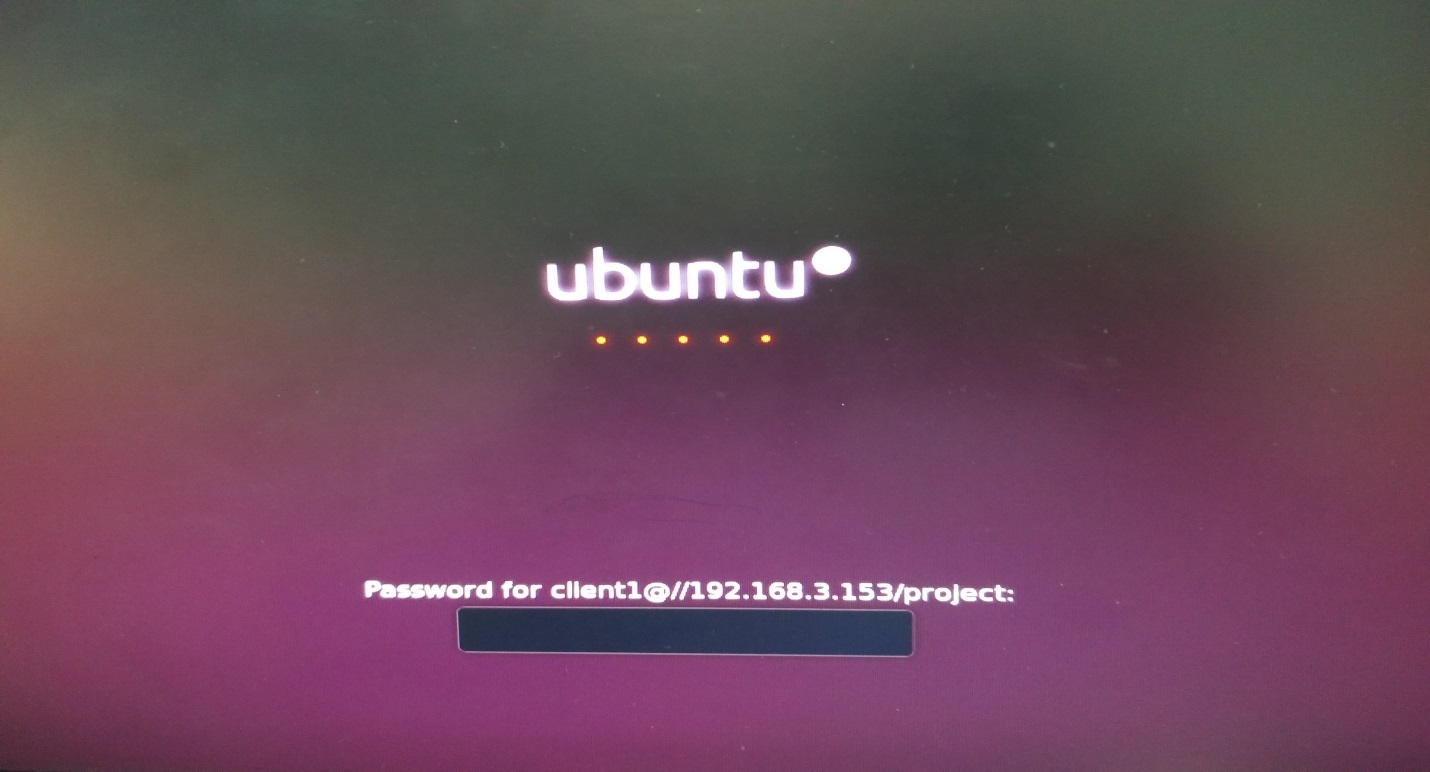
sudo mhddfs /home/server/project/share1, /home/server/project/share2 /home/server/combine -o allow\_other

Permanently mount share by making an Fstab entry:

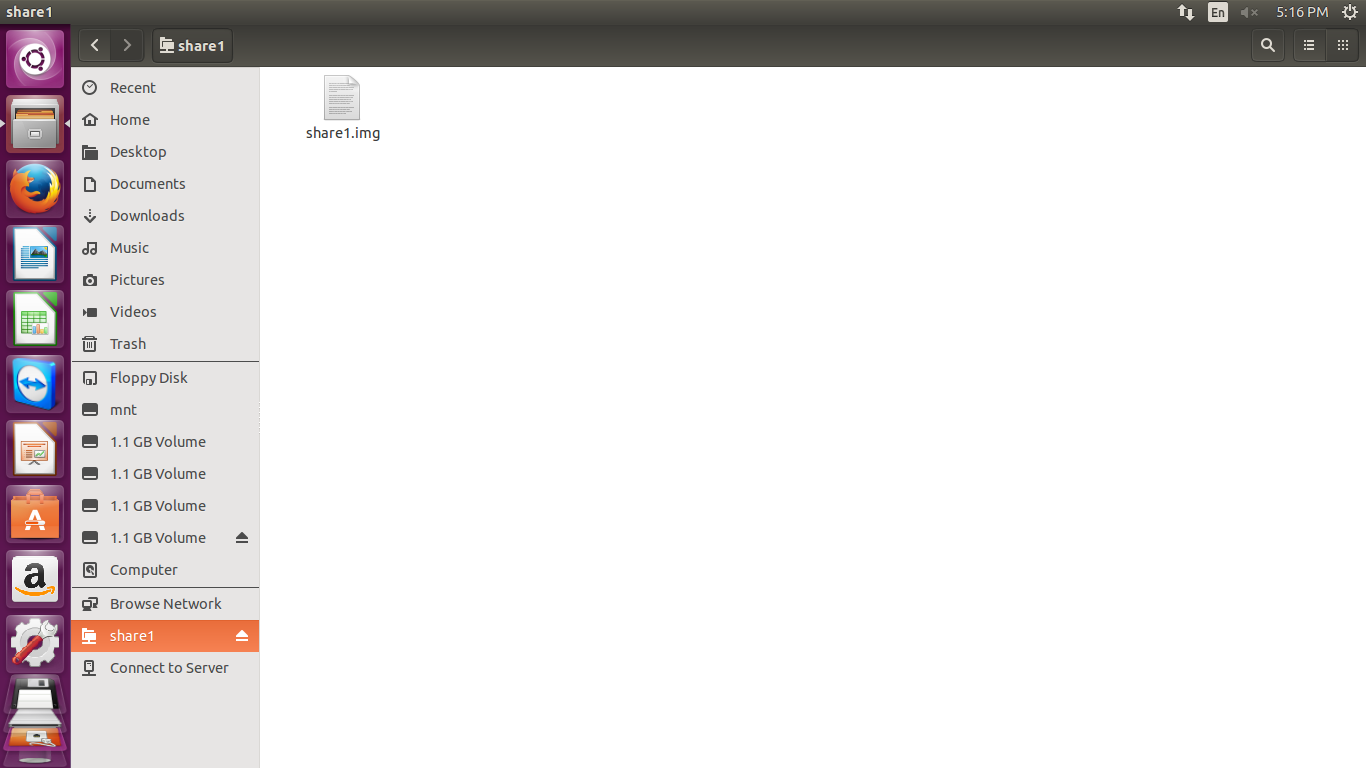
//192.168.3.153/project /home/server/project/share1 cifs username=client1, password=codeforpeace007 0 0

//192.168.3.151/project /home/server/project/share1 cifs username=client1, password=codeforpeace007 0 0

Now restart the server machine, during booting, following screen would appear for entering password:

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Now once successfully booted, go to the project directory of server, the shared folder is displayed in following manner:

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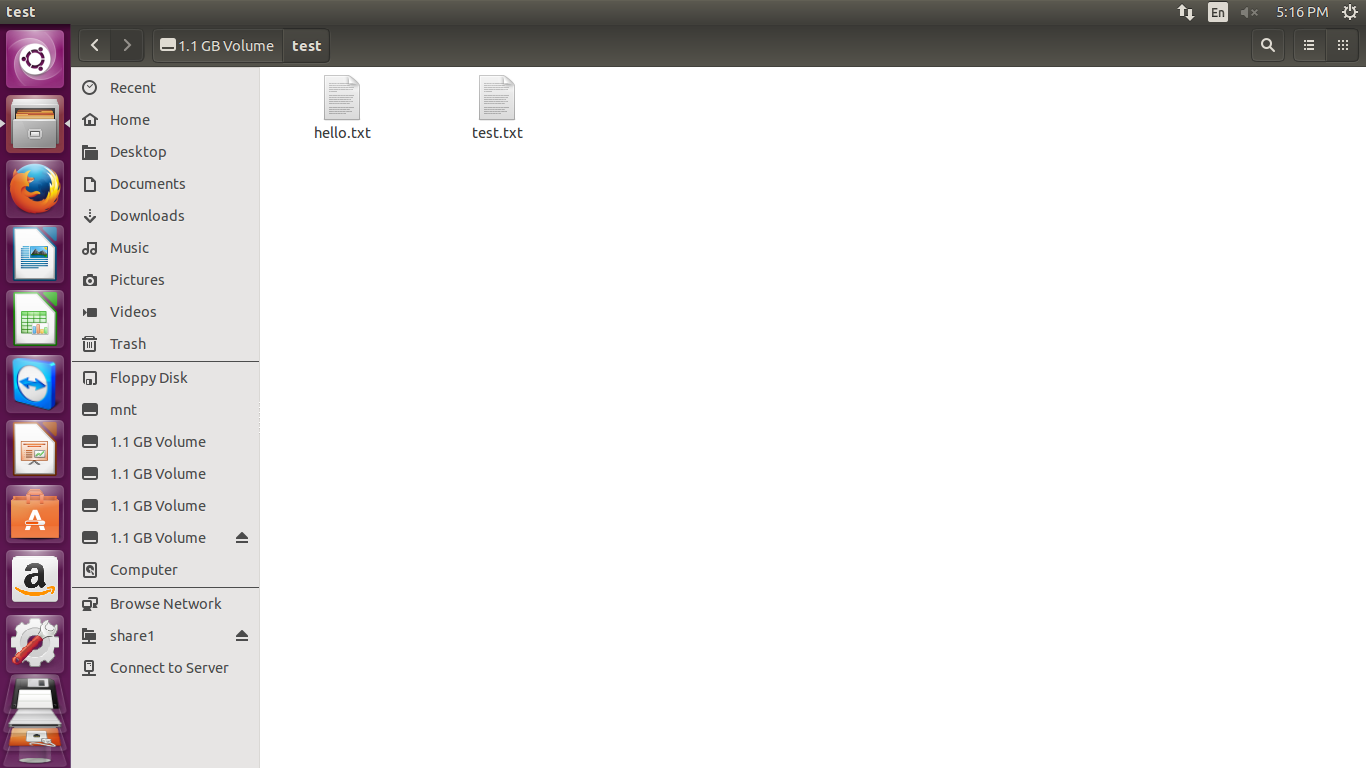
**TESTING**

**Manual Testing**

Manual testing is done after execution on every command. Manual testing includes testing a program or system manually, i.e., without using any automated tool or any script. In this type, the tester takes over the role of an end-user and tests the system to identify any unexpected behavior or bug. There are different stages for manual testing such as unit testing, integration testing, system testing, and user acceptance testing.

Testers use test plans, test cases, or test scenarios to test a software to ensure the completeness of testing. Manual testing also includes exploratory testing, as testers explore the software to identify errors in it.

For checking the persistence of the system, a file called hello.txt is saved and the machine is restarted, and the file was to be seen in existence:



**SUMMARY**

LAN based storage sharing of the computers connected in network is achieved with the help of Samba server and mhddfs package which enable us to use small partition storage of different physical machines as a single large logical storage. Also we use Fstab for persistence of the shared filesystem.

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