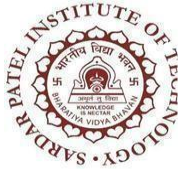


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<b>Name</b>	Manish Shashikant Jadhav
<b>UID</b>	2023301005
<b>Subject</b>	Computer Communication and Networks (CCN)
<b>Experiment No.</b>	6
<b>Aim</b>	Installation and configuration of FTP server.
<b>Step1:</b>	<p>Steps to install vsftpd and check if the vsftpd service is active or not.</p> <pre>students@spit:~/Manish\$ sudo apt install vsftpd Reading package lists... Done Building dependency tree Reading state information... Done vsftpd is already the newest version (3.0.5-0ubuntu0.20.04.1). 0 upgraded, 0 newly installed, 0 to remove and 204 not upgraded. students@spit:~/Manish\$</pre>
<b>Step2:</b>	<p><b>Configure Firewall</b></p> <pre>sudo ufw allow 20/tcp sudo ufw allow 21/tcp sudo ufw allow 990/tcp  sudo ufw allow 5000:10000/tcp</pre> <p><b>This allows incoming connections to ports like 20, 21, 990 and 5000:10000/tcp</b></p> <p><b>Configure users</b></p> <p><b>Let's start by creating our public user account. Type in</b></p> <pre>sudo adduser ftpuser</pre> <p><b>Enter your password, leave other values empty, and at last, enter Y to save changes.</b></p>



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```
students@spit: ~/Manish
students@spit:~/Manish$ sudo ufw allow 20/tcp
Skipping adding existing rule
Skipping adding existing rule (v6)
students@spit:~/Manish$ sudo ufw allow 21/tcp
Skipping adding existing rule
Skipping adding existing rule (v6)
students@spit:~/Manish$ sudo ufw allow 990/tcp
Skipping adding existing rule
Skipping adding existing rule (v6)
students@spit:~/Manish$ sudo ufw allow 5000:10000/tcp
Skipping adding existing rule
Skipping adding existing rule (v6)
students@spit:~/Manish$ sudo adduser ftpusers
Adding user `ftpusers' ...
Adding new group `ftpusers' (1002) ...
Adding new user `ftpusers' (1002) with group `ftpusers' ...
Creating home directory `/home/ftpusers' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for ftpusers
Enter the new value, or press ENTER for the default
    Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] y
students@spit:~/Manish$
```

**Step 3:**

Now, for security purposes, we will disable ssh permission for this user.  
Type in

sudo nano

/etc/ssh/sshd\_config Add

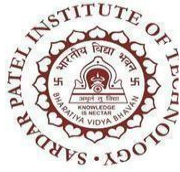
the following line in this file

DenyUsers ftpuser

Press **Ctrl + x** then **y** then **enter**. Now, restart the SSH service so that the new settings take effect.

sudo systemctl restart sshd

```
GNU nano 4.8
DenyUsers ftpusers
2
```



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```
students@spit: ~/Manish
students@spit:~/Manish$ sudo nano /etc/ssh/sshd_config
students@spit:~/Manish$ sudo systemctl restart sshd
Failed to restart sshd.service: Unit sshd.service not found.
students@spit:~/Manish$ sudo apt-get-remove --purge openssh-s
erver
sudo: apt-get-remove: command not found
students@spit:~/Manish$ sudo apt-get remove --purge openssh-s
erver
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'openssh-server' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 204 not upgrad
ed.
students@spit:~/Manish$
```

**Step4:**

**Create the FTP folder and set permissions**

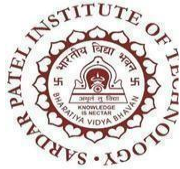
We will create our FTP folder. Type in

```
sudo mkdir /ftp
```

Now, we will change this directory's owner to our admin user. Type in

```
sudo chown adminuser /ftp
```

If you want to upload files to any folder that is not owned by your admin user, you will have to change that folder's owner using the above-mentioned command.



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```
students@spit: ~/Manish
students@spit:~/Manish$ sudo mkdir /ftp
students@spit:~/Manish$ sudo chown admin /ftp
chown: invalid user: 'admin'
students@spit:~/Manish$ sudo chown adminuser /ftp
chown: invalid user: 'adminuser'
students@spit:~/Manish$ sudo chown students /ftp
students@spit:~/Manish$
```

**Step5:**

**Configure and secure vsftpd**

Open the vsftpd configuration file. Type in

```
sudo nano /etc/vsftpd.conf
```

Make sure the following lines are uncommented

...

```
anonymous_enable=NO
```

```
local_enable=YES
```

```
write_enable=YES
```

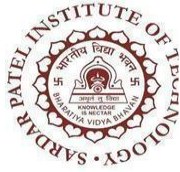
...

Also, we opened ports 5000 to 10000 in step 2 for passive mode, so now we will let vsftpd know which ports to use for passive FTP connection. Add the following lines in vsftpd.conf file

```
pasv_min_port=5000
```

```
pasv_max_port=10000
```

Now, we will specify the default directory for FTP connections which will open when someone connects to our FTP server. Add the following line



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```
local_root=/ftp
```

Remember, do not put any space before and after = in this configuration file.

*Locking user into the home directory*

Now, for security reasons, we will lock the ftpuser to the default directory, as by default, a user can browse the whole Linux server. To do this, vsftpd uses chroot. To do this, uncomment the following lines

```
...
```

```
chroot_local_user=YES
```

```
chroot_list_enable=YES
```

```
chroot_list_file=/etc/vsftpd.chroot_list
```

```
...
```

Also, add the following line as it is not in the configuration file by default

```
allow_writeable_chroot=YES
```

The first line enables chroot feature for local users which includes our adminuser and our ftpuser. The second and third lines let us choose which users to apply to chroot to.

*Setting file permission*

```
local_umask=0002
```

This line will set the modification permission of every new file created to 664(-rw-rw-r-) and of every new folder to 775(rwxrwxr-x). With this, the ftpuser can only read and download files from every sub-directory of our FTP directory, but it does not have permission to upload anything to our FTP directory since it is not the owner.

**Press Ctrl + x then y then enter.** Now, we need to create that list file. Type in

```
sudo touch
```

```
/etc/vsftpd.chroot_list
```

```
nano /etc/vsftpd.chroot_list
```



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```
students@spit: ~/Manish
students@spit:~/Manish$ sudo nano /etc/vsftpd.conf
students@spit:~/Manish$ sudo touch /etc/vsftpd.chroot_list
students@spit:~/Manish$ sudo nano /etc/vsftpd.chroot_list
students@spit:~/Manish$ sudo nano /etc/vsftpd.chroot_list
students@spit:~/Manish$ sudo systemctl restart --now vsftpd
students@spit:~/Manish$
```

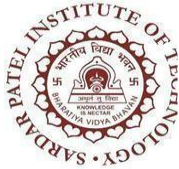
```
GNU nano 4.8 /etc/vsftpd.conf Modified
# encrypted connections.
rsa_cert_file=/etc/ssl/certs/ssl-cert-snakeoil.pem
rsa_private_key_file=/etc/ssl/private/ssl-cert-snakeoil.key
ssl_enable=NO

#
# Uncomment this to indicate that vsftpd use a utf8 filesystem
#utf8_filesystem=YES

pasv_min_port=5000
pasv_max_port=10000

local_root=/ftp

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell
```



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Whatever users you specify in this file, will not be chroot-ed. So add your admin username in this file because we do not want to lock it. Press **Ctrl +x** then **y** then **enter**. Now we need to restart our vsftpd server so that all these settings get applied immediately. Type in

```
sudo systemctl restart --now vsftpd
```

```
students@spit: ~/Manish
GNU nano 4.8 /etc/vsftpd.conf Modified
# (Warning! chroot'ing can be very dangerous. If using chroot>
# the user does not have write access to the top level direc>
# chroot)
chroot_local_user=YES
chroot_list_enable=YES
allow_writable_chroot=YES
# (default follows)
chroot_list_file=/etc/vsftpd.chroot_list
#
# You may activate the "-R" option to the builtin ls. This i>
# default to avoid remote users being able to cause excessiv>
# sites. However, some broken FTP clients such as "ncftp" an>
# the presence of the "-R" option, so there is a strong case>
#ls_recurse_enable=YES
#
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Paste Tex ^T To Spell
```

**Step6:**

### Securing vsftpd with SSL/TLS

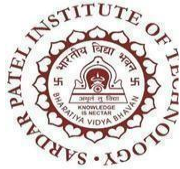
It is recommended to encrypt FTP traffic if you want to use it over the inter-net. We will encrypt our traffic with FTPS (file transfer protocol over SSL).

Let's start by generating a self-signed certificate. Type in

```
sudo openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/ssl/private/vsftpd.pem -out /etc/ssl/private/vsftpd.pem
```

```
students@spit:~/Manish$ sudo openssl req -x509 -nodes -days 365 -newkey rsa:2048 -keyout /etc/ssl/private/vsftpd.pem -out /etc/ssl/private/vsftpd.pem
Generating a RSA private key
.....+++++
writing new private key to '/etc/ssl/private/vsftpd.pem'
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:In
State or Province Name (full name) [Some-State]:Mh
Locality Name (eg, city) []:An
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Gl
Organizational Unit Name (eg, section) []:Se
Common Name (e.g. server FQDN or YOUR name) []:
Email Address []:
students@spit:~/Manish$ sudo nano /etc/vsftpd.conf
students@spit:~/Manish$ sudo systemctl restart --now vsftpd
systemctl: unrecognized option '--now'
students@spit:~/Manish$ sudo systemctl restart --now vsftpd
students@spit:~/Manish$
```

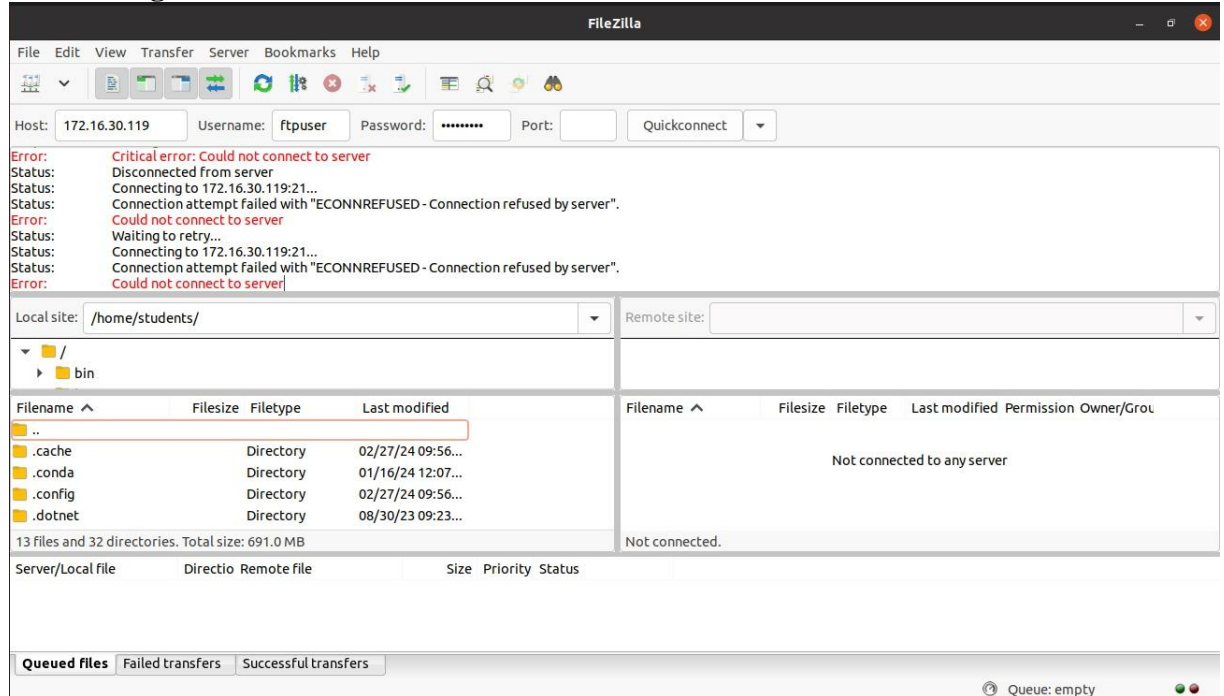




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**Step7:**

**Connecting to FTP Server:**



**Conclusion**

Hence, by completing this experiment I came to know about Installation and configuration of FTP server.