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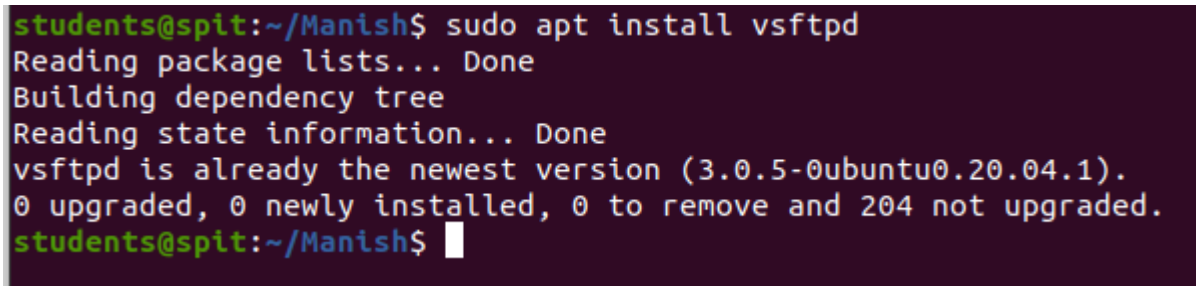
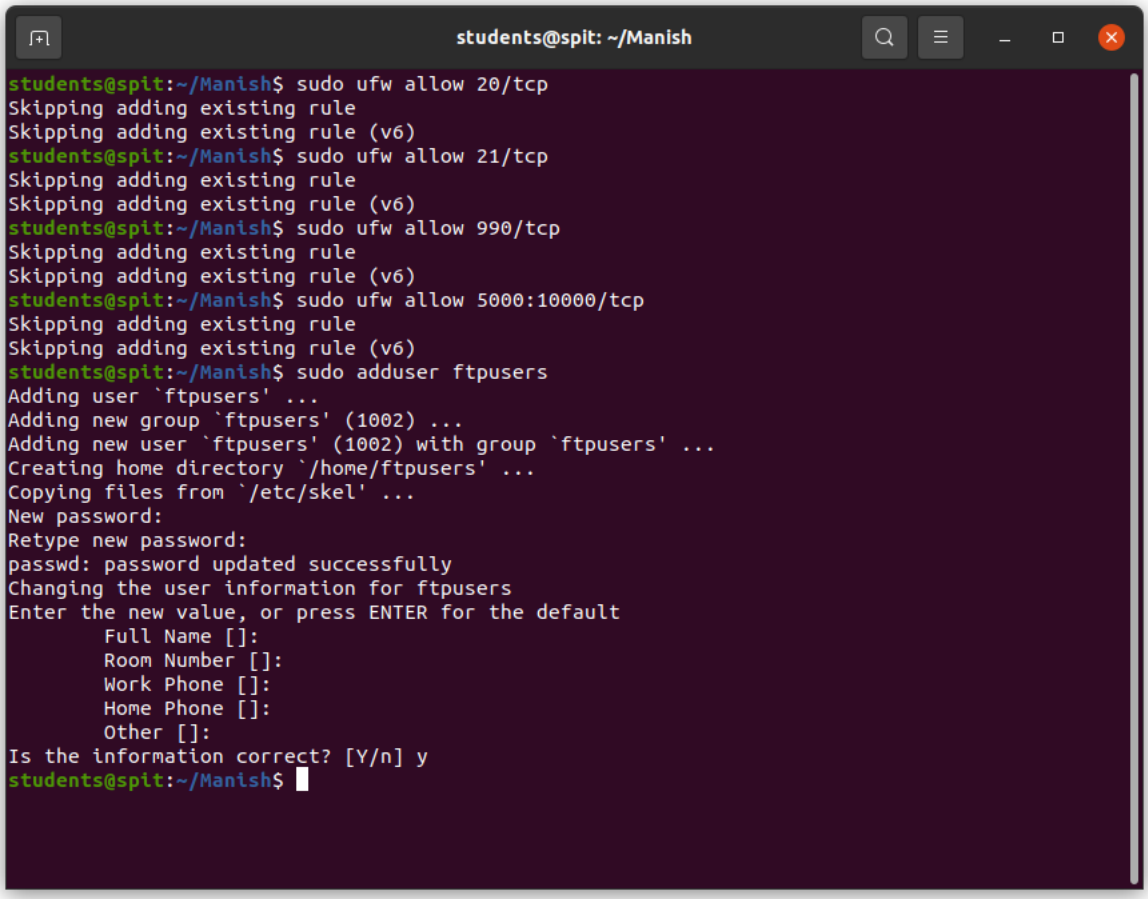
Subject	Computer Communication and Networks (CCN)
Experiment No.	6
Aim	Installation and configuration of FTP server.
Step1:	**Steps to install vsftpd and check if the vsftpd service is active or not.** 

Step2:	**Configure Firewall**
	`sudo ufw allow 20/tcp sudo ufw allow 21/tcp`
	`sudo ufw allow 990/tcp`
	`sudo ufw allow 5000:10000/tcp`
	This allows incoming connections to ports like 20, 21, 990 and 5000:10000/tcp
	
	Configure users
	
	Let's start by creating our public user account. Type in
	`sudo adduser ftpuser`
	Enter your password, leave other values empty, and at last, enter Y to save changes.



Step 3:

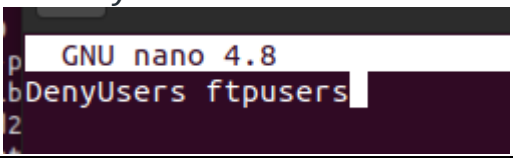
Now, for security purposes, we will disable ssh permission for this user. Type in

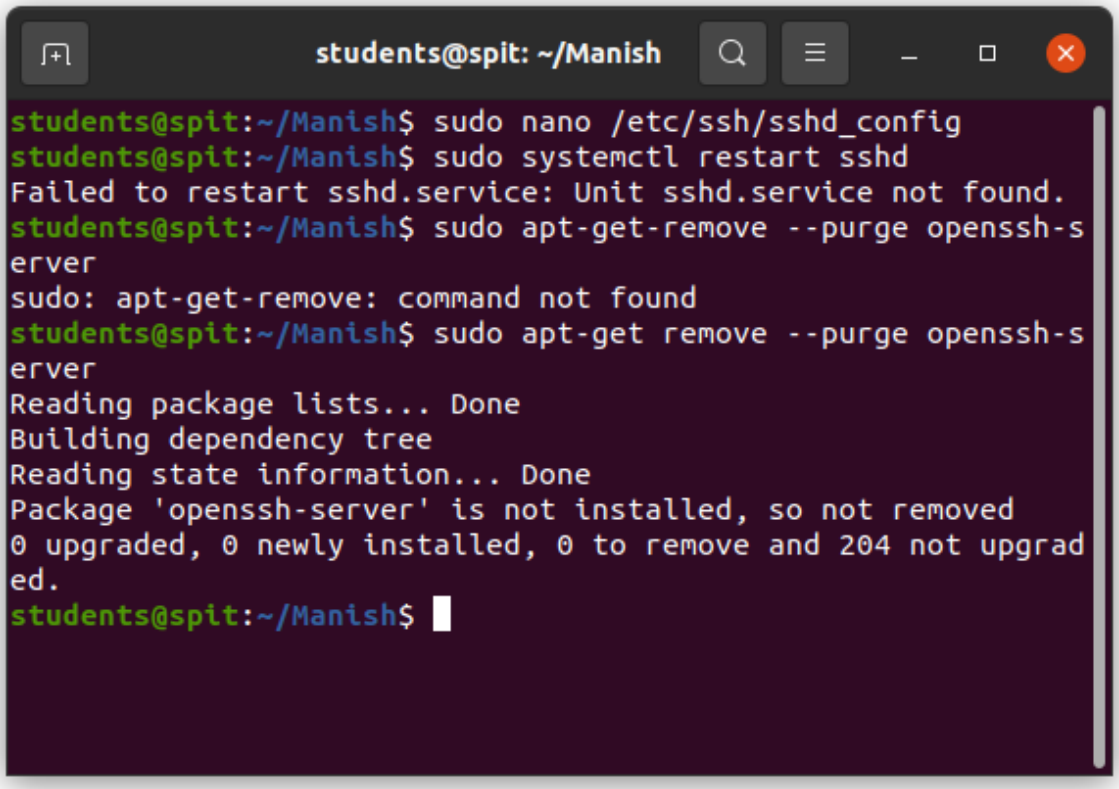
`sudo nano /etc/ssh/sshd_config` Add the following line in this file

`DenyUsers ftpuser`

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

`sudo systemctl restart sshd`





Step4:

Create the FTP folder and set permissions

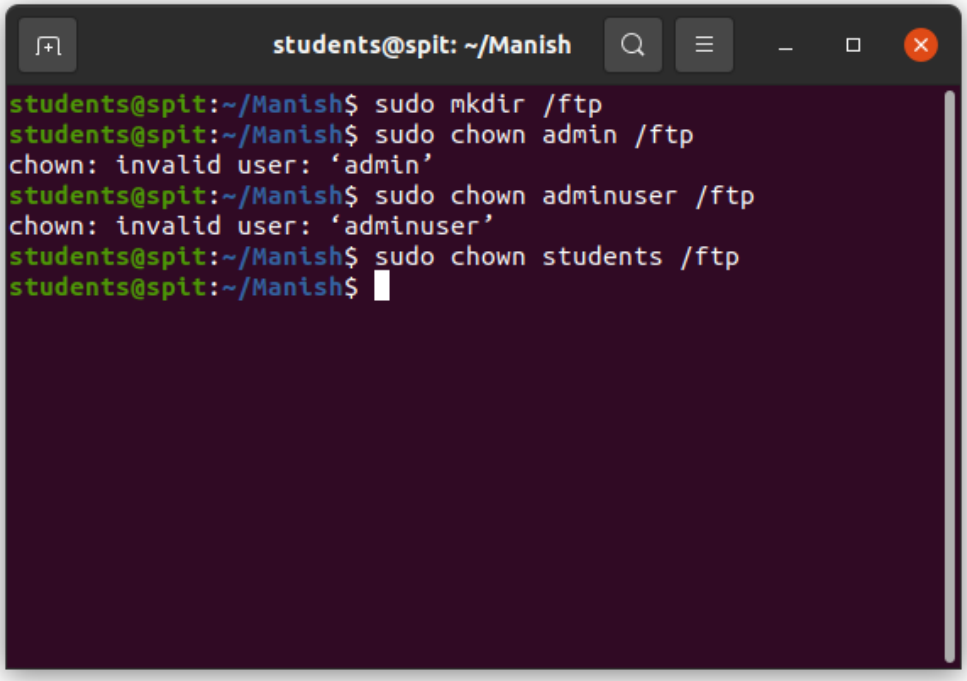
We will create our FTP folder. Type in

```
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-mentionedcommand.



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 wewill 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 willopen when someone connects to our FTP server. Add the following line

```
local_root=/ftp
```

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

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
```

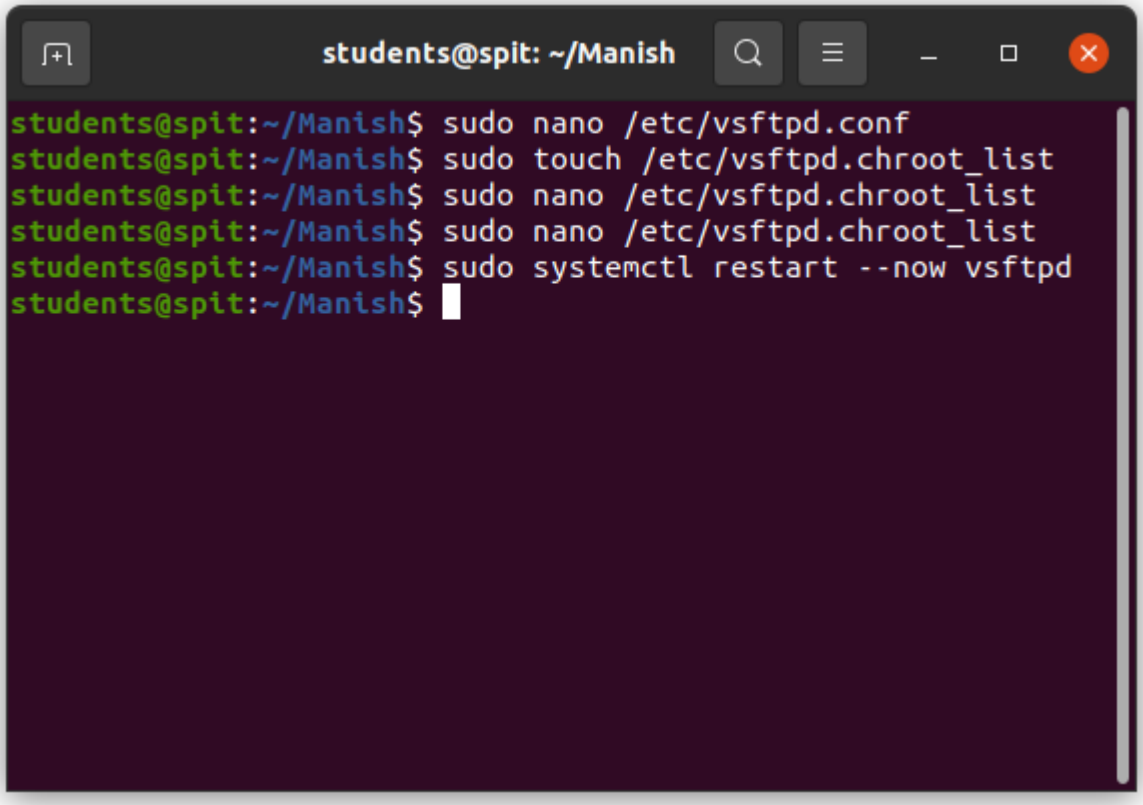
The first line enables chroot feature for local users which includes our adminuser and our ftpuser. The second and third lines let us choose which users to apply to chroot to.

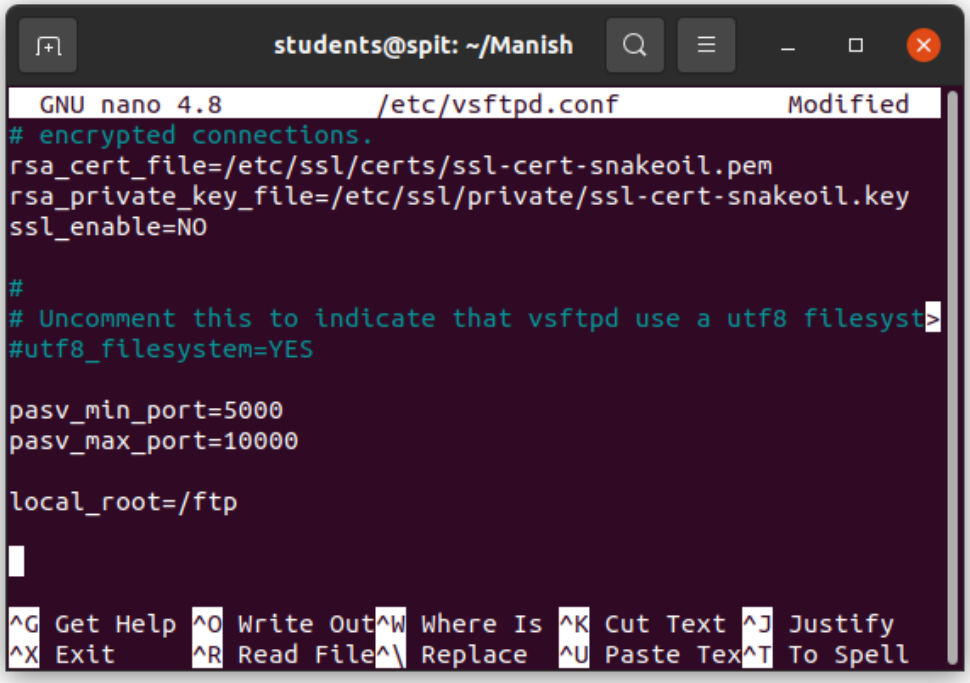
Setting file permission
`local_umask=0002`

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 FTPdirectory since it is not the owner.

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

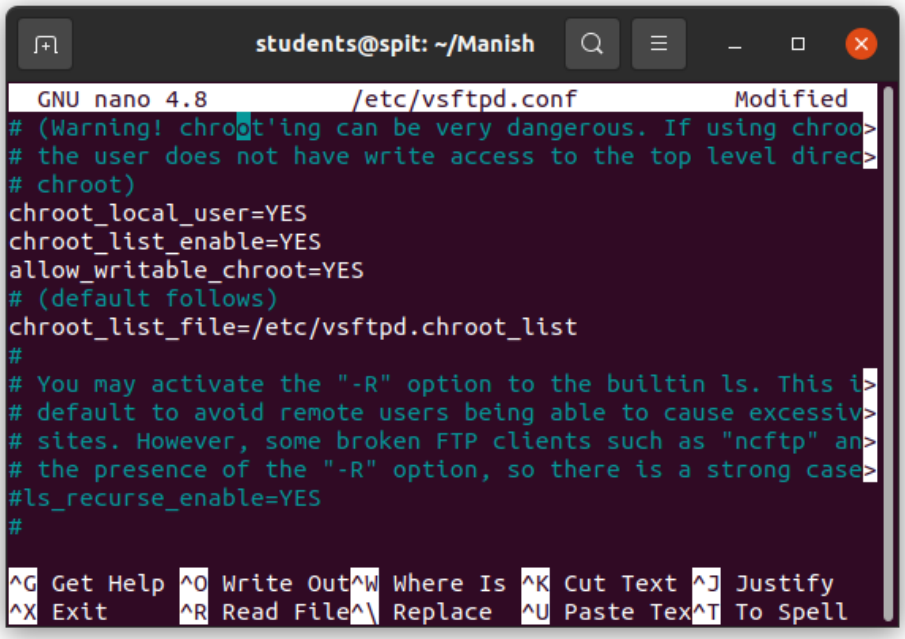
```
sudo touch
/etc/vsftpd.chroot_listsudo
nano /etc/vsftpd.chroot_list
```


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$


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 filesyst
#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 Tex ^T To Spell

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
```



Step6:

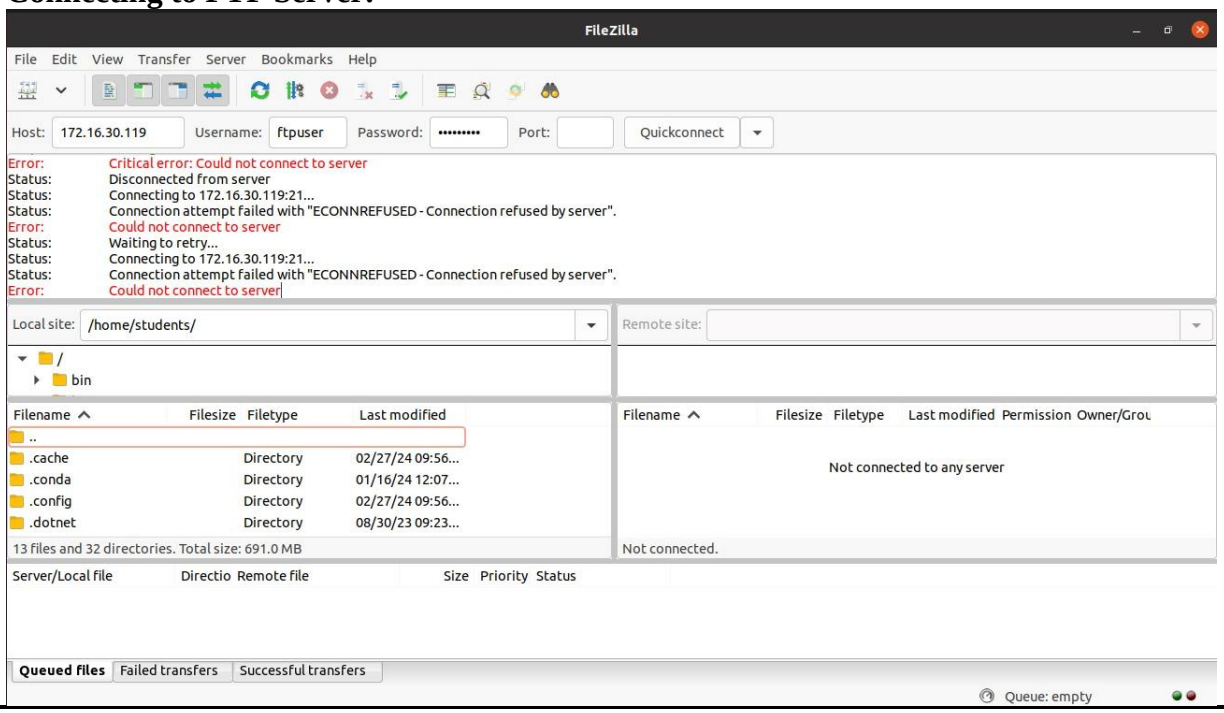
Securing vsftpd with SSL/TLS

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$
```

Step7:	**Connecting to FTP Server:** 
Conclusion	Hence, by completing this experiment I came to know about Installation and configuration of FTP server.