Name: Adwait Purao

UID: 2021300101

Batch: B2

Experiment 7

Aim: To Create an ftp Server using vsftpd

Theory:

FTP Server:

• The primary purpose of an FTP server is to allow users to upload and download files.

• An FTP server is a computer that has a file transfer protocol (FTP) address and is dedicated to receiving an FTP connection.

• FTP is a protocol used to transfer files via the internet between a server (sender) and a client (receiver).

• An FTP server is a computer that offers files available for download via an FTP protocol, and it is a common solution used to facilitate remote data sharing between computers.

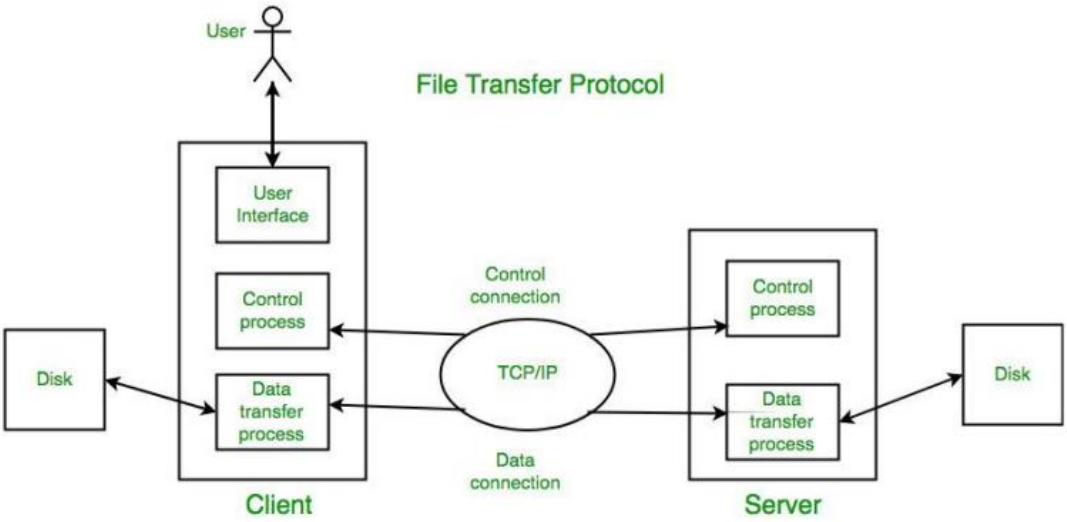
• An FTP server is an important component in FTP architecture and helps in exchanging files over the internet. The files are generally uploaded to the server from a personal computer or other removable hard drives (such as a USB flash drive) and then sent from the server to a remote client via the FTP protocol.

• An FTP server needs a TCP/IP network to function and is dependent on the use of dedicated servers with one or more FTP clients. In order to ensure that connections can be always established from the clients, an FTP server is usually switched on; up and running 24/7.

• An FTP server is also known as an FTP site or FTP host.

• All file transfer protocol site addresses begin with ftp://. FTP servers usually listen for client connections on port 21 since the FTP protocol generally uses this port as its principal route of communication.

• FTP runs on two different Transmission Control Protocol ports: 20 and 21. FTP ports 20 and 21 must both be open on the network for successful file transfers.



Advantages of FTP:

1. Ease of use: FTP is simple to use and does not require any special software. Most operating systems have built-in FTP clients, making it easy to transfer files.

2. File transfer speed: FTP allows for fast transfer speeds, which is important when transferring large files or large amounts of data.

3. Compatibility: FTP is compatible with a wide range of devices and operating systems, making it a flexible choice for file transfer.

4. Security: FTP supports encryption and user authentication, making it a secure way to transfer files.

Disadvantages of FTP:

1. Lack of security: While FTP supports encryption and user authentication, it is still vulnerable to attacks such as password sniffing and spoofing.

2. Limited functionality: FTP has limited functionality compared to other file transfer protocols, such as SFTP or FTPS.

3. Firewall issues: FTP can be blocked by firewalls, which can make it difficult to transfer files between networks.

4. Lack of reliability: FTP does not have built-in error checking or recovery mechanisms, so files can become corrupted or lost during transfer.

VSFTPD:

vsftpd stands for Very Secure FTP Daemon. It is an open-source, lightweight, and secure FTP server software that runs on Unix-like operating systems such as Linux, FreeBSD, and Solaris. vsftpd is widely used because of its focus on security, simplicity, and performance.

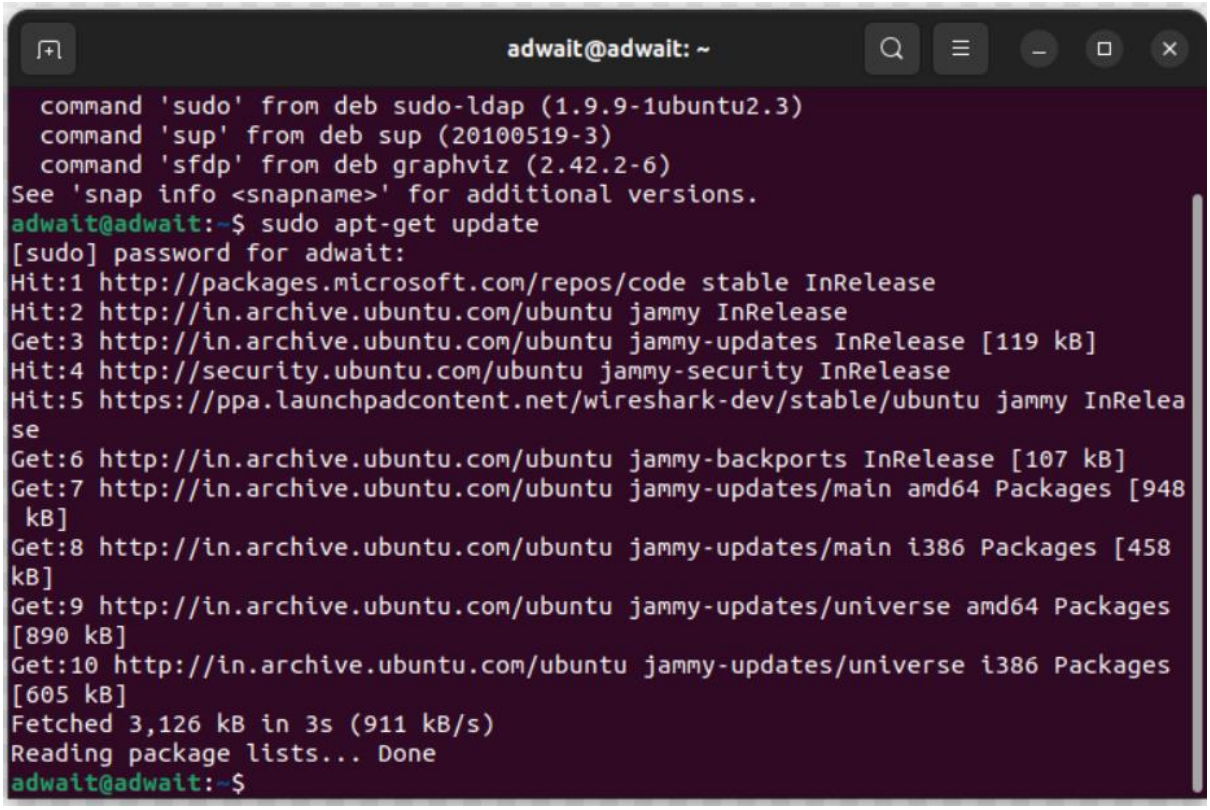
Some of the features of vsftpd include:

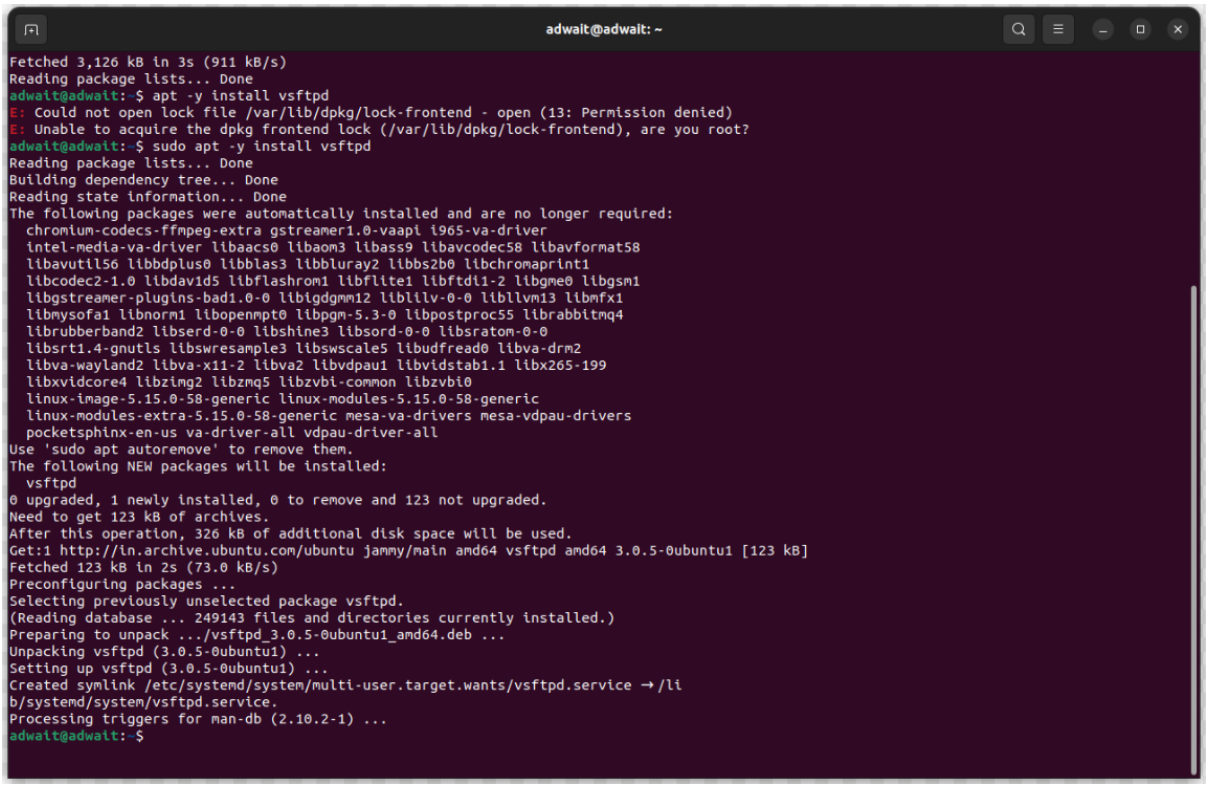
1. Security: vsftpd is designed with security in mind and has built-in support for SSL/TLS encryption, virtual users, and IP-based access control.
2. Performance: vsftpd is designed to be lightweight and efficient, with support for high-speed data transfers.
3. Simplicity: vsftpd is easy to configure and use, with a simple configuration file and a user-friendly command-line interface.
4. Customization: vsftpd is highly customizable, with support for a wide range of configuration options and plugins.

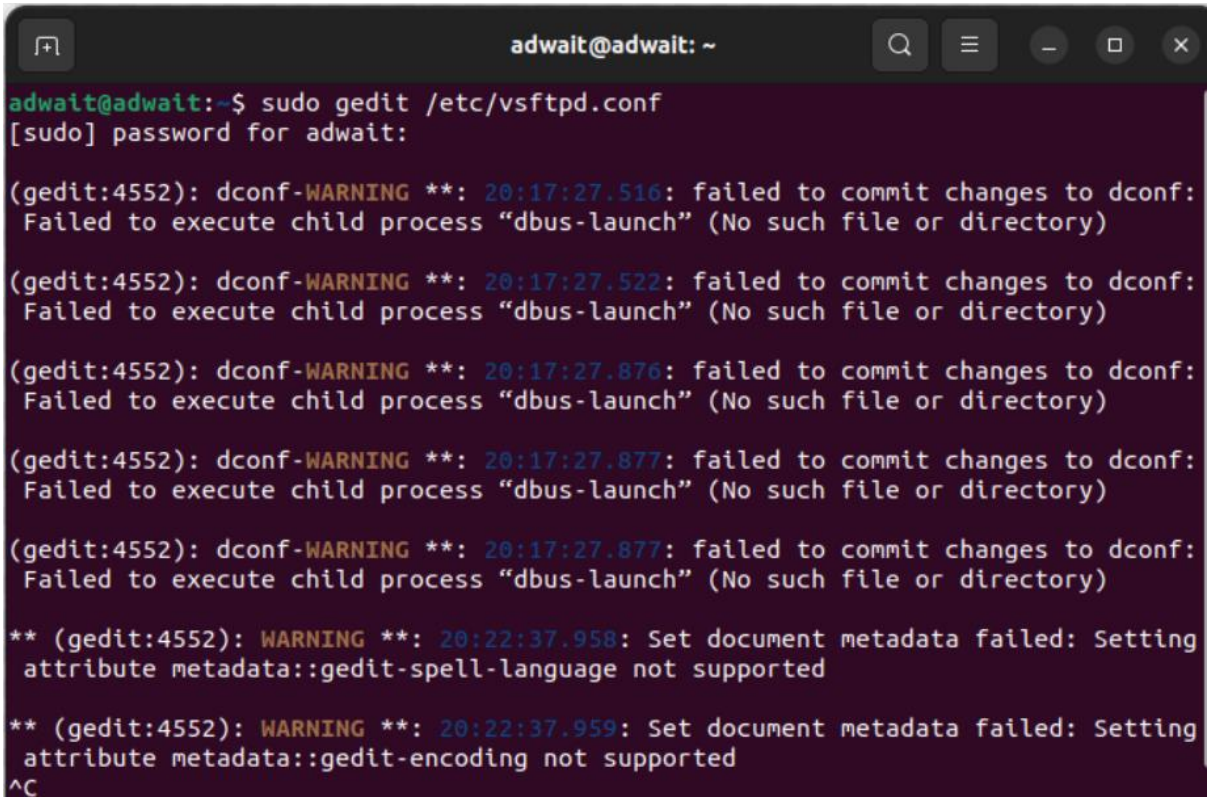
vsftpd is a reliable and secure FTP server software that is well-suited for small to mediumsized organizations. It is a popular choice for those who require a lightweight and efficient FTP server with strong security features.

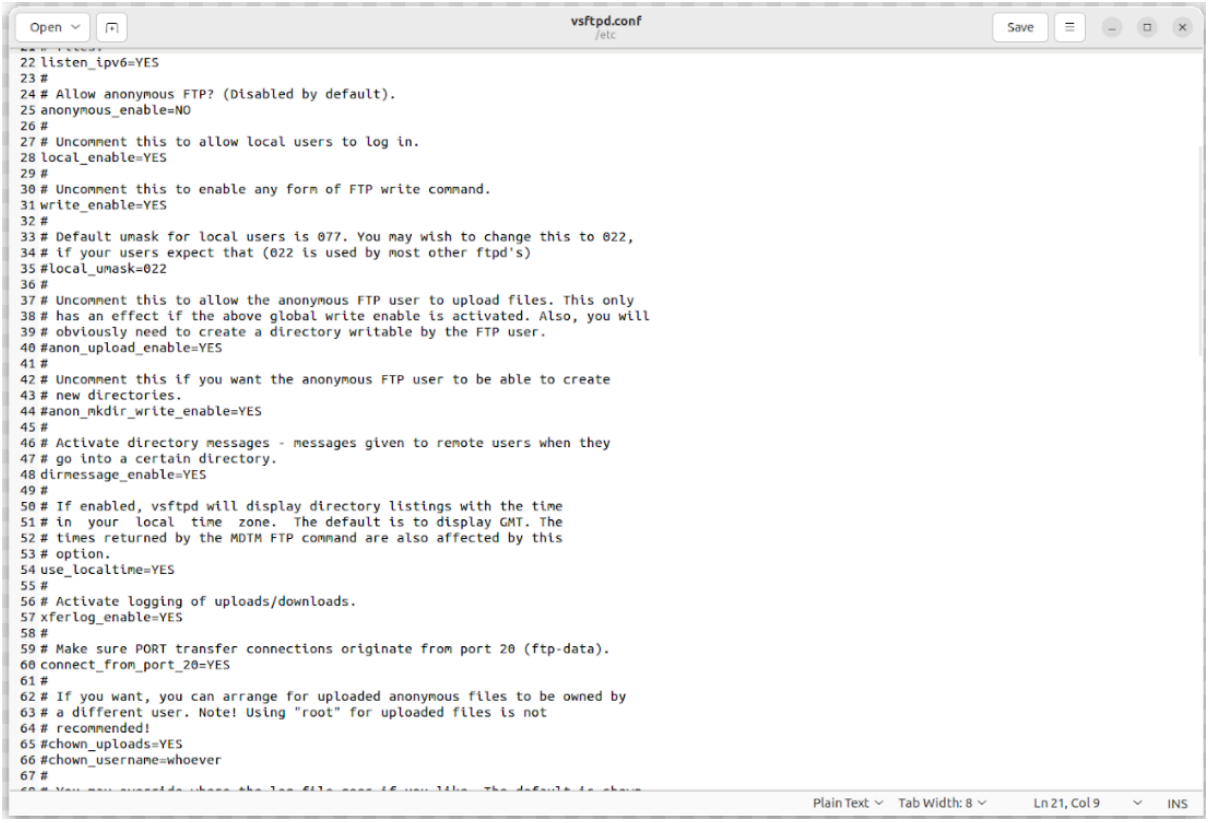
Installation and Configuration:

- **Installing vsftpd and then setting up the .conf files for ftp server**


adwait@adwait: ~
command 'sudo' from deb sudo-ldap (1.9.9-1ubuntu2.3)
command 'sup' from deb sup (20100519-3)
command 'sfdp' from deb graphviz (2.42.2-6)
See 'snap info <snapname>' for additional versions.
adwait@adwait:~$ sudo apt-get update
[sudo] password for adwait:
Hit:1 http://packages.microsoft.com/repos/code stable InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:3 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:5 https://ppa.launchpadcontent.net/wireshark-dev/stable/ubuntu jammy InRelease
Get:6 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [107 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [948 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu jammy-updates/main i386 Packages [458 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [890 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe i386 Packages [605 kB]
Fetched 3,126 kB in 3s (911 kB/s)
Reading package lists... Done
adwait@adwait:~$


adwait@adwait: ~
Fetched 3,126 kB in 3s (911 kB/s)
Reading package lists... Done
adwait@adwait:~$ apt -y install vsftpd
E: Could not open lock file /var/lib/dpkg/lock-frontend - open (13: Permission denied)
E: Unable to acquire the dpkg frontend lock (/var/lib/dpkg/lock-frontend), are you root?
adwait@adwait:~$ sudo apt -y install vsftpd
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver
intel-media-va-driver libaacs0 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1
libcodec2-1.0 libdav1d5 libflashrom1 libflite1 libftdi1-2 libgme0 libgsm1
libgstreamer-plugins-bad1.0-0 libigdgmm12 liblilv-0-0 libllvm13 libmfx1
libmysofa1 libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55 librabbitmq4
librubberband2 libserd-0-0 libshine3 libsord-0-0 libsratom-0-0
libsrt1.4-gnutls libswresample3 libswscale5 libudfread0 libva-drm2
libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libx265-199
libxvidcore4 libzimg2 libzmq5 libzvbi-common libzvbi0
linux-image-5.15.0-58-generic linux-modules-5.15.0-58-generic
linux-modules-extra-5.15.0-58-generic mesa-va-drivers mesa-vdpau-drivers
pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
vsftpd
0 upgraded, 1 newly installed, 0 to remove and 123 not upgraded.
Need to get 123 kB of archives.
After this operation, 326 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 vsftpd amd64 3.0.5-0ubuntu1 [123 kB]
Fetched 123 kB in 2s (73.0 kB/s)
Preconfiguring packages ...
Selecting previously unselected package vsftpd.
(Reading database ... 249143 files and directories currently installed.)
Preparing to unpack .../vsftpd_3.0.5-0ubuntu1_amd64.deb ...
Unpacking vsftpd (3.0.5-0ubuntu1) ...
Setting up vsftpd (3.0.5-0ubuntu1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/vsftpd.service → /lib/systemd/system/vsftpd.service.
Processing triggers for man-db (2.10.2-1) ...
adwait@adwait:~$


adwait@adwait: ~
adwait@adwait:~$ sudo gedit /etc/vsftpd.conf
[sudo] password for adwait:
(gedit:4552): dconf-WARNING **: 20:17:27.516: failed to commit changes to dconf:
Failed to execute child process “dbus-launch” (No such file or directory)
(gedit:4552): dconf-WARNING **: 20:17:27.522: failed to commit changes to dconf:
Failed to execute child process “dbus-launch” (No such file or directory)
(gedit:4552): dconf-WARNING **: 20:17:27.876: failed to commit changes to dconf:
Failed to execute child process “dbus-launch” (No such file or directory)
(gedit:4552): dconf-WARNING **: 20:17:27.877: failed to commit changes to dconf:
Failed to execute child process “dbus-launch” (No such file or directory)
(gedit:4552): dconf-WARNING **: 20:17:27.877: failed to commit changes to dconf:
Failed to execute child process “dbus-launch” (No such file or directory)
** (gedit:4552): WARNING **: 20:22:37.958: Set document metadata failed: Setting
attribute metadata::gedit-spell-language not supported
** (gedit:4552): WARNING **: 20:22:37.959: Set document metadata failed: Setting
attribute metadata::gedit-encoding not supported
^C


Open
vsftpd.conf
/etc
Save
22 listen_ipv6=YES
23 #
24 # Allow anonymous FTP? (Disabled by default).
25 anonymous_enable=NO
26 #
27 # Uncomment this to allow local users to log in.
28 local_enable=YES
29 #
30 # Uncomment this to enable any form of FTP write command.
31 write_enable=YES
32 #
33 # Default umask for local users is 077. You may wish to change this to 022,
34 # if your users expect that (022 is used by most other ftpd's)
35 #local_umask=022
36 #
37 # Uncomment this to allow the anonymous FTP user to upload files. This only
38 # has an effect if the above global write enable is activated. Also, you will
39 # obviously need to create a directory writable by the FTP user.
40 #anon_upload_enable=YES
41 #
42 # Uncomment this if you want the anonymous FTP user to be able to create
43 # new directories.
44 #anon_mkdir_write_enable=YES
45 #
46 # Activate directory messages - messages given to remote users when they
47 # go into a certain directory.
48 dirmessage_enable=YES
49 #
50 # If enabled, vsftpd will display directory listings with the time
51 # in your local time zone. The default is to display GMT. The
52 # times returned by the MDTM FTP command are also affected by this
53 # option.
54 use_localtime=YES
55 #
56 # Activate logging of uploads/downloads.
57 xferlog_enable=YES
58 #
59 # Make sure PORT transfer connections originate from port 20 (ftp-data).
60 connect_from_port_20=YES
61 #
62 # If you want, you can arrange for uploaded anonymous files to be owned by
63 # a different user. Note! Using "root" for uploaded files is not
64 # recommended!
65 #chown_uploads=YES
66 #chown_username=whoever
67 #
Plain Text
Tab Width: 8
Ln 21, Col 9
INS

Open | vsftpd.conf /etc | Save

```
115 #
116 # You may specify an explicit list of local users to chroot() to their home
117 # directory. If chroot_local_user is YES, then this list becomes a list of
118 # users to NOT chroot().
119 # (Warning! chroot'ing can be very dangerous. If using chroot, make sure that
120 # the user does not have write access to the top level directory within the
121 # chroot)
122 chroot_local_user=YES
123 chroot_list_enable=YES
124 allow_writeable_chroot=YES
125 # (default follows)
126 #chroot_list_file=/etc/vsftpd.chroot_list
127 #
128 # You may activate the "-R" option to the builtin ls. This is disabled by
129 # default to avoid remote users being able to cause excessive I/O on large
130 # sites. However, some broken FTP clients such as "ncftp" and "mirror" assume
131 # the presence of the "-R" option, so there is a strong case for enabling it.
132 #ls_recurse_enable=YES
133 #
134 # Customization
135 #
136 # Some of vsftpd's settings don't fit the filesystem layout by
137 # default.
138 #
139 # This option should be the name of a directory which is empty.  Also, the
140 # directory should not be writable by the ftp user. This directory is used
141 # as a secure chroot() jail at times vsftpd does not require filesystem
142 # access.
143 secure_chroot_dir=/var/run/vsftpd/empty
144 #
145 # This string is the name of the PAM service vsftpd will use.
146 pam_service_name=vsftpd
147 #
148 # This option specifies the location of the RSA certificate to use for SSL
149 # encrypted connections.
150 rsa_cert_file=/etc/ssl/certs/ssl-cert-snakeoil.pem
151 rsa_private_key_file=/etc/ssl/private/ssl-cert-snakeoil.key
152 ssl_enable=NO
153
154 #
155 # Uncomment this to indicate that vsftpd use a utf8 filesystem.
156 #utf8_filesystem=YES
157
158 user_sub_token=$USER
159 local_root=/home/$USER/ftp
160 pasv_min_port=10000
161 pasv_max_port=10100
```

Plain Text | Tab Width: 8 | Ln 94, Col 76 | INS

Open | *vsftpd.conf /etc | Save

```
128 # You may activate the "-R" option to the builtin ls. This is disabled by
129 # default to avoid remote users being able to cause excessive I/O on large
130 # sites. However, some broken FTP clients such as "ncftp" and "mirror" assume
131 # the presence of the "-R" option, so there is a strong case for enabling it.
132 #ls_recurse_enable=YES
133 #
134 # Customization
135 #
136 # Some of vsftpd's settings don't fit the filesystem layout by
137 # default.
138 #
139 # This option should be the name of a directory which is empty.  Also, the
140 # directory should not be writable by the ftp user. This directory is used
141 # as a secure chroot() jail at times vsftpd does not require filesystem
142 # access.
143 secure_chroot_dir=/var/run/vsftpd/empty
144 #
145 # This string is the name of the PAM service vsftpd will use.
146 pam_service_name=vsftpd
147 #
148 # This option specifies the location of the RSA certificate to use for SSL
149 # encrypted connections.
150 rsa_cert_file=/etc/ssl/certs/ssl-cert-snakeoil.pem
151 rsa_private_key_file=/etc/ssl/private/ssl-cert-snakeoil.key
152 ssl_enable=NO
153
154 #
155 # Uncomment this to indicate that vsftpd use a utf8 filesystem.
156 #utf8_filesystem=YES
157
158 user_sub_token=$USER
159 local_root=/home/$USER/ftp
160 pasv_min_port=10000
161 pasv_max_port=10100
162 userlist_enable=YES
163 userlist_file=/etc/vsftpd.userlist
164 userlist_deny=NO
```

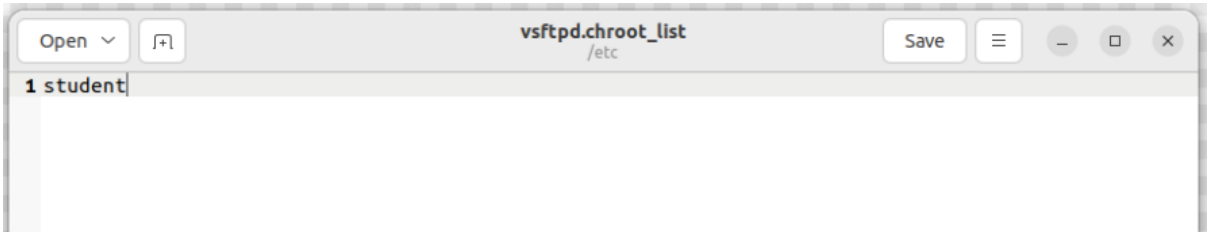
Plain Text | Tab Width: 8 | Ln 164, Col 17 | INS

```
adwait@adwait:~$ sudo ufw allow from any to any port 20,21,10000:10100 proto tcp
Rules updated
Rules updated (v6)
```

Add user student

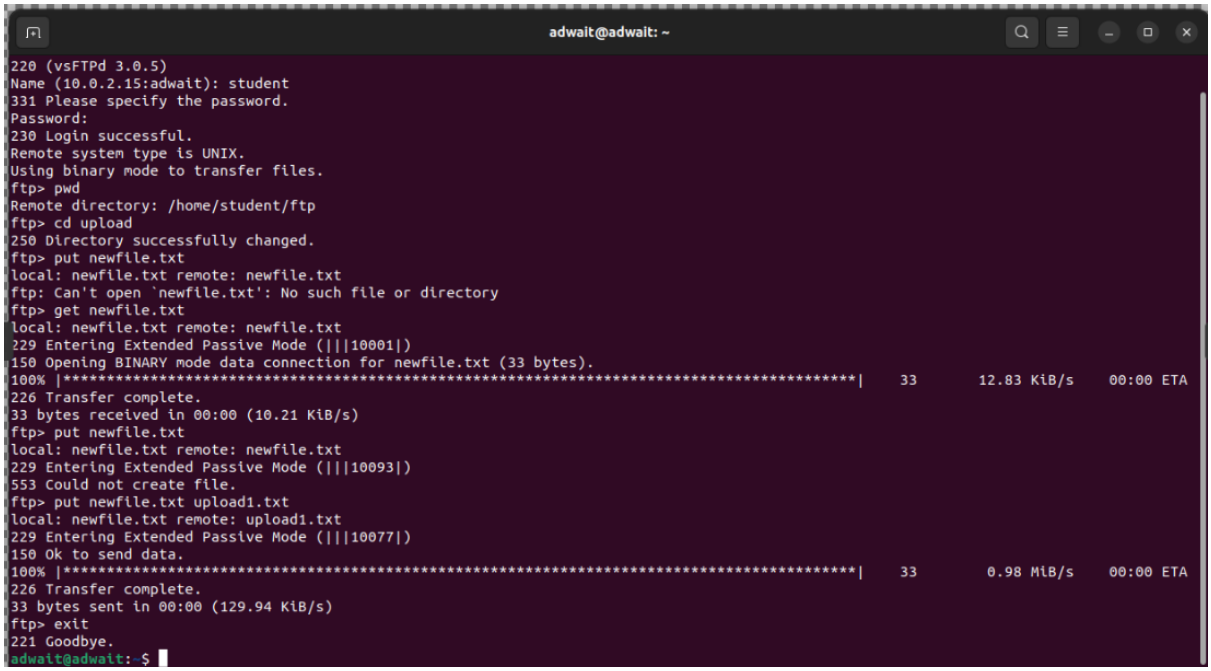
```
adwait@adwait:~$ sudo adduser student
Adding user `student' ...
Adding new group `student' (1001) ...
Adding new user `student' (1001) with group `student' ...
Creating home directory `/home/student' ...
Copying files from `/etc/skel' ...
New password:
BAD PASSWORD: The password is shorter than 8 characters
Retype new password:
passwd: password updated successfully
Changing the user information for student
Enter the new value, or press ENTER for the default
        Full Name []: New Student
        Room Number []: 09
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] Y
adwait@adwait:~$
```

```
adwait@adwait:~$ sudo gedit /etc/vsftpd.chroot_list

(gedit:5512): dconf-WARNING **: 20:58:21.602: failed to commit changes to dconf:
 Failed to execute child process “dbus-launch” (No such file or directory)

(gedit:5512): dconf-WARNING **: 20:58:21.617: failed to commit changes to dconf:
 Failed to execute child process “dbus-launch” (No such file or directory)
```



```
adwait@adwait:~$ ftp 10.0.2.15
Connected to 10.0.2.15.
220 (vsFTPd 3.0.5)
Name (10.0.2.15:adwait): student
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> pwd
Remote directory: /home/student/ftp
ftp> ls
229 Entering Extended Passive Mode (|||10019|)
150 Here comes the directory listing.
drwxr-xr-x    2 1001     1001         4096 Mar 16 21:10 upload
226 Directory send OK.
ftp> cd upload
250 Directory successfully changed.
ftp> ls
229 Entering Extended Passive Mode (|||10002|)
150 Here comes the directory listing.
-rw-r--r--    1 0        0              33 Mar 16 21:09 myfile.txt
-rw-r--r--    1 0        0              33 Mar 16 21:09 newfile.txt
226 Directory send OK.
ftp> get myfile.txt
local: myfile.txt remote: myfile.txt
229 Entering Extended Passive Mode (|||10078|)
150 Opening BINARY mode data connection for myfile.txt (33 bytes).
100% |***********************************************************|    33       11.67 KiB/s    00:00 ETA
226 Transfer complete.
```

```
229 Entering Extended Passive Mode (|||10019|)
150 Here comes the directory listing.
drwxr-xr-x    2 1001     1001         4096 Mar 16 21:10 upload
226 Directory send OK.
ftp> cd upload
250 Directory successfully changed.
ftp> ls
229 Entering Extended Passive Mode (|||10002|)
150 Here comes the directory listing.
-rw-r--r--    1 0        0              33 Mar 16 21:09 myfile.txt
-rw-r--r--    1 0        0              33 Mar 16 21:09 newfile.txt
226 Directory send OK.
ftp> get myfile.txt
local: myfile.txt remote: myfile.txt
229 Entering Extended Passive Mode (|||10078|)
150 Opening BINARY mode data connection for myfile.txt (33 bytes).
100% |***********************************************************|    33       11.67 KiB/s    00:00 ETA
226 Transfer complete.
33 bytes received in 00:00 (9.79 KiB/s)
ftp> put myfile.txt
local: myfile.txt remote: myfile.txt
229 Entering Extended Passive Mode (|||10091|)
553 Could not create file.
ftp> put myfile.txt upload.txt
local: myfile.txt remote: upload.txt
229 Entering Extended Passive Mode (|||10075|)
150 Ok to send data.
100% |***********************************************************|    33      495.79 KiB/s    00:00 ETA
226 Transfer complete.
33 bytes sent in 00:00 (80.76 KiB/s)
ftp> exit
221 Goodbye.
adwait@adwait:~$
```



Conclusion:

Through this experiment, we gained knowledge about the File Transfer Protocol (FTP) and its server, as well as the vsftpd package which facilitates the creation of an FTP server. We also learned about the process of sending and receiving files between different users using IP addresses, and how this can be accomplished from both server perspectives.