

## U04: FILE TRANSFER PROTOCOL

### Laboratory 2: Installing and setting up vsftpd in Ubuntu

VSFTPD stands for "Very Secure FTP Daemon" it is a GPL licensed FTP server for UNIX systems. vsftpd is the default FTP server in Ubuntu. It is secure, fast, stable and easy to configure.

#### 1 Installing

To install open a terminal and run the command:

```
sudo apt install vsftpd
```

The commands to start, stop, restart the service and reload the configuration files are:

```
sudo service vsftpd start
```

```
sudo service vsftpd stop
```

```
sudo service vsftpd restart
```

```
sudo service vsftpd reload
```

#### 2 Setting up

All configuration of vsftpd is handled by its configuration file, **/etc/vsftpd.conf**. Each directive is on its own line within the file and follows the following format:

directive=value

There must not be any spaces between the **directive**, **equal symbol**, and the **value** in a directive line.

For each directive, replace **directive** with a valid directive and **value** with a valid value. A valid value can be:

- Yes or No
- A number
- A string

Comment lines must be preceded by a hash symbol (#) and are ignored.

All directives not explicitly found or commented out within the vsftpd's configuration file are set to their default value. For a complete list of all directives available and their default value run the command:

```
man vsftpd.conf
```

Other configuration files are:

- /etc/ftpusers
- /etc/vsftpd.chroot\_list (it is not created by default)

#### 3 Before starting

It is good practice to make a copy of configuration files before changing them:

```
sudo cp /etc/vsftpd.conf /etc/vsftpd.conf.old
```

#### 4 Users

This ftp server allows three types of users:

- Anonymous users.
- Local users (/etc/passwd).
- Virtual users.

a) Anonymous users:

- The directive to enable or disable "anonymous" users is:  
*anonymous\_enable=(YES/NO)*
- The login is "anonymous" or "ftp"



- The connection directory for “anonymous” users is:

`/srv/ftp`

This is, the anonymous's root directory and the user cannot go up in the directory tree, that is the user is “jailed”.

b) Local users:

- They are allowed or refused with the directive  
`local_enable=(YES/NO)`
- Local users connect to their home directories. They can be jailed or not, that is they are allowed to go up or not in the directory tree. Local users are not jailed by default.

c) Virtual Users

- vsftpd allows virtual users, that means that they are not local users.
- The virtual user information can be saved in files, databases, directory service, etc and it is consulted by the ftp server in order to identify the users.
- Virtual users are mapped in local users.

## 5. Default configuration

The `vsftpd.conf` file contains a list of some of the more important directives. If you need a missing directive or you need to change a directive default value you must include it in `/etc/vsftpd.conf` with the appropriate value. You can uncomment the commented lines if it is necessary.

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The default value of `xferlog_enable` directive is NO, that means it is not going to record a log of ftp server activities. However the value of this directive has been changed to YES in `vsftpd.conf`.

Look at the `/etc/vsftpd.conf` file and check the following basic directives:

- `anonymous_enable=NO` → “anonymous” user is not allowed.
- `local_enable=YES` → local users are enabled.
- `#write_enable=YES` → (commented) local users can use FTP write commands
- `#local_umask=022` → (commented) default umask for local users is 077; but most other ftp server use umask=022.
- `dirmessage_enable=YES` → some messages are given to ftp users when they go into a certain directory
- `xferlog_enable=YES` → this directive activates log of uploads and downloads.
- `xferlog_file=/var/log/vsftpd.log` → name of log file.

Before trying vsftpd server we are going to:

- Create two users in Ubuntu Server VM:
  - `atenea` (`sudo adduser atenea`)
  - `apolo` (`sudo adduser apolo`)
- Connect as “atenea” and make `/home/atenea/test.one` file.
- Switch on Ubuntu client VM:
- Create `upload_ftp` and `download_ftp` directories in `/home/client` folder.

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- Create `/home/client/upload_ftp/file1_load` and `/home/client/upload_ftp/file2_load` files.

Now, we are going to try vsftpd server.

- Open a FTP connection as “*atenea*” from Ubuntu client VM using the command “*ftp ip\_address\_of\_ftp\_server*”.
- Try to download the `test.one` file from the ftp server to your `/home/client/download_ftp` directory. Have you succeeded?
- Now, try to upload `file1_load` to the ftp server using the ftp connection. Have you managed?
- Can you go up in the tree directory? That is, can you change to `/home` directory? If you can, then local users are not “jailed” and that is because `chroot_local_user=NO`.

## 6. How to allow local users to write through an ftp connection.

- To allow local users to write through an ftp connection just uncomment the “*write\_enable=YES*” line.
- Find out how to show a hello message when users connect to the ftp server. (`ftpd_banner`)
- Restart the ftp service.

Now, practice some ftp commands:

- a) Connect to the ftp server as *Apolo* from Ubuntu client VM.
- b) Find out which directory of ftp server you are in.
- c) Make `files_client` directory in FTP server.
- d) Change to `files_client` directory.
- e) Copy `file1_load` and `file2_load` files from Ubuntu client VM to `files_client` directory in ftp server. Use only one command in order to copy both files.
- f) Delete `file1_load` that you have just copied. You must delete the one on the ftp server.
- g) Download `file2_load` to `download_ftp` directory of Ubuntu client VM.
- h) Change to the current parent directory in Ubuntu client VM without disconnecting from ftp server.
- i) Find out your current directory in client VM and server VM.
- j) Show the ftp connection status.
- k) Show ftp commands list.
- l) Disconnect.

## 7 Jail some local users.

`chroot_local_user` is set to `NO` by default, that is, local users are “not jailed”. Instead of that, if `chroot_local_user=YES` local user should be “jailed”. In other words local user is not allowed to go up in the tree directory.

Moreover some local users can be “jailed” while others can be “not jailed”. In this case two more directives are necessary:

- `chroot_list_enable` → determines if the list file is going to be taken into account
- `chroot_list_file` → File that contains the list of users who are going to be “jailed” when `chroot_local_user=NO` and who are going to be “not jailed” when `chroot_local_user=YES`; that is, the opposite to the meaning of `chroot_local_user` directive.

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if `chroot_local_user=NO`, `chroot_list_enable=YES`, as a rule, local users are going to be not jailed but the local users in the list are going to be jailed.



if `chroot_local_user=YES`, `chroot_list_enable=YES`, as a rule local users are going to be jailed but the local users in the list are going to be not jailed.

If you change the `chroot_local_user` directive value **you must add** `allow_writeable_chroot=YES` directive (it allows writing to jailed users) directive to `vsftpd.conf` file.

Which changes are necessary if we want that all the users to be jailed, but we want “atenea” to be not jailed?

## 8 Enabling anonymous users

Now we are going to configure an anonymous ftp server:

- a) Create some files and directories in `/srv/ftp` directory in ftp server. `/srv/ftp` is the directory where anonymous users are logged when they run the ftp command.
- b) Allow “anonymous” user to connect to ftp server.
- c) Connect to the ftp server from Ubuntu client VM as anonymous user running “`ftp ftp_server_ip_address`” command.
- d) We will use “anonymous” as login and Enter as password.
- e) Check the “230 Login successful” message.
- f) Find out the current directory in the ftp server.
- g) List the current directory content in the ftp server and download one of the listed files.
- h) Change to the current parent directory. Have you succeeded?
- i) Move to another directory.
- j) Make a directory in your current directory of ftp server. Have you been able to?

After that, we should conclude that:

- anonymous users are allowed.
- anonymous users can download files from ftp server.
- anonymous users are not allowed to write in the ftp server. That is they cannot copy files, make directories or delete directories or files.
- anonymous users are jailed in `/srv/ftp`. Notice that when anonymous users connect to ftp server its current directory is `/`.

## 9 /etc/ftpusers File

Look at the content of `/etc/ftpusers` file, What does it contain?

It contains users' names. Add “atenea” at the end of the file and save it.

Open connection as “atenea” in ftp server. What happens? Atenea cannot open ftp connections now. As you can see `ftpusers` file contains users that are not allowed to open ftp connections to the ftp server. Delete “atenea” from the `ftpusers` file.

## 10 Testing the ftp server log

Look at the content of `/var/log/vsftpd.log` file, it contains the accesses and transfers log.

## 11 dirmessage\_enable and message\_file Directives

If `dirmessage_enable=YES` and if the directory contains the file set in `message_file` directive when a user accesses to this directory it will show the content of this file.

By default `dirmessage_enable: NO` and `message_file=.message`. Make the necessary changes to show “Backups Directory” message when a user goes to `files_client` directory of apolo's home directory.

## 12 Setting a specified profile for a user. **user\_config\_dir** directive.

The `user_config_dir` directive allows overriding default settings specified in `vsftpd.conf`. Usage is simple, and is best illustrated with an example. If you set **`user_config_dir`** to be `/etc/vsftpd_user_conf` and then log on as the user "chris", then vsftpd will apply the settings in the file `/etc/vsftpd_user_conf/chris` if it exists. Notice the file that includes the directives is named as the user, in this case chris.

Using this directive, we are going to remove the writing permission to “*atenea*”. To achieve this goal, it will be necessary:

- To add `user_config_dir=/etc/vsftpd/users` directive to the `vsftpd.conf` file.
- To create the `/etc/vsftpd/users/atenea` file and include the following line:
  - `write_enable=NO`

## 13 Learning about **local\_umask** directive.

Find out the access permissions to `files_client` directory in `/home/apollo` directory. It was created from an opened ftp connection.

What changes should be necessary to set the directories access permission to 755 when you create directories from a ftp connection from now on?

## 14 Connect from a Windows system.

Now open a ftp connection from your host system or another system to your ftp server and check out the set up you have just completed.