Downloading the license:

Refer to the file in the shared folder to create a license and download it.

Instruction_for_getting_evaluation_license_key_for_cisco.pdf

Select "AX" license for full features.

To install the license on the cisco router image in openstack, we need to copy the file in the flash directory. To do so, we will create a ftp server on the linux server (here 172.16.218.10) so that the router may download it.

Creating FTP server:

Ubuntu Version: 16.04.5

Steps:

Sudo apt-get update
Sudo apt-get install vsftpd

Check status using:

Sudo service vsftpd status

Usually the ftp server needs a username and password for authentication. We need to enable anonymous downloading so that the cisco router can download it.

Create a directory to place the files: sudo mkdir -p /var/ftp/pub
Change the ownership to nobody:nogroup: sudo chown nobody:nogroup /var/ftp/pub
Change configuration file as per below sample: sudo vim /etc/vsftpd.conf

# Run standalone? vsftpd can run either from an inetd or as a standalone
# daemon started from an initscript.
listen=NO
#
This directive enables listening on IPv6 sockets. By default, listening
on the IPv6 "any" address (::) will accept connections from both IPv6

and IPv4 clients. It is not necessary to listen on *both* IPv4 and IPv6
sockets. If you want that (perhaps because you want to listen on specific
addresses) then you must run two copies of vsftpd with two configuration
files.

# Point users at the directory we created earlier.
anon_root=/var/ftp/
#
# Stop prompting for a password on the command line.
no_anon_password=YES
#
# Show the user and group as ftp:ftp, regardless of the owner.
hide_ids=YES
#

listen_ipv6=YES
#
# Allow anonymous FTP? (Disabled by default).
anonymous_enable=YES
#
# Uncomment this to allow local users to log in.
local_enable=YES
#
# Uncomment this to enable any form of FTP write command.
write_enable=YES
#

Restart ftp service: sudo service vsftpd restart
Check status: sudo service vsftpd status

The output should look like this:

t9eqx@t9eqx:~$ sudo service vsftpd status
● vsftpd.service - vsftpd FTP server
  Loaded: loaded (/lib/systemd/system/vsftpd.service; enabled; vendor preset: enabled)
  Active: active (running) since Mon 2019-02-25 13:28:13 MST; 1s ago
 Process: 70401 ExecStartPre=/bin/mkdir -p /var/run/vsftpd/empty (code=exited,
status=0/SUCCESS)
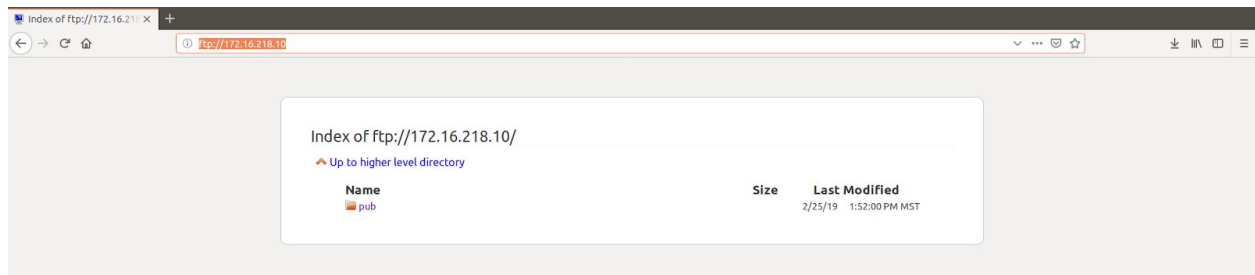 Main PID: 70405 (vsftpd)
   Tasks: 1
  Memory: 364.0K
    CPU: 4ms

CGroup: /system.slice/vsftpd.service
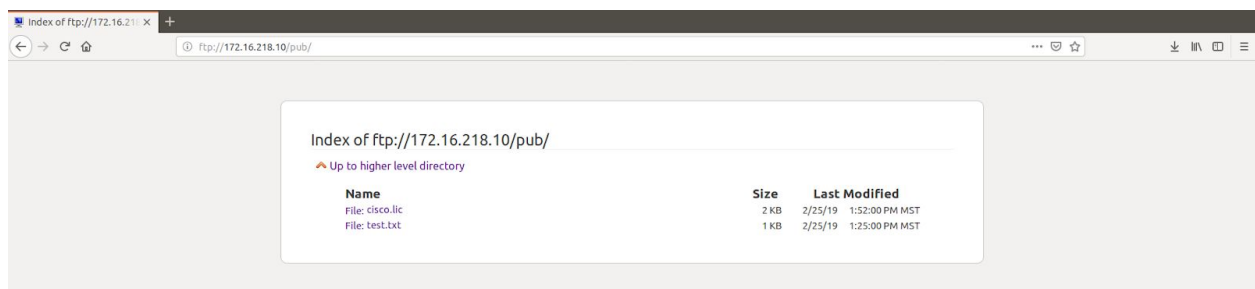└─70405 /usr/sbin/vsftpd /etc/vsftpd.conf

Testing:

Create a sample test file: echo "vsftpd test file" | sudo tee /var/ftp/pub/test.txt
This creates a file test.txt in the folder /var/ftp/pub

To test the server, open a browser on the ubuntu VM and type: ftp://172.16.218.10/

Open the pub folder and check if the test.txt is present.

Reference:
https://www.digitalocean.com/community/tutorials/how-to-set-up-vsftpd-for-anonymous-downloads-on-ubuntu-16-04

Adding cisco license:

Download the cisco license file on ubuntu VM and scp it to the Openstack server 172.16.218.10

Copy the file to the path for the ftp service i.e. /var/ftp/pub

```
t9eqx@t9eqx:~$ cd /var/ftp/pub/
t9eqx@t9eqx:/var/ftp/pub$ ls
test.txt
t9eqx@t9eqx:/var/ftp/pub$ cp /home/t9eqx/cisco.lic .
cp: cannot create regular file './cisco.lic': Permission denied
t9eqx@t9eqx:/var/ftp/pub$ sudo cp /home/t9eqx/cisco.lic .
[sudo] password for t9eqx:
t9eqx@t9eqx:/var/ftp/pub$
t9eqx@t9eqx:/var/ftp/pub$
t9eqx@t9eqx:/var/ftp/pub$ ls
cisco.lic  test.txt
t9eqx@t9eqx:/var/ftp/pub$
```

The license file should be visible on the UI as above.

Copying the file to cisco IOS:

Check if the router is able to access an IP on the Openstack server. I had given the default gateway as one of the vrouters and assigned a floating IP to the CSR.

Ping to one of the external interfaces of the server (2.2.2.100 or 1.1.1.100) should work. This is so that it can access the tftp server.

Once done, copy the file to flash using the command: ftp://2.2.2.100/pub/cisco.lic flash:

```
CSR-1#copy ftp://2.2.2.100/pub/cisco.lic flash:
Destination filename [cisco.lic]?
%Warning:There is a file already existing with this name
Do you want to over write? [confirm]
Accessing ftp://2.2.2.100/pub/cisco.lic...!
[OK - 1239/4096 bytes]

1239 bytes copied in 0.957 secs (1295 bytes/sec)
CSR-1#
```

Check if the file exists using: dir flash:

```
    15  -rw-                  30  Feb 25 2019 21:00:12 +00:00  throughput_monitor_pa
rams
    18  -rw-                   0  Feb 25 2019 21:00:12 +00:00  cvac.log
    17  -rw-                 157  Feb 25 2019 21:00:23 +00:00  csrlxc-cfg.log
365761  drwx               4096   Apr 4 2018 04:43:52 +00:00  onep
    21  -rw-                  35  Feb 25 2019 04:16:14 +00:00  pnp-tech-time
    22  -rw-               49392  Feb 25 2019 04:16:15 +00:00  pnp-tech-discovery-su
mmary
    23  -rw-                  17  Feb 25 2019 20:30:14 +00:00  test.txt
    24  -rw-                1239  Feb 25 2019 21:36:53 +00:00  cisco.lic

7897796608 bytes total (7021699072 bytes free)
CSR-1#_
```

Once the license is in router flash, install using: license install flash:cisco.lic

To activate the license on next reload, in config mode of router, type:
Config mode: license boot level ax
Global mode: write mem

For me, I got another notification saying i need to accept the end user license agreement. For that in config mode, type:
Config mode: license accept end user agreement
Global mode: write mem

Reload the router with: reload

Once the router is reloaded, check the license information.

```
CSR-1#
*Feb 25 21:42:15.784: %SYS-5-CONFIG_I: Configured from console by console
CSR-1#
CSR-1#
CSR-1#sh license detail
Index: 1         Feature: ax_2500M                        Version: 1.0
        License Type: Permanent
        Start Date:        N/A, End Date: Apr 26 2019
        License State: Active, In Use
        License Count: Non-Counted
        License Priority: Medium
        Store Index: 0
        Store Name: Primary License Storage
```

The feature should show up as ax_2500M with the end date of 2 months from the time the license was installed.

Reference:
https://www.cisco.com/c/en/us/td/docs/routers/csr1000/software/configuration/b_CSR1000v_Configuration_Guide/b_CSR1000v_Configuration_Guide_chapter_01000.pdf