

8. Lamp Installation Procedure

a) Install apache

updating the local package index to reflect the latest upstream changes:

sudo apt update && sudo apt install ufw

Then, install the apache2 package:

sudo apt install apache2

Install Apache using apt:

It is recommended that you enable the most restrictive profile that will still allow the traffic You have configured. Since we haven't configured SSL for our server yet in this guide, we will only need to allow traffic on port 80:

sudo ufw allow 'Apache'

You can verify the change by typing:

sudo ufw status

The output will provide a list of allowed HTTP traffic:

Output

Status: active

To	Action	From
OpenSSH	ALLOW	Anywhere
Apache	ALLOW	Anywhere
OpenSSH (v6)	ALLOW	Anywhere (v6)
Apache (v6)	ALLOW	Anywhere (v6)

Checking your Web Server

At the end of the installation process, Ubuntu 20.04 starts Apache. The web server should already be up and running.

Check with the systemd init system to make sure the service is running by typing:

sudo systemctl status apache2

Output

- `apache2.service` - The Apache HTTP Server

Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)

Active: active (running) since Thu 2020-04-23 22:36:30 UTC; 20h ago

Docs: <https://httpd.apache.org/docs/2.4/>

Main PID: 29435 (apache2)

Tasks: 55 (limit: 1137)

Memory: 8.0M

CGroup: /system.slice/apache2.service

└─29435 /usr/sbin/apache2 -k start

└─29437 /usr/sbin/apache2 -k start

└─29438 /usr/sbin/apache2 -k start

As confirmed by this output, the service has started successfully. However, the best way to test this is to request a page from Apache.

We can access the default Apache landing page to confirm that the software is running properly through your IP address. If you do not know your server's IP address, you can get it a few different ways from the command line.

Try typing this at your server's command prompt:

hostname -I

We will get back a few addresses separated by spaces. You can try each in your web browser to determine if they work.


Another option is to use the Icanhazip tool, which should give you your public IP address as read from another location on the internet:

curl -4 icanhazip.com

When you have your server's IP address, enter it into your browser's address bar:

http://your_server_ip

You should see the default Ubuntu 20.04 Apache web page:



Apache2 Ubuntu Default Page

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in [/usr/share/doc/apache2/README.Debian.gz](#)**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```

/etc/apache2/
|-- apache2.conf
|   |-- ports.conf
|-- mods-enabled
|   |-- *.load
|   |-- *.conf
|-- conf-enabled
|   |-- *.conf
|-- sites-enabled
|   |-- *.conf

```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- `ports.conf` is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the `mods-enabled/`, `conf-enabled/` and `sites-enabled/` directories contain particular configuration snippets which manage modules, global configuration fragments, or virtual host configurations, respectively.
- They are activated by symlinking available configuration files from their respective `*-available/` counterparts. These should be managed by using our helpers **`a2enmod`**, **`a2dismod`**, **`a2ensite`**, **`a2dissite`**, and **`a2enconf`**, **`a2disconf`**. See their respective man pages for detailed information.
- The binary is called `apache2`. Due to the use of environment variables, in the default configuration, `apache2` needs to be started/stopped with `/etc/init.d/apache2` or `apache2ctl`. **Calling `/usr/bin/apache2` directly will not work** with the default configuration.

Document Roots

By default, Ubuntu does not allow access through the web browser to *any* file apart of those located in `/var/www`, **public_html** directories (when enabled) and `/usr/share` (for web applications). If your site is using a web document root located elsewhere (such as in `/srv`) you may need to whitelist your document root directory in `/etc/apache2/apache2.conf`.

The default Ubuntu document root is `/var/www/html`. You can make your own virtual hosts under `/var/www`. This is different to previous releases which provides better security out of the box.

Reporting Problems

Please use the `ubuntu-bug` tool to report bugs in the Apache2 package with Ubuntu. However, check **existing bug reports** before reporting a new bug.

Please report bugs specific to modules (such as PHP and others) to respective packages, not to the web server itself.

b) Install mariadb

Install mariaDB

sudo apt install mariadb-server mariadb-client

Check mariadb Installation

sudo systemctl status mysql

(if it is not working sudo systemctl start mysql)

```
silja@silja-VirtualBox:~$ sudo systemctl start mysql
[sudo] password for silja:
silja@silja-VirtualBox:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.5.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2021-09-28 19:54:42 IST; 24min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Process: 633 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var/
   Process: 648 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_ST
   Process: 652 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] &&
   Process: 918 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_S
   Process: 920 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/
 Main PID: 741 (mariabdd)
   Status: "Taking your SQL requests now..."
    Tasks: 8 (limit: 1389)
  Memory: 31.6M
   CGroup: /system.slice/mariadb.service
           └─741 /usr/sbin/mariabdd

Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] R
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] A
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] /
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: Version: '10.5.12-MariaDB-0ubu
```

```
lines 1-27/27 (END)...skipping...
● mariadb.service - MariaDB 10.5.12 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2021-09-28 19:54:42 IST; 24min ago
     Docs: man:mariadb(8)
           https://mariadb.com/kb/en/library/systemd/
   Process: 633 ExecStartPre=/usr/bin/install -m 755 -o mysql -g root -d /var/run/mysqld (code=exited, status=0/SUCCESS)
   Process: 648 ExecStartPre=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUCCESS)
   Process: 652 ExecStartPre=/bin/sh -c [ ! -e /usr/bin/galera_recovery ] && VAR=|| VAR='cd /usr/bin; rm -f galera_recovery; cd /usr/bin; echo "galera_recovery removed"' (code=exited, status=0/SUCCESS)
   Process: 918 ExecStartPost=/bin/sh -c systemctl unset-environment _WSREP_START_POSITION (code=exited, status=0/SUCCESS)
   Process: 920 ExecStartPost=/etc/mysql/debian-start (code=exited, status=0/SUCCESS)
 Main PID: 741 (mariabdd)
   Status: "Taking your SQL requests now..."
    Tasks: 8 (limit: 1389)
  Memory: 31.6M
   CGroup: /system.slice/mariadb.service
           └─741 /usr/sbin/mariabdd

Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] Reading of all Master_info entries completed
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] Added new Master_info '' to the list
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: 2021-09-28 19:54:41 0 [Note] /usr/sbin/mariabdd: ready for connections
Sep 28 19:54:41 silja-VirtualBox mariabdd[741]: Version: '10.5.12-MariaDB-0ubuntu0.21.04.1' socket: /var/run/mysqld/mysqld.sock
Sep 28 19:54:42 silja-VirtualBox systemd[1]: Started MariaDB 10.5.12 database server.
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: Looking for 'mysql' as: /usr/bin/mysql
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: Looking for 'mysqlcheck' as: /usr/bin/mysqlcheck
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[928]: This installation of MariaDB is already up-to-date
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[955]: Checking for insecure root accounts.
Sep 28 19:54:43 silja-VirtualBox /etc/mysql/debian-start[959]: Triggering myisam-recover for all MyISAM tables
```

c) Install PHP

Install phpmyadmin

- ☐ Install phpmyadmin

sudo apt install phpmyadminphp-mbstringphp-zipphp-gdphp-jsonphp-curl

(It ask for webserver select apache2, select dbconfiguration and set password)

- ☐ Restart apache2

sudo systemctl restart apache2

d) Ansible installation

Ansible is a radically simple IT automation platform that makes your applications and systems easier to deploy. Avoid writing scripts or custom code to deploy and update your applications— automate in a language that approaches plain English, using SSH, with no agents to install on remote systems.

Update OS to latest version.

Command: sudo apt-get update

root@localhost:~# sudo apt-get update

```
Hit:1 http://mirrors.linode.com/ubuntu cosmic InRelease
Get:2 http://mirrors.linode.com/ubuntu cosmic-updates InRelease [88.7 kB] Get:3
http://mirrors.linode.com/ubuntu cosmic-backports InRelease [74.6 kB]
Get:4 http://mirrors.linode.com/ubuntu cosmic-updates/main i386 Packages [200 kB] Get:5
http://mirrors.linode.com/ubuntu cosmic-updates/main amd64 Packages [223 kB] Get:6
http://security.ubuntu.com/ubuntu cosmic-security InRelease [88.7 kB]
Get:7 http://security.ubuntu.com/ubuntu cosmic-security/main amd64 Packages [131 kB]
Get:8 http://security.ubuntu.com/ubuntu cosmic-security/main i386 Packages [109 kB]
```

Fetchd 915 kB in 1s (700 kB/s)

Reading package lists... Done

Add Ansible package to your Ubuntu system.

Command: sudo apt-add-repository --yes --update ppa:ansible/ansible

root@localhost:~# sudo apt-add-repository --yes --update ppa:ansible/ansible

```
Hit:1 http://mirrors.linode.com/ubuntu cosmic InRelease
Hit:2 http://mirrors.linode.com/ubuntu cosmic-updates InRelease
Get:3 http://mirrors.linode.com/ubuntu cosmic-backports InRelease [74.6 kB]
Hit:4 http://security.ubuntu.com/ubuntu cosmic-security InRelease
Get:5 http://ppa.launchpad.net/ansible/ansible/ubuntu cosmic InRelease [15.9 kB]
```


Get:6 <http://ppa.launchpad.net/ansible/ansible/ubuntu> cosmic/main i386 Packages [536 B]
 Get:7 <http://ppa.launchpad.net/ansible/ansible/ubuntu> cosmic/main amd64 Packages[536B]
 Get:8 <http://ppa.launchpad.net/ansible>

ansible/ubuntu cosmic/main Translation-en [344 B]
 Fetched 91.9 kB in 1s (64.7 kB/s)
 Reading package lists... Done

Install Ansible completely.

COMMAND sudo apt install ansible

```

VirtualBox:~$ sudo apt install ansible
[sudo] password for silja:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  Files ble-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-libcloud python3-netaddr python3-ntlm-auth
  python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xlrd python3-xlsxwriter
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
  python-pyparsing-doc
The following NEW packages will be installed:
  ansible ansible-base ieee-data python3-argcomplete python3-distutils
  python3-dnspython python3-ecdsa python3-jinja2 python3-jmespath
  python3-kerberos python3-libcloud python3-netaddr python3-ntlm-auth
  python3-packaging python3-pycryptodome python3-pyparsing
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xlrd python3-xlsxwriter
0 upgraded, 21 newly installed, 0 to remove and 157 not upgraded.
Need to get 31.8 MB of archives.
After this operation, 275 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 python3-jinja2 all
  2.11.2-1 [99.8 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 python3-pyparsing

```

COMMAND : ansible --version

```

sysops@control:~$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/sysops/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.5 (default, May 27 2021, 13:30:53) [GCC 9.3.0]
sysops@control:~$
sysops@control:~$

```

Install Ansible and pyVmomi

Python should already be installed on Mac but you might need to install pip by running this command.

```
sudo easy_install pip
```

Once pip is installed, we can use it to install Ansible with the following command.

```
sudo pip install ansible
```

We also need to install pyVmomi which is the Python SDK for the VMware vSphere API that allows you to manage ESX, ESXi, and vCenter.

```
sudo pip install pyvmomi
```

That's all the dependencies installed, we're now ready to create our Ansible playbook.

Create Ansible Playbook

Ansible playbooks are YAML configuration files that describe what actions to run on a remote host. For this example, we'll create a simple playbook called `deploy-vm.yml` that will use the `vmware_guest` module to deploy a VM from template.

Create the file.

vim deploy-vm.yml

Add the following contents to the file. You'll want to change the variables in the `vars` section to match the details of your vCenter.

```
---
- hosts: localhost
  gather_facts: no
  vars:
    vcenter_server: "10.1.1.100"
    vcenter_user: "administrator@vsphere.local"
    vcenter_pass: "Pa$$w0rd"
    datacenter_name: "Datacenter"
    cluster_name: "Cluster"
  tasks:
    - name: Clone the template
      vmware_guest:
        hostname: "{{ vcenter_server }}"
```

```

username: "{{ vcenter_user }}"
password: "{{ vcenter_pass }}"
validate_certs: False
name: web02
template: template-ubuntu-18.04
datacenter: "{{ datacenter_name }}"
folder: "{{ datacenter_name }}/vm"
cluster: "{{ cluster_name }}"

```

```

username: "{{ vcenter_user }}"
password: "{{ vcenter_pass }}"
validate_certs: False
name: web02
template: template-ubuntu-18.04
datacenter: "{{ datacenter_name }}"
folder: "{{ datacenter_name }}/vm"
cluster: "{{ cluster_name }}"

```

The playbook above will create a new VM called web02 and place it on a datastore called iscsi-datastore01. It will be cloned from a template called template-ubuntu-18.04.

Run the playbook

After making the required changes to the deploy-vms.yml file, save it, then run the following command to deploy the VM.

ansible-playbook deploy-vms.yml

The screenshot below shows the playbook in action.


```

sysadmin@web01:~$ ansible-playbook deploy-vm.yml
[WARNING]: No inventory was parsed, only implicit localhost is available

[WARNING]: provided hosts list is empty, only localhost is available. Note that the implicit localhost does not match '

PLAY [localhost] *****

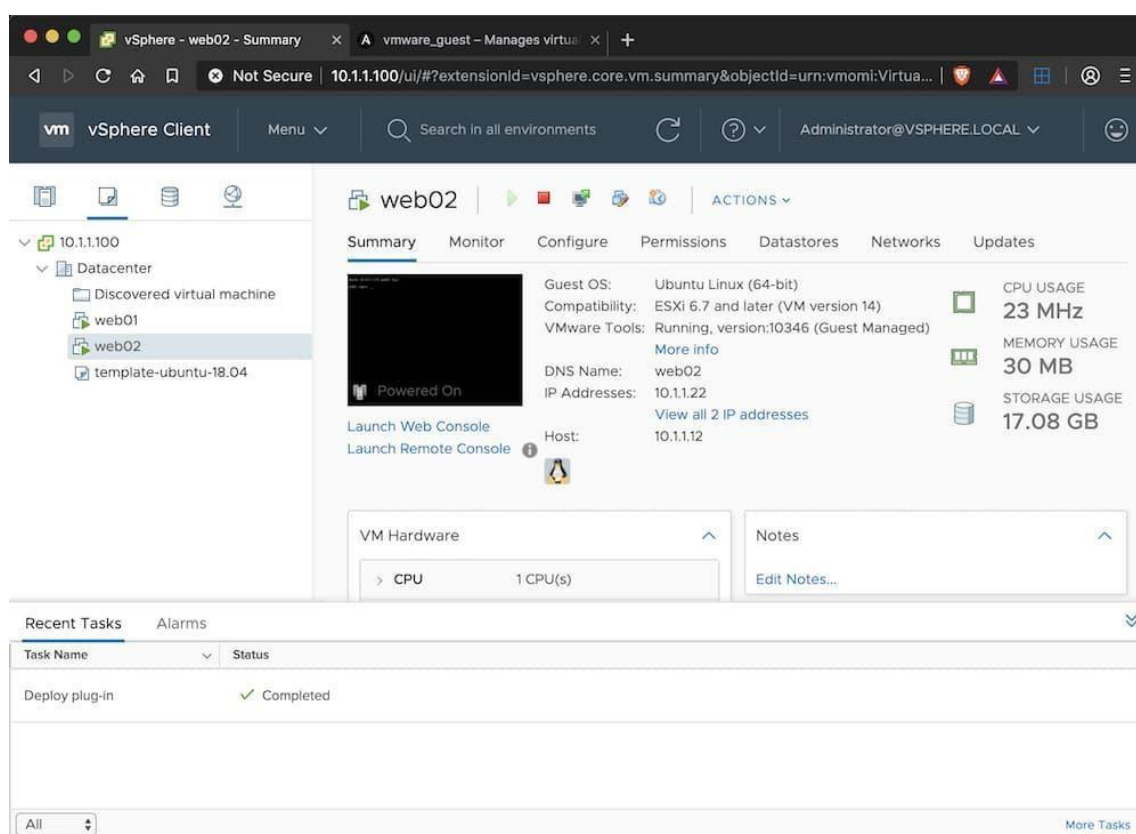
TASK [Clone the template] *****
changed: [localhost -> localhost]

PLAY RECAP *****
localhost                : ok=1    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

```

The playbook might take awhile to complete because we used the `wait_for_ip_address: yes` option, which means the Ansible command finishes once the VM has been cloned and the network is configured with the static IP address specified.

The screenshot below shows the VM has been created in vCenter.



e) TCPDUMP

Execute tcpdump and its options on your own system, and submit the output screenshot as a document.

```
silja-VirtualBox:~$ sudo apt install tcpdump
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
tcpdump is already the newest version (4.9.3-7).
tcpdump set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 157 not upgraded.
```

☐ Sudo tcpdump

```
silja-VirtualBox:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
^C
0 packets captured
0 packets received by filter
0 packets dropped by kernel
```

☐ Sudo apt update

```
silja-VirtualBox:~$ sudo apt update
[sudo] password for silja:
Hit:1 http://in.archive.ubuntu.com/ubuntu hirsute InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu hirsute-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu hirsute-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu hirsute-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
157 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

☐ Sudo tcpdump

```
silja-VirtualBox:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
11:30:31.334812 IP6 silja-VirtualBox > ip6-allrouters: ICMP6, router solicitation, length 8
11:31:11.501310 IP silja-VirtualBox.41220 > 84.170.224.35.bc.googleusercontent.com.http: Flags [S], seq 475077761, win 64240, options [mss 1460,sackOK,TS val 2429675019,ecnr 0,nop,wscale 7], length 0
11:31:11.501954 IP silja-VirtualBox.56434 > 192.168.43.1.domain: 50750+ PTR? 84.170.224.35.in-addr.arpa. (44)
11:31:11.732345 IP 192.168.43.1.domain > silja-VirtualBox.56434: 50750 1/0/0 PTR 84.170.224.35.bc.googleusercontent.com. (96)
11:31:11.733210 IP silja-VirtualBox.37861 > 192.168.43.1.domain: 28068+ PTR? 15.2.0.10.in-addr.arpa. (40)
11:31:11.834954 IP 192.168.43.1.domain > silja-VirtualBox.37861: 28068 NXDomain 0/0/0 (40)
11:31:11.835366 IP 84.170.224.35.bc.googleusercontent.com.http > silja-VirtualBox.41220: Flags [S.], seq 26048001, ack 475077762, win 65535, options [mss 1460], length 0
11:31:11.835392 IP silja-VirtualBox.41220 > 84.170.224.35.bc.googleusercontent.com.http: Flags [.], ack 1, win 64240, length 0
11:31:11.836252 IP silja-VirtualBox.56651 > 192.168.43.1.domain: 56832+ PTR? 1.43.168.192.in-addr.arpa. (43)
11:31:11.836472 IP silja-VirtualBox.41220 > 84.170.224.35.bc.googleusercontent.com.http: Flags [P.], seq 1:88, ack 1, win 64240, length 87: HTTP: GET / HTTP/1
```

- Sudo tcpdump -D

```
silja-VirtualBox:~$ sudo tcpdump -D
1.enp0s3 [Up, Running]
2.any (Pseudo-device that captures on all interfaces) [Up, Running]
3.lo [Up, Running, Loopback]
4.bluetooth-monitor (Bluetooth Linux Monitor) [none]
5.nflog (Linux netfilter log (NFLOG) interface) [none]
6.nfqueue (Linux netfilter queue (NFQUEUE) interface) [none]
7.dbus-system (D-Bus system bus) [none]
8.dbus-session (D-Bus session bus) [none]
```

- Sudo tcpdump -c 5

```
silja-VirtualBox:~$ sudo tcpdump -c 5
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp0s3, link-type EN10MB (Ethernet), capture size 262144 bytes
-v
11:34:32.976480 IP silja-VirtualBox.57522 > 192.168.43.1.domain: 25681+ AAAA? c
onnectivity-check.ubuntu.com. (47)
11:34:32.978247 IP silja-VirtualBox.36580 > 192.168.43.1.domain: 62896+ PTR? 1.
43.168.192.in-addr.arpa. (43)
11:34:37.979326 IP silja-VirtualBox.36580 > 192.168.43.1.domain: 62896+ PTR? 1.
43.168.192.in-addr.arpa. (43)
11:34:37.979449 IP silja-VirtualBox.57522 > 192.168.43.1.domain: 25681+ AAAA? c
onnectivity-check.ubuntu.com. (47)
11:34:37.984032 IP 192.168.43.1.domain > silja-VirtualBox.36580: 62896 NXDomain
0/0/0 (43)
5 packets captured
10 packets received by filter
```

- Sudo tcpdump -i enp2s0

```
silja-VirtualBox:~$ -v
-v: command not found
silja-VirtualBox:~$ sudo tcpdump -i enp2s0
tcpdump: enp2s0: No such device exists
(SIOCGIFHWADDR: No such device)
silja-VirtualBox:~$
```