

Ubuntu Core: Creating uhttpd Server Daemon Snap

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Revision History

Date [MM/DD/YYYY]	Author [First and Last Name]	Revision [Letter]	Reason [Brief Description]
4/25/2023	Kris Z	A	Initial Release

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Purpose

The overall purpose of this document is to show step-by-step how-to build and run uhttpd as a Snap.

Requirements

- Ubuntu (Desktop and Core) 22.04 Linux IoT Device
- Access to the Internet

Instructions

1. Prerequisites – Install Packages

Install the following packages:

Terminal Syntax

```
sudo apt install -y snapd  
sudo snap install snapcraft --classic  
sudo snap install multipass --classic
```

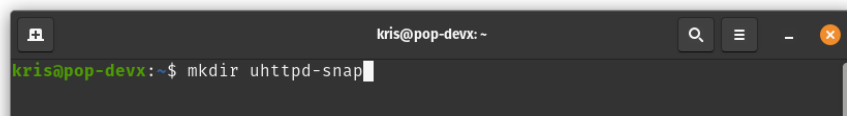
Proceed to setup a Snap project.

2. Create Project

- a. Create a new directory.

Terminal Syntax:

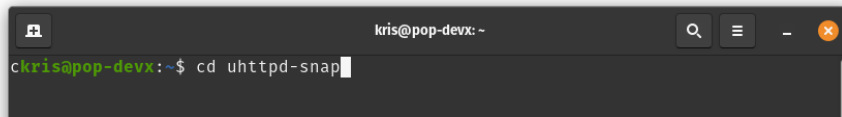
```
mkdir uhttpd-snap
```



- b. Navigate into the new directory.

Terminal Syntax:

```
cd uhttpd-snap
```

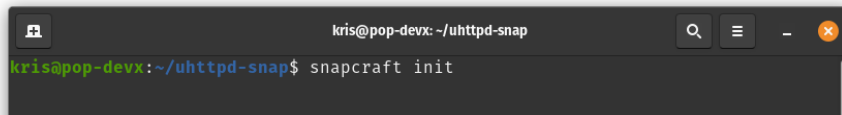


```
kris@pop-devx: ~  
kris@pop-devx:~$ cd uhttpd-snap
```

- c. Initialize snapcraft.

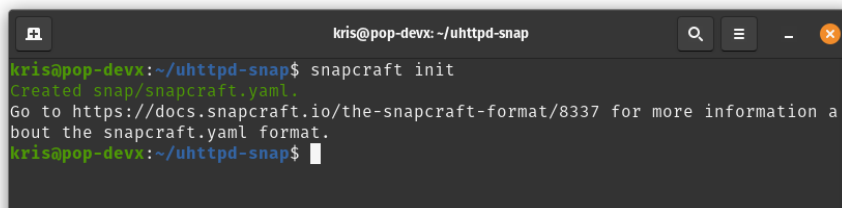
Terminal Syntax:

```
snapcraft init
```



```
kris@pop-devx: ~/uhttpd-snap  
kris@pop-devx:~/uhttpd-snap$ snapcraft init
```

- d. Wait until the command finishes.

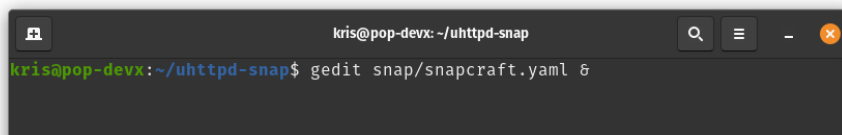


```
kris@pop-devx: ~/uhttpd-snap  
kris@pop-devx:~/uhttpd-snap$ snapcraft init  
Created snap/snapcraft.yaml.  
Go to https://docs.snapcraft.io/the-snapcraft-format/8337 for more information a  
bout the snapcraft.yaml format.  
kris@pop-devx:~/uhttpd-snap$
```

- e. Edit the newly created snapcraft.yaml file.

Terminal Syntax:

```
gedit snap/snapcraft.yaml &
```



```
kris@pop-devx: ~/uhttpd-snap  
kris@pop-devx:~/uhttpd-snap$ gedit snap/snapcraft.yaml &
```

- f. Paste the following into the file, replacing existing templated code.

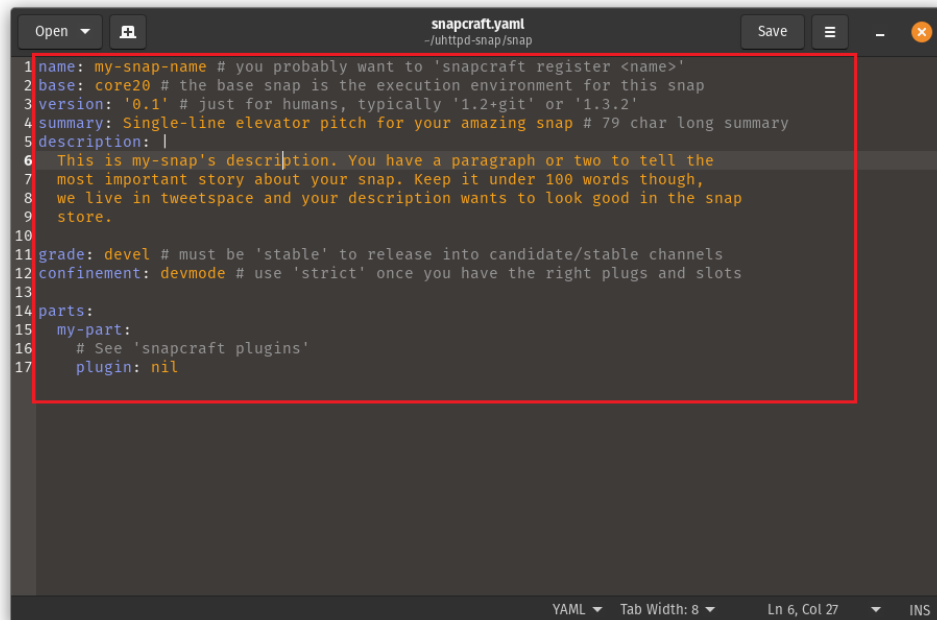
File Contents:

```
name: uhttpd  
base: core20  
version: '0.1.2'  
summary: A laughably-small HTTP server  
description: |  
  The only thing uhttpd is good for, is serving static content.  
  It has no fancy bells, orwhistles, like virtual hist, or CGI support.  
  All it does is host static files out of a directory.  
grade: stable  
confinement: strict  
parts:  
  uhttpd:
```

```

plugin: go
source: https://github.com/nesv/uhttpd.git
source-tag: '0.1.2'
override-build: |
  go mod init uhttpd
  go mod tidy
  go build
  snapcraftctl build
build-packages:
  - gcc
uhttpd-data:
  # See 'snapcraft plugins'
plugin: dump
source: .
stage:
  - www
apps:
  uhttpd:
    command: bin/uhttpd -dir $SNAP_COMMON/www
    daemon: simple
    plugs:
      - network
      - network-bind
hooks:
  install:
    plugs: [network]

```

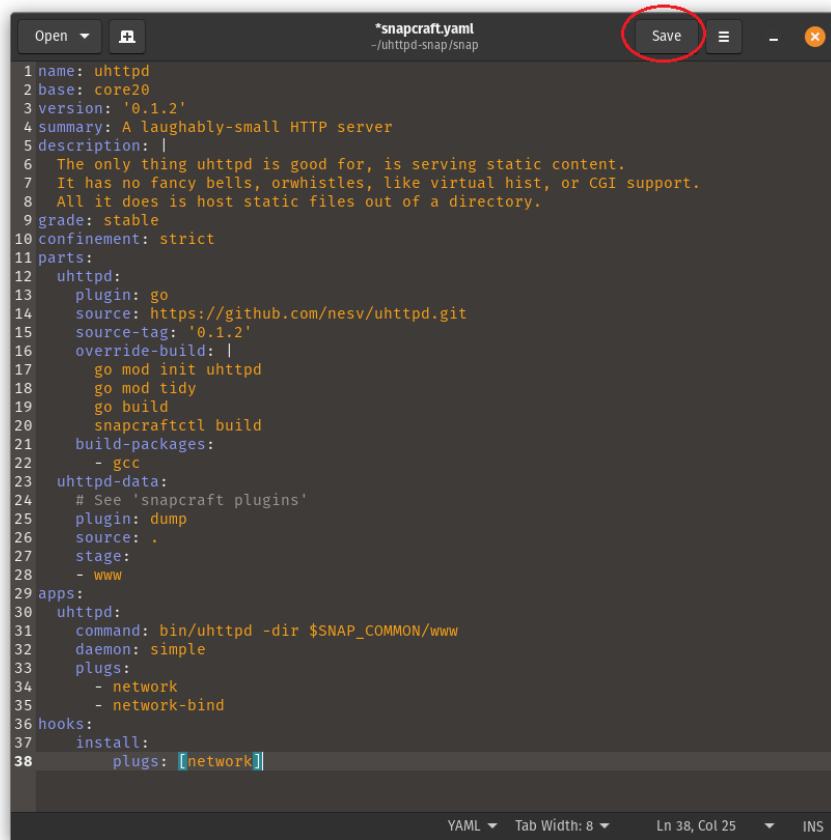


```

1 name: my-snap-name # you probably want to 'snapcraft register <name>'
2 base: core20 # the base snap is the execution environment for this snap
3 version: '0.1' # just for humans, typically '1.2+git' or '1.3.2'
4 summary: Single-line elevator pitch for your amazing snap # 79 char long summary
5 description: |
6   This is my-snap's description. You have a paragraph or two to tell the
7   most important story about your snap. Keep it under 100 words though,
8   we live in tweetspace and your description wants to look good in the snap
9   store.
10
11 grade: devel # must be 'stable' to release into candidate/stable channels
12 confinement: devmode # use 'strict' once you have the right plugs and slots
13
14 parts:
15   my-part:
16     # See 'snapcraft plugins'
17     plugin: nil

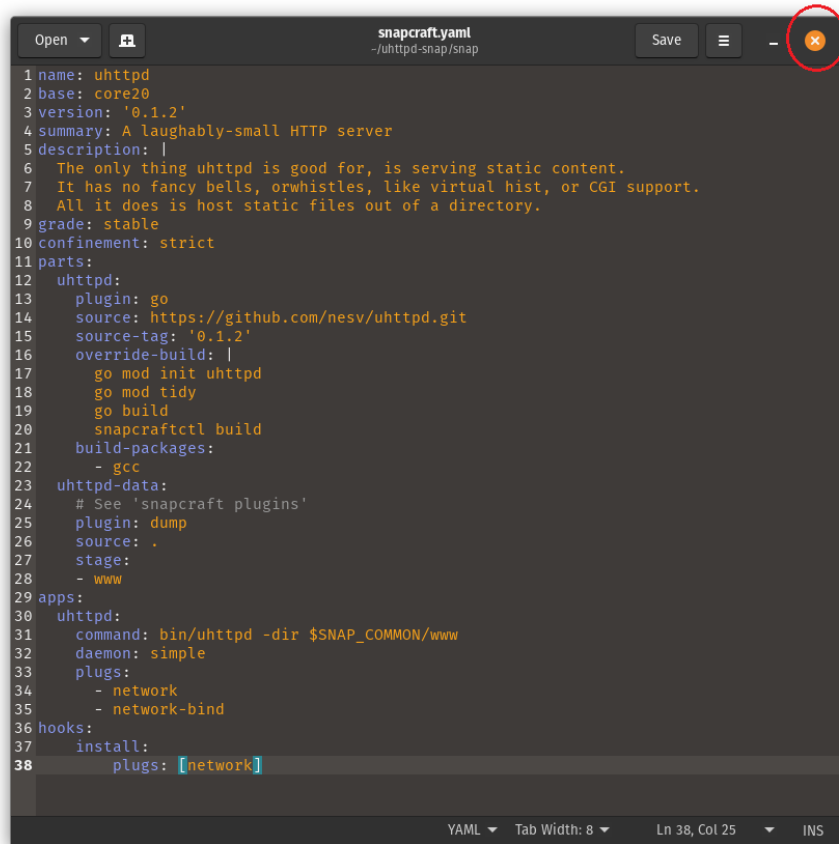
```

g. Click on “Save”.



```
1 name: uhttpd
2 base: core20
3 version: '0.1.2'
4 summary: A laughably-small HTTP server
5 description: |
6   The only thing uhttpd is good for, is serving static content.
7   It has no fancy bells, orwhistles, like virtual hist, or CGI support.
8   All it does is host static files out of a directory.
9 grade: stable
10 confinement: strict
11 parts:
12   uhttpd:
13     plugin: go
14     source: https://github.com/nesv/uhttpd.git
15     source-tag: '0.1.2'
16     override-build: |
17       go mod init uhttpd
18       go mod tidy
19       go build
20       snapcraftctl build
21     build-packages:
22       - gcc
23   uhttpd-data:
24     # See 'snapcraft plugins'
25     plugin: dump
26     source: .
27     stage:
28       - www
29 apps:
30   uhttpd:
31     command: bin/uhttpd -dir $SNAP_COMMON/www
32     daemon: simple
33     plugs:
34       - network
35       - network-bind
36 hooks:
37   install:
38     plugs: [network]
```

h. Close the file.

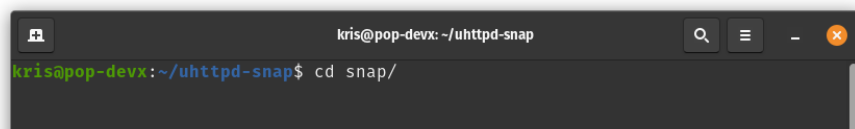


```
1 name: uhttpd
2 base: core20
3 version: '0.1.2'
4 summary: A laughably-small HTTP server
5 description: |
6   The only thing uhttpd is good for, is serving static content.
7   It has no fancy bells, orwhistles, like virtual hist, or CGI support.
8   All it does is host static files out of a directory.
9 grade: stable
10 confinement: strict
11 parts:
12   uhttpd:
13     plugin: go
14     source: https://github.com/nesv/uhttpd.git
15     source-tag: '0.1.2'
16     override-build: |
17       go mod init uhttpd
18       go mod tidy
19       go build
20       snapcraftctl build
21     build-packages:
22       - gcc
23   uhttpd-data:
24     # See 'snapcraft plugins'
25     plugin: dump
26     source: .
27     stage:
28       - www
29 apps:
30   uhttpd:
31     command: bin/uhttpd -dir $SNAP_COMMON/www
32     daemon: simple
33     plugs:
34       - network
35       - network-bind
36 hooks:
37   install:
38     plugs: [network]
```

i. Enter the snap directory.

Terminal Syntax:

```
cd snap/
```

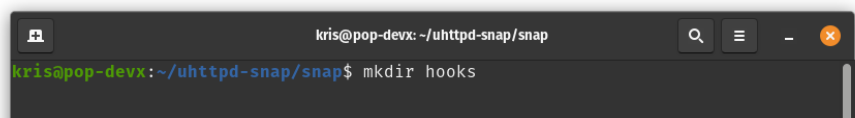


```
kris@pop-devx: ~/uhttpd-snap$ cd snap/
```

j. Create a new hooks directory.

Terminal Syntax:

```
mkdir hooks
```

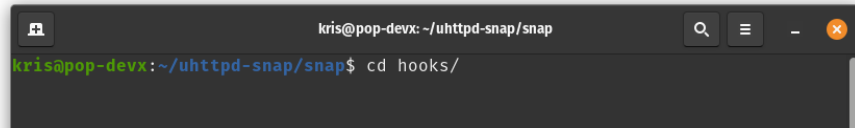


```
kris@pop-devx: ~/uhttpd-snap/snap$ mkdir hooks
```


- k. Navigate into the hooks directory.

Terminal Syntax:

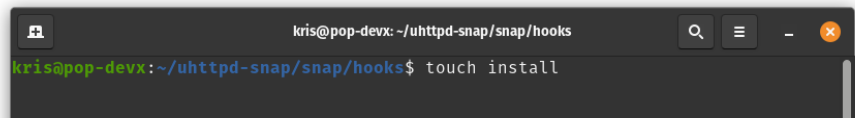
```
cd hooks/
```



- l. Use the touch command to create an empty file named “install”.

Terminal Syntax:

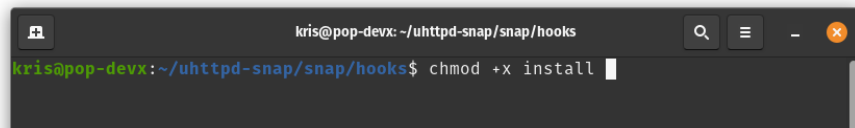
```
touch install
```



- m. Change the permissions on the file.

Terminal Syntax:

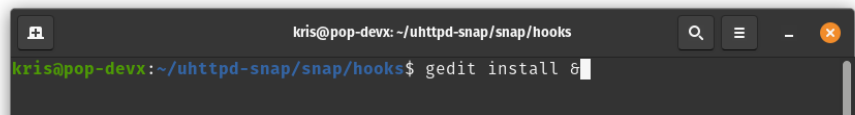
```
chmod +x install
```



- n. Edit the file.

Terminal Syntax:

```
gedit install &
```

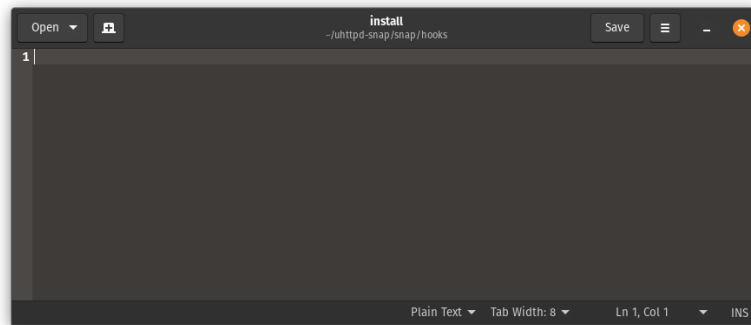


- o. Paste the following into the file.

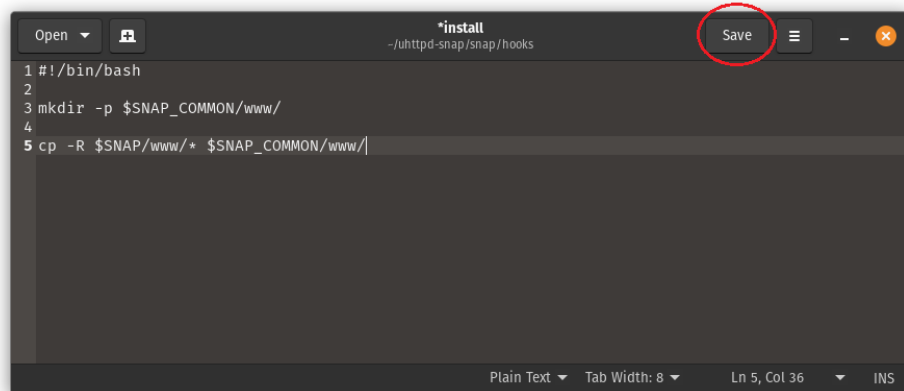
File Contents:

```
#!/bin/bash  
  
mkdir -p $SNAP_COMMON/www/
```

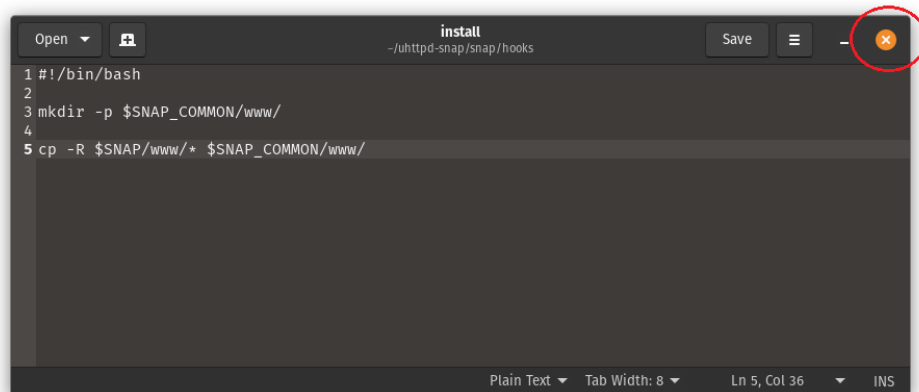
```
cp -R $SNAP/www/* $SNAP_COMMON/www/
```



p. Click on “Save”.



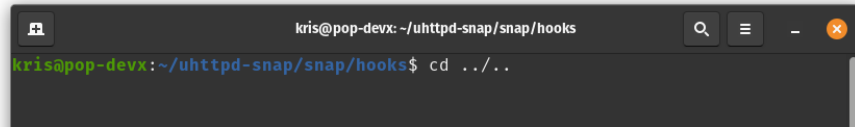
q. Close the file.



r. Go back to the top level directory.

Terminal Syntax:

```
cd ../..
```

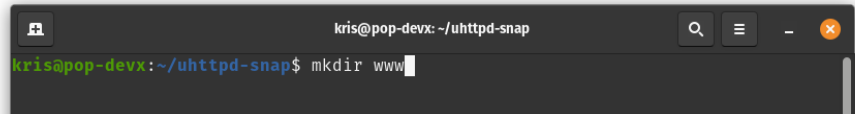
A terminal window titled 'kris@pop-devx: ~/uhttpd-snap/snap/hooks'. The prompt is 'kris@pop-devx:~/uhttpd-snap/snap/hooks\$' and the command 'cd ../../' has been entered.

```
kris@pop-devx:~/uhttpd-snap/snap/hooks$ cd ../../
```

- s. Create a new “www” directory.

Terminal Syntax:

```
mkdir www
```

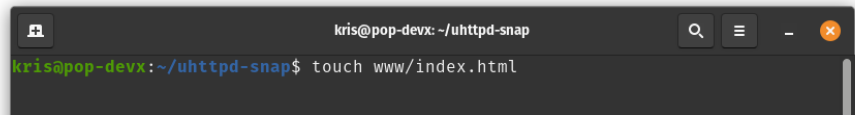
A terminal window titled 'kris@pop-devx: ~/uhttpd-snap'. The prompt is 'kris@pop-devx:~/uhttpd-snap\$' and the command 'mkdir www' has been entered.

```
kris@pop-devx:~/uhttpd-snap$ mkdir www
```

- t. Create a new file “www/index.html”.

Terminal Syntax:

```
touch www/index.html
```

A terminal window titled 'kris@pop-devx: ~/uhttpd-snap'. The prompt is 'kris@pop-devx:~/uhttpd-snap\$' and the command 'touch www/index.html' has been entered.

```
kris@pop-devx:~/uhttpd-snap$ touch www/index.html
```

- u. Edit the file.

Terminal Syntax:

```
gedit www/index.html
```

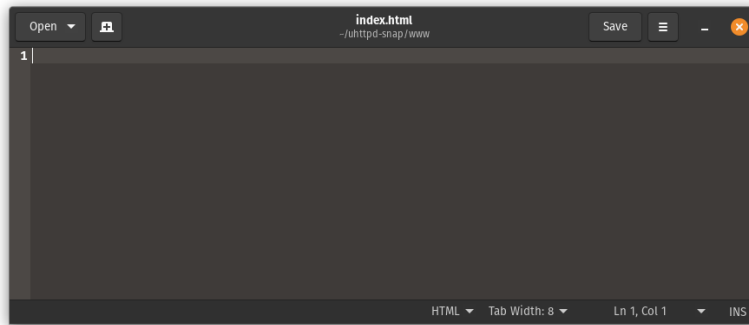
A terminal window titled 'kris@pop-devx: ~/uhttpd-snap'. The prompt is 'kris@pop-devx:~/uhttpd-snap\$' and the command 'gedit www/index.html' has been entered.

```
kris@pop-devx:~/uhttpd-snap$ gedit www/index.html
```

- v. Paste the following contents into the file.

Terminal Syntax:

```
<h1>Testing uhttpd!</h1>
```



w. Click on “Save” to save the file.



x. Close the file.



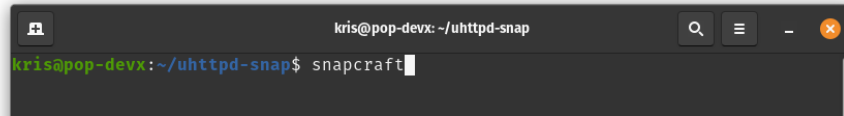
y. Proceed to next steps.

3. Build Snap

- a. To build run the snapcraft information.

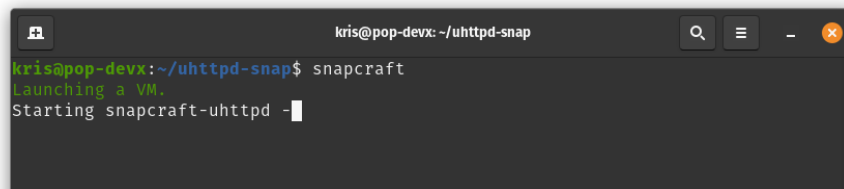
Terminal Syntax:

```
snapcraft
```



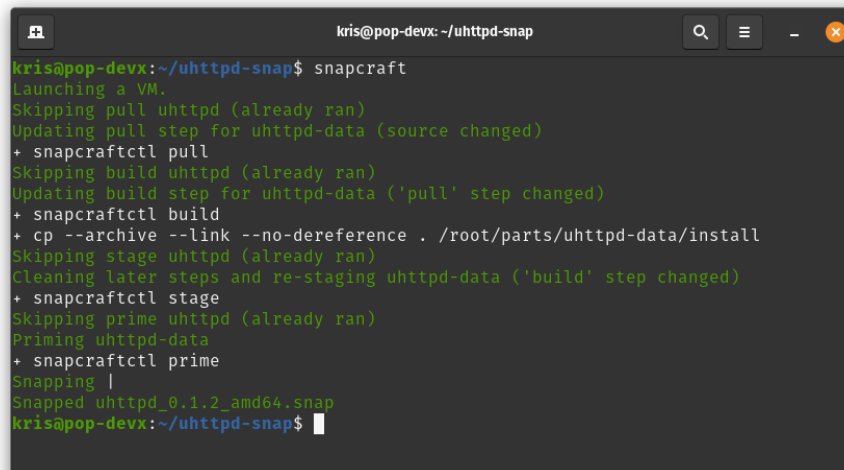
```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ snapcraft
```

- b. Wait for the build to start.



```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ snapcraft
Launching a VM.
Starting snapcraft-uhttpd -
```

- c. It will take several minutes to build. Wait until the build is finished.

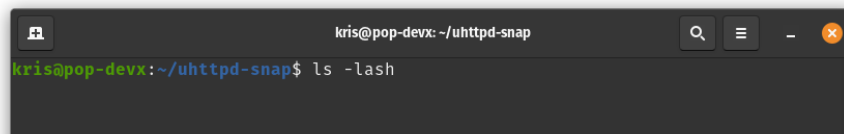


```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ snapcraft
Launching a VM.
Skipping pull uhttpd (already ran)
Updating pull step for uhttpd-data (source changed)
+ snapcraftctl pull
Skipping build uhttpd (already ran)
Updating build step for uhttpd-data ('pull' step changed)
+ snapcraftctl build
+ cp --archive --link --no-dereference . /root/parts/uhttpd-data/install
Skipping stage uhttpd (already ran)
Cleaning later steps and re-staging uhttpd-data ('build' step changed)
+ snapcraftctl stage
Skipping prime uhttpd (already ran)
Priming uhttpd-data
+ snapcraftctl prime
Snapping |
Snapped uhttpd_0.1.2_amd64.snap
kris@pop-devx:~/uhttpd-snap$
```

- d. Call the list command.

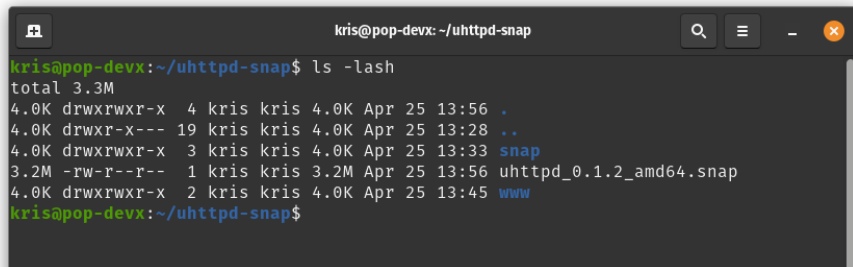
Terminal Syntax:

```
ls -lash
```



```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ ls -lash
```

- e. The output will show the new Snap install file: `uhttpd_0.1.2_amd64.snap`.



```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ ls -lash
total 3.3M
4.0K drwxrwxr-x  4 kris kris 4.0K Apr 25 13:56 .
4.0K drwxr-x--- 19 kris kris 4.0K Apr 25 13:28 ..
4.0K drwxrwxr-x  3 kris kris 4.0K Apr 25 13:33 snap
3.2M -rw-r--r--  1 kris kris 3.2M Apr 25 13:56 uhttpd_0.1.2_amd64.snap
4.0K drwxrwxr-x  2 kris kris 4.0K Apr 25 13:45 www
kris@pop-devx:~/uhttpd-snap$
```

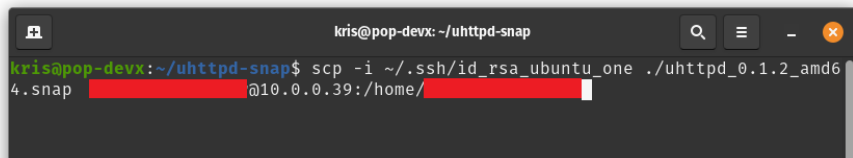
- f. Proceed to next steps.

4. Transfer Snap to Target & SSH to Target

- a. Use SCP to transfer the Snap to an Ubuntu Core device.

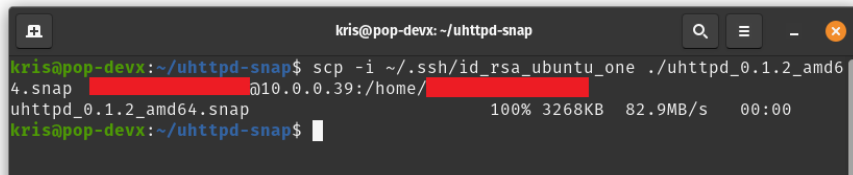
Terminal Syntax:

```
scp -i ~/.ssh/id_rsa_ubuntu_one ./uhttpd_0.1.2_amd64.snap
zzzz@10.0.0.39:/home/zzzz
```



```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ scp -i ~/.ssh/id_rsa_ubuntu_one ./uhttpd_0.1.2_amd64.snap [redacted]@10.0.0.39:/home/[redacted]
```

- b. Wait for the file to be transferred.

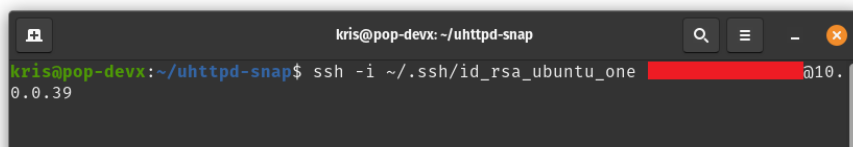


```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ scp -i ~/.ssh/id_rsa_ubuntu_one ./uhttpd_0.1.2_amd64.snap [redacted]@10.0.0.39:/home/[redacted]
uhttpd_0.1.2_amd64.snap 100% 3268KB 82.9MB/s 00:00
kris@pop-devx:~/uhttpd-snap$
```

- c. Use SSH to connect to the device.

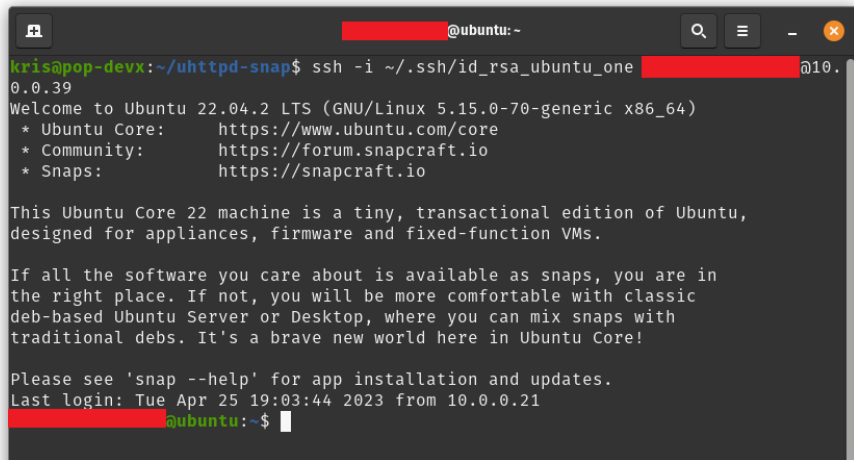
Terminal Syntax:

```
ssh -i ~/.ssh/id_rsa_ubuntu_one zzzz@10.0.0.39
```



```
kris@pop-devx: ~/uhttpd-snap
kris@pop-devx:~/uhttpd-snap$ ssh -i ~/.ssh/id_rsa_ubuntu_one [redacted]@10.0.0.39
```

- d. Wait until connected with SSH.



```
kris@pop-devx:~/uhttpd-snap$ ssh -i ~/.ssh/id_rsa_ubuntu_one [redacted]@10.0.0.39
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.15.0-70-generic x86_64)
 * Ubuntu Core:      https://www.ubuntu.com/core
 * Community:       https://forum.snapcraft.io
 * Snaps:            https://snapcraft.io

This Ubuntu Core 22 machine is a tiny, transactional edition of Ubuntu,
designed for appliances, firmware and fixed-function VMs.

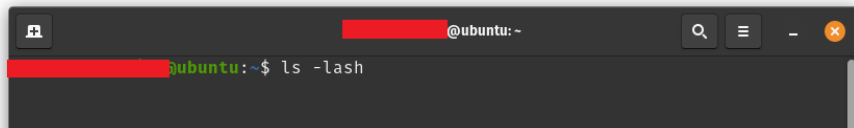
If all the software you care about is available as snaps, you are in
the right place. If not, you will be more comfortable with classic
deb-based Ubuntu Server or Desktop, where you can mix snaps with
traditional debs. It's a brave new world here in Ubuntu Core!

Please see 'snap --help' for app installation and updates.
Last login: Tue Apr 25 19:03:44 2023 from 10.0.0.21
[redacted]@ubuntu:~$
```

- e. Run the list command to show the files.

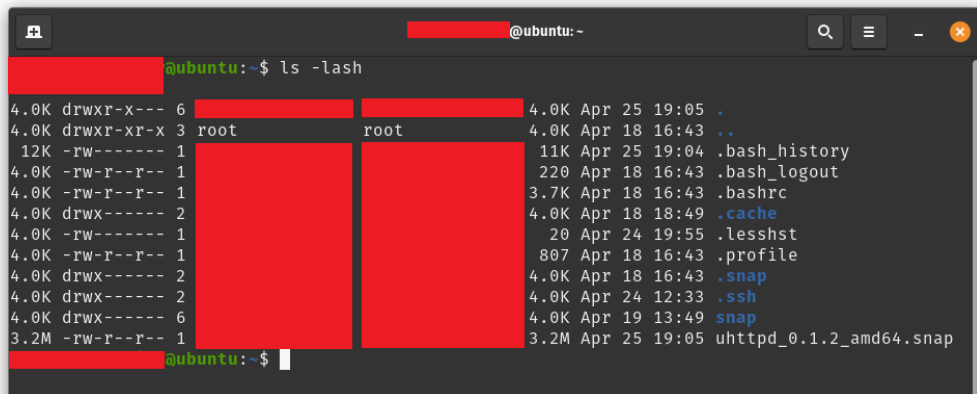
Terminal Syntax:

```
ls -lash
```



```
[redacted]@ubuntu:~$ ls -lash
```

- f. Notice that the uhttpd_0.1.2_amd64.snap file was transferred.



```
[redacted]@ubuntu:~$ ls -lash
4.0K drwxr-x--- 6 [redacted] [redacted] 4.0K Apr 25 19:05 .
4.0K drwxr-xr-x 3 root      root      4.0K Apr 18 16:43 ..
12K -rw----- 1 [redacted] [redacted] 11K Apr 25 19:04 .bash_history
4.0K -rw-r--r-- 1 [redacted] [redacted] 220 Apr 18 16:43 .bash_logout
4.0K -rw-r--r-- 1 [redacted] [redacted] 3.7K Apr 18 16:43 .bashrc
4.0K drwx----- 2 [redacted] [redacted] 4.0K Apr 18 18:49 .cache
4.0K -rw----- 1 [redacted] [redacted] 20 Apr 24 19:55 .lessht
4.0K -rw-r--r-- 1 [redacted] [redacted] 807 Apr 18 16:43 .profile
4.0K drwx----- 2 [redacted] [redacted] 4.0K Apr 18 16:43 .snap
4.0K drwx----- 2 [redacted] [redacted] 4.0K Apr 24 12:33 .ssh
4.0K drwx----- 6 [redacted] [redacted] 4.0K Apr 19 13:49 snap
3.2M -rw-r--r-- 1 [redacted] [redacted] 3.2M Apr 25 19:05 uhttpd_0.1.2_amd64.snap
[redacted]@ubuntu:~$
```

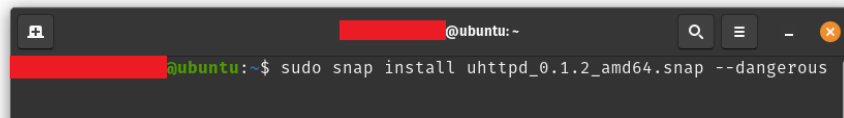
- g. Proceed to next steps.

5. Install Snap

- a. Install the Snap as shown below.

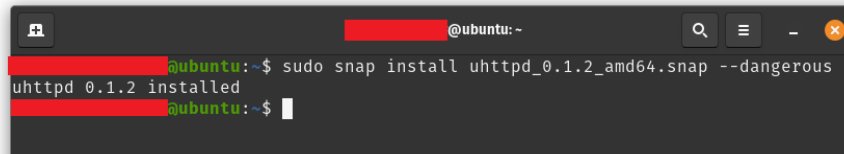
Terminal Syntax:

```
sudo snap install uhttpd 0.1.2 amd64.snap --dangerous
```



```
@ubuntu: ~  
ubuntu:~$ sudo snap install uhttpd 0.1.2 amd64.snap --dangerous
```

- b. Wait until installed.

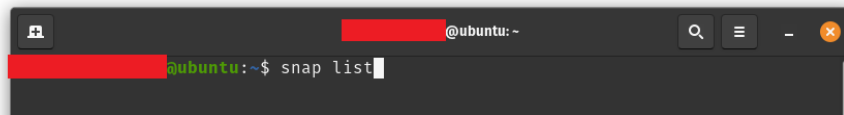


```
@ubuntu: ~  
ubuntu:~$ sudo snap install uhttpd 0.1.2 amd64.snap --dangerous  
uhttpd 0.1.2 installed  
ubuntu:~$
```

- c. Run the snap list command.

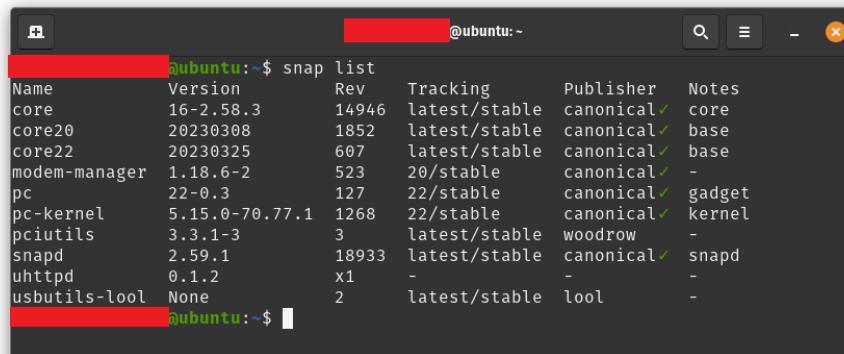
Terminal Syntax:

```
snap list
```



```
@ubuntu: ~  
ubuntu:~$ snap list
```

- d. The output will show all the installed snap application. The snap “uhttpd” is shown.

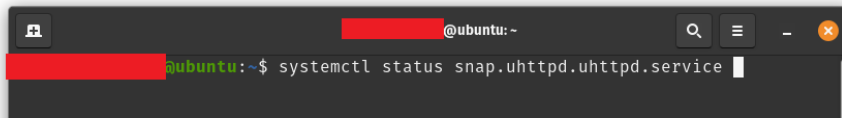


```
@ubuntu: ~  
ubuntu:~$ snap list  
Name      Version  Rev   Tracking   Publisher  Notes  
core      16-2.58.3 14946 latest/stable canonical✓ core  
core20    20230308 1852  latest/stable canonical✓ base  
core22    20230325 607   latest/stable canonical✓ base  
modem-manager 1.18.6-2 523   20/stable  canonical✓ -  
pc         22-0.3    127   22/stable  canonical✓ gadget  
pc-kernel 5.15.0-70.77.1 1268 22/stable  canonical✓ kernel  
pciutils  3.3.1-3   3     latest/stable woodrow    -  
snapd     2.59.1    18933 latest/stable canonical✓ snapd  
uhttpd    0.1.2     x1    -          -         -  
usbutils-lool None      2     latest/stable lool      -  
ubuntu:~$
```

- e. Check the status of the service as shown below.

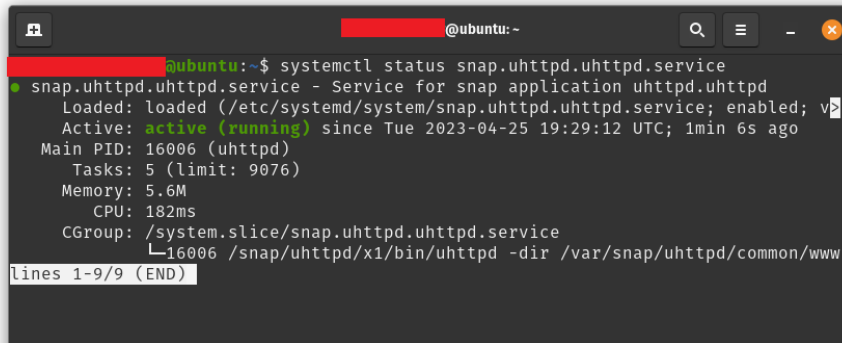
Terminal Syntax:

```
systemctl status snap.uhttpd.uhttpd.service
```

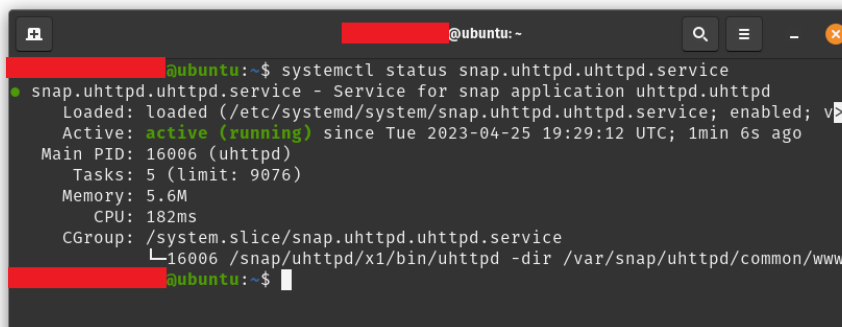
```
@ubuntu: ~  
ubuntu:~$ systemctl status snap.uhttpd.uhttpd.service
```

- f. Notice the output of the command. Press “q” on the keyboard to exit.



```
@ubuntu: ~  
ubuntu:~$ systemctl status snap.uhttpd.uhttpd.service  
● snap.uhttpd.uhttpd.service - Service for snap application uhttpd.uhttpd  
   Loaded: loaded (/etc/systemd/system/snap.uhttpd.uhttpd.service; enabled; v>  
   Active: active (running) since Tue 2023-04-25 19:29:12 UTC; 1min 6s ago  
     Main PID: 16006 (uhttpd)  
       Tasks: 5 (limit: 9076)  
      Memory: 5.6M  
         CPU: 182ms  
    CGroup: /system.slice/snap.uhttpd.uhttpd.service  
            └─16006 /snap/uhttpd/x1/bin/uhttpd -dir /var/snap/uhttpd/common/www  
lines 1-9/9 (END)
```

- g. The terminal prompt will be available.

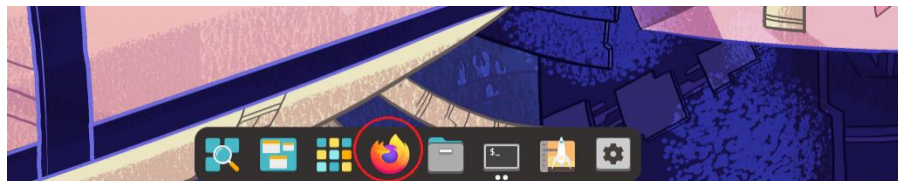


```
@ubuntu: ~  
ubuntu:~$ systemctl status snap.uhttpd.uhttpd.service  
● snap.uhttpd.uhttpd.service - Service for snap application uhttpd.uhttpd  
   Loaded: loaded (/etc/systemd/system/snap.uhttpd.uhttpd.service; enabled; v>  
   Active: active (running) since Tue 2023-04-25 19:29:12 UTC; 1min 6s ago  
     Main PID: 16006 (uhttpd)  
       Tasks: 5 (limit: 9076)  
      Memory: 5.6M  
         CPU: 182ms  
    CGroup: /system.slice/snap.uhttpd.uhttpd.service  
            └─16006 /snap/uhttpd/x1/bin/uhttpd -dir /var/snap/uhttpd/common/www  
ubuntu:~$
```

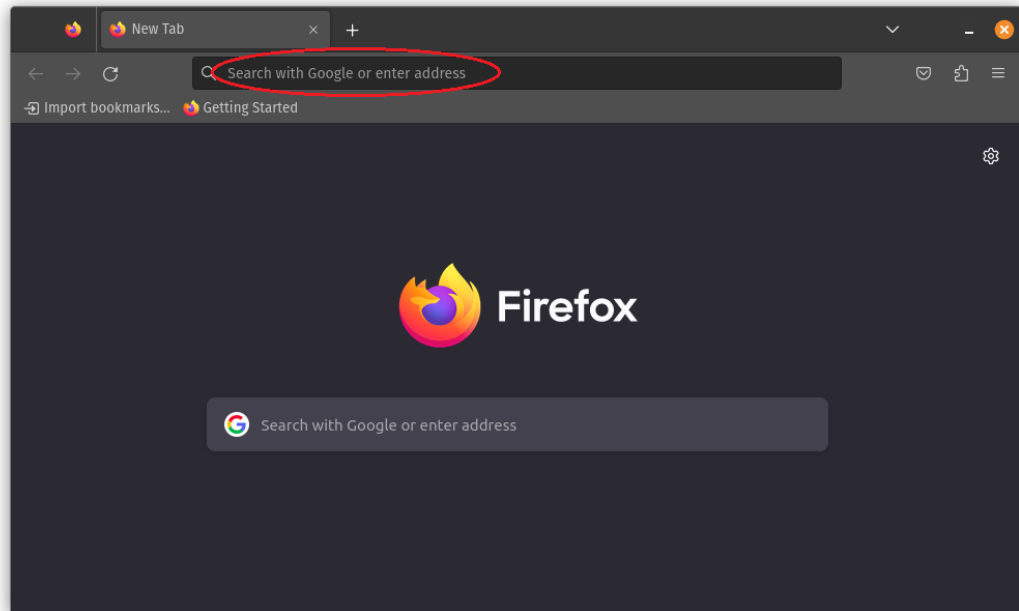
- h. Proceed to next steps.

6. Test Snap

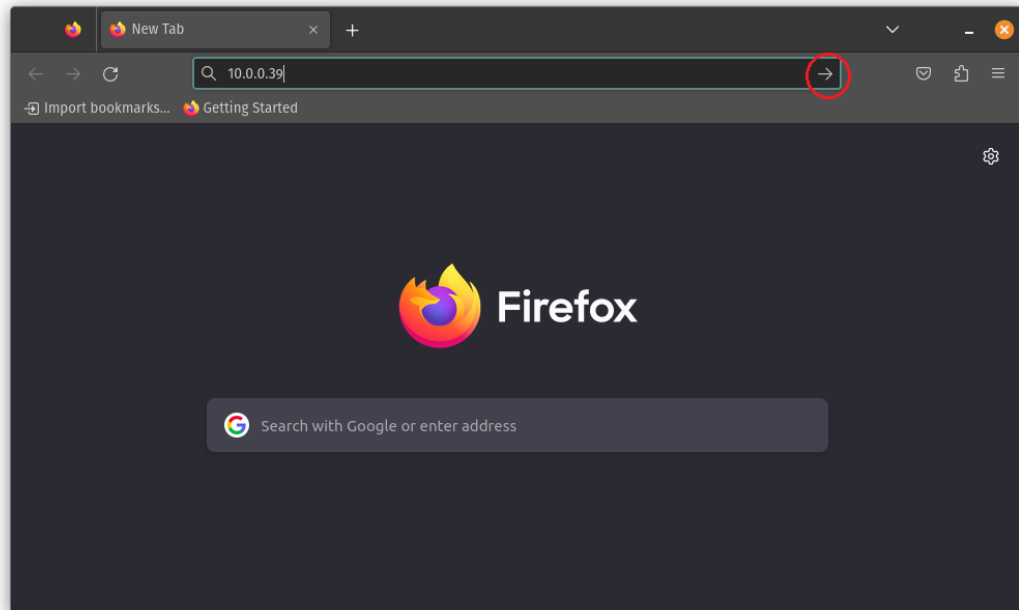
- a. Open a web browser, by clicking on the icon.



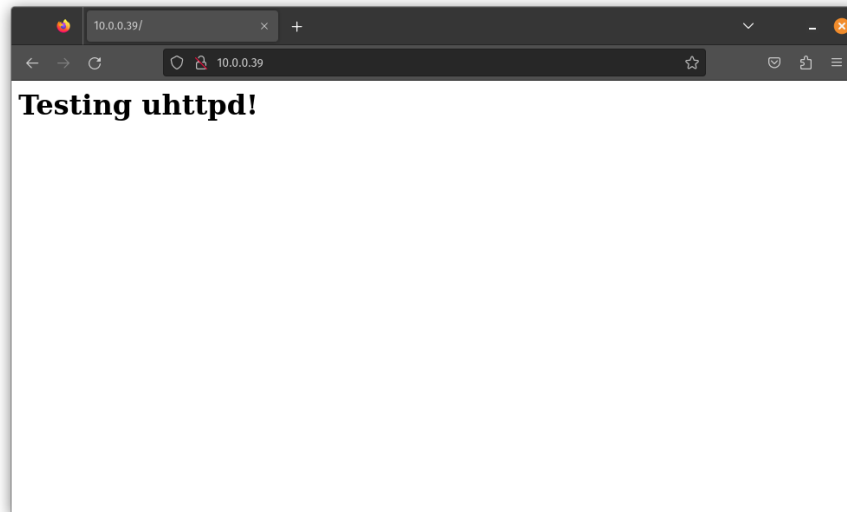
- b. Place the IP address of the Ubuntu Core machine, in this case: 10.0.0.39.



- c. Click the arrow to proceed to the webpage.



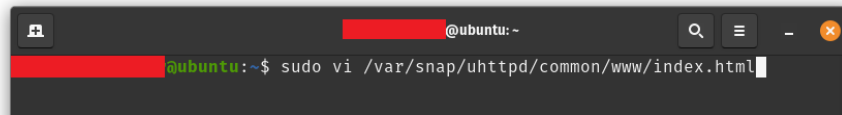
- d. The webpage “index.html” will be shown.



- e. Modify the file using “vi”.

Terminal Syntax:

```
sudo vi /var/snap/uhttpd/common/www/index.html
```



- f. Move the cursor to the end of “uhttpd” using arrow keys.



- g. Click on “i” on the keyboard to insert.

```
@ubuntu: -
<h1>Testing uhttpd</h1>

/var/snap/uhttpd/common/www/index.html" 1 line, 25 bytes
```

- h. Type the text “web service”.

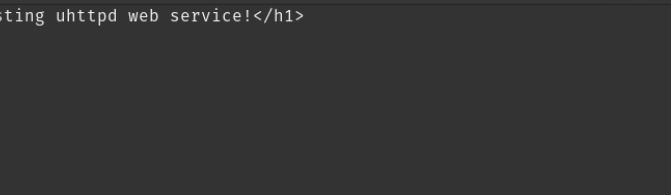
```
@ubuntu: -
<h1>Testing uhttpd web service</h1>

"/var/snap/uhttpd/common/www/index.html" 1 line, 25 bytes
```

- i. Press the “Esc” key on the keyboard.

[illegible]

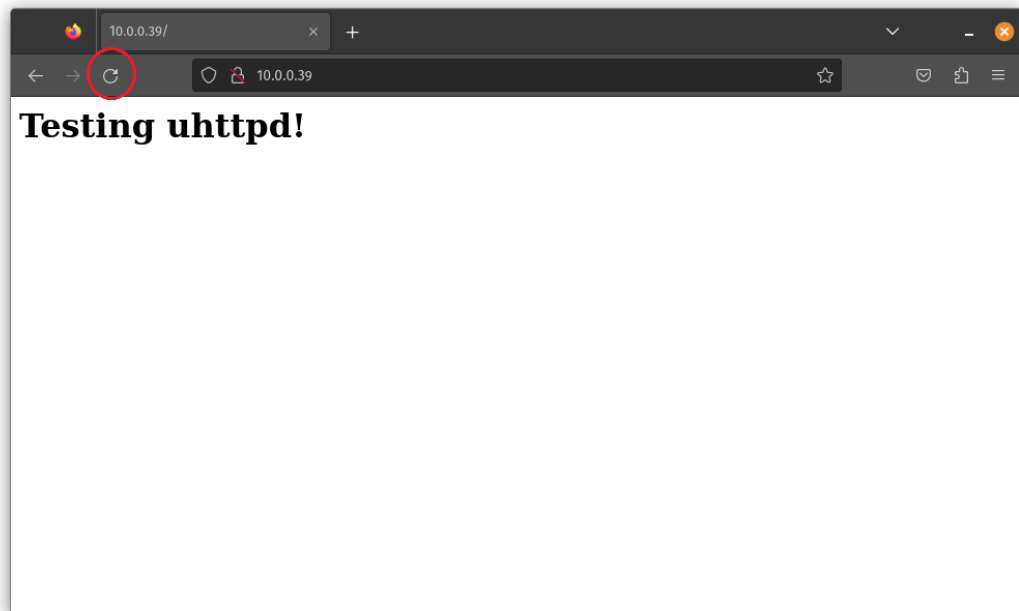
- j. Type “:wq”.



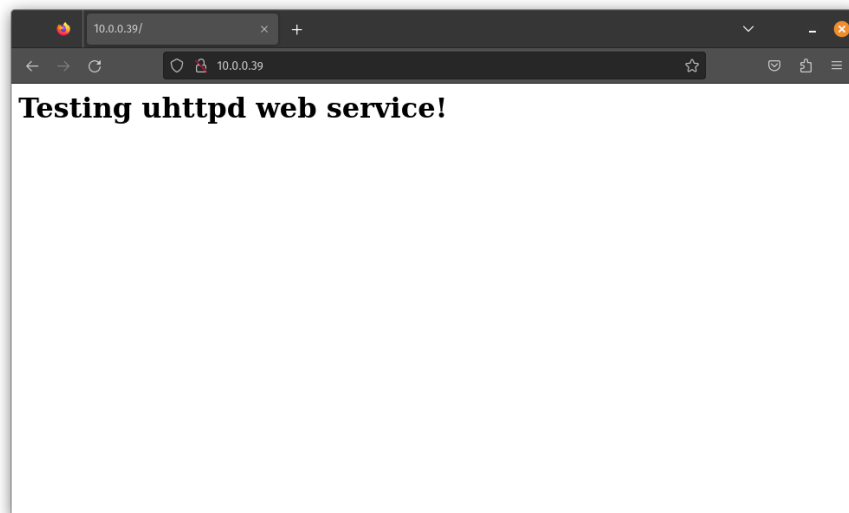
The screenshot shows a terminal window with a dark background. The title bar at the top indicates the user is logged in as 'root' on an 'ubuntu' machine. The terminal content shows the output of a curl command: 'Testing uhttpd web service!'. The output is enclosed in HTML tags: '<h1>Testing uhttpd web service!</h1>'. The prompt ':wq' is visible at the bottom left, indicating the user is in a text editor.

```
root@ubuntu: ~  
<h1>Testing uhttpd web service!</h1>  
:wq
```

- k. Refresh the page.



- l. The updated text is shown.



- m. Proceed to next steps.

Tips & Warnings

- None

Related

- Video on “Snapcraft Live - Building server snaps”:
 - <https://www.youtube.com/watch?v=y0vtk5MDqA4>