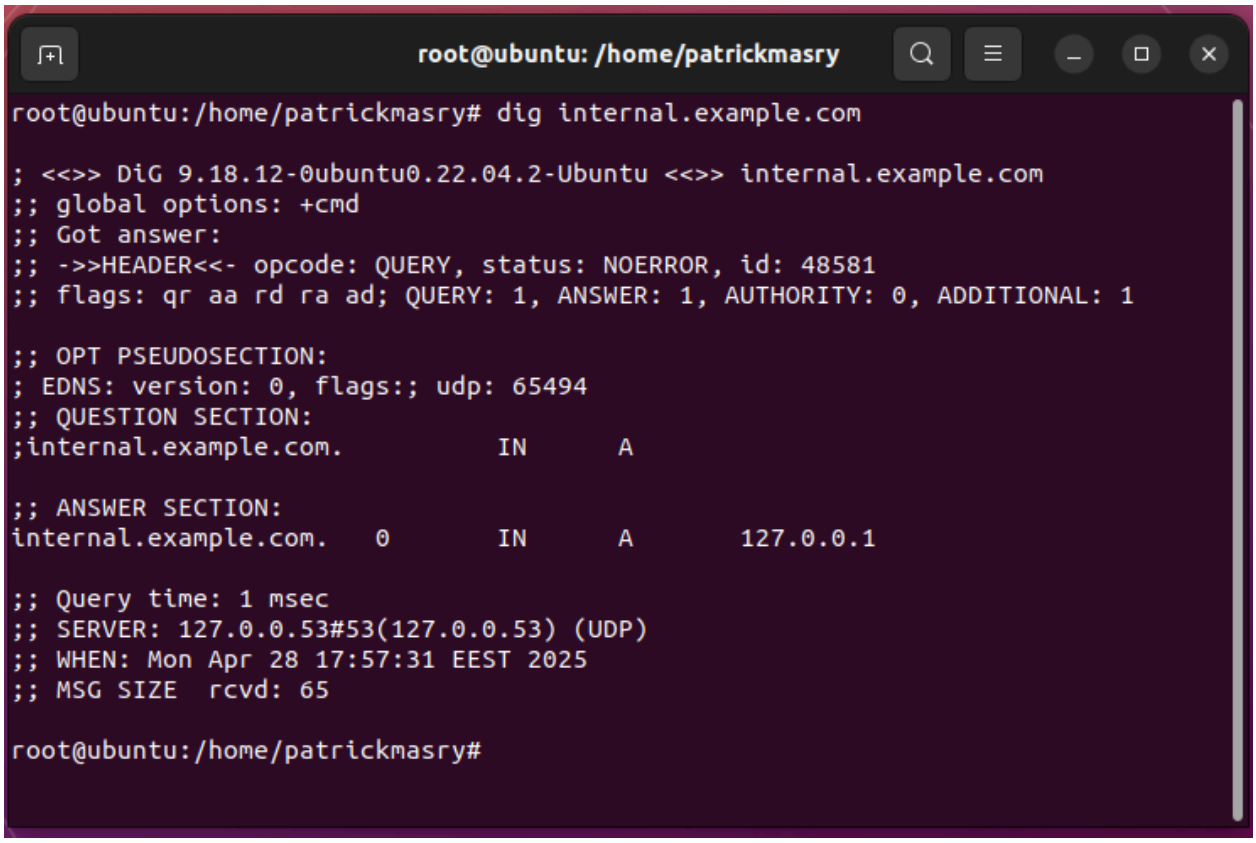
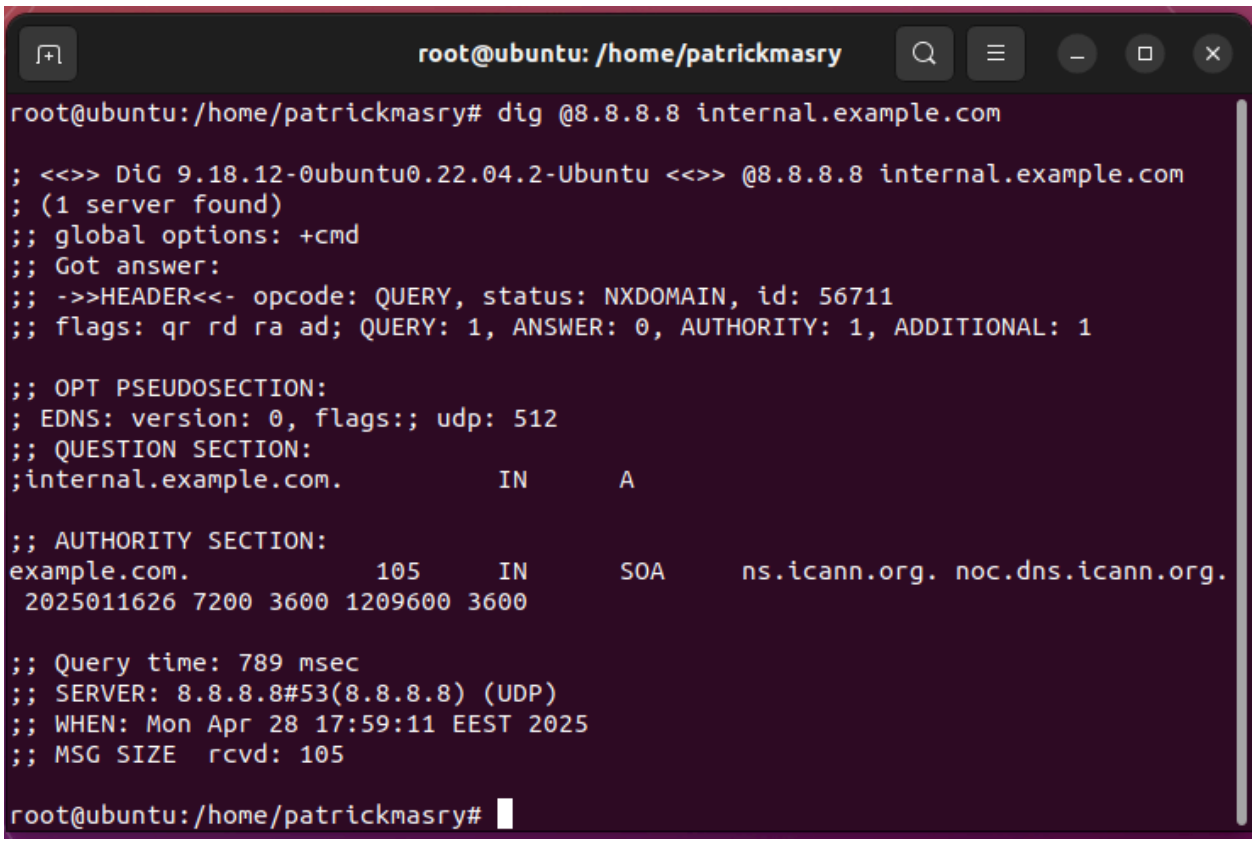
1. Verify DNS Resolution :

First, I verified DNS resolution using this command :
dig internal.example.com

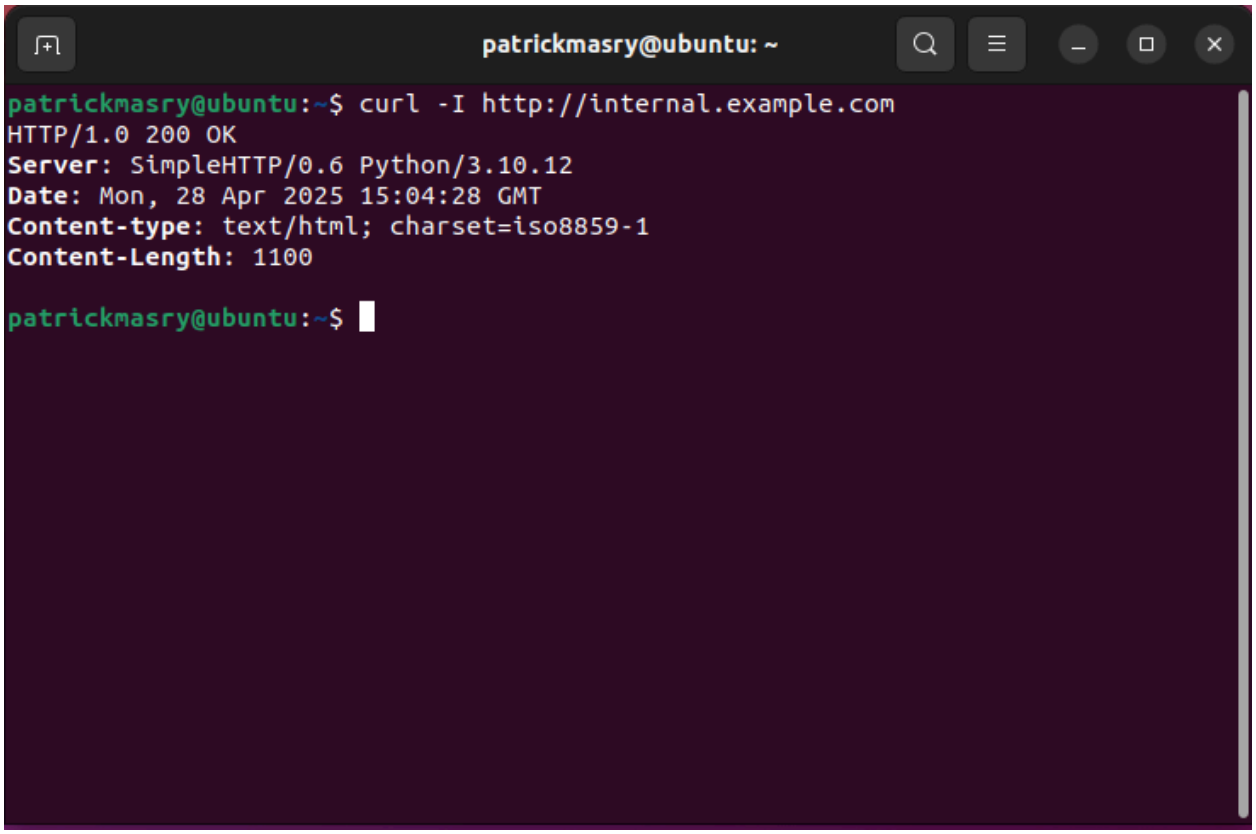


Then I checked against Google's DNS server using this command :
dig @8.8.8.8 internal.example.com



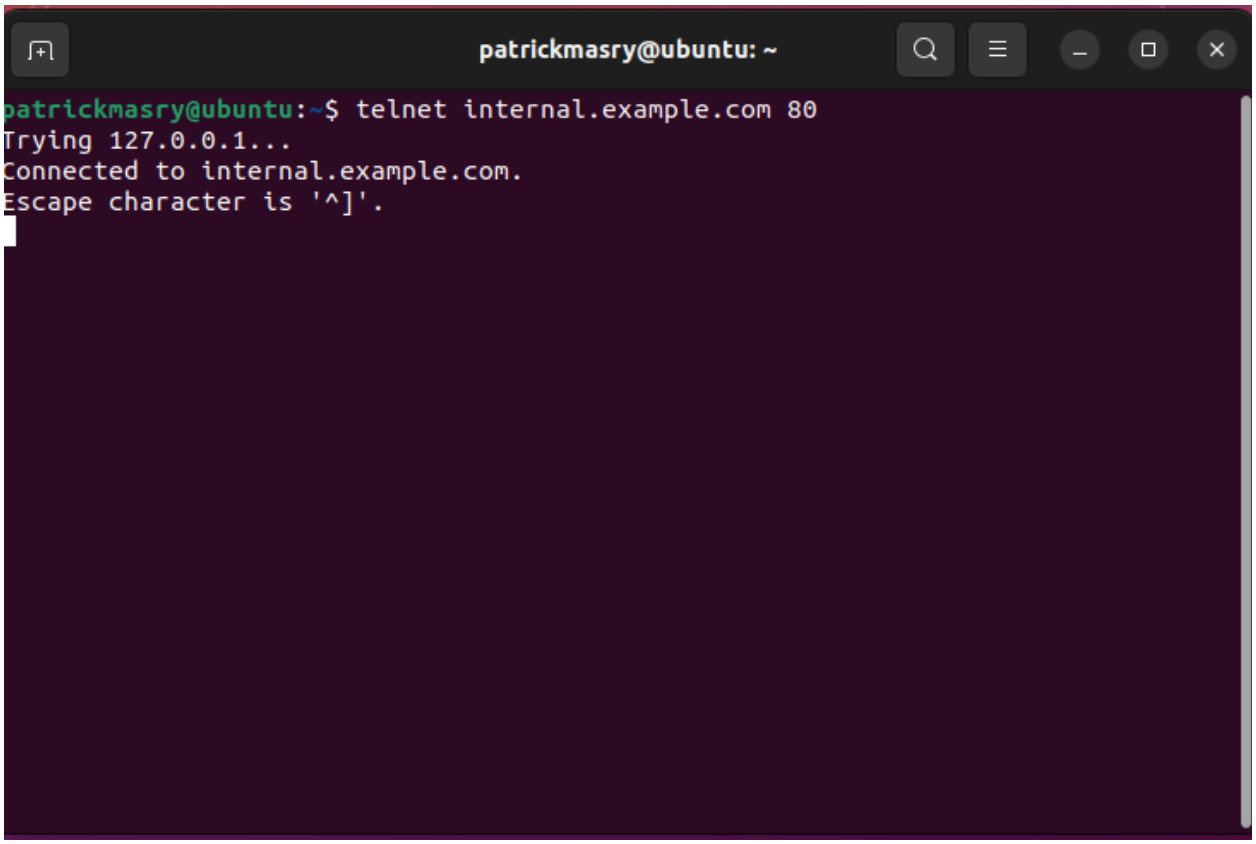
2. Diagnose Service Reachability :

I confirmed the web service was reachable by this command :
curl -I http://internal.example.com



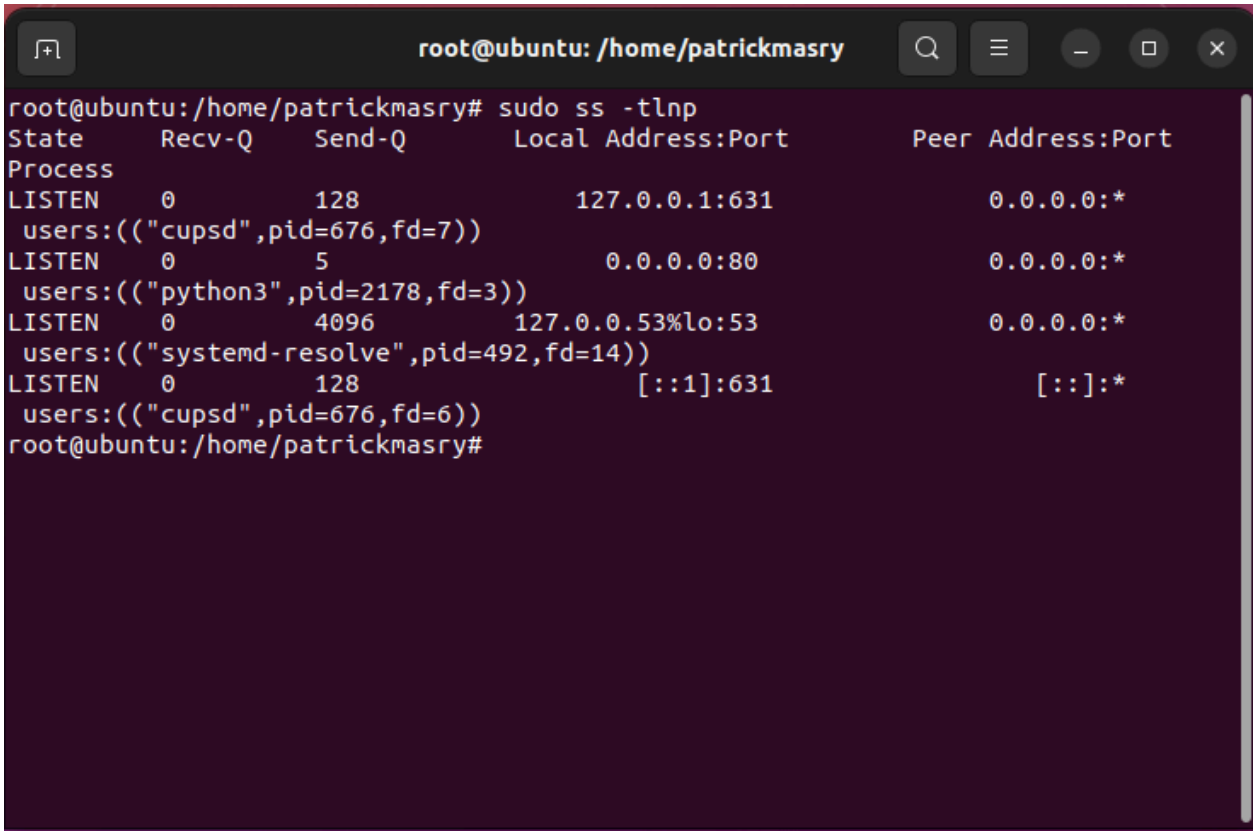
Then I checked port connectivity by this command :

telnet internal.example.com 80



Then verified service is listening by this command :

sudo ss -tlnp



Tracing the Issue and Listing All Possible Causes :

1. DNS Misconfiguration

- Possible Cause : The DNS configuration is incorrect.
- How to Confirm : Use the `dig` command; it shows an NXDOMAIN error or an incorrect IP address.
- How to Fix : Update the `/etc/hosts` file or correct the DNS server settings.
- Command : Use `sudo nano /etc/hosts`.

2. Web Service Not Running

- Possible Cause : The web service is not running.
- How to Confirm : Using `curl` fails, and `ss` or `netstat` show no listening service on the expected port.
- How to Fix : Restart or start the web service.
- Command : Use `sudo python3 -m http.server 80` to test or start the service.

3. Firewall Blocking Port

- Possible Cause : The firewall is blocking access to the required port.
- How to Confirm : Using `telnet` fails to connect, resulting in a timeout.
- How to Fix : Allow port 80 through the firewall.
- Command : Use `sudo ufw allow 80`.

4. Wrong IP in DNS

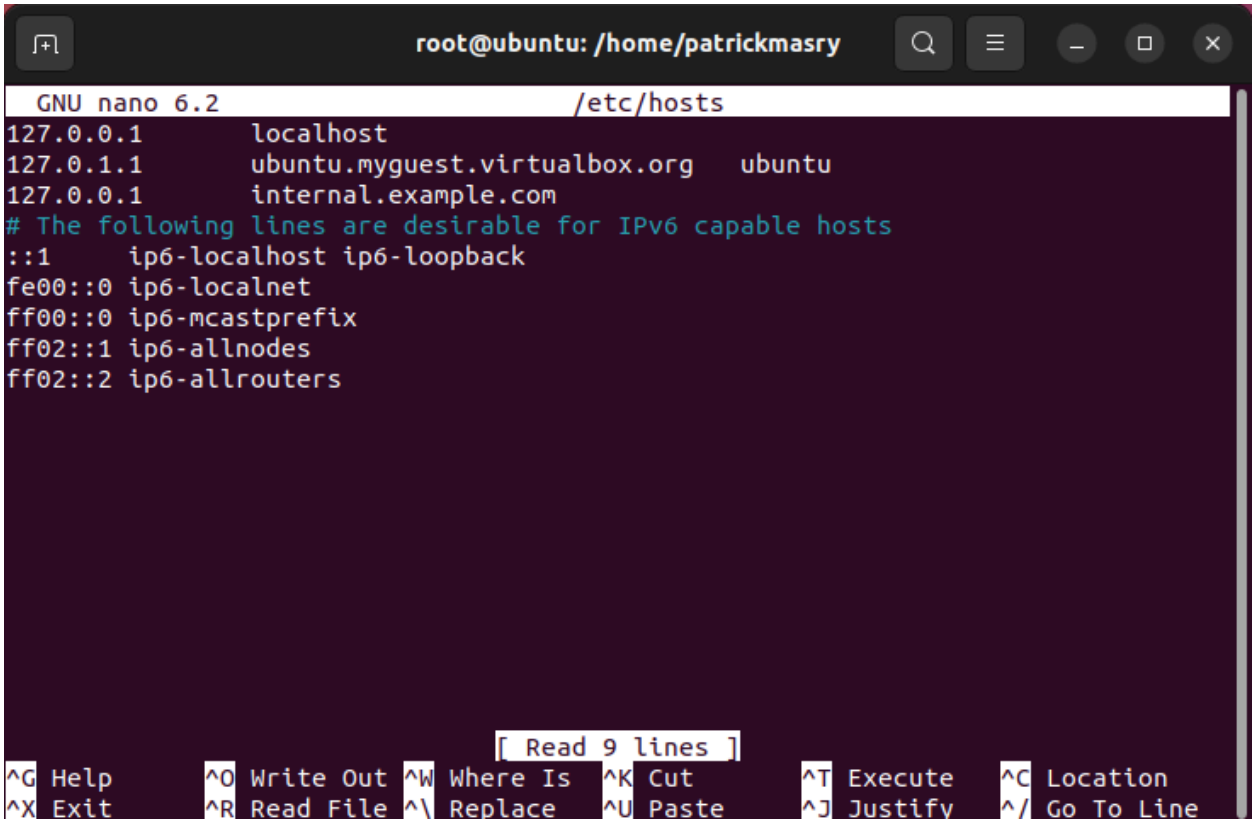
- Possible Cause : The DNS records contain an incorrect IP address.
- How to Confirm : Using `dig` shows an incorrect IP address.
- How to Fix : Update the DNS settings or modify the `/etc/hosts` file.
- Command : Use `sudo nano /etc/hosts`.

5. Routing Problems

- Possible Cause : There are issues with network routing.
- How to Confirm : The `ping` command fails even when DNS resolution is correct.
- How to Fix : Fix routing or firewall configurations.
- Command : Use `ping 127.0.0.1` to test basic connectivity.

Bonus section :

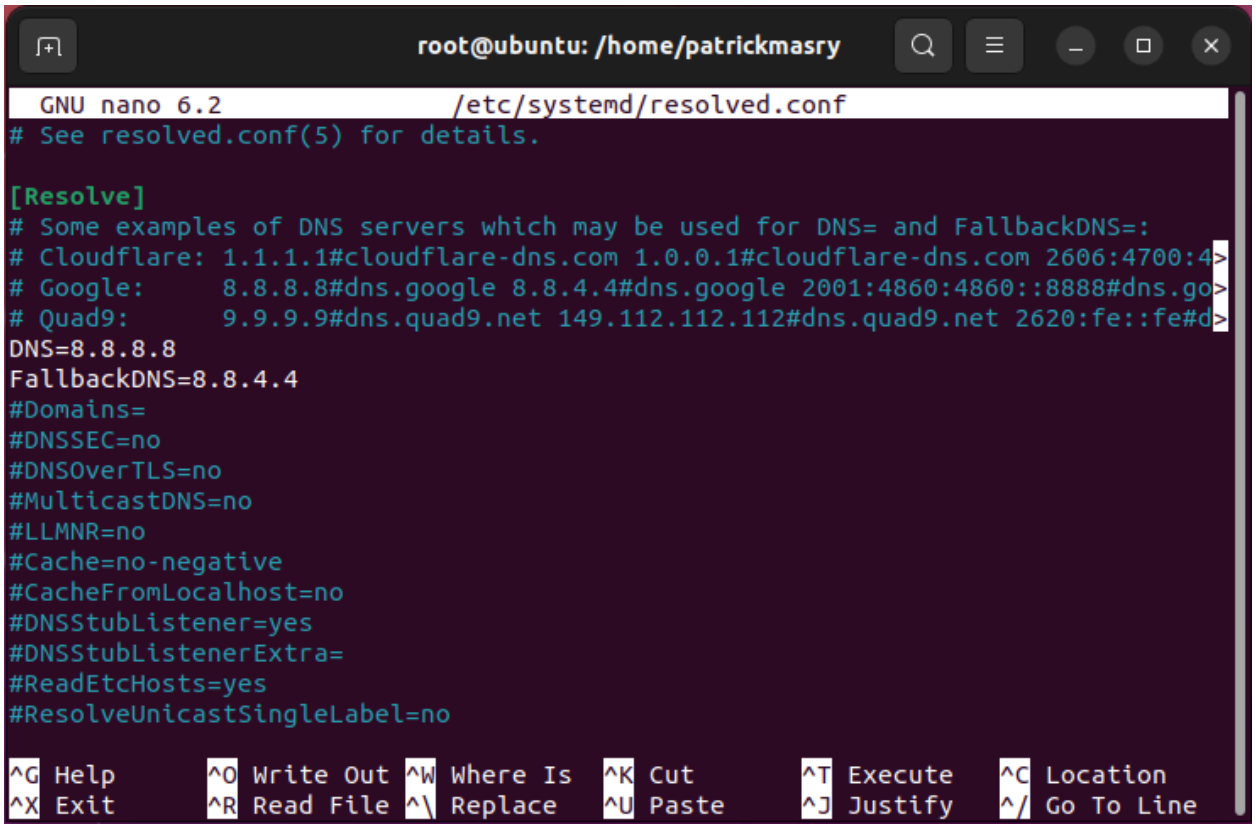
Configure a local /etc/hosts entry to bypass DNS for testing.



Show how to persist DNS server settings using systemd-resolved or NetworkManager.

I used systemd-resolved

Edited `/etc/systemd/resolved.conf`



Then restarted the service and checked it's status