Project Name: **Cybersecurity Club's Raspberry Pi Networking Project**

Date: **June 30, 2023**

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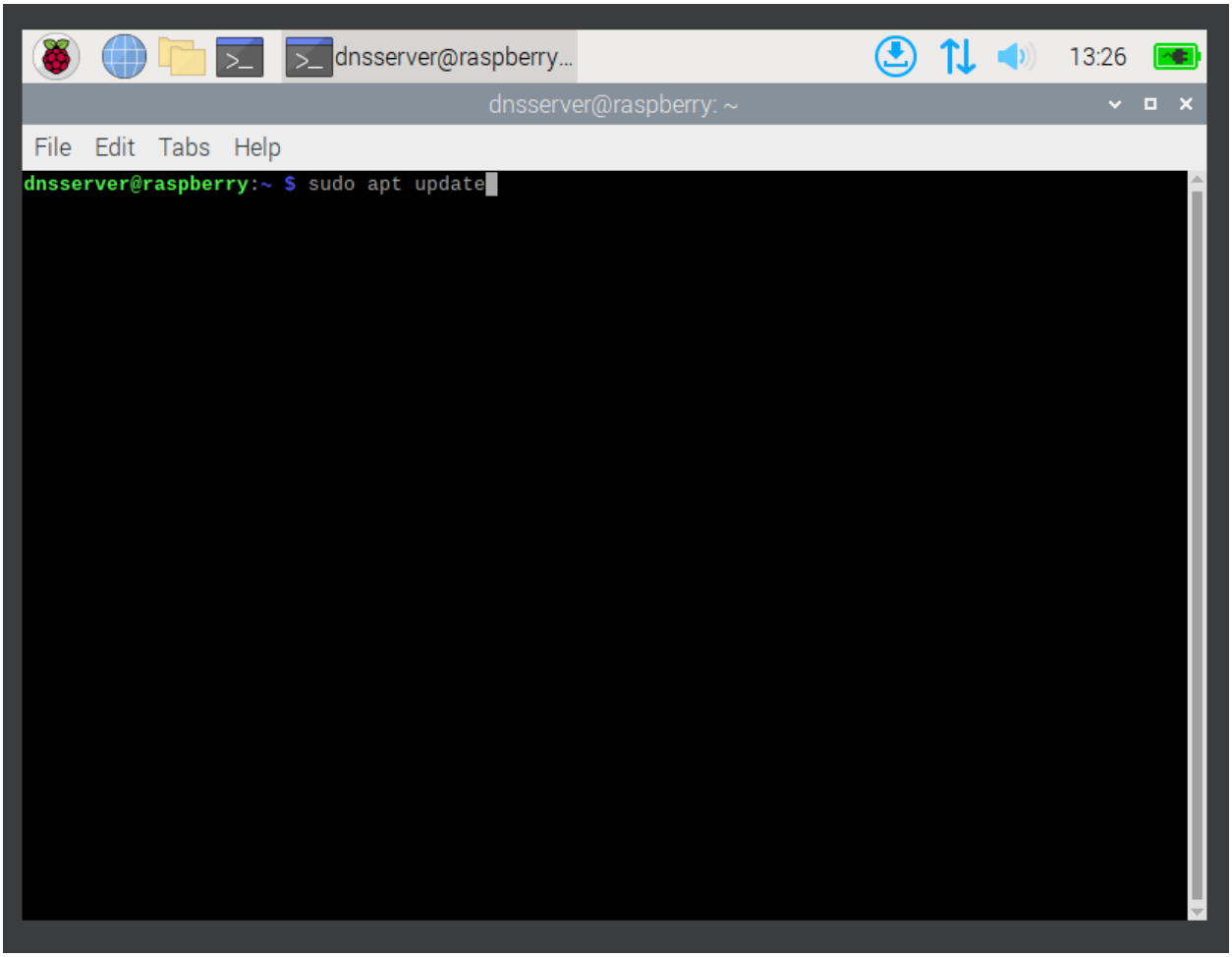
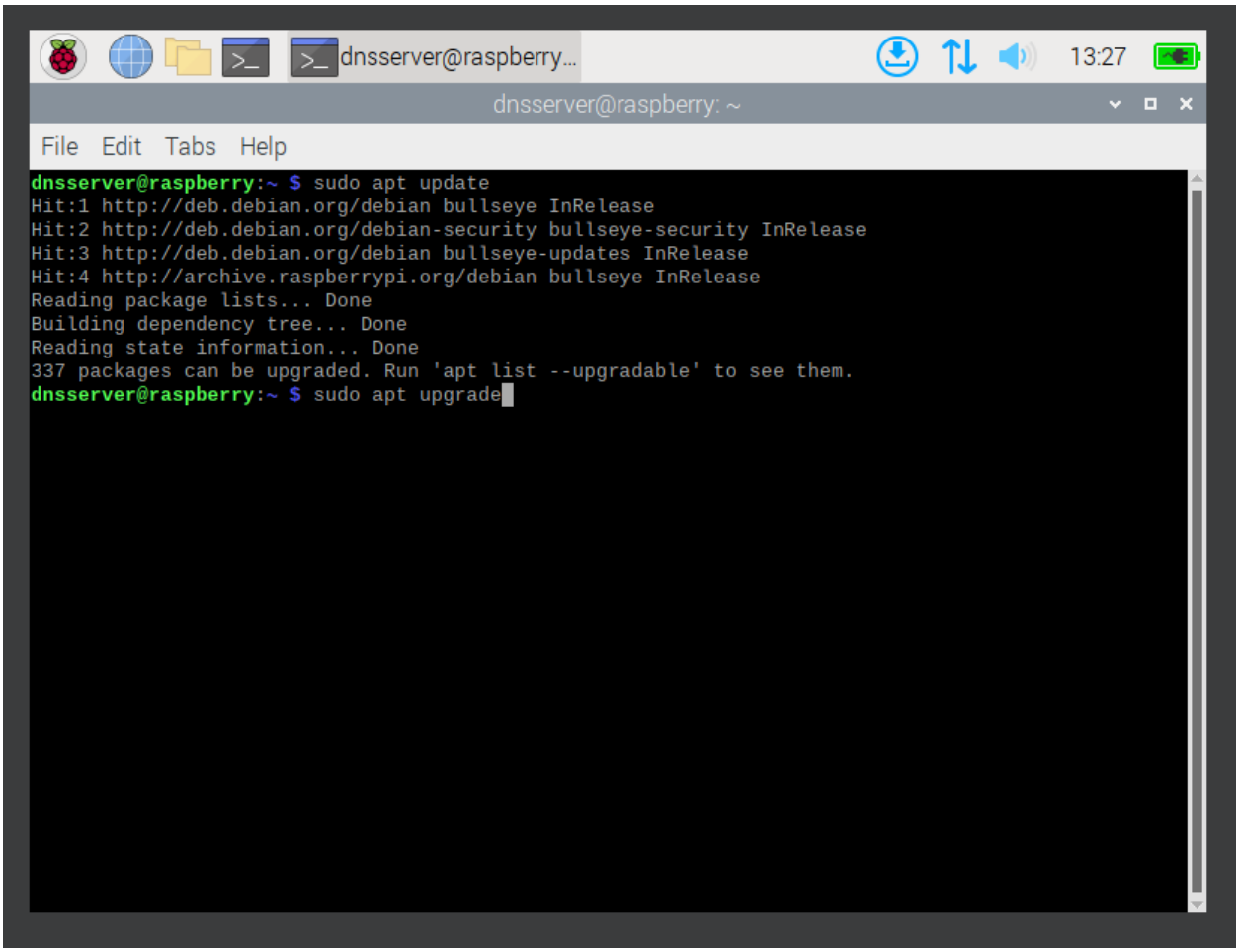
Purpose: **Documentation for the DNS Server**

Set up a Raspberry Pi as a DNS Server

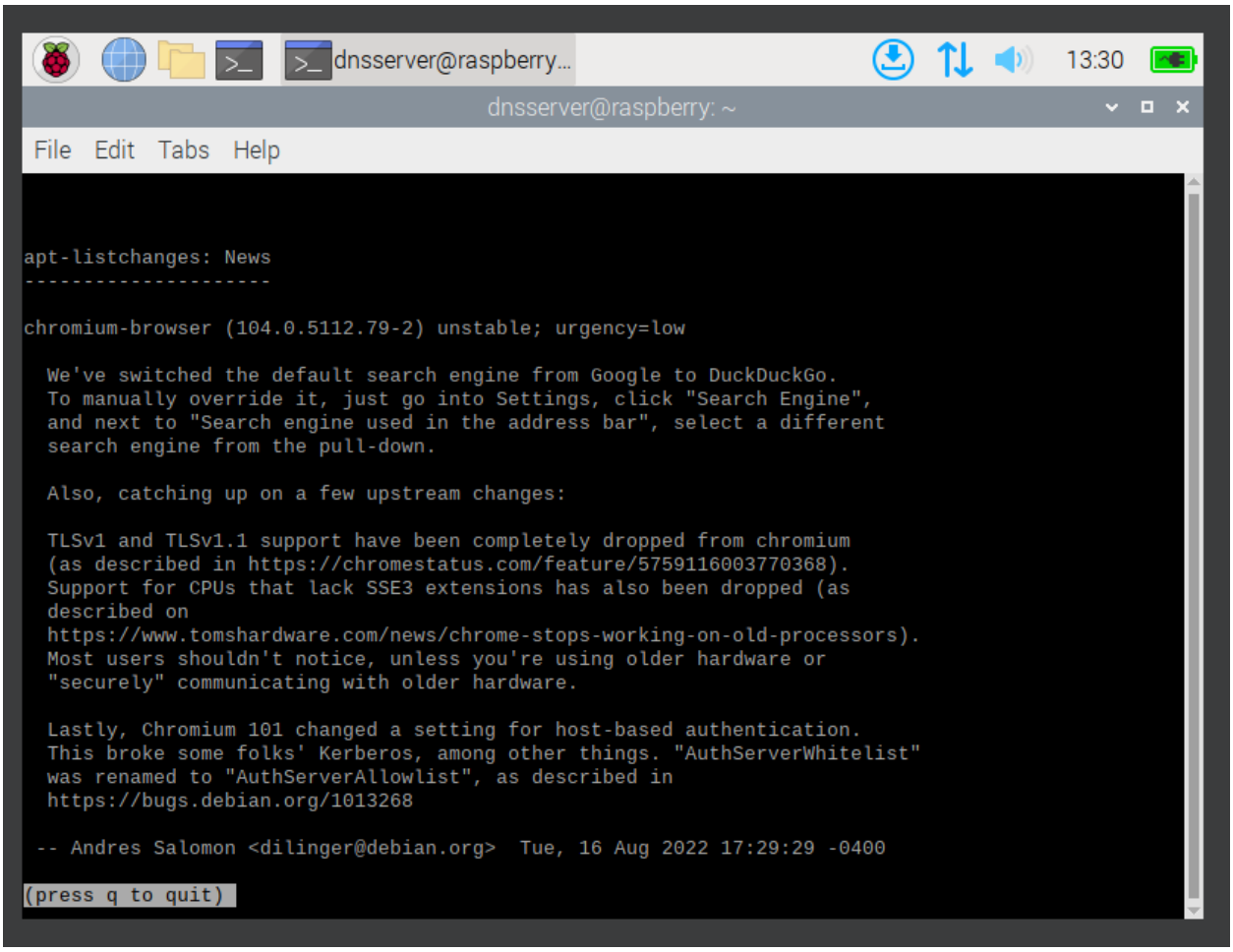
1. I opened the Terminal, and typed the following: **sudo apt update**, this command will update the local package cache, refreshes package lists, and check for updates



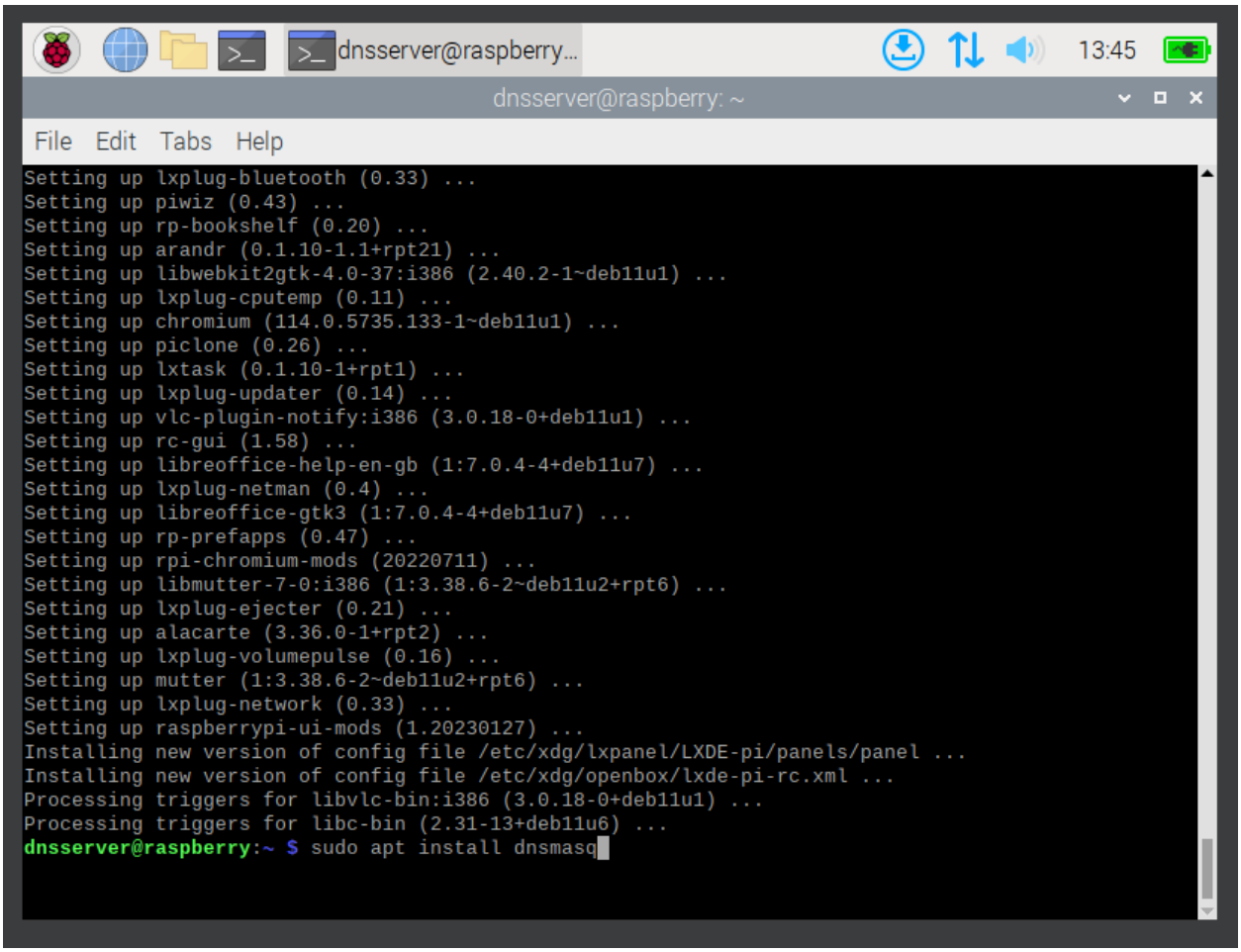
2. I typed the command: **sudo apt upgrade**, this command will upgrade/update the packages that are already installed on the raspberry pi OS.



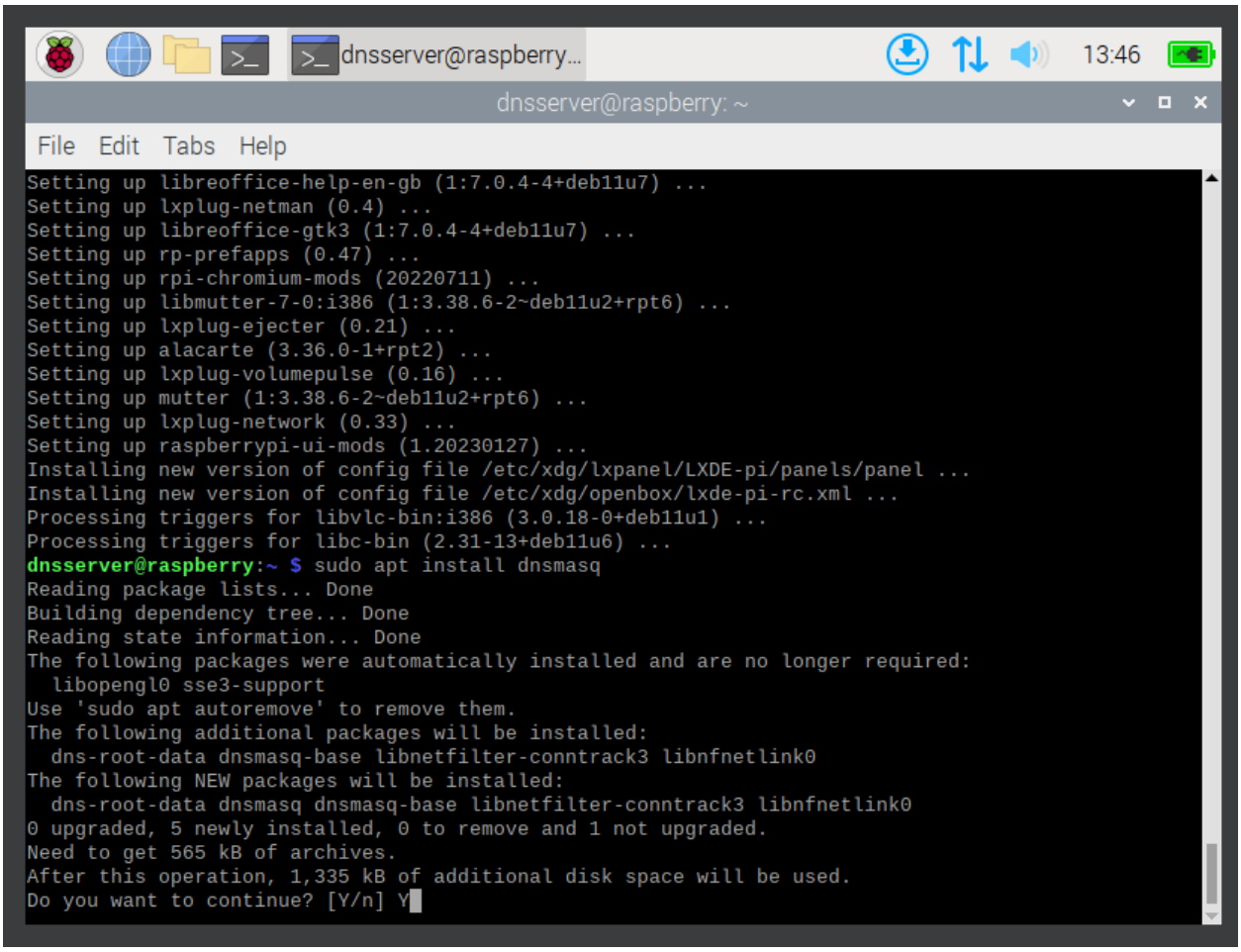
3. After the Installation is done, it will display the **apt-listchanges: News,** what changes have occurred.



4. I've typed the following command: **sudo apt install dnsmasq**, this command will install the **dnsmasq** software package on our Raspberry Pi OS.



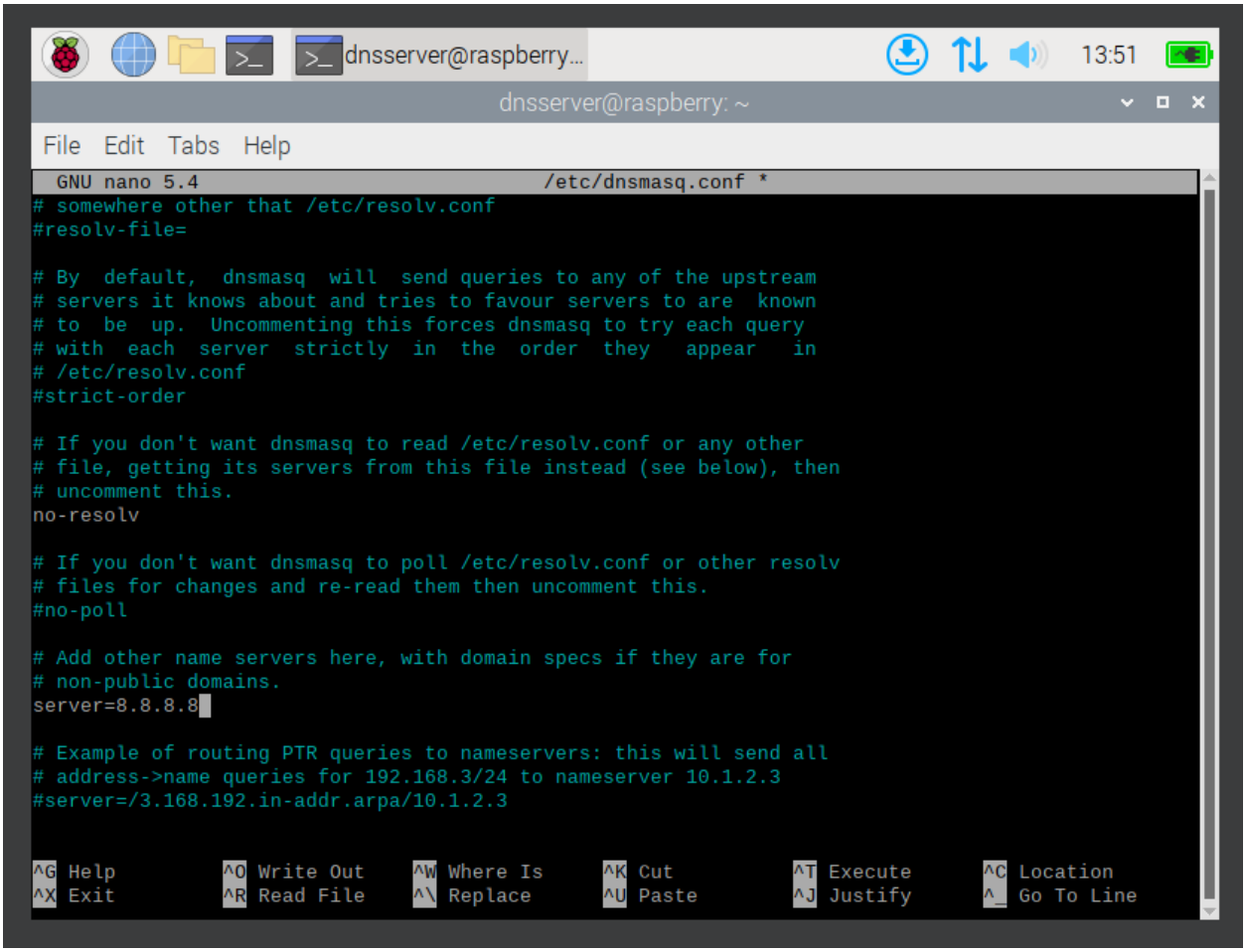
5. I've Pressed **Y** and hit enter, to accept 1335 KB of additional disk space.



6. I modified the dnsmasq.conf file, through this command: **sudo nano /etc/dnsmasq.conf** , using the keys **CTRL+W** to find and uncomment the

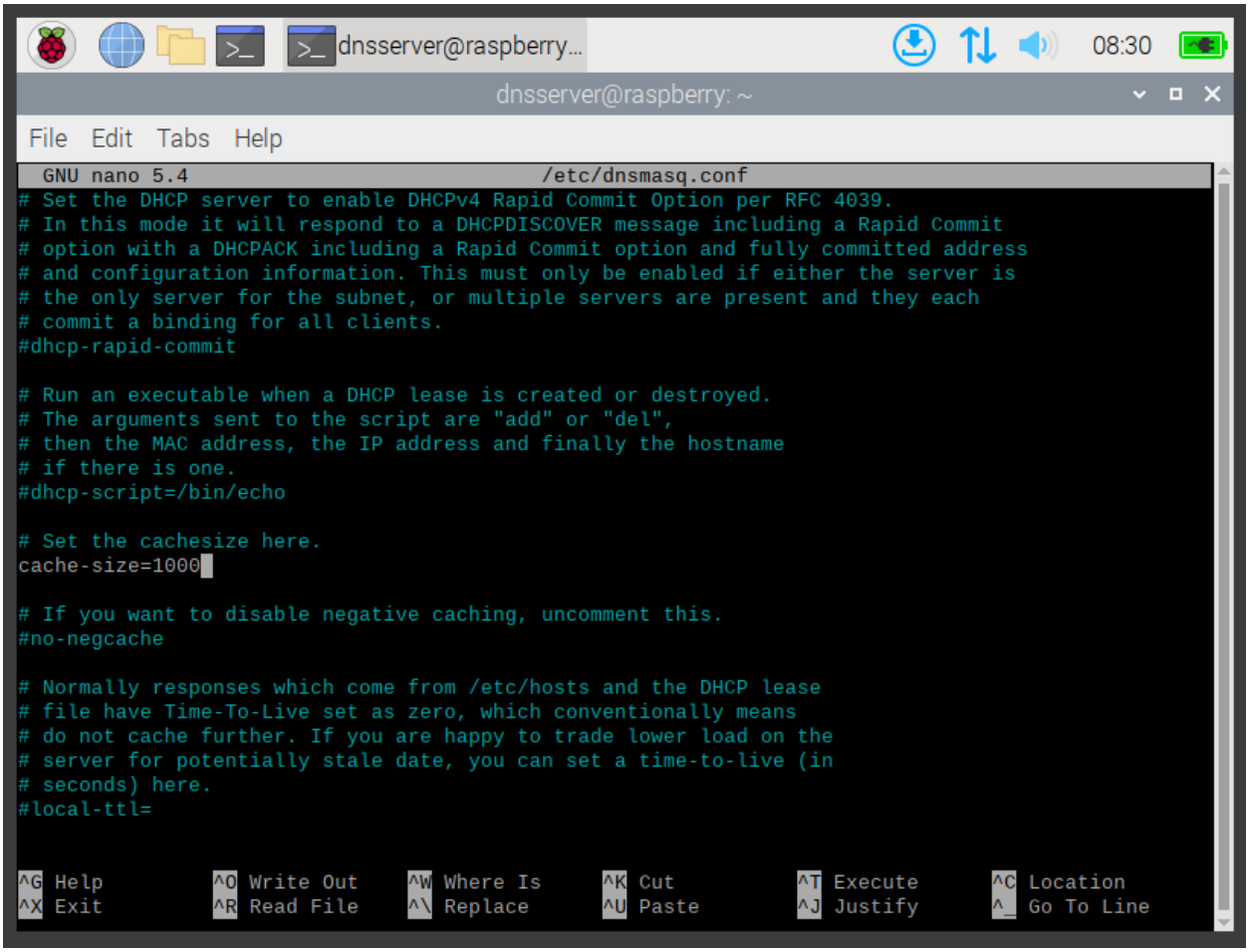
following: **domain-needed, bogus-priv, no-resolv**. The next line to find is **#sever=/localnet/192.168.0.1** , and removing it and replacing it with **server=8.8.8.8** and **server=8.8.4.4** next is finding

Note: adding **server=8.8.8.8, server=8.8.4.4** makes use of Google's DNS Servers for upstream nameservers.

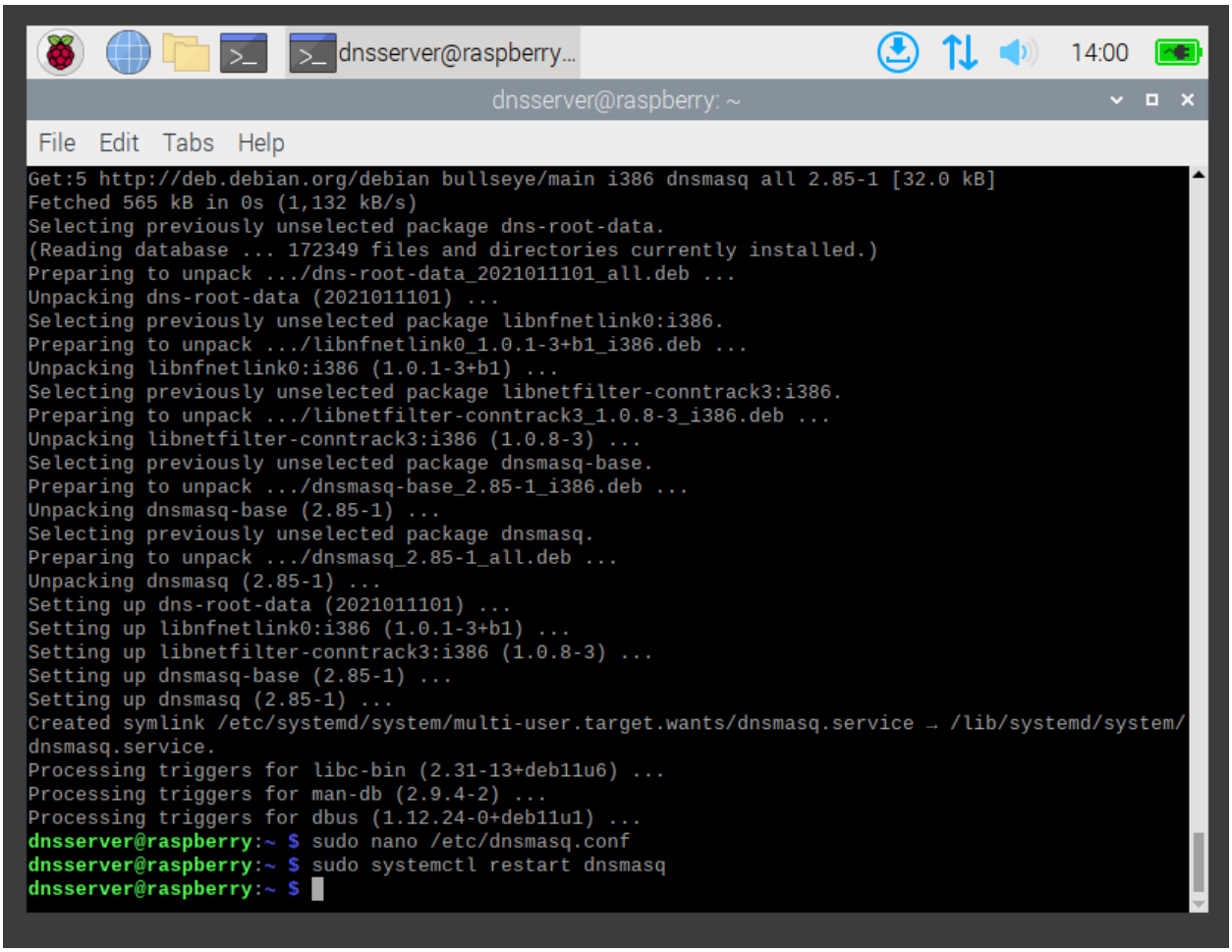


7. The next thing to change is by uncommenting **#cache-size=150** and changing the value from **150** to **1000**. I'd save the file using **CTRL+X** then pressing **Y** and hitting enter to keep the changes.

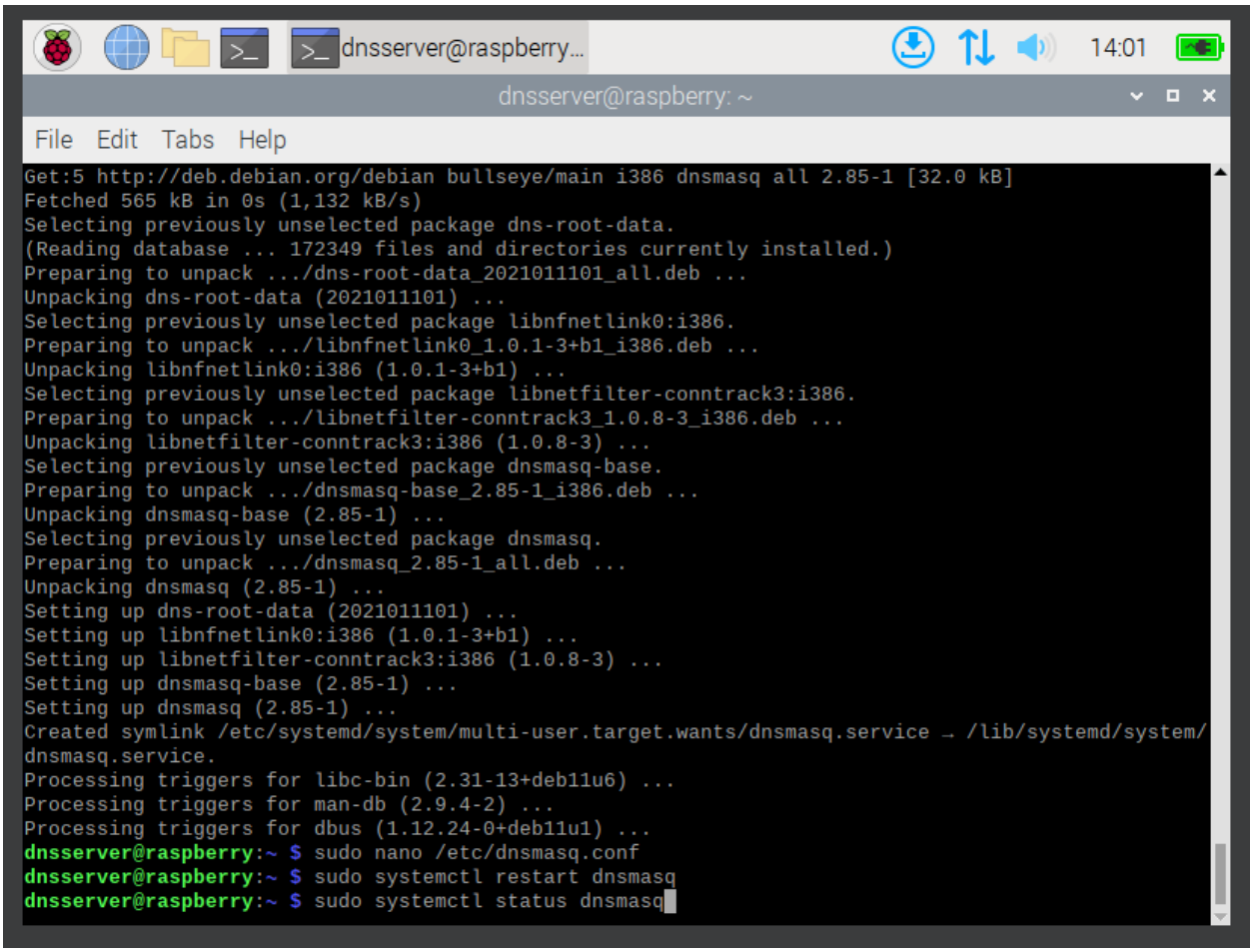
Note: More DNS queries are avoided by the DNSMasq cache when the cache size is increased. The DNS lookup time is decreased, which enhances network performance.



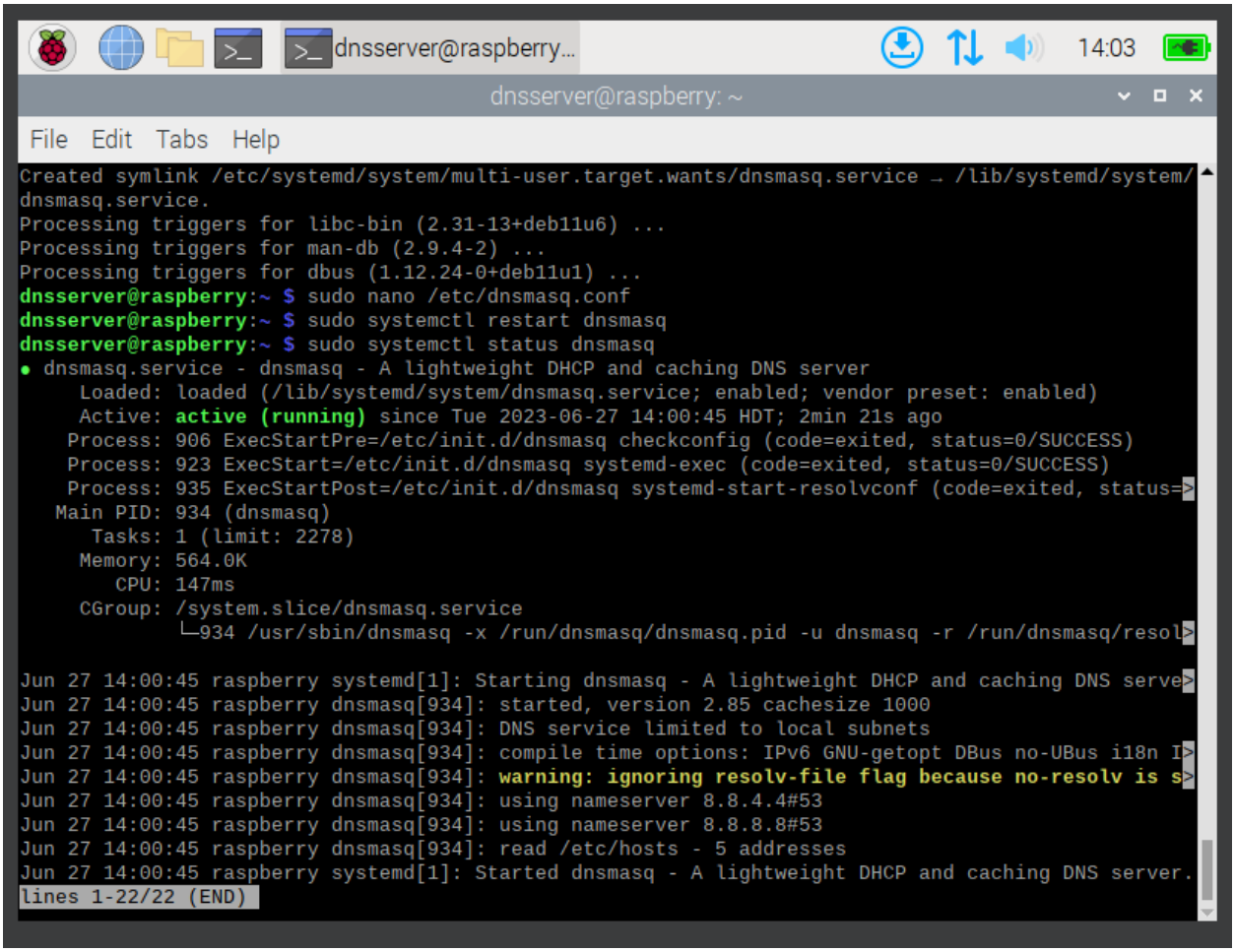
8. I had to restart the dnsmasq service to apply the changes, using the command: **sudo systemctl restart dnsmasq**.



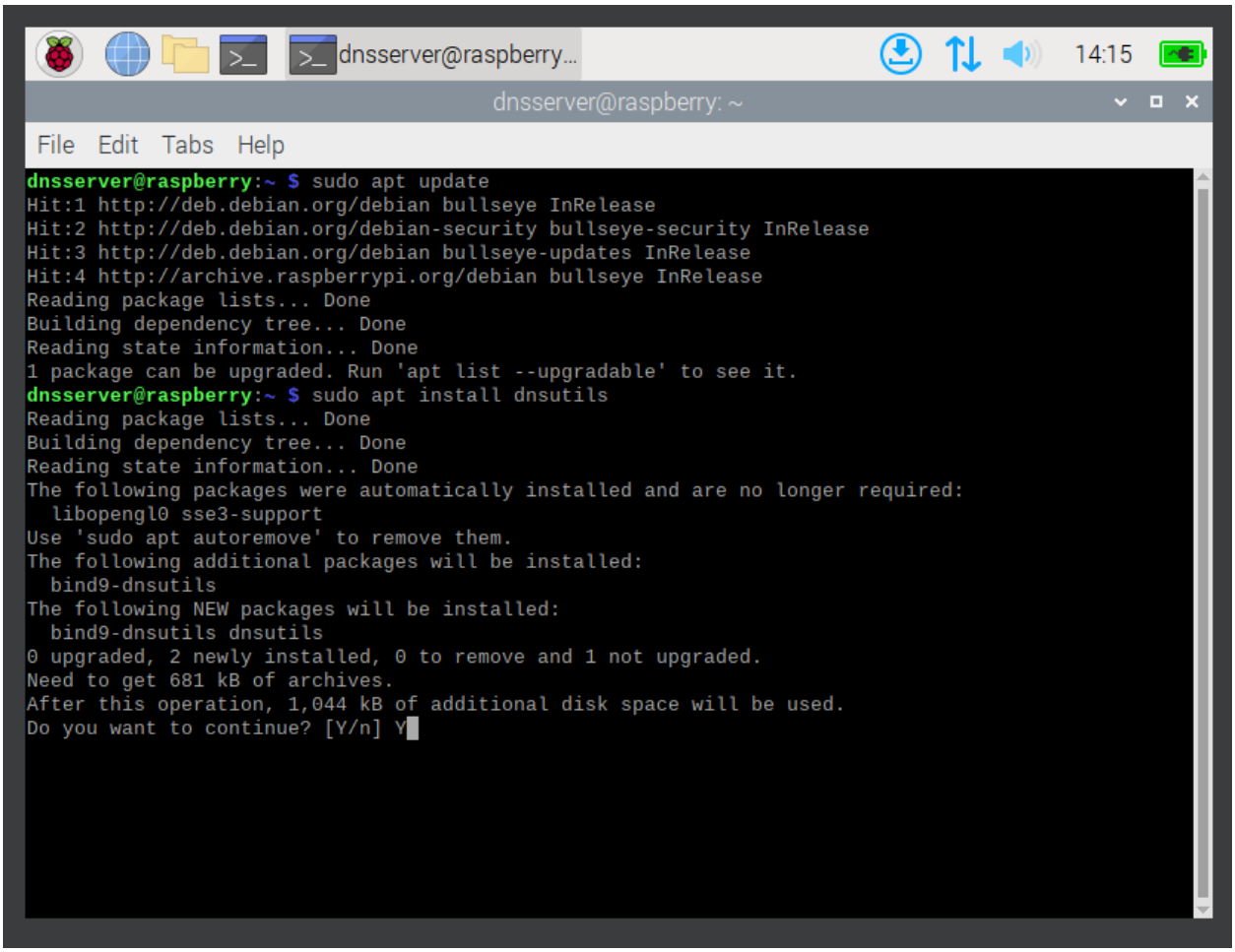
9. Next is to check the status of dnsmasq service, by using the command: **sudo systemctl status dnsmasq.**



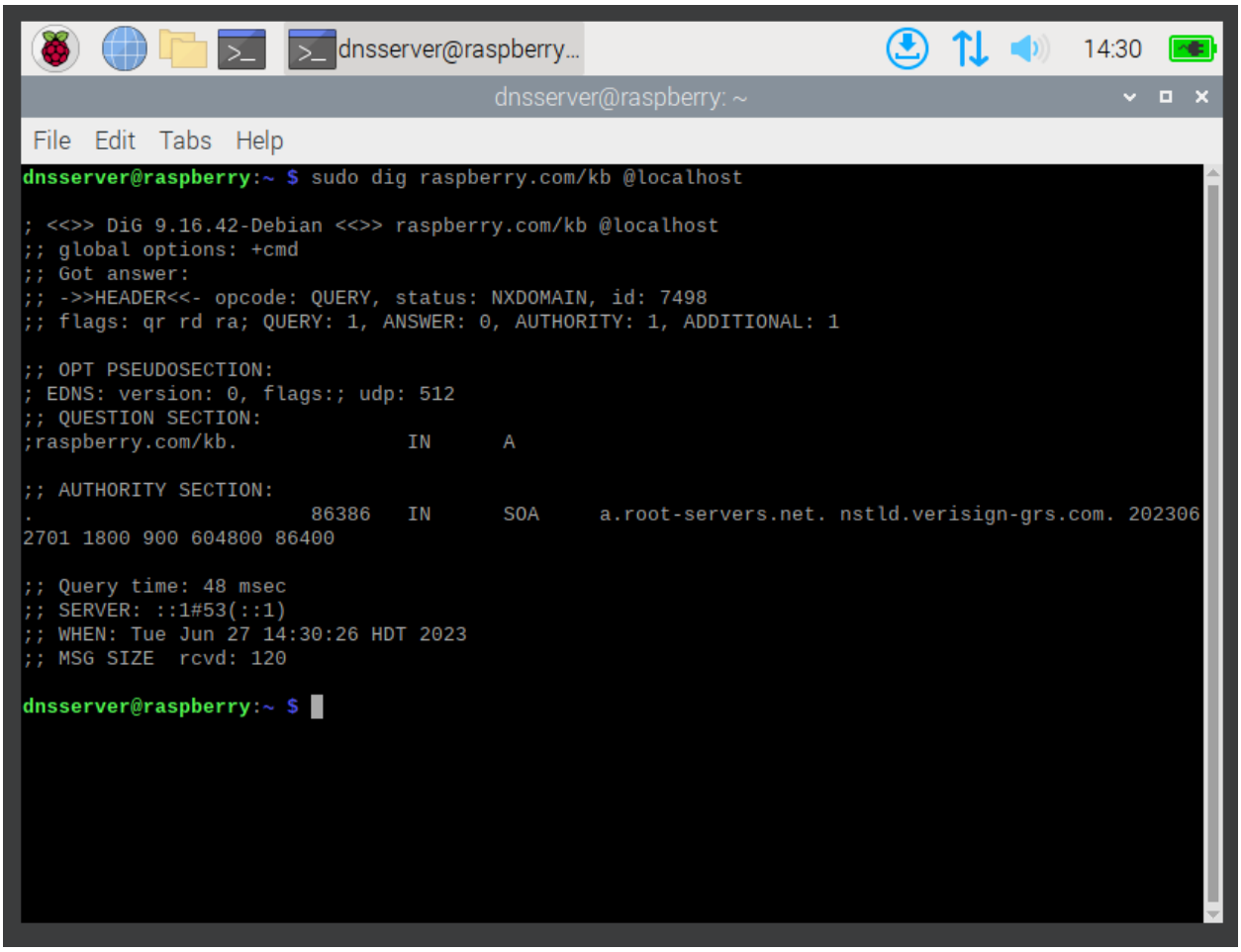
10. As we can see from the dnsmasq service, it is active (running), which indicates that our Raspberry Pi is running as a DNS server.



11. The next command I was suppose to run was: **sudo dig raspberry.com/kb @localhost**, however when I runned that command it prompted me that there was no such command (**dig**)therefore I had to run the command: **sudo apt update** to update its packages and run the following command: **sudo apt install dnsutils** to install the necessary tools (**dig**).



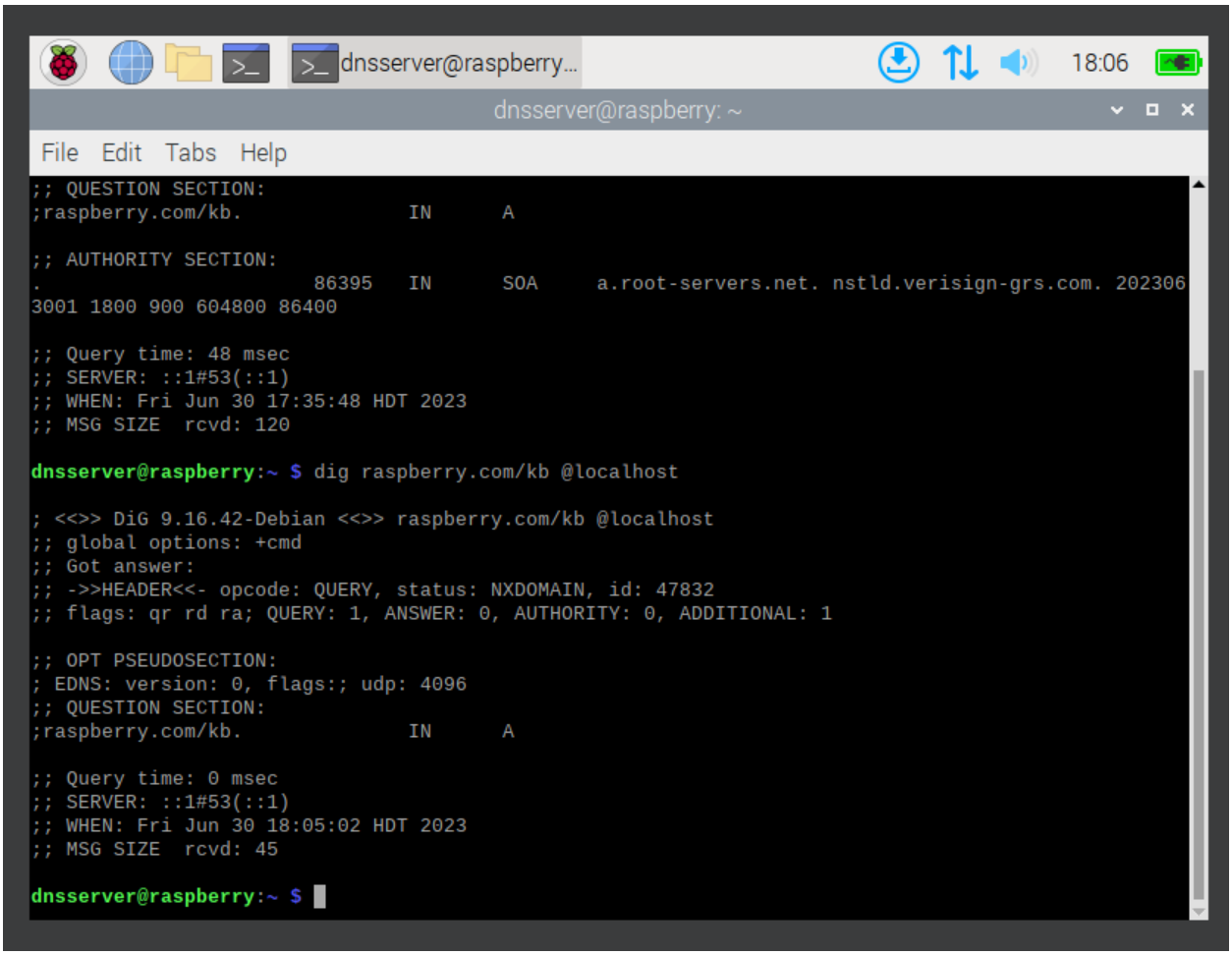
12. The next thing to do is finally test it by running the command: **sudo dig raspberry.com/kb @localhost** and as we can see the **query time is 48 msec**.


dnsserver@raspberry...
14:30
dnsserver@raspberry: ~
File Edit Tabs Help
dnsserver@raspberry:~ $ sudo dig raspberry.com/kb @localhost
; <<>> DiG 9.16.42-Debian <<>> raspberry.com/kb @localhost
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 7498
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;raspberry.com/kb. IN A
;; AUTHORITY SECTION:
. 86386 IN SOA a.root-servers.net. nstld.verisign-grs.com. 202306
2701 1800 900 604800 86400
;; Query time: 48 msec
;; SERVER: ::1#53(::1)
;; WHEN: Tue Jun 27 14:30:26 HDT 2023
;; MSG SIZE rcvd: 120
dnsserver@raspberry:~ $

13. I want to test it once again to see if the query time has changed, and as it displays the query time has to **0 msec** we can verify that the address has been cached.

    Note: the next step supposedly is to configure the endpoints/devices to use the Raspberry Pi as a DNS server however that is beyond this documentation.

    References: https://phoenixnap.com/kb/raspberry-pi-dns-server



14. As a bonus I added a text file called **dns_info.txt** so that if anyone wants to know the commands executed for the raspberry pi running as a DNS server, they

can read that file. It also states who executed the commands previously, since I added the command history there.