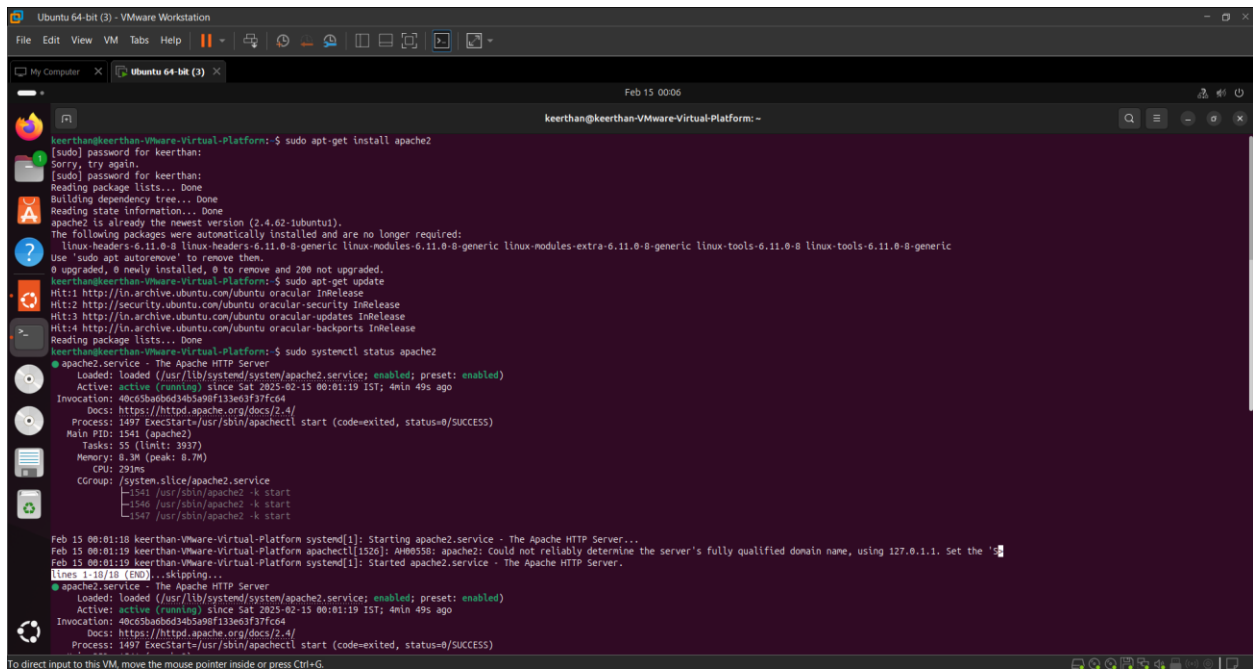


# COMPUTER NETWORK

NAME : Keerthan P.V

SRN : PES2UG23CS272

## SERVER SIDE:



```
keerthan@keerthan-VMware-Virtual-Platform: ~$ sudo apt-get install apache2
[sudo] password for keerthan:
[sudo] password for keerthan:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
apache2 is already the newest version (2.4.62-1ubuntu1).
The following packages were automatically installed and are no longer required:
  linux-headers-6.11.0-8 linux-headers-6.11.0-8-generic linux-modules-6.11.0-8-generic linux-modules-extra-6.11.0-8-generic linux-tools-6.11.0-8-generic
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 208 not upgraded.
keerthan@keerthan-VMware-Virtual-Platform: ~$ sudo apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu oracular InRelease
Hit:2 http://security.ubuntu.com/ubuntu oracular-security InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu oracular-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu oracular-backports InRelease
Reading package lists... Done
keerthan@keerthan-VMware-Virtual-Platform: ~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-02-15 00:01:19 IST; 4min 49s ago
   Invocation: 40c5ba0b6d34b5a98f133e3f37fc04
   Docs: https://httpd.apache.org/docs/2.4/
   Process: 1497 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 1541 (apache2)
   Tasks: 55 (limit: 3937)
   Memory: 8.3M (peak: 8.7M)
   CPU: 291ms
   CGroup: /system.slice/apache2.service
           └─1541 /usr/sbin/apache2 -k start
             └─1546 /usr/sbin/apache2 -k start
               └─1547 /usr/sbin/apache2 -k start

Feb 15 00:01:18 keerthan-VMware-Virtual-Platform systemd[1]: Starting apache2.service - The Apache HTTP Server...
Feb 15 00:01:19 keerthan-VMware-Virtual-Platform apachectl[1526]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.0.1. Set the '
Feb 15 00:01:19 keerthan-VMware-Virtual-Platform systemd[1]: Started apache2.service - The Apache HTTP Server.
lines 1-18/18 (END) ...skipping...
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-02-15 00:01:19 IST; 4min 49s ago
   Invocation: 40c5ba0b6d34b5a98f133e3f37fc04
   Docs: https://httpd.apache.org/docs/2.4/
   Process: 1497 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
```

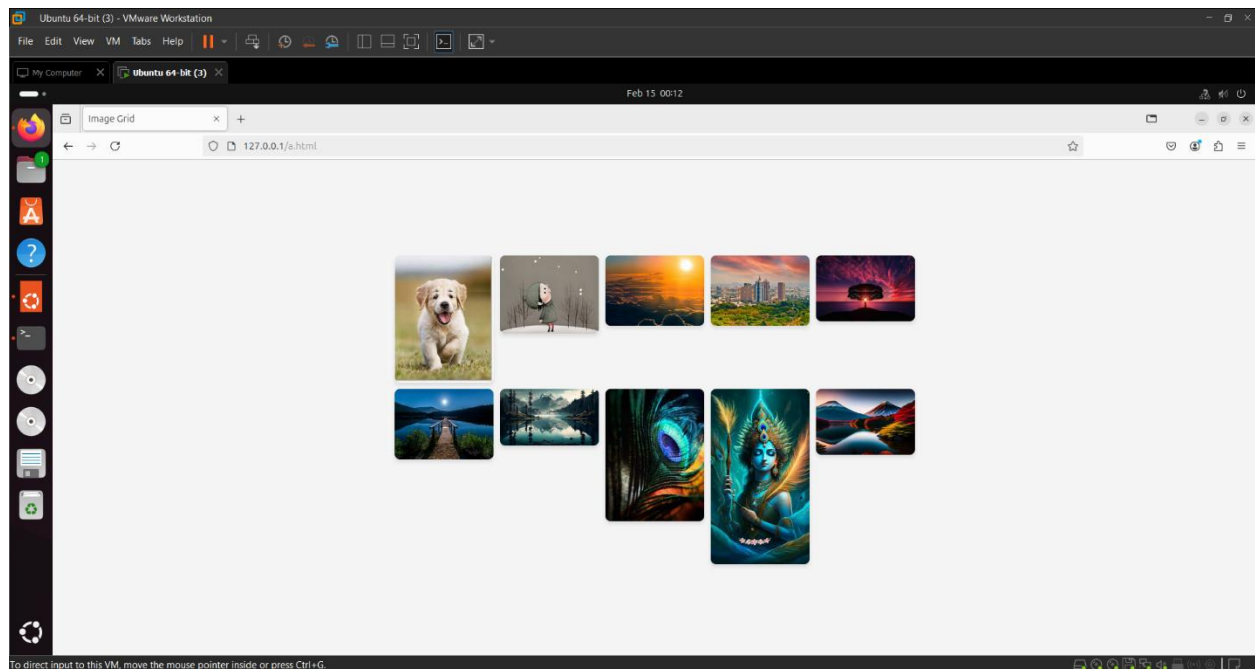
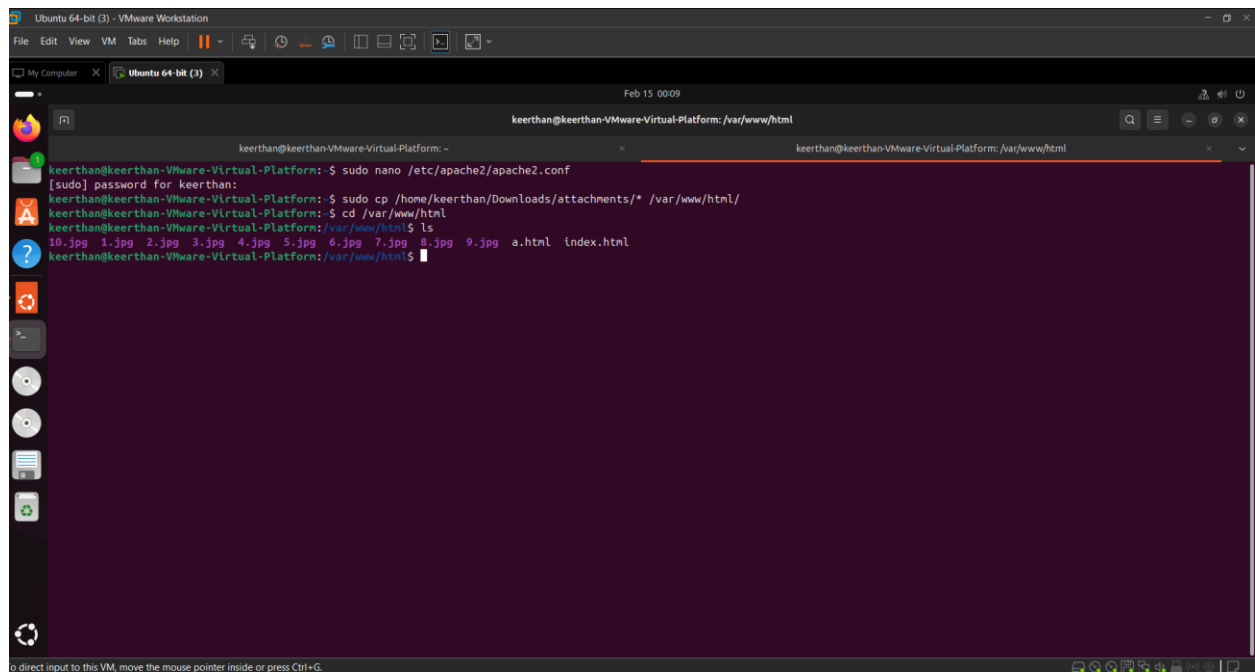
```
Ubuntu 64-bit (3) - VMware Workstation
File Edit View VM Tabs Help
My Computer x Ubuntu 64-bit (1) x
Feb 15 00:07
keerthan@keerthan-VMware-Virtual-Platform: ~
keerthan@keerthan-VMware-Virtual-Platform: $ sudo apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu oracular InRelease
Hit:2 http://security.ubuntu.com/ubuntu oracular-security InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu oracular-updates InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu oracular-backports InRelease
Reading package lists... Done
keerthan@keerthan-VMware-Virtual-Platform: $ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-02-15 00:01:19 IST; 4m1s 49s ago
     Invocation: 40c65ba06d34b5a98f133e6f377cd4
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 1497 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 1541 (apache2)
      Tasks: 55 (limit: 3937)
     Memory: 8.3M (peak: 8.7M)
        CPU: 29ms
    CGroup: /system.slice/apache2.service
            └─1541 /usr/sbin/apache2 -k start
            └─1546 /usr/sbin/apache2 -k start
            └─1547 /usr/sbin/apache2 -k start

Feb 15 00:01:18 keerthan-VMware-Virtual-Platform systemd[1]: Starting apache2.service - The Apache HTTP Server...
Feb 15 00:01:19 keerthan-VMware-Virtual-Platform apache2[1520]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.1.1. Set the 'ServerName' directive globally to suppress this message
Feb 15 00:01:19 keerthan-VMware-Virtual-Platform systemd[1]: Started apache2.service - The Apache HTTP Server.
lines 1-10/18 (END) ...skipping...
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-02-15 00:01:19 IST; 4m1s 49s ago
     Invocation: 40c65ba06d34b5a98f133e6f377cd4
       Docs: https://httpd.apache.org/docs/2.4/
    Process: 1497 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
   Main PID: 1541 (apache2)
      Tasks: 55 (limit: 3937)
     Memory: 8.3M (peak: 8.7M)
        CPU: 29ms
    CGroup: /system.slice/apache2.service
            └─1541 /usr/sbin/apache2 -k start
            └─1546 /usr/sbin/apache2 -k start
            └─1547 /usr/sbin/apache2 -k start

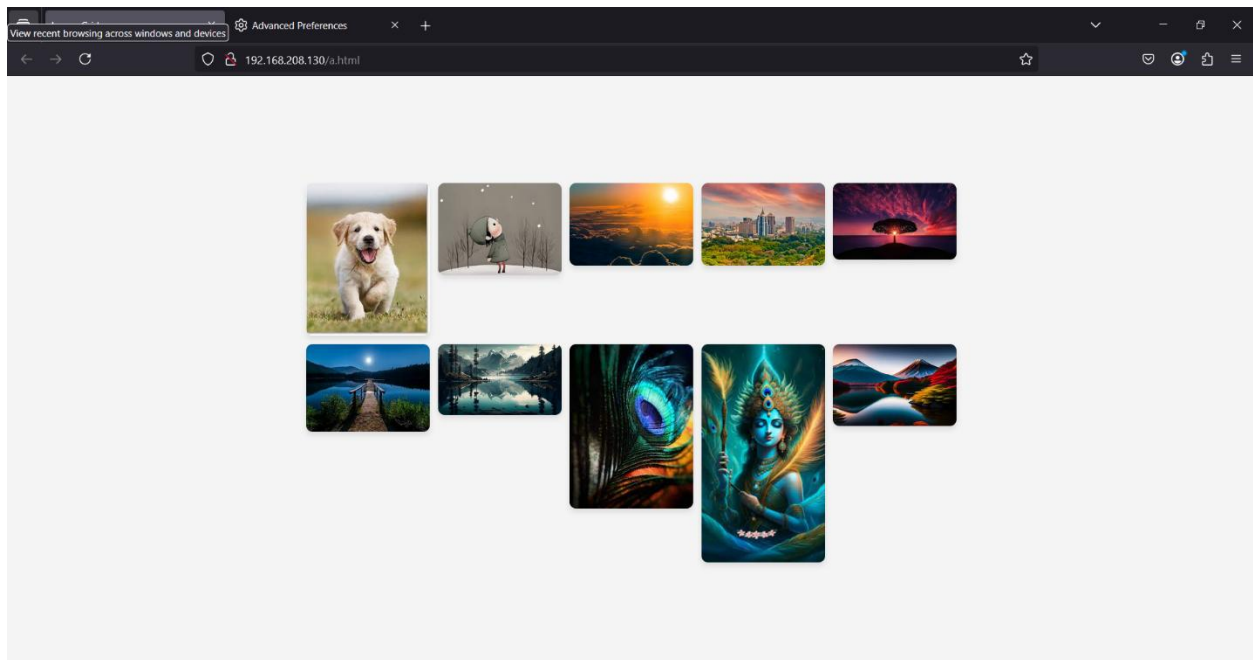
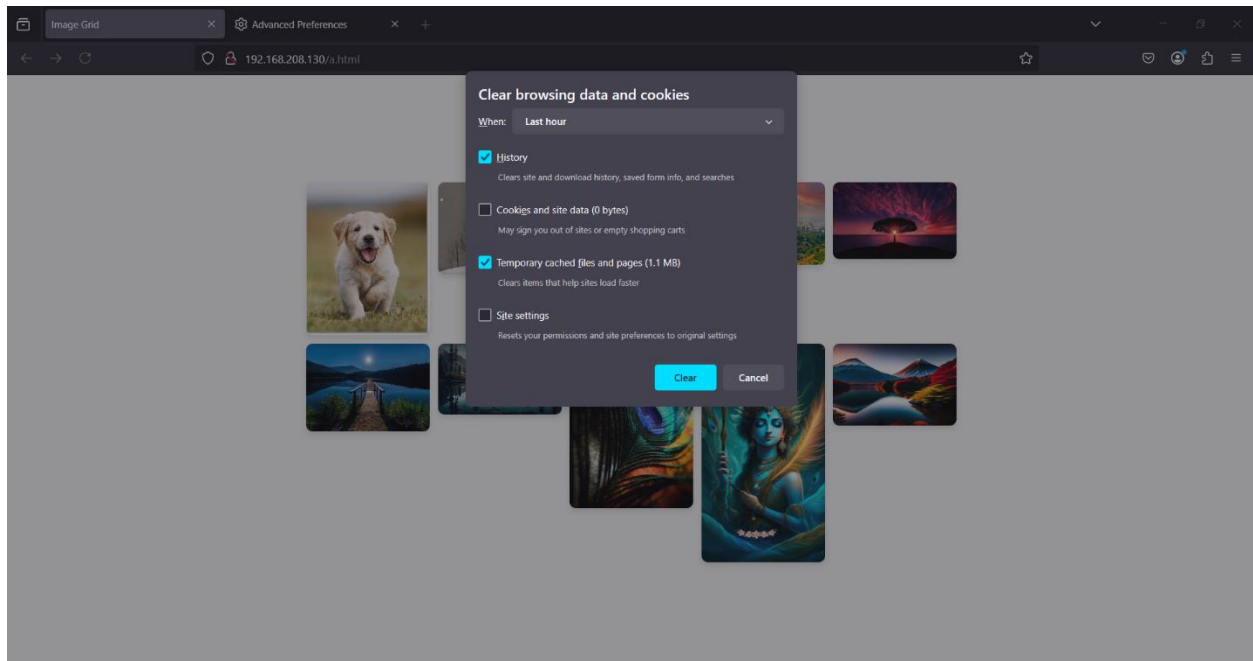
Feb 15 00:01:18 keerthan-VMware-Virtual-Platform systemd[1]: Starting apache2.service - The Apache HTTP Server...
Feb 15 00:01:19 keerthan-VMware-Virtual-Platform apache2[1520]: AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.1.1. Set the 'ServerName' directive globally to suppress this message
Feb 15 00:01:19 keerthan-VMware-Virtual-Platform systemd[1]: Started apache2.service - The Apache HTTP Server.
```

```
Ubuntu 64-bit (3) - VMware Workstation
File Edit View VM Tabs Help
My Computer x Ubuntu 64-bit (1) x
Feb 15 00:08
keerthan@keerthan-VMware-Virtual-Platform: ~
keerthan@keerthan-VMware-Virtual-Platform: ~
keerthan@keerthan-VMware-Virtual-Platform: ~
GNU nano 8.1 /etc/apache2/apache2.conf *
# PidFile: The file in which the server should record its process
# identification number when it starts.
# This needs to be set in /etc/apache2/envvars
#
PidFile ${APACHE_PID_FILE}
#
# Timeout: The number of seconds before receives and sends time out.
#
Timeout 300
#
# KeepAlive: Whether or not to allow persistent connections (more than
# one request per connection). Set to "Off" to deactivate.
#
KeepAlive On
#
# MaxKeepAliveRequests: The maximum number of requests to allow
# during a persistent connection. Set to 0 to allow an unlimited amount.
# We recommend you leave this number high, for maximum performance.
#
MaxKeepAliveRequests 2
#
# KeepAliveTimeout: Number of seconds to wait for the next request from the
# same client on the same connection.
#
KeepAliveTimeout 5

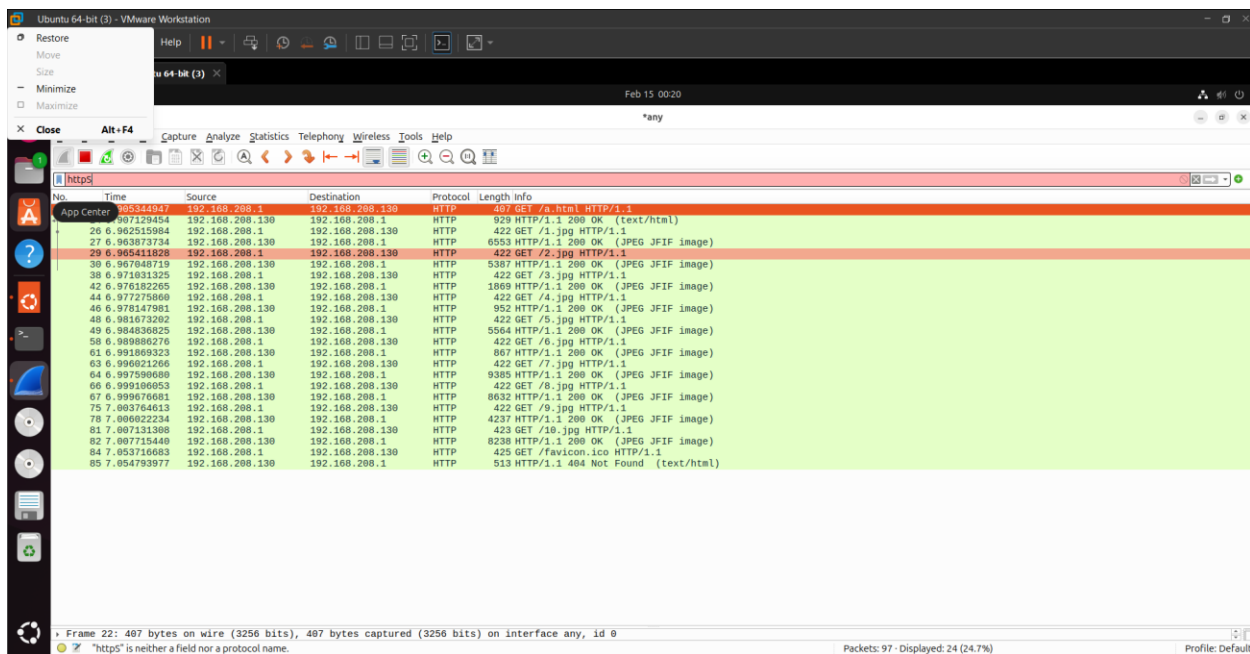
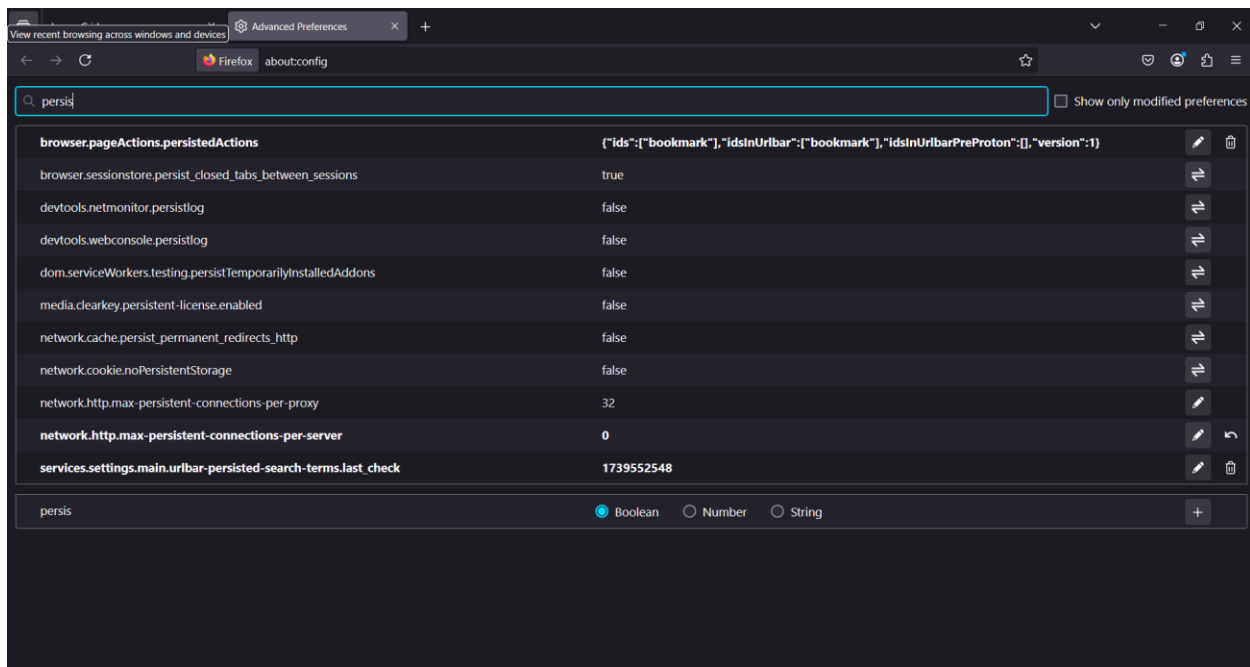
Help      Write Out  Where Is  Cut       Execute   Location  -U Undo   -A Set Mark -] To Bracket -B Previous -_ Back
Exit      Read File  Replace   Paste     Justify   Go To Line -E Redo   -C Copy   -W Where Was -N Next   -F Forward
```



## CLIENT SIDE:

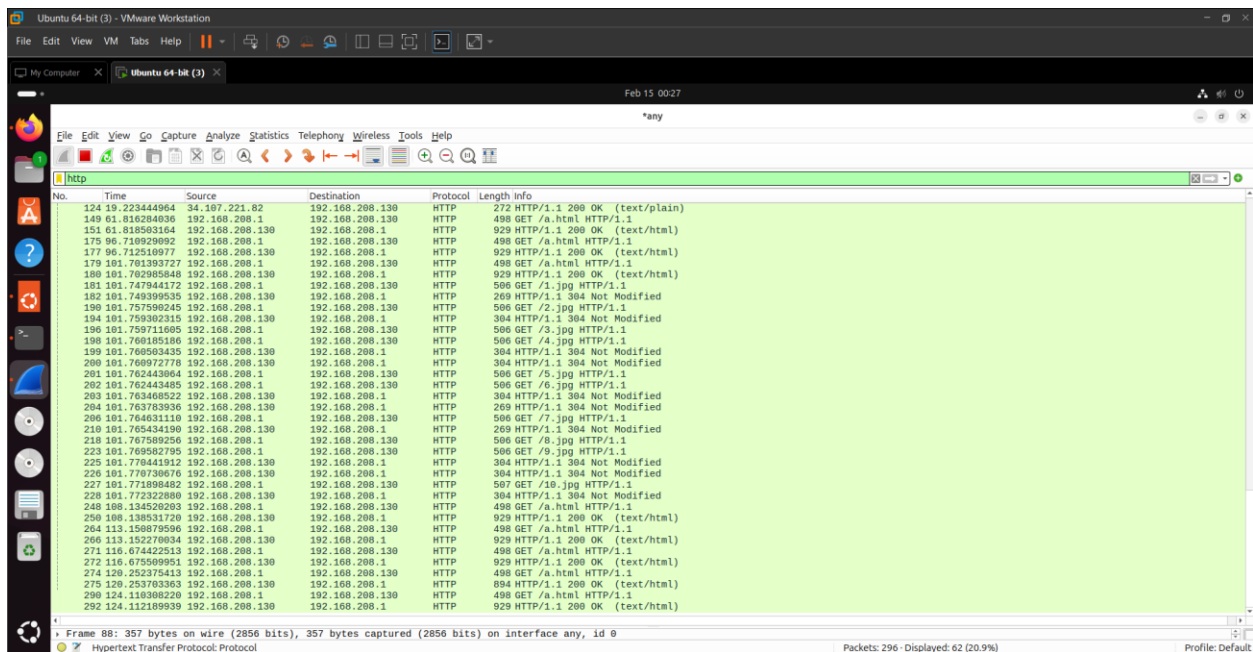
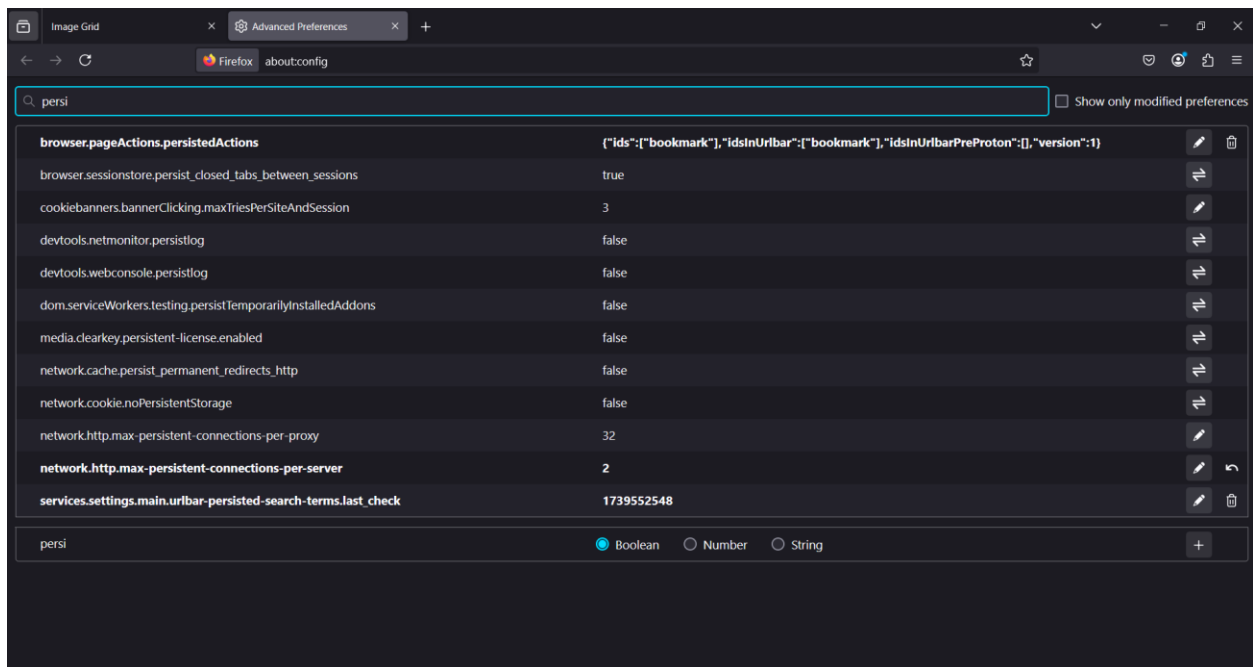


## NON-PERSISTENT:

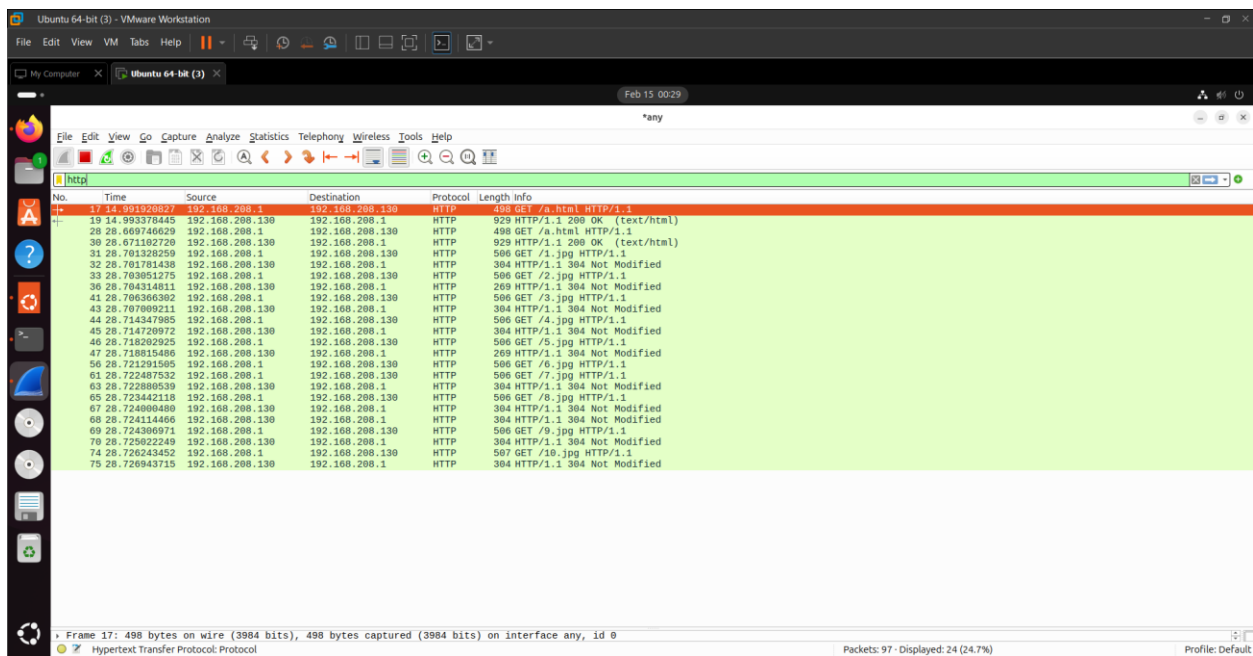
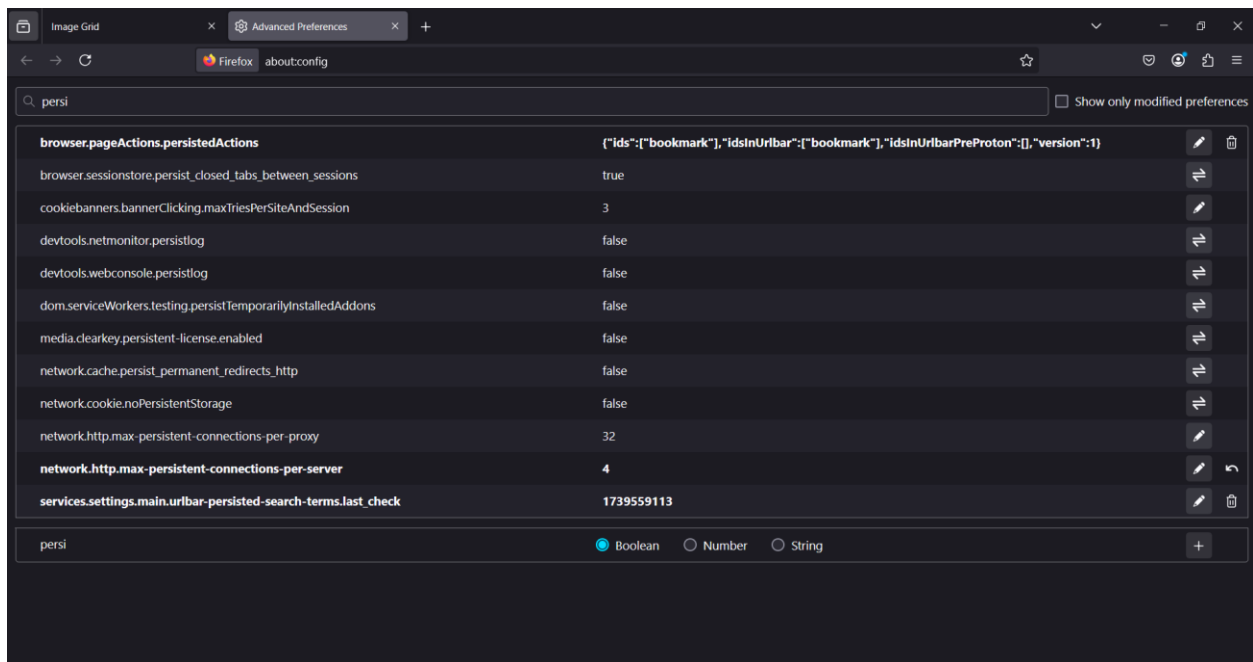


Here  $7.007715440 - 6.905344947 = 0.102370493$  seconds

# PERSISTENT:



Here  $3.042252027 - 2.685888334 = 0.356363$



Here  $28.720947 - 28.699482 = 0.021465$  seconds

This is the optimal number of HTTP persistent connections.

