Title: Secure Website Deployment, Firewall Configuration & Server Monitoring

Module: Internetworking Security

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Part 1: Website and Web Server Setup

For this project, the WordPress Content Management System (CMS) was selected due to its simplicity, flexibility, and wide community support. WordPress is ideal for creating a quick, secure, and extensible website with minimal configuration.

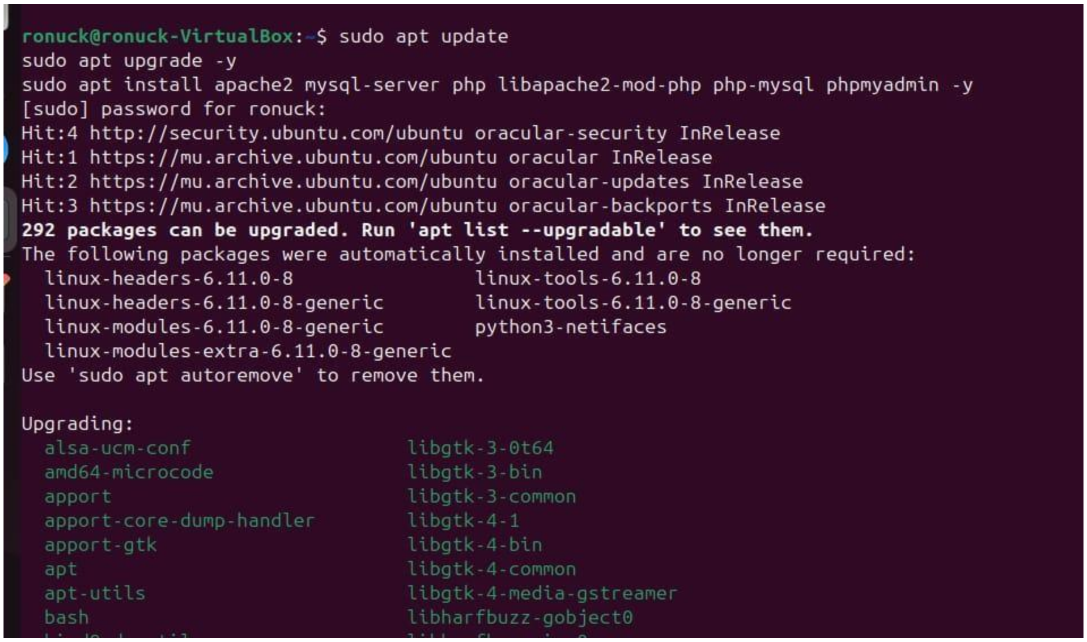
i. Web Server Installation and Configuration

A Linux-based server (Ubuntu 22.04 LTS) was used. The Apache web server was chosen due to its compatibility with WordPress and widespread usage.

Commands Executed:

sudo apt update

sudo apt install apache2 mysql-server php php-mysql libapache2-mod-php php-cli php-curl php-xml php-mbstring unzip wget –y



```
ronuck@ronuck-VirtualBox:~$ sudo apt update
sudo apt upgrade -y
sudo apt install apache2 mysql-server php libapache2-mod-php php-mysql phpmyadmin -y
[sudo] password for ronuck:
Hit:4 http://security.ubuntu.com/ubuntu oracular-security InRelease
Hit:1 https://mu.archive.ubuntu.com/ubuntu oracular InRelease
Hit:2 https://mu.archive.ubuntu.com/ubuntu oracular-updates InRelease
Hit:3 https://mu.archive.ubuntu.com/ubuntu oracular-backports InRelease
292 packages can be upgraded. Run 'apt list --upgradable' to see them.
The following packages were automatically installed and are no longer required:
  linux-headers-6.11.0-8                linux-tools-6.11.0-8
  linux-headers-6.11.0-8-generic        linux-tools-6.11.0-8-generic
  linux-modules-6.11.0-8-generic        python3-netifaces
  linux-modules-extra-6.11.0-8-generic
Use 'sudo apt autoremove' to remove them.

Upgrading:
  alsa-ucm-conf                   libgtk-3-0t64
  amd64-microcode                 libgtk-3-bin
  apport                          libgtk-3-common
  apport-core-dump-handler        libgtk-4-1
  apport-gtk                      libgtk-4-bin
  apt                             libgtk-4-common
  apt-utils                       libgtk-4-media-gstreamer
  bash                            libharfbuzz-gobject0
```

Apache Configuration:

cd /var/www/

sudo wget https://wordpress.org/latest.tar.gz

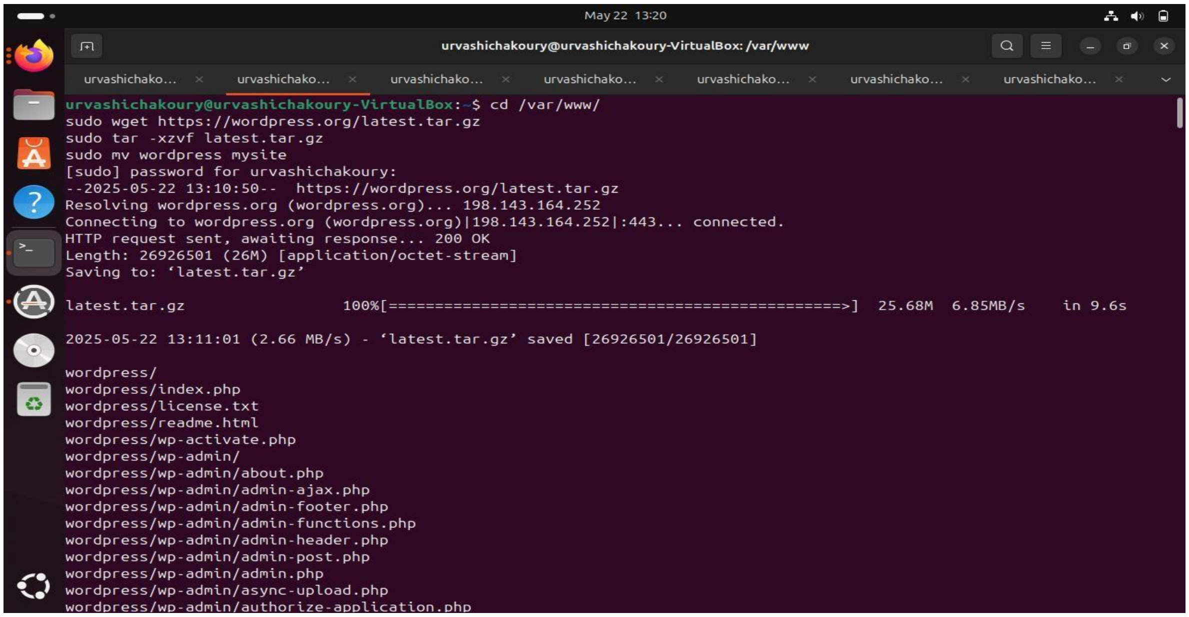
sudo tar -xzvf latest.tar.gz

sudo mv wordpress mysite

Set permissions:

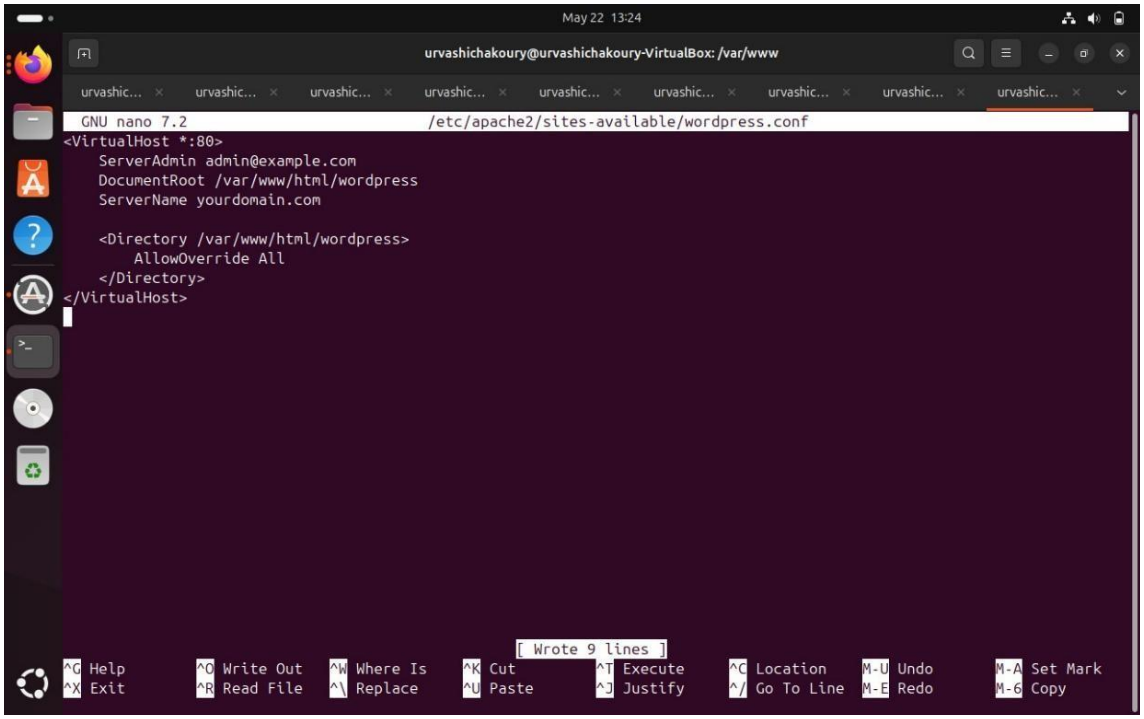
sudo chown -R www-data:www-data /var/www/mysite

sudo chmod -R 755 /var/www/mysite



```
urvashichakoury@urvashichakoury-VirtualBox:~$ cd /var/www/
sudo wget https://wordpress.org/latest.tar.gz
sudo tar -xzvf latest.tar.gz
sudo mv wordpress mysite
[sudo] password for urvashichakoury:
--2025-05-22 13:10:50--  https://wordpress.org/latest.tar.gz
Resolving wordpress.org (wordpress.org)... 198.143.164.252
Connecting to wordpress.org (wordpress.org)|198.143.164.252|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 26926501 (26M) [application/octet-stream]
Saving to: ‘latest.tar.gz’

latest.tar.gz              100%[=================================================>]  25.68M  6.85MB/s    in 9.6s

2025-05-22 13:11:01 (2.66 MB/s) - ‘latest.tar.gz’ saved [26926501/26926501]

wordpress/
wordpress/index.php
wordpress/license.txt
wordpress/readme.html
wordpress/wp-activate.php
wordpress/wp-admin/
wordpress/wp-admin/about.php
wordpress/wp-admin/admin-ajax.php
wordpress/wp-admin/admin-footer.php
wordpress/wp-admin/admin-functions.php
wordpress/wp-admin/admin-header.php
wordpress/wp-admin/admin-post.php
wordpress/wp-admin/admin.php
wordpress/wp-admin/async-upload.php
wordpress/wp-admin/authorize-application.php
```

Configure Apache for the Site:

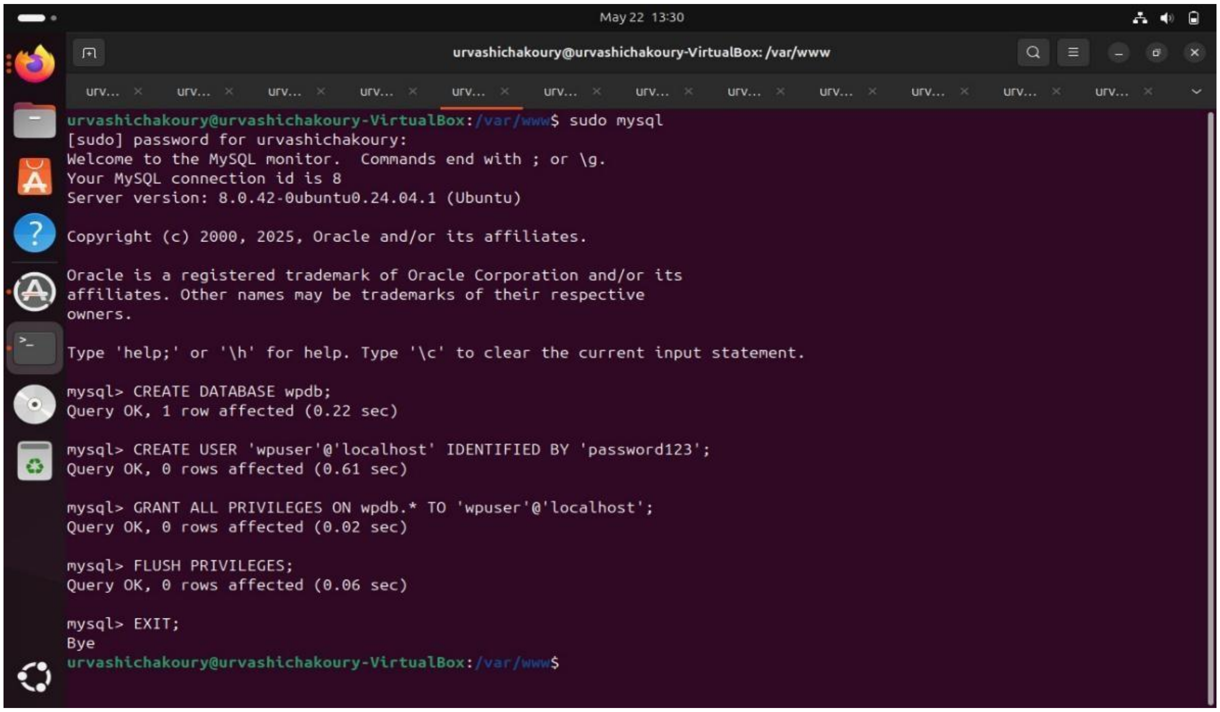


```
  GNU nano 7.2                     /etc/apache2/sites-available/wordpress.conf
<VirtualHost *:80>
    ServerAdmin admin@example.com
    DocumentRoot /var/www/html/wordpress
    ServerName yourdomain.com

    <Directory /var/www/html/wordpress>
        AllowOverride All
    </Directory>
</VirtualHost>

                                                 [ Wrote 9 lines ]
^G Help       ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark
^X Exit       ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/ Go To Line M-E Redo      M-6 Copy
```

ii. WordPress Installation

Database Setup:

sudo mysql


May 22 13:30
urvashichakoury@urvashichakoury-VirtualBox: /var/www
urv... urv... urv... urv... urv... urv... urv... urv... urv... urv... urv... urv...

```
urvashichakoury@urvashichakoury-VirtualBox:/var/www$ sudo mysql
[sudo] password for urvashichakoury:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.42-0ubuntu0.24.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE wpdb;
Query OK, 1 row affected (0.22 sec)

mysql> CREATE USER 'wpuser'@'localhost' IDENTIFIED BY 'password123';
Query OK, 0 rows affected (0.61 sec)

mysql> GRANT ALL PRIVILEGES ON wpdb.* TO 'wpuser'@'localhost';
Query OK, 0 rows affected (0.02 sec)

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.06 sec)

mysql> EXIT;
Bye
urvashichakoury@urvashichakoury-VirtualBox:/var/www$
```
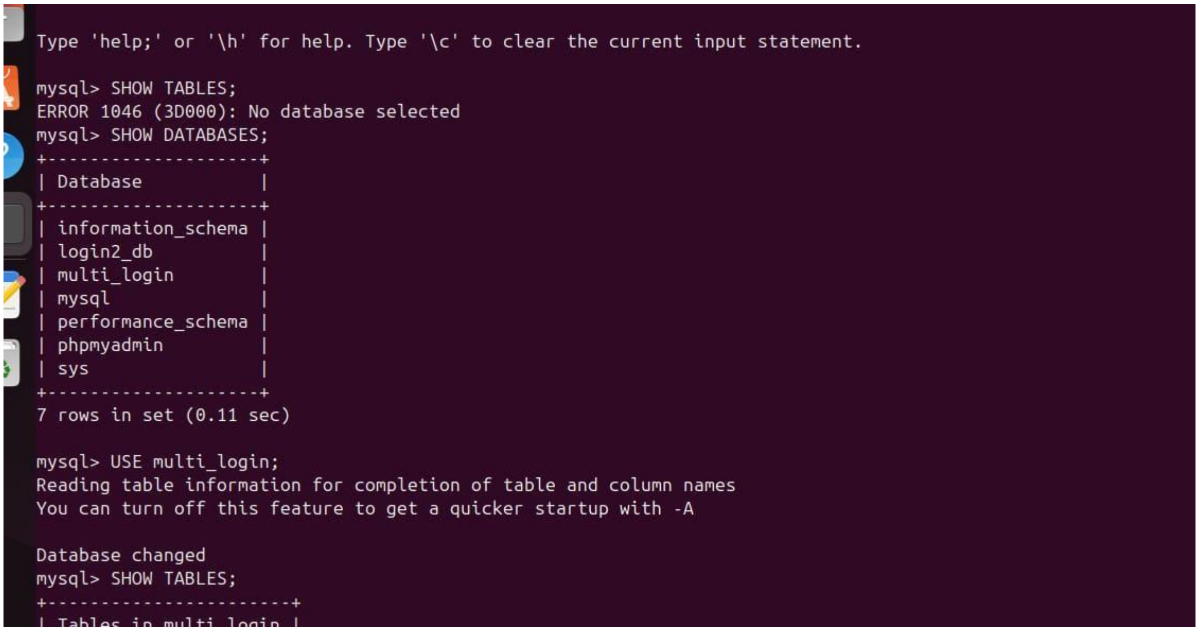



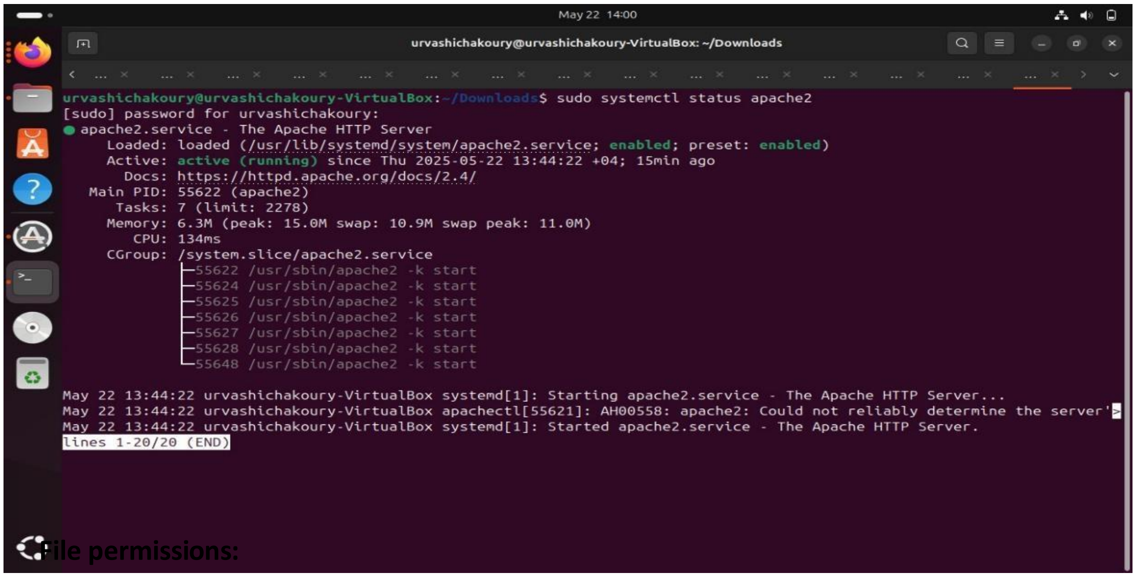
```
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> SHOW TABLES;
ERROR 1046 (3D000): No database selected
mysql> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| login2_db          |
| multi_login        |
| mysql              |
| performance_schema |
| phpmyadmin         |
| sys                |
+--------------------+
7 rows in set (0.11 sec)

mysql> USE multi_login;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> SHOW TABLES;
+-----------------------+
| Tables_in_multi_login |
```

Website Accessibility

The site was successfully hosted and is accessible via HTTP (port 80). HTTPS setup will be handled as part of the optional bonus section if implemented.

Apache status:

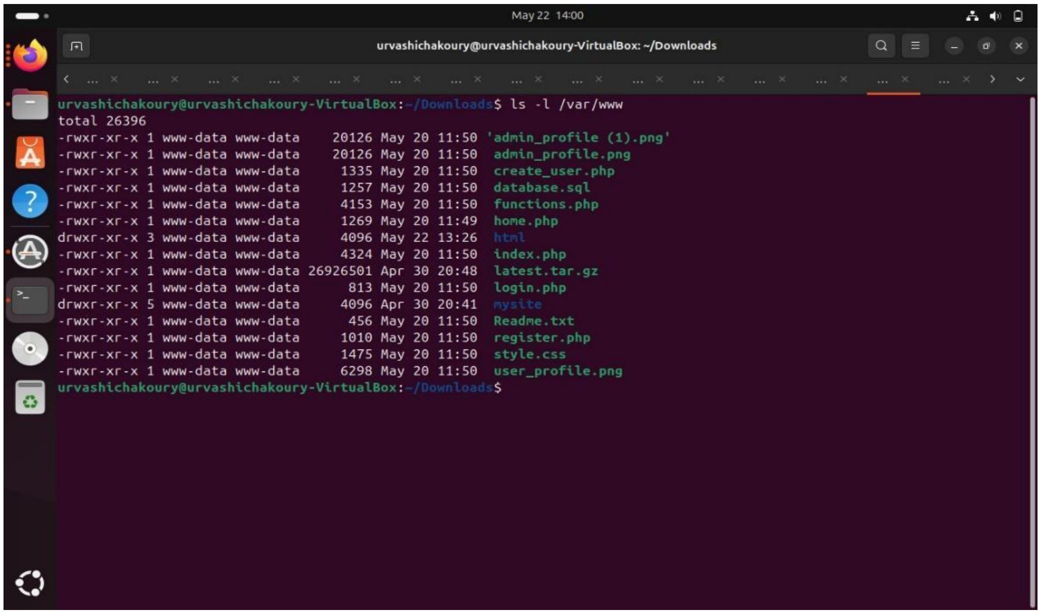
sudo systemctl status apache2



```
urvashichakoury@urvashichakoury-VirtualBox:~/Downloads$ sudo systemctl status apache2
[sudo] password for urvashichakoury:
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Thu 2025-05-22 13:44:22 +04; 15min ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 55622 (apache2)
      Tasks: 7 (limit: 2278)
     Memory: 6.3M (peak: 15.0M swap: 10.9M swap peak: 11.0M)
        CPU: 134ms
     CGroup: /system.slice/apache2.service
             ├─55622 /usr/sbin/apache2 -k start
             ├─55624 /usr/sbin/apache2 -k start
             ├─55625 /usr/sbin/apache2 -k start
             ├─55626 /usr/sbin/apache2 -k start
             ├─55627 /usr/sbin/apache2 -k start
             ├─55628 /usr/sbin/apache2 -k start
             └─55648 /usr/sbin/apache2 -k start

May 22 13:44:22 urvashichakoury-VirtualBox systemd[1]: Starting apache2.service - The Apache HTTP Server...
May 22 13:44:22 urvashichakoury-VirtualBox apachectl[55621]: AH00558: apache2: Could not reliably determine the server'>
May 22 13:44:22 urvashichakoury-VirtualBox systemd[1]: Started apache2.service - The Apache HTTP Server.
lines 1-20/20 (END)
```

File permissions:

ls -l /var/www/mysite

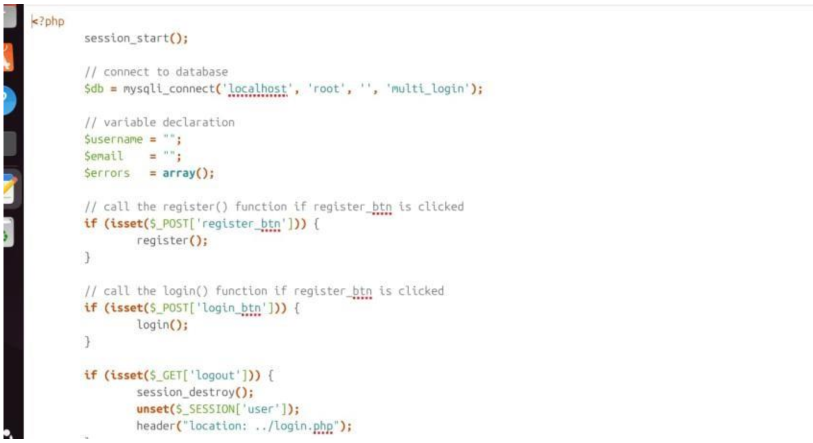


```
urvashichakoury@urvashichakoury-VirtualBox:~/Downloads$ ls -l /var/www
total 26396
-rwxr-xr-x 1 www-data www-data    20126 May 20 11:50 'admin_profile (1).png'
-rwxr-xr-x 1 www-data www-data    20126 May 20 11:50  admin_profile.png
-rwxr-xr-x 1 www-data www-data     1335 May 20 11:50  create_user.php
-rwxr-xr-x 1 www-data www-data     1257 May 20 11:50  database.sql
-rwxr-xr-x 1 www-data www-data     4153 May 20 11:50  functions.php
-rwxr-xr-x 1 www-data www-data     1269 May 20 11:49  home.php
drwxr-xr-x 3 www-data www-data     4096 May 22 13:26  html
-rwxr-xr-x 1 www-data www-data     4324 May 20 11:50  index.php
-rwxr-xr-x 1 www-data www-data 26926501 Apr 30 20:48  latest.tar.gz
-rwxr-xr-x 1 www-data www-data      813 May 20 11:50  login.php
drwxr-xr-x 5 www-data www-data     4096 Apr 30 20:41  mysite
-rwxr-xr-x 1 www-data www-data      456 May 20 11:50  Readme.txt
-rwxr-xr-x 1 www-data www-data     1010 May 20 11:50  register.php
-rwxr-xr-x 1 www-data www-data     1475 May 20 11:50  style.css
-rwxr-xr-x 1 www-data www-data     6298 May 20 11:50  user_profile.png
urvashichakoury@urvashichakoury-VirtualBox:~/Downloads$
```

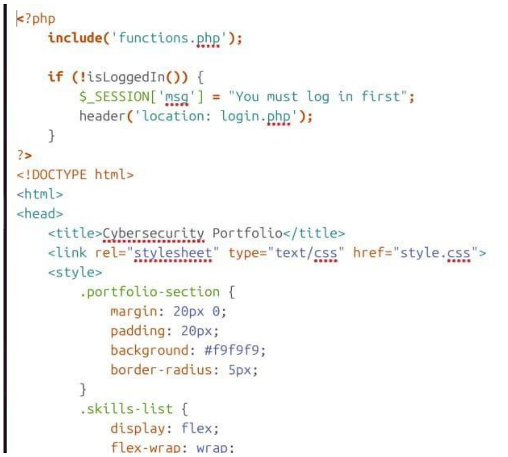
The Website Page:

- **index.html or index.php: Main HTML or PHP file for the homepage**

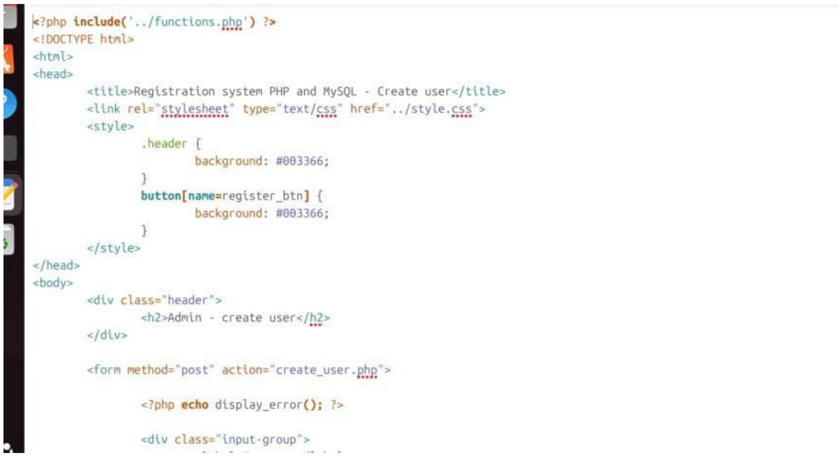
- **style.css: Custom CSS file for layout and design**
- **database.sql**
- **Additional PHP files (e.g., config.php, login.php)**
- **images**
- **css**



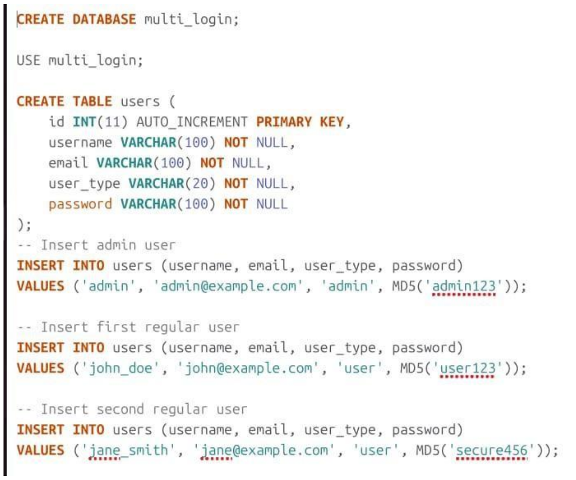
```
<?php
        session_start();

        // connect to database
        $db = mysqli_connect('localhost', 'root', '', 'multi_login');

        // variable declaration
        $username = "";
        $email    = "";
        $errors   = array();

        // call the register() function if register_btn is clicked
        if (isset($_POST['register_btn'])) {
                register();
        }

        // call the login() function if register_btn is clicked
        if (isset($_POST['login_btn'])) {
                login();
        }

        if (isset($_GET['logout'])) {
                session_destroy();
                unset($_SESSION['user']);
                header("location: ../login.php");
```



```
<?php
    include('functions.php');

    if (!isLoggedIn()) {
        $_SESSION['msg'] = "You must log in first";
        header('location: login.php');
    }
?>
<!DOCTYPE html>
<html>
<head>
    <title>Cybersecurity Portfolio</title>
    <link rel="stylesheet" type="text/css" href="style.css">
    <style>
        .portfolio-section {
            margin: 20px 0;
            padding: 20px;
            background: #f9f9f9;
            border-radius: 5px;
        }
        .skills-list {
            display: flex;
            flex-wrap: wrap;
```

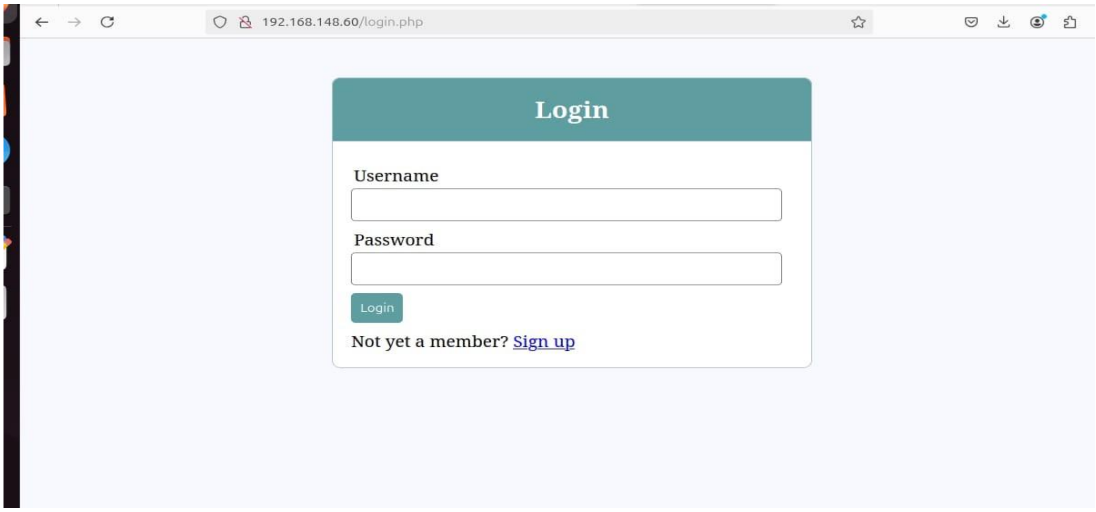


```
<?php include('../functions.php') ?>
<!DOCTYPE html>
<html>
<head>
        <title>Registration system PHP and MySQL - Create user</title>
        <link rel="stylesheet" type="text/css" href="../style.css">
        <style>
                .header {
                        background: #003366;
                }
                button[name=register_btn] {
                        background: #003366;
                }
        </style>
</head>
<body>
        <div class="header">
                <h2>Admin - create user</h2>
        </div>

        <form method="post" action="create_user.php">

                <?php echo display_error(); ?>

                <div class="input-group">
```



```sql
CREATE DATABASE multi_login;

USE multi_login;

CREATE TABLE users (
    id INT(11) AUTO_INCREMENT PRIMARY KEY,
    username VARCHAR(100) NOT NULL,
    email VARCHAR(100) NOT NULL,
    user_type VARCHAR(20) NOT NULL,
    password VARCHAR(100) NOT NULL
);
-- Insert admin user
INSERT INTO users (username, email, user_type, password)
VALUES ('admin', 'admin@example.com', 'admin', MD5('admin123'));

-- Insert first regular user
INSERT INTO users (username, email, user_type, password)
VALUES ('john_doe', 'john@example.com', 'user', MD5('user123'));

-- Insert second regular user
INSERT INTO users (username, email, user_type, password)
VALUES ('jane_smith', 'jane@example.com', 'user', MD5('secure456'));
```

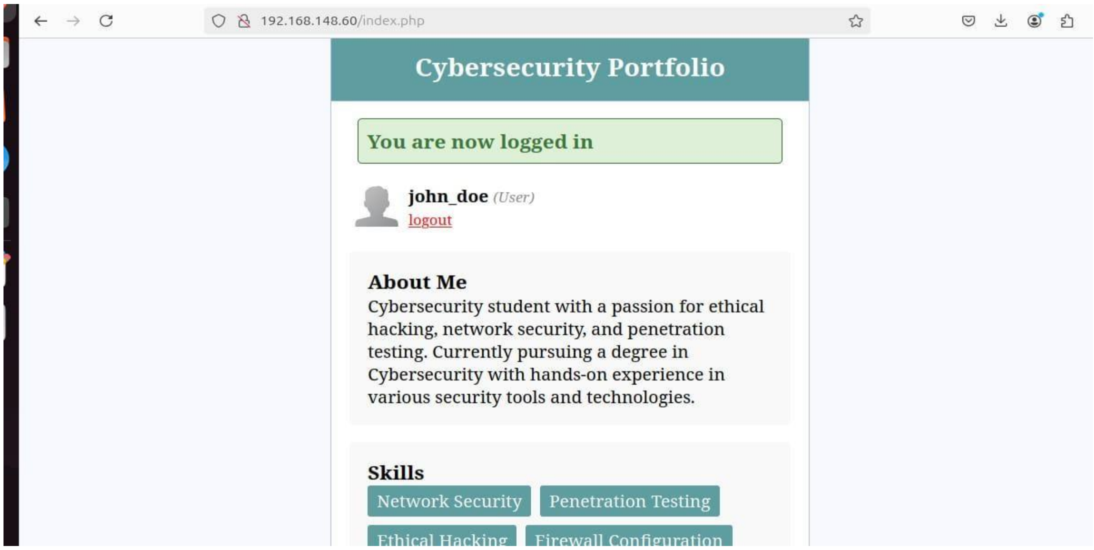
The Login Page: 192.168.148.60/login.php



Not yet a member? Sign up

The index.php:

192.168.148.60/index.php



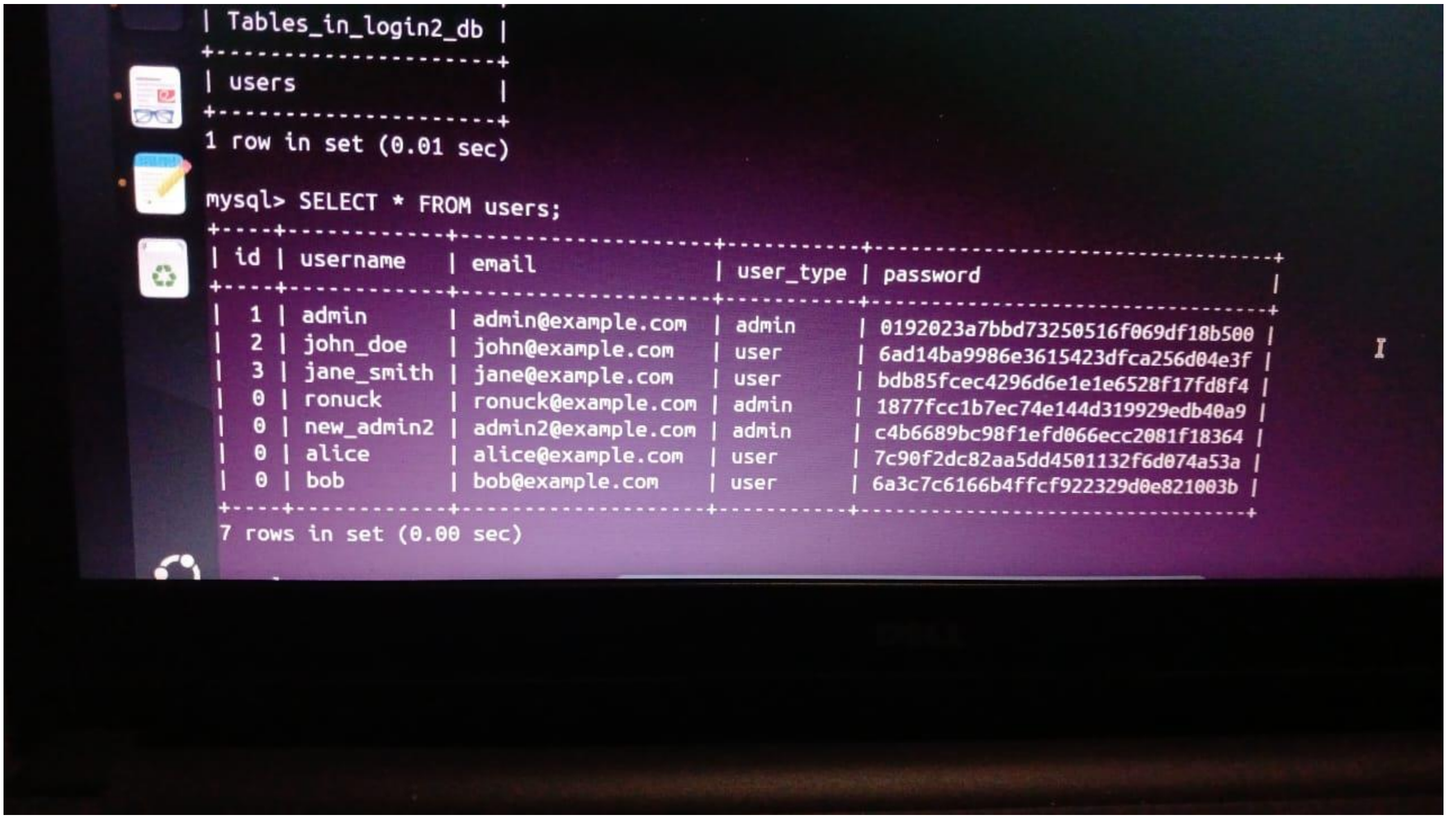
You are now logged in

john_doe (User)
logout

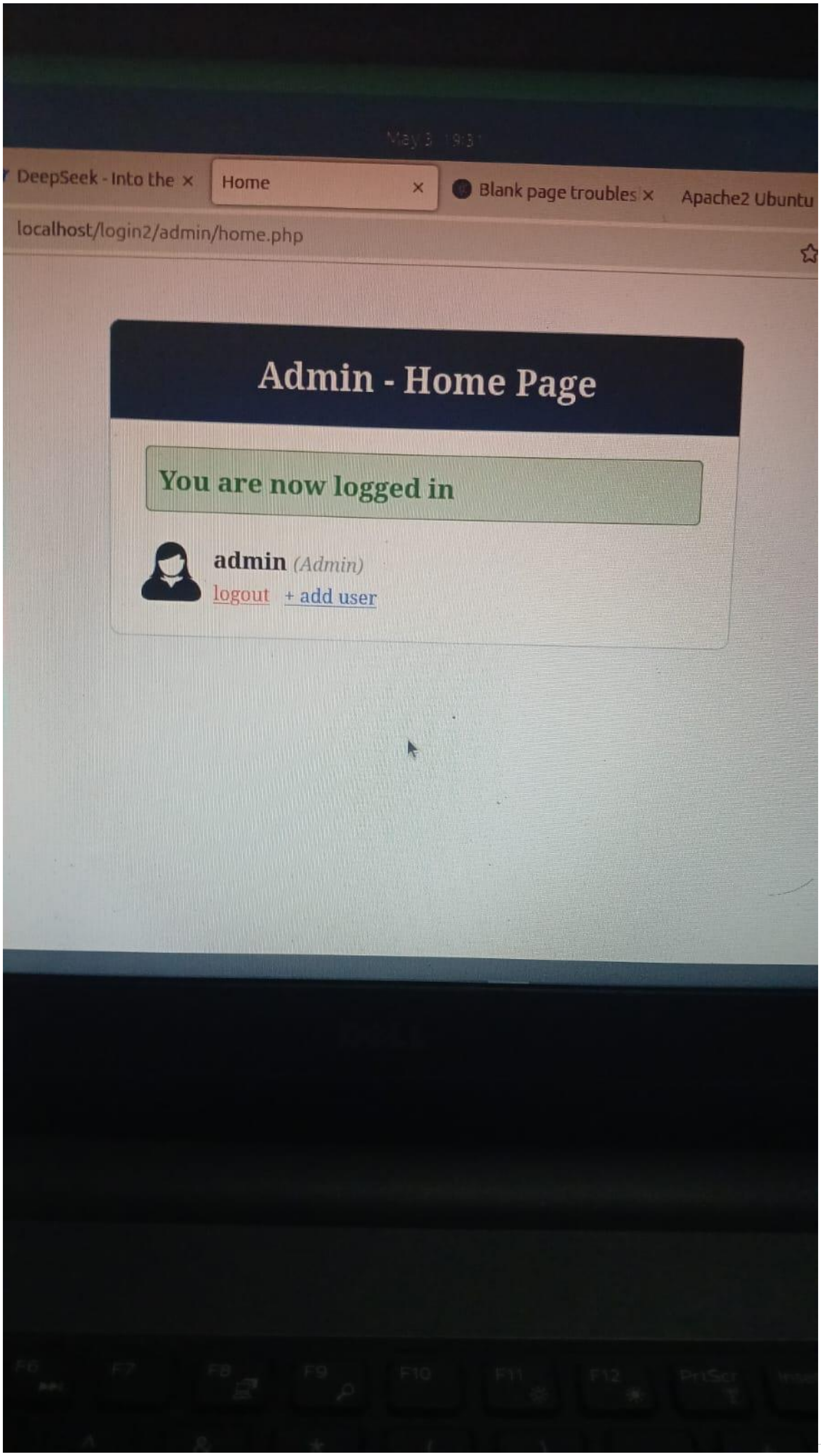
About Me
Cybersecurity student with a passion for ethical hacking, network security, and penetration testing. Currently pursuing a degree in Cybersecurity with hands-on experience in various security tools and technologies.

Skills

A website is hosted on a web server (Apache/Nginx) to provide online access to content or services. PHP is a server-side scripting language commonly used with HTML and CSS for dynamic websites. MySQL is used for storing structured data. Here is the page where is the access of access control using RBAC with admin and user page



```
| Tables_in_login2_db |
+---------------------+
| users               |
+---------------------+
1 row in set (0.01 sec)

mysql> SELECT * FROM users;
+----+------------+--------------------+-----------+----------------------------------+
| id | username   | email              | user_type | password                         |
+----+------------+--------------------+-----------+----------------------------------+
|  1 | admin      | admin@example.com  | admin     | 0192023a7bbd73250516f069df18b500 |
|  2 | john_doe   | john@example.com   | user      | 6ad14ba9986e3615423dfca256d04e3f |
|  3 | jane_smith | jane@example.com   | user      | bdb85fcec4296d6e1e1e6528f17fd8f4 |
|  0 | ronuck     | ronuck@example.com | admin     | 1877fcc1b7ec74e144d319929edb40a9 |
|  0 | new_admin2 | admin2@example.com | admin     | c4b6689bc98f1efd066ecc2081f18364 |
|  0 | alice      | alice@example.com  | user      | 7c90f2dc82aa5dd4501132f6d074a53a |
|  0 | bob        | bob@example.com    | user      | 6a3c7c6166b4ffcf922329d0e821003b |
+----+------------+--------------------+-----------+----------------------------------+
7 rows in set (0.00 sec)
```



Admin - Home Page

You are now logged in

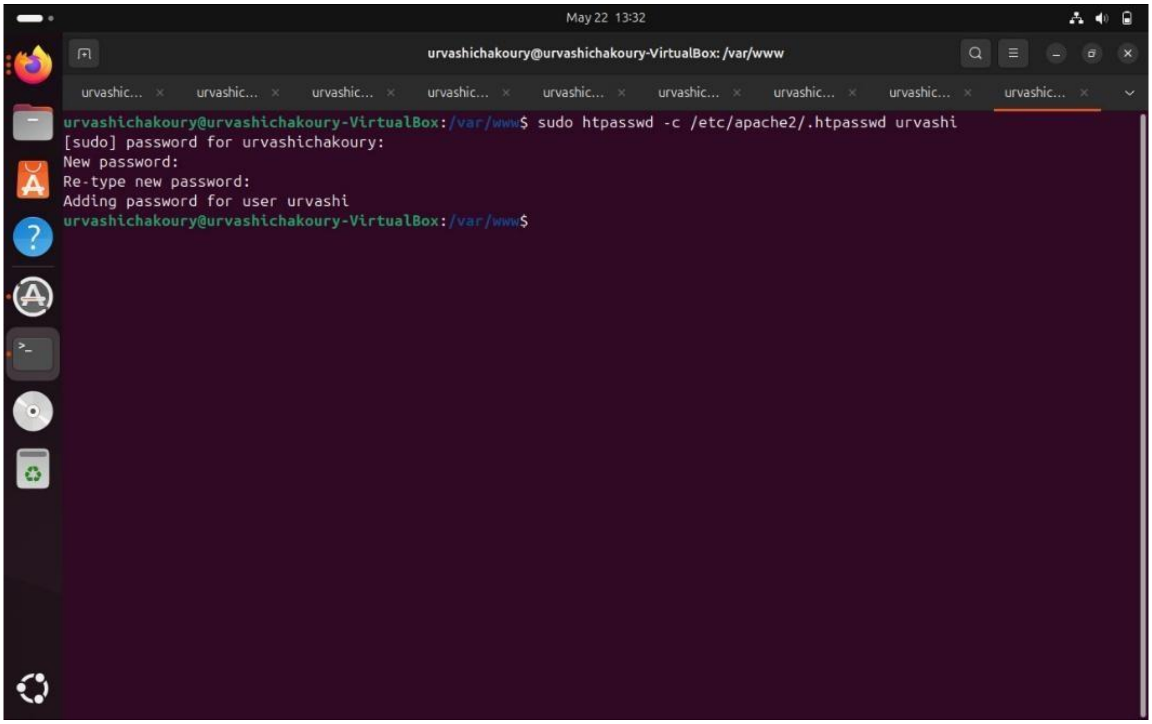
admin *(Admin)*

Practice:

- Apache2 was installed to serve HTML and PHP files
- A website was deployed in **/var/www/html/**
- WordPress or a custom PHP+SQL site was used
- The site was tested locally (localhost).

Part 2: Implement Access Control Feature

Choose: Basic Authentication with .htaccess and .htpasswd.



May 22 13:32
urvashichakoury@urvashichakoury-VirtualBox: /var/www
urvashic... × urvashic... × urvashic... × urvashic... × urvashic... × urvashic... × urvashic... × urvashic... × urvashic... ×

```
urvashichakoury@urvashichakoury-VirtualBox:/var/www$ sudo htpasswd -c /etc/apache2/.htpasswd urvashi
[sudo] password for urvashichakoury:
New password:
Re-type new password:
Adding password for user urvashi
urvashichakoury@urvashichakoury-VirtualBox:/var/www$
```

Part 3: Firewall Configuration Using iptables

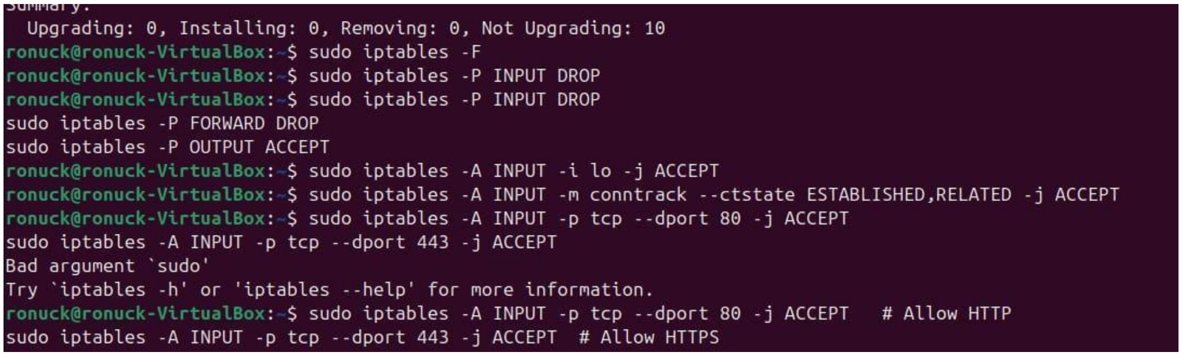
The objective of this section is to secure the web server using a firewall configured with iptables. Only essential ports: HTTP (80), HTTPS (443), and SSH (22) were allowed. All other incoming traffic was blocked. SSH access can optionally be restricted to a specific IP address. The rules were made persistent to ensure they survive system reboots.

sudo iptables –F

sudo iptables -P INPUT DROP

sudo iptables -P FORWARD DROP

sudo iptables -P OUTPUT ACCEPT

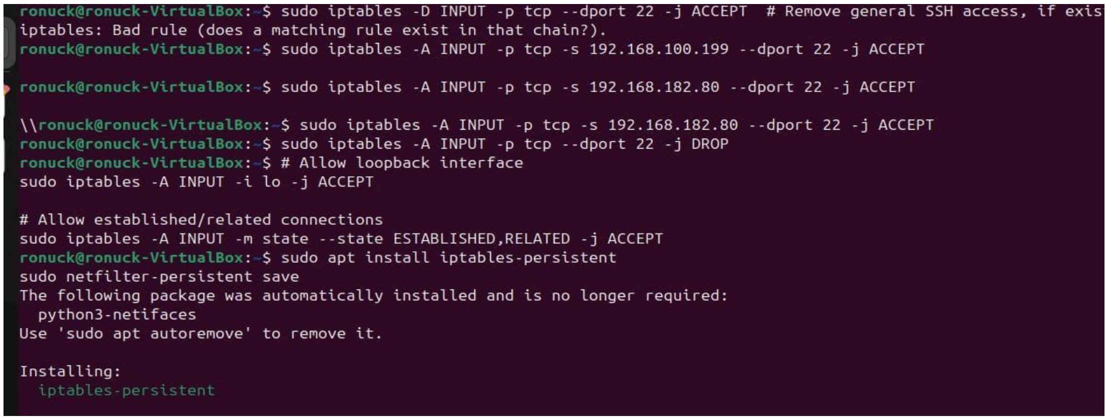


```
Summary:
  Upgrading: 0, Installing: 0, Removing: 0, Not Upgrading: 10
ronuck@ronuck-VirtualBox:~$ sudo iptables -F
ronuck@ronuck-VirtualBox:~$ sudo iptables -P INPUT DROP
ronuck@ronuck-VirtualBox:~$ sudo iptables -P INPUT DROP
sudo iptables -P FORWARD DROP
sudo iptables -P OUTPUT ACCEPT
ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -i lo -j ACCEPT
ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -m conntrack --ctstate ESTABLISHED,RELATED -j ACCEPT
ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT
sudo iptables -A INPUT -p tcp --dport 443 -j ACCEPT
Bad argument `sudo'
Try `iptables -h' or 'iptables --help' for more information.
ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -p tcp --dport 80 -j ACCEPT   # Allow HTTP
sudo iptables -A INPUT -p tcp --dport 443 -j ACCEPT  # Allow HTTPS
```

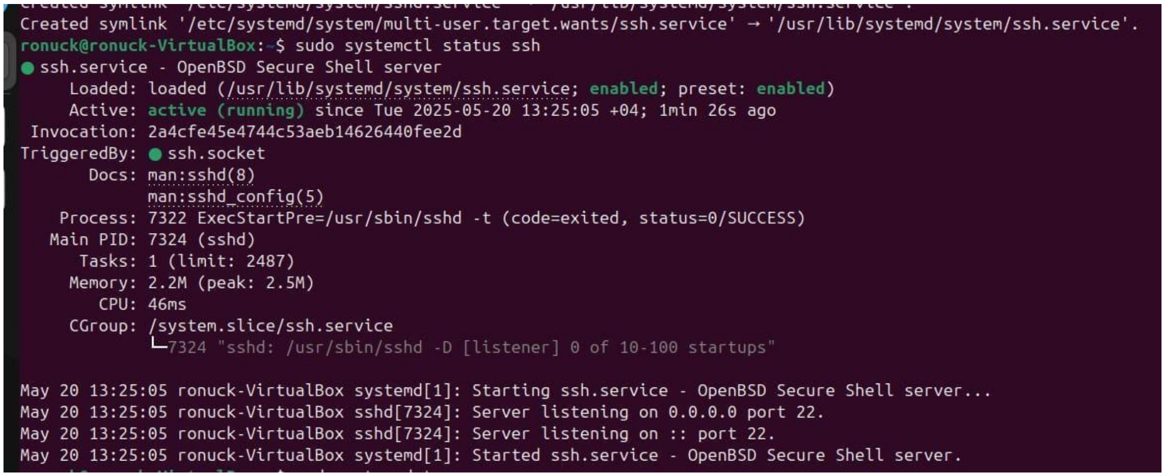
Allow Established: To ensure proper functioning of internal services and ongoing connections, the following rules were added:

sudo iptables -A INPUT -i lo -j ACCEPT

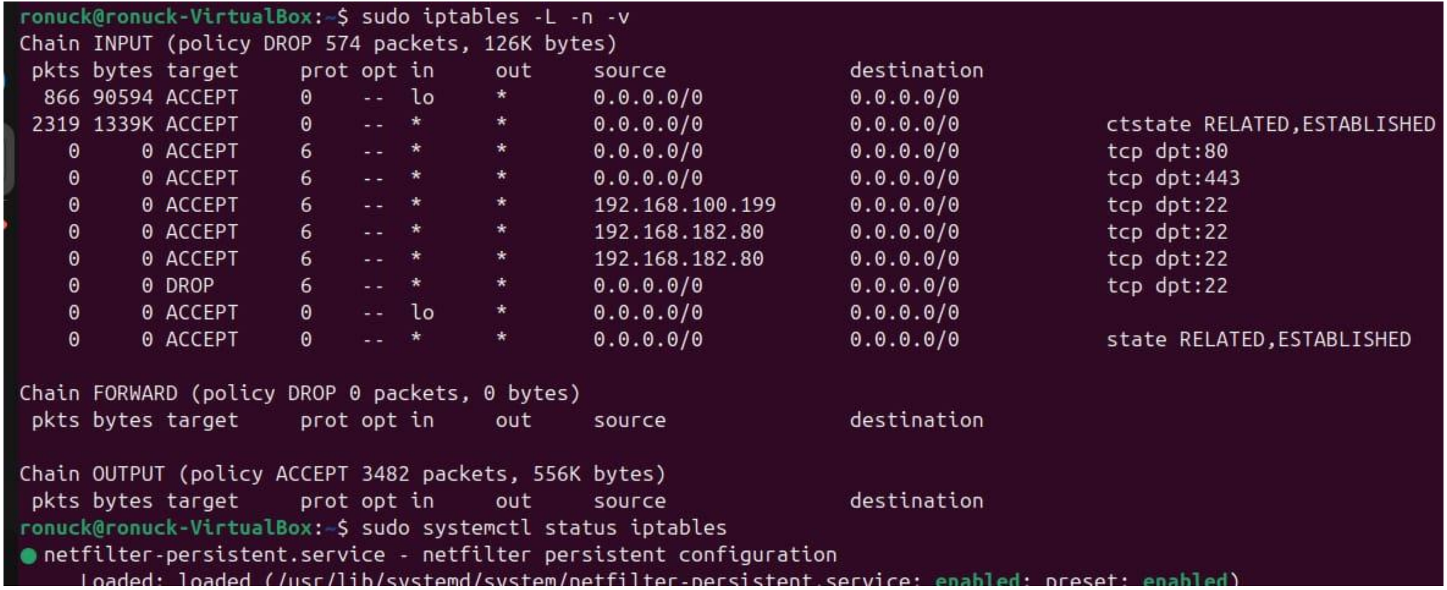
sudo iptables -A INPUT -m conntrack --ctstate ESTABLISHED,RELATED -j ACCEPT



```
ronuck@ronuck-VirtualBox:~$ sudo iptables -D INPUT -p tcp --dport 22 -j ACCEPT  # Remove general SSH access, if exis
iptables: Bad rule (does a matching rule exist in that chain?).
ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -p tcp -s 192.168.100.199 --dport 22 -j ACCEPT

ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -p tcp -s 192.168.182.80 --dport 22 -j ACCEPT

\\ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -p tcp -s 192.168.182.80 --dport 22 -j ACCEPT
ronuck@ronuck-VirtualBox:~$ sudo iptables -A INPUT -p tcp --dport 22 -j DROP
ronuck@ronuck-VirtualBox:~$ # Allow loopback interface
sudo iptables -A INPUT -i lo -j ACCEPT

# Allow established/related connections
sudo iptables -A INPUT -m state --state ESTABLISHED,RELATED -j ACCEPT
ronuck@ronuck-VirtualBox:~$ sudo apt install iptables-persistent
sudo netfilter-persistent save
The following package was automatically installed and is no longer required:
  python3-netifaces
Use 'sudo apt autoremove' to remove it.

Installing:
  iptables-persistent
```

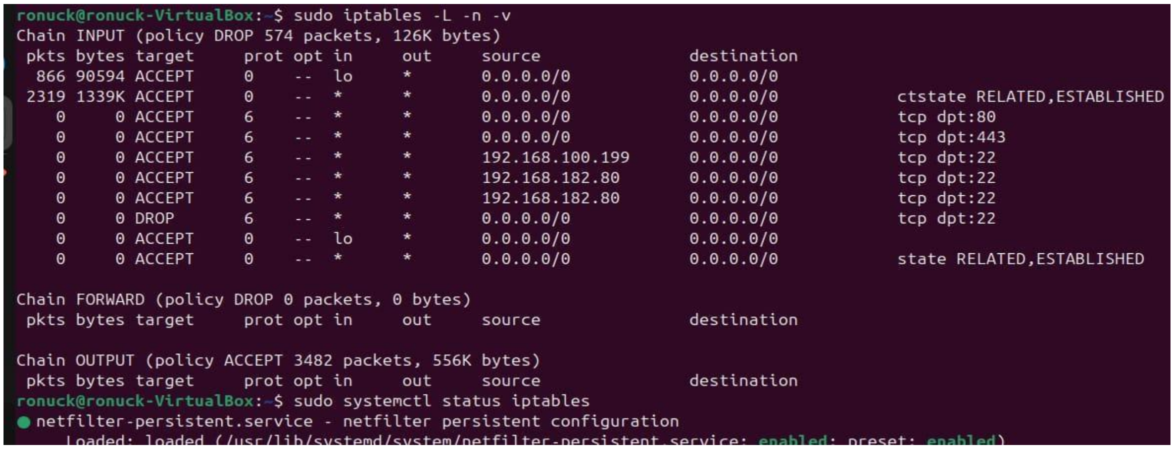


```
Created symlink '/etc/systemd/system/sshd.service' → '/usr/lib/systemd/system/ssh.service'.
Created symlink '/etc/systemd/system/multi-user.target.wants/ssh.service' → '/usr/lib/systemd/system/ssh.service'.
ronuck@ronuck-VirtualBox:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
     Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)
     Active: active (running) since Tue 2025-05-20 13:25:05 +04; 1min 26s ago
 Invocation: 2a4cfe45e4744c53aeb14626440fee2d
TriggeredBy: ● ssh.socket
       Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 7322 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 7324 (sshd)
      Tasks: 1 (limit: 2487)
     Memory: 2.2M (peak: 2.5M)
        CPU: 46ms
     CGroup: /system.slice/ssh.service
             └─7324 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

May 20 13:25:05 ronuck-VirtualBox systemd[1]: Starting ssh.service - OpenBSD Secure Shell server...
May 20 13:25:05 ronuck-VirtualBox sshd[7324]: Server listening on 0.0.0.0 port 22.
May 20 13:25:05 ronuck-VirtualBox sshd[7324]: Server listening on :: port 22.
May 20 13:25:05 ronuck-VirtualBox systemd[1]: Started ssh.service - OpenBSD Secure Shell server.
```



```
ronuck@ronuck-VirtualBox:~$ sudo iptables -L -n -v
Chain INPUT (policy DROP 574 packets, 126K bytes)
 pkts bytes target     prot opt in     out     source               destination
  866 90594 ACCEPT     0    --  lo     *       0.0.0.0/0            0.0.0.0/0
 2319 1339K ACCEPT     0    --  *      *       0.0.0.0/0            0.0.0.0/0            ctstate RELATED,ESTABLISHED
    0     0 ACCEPT     6    --  *      *       0.0.0.0/0            0.0.0.0/0            tcp dpt:80
    0     0 ACCEPT     6    --  *      *       0.0.0.0/0            0.0.0.0/0            tcp dpt:443
    0     0 ACCEPT     6    --  *      *       192.168.100.199      0.0.0.0/0            tcp dpt:22
    0     0 ACCEPT     6    --  *      *       192.168.182.80       0.0.0.0/0            tcp dpt:22
    0     0 ACCEPT     6    --  *      *       192.168.182.80       0.0.0.0/0            tcp dpt:22
    0     0 DROP       6    --  *      *       0.0.0.0/0            0.0.0.0/0            tcp dpt:22
    0     0 ACCEPT     0    --  lo     *       0.0.0.0/0            0.0.0.0/0
    0     0 ACCEPT     0    --  *      *       0.0.0.0/0            0.0.0.0/0            state RELATED,ESTABLISHED

Chain FORWARD (policy DROP 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 3482 packets, 556K bytes)
 pkts bytes target     prot opt in     out     source               destination
ronuck@ronuck-VirtualBox:~$ sudo systemctl status iptables
● netfilter-persistent.service - netfilter persistent configuration
     Loaded: loaded (/usr/lib/systemd/system/netfilter-persistent.service; enabled; preset: enabled)
```

Sudo iptables –L –n -v

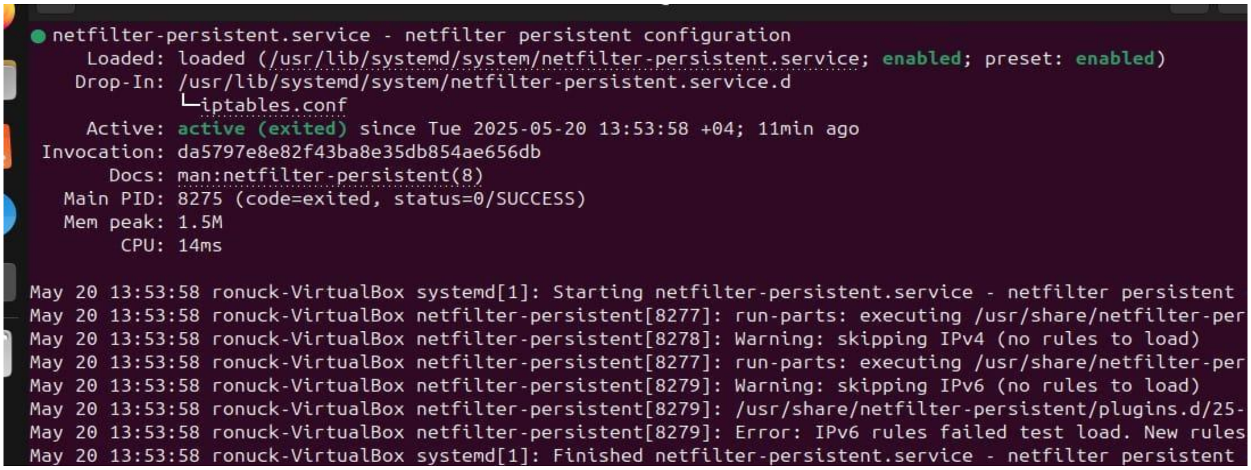


```
ronuck@ronuck-VirtualBox:~$ sudo iptables -L -n -v
Chain INPUT (policy DROP 574 packets, 126K bytes)
 pkts bytes target     prot opt in     out     source               destination
  866 90594 ACCEPT     0    --  lo     *       0.0.0.0/0            0.0.0.0/0
 2319 1339K ACCEPT     0    --  *      *       0.0.0.0/0            0.0.0.0/0            ctstate RELATED,ESTABLISHED
    0     0 ACCEPT     6    --  *      *       0.0.0.0/0            0.0.0.0/0            tcp dpt:80
    0     0 ACCEPT     6    --  *      *       0.0.0.0/0            0.0.0.0/0            tcp dpt:443
    0     0 ACCEPT     6    --  *      *       192.168.100.199      0.0.0.0/0            tcp dpt:22
    0     0 ACCEPT     6    --  *      *       192.168.182.80       0.0.0.0/0            tcp dpt:22
    0     0 ACCEPT     6    --  *      *       192.168.182.80       0.0.0.0/0            tcp dpt:22
    0     0 DROP       6    --  *      *       0.0.0.0/0            0.0.0.0/0            tcp dpt:22
    0     0 ACCEPT     0    --  lo     *       0.0.0.0/0            0.0.0.0/0
    0     0 ACCEPT     0    --  *      *       0.0.0.0/0            0.0.0.0/0            state RELATED,ESTABLISHED

Chain FORWARD (policy DROP 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 3482 packets, 556K bytes)
 pkts bytes target     prot opt in     out     source               destination
ronuck@ronuck-VirtualBox:~$ sudo systemctl status iptables
● netfilter-persistent.service - netfilter persistent configuration
     Loaded: loaded (/usr/lib/systemd/system/netfilter-persistent.service; enabled; preset: enabled)
```

The rules were saved using iptables-persistent to ensure they reload after reboot:

sudo apt install iptables-persistent -y

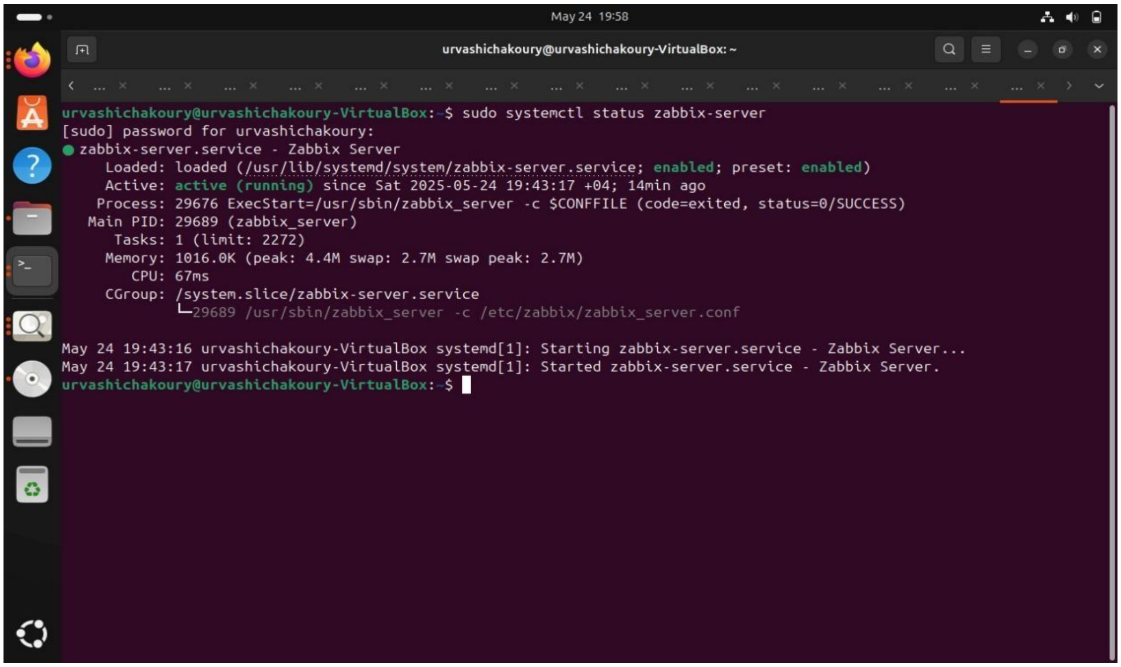
sudo netfilter-persistent save



```
● netfilter-persistent.service - netfilter persistent configuration
     Loaded: loaded (/usr/lib/systemd/system/netfilter-persistent.service; enabled; preset: enabled)
    Drop-In: /usr/lib/systemd/system/netfilter-persistent.service.d
             └─iptables.conf
     Active: active (exited) since Tue 2025-05-20 13:53:58 +04; 11min ago
 Invocation: da5797e8e82f43ba8e35db854ae656db
       Docs: man:netfilter-persistent(8)
   Main PID: 8275 (code=exited, status=0/SUCCESS)
   Mem peak: 1.5M
        CPU: 14ms

May 20 13:53:58 ronuck-VirtualBox systemd[1]: Starting netfilter-persistent.service - netfilter persistent
May 20 13:53:58 ronuck-VirtualBox netfilter-persistent[8277]: run-parts: executing /usr/share/netfilter-per
May 20 13:53:58 ronuck-VirtualBox netfilter-persistent[8278]: Warning: skipping IPv4 (no rules to load)
May 20 13:53:58 ronuck-VirtualBox netfilter-persistent[8277]: run-parts: executing /usr/share/netfilter-per
May 20 13:53:58 ronuck-VirtualBox netfilter-persistent[8279]: Warning: skipping IPv6 (no rules to load)
May 20 13:53:58 ronuck-VirtualBox netfilter-persistent[8279]: /usr/share/netfilter-persistent/plugins.d/25-
May 20 13:53:58 ronuck-VirtualBox netfilter-persistent[8279]: Error: IPv6 rules failed test load. New rules
May 20 13:53:58 ronuck-VirtualBox systemd[1]: Finished netfilter-persistent.service - netfilter persistent
```

Part 4: Server Monitoring with Zabbix

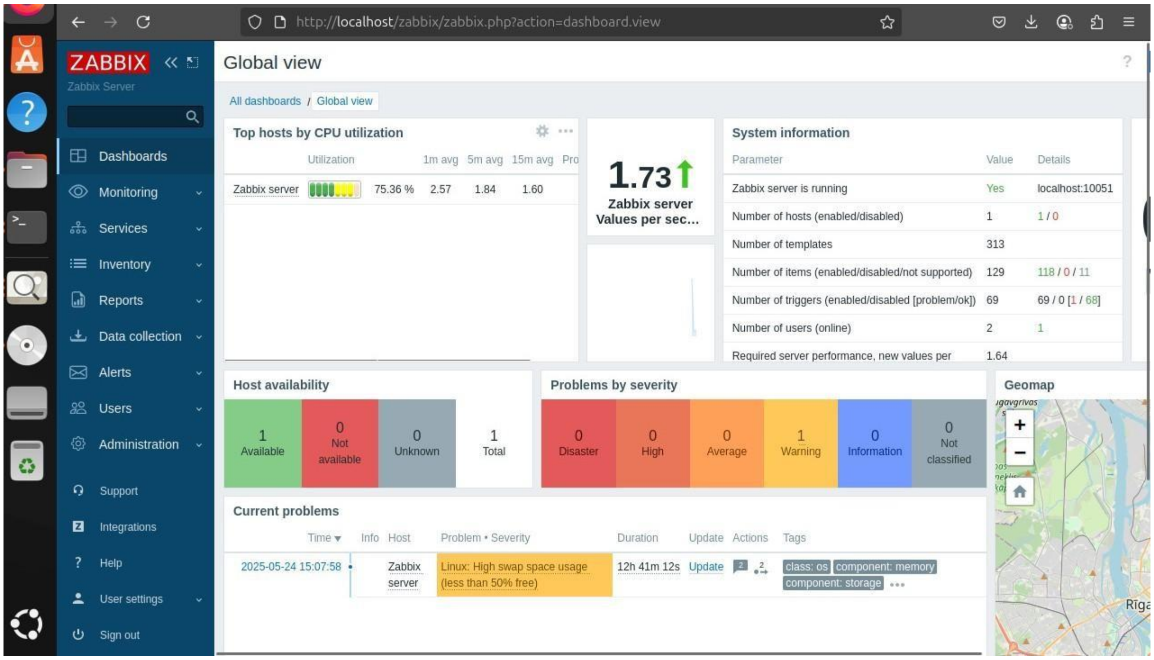
sudo systemctl status zabbix-server : This command checks the current status of the Zabbix Server service on your system.



```
urvashichakoury@urvashichakoury-VirtualBox:~$ sudo systemctl status zabbix-server
[sudo] password for urvashichakoury:
● zabbix-server.service - Zabbix Server
     Loaded: loaded (/usr/lib/systemd/system/zabbix-server.service; enabled; preset: enabled)
     Active: active (running) since Sat 2025-05-24 19:43:17 +04; 14min ago
    Process: 29676 ExecStart=/usr/sbin/zabbix_server -c $CONFFILE (code=exited, status=0/SUCCESS)
   Main PID: 29689 (zabbix_server)
      Tasks: 1 (limit: 2272)
     Memory: 1016.0K (peak: 4.4M swap: 2.7M swap peak: 2.7M)
        CPU: 67ms
     CGroup: /system.slice/zabbix-server.service
             └─29689 /usr/sbin/zabbix_server -c /etc/zabbix/zabbix_server.conf

May 24 19:43:16 urvashichakoury-VirtualBox systemd[1]: Starting zabbix-server.service - Zabbix Server...
May 24 19:43:17 urvashichakoury-VirtualBox systemd[1]: Started zabbix-server.service - Zabbix Server.
urvashichakoury@urvashichakoury-VirtualBox:~$ 
```

Access the Zabbix Web Interface

http://localhost/zabbix



Top hosts by CPU utilization

	Utilization		1m avg	5m avg	15m avg	Pro
Zabbix server		75.36 %	2.57	1.84	1.60	

1.73 ↑
Zabbix server Values per sec...

System information

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled)	1	1 / 0
Number of templates	313	
Number of items (enabled/disabled/not supported)	129	118 / 0 / 11
Number of triggers (enabled/disabled [problem/ok])	69	69 / 0 [1 / 68]
Number of users (online)	2	1
Required server performance, new values per	1.64	

Host availability

1	0	0	1
Available	Not available	Unknown	Total

Problems by severity

0	0	0	1	0	0
Disaster	High	Average	Warning	Information	Not classified

Current problems

Time ▾	Info	Host	Problem • Severity	Duration	Update	Actions	Tags
2025-05-24 15:07:58	•	Zabbix server	Linux: High swap space usage (less than 50% free)	12h 41m 12s	Update	2 2	class: os component: memory component: storage •••

Zabbix Server installed and configured successfully.

Web interface accessible at http://localhost/zabbix.

Zabbix Monitoring System Status

Current System Status

The Zabbix monitoring system has detected several critical issues affecting the Apache web service on host "ronuck-VirtualBox." The primary alert shows an Average severity PROBLEM indicating the Apache service is currently down. This main issue has triggered multiple dependent warnings including:

- ➔ Failed to fetch status page
- ➔ High service response time (0ms, indicating service unavailability).

Concurrently, the system has recorded several informational alerts:

- Apache service was recently restarted
- Apache version has changed
- Linux system modifications (/etc/passwd change)
- Open file descriptor configuration notice   Incident Analysis

The monitoring triggers reveal a cascading failure pattern originating from the Apache service interruption. The dependency chain shows the service outage is causing subsequent monitoring checks to fail. Key metrics currently unavailable include:

- Apache uptime status (last known status: unavailable)
- TCP service check failing on configured port
- Performance metrics exceeding warning thresholds

The system successfully sent an email notification to **roney22ab@gmail.com**, confirming the alerting mechanism is operational. The test message demonstrates Zabbix's notification system is properly configured for email delivery.

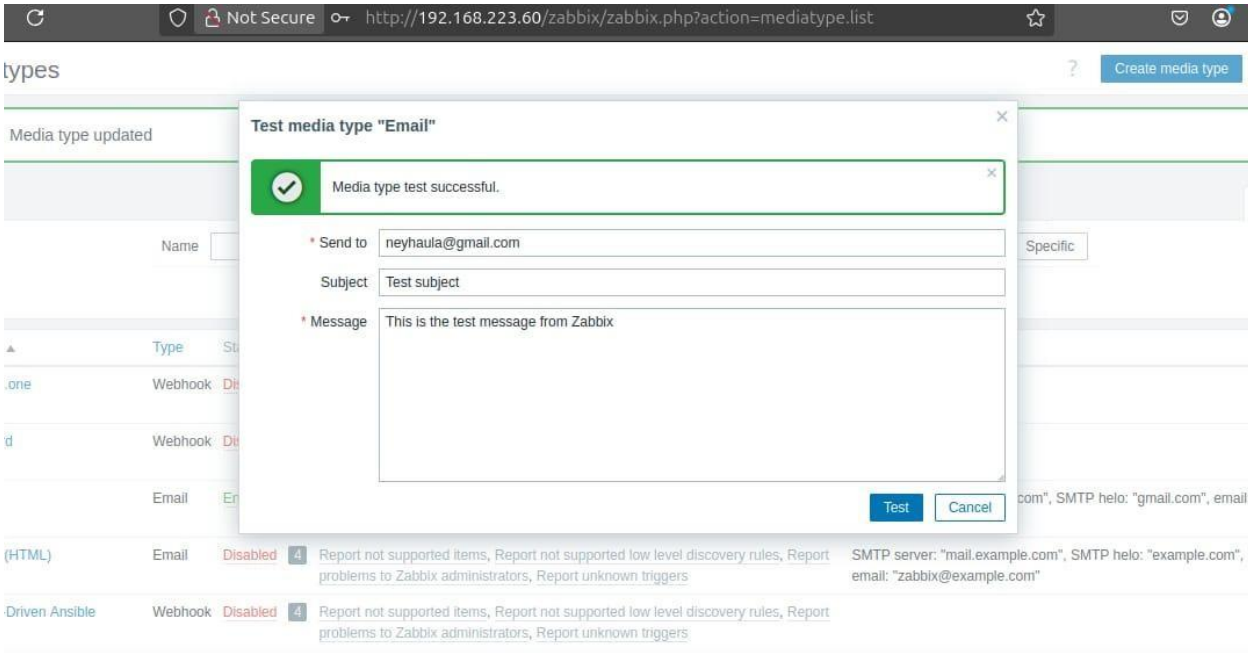
Recommended Actions

Configuration Review

- Verify Apache status page accessibility
- Validate TCP port configuration in Zabbix items
- Review trigger dependencies to prevent alert storms

Preventive Measures

- Implement automatic service recovery scripts
- Schedule regular configuration audits
- Establish maintenance windows for planned changes



http://192.168.223.60/zabbix/zabbix.php?action=mediatype.list

types

Media type updated

Test media type "Email"

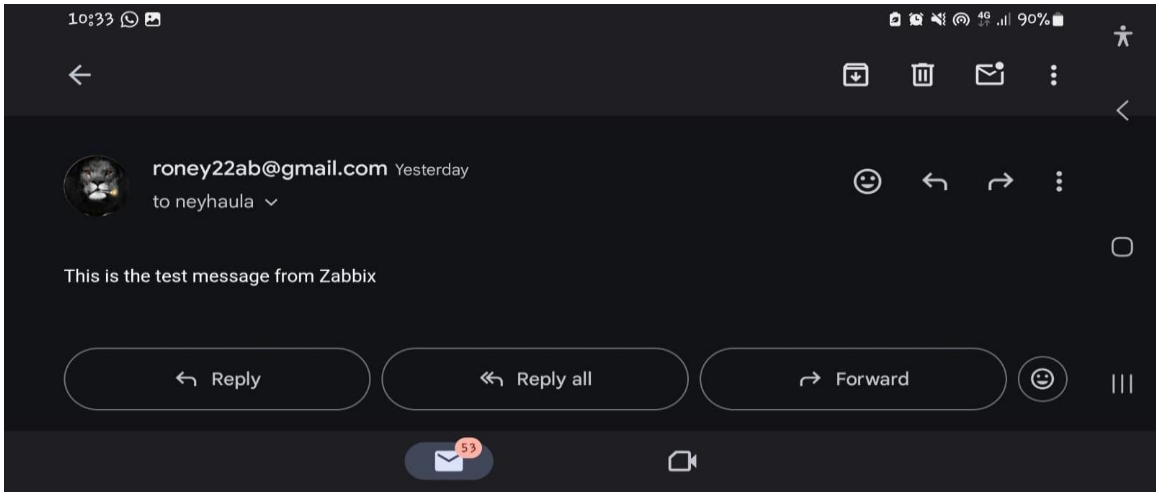
Media type test successful.

* Send to: neyhaula@gmail.com

Subject: Test subject

* Message: This is the test message from Zabbix

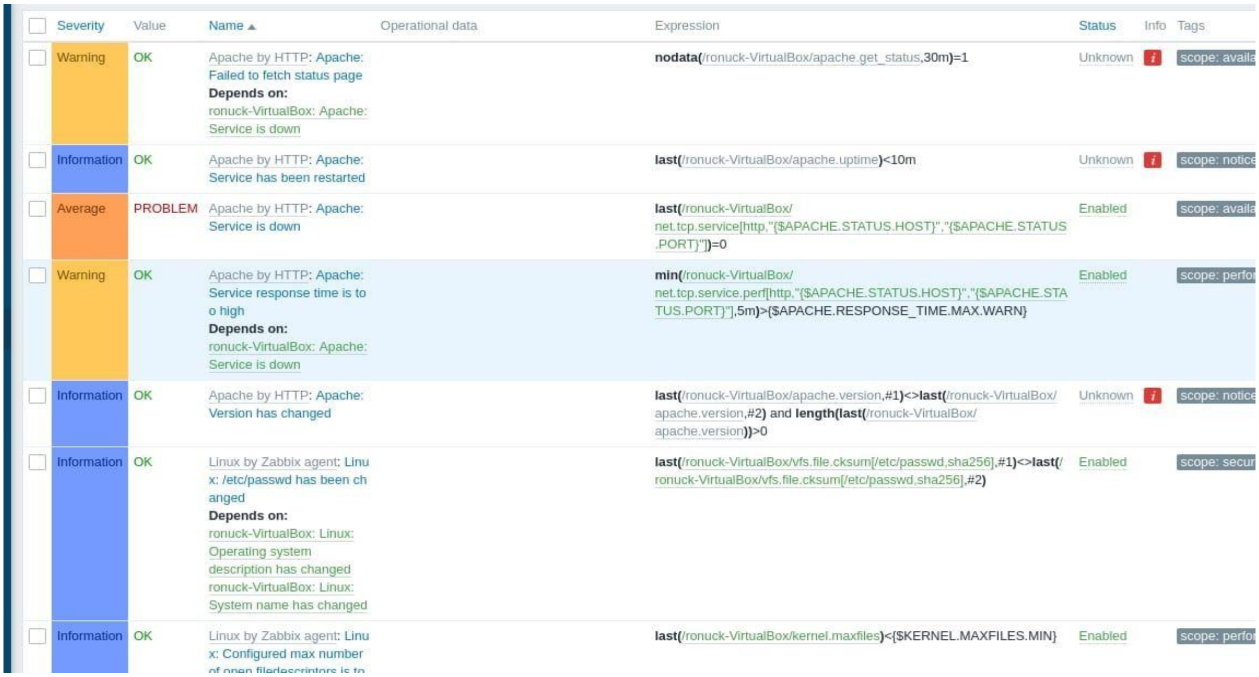
(HTML)	Email	Disabled	4	Report not supported items, Report not supported low level discovery rules, Report problems to Zabbix administrators, Report unknown triggers	SMTP server: "mail.example.com", SMTP helo: "example.com", email: "zabbix@example.com"
Driven Ansible	Webhook	Disabled	4	Report not supported items, Report not supported low level discovery rules, Report problems to Zabbix administrators, Report unknown triggers	



roney22ab@gmail.com Yesterday

to neyhaula

This is the test message from Zabbix



☐	Severity	Value	Name ▲	Operational data	Expression	Status	Info	Tags
☐	Warning	OK	Apache by HTTP: Apache: Failed to fetch status page **Depends on:** ronuck-VirtualBox: Apache: Service is down		**nodata(**/ronuck-VirtualBox/apache.get_status,30m**)**=1	Unknown	i	scope: availa
☐	Information	OK	Apache by HTTP: Apache: Service has been restarted		**last(**/ronuck-VirtualBox/apache.uptime**)**<10m	Unknown	i	scope: notice
☐	Average	PROBLEM	Apache by HTTP: Apache: Service is down		**last(**/ronuck-VirtualBox/net.tcp.service[http,"{$APACHE.STATUS.HOST}","{$APACHE.STATUS.PORT}"]**)**=0	Enabled		scope: availa
☐	Warning	OK	Apache by HTTP: Apache: Service response time is too high **Depends on:** ronuck-VirtualBox: Apache: Service is down		**min(**/ronuck-VirtualBox/net.tcp.service.perf[http,"{$APACHE.STATUS.HOST}","{$APACHE.STATUS.PORT}"],5m**)**>{$APACHE.RESPONSE_TIME.MAX.WARN}	Enabled		scope: perfor
☐	Information	OK	Apache by HTTP: Apache: Version has changed		**last(**/ronuck-VirtualBox/apache.version,#1**)**<>**last(**/ronuck-VirtualBox/apache.version,#2**)** and **length(last(**/ronuck-VirtualBox/apache.version**))**>0	Unknown	i	scope: notice
☐	Information	OK	Linux by Zabbix agent: Linux: /etc/passwd has been changed **Depends on:** ronuck-VirtualBox: Linux: Operating system description has changed ronuck-VirtualBox: Linux: System name has changed		**last(**/ronuck-VirtualBox/vfs.file.cksum[/etc/passwd,sha256],#1**)**<>**last(**/ronuck-VirtualBox/vfs.file.cksum[/etc/passwd,sha256],#2**)**	Enabled		scope: secur
☐	Information	OK	Linux by Zabbix agent: Linux: Configured max number of open filedescriptors is to		**last(**/ronuck-VirtualBox/kernel.maxfiles**)**<{$KERNEL.MAXFILES.MIN}	Enabled		scope: perfor