

# **Operating Systems**

Lab Report #7

## **Apache server configuration**

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## OBJECTIVES

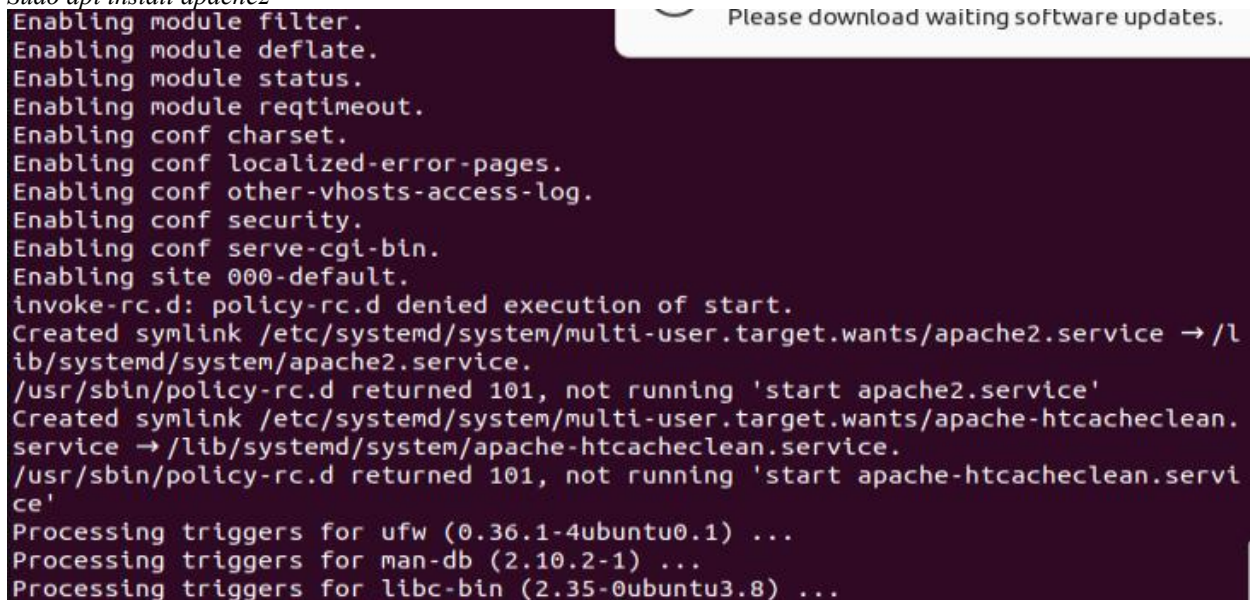
Briefly describe the objective of this lab assignment.

- 1、 Master the basic methods and steps of Apache server, and be able to install Apache Web services
- 2、 Understand the configuration method of access control, and understand the basic configuration of authentication and authorization
- 3、 Master the configuration of port-based virtual host, IP address-based virtual host configuration, and domain name-based virtual host configuration.

## CODE AND EXECUTION

### Assignment 1: download apache

*Sudo apt install apache2*

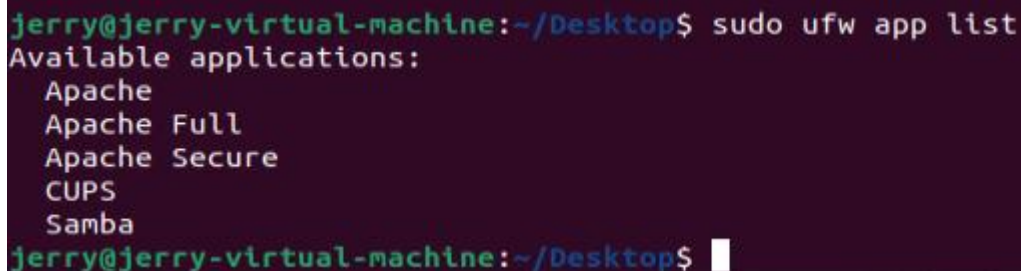


```
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
invoke-rc.d: policy-rc.d denied execution of start.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.
/usr/sbin/policy-rc.d returned 101, not running 'start apache2.service'
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.
/usr/sbin/policy-rc.d returned 101, not running 'start apache-htcacheclean.service'
Processing triggers for ufw (0.36.1-4ubuntu0.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
```

### Assignment 2: Configure UFW firewall

**Step 1:**list the file of ufw

*Sudo ufw app list*



```
jerry@jerry-virtual-machine:~/Desktop$ sudo ufw app list
Available applications:
  Apache
  Apache Full
  Apache Secure
  CUPS
  Samba
jerry@jerry-virtual-machine:~/Desktop$
```

**Step 2:** Allow apache on ufw and verify its status

*Sudo ufw allow 'APACHE'*

```
jerry@jerry-virtual-machine:~/Desktop$ sudo ufw allow 'Apache'
Rules updated
Rules updated (v6)
jerry@jerry-virtual-machine:~/Desktop$
```

### Assignment 3: Configure apache web server

#### Step1: verify that the ahe service is running

*Sudo systemctl status apache2*

```
jerry@jerry-virtual-machine:~/Desktop$ sudo systemctl status apache2
○ apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese>
   Active: inactive (dead)
   Docs: https://httpd.apache.org/docs/2.4/
lines 1-4/4 (END)
[3]+  Stopped                  sudo systemctl status apache2
jerry@jerry-virtual-machine:~/Desktop$ sudo systemctl start apache2
```

the output shows that apache server is stopped.

Enter : *sudo systemctl start apache* To start apache2 server

```
jerry@jerry-virtual-machine:~/Desktop$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor prese>
   Active: active (running) since Wed 2024-06-12 21:49:31 CST; 17s ago
   Docs: https://httpd.apache.org/docs/2.4/
  Process: 6931 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SU>
 Main PID: 6942 (apache2)
    Tasks: 55 (limit: 4554)
   Memory: 5.0M
      CPU: 59ms
   CGroup: /system.slice/apache2.service
           └─6942 /usr/sbin/apache2 -k start
             └─6943 /usr/sbin/apache2 -k start
               └─6944 /usr/sbin/apache2 -k start

6月 12 21:49:31 jerry-virtual-machine systemd[1]: Starting The Apache HTTP Serv>
6月 12 21:49:31 jerry-virtual-machine apachectl[6941]: AH00558: apache2: Could >
6月 12 21:49:31 jerry-virtual-machine systemd[1]: Started The Apache HTTP Serve>
lines 1-17/17 (END)
```

### Assignment 3: Set virtual machine

#### Step 1: Create a directory

*Sudo mkdir -p /var/www/example-1/html*

#### Step 2: Assigning ownership of directory with the \$USER environment variable

*Sudo chown -R \$USER:\$USER /var/www/example\_1.com/html*

#### Step 3: make the permissions on your web root directory correct.

*Sudo chown -R 755 /var/www/example\_1.com*

#### Step 4: use gedit to create a index.html page.

*Sudo gedit /var/www/example\_1.com/html/index.html*

```
jerry@jerry-virtual-machine:~/Desktop$ sudo mkdir -p /var/www/example_1.com/html
jerry@jerry-virtual-machine:~/Desktop$ sudo chown -R $USER:$USER /var/www/example_1.com/html
jerry@jerry-virtual-machine:~/Desktop$ sudo chown -R 755 /var/www/example_1.com/html
jerry@jerry-virtual-machine:~/Desktop$ sudo getid /var/www/example_1.com/html/index.html
sudo: getid: command not found
jerry@jerry-virtual-machine:~/Desktop$ gedit /var/www/example_1.com/html/index.html
```

#### Step 5: adding the following context into the index.html

```
<html>
  <head>
    <title>Welcome to Example-1.com!</title>
  </head>
  <body>
    <h1>Success! The example-1.com server block is working!</h1>
  </body>
</html>
```

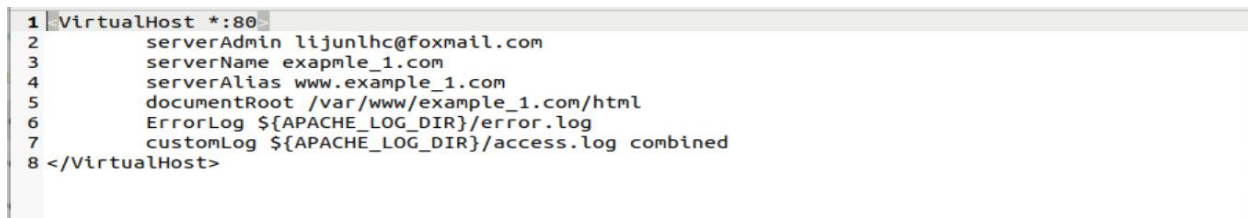


#### Step 6: use correct command to create virtual machine file

*Sudo gedit /etc/apache2/sites-available/example\_1.com.conf*

Adding the following context into the file.

```
<VirtualHost *:80>
  ServerAdmin lijunlhc@foxmail.com
  ServerName example-1.com
  ServerAlias www.example-1.com
  DocumentRoot /var/www/example-1.com/html
  ErrorLog ${APACHE_LOG_DIR}/error.log
  CustomLog ${APACHE_LOG_DIR}/access.log combined
</VirtualHost>
```



#### Step 7: user asensite tool to start the file.

*sudo a2ensite example\_12.com.conf*

```
jerry@jerry-virtual-machine:~/Desktop$ sudo a2ensite example_1.com.conf
Enabling site example_1.com.
To activate the new configuration, you need to run:
    systemctl reload apache2
jerry@jerry-virtual-machine:~/Desktop$
```

**Step 8: Disable the default site defined in 000-default.conf**

*sudo a2dissite 000-default.conf*

```
jerry@jerry-virtual-machine:~/Desktop$ sudo a2dissite 000-default.conf
Site 000-default disabled.
To activate the new configuration, you need to run:
    systemctl reload apache2
jerry@jerry-virtual-machine:~/Desktop$
```

**Step 9: Restart Apache server**

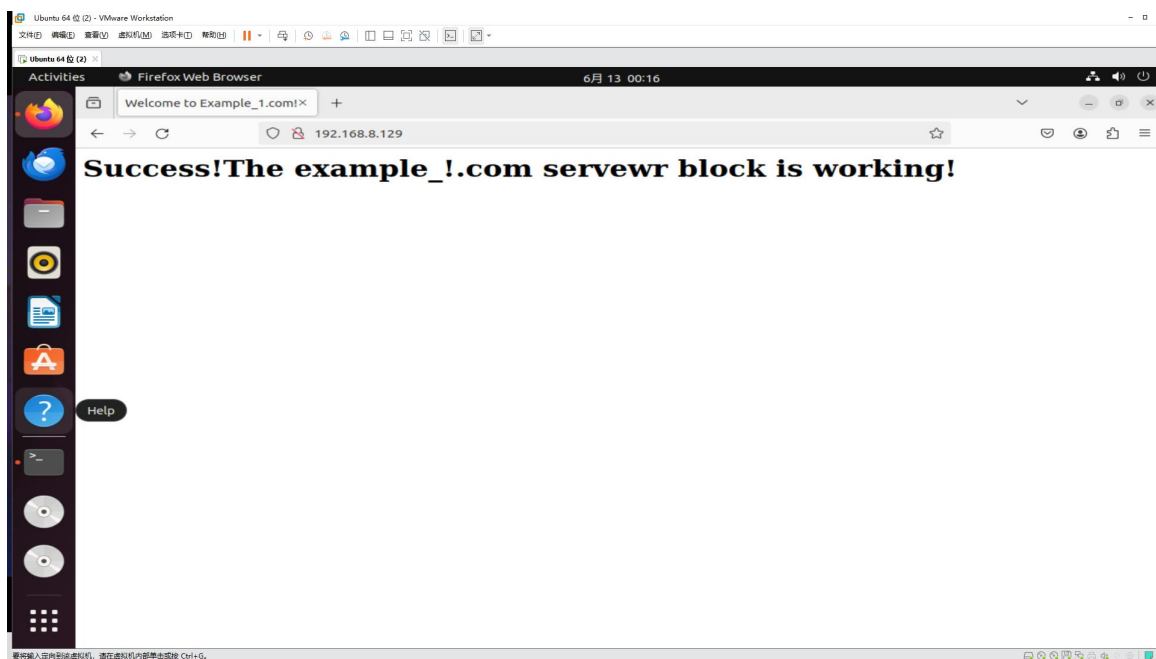
*sudo systemctl restart apache2*

**Step 10: Test error of Apache server**

*sudo apache2ctl configtest*

```
jerry@jerry-virtual-machine:~/Desktop$ sudo apache2ctl configtest
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
Syntax OK
```

**Step 11: test virtual machine**



### **ANALYSIS**

Analyze the behavior of each program. Explain the observed outputs, discuss any challenges encountered, and how they were resolved.

### **CONCLUSION**

Summarize your findings and experiences from this lab assignment.

### **REFERENCES**

List any references or resources you used to complete this lab assignment, if any.