

# Web Lab Manual-1: Task 2

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## Task 2: Creating and Configuring Virtual Hosts

### Task Objective

The objective of this task is to create and configure multiple virtual hosts on the Apache2 web server. This allows a single Apache server to host multiple websites with different domain names. The specific goals are:

- Create separate directory structures for each website
- Create HTML content files for each virtual host
- Configure virtual host configuration files in Apache
- Enable virtual hosts using Apache tools
- Verify that each virtual host serves the correct content
- Set appropriate file permissions and ownership

### Implementation Steps

#### *Step 1: Create Directory Structure for Virtual Hosts*

Create directories to store the HTML files for each virtual host. These directories will contain the website content.

Commands executed:

```
sudo mkdir -p /var/www/webserverlab.com/html  
sudo mkdir -p /var/www/example.com/html
```

#### *Step 2: Set Appropriate Permissions and Ownership*

Set the correct ownership and permissions for the website directories to allow the web server to serve content.

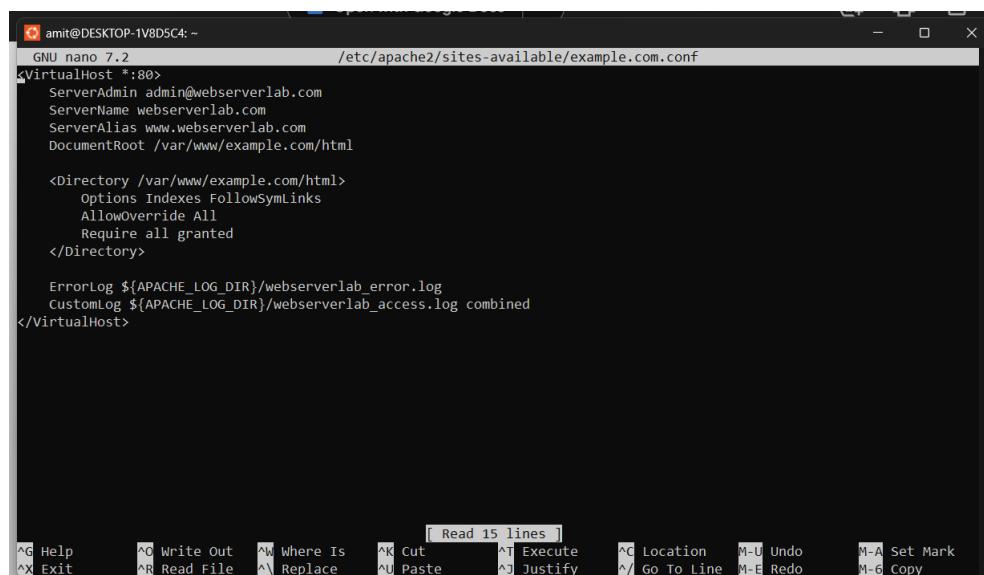
Commands executed:

```
sudo chown -R $USER:$USER  
/var/www/webserverlab.com/html  
sudo chmod -R 755 /var/www/webserverlab.com/html
```

### **Step 3: Create HTML Content Files**

Create simple HTML files for each virtual host to test the server configuration. These files will be served when the domains are accessed.

Terminal Commands and Output:

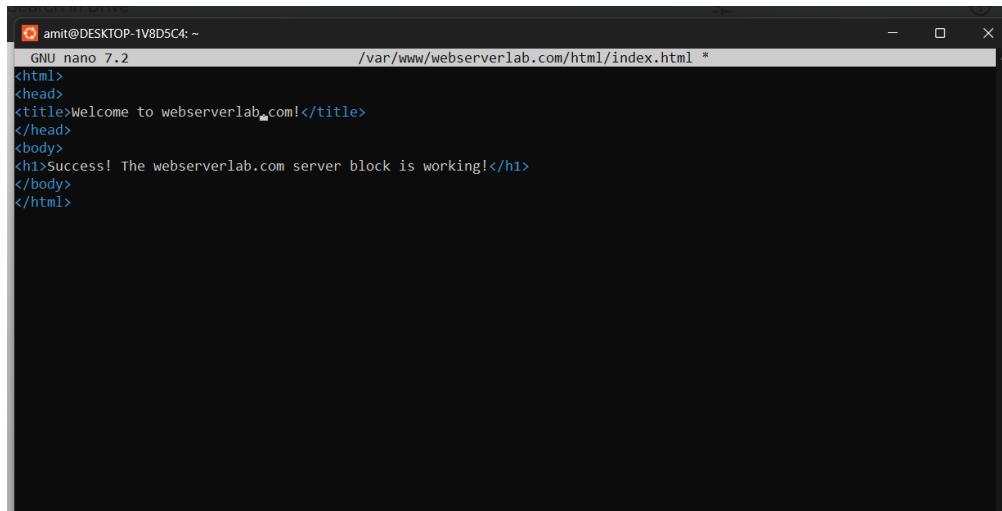


```
amit@DESKTOP-1V8D5C4: ~
GNU nano 7.2                               /etc/apache2/sites-available/example.com.conf
VirtualHost *:80
    ServerAdmin admin@webserverlab.com
    ServerName webserverlab.com
    ServerAlias www.webserverlab.com
    DocumentRoot /var/www/example.com/html

    <Directory /var/www/example.com/html>
        Options Indexes FollowSymLinks
        AllowOverride All
        Require all granted
    </Directory>

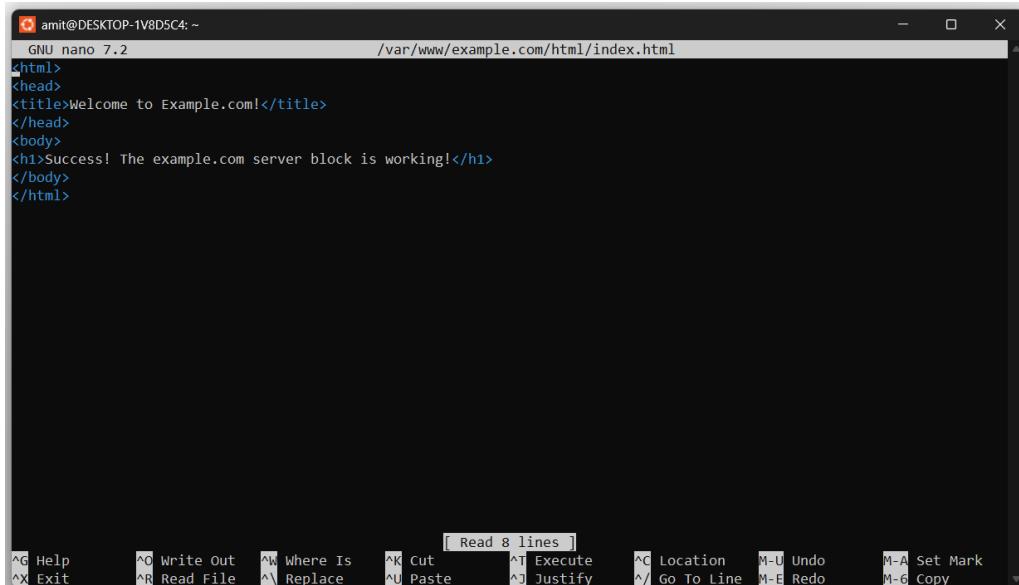
    ErrorLog ${APACHE_LOG_DIR}/webserverlab_error.log
    CustomLog ${APACHE_LOG_DIR}/webserverlab_access.log combined
</VirtualHost>
```

HTML content for webserverlab.com/html/index.html (shown in nano editor):



```
amit@DESKTOP-1V8D5C4: ~
GNU nano 7.2                               /var/www/webserverlab.com/html/index.html *
<html>
<head>
<title>Welcome to webserverlab.com!</title>
</head>
<body>
<h1>Success! The webserverlab.com server block is working!</h1>
</body>
</html>
```

HTML content for example.com/html/index.html (shown in nano editor):



```
amit@DESKTOP-1V8D5C4: ~
GNU nano 7.2                               /var/www/example.com/html/index.html
<html>
<head>
<title>Welcome to Example.com!</title>
</head>
<body>
<h1>Success! The example.com server block is working!</h1>
</body>
</html>
```

[ Read 8 lines ]

^H 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 ^Y Go To Line M-E Redo M-G Copy

#### **Step 4: Create Virtual Host Configuration Files**

Create Apache virtual host configuration files for each domain. These files tell Apache how to handle requests for each domain.

1. Create webserverlab.com virtual host configuration:

- sudo nano /etc/apache2/sites-available/webserverlab.com.conf

2. Create example.com virtual host configuration:

- sudo nano /etc/apache2/sites-available/example.com.conf

#### **Configuration File Content (webserverlab.com.conf):**

```
/etc/apache2/sites-available/webserverlab.com.conf
<VirtualHost *:80>

    ServerAdmin admin@webserverlab.com

    ServerName webserverlab.com

    ServerAlias www.webserverlab.com

    DocumentRoot /var/www/example.com/html

    <Directory /var/www/example.com/html>

        Options Indexes FollowSymLinks

        AllowOverride All
```

```

        Require all granted

</Directory>

ErrorLog ${APACHE_LOG_DIR}/webserverlab_error.log

CustomLog ${APACHE_LOG_DIR}/webserverlab_access.log combined

</VirtualHost>

```

### **Step 5: Enable Virtual Host Configurations**

Use Apache tools to enable the virtual host configurations.

3. Enable webserverlab.com virtual host:

- sudo a2ensite webserverlab.com.conf

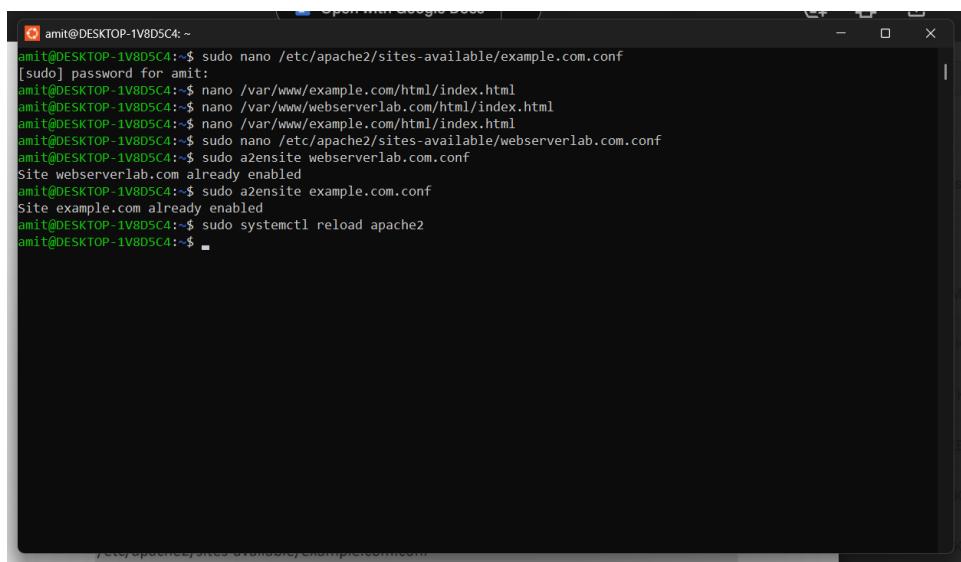
4. Enable example.com virtual host:

- sudo a2ensite example.com.conf

5. Reload Apache2 to apply changes:

- sudo systemctl reload apache2

Terminal Output:



```

amit@DESKTOP-1V8D5C4:~$ sudo nano /etc/apache2/sites-available/example.com.conf
[sudo] password for amit:
amit@DESKTOP-1V8D5C4:~$ nano /var/www/example.com/html/index.html
amit@DESKTOP-1V8D5C4:~$ nano /var/www/webserverlab.com/html/index.html
amit@DESKTOP-1V8D5C4:~$ nano /var/www/example.com/html/index.html
amit@DESKTOP-1V8D5C4:~$ sudo nano /etc/apache2/sites-available/webserverlab.com.conf
amit@DESKTOP-1V8D5C4:~$ sudo a2ensite webserverlab.com.conf
Site webserverlab.com already enabled
amit@DESKTOP-1V8D5C4:~$ Site example.com already enabled
amit@DESKTOP-1V8D5C4:~$ sudo a2ensite example.com.conf
amit@DESKTOP-1V8D5C4:~$ sudo systemctl reload apache2
amit@DESKTOP-1V8D5C4:~$ 

```

## **Testing and Verification**

### ***Virtual Host Verification***

After enabling the virtual hosts and reloading Apache, verify that each virtual host is accessible and serving the correct content.

Virtual hosts successfully configured and enabled:

- webserverlab.com - accessible at *http://webserverlab.com*
- example.com - accessible at *http://example.com*
- Both virtual hosts are serving custom HTML content

## **Configuration Details**

### ***Virtual Host Configuration Structure***

Each virtual host configuration file follows this structure:

- VirtualHost directive: Specifies the IP address and port (typically \*:80 for HTTP)
- ServerAdmin: Email address of the server administrator
- ServerName: The primary domain name for this virtual host
- ServerAlias: Alternative domain names that point to the same virtual host
- DocumentRoot: The directory containing the website files
- ErrorLog and CustomLog: Logging configuration for this virtual host

### ***File Permissions and Ownership***

Proper file permissions are critical for security:

- 755 permissions on directories: Allow Apache to read and execute
- 644 permissions on files: Allow Apache to read HTML files
- User ownership: The www-data user (Apache) can read files

## **Results and Observations**

### 6. Directory Structure Created:

- /var/www/webserverlab.com/html/ - Created and configured
- /var/www/example.com/html/ - Created and configured

### 7. Configuration Files Created:

- /etc/apache2/sites-available/webserverlab.com.conf
- /etc/apache2/sites-available/example.com.conf

8. Virtual Hosts Enabled:

- Both sites successfully enabled using a2ensite command
- Apache reloaded without errors

9. Content Serving:

- Each domain serves custom HTML content
- HTML files properly formatted and displayed