

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.

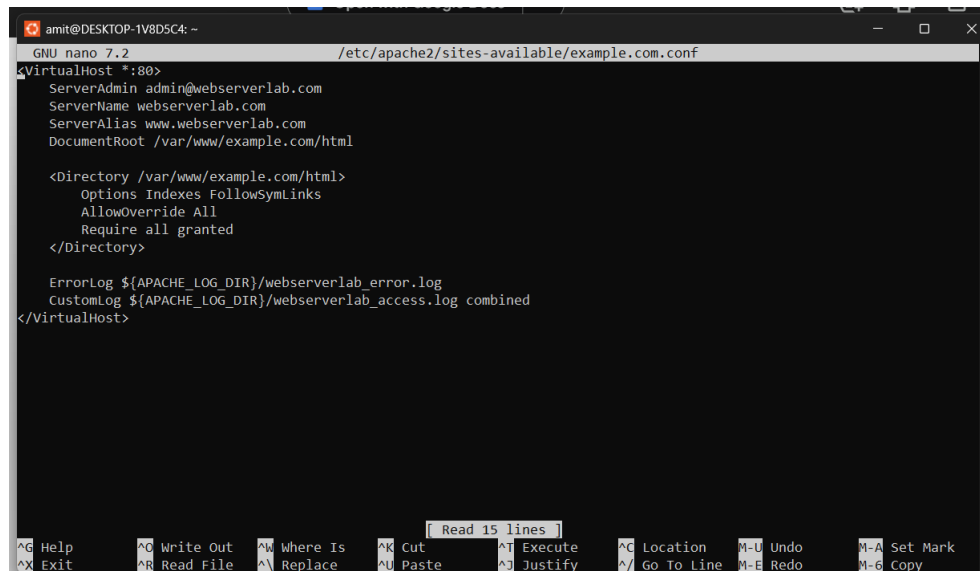
Commands executed:

```
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:

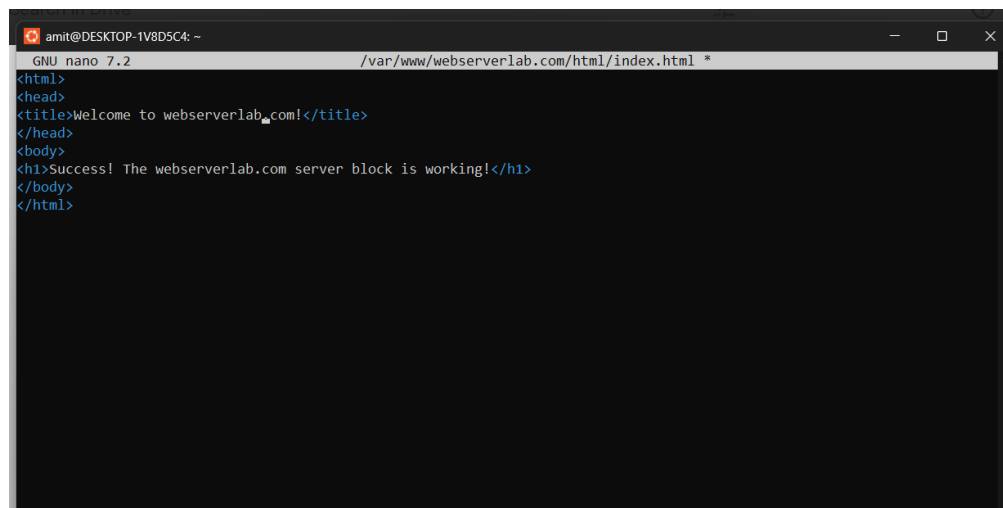


```
amit@DESKTOP-1V8D5C4: ~
GNU nano 7.2 /etc/apache2/sites-available/example.com.conf
<VirtualHost *:80>
  ServerAdmin admin@webserverlab.com
  ServerName webserverlab.com
  ServerAlias www.webserverlab.com
  DocumentRoot /var/www/example.com/html

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

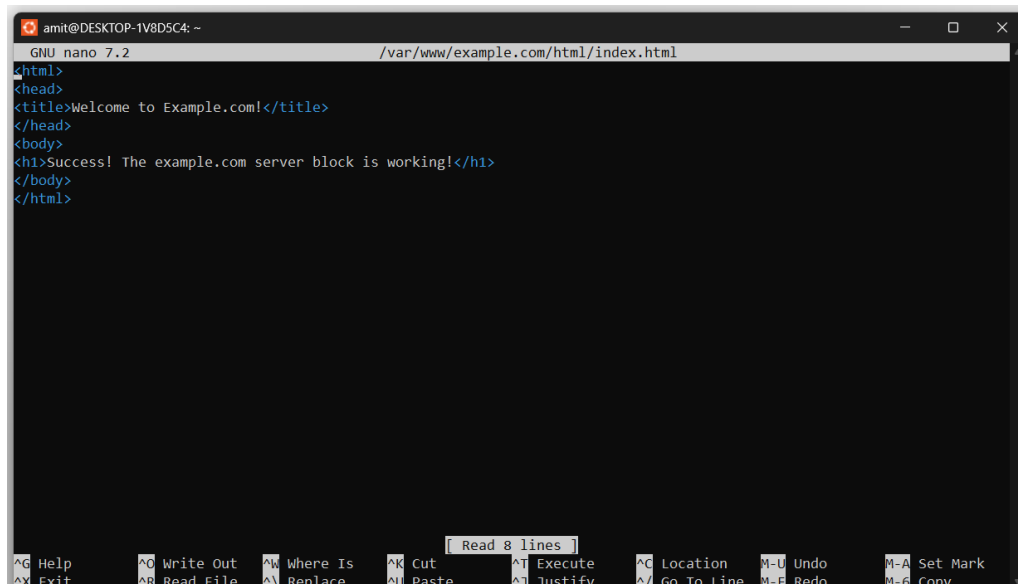
  ErrorLog ${APACHE_LOG_DIR}/webserverlab_error.log
  CustomLog ${APACHE_LOG_DIR}/webserverlab_access.log combined
</VirtualHost>
```

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 ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   ^U Undo       ^A Set Mark
^X Exit      ^R Read File  ^N Replace    ^V Paste      ^D Justify    ^_ Go To Line  ^E Redo       ^M 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`

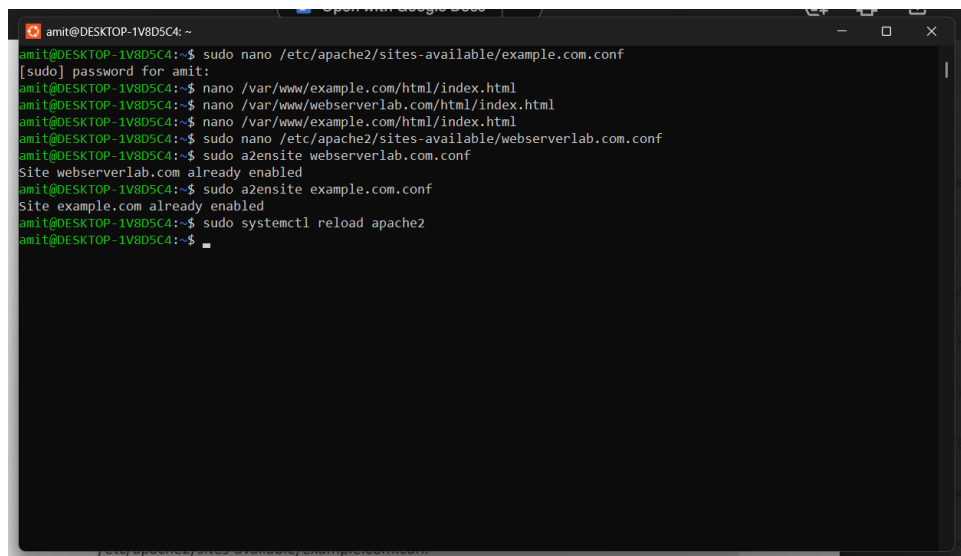
4. Enable example.com virtual host:

- `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: ~$ 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: ~$ sudo a2ensite example.com.conf
Site example.com already enabled
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