



Apache Project Part-I

420-635-AB-Network Installation and Administration I

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Objective:

- ✓ *Install and configure Apache Web Server.*
- ✓ *Create our first website by applying the necessary security rules.*

TASK 1 – CREATING A WEBSITE

1. Install and configure the Apache server to read web pages from the directory `"/var/www/html_project1"`.
 - You must copy the **httpd.conf** file to **httpd.conf.original**.
 - Configure the server to be accessible via the IP address 192.168.50.10.
 - Ensure the **httpd** service is started and enabled to run at boot.

```
[root@server18 ~]# dnf install httpd -y
Last metadata expiration check: 0:54:40 ago on Mon 14 Apr 2025 03:45:14 PM.
Dependencies resolved.
=====
Package           Arch  Version              Repo                Size
=====
Installing:
httpd              x86_64 2.4.62-1.el9_5.2 appstream           45 k
Installing dependencies:
almalinux-logos-httpd
                    noarch 90.5.1-1.1.el9 appstream           18 k
...
                    x86_64 1:7.0-12.el9_5 appstream          122 k
```

```
[root@server18 ~]# cp /etc/httpd/conf/httpd.conf /etc/httpd/conf/httpd.conf.original
[root@server18 ~]# ls /etc/httpd/conf
httpd.conf httpd.conf.original magic
```

```
[root@server18 ~]# mkdir /var/www/html_project1
[root@server18 ~]# ls -l /var/www/
total 0
drwxr-xr-x. 2 root root 6 Jan 21 16:23 cgi-bin
drwxr-xr-x. 2 root root 6 Jan 21 16:23 html
drwxr-xr-x. 2 root root 6 Apr 14 17:55 html_project1
```

```
[root@server18 ~]# cd /etc/httpd/conf
[root@server18 conf]# vim httpd.conf
```

```

ServerRoot "/etc/httpd"
Listen 80
Include conf.modules.d/*.conf

User apache
Group apache

#
ServerAdmin root@localhost

#
#ServerName www.example.com:80

#
<Directory />
    AllowOverride none
    Require all denied
</Directory>

DocumentRoot "/var/www/html_project1"

[root@server18 conf]# systemctl enable --now httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/
md/system/httpd.service.
[root@server18 conf]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: di
   Active: active (running) since Mon 2025-04-14 17:59:58 EDT; 35s ago
     Docs: man:httpd.service(8)
  Main PID: 3206 (httpd)
    Status: "Total requests: 0; Idle/Busy workers 100/0;Requests/sec: 0; Bytes
      Tasks: 177 (limit: 22830)
     Memory: 38.3M
        CPU: 388ms
    CGroup: /system.slice/httpd.service
            └─3206 /usr/sbin/httpd -DFOREGROUND
              └─3207 /usr/sbin/httpd -DFOREGROUND
                └─3208 /usr/sbin/httpd -DFOREGROUND
                  └─3209 /usr/sbin/httpd -DFOREGROUND
                    └─3210 /usr/sbin/httpd -DFOREGROUND

```

2. Create a new homepage named **index.html** in the **/var/www/html_project1** directory.

```

[root@server18 conf]# cd /var/www/html_project1/
[root@server18 html_project1]# vim index.html

```

3. The page must include all of the following **HTML tags** (each used at least once): **<html>**, **<head>**, **<title>**, **<body>**, **<p>**, **<hr>**, **<a href>**, ****, **
, **, **<i>**, and **<u>**.
 - The page title must be **Project Part I - Homepage**
 - You must add a link to each web page of this project inside the **index.html** page.

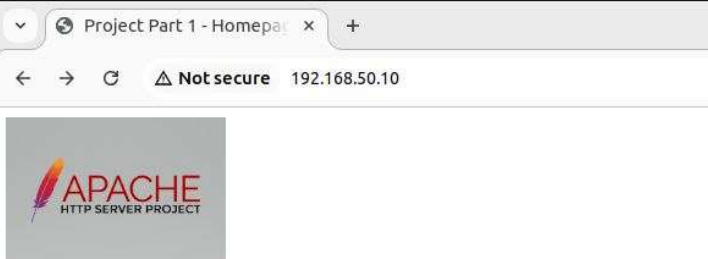
- Add a **hyperlink** to each web page created for this project inside the index.html page. Each link should **open the corresponding web page of each question**, allowing you to test its functionality. See the example provided on the last page of this document.

```
<!doctype html>
<html>
  <head>
    <br>
    <title>Project Part 1 - Homepage</title>
  </head>
  <body>
    <h2 class="title">Project Part 1 - Homepage</h2>
    <hr>
    <h3 class="subtitle"><u><b>Task 2 - Secure directories:</b></u></h3>
    <ul>
      <p><b><u><a href=http://192.168.50.10/secure1>secure1 (user01 - accessible)</a></b></u></p>
      <p><b><u><a href=http://192.168.50.10/secure2>secure2 (user01 and 192.168.50.0/24 - accessible)</a></b></u></p>
      <p><b><u><a href=http://10.35.16.1/secure2>secure2 (user01 and 10.35.16.1/24 - Not accessible)</a></b></u></p>
      <p><b><u><a href=http://192.168.50.10/secure3>secure3 (user01 or 192.168.50.0/24 - accessible)</a></b></u></p>
      <p><b><u><a href=http://10.35.16.1/secure3>secure3 (user01 or 192.168.50.0/24 - accessible)</a></b></u></p>
      <p><b><u><a href=http://192.168.50.10/secure4>secure4 (user02 - accessible)</a></b></u></p>
      <p><b><u><a href=http://192.168.50.10/secure5>secure5 (user01 with .htaccess - accessible)</a></b></u></p>
      <p><b><u><a href=http://192.168.50.10/secure6>secure6 (user01 and 192.168.50 with .htaccess - accessible)</a></b></u></p>
      <p><b><u><a href=http://10.35.16.1/secure6>secure6 (user01 and 10.35.16.1/24 with .htaccess - Not accessible)</a></b></u></p>
      <p><b><u><a href=http://192.168.50.10/secure7>secure7 (user01 or 192.168.50 with .htaccess - accessible)</a></b></u></p>
      <p><b><u><a href=http://10.35.16.1/secure7>secure7 (user01 or 192.168.50 with .htaccess - accessible)</a></b></u></p>
    </ul>
    <hr>
```

```
<h3 class="subtitle"><u><b>Task 3 - Project 1:</b></u></h3>
<ul>
  <p><b><u><a href=http://192.168.50.10/Project1>Project1 (192.168.50.10 - All is accessible)</a></b></u></p>
  <p><b><u><a href=http://10.35.16.1/Project1>Project1 (10.35.16.1 accessible except secret.* and *.txt)</a></b></u></p>
  <p><b><u><a href=http://10.35.17.1/Project1>Project1 (10.35.17.1 accessible except files secret.* and *.txt)</a></b></u></p>
  <p><b><u><a href=http://192.168.100.1/Project1>Project1 (192.168.100.1 Not accessible)</a></b></u></p>
</ul>
<hr>
<h3 class="subtitle"><u><b>Task 3 - Project 2:</b></u></h3>
<ul>
  <p><b><u><a href=http://192.168.50.10/Project2>Project2 (192.168.50.10 - All is accessible)</a></b></u></p>
  <p><b><u><a href=http://10.35.16.1/Project2>Project2 (10.35.16.1 - Not accessible)</a></b></u></p>
  <p><b><u><a href=http://10.35.17.1/Project2>Project2 (10.35.17.1 accessible except files *.txt)</a></b></u></p>
  <p><b><u><a href=http://192.168.100.1/Project2>Project2 (192.168.100.1 accessible except files *.txt)</a></b></u></p>
</ul>
<hr>
```

```
<h3 class="subtitle"><u><b>Task 3 - Project 3:</b></u></h3>
<ul>
  <p><b><u><a href=http://192.168.50.10/Project3>Project3 (192.168.50.10 - All is accessible)</a></b></u></p>
  <p><b><u><a href=http://10.35.16.1/Project3>Project3 (10.35.16.1 - Not accessible)</a></b></u></p>
  <p><b><u><a href=http://10.35.17.1/Project3>Project3 (10.35.17.1 - Not accessible)</a></b></u></p>
  <p><b><u><a href=http://192.168.100.1/Project3>Project3 (192.168.100.1 - accessible except files *.gif and *.txt)</a></b></u></p>
</ul>
<hr>
<h3 class="subtitle"><u><b>Task 3 - Project 4:</b></u></h3>
<ul>
  <p><b><u><a href=http://192.168.50.10/Project4>Project4 (192.168.50.10 - All is accessible)</a></b></u></p>
  <p><b><u><a href=http://10.35.16.1/Project4>Project4 (10.35.16.1 - accessible except files test.html)</a></b></u></p>
  <p><b><u><a href=http://10.35.17.1/Project4>Project4 (10.35.17.1 - Not accessible)</a></b></u></p>
  <p><b><u><a href=http://192.168.100.1/Project4>Project4 (192.168.100.1 - accessible except files test.html)</a></b></u></p>
</ul>
<hr>
```

```
<h3 class="subtitle"><u><b>Task 4 - Vendors Website:</b></u></h3>
<ul>
<p><b><u><a href=http://10.50.1.1/vendors>Accessible to Vendors (10.50.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.51.1.1/vendors>Not accessible to Accountants (10.51.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.52.1.1/vendors>Accessible to Administrators (10.52.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.53.1.1/vendors>Accessible to Programmers (10.53.1.0/24) except *.gif and *.jpg files</a></b></u>
</p>
</ul>
<hr>
<h3 class="subtitle"><u><b>Task 4 - Accountants Website:</b></u></h3>
<ul>
<p><b><u><a href=http://10.50.1.1/accountants>Not accessible to Vendors (10.50.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.51.1.1/accountants>Accessible to Accountants (10.51.1.0/24) except *.html files</a></b></u></p>
<p><b><u><a href=http://10.52.1.1/accountants>Accessible to Administrators (10.52.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.53.1.1/accountants>Accessible to Programmers (10.53.1.0/24) except *.gif and *.jpg files</a></b>
</u></p>
</ul>
<hr>
<h3 class="subtitle"><u><b>Task 4 - Administrators Website:</b></u></h3>
<ul>
<p><b><u><a href=http://10.50.1.1/administrators>Not accessible to Vendors (10.50.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.51.1.1/administrators>Not accessible to Accountants (10.51.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.52.1.1/administrators>Accessible to Administrators (10.52.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.53.1.1/administrators>Accessible to Programmers (10.53.1.0/24) except *.gif and *.jpg files</a></b>
</u></p>
</ul>
<hr>
<h3 class="subtitle"><u><b>Task 4 - Programmers Website:</b></u></h3>
<ul>
<p><b><u><a href=http://10.50.1.1/programmers>Not accessible to Vendors (10.50.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.51.1.1/programmers>Not accessible to Accountants (10.51.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.52.1.1/programmers>Accessible to Administrators (10.52.1.0/24)</a></b></u></p>
<p><b><u><a href=http://10.53.1.1/programmers>Accessible to Programmers (10.53.1.0/24)</a></b></u></p>
</ul>
<hr>
</body>
</html>
```



Project Part 1 - Homepage

Task 2 - Secure directories:

- [secure1 \(user01 - accessible\)](#)
- [secure2 \(user01 and 192.168.50.0/24 - accessible\)](#)
- [secure2 \(user01 and 10.35.16.1/24 - Not accessible\)](#)
- [secure3 \(user01 or 192.168.50.0/24 - accessible\)](#)
- [secure3 \(user01 or 192.168.50.0/24 - accessible\)](#)
- [secure4 \(user02 - accessible\)](#)
- [secure5 \(user01 with .htaccess - accessible\)](#)
- [secure6 \(user01 and 192.168.50 with .htaccess - accessible\)](#)
- [secure6 \(user01 and 10.35.16.1/24 with .htaccess - Not accessible\)](#)
- [secure7 \(user01 or 192.168.50 with .htaccess - accessible\)](#)
- [secure7 \(user01 or 192.168.50 with .htaccess - accessible\)](#)

Project Part 1 - Homepag

← → ↻

Not secure 192.168.50.10

Task 3 - Project 1:

- [Project1 \(192.168.50.10 - All is accessible\)](#)
- [Project1 \(10.35.16.1 accessible except secret.* and *.txt\)](#)
- [Project1 \(10.35.17.1 accessible except files secret.* and *.txt\)](#)
- [Project1 \(192.168.100.1 Not accessible\)](#)

Task 3 - Project 2:

- [Project2 \(192.168.50.10 - All is accessible\)](#)
- [Project2 \(10.35.16.1 - Not accessible\)](#)
- [Project2 \(10.35.17.1 accessible except files *.txt\)](#)
- [Project2 \(192.168.100.1 accessible except files *.txt\)](#)

Task 3 - Project 3:

- [Project3 \(192.168.50.10 - All is accessible\)](#)
- [Project3 \(10.35.16.1 - Not accessible\)](#)
- [Project3 \(10.35.17.1 - Not accessible\)](#)
- [Project3 \(192.168.100.1 - accessible except files *.gif and *.txt\)](#)

Task 3 - Project 4:

- [Project4 \(192.168.50.10 - All is accessible\)](#)
- [Project4 \(10.35.16.1 - accessible except files test.html\)](#)
- [Project4 \(10.35.17.1 - Not accessible\)](#)
- [Project4 \(192.168.100.1 - accessible except files test.html\)](#)

Project Part 1 - Homepa x +

← → ↻ ⚠ Not secure 192.168.50.10

[Project4 \(192.168.100.1 - accessible except files test.html\)](#)

Task 4 - Vendors Website:

[Accessible to Vendors \(10.50.1.0/24\)](#)

[Not accessible to Accountants \(10.51.1.0/24\)](#)

[Accessible to Administrators \(10.52.1.0/24\)](#)

[Accessible to Programmers \(10.53.1.0/24\) except *.gif and *.jpg files>](#)

Task 4 - Accountants Website:

[Not accessible to Vendors \(10.50.1.0/24\)](#)

[Accessible to Accountants \(10.51.1.0/24\) except *.html files](#)

[Accessible to Administrators \(10.52.1.0/24\)](#)

[Accessible to Programmers \(10.53.1.0/24\) except *.gif and *.jpg files>](#)

Task 4 - Administrators Website:

[Not accessible to Vendors \(10.50.1.0/24\)](#)

[Not accessible to Accountants \(10.51.1.0/24\)](#)

[Accessible to Administrators \(10.52.1.0/24\)](#)

[Accessible to Programmers \(10.53.1.0/24\) except *.gif and *.jpg files](#)

Task 4 - Programmers Website:

[Not accessible to Vendors \(10.50.1.0/24\)](#)

[Not accessible to Accountants \(10.51.1.0/24\)](#)

[Accessible to Administrators \(10.52.1.0/24\)](#)

[Accessible to Programmers \(10.53.1.0/24\)](#)

TASK 2 – AUTHENTICATION

All files for this section should be created within the **/var/www/html_project1** directory.

1. Create a **secure1** directory and configure Apache using the **<Directory>** directive so that only the user **user01** with the password “**secret**” can access it from **any subnet**. No other users should have access.

```
[root@server18 html_project1]# mkdir secure1
[root@server18 html_project1]# cd secure1
[root@server18 secure1]# vim index.html
```

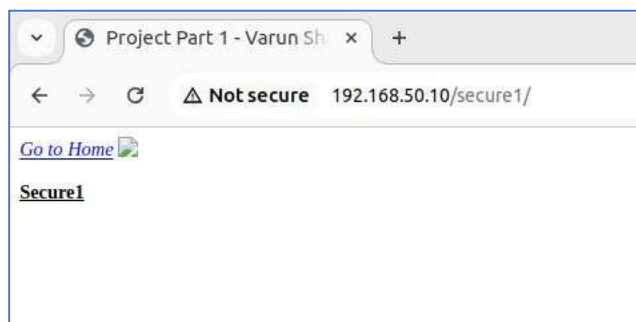
```
<!doctype html>
<html>
  <head>
    <a href=http://localhost><i>Go to Home</i></a>
    <img src=/home/vsharma/Downloads/Apache.jpg>
    <title>Project Part 1 - Varun Sharma</title>
  </head>
  <body>
    <p><u><b>Secure1</b></u></p>
  </body>
</html>
```



```
[root@server18 ~]# cd /etc/httpd/conf
[root@server18 conf]# vim httpd.conf
```

```
#Directory "secure1" accessible by user01 from any subnet
<Directory "/var/www/html_project1/secure1">
    AuthType Basic
    AuthName "Enter the details to access secure1"
    AuthUserFile "/var/www/.htpasswd"
    Require user user01
</Directory>
```

```
[root@server18 www]# htpasswd -bc .htpasswd user01 secret
Adding password for user user01
```



2. Create a **secure2** directory and configure Apache so that only **user01** can access it when connecting from the subnet **192.168.50.0/24**.

```
[root@server18 html_project1]# mkdir secure2
[root@server18 html_project1]# cp secure1/index.html secure2/index.html
```

```
[root@server18 html_project1]# nano secure2/index.html
```

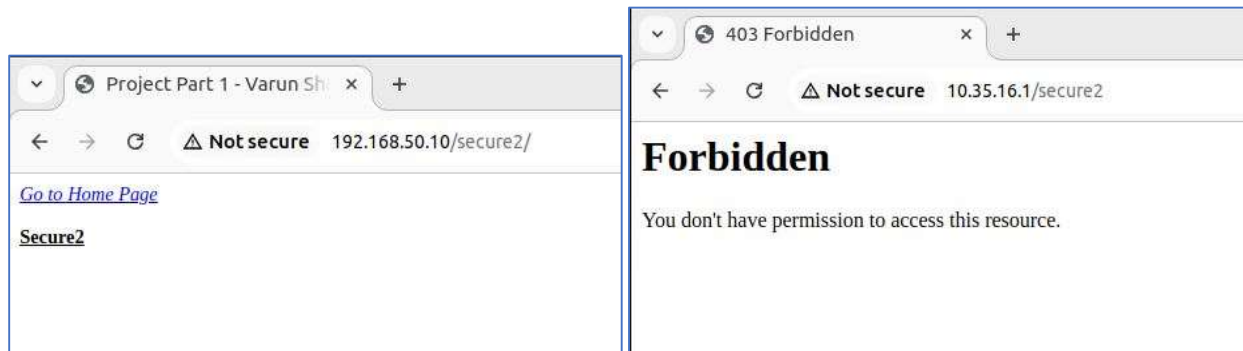
```
GNU nano 5.6.1 secure2/index.html
<!doctype html>
<html>
  <head>
    <a href=http://localhost><i>Go to Home</i></a>
    
    <title>Project Part 1 - Varun Sharma</title>
  </head>
  <body>
    <p><u><b>Secure2</b></u></p>
  </body>
</html>
```

```
[root@server18 conf]# vim httpd.conf
```

```
#Directory "secure2" accessible by user01 when connecting from 192.168.50.0/24
<Directory "/var/www/html_project1/secure2">
    <RequireAll>
        Require ip 192.168.50.0/24
        Require user user01
    </RequireAll>
    AuthType Basic
    AuthName "Enter the details to access secure2"
    AuthUserFile "/var/www/.htpasswd"
</Directory>

[root@server18 conf]# nmcli connection modify LAN1 +ipv4.addresses 10.35.16.1/24
[root@server18 conf]# nmcli connection down LAN1 ; nmcli connection up LAN1
Connection 'LAN1' successfully deactivated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/3)
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/4)

vsharma@client18:~$ nmcli connection modify LAN1 +ipv4.addresses 10.35.16.2/24
vsharma@client18:~$ nmcli connection down LAN1 ; nmcli connection up LAN1
Connection 'LAN1' successfully deactivated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/1)
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkManager/ActiveConnection/2)
```



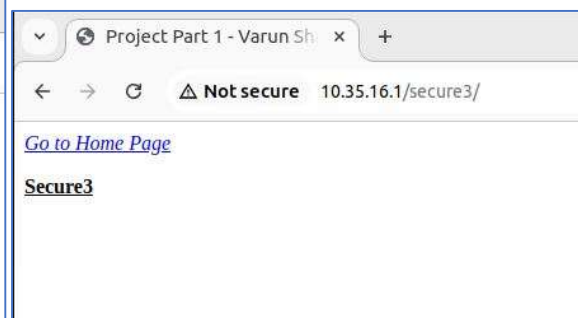
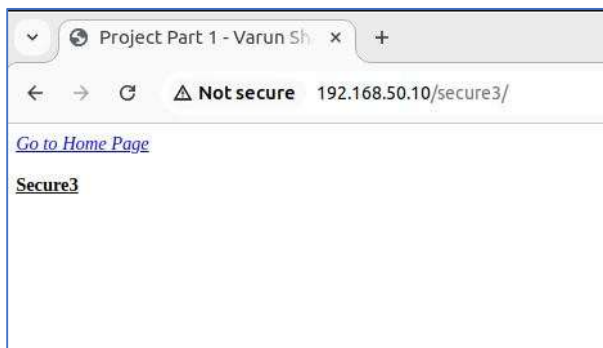
3. Create a **secure3** directory and configure Apache so that either **user01** or **any user** from the **192.168.50.0/24** subnet can access it.

```
[root@server18 html_project1]# mkdir secure3
[root@server18 html_project1]# cp secure2/index.html secure3/index.html
[root@server18 html_project1]# vim secure3/index.html
```

```
<!doctype html>
<html>
  <head>
    <a href=http://localhost><i>Go to Home Page</i></a>
    <title>Project Part 1 - Varun Sharma</title>
  </head>
  <body>
    <p><u><b>Secure3</b></u></p>
  </body>
</html>
```

```
[root@server18 conf]# vim httpd.conf
```

```
#Directory "secure3" accessible by either user01 or any user from 192.168.50.0/24 subnet
<Directory "/var/www/html_project1/secure3">
    <RequireAny>
        Require ip 192.168.50.0/24
        Require user user01
    </RequireAny>
    AuthType Basic
    AuthName "Enter the details to access secure3"
    AuthUserFile "/var/www/.htpasswd"
</Directory>
```

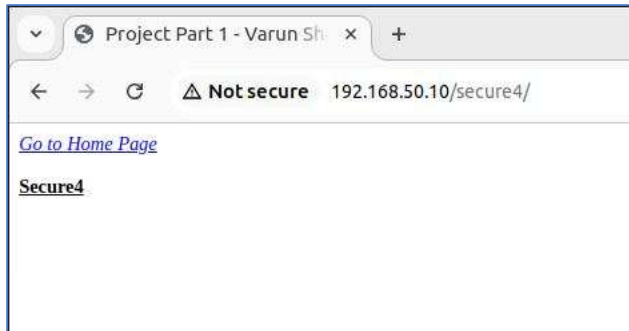


4. Create a **secure4** directory and configure it similarly to **secure1** but grant access only to the user **user02** (password "secret").

```
[root@server18 www]# htpasswd -b .htpasswd user02 secret
Adding password for user user02
[root@server18 html_project1]# mkdir secure4
[root@server18 html_project1]# cp secure3/index.html secure4/index.html
[root@server18 html_project1]# vim secure4/index.html
```

```
<!doctype html>
<html>
  <head>
    <a href=http://localhost><i>Go to Home Page</i></a>
    <title>Project Part 1 - Varun Sharma</title>
  </head>
  <body>
    <p><u><b>Secure4</b></u></p>
  </body>
</html>
```

```
[root@server18 conf]# vim httpd.conf
#Directory "secure4" accessible only by user02 (from any subnet)
<Directory "/var/www/html_project1/secure4">
    AuthType Basic
    AuthName "Enter the details to access secure4"
    AuthUserFile "/var/www/.htpasswd"
    Require user user02
</Directory>
```



5. Create a **secure5** directory and place an **.htaccess** file inside it to restrict access to only **user01** from **any** subnet.

```
[root@server18 html_project1]# mkdir secure5
[root@server18 html_project1]# cd secure5
[root@server18 secure5]# vim .htaccess
```

```
<RequireAll>
  AuthType Basic
  AuthName "Enter the details to access secure5"
  AuthUserFile "/var/www/.htpasswd"
  Require user user01
</RequireAll>
```

```
[root@server18 conf]# vim httpd.conf
```

```
#Directory "secure5" accessible only by user01 (using .htaccess)
<Directory "/var/www/html_project1/secure5">
    AllowOverride All
</Directory>
```



6. Create a **secure6** directory and use an **.htaccess** file to restrict access to **user01**, but only when connecting from the **192.168.50.0/24** subnet.

```
[root@server18 html_project1]# mkdir secure6
[root@server18 html_project1]# cd secure6
[root@server18 secure6]# vim .htaccess
```



```
<RequireAll>
  AuthType Basic
  AuthName "Enter the details to access secure6"
  AuthUserFile "/var/www/.htpasswd"
  Require user user01
  Require ip 192.168.50.0/24
</RequireAll>
```

```
[root@server18 conf]# vim httpd.conf
```

```
#Directory "secure6" accessible by user01 only from 192.168.50.0/24 subnet
<Directory "/var/www/html_project1/secure6">
    AllowOverride All
</Directory>
```



7. Create a **secure7** directory and use an **.htaccess** file to allow access to either the **user01** or **any user** from the **192.168.50.0/24** subnet.

```
[root@server18 html_project1]# mkdir secure7
[root@server18 html_project1]# cp secure6/.htaccess secure7/.htaccess
[root@server18 html_project1]# vim secure7/.htaccess
```

```
<RequireAny>
  AuthType Basic
  AuthName "Enter the details to access secure7"
  AuthUserFile "/var/www/.htpasswd"
  Require user user01
  Require ip 192.168.50.0/24
</RequireAny>
```

```
[root@server18 conf]# vim httpd.conf
```

```
#Directory "secure7" accessible either by user01 or any user in 192.168.50.0/24 subnet
<Directory "/var/www/html_project1/secure7">
    AllowOverride All
</Directory>
```



TASK 3 – ACCESSIBILITY

1 In the `/var/www/html_project1` directory add the following subdirectories:

- Project1
- Project2
- Project3
- Project4

```
[root@server18 html_project1]# mkdir Project1 Project2 Project3 Project4
[root@server18 html_project1]# ls Pr*
Project1:
Project2:
Project3:
Project4:
```

- 2 In each of these directories, create a web page named after the directory itself. For example, **Project1/project1.html**, **Project2/project2.html**, etc.

```
[root@server18 html_project1]# vim Project1/project1.html
```

```
<!doctype html>
<html>
  <head>
    <title>Welcome to project 1</title>
  </head>
  <body>
    <p><b>Welcome to project 1</b></p>
  </body>
</html>
```

```
[root@server18 html_project1]# vim Project2/project2.html
```

```
<!doctype html>
<html>
  <head>
    <title>Welcome to project 2</title>
  </head>
  <body>
    <p><b>Welcome to project 2</b></p>
  </body>
</html>
```

```
[root@server18 html_project1]# vim Project3/project3.html
```

```
<!doctype html>
<html>
  <head>
    <title>Welcome to project 3</title>
  </head>
  <body>
    <p><b>Welcome to project 3</b></p>
  </body>
</html>
```

```
[root@server18 html_project1]# vim Project4/project4.html
```

```
<!doctype html>
<html>
  <head>
    <title>Welcome to project 4</title>
  </head>
  <body>
    <p><b>Welcome to project 4</b></p>
  </body>
</html>
```

- 3 Do not place an **index.html** file in these directories. Instead, configure Apache to display a **directory listing** when accessed.

```
[root@server18 conf]# vim httpd.conf
```

```
#Directory "Project1"
<Directory "/var/www/html_project1/Project1">
    Options Indexes
</Directory>

#Directory "Project2"
<Directory "/var/www/html_project1/Project2">
    Options Indexes
</Directory>

#Directory "Project3"
<Directory "/var/www/html_project1/Project3">
    Options Indexes
</Directory>

#Directory "Project4"
<Directory "/var/www/html_project1/Project4">
    Options Indexes
</Directory>
```

- 4 Add <Directory> and <Files> directives to implement the following access controls:
 - All directories and their contents must be accessible from the **192.168.50.0/24** subnet.

The image displays four browser windows showing directory indexes for different projects. Each window has a title bar and a URL bar indicating the project path (e.g., 192.168.50.10/Project1/). The indexes are as follows:

- Index of /Project1:** Lists files: project1.html (149 bytes), project1.txt (0 bytes), secret.gif (0 bytes), and secret.txt (0 bytes).
- Index of /Project2:** Lists files: project2.html (149 bytes), project2.txt (0 bytes), and secret.gif (0 bytes).
- Index of /Project3:** Lists files: project3.doc (0 bytes), project3.html (149 bytes), project3.txt (0 bytes), and secret3.gif (0 bytes).
- Index of /Project4:** Lists files: project4.html (149 bytes), project4.txt (0 bytes), secret4.gif (0 bytes), test.html (0 bytes), test.png (0 bytes), and test_view.html (0 bytes).

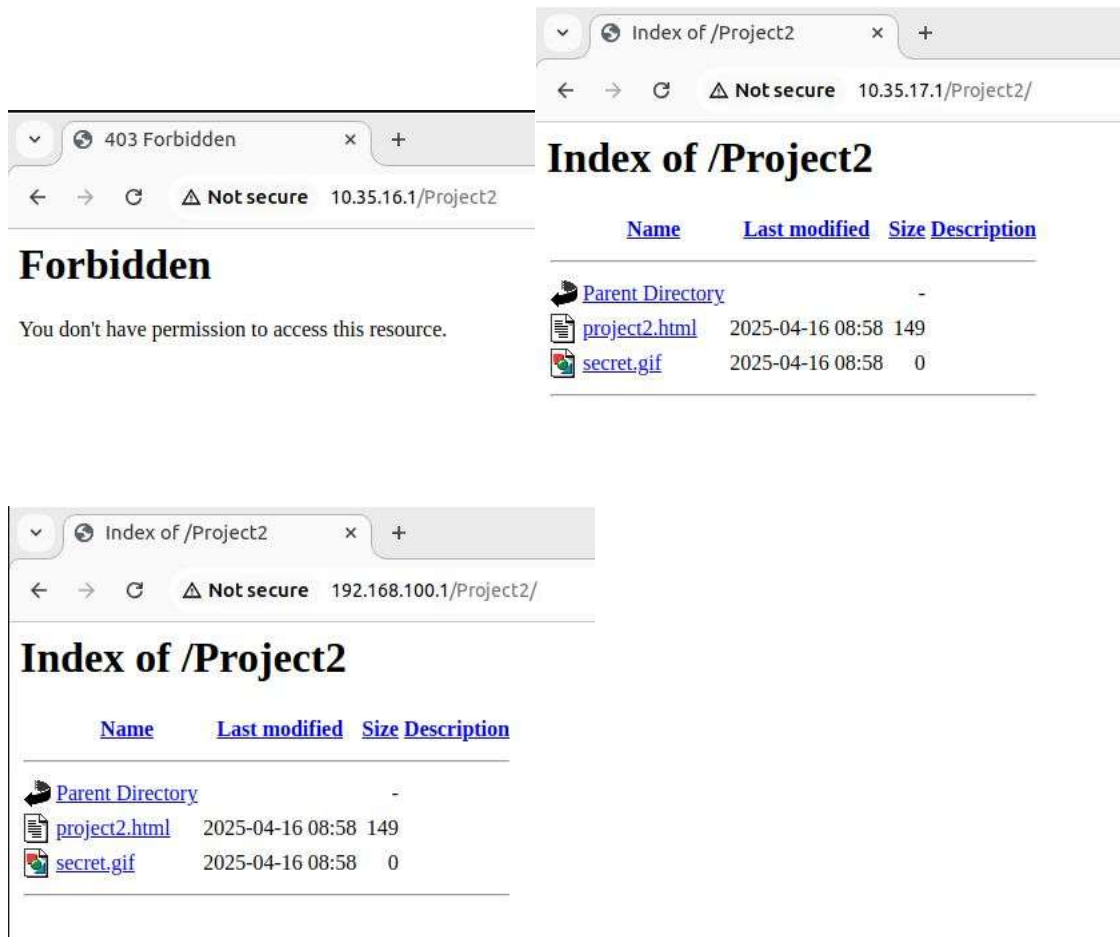
- **Project1:** Accessible only from the **10.35.16.0/24** and **10.35.17.0/24** subnets. Any files named **secret.*** must not be accessible.

```
#Directory "Project1" accessible only from 192.168.50.0/24, 10.35.16.0/24
or 10.35.17.0/24 subnets. Any files named secret.*
<Directory "/var/www/html_project1/Project1">
    Options Indexes
    <RequireAny>
        Require ip 192.168.50
        Require ip 10.35.16
        Require ip 10.35.17
    </RequireAny>
    <Files "secret.*">
        Require ip 192.168.50
    </Files>
</Directory>
```



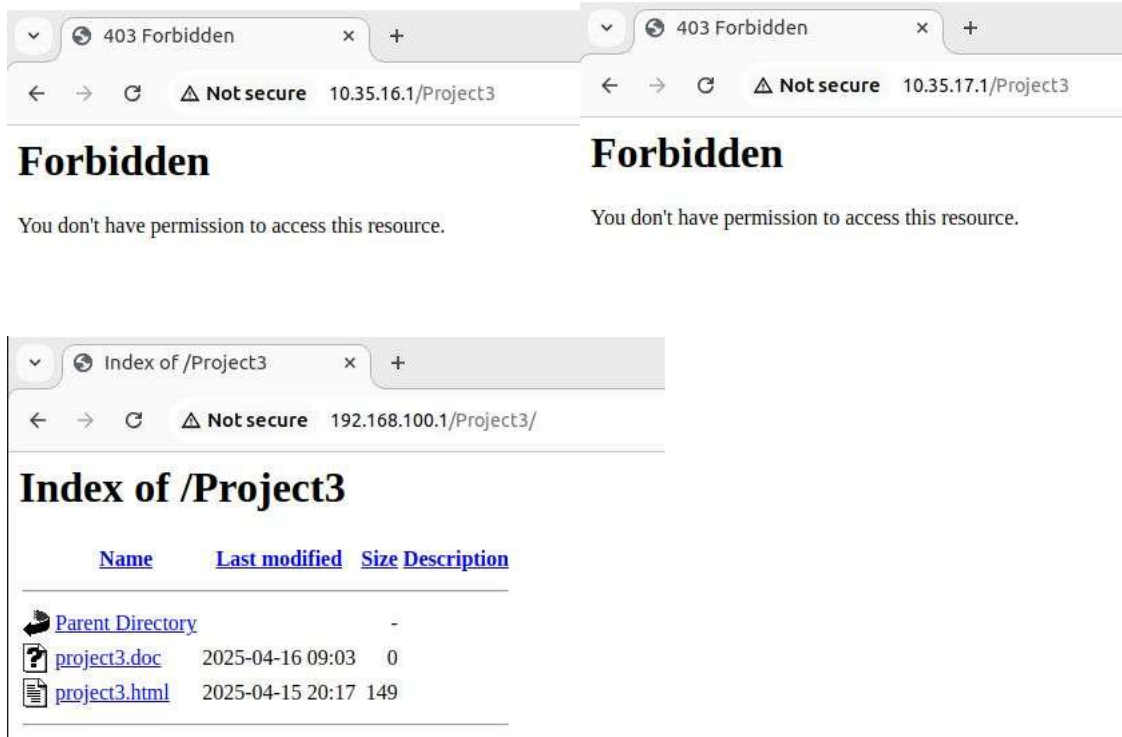
- **Project2:** Not accessible only from the **10.35.16.0/24** subnet. All files must be accessible to others.

```
#Directory "Project2" not accessible only from the 10.35.16.0/24 subnet.
<Directory "/var/www/html_project1/Project2">
    Options Indexes
    <RequireAll>
        Require all granted
        Require not ip 10.35.16.0/24
    </RequireAll>
</Directory>
```



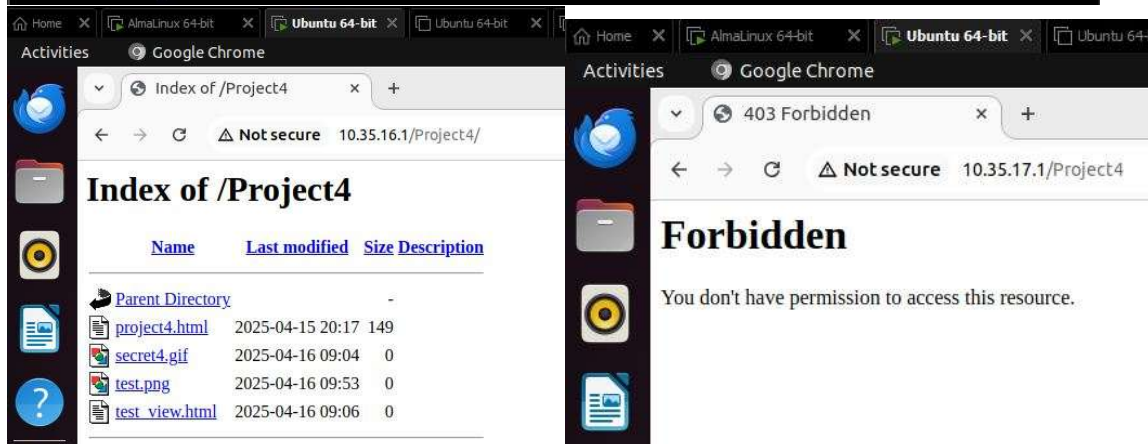
- **Project3:** Accessible only from the **192.168.100.0/24** subnet. All ***.gif** files must not be accessible.

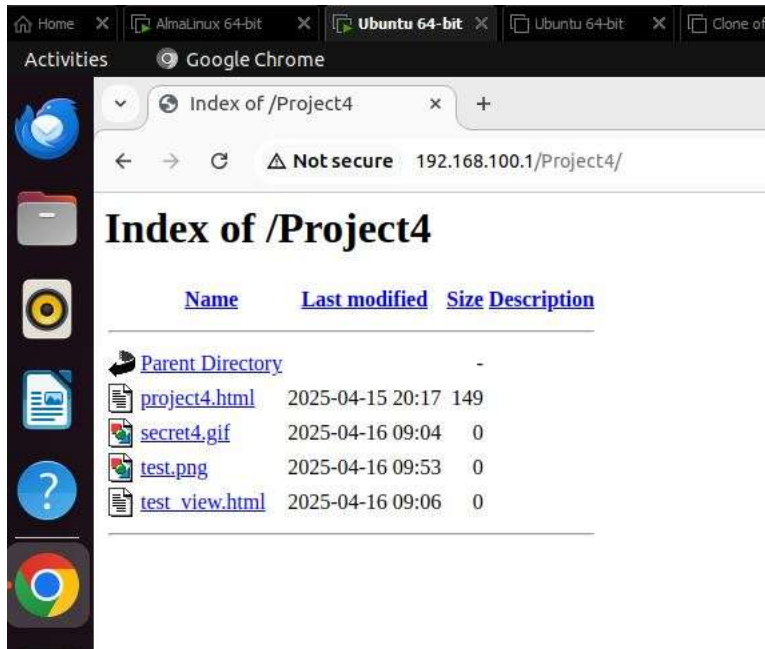
```
#Directory "Project3" accessible only from 192.168.50.0/24 and 192.168.100.0/24 subnets. All *.gif files are not accessible
<Directory "/var/www/html_project1/Project3">
    Options Indexes
    <RequireAny>
        Require ip 192.168.50
        Require ip 192.168.100
    </RequireAny>
    <Files "*.gif">
        Require ip 192.168.50
    </Files>
</Directory>
```



- **Project4:** Accessible only from **10.35.16.0/24** and **192.168.100.0/24**. All **test.html** files must not be accessible.

```
#Directory "Project4" accessible only from 192.168.50.0/24, 10.35.16.0/24
and 192.168.100.0/24. All test.html files are not accessible.
<Directory "/var/www/html_project1/Project4">
    Options Indexes
    <RequireAny>
        Require ip 192.168.50
        Require ip 10.35.16
        Require ip 192.168.100
    </RequireAny>
    <Files "test.html">
        Require ip 192.168.50
    </Files>
</Directory>
```





- 5 For all directories, *.txt files must not be accessible. Place the corresponding **directive** **outside** of any <Directory> blocks.

```
<FilesMatch "\.(txt)$">  
  Require ip 192.168.50  
</FilesMatch>
```

TASK 4 – AUTHORIZATION

- 1 Identify the network subnet of each department:
 - **Vendors** use the subnet **10.50.1.0/24**
 - **Accountants** use the subnet **10.51.1.0/24**
 - **Administrators** use the subnet **10.52.1.0/24**
 - **Programmers** use the subnet **10.53.1.0/24**
- 2 Each department has its own **dedicated web directory** on the server.
- 3 Websites must be placed in the **/var/www/htdocs/<group_name>** directory. For example: **/var/www/htdocs/vendors**, **/var/www/htdocs/accountants**, etc.
- 4 You must use **aliases** to make these websites accessible. For example, to access the vendors' website, use: <http://10.50.1.1/vendors>


```
<Directory "/var/www/htdocs">
    Options Indexes FollowSymLinks
    AllowOverride None
    Require all granted
</Directory>
```

```
# Directory "vendors" accessible by vendors and administrators.
# Also accessible by programmers except *.gif and *.jpg files.
```

```
Alias /vendors "/var/www/htdocs/vendors"
<Directory "/var/www/htdocs/vendors">
    <RequireAny>
        Require ip 10.50.1
        Require ip 10.52.1
        Require ip 10.53.1
    </RequireAny>
    <FilesMatch "\.(gif|jpg)$">
        Require ip 10.52.1
        Require ip 10.50.1
    </FilesMatch>
</Directory>
```

```
# Directory "accountants" accessible by accountants except .html files.
# Administrators can access everything.
# Also accessible by programmers except *.gif and *.jpg files.
```

```
Alias /accountants "/var/www/htdocs/accountants"
<Directory "/var/www/htdocs/accountants">
    <RequireAny>
        Require ip 10.51.1
        Require ip 10.52.1
        Require ip 10.53.1
    </RequireAny>

    <FilesMatch "\.(gif|jpg)$">
        Require ip 10.51.1
        Require ip 10.52.1
    </FilesMatch>

    <FilesMatch "^(?!index\.html$).*\.html$">
        Require ip 10.52.1
        Require ip 10.53.1
    </FilesMatch>
</Directory>
```

```
# Directory "administrators" accessible by administrators.
# Also accessible by programmers but not *.gif or *.jpg files.

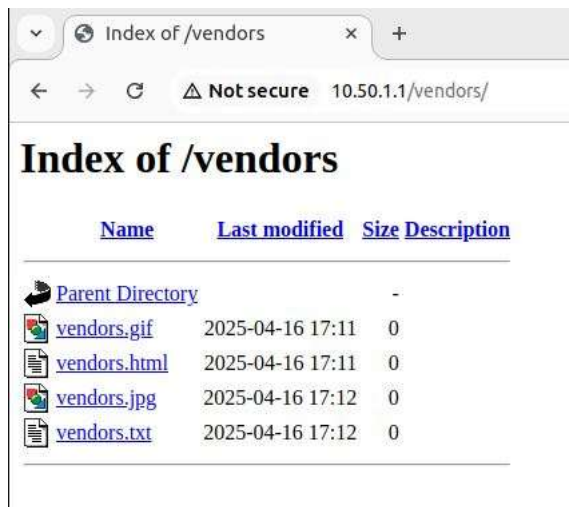
Alias /administrators "/var/www/htdocs/administrators"
<Directory "/var/www/htdocs/administrators">
    <RequireAny>
        Require ip 10.52.1
        Require ip 10.53.1
    </RequireAny>
    <FilesMatch "\.(gif|jpg)$">
        Require ip 10.52.1
    </FilesMatch>
</Directory>
```

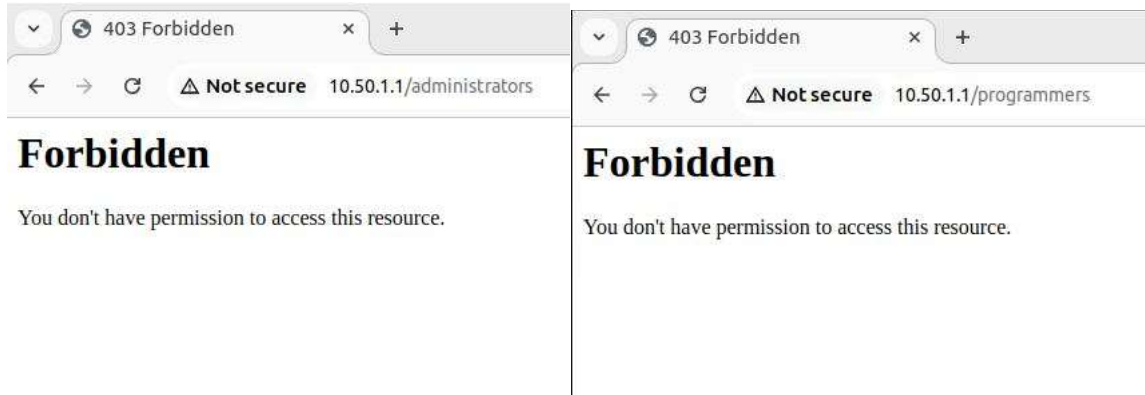
```
# Directory "programmers" accessible by administrators.
# Also accessible by programmers but not *.gif or *.jpg files.

Alias /programmers "/var/www/htdocs/programmers"
<Directory "/var/www/htdocs/programmers">
    <RequireAny>
        Require ip 10.52.1
        Require ip 10.53.1
    </RequireAny>
</Directory>
```

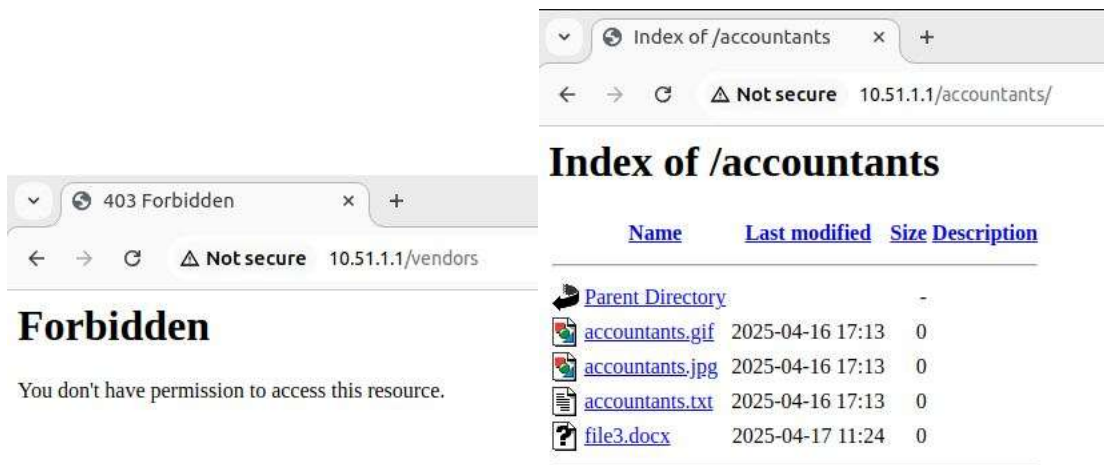
5 Configure the Apache server with the following access rules:

- Vendors can access only their own website.





- Accountants can access only the accountants' website and must not be able to view any *.html files.



- Administrators must be able to view all department websites.

Index of /vendors
10.52.1.1/vendors/

Index of /vendors

Name	Last modified	Size	Description
Parent Directory		-	
vendors.gif	2025-04-16 17:11	0	
vendors.html	2025-04-16 17:11	0	
vendors.jpg	2025-04-16 17:12	0	
vendors.txt	2025-04-16 17:12	0	

Index of /accountants
10.52.1.1/accountants/

Index of /accountants

Name	Last modified	Size	Description
Parent Directory		-	
accountants.gif	2025-04-16 17:13	0	
accountants.html	2025-04-16 17:13	0	
accountants.jpg	2025-04-16 17:13	0	
accountants.txt	2025-04-16 17:13	0	
file3.docx	2025-04-17 11:24	0	

Index of /administrators
10.52.1.1/administrators/

Index of /administrators

Name	Last modified	Size	Description
Parent Directory		-	
administrators.gif	2025-04-16 17:14	0	
administrators.html	2025-04-16 17:13	0	
administrators.jpg	2025-04-16 17:14	0	
administrators.txt	2025-04-16 17:14	0	

Index of /programmers
10.52.1.1/programmers/

Index of /programmers

Name	Last modified	Size	Description
Parent Directory		-	
programmers.gif	2025-04-16 17:14	0	
programmers.html	2025-04-16 17:14	0	
programmers.jpg	2025-04-16 17:14	0	
programmers.txt	2025-04-16 17:14	0	

- Programmers must be able to access their own website and to view all department websites except their *.gif or *.jpg files.

The image displays four browser screenshots arranged in a 2x2 grid, each showing a directory listing for a different department. Each browser window has a single tab and a 'Not secure' warning. The address bars show the following URLs: 10.53.1.1/vendors/, 10.53.1.1/accountants/, 10.53.1.1/administrators/, and 10.53.1.1/programmers/.

Index of /vendors

Name	Last modified	Size	Description
Parent Directory	-	-	-
vendors.html	2025-04-16 17:11	0	
vendors.txt	2025-04-16 17:12	0	

Index of /accountants

Name	Last modified	Size	Description
Parent Directory	-	-	-
accountants.html	2025-04-16 17:13	0	
accountants.txt	2025-04-16 17:13	0	
file3.docx	2025-04-17 11:24	0	

Index of /administrators

Name	Last modified	Size	Description
Parent Directory	-	-	-
administrators.html	2025-04-16 17:13	0	
administrators.txt	2025-04-16 17:14	0	

Index of /programmers

Name	Last modified	Size	Description
Parent Directory	-	-	-
programmers.gif	2025-04-16 17:14	0	
programmers.html	2025-04-16 17:14	0	
programmers.jpg	2025-04-16 17:14	0	
programmers.txt	2025-04-16 17:14	0	