VIRTUAL HOST SERVER CONFIGURATION

Creating websites identified by a combination of IP addresses, domain names and port numbers

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Contents

TASK 1 : PREPARATION (10 POINTS)

•The root directory for this project must be "/var/www/html_project2".

• A web page named master_project2.html should be placed in this directory and configured as the default page for the root.

• The master_project2.html page must include hyperlinks allowing users to test each question and every scenario related to each question in this lab. See the example provided on the last page of this document.

**This preparation assumes that all IP addresses mentioned in this document were added, and httpd installed on both on the Alma and the ubuntu clients using "nmcli".*

First, create a copy of the Part 1 httpd.conf file to start fresh and limit potential errors.

```
[root@server15 conf]# ll
total 36
-rw-r--r--. 1 root root  8070 Apr 21 16:40 httpd.conf
-rw-r--r--. 1 root root 12013 Apr 15 20:05 httpd.original
-rw-r--r--. 1 root root 13430 Jan 21 16:24 magic
[root@server15 conf]# cp httpd.conf httpd.conf.p1
[root@server15 conf]# ll
total 44
-rw-r--r--. 1 root root  8070 Apr 21 16:40 httpd.conf
-rw-r--r--. 1 root root  8070 Apr 21 20:50 httpd.conf.p1
-rw-r--r--. 1 root root 12013 Apr 15 20:05 httpd.original
-rw-r--r--. 1 root root 13430 Jan 21 16:24 magic
```

```
[root@server15 www]# mkdir html_project2
[root@server15 www]# ll
total 4
drwxr-xr-x.  2 root root    6 Jan 21 16:23 cgi-bin
drwxr-xr-x.  6 root root   81 Apr 20 19:36 htdocs
drwxr-xr-x.  2 root root    6 Jan 21 16:23 html
drwxr-xr-x. 13 root root 4096 Apr 21 17:15 html_project1
drwxr-xr-x.  2 root root    6 Apr 21 18:50 html_project2
```

Then create the html project file and the master_project2 file that will serve as the index to hyperlink all the future IPs and addresses in the browser for testing

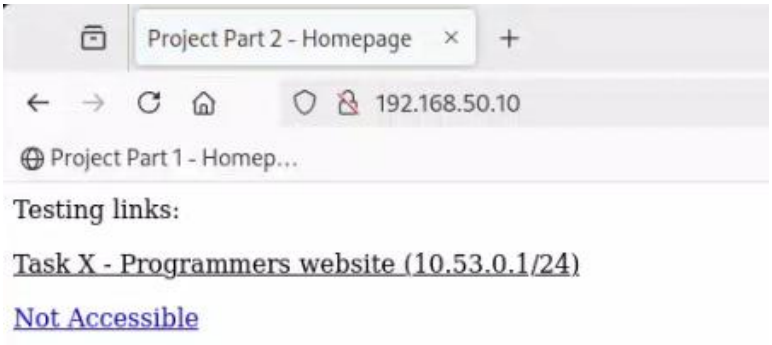
```
[root@server15 www]# cd html_project2
[root@server15 html_project2]# ll
total 0
[root@server15 html_project2]# touch master_project2.html
[root@server15 html_project2]# ll
total 0
-rw-r--r--. 1 root root 0 Apr 21 18:51 master_project2.html
```

root@server15:/var/www/html_project2 117x52

```
<html>
        <head>
                <title>Project Part 2 - Homepage</title>
        </head>
        <body>
                <p>Testing links:</p>

                <p><u>Task X - Programmers website (10.53.0.1/24)</p></u>
                <p><a href=</a></p>
                <p><a href="http://example.com">Not Accessible</a></p>


        </body>
</html>
```

Now setup the DirectoryIndex in httpd.conf file to ensure we can navigate to this html file when navigating to 192.168.50.10

```
<Directory />
        AllowOverride None
        Require all denied
</Directory>

DocumentRoot "/var/www/html_project2"
DirectoryIndex master_project2.html
```



This is not a final product of the content that will be shown, only for testing purposes

TASK 2 : NAME-BASED AND PORT-BASED VIRTUAL HOSTS (20 POINTS)

Create virtual hosts identified by both hostname and port, using the names provided below.

• All servers in this exercise will use the same IP address: 10.35.16.1.

o However, this address must be different from the main non-virtual website.

o You will need to edit the /etc/hosts file accordingly to resolve the hostnames.

• Since these are virtual hosts, the basic Apache configuration will be similar for all of them:

o Each server will have its own directory to store web pages.

o Each server must also use its own log files.

Setting up

```
[root@server15 www]# mkdir virtuals
[root@server15 www]# ll
total 4
drwxr-xr-x.  2 root root    6 Jan 21 16:23 cgi-bin
drwxr-xr-x.  6 root root   81 Apr 20 19:36 htdocs
drwxr-xr-x.  2 root root    6 Jan 21 16:23 html
drwxr-xr-x. 13 root root 4096 Apr 21 21:06 html_project1
drwxr-xr-x.  2 root root   34 Apr 21 21:12 html_project2
drwxr-xr-x.  2 root root    6 Apr 21 21:16 virtuals
[root@server15 www]#
```

```
[root@server15 virtuals]# mkdir virtual1_80 ; mkdir virtual1_8000 ; mkdir virtual2
_80 ; mkdir virtual2_8000
[root@server15 virtuals]# ll
total 0
drwxr-xr-x. 2 root root 6 Apr 21 21:17 virtual1_80
drwxr-xr-x. 2 root root 6 Apr 21 21:17 virtual1_8000
drwxr-xr-x. 2 root root 6 Apr 21 21:17 virtual2_80
drwxr-xr-x. 2 root root 6 Apr 21 21:17 virtual2_8000
[root@server15 virtuals]#
```

Add an index to each

```
[root@server15 virtuals]# tree
.
├── virtual1_80
│   └── index.html
├── virtual1_8000
│   └── index.html
├── virtual2_80
│   └── index.html
└── virtual2_8000
    └── index.html

4 directories, 4 files
```

Verify this exercise's ports and if they are authorized

```
[root@server15 ~]# semanage port -l | grep http_port_t
http_port_t                    tcp      80, 81, 443, 488, 8008, 8009, 8443, 9000
pegasus_http_port_t            tcp      5988
[root@server15 ~]#
```

No, then need to add Port 8000

```
[root@server15 ~]# semanage port -a -t http_port_t -p tcp 8000
Port tcp/8000 already defined, modifying instead
[root@server15 ~]# semanage port -l | grep http_port_t
http_port_t                    tcp      8000, 80, 81, 443, 488, 8008, 8009, 8443, 9000
pegasus_http_port_t            tcp      5988
[root@server15 ~]#
```

Configure the hosts file in /etc/

```
127.0.0.1   localhost

10.35.16.1      virtual1.aucegep.com    virtual2.aucegep.com
```

Now authorize the writing in the folders used by virtuals in SELinux (to create log files)

```
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals
[root@server15 ~]#
```

```
[root@server15 ~]# setsebool -P httpd_unified 1
```

Add the Listen in the httpd.conf file:

```
ServerRoot "/etc/httpd"

Listen 192.168.50.10:80
Listen 10.35.16.1:80
Listen 10.35.16.1:8000

Include conf.modules.d/*.conf
User apache
Group apache
ServerAdmin root@localhost
ServerName www.patrick.ca:80
```

Virtual Hosts configuration details:

➢ Hostname: virtual1.aucegep.com

o Port: 80

o Document Root: /var/www/ virtuals/virtual1_80

```
<VirtualHost 10.35.16.1>
        DocumentRoot /var/www/virtuals/virtual1_80
        ServerName virtual1.aucegep.com
        ServerAlias www.virtual1.aucegep.com *.virtual1.aucegep.com
</VirtualHost>
```

➢ Hostname: virtual2.aucegep.com

o Port: 80

o Document Root: /var/www/virtuals/virtual2_80

```
<VirtualHost 10.35.16.1>
        DocumentRoot /var/www/virtuals/virtual2_80
        ServerName virtual2.aucegep.com
        ServerAlias www.virtual2.aucegep.com *.virtual2.aucegep.com
</VirtualHost>
```

➢ Hostname: virtual2.aucegep.com

o Port: 8000

o Document Root: /var/www/virtuals/virtual1_8000

```
<VirtualHost 10.35.16.1:8000>
        DocumentRoot /var/www/virtuals/virtual1_8000
        ServerName virtual1.aucegep.com
        ServerAlias www.virtual1.aucegep.com *.virtual1.aucegep.com
</VirtualHost>
```

➢ Hostname: virtual2.aucegep.com

o Port: 8000

o Document Root: /var/www/virtuals/virtual2_8000

```
<VirtualHost 10.35.16.1:8000>
        DocumentRoot /var/www/virtuals/virtual2_8000
        ServerName virtual2.aucegep.com
        ServerAlias www.virtual2.aucegep.com *.virtual2.aucegep.com
</VirtualHost>
```

Restart the httpd service

```
[root@server15 ~]# systemctl restart httpd
[root@server15 ~]#
```

Now testing on the browser (note that the index.html files were modified in each directory in /virtuals, just to have the website's name written when accessing it.)

TASK 3 : NAME-BASED VIRTUAL HOSTS WITH ACCESS CONTROL (20 POINTS)

Setting up

Configure the DNS

```
127.0.0.1   localhost

10.35.16.1      virtual1.aucegep.com    virtual2.aucegep.com
10.35.17.1      www.ici.com     www.intranet.ici.com    www.development.ici.com
```

Create directories, their index.html and their logs

```
[root@server15 virtuals]# tree
.
├── development
│   ├── index.html
│   └── logs
├── ici
│   ├── index.html
│   └── logs
├── intranet
│   ├── index.html
│   └── logs
└── pre_production
    ├── index.html
    └── logs
```

Configure port listening in httpd.conf

```
ServerRoot "/etc/httpd"

Listen 192.168.50.10:80
Listen 10.35.16.1:80
Listen 10.35.16.1:8000
Listen 10.35.17.1:80
Listen 10.35.17.1:8000

Include conf.modules.d/*.conf
User apache
Group apache
ServerAdmin root@localhost
ServerName www.patrick.ca:80
```

Allow Apache to write in the directories

```
[root@server15 virtuals]# cd
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/ici
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/intranet
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/pre_production
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/development
```

Make sure Apache is listening on port 8000

```
[root@server15 ~]# semanage port -l | grep http_port_t
http_port_t                    tcp      8000, 80, 81, 443, 488, 8008, 8009, 8443, 9000
pegasus_http_port_t            tcp      5988
[root@server15 ~]#
```

• Server IP addresses: 10.35.17.1

• You are required to create virtual servers using name-based hosting, with access permissions and document roots as described below:

➢ Hostname: www.ici.com

o Port: 80

o Document Root: /var/www/virtuals/ici

o Accessible to everyone (no restrictions)

```
<VirtualHost 10.35.17.1:80>
        ServerName www.ici.com
        DocumentRoot /var/www/virtuals/ici
        ErrorLog /var/www/virtuals/ici/logs/error_log
        TransferLog /var/www/virtuals/ici/logs/access_log
</VirtualHost>
```

➢ Hostname: intranet.ici.com

o Port: 80

o Document Root: /var/www/virtuals/intranet

o Accessible to everyone (no restrictions).

```
<VirtualHost 10.35.17.1:80>
        ServerName intranet.ici.com
        DocumentRoot /var/www/virtuals/intranet
        ErrorLog /var/www/virtuals/intranet/logs/error_log
        TransferLog /var/www/virtuals/intranet/logs/access_log
</VirtualHost>
```

➢ Hostname: intranet.ici.com

o Port 8000

o Document Root: /var/www/virtuals/pre_production

o Accessible only from the 10.35.17.0/24 subnet.

```
<VirtualHost 10.35.17.1:8000>
        ServerName intranet.ici.com
        DocumentRoot /var/www/virtuals/pre_production
        <Directory /var/www/virtuals/pre_production>
        <RequireAll>
        Require ip 10.35.17
        </RequireAll>
        </Directory>
        ErrorLog /var/www/virtuals/intranet/logs/error_log
        TransferLog /var/www/virtuals/intranet/logs/access_log
</VirtualHost>
```

➢ Hostname: development.ici.com

o Port 80

o Document Root: /var/www/virtuals/development

o Accessible only from the 10.35.17.0/24 subnet.

```
<VirtualHost 10.35.17.1:80>
        ServerName development.ici.com
        DocumentRoot /var/www/virtuals/development
        <Directory /var/www/virtuals/development>
        Require ip 10.35.17
        </Directory>
        ErrorLog /var/www/virtuals/development/logs/error_log
        TransferLog /var/www/virtuals/development/logs/access_log
</VirtualHost>
```

TASK 4 : VIRTUAL WEB SERVERS BY IP AND PORT (20 POINTS)

• Create and configure four virtual web servers as described below.

• Use a separate directory for each server under:

/var/www/virtuals/q4/<server_name>

• For example, the sales web server will use:

/var/www/virtuals/q4/sales

• To access each server, use the IP address 10.35.16.1 followed by the corresponding port number. For example:

http://10.35.16.1:8080 should display the sales web server homepage.

Setting up

Create the directories

```
[root@server15 q4]# pwd
/var/www/virtuals/q4
```

```
[root@server15 q4]# tree
.
├── admin
│   ├── index.html
│   └── logs
├── other
│   ├── index.html
│   └── logs
├── sales
│   ├── index.html
│   └── logs
└── thing
    ├── index.html
    └── logs

8 directories, 4 files
```

Allow Apache to write log files

```
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/q4/admin
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/q4/other
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/q4/sales
[root@server15 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/q4/thing
[root@server15 ~]#
```

Configure port listening in httpd.conf

```
ServerRoot "/etc/httpd"

Listen 192.168.50.10:80
Listen 10.35.16.1:80
Listen 10.35.16.1:8000
Listen 10.35.17.1:80
Listen 10.35.17.1:8000

Listen 10.35.16.1:8080
Listen 10.35.16.1:8081
Listen 10.35.16.1:8082
Listen 10.35.16.1:8083

Include conf.modules.d/*.conf
User apache
Group apache
ServerAdmin root@localhost
ServerName www.patrick.ca:80
```

Make sure the ports are also open

```
[root@server15 ~]# semanage port -l | grep http_port_t
http_port_t                    tcp      8000, 80, 81, 443, 488, 8008, 8009, 8443, 9000
pegasus_http_port_t            tcp      5988
[root@server15 ~]#
```

```
[root@server15 ~]# semanage port -a -t http_port_t -p tcp 8080-8083
[root@server15 ~]# semanage port -l | grep http_port_t
http_port_t                    tcp      8080-8083, 8000, 80, 81, 443, 488, 8008, 8009, 8443,
 9000
pegasus_http_port_t            tcp      5988
[root@server15 ~]#
```

Now configure the httpd.conf file for the servers

• Virtual servers to create:

o Sales server on port 8080.

```
<VirtualHost 10.35.16.1:8080>
        DocumentRoot /var/www/virtuals/q4/sales
        ServerName sales.patrick.ca
        ErrorLog /var/www/virtuals/q4/sales/logs/error_log
        TransferLog /var/www/virtuals/q4/sales/access_log
</VirtualHost>
```

o Admin server on port 8081.

```
<VirtualHost 10.35.16.1:8081>
        DocumentRoot /var/www/virtuals/q4/admin
        ServerName admin.patrick.ca
        ErrorLog /var/www/virtuals/q4/admin/logs/error_log
        TransferLog /var/www/virtuals/q4/admin/access_log
</VirtualHost>
```

o Thing server on port 8082.

```
<VirtualHost 10.35.16.1:8082>
        DocumentRoot /var/www/virtuals/q4/thing
        ServerName thing.patrick.ca
        ErrorLog /var/www/virtuals/q4/thing/logs/error_log
        TransferLog /var/www/virtuals/q4/thing/access_log
</VirtualHost>
```

o Other server on port 8083.

```
<VirtualHost 10.35.16.1:8083>
        DocumentRoot /var/www/virtuals/q4/other
        ServerName other.patrick.ca
        ErrorLog /var/www/virtuals/q4/other/logs/error_log
        TransferLog /var/www/virtuals/q4/other/access_log
</VirtualHost>
```

TASK 5 :DYNAMIC VIRTUAL HOSTING (15 POINTS)

• Server IP address: 10.50.1.1

**This was added using nmcli con mod in the Project Part 1*

• You are required to configure your Apache web server to support five virtual servers using only one <VirtualHost> block and the VirtualDocumentRoot directive.

• Virtual Servers to Configure:

Server Name IP Address

www.itmt.com 10.50.1.1

www.itmt.ca 10.50.1.1

www2.itmt.com 10.50.1.1

www.montmo.com 10.50.1.1

www.montmo.ca 10.50.1.1

• Each website will have its own directory based on the following path format:

/var/www/virtuals/q5/x/y/z/

Where:

o x = TLD of the domain (com or ca).

o y = The name of the company.

o z = The prefix before the domain (e.g., www, www2).

• For example, www.itmt.com, the full directory would be:

/var/www/virtuals/q5/com/itmt/www/

• All virtual host errors should be logged to:

/ var/www/virtuals/q5/logs/virtual_error_q5_log

Setting up

The structure for the folders look like this:

```
[root@server15 q5]# pwd
/var/www/virtuals/q5
[root@server15 q5]# tree
.
├── ca
│   ├── itmt
│   │   └── www
│   │       └── index.html
│   └── montmo
│       └── www
│           └── index.html
├── com
│   ├── itmt
│   │   ├── www
│   │   │   └── index.html
│   │   └── www2
│   │       └── index.html
│   └── montmo
│       └── www
│           └── index.html
└── logs
```

Allow Apache to create the log files

```
[root@server15 q5]# chcon -R -t httpd_sys_rw_content_t /var/www/virtuals/q5
```

Make sure it is listening to the server IP

```
ServerRoot "/etc/httpd"

Listen 192.168.50.10:80

Listen 10.35.16.1:80
Listen 10.35.16.1:8000
Listen 10.35.17.1:80
Listen 10.35.17.1:8000

Listen 10.35.16.1:8080
Listen 10.35.16.1:8081
Listen 10.35.16.1:8082
Listen 10.35.16.1:8083

Listen 10.50.1.1:80
```

Add the the IP in the /etc/hosts file

```
127.0.0.1   localhost

10.35.16.1      virtual1.aucegep.com    virtual2.aucegep.com
10.35.17.1      www.ici.com     intranet.ici.com        development.ici.com


10.50.1.1       www.itmt.com    www.itmt.ca     www2.itmt.com   www.montmo.com  www.montmo.ca
```

Configure the httpd.conf file

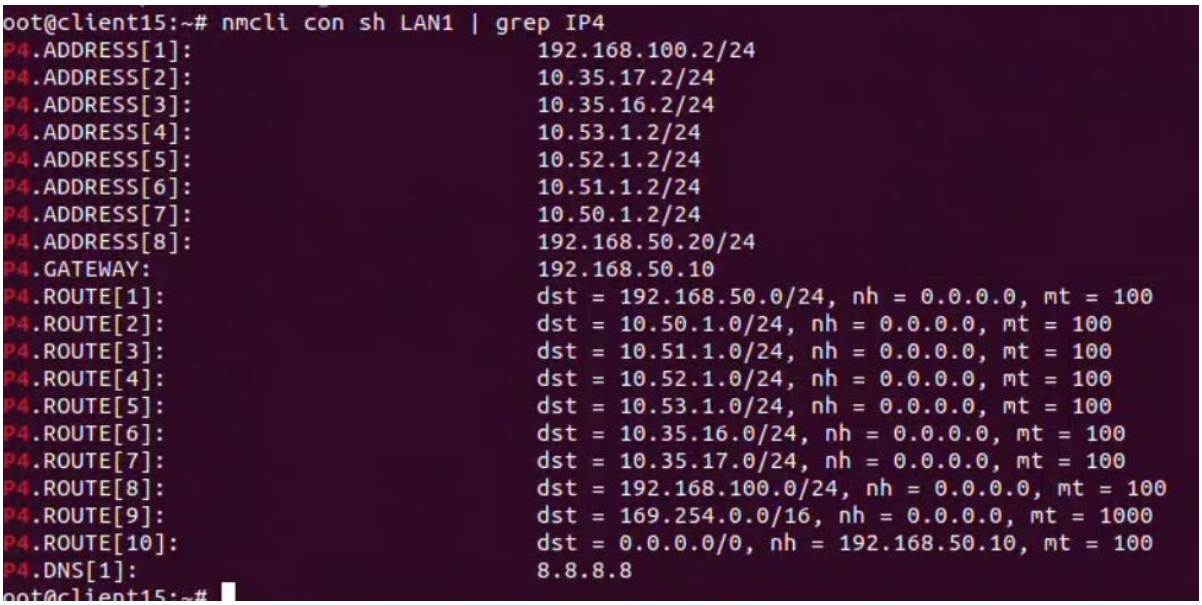
```
<VirtualHost 10.50.1.1:80>
        UseCanonicalName off
        VirtualDocumentRoot /var/www/virtuals/q5/%3/%2/%1
        ErrorLog /var/www/virtuals/q5/logs/virtual_error_q5_log
</VirtualHost>
```

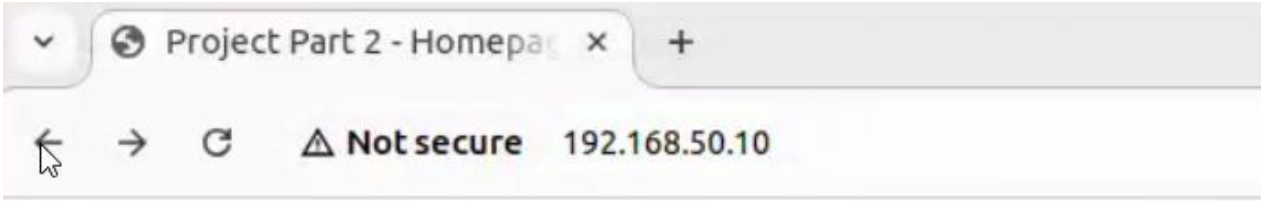
Testing with server on 192.168.50.10

We first need to modify the master2_html file in order to test

```
<h1>Project 2 - Testing links for every task</h1>

<h3>Task 2</h3>
<p><a href="http://virtual1.aucegep.com/">http://virtual1.aucegep.com</a></p>
<p><a href="http://virtual1.aucegep.com:8000">http://virtual1.aucegep.com:8000</a></p>
<p><a href="http://virtual1.aucegep.com/">http://virtual2.aucegep.com</a></p>
<p><a href="http://virtual1.aucegep.com:8000">http://virtual2.aucegep.com:8000</a></p>

<h3>Task 3</h3>
<p><a href="http://www.ici.com">http://www.ici.com</a></p>
<p><a href="http://intranet.ici.com">http://intranet.ici.com</a></p>
<p><a href="http://intranet.ici.com:8000">http://intranet.ici.com:8000</a></p>
<p><a href="http://development.ici.com">http://development.ici.com</a></p>

<h3>Task 4</h3>
<p><a href="http://10.35.16.1:8080">http://10.35.16.1:8080</a></p>
<p><a href="http://10.35.16.1:8081">http://10.35.16.1:8081</a></p>
<p><a href="http://10.35.16.1:8082">http://10.35.16.1:8082</a></p>
<p><a href="http://10.35.16.1:8083">http://10.35.16.1:8083</a></p>

<h3>Task 5</h3>
<p><a href="http://www.itmt.com">http://www.itmt.com</a></p>
<p><a href="http://www.itmt.ca">http://www.itmt.ca</a></p>
<p><a href="http://www2.itmt.com">http://www2.itmt.com</a></p>
<p><a href="http://www.montmo.com">http://www.montmo.com</a></p>
<p><a href="http://www.itmt.ca">http://www.montmo.ca</a></p>
```

```
root@client15: ~
127.0.0.1       localhost
127.0.1.1       client15

10.35.16.1      virtual1.aucegep.com    virtual2.aucegep.com
10.35.17.1      www.ici.com     intranet.ici.com        development.ici.com

10.50.1.1       www.itmt.com    www.itmt.ca     www2.itmt.com   www.montmo.com
www.montmo.ca
```


oot@client15:~# nmcli con sh LAN1 | grep IP4
P4.ADDRESS[1]: 192.168.100.2/24
P4.ADDRESS[2]: 10.35.17.2/24
P4.ADDRESS[3]: 10.35.16.2/24
P4.ADDRESS[4]: 10.53.1.2/24
P4.ADDRESS[5]: 10.52.1.2/24
P4.ADDRESS[6]: 10.51.1.2/24
P4.ADDRESS[7]: 10.50.1.2/24
P4.ADDRESS[8]: 192.168.50.20/24
P4.GATEWAY: 192.168.50.10
P4.ROUTE[1]: dst = 192.168.50.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[2]: dst = 10.50.1.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[3]: dst = 10.51.1.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[4]: dst = 10.52.1.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[5]: dst = 10.53.1.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[6]: dst = 10.35.16.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[7]: dst = 10.35.17.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[8]: dst = 192.168.100.0/24, nh = 0.0.0.0, mt = 100
P4.ROUTE[9]: dst = 169.254.0.0/16, nh = 0.0.0.0, mt = 1000
P4.ROUTE[10]: dst = 0.0.0.0/0, nh = 192.168.50.10, mt = 100
P4.DNS[1]: 8.8.8.8
oot@client15:~#



Project 2 - Testing links for every task

Task 2

http://virtual1.aucegep.com

http://virtual1.aucegep.com:8000

http://virtual2.aucegep.com

http://virtual2.aucegep.com:8000

Task 3

http://www.ici.com

http://intranet.ici.com

http://intranet.ici.com:8000

http://development.ici.com

Task 4

http://10.35.16.1:8080

http://10.35.16.1:8081

http://10.35.16.1:8082

http://10.35.16.1:8083

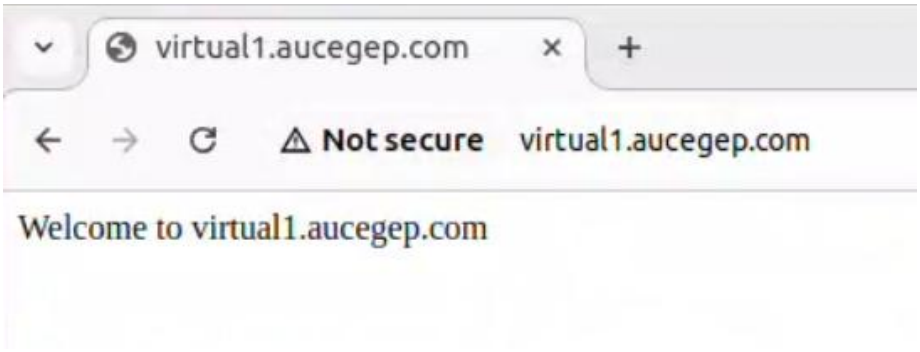
Task 5

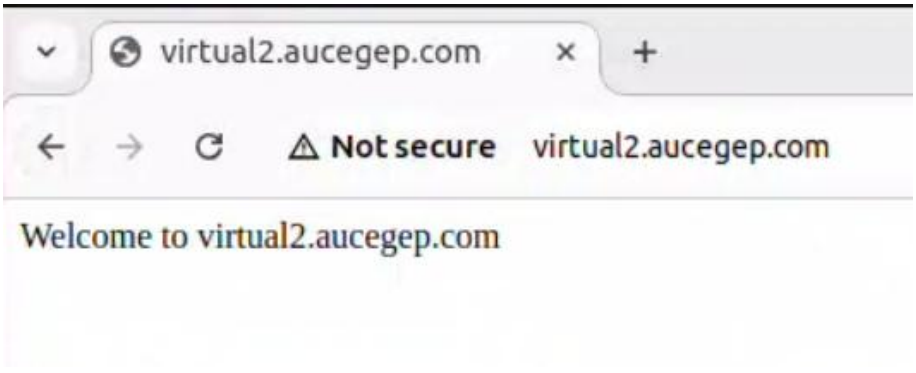
http://www.itmt.com

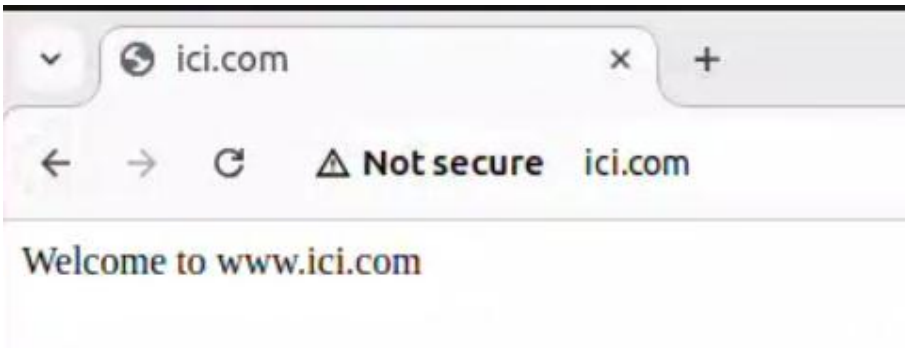
http://www.itmt.ca

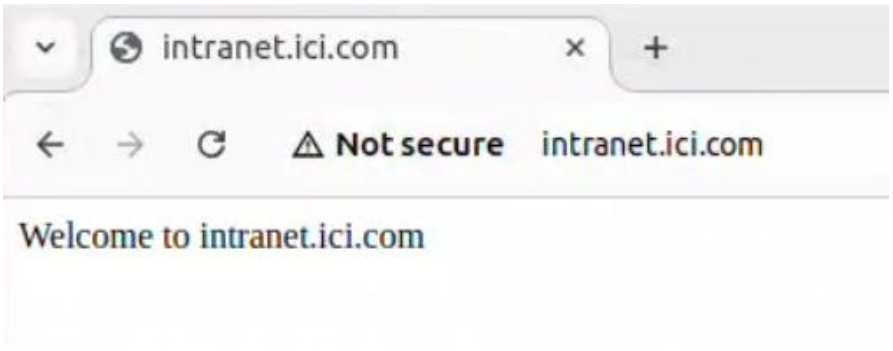
http://www2.itmt.com

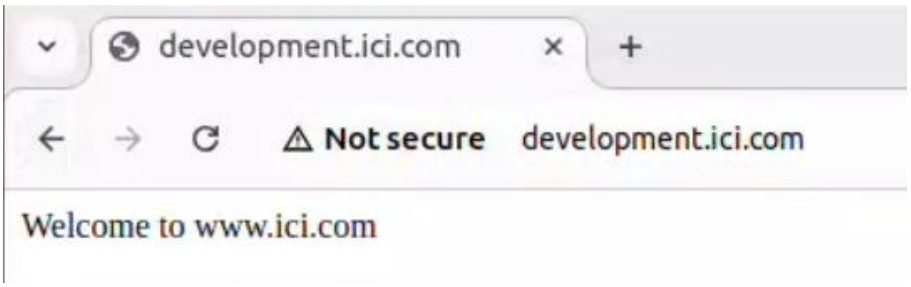
On ubuntu, every link that goes to port 80 works









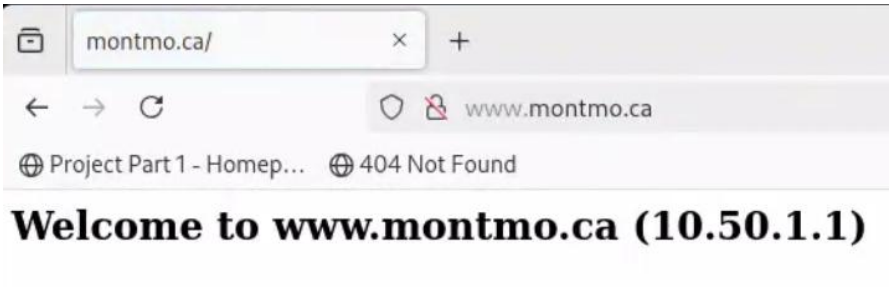

development.ici.com
Not secure
development.ici.com
Welcome to www.ici.com


itmt.com
Not secure
itmt.com
Welcome to www.itmt.com (10.50.1.1) !

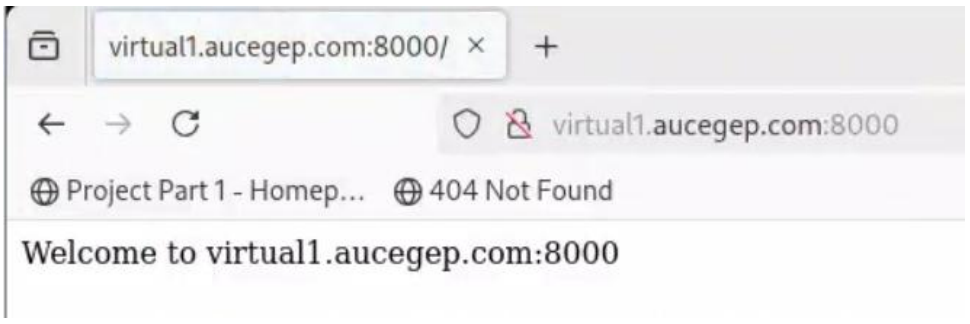

itmt.ca
Not secure
itmt.ca
Welcome to www.itmt.ca (10.50.1.1) !

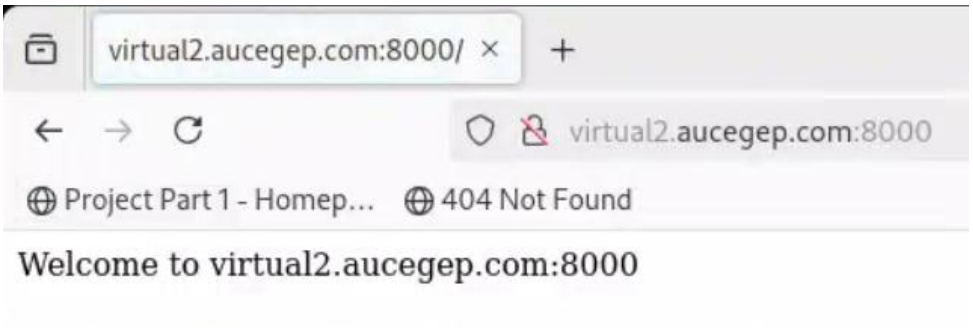

www2.itmt.com
Not secure
www2.itmt.com
Welcome to www2.itmt.com (10.50.1.1)

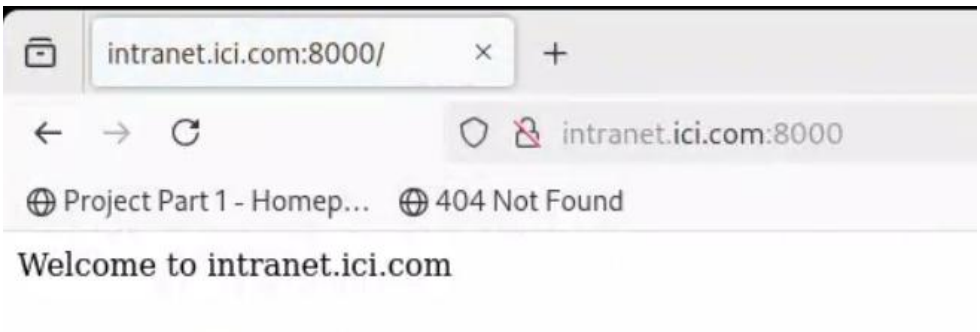

montmo.com
Not secure
montmo.com
Welcome to www.montmo.com (10.50.1.1) !

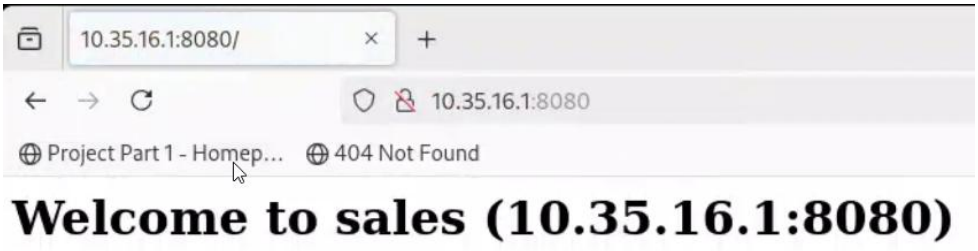


Otherwise, other links using a different port work on the AlmaLinux web browser

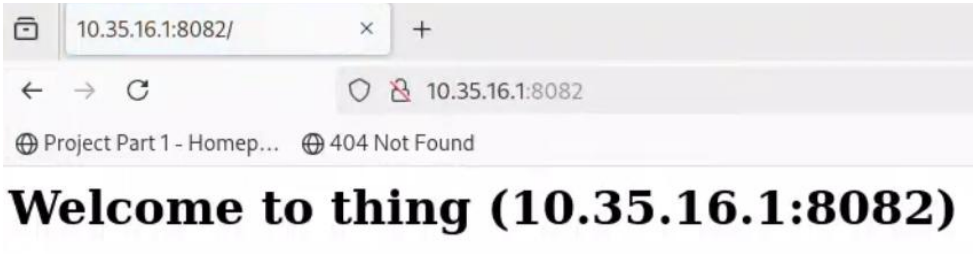


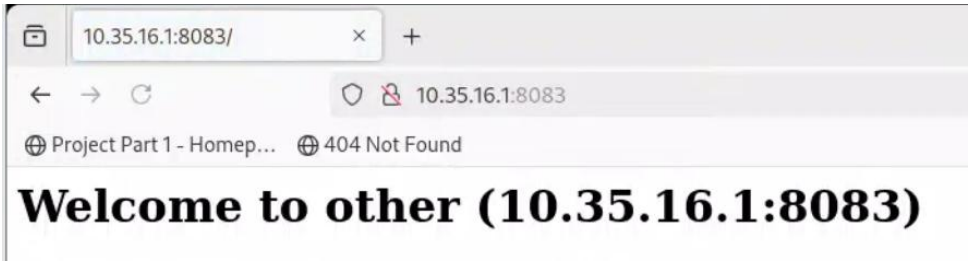







10.35.16.1:8081/
10.35.16.1:8081
Project Part 1 - Homep...
404 Not Found
Welcome to admin (10.35.16.1:8081)


10.35.16.1:8082/
10.35.16.1:8082
Project Part 1 - Homep...
404 Not Found
Welcome to thing (10.35.16.1:8082)


10.35.16.1:8083/
10.35.16.1:8083
Project Part 1 - Homep...
404 Not Found
Welcome to other (10.35.16.1:8083)