PROJECT 2

Virtual Hosts

APRIL 21, 2025

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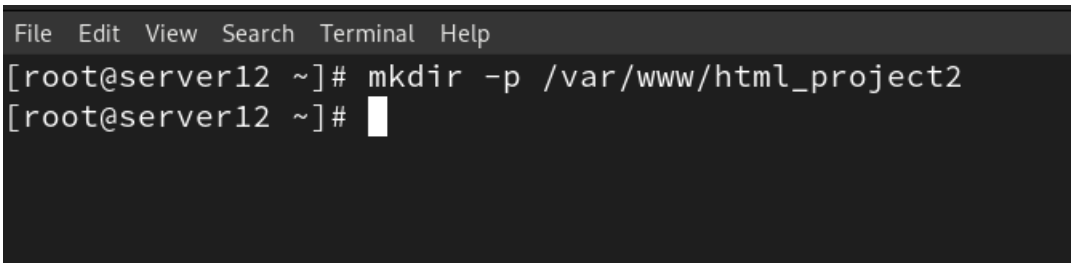
Network Installation and Administration I

Contents

Task 1 - Preparation

Start by creating the root directory for the project, which will be **html_project2** in /var/www/

sudo mkdir -p /var/www/html_project2



Create the webpage named master_project2 in html_project2

nano /var/www/html_project2/master_project2.html

```
[root@server12 ~]# nano /var/www/html_project2/master_project2.html
```

This is where your links will go

```
<!DOCTYPE html>
<html>
<head>
    <title>Project 2 Master Page</title>
</head>
<body>
    <h1>Project 2: Testing</h1>
    <h2>Task 2</h2>
    <ul>
        <li><a href="http://virtual1.aucegep.com">virtual1.aucegep.com:80</a></li>
        <li><a href="http://virtual2.aucegep.com">virtual2.aucegep.com:80</a></li>
        <li><a href="http://virtual1.aucegep.com:8000">virtual1.aucegep.com:8000</a></li>
        <li><a href="http://virtual2.aucegep.com:8000">virtual2.aucegep.com:8000</a></li>
```

```
  <h2>Task 3</h2>

  <ul>

      <li><a href="http://www.ici.com">www.ici.com</a></li>

      <li><a href="http://intranet.ici.com">intranet.ici.com</a></li>

      <li><a href="http://intranet.ici.com:8000">intranet.ici.com:8000</a></li>

      <li><a href="http://development.ici.com">development.ici.com</a></li>

  </ul>

  <h2>Task 4</h2>

  <ul>

      <li><a href="http://10.35.16.1:8080">Sales Server (10.35.16.1:8080)</a></li>
      <li><a href="http://10.35.16.1:8081">Admin Server (10.35.16.1:8081)</a></li>
      <li><a href="http://10.35.16.1:8082">Thing Server (10.35.16.1:8082)</a></li>
      <li><a href="http://10.35.16.1:8083">Other Server (10.35.16.1:8083)</a></li>
  </ul>
```

```
    <h2>Task 5</h2>
    <ul>
        <li><a href="http://www.itmt.com">www.itmt.com</a></li>
        <li><a href="http://www.itmt.ca">www.itmt.ca</a></li>
        <li><a href="http://www2.itmt.com">www2.itmt.com</a></li>
        <li><a href="http://www.montmo.com">www.montmo.com</a></li>
        <li><a href="http://www.montmo.ca">www.montmo.ca</a></li>
    </ul>
</body>
</html>
```

How it looks in the browser:

Project 2: Testing

Task 2

- virtual1.aucegep.com:80
- virtual2.aucegep.com:80
- virtual1.aucegep.com:8000
- virtual2.aucegep.com:8000

Task 3

- www.ici.com
- intranet.ici.com
- intranet.ici.com:8000
- development.ici.com

Task 4

- Sales Server (10.35.16.1:8080)
- Admin Server (10.35.16.1:8081)
- Thing Server (10.35.16.1:8082)
- Other Server (10.35.16.1:8083)

Task 5

- www.itmt.com
- www.itmt.ca
- www2.itmt.com
- www.montmo.com
- www.montmo.ca

SELinux permissions

We need to the writing in folders used by vhosts in SELinux for our html_project2

chcon -R -t httpd_sys_rw_content_t /var/www/html_project2

```
[root@server12 ~]# chcon -R -t httpd_sys_rw_content_t /var/www/html_project2
```

setsebool -P httpd_unified 1

```
[root@server12 ~]# setsebool -P httpd_unified 1
[root@server12 ~]#
```

First command will changes SELinux context of the folder /var/www/vhosts (and all files/directories inside it) to allow read and write access by Apache. Second command sets a SELinux boolean to allow Apache to treat all content as readable and writable, simplifying permission checks

You also need to authorize the tcp port in SELinux

semanage port -l | grep http_port_t

semanage port -a -t http_port_t-p tcp 8000

semanage port -a -t http_port_t-p tcp 8080-8083

This lists the port authorized in SELinux

```
[root@server12 ~]# 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@server12 ~]#
```

This adds or modifies the port in SELinux

```
[root@server12 ~]# semanage port -a -t http_port_t -p tcp 8000
Port tcp/8000 already defined, modifying instead
[root@server12 ~]#
```

```
[root@server12 ~]# semanage port -a -t http_port_t -p tcp 8080-8083
Port tcp/8080-8083 already defined, modifying instead
[root@server12 ~]#
```

Set Apache to use html_project2 as the root

Modify this for Apache to use this page as the default for the document root

```
DocumentRoot "/var/www/html_project2"

#
```

Task 2

Editing /etc/hosts to resolve hostnames

In **/etc/hosts**, add both **virtual1.aucegep.com** and **vitual2.aucegep.com** hostnames along with their server IP **10.35.16.1**

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

Creating the directories

mkdir -p /var/www/virtuals/virtual1_80

mkdir -p /var/www/virtuals/virtual2_80

mkdir -p /var/www/virtuals/virtual1_8000

mkdir -p /var/www/virtuals/virtual2_8000

```
[root@server12 ~]# mkdir -p /var/www/virtuals/virtual1_80
[root@server12 ~]# mkdir -p /var/www/virtuals/virtual2_80
[root@server12 ~]# mkdir -p /var/www/virtuals/virtual1_8000
[root@server12 ~]# mkdir -p /var/www/virtuals/virtual2_8000
```

```
[root@server12 www]# cd /var/www/virtuals
[root@server12 virtuals]# ll
total 0
drwxr-xr-x. 2 root root 6 Apr 21 19:44 virtual1_80
drwxr-xr-x. 2 root root 6 Apr 21 19:45 virtual1_8000
drwxr-xr-x. 2 root root 6 Apr 21 19:44 virtual2_80
drwxr-xr-x. 2 root root 6 Apr 21 19:45 virtual2_8000
[root@server12 virtuals]#
```

```
[root@server12 virtuals]# echo "<h1>virtual1 port 80</h1>" | sudo tee /var/www/virtuals/virtual1_80/index.html
<h1>virtual1 port 80</h1>
[root@server12 virtuals]# echo "<h1>virtual1 port 8000</h1>" | sudo tee /var/www/virtuals/virtual1_8000/index.html
<h1>virtual1 port 8000</h1>
[root@server12 virtuals]# echo "<h1>virtual2 port 8000</h1>" | sudo tee /var/www/virtuals/virtual2_8000/index.html
<h1>virtual2 port 8000</h1>
[root@server12 virtuals]# echo "<h1>virtual2 port 80</h1>" | sudo tee /var/www/virtuals/virtual2_80/index.html
<h1>virtual2 port 80</h1>
[root@server12 virtuals]# systemctl restart httpd
[root@server12 virtuals]# sudo chown -R apache:apache /var/www/virtuals
[root@server12 virtuals]# sudo chmod -R 755 /var/www/virtuals
[root@server12 virtuals]#
```

Virtual Host configurations

In /etc/httpd/conf/httpd.conf, enter the following:

```
# Further relax access to the default document root:
<Directory "/var/www/virtuals">
   Options Indexes FollowSymLinks
   AllowOverride None
   Require all granted
</Directory>
```

For port 80

```
# virtual1.aucegep.com:80

<VirtualHost 10.35.16.1:80>
    ServerName virtual1.aucegep.com
    DocumentRoot /var/www/virtuals/virtual1_80
    ErrorLog /var/www/virtuals/virtual1_80/error.log
    TransferLog /var/www/virtuals/virtual1_80/access.log
</VirtualHost>



# virtual2.aucegep.com:80

<VirtualHost 10.35.16.1:80>
    ServerName virtual2.aucegep.com
    DocumentRoot /var/www/virtuals/virtual2_80
    ErrorLog /var/www/virtuals/virtual2_80/error.log
    TransferLog /var/www/virtuals/virtual2_80/access.log
</VirtualHost>
```

For port 8000

```
# virtual1.aucegep.com:8000

<VirtualHost 10.35.16.1:8000>
    ServerName virtual1.aucegep.com
    DocumentRoot /var/www/virtuals/virtual1_8000
    ErrorLog /var/www/virtuals/virtual1_8000/error.log
    TransferLog /var/www/virtuals/virtual1_8000/access.log
</VirtualHost>


# virtual2.aucegep.com:8000
<VirtualHost 10.35.16.1:8000>
    ServerName virtual2.aucegep.com
    DocumentRoot /var/www/virtuals/virtual2_8000
    ErrorLog /var/www/virtuals/virtual2_8000/error.log
    TransferLog /var/www/virtuals/virtual2_8000/access.log
</VirtualHost>
```

Configure Apache to listen on port 80 and 8000

Change the listen directive to 80 and 8000. Ours is already listening on 80 so we'll just add 8000.

```
#Listen 12.34.56.78:80
Listen 80
Listen 8000
```

Save and quit. Validate the configuration syntax with **apachectl configtest**

If syntax is OK, reload Apache for the configurations to take effect

Systemctl restart httpd

```
[root@server12 virtuals]# systemctl restart httpd
[root@server12 virtuals]#
```

Task 3

This task is like Task 2, except we'll be using the IP address 10.35.17.1, different virtual servers and adding accessibility permissions.

Editing the /etc/hosts file

Like in Task 2, go to /etc/hosts and add the hostnames

```
10.35.17.1 www.ici.com intranet.ici.com development.ici.com
```

Save and quit.

Creating directories

mkdir -p /var/www/virtuals/ici

mkdir -p /var/www/virtuals/intranet

mkdir -p /var/www/virtuals/pre_production

```
[root@server12 virtuals]# mkdir -p /var/www/virtuals/ici
[root@server12 virtuals]# mkdir -p /var/www/virtuals/intranet
[root@server12 virtuals]# mkdir -p /var/www/virtuals/pre_production
[root@server12 virtuals]# mkdir -p /var/www/virtuals/development
[root@server12 virtuals]# ll
total 0
drwxr-xr-x. 2 root root  6 Apr 21 20:35 development
drwxr-xr-x. 2 root root  6 Apr 21 20:34 ici
drwxr-xr-x. 2 root root  6 Apr 21 20:35 intranet
drwxr-xr-x. 2 root root  6 Apr 21 20:35 pre_production
drwxr-xr-x. 2 root root 41 Apr 21 20:26 virtual1_80
drwxr-xr-x. 2 root root 41 Apr 21 20:26 virtual1_8000
drwxr-xr-x. 2 root root 41 Apr 21 20:26 virtual2_80
drwxr-xr-x. 2 root root 41 Apr 21 20:26 virtual2_8000
[root@server12 virtuals]#
```

Configure Virtual Hosts in httpd.conf

Like we did in Task 2, we're going to add these virtual hosts and their server names. Pre-production and development require an IP on the 10.35.17.0/24 network for access.

```
NameVirtualHost 10.35.17.1:80
NameVirtualHost 10.35.17.1:8000

# www.ici.com

<VirtualHost 10.35.17.1:80>
    ServerName www.ici.com
    DocumentRoot /var/www/virtuals/ici
<Directory /var/www/virtuals/ici>
        Require all granted
</Directory>
</VirtualHost>



# intranet.ici.com

<VirtualHost 10.35.17.1:80>
    ServerName intranet.ici.com
    DocumentRoot /var/www/virtuals/intranet
<Directory /var/www/virtuals/intranet>
<RequireAll>
       Require all granted
</RequireAll>
</Directory>
</VirtualHost>
```

```
# intranet.ici.com:8000 (restricted)

<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 10.35.17.0/24
</RequireAll>
    </Directory>
</VirtualHost>



# development.ici.com (restricted)

<VirtualHost 10.35.17.1:80>
    ServerName development.ici.com
    DocumentRoot /var/www/virtuals/development
    <Directory /var/www/virtuals/development>
<RequireAll>
        Require ip 10.35.17.0/24
</RequireAll>
    </Directory>
</VirtualHost>
```

Configure for Apache to listen on port 8000 and 80 for 10.35.17.1

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

Add port 8000 to the nm-shared zone on the firewall

```
[root@server12 virtual1_80]# firewall-cmd --permanent --add-port=8000/tcp --zone=nm-shared
success
[root@server12 virtual1_80]# firewall-cmd --reload
success
[root@server12 virtual1_80]#
```

Task 4

Create and configure four virtual web servers

Create directories

mkdir -p /var/www/virtuals/q4/sales

mkdir -p /var/www/virtuals/q4/admin

mkdir -p /var/www/virtuals/q4/thing

```
[root@server12 pre_production]# mkdir -p /var/www/virtuals/q4/sales
[root@server12 pre_production]# mkdir -p /var/www/virtuals/q4/admin
[root@server12 pre_production]# mkdir -p /var/www/virtuals/q4/thing
[root@server12 pre_production]# mkdir -p /var/www/virtuals/q4/other
```

```
[root@server12 virtuals]# cd q4
[root@server12 q4]# ll
total 0
drwxr-xr-x. 2 root root 6 Apr 21 21:42 admin
drwxr-xr-x. 2 root root 6 Apr 21 21:42 other
drwxr-xr-x. 2 root root 6 Apr 21 21:42 sales
drwxr-xr-x. 2 root root 6 Apr 21 21:42 thing
[root@server12 q4]#
```

Add the virtual servers to httpd.conf

```
#Task 4

<VirtualHost 10.35.16.1:8080>
    DocumentRoot /var/www/virtuals/q4/sales
</VirtualHost>

<VirtualHost 10.35.16.1:8081>
    DocumentRoot /var/www/virtuals/q4/admin
</VirtualHost>

<VirtualHost 10.35.16.1:8082>
    DocumentRoot /var/www/virtuals/q4/thing
</VirtualHost>

<VirtualHost 10.35.16.1:8083>
    DocumentRoot /var/www/virtuals/q4/other
</VirtualHost>
```

Add these ports for Apache to listen to on 10.35.16.1

```
#Listen 12.34.56.78:80
Listen 192.168.50.10:80
Listen 10.35.16.1:8000
Listen 10.35.16.1:80
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 10.35.17.1:8000
Listen 10.35.17.1:80
```

Configure the firewall to allow ports in nm-shared

```
[root@server12 q4]# firewall-cmd --permanent --add-port=8080/tcp --zone=nm-shared
success
[root@server12 q4]# firewall-cmd --permanent --add-port=8081/tcp --zone=nm-shared
success
[root@server12 q4]# firewall-cmd --permanent --add-port=8082/tcp --zone=nm-shared
success
[root@server12 q4]# firewall-cmd --permanent --add-port=8083/tcp --zone=nm-shared
success
[root@server12 q4]#
```

Task 5

Configure Apache web server to support five virtual servers using only one block and the VirtualDocumentRoot directive

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:

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

y = The name of the company.

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

Create the directory structure

mkdir -p /var/www/virtuals/q5/com/itmt/www

mkdir -p /var/www/virtuals/q5/ca/itmt/www

mkdir -p /var/www/virtuals/q5/com/itmt/www2

mkdir -p /var/www/virtuals/q5/com/montmo/www

mkdir -p /var/www/virtuals/q5/ca/montmo/www

```
[root@server12 q4]# mkdir -p /var/www/virtuals/q5/com/itmt/www
[root@server12 q4]# mkdir -p /var/www/virtuals/q5/ca/itmt/www
[root@server12 q4]# mkdir -p /var/www/virtuals/q5/com/itmt/www2
[root@server12 q4]# mkdir -p /var/www/virtuals/q5/com/montmo/www
[root@server12 q4]# mkdir -p /var/www/virtuals/q5/ca/montmo/www
```

```
[root@server12 q5]# mkdir -p /var/www/virtuals/q5/logs
[root@server12 q5]#
```

Tree /var/www/virtuals/q5 to show the directory tree

```
[root@server12 ici]# tree /var/www/virtuals/q5
/var/www/virtuals/q5
├── ca
│   ├── itmt
│   │   └── www
│   │       └── index.html
│   └── montmo
│       └── www
│           └── index.html
├── com
│   ├── itmt
│   │   ├── www
│   │   │   └── index.html
│   │   └── www2
│   │       └── index.html
│   └── montmo
│       └── www
│           └── index.html
└── logs
    ├── virtual_access_q5_log
    └── virtual_error_q5_log
```

Add the hostnames to the **/etc/hosts** file

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

In the httpd.conf file, add one VirtualHost block with VirtualDocumentRoot for all websites combined using the following path:

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

Example:

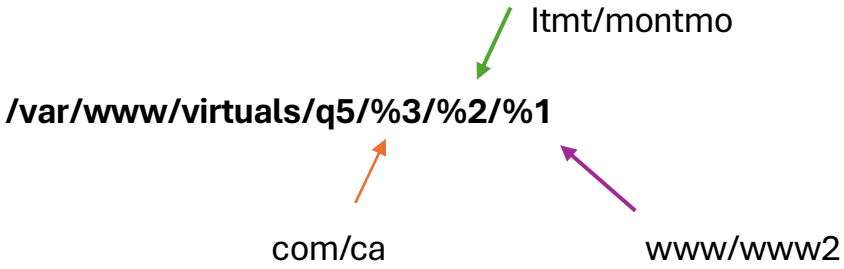
Split into components: www, itmt, com

%1: First component (www)

%2: Second component (itmt)

%3: Third component (com)

So in our case, Apache will go look for either com or ca first in the q5 directory, then it'll look for the website name (itmt, montmo) and lastly for the www or www2 in order to map from one block.




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

Add **10.50.1.1:80** to Listen

```
#Listen 12.34.56.78:80
Listen 192.168.50.10:80
Listen 10.35.16.1:8000
Listen 10.35.16.1:80
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 10.35.17.1:8000
Listen 10.35.17.1:80
Listen 10.50.1.1:80
```

Save and quit.

Testing

Configuring the hostnames on Ubuntu (for testing)

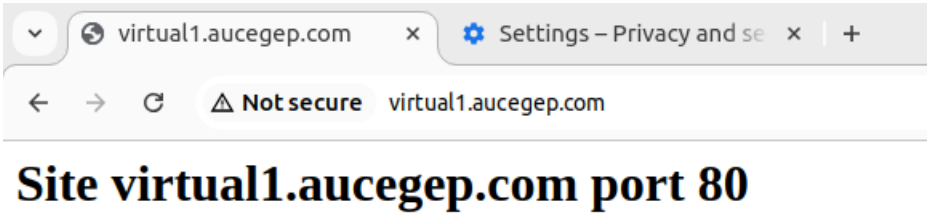
Same as usual, go to /etc/hosts and add the same hostnames we've done up until now

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

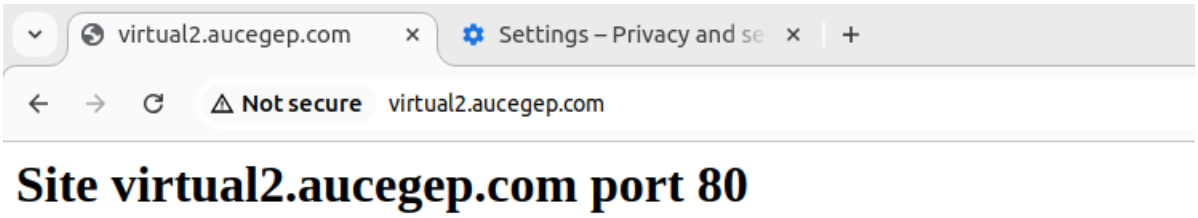
On Ubuntu, open and links and the sites will display.

Task 2

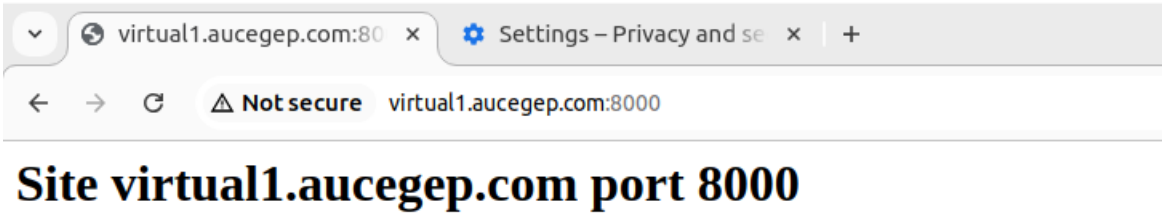
http://virtual1.aucegep.com/



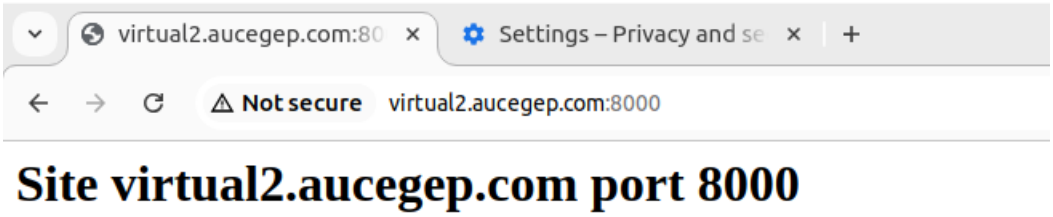
http://virtual2.aucegep.com/



http://virtual1.aucegep.com:8000/

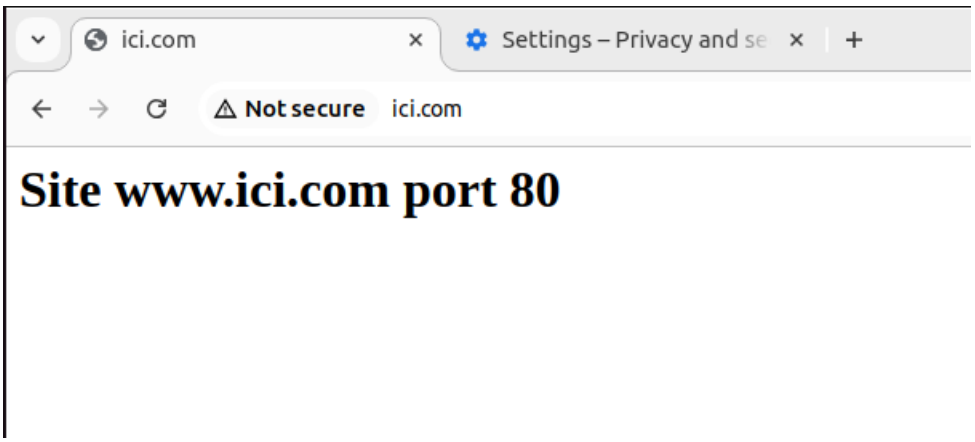


http://virtual2.aucegep.com:8000/



Task 3

http://www.ici.com/



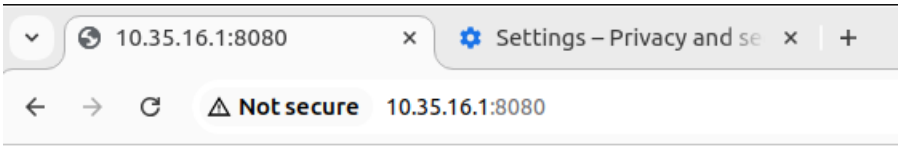
http://intranet.ici.com/

http://intranet.ici.com:8000/

http://development.ici.com/

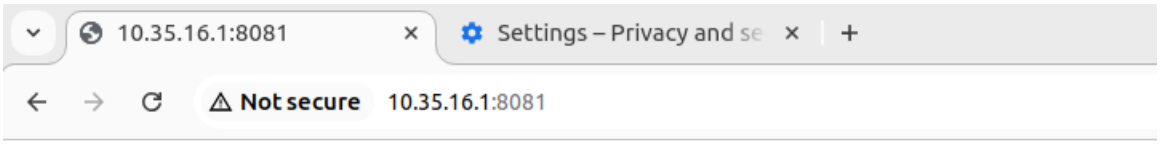
Task 4

http://10.35.16.1:8080/



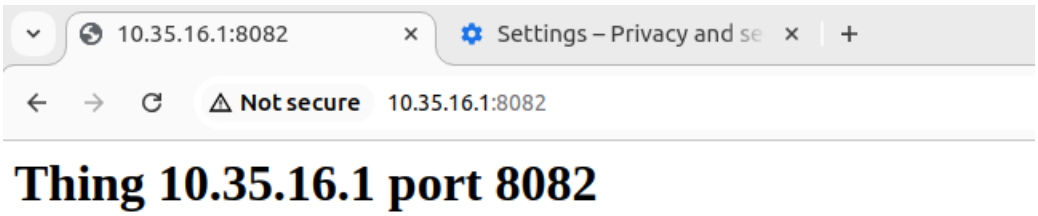
Sales 10.35.16.1 port 8080

http://10.35.16.1:8081/



Admin 10.35.16.1 port 8081

http://10.35.16.1:8082/



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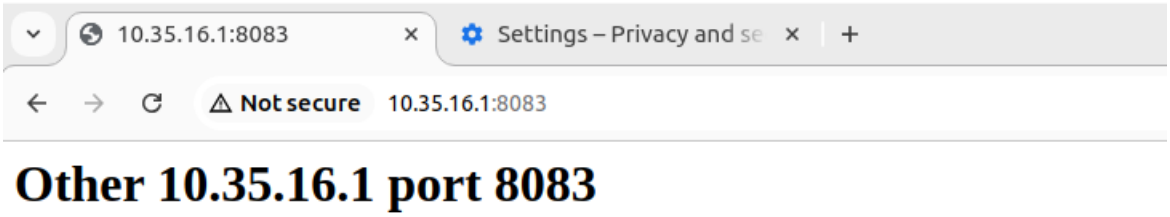

Task 5

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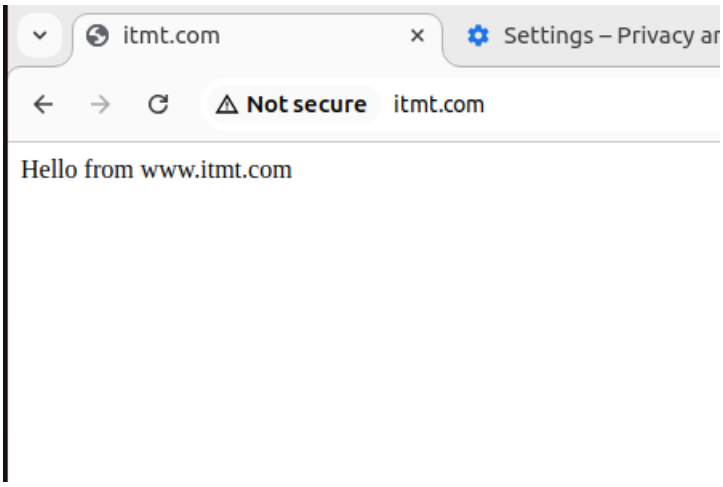

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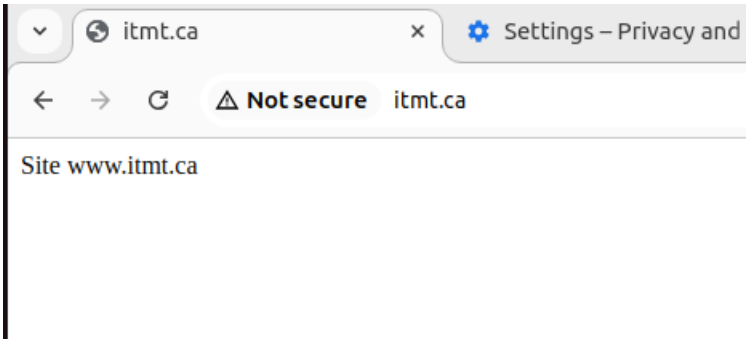

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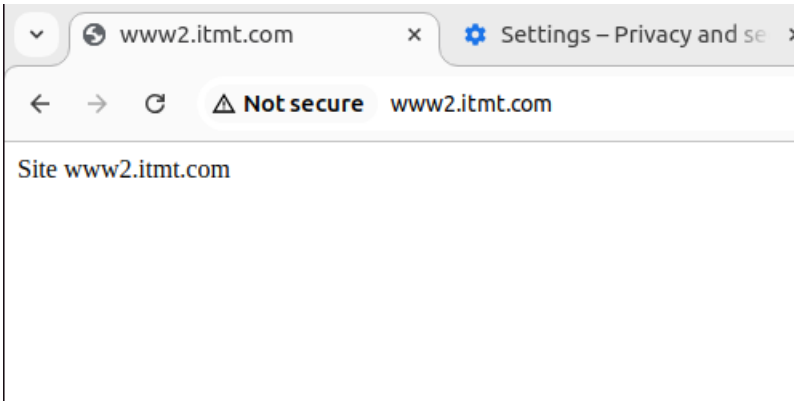

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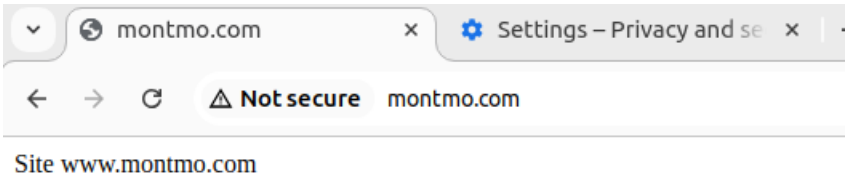

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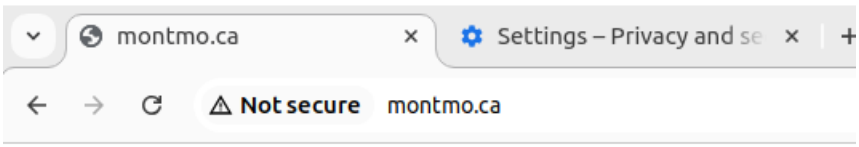

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