

National Polytechnic Institute of Cambodia

Faculty of Computer Science

Professor: SAN EAMSOT

Subject: Linux Server Administration

Topic: DHCP, DNS, Web Server

Student: Non Savan

Content

1. What is DHCP?
2. What is DHCP Server provide to Client?
3. What is DNS?
4. Why we use DNS?
5. What is Web Server?
6. Why we use Web Server?
7. Configuration step by step of
 - a. DHCP
 - b. DNS
 - c. Web Server

I. What is DHCP?

DHCP stand for Dynamic Host Configuration Protocol.

DHCP is the service that automatically assign IP Address to client.

- DHCP Server is the provider.
- DHCP client is the receiver.

II. What is DHCP Server provide to Client?

DHCP Server provide:

- IP Address
- Subnet Mask
- Default Gateway
- DNS

III. What is DNS?

DNS stand for Domain Name System.

DNS is a system that translates human-readable domain names, like facebook.com, into machine-readable IP addresses, such as 57.144.152.141

For example: domain name: google.com => IP Address : 8.8.8.8

IV. Why we use DNS?

You need DNS on a web server because it:

- Translates domain names to IPs.
- Supports hosting multiple sites.
- Enables services like email, APIs, subdomains.

V. What is Web Server?

A web server is a computer system capable of delivering web content to end users over the internet via a web browser.

VI. Why we use Web Server?

We use a Web Server to host and serve websites or web applications over the internet or a local network. Here's a clear explanation of why a web server is used.

To Deliver Web Content to Users: A web server stores website files like:

- HTML, CSS, JavaScript
- Images, videos
- Documents (PDFs, etc.)

When someone types a URL into their browser, the web server responds with the right content.

VII. Configuration step by step

a. DHCP

1. Set Static IP and check your IP Address

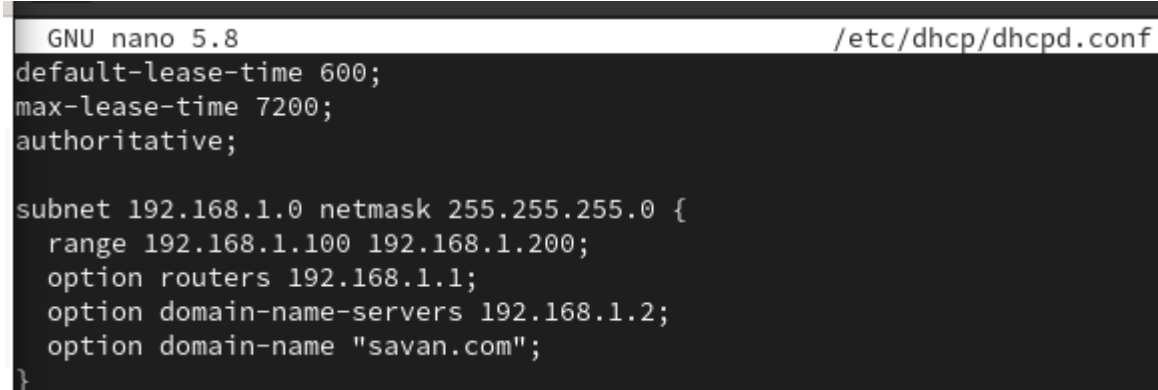
2. Install Packages

```
# dnf install dhcp-server
```

3. Configure DHCP

```
# nano /etc/dhcp/dhcpd.conf
```

```
default-lease-time 600;  
max-lease-time 7200;  
authoritative;  
  
subnet 192.168.1.0 netmask 255.255.255.0 {  
    range 192.168.1.100 192.168.1.200;  
    option routers 192.168.1.1;  
    option domain-name-servers 192.168.1.2;  
    option domain-name "savan.com";  
}
```



```
GNU nano 5.8 /etc/dhcp/dhcpd.conf  
default-lease-time 600;  
max-lease-time 7200;  
authoritative;  
  
subnet 192.168.1.0 netmask 255.255.255.0 {  
    range 192.168.1.100 192.168.1.200;  
    option routers 192.168.1.1;  
    option domain-name-servers 192.168.1.2;  
    option domain-name "savan.com";  
}
```

Use Ctrl + o and Ctrl + x for save you configuration.

4. Enable DHCP server and show status dhcp.

```
# systemctl enable --now dhcpd
```

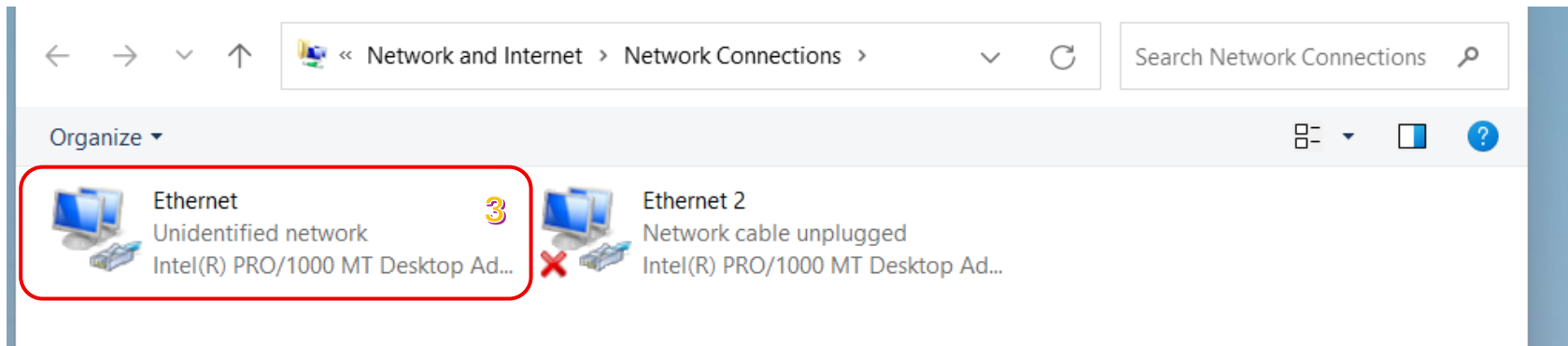
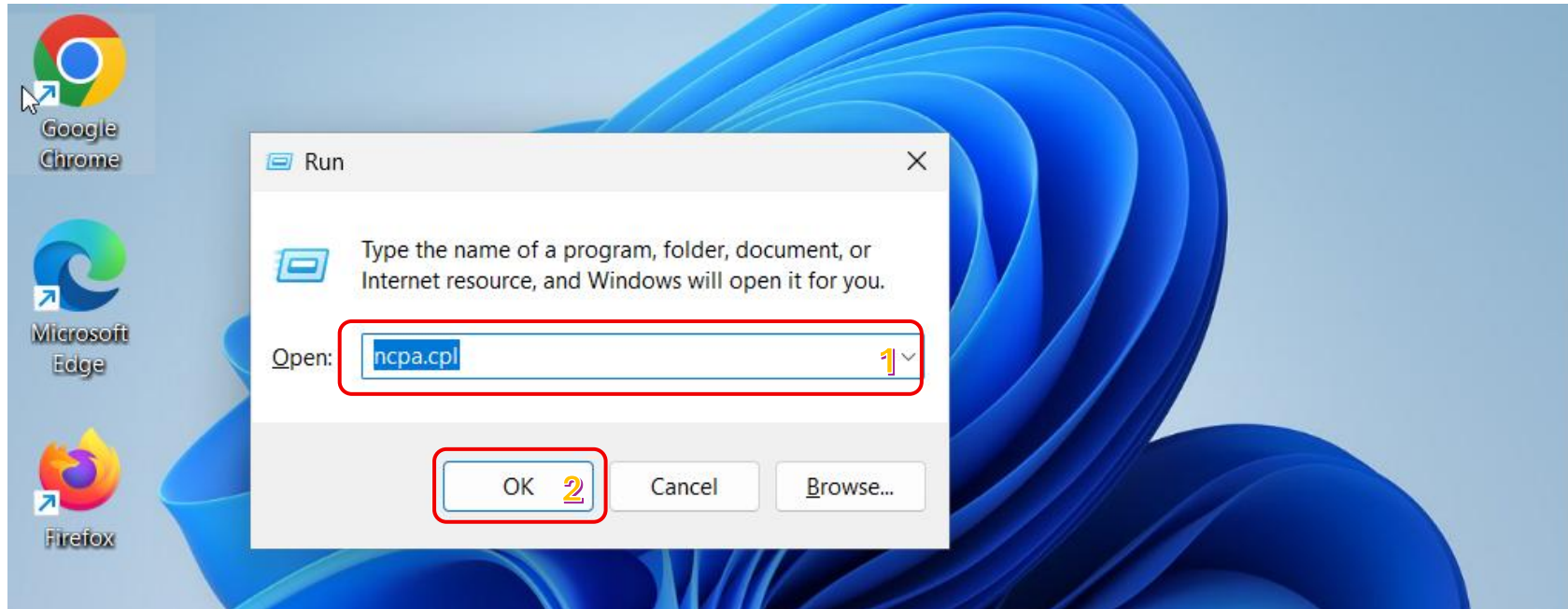
```
# systemctl status dhcpd
```

```
[root@vbox /]# nano etc/named.conf
[root@vbox /]# systemctl enable --now dhcpd
[root@vbox /]# systemctl status dhcpd
● dhcpd.service - DHCPv4 Server Daemon
   Loaded: loaded (/usr/lib/systemd/system/dhcpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Sun 2025-08-03 10:37:43 +07; 1h 3min ago
     Docs: man:dhcpd(8)
           man:dhcpd.conf(5)
  Main PID: 14493 (dhcpd)
    Status: "Dispatching packets..."
     Tasks: 1 (limit: 5850)
    Memory: 6.7M
       CPU: 82ms
    CGroup: /system.slice/dhcpd.service
           └─14493 /usr/sbin/dhcpd -f -cf /etc/dhcp/dhcpd.conf -user dhcpd -group dhcpd --no-pid enp0s8

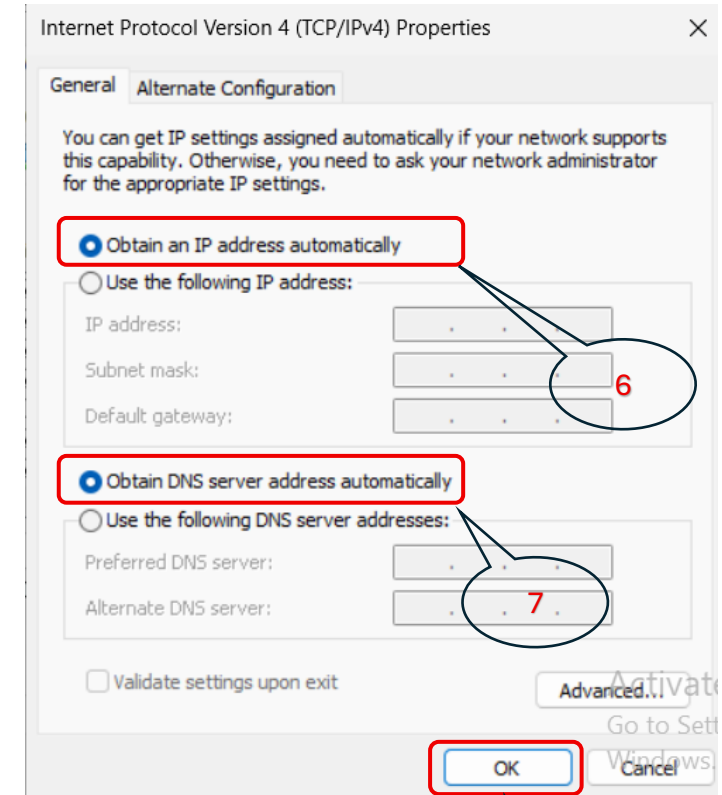
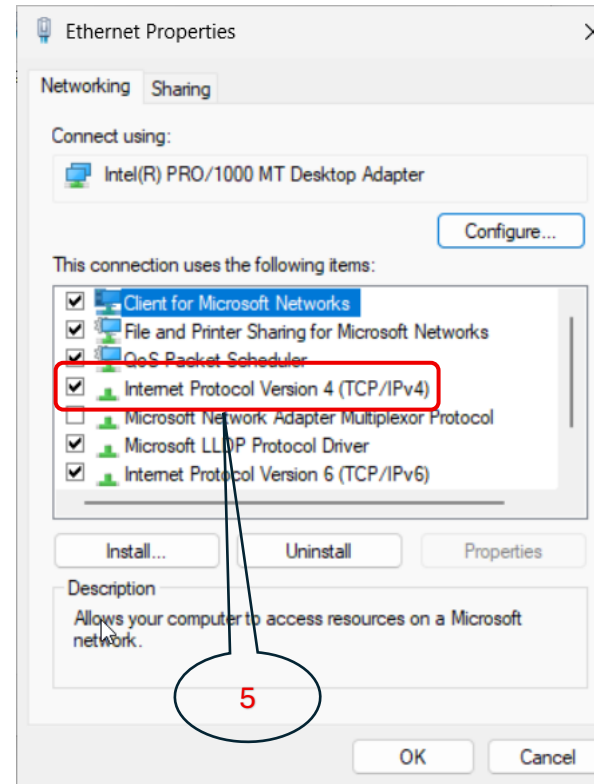
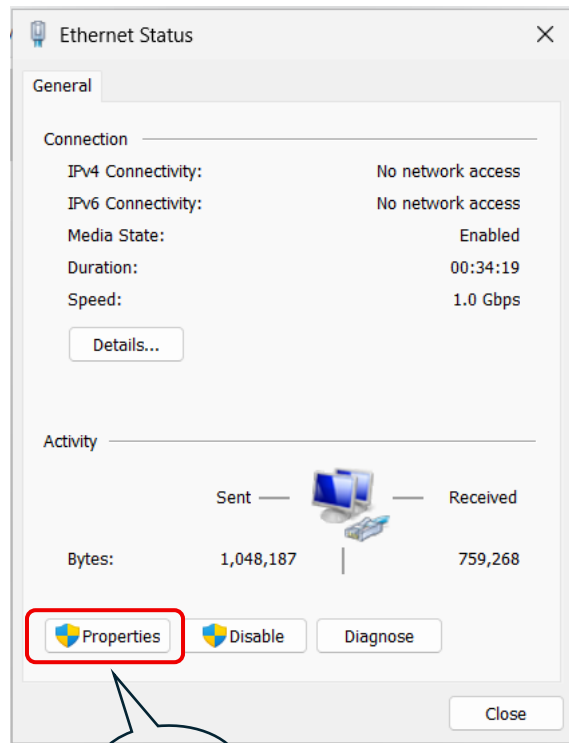
Aug 03 11:20:05 vbox dhcpd[14493]: DHCPACK on 192.168.1.100 to 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:25:05 vbox dhcpd[14493]: DHCPREQUEST for 192.168.1.100 from 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:25:05 vbox dhcpd[14493]: DHCPACK on 192.168.1.100 to 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:30:05 vbox dhcpd[14493]: DHCPREQUEST for 192.168.1.100 from 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:30:05 vbox dhcpd[14493]: DHCPACK on 192.168.1.100 to 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:35:05 vbox dhcpd[14493]: DHCPREQUEST for 192.168.1.100 from 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:35:05 vbox dhcpd[14493]: DHCPACK on 192.168.1.100 to 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:40:05 vbox dhcpd[14493]: DHCPREQUEST for 192.168.1.100 from 08:00:27:ae:80:2c (win11) via enp0s8
Aug 03 11:40:05 vbox dhcpd[14493]: Wrote 1 leases to leases file.
Aug 03 11:40:06 vbox dhcpd[14493]: DHCPACK on 192.168.1.100 to 08:00:27:ae:80:2c (win11) via enp0s8
[root@vbox /]#
```

5. On Window Client

Win + R and type **ncpa.cpl**



Edit your interface into DHCP client.



Open your cmd or Powershell.

Type `ipconfig /all`

Ethernet adapter Ethernet:

```
Connection-specific DNS Suffix . : savan.com
Description . . . . . : Intel(R) PRO/1000 MT Desktop Adapter
Physical Address. . . . . : 08-00-27-AE-80-2C
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::e240:5277:5c5a:69ee%8(Preferred)
IPv4 Address. . . . . : 192.168.1.100(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Tuesday, July 29, 2025 10:50:56 PM
Lease Expires . . . . . : Wednesday, July 30, 2025 1:02:31 AM
Default Gateway . . . . . : 192.168.1.1
DHCP Server . . . . . : 192.168.1.2
DHCPv6 IAID . . . . . : 101187623
DHCPv6 Client DUID. . . . . : 00-01-00-01-30-18-AC-7F-08-00-27-AE-80-2C
DNS Servers . . . . . : 192.168.1.2
NetBIOS over Tcpip. . . . . : Enabled
```

b. DNS

1. Install Packets of DNS that use BIND

```
# dnf install bind bind-utils httpd -y
```

2. Configure DNS (BIND)

```
# nano /etc/named.conf
```

```
options {  
    listen-on port 53 { any; };  
    directory "/var/named";  
    allow-query { any; };  
    recursion yes;  
};  
zone "savan.com" IN {  
    type master;  
    file "savan.com.zone";  
};
```

```
GNU nano 5.8  
options {  
    listen-on port 53 { any; };  
    directory "/var/named";  
    allow-query { any; };  
    recursion yes;  
};  
  
# Add zone section:  
zone "savan.com" IN {  
    type master;  
    file "savan.com.zone";  
};
```

Save you configuration for this session.

3. Configure savan.com.zone

nano /var/named/savan.com.zone

```
$TTL 86400
@ IN SOA savan.com. root.savan.com. (
    2025073101 ; Serial
    3600      ; Refresh
    1800      ; Retry
    604800    ; Expire
    86400 )    ; Minimum

@ IN NS  savan.com.
@ IN A   192.168.1.2
www IN A  192.168.1.2
```

```
GNU nano 5.8
$TTL 86400
@ IN SOA savan.com. root.savan.com. (
    2025073101 ; Serial
    3600      ; Refresh
    1800      ; Retry
    604800    ; Expire
    86400 )    ; Minimum

@ IN NS  savan.com.
@ IN A   192.168.1.2
www IN A  192.168.1.2
```

4. Set correct permissions

chown root:named /var/named/savan.com.zone

chmod 640 /var/named/savan.com.zone

5. Enable DNS

systemctl enable --now named

All commend

```
[root@vbox /]# nano /etc/named.conf
[root@vbox /]# nano /var/named/savan.com.zone
[root@vbox /]# sudo chown root:named /var/named/savan.com.zone
[root@vbox /]# sudo chown root:named /var/named/savan.com.zone
[root@vbox /]# ls -la var/named/savan.com.zone
-rw-r-----. 1 root named 289 Aug  3 10:40 var/named/savan.com.zone
[root@vbox /]# systemctl enable --now named
[root@vbox /]# systemctl status named
● named.service - Berkeley Internet Name Domain (DNS)
   Loaded: loaded (/usr/lib/systemd/system/named.service; enabled; vendor preset: disabled)
   Active: active (running) since Sun 2025-08-03 10:41:00 +07; 1h 1min ago
 Main PID: 14730 (named)
    Tasks: 11 (limit: 5850)
   Memory: 44.5M
      CPU: 16.815s
   CGroup: /system.slice/named.service
           └─14730 /usr/sbin/named -u named -c /etc/named.conf

Aug 03 11:41:21 vbox named[14730]: broken trust chain resolving 'beacons.gvt2.com/AAAA/IN': 216.239.32.10#53
Aug 03 11:41:24 vbox named[14730]: broken trust chain resolving 'edge.microsoft.com/HTTPS/IN': 13.107.206.39#53
Aug 03 11:41:24 vbox named[14730]: broken trust chain resolving 'edge.microsoft.com/A/IN': 13.107.206.39#53
Aug 03 11:41:25 vbox named[14730]: broken trust chain resolving 'edge.microsoft.com/AAAA/IN': 13.107.206.39#53
Aug 03 11:41:37 vbox named[14730]: broken trust chain resolving 'beacons3.gvt2.com/A/IN': 216.239.32.10#53
Aug 03 11:41:37 vbox named[14730]: broken trust chain resolving 'beacons3.gvt2.com/AAAA/IN': 216.239.36.10#53
Aug 03 11:41:37 vbox named[14730]: broken trust chain resolving 'beacons3.gvt2.com/HTTPS/IN': 216.239.32.10#53
Aug 03 11:41:38 vbox named[14730]: broken trust chain resolving 'clients2.google.com/AAAA/IN': 216.239.32.10#53
Aug 03 11:41:38 vbox named[14730]: broken trust chain resolving 'clients2.google.com/HTTPS/IN': 216.239.32.10#53
Aug 03 11:41:38 vbox named[14730]: broken trust chain resolving 'clients2.google.com/A/IN': 216.239.32.10#53
[root@vbox /]#
```

c. Web Server

1. Install Apache httpd

dnf -y install httpd

2. Create Directory for store source code

mkdir -p /var/www/Savann_WebServer

For Directory that store source code is in /var/www/

mkdir Savan_WebServer

```
[root@vbox /]# cd var/www/  
[root@vbox www]# mkdir Savan_WebServer
```

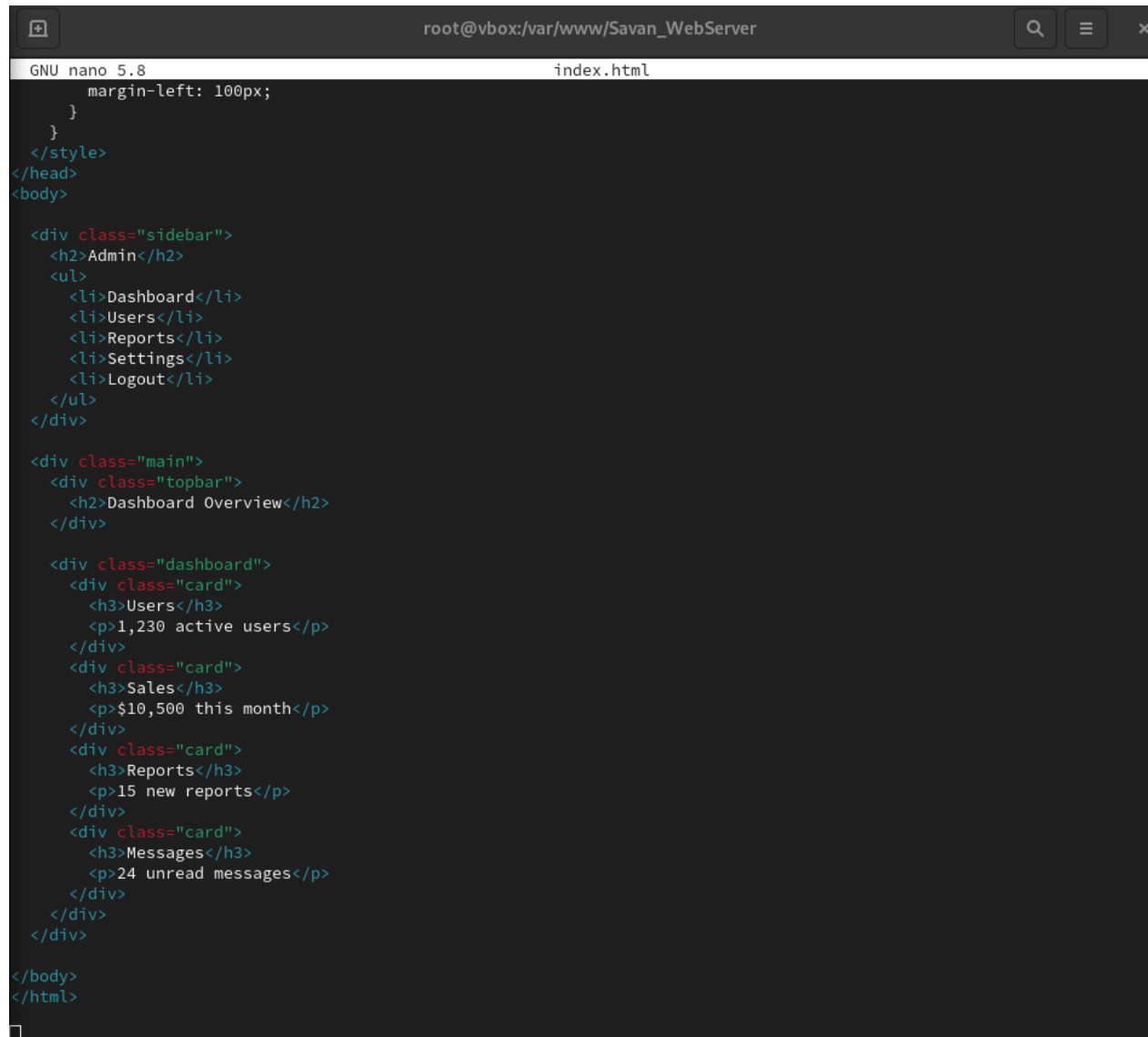
3. Create file index.html

touch index.html

nano index.html

In this file we to include you source code like HTML, CSS, JS,...

Don't forget to save your comfiguration.



```
root@vbox:/var/www/Savan_WebServer
GNU nano 5.8 index.html
    margin-left: 100px;
  }
}
</style>
</head>
<body>

  <div class="sidebar">
    <h2>Admin</h2>
    <ul>
      <li>Dashboard</li>
      <li>Users</li>
      <li>Reports</li>
      <li>Settings</li>
      <li>Logout</li>
    </ul>
  </div>

  <div class="main">
    <div class="topbar">
      <h2>Dashboard Overview</h2>
    </div>

    <div class="dashboard">
      <div class="card">
        <h3>Users</h3>
        <p>1,230 active users</p>
      </div>
      <div class="card">
        <h3>Sales</h3>
        <p>$10,500 this month</p>
      </div>
      <div class="card">
        <h3>Reports</h3>
        <p>15 new reports</p>
      </div>
      <div class="card">
        <h3>Messages</h3>
        <p>24 unread messages</p>
      </div>
    </div>
  </div>
</body>
</html>
```

4. Edit file Savan_WebServer.conf

nano /etc/httpd/conf.d/savan.com.conf

```
<VirtualHost *:80>
  ServerName savan.com
  DocumentRoot /var/www/savan.com

  <Directory /var/www/savan.com>
    AllowOverride All
    Require all granted
  </Directory>

  ErrorLog /var/log/httpd/savan.com-error.log
  CustomLog /var/log/httpd/savan.com-access.log combined
</VirtualHost>
```

```
GNU nano 5.8 etc/httpd/conf.d/Savan_WebServer.conf
<VirtualHost *:80>
  ServerName savan.com
  DocumentRoot /var/www/Savan_WebServer

  <Directory /var/www/Savan_WebServer>
    options Indexes FollowSymLinks
    AllowOverride All
    Require all granted
  </Directory>

  ErrorLog /var/log/httpd/savan.com-error.log
  CustomLog /var/log/httpd/savan.com-access.log combined
</VirtualHost>
```

ServerName **savan.com** : This name, use to search in browser or internet.

DocumentRoot **/var/www/Savan_WebServer**: For **Savan_WebServer** is the directory that we created for store source code.

5. Enable Apache and Open Port in Firewall

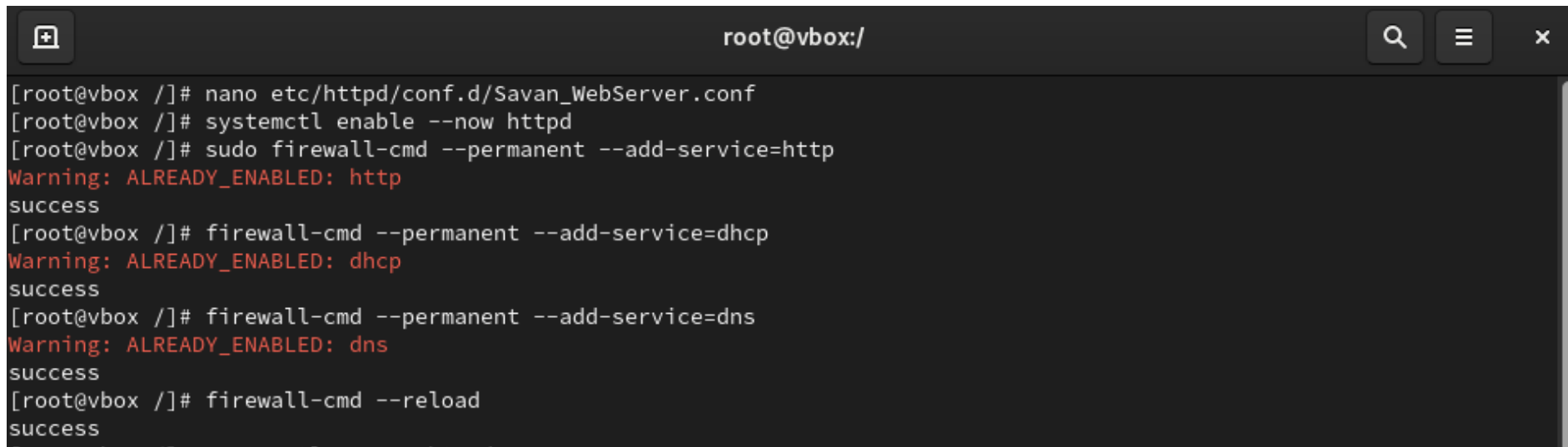
```
# systemctl enable --now httpd
```

```
# firewall-cmd --permanent --add-service=http
```

```
# firewall-cmd --permanent --add-service=dhcp
```

```
# firewall-cmd --permanent --add-service=dns
```

```
# firewall-cmd --reload
```



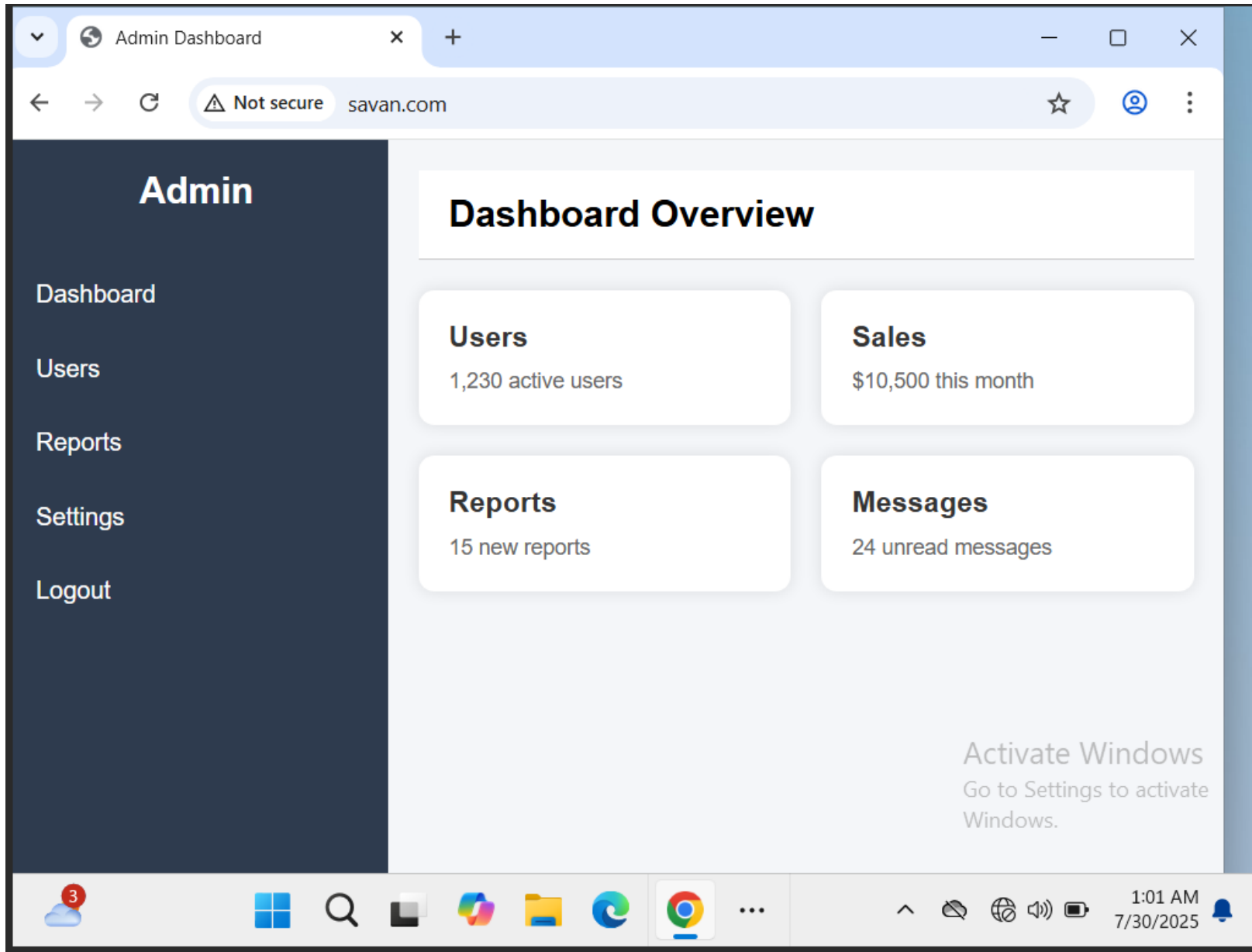
```
root@vbox:/  
[root@vbox /]# nano etc/httpd/conf.d/Savan_WebServer.conf  
[root@vbox /]# systemctl enable --now httpd  
[root@vbox /]# sudo firewall-cmd --permanent --add-service=http  
Warning: ALREADY_ENABLED: http  
success  
[root@vbox /]# firewall-cmd --permanent --add-service=dhcp  
Warning: ALREADY_ENABLED: dhcp  
success  
[root@vbox /]# firewall-cmd --permanent --add-service=dns  
Warning: ALREADY_ENABLED: dns  
success  
[root@vbox /]# firewall-cmd --reload  
success
```

All Command

```
root@vbox:/
[root@vbox /]# nano etc/httpd/conf.d/Savan_WebServer.conf
[root@vbox /]# systemctl enable --now httpd
[root@vbox /]# sudo firewall-cmd --permanent --add-service=http
Warning: ALREADY_ENABLED: http
success
[root@vbox /]# firewall-cmd --permanent --add-service=dhcp
Warning: ALREADY_ENABLED: dhcp
success
[root@vbox /]# firewall-cmd --permanent --add-service=dns
Warning: ALREADY_ENABLED: dns
success
[root@vbox /]# firewall-cmd --reload
success
[root@vbox /]# systemctl status httpd
• httpd.service - The Apache HTTP Server
  Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
  Active: active (running) since Sat 2025-08-02 23:44:24 +07; 12h ago
    Docs: man:httpd.service(8)
  Main PID: 11513 (httpd)
    Status: "Total requests: 38; Idle/Busy workers 100/0; Requests/sec: 0.000871; Bytes served/sec: 0 B/sec"
    Tasks: 231 (limit: 5850)
  Memory: 22.3M
    CPU: 17.116s
  CGroup: /system.slice/httpd.service
          └─11513 /usr/sbin/httpd -DFOREGROUND
            └─12151 /usr/sbin/httpd -DFOREGROUND
              └─12152 /usr/sbin/httpd -DFOREGROUND
                └─12153 /usr/sbin/httpd -DFOREGROUND
                  └─12154 /usr/sbin/httpd -DFOREGROUND
                    └─12155 /usr/sbin/httpd -DFOREGROUND
                      └─13242 /usr/sbin/httpd -DFOREGROUND

Aug 02 23:44:24 vbox systemd[1]: Starting The Apache HTTP Server...
Aug 02 23:44:24 vbox httpd[11513]: AH00112: Warning: DocumentRoot [/var/www/virtual.host] does not exist
Aug 02 23:44:24 vbox httpd[11513]: Server configured, listening on: port 80
Aug 02 23:44:24 vbox systemd[1]: Started The Apache HTTP Server.
Aug 03 00:00:03 vbox systemd[1]: Reloading The Apache HTTP Server.
Aug 03 00:00:03 vbox httpd[12140]: AH00112: Warning: DocumentRoot [/var/www/virtual.host] does not exist
Aug 03 00:00:03 vbox systemd[1]: Reloaded The Apache HTTP Server.
Aug 03 00:00:03 vbox httpd[11513]: Server configured, listening on: port 80
[root@vbox /]#
```

Testing



Thank you