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Task 1 :

Interface detection : displays all **network interfaces** and their **IP configurations** on your **EC2 instance**.

Ip a

```
[ec2-user@ip-172-31-88-0 ~]$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enX0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 9001 qdisc fq_codel state UP group default
    link/ether 12:21:08:16:5a:f7 brd ff:ff:ff:ff:ff:ff
    altname eni-0fcc6d6fcd697811c
    altname device-number-0.0
    inet 172.31.88.0/20 metric 512 brd 172.31.95.255 scope global dynamic enX0
        valid_lft 2811sec preferred_lft 2811sec
    inet6 fe80::1021:8ff:fe16:5af7/64 scope link proto kernel_ll
        valid_lft forever preferred_lft forever
```

2.cmd : cat /etc/nsswitch.conf

Displays the system's Name Service Switch (NSS) configuration

```

[ec2-user@ip-172-31-88-0 ~]$ cat /etc/nsswitch.conf
#
# /etc/nsswitch.conf
#
# Name Service Switch config file. This file should be
# sorted with the most-used services at the beginning.
#
# Valid databases are: aliases, ethers, group, gshadow, hosts,
# initgroups, netgroup, networks, passwd, protocols, publickey,
# rpc, services, and shadow.
#
# Valid service provider entries include (in alphabetical order):
#
#      compat          Use /etc files plus *_compat pseudo-db
#      db              Use the pre-processed /var/db files
#      dns             Use DNS (Domain Name Service)
#      files           Use the local files in /etc
#      hesiod          Use Hesiod (DNS) for user lookups
#
# See 'info libc "NSS Basics"' for more information.
#
# Commonly used alternative service providers (may need installation):
#
#      ldap            Use LDAP directory server
#      myhostname      Use systemd host names
#      mymachines      Use systemd machine names
#      mdns*, mdns*_minimal Use Avahi mDNS/DNS-SD
#      resolve         Use systemd resolved resolver
#      sss             Use System Security Services Daemon (sssd)
#      systemd        Use systemd for dynamic user option
#      winbind         Use Samba winbind support
#      wins            Use Samba wins support
#      wrapper         Use wrapper module for testing
#
# Notes:
#
# 'sssd' performs its own 'files'-based caching, so it should generally
# come before 'files'.
#
# WARNING: Running nscd with a secondary caching service like sssd may
# lead to unexpected behaviour, especially with how long
# entries are cached.
#
# Installation instructions:

```

```

#
# Installation instructions:
#
# To use 'db', install the appropriate package(s) (provide 'makedb' and
# libnss_db.so.*), and place the 'db' in front of 'files' for entries
# you want to be looked up first in the databases, like this:
#
# passwd:      db files
# shadow:      db files
# group:       db files
#
# In order of likelihood of use to accelerate lookup.
passwd:      sss files
shadow:      files
group:       sss files
hosts:       files dns myhostname
services:    files sss
netgroup:    sss
automount:   files sss

aliases:     files
ethers:      files
gshadow:     files
# Allow initgroups to default to the setting for group.
# initgroups: files
networks:    files dns
protocols:   files
publickey:   files
rpc:         files
[ec2-user@ip-172-31-88-0 ~]$

```

Cmd : cat /etc/hosts

>displays the host information

```
ec2-user@ip-172-31-88-0:~  
ec2-user@ip-172-31-88-0 ~]$ cat /etc/hosts  
27.0.0.1    localhost localhost.localdomain localhost4 localhost4.localdomain  
:  
:1          localhost6 localhost6.localdomain6  
ec2-user@ip-172-31-88-0 ~]$
```

Cmd : cat /etc/sysconfig/network

system will automatically **apply these network settings every time it starts.**

```
:1          localhost6 localhost6.localdomain6  
[ec2-user@ip-172-31-88-0 ~]$ cat /etc/sysconfig/network  
NETWORKING=yes  
NOZEROCONF=yes
```

Cmd :

cd /etc/sysconfig/network-scripts

cat ifcfg-eth0

cat route-eth0

```
[ec2-user@ip-172-31-88-0 ~]$ cd /etc/sysconfig/network-scripts
[ec2-user@ip-172-31-88-0 network-scripts]$ ll
total 8
-rw-r--r--. 1 root root 167 Mar  4 00:32 ifcfg-eth0
-rw-r--r--. 1 root root  73 Mar  4 00:32 route-eth0
[ec2-user@ip-172-31-88-0 network-scripts]$ cat ifcfg-eth0
DEVICE=eth0
BOOTPROTO=dhcp
ONBOOT=yes
TYPE=Ethernet
USERCTL=yes
PEERDNS=yes
DHCPV6C=yes
DHCPV6C_OPTIONS=-nw
PERSISTENT_DHCLIENT=yes
RES_OPTIONS="timeout:2 attempts:5"
[ec2-user@ip-172-31-88-0 network-scripts]$ cat route-eth0
# Static route for metadata service
169.254.169.254 via 0.0.0.0 dev eth0
[ec2-user@ip-172-31-88-0 network-scripts]$
```

## ifcfg-eth0 (Interface Configuration File)

This file contains network settings for the **eth0** interface:

- **DEVICE=eth0** → Specifies the network interface name.
- **BOOTPROTO=dhcp** → The interface obtains an IP address dynamically using **DHCP**.
- **ONBOOT=yes** → The interface will start automatically on boot.
- **TYPE=Ethernet** → Defines the interface type as Ethernet.
- **USERCTL=yes** → Allows non-root users to control the interface.
- **PEERDNS=yes** → Allows the interface to modify **/etc/resolv.conf** with DNS settings from DHCP.
- **DHCPV6C=yes** → Enables IPv6 DHCP client.
- **PERSISTENT\_DHCLIENT=yes** → Keeps the DHCP client persistent.
- **RES\_OPTIONS="timeout:2 attempts:5"** → Specifies DNS resolver options.

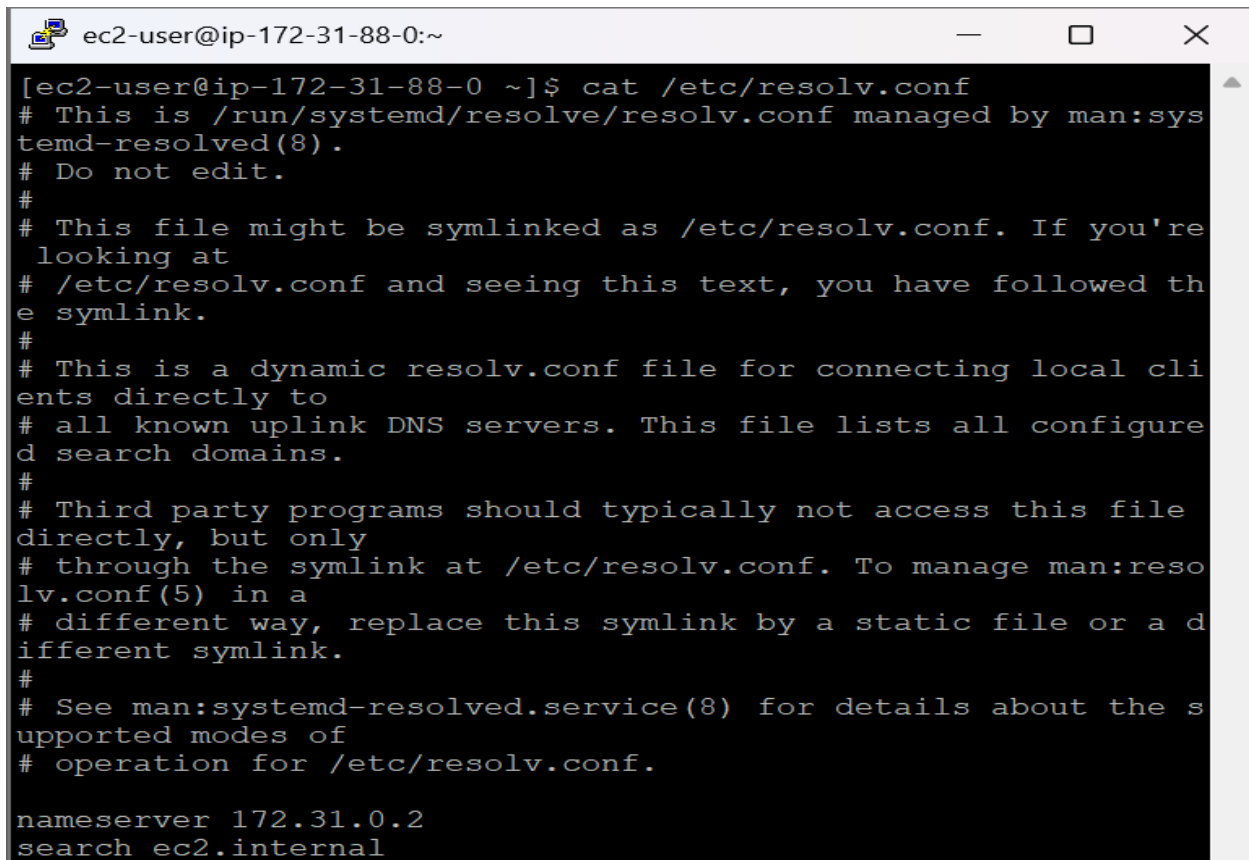
## 2. route-eth0 (Static Route Configuration File)

- **169.254.169.254 via 0.0.0.0 dev eth0**
  - This is a **static route for AWS EC2 metadata service**.

- **169.254.169.254** is the AWS instance metadata endpoint.
- The instance routes metadata requests via **eth0**.

Cmd : cat /etc/resolv.conf

The **/etc/resolv.conf** file is used to configure the **Domain Name System (DNS) resolution** on a Linux system. It tells the system which **DNS servers** to use when resolving domain names into IP addresses.

A terminal window titled 'ec2-user@ip-172-31-88-0:~' with standard window controls. The terminal displays the output of the command 'cat /etc/resolv.conf'. The output consists of several lines of comments explaining the file's purpose and management, followed by two configuration lines: 'nameserver 172.31.0.2' and 'search ec2.internal'.

```
[ec2-user@ip-172-31-88-0 ~]$ cat /etc/resolv.conf
# This is /run/systemd/resolve/resolv.conf managed by man:systemd-resolved(8).
# Do not edit.
#
# This file might be symlinked as /etc/resolv.conf. If you're looking at
# /etc/resolv.conf and seeing this text, you have followed the symlink.
#
# This is a dynamic resolv.conf file for connecting local clients directly to
# all known uplink DNS servers. This file lists all configured search domains.
#
# Third party programs should typically not access this file directly, but only
# through the symlink at /etc/resolv.conf. To manage man:resolv.conf(5) in a
# different way, replace this symlink by a static file or a different symlink.
#
# See man:systemd-resolved.service(8) for details about the supported modes of
# operation for /etc/resolv.conf.

nameserver 172.31.0.2
search ec2.internal
```

Cmd : ifconfig

>shows the ipaddress

```
ec2-user@ip-172-31-88-0:~  
[ec2-user@ip-172-31-88-0 ~]$ ifconfig  
enX0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 9001  
    inet 172.31.88.0  netmask 255.255.240.0  broadcast 172.31.95.255  
    inet6 fe80::1021:8ff:fe16:5af7  prefixlen 64  scopeid 0x20<link>  
    ether 12:21:08:16:5a:f7  txqueuelen 1000  (Ethernet)  
    RX packets 28483  bytes 36437849 (34.7 MiB)  
    RX errors 0  dropped 0  overruns 0  frame 0  
    TX packets 6018  bytes 541805 (529.1 KiB)  
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1  netmask 255.0.0.0  
    inet6 ::1  prefixlen 128  scopeid 0x10<host>  
    loop txqueuelen 1000  (Local Loopback)  
    RX packets 12  bytes 1020 (1020.0 B)  
    RX errors 0  dropped 0  overruns 0  frame 0  
    TX packets 12  bytes 1020 (1020.0 B)  
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Cmd : netstat

```
Bash: netstat: command not found  
[ec2-user@ip-172-31-94-69 ~]$ netstat  
Active Internet connections (w/o servers)  
Proto Recv-Q Send-Q Local Address           Foreign Address         State  
tcp        0      0 ip-172-31-94-69.e:45562 instance-data.ec2.:http TIME_WAIT  
tcp        0    200 ip-172-31-94-69.ec2:ssh ec2-18-206-107-29:27414 ESTABLISHED  
tcp        0      0 ip-172-31-94-69.e:45476 instance-data.ec2.:http TIME_WAIT  
tcp        0      0 ip-172-31-94-69.e:45348 instance-data.ec2.:http TIME_WAIT  
Active UNIX domain sockets (w/o servers)  
Proto RefCnt Flags       Type       State         I-Node  Path  
unix    3      [ ]          STREAM     CONNECTED    16104   /run/dbus/system_bus_socket  
unix    3      [ ]          STREAM     CONNECTED    15966  
unix    3      [ ]          STREAM     CONNECTED    16108   /run/dbus/system_bus_socket
```

Cmd : netstat -tulnp

```
[ec2-user@ip-172-31-94-69 ~]$ netstat -tulnp
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         S
tate PID/Program name
tcp        0      0 0.0.0.0:22              0.0.0.0:*               L
ISTEN
tcp6       0      0 :::22                  :::*                    L
ISTEN
udp        0      0 172.31.94.69:68        0.0.0.0:*
udp        0      0 127.0.0.1:323          0.0.0.0:*
udp6       0      0 fe80::108a:beff:fe4:546 :::*
udp6       0      0 ::1:323                :::*
```

Cmd :

netstat -u

```
[ec2-user@ip-172-31-94-69 ~]$ netstat -u
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         S
tate
```

Cmd :

Netstat -t

```
[ec2-user@ip-172-31-94-69 ~]$ netstat -t
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         S
tate
tcp        0      0 ip-172-31-94-69.ec2:ssh 58.149.253.83:42812     S
YN_RECV
tcp        0      0 ip-172-31-94-69.ec2:ssh ec2-18-206-107-29:27414 E
STABLISHED
tcp        0      0 ip-172-31-94-69.ec2:ssh 58.149.253.83:52245    E
STABLISHED
```

Cmd :

netstat -an | grep ESTABLISHED

```
[ec2-user@ip-172-31-94-69 ~]$ netstat -an | grep ESTABLISHED
tcp        0      0 172.31.94.69:22      18.206.107.29:27414  ESTABLISHED
[ec2-user@ip-172-31-94-69 ~]$
```

Cmd :

netstat -r

```
[ec2-user@ip-172-31-94-69 ~]$ netstat -r
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
default ip-172-31-80-1. 0.0.0.0 UG 0 0 0 enX0
ip-172-31-0-2.e ip-172-31-80-1. 255.255.255.255 UGH 0 0 0 enX0
ip-172-31-80-0. 0.0.0.0 255.255.240.0 U 0 0 0 enX0
ip-172-31-80-1. 0.0.0.0 255.255.255.255 UH 0 0 0 enX0
[ec2-user@ip-172-31-94-69 ~]$
```

Firewall :

sudo amazon-linux-extras enable epel

This enables the **Extra Packages for Enterprise Linux (EPEL)** repository on Amazon Linux, allowing access to additional software packages.

```
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : epel-release-7-11.noarch [#####] 1/1
Installing : epel-release-7-11.noarch [#####] 1/1
Installing : epel-release-7-11.noarch [#####] 1/1
Installing : epel-release-7-11.noarch [#####] 1/1
Installing : epel-release-7-11.noarch [#####] 1/1
Installing : epel-release-7-11.noarch [#####] 1/1
Installing : epel-release-7-11.noarch [#####] 1/1
Verifying : epel-release-7-11.noarch [#####] 1/1
Installed:
epel-release.noarch 0:7-11

Complete!
2 httpd_modules available [ =1.0 =stable ]
```

sudo yum install -y epel-release

Installs the EPEL repository package, which provides access to a collection of useful software packages for Amazon Linux and CentOS.



```
230 packages excluded due to repository priority protections
Package epel-release-7-11.noarch already installed and latest version
Nothing to do
[ec2-user@ip-172-31-15-15 ~]$ sudo amazon-linux-extras enable epel
 2 httpd_modules          available [ =1.0 =stable ]
 3 memcached1.5           available \
    [ =1.5.1 =1.5.16 =1.5.17 ]
 9 R3.4                   available [ =3.4.3 =stable ]
10 rust1                  available \
    [ =1.22.1 =1.26.0 =1.26.1 =1.27.2 =1.31.0 =1.38.0
    =stable ]
18 libreoffice            available \
    [ =5.0.6.2_15 =5.3.6.1 =stable ]
19 gimp                   available [ =2.8.22 ]
20 †docker=latest          enabled \
    [ =17.12.1 =18.03.1 =18.06.1 =18.09.9 =stable ]
21 mate-desktop1.x        available \
    [ =1.19.0 =1.20.0 =stable ]
22 GraphicsMagick1.3      available \
    [ =1.3.29 =1.3.32 =1.3.34 =stable ]
24 epel=latest             enabled [ =7.11 =stable ]
```

```
sudo yum install -y ufw
```

Installs **UFW (Uncomplicated Firewall)**, a frontend for managing firewall rules.

```
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
Installing : ufw-0.35-9.el7.noarch [#####] 1/
1
Verifying : ufw-0.35-9.el7.noarch [#####] 1/
1
Installed:
  ufw.noarch 0:0.35-9.el7

Complete!
[ec2-user@ip-172-31-15-15 ~]$
```

```
sudo systemctl enable --now ufw
```

Enables UFW to start on boot and immediately starts the service.

```
[ec2-user@ip-172-31-15-15 ~]$ sudo systemctl enable --now ufw
Created symlink from /etc/systemd/system/basic.target.wants/ufw.service to /usr/lib/systemd/system/ufw.service.
[ec2-user@ip-172-31-15-15 ~]$
```

```
sudo ufw allow ssh/22
```

Allows incoming SSH connections through the firewall (port **22/tcp**).

```
[ec2-user@ip-172-31-15-15 ~]$ sudo ufw allow 22/tcp
Rule added
Rule added (v6)
[ec2-user@ip-172-31-15-15 ~]$
```

