



Sehajpreet1313 / Linux\_Lab01



&lt;&gt; Code

Issues

Pull requests

Actions

Projects

Wiki

Security



main ▾

Linux\_Lab01 / LINUX\_NETWORKING / linux\_networking.md



Sehajpreet1313 jxbejdbejd

7a8a16d · 3 days ago



157 lines (114 loc) · 4.44 KB

Preview

Code

Blame



Raw



# Experiment: Basic Linux Data Networking Commands

## Aim

To study and execute basic data networking commands in Linux using the command line interface.

## Objectives

- To understand Linux network configuration.
- To test network connectivity.
- To diagnose network-related issues.
- To access and transfer data between systems using networking tools.

## Requirements

- Linux Operating System (Ubuntu/Debian/Fedora/Kali etc.)
- Terminal access
- Basic knowledge of Linux commands
- Internet connection (optional)

## Theory

---

Data networking in Linux is performed using built-in terminal commands. These commands help configure systems, test connections, and troubleshoot network problems.

Command	Purpose
<code>ifconfig / ip addr</code>	Shows network interface configuration
<code>ping</code>	Tests connectivity to another host
<code>hostname</code>	Displays system hostname
<code>traceroute</code>	Shows the route packets take
<code>netstat</code>	Displays active connections
<code>nslookup</code>	Queries DNS information
<code>ssh</code>	Secure remote login
<code>scp</code>	Secure file transfer

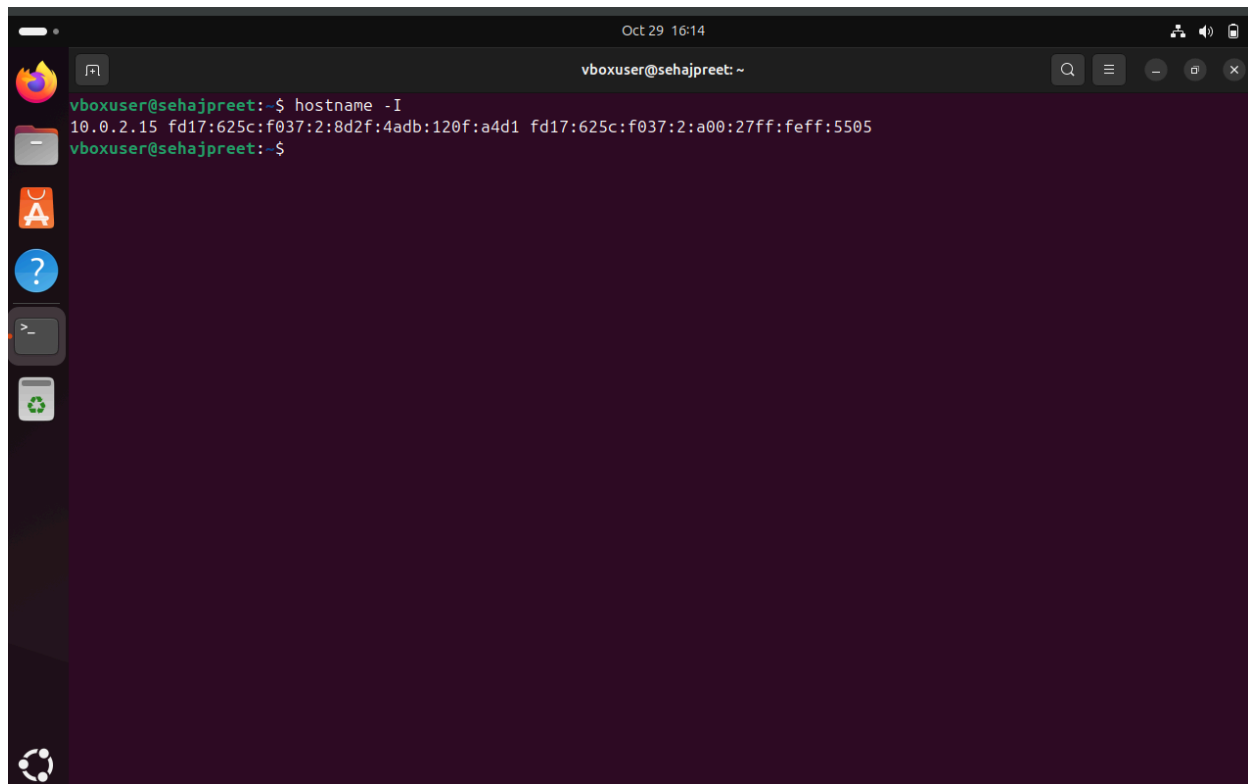
## Procedure

---

### Step 1: View IP Address and Network Interfaces

```
ip addr show
```



A terminal window titled 'vboxuser@sehajpreet: ~' with a dark purple background. The terminal shows the command 'hostname -I' being executed, which outputs '10.0.2.15 fd17:625c:f037:2:8d2f:4adb:120f:a4d1 fd17:625c:f037:2:a00:27ff:feff:5505'. The terminal has a sidebar on the left with icons for applications like Firefox, Files, and the Dash icon. The top of the window shows the date 'Oct 29 16:14' and system icons for network, volume, and battery.

```
vboxuser@sehajpreet:~$ hostname -I
10.0.2.15 fd17:625c:f037:2:8d2f:4adb:120f:a4d1 fd17:625c:f037:2:a00:27ff:feff:5505
vboxuser@sehajpreet:~$
```

## Step 2:Display hostname

hostname

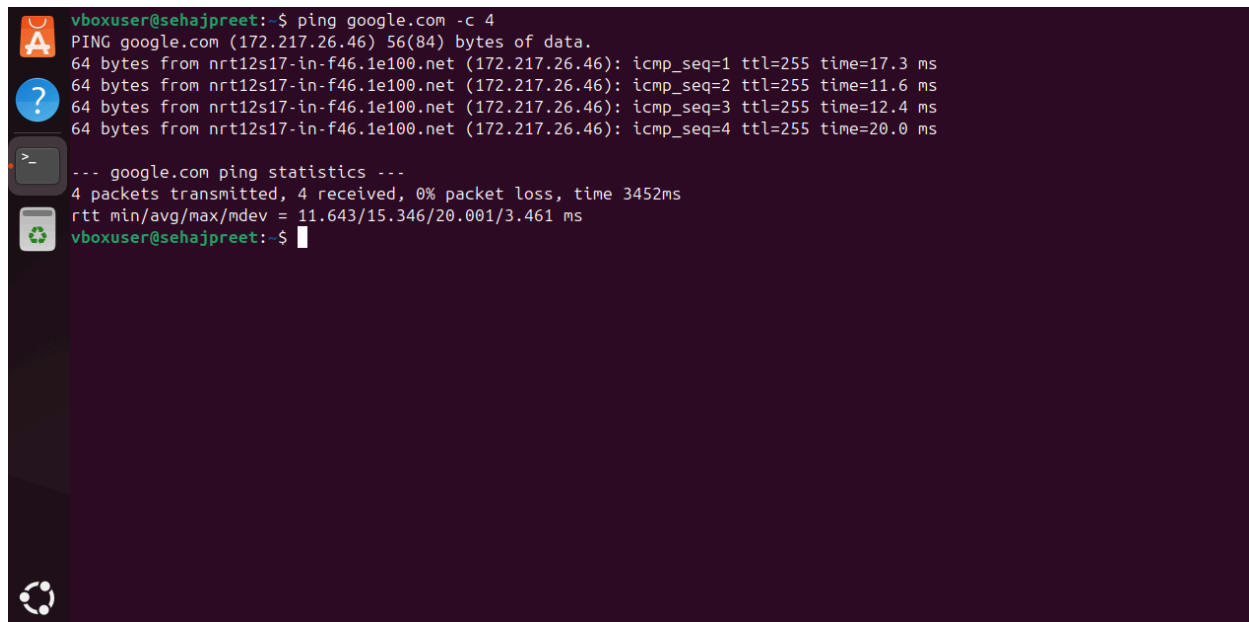
A terminal window titled 'vboxuser@sehajpreet: ~' with a dark purple background. The terminal shows the command 'hostname' being executed, which outputs 'sehajpreet'. The terminal has a sidebar on the left with icons for applications like Files, Dash, and the Dash icon. The top of the window shows the date 'Oct 29 16:14' and system icons for network, volume, and battery.

```
vboxuser@sehajpreet:~$ hostname
sehajpreet
vboxuser@sehajpreet:~$
```

## step 3:Test Network connectivity(ping)

ping google.com -c 4



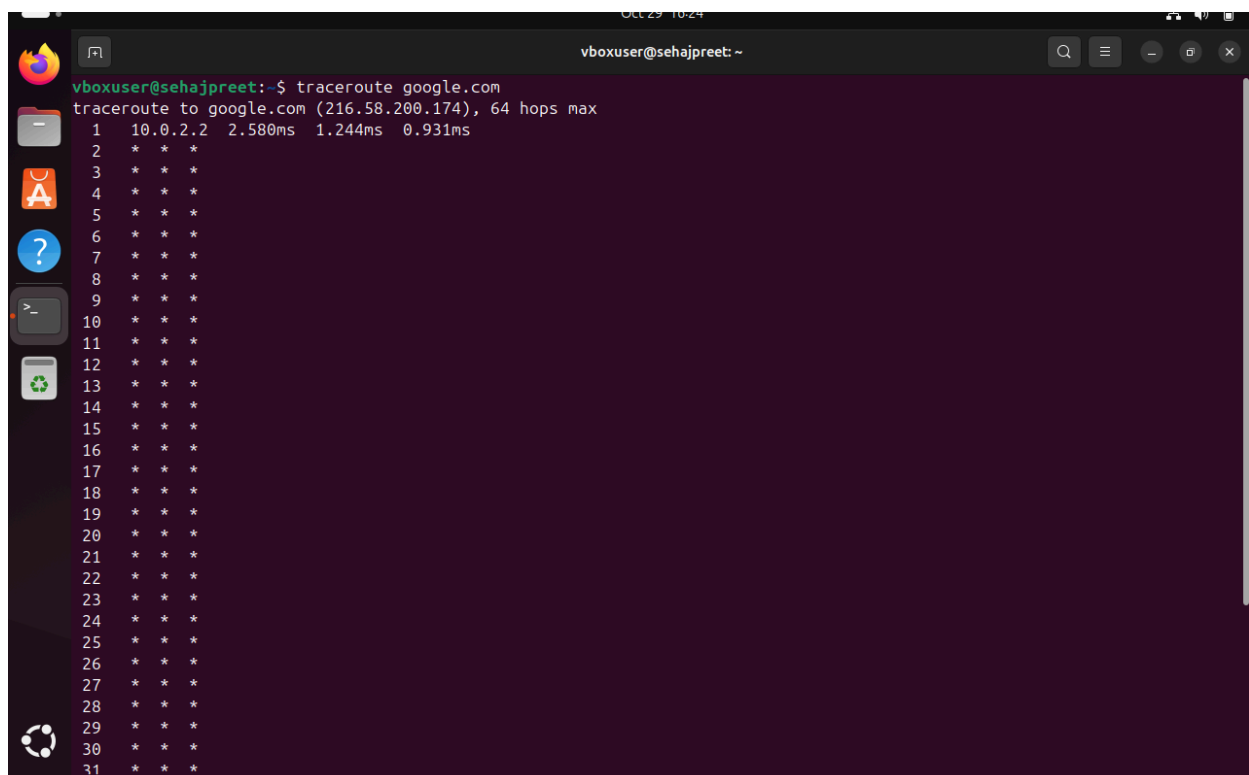


```
vboxuser@sehajpreet:~$ ping google.com -c 4
PING google.com (172.217.26.46) 56(84) bytes of data:
64 bytes from nrt12s17-in-f46.1e100.net (172.217.26.46): icmp_seq=1 ttl=255 time=17.3 ms
64 bytes from nrt12s17-in-f46.1e100.net (172.217.26.46): icmp_seq=2 ttl=255 time=11.6 ms
64 bytes from nrt12s17-in-f46.1e100.net (172.217.26.46): icmp_seq=3 ttl=255 time=12.4 ms
64 bytes from nrt12s17-in-f46.1e100.net (172.217.26.46): icmp_seq=4 ttl=255 time=20.0 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3452ms
rtt min/avg/max/mdev = 11.643/15.346/20.001/3.461 ms
vboxuser@sehajpreet:~$
```

## Step 4: Trace Route to Remote Hosts

traceroute google.com



```
vboxuser@sehajpreet:~$ traceroute google.com
traceroute to google.com (216.58.200.174), 64 hops max
 1  10.0.2.2  2.580ms  1.244ms  0.931ms
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
31  * * *
```

## Step 5: View Active Network Ports

netstat -tulnp



## Step 6: DNS Lookup

```
nslookup google.com
```



## Step 7: Remote Login using SSH

```
ssh user@192.168.1.10
```



## Step 8: File Transfer using SCP

```
scp test.txt user@192.168.1.10:/home/user/
```



```
Oct 29 16:38
vboxuser@sehajpreet: ~

vboxuser@sehajpreet:~$ ssh rohit@10.0.2.15
rohit@10.0.2.15's password:
Permission denied, please try again.
rohit@10.0.2.15's password:
Permission denied, please try again.
rohit@10.0.2.15's password:
Connection closed by 10.0.2.15 port 22
vboxuser@sehajpreet:~$ ls
array          day2a.c      Desktop      int.c         macros        product       static
array.c        day2b.c      deviation.c  integer       macros.c      product.c     static.c
array.zip      day2b.c      Documents    'integer (2).c' max           Public        static.zip
binomial       day3a.c      Downloads    integer.c     max.c         ram           swap
binomial.c    day3b.c      even         integer.zip   max.c.save   ram.c        swap.c
block          day4a.c      even.c       int.zip       Music         simple        Templates
block.c        day4b.c      gcd.sh       list          pi            simple.c     variables
block.zip      day5a.c      global       list.c        pi.c          'simple calculator.c' variables.c
calculator.c   day5b.c      global.c     local         Pictures      snap         variables.zip
day1a.c        day6a.c      global.zip   local.c       population    statements   Videos
day1b.c        day6b.c      int          local.zip     population.c  statements.c

vboxuser@sehajpreet:~$
```

```
vboxuser@sehajpreet: ~

vboxuser@sehajpreet:~$ curl -fsSL https://tailscale.com/install.sh | sh
Installing Tailscale for ubuntu noble, using method apt
+ sudo mkdir -p --mode=0755 /usr/share/keyrings
+ + curlsudo -fsSL tee https://pkgs.tailscale.com/stable/ubuntu/noble.noarmor.gpg /usr/share/keyrings/tailscale-archive-keyring.gpg
+ sudo chmod 0644 /usr/share/keyrings/tailscale-archive-keyring.gpg
+ curl -fsSL https://pkgs.tailscale.com/stable/ubuntu/noble.tailscale-keyring.list
+ sudo tee /etc/apt/sources.list.d/tailscale.list
# Tailscale packages for ubuntu noble
deb [signed-by=/usr/share/keyrings/tailscale-archive-keyring.gpg] https://pkgs.tailscale.com/stable/ubuntu noble main
+ sudo chmod 0644 /etc/apt/sources.list.d/tailscale.list
+ sudo apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://deb.anydesk.com all InRelease
Get:3 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:5 https://pkgs.tailscale.com/stable/ubuntu noble InRelease
Get:6 http://in.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:7 https://pkgs.tailscale.com/stable/ubuntu noble/main amd64 Packages [13.7 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,548 kB]
Get:9 https://pkgs.tailscale.com/stable/ubuntu noble/main all Packages [354 B]
Get:10 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1,270 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [294 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.4 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [2,180 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [491 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:17 http://in.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 c-n-f Metadata [516 B]
Get:18 http://in.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1,498 kB]
Get:19 http://in.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [303 kB]
Get:20 http://in.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
```

```

vboxuser@sehajpreet: ~
Get:24 http://in.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:25 http://in.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 c-n-f Metadata [484 B]
Get:26 http://in.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7,152 B]
Get:27 http://in.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [212 B]
Get:28 http://in.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.0 kB]
Get:29 http://in.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Get:30 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [211 kB]
Get:31 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]
Get:32 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [9,008 B]
Get:33 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [2,080 kB]
Get:34 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [470 kB]
Get:35 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:36 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [500 B]
Get:37 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [905 kB]
Get:38 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [203 kB]
Get:39 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.2 kB]
Get:40 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [19.4 kB]
Get:41 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [27.4 kB]
Get:42 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [5,708 B]
Get:43 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:44 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [384 B]
Fetched 12.6 MB in 20s (637 kB/s)
Reading package lists... Done
+ sudo apt-get install -y tailscale tailscale-archive-keyring
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa libllvml9
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  tailscale tailscale-archive-keyring
0 upgraded, 2 newly installed, 0 to remove and 46 not upgraded.

vboxuser@sehajpreet: ~
+ sudo apt-get install -y tailscale tailscale-archive-keyring
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa libllvml9
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  tailscale tailscale-archive-keyring
0 upgraded, 2 newly installed, 0 to remove and 46 not upgraded.
Need to get 33.4 MB of archives.
After this operation, 64.9 MB of additional disk space will be used.
Get:2 https://pkgs.tailscale.com/stable/ubuntu noble/main all tailscale-archive-keyring all 1.35.181 [3,082 B]
Get:1 https://pkgs.tailscale.com/stable/ubuntu noble/main amd64 tailscale amd64 1.90.4 [33.4 MB]
Fetched 33.4 MB in 8s (4,041 kB/s)
Selecting previously unselected package tailscale.
(Reading database ... 195203 files and directories currently installed.)
Preparing to unpack .../tailscale_1.90.4_amd64.deb ...
Unpacking tailscale (1.90.4) ...
Selecting previously unselected package tailscale-archive-keyring.
Preparing to unpack .../tailscale-archive-keyring_1.35.181_all.deb ...
Unpacking tailscale-archive-keyring (1.35.181) ...
Setting up tailscale-archive-keyring (1.35.181) ...
Setting up tailscale (1.90.4) ...
Created symlink /etc/systemd/system/multi-user.target.wants/tailscaled.service → /usr/lib/systemd/system/tailscaled.serv
ice.
+ [ false = true ]
+ set +x
Installation complete! Log in to start using Tailscale by running:

sudo tailscale up
vboxuser@sehajpreet: ~$

```

## Output / Observations

Command	Result
ip addr	Lists network interfaces and IP addresses
ping	Replies received indicate connectivity
traceroute	Displays the route path to the destination
nslookup	Shows DNS IP information

Command	Result
ssh	Connects to a remote machine securely
scp	Transfers files securely over SSH

## Result

---

Basic Linux networking commands were successfully executed and network connectivity and configuration were verified.

## Conclusion

---

Linux provides powerful built-in commands for networking tasks such as configuration, troubleshooting, monitoring, and secure communication between systems.

## Viva Questions

---

? What is the purpose of the `ping` command?

✨ The `ping` command is used to test network connectivity between the source and a destination host. It sends ICMP Echo Request packets and waits for Echo Reply packets to verify whether the destination is reachable and to measure round-trip time.

? What is the difference between SSH and Telnet?

✨ | Feature | SSH (Secure Shell) | Telnet |

-----	-----	-----	Security	Encrypted communication	No encryption
	Default Port	22   23	Usage	Secure remote login	Unsecure remote login
	Current Status	Widely used	Mostly outdated		

*SSH is preferred over Telnet because it provides secure communication.*

? How does `traceroute` help in network troubleshooting?



🌟 **traceroute** displays the path taken by packets from the local system to a remote host. It shows each intermediate router (hop) along the path and the time taken. It helps identify:

- Network delays
- Connection failures
- Routing issues

? **Why is DNS used in networking?**

🌟 DNS (Domain Name System) translates human-friendly domain names like `www.google.com` into machine-readable IP addresses like `142.250.182.14`. This is necessary because computers communicate using IP addresses, not domain names.

? **How can you transfer a file securely in Linux?**

🌟 Files can be transferred securely in Linux using the `scp` (Secure Copy) command, which uses SSH encryption.

Example:

```
scp file.txt user@192.168.1.10:/home/user/
```

