🐧 Linux Networking Guide

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🌐 Transfer or Copy Files Through the Same Network

📘 1. What is Linux Networking?

> Linux networking is a collection of kernel subsystems, user-space tools, configuration files, and services that allow a Linux system to exchange data with other systems — whether locally or over the Internet.

At runtime, Linux networking manages:

- ⚙ Moving bits between hardware and applications
- 🧭 Addressing and routing packets
- 🔒 Secure transfer (via TCP/SSH)
- 🧱 Policy enforcement (firewalls, iptables/nftables)
- 🪄 Virtualization of networks (namespaces, bridges, VLANs, etc.)

🎯 2. Why Do Networking?

Networking enables:

- 🤝 *Resource sharing:* Files, printers, databases, compute nodes
- 💻 *Service hosting:* Web, mail, DNS, SSH, LDAP
- 🧠 *Centralized management:* Monitoring, automation, logging
- 🚀 *Scalability:* Load balancing, clustering, cloud orchestration
- 🌍 *Remote access:* Admin, APIs, file transfer
- 🛡 *Security & isolation:* Firewalls, namespaces, VLANs
- ⚡ *Performance optimization:* Traffic shaping, QoS, offloading

> Networking transforms isolated computers into an interconnected system that powers modern computing.

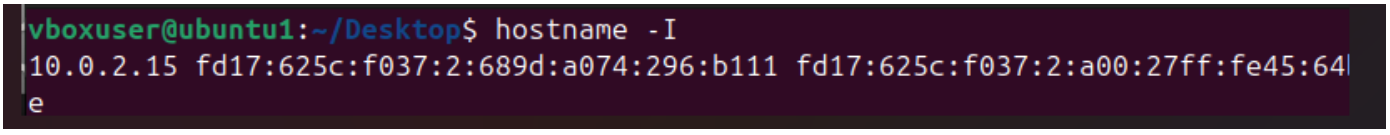
🧩 3. The Conceptual Networking Stack

Layer	Description	Tools
Physical / Link Layer	NICs, Ethernet/Wi-Fi, MAC, ARP	ethtool, ip link
Network Layer	IPv4/IPv6, routing, subnets	ip addr, ip route, ip neigh
Transport Layer	TCP (reliable), UDP (fast)	ss, netstat, tcpdump
Socket API & Kernel	App ↔ Kernel interface, buffering	socket, netfilter
Application Layer	Services (HTTP, SSH, DNS, NFS)	-
Management Layer	NetworkManager, DHCP, systemd-networkd	-

⚙ 4. Basic Network Configuration

🔍 View IP Configuration

bash
hostname -I
`



🔐 SSH (Secure Shell)

🧩 Install and Start SSH

bash
sudo apt install openssh-server
sudo systemctl enable ssh
sudo systemctl start ssh

🩺 Check SSH Status

bash
sudo systemctl status ssh

💻 Connect to Remote System

bash
ssh username@192.168.1.5

📦 Copy Files with SCP

bash
scp file.txt username@192.168.1.5:/home/username/

📁 Copy a Directory

bash
scp -r myfolder username@192.168.1.5:/home/username/

🔑 Copy SSH Key

bash
ssh-copy-id username@192.168.1.5

📂 FTP (File Transfer Protocol)

🧰 Install and Start FTP Server

bash
sudo apt install vsftpd
sudo systemctl enable vsftpd
sudo systemctl start vsftpd

📡 Check FTP Status

bash
sudo systemctl status vsftpd

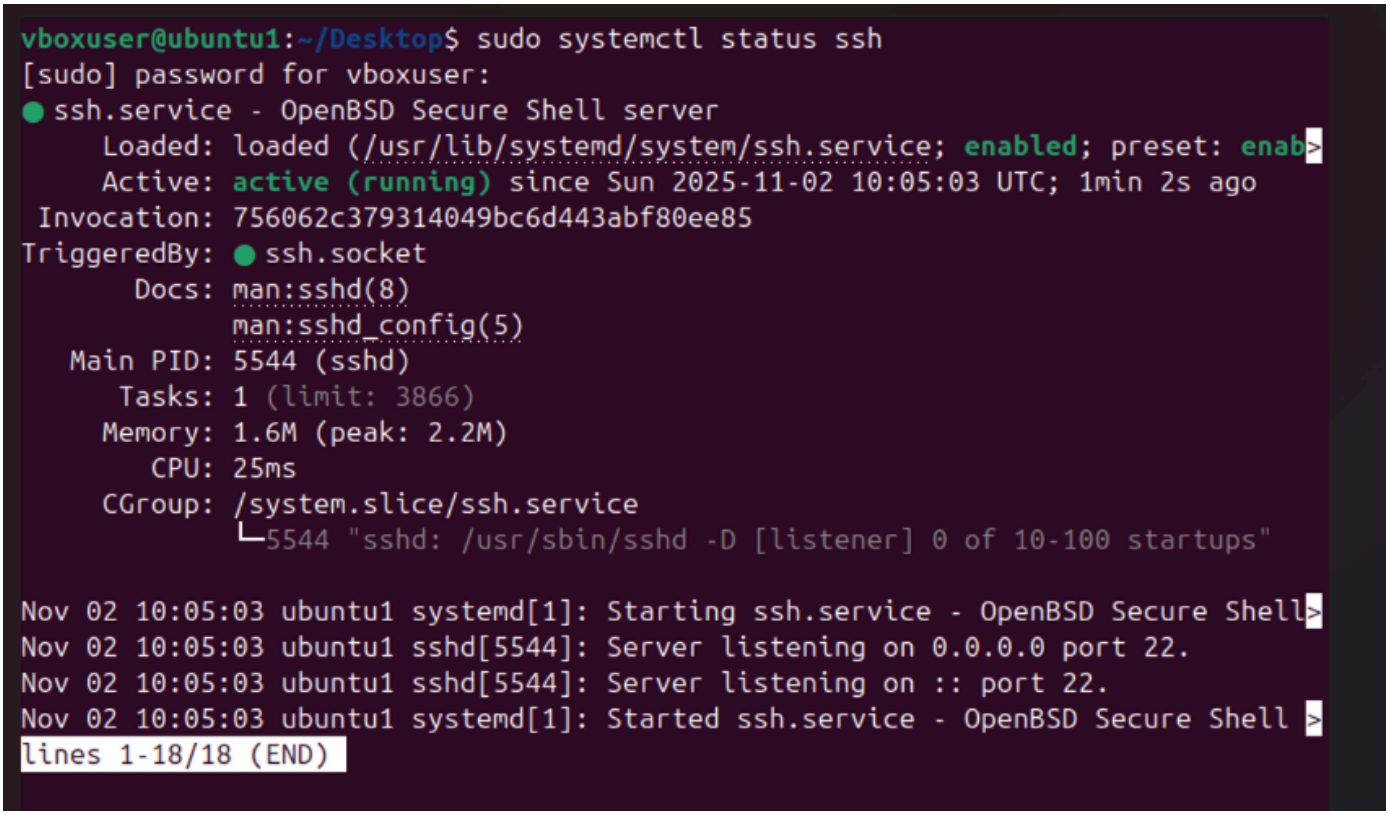
🌐 Connect to FTP Server

bash
ftp 192.168.1.5

Login Example:

Name (192.168.1.5:yourusername): ftpuser
Password: ********

📸 Screenshot Example:



🧠 Basic FTP Commands

bash
ls # List files
cd folder # Change directory
get file.txt # Download file
put file.txt # Upload file
mget * # Download multiple files
bye # Exit FTP

Configuration File:
/etc/vsftpd.conf

👥 User & Group Access Management

Action	Command
➕ Create User	sudo adduser username
❌ Delete User	sudo deluser username
👥 Create Group	sudo groupadd developers
➕ Add User to Group	sudo usermod -aG developers username
🔍 View Groups	groups username

Action	Command
📄 Change File Owner	sudo chown username filename
👬 Change Group Owner	sudo chgrp developers filename
🔐 Change Permissions	chmod 755 filename
📜 View Permissions	ls -l
🔁 Switch User	su - username
🔒 Lock / Unlock User	sudo passwd -l username / sudo passwd -u username

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🧠 Quick Command Summary

Command	Description
ip addr	Show IP address
ping	Test connectivity
ssh user@host	Remote login
scp	Secure file copy
ftp	Connect to FTP
adduser	Create new user
groupadd	Create new group
chmod	Change permissions
chown	Change ownership

📦 File Transfer Between Systems

🔹 Method 1 — Using SCP

bash
scp [source_file] [username]@[destination_IP]:[destination_path]

Example:

bash
scp /home/user/Documents/test.txt ubuntu@192.168.1.15:/home/ubuntu/Desktop/

✅ The file test.txt will be copied to /home/ubuntu/Desktop/ on System B.

🔹 Method 2 — Copying Folders

bash
scp -r /home/user/myfolder ubuntu@192.168.1.15:/home/ubuntu/Documents/

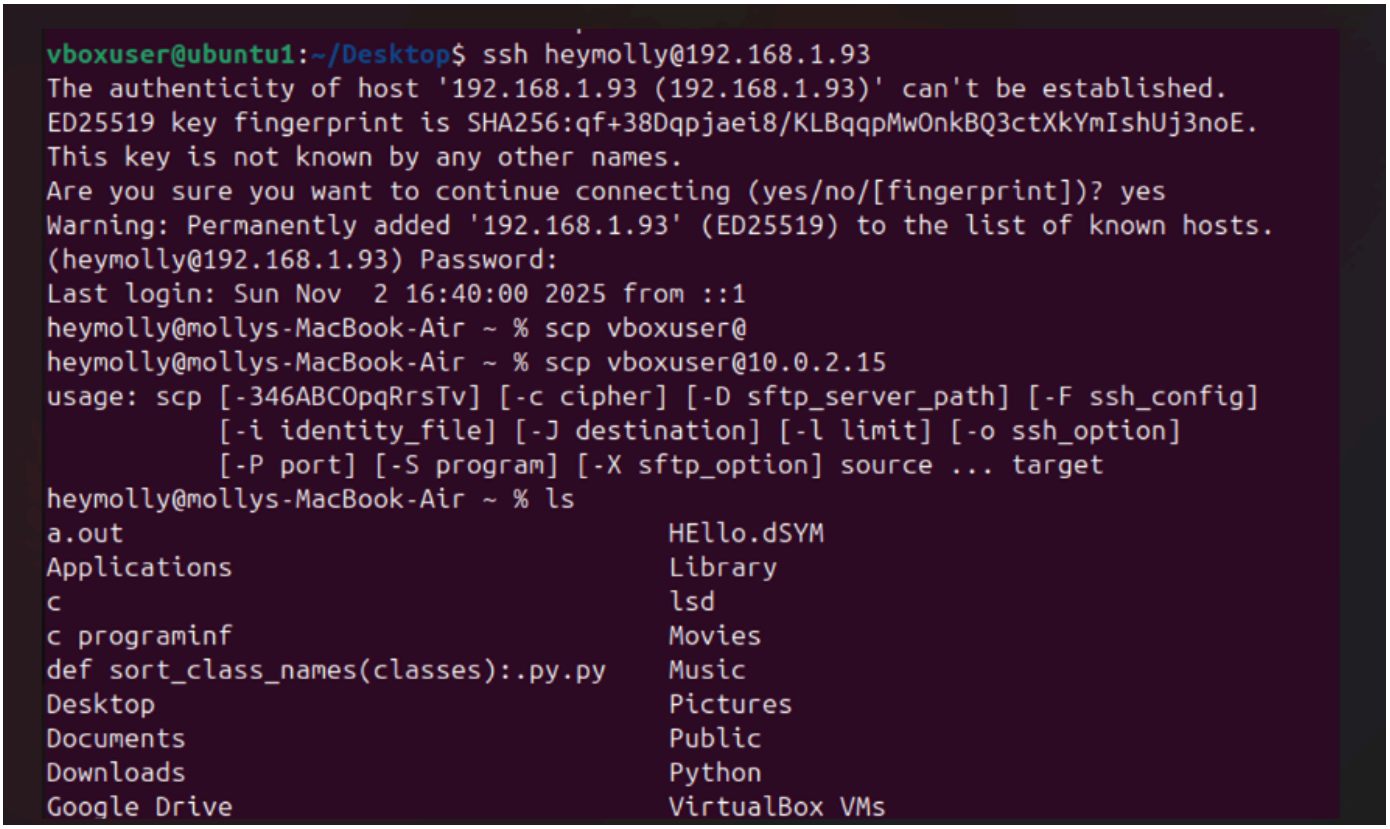
🔹 Method 3 — Using rsync (Faster)

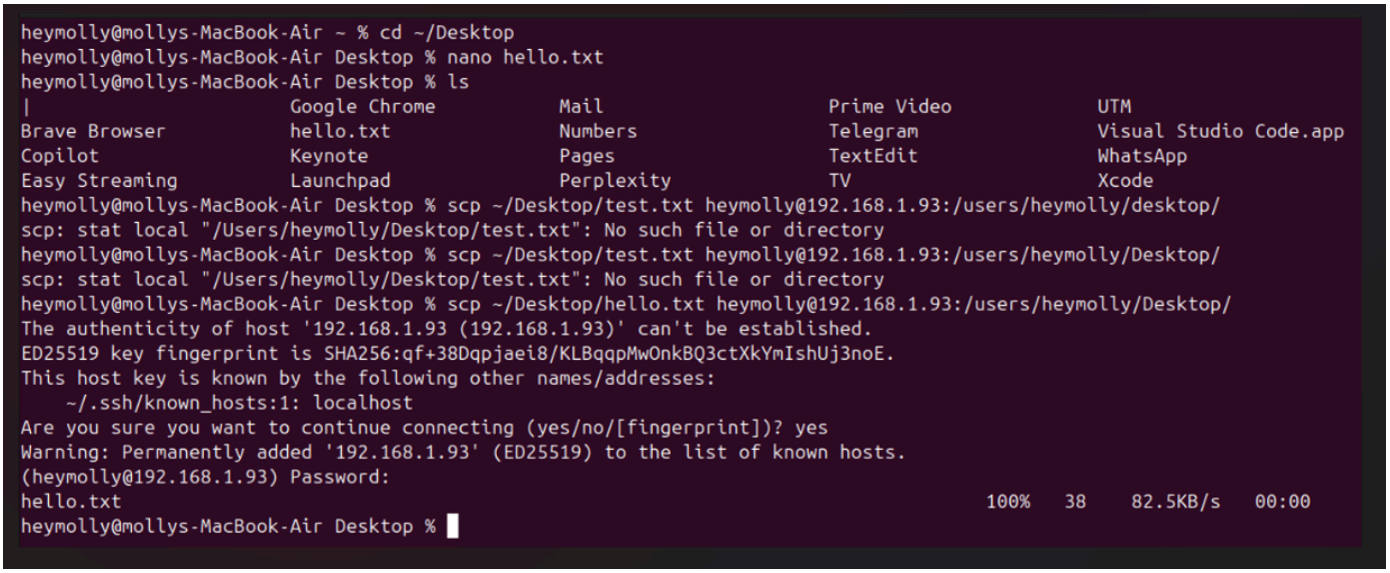
bash
sudo apt install rsync
rsync -avz /home/user/Documents/ ubuntu@192.168.1.15:/home/ubuntu/Backup/

Flags:

- -a → Archive mode
- -v → Verbose
- -z → Compression

📸 Screenshot:





🗑️ Deleting Files Remotely

Option 1 — SSH into the Second System

bash
ssh ubuntu@192.168.1.15
cd /home/ubuntu/Desktop
rm test.txt
exit

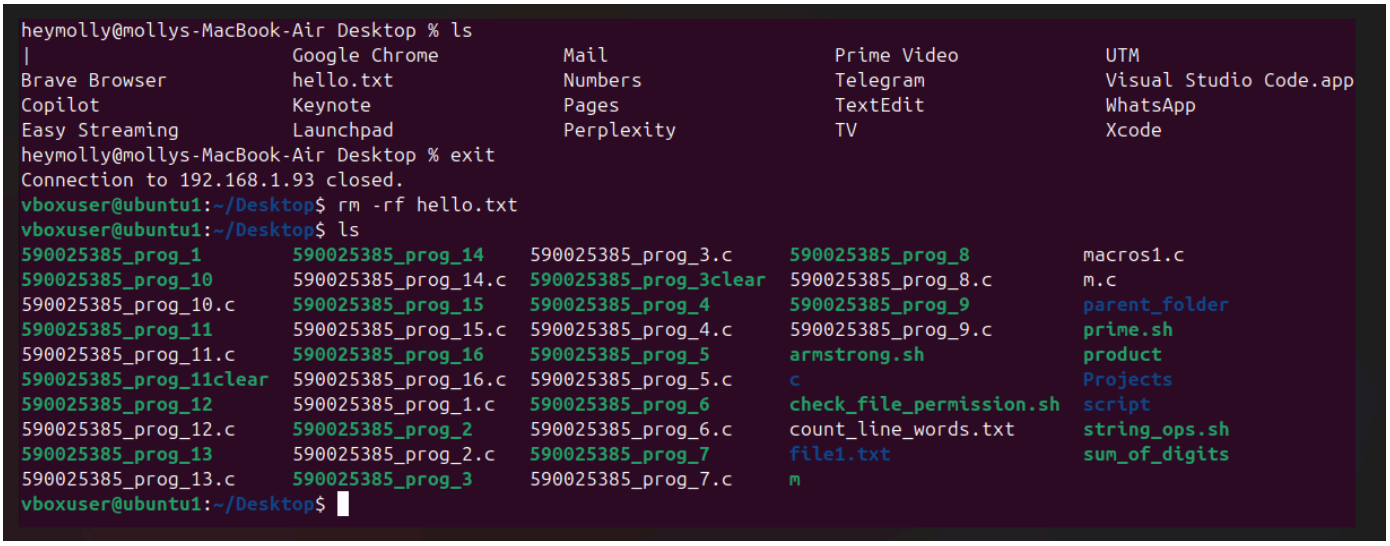
Option 2 — Delete Directly from Source

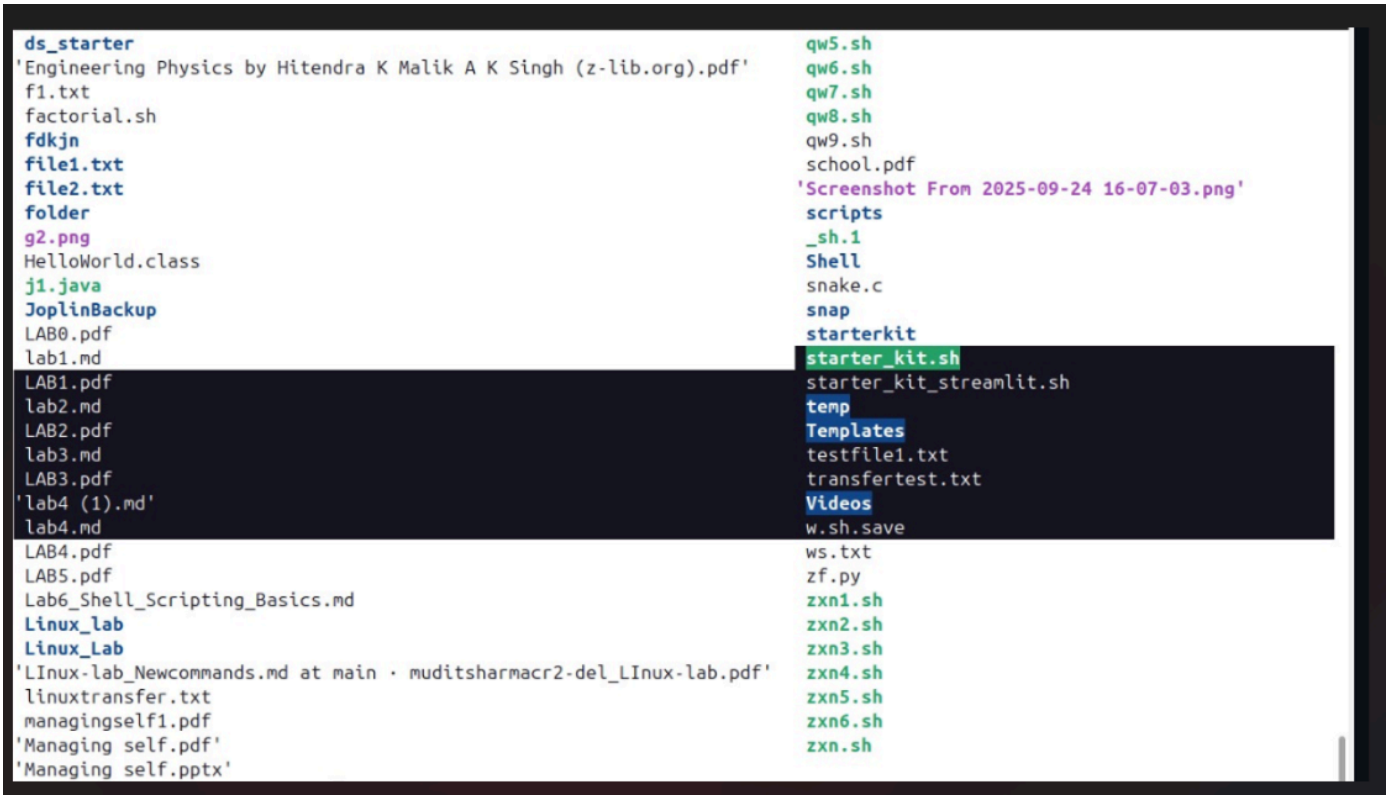
bash
ssh ubuntu@192.168.1.15 "rm /home/ubuntu/Desktop/test.txt"

🧹 To Delete a Folder:

bash
ssh ubuntu@192.168.1.15 "rm -r /home/ubuntu/Desktop/foldername"

📸 Screenshot:





🏁 Conclusion

> With Linux networking tools like SSH, SCP, and FTP, you can easily transfer, manage, and secure files across systems — empowering automation, collaboration, and control in any networked environment.

✨ *Tip:* Always verify IP addresses, permissions, and connectivity before file transfer to prevent errors or unauthorized access.
