

# **Networking Roadmap: From Beginner to Expert (2025 Edition)**

## **Stage 1: Networking Fundamentals (Beginner Level)**

Goal: Understand how computer networks work, their components, protocols, and topologies.

Topics:

- What is Networking? LAN, WAN, MAN, PAN, Client-server vs peer-to-peer
- Network Devices: Hub, Switch, Router, Bridge, Access Point, Modem, Gateway, Repeater
- Cabling and Media: Ethernet, Fiber optics, Wireless standards, UTP vs STP
- OSI & TCP/IP Models, Protocols at each layer
- IP Addressing: IPv4, IPv6, Public vs Private, Subnetting, CIDR
- MAC vs IP Address, ARP Protocol
- Common Protocols and Ports: HTTP, HTTPS, DNS, DHCP, SSH, etc.
- Topologies: Star, Bus, Ring, Mesh
- Basic Network Commands: ping, tracer, ipconfig, nslookup

Tools: Cisco Packet Tracer, Wireshark

Certifications: CompTIA ITF+, Cisco Intro to Networks

## **Stage 2: Intermediate Networking (Core Skills)**

Goal: Understand routing, switching, VLANs, ACLs, wireless, and security basics.

Topics:

- Switching: VLANs, Trunking, Inter-VLAN, STP, VTP
- Routing: Static, RIP, OSPF, EIGRP, Summarization
- ACLs: Standard vs Extended, Wildcard masks
- NAT & PAT
- Wireless Networking: Encryption, WLC, APs
- WAN Technologies: PPP, MPLS, DSL, VPN

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- Network Security: Firewalls, DHCP Snooping
- Troubleshooting: show/debug commands

Tools: GNS3, EVE-NG, Packet Tracer

Certifications: CCNA, CompTIA Network+

### **Stage 3: Advanced Networking (Enterprise Level)**

Goal: Design, implement, and troubleshoot large networks with advanced technologies.

Topics:

- Advanced Routing: OSPFv3, BGP, Redistribution
- Redundancy: HSRP, VRRP, Load Balancing
- QoS: DSCP, Policing, Shaping
- Virtualization: VRF, VXLAN, GRE
- Automation: Python, Cisco DNA, APIs, Ansible
- Monitoring: SNMP, Syslog, NetFlow
- Network Design: Hierarchical, Campus, WAN
- Wireless Enterprise Deployment

Certifications: CCNP, JNCIS, CompTIA Security+

### **Stage 4: Specialization (Career Focus)**

Choose a career focus:

#### **1. Network Security Specialist**

- Firewalls, VPNs, IDS/IPS, Pen Testing, Security Tools
- Certs: CCNP Security, CEH, CySA+, CISSP

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## 2. Cloud Network Engineer

- AWS VPC, Azure VNets, Hybrid Networking
- Certs: AWS Networking, Azure Network Engineer

## 3. Network Automation/DevNet

- Python, Netmiko, RESTCONF, Ansible
- Certs: Cisco DevNet Associate/Professional

## Practice, Tools, and Resources

### Tools:

- Cisco Packet Tracer, GNS3, EVE-NG, Wireshark, Boson NetSim, TryHackMe, HackTheBox

### Courses:

- Cisco NetAcad, Udemy, INE, YouTube (Jeremy's IT Lab, NetworkChuck)

### Tips:

- Lab everything, join forums, follow a schedule, keep certs updated every 3 years.