
WEEK 1 – NETWORKING FOUNDATIONS

DAY 7 – REVISION & PRACTICE

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1. Draw Full Packet Flow Diagram

To **visualize data flow from source to destination**, include **all layers of OSI, encapsulation, and network devices**.

Example: Sending a Web Request

Scenario: Laptop → Switch → Router → Server (HTTP request)

1. **Application Layer**
    - Browser sends HTTP request (GET /index.html)
2. **Presentation Layer**
    - Data formatted for transmission, encrypted if HTTPS
3. **Session Layer**
    - Session established (TCP handshake)
4. **Transport Layer (TCP)**
    - Adds **port number & sequence number**
    - Encapsulates data into **segments**
5. **Network Layer (IP)**
    - Adds **source and destination IP addresses**
    - Packet ready for routing
6. **Data Link Layer (Ethernet)**
    - Adds **MAC addresses**
    - Frame sent to switch
7. **Physical Layer**
    - Converts bits into **electrical/wireless signals**

Router forwarding:

- Data link layer replaced at each hop
- Network layer IP remains same

Server receives:

- Layers remove headers step by step → original HTTP request delivered

Interview tip:

Always explain **encapsulation → transmission → decapsulation** while drawing.

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2. Subnet Practice Questions

Practice Question 1:
Network: 192.168.1.0/24

- Subnet into 4 subnets
- Find: Network, broadcast, usable hosts

Solution:

- /24 → 256 IPs
- 4 subnets → 2 additional bits → /26 subnets
- Block size = 64

Subnet	Network	Broadcast	Usable
1	192.168.1.0	192.168.1.63	.1 – .62
2	192.168.1.64	192.168.1.127	.65 – .126
3	192.168.1.128	192.168.1.191	.129 – .190
4	192.168.1.192	192.168.1.255	.193 – .254

Practice Question 2:
IP: 10.0.0.0/22

- Dept A → 100 hosts
- Dept B → 50 hosts
- Dept C → 20 hosts

Solution: (VLSM)

- Dept A → /25 → 126 hosts
- Dept B → /26 → 62 hosts
- Dept C → /27 → 30 hosts

Subnet ranges assigned **largest first** to avoid overlap.

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3. Explain TCP Handshake Aloud

Practice saying this like an interviewer is listening:

“TCP is connection-oriented. To establish a connection, we use a 3-way handshake. First, the client sends a SYN with its initial sequence number. Second, the server responds with SYN-ACK, acknowledging the client’s sequence and providing its own sequence number. Third, the client sends an ACK, completing the handshake. After this, reliable communication begins.”

Tip: Use **hands or drawing** to show sequence numbers and ACKs.

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4. Mock Interview Questions (High Probability)

OSI & TCP/IP

1. Explain OSI model with a real-life example.
2. Difference between TCP and UDP.
3. Explain flow control and congestion control in TCP.

IP & Subnetting

4. Why CIDR replaced classful IPs?
5. Given IP 192.168.10.0/24, create subnets for 3 departments.
6. Explain public vs private IP and NAT.

Protocols & Security

7. Explain HTTP vs HTTPS.
8. Difference between FTP and SFTP.
9. What is a SYN flood attack?
10. Explain DNS spoofing and mitigation.

Packet Flow

11. Draw and explain full packet flow from client to server.
12. Explain encapsulation and decapsulation.

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5. Revision Checklist – Day 7

Make sure you can:

1. Draw **full packet flow diagram** (all OSI layers + encapsulation)
2. Solve **subnetting problems quickly** (classful & VLSM)
3. Explain **TCP handshake aloud** with confidence
4. Compare **protocols clearly** (HTTP/HTTPS, FTP/SFTP, SMTP/POP3/IMAP)
5. Explain **common attacks & mitigations** (SYN flood, DNS spoofing, MAC flooding)
6. Use **real-life analogies** for OSI layers, subnetting, and protocols

Tip for interviews: Speak slowly, give examples, and **relate security where possible**.