1 Routing and Forwarding

1.1 Distance Vector
- Convergence property
- Messages
- State
- Route computations

1.2 Link State
- Messages
- State
- Route Computations

1.3 BGP
- Autonomous Systems
- AS Types
- AS Relationships
- Advertising/withdrawing routes
- Interior vs Exterior BGP
- Border routers

1.4 CIDR
- Prefix lengths
- Subnet addresses
- Broadcast addresses

1.5 Unicast
- Forwarding tables
- Longest-prefix matching

1.6 Multicast
- Groups
- Difference between unicast and multicast forwarding tables
- Difference between DVMRP and PIM-SM

1.7 Fragmentation
- Maximum Transmission Unit
- Unique packet id
- Fragment offset
- MF/DF bits
- Probing for MTU using DF bit and ICMP

1.8 Tools
You should know about these for the exam, but I will not expect any details beyond what they do. This list may serve you well in the future, though.

Examining local state:
- ifconfig/ip link
- ifconfig/ip addr
- route/ip route
- netstat

Probing network:
- ping
- traceroute

Capturing traffic:
- tcpdump
- wireshark
2 Transport Layer

2.1 ICMP and UDP
• Ping
• Error Reporting
• Multiplexing/Ports

2.2 TCP and Reliable Delivery
• Sliding Window
• Three-Way Handshake
• Flow Control
• Congestion Control

3 Applications

3.1 DNS and NTP
• Namespace Hierarchy
• Iterative and Recursive Searching
• Zones
• Timeserver Strata
• Reference Clocks
• Skew/Drift
• Offset/Delay/Processing Time

3.2 SMTP and HTTP
• Headers
• MIME
• Commands

3.3 Chord
• Finger Tables
• Performance
  – hops
  – state
  – latency
• Bootstrapping

3.4 Bitcoin
The basics of:
• Hash Functions
• Hash/Merkle Trees
• Encryption and Digital Signatures
• Bloom Filters
• Sources of Trust
  – Certificate Authorities
  – (Decentralized) Web of Trust

How the following relate to one another and the primitives:
• Transaction Inputs/Outputs
• Wallets
• Block Signing/Mining
• Full/SPV Nodes
• P2P Network
  – bootstrapping
  – broadcasting blocks
  – broadcasting transactions

4 Ethernet

4.1 LAN Characteristics
• CSMA/CD
  – Carrier Sense
  – Multiple Access
  – Collision Detection
• Repeaters/Hubs
• Addressing

4.2 Transmitting
• p-persistence
• collision handling
4.3 Switching/Bridging

- Datagram Forwarding
- Virtual Circuits
- Source Routing
- Spanning Tree Algorithm
- VLANs

4.4 ARP

- Caching
- Message exchange
- Inferring information about previously seen hosts