NETWORK SECURITY FOUNDATIONS MIND MAP

Network Security Foundation

- **Network Architecture Design**
  - Network Topology & Protocols
    - Topology
    - Protocols
    - VPNs
  - Network Security
    - VLANs
    - Firewall
    - IDS/IPS
    - SIEM
- **Network Management and Monitoring Tools**
  - Network Tools
    - Wireshark
    - Nagios
    - Cacti
- **Network Performance Optimization**
  - Network Optimiztions
    - Bandwidth
    - QoS
    - Load balancing
  - Common Network Issues
    - Latency
    - Packet Loss
    - Jitter
- **Network Troubleshooting**
  - Network Troubleshooting Tools
    - Ping
    - Traceroute
    - Netstat
  - Network Dianostic Tools
    - Protocol Analyzer
    - Packet Capture
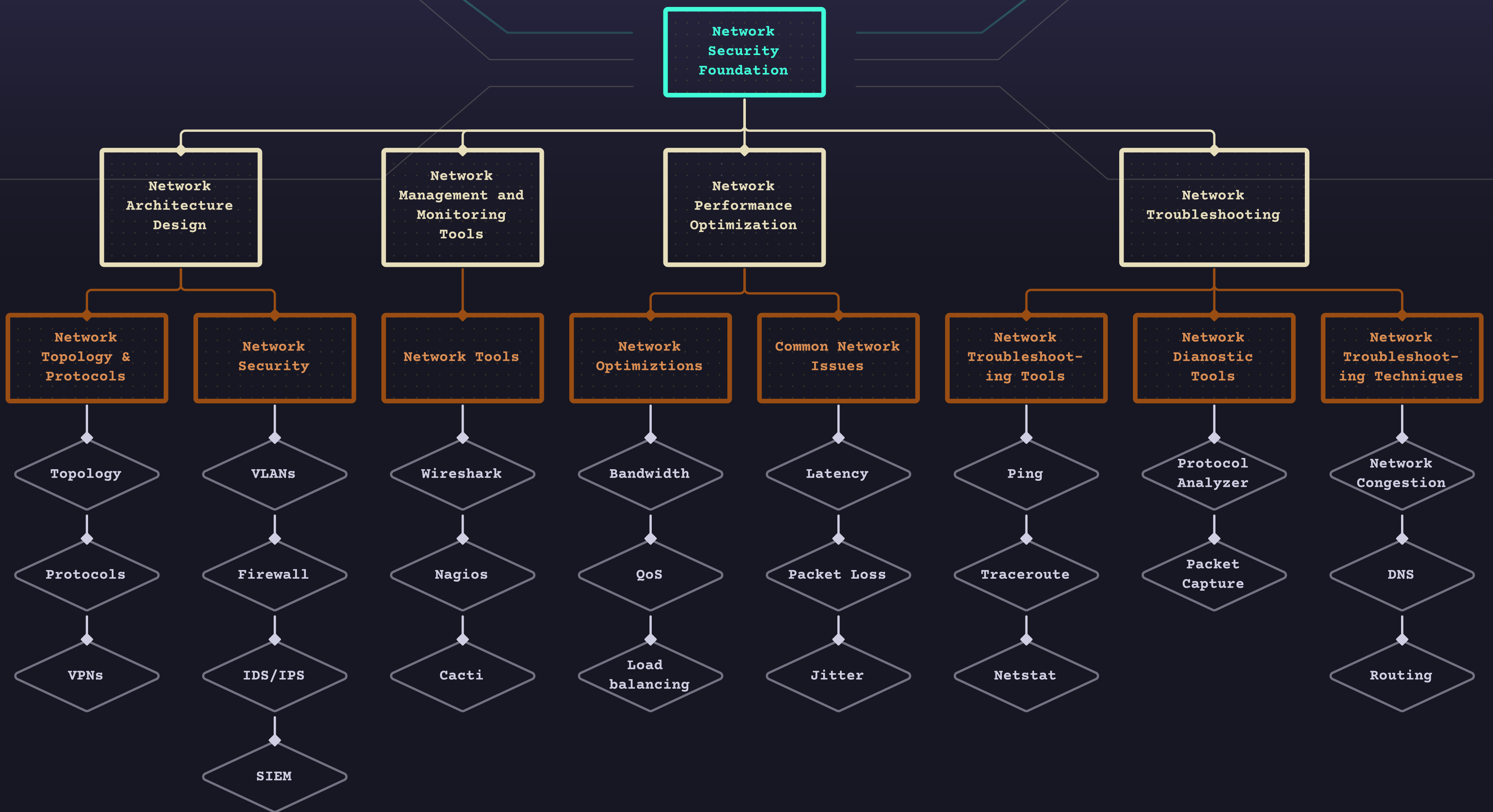 - Network Troubleshooting Techniques
    - Network Congestion
    - DNS
    - Routing

A. NETWORK ARCHITECTURE DESIGN

Designing secure network architectures to prevent unauthorized access and data breaches

NETWORK TOPOLOGY & PROTOCOLS:

- **Topology** Physical or logical layout of a network, including star, bus, ring, mesh, and hybrid topologies
- **Protocols** Network management, communication, and security protocols including TCP/IP, HTTP, SMTP, FTP, and DNS
- **VPNs** Create a secure, encrypted connection for site-to-site, remote access, SSL/TLS, and IPsec

NETWORK SECURITY:

- **Firewall** Implementing firewalls, routers, switches, and other devices to protect the network
- **IDS/IPS** Intrusion detection/prevention systems for unauthorized access and other network attacks
- **SIEM** Security Information and Event Management (SIEM) systems to analyze and correlate security events
- **VLANs** Segregating networks into virtual local area networks (VLANs) to control access and reduce the risk of attacks

B. NETWORK MANAGEMENT & MONITORING TOOLS

Tools used to manage, monitor and secure network resources and assets

NETWORK TOOLS:

- **Wireshark** Free network protocol analyzer used for troubleshooting, analysis, software and protocol development, & education
- **Nagios** Open-source Network monitoring tool to for availability and performance of network devices, servers, and services
- **Cacti** Open-source Network performance monitoring tool used to graph and analyze network traffic and device performance

C. NETWORK PERFORMANCE OPTIMIZATION

Optimizing network performance to ensure that the network operates at its best

NETWORK OPTIMIZATION:

- **Bandwidth** Bandwitdh management techniques to prioritize traffic and ensure that mission-critical traffic gets priority
- **QoS** Quality of Service (QoS) policies to ensure that high-priority traffic is prioritized and congestion is managed
- **Load balancing** Prevent network congestion and improve performance by distributing traffic

COMMON NETWORK ISSUES:

- **Latency** Delay between when a data packet is sent and when it is received
- **Packet Loss** Loss of data packets during transmission over a network
- **Jitter** Variation in the time delay of received packet over a network connection

D. NETWORK TROUBLESHOOTING

Techniques used to identify and resolve network issues

NETWORK TROUBLESHOOTING TOOLS:

- **Ping** Test network connectivity to determine latency and packet loss
- **Traceroute** Trace the path of packets and identify network hops and delays
- **Netstat** Network diagnostic tool to display active network connections, statistics, and routing table

NETWORK DIAGNOSTIC TOOLS:

- **Protocol Analyzer** Capture and analyze network traffic to troubleshoot network issues
- **Packet Capture** Record network traffic for analysis and diagnose network problems

NETWORK TROUBLESHOOTING TECHNIQUES:

- **Network Congestion** Identify and resolve network congestion issues
- **DNS** Domain name system created to resolve domain names to IP addressed
- **Routing** Optimize path selection, routing protocols and troubleshoot routing problems