



## 3.0 Network Operations

### 3.1 Explain the purpose of organizational processes and procedures.

- **Documentation**
  - Physical vs. logical diagrams
  - Rack diagrams
  - Cable maps and diagrams
  - Network diagrams
    - Layer 1
    - Layer 2
    - Layer 3
  - Asset inventory
    - Hardware
    - Software
    - Licensing
    - Warranty support
  - IP address management (IPAM)
  - Service-level agreement (SLA)
  - Wireless survey/heat map
- **Life-cycle management**
  - End-of-life (EOL)
  - End-of-support (EOS)
  - Software management
    - Patches and bug fixes
    - Operating system (OS)
    - Firmware
  - Decommissioning
- **Change management**
  - Request process tracking/  
service request
- **Configuration management**
  - Production configuration
  - Backup configuration
  - Baseline/golden configuration

### 3.2 Given a scenario, use network monitoring technologies.

- **Methods**
  - SNMP
    - Traps
    - Management information base (MIB)
    - Versions
      - v2c
      - v3
    - Community strings
    - Authentication
  - Flow data
  - Packet capture
  - Baseline metrics
    - Anomaly alerting/notification
  - Log aggregation
    - Syslog collector
    - Security information and event management (SIEM)
  - Application programming interface (API) integration
- **Solutions**
  - Port mirroring
  - Network discovery
    - Ad hoc
    - Scheduled
  - Traffic analysis
  - Performance monitoring
  - Availability monitoring
  - Configuration monitoring



### 3.3 Explain disaster recovery (DR) concepts.

- **DR metrics**
  - Recovery point objective (RPO)
  - Recovery time objective (RTO)
  - Mean time to repair (MTTR)
  - Mean time between failures (MTBF)
- **DR sites**
  - Cold site
  - Warm site
  - Hot site
- **High-availability approaches**
  - Active-active
  - Active-passive
- **Testing**
  - Tabletop exercises
  - Validation tests

### 3.4 Given a scenario, implement IPv4 and IPv6 network services.

- **Dynamic addressing**
  - DHCP
    - Reservations
    - Scope
    - Lease time
    - Options
    - Relay/IP helper
    - Exclusions
  - Stateless address autoconfiguration (SLAAC)
- **Name resolution**
  - DNS
    - Domain Name Security Extensions (DNSSEC)
    - DNS over HTTPS (DoH) and DNS over TLS (DoT)
  - Record types
    - Address (A)
    - AAAA
    - Canonical name (CNAME)
    - Mail exchange (MX)
    - Text (TXT)
    - Nameserver (NS)
    - Pointer (PTR)
  - Zone types
    - Forward
    - Reverse
  - Authoritative vs. non-authoritative
  - Primary vs. secondary
  - Recursive
  - Hosts file
- **Time protocols**
  - NTP
  - Precision Time Protocol (PTP)
  - Network Time Security (NTS)

### 3.5 Compare and contrast network access and management methods.

- **Site-to-site VPN**
- **Client-to-site VPN**
  - Clientless
  - Split tunnel vs. full tunnel
- **Connection methods**
  - SSH
  - Graphical user interface (GUI)
  - API
  - Console
- **Jump box/host**
- **In-band vs. out-of-band management**