

Cheat Sheet for comprehensive Cisco Certified Design Professional (CCDP)

- Enterprise

Network Design Principles

- Scalability:

- Design for future growth.
- Use modular architectures (e.g., hierarchical model).
- Implement VLANs and subnets to segment traffic.

- Redundancy:

- Deploy redundant paths (e.g., dual-homed connections).
- Use protocols like HSRP, VRRP, and GLBP for failover.
- Implement redundant power supplies and cooling systems.

- Performance:

- Optimize routing protocols (e.g., EIGRP, OSPF).
- Use QoS to prioritize critical traffic.
- Implement load balancing (e.g., LAG, ECMP).

- Security:

- Segment networks using firewalls and ACLs.
- Implement secure access (e.g., VPN, AAA).
- Regularly update and patch devices.

Hierarchical Network Design

- Core Layer:

- High-speed, low-latency routing.
- Use high-capacity switches (e.g., Nexus 9000).
- Implement ECMP for load balancing.

- Distribution Layer:

- Policy enforcement (e.g., ACLs, QoS).
- Routing protocols (e.g., OSPF, EIGRP).
- Redundancy (e.g., HSRP, VRRP).

- Access Layer:

- Connect end-user devices.

- Implement VLANs and subnets.
- Use PoE for IP phones and IoT devices.

Routing Protocols

- EIGRP:

- **Features:** Fast convergence, low overhead.

- **Configuration:**

```
router eigrp 1
 network 10.0.0.0
 passive-interface default
 no auto-summary
```

- **Troubleshooting:**

```
show ip eigrp neighbors
show ip eigrp topology
```

- OSPF:

- **Features:** Open standard, large-scale networks.

- **Configuration:**

```
router ospf 1
 network 10.0.0.0 0.0.0.255 area 0
 passive-interface default
```

- **Troubleshooting:**

```
show ip ospf neighbor
show ip ospf database
```

- BGP:

- **Features:** Inter-domain routing, policy-based.

- **Configuration:**

```
router bgp 65001
  neighbor 10.0.0.2 remote-as 65002
  address-family ipv4 unicast
    network 10.0.0.0 mask 255.255.255.0
```

- **Troubleshooting:**

```
show ip bgp summary
show ip bgp neighbors
```

Quality of Service (QoS)

- **Classification:**

- **Match Criteria:** IP Precedence, DSCP, ACLs.

- **Example:**

```
class-map match-all VOICE
  match ip dscp ef
```

- **Marking:**

- **Commands:** `set ip dscp`, `set ip precedence`.

- **Example:**

```
policy-map VOICE_POLICY
  class VOICE
    set ip dscp ef
```

- **Queuing:**

- **Methods:** FIFO, PQ, WFQ, CBWFQ.

- **Example:**

```
policy-map VOICE_POLICY
  class VOICE
    priority percent 20
```

- **Congestion Management:**

- **Tools:** LLQ, CBWFQ, WRED.

- **Example:**

```
policy-map VOICE_POLICY
  class VOICE
    bandwidth percent 20
```

Security Features

- **Firewalls:**

- **Types:** ACLs, Zone-Based Policy Firewall (ZBF).

- **Example:**

```
access-list 101 permit tcp any any eq 80
```

- **VPN:**

- **Types:** Site-to-Site (IPsec), Remote Access (SSL).

- **Example:**

```
crypto isakmp policy 10
  encryption aes
  hash sha
```

- **AAA:**

- **Protocols:** TACACS+, RADIUS.

- **Example:**

```
aaa new-model
aaa authentication login default group tacacs+ local
```

High Availability

- **Redundancy Protocols:**

- **HSRP:**

```
interface GigabitEthernet0/1
  standby 1 ip 10.0.0.2
  standby 1 priority 110
```

- **VRRP:**

```
interface GigabitEthernet0/1
  vrrp 1 ip 10.0.0.2
  vrrp 1 priority 110
```

- **GLBP:**

```
interface GigabitEthernet0/1
  glbp 1 ip 10.0.0.2
  glbp 1 priority 110
```

- **Link Aggregation:**

- **LAG:**

```
interface port-channel 1
  switchport mode access
  channel-group 1 mode active
```

Network Automation

- **Ansible:**

- **Inventory:**

```
[routers]
router1 ansible_host=10.0.0.1
```

- **Playbook:**

```
- hosts: routers
  tasks:
    - name: Configure OSPF
      ios_config:
        lines:
          - router ospf 1
          - network 10.0.0.0 0.0.0.255 area 0
```

- **Python:**

- **Netmiko:**

```
from netmiko import ConnectHandler
device = {
    'device_type': 'cisco_ios',
    'host': '10.0.0.1',
    'username': 'admin',
    'password': 'cisco'
}
connection = ConnectHandler(**device)
output = connection.send_command('show ip interface brief')
print(output)
```

Troubleshooting Tools

- **Ping:**

```
ping 10.0.0.1
```

- **Traceroute:**

```
traceroute 10.0.0.1
```

- **Show Commands:**

- **Interfaces:**

```
show ip interface brief
```

- **Routing:**

```
show ip route
```

- **ARP Table:**

```
show ip arp
```

Best Practices

- **Documentation:**

- Maintain detailed network diagrams.
- Document configurations and changes.

- **Regular Audits:**

- Perform security audits.
- Review and optimize QoS settings.

- **Training:**

- Keep up-to-date with new technologies.
- Train team members on best practices.

Example Network Design

- **Scenario:** Enterprise with multiple branches.

- **Core:** Nexus 9000 with ECMP.

- **Distribution:** Catalyst 9000 with OSPF.

- **Access:** Catalyst 9000 with VLANs.

- **Security:** Firepower NGFW with ZBF.

- **High Availability:** HSRP for failover.

- **Automation:** Ansible for configuration management.

Conclusion

- **Summary:**

- Focus on scalability, redundancy, and security.
- Use hierarchical design for modularity.
- Implement QoS for performance.
- Automate where possible.
- Regularly audit and document the network.

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