Cheat Sheet for comprehensive Cisco Certified Network Associate (CCNA) - Wireless

Wireless LAN Fundamentals

- **802.11 Standards**
  - **802.11a**: 5 GHz, 54 Mbps
  - **802.11b**: 2.4 GHz, 11 Mbps
  - **802.11g**: 2.4 GHz, 54 Mbps
  - **802.11n**: 2.4/5 GHz, up to 600 Mbps
  - **802.11ac**: 5 GHz, up to 1.3 Gbps
  - **802.11ax (Wi-Fi 6)**: 2.4/5 GHz, up to 9.6 Gbps
- **Frequency Bands**
  - **2.4 GHz**: 14 channels, 20 MHz width
  - **5 GHz**: 25+ channels, 20/40/80/160 MHz width
- **Channels**
  - **2.4 GHz**: 1, 6, 11 (non-overlapping)
  - **5 GHz**: 36, 40, 44, 48 (non-overlapping)

Wireless LAN Components

- **Access Points (APs)**
  - **Types**: Autonomous, Lightweight (LWAP)
  - **Modes**: Local, FlexConnect, Monitor
  - **Interfaces**: Radio, Ethernet, Console
- **Controllers**
  - **Types**: Standalone, Virtual, Cloud-based
  - **Functions**: AP management, RF management, Security
- **Clients**

- **Types**: Stations (STAs), Mobile devices
- **Authentication**: Open, WPA2, WPA3

Wireless LAN Deployment

- **Site Survey**
  - **Tools**: Cisco Prime Infrastructure, Ekahau
  - **Steps**: Pre-deployment, Post-deployment
- **AP Placement**
  - **Coverage**: Omni-directional, Directional
  - **Height**: 8-12 feet above floor
  - **Separation**: 50-100 feet apart
- **RF Management**
  - **Automatic Channel Assignment (ACA)**
  - **Transmit Power Control (TPC)**
  - **Load Balancing**

Wireless LAN Security

- **Authentication**
  - **Open System**: No authentication
  - **Shared Key**: WEP, WPA-PSK
  - **802.1X**: EAP, RADIUS
- **Encryption**
  - **WEP**: 64-bit, 128-bit
  - **WPA**: TKIP
  - **WPA2**: AES
  - **WPA3**: AES-GCMP, SAE
- **Guest Access**
  - **VLAN Separation**: Guest VLAN

- **Captive Portal**: Web authentication

Wireless LAN Configuration

- **Basic Configuration**

- **AP Configuration**

```
configure terminal
ap name AP1
radio dot11a
channel 36
power 50
end
```

- **Controller Configuration**

```
configure terminal
wlan 10 SSID1
security wpa akm dot1x
encryption mode ciphers aes
end
```

- **Advanced Configuration**

- **QoS**

```
configure terminal
wlan 10 SSID1
qos profile voice
end
```

- **Mobility**

```
configure terminal
mobility group name MG1
ap join-group MG1
end
```

Wireless LAN Troubleshooting

- **Common Issues**

- **Signal Strength**: Use `show ap dot11a summary`

- **Authentication Failures**: Check RADIUS server
- **Interference**: Use `show interference summary`

- **Commands**
  - **AP Status**

```
show ap summary
show ap dot11a summary
```

  - **Client Details**

```
show client detail
show client summary
```

  - **RF Details**

```
show rf-cell summary
show interference summary
```

Wireless LAN Best Practices

- **Design**
  - **Coverage**: Ensure complete coverage with minimal overlap
  - **Capacity**: Plan for future growth
- **Security**
  - **Regular Updates**: Firmware, security patches
  - **Monitoring**: Use IDS/IPS for rogue AP detection
- **Performance**
  - **QoS**: Prioritize critical applications
  - **Load Balancing**: Distribute clients evenly

Wireless LAN Tools

- **Cisco Prime Infrastructure**
  - **Functions**: Monitoring, Reporting, Configuration

    - **Modules**: Wireless, Wired, Security
- **Cisco DNA Center**
    - **Functions**: Network Automation, Assurance
    - **Modules**: Wireless, Wired, Security
- **Ekahau Site Survey**
    - **Functions**: Site Survey, Heatmaps, Coverage Analysis

Wireless LAN Certification Tips

- **Study Resources**
    - **Cisco Learning Network**
    - **Cisco Press Books**
    - **Online Courses**
- **Practice Labs**
    - **Cisco Packet Tracer**
    - **GNS3**
- **Exam Preparation**
    - **Simulations**: Practice real-world scenarios
    - **Flashcards**: Key concepts and commands
    - **Mock Exams**: Assess your readiness

Wireless LAN Future Trends

- **Wi-Fi 6 (802.11ax)**
    - **Features**: OFDMA, MU-MIMO, BSS Coloring
    - **Benefits**: Higher efficiency, lower latency
- **IoT Integration**
    - **Protocols**: Zigbee, Z-Wave, BLE
    - **Security**: IoT-specific encryption and authentication
- **Cloud Management**

- **Platforms**: Cisco Meraki, Aruba Central
- **Benefits**: Centralized management, scalability

Wireless LAN Command Reference

| Command | Description |

|---------|-------------|

| `show ap summary` | Displays summary of all APs |

| `show client detail` | Displays detailed information about clients |

| `show rf-cell summary` | Displays RF cell summary |

| `show interference summary` | Displays interference summary |

| `show wlan summary` | Displays summary of all WLANs |

Wireless LAN Configuration Examples

- **Create a WLAN**

```
configure terminal
wlan 10 SSID1
security wpa akm dot1x
encryption mode ciphers aes
end
```

- **Configure QoS**

```
configure terminal
wlan 10 SSID1
qos profile voice
end
```

- **Join AP to Mobility Group**

```
configure terminal
mobility group name MG1
ap join-group MG1
end
```

Wireless LAN Security Checklist

- **Authentication**

- Use 802.1X with RADIUS
- Implement WPA2/WPA3

- **Encryption**

- Use AES encryption
- Avoid WEP

- **Guest Access**

- Separate guest VLAN
- Use captive portal

- **Monitoring**

- Regularly update firmware
- Use IDS/IPS for rogue AP detection

Wireless LAN Performance Optimization

- **Channel Planning**

- Use non-overlapping channels
- Regularly update channel assignments

- **Power Management**

- Adjust transmit power based on coverage
- Use TPC for optimal performance

- **Load Balancing**

- Distribute clients evenly across APs
- Use load balancing algorithms

Wireless LAN Troubleshooting Flowchart

1. **Check Signal Strength**

- Use `show ap dot11a summary`

2. **Verify Authentication**

- Check RADIUS server

3. **Check Interference**

- Use `show interference summary`

4. **Review Client Details**

- Use `show client detail`

5. **Check RF Cell**

- Use `show rf-cell summary`

Wireless LAN Future Certification Path

- **CCNP Wireless**
  - **Tracks**: Design, Implementation, Troubleshooting
  - **Exams**: 300-360, 300-365, 300-370
- **CCIE Wireless**
  - **Lab Exam**: Hands-on, scenario-based
  - **Preparation**: Practice labs, study groups

Wireless LAN Community Resources

- **Forums**
  - **Cisco Community**
  - **Reddit**
- **Blogs**
  - **Cisco Blogs**
  - **Networking Blogs**
- **Webinars**
  - **Cisco Live**
  - **Networking Webinars**

Wireless LAN Command Quick Reference

- **AP Commands**

- `show ap summary`
- `show ap dot11a summary`
- `show ap config general`

- **Client Commands**

- `show client detail`

- `show client summary`

- **RF Commands**

- `show rf-cell summary`
- `show interference summary`

- **WLAN Commands**

- `show wlan summary`
- `show wlan id 10`

Wireless LAN Configuration Best Practices

- **AP Naming**

- Use consistent naming conventions
- Include location and function

- **WLAN Naming**

- Use descriptive names
- Include security and QoS details

- **Backup Configuration**

- Regularly backup configurations
- Store in secure location

Wireless LAN Troubleshooting Tips

- **Use CLI Commands**

- `show` commands for detailed information
- `debug` commands for real-time analysis

- **Check Logs**

- Review logs for error messages
- Use `show logging` command

- **Test Connectivity**

- Use `ping` and `traceroute` commands
- Verify end-to-end connectivity

Wireless LAN Performance Metrics

- **Throughput**

- Measure data transfer rate

- Use tools like iPerf

- **Latency**

- Measure delay in network
- Use tools like PingPlotter

- **Packet Loss**

- Measure lost packets
- Use tools like MTR

Wireless LAN Security Best Practices

- **Regular Audits**

- Conduct regular security audits
- Review configurations and logs

- **User Training**

- Train users on security best practices
- Educate on phishing and malware

- **Access Control**

- Implement strict access controls
- Use role-based access control (RBAC)

Wireless LAN Future Trends

- **Wi-Fi 6E**

  - **Features**: 6 GHz band, higher throughput

  - **Benefits**: Less interference, higher capacity

- **AI and ML**

  - **Applications**: Predictive maintenance, anomaly detection

  - **Benefits**: Proactive management, improved performance

- **5G Integration**

  - **Use Cases**: Hybrid networks, IoT

  - **Benefits**: Enhanced connectivity, lower latency

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By Ahmed Baheeg Khorshid

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