



5.0 Network Troubleshooting and Tools

5.1 Explain the network troubleshooting methodology.

- **Identify the problem**
 - Gather information
 - Duplicate the problem, if possible
 - Question users
 - Identify symptoms
 - Determine if anything has changed
 - Approach multiple problems individually
- **Establish a theory of probable cause**
 - Question the obvious
 - Consider multiple approaches
 - Top-to-bottom/bottom-to-top OSI model
 - Divide and conquer
- **Test the theory to determine the cause**
 - Once the theory is confirmed, determine the next steps to resolve the problem
 - If the theory is not confirmed, reestablish a new theory or escalate
- **Establish a plan of action to resolve the problem and identify potential effects**
- **Implement the solution or escalate as necessary**
- **Verify full system functionality and, if applicable, implement preventive measures**
- **Document findings, actions, and outcomes**

5.2 Given a scenario, use the appropriate tool.

- **Hardware tools**
 - Crimper
 - Cable tester
 - Punchdown tool
 - OTDR
 - Light meter
 - Tone generator
 - Loopback adapter
 - Multimeter
 - Spectrum analyzer
- **Software tools**
 - Packet sniffer
 - Port scanner
 - Protocol analyzer
 - WiFi analyzer
 - Bandwidth speed tester
 - Command line
 - ping
 - tracert, traceroute
 - nslookup
- ipconfig
- ifconfig
- iptables
- netstat
- tcpdump
- pathping
- nmap
- route
- arp
- dig



5.3 Given a scenario, troubleshoot common wired connectivity and performance issues.

- Attenuation
 - Latency
 - Jitter
 - Crosstalk
 - EMI
 - Open/short
 - Incorrect pin-out
 - Incorrect cable type
 - Bad port
 - Transceiver mismatch
 - TX/RX reverse
 - Duplex/speed mismatch
 - Damaged cables
 - Bent pins
 - Bottlenecks
 - VLAN mismatch
 - Network connection LED status indicators
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5.4 Given a scenario, troubleshoot common wireless connectivity and performance issues.

- Reflection
 - Refraction
 - Absorption
 - Latency
 - Jitter
 - Attenuation
 - Incorrect antenna type
 - Interference
 - Incorrect antenna placement
 - Channel overlap
 - Overcapacity
 - Distance limitations
 - Frequency mismatch
 - Wrong SSID
 - Wrong passphrase
 - Security type mismatch
 - Power levels
 - Signal-to-noise ratio
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5.5 Given a scenario, troubleshoot common network service issues.

- Names not resolving
- Incorrect gateway
- Incorrect netmask
- Duplicate IP addresses
- Duplicate MAC addresses
- Expired IP address
- Rogue DHCP server
- Untrusted SSL certificate
- Incorrect time
- Exhausted DHCP scope
- Blocked TCP/UDP ports
- Incorrect host-based firewall settings
- Incorrect ACL settings
- Unresponsive service
- Hardware failure