Network Troubleshooting Guide

CompTIA 7-Step Methodology + Common Scenarios

CompTIA Troubleshooting Methodology

Step	Action	Key Points
1	Identify the problem	• Question users • Gather info • Duplicate if possible • Identify symptoms
2	Establish theory of probable cause	• Question the obvious • Consider multiple approaches • Top-to-bottom or bottom-to-top
3	Test the theory	• If confirmed → next step • If not → new theory • Escalate if needed
4	Establish plan of action	• Determine steps • Consider impact • Get approval if needed
5	Implement solution or escalate	• Make ONE change at a time • Document changes • Escalate if beyond scope
6	Verify full functionality	• Test solution • Verify with user • Preventive measures
7	Document findings	• Record actions taken • Update documentation • Knowledge base article

■ Common Network Problems & Solutions

Scenario 1: No Network Connectivity

Symptom	Possible Cause	Solution	Layer
No link lights	Bad cable/port	Replace cable, try different port	Physical
Link light but no IP	DHCP failure	Check DHCP server, renew lease	Network
APIPA (169.254.x.x)	No DHCP server	Check DHCP, set static IP temporarily	Network
Wrong subnet mask	Misconfiguration	Verify and correct subnet mask	Network
Wrong gateway	Misconfiguration	Verify and correct default gateway	Network

Scenario 2: Can Ping IP but Not Hostname

1. **Symptom:** ping 8.8.8.8 works, but ping google.com fails
2. **Problem:** DNS issue (can't resolve names to IPs)
3. **Solutions:**
• Check DNS server settings (ipconfig /all)
• Flush DNS cache (ipconfig /flushdns)
• Try alternate DNS (8.8.8.8, 1.1.1.1)
• Verify DNS server is reachable (ping DNS server IP)
4. **OSI Layer:** Application layer (Layer 7)

Scenario 3: Intermittent Connectivity

Cause	Test	Solution
Loose cable	Wiggle cable, check link lights	Reseat or replace cable
Duplex mismatch	Check interface errors	Match duplex settings (auto or manual)
EMI/interference	Check environment	Use shielded cable, move away from sources
Bandwidth saturation	Check utilization	Implement QoS, upgrade link
Bad port/NIC	Try different port	Replace NIC or use different switch port

Scenario 4: Slow Network Performance

Check these in order:
1. **Bandwidth utilization** - Is link saturated?
2. **Duplex mismatch** - Half duplex when should be full?
3. **Latency** - High ping times? Use tracert to find where
4. **Packet loss** - Check interface errors and drops
5. **QoS misconfiguration** - Priority traffic being dropped?
6. **Broadcast storms** - Check for Layer 2 loops
Commands to use:

- ping (check latency and packet loss)
- tracert (identify where delay occurs)
- iperf (bandwidth testing)
- netstat -s (check for errors)

■ Essential Troubleshooting Commands

Command	Purpose	Example
ping	Test connectivity and latency	ping 8.8.8.8
ipconfig	View IP configuration	ipconfig /all
ipconfig /release	Release DHCP lease	ipconfig /release
ipconfig /renew	Renew DHCP lease	ipconfig /renew
ipconfig /flushdns	Clear DNS cache	ipconfig /flushdns
tracert	Trace route to destination	tracert google.com
nslookup	Query DNS	nslookup google.com
netstat	View connections and stats	netstat -an
arp -a	View ARP cache	arp -a
route print	View routing table	route print

■ OSI Model Troubleshooting Approach

Bottom-Up (Most Common):
1. **Physical:** Check cables, lights, connections
2. **Data Link:** Check switch ports, MAC addresses, VLANs
3. **Network:** Check IP config, routing, gateway
4. **Transport:** Check firewall, port blocking
5-7. **Upper Layers:** Check application settings, DNS, certificates

Top-Down (When Bottom Layers Verified):
Start with application and work down if lower layers are known good

Divide and Conquer:
Start in the middle (Network layer) and eliminate half the problem

■ Troubleshooting Best Practices

• Always check the simple things first (cable plugged in?)
• Make ONE change at a time (so you know what fixed it)
• Document everything (what you tried, what worked)
• Ask the user what changed (software update? moved PC?)
• Don't assume (verify everything)
• Use a systematic approach (OSI model)
• Know when to escalate (don't waste time beyond your skill level)
• Verify the fix (don't just assume it's working)
• Implement preventive measures (keep it from happening again)