Troubleshooting Common Wi-Fi Problems
Tom Resman - NetScout

It just has to work!
AirCheck Sparks a Debate at the Presidential Debates

-Using AirCheck to shut down hotspots at the debates and sell $200 WiFi access 😊
Troubleshooting Common WiFi Problems – Simple and Fast!
What Wi-Fi Complaints Do You Typically Get?

- The Wi-Fi is too slow
- I keep getting disconnected
- I can’t roam
- I can’t connect to the wireless network
What are the Causes Behind These Complaints?

- Misconfiguration
  - Access Points
  - Clients

- Coverage

- Capacity

- Co-Channel Interference
  - Your networks
  - Neighbor networks
  - Rogues

- Non Wi-Fi Interference
  - Persistent sources
  - Transient sources

- Security breaches and attacks
Finding Root Cause is Complex

- Complaints
  - Slow
  - Can't Connect
  - Get Disconnected
  - Can't Roam

- Causes
  - Excessive Retries on channel
  - Client connected at slow rate
  - AP cell too big
  - AP cell too small
  - AP misconfigured
  - Too many APs on channel
  - Too many users on channel
  - Interferers are present
  - Too many SSIDs broadcasting
  - Neighbor AP on same channel
  - Too many users on same AP
  - User's client misconfigured
  - Legacy 802.11b clients present
  - No secondary AP coverage
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Channel traffic congestion
Channel device congestion
Poor SNR
Finding Root Cause is Complex

- **Complaints**
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  - Legacy 802.11b clients present
  - No secondary AP coverage
  - Channel traffic congestion
  - Channel device congestion
  - Poor SNR
  - Client mis-configured
  - AP mis-configured
  - ...

...
Key points

- Wi-Fi is location-dependent. Need portable tools to troubleshoot.
- Wi-Fi uses a time-shared medium… the channel.
- Signal Strength is important, but Signal/Noise Ratio is more-so.
- Critical KPIs include channel airtime utilization, SNR, retry rates.
- Client visibility is priceless.
- Every wireless network uses a wired network. Check for services.
- The right tools for the job makes all the difference.
• So let’s look at each complaint and how it can be addressed…
“The Wi-Fi is too slow”
What To Check For

- How many APs on the channel?
- Airtime utilization of the channel for Wi-Fi devices
  - Are there legacy clients present?
- Airtime utilization of the channel for non Wi-Fi devices
  - Are there any non Wi-Fi interferers on that channel?
- What AP is the customer connected to, and what rates are supported?
What Dave the IT Tech Did (v1)

- Grabbed his AirCheck Wi-Fi Tester and went to the location of the user.
What Dave the IT Tech Did

• Found the user’s connection on his AirCheck Wi-Fi Tester, and identified its channel.
What Dave the IT Tech Did

- Checked the channel and found too many APs on it.
- Corresponding 802.11 utilization was high.
What Dave the IT Tech Did

- Drilled to the APs on the channel and saw many neighbor network APs.
What Dave the IT Tech Did

- Viewed other channels and found one much less used.
- Moved the AP to that channel.
What Dave the IT Tech Did (v2)

- Checked the channel that the client was on.
- Found 2 APs on the channel; didn’t seem too bad
What Dave the IT Tech Did (v2)

- Checked channel utilization and saw it was very high
What Dave the IT Tech Did (v2)

- Checked the APs on the channel and found one was not familiar.
- He located it.
What Dave the IT Tech Did (v2)

• Found a rogue AP that was transmitting large files. One AP and client caused over-utilization of the channel.

• Removing the AP killed two problems with one swipe - Score!
Network is Slow!
“I keep getting disconnected”
What To Check For

- Are there interference sources present?
  - Signal levels and duty cycles
- Weak SNR at client location
- Is the client device configured properly?
What Dave the IT Tech Did

- Grabbed his AirCheck Wi-Fi Tester and went to the location of the user
What Dave the IT Tech Did

- Found the AP that the user connects to, and identified its channel
What Dave the IT Tech did

- Saw non-802.11 Wi-Fi channel utilization was high. Immediately knew there was a interferer issue and notified Ed the engineer
What Ed the engineer did

- Grabbed his AirMagnet® Spectrum XT™ and identified the interference source
  - Only periodic transmissions
  - But duty cycle = 99% and across all 2.4GHz band
What Ed the engineer did

- Located the interference source
What Ed the engineer did

- Depending on the interference source:
  - Removed it
    - For unauthorized or unnecessary devices
  - Changed the Wi-Fi channels around it
    - For embedded devices like microwaves and security cameras
  - Move the AP or increase power to increase SNR
    - For low power devices like sensors
“I can’t roam”
What To Check For

- Secondary AP coverage
- AP cell sizes too big, Tx power too high
- Client overload on an AP
- AP misconfiguration
What Dave the IT Tech Did

- Grabbed his AirCheck Wi-Fi Tester and successfully connected to the network
What Dave the IT Tech Did

- Performed a roaming test. Roaming failed
What Dave the IT Tech Did

- AirCheck Wi-Fi Tester indicated the network had mixed security types. This is a misconfiguration of an access point.
What Dave the IT Tech Did

- Immediately went to the list of APs on the network. Saw the AP he needed to roam to was set for the wrong security type
What Dave the IT Tech Did

- Fixed the AP security configuration issue, and roaming was restored
“I can’t connect”

- “I can’t connect”
What To Check For

- Network availability
- Proper signal coverage, and SNR
- Proper access point configuration
- Proper client configuration
- Channel utilization and interference
- Network services availability: DHCP, DNS, gateway route
- Security incidents
What Dave the IT Tech Did (v1)

- Grabbed his AirCheck Wi-Fi Tester and tried to connect to the network.
What Dave the IT Tech Did (v1)

• Checked the Ethernet connection at the AP and saw that he could not get out to the internet.

• Found that it was a misconfigured firewall.
Simple and Fast WiFi Troubleshooting
THANK YOU