Wireless Network Monitoring and Troubleshooting

Wireless Network Troubleshooting Techniques

Sherinah Nakazibwe
snakazibwe@renu.ac.ug

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Outline

- Introduction

- Why reliable wireless matters

- Anatomy of wireless network

- Common wireless issues

- Real-world symptoms

- Troubleshooting framework

- Heat maps and site surveys

- Optimization tips

- Q & A

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Introduction

- Devices connect without physical cables – radio frequencies.

- Provides mobility, flexibility, and scalability that institutions increasingly rely on.

- Wireless networks are complex, unlike cable.

- Performance is influenced by several factors, unlike cable.

- Crucial in different fields and sectors of work.

Anatomy of wireless networks

- Core components; APs, authentication servers, controller

- SSID Segmentation: public Wi-Fi vs secure internal SSIDs

- Architecture: centralized vs distributed vs cloud-managed
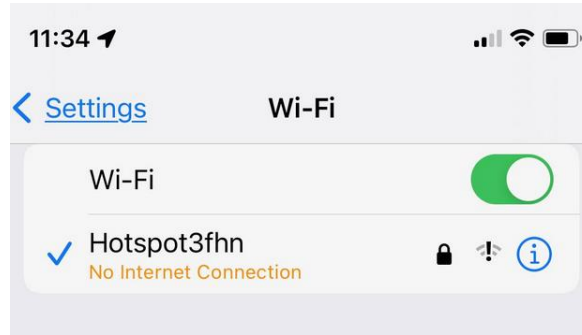
Common Wireless Issues

- Coverage holes

- Co-channel interference

- Bandwidth saturation

- IP exhaustion
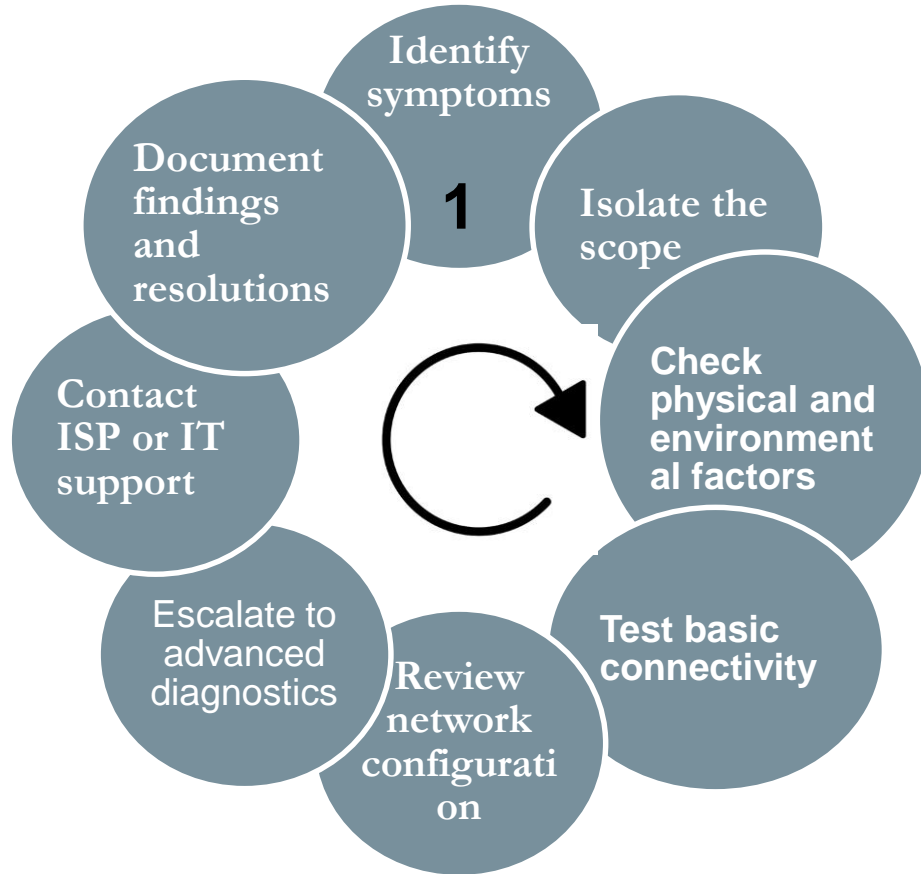
- Authentication failures

- Roaming problems

Real-World Symptoms

- Wi-Fi keeps disconnecting

- Video keeps buffering.

- Can't connect to the network.

- Slow Internet speeds.

- Intermittent connectivity

- Device-specific issues.

Troubleshooting Framework

- Identify symptoms
- **1**
- Isolate the scope
- **Check physical and environmental factors**
- **Test basic connectivity**
- Review network configuration
- Escalate to advanced diagnostics
- Contact ISP or IT support
- Document findings and resolutions

Site Surveys and Heatmaps

- A site survey

  Involves physical, walkthroughs and planning.

- A heatmap is a visual output showing signal strength and quality.

  Focuses on displaying signal-related data visually.

 Most heatmaps use a color gradient to show signal strength:

1. Color gradients; Green, Yellow, Orange, Red, Gray/Black
2. Signal Strength (RSSI - dBm)

Wifi Heat Map Software

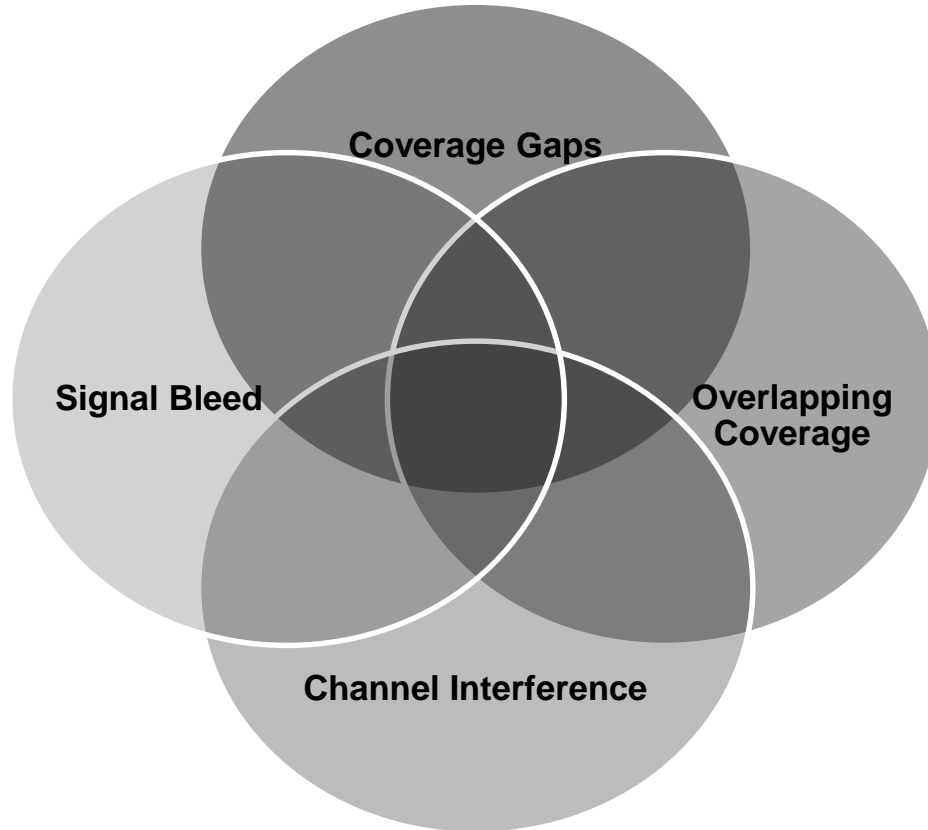Fix Weak Wifi Signals & Dead Spots!

Why Heatmaps and Site Surveys

- Ensure strong, consistent coverage.

- Optimize placement of access points

- Avoid signal overlap & interference.

- Improve performance, roaming, and

  speed.

- Support high user/device density.
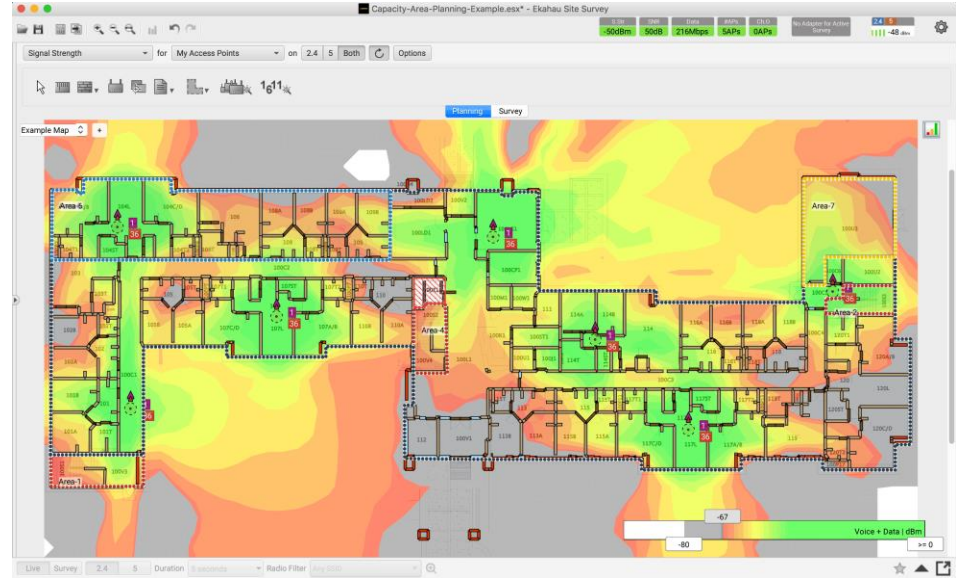
What to Look For

Common Fixes Based on Findings

Red / grey areas (dead zones)	Add or reposition Access Points (APs)
Overlapping green zones (too much signal)	Reduce AP transmit power
Strong signal outside building	Reduce transmit power to limit signal bleed
Interference between APs	Change Wi-Fi channels (especially on 2.4GHz)

Tools and When to Use

- **Common Tools:**

  Ekahau, NetSpot, AirMagnet, VisiWave

  Commercial

- **When to Conduct:**

  Before Wi-Fi deployment

  After network complaints

  During renovations

  When adding new users/devices

Optimization Tips

Strategic router placement	**Choose the right frequency band**	**Use non-overlapping channels**
Update your firmware	**Upgrade your hardware**	**Old devices = bottlenecks**
Run a wireless site survey	**Secure your network**	

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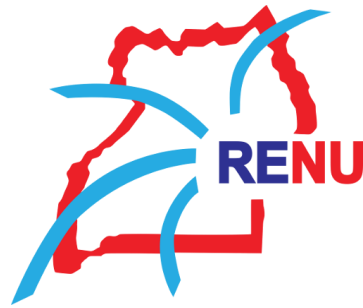
The End

"Success is the sum of small efforts, repeated day in and day out"
-Robert J. Collier