Innovative Solutions for Successful Wireless Network Management

How to Tackle the Latest Security, Performance and Compliance Issues

Stay Ahead of Wireless Risks

Not all wireless network "threats" are as obvious as you might expect, and they're not all directly related to data security. While stolen data and network attacks are among the biggest wireless risks and continue to require mitigation, newer types of threats jeopardie the integrity of your wireless network and your business.

Depending on the nature of your business and industry, compromises in network uptime, throughput and compliance policy can be as detrimental to your business as denial of service (DoS) attacks that bring your network operations to a halt. For example, RF congestion can arise for many reasons – such as new sources of interference, high-capacity multimedia application traffic and "sticky" clients that overload a given access point (AP) – and cause performance slowdowns and disconnects. Poor-performing networks degrade overall business processes, worker productivity and, potentially, e-commerce revenues and customer service.

From a compliance standpoint, it's no secret that even a minor configuration error could send a WLAN out of compliance. For example, in the retail industry, violations of the Payment Card Industry Data Security Standards (PCI DSS) could put customer credit card information at serious risk and result in fines by the card issuers. Worse, a compromise could lead to expensive litigation and loss of reputation. Several other industries, including healthcare and financial organisations, have similar types of governance mandates and standards.

What are the Threats?

Network risks continually change as new exploits emerge, hackers grow more sophisticated, Wi-Fi networks get crowded, and industry rules about security and privacy evolve.

- **Security.** The very nature of security threats (internal and external) and how you deal with them is changing constantly. Unlike early attacks that focused on wireless network infrastructure equipment, emerging exploits target the millions of mobile client devices invading enterprise networks. Attacks also are growing more complex, employing a combination of exploit techniques over a period of time. Additionally, attackers that once had to be geographically close to your wireless LAN (WLAN) to penetrate it – such as in the proverbial parking lot – can now gain access from over a mile away using high-gain antennas.

- **Performance.** Threats to network performance and uptime are equally dangerous to organisations that transact business or fully depend on applications running on the wireless network.
  Impediments to network uptime and performance include:
  - » RF interference from neighboring wireless networks and non-Wi-Fi devices that impact wireless bandwidth, network availability and performance
  - » Network configuration errors that result in mismatched user access rights and policies (and possible policy violations) or less-than-optimal mobile traffic flows
  - » High-density network designs that fail to achieve the right balance of AP placement, signal strength (power settings) and interference mitigation

- **Compliance**. Compliance regulations further complicate your network environment design and management practices. As noted, the PCI DSS Council has specific wireless guidelines for verifying the security of the cardholder data environment. Organisations must regularly audit their networks, even if they don't formally allow wireless access to their systems, to ensure that network use is in accordance with government and business policy. Most organisations are driven by these specialised compliance regulations for their vertical segments (HIPAA, FISMA, SOX, etc.)

Solutions for the Full Wi-Fi Lifecycle

With Fluke Networks' complete portfolio of wireless solutions, you can ensure the security, performance and compliance of your wireless networks amid all the changing conditions. Fluke Networks' AirMagnet solutions span the entire WLAN lifecycle, from planning and deployment to ongoing troubleshooting and dedicated security monitoring, combating all wireless issues you face. Our comprehensive mobile tools have been specifically designed for the pre-deployment planning, ongoing management and multifaceted security of IEEE 802.11a/b/g/n networks.

Fluke Networks Wireless Portfolio

Planning

24x7 Performance & Security

Deployment & Verification

Troubleshooting and Interference

AirMagnet Enterprise

AirMagnet Planner

AirMagnet Survey

Wired/WLAN Analysis

OptiView® XG Network Analysis Tablet

EtherScope™ Series II Assistant

Spectrum Analysis

AirMedic® USB

AirMagnet Spectrum XT

WLAN Test & Analysis

AirCheck™ Wi-Fi Tester

AirMagnet WiFi Analyser

AirMagnet VoFi Analyser

Some of the common questions that solutions from Fluke Networks can answer for you include the following:

• Is the WLAN secure? How can I tell?

• Why don't users' client devices discover any Wi-Fi APs?

• Why are users having difficulty connecting to the WLAN or the Internet – or staying connected?

• Is the network compliant with regulatory standards, such as PCI DSS, HIPAA, GLBA, SOX and others?

• Why is the wireless network not performing to expectations?

• What's the best strategy to migrate to 802.11n?

• How well is the 802.11n network performing?

Step 1. Wi-Fi Planning & Design

Fluke Networks delivers the industry's most accurate solutions for designing, deploying and optimizing 802.11a/b/g/n WLANs. Our AirMagnet expert planning and design tools ensure that your wireless network accommodates the highest possible user capacity and most stringent quality of service (QoS) demands of even time-sensitive wireless applications in the most interference-prone and challenging RF environments.

AirMagnet Planner

With the AirMagnet Planner wireless network-planning tool, you can create a WLAN model for any WLAN infrastructure vendor that lets you build a predictive map of Wi-Fi coverage and performance without having to physically deploy any APs. The map accounts for building materials, obstructions, AP configurations, antenna patterns and a host of other variables as it determines an optimal infrastructure layout for your specific environment.

And if you are introducing 802.11n into an existing 802.11a/b/g environment, AirMagnet Planner automatically accounts for the mix of technologies in a single network and adjusts the infrastructure layout accordingly. The tool helps you define your migration strategy, whether it's a rip-and-replace or slow transitional approach. It also generates a bill of materials report and estimates costs so you can budget for exactly what you'll need.

AirMagnet Planner can be purchased as a standalone product or as a fully integrated feature of AirMagnet Survey (see section below). Using AirMagnet Planner integrated with AirMagnet Survey, you have a powerful solution that combines state-of-the-art predictive modeling with real-world coverage and performance measured data.
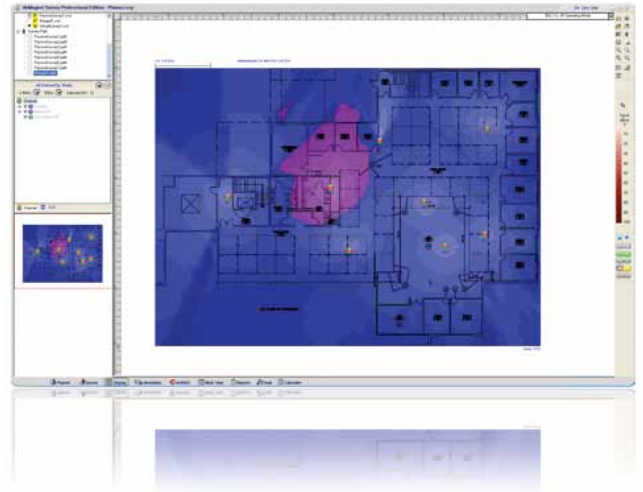
Step 2. Site Survey, Deployment & Verification

Site surveys are required for *new installations* where you need to calculate the number of APs required, determine the locations where they need to be placed and decide how they must be configured. Site surveys in *existing installations*, by contrast, verify the number of APs required versus the number actually deployed and validate their location and configuration to ensure optimal coverage and performance.

Site surveys are also critical in ongoing network optimization. As new users join the shared-access WLAN, for example, it becomes important to ensure that a sufficient number of APs are deployed to provide the required network capacity and coverage. Real-time applications like voice typically have more stringent requirements for signal values, coverage overlap, coverage from multiple APs and so forth. Site surveys help verify the network's readiness for the new application.

Newer technologies, such as 802.11n, change some of the RF fundamentals that we were used to with the now legacy technology, 802.11a/b/g. Site surveys help you define your migration strategy to the new WLAN technology and verify true end-user performance metrics at every location on the floor.

Surveys can be conducted manually, by walking around a building, inside and out, and driving the city streets to record coverage, congestion and performance data. However, automating the process with software tools simplifies and accelerates the pre-deployment design and post-deployment verification of your WLAN. Using full-featured wireless site survey software can save an enormous amount of time, money and frustration compared to manual or paper-based site survey techniques.

AirMagnet Survey

AirMagnet Survey is the industry's most accurate solution for planning and designing 802.11a/b/g/n networks for optimal performance, security and compliance. It calculates the ideal quantity, placement and configuration of APs for a successful WLAN deployment.

AirMagnet Survey goes beyond just verifying raw RF coverage. It plots actual end-user network performance metrics such as data rates, actual per-user throughput and packet losses and retries. This information allows you to check that each user and application is getting the capacity and service quality needed at any given time by providing this complete Wi-Fi "weather map of the environment."

Advanced features available in the PRO version allow users to integrate with professional spectrum Analysers, such as AirMagnet Spectrum XT, to conduct RF spectrum surveys and account for interference sources during the design and deployment phase; perform outdoor surveys and unique voice-over-Wi-Fi (VoFi) surveys; verify the WLAN's readiness for end-user, infrastructure and application requirements; conduct detailed end-user capacity planning; conduct multiple surveys at the same time; and generate customised reports.

AirMagnet Survey is also available in the **Express** version. It is ideal for users who walk the floor collecting Wi-Fi survey data. Once they've collected the data, they can then transfer the survey project to an expert armed with AirMagnet Survey PRO to make crucial design and deployment decisions.

Step 3. Troubleshooting & Managing Interference

Troubleshooting wireless performance problems can be notoriously time consuming. Problem sources can be RF interference, client-side glitches, an improper setting in the WLAN infrastructure or dozens of other wireless issues. Fluke Networks tools automatically and proactively identify the root cause of such wireless problems so that issues can be fixed quickly. Results of wireless data analysis are presented in simple terms to enable precise, rapid adjustments to WLAN performance. Intelligent insight into RF and network-level information enables network engineers and frontline technicians to pinpoint the source of risks or performance inhibitors. Solutions ensure that time-sensitive wireless applications, such as VoFi, maintain integrity throughout network deployment and expansion phases.

Network & WLAN engineer, security/compliance professional, SI

- Centralised, 24x7 WLAN monitoring and analysis
- Solve basic and advanced problems centrally and remotely

2nd/3rd line of support

WLAN engineer, security engineer

- Portable WLAN analysis
- Solves basic and advanced problems with built-in expertise

*PRO version

2nd/3rd line of support

Dispatched Network Technician

- Portable WLAN analysis
- Solves basic problems or escalate to 2nd/3rd line support

*Express version

1st line of support

> "As an avid user of AirMagnet's full suite of tools for more than a decade, I have introduced the product to hundreds of Colleges, Customers and Employers; the consensus always being the same – AirMagnet takes the mystery out of wireless networking. At Computer Design & Integration LLC, we recently adopted AirMagnet as our go-to wireless engineering tool; whether for site survey and design, security, performance, enterprise management, or daily troubleshooting, AirMagnet takes our wireless business to the next level by allowing my staff to get it right the first time, every time! Any professional organisation that sells, services, or manages a wireless network should have AirMagnet in their tool box."
>
> – Wil Ankerstjerne, Director, Wireless Networking Group Computer Design & Integration LLC., Teterboro, NJ

AirMagnet WiFi Analyser

AirMagnet WiFi Analyser is the industry-standard mobile tool for auditing and troubleshooting enterprise wireless networks. AirMagnet WiFi Analyser helps IT staff quickly solve end-user connectivity and performance issues while automatically detecting security threats, wireless network vulnerabilities and regulatory compliance status. The built-in analysis engine, AirWISE®, automatically provides instant answers on problem causes, symptoms, fixes and how to avoid future occurrences.

AirMagnet WiFi Analyser provides instant visibility into all wireless channels, devices, conversations, speeds, interference issues and the RF spectrum. AirMagnet WiFi Analyser PRO includes a complete troubleshooting toolset to quickly pinpoint and solve wireless network problems. This includes users not being able to connect to the network, users experiencing slower connections to the network or low WLAN application response times, 802.11n misconfigurations, traffic/infrastructure overloads, hardware failures, roaming problems and multipath interference problems.

AirMagnet WiFi Analyser **PRO** includes a full compliance reporting engine, which automatically maps collected network information to requirements for compliance with corporate policy and industry regulations. The solution also integrates with professional spectrum Analysers like AirMagnet Spectrum XT for simultaneous Layer 1 (RF) and Layer 2 (access) troubleshooting.

AirMagnet WiFi Analyser is available in the **Express** version for level 1 field technicians to solve basic problems in the WLAN. These dispatched technicians can also easily escalate more complicated or advanced problems to the network engineer using the PRO version via a simple packet capture and transfer.

AirMagnet Spectrum XT

AirMagnet Spectrum XT is the first professional spectrum Analyser that combines and correlates in-depth RF analysis of non-Wi-Fi interference sources with real-time WLAN information. The result is quicker and more accurate WLAN performance troubleshooting. By viewing the impact of RF interference on the network's overall performance, network managers can pinpoint the root cause of the problem. The tool detects, identifies and helps physically locate non-Wi-Fi sources of interference that operate in the 2.4GHz, 4.9GHz and 5GHz frequency bands, such as Bluetooth, microwave ovens, cordless phones, digital video monitors, ZigBee devices, game controllers, RF jammers, wireless cameras, radars and more.

AirMagnet Spectrum XT provides the industry's first "zero-day" automated response solution, that monitors the RF environment looking for unique and repeating RF patterns from "unknown or previously unclassified RF interference sources". Once the pattern of interest is detected and classified, users have the option of creating a customised signature for the pattern for future alerting. With this capability, users not only gain independence from the spectrum Analyser vendor's periodic classification updates, but also have a faster response to troubleshooting performance problems in their network. This provides an efficient method for troubleshooting any RF interference issues, saving time and costly IT resources.

AirMagnet Spectrum XT offers a variety of spectrum graphs, including real-time FFT, spectrogram, duty-cycle, channel and interference power graphs and unique Wi-Fi charts, to help users visualise the RF spectrum and WLAN performance. It's available in the universal, convenient USB form factor, allowing it to be used on any notebook, netbook or tablet PC.

The AirMagnet product line also includes an entry-level RF spectrum analysis solution, AirMedic® USB, which allows users to detect any RF activity in the environment, including areas where interference degrades performance.
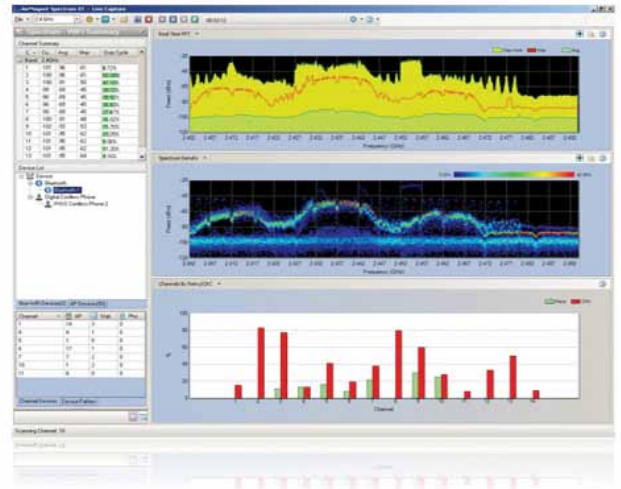
Integrated Wired/Wireless Solutions

AirMagnet solutions can run on the Fluke Networks OptiView® XG Network Analysis tablet, designed for network engineers and supporting both wireless and wired Ethernet (up to 10Gbps) networks. With three wireless radios, the XG provides a convenient platform for running AirMagnet WiFi Analyser, AirMagnet Spectrum XT and AirMagnet Survey.
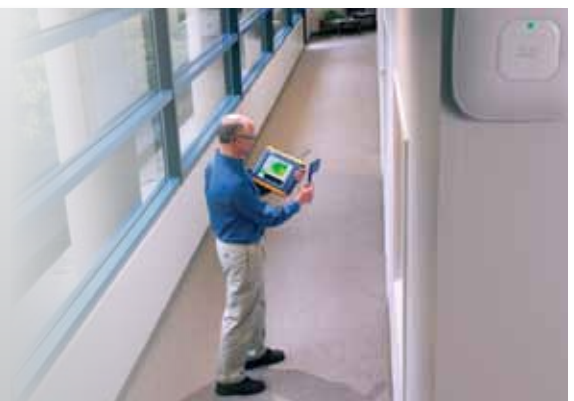
AirCheck™ Wi-Fi Tester

The handheld, rugged AirCheck Wi-Fi tester, designed for frontline technicians, allows almost anyone to quickly verify and troubleshoot 802.11a/b/g/n networks. From start to finish, AirCheck helps take the guesswork out of everyday wireless troubleshooting. With just a few clicks, you get an instant view of networks and s to identify coverage and verify security settings.

AirCheck also measures basic Wi-Fi performance to verify coverage and connectivity to networks and devices. Uncover overloaded channels and interference issues or track down rogue s or devices with the optional directional antenna.

Press one key to record all collected details, including s, clients, channel usage and connection performance. Then use the included AirCheck Manager software to create summary or detailed reports allowing you to quickly close a trouble ticket or provide documentation for problem escalation. This software also allows you to easily configure, manage and control the use of your AirCheck – or an entire fleet of them – and program network configuration settings, including all 802.11 encryption and authentication standards.

AirCheck's instant power-up, five-hour battery life and streamlined tests give answers in seconds so you can close trouble tickets faster or escalate the issue to the next level making the wireless support team more productive.

Maintain Business, Governance Policy Compliance

Organisations often find that complying with policy and legal regulations require countless hours of collecting data, verifying compliance and documenting the results in reports. Typical industry regulations requiring action by the IT staff include PCI DSS (retail), HIPAA (health care), GLBA (U.S. financial), Sarbanes-Oxley (public companies), DoD 8100.2 (U.S. Department of Defense), Basel II (international banking), ISO 27001 and others.

Fluke Networks' AirMagnet tools automatically test for compliance with these and other regulations.
Every standard compliance report includes the following:
- An overview of the regulation and how it applies to Wi-Fi
- Details of violations by relevant sections of the regulation
- A detailed pass/fail report card by device
- Suggestions for bringing the network back into compliance

You can also create reports based on your own internal policies for internal reporting and compliance with mandates set by your organisation.

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We have been able to take the security and performance of our wireless networks to the next level – we now have a big picture of how our WLAN is performing."

– Tom Cotter, Advisory Network Specialist at Memorial Sloan Kettering Cancer Center

AirMagnet VoFi Analyser

AirMagnet VoFi Analyser provides full analysis of encrypted WLAN traffic, scoring all calls in terms of call quality and proactively identifying all types of problems including phone, roaming, QoS and RF issues.

AirMagnet VoFi Analyser integrates with leading wireless voice solutions from Cisco, Polycom and Vocera to collect and correlate diagnostic information from the phone and wireless and wired sides of the network connection. By analyzing all three data sources, AirMagnet provides complete analysis and enables network staff to confidently deploy and operate a VoFi infrastructure.

Utilizing multiple Wi-Fi adapters plugged into the PC, AirMagnet VoFi Analyser provides advanced details about all roaming transactions detected in the VoFi deployment. These details include possible reasons for the roaming instance, VoFi-specific data (such as mean opinion score and signal strength) and packet transmission rates during the conversation. This can help network staff to identify problem phones that might be constantly roaming or "thrashing" between APs or alternatively identify problems affecting an entire channel and causing many phones to roam.

AirWISE® Analysis Engine
The unique technology underpinning every AirMagnet solution

AirWISE is the intelligent Wi-Fi analysis engine that translates raw wireless data collected by AirMagnet solutions into intelligent, actionable results. AirWISE detects and processes wireless events that can impact security, performance and compliance. It then describes them for users in easy-to-understand but detailed terms and prioritises the most threatening or important issues. It also drives readiness verification for WLAN device and application requirements.

AirWISE presents deep background information on each wireless issue, making it easy for networking technicians to deploy and maintain wireless networks with the same confidence as their wired networks. AirWISE prescribes the best solution for each issue, so you get concrete guidance on solving wireless problems.

> *AirMagnet Enterprise enables us to monitor our network for outside intrusion attempts and the attempts of our own students to use the network for purposes that may result in negative consequences. Lakefield has been the home to many prominent and well-known students, and it is essential that their records — and the personal information of all our students — are kept confidential and protected."*
>
> *– Todd Harris, Director of IT and Online Learning at Lakefield College School*

Step 4. Implement 24x7 Wireless Security Monitoring

Fluke Networks' AirMagnet solutions provide common intelligence that is a prerequisite for real control over Wi-Fi security, performance and compliance. Unlike the periodic "self-monitoring" found in most modern APs, Fluke Networks' AirMagnet solutions are based on active, firsthand observation of the entire wireless environment.

For example, in the 60 seconds between typical systems' AP snapshots, AirMagnet could see a hacker compromise an end-user's computer and spoof that user's identity. AirMagnet could then track all the attacker's packets and begin to remediate the threat, all in that 60-second window. Other passive monitoring solutions would overlook the threat and would be unable to provide the details needed to help staff know what actually happened.

Keeping a network secure requires you to make quick decisions based on a complete set of data from the real-world environment. This is precisely what Fluke Networks AirMagnet solutions provide: direct, deep and active analysis of everything in the WLAN.

AirMagnet Enterprise

AirMagnet Enterprise centralised wireless intrusion detection/prevention system (WIDS/WIPS) defends your wireless environment by automatically detecting, blocking, tracing and mapping any threat. It contains an unmatched suite of event alerting, escalation, remote troubleshooting, forensic analysis and professional PCI and other policy compliance reporting. The end result is a unified system that scans your environment 100% of the time to ensure it is performing safely and securely and is meeting the needs of your users and applications.

In addition to rich security features, AirMagnet Enterprise constantly monitors the health of the WLAN and RF environment to proactively detect evolving problems that can lead to network interruption. The system detects issues, gives users remediation advice and includes active remote tools to troubleshoot the issue. This allows staff to avoid network downtime and vastly reduces the time-to-fix for any outage, leading to greater uptime, better performance and overall higher end-user satisfaction.

AirMagnet Enterprise sensors distributed throughout the environment collect and analyze data, RF conditions and events. More than 1,000 sensors can be supported through a single centralised server in the data center. Analysis traffic consumes minimal WAN bandwidth, because processing takes place locally at the sensor level. Each sensor continues to enforce the security policy even if the WAN connection to the server is lost for more than 24 hours. The server then correlates the results processed by the distributed sensors and displays them on a network management system that can be used on any laptop or desktop, allowing staff to investigate and protect the network from any remote site (see diagram).

AirMagnet Server

AirMagnet Sensors

Remote investigation, automation intrusion detection/prevention