WHITEPAPER

WHY IT'S TIME TO RETIRE WLAN CONTROLLERS

THE WORLD HAS CHANGED SUBSTANTIALLY SINCE THEY WERE CREATED OVER A DECADE AGO.

Mist
A.I. is in the AIR™

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In the early 2000s, Intel launched Centrino, which caused a surge in Wi-Fi enabled laptops. As users wanted to leverage mobility in the workplace, IT needed to deploy a WLAN infrastructure that could handle Wi-Fi with scale and convenience. As a result, traditional "fat APs" were replaced by lightweight APs with centralized controllers, which made it easier to manage and secure Wi-Fi networks.

Fast forward 15 years, and Wi-Fi has become infinitely more ubiquitous - and complex. The average person has multiple wireless devices (e.g. smartphones, tablets, connected "things" and laptops) and expects consistent and reliable Wi-Fi almost everywhere he/she goes. Most companies have also adopted "wireless first" policies where the primary, and often only, connectivity is through the wireless network.

While the controller architecture was great for managing yesterday's network of APs where wireless clients were limited and connectivity was a convenience, they are not equipped for the modern era of mobility. They do not have visibility into the user experience. They cannot scale to handle the multitude of wireless users (and headless IoT devices) that require wireless access today. They do not offer the resiliency required for business-criticality (without spending a fortune on hardware). They do not have the compute power for proper troubleshooting and fault isolation. They do not effectively leverage new Bluetooth LE and IoT technologies. And they lack the automation and agility required to bring a DevOps approach to IT.

This all changes with Mist.

The Mist Learning WLAN is built on a modern cloud architecture with microservices for unprecedented agility, elastic scale, and resiliency. It seamlessly combines virtual BLE with Wi-Fi and IoT for cost-effective services that are easy to scale and manage. In addition, it is the first platform with an inline Artificial Intelligence (AI) engine for automation, optimization and insight.

There are many things Mist's AI-driven microservices cloud platform can do that controllers simply cannot, and controllers never will be able to achieve these things due to their inherent architectural limitations. In fact, we dare any vendor who claims to do the following to prove it, like Mist does here. You can't hide the truth in a demo!

If you are looking for a wireless network for the next decade instead of the last one, check out the comparison below.

Now is the time to: **#RetireWiFiControllers**

AI-driven Operations

Mist combines data science algorithms with a lifetime of wireless domain expertise to create the industry's most advanced knowledge graph for AI-driven IT operations. While other IT vendors are bolting AI on top of their network platforms with limited insights, Mist built AI primitives into the fabric of the Mist Learning WLAN. No additional sensors and/or software are required.

Mist uses AI to simplify Wi-Fi operations, lower costs, and to provide unprecedented visibility into the mobile user and IoT experience. For example:

- Service Level Expectation metrics are used to categorize user data into domain specific classifiers that enable IT departments to set, monitor, and enforce service levels for key Wi-Fi metrics like Time to Connect, Throughput, Coverage, Capacity, and Roaming.
- Mutual information is used to discover which network features (e.g. device type, devices OS, AP, …) are most responsible for the success or failure of an SLE metrics.
- Self-healing algorithms built on an AI foundation analyze this data and correlates events across the wireless, wired and device domains to rapidly fix the root cause of problems and continuously optimizes the SLE metrics.
- Mist uses time series anomaly detection to detect when things are trending in a negative direction and provide insight into the magnitude of those changes.
- Major issues are detected in real-time, triggering a dynamic packet capture for cost effective problem analysis. This eliminates expensive truck rolls with sniffers.
- Events, such as config changes and firmware upgrades, are automatically correlated to errors and Service Level Expectation (SLE) degradation to accelerate resolution.
- Automated workflows can be set up and initiated when service levels fall below a threshold or negative trends are detected. With Mist, you can proactively isolate and self-heal problems before your users even know they exist.
- Natural Language Processing enables simple queries of the Mist platform for unprecedented insight into your wireless domain and minimizing searching through endless dashboards. Data is presented in an easily consumable way with integrated help desk functions.
- Tie location to network problems, so you can easily visualize exactly where on the network, coverage, capacity, roaming, throughput and connection problems are plaguing users.

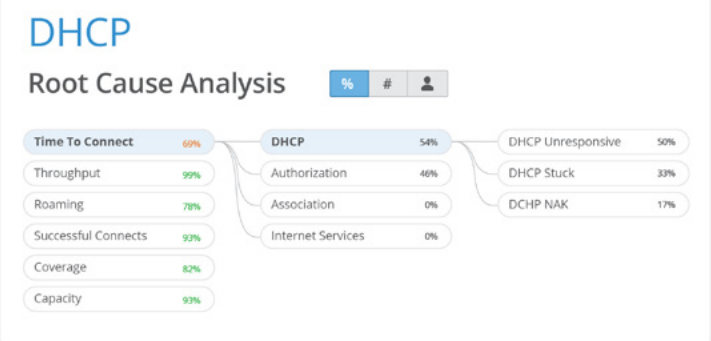
Controllers lack the compute horsepower to perform advanced data science calculations, and they don't have visibility across a global data set to correlate information across sites to detect macro trends.

Additionally, controllers use an embedded software architecture that requires months of regression testing for each release, becoming the bottle neck in an organization's speed to innovate. How long does it take your wireless controller vendor to deliver a simple bug fix or feature request?

In an increasing mobile world, an enterprise organization needs a wireless network that can scale and adapt, leveraging the next generation of AI algorithms to keep up with the innovation of their mobile strategy.

WHY THIS MATTERS

AI-driven operations can lower Wi-Fi costs by 40% or more, saving time, money and precious IT resources. Controllers already add substantially to hardware investment costs; without AI-driven operations they are also costlier from an operation standpoint.



Saas Agility for Day-to-Day Operations

Mist's microservices cloud architecture turns the monolithic controller model on its head.

Applications are split into core functions, with small teams of developers working on each service in isolation of one another. Communications between services happen asynchronously either through a message bus or an API, eliminating the complex and brittle nature of monolithic software that controllers are built on.

By leveraging microservices, it is simple to add and/or deprecate features in the Mist environment, and software fixes can be provided in days/weeks vs months / years. Compute power can be added on demand for elastic scale, without requiring additional hardware. Resilience is designed into the Mist cloud, as the failure of one service does not impact others.

WHY THIS MATTERS

The Mist model is more efficient, resilient, and much more cost effective to scale than the controller model.

Eliminate Physical Devices in Datacenter

Mist's microservices cloud architecture eliminates the need for planning, deploying, and maintaining physical boxes in the data center. Mist's cloud driven network eliminates, the need for allocating network ports, power, redundancy and management of physical controllers in the network.

By leveraging Mist, IT doesn't have to be in the business of managing scale. Adding controllers, licenses, and support licenses, every time the enterprise expands. Compute power can be added on demand for elastic scale, without requiring additional hardware. Resilience is designed into the Mist cloud, as the failure of one service does not impact others.

By comparison, controller architectures require customers to add more controller hardware in the customer network as the number of devices or APs are increased in a network. To get reliability or new features, further additional controllers or controller aggregators are required making the network grow in cost and complexity to manage and maintain.

WHY THIS MATTERS

The Mist modern cloud model liberates IT to work on more innovation projects, vs archaic maintenance of physical boxes in the network closet.

Microservices Agility for Feature Velocity

With Mist's cloud solution built on a modern microservices architecture, new features, new application support updates and device updates are rolled out weekly with no downtime.

The average controller, with its monolithic codebase, has new features available every 3-6 months. Customers fear upgrades as they require planned downtime and can adversely impact the entire feature set (requiring occasional rollbacks when a bad load is pushed).

WHY THIS MATTERS

With Mist you no longer need to plan upgrades months in advance due to risk/time to upgrade. New features and bug fixes are added with extreme agility and frequency – i.e., when you need it, not when you can schedule it. You can even test new updates, at your own time, on a subset of your network before you roll it out with a simple click to the rest of your site(s).

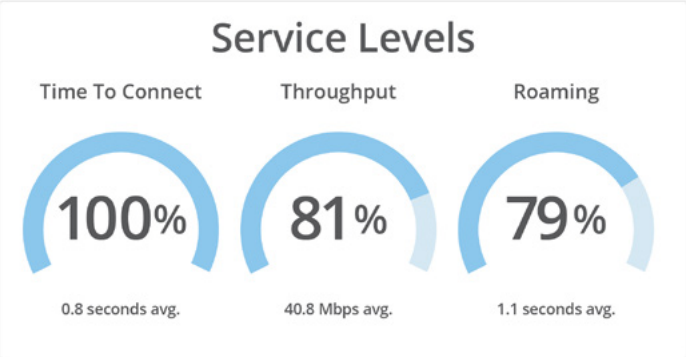
UX Visibility

Mist analyzes over 130 pre- and post-connection states from every mobile device and classifies them into key domain specific metrics that are used to set, monitor and enforce user service levels. This visibility extends from the site all the way down to the client level for unprecedented insight.

Controllers lack the compute and storage to collect and analyze this data. While they provide visibility into the network experience, they don't have the capacity to go the extra mile and give IT insight into the actual user experience.

WHY THIS MATTERS

It is one thing to know that your network is passing traffic. It is another to know exactly what level of experience you are offering to mobile users. By delivering full insight into the user experience, Mist ensures a premium Wi-Fi service over controllers.



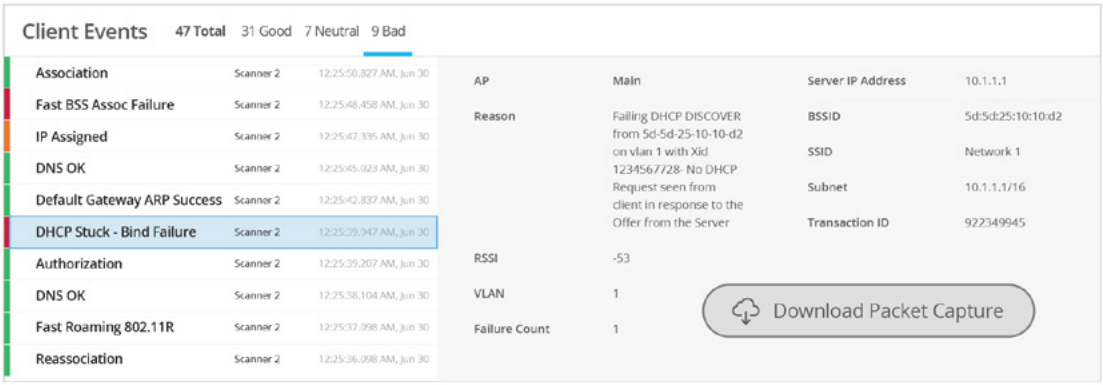
Dynamic Packet Capture

The Mist platform can proactively perform dynamic packet captures, storing the data in the cloud when a problem happens, to eliminate manual troubleshooting and accelerate problem resolution.

Controllers force admins to reproduce issues and perform manual packet captures after a problem happens, often requiring an IT engineer to travel to the site. Controllers have limited storage capacity, so the packet capture information must be stored and retrieved elsewhere and manually correlated for troubleshooting. Many controller architectures even require you to deploy overlay sensor hardware to perform packet captures...do you really want to support and pay for two networks when you could have a single integrated platform with Mist?

WHY THIS MATTERS

The controller model makes it very difficult and expensive to re-create wireless problems. This wastes time and money and leads to unhappy wireless users when problems are persistent. With dPCAP, Mist eliminates the needs for truck rolls entirely and lowers Mean Time to Repair (MTTR) substantially. This makes IT more productive and leads to happier Wi-Fi users



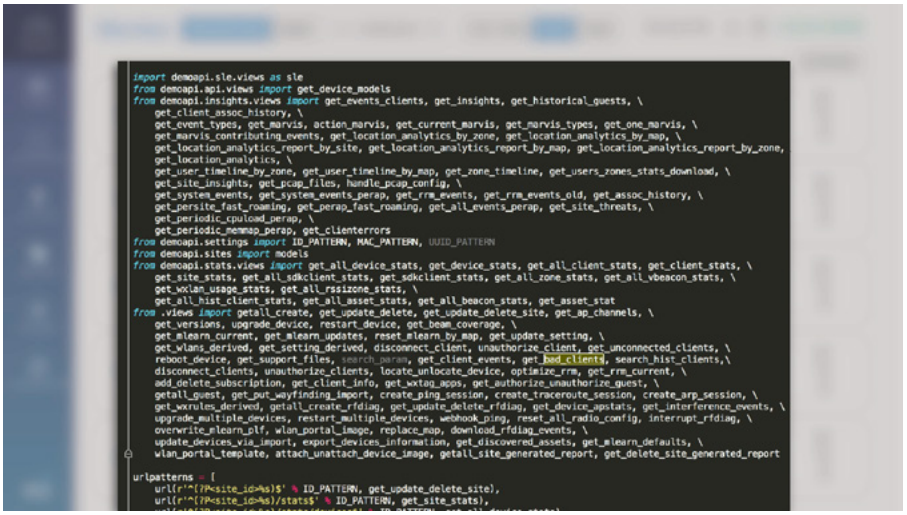
Automation via APIs

Mist's modern cloud solution is designed based on a principle of 100% API coverage. This provide full programmability and automation and delivers amazing insights from the site to the user level. When a new feature or microservice is added to the platform, the APIs to support it are automatically created at software compilation time.

Archaic controllers have a limited set of "bolt-on" APIs, which were added years after the foundation of the software was built.

WHY THIS MATTERS

The world is moving towards a DevOps mentality for IT, where automation and full programmability are critical. Only the Mist platform embraces this mentality and enables it to become a reality. Controller solutions do not.



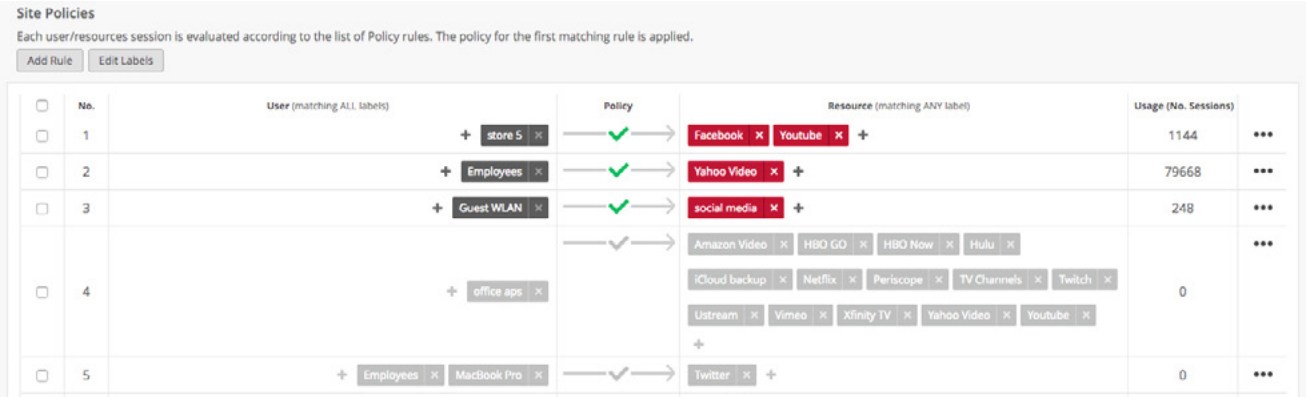
Inline Policy Engine with Personal WLANs for Microsegmentation

Mist's patented inline policy engine, WxLAN, dynamically discovers wireless users and IoT/headless devices, segments them across the network fabric, and applies policies for accessing resources (e.g. Internet, servers by IP address, URLs, applications, etc.). No ACLs or VLANs are required.

For more secure separation, Mist also offers "Personal WLANs", where devices can be segmented with a separate common preshared key for these devices on that single SSID that is created through a self-serve web page by the end-user. This allows easy onboarding of devices while maintaining complete isolation and secure segmentation of individual device groups. Applications for this span across multiple verticals such as Hospitality (for guests bringing their own devices), education dorm rooms, retail stores (for headless IoT devices such as appliances), manufacturing, and warehouses (for appliances and robots).
Controllers require an external NAC in order to classify device types and assign policy/role for segmentation of applications. They also lack the ability to create Personal WLANs and force admins to either create a new SSID for each device group or leverage firewalls and/or roles to separate the traffic with the inherent weakness of not having a separate key for each group. In both cases they require complex bolt-on Network Access Control appliance/VM servers and software.

WHY THIS MATTERS

An inline policy engine simplifies and makes microsegmentation more accurate and secure in identifying devices and apps to apply policy. A Personal WLAN offloads IT from having to manually create separate SSIDs and segmentation policies while security traffic with a separate preshared key



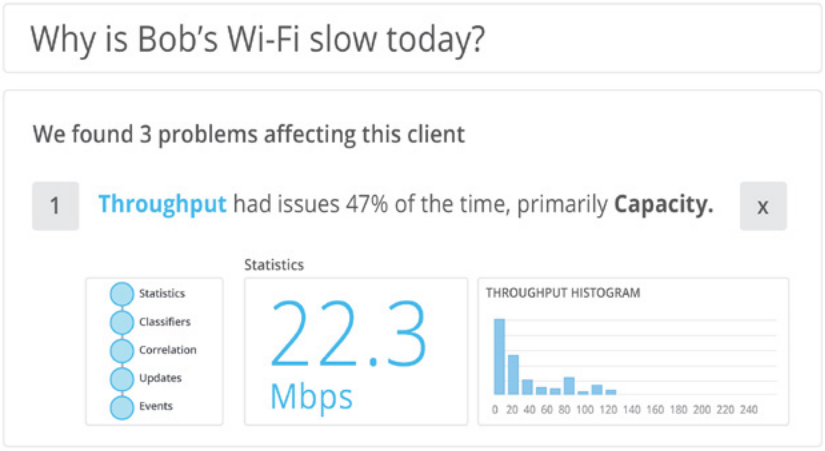
Natural Language Queries

Natural Language Processing (NLP) is a key feature that makes it easy to understand and troubleshoot your wireless environment by simply asking the system a question. This is a core function of the Virtual Network Assistant (VNA) service within the Mist platform.

Controllers lack the extensive compute power and data science to deliver NLP capability. As a result, admins must manually hunt through the UI to find answers or use 3rd party overlay tools for data mining.

WHY THIS MATTERS

NLP makes it easier to understand your network for better operational savings and new business intelligence. Having it integrated into the Mist platforms provides better insight than overlay systems and saves substantial time and money in both investment and operations costs.



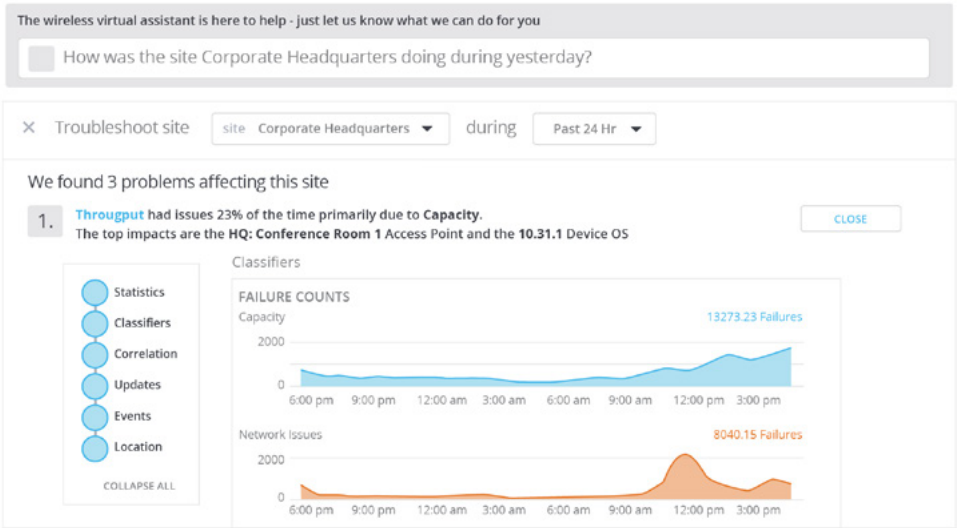
Virtual Network Assistant

With the Mist AI-driven virtual network assistant (VNA), your system will perform real-time analysis, UX baselining and proactively identify & correlate issues. This turns help desk administrators into wireless experts for faster and more efficient troubleshooting. VNA also offloads IT personnel from repetitive and complex troubleshooting, enabling them to focus on more strategic tasks.

Controllers force you to manually hunt through dashboards on multiple management interfaces, like looking for a needle in a haystack. 3rd party solutions can be overlaid on top of controllers to provide VNA-like functions, but these require time and money to deploy and operate, and they do not give the same level of visibility and insight as Mist (i.e. they don't go all the way to the client level like Mist does, and they don't have the ability to actually take action on the network).

WHY THIS MATTERS

The help desk is often staffed by a completely different set of people who lack wireless expertise (like the IT department). VNA puts turns these individuals into RF experts, enabling faster and more efficient troubleshooting (without additional overlay solutions).



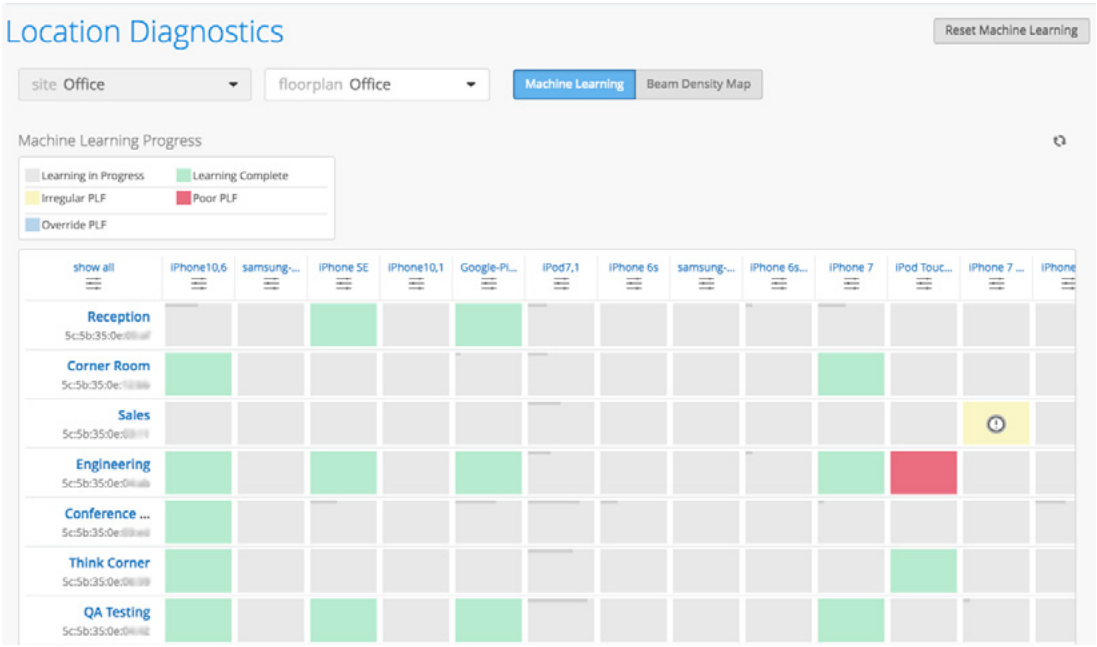
Scalable Location Services

The Mist platform uses unsupervised machine learning in the cloud combined with patented BLE antenna technology and virtual beacons to deliver highly accurate indoor location. No battery beacons or manual calibration are required with Mist for seamless deployment and operations.

Controllers lack the compute power and AI foundation to calculate accurate indoor location. Instead, they rely on the deployment of an excessive amount of APs for Wi-Fi triangulation and/or additional BLE battery beacons that are glued to the wall. Both options are extremely expensive, don't scale, increase ongoing maintenance costs and provide limited flexibility.

WHY THIS MATTERS

Indoor location services provide enormous value – from wayfinding and proximity messages to asset location. However, a reliance on Wi-Fi and/or BLE battery beacons has held back mass market adoption of indoor location to date. By converging indoor location with Wi-Fi in a single cost effective infrastructure and leveraging the cloud for accuracy and flexibility, Mist has flipped the model on indoor location. For the first time, location services are easy to operate, deploy and scale, making them ready for mass market adoption.



Real-time RF View

The Mist platform, with its RF Glasses technology, examines both the Wi-Fi and BLE Received Signal Strength Indication (RSSI) from mobile devices and continuously updates the Radio Frequency (RF) model for each type, such as iPhones, iPads, and Android smartphones. This ensures that the RF model adapts to the RF environment as it changes and accounts for differences between device types, providing a consistent user experience across mobile devices.

Mist also has the ability to do remote packet captures for location. With RF Glasses Location packet capture, you can not only replay RSSI values, you can see the speed and direction of mobile clients over a specific period of time.

Controllers use statistical models or external software to predict or estimate the RF coverage. They do not provide a real-time nor actual view of the RF environment so admins are unable to see the actual coverage.

WHY THIS MATTERS

Real-time data is critical for accurate problem detection and resolution. The RF environment is always changing, so a tool like RF glasses is critical for understating and adjusting to conditions as they evolve (in conjunction with machine learning).

> "The electric light did not come from the continuous improvement of candles." ~ OREN HARARI