Arista Cognitive WiFi

Overview

The Arista cognitive WiFi solution, uniquely harnesses the power of the cloud, big data analytics and self-awareness to automate WiFi troubleshooting and deliver the best user experience possible to both WiFi users and network administrators.

The solution is built on top of a cognitive plane that is distributed across Arista's high performance, intelligent WiFi access points (APs) at the edge and its massively scalable cloud platform. Arista's cognition plane continuously monitors close to 300 Key Performance Indicators (KPIs) and uses machine learning and cognitive computing based on deep domain expertise to convert those KPIs into essential, actionable insights for the network administrators, and when possible, let's the WiFi network self-heal.

Ease of Use

The Arista cognitive WiFi solution provides a pristine user experience to network administrators by presenting only the information that matters the most and making it easy to access via intuitive workflows. Particularly, it takes a client-first approach and provides direct insight into how WiFi clients are experiencing the network in terms of connectivity and performance. The assessment of the client experience is available both in real time and also historically — if a network administrator wants to investigate an incident in the past.

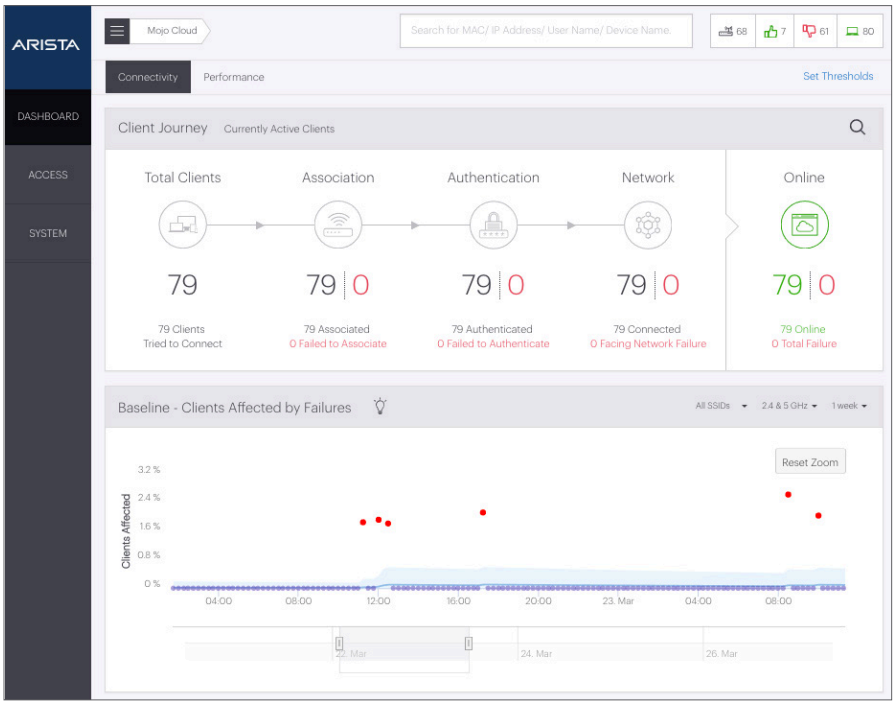
The dashboard provides a summary of key metrics, and highlights failures, anomalies or anything that may hamper the WiFi user experience and requires attention. The information is interactive making it easy to gain further insight by mouse-hover or to click and drill down into the context of a specific WiFi client, an AP, an application or a statistical data point in a chart.

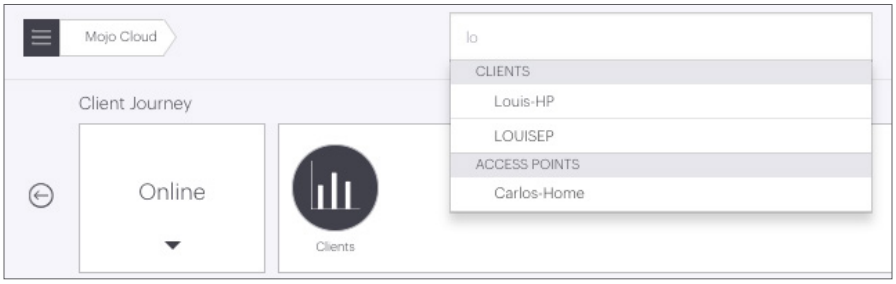
Being able to quickly search and drill down to a WiFi user or client on the UI is often the most critical first step in troubleshooting a user-reported WiFi issue. The Arista cognitive WiFi solution minimizes the time and pain it takes to find a troubled client by providing global, dynamic search for clients on the network. The main search bar is readily accessible at the top of the dashboard and it dynamically searches for clients based on their MAC address, IP address, user Name (802.1x), or device name refining the search as you type, character by character.

Troubleshooting Connections and Performance

WiFi issues can be divided into two general categories:

- Users experience network downtime because their WiFi device is unable to connect
- Users experience poor performance while using the WiFi network





The approach and information needed for troubleshooting these two types problems is different.

Connection Failures

Using the deep domain expertise embedded into Arista APs, the connection analysis engine monitors each client as it attempts to connect to the WiFi network. If a connection problem occurs, the engine detects it in real time, determines the root cause of the problem, and reports it to the UI that displays it in an easy to understand language.

Client Journey - Location

The Client Journey provides a quick view into the type and number of client connection problems by showing the attempts and failure as clients go through the association, authentication, and network (DHCP and DNS) connection steps. It aggregates the data for the currently active WiFi clients that are attempting to connect or successfully connected to Arista APs and shows the total number of clients that attempted to connect and how many of those passed or failed at each of the association, authentication and

network phases. Hovering over the number of failed clients in a connection phase shows the root cause and number of each type of connection error.

Client Journey - Individual Client

The Client Journey can also be used to see the details of individual client's connection. Searching and selecting the client by using the search bar on the Client Journey's graph, shows the details of user's last connection attempt. It shows the connection details (success/ failure, latency, etc.) and allows you to drill down into the client's connection logs.

Performance

Once clients are connected, the user experience and application performance largely depends on the quality of a client's connection. The Arista cognitive WiFi solution provides direct insight into client health and reports clients experiencing WiFi issues (e.g., low RSSI or poor coverage, low data rate, high retry rate and stick clients) that may eventually lead to poor application performance or user experience. It also provides latencies for the various network services such as DHCP and DNS and latency experienced by TCP-based applications.

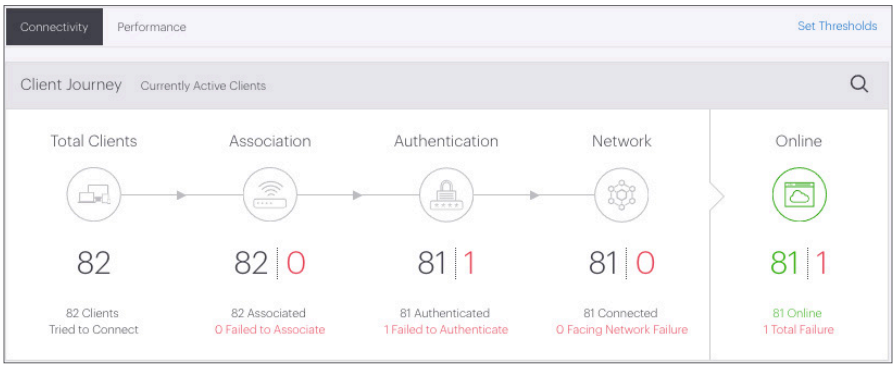
Application Quality of Experience (QoE)

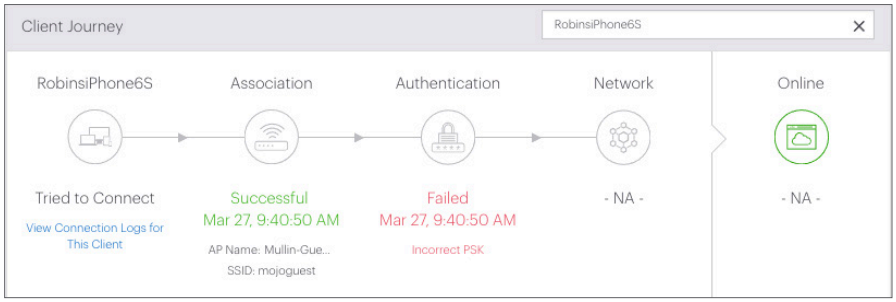
Using machine-learning, the Arista cognitive WiFi solution is able to determine the QoE for specific applications, and the clients impacted by poor experience.

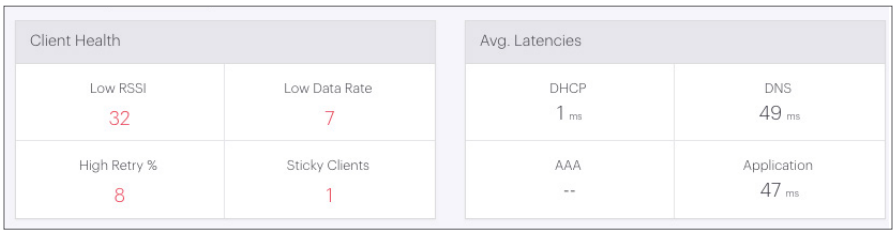
Network Baselining

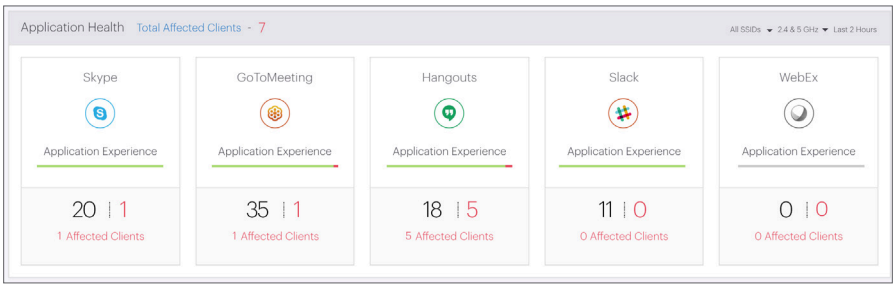
Traditional network monitoring systems use manually set and tuned thresholds to trigger alerts. Most network managers disable these warning because there are too many false alarms.

Arista cognitive WiFi provides baselines to characterize "normal" network behavior and highlights anomalies or significant deviations





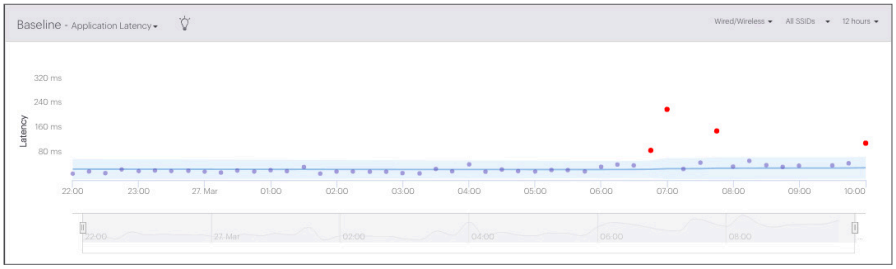


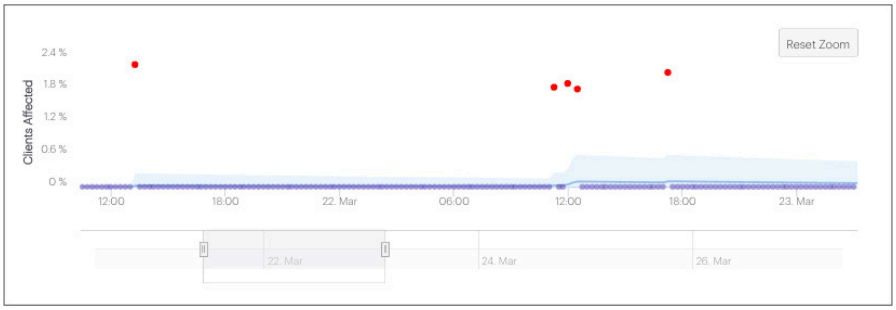


from those baselines. Baselines, like networks, are dynamic and adjust as the network characteristics change. Each baseline graph contains three components that make normal and unusual behavior easy to see:

- Baseline
- Deviation range
- Anomalies

The deviation range plots the standard deviation of the data points and adjusts with the baseline as more data points are added. Anomalies--data points that differ significantly from the baseline and deviation range--are highlighted in red for further investigation.





Application Latency

End-to-end application performance depends on both WiFi and wired networks over which packets traverse. Users often blame WiFi for performance problems when there could be a problem with wired side of the network. Using deep packet inspection (DPI), Arista parses all TCP connections for the network and separates them into wired and wireless components. The Application Latency baseline graph displays the wired and wireless components of TCP latency. Comparing these baselines allows you to narrow down the troubleshooting focus to the wired or wireless part of the network.

Troubleshooting

The Arista cognitive WiFi solution takes the pain out of WiFi troubleshooting by largely automating the detection and root cause analysis of failures and anomalies, even in situations when the problem is not with WiFi, but elsewhere on the network. However, at times, a deeper look or further analysis may be necessary. Traditionally, advanced WiFi troubleshooting has been a painstaking process, often requiring personnel to travel to the site, set up test gear, attempt to reproduce the problem and collect relevant information if everything goes as planned. Arista also simplifies advanced WiFi troubleshooting with its Auto Packet Capture and Client Emulation features.

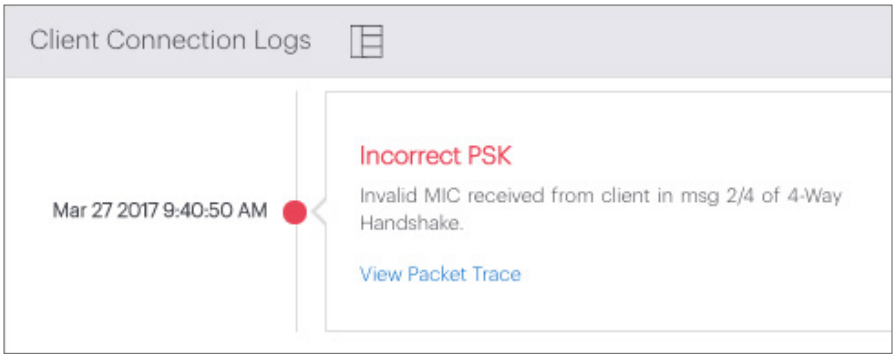
Auto Packet Capture

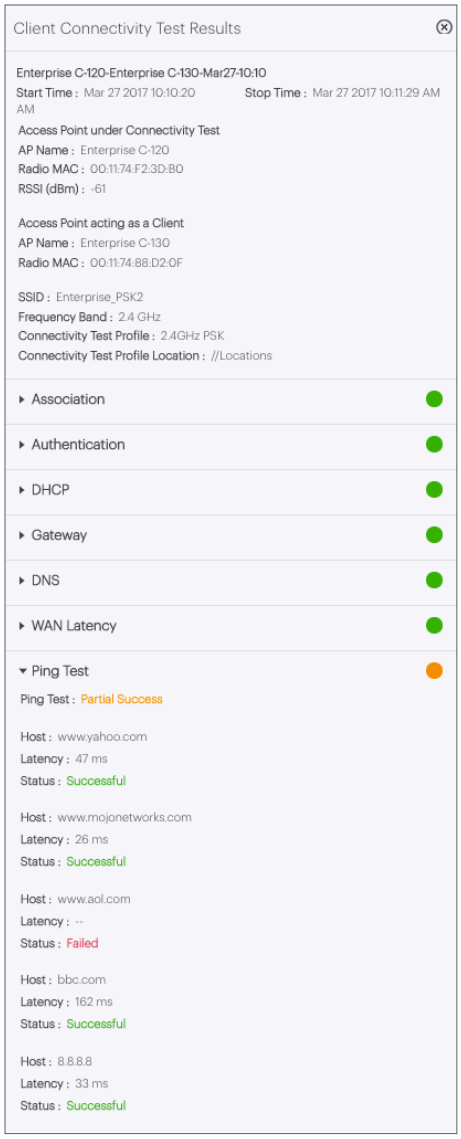
Network administrators often rely on capturing packet traces for advanced WiFi troubleshooting. However, in many cases, by the time a packet trace is captured, the problem has gone away. The administrator has to coordinate with the user(s) that experienced and reported a problem and seek their help in reproducing the problem so that it can be captured in a packet trace. Special tools for WiFi packet capture and analysis, and presence of onsite WiFi experts is often needed.

The Arista cognitive WiFi solution provides a smarter, automated way of capturing packet traces when it matters. Each Arista AP captures packets for each client as it connects to the network. When a problem occurs, the AP uses its in-built connection analysis engine to detect the problem, perform root cause analysis, save the captured packets, and report all that information to the cloud.

All necessary information is captured in real-time, as the problem occurs and available at your fingertips in the context of the specific WiFi client that experienced the problem. No need to travel to the site with special tools to try to reproduce the problem and capture a packet trace.

Reviewing the trace is easy. It can be downloaded locally for review with your favorite sniffer tool or even better, the trace can be seamlessly uploaded to the Arista Packets tool for graphical analysis without having to sift through thousands of raw packets.





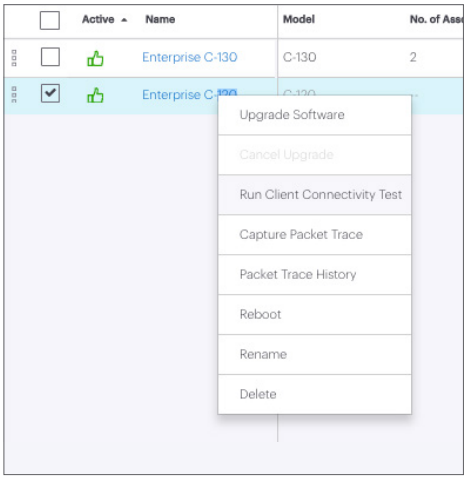
Client Emulation

By converting the third radio of Arista's tri-radio APs into a client, administrators can emulate WiFi clients and run WiFi connectivity and performance tests. This can be done by selecting WiFi APs to test, defining the test profile (e.g., SSID profile, frequency band, and websites or services to ping), and selecting the tri-radio APs to be used as WiFi clients. The tests can be run on-demand or scheduled for automated execution.

The client emulation testing evaluates connectivity and latency of:

- Association
- Authentication (PSK or 802.1x)
- DHCP
- Gateway
- DNS
- WAN Latency - to www.google.com
- Ping to selected servers

Using client emulation, network administrators can experience the WiFi network before their WiFi users do, and also validate user-reported "WiFi issues."



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