

# mojo

*Cognitive WiFi™*. Brilliant.

Radek Černý, SE for DACH & CEE & MEA

June 2018



Established in 2003



AirTight<sup>®</sup>  
NETWORKS



mojo Networks

Renamed in November 2015



Why We Exist?

To increase the pace of innovation in networking by breaking the proprietary business model



What We Deliver?

The next generation of Enterprise WiFi



Target Markets

Service Provider (Telco, MSO), Education, Enterprise, Retail



Customers

2000+ Customers, 500,000+ WiFi MOJO Access Points shipped



Competitions

Cisco/Meraki, HPE/Aruba, Arris/Ruckus



Employees

350 brilliant people in Mountain View, CA (HQ) and Pune, India



Mojo Investors

Presidio, Trident, Granite, Walden, Morgan Stanley

Large Enterprise	Retail & Hospitality	Education	Service Providers & OEM	Federal
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# Industry Recognition



## WiFi's evolving role in IoT

WiFi is often the obvious choice for IoT applications. As the number of new specifications, 802.11ah, ad, ax and ay paving the way for Wi-Fi's future, Wi-Fi Now attendees told

By Jatin Parekh, VP Product, Mojo Networks (Network World) | 12 May, 2017 01:05

Mojo Networks, Inc.

recognized by CIO Review magazine as



An annual listing of 30 companies that are at the forefront of providing wireless solutions and impacting the marketplace

NETWORKWORLD

Home - LAN & WAN - WiFi

## Toward a bigger, faster, denser Wi-Fi world

802.11ah, ad, ax and ay paving the way for Wi-Fi's future, Wi-Fi Now attendees told



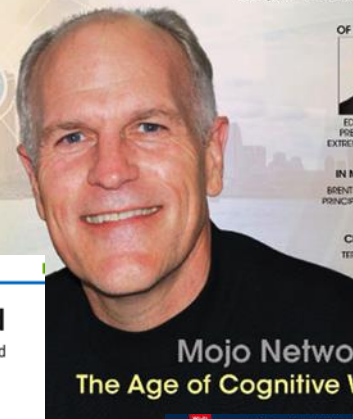
By Bob Brown  
News Editor, Network World | APR 20, 2017 5:45 AM EDT

NETWORKWORLD

So there's big Wi-Fi, and then there's really big. Kaustubh Phanse, VP in the Office of CTO for Mojo Networks, covered his company's ongoing project with Reliance Jio to build a billion-user Wi-Fi network in India as part of a broader network expansion by the service provider involving 4G and fiber rollouts. Some 70,000 access points have already been rolled out and more than a million will be distributed over the next 12 months if all goes as planned, he says.



Mojo Networks' Kaustubh Phanse: The company comparing plan benefits analysis to a very large scale.



Mojo Networks:  
The Age of Cognitive Wi-Fi

Internet | Reliance Jio | WiFi | Reliance | Mojo Networks | Jio | Google | NBN Ltd | Artificial Intelligence and Machine Learning

## Mojo Networks: Company behind Reliance Jio's WiFi network is now eyeing India's public WiFi market

Kiran Deshpande, Co-Founder & President of Mojo Networks told ET Telecom that the company is eyeing India's public WiFi market.

Danish Khan | ET Telecom | Updated: July 06, 2017, 14:05 IST

Share 11 | Like 0 | Comment 28 | Tweet



NEW DELHI: US-headquartered Mojo Networks is bullish about public Wi-Fi space "deeply" engaged v

a product review from  
**YDT**  
yourdailytech.com

mojo Networks

## Review: Mojo Networks Levels Up WiFi with C-130 Tri Radio

by Lindsay Coble, SecurityTechFeature Columnist | Feb 2, 2017

WiFi is king in the technology realm. From digital businesses to coffee shops to schools to hospitals, everyone depends on WiFi. Compliance security requirements, a rising population of wireless devices on the network, and the increasing dependence on WLAN as a primary access method have only continued to increase the importance of a good WiFi infrastructure.

would end up disabled, limiting the visibility and effectiveness of the scanning.



Mojo C-130 Product

An alternative option is deploying extra access points strictly for scanning and configured as a "sniffer" mode. However, enterprises face the following challenge when accounting for a persistent channel scanning platform in this manner: increased costs in the form of devices and on-going maintenance, updating infrastructure cost, and Ethernet port costs.

Overall, it is a very costly and untenable solution. A third answer, however, is to deploy a tri-radio access point.

Businesses depend upon effective WLAN performance optimization, a strong WIPS (wireless intrusion prevention) security platform and flexible troubleshooting options in their WiFi infrastructure to keep, protect, and maintain the reliability of networks and keep users content accessible. To meet all these needs, enterprises need to deploy persistent channel scanning that searches across the WLAN infrastructure for threats and preserves the health of the WiFi. However, the challenge exists in that most enterprise access points presently are only dual radio: in a dual radio access point, both radios are deployed (level 1) to provide consistent and WiFi access. In this setup, typically one radio is in the 2.4GHz spectrum and one in the 5GHz spectrum.

In order to achieve and maintain persistent channel scanning, there are several choices. First, background scanning, a function by which access radios periodically hop to off-network channels, has been the de facto standard for a while to accomplish this goal. However, high bandwidth applications like voice and video are making this method of scanning antiquated and worthless especially since that background scanning

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# Renowned Best WiFi Security

**#1 Gartner**

Marketscope for Wireless LAN  
Intrusion Prevention Systems

**37+ Patents**

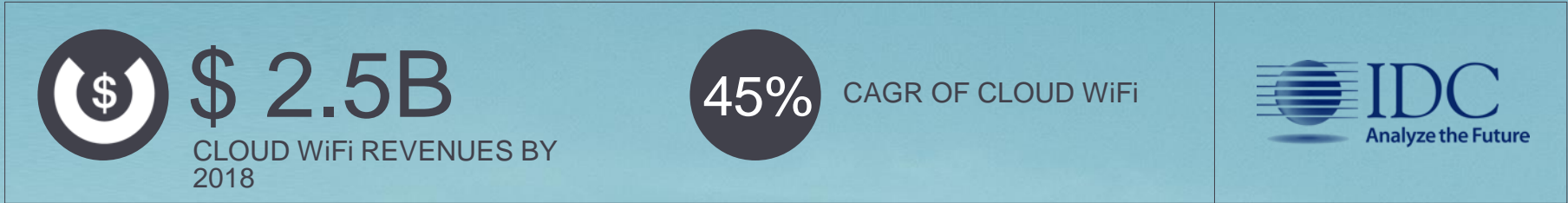
**2000+  
Customers**



Marketscape

Recognized as the best Wi-Fi security for 10+ years

# The Market: Cloud for Enterprise WiFi



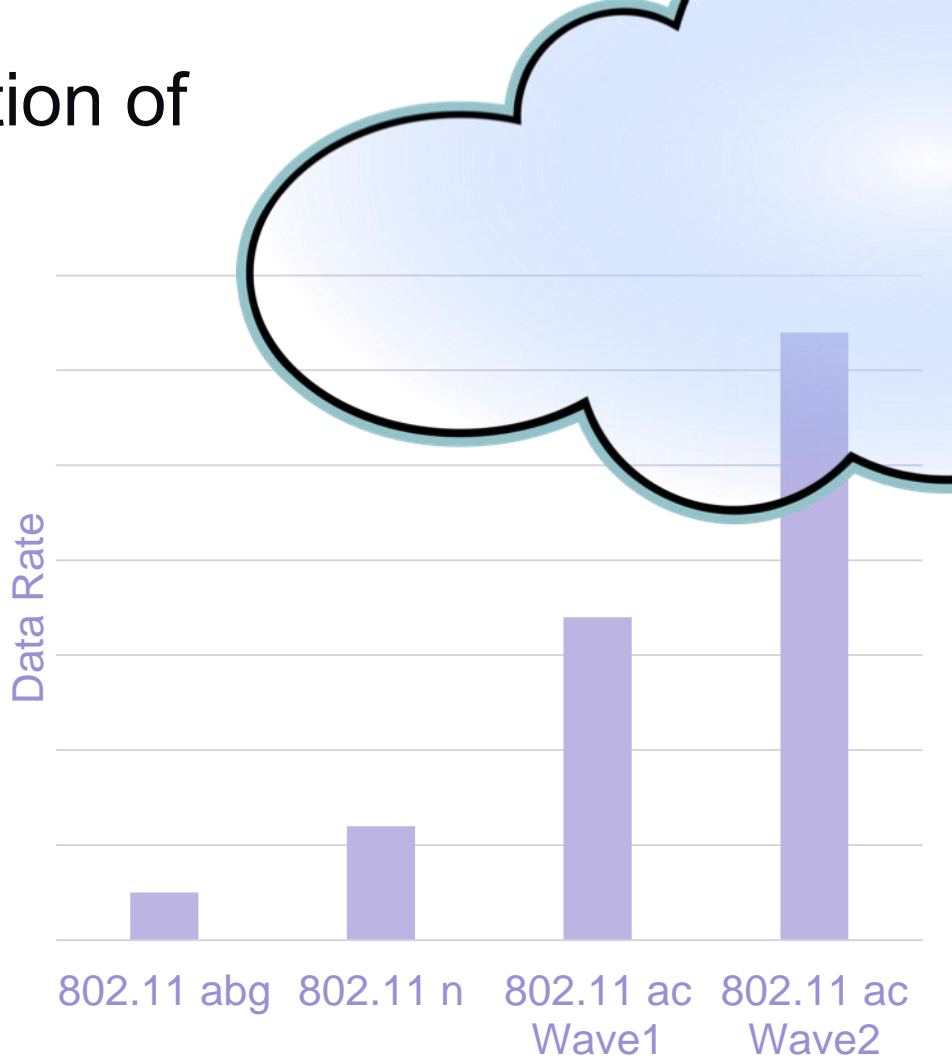
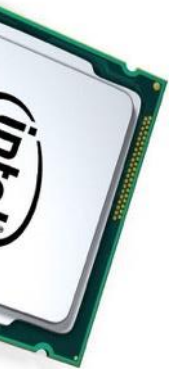
Source: IDC



Source: Dell'Oro, July 2016

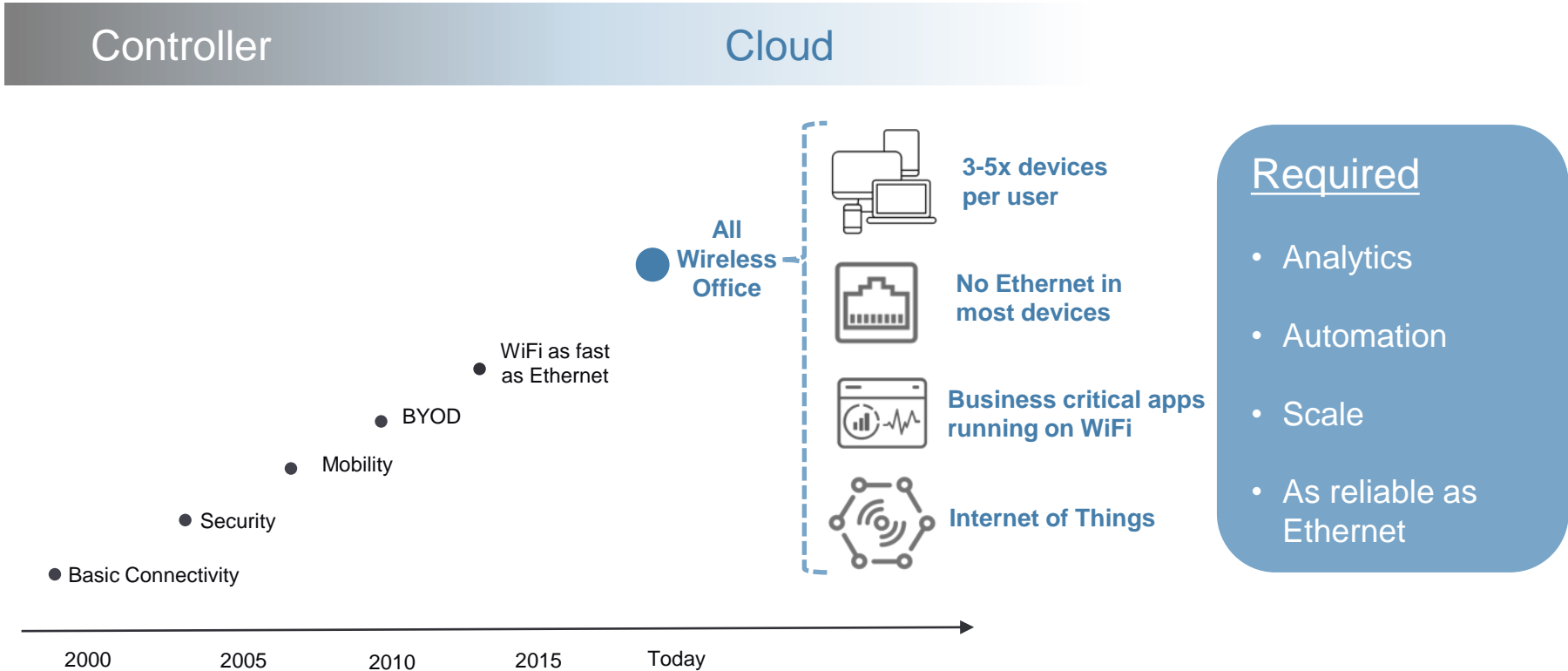
# We're Exploiting the Evolution of Core Technologies

- CLOUD
- WiFi is as fast as Ethernet
- More powerful  $\mu$ processors
  - In the data center AND at the edge





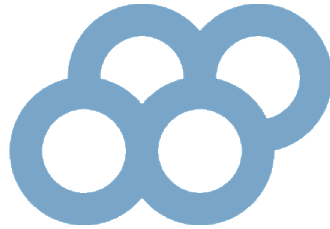
# Enterprise WiFi Evolution: Stakes are Higher than Ever Before!



# To Realize Our Vision for Enterprise WiFi

100% Cloud based  
NO MORE controllers

Radically less expensive



Reliable enough to be the  
**EXCLUSIVE** connection to  
the network

High Performing

Secure

# Ensure the Security of your Applications IN the Cloud

AWS manages data center security OF the cloud



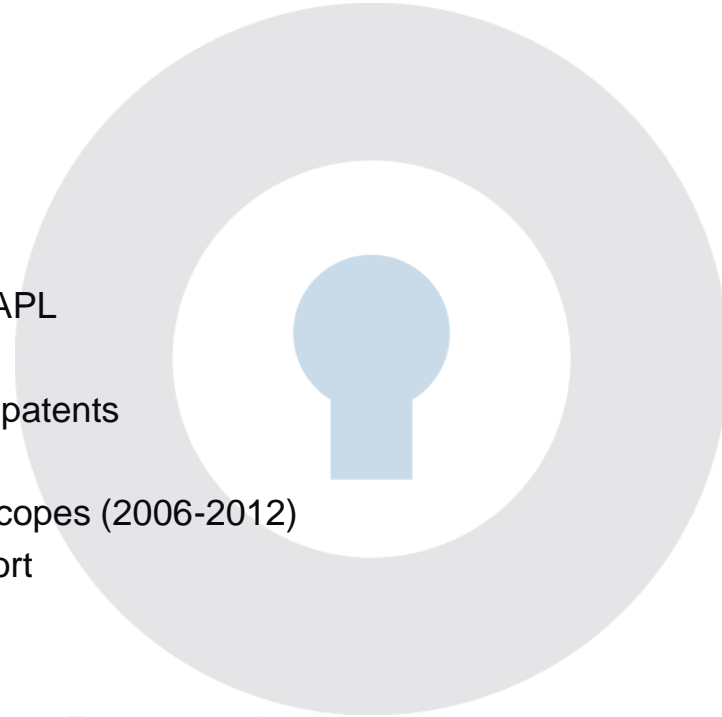
Only Mojo Networks has received SOC Type 1 & Type 2 attestation for application management security IN the cloud

From Amazon Web Services Shared Responsibility Model:

Customers retain control of what security they choose to implement to protect their own content, platform, applications, systems and networks, no differently than they would for applications in an on-site datacenter.

# Mojo AirTight

- Launched in 2004
- NIAP EAL 2+ Certified
- FIPS 140-2 Certified
- First dedicated WIPS listed on the DISA UC APL
- Market Leadership
  - Seminal patent for WIPS, + 30 additional patents
  - 20+ additional patents pending
  - Top rated in all 6 Gartner WIPS Market Scopes (2006-2012)
- Worldwide customers, distribution, and support



## The Leader in Wireless Intrusion Prevention

# Mojo 802.11ac AP Family



C-65	W-68	C-75	O-90	C-100	C-110	C-120	C-130
2x2:2 MIMO 802.11ac Wave 1	2x2:2 MIMO 802.11ac Wave 1	3x3:3 MIMO 802.11ac Wave 1	3x3:3 MIMO 802.11ac Wave 1	2x2:2 MU-MIMO 802.11ac Wave 2	2x2:2 MU-MIMO 802.11ac Wave 2 Tri-Radio	4x4:4 MU-MIMO 802.11ac Wave 2	4x4:4 MU-MIMO 802.11ac Wave 2 Tri-radio
1x Gigabit Ethernet Port	5x Ethernet Ports 2x Gigabit pass through	2x Gigabit Ethernet Ports USB 2.0	1x Gigabit Ethernet Port	1 x Gigabit Ethernet Ports	1 x Gigabit Ethernet Ports	2x Gigabit Ethernet Ports	2x Gigabit Ethernet Ports
<ul style="list-style-type: none"> <li>Horizontal or vertical mounting support</li> <li>Best for branch offices, stores and small classrooms</li> <li>802.3af</li> </ul>	<ul style="list-style-type: none"> <li>Wall mount, 4x switch ports</li> <li>Best for dormitories, hotels, apartment building</li> <li>802.3af</li> </ul>	<ul style="list-style-type: none"> <li>Internal or external antenna options</li> <li>802.3af or DC power options</li> <li>perfect for busy environments with diverse client ecosystem and WiFi requirements.</li> <li>802.3af</li> </ul>	<ul style="list-style-type: none"> <li>Internal &amp; external antenna options</li> <li>Best for stadiums, outdoor spaces, weather-affected environments</li> <li>802.3at</li> </ul>	<ul style="list-style-type: none"> <li>Low cost Wave-2</li> <li>Best for medium density, SMB, Retail, K-12</li> <li>802.3af</li> </ul>	<ul style="list-style-type: none"> <li>Low cost Wave-2</li> <li>Best for medium density SMB, Retail, K12 Schools, Enterprise</li> <li>802.3af</li> </ul>	<ul style="list-style-type: none"> <li>Latest QCA chipset</li> <li>Best for high density, enterprise, classroom and auditoriums</li> <li>802.3at</li> </ul>	<ul style="list-style-type: none"> <li>2x2 ac 3rd radio for dedicated WIPS/RF monitoring</li> <li>Best for high density, enterprise, classroom and auditoriums</li> <li>802.3at</li> </ul>
<ul style="list-style-type: none"> <li>AP + 1-year \$595</li> <li>AP + 3-year \$775</li> <li>AP + 5-year \$955</li> </ul>	<ul style="list-style-type: none"> <li>AP + 1-year \$595</li> <li>AP + 3-year \$775</li> <li>AP + 5-year \$955</li> </ul>	<ul style="list-style-type: none"> <li>AP + 1-year \$675</li> <li>AP + 3-year. \$855</li> <li>AP + 5-year. \$1,035</li> </ul>	<ul style="list-style-type: none"> <li>AP + 1-year \$775</li> <li>AP + 3-year. \$955</li> <li>AP + 5-year. \$1,135</li> </ul>	<ul style="list-style-type: none"> <li>AP + 1-year \$615</li> <li>AP + 3-year. \$795</li> <li>AP + 5-year. \$975</li> </ul>	<ul style="list-style-type: none"> <li>AP + 1-year \$745</li> <li>AP + 3-year. \$970</li> <li>AP + 5-year. \$1,195</li> </ul>	<ul style="list-style-type: none"> <li>AP + 1-year \$785</li> <li>AP + 3-year. \$965</li> <li>AP + 5-year. \$1,145</li> </ul>	<ul style="list-style-type: none"> <li>AP + 1-year \$860</li> <li>AP + 3-year. \$1,085</li> <li>AP + 5-year. \$1,310</li> </ul>

# Incomming ...

## Mojo S-2000 series PoE+ Gigabit Ethernet switches



### Available April/May 2018

- Cloud-managed PoE+ Gigabit Ethernet Switches
- Full-featured Layer 2
- S-2008P 8-port
- S-2024P 24-port
- S-2048P 48-port
- 130W PoE budget for S-2008P
- 370W PoE budget for S-2024P
- 740W PoE budget for S-2048P
- 19" Rackmount, 1U form factor.

# Mojo W-118 – Tri-Radio Wallplate Access Point

**Available April/May 2018**



- 2x2:2ss 802.11ac Wave 2 Client Radios
- 2x2:2ss Third Radio
- Integrated BLE beacon
- Three Wired Ports
- One 802.3af PoE PD output
- Supports Client Simulation Testing, Full-time WIPS Scanning,

# Mojo O-105 – Dual-Radio Outdoor Wave 2 Access Point

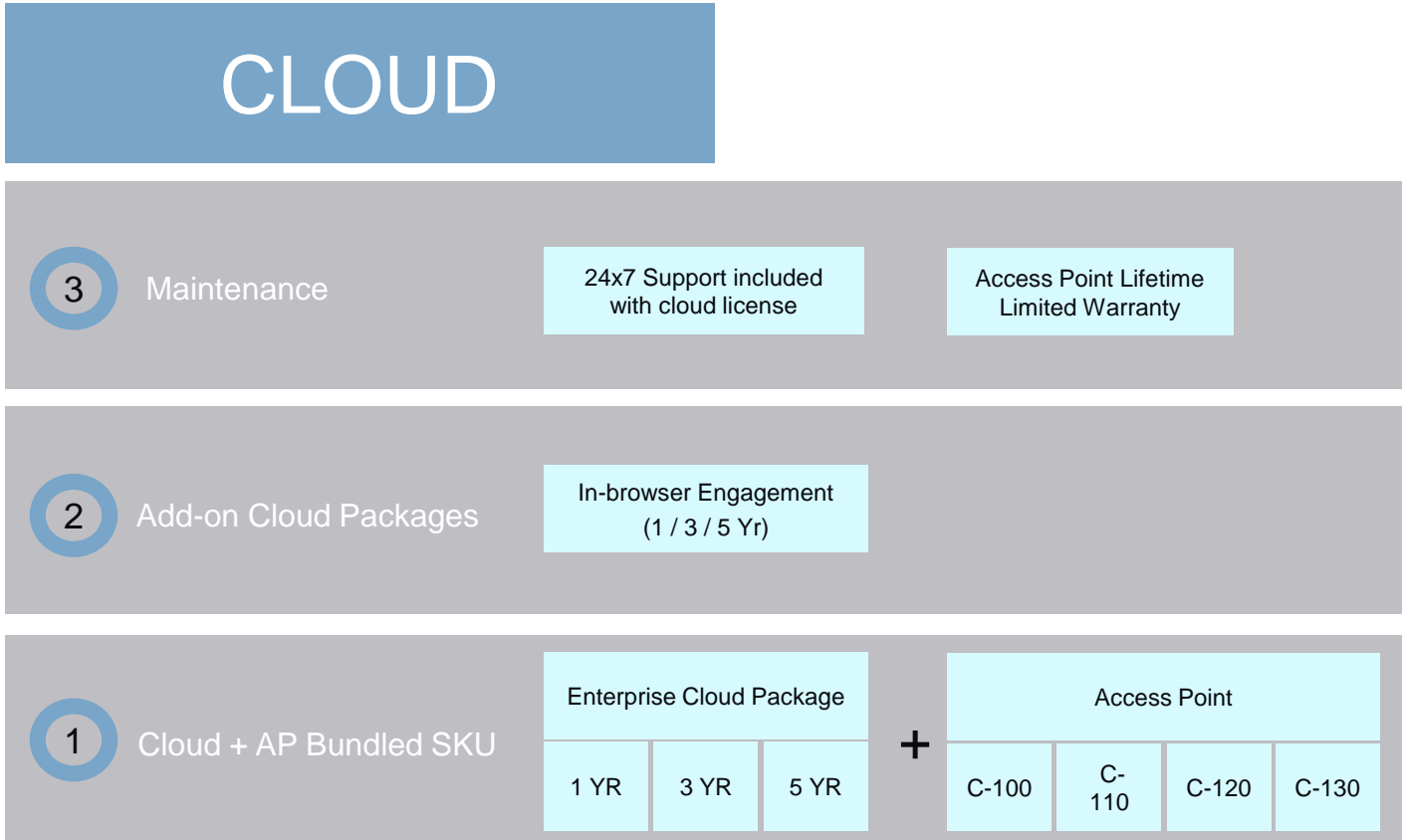


**Available TBD**

- O-105 – Internal Antennas, O-105E – External Antennas
  - Other additions possible
- 2x2:2ss 802.11ac Wave 2
- Integrated BLE beacon
- IP67 grade
- Temp: -40C to +65C

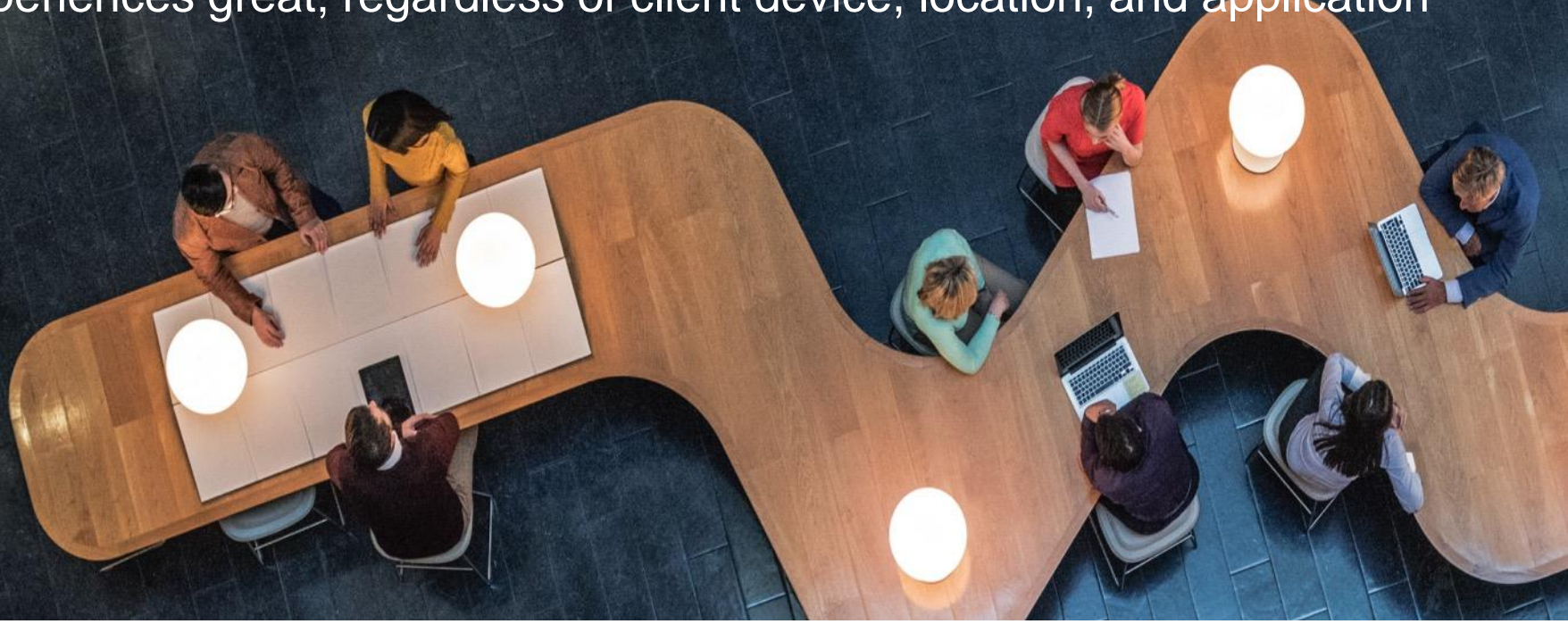


# Cloud Product Offering – All-in-One



Cloud Makes Cognitive WiFi Possible: harnessing the power of the cloud to apply AI to massive amounts of network data

Result: A self-aware, self-correcting network that makes user experiences great; regardless of client device, location, and application



# Cognitive WiFi: AI at work in Real Time

Know WiFi clients that fail to connect or experience poor performance

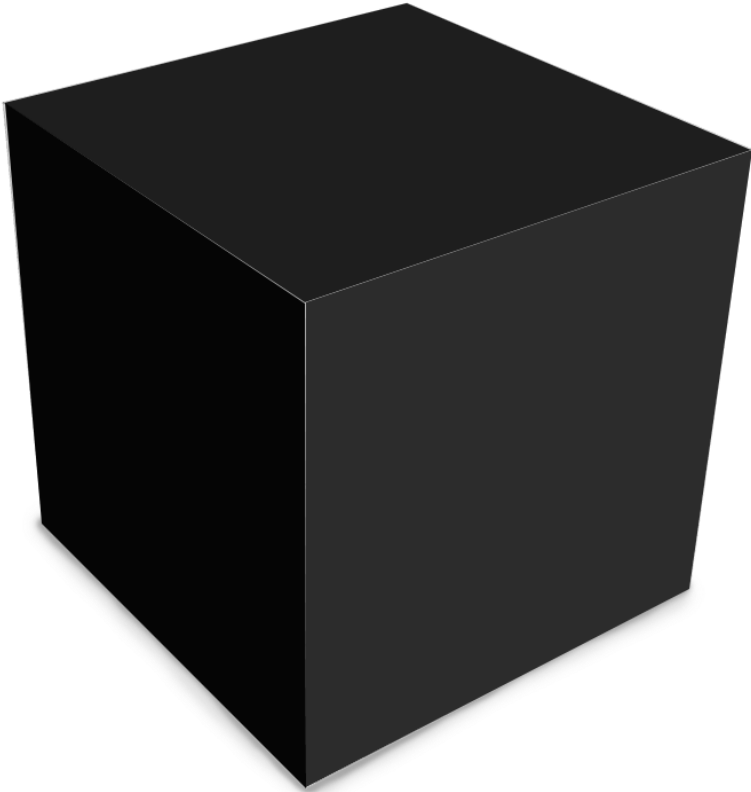
Know the exact reason, WiFi or wired, for every WiFi client failure, automatically remediate WiFi problems



Monitor network latencies (AAA, DHCP, DNS, WAN) that affect client experience

Troubleshoot in no time user-reported "WiFi issues"

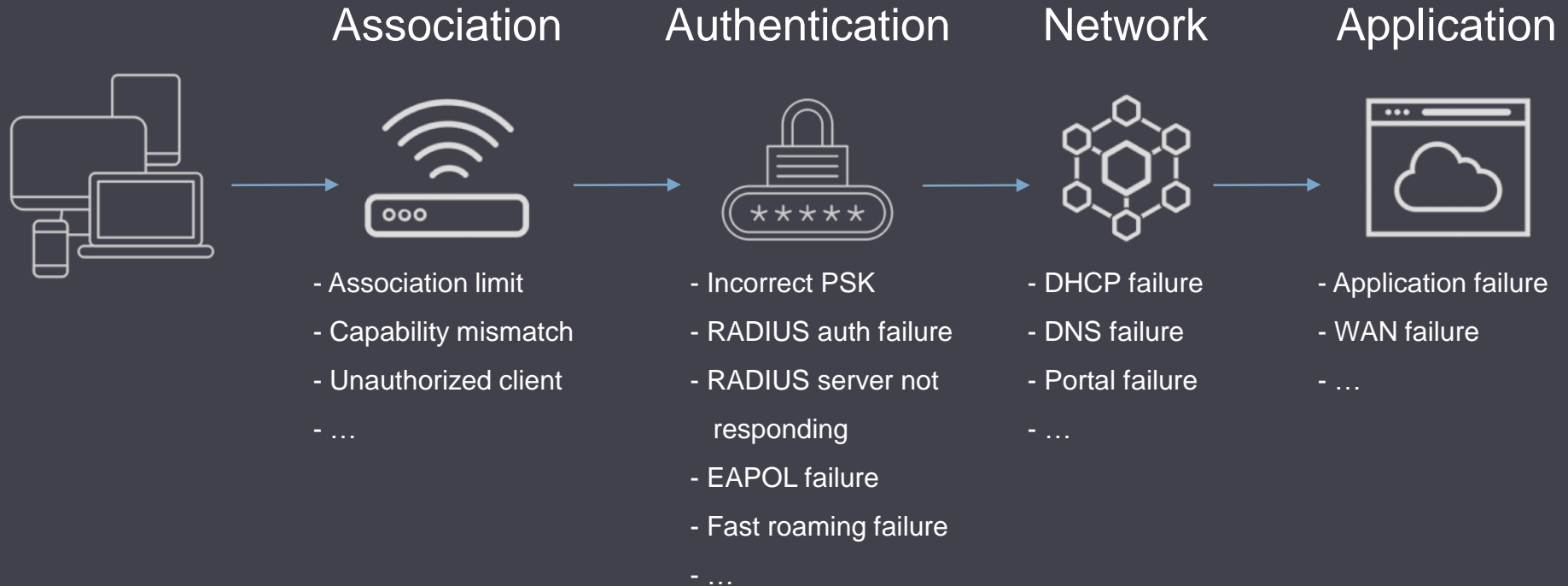
# Legacy Networks Lack Visibility



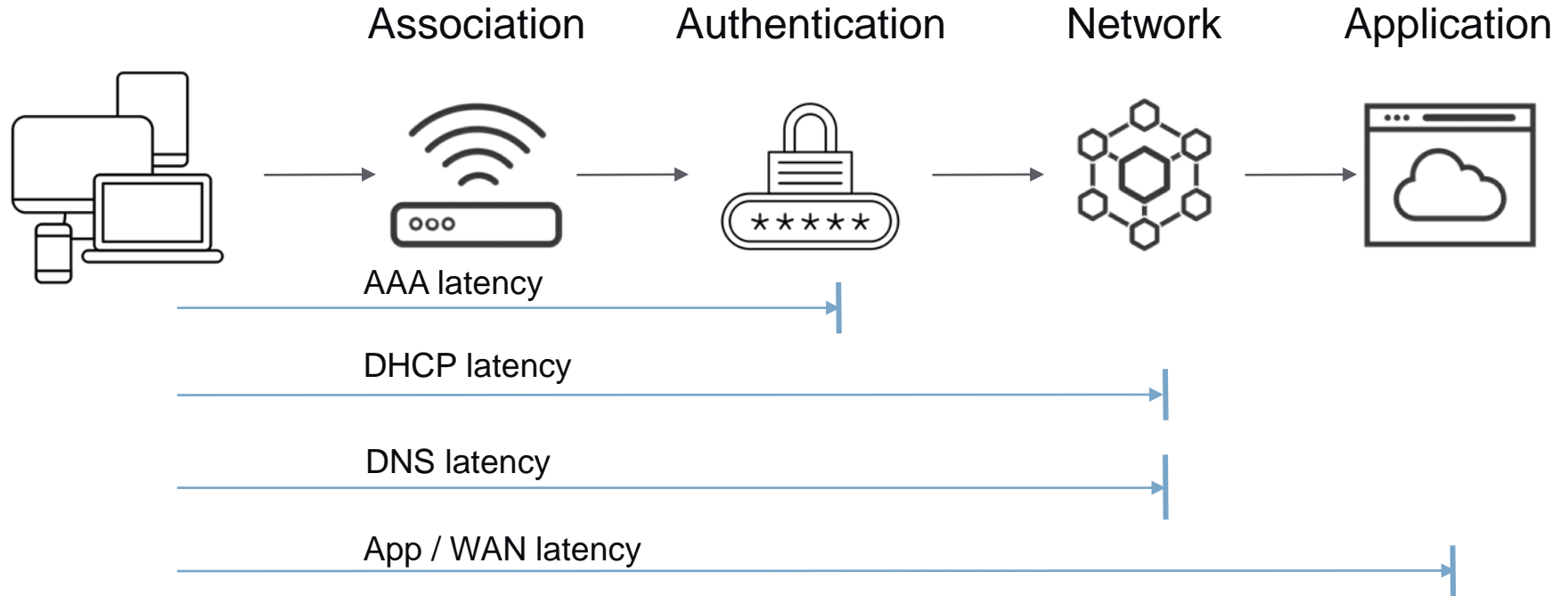
# Mojo Networks Offers Complete Visibility In an Instant



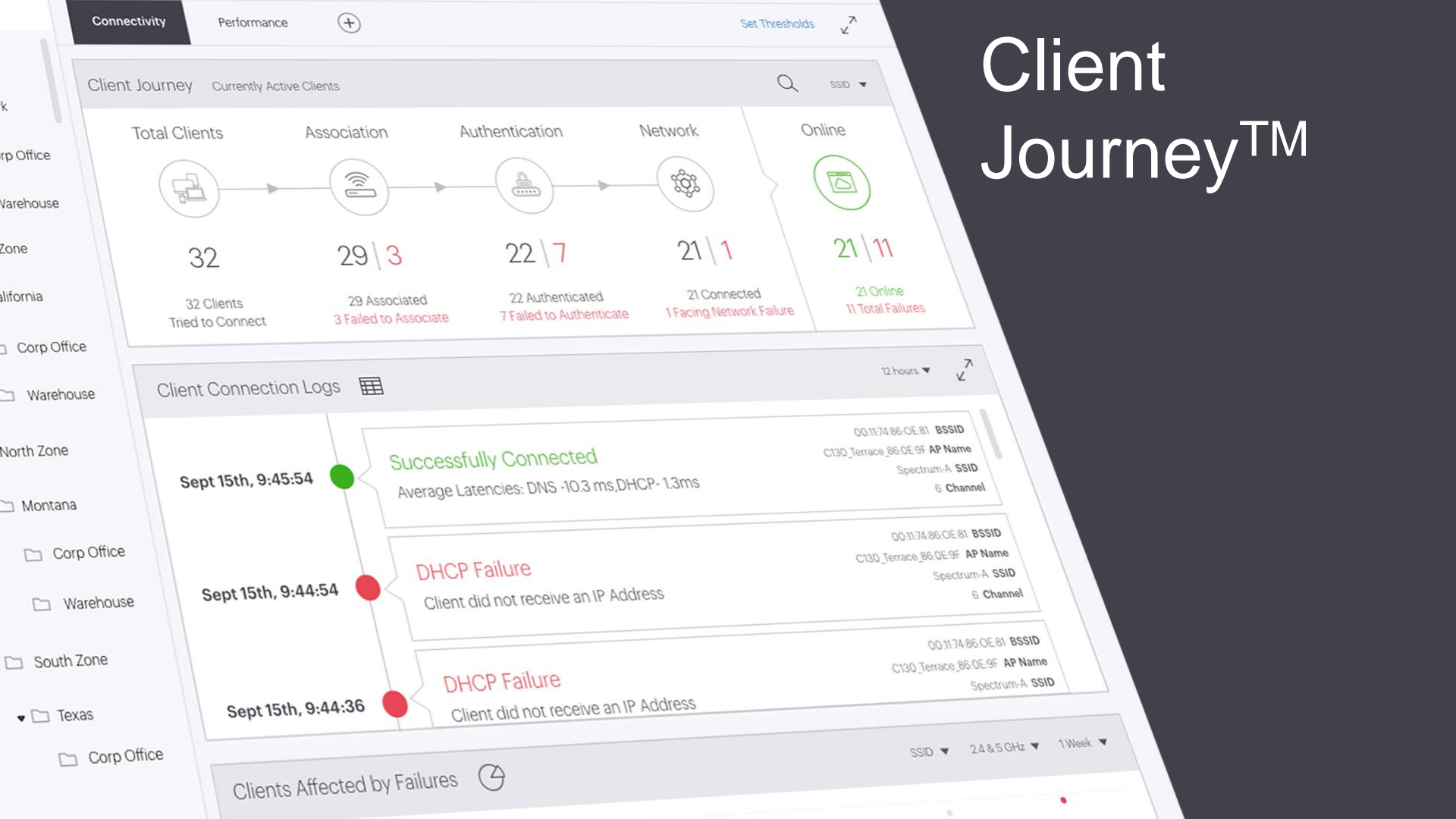
# WiFi user experience depends on more than just WiFi



# WiFi user experience depends on more than just WiFi



# Client Journey™



Connectivity

Performance

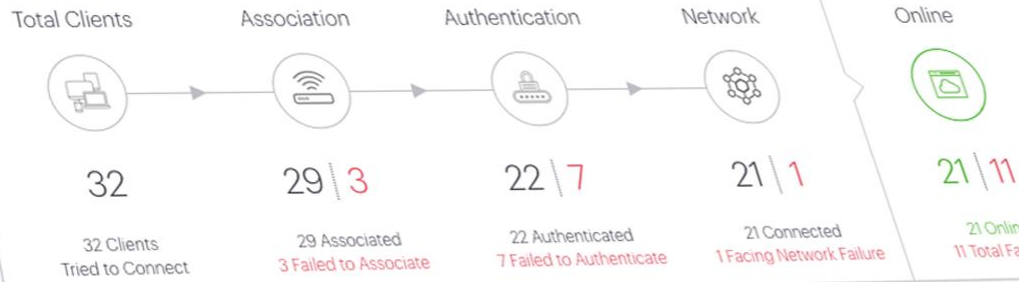


Set Thresholds



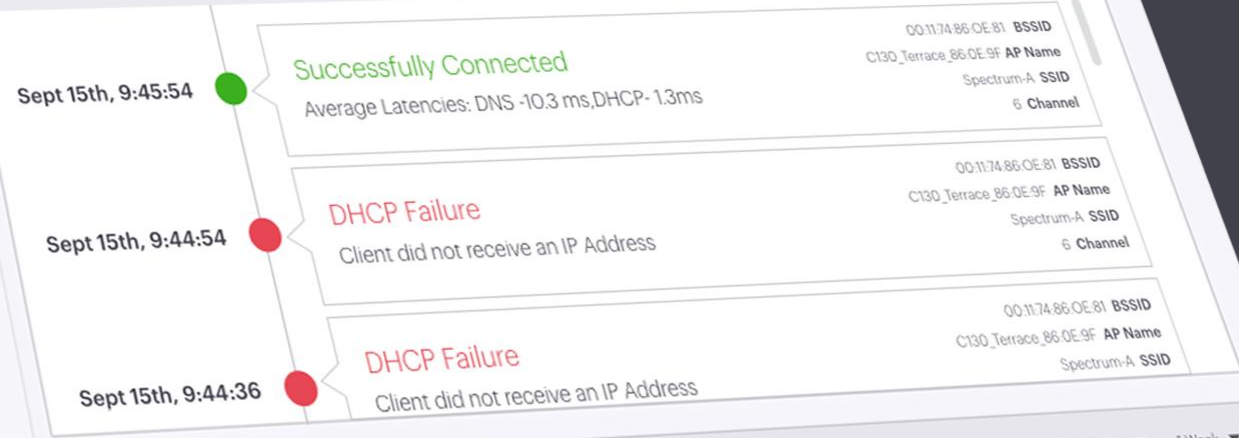
Client Journey Currently Active Clients

SSID



Client Connection Logs

12 hours



Clients Affected by Failures

SSID 2.4 & 5 GHz 1 Week



While you were away, [view incidents](#) occurred on your network that requires attention!

# Machine Learning

Access Points

Mojo\_F2:20:9F(...)

Mojo\_F2:20:9F(...)

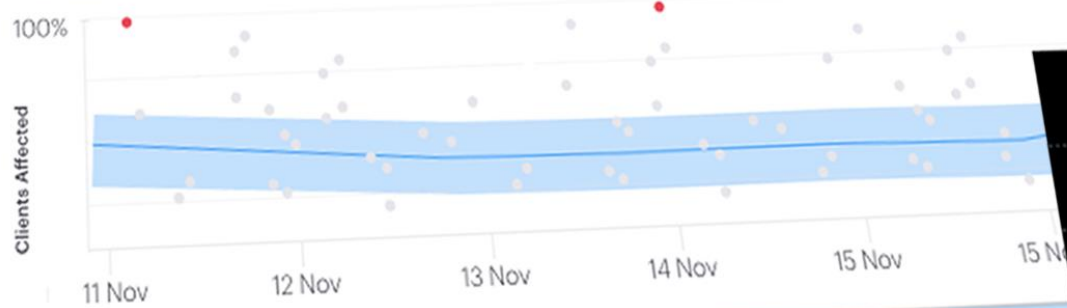
16% Clients with low Dat...

Stephan Flame

Name: Stephan Flame  
MAC: FC:F8:AE:DA:E4:CC  
Associated AP: Mojo 0E:E5:A4F  
Associated SSID: Airtightguest

Baseline - Clients Affected by Performance

SSID 24 & 5 GHz 1 Week

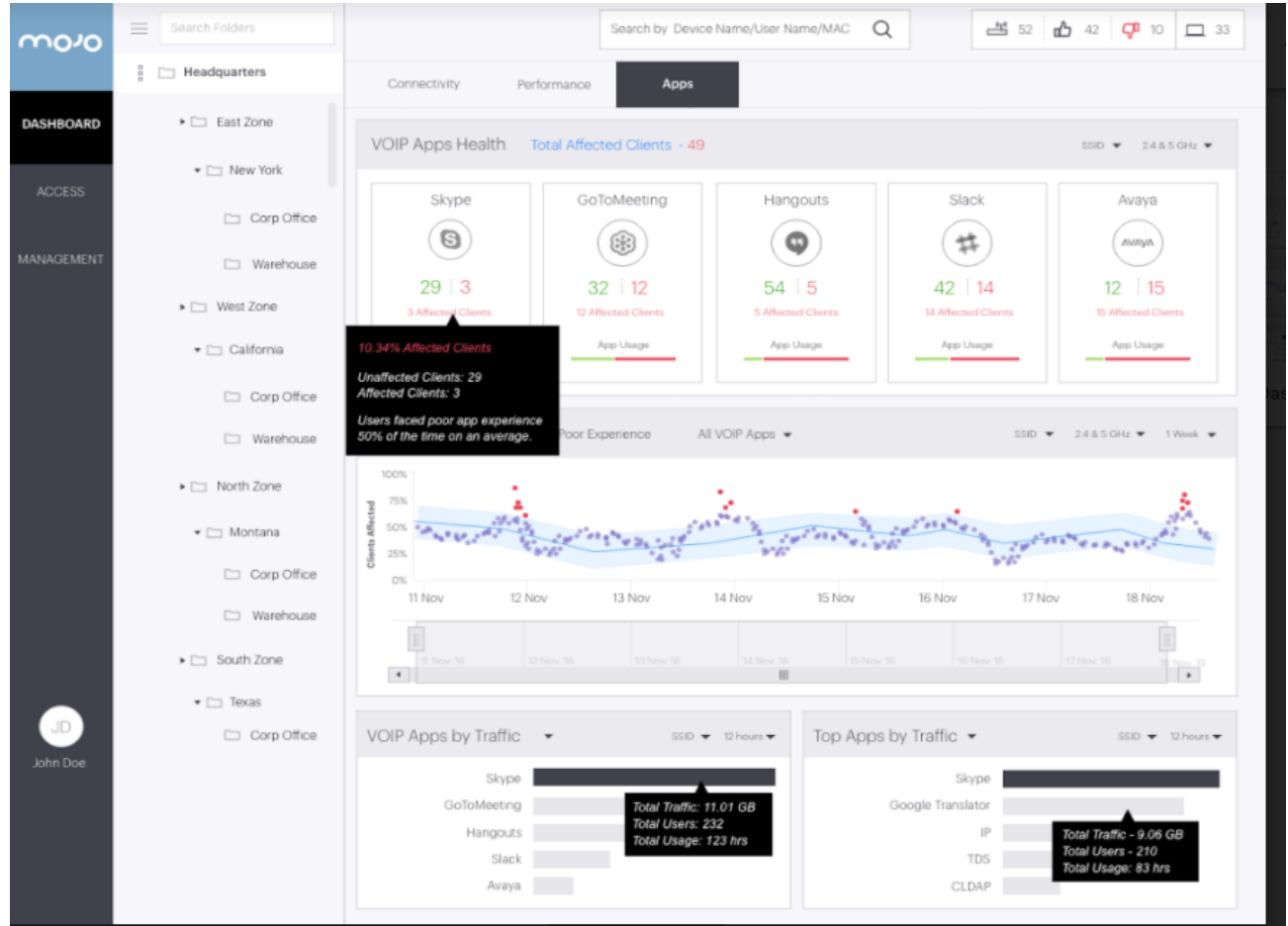


Distribution by performance issues

- Clients with High Retry % - 12%
- Clients with low RSSI - 6%
- Clients with low Data Rate - 17%
- Sticky Clients - 13%

11 Nov. 16 12 Nov. 16 13 Nov. 16 14 Nov. 16 15 Nov. 16

# Application View



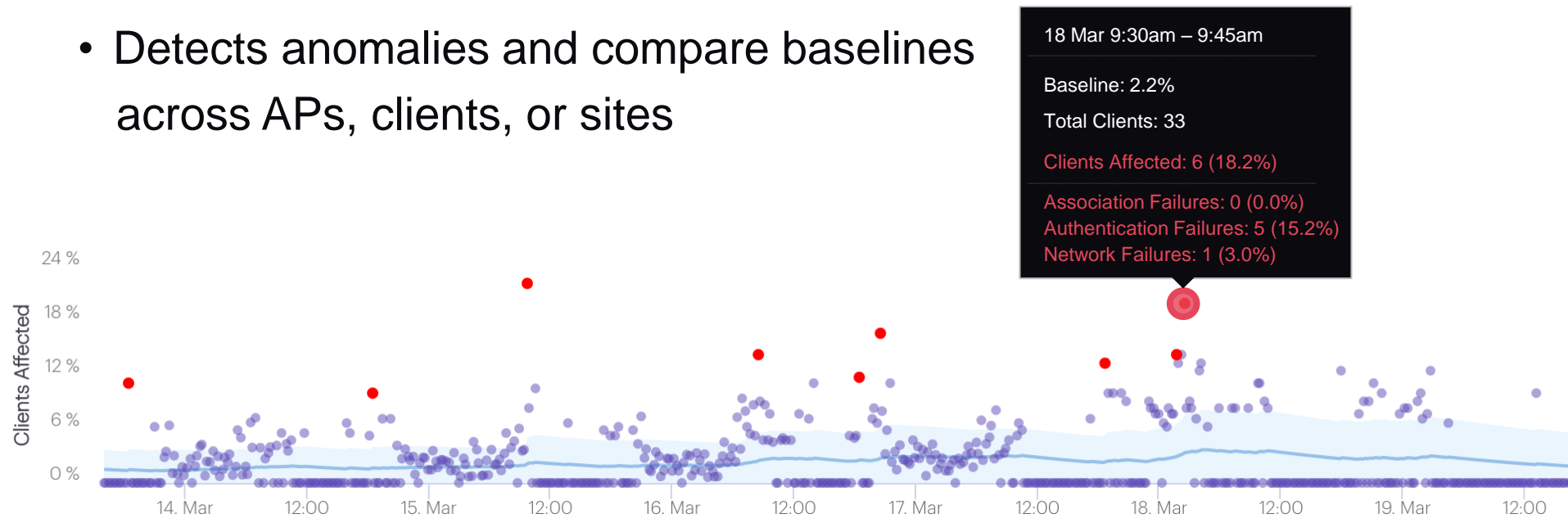
# Mojo S-2000 series Gigabit PoE+ switches

The screenshot displays the Mojo network management interface. On the left is a navigation sidebar with sections: DASHBOARD, MONITOR (active), CONFIGURE, TROUBLESHOOT, REPORTS, FLOOR PLANS, and SYSTEM. Below these are 'Services' and a user profile for 'John Doe'. The main content area shows the hierarchy: Headquarters > East Zone > New York > Corp Office. The selected switch is S-3024-MOJO-1. A 'Switch Summary' section shows a 24-port layout with ports 1-24 color-coded (green, red, grey). Below this are two panels: 'Switch Properties' and 'Details - Port 1'. The 'Switch Properties' panel lists: MAC Address: e0.cb.bc:57.bb.20, LAN IP: 192.168.180.99, Management VLAN ID: 1, Gateway: 192.168.180.254, Public IP: 12.220.130.140, DNS: 8.8.8.8, and RSTP root: 00:0b:86:b7:8b:77 (priority 32768). The 'Details - Port 1' panel shows: Status: Connected, Port Profile: Branch, Type: Trunk, Allowed VLANs: 1, 2, 5, Access Point (MAC: 88:63:DF:A4:39:23, Model: C-120), and Link (Link speed: Auto, Duplex: HD, Flow Control: Enabled). At the bottom, a '32 Clients' table shows two connected devices:

Status	User Name	Name	MAC Address	Location	Vendor Name	OS Type	Associated AP
<input type="checkbox"/>	John Paul	John-iPad	88:63:DF:A4:39:23	*/India/BLR-Office	Intel	Windows	Mojo OE.E5.A4
<input type="checkbox"/>	Louis	HP 10C1 DEE04D0	64:20:0C:2E:4E:18	*/Pune/Delta Force	Intel	Windows	Mojo OE.E5.A4

# Network Baseline & Anomaly Detection

- Benchmarks “normal” behavior: KPIs such as retry rate, data rate, latency, etc.
- Detects anomalies and compare baselines across APs, clients, or sites

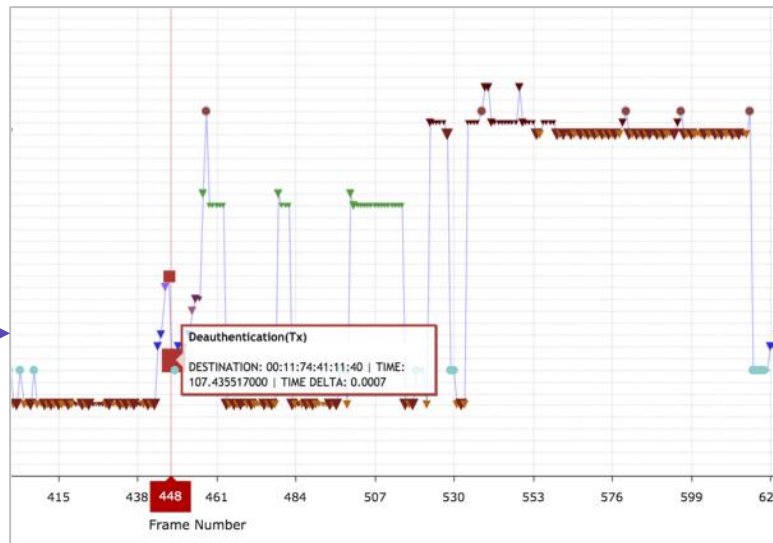


# Automated Smart Packet Capture

Auto packet captures inline and in real time, stored in the context of specific client failures

The screenshot displays a network management interface. At the top, under 'Clients', a client named 'Lap-382 (34:02...)' is shown with a status of 'Failed'. Details include Name: Lap-382, User Name: host/Lap-382.pune.wibhu..., and MAC Address: 34:02:86:90:FB:AA. Below this, the 'Client Connection Logs' section shows two entries for 'Radius Authentication Failure' on Mar 17 2017 6:32:01 PM and Mar 16 2017 6:26:40 PM. Each entry includes the message 'Received ACCESS REJECT from Authentication server.' and a 'View Packet Trace' button. A blue box highlights the 'View Packet Trace' button for the Mar 17 entry, with an arrow pointing to the packet trace analysis graph on the right.

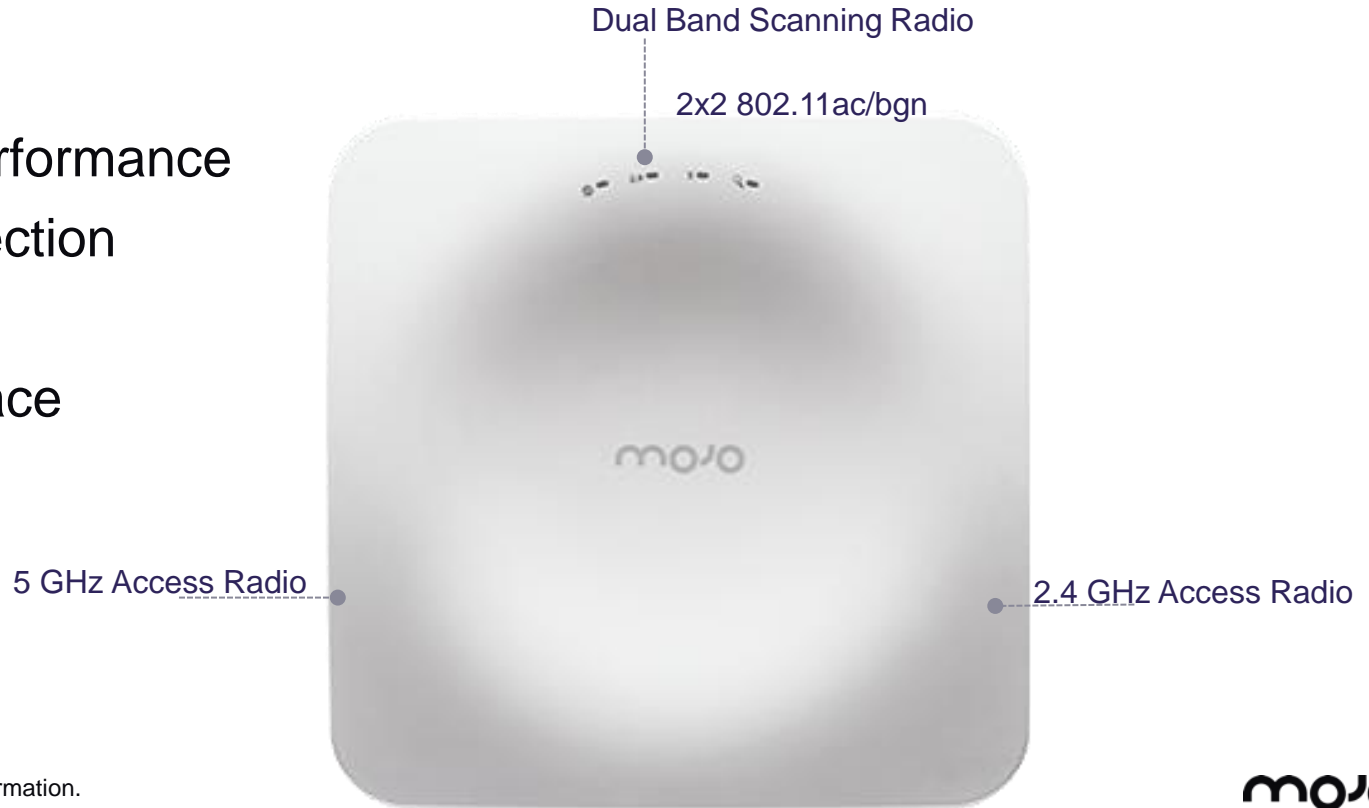
Visual packet trace analysis and auto diagnosis simplifies debugging.



# C-130: Multi-functional 3 Radio AP

*Pushes the control plane into the Access Point*

- Best-in-class performance
- 24/7 WIPS protection
- Client emulation
- Visual packet trace
- Smarter RRM



Without Background Scanning

-No spectrum visibility

With Background Scanning



1 x1 Third radio

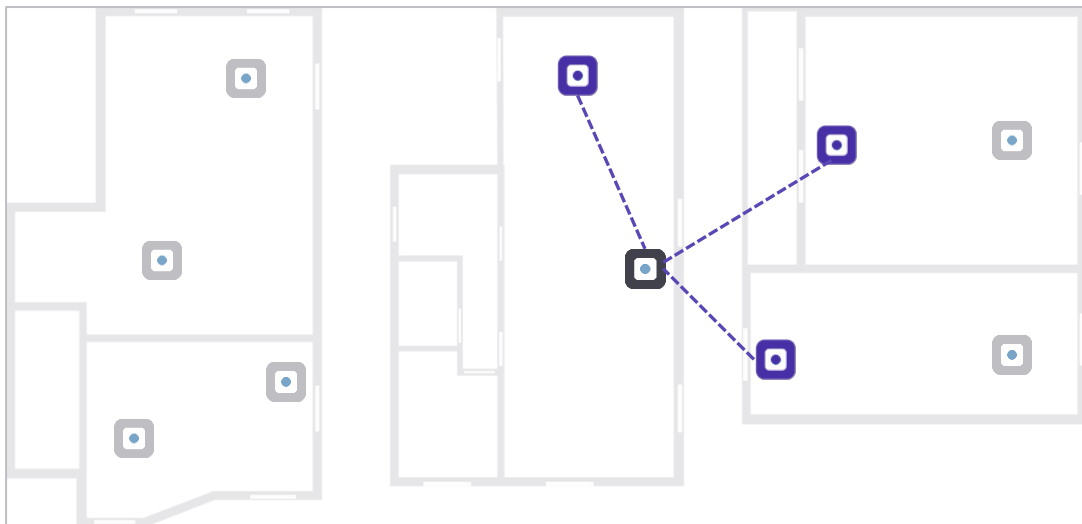


Mojo C-130 / C-110



# Experience your network before your users do

- Turn multi-function tri-radio APs into WiFi clients
- Proactively test your network's readiness
- Validate user-reported WiFi issues



## Test Report

Association Status	●
Authentication Status	●
DHCP Status and Latency	●
Gateway Reachability and Latency	●
DNS Status and Latency	●
WAN Reachability and Latency	●
Ping Tests	●



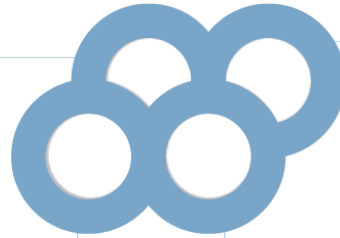
# Finally, a Cloud Architected for Large Scale WiFi

## Fits like a glove with the underlying network design

- Easy to migrate even from a controller-based WLAN
- Data path flexibility
- Integration with local systems, e.g., NMS, SIEM, Syslog

## Federal-grade security

- SSAE-16 SOC 2, FIPS 140-2, Common Criteria, ISO27001 certified
- AES-encrypted data at rest and in flight



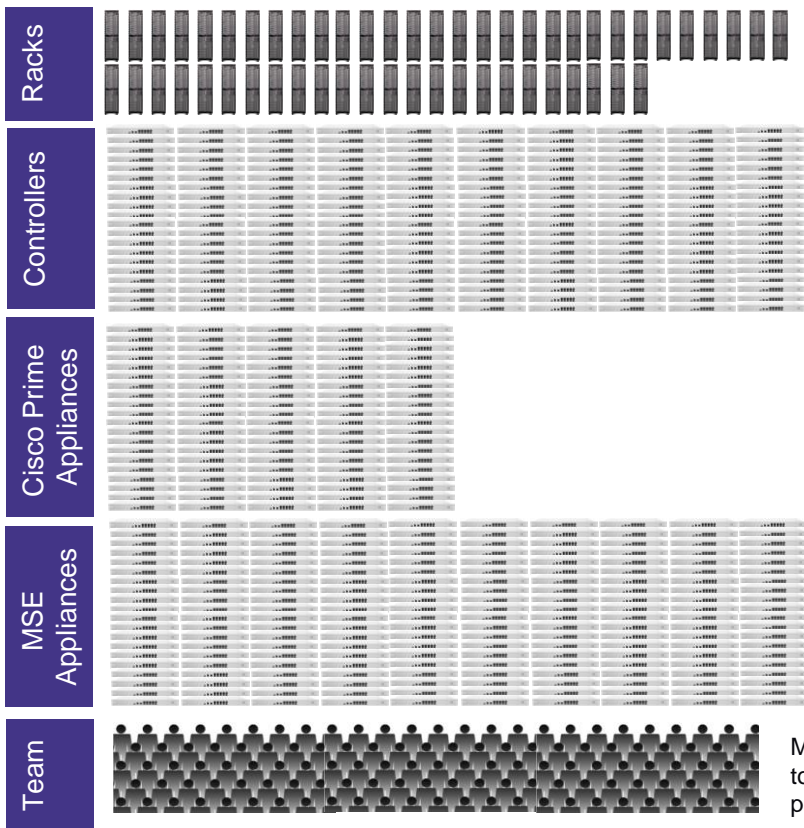
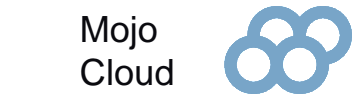
## Solid reliability

- High availability and automatic disaster recovery in the cloud
- Fault-tolerant, standalone AP mode

## Extensible with powerful APIs

- Web APIs available both in the cloud and from WiFi APs
- Push and pull support
- Periodic and real-time integration with third-party systems

# Cisco Controllers versus Mojo Cloud for 1M AP Deployment: REAL data



Zero

Zero

Zero



Small Central Team



Be a hero for your customers

# Leading the Cognitive WiFi revolution

[www.mojonetworks.com](http://www.mojonetworks.com)

