



## UP TO 10-TIMES FASTER PERFORMANCE FOR CONTROLLERLESS WI-FI

Aruba Instant 135 vs. Aerohive AP330 and  
Cisco-Meraki MR24

Conducted at the Aruba Proof-of-Concept Lab  
July 2013

**Statement of test result confidence**

- Aruba makes every attempt to optimize all vendors for performance and follow best practices for configuration as published by the vendor.
- Aruba makes every attempt to make a fair and apples-to-apples comparison, including access point (AP) mounting position, client location, transmit power, channel and the latest shipping firmware.
- Aruba ensures the test bed environment to be free of any interference sources. Also, the 802.11 wireless LAN (WLAN) channels configured are ensured to be consistent when testing 2.4-GHz and 5-GHz bands for all vendors.
- Aruba believes the test results are both repeatable and reproducible in similar testing environments.

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## Executive summary

What's great about a controllerless WLAN is that you can get great Wi-Fi without the cost of a hardware controller. But unfortunately, it matters which brand you pick.

While Aruba offers enterprise-grade performance and reliability, Meraki and Aerohive have serious tradeoffs to think about.

There are three main cases when you need strong performance and reliability:

- 30 students in a classroom are trying to connect to learn or take tests all at once.
- Your Wi-Fi network supports your business – like in retail for point-of-sale.
- You have lots of people in a small place, like a conference room or waiting room.

For Wi-Fi to work well in these scenarios, you need:

- Fast connections for slow devices like smartphones.
- A way for high-performance devices like laptops to get top performance even with slow devices on the network.
- Efficient handling of types of video traffic, which isn't natively supported on Wi-Fi.
- Ability to automatically find and avoid performance-slowng RF interference.

We tested the top-of-the line APs from Aruba, Meraki and Aerohive, and proved that the Aruba solution is faster and more reliable, especially when you have 20+ devices connecting or there is wireless interference in the area.

| Test Case  | Aruba Instant | Aerohive | Meraki |
|--|---------------|----------|--------|
| TCP downstream throughput for 20 iPhones in 2.4 Ghz (Mbps)   | <b>31</b>     | 15       | 3      |
| TCP downstream throughput for 20 iPhones, 20 laptops, 20 tablets on one AP (Mbps)                    | <b>100</b>    | 48       | 45     |
| Multicast 5-Mbps video stream to max. number laptops on the network                                  | <b>31</b>     | 21       | 15     |
| Performance when spectrum scanning is enabled while sending TCP downstream to a single laptop (Mbps) | <b>235</b>    | 19       | 0      |
| Self-healing – Does the AP change channels to avoid interference?                                    | <b>Yes</b>    | Yes      | No     |

*Figure 1. Aruba Instant vs. Meraki and Aerohive performance test summary*

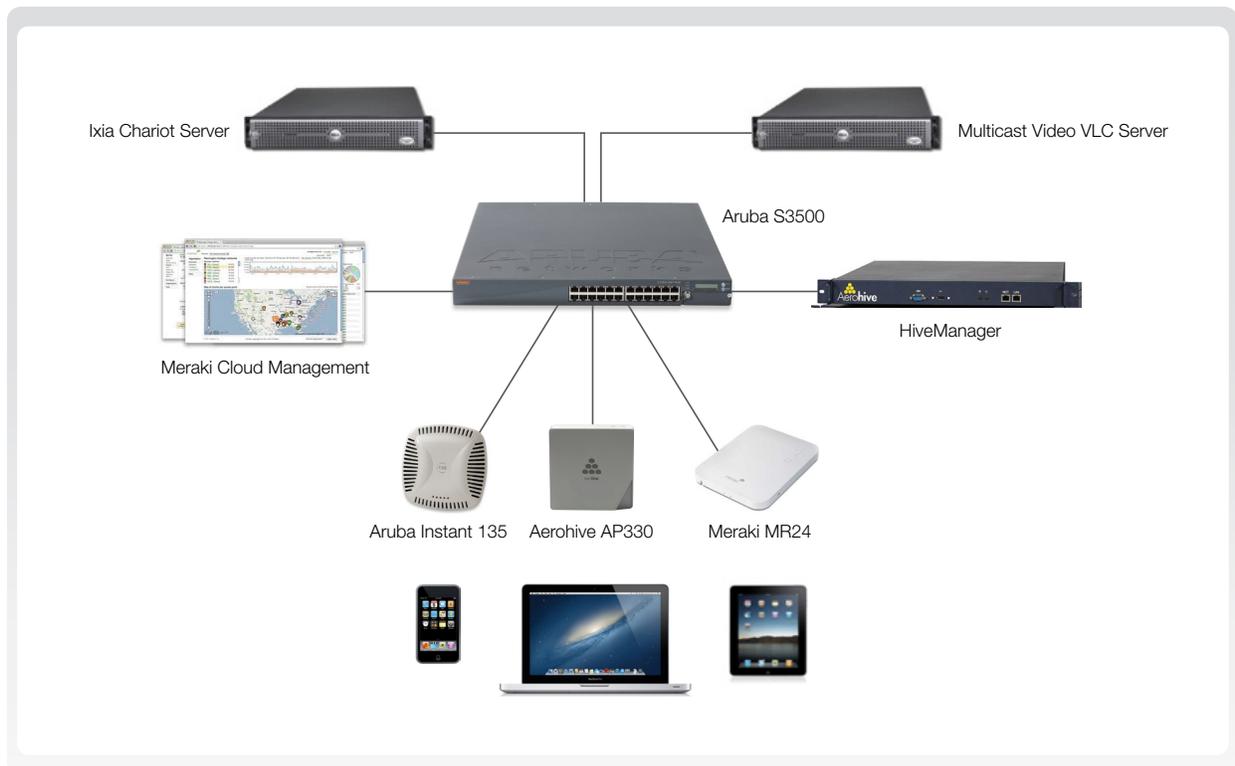
## Test environment

| Vendor   | AP          | Quantity | Spatial Streams |
|----------|-------------|----------|-----------------|
| Aruba    | Instant 135 | 1        | 3x3:3           |
| Meraki   | MR24        | 1        | 3x3:3           |
| Aerohive | AP330       | 1        | 3x3:3           |

*Figure 2. Vendors tested*

| Client Devices                     | Quantity | Spatial Streams |
|------------------------------------|----------|-----------------|
| Laptops: Dell 6300 and MacBook Pro | 20       | 3x3:3           |
| iPad2                              | 20       | 1x1:1           |
| iPhones                            | 20       | 1x1:1           |

**Figure 3. Client devices tested**



**Figure 4. Test bed setup**

## Test scenarios

### Scenario 1: Download speeds at high density

To test crowded classroom or waiting room situations, we set up tests with a range of devices, connecting 20, 40, and 60 devices to one single AP to see how performance was affected.

We measured TCP download streams running to each client, using channel 149+ and the Ixia Chariot test solution. We ran the test three times and averaged the results to eliminate any outliers.

With smartphones, Aruba was 10-times faster than Meraki and more than two-times faster than Aerohive. With a mix of clients, Aruba Instant is more than two-times faster than both competitors.

Bottom line: Both for slow clients and a mix of slow, medium and fast clients, Aruba Instant outperformed Aerohive and Meraki.

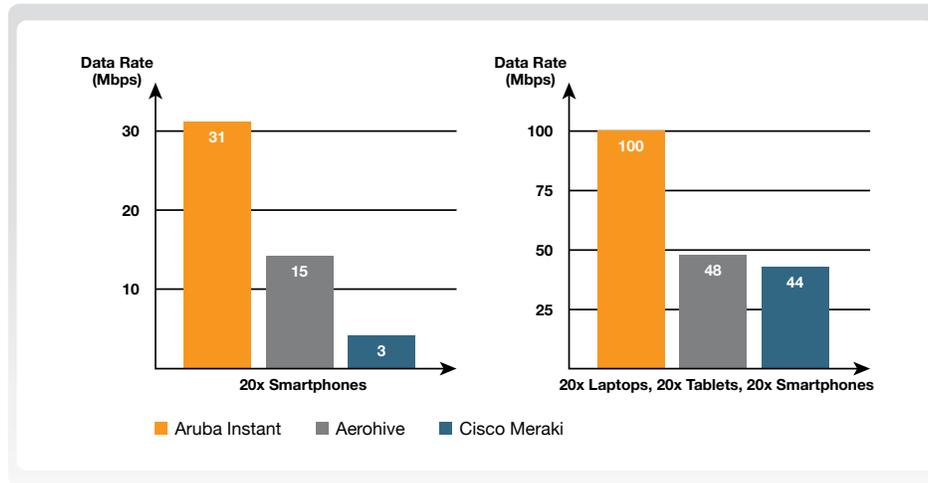


Figure 5

### Scenario 2: Video streaming (5 Mbps)

Especially in classrooms, handling 20+ video clients at once on the wireless network is key to supporting real-world mobile device use when a whole room of students needs to watch the same lesson.

We set up a VLC server to stream video to MacBook Pro laptops and connected up to 20 at a time to approximate a classroom, and used one AP from each vendor.

Active transcoding was used to ensure that the video was 5 Mbps bit rate, and the actual video file used was the Disney Pixar movie “Cars” in HD.

MacBook Pro laptops were connected to the network one by one and multicast video stream was started on each of them. The count was increased up to a point where pixilation/artifacts started showing up in the streaming video – reported in the graph below.

Bottom line: the max number of laptops connected before video quality degraded was 33 for Instant, 21 for Aerohive, and 15 for Meraki – that’s 50% more than Aerohive and 100% more than Meraki.

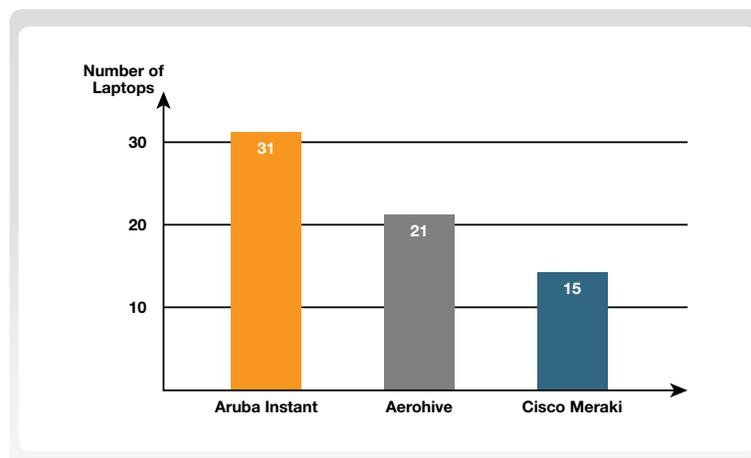


Figure 6

### Scenario 3: Performance with spectrum scanning (Mbps)

Aware that in the real world, we experience lots of Wi-Fi interference from neighboring networks, microwaves, spy cams and thousands more consumer devices, we tested AP performance while spectrum monitoring was enabled.

Spectrum monitoring is critical to detect, identify and understand sources of performance-slowing interference.

We measured four simultaneous TCP download streams running to a laptop, once again using channel 149+ and the Ixia Chariot test solution. We ran the test three times and averaged the results to eliminate outliers.

To make the test fair, we followed all recommended best practices while setting up competitor APs.

While the Meraki AP could not serve clients while scanning, the Aerohive AP eked by with just 19 Mbps streams, while the Aruba Instant maintained 235 Mbps.

Bottom line: Only Aruba Instant can successfully show spectrum data and handle Wi-Fi clients to detect and alert against security and interference threats.

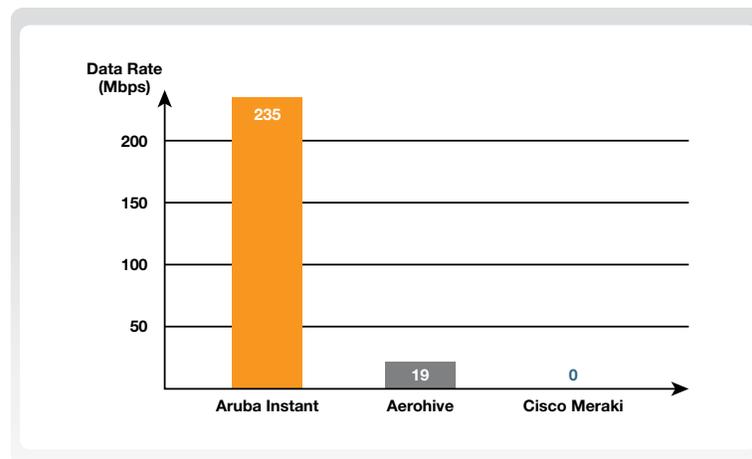


Figure 7

### Scenario 4: Self-healing from interference

Scanning for interference is useful for troubleshooting, but ideally APs scan the air to take automatic avoidance actions in the presence of interference and self-heal performance problems. With no human intervention needed to fix interference problems, the WLAN has more uptime and costs less to maintain.

We compared the Adaptive Radio Management™ (ARM) technology in Aruba Instant to Aerohive and Meraki by introducing interference in the 2.4-GHz band and observing the reaction of each AP.

Process:

- Each AP was brought up with all recommended configuration knobs to enable automatic channel and power selection.
- Next, after boot up, the APs picked Channel 1.
- A video bridge interference source was then turned on in the same channel and AP behavior was recorded.

All Meraki APs were rendered unusable by the presence of a non-802.11n video bridge interference source. The Wi-Fi client connected to the AP lost connectivity to the network and was unable to reconnect within 60 minutes.

The Aerohive AP disconnected Wi-Fi clients and remained unusable for about two minutes until the AP changed channels.

The Aruba Instant AP changed from Channel 1 to Channel 6 within 30 seconds of turning on the interference source.

Bottom line: Aruba Instant self-heals within 30 seconds, while competitors leave clients disconnected for minutes or hours.

## What do the tests reveal?

### Aruba performs better for K-12 schools

If your primary school has 30 or more children who need to view classroom material, including videos, Aruba Instant will deliver better performance and support more video per AP.

You can successfully deliver tests and lessons knowing that Aruba Instant will automatically self-heal when it finds interference that could disrupt connections.

### Aruba performs better for business

In meeting rooms or waiting room, Aruba Instant gives you up to 10-times better performance when connecting 20 or more devices, instead of dramatically dropping off and causing frustration and productivity problems.

Aruba airtime fairness capabilities ensure that even when one, two and three spatial-stream devices connect, the slow devices do not cause faster devices to slow down – so everyone moves more quickly.

### Aruba performs better for mission-critical applications

Because Aruba Instant continually scans for interference – unlike the competition – and is able to take automatic corrective action when finding interference, we keep performance higher.

Aerohive performance drops dramatically if scanning is enabled and Meraki is completely unable to scan while devices are connected. So, if you want a network that performs optimally in the presence of background interference, Aruba Instant is your best bet.

## About Aruba Networks, Inc.

Aruba Networks is a leading provider of next-generation network access solutions for the mobile enterprise. The company's Mobile Virtual Enterprise (MOVE) architecture unifies wired and wireless network infrastructures into one seamless access solution for corporate headquarters, mobile business professionals, remote workers and guests. This unified approach to access networks enables IT organizations and users to securely address the Bring Your Own Device (BYOD) phenomenon, dramatically improving productivity and lowering capital and operational costs.

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