Cloud-Managed Networking

Annual Market Report

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IHS Markit Technology | **Report**

Contents

Exhibits

Top takeaways: Cloud-managed networking surpasses $2B in CY18, grows 3x than traditional networking

The worldwide Cloud-managed networking market surpassed $2.0B in revenue in CY18, growing 31% over CY17. It significantly outpaced results in the traditionally managed networking market, which grew 8% in CY18. The need for simplified management approaches, the embrace of IT-as-a-service, a shift from on-premises hardware controllers to Cloud-management in the enterprise Wi-Fi market, strong economic growth across the world, and expansion to new segments such as switches and wide area network (WAN) gateways are driving growth in Cloud-managed networking. Growth will accelerate through CY20 as more companies adopt Cloud-managed networking. It will then temper as the market matures and reach more than $7B by CY23.

Wi-Fi access points (APs) are the largest segment by far and where Cloud-managed networking had its start 10 years ago. Cloud-management is gaining traction in other segments as well, in particular, WAN gateways, which are well-suited for Cloud-management in large and highly distributed organizations. Cloud-managed switches are growing as well but, for the most part, are driven by the adoption of Wi-Fi as companies need a way to connect and power their APs. In the long term though, it will lag as user network access shifts to wireless access. Adopters of Cloud-managed networking are more likely to have a mobile-first mindset: 62% of their employees will connect solely via Wi-Fi by 2020 versus 54% of employees in traditionally managed networks.

North America accounts for nearly half of all Cloud-managed networking revenue, but IHS Markit expects EMEA to become the dominant region by CY23 as businesses in EMEA are generally more receptive to outsourcing. APAC has been slower to adopt Cloud services but mindsets are changing. IHS Markit anticipates APAC to be the fastest growing region through CY23 as enterprises and government agencies embrace Cloud-based architectures.

Key data points:

- A total of 7.2M networking devices are now managed through Cloud management platforms.

- Approximately ¾ of Cloud-managed networking revenue came from equipment last year, the remaining ¼ came from software as a service (SaaS).

- The average annual SaaS revenue per Cloud-managed device varies from under $50 for a Wi-Fi access point to more than $150 for a WAN gateway.

- Cloud-managed networking revenue will grow at a five-year revenue CAGR of 32% to reach more than $7B by CY23. By comparison, the total enterprise network equipment market is a $44B market as of CY18 and forecasted by IHS Markit to grow at a CAGR of 5% over the next five years. The diverging growth rates will drive the share of cloud-managed networking to 14% by CY23.

- **Cisco** leads the market for Cloud-managed networking by a wide margin, accounting for more than two-thirds of all revenue in CY18. **Aerohive** is #2 overall, just slightly ahead of HPE for revenue and comfortably ahead of HPE for devices managed. **Fortinet** is #2 in the Cloud-managed WAN gateway segment, and **Netgear** is in the top five for devices managed.

Gray right-side border denotes analysis updated since the last edition of this report.

Market background

Companies of all types and sizes have data and communication networks, and they need a way of managing them to ensure that the network behaves according to policies and can handle the various and growing user and application demands to ensure proper performance. There is a myriad of ways to manage networks, from manually configuring individual devices via a command line interface to centralized management platforms that provide a complete view of the network and can push out configuration changes and updates to thousands of devices with the click of a button. The complexity and demands placed on the network play a big role in determining the right approach. Smaller networks can get by with manual/individual device configuration, while larger networks benefit greatly from centralized management and automation to increase speed and reduce errors. Novice administrators can benefit from user-friendly graphical user interfaces (GUIs) while experienced administrators know how to get the most out of the command line interface (CLI). As IT and network infrastructure has become mission-critical to the daily operations of almost any organization, management tools are becoming more important, as good management software directly impacts an organizations ability to operate networks that are reliable, secure, and high performing—the key requirements companies have of their networks.

Network administrators have different choices for management tools—they can use the built-in capabilities of their network equipment, deploy a separate management tool offered by their equipment vendor, buy a third-party management platform, or use one of the various open source tools that are available. This report focuses on management tools offered by equipment vendors, specifically in a SaaS model, commonly called Cloud-managed networking. With a Cloud-managed deployment, network administrators do not have to install or maintain any software on their own servers but simply log onto the Cloud management portal, where they can see the status of their network and make changes.

Meraki (now owned by Cisco) kickstarted this model more than 10 years ago to provide an alternative management model to on-premises controller-based Wi-Fi architectures. Centralized management has been a key feature of Wi-Fi networks for well over a decade, to help manage the large number of network elements, coordinate radio frequency (RF) settings, provide roaming and load-balancing between APs, set consistent user and network policies, and provide security to fend off wireless intruders. Typically, this has been accomplished with a hardware-based controller on-site, but these add additional capital costs and another element to install and maintain. Cloud-management pulls this controller function out of individual sites, centralizes it in a data center, and then offers the management as a service, allowing customers to purchase exactly the right amount of capacity they need and not worry about software maintenance including installing upgrades.

Other vendors have since widely emulated Cloud-management and expanded the model to other networking devices like switches, routers, and security appliances, and even non-networking devices like IP cameras and storage appliances. Initially targeted at small companies with little in-house expertise, Cloud-management has been adopted by all kinds of organizations, in part, driven by the general trend toward outsourcing and adoption of Cloud services and the rising complexity of networks (e.g., new applications, devices, security threats, distributed locations, etc.)

Vendors are also pushing this approach because it allows them to transition from a one-time transactional model to an ongoing relationship with their customers that delivers a steady recurring revenue stream and to draw attention to their software capabilities rather than the hardware (which in many cases has the same specifications as their competitors').

4   6 June 2019

Cloud-management is resonating with end user organizations. In our July 2018 *WLAN Strategies* enterprise survey, IHS Markit found that WLAN management is undergoing a fundamental shift. Dominated by on-premises controllers today, the use of Cloud-based, subscription WLAN controllers (SaaS) will become the #1 management approach by 2020 (please see chart below). However, the data also shows that there will be a mix of approaches in use for some time, dictated by the unique circumstances of each organization (e.g., the number and size of locations, the type of user population, and how many and what type of devices). While these survey results only considered the management of Wi-Fi networks, IHS Markit believes that they are also relevant to switching and WAN gateways as these segments converge and network administrators look for unified management approaches, and as wireless becomes the default access method.

Exhibit 1   WLAN management model

Source: IHS Markit   © 2018 IHS Markit
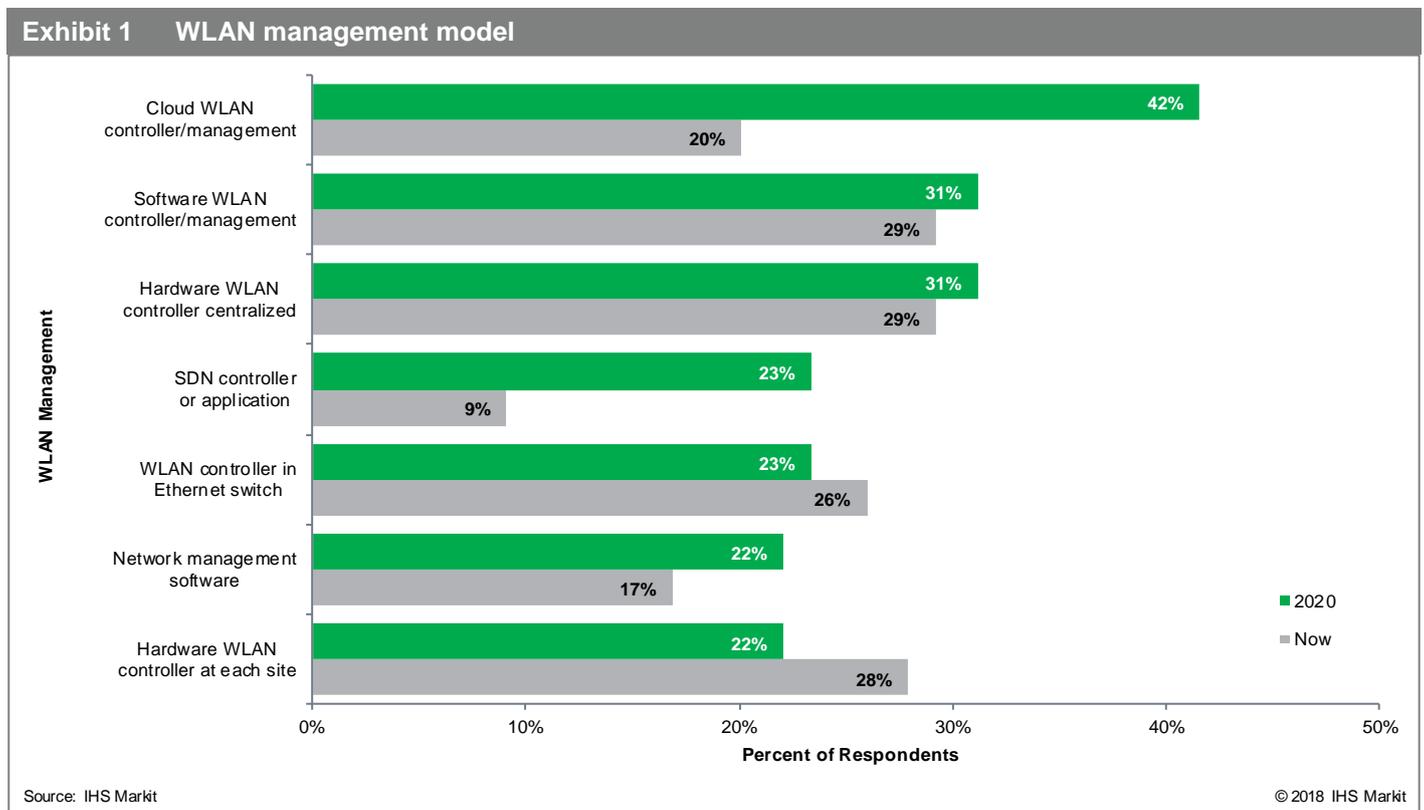
According to our discussions with vendors, the most common reasons why organizations are moving to Cloud-management revolve around the following:

- Simplicity and ease of use: after the equipment is installed and powered on, it automatically connects to the Cloud-management platform and downloads the latest firmware and configuration. The management portal shows all the relevant information in an intuitive, easy-to-learn, easy-to-use GUI, and provides network information (e.g., clients, applications, performance). Previously this was only available on enterprise-class equipment. Additionally, the vendor handles software maintenance (e.g., bug fixes, upgrades), thus, reducing the risk of errors.

- Operational savings: this may be counterintuitive, given that Cloud-management trades some upfront expenses for on-going subscriptions. Instead, savings from operating expense (OPEX) come from freeing up network administrators via automation, presenting relevant information, notifications, and (in some cases) making recommendations to improve performance. Distributed enterprises may not have staff at remote branches, making it costly to troubleshoot network outages.

- Providing value-added services: many ecosystems providers, such as value-added resellers (VARs), want to deliver higher value services and some of the Cloud-management platforms profiled in this report have multi-tenancy features, lowering the barrier to entry in becoming a managed network service provider.

Overall, buyers are giving thumbs up to Cloud-management, but there are some downsides to address. With Cloud-management, organizations are asked to buy hardware and an on-going subscription to (fully) use said-hardware. There is a segment of buyers that are just fundamentally opposed to the concept of paying a fee to use something they have already bought. There is also organizational resistance—more conservative network administrators are not keen to introduce significant changes into their network architecture. IHS Markit thinks that these barriers will diminish over time as organizations become more comfortable with Cloud services and architectures in general. Vendors can alleviate some of these concerns in their messaging, for example, by providing total cost of ownership (TCO) calculations that consider the not insignificant service and support contracts that accompany traditional approaches and demonstrating how their Cloud platforms address common pain points like rolling out upgrades, troubleshooting, and responding quickly to business needs.

Finally, not all organizations trust public Cloud infrastructure and are concerned that sensitive corporate data could become compromised. Regulations may further limit how Cloud services are used. These are general concerns with Cloud services and while they have been declining in importance, vendors still need to be mindful and address them. This could include changing what data is captured and how it is stored, getting certifications from regulatory bodies, and opening regional data centers to keep data in-country.

Cloud-managed networking grows at 3x the rate of traditional networking in CY18

The worldwide Cloud-managed networking market surpassed $2.0B in revenue in CY18, growing 31% over CY17, and significantly outpaced results in the traditionally managed (i.e., not through a Cloud service) networking market (up 8% in CY18). A total of 7.2M networking devices are now managed through Cloud management platforms. Several factors are driving the growth in Cloud-managed networking:

- **Need for simplified management approaches**: With the move to connect everything to anything, enterprise networks have become incredibly complex, covering more physical areas, connecting more users, a greater variety of devices, and carrying more diverse traffic. On top of that, the characteristics of the network change significantly over time as users quickly adopt new devices and applications. Active management is a must to identify potential performance or security issues before they negatively impact day-to-day operations. Cloud-based management tools make it simple to access powerful management features, automate common tasks like initial device set-up and configuration changes, and provide a complete view of network health and how the network is being used.

- **Embrace of as-a-service models for all aspects of IT**: Enterprises have been adopting IT-as-a-service for many years now, starting with software (SaaS) and spreading to infrastructure components like on-demand compute and storage (infrastructure as a service or IaaS) and application development environments (platform as a service or PaaS). Efforts to right-size IT infrastructure, dealing with rapid growth or inconsistent demand, and creating an IT organization that responds quickly to the needs of the business are driving IT-as-a-service. In our November 2018 *Cloud Service Strategies* enterprise survey, IHS Markit found that enterprises, on average, expect to spend 33% of their IT budget on off-premises cloud services in 2019, up from 15% in 2017.

- **Shift from on-premises hardware WLAN controllers:** Cloud-management was pioneered in the Wi-Fi market to provide an alternative to hardware controller-based architectures prevalent in Wi-Fi networks today. There has been a steady shift from controllers to Cloud-managed Wi-Fi networks as network managers prefer the flexibility and ease-of-use of Cloud-management. IHS Markit estimates that there is an installed base of 95M enterprise Wi-Fi access points, and only 5.2% of them were Cloud-managed as of the end of 2018 (up from 4.6% in 2017)0. On top of that, Wi-Fi is consistently one of the top growing enterprise networking segments.

- **Expansion to new segments:** Cloud-management started with Wi-Fi APs, but vendors quickly realized that it lends itself well to managing all kinds of networking devices. Therefore, they added support for additional devices, starting with the obvious, Ethernet switches used to physically connect APs, WAN gateways to connect the LAN with the WAN, and even non-networking devices.

- **Strong economic growth:** Worldwide GDP growth has been robust over the last two years (above 3% and broad-based across geographies), which is causing enterprises to make investments in their campus networks as they hire more employees and expand to new locations.

Exhibit 2	Cloud-managed Networking Results				
	Worldwide Revenue (US$M) & Devices Managed (M)			**% Change**	
	CY17	**CY18**	**CY23**	**CY18 vs 17**	**CY18-23 CAGR**
Devices Managed	5.4	7.3	31.7	34%	34%
Equipment Revenue	$1,203	$1,549	$5,471	29%	29%
SaaS Revenue	$343	$469	$1,826	37%	31%
Total Revenue	**$1,546**	**$2,018**	**$7,297**	**31%**	**29%**

Source: IHS Markit

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Cloud-management is no longer just a Wi-Fi story

Cloud-managed Wi-Fi APs are the largest segment by far, exceeding $1B in revenue for the first time in CY18. Wi-Fi is where Cloud-managed networking had its start 10 years ago and will continue to be a mainstay in this market for years to come. However, Cloud-management is gaining traction in other segments as well, in particular, WAN gateways. For large and highly distributed organizations, WAN gateways are well-suited for Cloud-management because they have many devices, in locations without on-site IT resources. Cloud-management simplifies provisioning and ongoing management of hundreds of devices across far-flung locations. In addition, many vendors have added software-defined wide-area network (SD-WAN) functionality to their WAN gateways, which has helped this segment benefit from the adoption of SD-WAN architectures, one of the fastest growing networking markets and accounting for more than $1B in control and management software and hardware revenue in CY18.

Cloud-managed switches are growing as well, but for the most part, the adoption of Wi-Fi APs is driving this segment as companies need a way to connect and power their APs. Beyond that, IHS Markit does not expect switches to be a great opportunity for Cloud management—there will be a small acceleration in growth over the next two to three years, followed by a leveling off as user network access, which traditionally has accounted for the bulk of wired ports in campus and branch environments, shifts to wireless access. Adopters of Cloud-managed networking, in particular, are more likely to have a mobile first mindset; in our June 2018 *WLAN Strategies* enterprise survey, IHS Markit found that adopters of Cloud-managed Wi-Fi solutions expect 62% of their employees to connect solely via Wi-Fi by 2020 versus 54% of employees in traditionally managed networks.

Exhibit 3	Cloud-managed Networking Results by Segment				
	Worldwide Revenue (US$M)			% Change	
	CY17	CY18	CY23	CY18 vs 17	CY18-23 CAGR
Wi-Fi APs	$890	$1,139	$4,328	28%	31%
Switches	$314	$406	$1,221	29%	25%
WAN gateways	$342	$473	$1,749	38%	30%
Total	**$1,546**	**$2,018**	**$7,297**	**31%**	**29%**

Source: IHS Markit © 2019 IHS Markit

Wi-Fi APs take the lion share of Cloud-managed devices

In terms of the number of devices managed, Wi-Fi APs have an even bigger lead, accounting for more than three-quarters of all Cloud-managed devices today. The ratio of APs, switches, and gateways is roughly 8:1:1, with WAN gateways slightly ahead of switches. At a typical branch implementation, you might find multiple access points, a switch, and a WAN gateway. If the location is small enough or predominantly runs on Wi-Fi, it is possible to eliminate the switch entirely. Given this typical scenario, IHS Markit expects the distribution of Cloud-managed devices to stay relatively stable over the forecast period.

Exhibit 4   Cloud-managed Licenses by Segment

	Licenses (thousands)			% Change	
	CY17	**CY18**	**CY23**	**CY18 vs 17**	**CY18-23 CAGR**
Wi-Fi APs	4,237	5,517	24,987	30%	35%
Switches	487	753	2,824	55%	30%
WAN gateways	695	980	3,905	41%	32%
Total	**5,419**	**7,250**	**31,716**	**34%**	**34%**

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Cloud management SaaS pricing varies, expected to be stable

There is a lot of variability in how manufacturers price their Cloud-managed network offerings, starting with how much they charge for hardware versus access to the Cloud-management portal, length of terms offered (pay-as-you-go monthly to terms of one, three, or five years), payment terms (upfront versus over time), and tiered management feature pricing. Some vendors offer free basic device management features that just show a network dashboard but do not allow configuration changes, hoping to entice customers to upgrade to full-featured option (IHS Markit does not count the former since they do not technically qualify as Cloud-management).

The average annual SaaS revenue per Cloud-managed device varies from under $50 for a Wi-Fi AP to more than $150 for a WAN gateway. Prices were relatively stable in CY18, partly because of multi-year deals that are the norm—the typical term length is three years, which corresponds closely to the typical deployment length of Wi-Fi APs. For now, IHS Markit expects per device pricing to remain stable over the forecast period, however, this assumes vendors keep the current pricing models. Vendors like the recurring revenue provided by SaaS and, in theory, could change their pricing models to shift more revenue to SaaS. Yet, that would come at the expense of near-term revenue; thus, any pricing changes will likely be subtle.

**Exhibit 5   Annual SaaS Revenue per Device**

	Average SaaS Revenue Per Device			% Change	
	CY17	**CY18**	**CY23**	**CY18 vs 17**	**CY18-23 CAGR**
Wi-Fi APs	$46	$47	$42	2%	-2%
Switches	$66	$63	$56	-4%	-2%
WAN gateways	$169	$167	$160	-1%	-1%
Total	**$63**	**$65**	**$58**	**2%**	**-2%**

Source: IHS Markit   © 2019 IHS Markit

Equipment/SaaS revenue ratio is 3:1

Approximately three-quarters of Cloud-managed networking revenue came from equipment last year; the remaining one-quarter is from the SaaS subscription/license that is (in most cases) required to operate and manage the equipment. Most vendors recognize equipment revenue right away, and SaaS revenue over the term of the agreement (typically three years. That means in a steady market, SaaS revenue growth will equal equipment growth after two to three years. If there are changes in equipment revenue, then the effect on current year SaaS revenue is muted because it also reflects SaaS revenue from the previous two years of equipment sales. This is part of the allure of subscription offerings: they help to smooth out the inevitable fluctuations in demand and provide more stable revenue recognition. Unless vendors make changes to their pricing models, IHS Markit expects the equipment/SaaS ratio to stay steady over the long term.

Exhibit 6	Cloud-managed networking revenue: Equipment vs SaaS

Source: IHS Markit
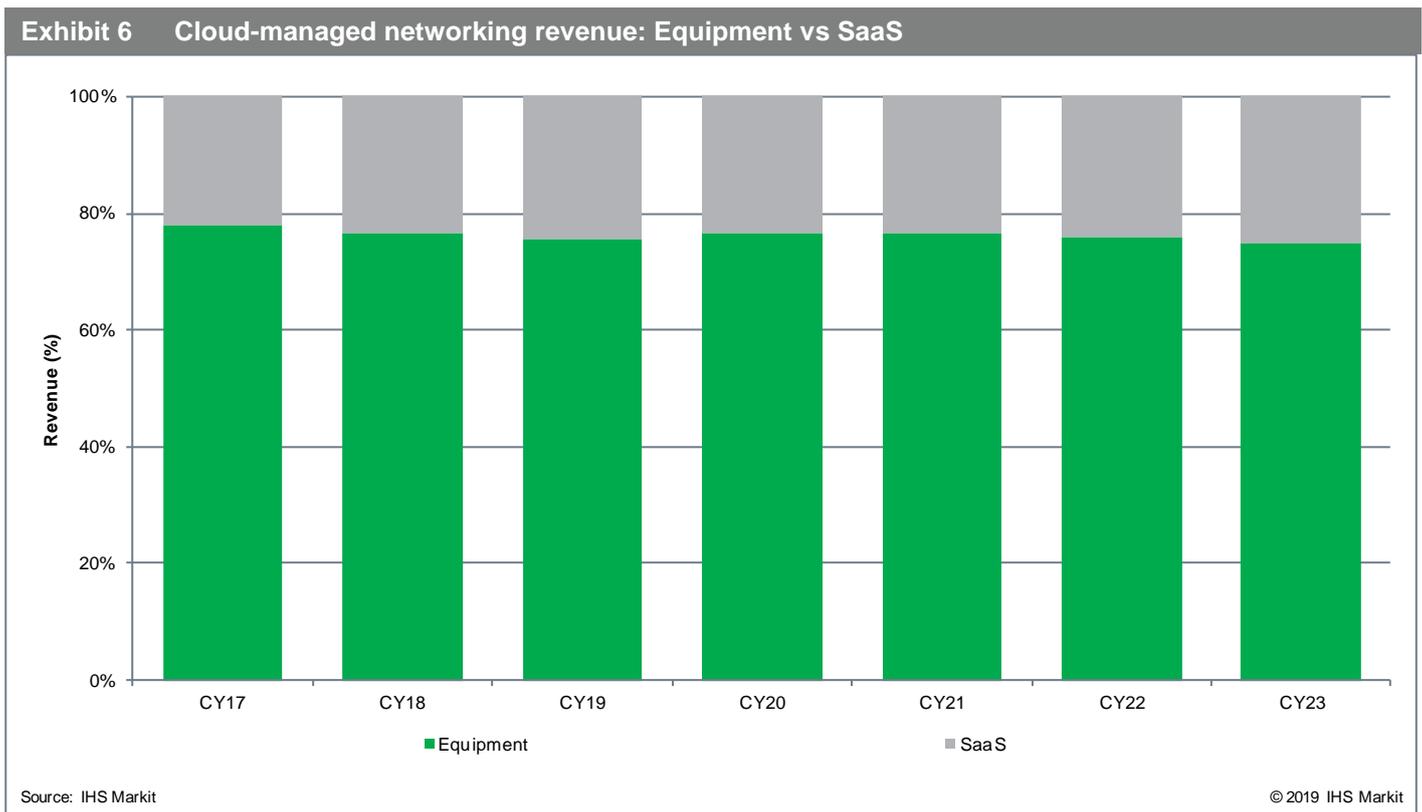
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# Healthy growth ahead for Cloud-managed networking

Cloud-managed networking revenue grew 31% in CY18 and IHS Markit expects this growth rate to continue, on average, through CY23. Growth will accelerate through CY20 as more companies adopt Cloud-managed networking, then temper as the market matures. IHS Markit forecasts a five-year revenue CAGR of 32% and reaching more than $7B in revenue in CY23. Cloud management SaaS revenue growth will be slightly stronger, at a 34% CAGR, as it benefits from the residual effects of the acceleration in equipment sales over the next two years.

Cloud-managed Wi-Fi APs will be the top growing segment, followed closely behind by WAN gateways. Switches will catch up briefly in CY20–22 but will then fall behind again as they clash with the long-term trend towards wireless connectivity.

Exhibit 7   Cloud-managed networking forecast by segment

Source: IHS Markit
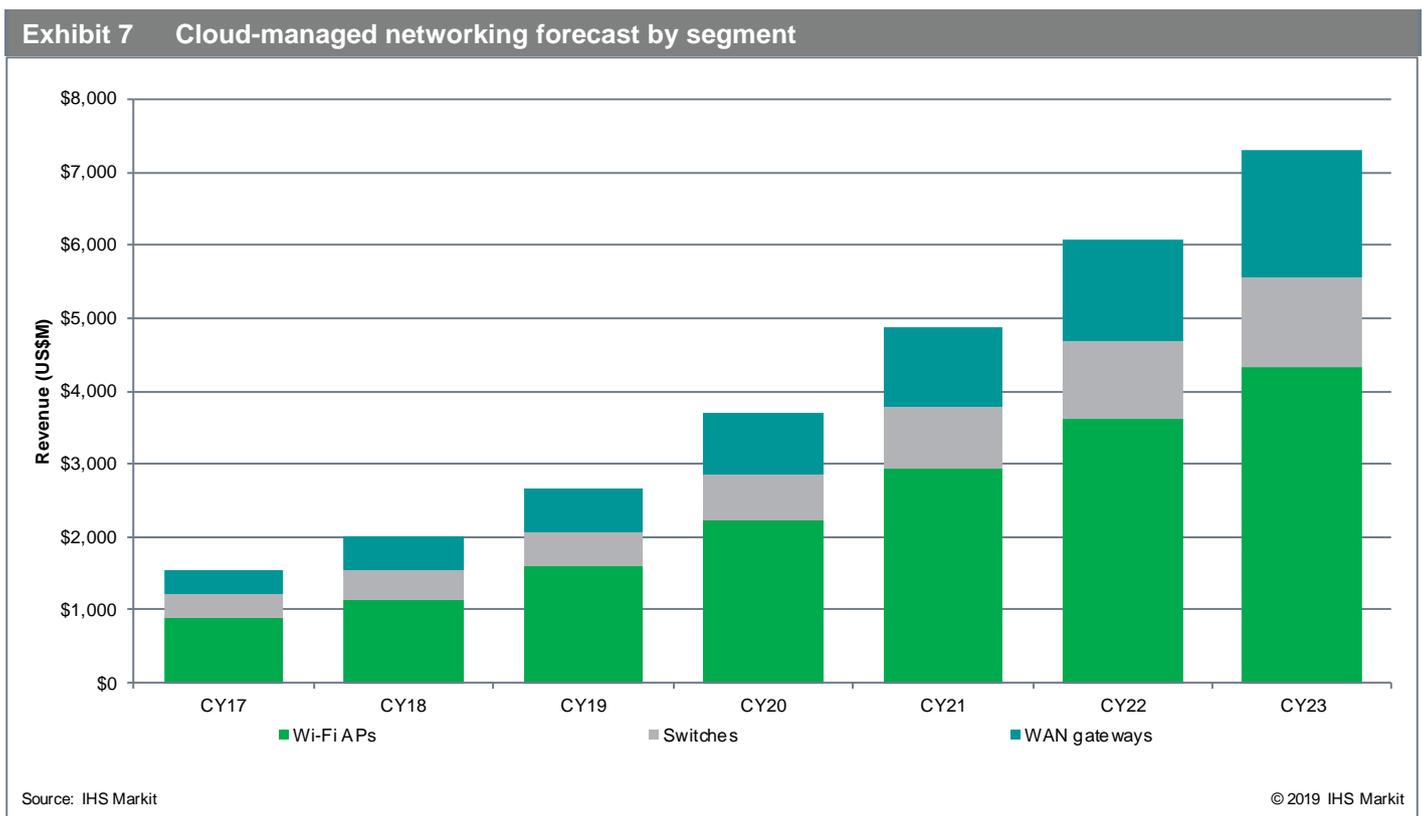
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Cloud-managed share of total networking market will nearly triple by CY23

The enterprise network equipment market (Wi-Fi APs/management, switches, routers, and network security appliances) is a $44B market as of CY18 and IHS Markit forecasts it to grow at a CAGR of 5% over the next five years. The share of Cloud-managed networking stood at a modest 5% as of 2018 within the larger enterprise networking context. The diverging growth rates of total enterprise networking and Cloud-managed networking will drive the share of Cloud-managed networking to 14% by CY23. By CY20, the traditional enterprise networking market, i.e. equipment that is not managed via Cloud subscription, will flatline and start to decline; any growth in enterprise networking will purely come from Cloud-managed equipment at that point. Vendors without a Cloud-managed networking strategy will find it difficult to sustain growth at that point. That does not mean that Cloud-management will take over the entire market—for example, IHS Markit does not expect data center switching, which accounts for 25% of the enterprise networking market, to convert to Cloud-management at this point as data center buyers use on-premises DC orchestration tools to manage their entire DC IT stack. For organizations that have concentrated (e.g., single site) networks, internal resources, or slowly changing networks, the economics of Cloud-management may not be favorable compared to on-premises solutions.

Exhibit 8   Cloud-managed networking vs total networking revenue

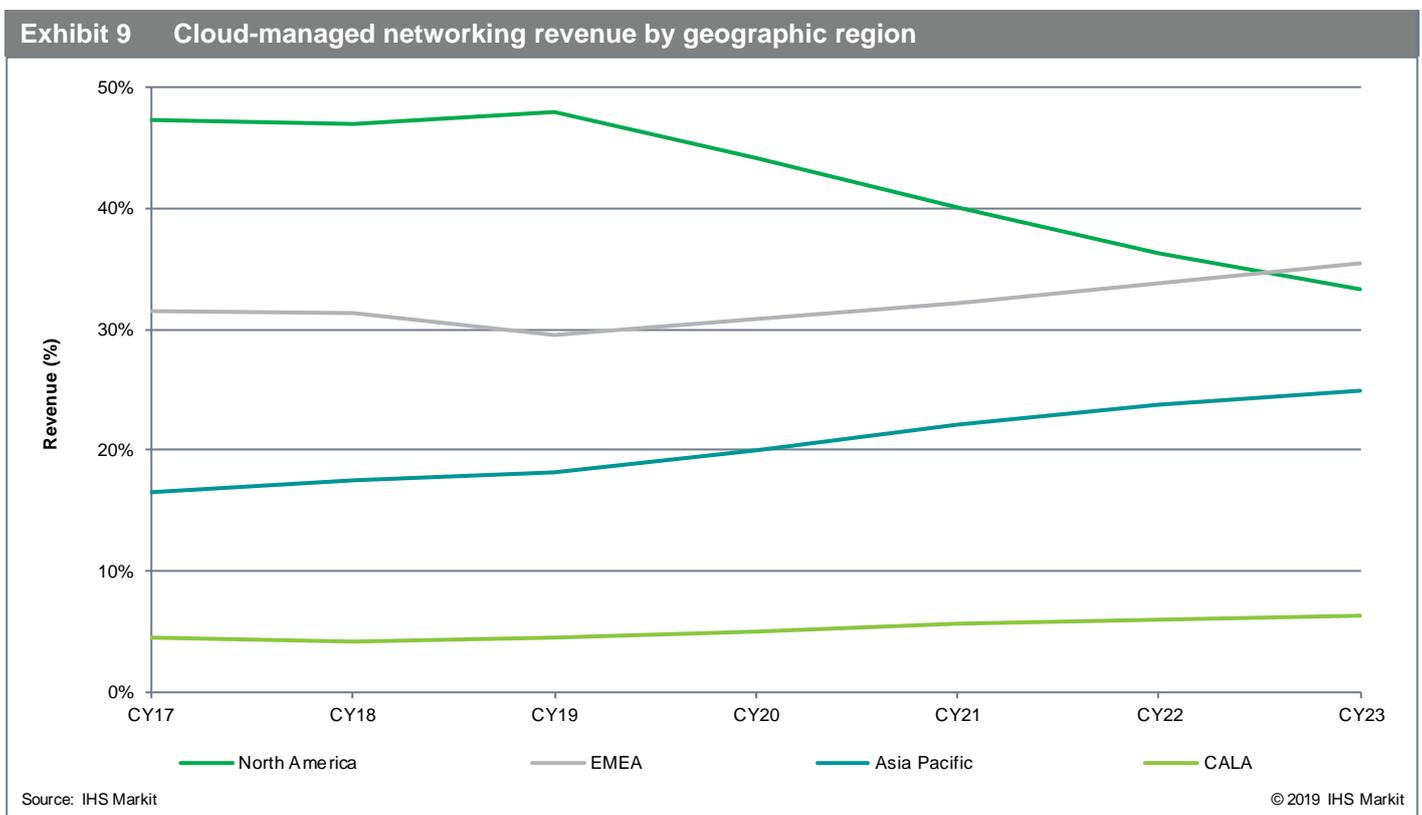Source: IHS Markit

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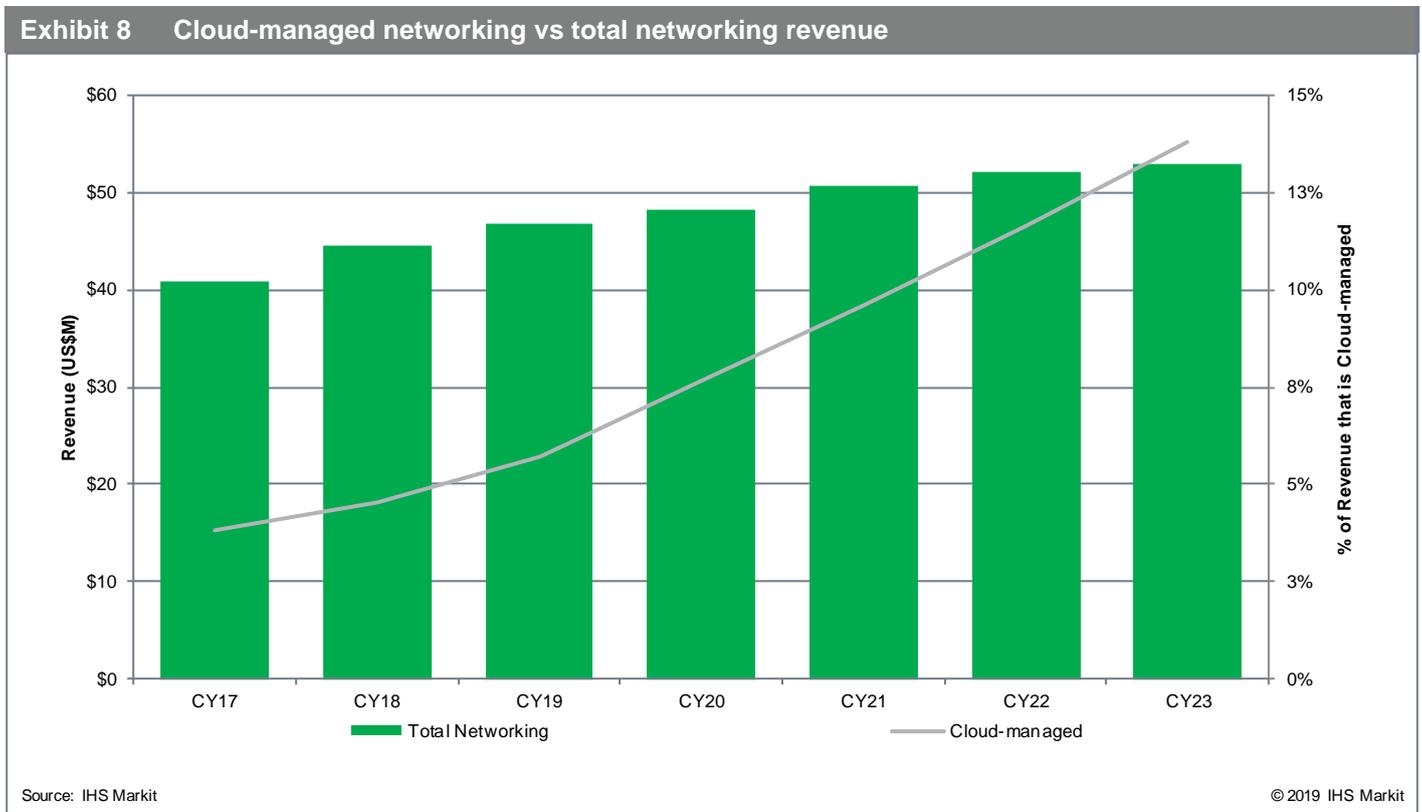
North America is the dominant region, but not for long

North America accounts for nearly half of all Cloud-managed networking revenue as of CY18. This reflects the significant contribution of North America in the overall enterprise networking space and the willingness of organizations in North America to adopt Cloud-based solutions. Most of the vendors tracked in this service are headquartered in North America or devote significant resources to this region. Growth in North America will continue but moderate to only 10% by CY23 as Cloud-management enters a mature stage in this region.

EMEA accounts for nearly a third of Cloud-managed networking and IHS Markit expects EMEA to become the dominant region by CY23. The enterprise research of IHS Markit has shown that businesses in EMEA are generally more receptive to outsourcing aspects of their network operations, which will drive interest in Cloud-managed networking solutions.

APAC is the smallest of the three major regions at less than a fifth of revenue in CY18. China, the dominant economy in this region, heavily influences trends in APAC. In general, APAC has been slower to adopt Cloud services but mindsets are changing and enterprises/government agencies are now embracing Cloud-based architectures. IHS Markit expects APAC to be the fastest growing region through CY23, which will drive the penetration of Cloud-managed networking in APAC ahead of North America by CY23.

Exhibit 9	Cloud-managed networking revenue by geographic region

Source: IHS Markit

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Market share: Cisco leads by far

Cisco leads the market for Cloud-managed networking by a wide margin, accounting for more than two-thirds of all revenue in CY18. Cisco's Meraki division invented this market segment and the backing of Cisco helped make it a mainstream idea.
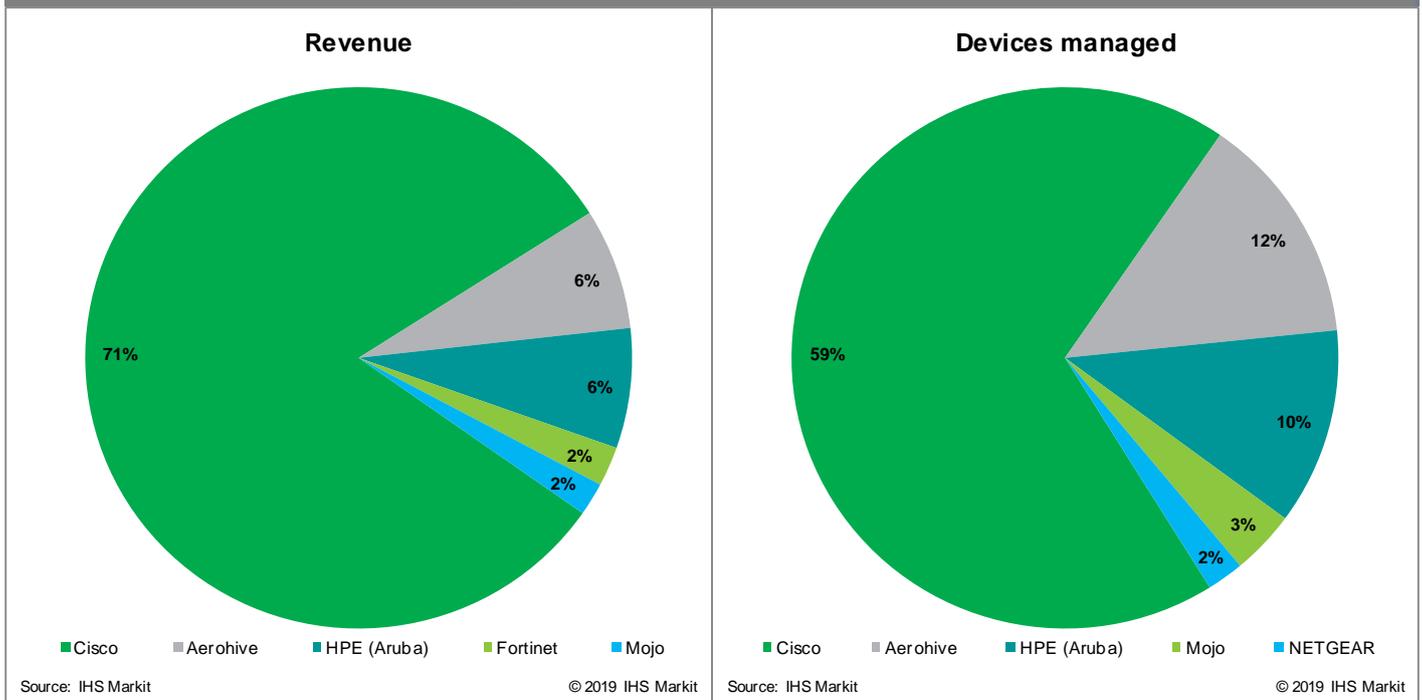
Aerohive is #2 overall, just slightly ahead of HPE for revenue and comfortably ahead of HPE for devices managed. However, this does not quite capture how serious Aerohive is about this market—more than three-quarters of its revenue is derived from Cloud-management networking.

HPE (Aruba) comes in third place and has been mostly active in Cloud-managed Wi-Fi and switching, but IHS Markit expects that to change thanks to the launch of its SD-WAN solution in 2018.

Fortinet is #4 overall but #2 in the Cloud-managed WAN gateway segment, where it had an early start with Cloud-management of the FortiGate security appliances.

Netgear is in the top five for devices managed but does not have a top five revenue spot because of the much lower price points of its solution.

Exhibit 10   Cloud-managed networking market share (revenue, devices managed)

Revenue

- 71% Cisco
- 6% Aerohive
- 6% HPE (Aruba)
- 2% Fortinet
- 2% Mojo

■ Cisco   ■ Aerohive   ■ HPE (Aruba)   ■ Fortinet   ■ Mojo

Source: IHS Markit   © 2019 IHS Markit

Devices managed

- 59% Cisco
- 12% Aerohive
- 10% HPE (Aruba)
- 3% Mojo
- 2% NETGEAR

■ Cisco   ■ Aerohive   ■ HPE (Aruba)   ■ Mojo   ■ NETGEAR

Source: IHS Markit   © 2019 IHS Markit

Looking at Cloud-managed networking market share by major equipment segment—Wi-Fi APs, switches, and WAN gateways—IHS Markit again finds that **Cisco** leads by a significant margin. For switching and Wi-Fi, the players and share are very similar but for WAN gateways, there are big differences: Fortinet is #2, and Huawei is #3 due to strong growth in Cloud-Managed routing/security in China.

Exhibit 11   Cloud-managed networking revenue market share (WAN Gateways)
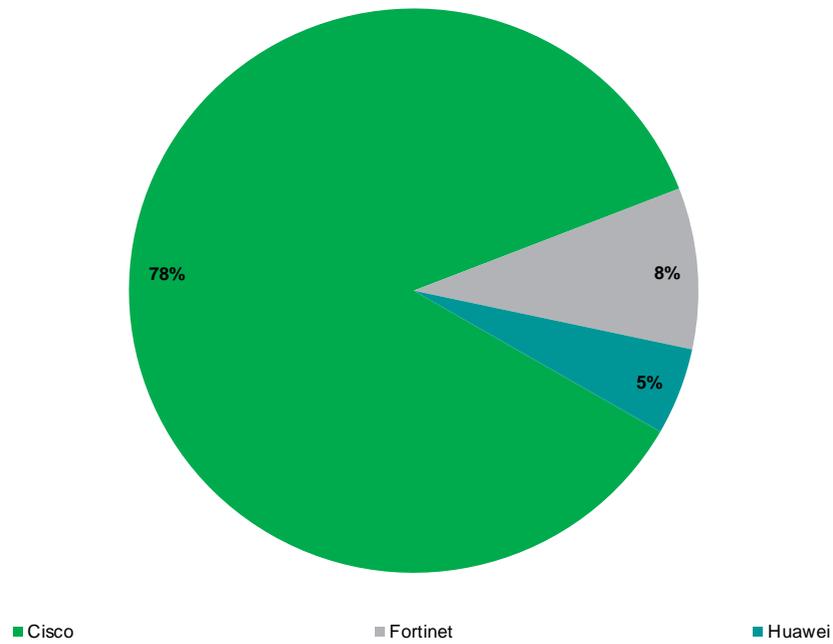
Source: IHS Markit

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Vendor landscape

Cisco leads the Cloud-managed networking market via its Meraki division, a company it acquired in 2012. Meraki, which was founded in 2006, is generally credited with inventing Cloud-managed networking, focusing on alternative management models for Wi-Fi in the beginning. Over time, Meraki extended into other networking segments, such as switches, security appliances/routers, and devices like IP cameras and IP phones (discontinued). At the time of the acquisition, Meraki had 18,000 customers, and today, it claims 350,000 customers with 4.5M devices under management. Meraki sells the networking hardware and per device SaaS licenses that are required to operate the equipment. Device licenses come in 1-, 3-, 5-, 7-, or 10-year term lengths. Costs are from less than $50 (manufacturer's suggested retail price or MSRP) for a one-year, entry-level switch license to more than $300 for a one-year security appliance license. For Wi-Fi APs, Meraki charges $150 for a one-year, $300 for a three-year, and $450 for a five-year SaaS license. Generally, SaaS licenses will account for approximately 20–30% of the total solution cost over a three-year term. Wi-Fi remains the top segment for Meraki and WAN gateways are enjoying strong growth thanks to the addition of SD-WAN functionality. IP video cameras (not considered in this service) were introduced two years ago, and it is the fastest growing segment. Cisco sees the greatest demand from companies that have multiple locations and/or lean IT teams; common verticals include retail, restaurants, and education. A key differentiator for Cisco is its open application programming interface (API) that allows developers to build applications that integrate with Meraki; examples include network automation, reporting, monitoring, wayfinding, and image detection.

Aerohive is the #2 provider of Cloud-managed networking equipment. It embraced a controller-less Wi-Fi model from the start, using a software tool (HiveManager) to manage the Wi-Fi network, which Aerohive later made available as a SaaS offering. Aerohive offers two levels of Cloud-management, Connect and Select, which are hosted in one global and nine regional AWS data centers. Every Aerohive AP and switch comes with a free lifetime subscription to Connect, which offers a basic set of management features. Select offers advanced monitoring, application analytics, advanced guest access, and enhanced support; it starts at $175 per AP for one year. Aerohive also offers a flexible management model—companies can move back and forth from on-premises installations to public Cloud subscription or even an off-premises private Cloud, depending on evolving needs. Aerohive notes that demand for its offering from companies without dedicated Wi-Fi staff and from the K12 education vertical, although the latter is mostly a function of Aerohive's historical market focus.

HPE Aruba is the #3 vendor for Cloud-managed networking and derives its significant presence by virtue of its long-standing #2 ranking in the enterprise Wi-Fi market. Previously a standalone, publicly traded company, Aruba was acquired by HPE in 2015 and now serves as HPE's campus networking and enterprise mobility division. HPE has been offering a Cloud management platform for a long time (Aruba Central), but it typically still led with its on-premises management offerings, such as its mobility controllers, controller-less Instant APs, and Airwave. That is starting to change as market demand is shifting to unified management and Aruba Central is getting more prominence as the platform for managing a local area network (LAN), WLAN, and WAN. Initially focused on Wi-Fi, HPE has added switching support and SD-WAN support in 2018. HPE offers one-, three-, and five-year SaaS license terms. Users need a device management license for the base set of management features and can add services licenses for additional features like guest-Wi-Fi or user analytics.

Fortinet is best known as a network security vendor, but it does offer a complete range of networking devices/features including access points (from its Meru acquisition), switches, and SD-WAN, all of which are positioned in a secure networking context. Fortinet's Cloud management options are specific to an equipment class, such as FortiCloud for managing security appliances (FortiGate), FortiSwitch for managing switches, and FortiAP for managing APs. Given its security heritage, FortiCloud is its most popular offering and because FortiGates have an integrated Wi-Fi controller, FortiCloud can also be used to manage APs. Fortinet offers a free tier that shows device status and seven days of logs, and a paid tier with full management and one-year log retention. Prices start at $30 per year per switch or AP and $170 per year for the popular FortiGate 60E model.

Mojo Networks has been around since 2003, initially doing business as AirTight Networks then rebranding to Mojo as the company pivoted to a Cloud-managed Wi-Fi model. In 2018, Arista acquired Mojo as part of Arista's expansion into campus networking, and the offering has since been rebranded to Arista Cognitive WiFi. Arista positions Cognitive Wi-Fi as a solution focused on delivering the best user experience. It does so by collecting data on nearly 300 key performance indicators about the network, the clients, and the user experience. It applies analytics to the collected data and then either automatically adjust network setting or makes recommendations on fixes. Previously, Mojo offered one-, three-, or five-year SaaS licensing terms, but under Arista this is moving to a monthly subscription, with an option for long-term discounts. The offering is purely focused on Wi-Fi right now, but IHS Markit expects Arista to add switching support over the coming year.

Mist was founded in 2014 and positions its offering as an artificial intelligence-(AI) driven solution to make Wi-Fi more predictable and reliable. The Mist Cloud collects more than 150 statistics every two seconds from every device and analyzes the information to gain insight into the user experience, such as time to connect, throughput, etc. Mist correlates user experience to device and network characteristics and provides administrators with recommendations on how to improve Wi-Fi performance or even changes settings automatically if possible. Mist also has a voice assistant feature (Marvis) that provides answers to spoken questions and offers location services for wayfinding, proximity-based notifications, and asset tracking. Subscriptions to the Mist dashboard cost $150 per AP for a one-year term (most common). Mist started revenue deployments in 2017 and its customers include 7 of the 30 largest US retailers, higher education institutions, and healthcare providers. In 2019, Juniper Networks acquired Mist to fill in the Wi-Fi gap in Juniper's campus networking portfolio (switches, security, and SD-WAN).

Huawei has grown into a major player in enterprise networks over the past few years, focusing on its core market in China and targeting growth opportunities in EMEA, APAC, and CALA. In 2017, Huawei pushed into Cloud management, offering both a Huawei-delivered public Cloud and a managed service provider (MSP)-delivered option. Enterprise can also deploy its own on-premises management software and migrate between deployment models if needs change. Huawei's Cloud management platform supports more than 50 AP models, nearly 200 switches, more than 60 security appliances, and nearly 20 router models. Huawei sees demand from companies with many locations, such as retailers and hospitality chains, and K-12 education. APs are the most common Cloud-managed device, but Huawei gets more revenue from WAN gateway deployments because of the higher price tags; the latter is popular with enterprises and government agencies.

Netgear is a well-known provider of small/medium business (SMB) networking solutions. It launched its Cloud-managed offering (Insight) in September 2017 for remote management of Netgear routers, switches, Wi-Fi APs, and storage appliances. Netgear has developed a specific line of switches and APs that work with the Insight management tool. In addition, Insight can discover and monitor Netgear's existing line of smart and fully managed switches. Insight has three tiers for its Cloud-managed SaaS:

- Basic, which only provides access via a mobile app and is free for up to two devices and $5 per year per additional device

- Premium, which costs $10 per year per device and adds additional features like web portal, Wi-Fi roaming, and PoE scheduling

- Pro, which is geared towards managed service providers (MSPs) and has multi-tenancy features.

Relative to other vendors, Netgear's pricing model is skewed towards hardware, with SaaS subscription only making up 5–10% of the cost for the first year. Interest in Netgear Insight is coming from very small businesses, like restaurants and hair salons, in need of wireless and guest access; MSPs; and VARs interested in becoming an MSP.

Zyxel is a Taiwanese manufacturer of internet service provider (ISP), home, and SMB networking products. It launched its Cloud-management product Nebula in 2016. Initially, Nebula was offered only for a dedicated line of Nebula APs and switches and Zyxel subsequently added support for other Zyxel APs, switches, and security gateways in 2018. Zyxel offers a free license that comes with basic management features and a Pro license that adds enhancements like 365 days of log retention, notifications, configuration back-up, analytics, and more. The Pro license can be purchased as an annual subscription or perpetual license and is transferable between devices. Zyxel reports demand from the hospitality industry (where Zyxel traditionally has had good traction), education, MSPs, and VARs interested in becoming MSPs.

Category definitions

Below are the definitions for the products included in this service:

Cloud-managed networking: Integrated offering consisting of network devices and a corresponding off-premises Cloud service providing a management portal that allows network administrators to centrally manage their network through a web browser or mobile application. Access to the management portal is sold in a software-as-a-service (SaaS) model, i.e. as an ongoing subscription (e.g., monthly) or a term-based (e.g., one, three, or five years) device license. The portal must be graphical user interface (GUI)-based, support zero-touch (i.e., plug-and-play) device provisioning, remote device configuration, and provide basic network statistics (e.g., device status, number of connected clients). It includes the following types of equipment:

- **Wi-Fi APs:** Wireless access points (APs) based on the 802.11 standard; provide wireless network access to Wi-Fi clients (e.g., smartphones, tablets, laptops, etc.)

- **Switches:** Forward traffic based on layer 2 information and are used to build LANs and connect PCs, printers, IP phones, IP cameras, Wi-Fi APs, servers, etc., to the network

- **WAN gateways:** Provide wide area networking functions, such as routing, virtual private networks (VPNs), and firewall

What's counted

For each of the above categories, IHS Markit tracks the following metrics:

- **Equipment revenue** reported is for all hardware required to operate equipment shipped for revenue recognized during the calendar year.

- **SaaS revenue** reported is for subscriptions and/or licenses sold for access to the Cloud management portal during the calendar year; we do not include revenue from consulting, professional, and managed services.

- **Devices managed** is the number of networking devices with an active Cloud-management license at the end of the period.

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