ZYXEL

On-premises vs. Cloud-managed WLAN:

Which one to go for?

nebula

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Introduction

The dramatic emergence of smart devices is driving radical shifts in networking environments. Almost every device around our daily life – laptops, smartphones and tablets – is equipped with a wireless chipset that would find its way to connect to a network. The number of connected things is bound to grow exponentially. According to Gartner's IoT forecast[1], 6 billion connected things will be in demand for support by 2018, and it is estimated that more than 35 billion things will be connected to the Internet by Year 2020. Today, Internet connectivity is expected to be as common as utilities like electricity.

In fact, the pervasiveness of mobility has sent the demand for enterprise-class wireless connections through the roof in many organizations. As many of these mobile devices rely on Wi-Fi to work and some of them have no wired fallback at all, the wireless network infrastructure must be fast, secure and highly reliable. Therefore, companies would have to look for options to support these users and to deliver stable connections with greater bandwidth and higher speed.

Evolution of WLAN Architecture

One of the questions that challenges businesses looking for IT solutions is whether to implement a WLAN managed by on-premises controllers, or one with controllers in the cloud? What is the difference? Which architecture would be more suitable? First of all, let's take a quick look at the evolution of WLAN networks, and then figure out the key differences between an on-premises WLAN and a cloud-managed one.

Autonomous Access Points

Trace back to the very beginning of WLAN design, each wireless access point was configured and managed independently from others. This way was not regarded as a problem at the time because most access points were deployed in specific areas such as meeting rooms or lobbies, and the number of devices connecting to Wi-Fi networks was few.

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[1] Gartner's predictions: Top Strategic Predictions for 2016 and Beyond: The Future Is a Digital Thing

On-premises WLAN Controllers

With growing demand for wireless access in businesses, networking infrastructures also called for changes. Wireless signals had become a necessity within the entire building to meet demands; consequently hundreds of APs were deployed and managed. However, since these APs could not coordinate with each other, technical issues such as load-balance, channel selection, RF optimization and even to user authentication or client roaming, etc. might render the networks unstable or unpredictable.

To address these problems and control the massively deployed devices, wireless LAN controllers were created to force both control- and data-plane traffics to return to a single location for AP configuration, communication and even policy enforcement. This design allows a wireless controller to oversee all the APs through the network, so administrators are able to perform configuration to APs via the controller. Although on-premises WLAN controllers can greatly help administrators to manage multiple APs, it requires higher-skillset ITs to handle the complicated configuration tasks.

Cloud-managed WLAN Solution

Newly developed technologies push controllers forward, and they reached the clouds in recent years. In a cloud-managed WLAN architecture, organizations don't have to purchase physical controllers and deploy them on every site. The "cloud" mentioned here works like a virtual controller that actually reside in a public cloud, and all the distributed wireless access points connect to it via the Internet. The cloud offers remote provisioning, monitoring and troubleshooting to every access point.

Unlike hardware controller with higher upfront cost, the cloud-managed WLAN services, which are usually provided with an annual payment plan, give organizations more flexibility on their budgets comparing to on-premises ones, they are getting more popularity among organizations looking for centralized management and reduced costs. The cloud-managed WLAN services rely on subscribed licenses to work, and the cloud will take care of the issues such as data backup, storage, redundancy and more.

Benefits of On-premises and Cloud-managed WLAN Architectures

On-premises and cloud-based WLAN management approaches are both enterprise-ready now and they all have their own pros and cons, so determining which to implement depends on a number of factors. Before making the decision, you may want to have a look at the benefits of two architectures; let's get started with on-premises WLANs.

The Upside of On-premises Solutions

Relies less on Internet connectivity

Though there seems to be a big growth of cloud-managed architecture in the networking market, it's not for everyone. Cloud-controlled WLANs depend on the Internet to establish communications between wireless control data with local APs and to perform provision, authentication and other wireless services. In order to function properly, the cloud-based WLAN design relies heavily on the Internet; as a result, the cloud-based functions could have problems to function properly if your Internet connectivity is spotty or suffers from latency and throughput issues. On the contrary, an on-premises controller can handle all the functions locally without being affected by Internet issues.

Flexibility, robust WLAN access and failover

When it comes to actual network design and deployment, on-premises WLAN is considered more flexible and customizable under the most situations. On-premises solutions support more advanced features for Wi-Fi devices and applications, and they give administrators more granular control over specific wireless environments. In large, complex WLAN scenarios that deployed with hundreds of APs or need multiple network access authentication and authorization methods, on-premises controllers with role-based access control and secondary controller configuration can work together to offer more robust WLAN accessibility and failover support for users.

Advantages of Cloud-based Solutions

Ease of remote management and deployment

Cloud-managed design offers better management simplicity. In this architecture, there is no need to deploy controllers on each site. The cloud provides remote accessibility to control the entire network regardless of where the IT staff is located. One prerequisite of cloud-based WLAN solutions is that the cloud-managed networking hardware is designed for zero-touch deployments, so they can be installed without sending IT professionals on site. A tip to select cloud vendors, never go with anyone without zero-touch deployments as it lost one of the biggest benefits. The cloud-based approach makes networking deployments much easier – which is important especially for businesses with insufficient IT professionals.

No controller hardware limitations

Another obvious benefit of cloud-based WLANs is that the number of APs cloud can handle is unlimited, which provides better scalability in network deployment scenarios. So when it comes to expanding network infrastructures or setting up new sites, cloud-managed solutions can support from companies with just one AP in a single location up to multiple sites with hundreds of APs – all without the need to purchase additional hardware controllers.

Who Should Go for Cloud Then?

There is no definite choice between the two architectures as both can provide their respective benefits according to your company's current needs. So in what kind of situations should a business go for the cloud instead of staying on-premises? The following are some key criteria that might be helpful for you to make the decision on choosing cloud-based or on-premises solutions.

The network in your organization is operated by limited IT staff:

Start with taking a look over the IT structure in your organization. If you have IT staff that supports all branch locations and the team members are technical experts, then consider an on-premises solution as it offers a highly customizable network to fit your actual needs. However, if your IT team is relatively small and you are

looking for an easy way to simplify deployment and management, then cloud-managed approach may be the best way to go.

Your organization is geographically distributed in multiple locations:
On-premises architecture works well in large enterprise environments with sufficient technical support, while cloud-managed WLAN services are more suitable for distributed businesses with geographically dispersed branches such as retail chains with a large number of small sites. As cloud-managed access points can self-configure through the cloud, non-IT employees on the distributed sites just need to plug the devices in and turn them on, and then administrators can perform provision, monitoring and diagnostics from a remote location.

Your organization has dynamic demands:
As cloud managed solutions require no hardware controllers, and no need to select from small or large controllers, while new APs can be added at any time to any location of any quantity. Cloud-managed WLAN services are based on the "pay as you grow" model that allows companies to pay for only what they need according to the companies' dynamics. Therefore, if organizations are experiencing uncertain demands in the nearly future, cloud-managed WLAN is a way to go as it would help them to deal with the problems.

Basically, on-premises solutions provide more advanced features and techniques for customized networking deployments as well as sophisticated management capabilities for administrators, while cloud-managed solutions provide ease of use, remote management and full network visibility. Consider what matters to you the most before going for either architecture.

On-premises	Cloud-managed
• Relies less on Internet connectivity • Requires advanced features for complex WLAN applications • Use private cloud • One-time purchase	• Ease of remote management • Zero-touch deployments • No hardware controller limitations • Pay as you grow

Considerations of ZyXEL Nebula and NXC

Now you've learned about benefits of the two WLAN architectures and how'd they work with your company network and IT capabilities. No matter you go for cloud-managed services or on-premises wireless controllers, ZyXEL offers what is ideal for you to provide consistent, high-performance and secure wireless network services that support personal, guest and corporate-owned devices.

The ZyXEL NXC Wireless Controller Series[2] and Gateway products with AP Controller functionality[3] are capable of extending networks flexibly and fulfilling different deployment requirements with excellent compatibility. The ZyXEL Nebula Cloud Networking Solution[4] can provide comprehensive control over Nebula devices across distributed locations through a single management interface. To better explain the difference between NXC and Nebula, the table below listed several considerations of the two choices. Have a glance to understand more details and select the appropriate WLAN architecture for a great wireless experience.

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[2] ZyXEL NXC5500 Wireless LAN Controller, ZyXEL NXC2500 Wireless LAN Controller
[3] ZyXEL AP Controller Technology Solution Brief
[4] ZyXEL Nebula Cloud Networking and Management Solution

	NXC wireless controller	Nebula cloud networking
Network environment	Complex	Simple
	Customer environments have more complicated VLANs or routing settings.	Green field or simpler network environments.
Wireless applications	Complex and challenging	High performance Internet
	Granular settings that allow fine-tuning to wireless parameters.	Hospitality or Internet access in education institutions.
User density	Medium to high	Low to medium
	Advanced Client Steering with more options. Suitable for conference centers, stadiums and one-to-one e-learning.	As simple as 1-2-3 and makes high-performance Wi-Fi services available.
Number of peer AP	Extremely high	High
	Smart Antenna and advanced Client Steering technology allow APs to overcome co-channel interference challenges.	Smart Antenna and optimized technology for common usage. Simple setting that just works.
Engineer skillset	Higher	lower
	RF domain knowledge is needed for optimization, and expertise is needed for complex network environments.	Basic knowledge of radio and networking is sufficient.
Deployment cost	Higher	Lower
	On-site deployments and site surveys are usually needed for more advanced applications and challenging environments.	Devices can be shipped to the location and then installed, provisioned and configured on the cloud by less-skilled engineers.
Maintenance cost	One time license	Recurring license
	The maintenance cost is more than license, device and labor cost of engineer team; other factors such as NMS are built or not must be considered as well. User can choose the most suitable solution between NXC and Nebula base on the need and conditions of the organization.	

Summary

Smart devices have changed the needs for WLAN networks. Today, offering secure, consistent and high-performance wireless network services are essential in every business. Fortunately, companies now have more options supporting the new requirements as some IT experts prefer the on-premises architecture, while some network engineers rave about the benefits of cloud networking. Just evaluate the current and near-future situation of your network, and then weight the factors listed above to see what is critical to your organization before making the best decision.

For more product information, visit us on the web at www.Zyxel.com