Software-Defined LAN
Redefine Your Access Layer
Mobility Driven Demands of the Network

Mobility is transforming every aspect of our personal and working lives and driving an exponential pace of change in the network. There are now billions of devices demanding connectivity, offering tremendous opportunities to increase flexibility, efficiency, and productivity. As mobile devices have become increasingly critical to enterprises’ business processes and productivity, expanding the wireless LAN has become a top investment priority.

As more and more devices connect to your network, they can create unintended consequences, making it important to carefully consider the implications these devices have on the network. Ill-prepared organizations with networks inadequately designed for one-to-one computing and BYOD may experience inconsistent wireless coverage, failed connections to employee, guest, and/or customer devices, staggered performance when accessing media rich content, and unmanaged network access.

As a result, users can become frustrated with poor network performance and reliability. Inadequate wireless systems can lead to the failure of a day’s lesson plan for a school/university, or pose a serious security risk for a corporate environment. Some organizations are finding their legacy wireless LAN unable to run real-time applications like voice and video-on-demand. Others desperately need an easier way to handle the growing volume — which can be exponential — of BYOD and guest devices that require access and authentication to the corporate network. These are some of the many challenges faced in the local area network today and a Software Defined-LAN can help you solve them.

The Many Flavors of Software-Defined Networking

For most of the networking world’s history, change and evolution came through hardware and software innovation as researchers developed faster and better ways to enhance networks. Now, software is in the driver’s seat, forcing dramatic changes in networking. Increasing parts of our lives are going digital, mobility is transforming lives, people are more connected than ever, and societal and global trends are contributing to the formation of a new software-defined world.

In the networking world, it started off with software-defined networking (SDN) in the data center - the primary goal of SDN is to provide more scalable and agile networks. One of the ways in which SDN networks provide flexibility and agility is by making them more programmable. Then came along SDN for the WAN (SD-WAN) with the promise of reduced WAN costs, improved WAN performance, and ease of deployment.

As other parts of your network evolve, it is now time to rethink your access layer as well. Traditional wired Local Area Networks (LANs) are outdated. Users expect to be able to connect any of their devices, corporate-deployed or personal, to the network wherever they are, making wireless truly the primary access layer. This is where SD-LAN comes in.

SD-LAN builds on the principles of Software Defined Networking (SDN) in the data center and Software Defined Wide-Area Network (SD-WAN) to create a new approach to adaptable, flexible, and cost effective wireless and wired access network. This builds an application and policy driven architecture, unchaining hardware and software layers while offering self-organizing and centrally managed networks that are simpler to operate, integrate, and scale.
Networks That Work for You

Modern networks must continuously adjust and adapt to keep up with the pace of change that mobility has created, something now unachievable in traditional network architectures. As you consider updating your network infrastructure to support the continuing mobile explosion, ensure that you consider the following:

- Adapts to Change
- Flexible Networks
- Cost Effective
- Business Continuity
- Scalable Architecture

1. Adaptability

Continuously adjusts to client, application, and infrastructure changes

The network should adapt itself to the continuous dynamics in client, application and the underlying infrastructure landscape. The requirement for adaptability of the network calls for a more intelligent approach to infrastructure—one that involves knowing who is on the network, what devices are connected, and what applications are running at any given moment in time. Furthermore, what you need is intelligent software-driven infrastructure that dynamically optimizes performance, makes the network smarter, and focuses network resources in real-time to serve the most critical activities currently on the network.

Extended visibility into applications based on context, such as user, device type, connected location, and time, ensures that IT administrators are equipped to deal with the transition of wireless to the primary access layer as well as the myriad of devices that users may bring onto the network. Focusing on simplicity and user centricity, an application-driven network combined with granular authentication and cloud-enabled management providing centralized visibility and control, moves the network from being a free-for-all to being a controlled, secure, and scalable next-generation access solution. In the simplest possible terms, this makes it possible to adapt the network based on the changing needs of the users.

It is an all-wireless network that delivers a consistent, interactive experience for all users—no matter what applications they are running, no matter what device they use and no matter how many other users are on the network.

Is your network today equipped with deep visibility into the LAN traffic and empowered with smart, adaptive controls?
2. **Flexibility**

*Easily integrates with existing architecture and applications*

An ideal unified edge solution is comprised of intelligent wireless access points and full-featured layer 2 access switches, both complementing each other to provide broad visibility into the network from a single pane of glass. Next-generation access devices should be capable of integrating into a standard existing architecture seamlessly without requiring any upgrades to the infrastructure. A heterogeneous mix of different AP models from a single vendor should work cohesively in the network powered by the intelligence of the software layers built on top of it. Power-over-Ethernet (PoE) support on wireless access points greatly accelerates and simplifies installation with the device powered up through standard PoE switches. Not only should the access points be able to identify and control bandwidth over the Wi-Fi side, but for true end-to-end optimization, your WLAN solution must be able to assign wired-side QoS prioritization and traffic classifications such as DiffServ and 802.1p, without which performance improvements may not be fully realized.

There are other ways in which today’s WLANs offer flexibility. Networks today have become a source of new information and new business insights. For example, they can give you information on who your users are, where they are, what they are doing, and what devices they are using. This offers opportunities to transform how they interact with your organization. The modern WLAN should provide a set of powerful open APIs that enable customers to leverage their Wi-Fi network data through customized applications, analytics and networking integrations for new insights, cost-savings, increased revenue and improved user experiences for everyone.

3. **Cost-effectiveness**

*Reduces the cost of acquisition and ongoing operations of the network*

Can companies truly drive down the cost of the network while driving up efficiency and flexibility of their IT environment? Yes, with SD-LAN, you can have the best of both worlds. The status quo for wireless networking solutions has involved deploying APs that are connected to, and managed by, a centralized controller. At the time of their creation, controllers eased the management and security headaches that non-pervasive networks comprised of autonomous access points would cause. Today however, with the increased reliance on Wi-Fi, expanding networks and increased performance requirements, the centralized model has severe architectural limitations, including data bottlenecks, scalability, unreliability, and unnecessary costs due to licensing and redundancy. Hidden cost implications include loss of productivity of wireless end-users, IT cost of deployment, and the additional cost of training and supporting customer issues.

By removing controller hardware, software, and licensing, dramatic cost savings can be realized without losing functionality. There are several benefits, including significantly lower relative CapEx, reduction in data center footprint and associated OpEx, simplified architecting and installation of APs, ease of ongoing management and increased solution resiliency and user productivity improvements.

In recent years, the cloud has proved popular with organizations looking to centralize software services and reduce costs with SaaS delivery becoming a popular software model that eliminates the need for organizations to incur the expense of purchasing or maintaining expensive application servers and software. When it comes to the LAN, this pay-as-you-grow model makes sure you have the flexibility to acquire network management as a subscription to match the pace of your business growth.

4. **Business Continuity**

*Self-optimizing, self-healing, and self-organizing operation*

Technology sometimes breaks, but having a fault-tolerant system is a way to ensure that a normal bump in the road won’t take down your network. Does your network have the power to automatically heal itself so that it keeps your business running when the circumstances are out of your control?

Modern-day LAN solutions must provide availability, resiliency and scalability to the mission-critical local environment without adding on costs and complexity.

In a fully-distributed WLAN, failover/failback, best-path forwarding, and dynamic mesh routing can allow for a self-healing, and thus highly-reliable, infrastructure. Predictive stateful roaming, cooperative RF management, station
load balancing can add yet another dimension of intelligence to the access layer. By routing around failures, such as APs, Ethernet switches/routers, and cut cables, and leveraging multiple Ethernet backhaul paths and stateful forwarding protocols, a fully-distributed Wi-Fi network can actually be as reliable as its Ethernet counterpart. The software layers of the solution stack need to create a mobility-optimized, self-organizing, self-optimizing and self-healing network edge.

The cloud-based architecture is yet another essential component of SD-LAN that is required to provide high reliability, resiliency, elasticity, consistency and disaster recovery.

5. **Scalability**

*Starts small and grows – or shrinks – as requirements change*

Scalability is a key consideration for enterprises and other organizations when making investment decisions about building new networks. This is important when selecting a LAN architecture because it allows organizations to be able to grow seamlessly without having to make major changes to the network, which can be a very complex and costly endeavor.

Given the explosive proliferation of devices throughout the network, IT departments want to be able to build an intelligent infrastructure that not only scales to support this influx of devices, but provides reliable access and security in order to maintain business integrity.

It is important to ensure the architecture you choose is designed from the ground up to provide a scalable, high performance, mobile wireless LAN. If your network can scale easily and simply by adding/removing additional wireless APs and switches to your network, it will greatly simplify network planning and development.

The cloud management platform should be able to scale to support the management and monitoring of thousands of devices from a single console with minimal overhead as a scalable, elastic network is simple for IT to plan, deploy, manage and grow. On the road to an IoT future, wireless networks need to be ready to sustain the onslaught of ever-growing networks of things and ‘location of things’, using BLE beacons as an example.

Network scalability translates into a lower operating expense with predictable hardware costs. Application visibility and control, automatic load balancing and other tools give administrators the ability to understand and control the priority of traffic resulting in more efficient uses of the network while profile-based management and security implemented at the edge of the network help to minimize risk to the organization.

Ensure that your cloud-based Network Management System (NMS) can scale from a small, basic network to cover a larger, complex network with seamless upgradeability and simplicity.

Single management interface for the wired and wireless domains as well as unified network policies with device templates allows configuration of any number of Wi-Fi devices and access switches enabling complete scalability.
Your **Software-Defined LAN**

As discussed, the five essential pre-requisites of the LAN today are adaptability, flexibility, cost-effectiveness, business continuity, and scalability. An SD-LAN delivers these attributes with a multi-layered software-driven solution for dynamic next-generation access networks.

- **Application Optimization** - Prioritizes and dynamically changes the performance and behavior of the network based on the applications that use the network, focusing network resources where they best serve the organizations’ most important activities.

- **Identity Driven** – Dynamically defines what individual users, clients, and things can do when they access the SD-LAN. Access needs to be granted and then revoked for all users and devices, or just for one.

- **Adaptable Access Layer** – Wireless access points and access switches that can intelligently respond as changes in network configuration and requirements occur. This includes control protocols to deliver self-optimization, self-healing, and device behavior that can be manipulated through software.

- **Cloud Managed** – Provides centralized management of operations and policies, with policy changes distributed in real-time to switches and access points, across the distributed access network infrastructure. Cloud management keep network dynamic, tightly managed, and cost effective to operate.

- **Open APIs** – Programmable interfaces that allow tight integration of network and applications infrastructures, enabling the network to provide new insights and integrate with rest of the operations framework.
In Summary – What Does All This Mean for You?

When investigating wired and wireless access network solutions today, measure the value of each vendor’s offering in terms of the SD-LAN requirements. Use the SD-LAN attributes as your navigation compass to find the true North Star - the LAN solution that fits the needs of your local environments today and in the future. Ensure that your mobility platform can be quickly rolled out, can easily and securely onboard devices, can expand as you do, can recover on its own, and can give you powerful and actionable network insights. Now is the time - elevate your network today with SD-LAN.
About Aerohive

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