



Wireless networks: Turning raw speed into great experiences

How distributed Wi-Fi control accelerates time-to-deployment and extracts maximum value from the latest wireless standards.

White paper

Deploy faster with Alcatel-Lucent
OmniAccess Stellar WLAN

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Introduction

Consider the dramatic changes that have taken place since you last made a significant investment in your wireless network.

Previously, wireless added a useful layer of mobility to your wired infrastructure. Now, you have users who may never connect with cables.

Before, laptops and desktops were the primary tools of productivity in the office. These days, smartphones, tablets and apps are essential, whether users are on the move or at their desks.

Cloud services, including cloud-hosted apps, were still taking shape. Now, they're driving productivity and consuming wireless bandwidth.

Just a few years ago, the 'Internet of Things' was an interesting prospect. Today, Business Intelligence forecasts that there will be a total of 22.5 billion IoT devices in 2021, up from 6.6 billion in 2016.

Of course, security was always a critical issue. But it's become more complex, particularly with the expectation of guest and visitor access.

In this white paper, we look at the impact those changes have had on the way organizations deploy wireless networks. We also look at the cultural impact of this new freedom of movement, and how it translates into higher productivity and increased efficiency.

In particular, we'll see how the phenomenon of business mobility has enabled Wi-Fi to come of age, with enterprise-class management, control and security, as well as rapid, simplified deployment.

We'll look at the critical factors affecting the decision to upgrade or migrate your wireless deployment, so you get maximum value and a scalable, future-ready infrastructure.



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The demand for change

The transformation of business wireless has been driven by user demand.

- The business wants users to have universal, always-on access to applications and cloud services.
- Employees want a consistent experience, with fast time-to-content, and authentication with minimal disruption.
- Guest users want easy access, without cumbersome registration.

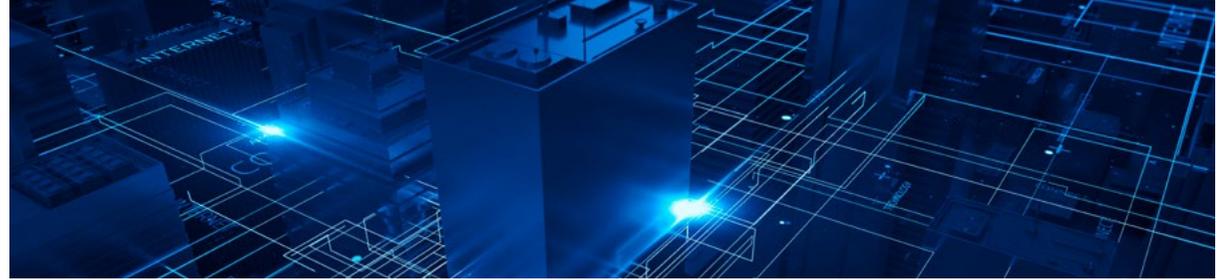
While striving to meet that demand, IT teams want end-to-end control, visibility, simplified deployment and management, rich analytics and strong security.

At the heart of this clamour for connection is the rise of the smartphone and the tablet, together with the apps they use.

Research from app developers Fliplet shows that 71% of employees now spend more than two hours a week accessing company information on mobile devices (*Enterprise Mobile Apps Report, Fliplet, 2017*). For the wireless network, this means many more connections, and traffic moving rapidly between access points.

In the education and hospitality sectors, the impact is even greater, with students and guests connecting and disconnecting in high volumes. And with the growth of the IoT, there are millions of new automated users, all about to flood networks with data.

The intelligent response



The first requirement of a new Wi-Fi deployment is to deliver an exponential increase in speed. Many wireless networks, having liberated new levels of mobility and productivity, are now delivering less and less value, as bottlenecks increase and bandwidth is consumed by demand.

The latest wireless standard, 802.11ac, offers a threefold increase in speed over the previous standard, 802.11n. It uses the 5 GHz spectrum rather than 2.4 GHz, and it employs 'beam forming', which can direct signals to a specific device. Multi-user multiple input/multiple output (MU-MIMO) capabilities also help to boost data throughput.

In some cases this amounts to gigabit-per-second connections, making Wi-Fi a more than acceptable alternative to wired networks. For example, wireless streaming of video content, or videoconferencing over Wi-Fi, are now practical options, with little risk of buffering or jitter caused by the wireless connection.

This is why speed is better measured in terms of user experience, rather than the rate at which data moves across the network. Any investment you make will be wasted if users do not consistently get the instant access to applications and content they expect.

For this reason, the management of wireless networks, and the intelligence built into them, are the key areas of consideration when investing in new Wi-Fi.

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The move to distributed Wi-Fi control

Earlier Wi-Fi deployments required centralized controllers. These appliances provided the control, security and resiliency that organizations needed to deploy wireless networks with confidence, and to support the limited capabilities of the APs themselves.

However, they brought with them the usual appliance costs of capital investment, management, maintenance, energy consumption, confined scale and obsolescence. They also offered limited functionality, which made the process of onboarding users and deploying policies slow and laborious.

Today, however, organizations can opt for a control architecture that runs in a distributed way within the APs themselves, with co-ordinated intelligence.

The new paradigm allows smart and advanced APs to be managed as single systems or groups. It simplifies the architecture, helping to eliminate single points of failure and remove traffic bottlenecks, while improving user Quality of Experience (QoE) with reduced latency and also reducing operational costs.

The flexibility and increased capabilities of the distributed intelligent architecture transforms the speed at which policies and user permissions can be deployed, while significantly reducing the management overhead.

Clearly, we are at a notable inflexion point for wireless networks. Four critical factors are coming together to make change a priority for organizations that recognize the speed, efficiency and productivity that Wi-Fi can deliver:

- Users, whether they are employees, visitors, guests or students, now take wireless access for granted
- 802.11ac offers a dramatic boost in speed and capacity, and it's set to be the standard for at least five years*
- Virtualization is simplifying management and control, while helping to reduce TCO
- The IoT is rapidly generating a vast increase in wireless network traffic

The speed at which organizations embrace this opportunity for change will have a significant impact on their ability to compete in the new wire-free world.

* "If you purchase a new AC capable wireless network solution in 2016 or early 2017, you will be able to rely on it for another 5 to 6 years."

[Solutions Review, "802.11ac Wireless Network Solutions"](#)



The key technical considerations

With centralized management, you have enormous flexibility in the way you deploy your new wireless infrastructure. You can also make changes and additions at speed, with minimal intervention.

User experience and security must be the primary considerations. You will need to consider the likely bandwidth requirements of different workgroups, and the number of devices that will be connecting to any particular access point.

We'll look at each aspect of the technology in turn, and highlight the benefits to be considered as you plan your investment.

Distributed intelligence

This is the key to ensuring consistently excellent user experiences. Intelligence built-in to the access points ensures that the flow of traffic is fully aligned with individual users needs and the patterns of demand affecting each access point. A variety of factors combine to achieve this:

Automatic, intelligent optimization allocates radio frequencies that best suits the user environment. Those who frequently stream video, or make voice or video calls, will automatically be assigned higher frequency signals when they need them.

Co-ordination among neighboring APs can eliminate co-channel interference, ensuring a consistent quality of signal between an access point and an endpoint, providing the best coverage with no interference.

Band steering, gives priority to the 5 GHz waveband, ensuring that devices with support for 5 GHz will always connect to that frequency. This also means that there will be fewer devices connecting to the 2.4 GHz network, helping to optimize bandwidth for older devices.

Smart load balancing automatically connects clients to the most suitable access point, balancing the needs of the client device with the general demand on the network, again to ensure a reliable connection.

Airtime fair access regulates the flow of packets to ensure that even older clients get the quality of service they need from any given access point. This is one of the reasons why migrating to 802.11ac does not mean having to replace all client devices.

Self-healing APs provide dynamic coverage adjustment to counteract AP failures. The signal is automatically handed to the most suitable alternative AP, with little or no impact on the user experience.

Adding new APs to the network is quick and easy, with very little management intervention required. The network can scale intelligently in line with rising demand.

Deployment options

In some instances, such as branch offices, or specific areas on a campus, it may be appropriate to deploy smaller groups of APs in standalone clusters. In others, a fully managed deployment, with the option to scale in line with changing demand, will be required. However, even standalone clusters can still offer separate, secure guest access and intelligent optimization of the signal.

User onboarding

Ease of connection is a critical aspect of the user experience, especially for guest networks in the hospitality sector. Enabling self-service connectivity also reduces the impact of the onboarding process on the IT team, with less time required to provision devices and faster updates.

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Bring Your Own Device

There is a rising expectation among employees that they will be able to connect their own devices to the corporate network. Moreover, [Capgemini](#) reports that mobile workers who use mobile devices for both work and personal purposes put in 240 more hours per year than those who do not.

BYOD is a wireless phenomenon, so policy enforcement is reliant on a management platform that can deal with the nuances and capabilities of different devices and operating systems.

User onboarding and security are again key considerations. You can regulate the level of access that user-owned devices have to corporate information, and use non-intrusive authentication methods, such as device fingerprinting or MAC address registration, to control connection to the network.

The Internet of Things

You need to be able to manage the machines that want to connect to your wireless infrastructure as easily as the people. Your management platform can incorporate established standards, such as Bonjour and Universal Plug and Play, to simplify the onboarding of IoT devices. Rules can be based on location, user group and identity.

Profile-based management allows you to control access privileges for IoT devices, enabling secure access to the core infrastructure where appropriate. For example, a machine control system may need to exchange data with key management databases, whereas a wireless security camera may only need to connect to a local storage system.

You can also containerize IoT profiles, allowing them to be assigned instantly to other devices requiring the same access privileges. This can significantly reduce management time, removing the need for repeated configurations of similar machines.

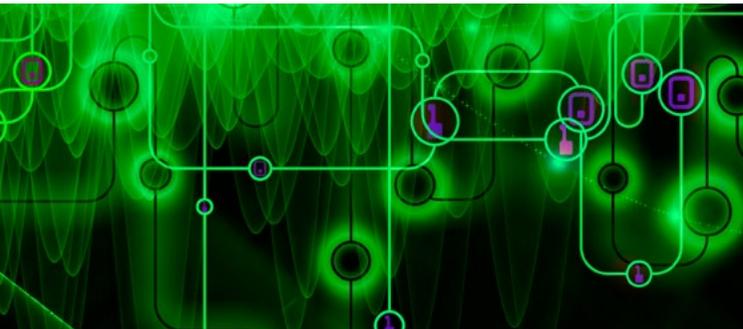
Scalability is also a key issue. As more and more areas of the organization recognize the possibilities of automation, it's likely that there will be a rapid scaling of demand for more connections. Moves and changes could also add to the management burden, with the inevitable tinkering that accompanies the vast array of equipment within an organization. Here again, automated onboarding alleviates the administration workload.

Automatic VLANs

Virtual LANs provide logical separation at layer 2 for Ethernet networks. This assures segregation and reduces the volume of traffic that needs to be routed.

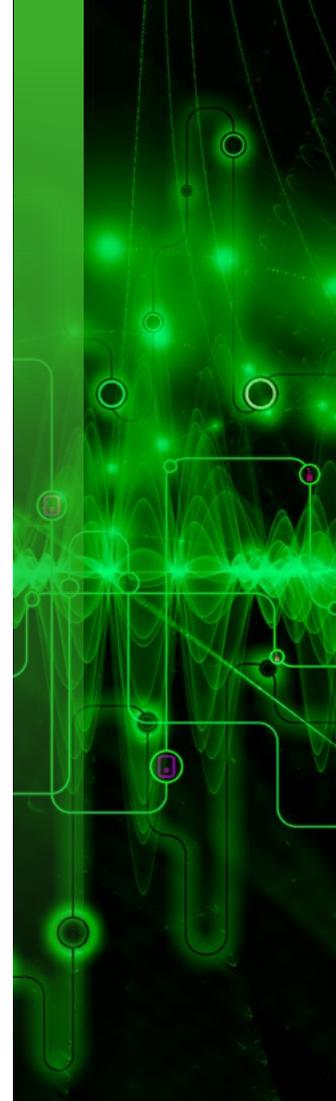
Traditionally, VLANs have to be manually configured on each network interface. With proliferation of access points at the network edge to meet the growing wireless demands, asking for manual configuration at each end point is cumbersome, error-prone and less flexible.

The Alcatel-Lucent OmniAccess® Stellar access points in integration with Alcatel-Lucent OmniSwitch® family of LAN products, provides automated VLAN provisioning at the edge of the network simplifying deployment at scale. When clients securely connect to the wireless network and begin transmitting traffic the network edge automatically detects the VLANs and provisions them on the fly. No manual configuration is required, traffic is segregated from the rest of the network, and data privacy can be assured.



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Unified Access

Today's users access the network from multiple devices, including their own smartphones and tablets. Unified access provides them with a single set of credentials that are automatically validated, whichever device they use to log in.

This helps to ensure a consistent user experience no matter how they connect to the network. It can control the level of network access they are allowed, and which applications they are able to use, no matter how they connect.

Your management platform should have native unified access capabilities, allowing you to apply policy-based quality of service rules, according to the user's role and requirements. For example, if a user regularly uses video conferencing, they can expect the same experience on their own tablet as they can on their corporate laptop (subject to the capabilities of the devices themselves).

Unified access helps to strengthen security, enforcing policies on every device that is used to connect to the network. And because it centralizes and automates identity management, it takes away another laborious task from the IT team.

Applications

When we talk about user experience, we are primarily talking about the applications that they use. From basic productivity tools, such as Office 365, to complex bespoke applications that may run critical financial systems, their ability to perform consistently is significantly affected by the network.

Even a few moments of downtime could be catastrophic if it causes a user to lose some work, or prevents a contact centre agent from accessing a customer's files in the middle of a sensitive call. And for applications that are costly to implement and maintain, any compromise in performance affects the return on investment they deliver.

The intelligence built into OmniAccess Stellar WLAN access points allows you to optimize application performance over the wireless network, in line with bandwidth requirements and user expectations. You can prioritize applications in terms of their impact on the business, allocating guaranteed bandwidth levels to business-critical apps to ensure they maintain performance.

For less critical applications, you can intelligently allocate bandwidth according to demand. This will also be governed by any policies you assign to particular users or workgroups. Thus a team that routinely works with a demanding piece of design software will always have sufficient bandwidth, whereas occasional users may not get the same speed of response.

If users manage to download non-compliant apps, you can protect against any potential harm by restricting network access solely to authorized applications. This is a critical function in the age of BYOD, where users are inevitably the weakest link.

Analytics

Every click on a connected device generates data that can help to shape management decisions. The way users work with applications, the patterns of traffic across a network, the peaks and troughs of demand – all these and many more factors contribute to a virtual picture of daily operations, and an indication of opportunities and challenges ahead.

IT teams can generate dashboards in real time, showing how traffic on the network is behaving, and how the network itself is running. They can refine the rules and policies governing the network on the basis of comprehensive data, either making temporary adjustments to deal with unexpected peaks, or more permanent changes in recognition of long-term trends in usage.

Line-of-business managers can extrapolate information about the wider business operations, and plan accordingly. For example, if a hotel food and beverage manager can see that demand for guest access is rising in a particular bar at an unexpected time of day, he or she can look at what might be happening and find ways of generating additional revenue from the guests using the bar.

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Healthcare: Connecting with care

Digital transformation is enabling healthcare providers to deliver efficient, effective treatment regimes, while reducing costs and improving the patient experience. But new digital services and capabilities are reliant on high-performance networks, especially if they are delivered from the cloud.

Distributed intelligent architecture ensures applications run smoothly. It also gives medical staff fast access to the information they need, at the point of care, in the lab or wherever else they may be working.

Where video is used, especially as part of a collaborative procedure, quality of service can be assured. And communications between staff can be

as fast and reliable as they need to be, because wireless coverage can reach the most remote corners of a building or campus.

All of this can be achieved while maintaining rigorous security. Patient confidentiality is critical, and the threat of malware or unauthorized intrusion can be kept to a minimum by automatic enforcement of policies.

Patients feel the benefit too, because they can connect to secure guest networks, isolated from the main network. But there is no additional overhead for the healthcare provider, because the guest network and the internal network can be delivered securely from the same access points.



Transportation: Freedom of movement

Wi-Fi matters for people on the move because mobile networks cannot always be relied upon to provide the quality of coverage they need. It's a problem for the staff who serve them as well, because they often need to be working away from fixed network connections.

As people move around arrivals and departure halls, waiting areas and booking lobbies, they want information delivered to their smartphones. Increasingly, it's likely that they'll have e-tickets on their phones, and they will certainly want to check travel information via your app.

As for your staff, it's essential that they are better informed than your passengers, and that they can rely on their mobile devices to access everything they need. This could

range from service information for platform staff, to wiring diagrams for maintenance crews.

Intelligent Wi-Fi ensures all these scenarios are covered. You can deliver reliable, high-bandwidth wherever it is needed, and optimise app performance over your guest network, while reducing the cost of providing and maintaining wireless coverage.

You can also use rich analytics to track patterns of demand and passenger movements, ensuring you always have sufficient and efficient levels of service staff available. And you can use the detailed management information feeding through from your wireless deployment to find new revenue-earning opportunities, from catering outlets and other services.



Education: Learning everywhere

Digital services have transformed learning, equipping teachers and students with access to a vast range of educational resources. At the same time, students are increasingly reliant on their phones and tablets to access learning materials, conduct research and stay in touch with families and friends.

At break times, social media is the lifeblood of most campuses, even among students in the same class. This generally helps with social cohesion, but it also supports collaboration on learning projects, both at school and at home.

This makes the provision of high-performance wireless networks essential to the smooth running of school and college life. With virtualized, distributed intelligent architecture, ubiquitous Wi-Fi can be provided at lower cost, both in terms of initial investment and cost of ownership.

Intelligent management can ensure that the wireless infrastructure can cope with the tumultuous demand for connection and disconnection as people come and go, and move between access points. It can also help with the collection of meaningful data on individual student's progress, helping to improve educational outcomes with better targeted learning.

The right wireless management platform can also ensure that the student and staff networks are secure, and compliant with regulatory standards. Student data can be kept safe, and the school or college infrastructure can be kept separate from the traffic flowing across the students' network.



Hospitality: The essential guest experience

Wireless access is no longer an added benefit for guests. It's as essential as light and heat. Wi-Fi is now a key factor in the choices guests make about where to stay, dine, or grab a cup of coffee.

But a wireless network is also a valuable source of data about guest behaviour and patterns of demand, which can help to unlock new revenue streams. If you provide an app for guests, you can even send them real-time offers that encourage them to linger a little longer, or try an extra service, such as a sauna or beauty treatment.

With distributed intelligent architecture, on a virtualized platform,

you can deploy entirely separate networks for guests and staff, through the same access points. You can also provide a third secure network for back office teams. And you can extend assured coverage wherever it needs to reach, linking staff across resorts or large properties to provide a consistently excellent guest experience.

Dependable, secure Wi-Fi also enables you to deploy valuable new guest services such as eConcierge, auto check-in and smartphone room keys. But on a virtualized platform, your up-front costs and operating costs are reduced, with less hands-on management and simplified maintenance and updates.



Summary: Wireless goes timeless

Time is an expensive commodity these days. As users, we're impatient if anything loads slowly on any device, or if security systems place what appear to be unnecessary barriers in our way.

But our experience and our frustration is trivial compared with the challenges faced by IT teams every day, as they work to meet and exceed our expectations.

This is why speed is such a critical factor in decisions about wireless networks. Not simply the speed of the network itself, but the speed at which routine administration tasks and more complex changes and additions can be completed.

Distributed Wi-Fi control and centralized management provides the breakthrough in security, control and time-to-deployment that IT teams need. It provides a layer of intelligence that ensures that the latest 802.11ac wireless networks deliver the performance and availability they promise.

- Applications perform consistently, with minimal dropouts
- Users get consistent experiences on every device they use, and wherever they connect
- IoT deployments can be managed as easily as human users - perhaps even more easily, because they are less inclined to tinker
- The security of the entire infrastructure is maintained, even with a vast and increasing pool of endpoints
- Guest users get great experiences, because they can connect easily and get fast, responsive performance, without touching the corporate network
- IT teams are relieved of much of the burden of management and administration, with automation and intelligence built into the wireless network itself
- The organization gets maximum value from its investment in networking technologies and network-based applications, as productivity and efficiency increase, and operational costs go down

ALE can help you exploit the opportunities created by the latest wireless networking technologies. Get in touch with your nearest ALE representative today.

www.al-enterprise.com/contact-us

To find out more about the Alcatel-Lucent OmniAccess Stellar WLAN solution visit www.al-enterprise.com/en/stellar-mobility-wifi

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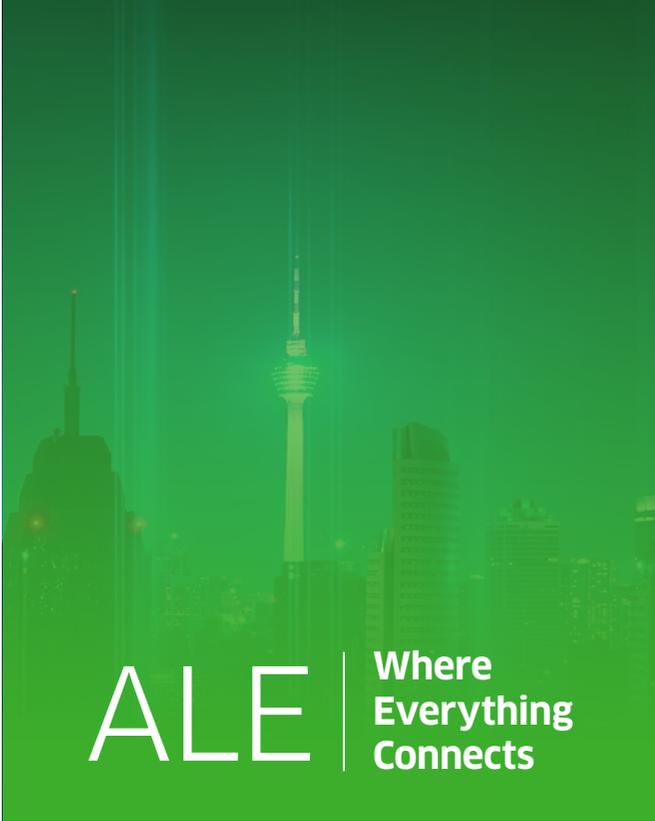


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