



ALCATEL-LUCENT ENTERPRISE CONVERGED NETWORK SOLUTION

Deliver a consistent and quality user experience,
streamline operations and reduce costs

THE CHALLENGES TO BECOME THE NEXT-GEN CORPORATIONS

Technology is essential for the efficiency and differentiation of enterprises in a very dynamic and demanding market. The network infrastructure is the backbone to enable or prevent this technology adoption. Major trends are driving new network demands and complexity: the increased utilization of multimedia applications, the support of next-generation devices, mobility, bring your own device (BYOD) and the move to the cloud.

The rapid growth and importance of real-time applications such as VoIP, video and collaboration suites push legacy networks to their limit with ever-increasing demands for bandwidth and overall enhanced Quality of Service (QoS).

Many new devices, such as smartphones, IP cameras, smart boards and feature-rich next-generation IP phones, demand additional bandwidth and sometimes have power requirements that are above the limits of today's networks. Many employees are demanding to use their own devices, such as smartphones and tablets, and need to connect to corporate networks. This new scenario, combined with the support of mobility, increases security risks and makes it difficult for network managers to predict bandwidth consumption, rendering the standard practice of static provisioning of bandwidth priority ineffective. Since IT can no longer control the endpoint, any tuning to improve application delivery now must be done in the network and preferably in an automatic fashion.

Virtualization is no longer confined to the data center. Today virtualization occurs throughout the network, all the way down to the desktop. With virtualized desktops, computing is carried out in the data center rather than at the desktop, with a traffic stream for display information that is more sensitive to delays and network interruptions.

It is imperative to have a converged network architected from the ground up to effectively meet the demands of new applications, devices, mobility and virtualization. Now is the time for enterprises to re-think their strategy to support higher WLAN utilization, increased LAN access speed and better core performance. They must adopt a network with a simplified architecture that optimizes resource utilization, provides a consistent quality of experience for wired and wireless users, and simplifies overall management.

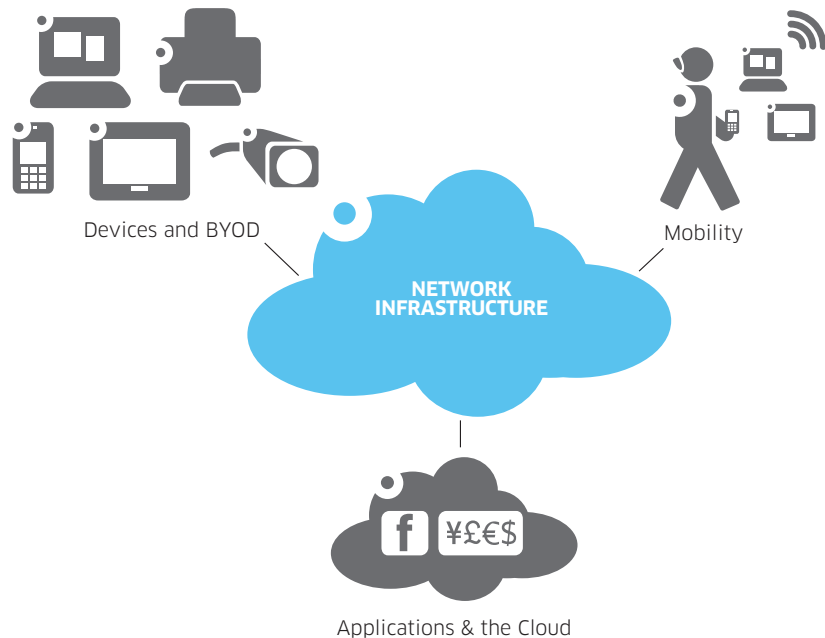


Figure 1. Major trends push legacy networks beyond their limit

THE ALCATEL-LUCENT APPLICATION FLUENT CONVERGED NETWORK

To answer these challenges, Alcatel-Lucent Enterprise brings its application fluent network approach to the converged network. Our vision of an application fluent network is based on a resilient architecture with automatic controls capable of dynamically tuning the network performance and streamlined operations that reduce network complexity. This application fluent network possesses broad knowledge of the users, the devices connected and the applications being used. Most importantly, it makes automatic adjustments based on that understanding.

A COMPLETE SOLUTION FOR THE CONVERGED NETWORK

The Alcatel-Lucent Enterprise Application Fluent Converged Network Solution is built on a wire-rate 10GbE/40GbE network core and Unified Access with built in BYOD functionality. The core includes the market-leading Alcatel-Lucent OmniSwitch™ 6900 Stackable LAN Switch, OmniSwitch 9000E Chassis LAN Switch, and the OmniSwitch 10K Modular LAN Chassis. The unified access provides a common set of network services, policy framework, authentication scheme and a single authentication database that applies to users accessing the network with either wired or wireless devices. Wireline access is provided by stackable LAN switches like the Alcatel-Lucent OmniSwitch 6855 Hardened LAN Switch, OmniSwitch 6850E and OmniSwitch 6450 Stackable LAN

Switches and OmniSwitch 6250 Stackable Fast Ethernet Switch; wireless access is provided by a variety of Wi-Fi access points.

The solution also incorporates the OmniAccess™ ESR branch routers and the Alcatel-Lucent 7750 Service Routers for customers seeking to deploy their own WAN. A software-based VPN client for laptops completes the solution by providing secure connectivity to employees on the road.

The management suite includes all tools needed to provision, monitor and troubleshoot the network and provides end-to-end application visibility, IP Address Management, Authentication, Authorization and Accounting (AAA), and BYOD-related services.

The Converged Campus Network solution delivers:

- A high-performance network with wire-rate 10GbE/40GbE core
- Network virtualization for reduced equipment, network simplification and streamlined operations
- A resilient network that does not impact real-time application performance in case of failure
- Automated provisioning of access switches and endpoints
- Leading wireless LAN with superior performance, quality multimedia delivery and flexible deployment options
- Low power consumption
- Network services that apply seamlessly to wired and wireless connected devices:
 - Embedded security for protecting users and keep the network always running
 - User Profiling for a quality user experience on a highly mobile environment
 - Multimedia Fluency for enhanced quality delivery of voice and video

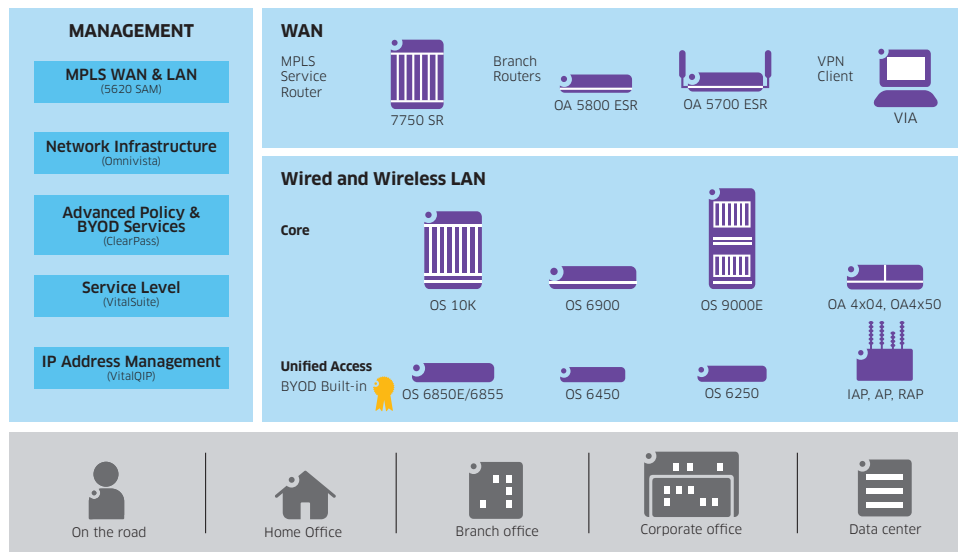


Figure 2. Alcatel-Lucent Application Fluent Converged Network Solution

- Citrix® Virtual Desktop Infrastructure (VDI) Fluency for differentiated QoS on applications delivered in a VDI tunnel
- AirGroup™ to enable simple connectivity and personalization of Apple devices
- Advanced BYOD services to simplify BYOD adoption and keep the network secure

The Alcatel-Lucent converged network solution supports open standards and interfaces to ensure interoperability and future expandability of the network.

A SIMPLIFIED AND RESILIENT ARCHITECTURE

The converged network solution offers new architecture that is simplified and flattened, with just two layers instead of the traditional three. In many cases, it is possible to eliminate the need for a distribution layer due to the introduction of new-generation wire-rate 10GbE/40GbE core switches, led by the Alcatel-Lucent OmniSwitch 6900 and OmniSwitch 10K, with market-leading port density and switching capacity.

Virtualization is also important to achieving a flattened and simplified architecture, since it removes the inefficiencies of a spanning tree protocol and enables the network to keep all links active and fully utilize all resources available. Traditional methods would disable all redundant links and only use them in the event of main link or switch failures. With technologies like Virtual Chassis (VC) you can combine up to six OmniSwitch 6900 Stackable LAN Switches to behave as a single fully redundant unit, which in many

cases can replace expensive chassis with better space, power consumption and pricing.

The Alcatel-Lucent Application Fluent Network provides simple and resilient architecture. It uses less equipment, increases efficiency and also provides industry-leading re-convergence time in case of equipment failure, without impacting the user experience with real-time applications, like voice and video.

SUPERIOR CORE PERFORMANCE, READY FOR FUTURE NEEDS

Video traffic is predicted to account for 54 percent of corporate bandwidth by 2016, according to Yankee Group. The modern corporation needs a network that is able to sustain the current multimedia challenges and also has the capability to support future demands, such as the expected increase in adoption of video.

The Alcatel-Lucent solution is based on a new generation of wire-rate 10GbE/40GbE core switches that provide unparalleled port density and switching capacity. The Alcatel-Lucent OmniSwitch 10K Modular Chassis supports up to 256 10GbE wire-speed ports and a total 5.12 Tb/s switching capacity, while the OmniSwitch 6900 Stackable LAN Switch supports up to 64 10GbE wire-speed ports and a total 1.28 Tb/s switching capacity in a compact 1U form factor.

These core switches reduce the need for oversubscription to meet the demands of today's real-time applications and are prepared to support your future needs. The hardware also supports 40GbE expansion interface modules and is ready to support 100GbE.

SEAMLESS EXPERIENCE ON WIRED OR WIRELESS ACCESS

With today's competitive environment, it is imperative that employees are empowered with applications and devices that allow them to share knowledge and remain connected with their peers and customers whenever they need to and wherever they are.

Deploying an Alcatel-Lucent Converged Network Solution with Unified Access ensures employees can fully exploit the benefits of mobility. Users can experience the same level of high-quality application delivery, the same policies and the same network services whether they are using a wired or wireless connection. With IEEE 802.11n and 802.11ac access points, even the performance is similar between wired and wireless, providing proper support for the increased speeds needed for real-time applications.

A Unified Access approach also provides simplification for the IT team. They can now offer a common set of policies on both wired and wireless access and the same level of security. Furthermore, a single management infrastructure provides better end-to-end visibility and troubleshooting tools.

THE ALCATEL-LUCENT USER NETWORK PROFILE

Unique to Alcatel-Lucent Enterprise and embedded in the access layer switches and access points (APs) is the ability to manage conversations in context with the Alcatel-Lucent User Network Profile (uNP). Figure 2 shows the uNP conceptually, where the user and devices are surrounded by the information required to support them.

The uNP enables the network to automatically adjust its configuration depending on the movement of users and devices in the network, instead of the traditional approach of static configurations based on switch port, AP or service set identifier (SSID).

uNP:

- Minimizes IT effort by eliminating the need to manually reconfigure the network when devices are moved around
- Improves application delivery performance for user mobility by fine-tuning the network so users have the same experience wherever they are connected
- Provides consistent security throughout the network

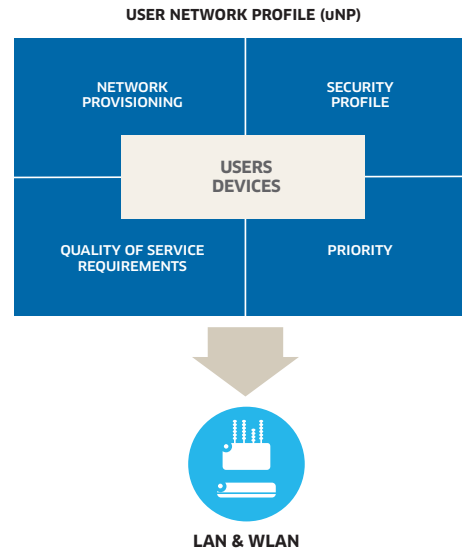


Figure 3. User Network Profile

QUALITY MULTIMEDIA DELIVERY

Expanding on the application fluency approach, Alcatel-Lucent introduces the unique Multimedia Fluency. With this capability the Unified Access layer is able to detect the initiation of a SIP-based conversation on the network, assign specific QoS treatment, monitor the actual QoS received and provide IT administrators with a dashboard for visibility on conversation quality on the network.

For example, it is possible to have a specific user receive differentiated QoS for his voice and video session, rather than any other application he is using. Even between voice and video sessions, the user could have different QoS based on his specific needs.

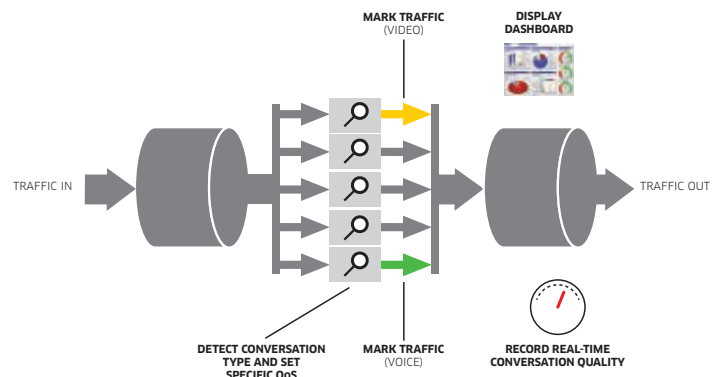


Figure 4. Multimedia Fluency

CITRIX VDI FLUENCY

One approach to handle BYOD or provide lower cost endpoints is the utilization of VDI. With this approach, the corporate applications are actually running on the data center and the endpoint (typically a thin client) is just rendering the images. The display data is delivered on a tunnel that includes multiple channels carrying the different applications data.

With Alcatel-Lucent VDI Fluency, it is possible to assign differentiated QoS for each individual application within the Citrix VDI tunnel. For instance, your video application can have priority over your email or web traffic. VDI fluency not only provides a better application experience, but also streamlines IT operations via a single command to assign default QoS to each channel in the VDI tunnel.

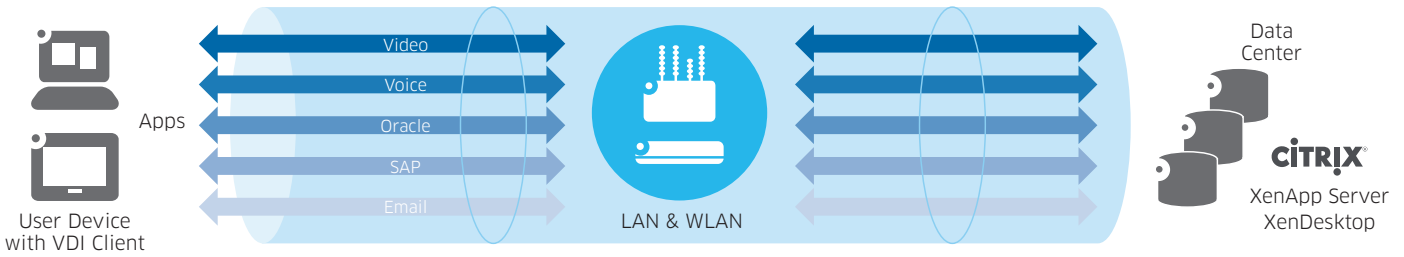


Figure 5. VDI Fluency

ENABLING APPLE DEVICES ON A CORPORATE NETWORK

Apple devices like Apple TV and Apple printers use a protocol called Bonjour, which allows these devices to be easily discovered in a network. The problem with this protocol is it was designed to work on residential networks with a single VLAN. When you connect an Apple device to a corporate network it just doesn't work.

With AirGroup network service you enable wired or wireless devices to be accessible in corporate environments. Users can restrict who can access the device and also define access rules based on user profile, location and end-user device. From the IT team perspective there is no need to create special network configurations like VLANs, SSID, etc. Additionally, users can self-register their device without IT intervention.

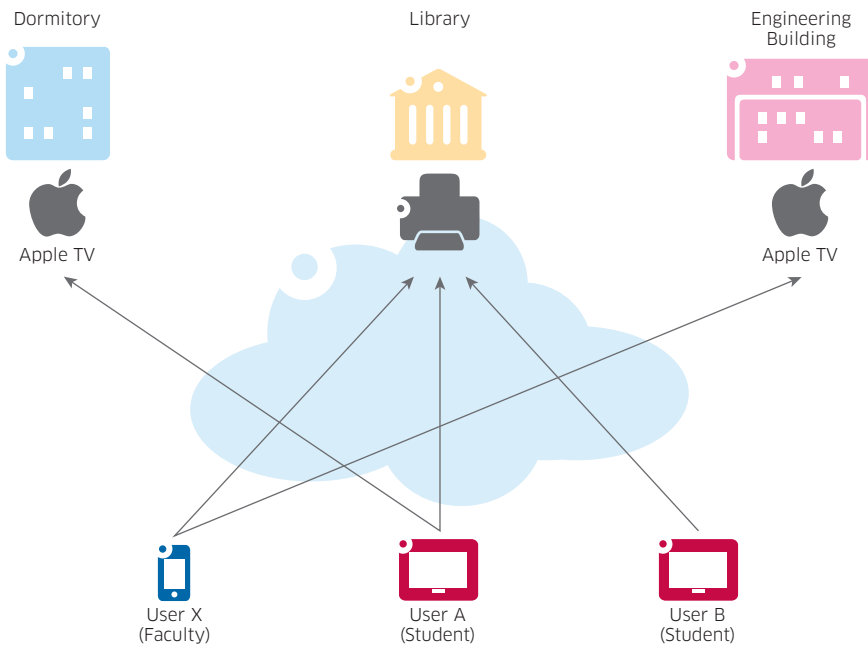


Figure 6. AirGroup network service for Apple devices

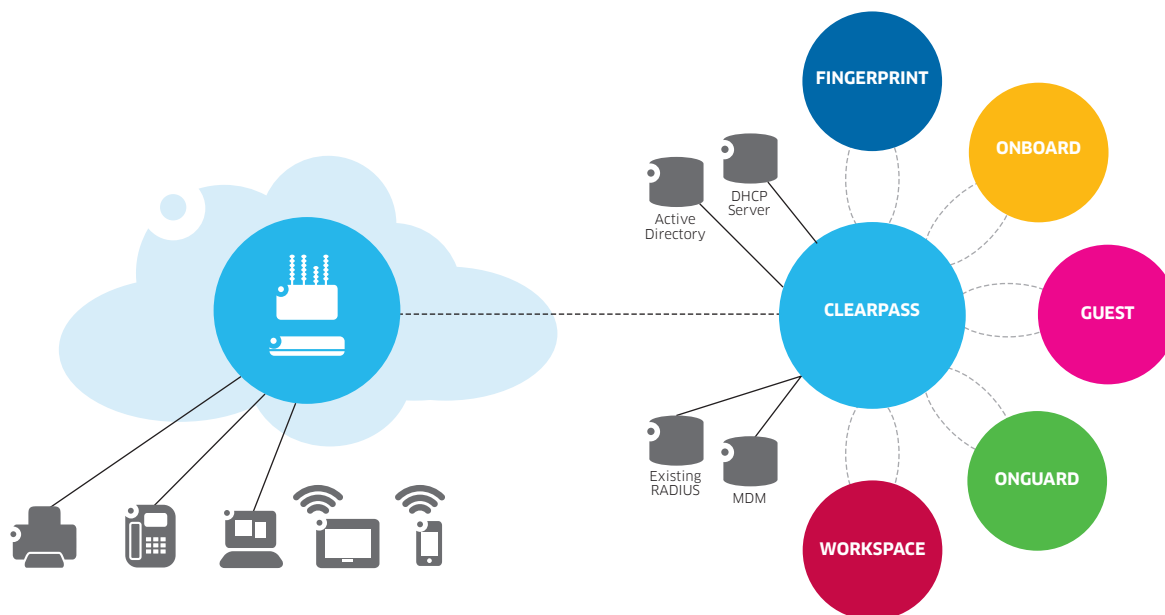


Figure 7. BYOD services with ClearPass

ADVANCED BYOD SERVICES

BYOD has several facets and there are multiple levels of BYOD adoption. Basic BYOD services like simple guest management and role based network access are built into Alcatel-Lucent LAN switches and WLAN APs. Advanced BYOD-related services are provided with the addition of the ClearPass platform. It offers multiple services that are activated by individual software licenses, providing a very flexible deployment options. These services include:

- Device fingerprinting: automatic detection of devices connected to the network
- Device onboarding: configurations of devices for secure access to the network without IT intervention
- Onguard: device health check via active agents installed in the devices
- Guest management: sponsored or self-registration of guests
- Workspace: corporate applications containerization for better security and control

With ClearPass it is also possible to define sophisticated policies based on a combination of who the user is, what device he or she is using and other conditions like location and time of day.

EMBEDDED SECURITY

A quality user experience can only be provided if the network is always running and the information is protected. Security is a fundamental component in the corporate network architecture, especially now that companies are embracing BYOD.

More than ever before, security needs to be built in from the ground up and applied universally across all methods of access for the network, wired or wireless. Network edge security services provided with the Alcatel-Lucent solution are applied to each individual or device, rather than fixed just to the switch port.

Using role-based profiles, a user connecting to the network is authenticated and then a user profile is assigned that specifies all the network security behavior including access control lists (ACLs) and firewall rules. With this capability, wherever the user goes unique security rules will follow.

The network security framework also includes pre- and post-admission device health check with automatic network quarantine, rogue device detection and isolation, traffic anomaly detection, automatic device configuration with IEEE 802.1x client and certificate installation, and corporate application management for employee devices hosting both personal and company applications.

UNIFIED MANAGEMENT

IT departments are under unprecedented stress. They need to support more devices with a variety of operating systems, more applications, BYOD, more multimedia, and maintain a high-quality user experience, while the IT budget is simply maintained or even reduced. One key component to achieve this objective is a comprehensive and unified management system

Alcatel-Lucent leverages its extensive experience managing carrier networks to provide end-to-end network and application visibility, as well as carrier-class troubleshooting tools. OmniVista2500™ provides a common network management experience for network access, core, and datacenter, meeting the requirements to easily manage corporate, branch and home office sites for both wired and wireless users.

The Alcatel-Lucent Enterprise management suite also includes VitalSuite® for end-to-end application performance visibility and VitalQIP® for IP address management.

ENJOY THE ADVANTAGES OF AN APPLICATION FLUENT CONVERGED NETWORK

DELIVER A HIGH-QUALITY USER EXPERIENCE

The Alcatel-Lucent Application Fluent Network vision delivers an enhanced user experience.

- Unique, dynamic tuning of network performance for real-time applications ensures a high-quality user experience.
- VDI Fluency maintains quality experience for multimedia traffic even when using a VDI client.
- Consistent and seamless experience when switching from wired to wireless and vice-versa is ensured due to the Unified Access approach, which offers the same policies and network services for wired and wireless.
- Comprehensive BYOD network services provide the user freedom to choose between corporate or personal, wired or wireless devices.
- Market-leading resiliency provides the ability to recover from switch and link faults without impacting real-time applications such as voice and video.
- Widespread security protects corporate information and avoids compromised performance/downtime due to network infection.

STREAMLINE YOUR IT OPERATIONS

- Embedded security at the edge increases user, device and corporate security without the operational complexity associated with many security systems.
- Automated provisioning of edge switches and endpoints and integrated carrier-class troubleshooting tools minimize IT personnel time to support the network.
- Automation of end user device connectivity and guest self registration off loads the tasks from IT
- Simplified management and maintenance free the IT staff from the daily struggle to ensure application performance for users.

REDUCE NETWORK INFRASTRUCTURE COSTS

- Flatter network and better use of switch and network links with network virtualization require less equipment, reducing capital costs.
- Market-leading low-power consumption reduces operational costs.
- All-in-one branch routers consolidates router, switch and wireless AP into a single device
- Streamlined operations reduce operational costs.

PROTECT YOUR INVESTMENT

- Equipment shipped today already supports IPV6 and 40GbE and is ready to support new technologies, including 100GbE, enabling future growth without the need to swap out hardware.
- Software-enabled licenses for access switches allow customers to start with Fast Ethernet (FE) access and 1GbE uplinks and later upgrade to 1Gb/s access and 10GbE uplinks
- Unify the access via free software upgrade to all existing access switches and wireless APs from Alcatel-Lucent - no equipment forklift is required.
- Flexible license scheme on BYOD platform provides BYOD capabilities to fit initial customer requirements and can gradually expand as customer needs grow.
- New IEEE 802.11ac APs can start operating with Power over Ethernet (PoE) until the customer is ready to support PoE+ on access switches.
- Based on Alcatel-Lucent research, total cost of ownership (TCO) of competitors' solutions can be as high as 60 percent more than the Alcatel-Lucent Converged Network Solution.

A BETTER CONVERGED NETWORK

Only Alcatel-Lucent Enterprise offers an Application Fluent Converged Network with Unified Access. It is able to deliver a simplified, virtualized network with industry-leading wire-rate switching capacity and port density. It enables enterprises to create new operational efficiencies, cost savings and a consistent, high-quality user experience across wired and wireless.

It not only offers innovation to meet your immediate company needs, but also prepares your network for the evolution journey ahead with capabilities to gradually increase mobility, support BYOD and move to the cloud. Most importantly, this transformation can be achieved while maintaining the same hardware, therefore protecting your investments.

These Alcatel-Lucent benefits offer an outstanding ROI topped with a sustainable solution for the years to come. You can enjoy the benefits of the Alcatel-Lucent Application Fluent Converged Network Solution now.

To learn more, visit

<http://enterprise.alcatel-lucent.com/?solution=Convergedcampus&page=overview>