



Creating human-centric buildings with smart capabilities

Brochure

Alcatel•Lucent 
Enterprise



Meeting the need for the smart building

The sustainability of our world is a constant topic of discussion as the effects of global warming are seen across the globe. According to the World Green Building Council¹, buildings are currently responsible for 39% of global energy-related carbon emissions: 28% from operational emissions and 11% from materials and construction. Buildings clearly need to become more sustainable and efficient, and governments are putting policies and incentives in place to support sustainable buildings.

Sustainability comes from improved efficiency, smart buildings achieve through a high level of integration with building

systems. They are connected, centrally managed and working in harmony. Sensors and automation detect when services are needed (lights, heating, air conditioning) and turn off and on to ensure energy is used only when required. When services are managed automatically, the building is also “human-centric” – more comfortable and safe for the people who use it. To operate effectively, smart buildings rely on a secure, resilient data network and advanced communications. Alcatel-Lucent Enterprise provides network and communications solutions that enable the digital foundation for smart buildings.

Convergence of OT and IT

Integrating operational technology (OT) and information technology (IT) on a single network segmented for different types of traffic unlocks significant efficiency potential. ALE solutions support OT/IT convergence with real-time data analysis, remote monitoring and Power over Ethernet (PoE) technology. This approach enhances operational efficiency, lowers costs and ensures secure network management across smart buildings.

Integration tools help to empower OT with some basic IT capabilities and best practices, such as video surveillance. For example, [ALE video management system \(VMS\) plugins for Milestone and Genetec](#) allow the OT team to perform network

infrastructure actions (e.g., restarting a non-functioning camera) directly from the VMS platform.

The convergence of IT and OT increases the workload and the level of expertise needed to manage these systems. It is essential to find ways to reduce the operational burden on IT and OT departments while empowering them to perform new functions in the smart building. ALE addresses these challenges by offering solutions that streamline management tasks, automate routine operations and provide advanced tools for monitoring and control.

1 - <https://worldgbc.org/advancing-net-zero/embodied-carbon/>

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The Autonomous Network

The foundation of any smart building is the data network. The Alcatel-Lucent Enterprise [Autonomous Network](#) is configured and provisioned automatically to run with minimal-to-no human intervention. It ensures that new technologies are operational and scalable and provides mission-critical, secure network operations while optimizing the user experience. The ALE Autonomous Network architecture provides automated service provisioning between users, devices and applications.

Wi-Fi technology

[Alcatel-Lucent OmniAccess® Stellar Access Points](#) provide next-generation, controller-less Wi-Fi with embedded WLAN control, eliminating physical controllers. This architecture ensures high performance, scalability and availability, offering simplicity and low total cost of ownership (TCO). Built for IoT-connected enterprises, OmniAccess Stellar WLAN delivers robust connectivity, mobility and security, empowering agile, digital workspaces with Wi-Fi 7 and Wi-Fi 6/6E for reliable and efficient communication.

Multi-technology fabric

Smart buildings have varied needs, so networking should be adaptable. ALE provides flexible network solutions, supporting technologies like Multiprotocol Label Switching (MPLS), Ethernet VPN (EVPN), Shortest Path Bridging (SPB) and Virtual LAN (VLAN). This approach efficiently supports applications from security to IoT, simplifying management and ensuring seamless connectivity as needs evolve.

AI to improve operations

The role of AI in smart building operations will be critical in the future. The convergence of IT and OT means that the amount of data will increase, making operations more difficult to manage and act upon.

[OmniVista® Network Advisor](#) (AIOps) is an AI-driven platform that continuously monitors the LAN and WLAN networks, identifying issues and anomalies in real time and immediately alerting IT and OT teams. OmniVista Network Advisor not only detects problems but also offers actionable solutions to mitigate them via the Rainbow™ by Alcatel-Lucent Enterprise unified communications platform, allowing issues to be resolved with a single click or tap. It also optimizes the network through fine-tuning.



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IoT devices in smart buildings

IoT devices, from very simple sensors and actuators to highly sophisticated cameras, play an important role in the operations and management of smart buildings. Through sensors, they measure, monitor and control various aspects of a smart building. Deeper integration with the building management system in the future means more operational tasks will be automated, streamlining operations and reducing costs.

Automated IoT onboarding

The vast number of IoT devices involved in a smart building creates challenges in deployment, daily operations and security. ALE provides a secure onboarding process that is integrated into ALE's OmniSwitch® switches and OmniAccess® Stellar Wi-Fi Access Points. Features such as device discovery and classification, network segmentation into secure containers and continuous monitoring of device behavior simplify the process and ensure that connected devices, sensors and systems within smart buildings are secure, future-proof and compliant with robust network security standards. IoT devices are cataloged in the OmniVista 2500 management platform, which maintains a comprehensive inventory of devices (including operational status), enhancing the visibility of the IoT environment.

PoE for IoT devices

In smart buildings, uninterrupted operation of devices is essential. ALE's Fast and Perpetual PoE technologies ensure the continuous operation of IoT devices, even during network maintenance. ALE's Fast PoE technology significantly reduces the time it takes for connected devices such as IP cameras, access points and sensors to become operational during the initial boot. Perpetual PoE takes this a step further by maintaining power to connected devices even during the switch's reboot process, preventing any disruption to critical IoT systems.

Sustainable network architecture

ALE's fiber-to-the-office (FTTO) solutions use Ethernet and passive optical LAN (POL) technologies to enhance efficiency in modern buildings. Ethernet solutions deploy industrial-grade switches closer to end devices, reducing cabling and cooling needs. POL solutions leverage GPON technology for high-speed data transfer, consolidating services onto a single fiber and reducing network complexity. Both options allow for scalable, energy-efficient networks that are adaptable to future demands.

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Communications, collaboration and workflows

IoT systems generate triggers and alarms when thresholds are reached or breached for connected objects, such as smoke alarms, leak detection, increases in heat or luminosity, or a specific event is identified, such as people gathering or an intrusion in a protected zone. In addition, smart building users can also control their environment through an application or even voice command, which may trigger additional notifications for further analysis.

Analyzing these triggers can result in an automated set of correlated actions called a “workflow”. This can include informing a person or group of people, doing a deeper analysis of contextual information with AI, controlling an IoT device to lock access to a specific area of the building or controlling blinds for environment and energy consumption.

The first analysis is usually done by an edge notification server provided by a partner. ALE also provides a highly available and redundant [Visual Notification Assistant](#) (VNA) that can complement the notification server or directly track IoT alerts to execute a workflow and create communications schemes. VNA is also able to provide on-site safety by tracking Emergency calls (911 or 112) dialed on the phones connected to [Alcatel-Lucent OmniPCX® Enterprise Communication Server Purple](#) and by providing location information (per site, building, floor or area)

for fixed phones, mobile handsets and softphone applications. The typical communications actions integrated in the workflow can be:

- Triggering an OXE Purple conference (which can be recorded) to notify and gather people, save time and provide a coordinated response
- Broadcasting audio alerts using multicast on [ALE DeskPhones](#), DECT phones or even public phone numbers
- Sending email, SMS or instant messaging through [Rainbow™ by Alcatel-Lucent Enterprise](#).

The Rainbow cloud platform also enables triggered workflows, permits connection to a database, AI, and applications and exchanges contextual information for communications and collaboration. Facility management, maintenance or security can be informed through their mobile phones, mobile applications or desktop business applications to interact with stakeholders and take action.

These workflow scenarios help monitor the environment and consequently enhance the comfort and protection of people who work or live in smart buildings, facilitate automation and decrease energy consumption.

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Cybersecurity and the concept of zero trust

Cybersecurity is critical in smart buildings where an infrastructure of IoT devices introduces numerous entry points.

ALE network solutions code and software are independently verified and validated to ensure their integrity and security, and the source code is deliberately varied to make it much more challenging for potential hackers.

ALE's multi-layer approach to network security allows the flexibility to incorporate secure elements into an existing network, providing enhanced cybersecurity, and then use these same components and tools to support an evolution to micro-segmented zero-trust networks.

For IoT devices requesting access to the network, ALE's IoT containment strategy classifies each device based on predefined parameters. Based on the permissions, IoT containment allows devices to connect to the network, but within assigned sub-segments of the network called "containers" (or virtual networks), for an additional layer of security.

ALE also provides a Secure Supply Chain capability to ensure software is delivered over a secure network path only to the intended recipient.

Zero trust networking

Zero trust network architecture is the next level in network architecture, which operates from the premise of "never trust — always verify". Network segmentation occurs at both the macro and micro level. In macro-segmentation, the physical network is partitioned into different logical segments. Any traffic between users or devices on different segments is controlled by a physical firewall. In the Alcatel-Lucent OmniSwitch and Alcatel-Lucent OmniAccess Stellar Wi-Fi products, this segmentation is done dynamically. When the user or device connects and authenticates, it is assigned a profile, and the profile provisions the user or device to the correct segment regardless of the physical location, switch port or SSID. Micro-segmentation that is software defined takes things one step further. Not all users are the same, and not all users have a legitimate need to access all resources. The same profile that maps users to a segment also includes a set of policies that add even greater control over user/device privileges which may vary by role.



The smart building ecosystem

Smart buildings integrate with a wide range of technologies to achieve the high levels of operational efficiency and functionality that modern intelligent infrastructures demand.

ALE collaborates with a diverse ecosystem of developers and partners through the ALE Developer & Solution Partners Program

(DSPP) and strategic partners to deliver comprehensive and unique solutions.

Together, these partnerships both current, and future, empower ALE to provide fully integrated, state-of-the-art solutions that meet the complex and evolving requirements of smart building operations.

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We provide the digital foundation enabling smarter buildings

Smart networks

- Zero trust network
- IoT management
- Unified service platform
- Predictive maintenance (AIOps)
- IT/OT convergence
- Macro/micro-segmentation
- PoE management



Smart platform

- Rainbow CPaaS
- Data hub
- Workflow management
- Contextual data
- UC of Everything



Smart wireless

- Controllerless Wi-Fi
- RTLS (Real-time location services)
- Passive and active heatmap
- Smart analytics
- Wi-Fi 6/6E/7, BLE, Zigbee
- On premise or cloud management



Smart ecosystem

- Development and service partners
- HPOL / GPON / XGS-PON / 25GS-PON - FTTO
- SDK and sandbox access
- Third party Integration (API)
- VMS plugin
- LoRaWAN gateways



The right partner for your smart building project

Alcatel-Lucent Enterprise provides a secure, resilient foundation focusing on the critical areas that enable smart buildings to be smarter.

To learn more about how we can enable smart buildings, visit www.al-enterprise.com/en/industries/government/smart-buildings

