



ALE | Where
Everything
Connects



Digital Age Networking

in Government

Brochure

Alcatel·Lucent 
Enterprise

Government

Today's digital transformational challenges require a service defined, high performance network. It must be a network fabric that easily, automatically, and securely connects visitors, tourists, employees, partners and customers, as well as objects. These are the principles on which ALE Digital Age Networking is founded.

ALE Digital Age Networking provides government certified solutions, enabling government organizations to deploy secure and resilient network infrastructures. The ALE advanced multi-layer network security core provides comprehensive BYOD and IoT services, and protects highly available, real-time communications systems required for; confidentiality, event awareness, notification, and response coordination. ALE networks also improve IT team efficiency through network automation that reduces the risk of human error during configuration.

To better understand how Digital Age Networking enables digital transformation in the government sector, we will examine the following four main components of Digital Age Networking in the context of the smart city, a primary government opportunity.

Connectivity	IoT	Augmented intelligence	Cloud economics
			
Service defined network	IoT digital business	Proactive analytics	IT as a business engine
Build a secure network foundation to help public sector organizations deploy IoT to connect citizens to services, enable smart city solutions, and improve public infrastructure operational efficiency, while decreasing costs and risk.	Simplify government IoT network setup by easing device onboarding, providing more efficient operations, and greatly increasing security, with IoT enablement.	Minimize the chance of cyber-attacks on government networks; aid in managing crisis situations by prioritizing critical communications/resources; and reduce down-time related to maintenance.	LBS combined with smart city applications, offers services that provide a unique and differentiated citizen experience, as well it creates new revenue sources, and operational cost savings.



Connectivity

The citizen experience has become an important consideration as it pertains to decisions made by governmental organizations. Capabilities such as secure, responsive public services, improved emergency response systems, and wireless connectivity play a significant role in improving the experience. From air quality alerts sent to the public via mobile devices, to real-time wayfinding signage that identify emergency evacuation routes, the public is used to being able to connect from almost anywhere, and this must extend into the government experience.

Implementing these smart city use cases requires breaking organizational silos. Information must be shared, and budgets must be pooled across multiple government agencies for smart cities to be technically feasible and cost-effective. A siloed architecture, in which each vertical use case relies on its own infrastructure, middleware, and applications, can increase complexity and cost.

The ALE reference architecture for smart cities uses Digital Age Networking, a horizontal architecture that provides a common infrastructure and services layers, for use cases and applications.

This approach offers the following advantages:

- Facilitates the sharing of information across different use cases and applications, which is a key requirement of smart cities.
- Consolidates network, cloud and services in shared layers which are abstracted from, and consumed by applications, simplifying application development.
- Eliminates the duplication of infrastructure and middleware that perform similar functions, reducing total cost of ownership (TCO).

Cyber security is the most mission-critical component of any successful smart city deployment and requires a new contingent of cyber workers.

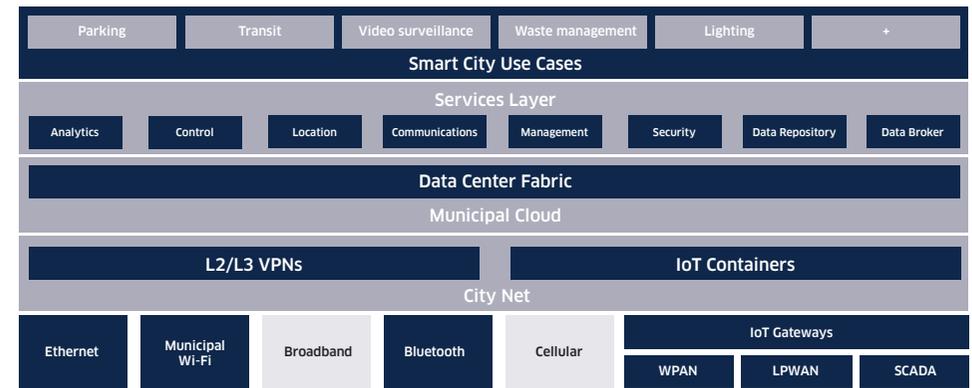
Service defined networking provides mission-critical security by using containers (VLAN or VPN) to segregate organizations and IoT devices into different virtual segments so the network is protected from attacks. Using MACsec, data is encrypted and protected against unauthorized access, or data tampering.

The ALE Service Defined Network includes **Intelligent Fabric** (iFab) technology, which automates the provisioning of networks and IoT devices, to improve the cost of operations, and reduce human error caused by manual commands.

The ALE Service Defined Network also provides simplification which can reduce costs. For example, **Shortest Path Bridging** (SPB), which delivers MPLS-like features, results in faster deployment and simpler operations. The ALE single operating system and management system, as well as the plug and play feature for network nodes and IoT devices, can further simplify things.

The ALE Service Defined Network also provides convergence which can reduce costs: One physical network using multiple virtual containers with converged electrical and data wiring equipment.

Forty percent of government officials cite their IT staff's lack of necessary technical expertise as the primary concern for not adopting smart city solutions. By 2020, only 40% of network operations teams will use the command line interface, down from 75% in 2018.¹



IoT

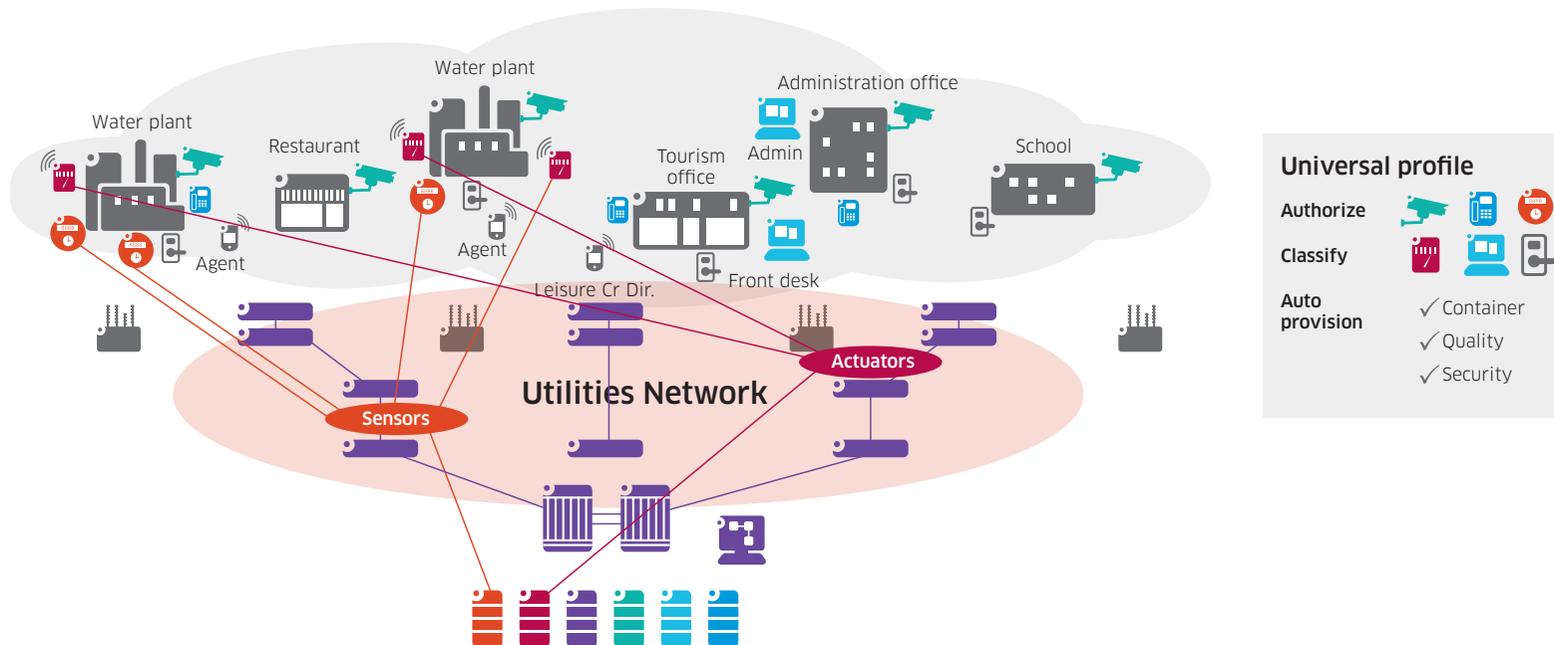
The [Internet of Things](#) (IoT) has the potential to transform the public sector by profoundly altering how government entities gather data and information, by bringing together major technical and business trends including mobility, automation, and data analytics. IoT refers to the networking of physical objects, using embedded sensors, actuators, and other devices, that collect and transmit information about real-time activity within the network.

Digital Age Networking provides [IoT enablement and containment](#), and facilitates IoT deployment in a simple and cost-efficient way.

A typical smart city network consists of users, employee devices (IoT), and the network infrastructure that interconnect the users to the multiple applications within the datacenter. Next comes installation of the associated IoT devices such as sensors, cameras and telemetry devices that support each of the different groups within a smart city deployment, including: utilities, healthcare, education, and security, among others.

The final step is to leverage the concept of a universal profile, which is part of the ALE Service Defined Network, where every device must be authorized before it can connect to the network. Once it is authorized, which could be as simple as using a MAC address, or using 802.1X authentication, it is classified and assigned a specific profile. The profile includes information that defines which container the device is placed in, and what quality of service (QoS) and security parameters are applied. In other words, the device is associated to a secure virtual environment.

In the 'IoT contained network' image, the smart city container would have specific policies, which would restrict users to interface with only smart city applications, and associated IoT devices that they are allowed to access. No one else can access or see these devices or applications, so is they are really protected from all other users in the network. This virtual environment operates as independent separate networks in a cost-efficient way by not requiring separate physical networks.



Augmented intelligence

Augmented intelligence, enabled by Digital Age Networking, collects an abundance of behavioral information. For example, location information coming from the Wi-Fi and Bluetooth Low Energy (BLE) infrastructure can identify where users congregate and what routes they take. This information could be leveraged to improve convention center services, or detect safety issues associated with large groups of people in specific areas.

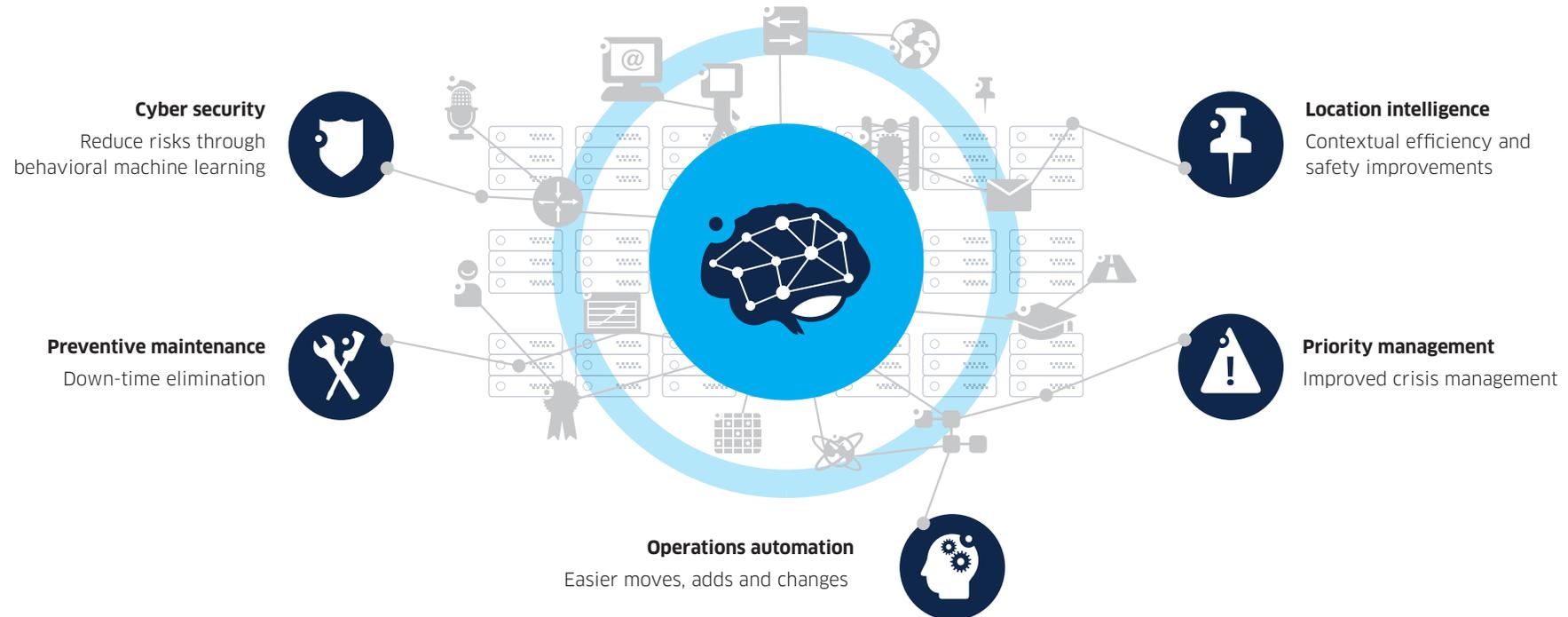
Minimizing the chances of cyber-attacks is always a high priority. Machine Learning (ML) can study the normal behaviors of IoT devices, traffic patterns of users, and access rights. When anomalies are detected, augmented intelligence can help detect and take immediate remediation action to minimize, or stop the effects of a malicious attack.

Augmented Intelligence can also minimize or eliminate down-time related to maintenance through proactive analytics. It can alert IT operators about predictive bottlenecks, recommend upgrades based on best practices, and identify potential network problems. It helps network operators be proactive instead of reactive.

Augmented intelligence will continue to enhance the ALE Service Defined Network and iFab solutions by bringing additional automation to the network infrastructure, making it easier to do network devices moves, adds, and changes, and consequently freeing up time for IT professionals to focus on other strategic tasks.

Lastly, augmented intelligence can help in managing crisis events that may be related to weather, natural disasters, or man-made. In these situations network infrastructures can easily become overwhelmed when many people are trying to communicate at the same time. ALE have the capabilities to ensure key individuals, such as first responders, have their communication requirements prioritized, as well as any special resources, such as a live feed from specific surveillance cameras.

The possibilities with augmented intelligence are unlimited and can take interactions between “things”, and “humans” to superior experience levels for both citizens and government employees.



Cloud economics

Cloud plays an important role in enabling IT to become a source of revenue by leveraging the economics of cloud-based solutions such as [Alcatel-Lucent Stellar Location-based Services](#) (LBS). LBS can be combined with smart city applications to offer services that provide a unique and differentiated citizen experience. As well, they can create new revenue sources and provide operational cost savings. The following is an example of a smart city application for citizens attending a city venue, which can help drive additional revenue for the city.

- You enter a civic venue—the city app automatically logs you in at your location using geopositioning. You share your group ID with your party and their locations are shared with you based on their geoposition.
- You identify members of your party that you do not want to go astray, such as children, or elderly people. You geo tag these members and define the allowable perimeter from your location. When they leave the defined area you are alerted using geofencing.

- When selecting a restaurant or points of interest (POI), the user is given directions using wayfinding. Using analytics, the user is also given the wait time for the POI. This can help generate additional revenue from restaurants, and gift shops.
- As the user is walking through the venue, special discounts and deals are displayed on the app. The alerts are enabled by geonotifications, and may also help drive additional revenue for the venue.
- With wayfinding and analytics, in the event of an emergency, such as a fire, or other threatening situation, the user is alerted about areas to avoid; as well they are provided information about the quickest exit from the venue.
- During the emergency, security administrators have visibility on where their staff and security are located in case they need to be mobilized. Administrators also have visibility on the venue attendees to ensure they are directed to the nearest exit and evacuated from the premises.

Location-based services in government



1 • A citizen enters a museum and launches the smart city application. Their location is identified on a map.

2 • A citizen shares their sign-up ID with members in their party to keep track of each others' locations.

3 • Specific Geotags can be assigned to at risk persons such as infants and elderly people so that geofencing alerts are activated when they move beyond the identified perimeter.

4 • The app provides a map of the exhibits. Selected exhibits of interest provide descriptions and wait time information.

5 • Visitors can record their experience and upload it to the venue social media platform to share with other guests.

6 • Click on POI (point of interest) to quickly get directions to a restroom, gift shop or restaurant.

7 • In case of an emergency, app users are alerted and the quickest path to an exit is highlighted on the map.

8 • Venue security administrators can use a tracker to locate and mobilize security staff quickly and ensure all visitors are evacuated.



Summary

ALE Digital Age Networking provides a foundation for government institutions to deploy secure and resilient network infrastructures. The Service Defined Network solution, in conjunction with IoT enablement, allows government institutions to easily and securely connect any IoT device. In addition, augmented intelligence and LBS provide government entities with the information they need to deliver the next level experience that citizens and employees demand.

We are ALE.

We make everything connect by delivering technology that works, for you. With our global reach, and local focus, we deliver networking and communications. On Premises. Hybrid. Cloud.



ALE | **Where
Everything
Connects**