Connected cities: Digital transformation in action

How smart, shared infrastructure can modernise cities

Alcatel·Lucent Enterprise

Table of contents

Connected cities:
Digital technology for quality of life

Cities around the world are accelerating their digital transformations to become connected cities.

The time has come to employ technology to build more inclusive, safe, resilient, sustainable and connected cities. There are challenges to overcome over-population, infrastructure needs, and climate change, among others. Smart technologies address these issues and open the door to an array of possibilities based on the Internet of Things (IoT), home automation and connected buildings. However, these developments rely on the implementation of a robust network and optimised data use. This helps local authorities communicate with residents more quickly, rationalise public expenditure, better prevent natural risks, and make travel easier. There are many possible services that can be developed. Cities need the right support to navigate through this digital revolution.

Technologies for innovation in public services

The digitisation of administrative services such as local authorities, municipal police forces, city halls, schools, water and energy suppliers provide citizens with easy access to services and simplified processes.

Digitalisation also enables possibilities for smart services to create connected cities that are more efficient and reduce resource consumption by automating waste recycling, lighting, water, and gas networks. Other areas where smart technology is being used to benefit cities and citizens is in transportation, where it is used for road management to assist in the smooth flow of traffic; and public safety which is undergoing significant transformation with the implementation of video protection in public areas.

None of these services would be possible without the underlying technologies, including:

- Wired networks based on optical fibre and wireless networks using standard protocols (for example: Wi-Fi, Zigbee, Lora)

- A wide variety of applications hosted in a data centre, or in the cloud, including business applications and dedicated services

- A growing number of connected objects such as video protection cameras, temperature sensors, air sensors and vehicle counters

- Digital public signage and display systems, smart car parks

- Multi-device and multi-media communications

City app: Improving government to citizen communications

Cities offer mobile apps to residents, directly accessible on their smartphones or tablets. These apps can link different community departments together to meet a variety of needs and practical functions.

For example:

A city hall improves its relationship with citizens by delivering ongoing public services and information. The city enables calls 24/7, entrusting their routing to chatbots that use Artificial Intelligence (AI) to recognise common requests. City authorities can send out text alerts so that people can pick up new administrative documents without having to stand in line.

What is CPaaS?

Communications Platform as a Service (CPaaS) is transforming the way cities communicate, how they develop new services, and how they interact with residents. From notifications concerning the status of requests, to customer surveys and bot integration, a fundamental CPaaS strength is that it connects everything. Contextual information can be seamlessly synchronised during a call or web interaction, allowing public agents or bots to offer a more personal service based on the eServices requested, the web page visited, or previous requests.

The citizen's role in their city

The digital city encourages citizen and visitor interaction

Through ongoing dialogue, the city can anticipate needs, monitor the collective perception of measures it introduces, and build new initiatives alongside its citizens.

Citizens at the heart of the strategy

CPaaS provides solutions so users can notify authorities in the event of an accident, damage or weather situation. It also provides citizens with the opportunity to share their opinions on current initiatives, or participate in city planning.
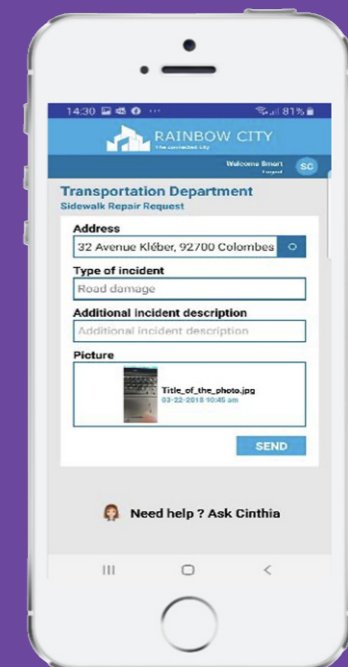
CPaaS and IoT integration

Enable communications between connected objects and humans

Flood prevention

- A water level sensor automatically sends an alert and a general call to the city authorities, the police, and the fire department

- A video/telephone conference call between all parties is initiated

- An alert is sent out to residents specifying the location of the problem and suggesting an alternate route to avoid the area concerned

- Activation of video cameras around the area allows the damage to be viewed in real-time

- Access for emergency and/or cleaning services is facilitated

Smart collection and household waste processing

- Request for a bulky item pickup is made on a city/building's mobile app from a phone at 10 p.m.

- The request is made to the chatbot which sends a notification to the relevant department

- The request and related details are passed on to the city worker the next morning at 9 a.m. Confirmation is sent to the requester and they are advised that they can deposit the items at the agreed location before 10:30 a.m.
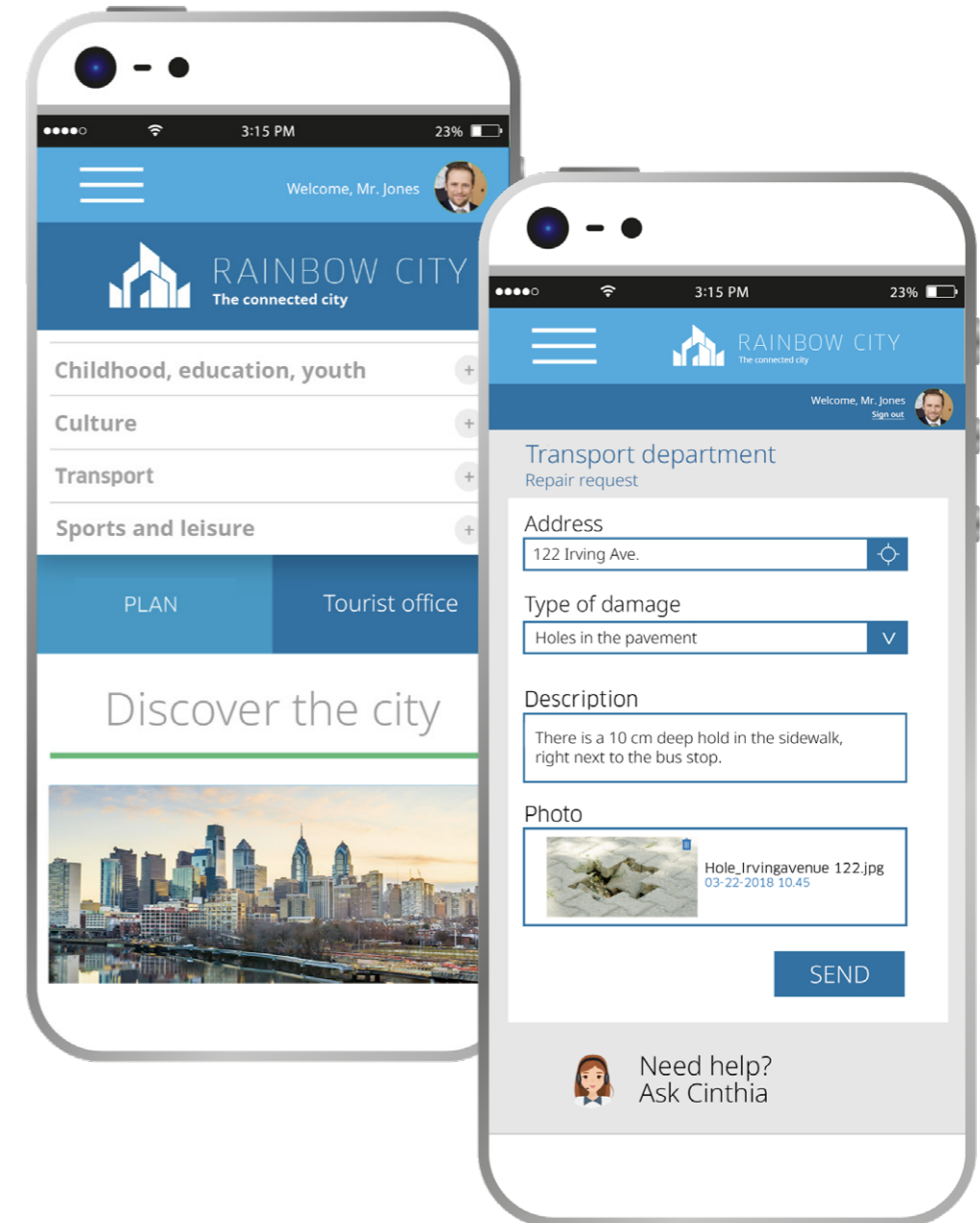
Modernisation of citizen services

One-click connection through your website

Enable agents or automated providers to be selected based on skills, language, or service. Once in communication, an agent can choose to engage with the web visitor using the voice/video/sharing option.

Digital appointments

- A click-to-calendar service enables website visitors to connect to a calendar service to make an appointment
- Allow your agents to schedule appointments and connect virtually through voice, video and chat, as well as share documents
- Simple integration of a URL into your website
- Drastically reduce no-shows through notifications and by specifying the documents people will require

Enabled by Alcatel-Lucent Enterprise Customisation services

Connected buildings

Transform interaction and services for citizens, workers and visitors

Control and monitoring of space automation

- Integration with a third-party automation system for centralised control of lighting, heating, cooling and door opening systems
- Smart control of lights, air conditioning and curtains from a smartphone, smart desk phone and chatbot, among others
- Provide analysis to monitor and improve energy consumption and operating costs

Real-time room reservations and availability

- Find and book the nearest available meeting room
- Real-time programming
- Automated room reservation upon entry or exit

Real-time location of security guards and equipment in case of emergency

- Geolocation of agents and directions to reach them in real-time in a building
- Location of emergency exits, fire extinguishers and defibrillators
- Man-down detection function
- Analysis data

Monitoring of sensitive areas and contact tracing

Public smart buildings used by citizens, tourists or employees can manage the number of people in a specific area and help enforce social distancing through real-time density monitoring.

The solution allows you to:

- Define an area to monitor
- Identify the number of people in the area
- Identify, in real-time, when people are too close, as well as when there is prolonged contact (logged timestamp)
- Notify affected staff based on specific criteria (for example: people moving across a boundary, or the number of people entering or leaving an area)
- Use analytics to trace the contact flow history, if necessary

Safety and security in public buildings

- Audio notifications/ alerts through phones and loudspeakers
- Emergency call points
- IoT notifications/alerts through different media
- Pre-defined workflows to quickly involve emergency contacts

Multi-service and secure infrastructure: The smart city foundation
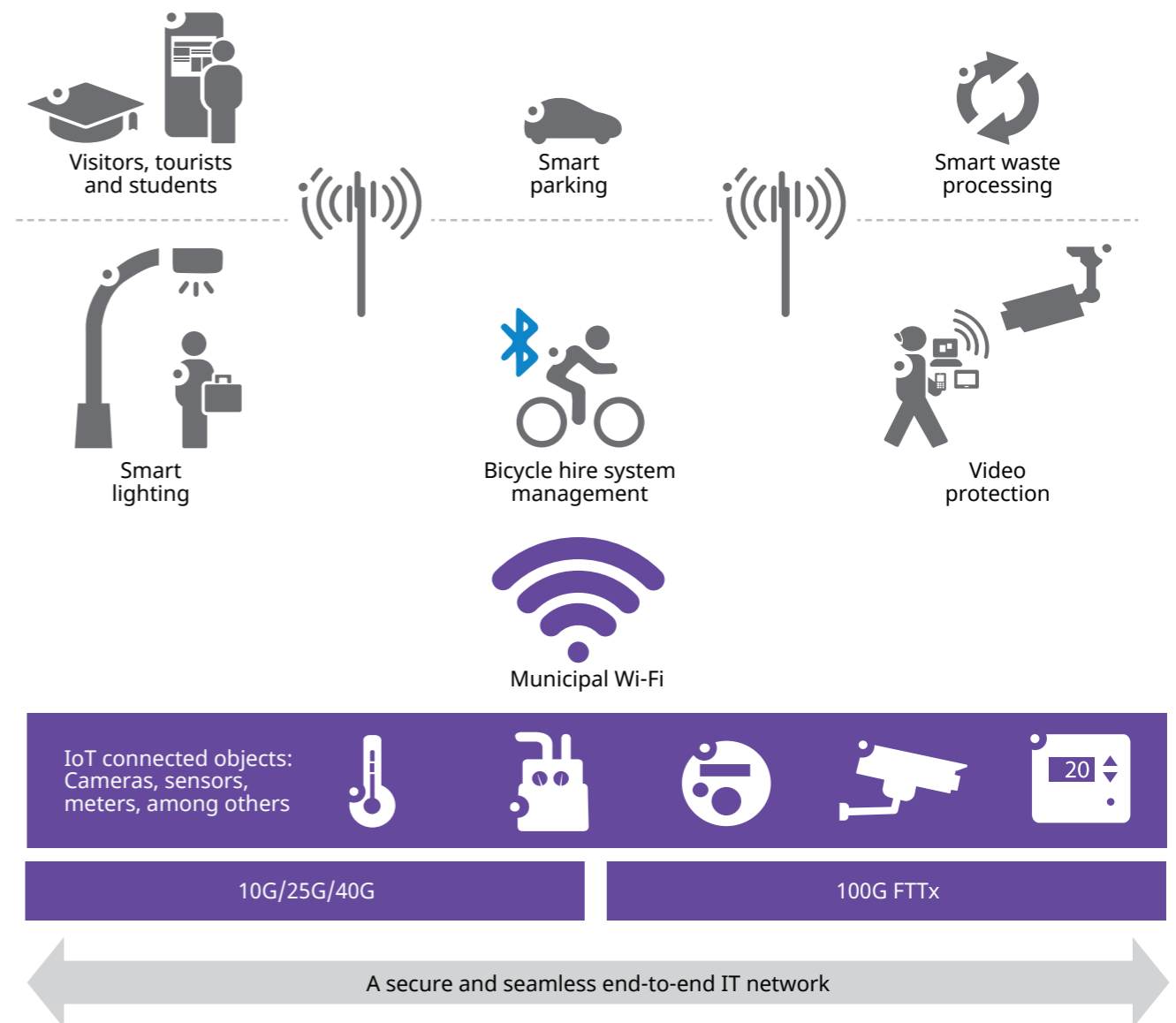
A single network

To connect all public services and connected objects to a single network, the city or community should rely on a secure multi-service infrastructure. Schools, day care centres, city halls, municipal police, media libraries and emergency services all gain dedicated applications with high-speed connectivity.

This communications base can be extended to local public sector partners and digital urban signage, while collecting information from the IoT - the multitude of connected objects (video protection cameras, sensors or detectors).

Unified and simplified administration

End-to-end consistency is guaranteed by a single administrative platform. A single networked system environment simplifies the integration, deployment and administration of a digital system and secures the exchange of data.

- Digital traffic between connected objects is confined within dedicated virtual networks

- Whether you connect to the information system using a wired or a wireless network, the user experience remains the same

- The administrator can fine-tune the resources accessible to match a user profile. This makes it possible to offer different services depending on the role or authorisations attached to each person.

Visitors, tourists and students

Smart parking

Smart waste processing

Smart lighting

Bicycle hire system management

Video protection

Municipal Wi-Fi

IoT connected objects: Cameras, sensors, meters, among others

20

10G/25G/40G

100G FTTx

A secure and seamless end-to-end IT network

Wi-Fi 6: Wi-Fi for modern cities

Ultra-accessible local services

The public network is the backbone of a connected city. Mobile users expect quality local services with high availability. City workers on the move need connectivity to access work tools, as well as effective collaboration to provide services more quickly. Wi-Fi 6 promises more speed, enhanced connectivity, and forty-times more bandwidth on each connected device. Installed in strategic locations and used appropriately, Wi-Fi 6 provides more stable and consistent connectivity and extends the battery life of connected devices, in tandem with the Target Wake Time (TWT) function.

Endless real-world examples

Cities are deploying new, more interactive wireless services for their communities. Publicly accessible forums, multimedia content, videos, surveys, games and virtual tours are available to mobile and smart devices. This connectivity translates into practical uses for residents, including; traffic flow, optimised parking management, public transport development, reduced operating costs through optimised energy expenditure, among others.

The rise of wireless devices is exponentially increasing mobile user expectations

City e-Guide   e-Education   e-Health   Intelligent transport
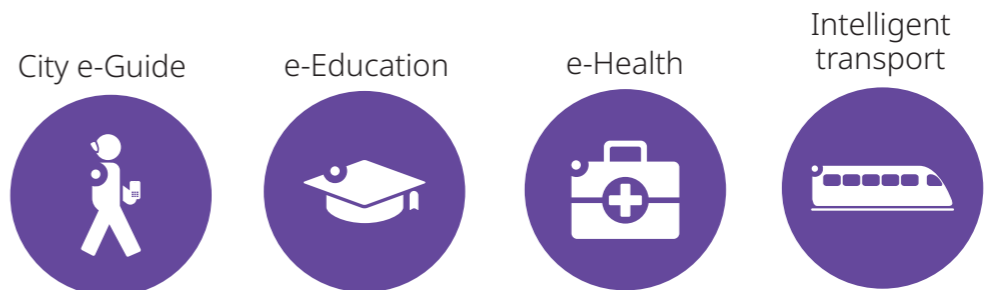
Public Wi-Fi for smart cities

Video protection   Sensors   Access control system   M-Parking   Interactive media

Secure technology: The key to success

How IT teams can approach IoT with confidence

Objects connected to a city's network can expose shared resources or be leveraged to extract private data passing through the network.

Network segmentation prevents the entire network from being compromised in the event of an attack on a vulnerable object or machine. It also provides the automatic and secure integration of IoT devices while simultaneously protecting the network.

The IoT containerisation strategy ensures the efficient and secure integration and support of multiple sensors and connected devices. It consists of three elements:

1. **Detection and classification**: Each object connected to the network must be detected and classified. The Digital Age Networking solution provides access to a huge database of objects (more than 29 million) to instantly identify an object connected to the network and automatically set up a configuration associated with a particular device.

2. **Virtual segmentation**: Segmenting a single physical network infrastructure into separate virtual networks or containers is essential to ensure that each service or application has its own dedicated segment, enabling suitable operation and security

3. **Continuous monitoring**: The network monitors the behaviour of IoT devices and applications to ensure they are functioning properly. Each authorised object is stored in an inventory. This allows the IT department to know exactly how many devices are connected to the network in real-time. It is important to constantly monitor a connected object on the network in order to take immediate action in the event of any deviation from its usual behaviour. In the event of abnormal activity the network can react and disconnect the faulty device, send a notification to the network administrator, or change the destination of the dedicated IoT container for further checks.

An expert's perspective on security, automation and visibility into a multi-service network

How is infrastructure key to the development of smart cities?

A city's digital transformation requires building a powerful, robust, and resilient digital foundation that enables it to move toward an infrastructure that supports the connectivity needed by users, digital applications and connected objects in a reliable and secure way. For this to be achieved, the infrastructure must evolve into a true service-oriented network with a high degree of automation. Digital Age Networking is part of this new paradigm, enabling local authorities and cities to join the digital transformation age. The solution is based on three key elements: An autonomous network, automatic and secure IoT integration and business process innovation.

What about IT teams' workload on such a city-wide network?

Automation allows us to save a significant amount of time. The Autonomous Network

is automatically configured and made available. It ensures critical and secure network operations while optimising the user experience. In the future, this technology will automatically adapt and will systematically enable a secure connection from a user or an object to an authorised application. This architecture combines high availability, ease-of-use, low Total Cost of Ownership (TCO) and a very high level of security.

As a result, teams on the ground will be able to work faster. Administrative tasks that used to be done manually, such as configuring network access for terminals, are now automated. Network maintenance is simplified and the infrastructure TCO is reduced. All of this allows even a small operations team to control a secure network covering the entire community.

Can we accurately control all network elements and connected objects?

While essential for the development of new services within the framework of smart cities, the connection of a large number of connected objects is a challenge both in terms of deployment and security. Configuring and managing each of these objects and their network connectivity can be a time-consuming process that carries considerable security risks.

The Alcatel-Lucent Enterprise IoT containerisation strategy is designed to provide an automated solution to integrate IoT devices securely and efficiently, while simultaneously protecting public authority networks.

Sebastien Claret
Sales Developer
Director Networks
Alcatel-Lucent Enterprise

About Alcatel-Lucent Enterprise

Alcatel-Lucent Enterprise solutions for the public sector deliver a new connected citizen experience, connected and sustainable cities, next-generation public safety and connected defence. Our solutions help you comply with stringent requirements and deliver a secure experience.

We find solutions to connect everything with efficient technologies, designed for you. Our goal is to provide customised technologies that meet the needs of our customers. Our mission is to connect all your devices with Digital Age Networking, Digital Age Communications and CPaaS Solutions and services to ensure your business success. In the cloud. On premises. Hybrid.

ALE is committed to developing effective technology solutions for our customers, connecting people, machines, objects and processes, while creating a more sustainable future for all.

Alcatel·Lucent @
Enterprise