aruba
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CASE STUDY

ESTABLISHING A CITY-WIDE NETWORK TO BUILD A SMART URBAN ENVIRONMENT FUELLED ON DATA

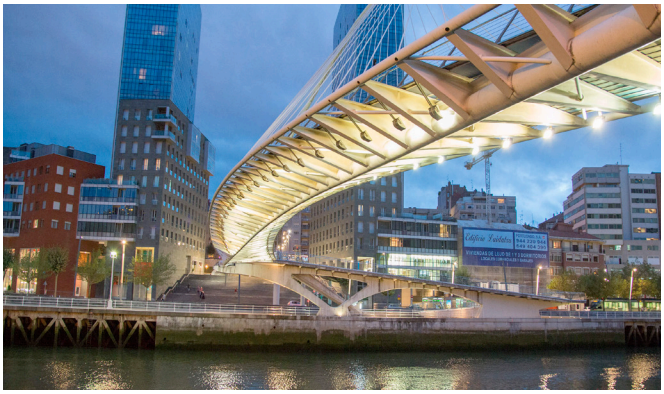
BilbaoTIK

Across Europe there has been a template for reviving former industrial cities. Culture is often central to this. Museums, music and food outlets replace factories and docks.

Bilbao is perhaps the best example of this. The former steel and shipbuilding city is today famed for its stunning Guggenheim museum and 40-plus Michelin starred restaurants. The Academy of Urbanism awarded Bilbao European City of the Year in 2018.

But transformation never stands still. The focus for Bilbao today is digital. It wants to be the smartest, most connected city in Spain. It wants to improve the physical Bilbao, and create its digital twin.

"We want Bilbao to be a more enjoyable place to live and work, that improves the quality of life of citizens," says Ane Miren Ibañez, Director General, BilbaoTIK, "and to attract new investment."



ONE NETWORK, MULTIPLE USAGES

This doesn't happen overnight. The smart city origins go back to 2010, and a plan to create free Internet access in every neighbourhood in the city. Over the years, the scale of ambition has grown.

Today, citizens, visitors, and local government workers can connect throughout the city. Bilbao is blanketed in connectivity in every public building, museum, the football stadium, parks and public square. There are more than 1,500 access points throughout the city where users are never more than 300 metres away from a Wi-Fi connection.

The challenge for Bilbao is not just connectivity but managing and scaling access. The city wants to be smarter in the way it captures data, maps usage and grants different network access to different user groups.

The omnipresence of the network is already impacting on the municipal employees as well, who can maintain their connection to the network while roaming around all the public buildings and even around the city. There are important inspection functions that require constant presence on the streets and for which, having uninterrupted secure network access, enables a whole new way of working. It also opens up a huge opportunity to develop certain business processes, access data and resolve issues in situ.

"Apart from continuing to provide a quality service we cannot forget the impact of data," says Ibañez. "How can we reuse this data to improve public services?"

Generating accurate data

Aruba's solution involves a matrix of over 1,500 Aruba 305 & 325 (indoor) and Aruba 365 (outdoor) Wireless Access Points, managed by a high availability cluster of Aruba 7220 Mobility Controllers overseen

REQUIREMENTS

- Support seamless mobility of citizens throughout the city
- Ensure internal workers secure access to the network
- Provide captive portal for internal visitors use
- Deliver open public Wi-Fi
- Enable network usage to scale in support of new services
- Generate a detailed map of network users and use cases

SOLUTION

- 802.11ac Aruba Wi-Fi indoor and outdoor APs
- Mobility Controllers
- Mobility Conductor
- HPE FlexFabric Core, Aggregation and Access Switches
- Aruba Core, Aggregation and Access Switches
- ClearPass Policy Manager
- AirWave Network Management
- Aruba Analytics and Location Engine (ALE)
- Meridian Mobile App Platform
- Aruba BLE Beacons

OUTCOMES

- Allows access for over 32 million devices per year
- Ensures citizens are never more than 300 metres away from a connection
- Enables remote working for students, healthcare workers staff and municipal government employees
- Gathers environmental, traffic and user data to inform new service provision
- Encourages organisations across the city to develop applications specific to their users
- Unites the city by reducing the digital gap between infrastructure and experience
- Makes public spaces more attractive for younger people
- Improves the city's competitiveness and international image
- Secure and high-speed connectivity

> "The network will act as an enabler. It can then open the door to projects that otherwise would not exist."

MANU ROIBAL
CIO, BILBAOTIK

by a Mobility Conductor. The entire LAN from the Edge to Core is based on a combination of HPE FlexFabric switches and Aruba 8320 Core and 2930F Access Switches; a total of 280 switches to date. Aruba ClearPass Policy Manager orchestrates secure access for the corporate network and guests in the council offices and provides open internet access for the public. Aruba AirWave Network Management enables the wired and wireless infrastructure to be monitored and supervised from a single viewpoint, managing all network assets in almost 260 locations across the city. AirWave also utilises Aruba VisualRF to provide heatmaps of coverage throughout the city which helps to identify areas where more resources or bandwidth may be required. Typically, 6,000 devices connect during a week, with close to 12,000 devices, utilising 5Gbps at peak times.

To enhance engagement with citizens through mobile apps, the city has also deployed Aruba BLE beacons in strategic locations. For example, a total of 180 beacons have been installed in bus shelters around the city, managed by the Meridian Mobile App Platform.

In order to produce useful data, the city council chose the Aruba Analytics and Location Engine (ALE), which provides valuable information such as when users connect, the types of devices, where they go, how long they remain connected, which points of the city are most visited, which are revisited and how often. The city has developed its own analytics service to manage the Smart City environment in order to monitor activities such as traffic, security, crowd related statistics and more.

"The Aruba Edge Architecture allows us to scale from the initial situation to a network with a high volume of access points. It also allows roaming between access points with a high level of efficiency," says Ibañez.

Most importantly, she continues, is the ability to determine the exact position of a device is essential to data accuracy.

"Plus, Aruba works with the most recent Wi-Fi standards, which is fundamental in a technology that is evolving quickly."

Changing how the city lives and works

The usage figures are staggering. In a city of 350,000, more than 32 million devices connected to the network through 2019, more than a million more than the previous year. December 21st, the day of the Santo Tomás fair, set a daily record of 98,756 devices connected.

This has a profound effect on the way the city works. Bilbao is now a huge virtual campus for students. Between 17,000 and 20,000 students connect each week from anywhere in the city.

Medical teams have a consistent network experience across clinics and the city's two hospitals. This simplifies the sharing of data and working between sites.

Local government has accelerated the adoption of remote working. The personnel who carry out the inspections are not tied to the office. This is having a positive impact on staff morale, office utilisation and city congestion.

Organisations throughout Bilbao can now progress with the development of applications specific to their users, safe in the knowledge that a reliable network is in place.

For tourists and visitors there is one network. It is the same network whether you're at the Tourist Information Office, the tram or train stations, in the San Mamés Stadium watching Athletic Bilbao, the Arriaga Theatre or the city's Maritime Museum.

SCALE, SECURITY AND VERSATILITY

The network delivers benefits to the city today and provides a platform for continued innovation and delivering new experiences.

"The cities of the future are either connected, or they won't be," says Manu Roibal, CIO, BilbaoTIK, and mobility project manager. "Having designed our own network strategy brings multiple advantages."

Mobility will bring several advantages to the city, he continues: "It will act as an enabler. It can then open the door to projects that otherwise would not exist."

By making services more available, it bridges the digital gap. It can make public spaces more relevant to specific demographics. And it can help attract new investment, and new jobs.

"We can scale, because we can grow the bandwidth virtually unlimited by having control over the dark fibres. Secondly, security is ensured, because the municipal traffic transits through private communications links end-to-end. Finally, versality. We can provide a network service to not just people but things."

These could include CCTV, pollution sensors, traffic lights or a network of electric bicycles. Indeed, the Bilbao Moves app allows users to check real-time status on trams, buses and the city's subway.

A city fuelled on data

Roibal says it is difficult to measure the true commercial impact of the project. Much of the value is intangible. Those who live in the city and those who visit it enjoy a stress-free network experience.

"We think that nowadays Bilbao is a better prepared city for the future technology challenges," he says. The hope is that Bilbao stays on the leading edge of digital service provision. The city now sits on a wealth of data. It can see which nationalities visited which attractions (and adjust marketing plans accordingly), it can map traffic pinch points, or understand pedestrian foot flows. This can inform future infrastructure investment, or help businesses decide where to open new shops.

"The city is a living being," Roibal concludes. "Managing it is a metabolic process. We can have absolute respect for data privacy while creating a smart environment. Bilbao will be a city fuelled by data."

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