Solution: NetCloud Service for Mobile ▪ **Industry:** Public Transit ▪ **Use Case:** In-Vehicle IoT

Italian Transit Agency Leverages 4G LTE Connectivity to Curb Overcrowding

During COVID-19 crisis, ATB used Cradlepoint's edge solution to complete large-scale innovation project across entire fleet

The on-the-spot verification of the cloud-based wireless technologies made available by Cradlepoint proved immediately positive. The routers proved to be a fundamental component of the system architecture and effectively guarantee the operation of the various services necessary for the monitoring system."

Francesca Curatolo
Technical Manager,
Azienda Trasporti Bergamo

Success story highlights

Challenge — After the global pandemic forced Italy into national lockdown, Azienda Trasporti Bergamo (ATB) needed to adjust ongoing digital transformation projects to support emergency public health protocols. This would require reconfiguring IoT platforms to monitor and control overcrowding on buses and stops. Data would need to be instantly available for internal operations and visible to the public via on-board digital signage, online and on the ATB app.

Solution — The agency upgraded its buses with a comprehensive solution: Cradlepoint's NetCloud Service for Mobile and wireless 4G LTE routers, purpose-built for the unique demands of in-vehicle use — including routing, ports for multiple IoT devices, GPS, AVL integration, and centralised network management.

Benefits — With highly reliable 4G LTE connectivity throughout its service area, ATB can depend on the real-time data gathered from IoT sensors and confidently use various technologies to combat overcrowding on buses, promote social distancing, and comply with emergency health guidelines.

Background

Azienda Trasporti Bergamo (ATB) provides public transportation for the 380,000 residents of the city of Bergamo, Italy, and 29 surrounding municipalities — with mobility services offered on vehicles including buses, trams, and funiculars.

With a tradition of and commitment to digital innovation, ATB was working on two projects to improve operational efficiency and rider experience, both of which rely on cellular broadband connectivity. The first initiative was a contactless electronic ticketing system for rapid fare payment, and the second entailed setting up the equipment necessary to use GPS data for real-time Auto Vehicle Location (AVL) technology.

"We already had a relationship with Cradlepoint. Thanks to the positive experience we had, we decided to use its technologies to broaden the scope of our solution – that is, extending our fleet connection and monitoring system, thus making a qualitative leap in the technological innovation of our infrastructure," said Gianni Scarfone, general director, Azienda Trasporti Bergamo.

Challenges

Then the pandemic happened. Following the initial lockdown phase, the ATB paused to consider how it could ensure a safe environment for public transportation. More specifically, the agency needed to guard against overcrowding at stations and stops.

The decision was made to change plans and deploy IoT devices on all buses — sensors for counting the number of onboard riders, and AVL platforms for tracking vehicle locations in real time. Information had to be instantly available to ATB bus operation control center, who in the short-term would dispatch additional resources when and where it was needed, and over time could aggregate data to create predictive models. Additionally, and perhaps most critically, updates needed to be seamlessly shared and accessible to the public.

Solution

ATB chose to use highly available and reliable cellular broadband networks for upgrading in-vehicle wireless broadband infrastructure. The agency standardised on Cradlepoint's NetCloud Service for Mobile and ruggedised IBR900 wireless edge routers to provide connectivity for IoT devices and GPS for AVL platforms. Additionally, NetCloud Manager enabled ATB to monitor device and system health and troubleshoot the network from anywhere.

> **"In addition to the reliability and robustness of the technologies, the relationship we had already established with Cradlepoint convinced us to innovate further. Its experts worked closely with our teams, ensuring a high level of assistance and problem solving, thus contributing to the overall success of the project."**
>
> **Gianni Scarfone**
> General Director
> Azienda Trasporti Bergamo

Benefits

Operational agility — With the Cradlepoint solution in place, ATB was able to quickly pivot and plan new systems without changing routers or adding accessories. They subsequently extended and enhanced the passenger counting system — originally part of the electronic ticketing system project — to monitor ridership and avoid overcrowding.

Access to real-time data — Using stereoscopic vision technology and high-brightness infrared LEDs to count passengers, the IoT sensor seamlessly interfaces with the onboard router to transmit data in real time. Whereas the original scope would only send information at the end of service, the change to continuous upload is critical for operational planning.

AVL support — Tracking the number of passengers is only one piece of the puzzle. With GPS tracking and integrated AVL platforms, the ATB operations centre can rapidly evaluate when overcrowding might happen and where additional buses need to be deployed.

Reliable, up-to-date public information — Persistent connectivity is essential for operational agility, but equally important is the ability to make real-time data available to the public. The agency can now update riders using digital displays on buses, at bus stops, and through the ATB app.

Centralised network monitoring and management — With NetCloud Manager providing real-time visibility of vehicle, on-board IoT, and network status, the agency can remotely manage, troubleshoot network issues, and push out or schedule system updates across ATB's entire vehicle fleet.

"The on-the-spot verification of the cloud-based wireless technologies made available by Cradlepoint proved immediately positive. The routers proved to be a fundamental component of the system architecture and effectively guarantee the operation of the various services necessary for the monitoring system," said Francesca Curatolo, technical manager, Azienda Trasporti Bergamo.

Room to innovate — By selecting near-ubiquitous cellular networks to connect buses, IoT, and operational infrastructure, ATB can use NetCloud Manager to quickly and easily set up new endpoints and devices and update existing connections.

Learn more at cradlepoint.com/mobile