



**Passenger Wi-Fi Solutions
For Public Transport**

Making Every Journey Count

There is little doubt that the transport industry's recovery from the COVID-19 pandemic will be propelled by new and improved passenger services such as Wi-Fi.

A significant percentage of the population has transitioned to hybrid home and office working; employers are becoming ever more open to employees working from any location, and employees are keener than ever to take advantage of their commute to carry out work-related tasks and stay productive. For business commuters, the increased availability and reliability of Wi-Fi on trains and buses can support the flexibility in work hours and locations that the "work from home" transition has introduced, allowing them to send emails, make conference calls, and research information for work-related tasks. If a passenger's commute can contribute towards their working day, and not disrupt it, then public transport will be the obvious and most effective modal choice for those journeys, while also easing the congestion of traditional peak travel hours.

For leisure travelers, passenger Wi-Fi offers an immersive experience; when passengers are engaged, the perceived journey time is reduced, and this has a positive impact on propensity to travel. Passengers can communicate with friends and family via social media, shop online, catch up with the latest news, or even learn a new language. Many travelers also use their commute to carry out digital chores such as paying bills, renewing insurance policies, and searching for new properties or jobs.





However, to deliver on its productivity promise, it's vital that the Wi-Fi connectivity on offer on vehicles not only works, but works well; indeed, a quality Wi-Fi connection can prove as important as seat availability or punctuality in enhancing the passenger experience.

This consideration is especially important if operators are to be more successful in attracting 'Generation Z' – digital natives born since the mid-1990s – to travel by public transport, rather than using the next modes of personal transport (e.g. ride-hailing services and autonomous vehicles). Less likely to drive cars, and more acutely aware of issues around the climate emergency, this demographic group could be key in helping drive the return to public transport post-pandemic. However, Generation Z are also the most discerning group of consumers to cater for, raised in a world of near-instant delivery of services and with very high expectations of reliability and quality.

Fast, reliable, and secure, Icomera's passenger Wi-Fi service has been installed on tens of thousands of vehicles across the globe, serving millions of passengers every week.

How We Deliver Industry-leading Connectivity for Passengers

With over two decades expertise pioneering Wi-Fi on the move, Icomera provides the best possible Internet connectivity for passengers via our fully integrated platform.



Overcoming the Faraday Cage Effect

The Challenge: The metallic construction of public transport vehicles tends to block electromagnetic signals, shielding equipment, staff, and passengers from all but 0.1% of external Radio Frequency (RF) signals - known as the "Faraday cage effect". This issue makes it very difficult for a smart device located within the vehicle to directly find the signal provided by a mobile network operator (MNO).

The Solution: To bypass the Faraday cage effect, Icomera mounts purpose-built antennas to the vehicle's roof, capturing maximum network capacity along the route, and delivering it to the vehicle's onboard network.

The Benefits of a Multi-modem Solution

The Challenge: When MNOs plan the locations of new masts or towers, they prioritize population coverage over area coverage. This is a challenge for public transport vehicles traveling along routes that take them through more remote rural environments. A single MNO is often unlikely to offer comprehensive coverage for the entirety of a vehicle's route. Geographical patches of poor cellular reception mean that the strength and stability of the signal varies, causing data packets to be delayed or lost. In real-world terms, this means slow webpage load times, video buffering, broken VPN tunnels and dropped conference calls.

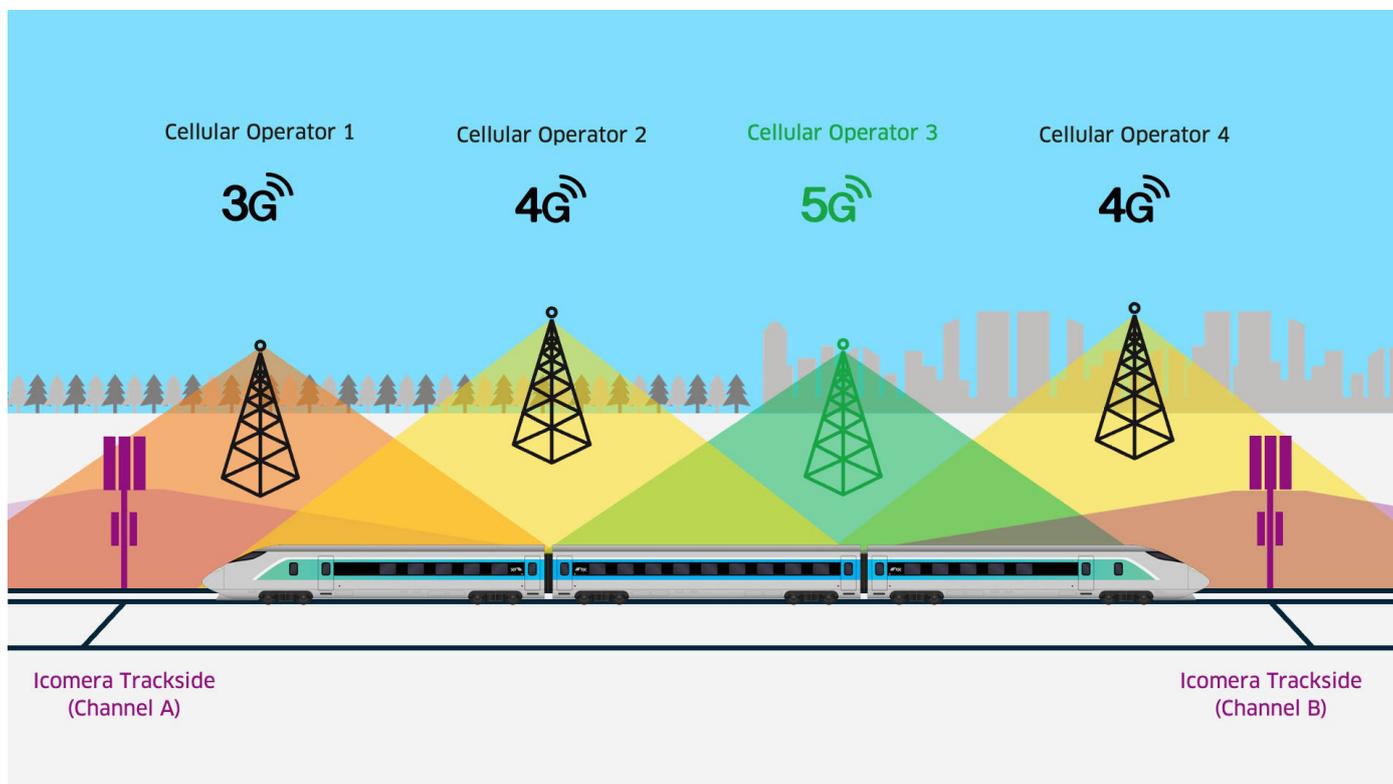
The Solution: Specifically designed for use on public transport, Icomera's multi-modem mobile connectivity and applications routers aggregate all available radio frequencies across multiple carriers. When the connection from a particular MNO is lost, the Icomera router retains all other available connections, ensuring reliable connectivity even in regions with sparse network coverage.

SureWAN™ Mobile Network Aggregation

The Challenge: As an example from rail transport, from a cellular network’s perspective, a modern train is comparable to a small town of up to 1,000 people arriving in their area of coverage at over 200km/h and leaving again just as quickly. Imagine this many passengers all trying to maintain a direct connection to the same cell towers along the route. Attempting to connect this many users at once results in resource fragmentation, lost capacity, and data packet loss in the “handover” from one cell tower to the next.

The Solution: Icomera’s integrated connectivity platform reduces the total number of direct connections from devices on board the vehicle, to the cell towers along the route, reducing the strain on the cellular network. This is done by utilizing SureWAN™, our proprietary core technology, which empowers our multi-modem mobile connectivity and applications routers to aggregate all available cellular capacity across multiple cellular modems in parallel, delivering the fastest, most reliable Internet connection possible.

For passengers, the seamless transition between different mobile networks provides an always-online experience, reducing data packet delay or loss. When multiple communications networks are simultaneously available, SureWAN aggregates all available spectrums in real time, offering maximum coverage and capacity. Since 4G, 5G, trackside and even satellite networks can be supported as part of a single solution, SureWAN delivers a higher throughput than would otherwise be available from just a single network, enabling passengers to enjoy more time online and to benefit from the most reliable, high-quality connection available.



Icomera’s SureWAN technology aggregates multiple communications networks, providing the fastest, most reliable Internet connection available to a moving vehicle

Managing your Wi-Fi Solution

Icomera's Network Insights and Control (ICONIC) cloud-based software tools have been specially developed for monitoring, managing and optimizing your Wi-Fi system.



System Configuration

Utilizing the onboard Internet connectivity, common settings and firmware updates can be deployed over-the-air, and any Wi-Fi performance issues fixed remotely. All Icomera devices which have been installed onboard a vehicle can be remotely configured using Icomera's tools.



Content Filtering

Providing passenger Wi-Fi brings a responsibility to prevent any unsuitable content from being viewed in public. It's vital that children and vulnerable adults are protected from being exposed to inappropriate content while they travel, and that all passengers' devices are protected from viruses and malware. Icomera's content filtering solution is well-equipped to ensure secure web surfing experiences; by categorizing websites according to type, operators can restrict access to whole sections of content, such as pornographic websites or potentially harmful file-sharing websites.



Analyze & Report on Performance

Through its intuitive, easy-to-navigate and customizable web interface, ICONIC allows users to quickly view key metrics regarding Wi-Fi usage, or drill-down into the wealth of connectivity data on an account, fleet and system level. Operators can track vehicles in a fleet in real-time, and inspect a wide range of data relating to the quality of Internet connection, data consumption, system and hardware performance along a vehicle's route.

Remote Monitoring & Support

Our Network Operations Centre (NOC) can provide round the clock proactive and reactive support for clients, helping maintain unbroken service coverage, resolving incidents in a timely manner, and contributing to a high performance and high availability environment.



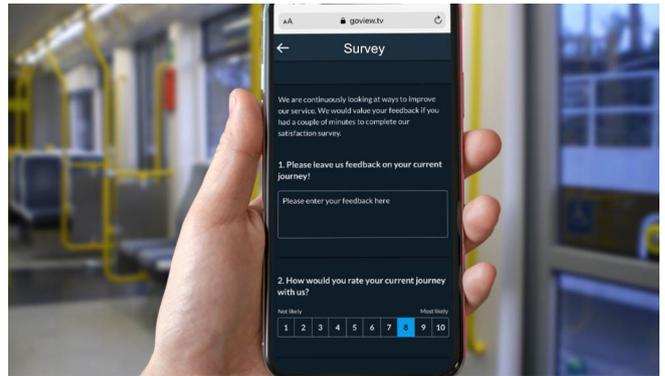
Responding to client enquiries via phone, email and chat, Icomera's support agents have the technical expertise to address complex and business critical issues, quickly identifying the root cause of any incidents and ensuring continual service improvement. This offers the dual advantages of increasing system uptime and service quality, alongside protecting a client's brand image and investment.

Icomera's regionally located NOCs use the world's time-zones to their advantage, following a Chase the Sun structure to maintain an uninterrupted service. NOC agents handle critical operations with the utmost care, working to ISO 27001 best practices and always keeping security front-of-mind.

The Network Operations Centre is also able to provide a range of enhanced services as and when required, including managing Wi-Fi-related enquiries from a client's passengers.

Unlock a World of Possibilities

Beyond Wi-Fi, Icomera's centralized platform can be leveraged to support a wide range of other services which further improve the passenger experience, enhance operational efficiency, and help maintain better safety and security.



Provide Real-time Journey Updates

Connecting to feeds from multiple APIs, passengers can be kept informed with live arrival and departure times, as well as multi-modal onward journey options. Viewable via the Wi-Fi portal, some journey information can be stored locally on the vehicle, allowing it to be accessed even at times when there is no onboard connectivity.

Deliver Onboard Entertainment

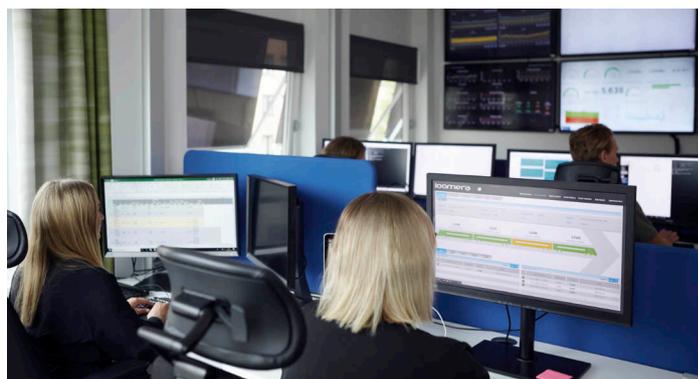
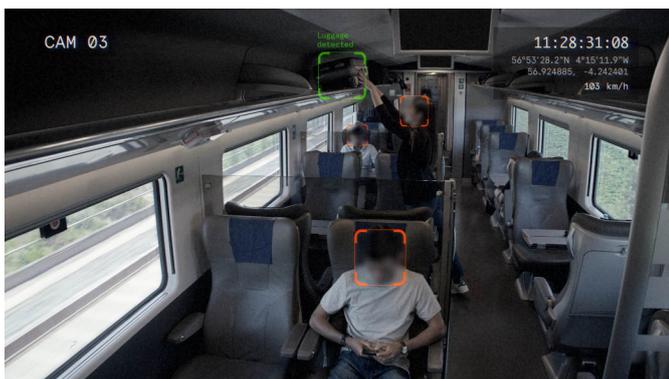
Icomera's onboard entertainment solution allows passengers to watch Hollywood movies and popular TV shows, play games, read bestselling eBooks, digital newspapers and magazines, and listen to audiobooks and other spoken-word content. The media is stored on the Icomera router, helping improve the speed of access, while also easing the load on the available bandwidth, and reducing mobile data usage costs associated with passengers' streaming content over Wi-Fi.

Collect Passenger Feedback

By gauging the sentiment of passengers traveling on a particular vehicle, operators can gain accurate and timely data that can be used to improve their services. Passengers can provide feedback via forms added to the Wi-Fi portal; simple multiple-choice questions allow those traveling to quickly express their views using happy face / sad face emoticons, and surveys can be created to add additional layers of information, delivering further valuable insights.

Send & Display Safety Messages

The Wi-Fi portal can be used to display targeted messages to those travelling, facilitating a safe, enjoyable and seamless experience. This capacity to send and display messages has been effectively used by operators during the COVID-19 pandemic, reassuring passengers of their personal safety; passengers can be shown safety videos via the Wi-Fi portal, kept informed of when the vehicle was last cleaned, and messaged with reminders to wear a face mask and maintain social distancing if required.



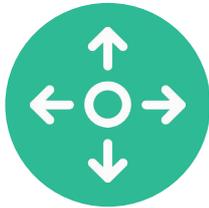
Monitor Onboard Incidents & Track Passenger Numbers

A vehicle's onboard Internet connectivity can be leveraged as a backbone for high-resolution digital video surveillance systems, allowing high-definition footage to be streamed or retrieved remotely in real-time, no matter where a vehicle is located. In the event of an incident, live footage allows the operator to make a fast and appropriate response, and for normal service to be resumed as quickly as possible. Furthermore, Icomera offers an innovative passenger counting solution which connects to video surveillance cameras to capture, analyze, and report occupancy data in real-time. For transport operators, understanding passenger travel patterns and volumetrics in the post-COVID world is vital for helping to ensure compliance with safety measures, as well as to manage timetabling and fleet planning. The ability to effectively gauge vehicle occupancy levels also makes it easier for passengers to choose less crowded environments to travel in, ensuring that they are safely socially distanced throughout their journey.

Utilize Telematics Data

The Icomera platform delivers the connectivity required to provide real-time access to operational data feeds from multiple devices and systems installed on board vehicles. This data can assist operators in managing costs, and to provide benefits principally relating to vehicle safety. For example, temperature sensors and vibration sensors can monitor onboard devices, preventing them from overheating, or monitor the surface a vehicle is traveling over, helping ensure a smooth journey. Receiving this type of information in real-time from vehicles can even become safety critical – The sooner any issues with devices or a route are discovered, the earlier a potential accident or breakdown can be averted.

The Icomera Advantage



A Single Point of Contact

From hardware to help-desk, Icomera's experts are on hand to design, install, manage and support your Wi-Fi solution



Lower Cost of Ownership

Our reliable and highly performant solutions enable you to minimize operating costs over their service life



A Platform for Connectivity

The very same connectivity that powers your passenger Wi-Fi can be used to support a wide-range of other value-adding applications



Secure Solutions as Standard

Our solutions are designed and delivered with cybersecurity in mind, ensuring that passenger and operational data is kept safe



Future-Proof Technology

Icomera's centralized platform delivers consistently reliable onboard connectivity now and throughout the years to come



Fully Scalable Solutions

Our offering is tailored to fit your business and budget, giving you access to efficient and fully realized solutions as you grow

Get in Touch Today...



At Icomera, we work in partnership with clients to build long-term relationships. We listen to your needs and advise you on the solutions that fit your requirements, with room to grow in the future. We are with you through the installation process and over the entirety of a solution's service life. We can point to our proven track record of successful projects, providing relevant case studies on request.

To find out more about how we can help you, contact sales-us@icomera.com today

About Icomera

Icomera is the world's leading provider of integrated connectivity solutions for trains, trams, buses and coaches, serving millions of passengers and tens of thousands of onboard systems on a daily basis.

We deliver the fastest, most reliable and secure Internet connection available to a moving vehicle, supporting a wide range of digital applications which increase passenger satisfaction, enhance operational efficiency, and improve safety and security.

Our solutions make transport more attractive for passengers and part of a smarter, safer, greener future for everyone, accelerating the transition towards a carbon-neutral world.



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