



ERICSSON

The IT roadmap for cellular solutions in vehicles

**A comprehensive comparison
of 5G routers for vehicle fleets**

Overview

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The continued expansion of digital technologies and applications in vehicles has gone hand-in-hand with reliance on wireless technology. The fleets supporting mass transit, education, public safety, delivery, and more cannot function without constant 5G or LTE connectivity everywhere they go. Today's vehicles are equipped with a broad range of connected technologies, including IoT devices such as surveillance cameras, point-of-sale (POS) devices, and digital signs; Wi-Fi channels for staff and passengers; AVL and telematics systems; and an increasing number of road-ready innovations.

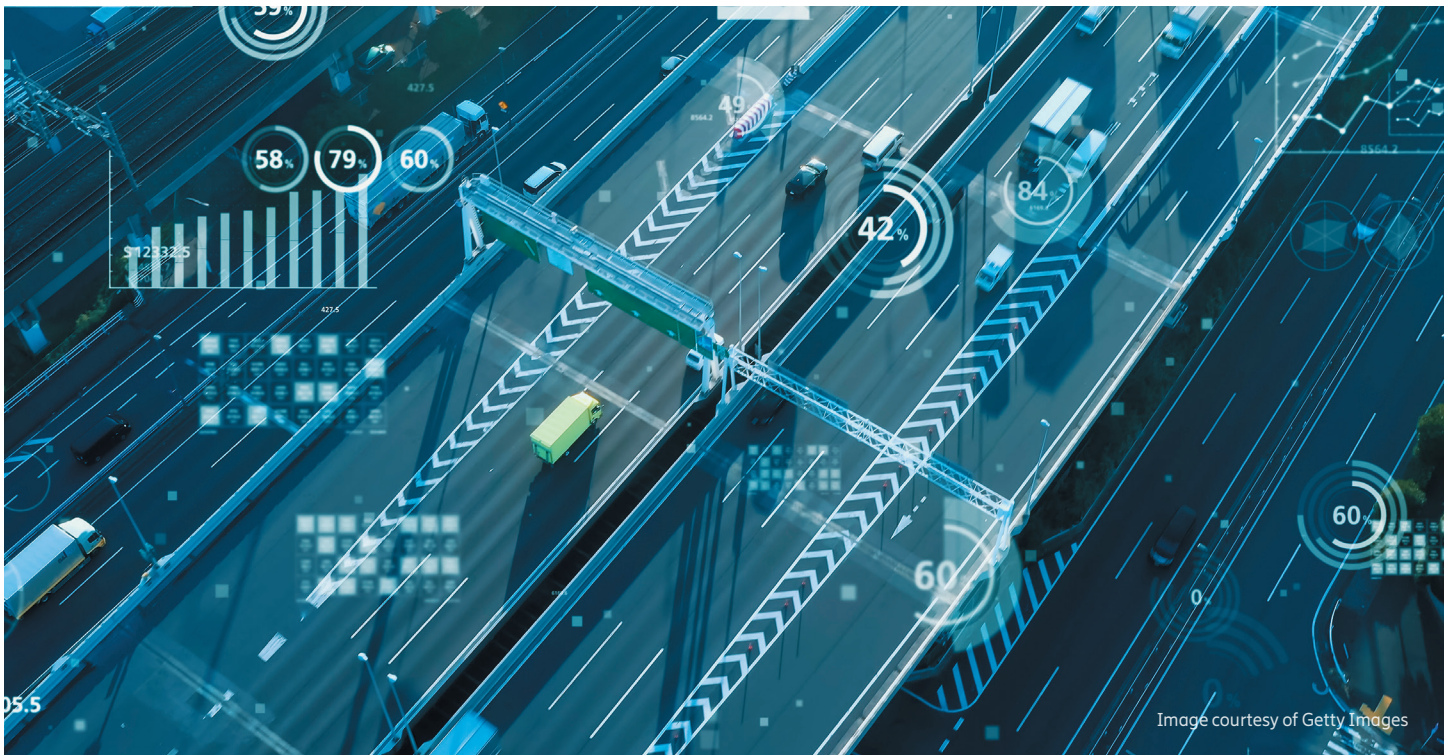
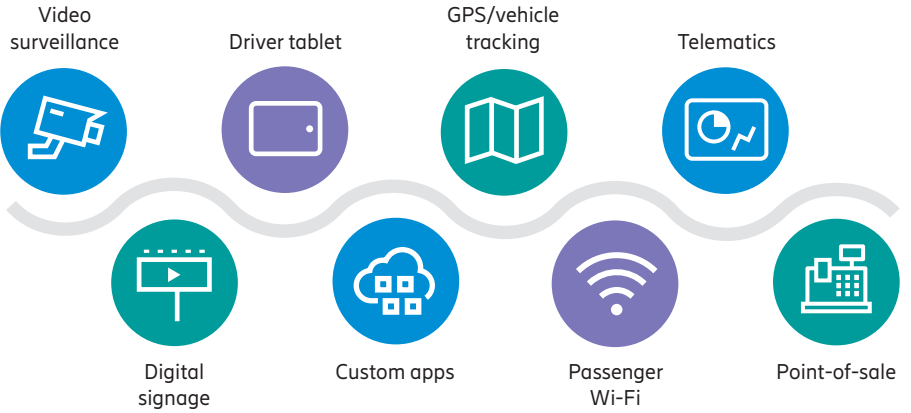
Luckily, many of today's vehicle routers and network management platforms are flexible enough to support such diverse needs. However, it's important to match your unique fleet connectivity needs with the best possible solution — taking into account the importance of automatic failover between multiple cellular carriers, network security measures, scalability, ease of deployment, and centralized network management. This buyers' guide provides information about important features and key options for your organization to consider.



Images courtesy of Getty Images and Adobe Stock

The digital transformation of vehicle fleets

For industries that rely on vehicles, technology and connectivity matter more than ever. Businesses focusing on customer service — including mass transit, private transportation, and food trucks — must now have guest Wi-Fi with the ability to create separate Wi-Fi bubbles that keep business connectivity and operations separated from customer access and activity. In addition, advanced POS systems, along with the ability to add remotely managed digital signage for displaying key messages or advertising. First responder agencies use a variety of ruggedized tablets, computers, dash cameras, devices, and applications to detect incoming emergency vehicles, manage traffic patterns, reduce response time and keep everyone safer. And many organizations that depend on vehicles can find ways to improve efficiency based on surveillance cameras, telemetry data, and real-time GPS information.



Key features for in-vehicle networking solutions

The most important technologies for vehicles depend on cellular connectivity that never stops. When selecting a wireless networking router and overall solution for your fleet, these are some of the most important features to look for:



Router essentials

- Built-in enterprise-grade 5G modem
- Software-defined radio supporting multiple carriers
- Optional second modem for wireless-to-wireless failover
- Support for Ethernet and Wi-Fi as WAN
- Dual-band, dual-concurrent Wi-Fi
- Ability to large data packets while in Wi-Fi
- Active GPS
- Compact and rugged for small spaces and roofs



Hardware protection

- Ruggedization for vibration, shock, dust, splash, and humidity
- Mounting integrated into the hardware for optimal placement and shock resistance
- Automatic router power on and off to mirror the ignition status
- Wide voltage input range with reverse polarity and transient voltage protection
- Transient and reverse polarity voltage protection



Software features

- Centralized and cloud-controlled configurations, updates and upgrades, and troubleshooting
- Robust analytics regarding cellular uptime and performance
- Insight into carrier usage based on cellular health mapping
- Zero trust networking
- Content filtering
- Flow duplication and bandwidth aggregation through link bonding

Choosing the right cellular solution for your fleet

Enterprise-grade 5G and LTE routers that are purpose-built for vehicles provide secure, reliable connectivity over nationwide cellular networks. With a cloud-based network management platform in place, IT teams can use connectivity and security dashboards to centrally make proactive adjustments and perform key troubleshooting duties, instead of having to visit each vehicle every time a change needs to be made.

Even the best in-vehicle solutions have key differences to account for before a fleetwide purchase and deployment. For example, IT teams need to decide whether they need automatic failover and failback between multiple carriers for increased reliability.

Option 1: Single-modem router

In a wireless router with an embedded modem featuring two SIM slots, the radio can only connect to one active SIM card at a time, which is a cost-effective option for organizations that have a minimal budget for cellular data usage. The presence of a second SIM within a software-defined modem enables IT teams to easily and remotely change the WAN connection in any vehicle from one cellular carrier to another. Ericsson Cradlepoint routers include SIM-based auto carrier selection. This feature detects the carrier of an installed SIM, loads the correct firmware and configuration settings automatically, and then connects

ⓘ Challenge: Blind carrier switching

Technically, wireless failover is possible with single-modem, dual-SIM routers. However, it's not ideal. When the software detects an outage and switches to the secondary SIM, it can take minutes, not seconds, to complete. Further, the system cannot predict whether the second carrier will offer a better connection. If a shift back to the first carrier is necessary, the vehicle could be offline for several minutes.

Option 2: Dual-modem router

Using a wireless router with two carriers active within separate modems is the best way to ensure always-on connectivity in vehicles. This solution is the only option for providing instant wireless-to-wireless failover, or WAN link redundancy. This is an essential service for vehicles that are constantly traveling in and out of good signal areas for particular cellular carriers.

Ericsson NetCloud SD-WAN features constantly monitor and measure both cellular connections, using intelligent path selection based on cellular signal strength, throughput, latency, and data plan consumption. The most important traffic — such as POS, GPS, and AVL data — can be assigned to the stronger link while less important applications remain connected over the weaker cellular signal. Link bonding features including flow duplication and bandwidth aggregation can increase application resiliency and ensure the delivery of mission-critical data.



Dual modems enable seamless support for multiple carriers in a single router.

Deployment considerations

It is important to understand the challenges that may arise during deployment, as well as how to mitigate them:

01**Antennas:**

Select an antenna that is optimized for the frequency bands the modem uses. Leveraging the most advanced modems with an older antenna may limit connectivity to some bands. Antenna placement is ideally outside the vehicle, ensuring the best connectivity available. Using two separate antennas will increase isolation for instances when there is a need to run two active modems that can both be transmitting at the same time.

02**Installation brackets:**

Select installation brackets designed to handle rough terrain, and ensure your router has been tested and verified to MIL STD 810G and SAE J1455 standards. Alternatively, select a solution that has mounting integrated into the hardware.

03**Choosing a provider:**

Unique reception should be studied and evaluated before selecting network providers. This study should include a service analysis, route and coverage maps, and testing in the field. A site survey can be used to gather reception data and help you evaluate and pick the best network carrier for reliable coverage.

Ericsson's enterprise wireless solutions for vehicle fleets

Ericsson Enterprise Wireless delivers routers that and software services that unlock the power of 5G and LTE networks to transform operations and rider experiences.



Always-on connectivity in vehicles

Ensure constant connectivity with SD-WAN intelligence optimizing network traffic across 5G, LTE, and satellite — enabling highly reliable in-vehicle connectivity for passenger Wi-Fi, key applications, and telemetry data for fleet efficiency.



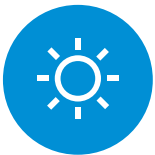
Network security features that safeguard data

Confidently send and receive sensitive data including public safety information, customer and payment data, and telemetry information from a highly secure, best-in-class edge solution that includes features such as zero trust networking and advanced content filtering.



Remote management and troubleshooting

Use one cloud platform to configure, deploy, and manage all of your wireless edge routers from anywhere. Advanced analytics provide visibility into cellular coverage, security, Wi-Fi utilization, custom applications, and more.



Protection against the elements

Because vehicles are like offices operating in wide-ranging locations, Ericsson Cradlepoint vehicle routers are built to withstand extreme temperatures, vibration, shock, dust, splash, and humidity.



Performance optimization through SD-WAN

The intelligent link bonding features within Ericsson NetCloud combine multiple connection links into one virtual connection. Traffic steering rules can aggregate the bonded links, assign traffic by application, distribute traffic by weighted percentages, or duplicate flows over each link for mission critical traffic.

Learn more at [cradlepoint.com](https://www.cradlepoint.com)