A Buyers' Guide to Mobile Solutions for Emergency Services Vehicles

Exploring Today's Connection, Security, and Management Needs for First Responders

Overview

The continued expansion of digital technologies and applications in emergency vehicles goes hand-in-hand with reliance on mobile broadband solutions. From police cars to ambulances, to fire and rescue services, first responders and their support teams simply cannot function without uninterrupted 4G LTE and 5G connectivity wherever they go.

Emergency service vehicles are equipped with a broad range of connected technologies, including IoT devices such as surveillance cameras and digital signage, Wi-Fi channels for mobile command centres, telematics systems, automatic vehicle locators (AVL), and much more.

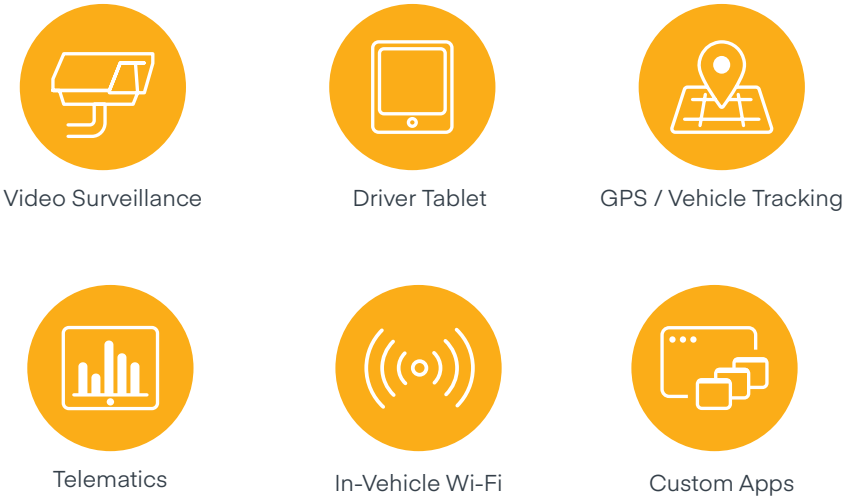
Luckily, many of today's in-vehicle routers and network management platforms are flexible enough to support such diverse needs. However, it's important to match your unique agency needs with the best possible solution, taking into account the importance of automatic failover between multiple mobile carriers, data security features, and centralised network management.

This buyers' guide will provide information about important features and key options for your organisation to consider.

The Digital Transformation of Emergency Services

In an industry where every second counts, technology and connectivity matter more than ever. First responders use a variety of ruggedised tablets, computers, devices, and applications to reduce response time and keep their communities safer.

In addition to outfitting their vehicles with the latest safety and rescue equipment, police, firemen, and paramedics can improve efficiencies with the integration of surveillance cameras, telemetry data, and real-time GPS information.



What to Look for in a Networking Solution for Emergency Services

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

Router essentials

- Built-in enterprise-grade 4G LTE or 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
- Active GPS/GNSS

Hardware protection

- Ruggedisation 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 vehicle's ignition status
- Wide voltage input range with reverse polarity and transient voltage protection
- Transient and reverse polarity voltage protection

Software features

- Centralised and cloud-controlled configurations, updates and upgrades, and troubleshooting
- Robust uptime and performance analytics for actionable insights
- Support for an Intrusion Protection and Detection System (IDS/IPDS) that defends against network breaches
- Content filtering
- Expansive cloud-delivered data security dashboards

Choosing a Networking Solution for Vehicles

Enterprise-grade 4G LTE and 5G routers that are purpose-built for vehicles provide secure, reliable connectivity over nationwide cellular networks. And with a cloud-based network management platform in place, IT teams can use dashboards full of rich connectivity and security analytics 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 prior to a fleetwide purchase and deployment. For example, emergency service 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 organisations 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.

Cradlepoint's NetCloud Service for Mobile and wireless edge routers include SIM-based auto carrier selection. This feature detects the carrier of an installed SIM, loads the correct firmware and configuration settings automatically, 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. 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 emergency service transportation vehicles. This solution is the only option for providing instant wireless-to-wireless failover, or WAN link redundancy. This is an essential service for emergency response teams who are constantly traveling in and out of good signal areas for particular cellular carriers.

Cradlepoint's 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 GPS and AVL data — can be assigned to the stronger link while less important applications remain connected over the weaker cellular signal.

Modems with dual-SIM capabilities enable 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:

- **Antennas:** Select an antenna that is optimised for the frequency bands the modem uses. Leveraging the most advanced modems with an older antenna may limit connectivity to some bands. Antenna placement ideally should be outside the vehicle, ensuring the best connectivity available. It is ideal to use two separate antennas to increase isolation for instances when there is a need to run two active modems that can both be transmitting at the same time.
- **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.
- **Choosing a provider:** Unique reception should be studied and evaluated prior to selecting network providers. This study should include a service analysis, route 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.

Cradlepoint's Wireless Edge Solutions for Emergency Services

Cradlepoint's NetCloud Service for Mobile, advanced wireless edge routers, and proprietary software technologies unlock the power of 4G LTE and 5G cellular networks to transform operations for a new era of emergency services.

Keep vehicles connected

Ensure constant connectivity with SD-WAN intelligence optimising network traffic across Wi-Fi and multi-link cellular networks, enabling in-vehicle connectivity and telemetry data for fleet efficiency. Cradlepoint's cellular routers further ensure first responders always have a clear path to connectivity

Protect critical information

Enterprise-class solutions provide unified security features that support IoT isolation, secure Internet access, threat detection, and content filtering, allowing you to confidently send and receive sensitive data from a highly secure, best-in-class edge solution, whether at headquarters or in the field.

Centrally manage the network

With Cradlepoint's NetCloud Manager, use one cloud platform to configure, deploy, and manage all of your wireless edge routers from anywhere. Advanced analytics provide visibility into cellular, application, and Wi-Fi utilisation and security.

One platform for your entire network

Treat mobile networks as part of your organisation's converged edge. Monitor and manage all your wireless in-vehicle, headquarter, station, and IoT routers through the same cloud-based management platform.

Deploy a purpose-built solution

With integrated Wi-Fi, Ethernet and serial ports, engine diagnostic connection, and precision GPS, our all-in-one mobile routers support all your in-vehicle connections. Because response vehicles operate in a wide range of locations, Cradlepoint's mobile routers are built to withstand extreme environments.

Upfit without an upgrade

Agencies using Cradlepoint in-vehicle solutions can quickly upfit vehicles with new services, such as surveillance cameras, telemetry devices, license plate recognition technology, and more as needs arise.

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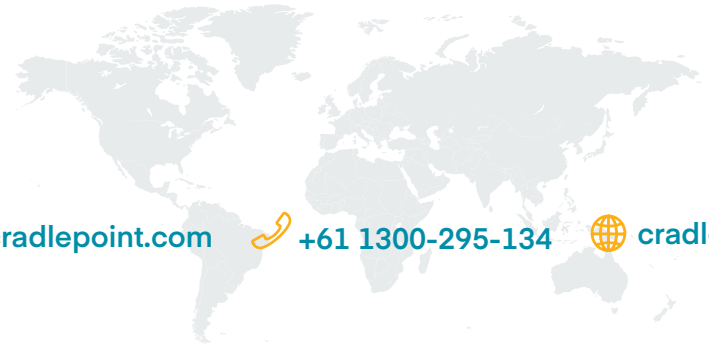

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About Cradlepoint

Cradlepoint enables the freedom to connect people, places, and things that drive more experiences, more ways to work, and better business results — anywhere. A pioneer in Wireless WAN, Cradlepoint offers advanced 4G LTE and 5G routers and adapters — controlled through Cradlepoint NetCloud™. Emergency services rely on Cradlepoint and its Cellular Intelligence to build a reliable, secure network for sites, vehicles, IoT devices, and remote employees. Cradlepoint is a subsidiary of Ericsson's Business Area Technologies and New Businesses division.