IoT Buyers' Guide: What to Look for in Enterprise Wireless WAN Solutions for Connected Things

Exploring today's connection, security, and management needs for cellular-enabled IoT deployments

For enterprises, the potential value of the Internet of Things (IoT) lies far beyond merely connecting edge sensors, devices, and machines to the LAN. Yes, those hallmarks of traditional enterprise IoT remain very important, but so do a slew of other applications that have greatly expanded the scope and even the definition of IoT.

Organizations across all industries are realizing IoT can scale as far and wide as its connectivity and data security will allow — all from the tiniest IoT devices featuring built-in wireless connectivity to HD video surveillance systems, enabled by cellular routers or gateways. The result? Enterprises are taking creative innovation higher and further. They're discovering new ways to use connected technologies to reap tremendous business benefits — especially concerning efficiency and ultimately the bottom line.

IoT provides immense value and ROI in stores, warehouses, manufacturing plants, fleet vehicles, and every nook and cranny of municipalities far and wide. The potential is there for the taking, but choosing the right solutions requires careful consideration.

Let's explore some important questions, options, and best practices regarding cellular connectivity, security, and flexibility for a variety of enterprise IoT use cases.

IoT and Cellular Networking Expand Together

IoT means a lot of things to a lot of different businesses. One company might simply need narrowband IoT for a weather station that needs to collect wind speed data, while another might be livestreaming video surveillance footage on a regular basis. However, while use cases and corresponding solution needs can be so divergent, one common theme is dependence on secure, flexible WAN connectivity for enterprise IoT.

LTE and 5G give organizations the freedom to put IoT devices and applications anywhere, and to move them as often as needed.
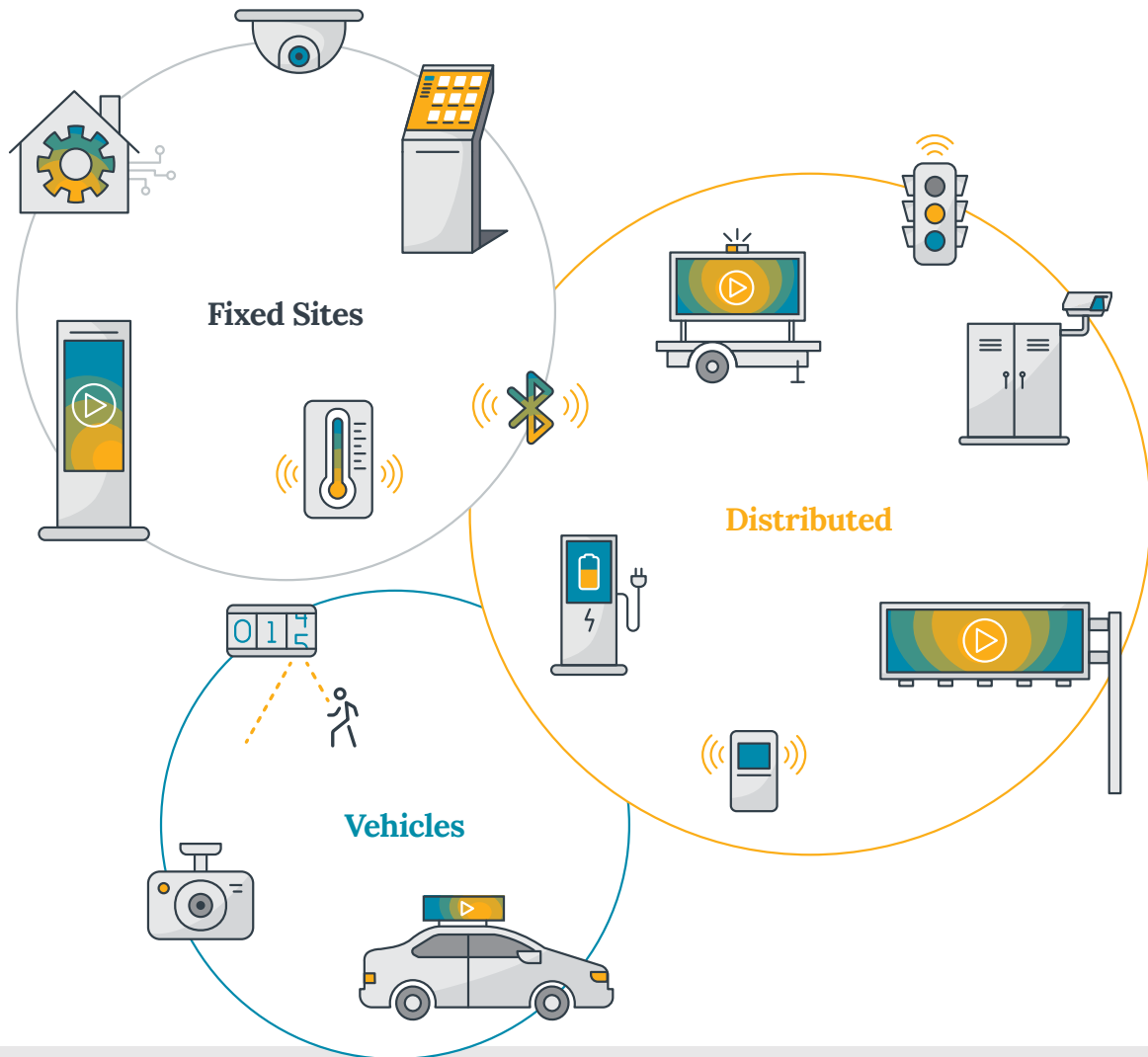
54% OF ORGANIZATIONS THAT UTILIZE 4G/5G FOR WIRELESS WAN ARE USING IT TO CONNECT IOT.

State of Wireless WAN **2022 Report**

> "**If the Internet connection isn't reliable, the data can't reach the cloud and our customers won't know the health and well-being of their animals. With the time and management challenges of wired ISPs, it became clear that LTE was the only WAN source that would allow us to scale our business.**" *– Quantified Ag*

Explore Quantified Ag's cellular-enabled agile IoT story in this **case study**.

What Type of Enterprise IoT Does Your Project Require?

Typically, IoT deployments fall into three categories: embedded nonconfigurable, embedded configurable, and agile IoT. Use cases from any of these categories can be set up using either wired or wireless WAN connectivity. Key factors to consider include:

- Reliability, based on network uptime percentage
- Performance indicators, such as throughput, loss, latency, and jitter
- Cost of data plans and management
- Flexibility, based on network availability and mobility

Determining which category your organization's project will fall into and which type of connectivity is most prudent is essential prior to choosing the best possible solution to meet your needs.

Embedded nonconfigurable devices

These are IoT instances requiring no computing capabilities, no machine intelligence, no configuration of settings, and tight integration in very small spaces. Nonconfigurable devices are typically provisioned with simple low-power wireless connectivity such as RFID, LPWAN, or Bluetooth.

Examples: Asset tags, simple sensors, smart badges, and wearables in warehouses, hospitals, and other sprawling spaces.

Agile IoT with advanced features

For use cases where more space is available, multiple advantages may be realized through wireless edge gateways or routers, including upgradeable future-proofing with advanced security, enterprise-class routing, full hardware/software extensibility suites, and edge computing capabilities.

Examples: Kiosks, digital signs, and smart buildings. Also, IoT data flowing from LAN to WAN in stores and fleet vehicles.

Embedded configurable connectivity for specialized use cases

In some proprietary edge products with physical space constraints or where tight integration is otherwise desired, connectivity is often embedded into the circuitry of the solution. While these products often include advanced configuration and management features, they lack routing capabilities and are not modular or upgradeable. Thus, this works best when the expected lifespan of the product is relatively short, or when future new technologies such as edge compute or improved throughput are deemed unessential.

Examples: Manufacturing equipment, point-of-sale (POS) equipment, energy meters, motor vehicles, and specialty equipment built for vertically integrated solutions such as cold chain.

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Six 'Must Haves' for Deploying Agile IoT Routers in Enterprise Environments

Despite all of its immense business value, enterprise IoT also involves significant challenges that must be accounted for. Data security is one of the most well-publicized barriers, and it is a key factor among the following six essential characteristics for enterprise IoT.

No. 1

Highly scalable management

Many businesses deploy hundreds, thousands, or even tens of thousands of IoT edge devices every year, which puts pressure on the IT and OT teams to use robust cloud management and security solutions that make rollout as simple and easy as possible. Manual processes and disparate technologies that don't easily integrate with each other make it challenging to manage scale. .

SOLUTION:

A cloud management platform with zero-touch deployment capabilities expedites and simplifies the rollout of cellular IoT routers.

No. 2

Enterprise-class security layers

Each organization's network attack surface is in a state of constant growth as IoT deployments, remote work, and other forms of digital transformation take place. New connections to wide area networks become enticing on-ramps for threat actors who are continually seeking new ways to breach organizations to steal valuable data.

SOLUTION:

A combination of air-gapped networks through physically separate routers and layers of software-based security applications, including Zero-Trust Network Access features, is a comprehensive foundation for IoT security.

No. 3

Small, upgradeable form factor

In many use cases, inability to upgrade to new connectivity technologies, update firmware, or change network operators greatly hinders the lifespan of the overall IoT solution. However, usually there isn't enough space for bulky edge networking equipment — whether in a kiosk, a system integrator's specialized enclosure, or even a police car. That said, many small cellular broadband gateways aren't designed to withstand extreme temperatures and other environmental factors.

SOLUTION:

Cellular-enabled IoT routers that are small yet ruggedized are ideal for many different climates and conditions. The ability to replace either the modem or the router, depending on the model, is essential for long-term use.

No. 4

Edge compute capabilities

On-premises edge computing reduces latency, which is essential for IoT use cases such as video surveillance and patient monitoring. However, edge computing requires a lot of processing power and memory; many IoT devices aren't powerful enough to run advanced scripts.

SOLUTION:

Organizations can use purpose-built routers that support lightweight containers and SDKs for edge computing — effectively enabling management of WAN connectivity and container workloads through one platform across the entire edge.

No. 5

Substantial flexibility

The broad scope of IoT today — ranging from collecting SCADA data in a remote oilfield to automated passenger counters aboard city buses — makes it impossible to rely on one specific IoT router for every situation. There simply are too many situational variables to consider.

SOLUTION:

Finding a wireless edge vendor that makes purpose-built routers for stores, vehicles, kiosks, and many other use cases is a good way to accommodate all potential needs, including LTE and 5G, Wi-Fi, containers, Bluetooth, third-party applications, and more.

No. 6

Robust management with lean IT teams

Many, if not most, IoT scenarios involve constant remote monitoring of data that is critical to day-to-day business operations. Adding the need to monitor cellular IoT connectivity and security threats is an added layer of management that is difficult for organizations to keep up with, especially given the constant drumbeat of new IoT devices and the reality that many businesses operate with relatively small IT and OT teams. These factors make in-person adjustments highly unmanageable.

SOLUTION:

A cloud management platform enables centralized monitoring, configuring, and troubleshooting of network connectivity and security through cellular IoT routers.

Spotlight: High-Value Opportunities for Cellular-Enabled Agile IoT

Agile IoT projects have been inundating enterprise networking for some time, with agile IoT via purpose-built cellular routers provisioning many of those projects. Several high-value use cases lead the way with large-scale deployments throughout the world.

Kiosks

Kiosks help companies from all industries bring services closer to consumers and make them easier to access. A lot of these machines must be able to be moved on a regular basis, making LTE or 5G the logical connectivity choice. Kiosks such as lottery machines, ticket machines, ATMs, vending machines, smart lockers, and electric vehicle (EV) charging stations usually must be able to transact credit card payments, putting a premium on data security and network uptime.

Digital signage

Digital signs deliver important messages ranging from public safety and roadway hazard information to high-value retail ads, but the key is organizations' ability to remotely manipulate content whenever and wherever needed. WAN flexibility and reliability are critical for giving agencies and businesses real-time control of roadside billboards; menu boards inside and outside restaurants; wayfinding at malls, convention centers, and hospitals; and beyond.

Video surveillance

Using video cameras to remotely monitor buildings, open areas, and vehicles has become an essential component of discouraging theft and other illegal activity. Whether or not a given use case necessitates streaming via cellular helps determine whether an organization should use a 1-to-1 router inside a NEMA enclosure or a branch router that supports more bandwidth and edge computing.

Branch IoT

Putting an array of IoT devices and sensors on a wired or Wi-Fi LAN through a hybrid WAN router enables enterprises to run edge computing, implement high-bandwidth applications, and reduce edge networking hardware needs. These routers also often provide Bluetooth connectivity, while smaller IoT gateways do not.
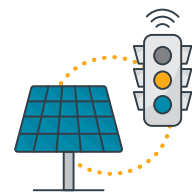
Smart cities

While the concept can mean different things to different agencies, "smart city" intersects most commonly with LTE and 5G where agile IoT is needed to ensure data is always available and that IT teams can troubleshoot immediately. Examples include EV charging stations, intelligent transportation systems, advanced traffic control cabinets, video cameras, green energy infrastructure, and more. In some cases, Private Cellular Networks are preferrable for fully separating critical infrastructure from the public cloud.

Questions to Answer Before Choosing an IoT Connectivity Solution

Before selecting a cellular IoT connectivity solution, it's a good idea to ask several key questions. The answers will help drive whether you choose a nonconfigurable device, embedded connectivity, or an enterprise-class router supporting agile IoT.

? Is there enough physical space to accommodate an IoT router?

? Does my application require 1-to-1 connectivity through a router/gateway for an air-gapped network?

? Does my organization's IoT use case call for data computing at the edge?

? Is Bluetooth or Wi-Fi connectivity essential for this use case?

? Will the deployment include locations where potentially extreme conditions call for a ruggedized router?

? Considering the potential scale of this project, is on-site IT management feasible?

? Does my use case require enough bandwidth to warrant 5G?

? Is my data sensitive enough to necessitate security measures including Zero-Trust Network Access or Private Cellular Networking?

? Does my cellular solution need to easily integrate with Microsoft Azure, AWS, and/or other key IoT platforms?

? Do you need a solution that easily integrates with SIM management services?

Cradlepoint's Wireless Edge Solutions for IoT

Agile IoT enables organizations to use data to solve problems, improve efficiency, and protect communities. The challenge? IoT devices and applications ranging from kiosks and digital signs to surveillance cameras and sensors also rely on highly secure, reliable connectivity that can be set up anywhere, and quickly. From deployments of 10 to 10,000, scalability, extensibility, durability, and efficient size are non-negotiable. Cradlepoint's cloud-managed IoT routers deliver ultra-reliable and secure LTE and 5G cellular connectivity that scales with each organization's business needs. Enterprises can manage their agile IoT solutions from anywhere through Cradlepoint NetCloud Manager featuring Cellular Intelligence.

Learn more at about agile IoT at **cradlepoint.com/iot**

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. The company is a pioneer in Wireless WAN, offering advanced 4G and 5G routers and adapters — controlled through Cradlepoint NetCloud™. Headquartered in Boise, Idaho, Cradlepoint is a subsidiary of Ericsson's Business Area Enterprise Wireless Solutions division.