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# IoT buyers' guide: Cellular solutions for connecting things

**Exploring connection, security, and management needs for cellular-enabled IoT deployments**

Image courtesy of Getty Images

# Overview

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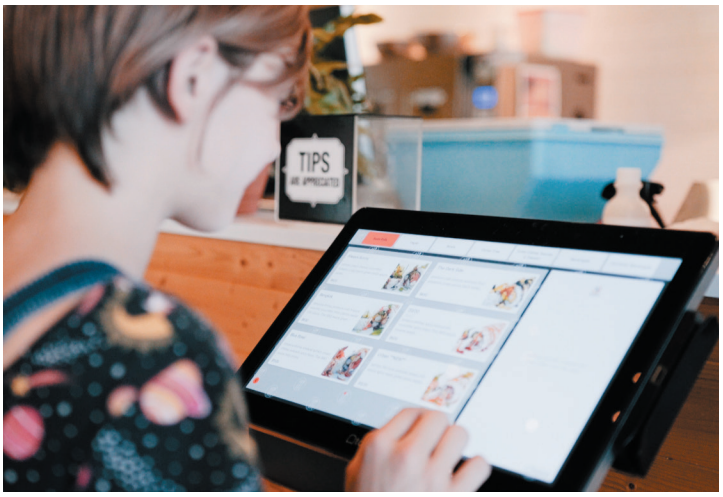
Enterprises across all industries now know that the Internet of Things (IoT) can scale as far and wide as its connectivity and data security will allow — all from the tiniest IoT devices featuring built-in wireless connectivity to HD video surveillance systems, enabled by cellular routers or gateways. The result? Enterprises are taking creative innovation higher and further. They're discovering new ways to leverage IoT devices and applications for immense value and ROI in stores, warehouses, manufacturing plants, fleet vehicles, and every nook and cranny of municipalities far and wide.

The potential is vast, but choosing the right connectivity and security solutions for your IoT scenarios requires careful consideration. Let's explore some important questions, options, and best practices regarding cellular connectivity, security, and flexibility for enterprise IoT.


# What type of enterprise IoT does your project require?

There are many types of IoT devices and applications, but for the most part, all IoT projects require thorough analysis regarding the use of wired vs. cellular 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

Some enterprise IoT devices — such as asset tags and smart badges — are nonconfigurable, with no computing capabilities, and merely need simple low-power wireless connectivity such as RFID, LPWAN, or Bluetooth. But many of today's IoT scenarios need cellular connectivity. That said, even within the realm of 5G, there are key differences between a wireless wired area network (WWAN) and a wireless local area network (WLAN), or private cellular network. Determining which type of connectivity your organization's project will require is essential to choosing the best possible solution.

## IoT requiring Wireless WAN connectivity

Many enterprise IoT use cases require the robust capabilities of cellular gateways or routers that are designed to meet the unique needs of IoT. Ideal in this situation is a cellular router for IoT that supports 5G, has enterprise-class routing, has full hardware/software extensibility and edge computing capabilities, supports zero trust security, and can be managed remotely through a cloud-based platform.

## IoT within a private cellular network environment

Within a large campus area such as a manufacturing plant, warehouse, mine, or port, often there are various IoT devices that need to be connected via a WLAN. Many of these environments present connectivity, security, and hardware difficulties that render Wi-Fi insufficient.

In these cases, organizations often set up their own private cellular network in order to dramatically reduce IoT downtime and improve reliability and performance while gaining unprecedented network control. At the edge, private 5G can be deployed through both cellular routers and SIM cards inserted directly into IoT devices.

# Six 'must haves' for cellular 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 Zero-touch deployment

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

## No. 2 Zero trust security

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:**

Zero trust network technology — in place of cumbersome VPNs — that leverages "invitation-only" access for advanced 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 computing 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 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 networking vendor that makes purpose-built routers for stores, vehicles, kiosks, and many other use cases — and that provides private cellular solutions — is a good way to accommodate all potential needs, including 5G and LTE, Wi-Fi, containers, Bluetooth, third-party applications, and more.

## No. 6 Remote management for 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-based management platform enables centralized monitoring, configuring, and troubleshooting of network connectivity and security through cellular IoT routers.

# Spotlight: High-value opportunities for cellular-connected IoT

## Kiosks

Kiosks help companies 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 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.

## Scanners

In some enterprise environments, such as warehouses and ports, scanners are arguably the most important technology on site. If employees are routinely losing access to these digital tools, every subsequent step in the production process is delayed — potentially costing the company millions of dollars. Putting scanners on a private cellular network is the best way to ensure high reliability and performance in these areas where large machines and physical barriers make Wi-Fi untenable.

## Automated guided vehicles (AGVs)

AGVs help reduce labor costs and boost efficiency in places such as warehouses, manufacturing plants, ports, and mines — places where materials must be moved constantly. In large spaces, Wi-Fi relies on handoffs between many access points, which creates dead spots and drop-offs that AGVs can't sustain. Ericsson Private 5G solutions combine cellular with a unique radio architecture that provides seamless handoffs.

# Questions to answer before choosing an IoT connectivity solution

- ☐ Does my IoT project call for a Wireless WAN (WWAN) solution or a private cellular network (WLAN)?
- ☐ Is there enough physical space to accommodate an IoT router?
- ☐ 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 technology?
- ☐ Does my cellular solution need to easily integrate with Microsoft Azure, AWS, and/or other key IoT platforms?

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