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Wireless WAN Essentials

**The 'when' and 'why' of cellular
networking for businesses and
agencies**



Image courtesy of Getty Images

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The new WAN environment of clouds, things, and mobility

Cloud services, IoT devices, and increased mobility are pushing businesses beyond the architectural constraints of wired networks. Organizations need broader reach and better operational flexibility to serve new applications that drive competitive advantage. As a result, Wireless WAN (WWAN), based on the capabilities of 5G and LTE, is becoming an essential part of any organization's digital transformation.

Over the past 20 years, similar demands fueled the move from wired Ethernet LANs to Wi-Fi. Nobody thinks about being close to an Ethernet jack anymore. As reliability, security, distance, and bandwidth improved, the flexibility and economics of Wi-Fi trumped those of wired LANs. 5G and LTE services are having the same effect on wired WANs, especially when integrated with and building on the capabilities of software-defined WANs (SD-WANs).



SD-WAN was the first step in WAN transformation

SD-WAN brought some very important capabilities to enterprise networks. Consolidating multiple network functions reduced both hardware and operating costs. Support for multiple WAN links improved reliability and enabled both bandwidth aggregation and traffic segregation. Application recognition and policy-based

routing created new opportunities for network optimization. Cloud-based management made it easier to deploy and manage network devices. These were necessary first steps in the transformation of WANs. But the resulting networks were still tied to wires, instead of the people and devices they were meant to support.

Wireless WANs is the next step

Wireless connections bring more diversity, greater network agility, and broader reach to enterprise networks. Supporting multiple types of network connectivity to create a more reliable WAN is the foundation for WWAN. Building on this capability, wireless edge solutions add cellular links as a connection

option. This expands the reach of enterprise network functionality to the people, places, and things where work is happening. The network intelligence at the core of cellular-enabled solutions makes it much easier to switch between links, segregate specific traffic types, or quickly open a new business location.

From 4G LTE to 5G


Carriers are making cellular a practical option for WWAN links with evolving flat-rate pricing options and bandwidth-boosting enhancements such as Gigabit-Class LTE. Emerging 5G services offer even greater performance and opportunity for new services. More than just increased bandwidth, 5G technology delivers a wide range of new capabilities and use cases. For example, 5G is designed to deliver ultra-low latency, enabling new applications that require

faster response times. Enhanced antenna and transmission techniques massively increase the number of devices and conversations that each 5G station can handle, making wireless support for IoT networks and other high-density applications a reality.


With 5G widely available now, it is becoming much easier to pull a network out of the air, whenever and wherever the business needs.

4 Wireless WAN strategies


Wireless WANs solve multiple problems for business networks, create new opportunities, and lay the foundation for further transformation and innovation. This paper outlines four key strategies for Wireless WAN deployments:




Network failover
[View diagram on page 4 →](#)



Using cellular as a primary link for sites
[View diagram on page 5 →](#)



Expanding IoT capabilities
[View diagram on page 6 →](#)



Boosting connectivity for vehicles
[View diagram on page 7 →](#)



Enhancing network failover

High availability tops the list of WAN requirements in any digital enterprise. Cloud applications and services have made WANs essential; you absolutely need an operating WAN to access mission-critical enterprise functions. Network uptime and nonstop operations have become key performance indicators for IT management. Historically, organizations added more wires into the building to ensure network availability and seamless failover, from different carriers, if necessary, for greater resilience.

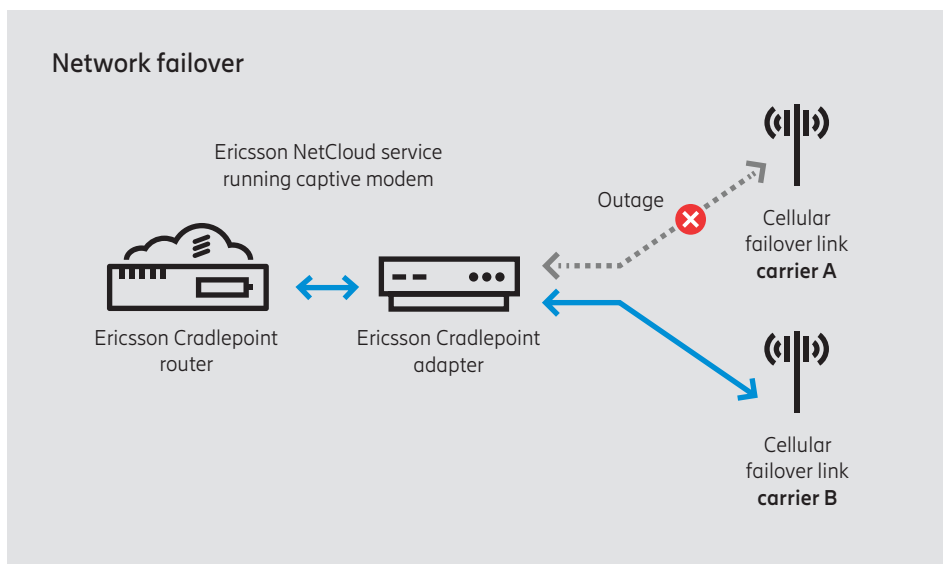
Unfortunately, adding another wire is not enough to ensure continuous operations. Pulling another wire through the same conduit or trench is not going to deliver the required diversity. Installing a new physical wire may also take too long for many projects. Instead, enterprises are building layered availability with different types of connections — some over wire, some over the air. Then simply repeat as needed to achieve the desired level of availability.

Failover flexibility

With networks forming the foundation for enterprise digital transformation, nonstop availability is critical. Wired-to-wireless failover seamlessly switches from one type of link to another, without any network or service disruption. With lower-bandwidth LTE connections, SD-WAN policies identify the critical traffic to carry on the wireless link. Higher-bandwidth 5G connections can fail over all traffic. Enterprises can also deploy wireless failover functionality quickly and easily — much faster than waiting for installation of a new wire or an alternate service provider.

Out-of-band management

When wired links go down, network management capability is lost along with the remote traffic. With most land-line disruptions happening within the last mile, secondary landlines often are also down, leaving the remote unit unreachable. Wireless links provide an efficient out-of-band management option, connecting directly to the console port on one or more remote devices. Network managers can easily and securely diagnose and fix problems over the air, without having to leave the office, roll a service truck, or painstakingly walk a local employee through the troubleshooting process.





Using cellular as the primary link for sites

Wireless when you can

People have embraced and prefer wireless connectivity in their offices and homes. Why? Because the reach and agility of wireless is worth far more than the shrinking bandwidth advantage of wires. Many banks, retail stores, insurance agents, and other types of branch offices are looking at WWAN solutions for the same reason.

WWAN brings greater operating agility to these locations, making it faster and easier to open or move stores and offices. Sometimes they may want to trial a location, expand if it works out, and quickly redeploy if not. Or the layout of the branch may change frequently, due to merchandising or staffing changes, and it is much easier to move a wireless endpoint around than a wired one.

Wireless when you must

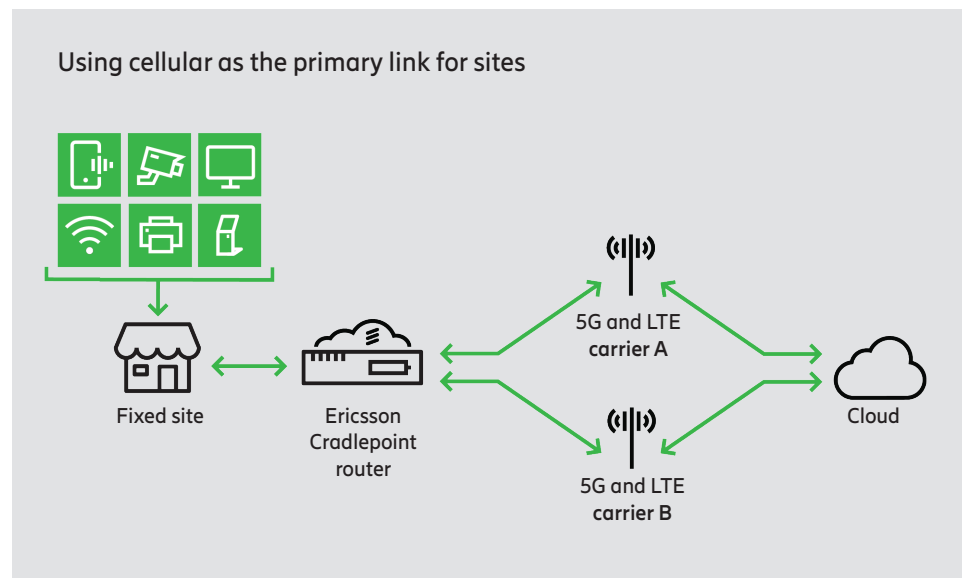
When wired connectivity isn't available, cellular is a good primary link option — especially when leveraged through a solution that makes it easy to ensure security and performance optimization. For example, short-term operating locations, or ones without a building, such as construction sites, pop-up stores, or outdoor markets. Or just a need to move to where the customers are due to unanticipated issues or disruptive situations, from major municipal repairs or construction projects to natural disasters and public health emergencies.

The cost and time of getting wires in these scenarios is prohibitive and unrealistic. Instead, businesses can quickly pull a network right out of the air and have full control to decide when, where, and for how long to set up remote locations.

Wireless for high availability and reduced management

Using cellular as the primary network connection can be helpful for building a highly redundant network with reduced operating costs. Organizations with regional or national operations often have to deal with hundreds or even thousands of ISPs for their branch office links. While these wired networks may have redundancies, the operating and administrative complexity can result in configuration errors that impact availability, not to mention the time and costs required to manage all of the contracts.

A simpler, more cost-effective alternative is national contracts with several cellular carriers, resulting in consistent configurations and easier network management. For maximum availability, each site can have a dual-modem router supporting two carriers.





Connecting and optimizing IoT anywhere

Video systems, kiosks, and industrial automation

The types of IoT devices and applications that enterprises utilize for actionable data and other business benefits can't be encumbered by reliance on wired connection options. Things like sensors, video camera systems, digital signs, and self-service retail kiosks need cellular connectivity that can be set up anywhere but also monitored and managed remotely. It's also important to be able to customize and optimize deployed IoT devices as easily as possible.

For security, start from ground zero (trust)

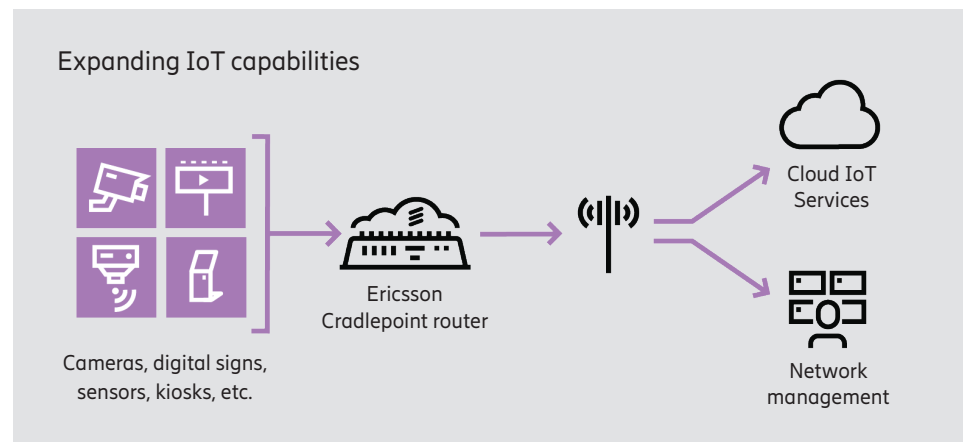
With security top of mind in IoT deployments, zero trust is an ideal approach. As opposed to perimeter-based solutions, zero trust networks remove any implicit trust and validate connections explicitly through policy.

Unlike VPNs (virtual private networks) and APNs (access point names), which often have complex configurations, known security vulnerabilities, and are generally more expensive, zero trust security assumes that no user or device should be trusted by default — inside or outside the network. Many organizations are deploying zero trust strategies through SASE solutions that integrate cellular-centric SD-WAN and security into one cloud-based platform.

Customizing and optimizing IoT

Custom application deployments can sometimes be challenging, slow and unsafe. When a company needs to create custom applications and deploy them to their network and devices, software development kits (SDKs) can be a dependable, fast, and cost-effective solution. Ericsson NetCloud is a cloud-based

platform that makes it easy to configure networks and manage them throughout their lifecycle. Users can leverage SDKs to extend solutions and simplify the integration of services into custom applications. This helps developers build more tailored applications that securely run on endpoints (or in the cloud) and can be easily deployed to routers or access points.





Improving connection performance in vehicles

Many organizations now have several business- and mission-critical technologies running within their vehicles. Needs range from rider Wi-Fi in public transit and school buses to computer-aided dispatch in police cars and fire apparatuses.

Seamless failover in moving vehicles

Dual-modem cellular routers allow vehicles to simultaneously connect to two different cellular networks, providing automatic failover in any area. This redundancy is important for vehicles equipped with mission-critical applications, such as emergency response or logistics tracking. Additionally, satellite and cellular connectivity help extend network reach to remote or rural areas where traditional cellular networks may be unavailable.

SD-WAN keeps you connected on the go

Think of SD-WAN as a smart navigation system for your vehicles. It manages and directs traffic across a WAN using intelligent traffic handling and link bonding. SD-WAN improves network performance and reliability on the go by automatically selecting the best path for data and making it easier to manage and optimize your network. With SD-WAN, businesses can monitor all applications on their network and establish policies for prioritizing them. It also allows them to implement more features later on, such as forward error correction (FEC), to improve resiliency and quality of experience.

Coupled with zero trust security, using SD-WAN on top of a dual-modem router guarantees the most secure, reliable connection needed for mission-critical applications, real-time communications and sensitive data transfers between vehicles and their organizations.

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

