How LTE and 5G Wireless WAN Can Transform Fixed and Temporary Locations

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Transforming the network edge can improve business responsiveness and reach

Organizations of all types are implementing their next phase of digital transformation to enhance their competitive edge, increase agility, and move away from the restrictions of physical locations. Work is no longer just in offices, but increasingly where customers, processes, or business conditions dictate. Over the last decade, enterprise networks have evolved to keep up with the broader distribution of data, applications, and end users, but the next evolution in the wide-area network (WAN) will further distribute the network and deliver the greatest impact. The WAN edge is ripe for transformation.

The WAN edge must evolve — again

Customers are more mobile, and business locations are becoming more dynamic to adapt to changing conditions, emerging trends, and unexpected events. Information and applications are increasingly distributed across the clouds to support this mobility, and the network edge is adapting to match. *The remote edge of the enterprise WAN is where business transformation happens, so it is where network connections need to be the most flexible and powerful.* Innovative businesses have pivoted to be where customers and operations are, so they cannot be constrained by fixed networks and long timetables for wired connections.

Figure 1 — Evolving WANs: Wires were necessary for WAN connections when work and computing were confined to stable locations and the most powerful links were costly. SD-WAN drove efficiencies, leveraging the cloud and internet, but remained confined using wired WAN connections that required weeks for setup. Now, in highly distributed and changing business climates, organizations need the agility and freedom of secure, enterprise-class Wireless WAN networking to enable connectedness wherever and whenever networks are needed.
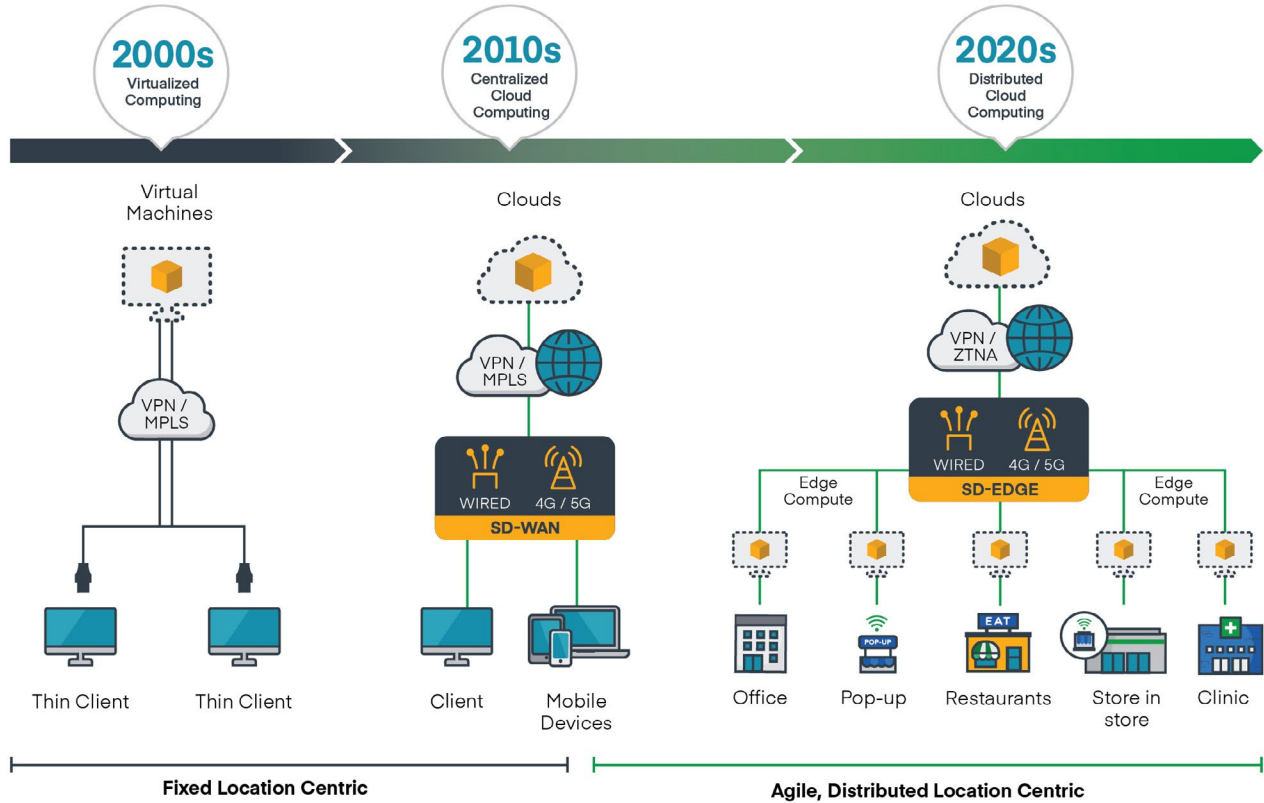

4 Foundational Elements of Wireless WAN for Fixed and Temporary Locations

Cellular wireless connections, as "anywhere networks," are helping organizations build flexible network foundations to respond to current and future operations, while still providing the necessary mix of reliability, performance, ease of scale and flexibility. This new model does not require trade-offs between enterprise-class networks, agility, and security.

Built on LTE and 5G technologies, Wireless WANs are proving to be an effective solution to respond to a wide range of business needs, from pop-up locations and day-1 connectivity to outdoor operations, parallel and IoT networks, and the growing needs of redundant, high-availability connected devices in fixed locations. In many remote locations, wireless is the only option to support enterprise-class networks. LTE and 5G empower lean IT departments to easily add agile network connections to existing networks for fast and secure access to critical data and applications.

Advanced wireless routers enable organizations to build more resilient connections, deploy and manage from anywhere, enhance branch security, and optimize network operations. This paper explores these four key foundational elements of modern Wireless WANs in fixed and temporary locations, the features that make them possible, the resulting business value, and some typical network scenarios.
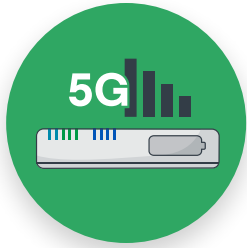
No.1
Agile, always-on, resilient connectivity

Software-defined modems and multiple carriers

Wireless technologies have evolved to deliver significantly enhanced connectivity and management. Software-defined modems enhance the ability to connect and remain connected while the cloud-based network management continuously monitors the quality and strength of the connection and makes adjustments for optimal throughput. Multi-carrier support automatically identifies the relevant carrier and authorized administrators can switch a modem to a different carrier, increasing flexibility and protecting investments. Integrated data tracking monitors cellular usage, providing alerts and failover options for plans with monthly data caps.

Business value analysis

According to research firm Nemertes, using Wireless WANs improves network availability, with 75 percent of study participants stating that wireless network availability was as good or better than with wired links. Those with at least 90 percent of their sites using Wireless WANs found that their annual downtime was reduced between 62 and 88 percent, depending on the specific use case. Using dual carriers is a strong contributor to improved reliability.

Resilient scenarios

Initially, common scenarios for adding wireless links to a branch or remote location were as a backup or bandwidth augmentation to wired links. Often, cellular is a solution for primary connections when wires won't work, because they aren't available or are cost prohibitive. However, Gigabit-Class LTE and increasing 5G coverage have encouraged more firms to use cellular as their primary connectivity, either permanently or as a day-1 solution for pop-up or temporary networks. These scenarios deliver agile networks wherever and whenever a network is needed.

Increasingly, demand for large files and video streaming away from fixed locations in industries such as construction, healthcare, retail, government, and entertainment is driving all Wireless WAN deployment using 5G as a functional replacement for fiber. Others are using the inherent flexibility and ample bandwidth of wireless to experiment with augmented reality, enhancing operational productivity and enriching customer experiences.

No.2
Intuitive deployment, visibility, and monitoring at scale

Cloud-based remote management and zero-touch deployment

Organizations have gotten more confident with the reliability and performance of Wireless WANs often using them as their primary connection, either with no wired links or with wired hybrid WANs. One of the big advantages of wireless routers is the ability to deploy them quickly, without requiring any onsite IT staff. Zero-touch deployment features make it easy to preconfigure the router, sometimes with a preinserted SIM, ship it to the desired location, and have someone local install the antennas and turn it on. No more delays for the installation of a wired link or enduring the expense of a truck roll.

Intuitive, cloud-based remote management enables network staff to securely provision, monitor, analyze, and control thousands of devices from anywhere, supplying the detailed statistics and insights necessary for optimal performance. Advanced Out-of-Band Management support via the console port means that cellular routers can be reached over the air even if the IP and Ethernet functions are not available, further increasing secure accessibility of these devices.

Business value analysis

One of the big benefits of Wireless WANs is reduced operating costs. Participants in the Nemertes study reported that their network team **shortened troubleshooting time by more than 50 percent, and could redirect almost 20 percent of the WAN staff to other issues.** The zero-touch deployment and remote management capabilities also mean that less-skilled staff could often resolve problems, freeing up more experienced team members to focus on other business-critical issues. **The cost of the links themselves is also cheaper,** with organizations saving more than 50 percent on a per-MBPS basis, on average, over the T1, DSL, and satellite links that they replaced.

Deployment scenarios

Organizations of all sizes are discovering many opportunities that benefit from the greater flexibility of Wireless WANs to ease deployment, manage at scale, establish security and networking policies, and offer operational insights. These time-saving management benefits extend to all edge devices, whether in fixed locations such as offices or stores, temporary locations such as pop-ups or parallel networks, with data-gathering IoT or fleet vehicles without requiring separate systems.
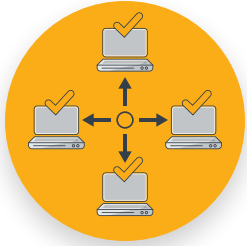
No.3
Policy-based traffic shaping

Policy-based routing and dynamic path selection

Wireless WANs often use both cellular and wired connections to establish link diversity and minimize outages in hybrid WAN scenarios. Even in cases where cellular is used as the primary link, software-defined WAN (SD-WAN) capabilities in advanced cellular routers provide the most often used and preferred functions to optimize network operations and boost performance. Policy-based routing can separate and prioritize traffic based on application, source and destination, or time of day, among other characteristics. These tools help ensure that critical traffic is not affected by, for example, generic web traffic or large but lower-priority file transfers. Wireless routers can also manage multiple distinct links, directing important applications onto the most efficient path or aggregating multiple links to handle peak times.

Business value analysis

The performance of Wireless WANs is now as good as or better than wired links. More than three-quarters of the Nemertes study participants reported that their wireless network operating characteristics of packet loss, latency, and jitter were at least equal to their previous wired statistics. In addition, two-thirds of them found their **overall throughput was improved, with an average bandwidth increase of more than five times.** There is an increasing availability of wireless data plans that allow capacity sharing among multiple sites, or don't institute overage penalties. These unlimited wireless data plans are encouraging even small and midsized organizations to cut the wires and use cellular as their primary branch connectivity. **Companies replaced low-bandwidth wired links with higher-bandwidth wireless with an average savings of 53.7%.**

Optimization scenarios

From using cellular as a backup to operating mirrored, redundant routers and links for maximum availability, Wireless WANs support a wide range of network optimization scenarios. Two interesting benefits that many organizations are discovering are the cost and time savings from managing fewer service providers. Instead of dealing with hundreds of local and regional ISPs for wired links, organizations are negotiating more advantageous terms with a few national wireless carriers. In addition to the contract savings, the resulting network has more consistent configurations and network management, reducing outages due to human error. Locations that need the highest availability can use two redundant routers, each with links to two different carriers and cell towers.

No.4
Enterprise-class security

Flexible security models and network segmentation

A sometimes overlooked advantage of Wireless WANs is the enhanced security capabilities they can bring to a store, office, or other type of location. Enterprise-class cellular routers include enterprise-grade security and flexible security models to meet most business or government requirements. They offer VPNs, application-aware firewalls, and threat management capabilities along with cloud security options to securely connect from the traffic source to the edge of the network. End-to-end encryption, automated public-key infrastructure, and cloaked private address spaces establish the equivalent of private network security over the public Internet.

Wireless WANs are also used for isolating and segmenting distinct types of traffic such as Point-of-Sale terminals, video surveillance footage, HVAC systems, and IoT devices. This facilitates clear visibility of activity and separates potential attack targets from general traffic.

Business value analysis

As organizations build confidence in the security and reliability of Wireless WANs, they are highlighting the strategic **benefits of greater network agility without sacrificing security.** Nemertes study participants emphasized that they were adopting innovative technologies in remote locations, stores, or offices because they could **connect them faster.** At the same time, they could still maintain the security they would have in a fixed office.

Security scenarios

Enhanced security capabilities are imperative for enterprise-class networking in any location to avoid potential threats and to stay compliant with security regulations. Sensitive information such as Point-of-Sale and patient data is a prime target for cybercriminals, which is why a comprehensive security stack, including easy integration with cloud security and a defined path to SASE is inherent in Wireless WAN networks.

Additionally, completely segmented and air-gapped parallel networks keep this data and the equipment that uses it separated, reducing the attack surface and mitigating the opportunities for criminals to gain access to confidential data by breaching a less secure device or application. This can be especially beneficial when deploying new devices or applications at the branch, making it easier to add something new without affecting existing security zones and protocols.

Networks are needed everywhere, and wireless is there

Wireless WAN routers featuring LTE and 5G broadband provide secure, resilient connectivity for organizations anywhere and everywhere a network is needed. Zero-touch deployment and rapid availability of wireless services help address immediate needs without compromising security and performance. From hybrid WANs to pop-up locations, day-1 connectivity, and parallel networks for new devices and services, Wireless WANs provide all the benefits of wires without the limitations.

Software-defined modems and networking capabilities protect investments and optimize traffic while building a foundation for enhanced agility and future opportunities. As the business analysis from Nemertes demonstrates, organizations that embrace new ways of networking are enabling new forms of business. When wires no longer cut it, cut the wires, and connect people, places, and things wherever they are with Cradlepoint.

- Go where wires can't
- Connect day-one
- Link temporary deployments
- Build segmented IoT networks
- Supplement bandwidth
- Scale resilient, redundant 24/7 networks
- Manage branch, mobile, and IoT networks
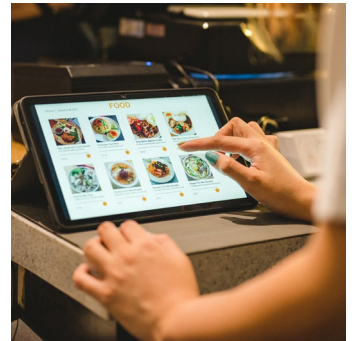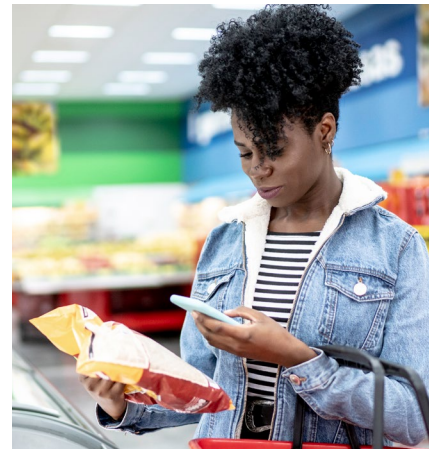
About Cradlepoint

Cradlepoint is a global leader in cloud-delivered 4G and 5G wireless network edge solutions. Cradlepoint's NetCloud™ platform and cellular routers deliver a pervasive, secure, and software-defined Wireless WAN edge to connect people, places, and things — anywhere. Many businesses and government agencies around the world, including many Global 2000 organizations and top public sector agencies, rely on Cradlepoint to keep mission-critical sites, points of commerce, field forces, vehicles, and IoT devices always connected. Cradlepoint was founded in 2006, acquired by Ericsson in 2020, and operates today as a standalone subsidiary within Ericsson's Business Area Technologies and New Businesses. Cradlepoint is headquartered in Boise, Idaho, with development centers in Silicon Valley and India and international offices in the UK and Australia.

Learn more about branch connectivity at cradlepoint.com/products/branch/