The State of **Wireless WAN** 2022

Introduction

Most organizations are using cellular broadband somewhere — and often many places — within their enterprise network. What's more, they are increasingly confident in the promise of cellular 4G and 5G, which is in a virtual tie with cable and DSL as the leading option for enterprise wide area networking (WAN) amid expectations it will experience the fastest growth over the next three years.

As they strive for more agile, secure, and resilient connectivity, organizations are no longer pondering *if* Wireless WAN will play a role, but rather how much and to what extent it will reshape their networking capabilities.

Wired cable/DSL and wireless broadband have been neck and neck in WAN deployment over the past three years, during which Cradlepoint and IDG have surveyed business, IT, and networking leaders. While cable/DSL holds a slight lead over wireless in the latest survey, the use of both types has exploded to outpace ethernet carrier services and traditional WAN technologies such as MPLS.

Over the next three years, growth for all forms of broadband will continue to accelerate, as will all forms of WAN connectivity. But the use of 4G and 5G cellular links will grow fastest, increasing by 68%, compared to 56% for cable and DSL, as organizations seek to increase bandwidth and introduce new services. Survey participants also document the dramatic increase in software-defined WAN (SD-WAN), which appears on track to exceed 90% penetration within the next two years.

These top-line findings are consistent across the five international markets in the current report, which adds Mexico and Australia to the survey base that previously included the U.S., Canada, and the U.K. More than 702 respondents, ranging from network administrators to CEOs and owners, participated in the latest survey, with 38% representing organizations of up to 999 employees, 38% in the 1,000-to-4,999 range, and 24% with workforces of more than 5,000.

Wireless WAN is emerging as organizations continue to expand its use to connect everything from branch locations to connected vehicles and Internet of Things (IoT) devices. Survey respondents are also increasingly comfortable and confident about carrier offerings, although 20%-25% express varying levels of confusion distinguishing between the capabilities of still-emerging 5G services.

Methodology

The survey included only respondents working for companies with 100 or more employees and holding a title of network or systems administrator and above. To be included, their organizations must utilize cellular WAN in any form or fashion. The participants represented a wide variety of industries, including manufacturing, financial services, retail, healthcare, and construction.
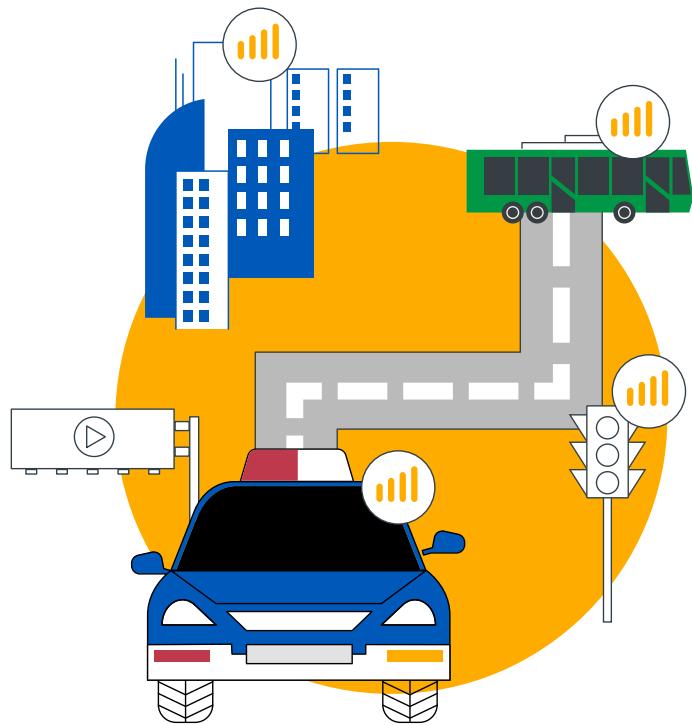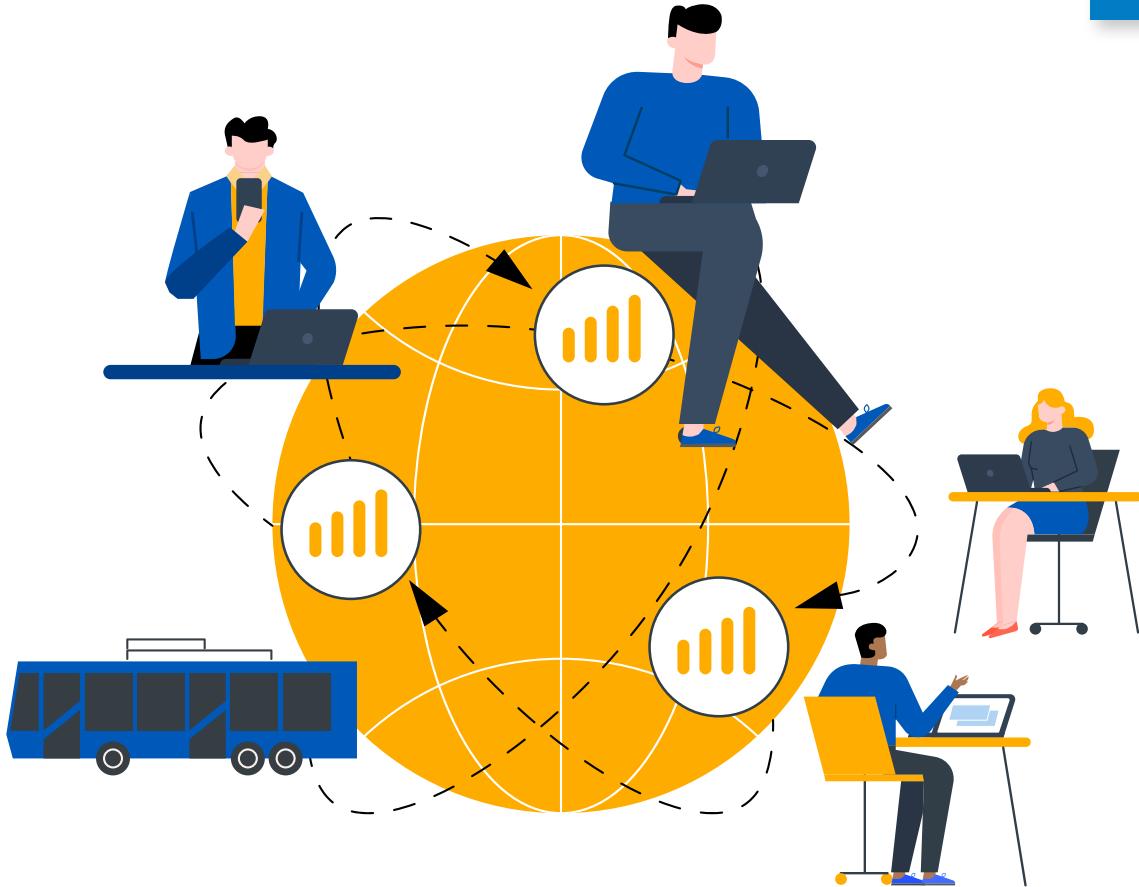
The World is on the Move

Businesses and public sector organizations rely on WANs to keep sites connected to enterprise applications vital for everyday operations. But with organizations intensely focused on agility and mobility, traditional T1, T3, and multi-protocol label switching (MPLS) services are often too rigid and costly to adapt to those changing needs, never more so than with the current reliance on remote workers. So, it should be no great surprise that wireless and wired broadband (DSL/cable) have become the dominant WAN connectivity options.

The third annual IDG/Cradlepoint survey illustrates the dramatic shift under way in WAN usage. Wireless broadband — including 4G and emerging 5G services — and wired broadband each are now in use at about two-thirds of the organizations represented in the survey. That represents an almost doubling of market penetration over the three-year span of this survey project.

Meanwhile, the use of traditional WAN links has barely budged, from 30% in 2018 to 32% in 2020. The use of T1/T3 and MPLS services is still expected to increase by half over the next three years, which can largely be explained by the need to increase bandwidth for data centers and other enterprise use cases that are dependent on existing vendor and service provider commitments. Complex network architectures that are currently employed are difficult and time-consuming to modernize, often requiring years of planning and implementation.

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Shift in wireless as primary link

Wired and wireless broadband in surveyed organizations have both grown dramatically over the past three years, with wired broadband slightly edging ahead in 2021, most likely due to the rapid disbursement of many workers to home offices where cable and DSL links were readily available. Wireless, however, is on track to become the leading option as connectivity needs increase, with surveyed organizations expecting to grow their use of 4G/5G by 68% over the next three years, compared to cable/DSL growth of 56%.

The shift to wireless options is a logical development as organizations take advantage of the technology's wide reach, nonstop reliability, and real-time agility. For many organizations, wired WAN connections can't meet the needs of today's business environments.

Half of all organizations that utilize 4G/5G connectivity are using it as the only WAN link for at least some of their branch locations, while half use the medium as a failover link or to augment wired links in those environments. Slightly more are using wireless for other needs, including connecting digital signage, other IoT devices such as sensors and cameras, and vehicles to WANs. Each of the use cases has increased by close to or more than 10% since the previous survey.

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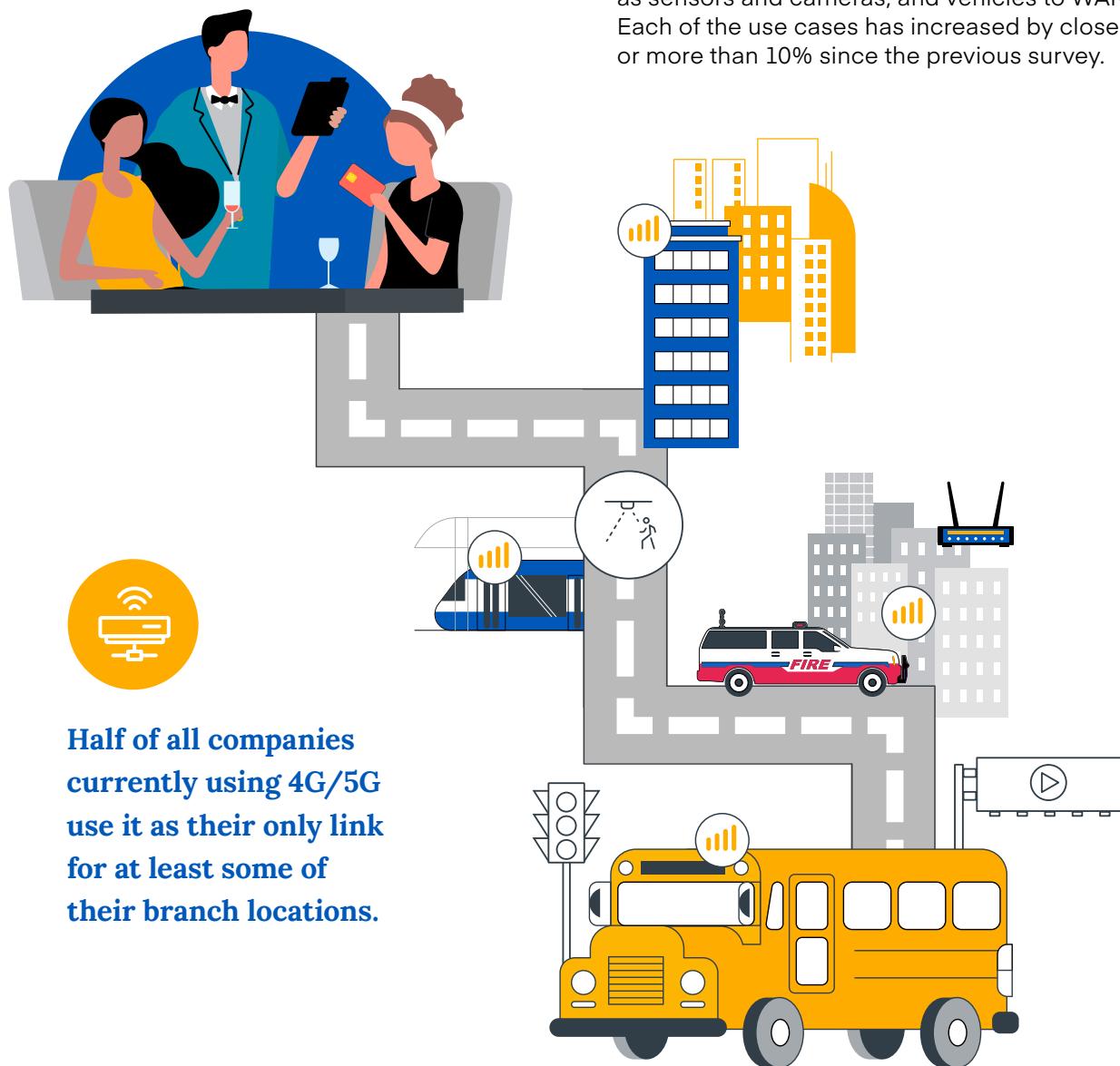
More confidence, less confusion

It is apparent that network administrators, IT leaders, and business executives are becoming more aware of and confident in the capabilities of 4G and 5G. In the past, decision-making was complicated by the often aggressive marketing campaigns of carriers trying to gain market advantage even while the needed infrastructure was still in early deployment stages.

Confidence in enhancements promised with 5G, such as reliability, low latency, and speed was at least 75%, and as much as 93%. Regarding the rollout timeline and reliability, each notched a 19% hike in confidence over the previous survey, while business benefit confidence increased to a total of 84% of survey participants.

As in all IT and network infrastructure issues, cost is a concern for slightly more than half of respondents, but that reflects a 5% decline from a year earlier. More survey respondents are focused on security and reliability issues, which is not surprising given that more and more are actually implementing, and increasingly reliant, on wireless WAN.

5G infrastructure and service availability are entering their advanced stages, so many survey respondents seem increasingly clear where 4G and 5G options can play a role in their WAN strategies. The speed, intelligence, and resiliency of next generation 5G services are expected to be a catalyst for faster Wireless WAN adoption. It will not only make today's applications better, but also enable a new generation of immersive customer experiences at the network edge (as well as more cost-effective SD-WAN 5G architectures). Larger organizations increasingly will be able to take advantage of high-speed wireless failover for critical operations and high-bandwidth applications.

In the past, some organizations making a generation switch experienced a clunky transition between 3G and 4G, with devices forced to choose between one or the other, often leading to user confusion and misunderstanding. This time around, organizations can rely on equipment capable of enabling dual 4G/5G connectivity so that decision-makers can prepare to take advantage of a 5G future today.

Dual connectivity technology enables a 4G and 5G connection to occur at the same time, with the 4G LTE network acting as an anchor band that is supplemented by 5G. When connected to a 5G modem, this technology can determine whether an LTE connection is sufficient to transmit data or if the traffic should be passed to an available stream of 5G. Another advantage for organizations is the ability to utilize SD-WAN capabilities for multi-carrier failover.

From a planning perspective, organizations can prepare themselves for the rollout of 5G while utilizing available 4G LTE networks, instead of having to make an "either/or" decision. That should make the wireless migration much simpler.

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Syncing up with wireless expands SD-WAN capabilities

Alongside wireless, organizations are lining up to take advantage of SD-WAN technology to layer in additional WAN flexibility. Just over two-thirds of survey respondents said they had already deployed SD-WAN (up 9% over the prior year survey) or planned to do so within six months (up 8%). Another 28% said they intend to deploy within the next seven months to two years, leaving just 4% who have no intent to move in this direction.

SD-WAN architecture was developed largely as an augmentation or replacement for MPLS to deliver more responsive, predictable applications at a lower cost by separating network services from applications, thus enabling the network to match the needs of the business and particularly to incorporate relatively ubiquitous and low-cost cable broadband. SD-WAN uses multiple links to establish a more reliable connection and then chooses the best path to achieve a desired outcome, including wireless 4G/5G.

Dozens of companies are providing SD-WAN solutions and managed services, offering a broad set of definitions and feature sets. The technology traditionally hinged on intelligent path selection, centralized management of policies, all-in-one design for branch simplification, zero-touch deployments, flexible VPN capabilities, and a replacement for MPLS. But usage has expanded broadly from the early days as many organizations, large and small, are taking advantage of SD-WAN capabilities to provide branch sites and remote workers with direct-to-cloud access for software-as-a-service applications, overcoming the latency of having to route traffic via network hubs.

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The popularity of SD-WAN can be attributed to its ability to monitor the network for degraded links, prioritize one type of traffic over the other, ensure application quality, compensate for errors in the network, and make decisions during outages. Cellular enables businesses to stay connected while retaining all the requirements of a wired network, including reliability, security, quality of service, and application continuity, even when the business itself is not within a traditional terrestrial fixed branch.

Connectivity to both 4G and 5G provides SD-WAN with optimal routing capabilities and built-in failover and furthermore enables a true hybrid WAN with wired broadband options. As such, it's likely to be used as the primary or mixed-use solution to connect branch locations, according to 50% of organizations that already are using 4G/5G.

With 5G's ability to handle significantly more bandwidth compared to cable, or legacy T1, WAN optimization techniques like caching, compression, and deduplication are virtually irrelevant for wireless SD-WAN links, so there's no longer a need to preserve high-quality links for only top-tier applications.

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In-vehicle network solutions pick up speed

Many organizations are also connecting vehicles via cellular broadband. Wireless WAN connectivity enables public safety agencies, transit providers, field-based organizations, and others to connect vehicles and on-board IoT to critical applications and the cloud wherever they go.

Operating across varied terrains, dense urban areas, or sprawling suburbs, in-vehicle network availability can be strong one minute and weak or lost the next — impacting connection reliability. That makes survey respondents particularly sensitive to failure, with 68% in the survey indicating their organizations need multi-carrier failover capabilities.

While the average numbers of vehicles in organizations' fleets has not changed since 2020, the number of vehicles equipped with wireless edge solutions has grown by 10%. Those numbers are going to increase further, according to 76% of those surveyed (up from 58% in the year-earlier survey).

Some of those fleets are or will employ powerful onboard devices to enable reliable video streaming and other critical applications that require reliable, high-performance connectivity that 4G/5G wireless can provide. A 5G modem embedded within an enterprise-class wireless edge router can support both 4G/Gigabit-Class LTE and 5G, ensuring that a connection is always in place. More than a third in the survey indicate they need greater bandwidth for their in-vehicle network connectivity.

Keeping up with IoT, wirelessly

Most organizations are now extending their use of Wireless WANs to connect IoT devices. The number of devices on IoT networks with cellular connectivity are growing by 10% year over year as organizations build out capabilities to take advantage of high-bandwidth, low-latency connectivity.

Among top use cases, security cameras are now connected via 4G/5G at 64% of surveyed organizations, up 6% from the previous year. Also continuing to grow are wireless-connected sensors and digital signage, each of which is now in use at more than 50% of the organizations surveyed.

An average of 247 IoT devices are connected on networks at the organizations represented in the survey, with 7% indicating they have connected 1,000 or more. The number of connections will only increase as IoT edge applications proliferate, so 5G IoT solutions will need to be highly scalable and able to accommodate inventory growth ranging from hundreds to thousands of devices.

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Wireless WAN sets the pace

5G will significantly expand how wireless broadband can be used to connect fixed locations, connected vehicles, and IoT. Dual connectivity solutions support both a 4G and 5G connection at the same time, allowing both connections to pass traffic simultaneously and ensure seamless connectivity as 5G continues to build out.

The third annual IDG/Cradlepoint survey demonstrates that organizations are accelerating their use of Wireless WANs as they gain confidence from their experiences. Many have used 4G LTE to transform WANs and edge networking and are eager to employ the flexibility and high performance of 5G solutions.

Learn more at cradlepoint.com

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