Using SD WAN to prepare for a 5G future

According to IDC, the total market for 5G systems and related network infrastructure could hit $26 billion within three years, a rise of 118 percent from 2018.[1] The GSMA, an association that represents mobile network operators, predicts 5G will become the leading mobile network technology in the United States by 2025.[2] By offering unprecedented capacity, performance and connectivity with multiple devices, 5G will enable state and local governments to reach new levels of operational efficiency and intelligence. However, many government networks are not fully prepared or optimized for 5G. Software-defined wide area networking (SD WAN)–an advanced networking approach that simplifies management by separating networking hardware from its control mechanism and integrating services into the corporate WAN–gives organizations a head start on 5G by solving immediate networking challenges while providing core components of a 5G future.

The 5G future is near

5G is the next generation of cellular network technology. With peak speeds (in the near future) of up to 10 gigabits per second, 5G will be approximately 100 times faster than today's 4G. High-capacity, high-speed bandwidth–along with 5G's unique architecture and supporting technologies–supercharge connection and data download speeds, allow applications that process extremely high volumes of data to function reliably, and enable rapid and simultaneous connectivity in high-density environments with hundreds of thousands of endpoints. In doing so, these capabilities address mobile connectivity challenges that have impeded state and local governments' wider adoption of innovations such as edge computing, extended reality, machine learning and artificial intelligence.

Industry-led innovation labs are already focused on developing 5G-based solutions for public safety and education, and use cases are showing promise in transportation, health and human services, smart cities and more. In the near-term, state and local governments will use 5G to enable real-time analytics for intelligent video (e.g., using technology to search video images for missing children) and IoT communications. Use cases will likely expand to include new functionality for drones, robotics and, eventually, fully autonomous vehicles.

Although 5G is in the early stages of adoption, momentum is growing rapidly. The four leading mobile providers in the United States are already providing mobile 5G services in select regions. Ultimately, 5G fixed-wireless services will complement (or in some locations where this service is problematic, serve as an accepted alternative to) fixed broadband connectivity. To prepare for this change, organizations need to ensure their internal infrastructures can accommodate the new capacity and functionality a 5G network can deliver.

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SD WAN: Creating a foundation for 5G

Software defined wide area networking (SD WAN) can help pave the way for a 5G future while solving existing network challenges to deliver a higher-quality user experience. At its most basic, SD WAN acts as a "traffic cop," intelligently routing data in real time as it travels over core networking components such as the internet. This flexible routing allows organizations to make the best use of their networking, computational and storage resources, and helps improve performance, availability, securityand disaster recovery.

Here are some important ways that SD WAN supports both existing processes and the transition to 5G:

Optimizes routing

SD WAN allows organizations to prioritize routes and resource delegation according to the criticality of an application. For example, an organization can use a high bandwidth, high-availability (and higher cost) circuit for voice over IP (VoIP), which is sensitive to latency and packet loss, and then dynamically route email, web browsing and other less critical applications over a lower-cost circuit. These capabilities will allow organizations to flexibly use 4G or 5G depending on the use case and the organization's desired balance of cost and quality of service. And regardless of the network being used, these capabilities help ensure the targeted levels of service for the specific application–without requiring manual adjustments for each WAN service the application touches.

Provides solid computing speed close to the edge

5G can dramatically reduce data transport times, but this benefit is lost if devices and applications don't have the computing performance to process high volumes of data quickly. SD WAN allows organizations to move computing functions to the cloud, where resources are more scalable and can be located closer to edge devices. This capability will be critical for innovations such as self-driving cars, where data from each car in a given vicinity will need to move back and forth, in real time, from the network to car sensors. Other use cases include intelligent railway systems, smart parking and high-resolution video conferencing (for example, in remote surgeries or in disaster scenarios where responders in the field and commanders at headquarters need to communicate critical information visually).

By allowing organizations to move computing functions closer to the edge, SD WAN also reduces hardware costs and energy consumption, which helps organizations achieve environmental sustainability goals.

Enables edge-to-edge security

5G splits network frequencies into slices (i.e., multiple virtual networks) that reside on a shared infrastructure. As the number of network slices and user devices increases, the number of attack vectors also grows. The upside is that 5G also allows organizations to create different security zones for different levels of security. SD WAN inherently provides an extra layer of data security for these zones by sending data through encrypted private tunnels. In addition, it enables consistent security-policy enforcement and monitoring across all these zones, devices and network slices–even as the speed and volume of data skyrocket with 5G.

Getting started with SD WAN

The following steps will help state and local government agencies get started with SD WAN and prepare for 5G.

Assess edge-device hardware and software capabilities.

Devices need to run in your current environment and be rightsized for future application needs related to performance, availability, security and more.

Understand the current application environment.

Knowing what applications are running will help you craft an application routing policy to prioritize and effectively run critical applications. Define the application-routing policy. Be sure to define appropriate thresholds for bandwidth, latency and jitter (i.e., irregular fluctuations in data traffic). If you're using multiple routing paths, include plans for reconfiguring them.

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Determine your security approach.

Work with your SD WAN vendor and IT security team to decide on the best approach to security.

Establish the quality of service (QoS) policy.

The QoS plan should support critical voice, video and ERP (enterprise resource planning) applications over land-based networks and 4G networks. It may include provisions to optimize bandwidth or reduce bandwidth requirements.

Consider vendor complexity.

Keep in mind the time, resources and coordination required to engage with all the vendors (and their help desks) that support all the services in the SDWAN deployment. When complex issues arise, how will the organization coordinate its response?

Incorporate 5G into visioning, strategy and goals.

Begin identifying potential 5G use cases specific to your unique business goals. Work toward creating an infrastructure that supports bandwidth-intensive 5G-powered applications, enterprise-level broadband, secure cloud connectivity, wireless video data capabilities and other advanced functionalities.

On the edge of the future

5G cellular technology is poised to revolutionize the way state and local government agencies fulfill their missions. While modernization and emerging technologies have provided a glimpse into technology-enabled government, 5G is an essential catalyst for real change in a world where everything is increasingly connected. Organizations can get a head start on 5G adoption by incorporating SD WAN into their existing infrastructure. Using SD WAN, they can improve current operations while also preparing to address some of the key requirements of a 5G future. With analysts predicting that more than 100 million 5G-enabled handsets will be sold in 2021, it's not too soon to start.[3]

Learn more

Find out more about SD WAN and how it can pave the way to your 5G future. Contact your Verizon account specialist or visit getsdwan.com.

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1. Marketwatch, "IDC forecasts 5G network infrastructure revenue to reach $26 billion in 2022," Nov 6, 2018.
2. GSMA, "The 5G Era in the United States," Mar 2018.
3. Deloitte, "The New Network Arrives," Dec 2018.