Unleash the Power of Fixed Wireless Access and Satellite with VMware VeloCloud SD-WAN

Remote and isolated areas need a stable WAN

Modern businesses rely on Wide Area Networks (WANs) for their success, enabling robust online presence, interconnecting stores, and enhancing customer interaction with their products. These enterprises span diverse locations, from urban centers to remote regions, relying heavily on WAN connections to link branch offices to the cloud. However, they encounter challenges in maintaining consistent connectivity, particularly in rural and isolated areas where coverage options are limited or nonexistent.

Beyond ensuring robust connectivity for branch office users, VMware VeloCloud SD-WAN plays a pivotal role in accommodating a wide array of application requirements at the edge. The VeloCloud SD-WAN solution ensures an optimal and secure connection from the edge to the cloud for:

- **Distributed edge AI**, aggregating critical data back to the cloud or data centers for centralized machine learning.
- **Edge computing applications for operational technology (OT)** deployed locally but often need access to critical components in the cloud or data center such as business intelligence, storage, and analytics.
- **Real-time streaming of video and audio** is essential for applications such as remote site monitoring, ensuring uninterrupted surveillance and operational oversight.

The infrastructure to support edge computing and edge AI needs the right compute resources and the right network resources. This requires an intelligent overlay—VeloCloud—that understands available resources and orchestrates them to the workloads when they need them.

The rise of Fixed Wireless Access networks

Fortunately, service providers have invested heavily in the wireless infrastructure, offering high-bandwidth connections through their cellular networks and Low Earth Orbit (LEO) satellites to the most remote and isolated areas. Since 2018, almost all of the U.S. and Europe and several markets in the Americas, Europe, Asia-Pacific, and the Middle East have seen 5G and satellite Fixed Wireless Access (FWA) deployments.

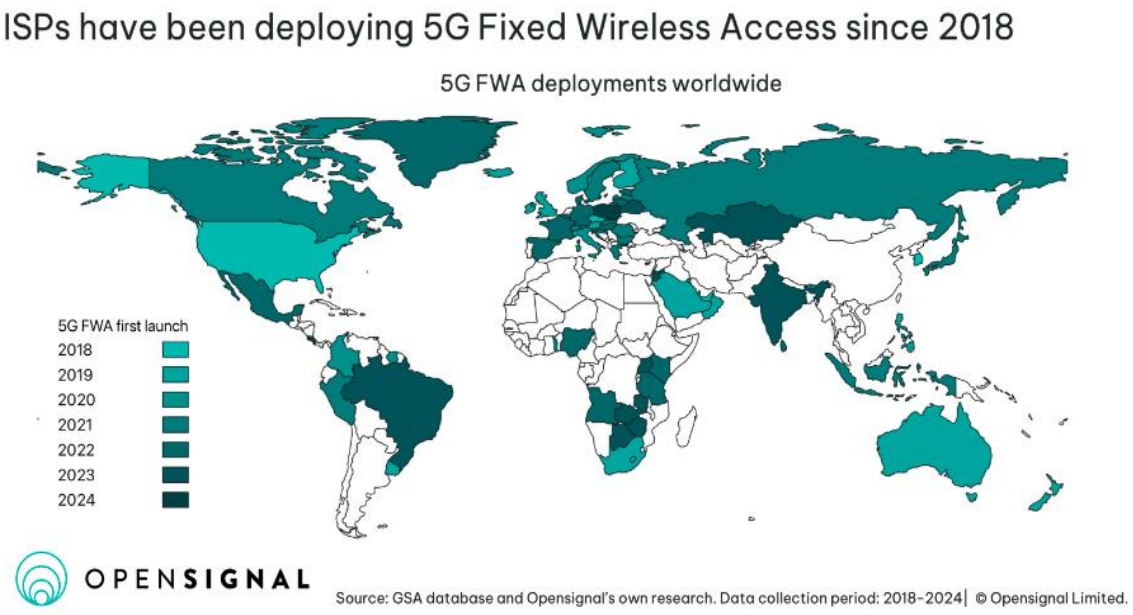

Figure 1: 5G Fixed Wireless Access worldwide deployment

Challenges of adopting FWA in the enterprise

While 5G and satellite FWA are great options for consumers, enterprises need to overcome the inherent limitations of Fixed Wireless Access and satellite to ensure optimal user experience while using applications such as voice, video, SaaS, and IaaS.

- Quality of the connection such as speed, packet drop, jitter and latency can negatively affect the application experience. Distance from the cell tower, line of sight to the satellite, and other environmental factors including trees, buildings, rain, and fog can further affect the quality of the connection.
- Costs of connections are high, and exceeding a monthly bandwidth cap may result in a slowdown of the connection speed.
- Higher average costs for deployment, including SIM card acquisition and provisioning, and onsite installation can hinder the rollout of FWA.

How VeloCloud SD-WAN helps enterprises improve FWA and satellite

VeloCloud SD-WAN customers have been transitioning from MPLS to a consumer-grade Internet. It has transformed more than 1 million consumer-grade circuits to enterprise-grade for over 60,000 customers, delivering high-performance, reliable, and secure branch access to cloud services, private data centers, and software-as-a-service (SaaS) enterprise applications. Circuits simply become better with VeloCloud SD-WAN, and the same technology also works with FWA and satellite connections.

High-quality FWA and satellite connections with VeloCloud Dynamic Multipath Optimization

Accessing real-time applications requires a solid WAN connection. VeloCloud SD-WAN enhances business-critical application performance by prioritizing them and addressing issues common in FWA connections such as packet drops, delays, and jitter, thereby improving overall application performance and reliability.

Figure 2 shows an example of Dynamic Multipath Optimization™ (DMPO) at work for 5G FWA. The standard 5G/4G-LTE connection experienced high loss and jitter that significantly impacted user experience for both voice and video. With DMPO applying circuit remediation techniques, DMPO remediation increases usable link up to 90% on FWA links.

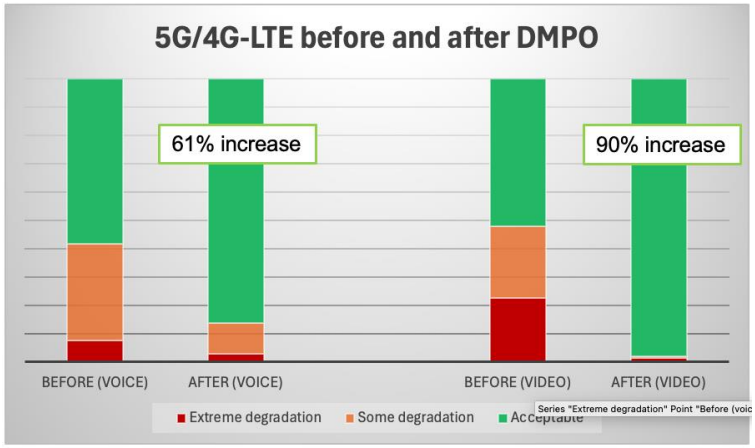

Figure 2: Link quality improvement with VeloCloud DMPO for 5G FWA

Similarly, for LEO satellite connections, DMPO can also apply link remediation techniques to improve the link quality for both voice and video, increasing the usable satellite link up to 650%, as shown in Figure 3.

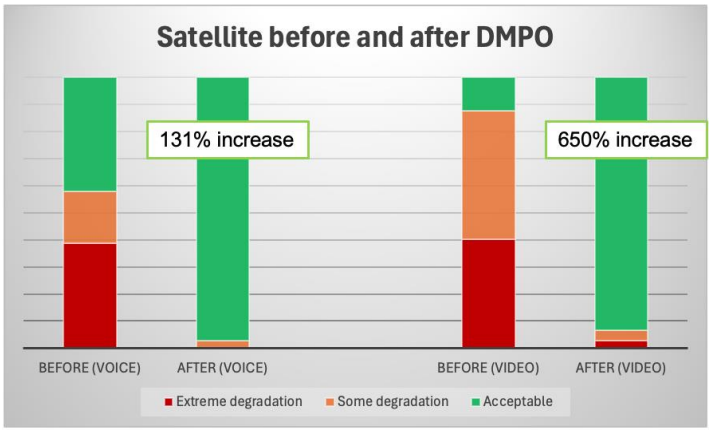

Figure 3: Link quality improvement with VeloCloud DMPO for LEO satellites FWA

Controlling applications that can go over FWA connections to save bandwidth

To optimize bandwidth usage, VeloCloud SD-WAN identifies non-business critical applications and either de-prioritizes or blocks them, conserving valuable bandwidth. VeloCloud SD-WAN, by default, identifies and classifies over 4,000 applications into business policies and can be configured to block non-essential apps to ensure they do not consume limited bandwidth.

Rapid rollout to remote locations with zero-touch provisioning and built-in SIM cards

Setting up branch location connectivity can be a daunting task, especially when those locations are in remote areas. VMware VeloCloud SD-WAN simplifies the deployment of VMware VeloCloud SD-WAN Edge devices for both 5G and satellite FWA:

- The VeloCloud 5G Edge portfolio is tailor-made for cellular connectivity scenarios. The Edge 710-5G features dual physical SIM and eSIM support for 5G/LTE, along with SIM failover support, and backward compatibility with 3G and 4G technologies.
- Pre-activated eSIMs with select carriers are ready to go straight out of the factory, eliminating the need for customers to acquire, install, and manage these activations, saving valuable time.
- Zero-touch provisioning streamlines the process by shipping a VeloCloud Edge to the site with 5G connectivity already activated, enabling sites to be operational in mere minutes without the need for onsite IT support.

Troubleshooting VeloCloud SD-WAN with telemetry from the FWA layer

VMware provides the underlying infrastructure required by service providers as they roll out FWA services. A wealth of information is available in the transport layer including congestion, packet drop, signal strength and degradation. Advanced applications are being developed to acquire underlay performance metrics from 5G core/RAN to assist VeloCloud SD-WAN in troubleshooting the network and to augment VeloCloud DMPO for an even better cloud application experience.

Programming the underlay and service level agreements

VMware also provides service provider customers with RAN Intelligent Controller (RIC), which is used to analyze and optimize 5G coverage for FWA services to ensure that optimum quality is provided to enterprise customers. It can assess the quality of wireless coverage in a given service area to determine how many FWA customers can be supported and at what levels of quality, typical in a service level agreement (SLA). More advanced applications are being developed that can optimize coverage for specific customers to deliver guaranteed SLAs. VeloCloud SD-WAN can then signal the FWA layer through either an API or RIC to get the best treatment for their applications across the service provider network.

VMware VeloCloud SD-WAN has provided optimized and secured connectivity infrastructure to over 20,000 customers and 630,000 sites across all continents, with DMPO running on millions of circuits including MPLS, dedicated, broadband, and fiber.

You can now add FWA and satellite connections to the list, so that organizations can accomplish their business goals in even the most remote locations.

For more information about VMware VeloCloud SD-WAN, visit vmware.com/products/sd-wan.

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