

May 2020

# COVID-19 Highlights the Business Case for Extending SD-WAN to Remote Workers

Frost & Sullivan Analysis by  
Roopashree Honnachari

**Business Communication Services (BCS)**

Volume 14, Number 1

*Excerpt Prepared for VMware  
(original publication date April 2020)*



Frost & Sullivan reports are limited edition publications containing valuable market information provided to a select group of customers in response to orders. Our customers acknowledge, when ordering, that Frost & Sullivan reports are for our customers' internal use and not for general publication or disclosure to third parties.

No part of this report may be given, lent, resold, or disclosed to non-customers without written permission. Furthermore, no part may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the permission of the publisher.

For information regarding permission, write:

Frost & Sullivan  
3211 Scott Blvd  
Santa Clara CA 95054  
United States

# COVID-19 Highlights the Business Case for Extending SD-WAN to Remote Workers

## Table of Contents

<b>Introduction</b> .....	<b>4</b>
<b>How SD-WAN Facilitates Remote Working</b> .....	<b>5</b>
<i>Ability to Prioritize Business Traffic</i> .....	<i>5</i>
<i>Superior Performance for Communication &amp; Collaboration Applications</i> .....	<i>6</i>
<i>Optimized Connectivity to Cloud-based Applications</i> .....	<i>6</i>
<b>Vertical-specific Applicability of SD-WAN for Remote Workers</b> .....	<b>7</b>
<i>Technology Industry</i> .....	<i>7</i>
<i>Healthcare</i> .....	<i>7</i>
<i>Contact Centers</i> .....	<i>7</i>
<i>Education</i> .....	<i>8</i>
<b>VMware SD-WAN: Cloud-scale Gateways to Support Remote Workers</b> .....	<b>8</b>
<b>The Last Word</b> .....	<b>10</b>
<i>Opportunities for Cloud and Network Service Providers</i> .....	<i>10</i>

# COVID-19 Highlights the Business Case for Extending SD-WAN to Remote Workers

## Introduction

Remote working or Work-From-Home (WFH) has been a growing trend in the past decade. While the tech industry has led the way for embracing part-time and full-time remote working, a wide range of businesses that rely on knowledge workers has adopted remote working for flexibility, productivity and harnessing the best talent from across the world.

- According to the U.S. Bureau of Labor Statistics, 26 million Americans—about 16% of the total workforce—now work remotely at least part of the time.<sup>1</sup>
- In its 2020 State of Remote Work report, Buffer Inc. surveyed 3500 remote workers, 98% of whom stated they would like to work remotely, at least some of the time, for the rest of their careers.<sup>2</sup>
- The Society for Human Resource Management (SHRM) found a threefold increase in the number of companies offering remote work options between 1996 and 2016.

The COVID-19 pandemic that has forced governments across the globe to order citizens to stay at home and follow physical isolation has further highlighted the benefits of remote working. Thanks to cloud and advances in networking technology, much of the global workforce (wherever applicable) is able to continue doing its work from a remote site. With businesses across industries embracing the public cloud to host key applications, and with advances in residential broadband and wireless speeds, remote workers can access most enterprise applications from home. However, as remote workers compete for bandwidth with kids attending virtual classrooms and others at home trying to stream entertainment videos, optimizing and prioritizing business applications on home networks has become critical during the current crisis.

Software-defined WAN (SD-WAN) technology is helping businesses optimize their branch site connectivity.<sup>3</sup> SD-WAN solutions leverage real-time performance monitoring of transport networks to make application-aware, policy-based network link selection and steer traffic over the best available link. In scenarios that rely on a single network link and where sufficient bandwidth is not available to support all applications, SD-WAN technology optimizes the available bandwidth by:

- giving higher priority to business traffic compared to social media, YouTube, and Netflix traffic
- continuously monitoring the traffic path for packet loss and delay, and applying forward error correction to reduce packet loss and increase throughput
- using traffic-handling techniques to steer application traffic over multiple links

---

<sup>1</sup> [https://www.bls.gov/news.release/atus.t06.htm#tus\\_tu\\_nr6.f.3](https://www.bls.gov/news.release/atus.t06.htm#tus_tu_nr6.f.3)

<sup>2</sup> <https://lp.buffer.com/state-of-remote-work-2020>

<sup>3</sup> An SD-WAN architecture uses SDN principles to separate the data plane from the control plane in the WAN. It abstracts the underlying transport networks (MPLS, Ethernet, wireless, satellite); and shifts control intelligence from customer premises equipment (CPE) or edge devices into a centralized, software-based controller. A graphical user interface (GUI)-based management platform enables network administrators to define application-specific business policies, which the controller translates into routing policies enforced in the edge devices.

These advanced features ensure that the WAN is always available and delivers superior performance to support critical enterprise applications. With the rapid increase in remote workers, and the fact that these employees are accessing the same enterprise applications as office-based workers, there is an emerging business case to be made for extending SD-WAN deployments to include work-from-home employees.

## **How SD-WAN Facilitates Remote Working**

SD-WAN architectures, with multiple dedicated high-speed links, ensure superior performance, resiliency and business continuity for employees to access their applications. With SD-WAN, companies are now able to take advantage of Internet, wireless and satellite links, alongside private network services, to deliver superior performance, while also saving network costs by eliminating the reliance on private-only WAN services. Considering that remote workers are often dependent on a single residential broadband link at their home, SD-WAN can bring tremendous value to users by optimizing the link through continuous monitoring and congestion mitigation features. SD-WAN solutions provide private network reliability and security over residential broadband links while providing a direct, optimized connectivity to the cloud. This is different from the traditional VPN based access, which requires backhauling traffic to corporate data center, thus adding unnecessary delays, and reduced application performance for users accessing cloud-based applications. Additionally, users with company-provided mobile devices can add their wireless 4G/LTE links to their home network and use SD-WAN to aggregate available bandwidth and provide resiliency over multiple links. Furthermore, any novice user at home can easily install an SD-WAN edge device, with the ability for the IT administrator to provision and manage the device remotely.

### ***Ability to Prioritize Business Traffic***

Residential broadband speeds have evolved considerably in the past decade from copper-based DSL links offering download speeds between 5-35 Mbps, to hybrid fiber coaxial (HFC) or 100% fiber-based download speeds ranging from 10 Mbps to 1 Gbps. According to the FCC, as of year-end 2017, approximately 304 million Americans, or 93.4% of the population, are covered by both 25 Mbps/3 Mbps fixed terrestrial service and mobile LTE with a minimum advertised speed of 5 Mbps/1 Mbps.<sup>4</sup>

While the residential broadband speeds have increased, so has the consumption of over-the-top video services by consumers. If other household members are streaming video on Netflix, Hulu or YouTube, or accessing gaming applications, the remote worker is competing for bandwidth with recreational applications, which can negatively influence the worker's productivity. For example, if a remote worker is trying to access a virtual desktop application, the experience must be seamless, as though the applications reside on the local device, with minimal delay in response times. By extending SD-WAN to remote worker locations, network administrators can apply policies for the remote location to prioritize business critical applications over other applications. This means that the user trying to access VMware Horizon virtual desktop or Office 365 applications will always get priority over a user trying to stream video on Netflix.

---

<sup>4</sup> <https://docs.fcc.gov/public/attachments/FCC-19-44A1.pdf>

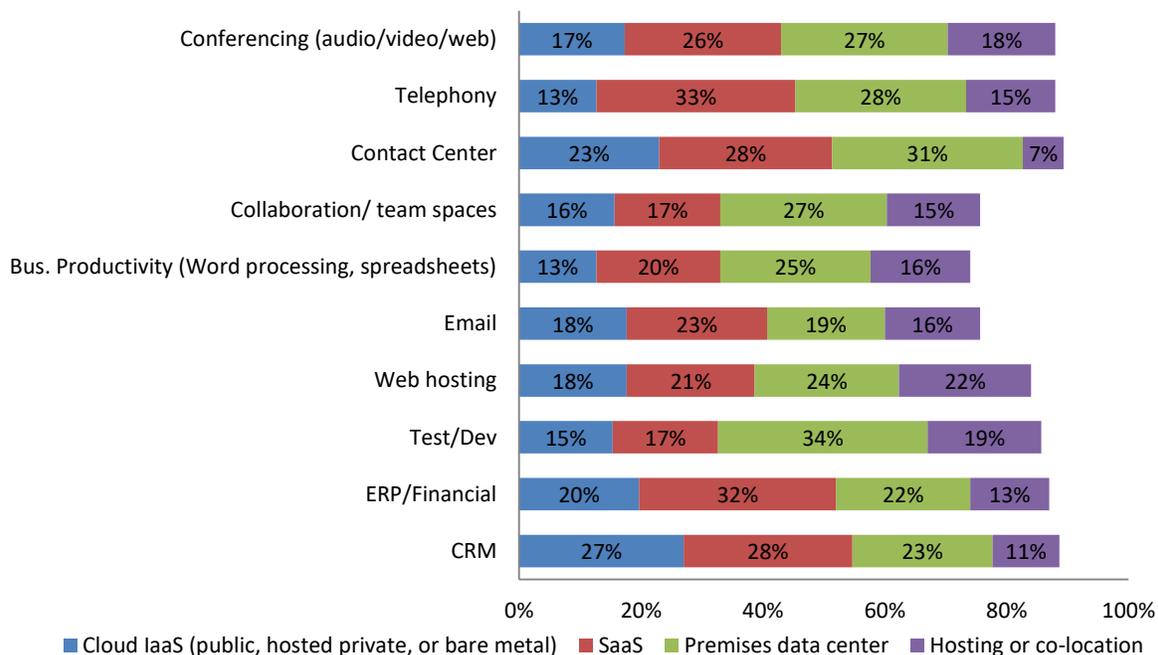
### Superior Performance for Communication & Collaboration Applications

IP-based voice and collaboration solutions are widely adopted by businesses across segments and vertical markets. According to recent Frost & Sullivan research on the North American Hosted IP telephony and Unified Communications as a Service (UCaaS) market, the total installed base of users was about 30 million in 2019 and is expected to grow to 76 million by 2025. While it is easy to configure business networks to prioritize and deliver high quality of service for real-time applications, it's a challenge to ensure remote workers have the same reliability and user experience for audio, video, and web conferencing; messaging; and content sharing. The unpredictability of residential Internet services, resulting in even few seconds of delay or packet loss, can be frustrating when accessing collaboration applications like Microsoft Teams, Zoom or Webex. SD-WAN technology uses features like path conditioning to continuously monitor the link for packet loss and delays, thus enabling superior performance for real-time applications.

### Optimized Connectivity to Cloud-based Applications

Cloud computing has revolutionized enterprise IT architecture. The 2019 Frost & Sullivan Global Cloud Survey results indicate that currently, nearly 60% of enterprises are using public cloud Infrastructure as a Service (IaaS), and 37% of enterprises are using a hybrid cloud.<sup>5</sup> On average, businesses run 14 applications in the cloud, across all deployment models.

**Exhibit 1: Deployment Models for Commonly Used Business Applications**



Source: 2019 Frost & Sullivan Cloud User Survey

<sup>5</sup> Frost & Sullivan defines hybrid cloud as any combination of cloud, hosting and private data center resources that are managed and controlled as a single pool of resources to run a workload. In a hybrid cloud, workloads generally can operate seamlessly across environments; for example, applications may burst across environments, or workload components may be hosted in different environments.

SD-WAN technology improves throughput on residential broadband networks by using features like forward error correction to provide better application experiences on lower-quality connections. Network administrators can define centralized policies to ensure the link delivers the necessary quality of service (among available options) for each application when remote employees are accessing enterprise applications.

## Vertical-specific Applicability of SD-WAN for Remote Workers

The value of SD-WAN for remote workers or the small office home office (SOHO) market segment existed before the COVID-19 crisis. However, the pandemic has highlighted the power of cloud and connectivity to ensure business continuity for the global workforce (wherever applicable) through remote working. The following are examples of verticals that hold potential for extensibility of SD-WAN to remote workers.

### *Technology Industry*

The technology industry has been a long-time adopter of remote working with large companies enabling their employees to work from home at least partly (a few days a week or a few hours in a day). The increased penetration of cloud-based applications has further facilitated seamless working for remote employees. Test and development applications rank among the top 10 applications organizations have moved to the cloud. During times when critical employees cannot be in the office location—whether due to a crisis like COVID-19 or a hurricane, or due to personal reasons—developers can continue to work on their applications to ensure continuity of business.

### *Healthcare*

The healthcare industry has used telemedicine to extend care-giving to patients remotely through audio and video conferencing tools.<sup>6</sup> By enabling remote working for doctors and nurses, large hospital systems can supplement their staff in an emergency. In the COVID-19 crisis, hospitals have responded to a surge in demand by revising their screening processes; for example, people wanting to get tested first complete an online survey, after which a doctor evaluates their symptoms through phone and/or video conference before directing the person to a testing center.<sup>7</sup> By enabling remote working for doctors and nurses, the healthcare industry can mobilize a large number of resources in a short amount of time. Furthermore, SD-WAN can get mobile testing centers up and running in hours, using 4G/LTE or satellite links.

### *Contact Centers*

The contact center industry has long supplemented its on-site agents by tapping into a large pool of stay-at-home moms who prefer to work from home and work flexible hours. The role of contact center agents is even more critical for state and local government agencies and healthcare facilities during emergencies—such as a hurricane, or a tornado, or the current COVID-19 crisis when there is a shelter-in-place order—as they are inundated with people calling to seek information or assistance. With hosted and cloud-based contact center solutions gaining traction, it is possible for agents to work remotely by accessing the resources hosted in cloud to ensure continuity of

---

<sup>6</sup> Telemedicine is the practice of medicine using technology to deliver care at a distance. A physician in one location uses a telecommunications infrastructure to deliver care to a patient at a distant site.

<sup>7</sup> <https://health.ucsd.edu/coronavirus/Pages/covid-19-nurse-line.aspx>

operations. SD-WAN for remote, home-based workers can ensure predictable performance on broadband and/or mobile links to support business continuity.

### **Education**

As the education vertical (consisting of K-12 and Higher Education) rapidly shifts to a virtual model in the face of COVID-19, enabling teachers to work remotely has become more critical than ever. While some niches within the education vertical have long embraced distance learning, the entire education community implementing and utilizing it at the same time is unheard of. Schools and colleges in the US and other hard-hit countries are implementing virtual classrooms using audio and video conferencing solutions such as Zoom, offering online curricula to students. The ability to host large volumes of content in the cloud (e.g., school coursework, lectures, assignments and e-books), which students can access via broadband, has made distance learning possible. However, for teachers trying to upload large amounts of content to the cloud and conduct web video conferencing, the unpredictability of broadband links can be a challenge. SD-WAN can optimize broadband links for better voice and video connectivity.

### **VMware SD-WAN: Cloud-scale Gateways to Support Remote Workers**

VMware SD-WAN is a WAN edge services platform, providing enterprise branch users with optimal, reliable, secure and automated access to applications in data centers and in the cloud. An extension of this offer, wherein existing and new customers can procure and ship SD-WAN edge devices to their remote workers' homes, holds potential.<sup>8</sup>

VMware's scalable Network of Clouds architecture enables the company to offer SD-WAN for Home. The Network of Clouds architecture consists of global distributed Cloud Gateways that route application traffic on performance-optimized paths to end destinations—such as the enterprise's data center or a cloud data center. Over 2000 VMware SD-WAN Gateways are hosted in 100+ points of presence (PoPs), and deployed and/or integrated with platforms from a rich ecosystem of technology, cloud, and service partners, including:

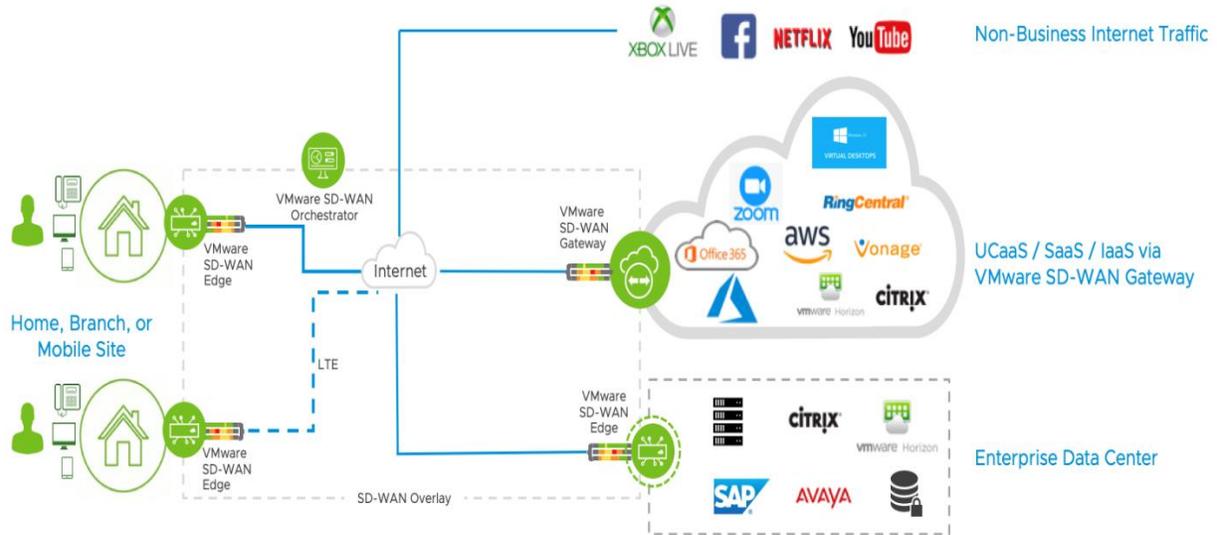
- Leading IaaS clouds (for example, Azure, AWS)
- Software as a Service (SaaS) clouds (for example, Microsoft Office 365, Zoom Meeting, UCaaS from providers such as Vonage and RingCentral)
- Security clouds (for example, CheckPoint, Zscaler, Menlo Security, Netskope, and more)
- Telco clouds (for example, AT&T MPLS PoPs)
- Network exchanges (for example, Equinix)

The global footprint of Cloud Gateways hosted in the PoPs of diverse partners ensures that business users, no matter where they are and what applications they are trying to access, are just a Gateway away from optimized connectivity. VMware's SD-WAN Dynamic Multi-Path Optimization (DMPO), which steers traffic over multiple links, along with its Cloud Gateways, delivers this optimized connectivity and assured application performance for work-from-home users over a congested last mile network.

---

<sup>8</sup> <https://www.velocloud.com/solutions/business-continuity>

**Exhibit 2: VMware SD-WAN for Home Architecture**



Source: VMware

Furthermore, with VMware SD-WAN, businesses easily consume the solution as a service through a subscription model. The Gateways are automatically assigned, synchronized with VMware SD-WAN Edge policies, and automatically scaled out, once instantiated.

VMware SD-WAN also allows remote users to initiate and complete home network deployments through Zero Touch Provisioning with no IT support onsite or online.

Finally, VMware SD-WAN Edge devices also use automated service chaining to connect to the security solutions of their cloud security partners, ensuring remote workers can securely connect to their enterprise applications.

## Frost & Sullivan The Last Word

Although technology tools have existed in the market for some time to support remote working, few employers have had to deal with large chunks of their workforce being remote.

Cloud and SD-WAN technologies together will change that thinking in an irreversible manner. The software-defined architecture of cloud and networks enable companies to put applications closer to the user, resulting in improved application availability and performance than possible with traditional inflexible, hardware-centric networking architectures.

### ***Opportunities for Cloud and Network Service Providers***

- Frost & Sullivan expects businesses to embrace cloud for a broader set of their enterprise applications. If not for cloud-hosted applications, the current work-from-home situation would require all employees working remotely to connect to enterprise data centers, which would not be able to keep pace with the demand.
- The global managed SD-WAN market has seen year-over-year growth of 50% or more for the last 3 years, with 2019 revenues predicted to surpass \$1.5 billion. Even with that kind of growth, vendors and service providers never expected remote workers to represent potential for SD-WAN deployment. That will be changing soon. Network service providers with business, residential and wireless services should consider bundling broadband and/or wireless links with SD-WAN for remote employees.
- SD-WAN vendors should start considering residential ISPs and cable providers as partners to package lightweight SD-WAN appliances with broadband links to enhance the user experience for streaming video or gaming applications.

Remote working is here to stay and COVID-19 has pushed employers, irrespective of their company size or the vertical they represent, to find ways to support remote working. The lessons learned during these times will change how businesses look at remote working in the future, and the communications industry is ready to support it.

### ***Roopashree Honnachari***

Industry Director – Business Communication Services

Frost & Sullivan

[roopashree@frost.com](mailto:roopashree@frost.com)

### **About Frost & Sullivan**

Frost & Sullivan, the Growth Partnership Company, works in collaboration with clients to leverage visionary innovation that addresses the global challenges and related growth opportunities that will make or break today's market participants. For more than 50 years, we have been developing growth strategies for the Global 1000, emerging businesses, the public sector and the investment community. Is your organization prepared for the next profound wave of industry convergence, disruptive technologies, increasing competitive intensity, Mega Trends, breakthrough best practices, changing customer dynamics and emerging economies? For more information about Frost & Sullivan's Growth Partnership Services, visit <http://www.frost.com>.

### **CONTACT US**

For more information, visit [www.frost.com](http://www.frost.com), dial 877-463-7678, or email [inquiries@frost.com](mailto:inquiries@frost.com).