

# Get High Performance for VMware Horizon Using VMware SD-WAN



## KEY TAKEAWAY

When companies provide employees anytime, anywhere access to necessary applications, employees reported a 17% savings in time, ultimately freeing them to focus on more important tasks.<sup>1</sup>

## Application delivery is changing and the network needs to change

Enterprise organizations are going through a digital transformation and the modern workplace is evolving. Organizations are using new applications to manage business processes. These applications are hosted in more locations—not just in the corporate data center—but in multiple clouds and as software as a service (SaaS). Additionally, the concept of a workplace perimeter is changing, as employees require more flexibility in where they work and on which devices they work. Businesses are empowering employees to work from anywhere, anytime and a seamless user experience throughout the workday is a must.

The digital workspace has emerged to address these evolving employee needs. It represents a fundamental shift in the way IT delivers end user services. In this model, IT delivers the apps and data employees need to work across any device, in any location. The digital workspace is made possible through an enterprise's transition to a software-defined infrastructure. Using cloud-based management technologies, digital workspace solutions deliver self-service, out of the box experiences that scale across platforms, locations, and device ownership models.

The benefits of moving to a digital workspace are well documented. A Forbes study found when companies provide employees anytime, anywhere access to necessary applications, employees reported a 17 percent savings in time, ultimately freeing them to focus on more important tasks, improving personal productivity and thus making their firm a more desirable place to work in the eyes of employees.<sup>1</sup>

Studies confirm a significant return on investment (ROI) for application virtualization systems, with substantial time and cost savings, improved productivity, as well as benefits for both the business and IT. For example, a study by Forrester found that IT admins are expected to reduce work time required to deliver applications to users by 92 percent. Frontline support calls for security and management are expected to reduce 10 percent and tier 2 escalations by 46 percent.<sup>2</sup>

As part of the digital workspace, organizations are using virtualized applications and virtualized desktops to deliver applications more effectively to their employees. They are also using platforms to host and manage applications, such as VMware Workspace ONE. With virtualized delivery of applications, anytime and anywhere is the goal.

1. Forbes – Impact of Digital Workforce

2. Forrester Total Economic Impact™ (TEI) Study: Workspace One Simplifies IT

“The four biggest challenges in adopting public cloud desktop as a service (DaaS) and application remoting as a service are cost (23.20%), trust (11.51%), creating a positive business case (11.34%) and performance (11.34%).”<sup>3</sup>

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Supporting all applications: mobile, cloud-based, web-based, tasked-based, Windows legacy and so on, is a must. Making applications highly accessible is crucial in boosting employee performance and productivity. Employee experience is the heart of the digital workspace. IT must focus on providing an effective user experience across any device or location. There is no way around it—if the user experience is subpar—productivity will decline.

The digital workspace is delivered over the wide area network (WAN), which can impact performance due to congestion, limited bandwidth, poor security and a lack of visibility into conditions on the network. The question is, how do you deliver the best possible digital workspace to your employees without compromising on performance and security? The answer is VMware SD-WAN™ by VeloCloud®.

### How the WAN impacts performance for virtualized desktops

The benefits of application and desktop virtualization will be lost if poor application performance causes a poor user experience. This can happen when virtual applications and desktops are delivered across a WAN that suffers from limited bandwidth or poor connectivity performance.

VMware SD-WAN provides performance and reliability for virtualized applications and desktops by overcoming network impediments that impact the performance of these applications across the WAN. VMware SD-WAN can overcome the negative impact of latency, packet loss, and bandwidth limitations that cause virtualized applications and desktops to perform poorly or become unreliable across the WAN.

In the report “VDI Like a Pro—End User Computing State of the Union 2019” when asked what the biggest challenges were in adopting public Cloud Remote Desktop and Remote Application services respondents cited performance as one of the top four challenges. “The four biggest challenges in adopting public cloud desktop as a service (DaaS) and application remoting as a service are cost (23.20 percent), trust (11.51 percent), creating a positive business case (11.34 percent) and performance (11.34 percent).”<sup>3</sup>

### Issues with running virtual apps and desktops over the WAN

#### Network congestion

Packet loss is often a big contributor to poor performance of virtual applications and desktops over the WAN. Packet loss can occur on shared network infrastructures, such as Multiprotocol Label Switching (MPLS) links and IP virtual private networks (VPNs), due to network congestion or out of order delivery, as packets are routed on different paths.

Research by VMware found that packet loss in traditional enterprise WANs varied up to 12.5 percent over 24 hours. The performance impact of packet loss is high: During a file transfer with 0.5 percent packet loss, Transmission Control Protocol (TCP) throughput drops from 10 megabits per second (Mbps) to 1 Mbps. For real time traffic, the mean opinion score (MOS) drops from 4.5 to 2.5. (MOS scores range from 1 [unacceptable] to 5 [excellent].)<sup>4</sup>

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3. VDI Like a Pro – End User Computing State of the Union 2019

4. VMware VeloCloud Internet Quality Report

### KEY TAKEAWAY

Packet loss can turn a 200-millisecond round trip into a 1-second delay. To end users, the virtual application or desktop seems unresponsive when packets are lost and subsequently retransmitted. They start to hit the keys again on their client machine, which compounds the problem by sending even more data across an already congested WAN.

When loss occurs, packets must be retransmitted across the WAN, which can add considerable latency. For example, packet loss can turn a 200-millisecond round trip into a 1-second delay. To end users, the virtual application or desktop seems unresponsive when packets are lost and subsequently retransmitted. They start to hit the keys again on their client machine, which compounds the problem by sending even more data across an already congested WAN.

### High latency

Some WAN links will have higher latency than others due to less optimal routing over more hops. Being able to detect link performance and steer traffic to the better performing links is critical.

### Insufficient bandwidth

WAN bandwidth limitations can negatively impact the performance of a virtual application or desktop. Network bandwidth is an especially important consideration for WAN links. If WAN links cannot provide the bandwidth for a virtual desktop infrastructure (VDI) environment, application performance will suffer and the user experience will be poor. Although virtualized applications are efficient with bandwidth, large file transfers and print jobs can consume significant WAN bandwidth. To compound matters, many branch and remote offices are linked to the data center and the cloud over low bandwidth private lines. To address this issue, organizations are looking for ways to utilize bandwidth rich Internet while ensuring performance and security.

### Network link failure

With virtualization, the connection between a branch office and the data center is essential for providing streamlined access to the application. If that connection is lost, productivity will suffer as access to the applications will end. Enterprises generally minimize this risk by using expensive private circuits such as MPLS, with service level agreements (SLAs), and often pay for backup connections. But MPLS connections can fail or degrade and SLAs don't cover the cost of downtime. Waiting for traffic to be rerouted to the backup connection can disrupt the virtual session and force users to reconnect—causing frustration and calls to the support desk.

## Improve VMware Horizon performance over the WAN

Organizations that use VMware Horizon services should be especially interested in VMware SD-WAN, since it provides significant benefits to virtualized applications and desktops.

In their report, “VDI and DaaS Demand the Enterprise Architects Rethink Their Network Architectures”, Gartner says that “Customers deploying VDI and DaaS should consider deploying SD-WAN to increase useful capacity and resilience.”<sup>5</sup> Gartner specifically calls out the WAN as a key part in virtual application delivery, but it also matters to voice quality, video quality, and other applications. Real time applications such as voice, video and VDI are the ones that are most impacted by WAN quality and require a low latency, low loss connection.

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5. VDI and DaaS Demand the Enterprise Architects Rethink Their Network Architectures

#### THE VMWARE SD-WAN SOLUTION IS BUILT ON THREE COMPONENTS:

- The **VMware SD-WAN Edge** sits at your branch office locations. It provides WAN connectivity and applies application policies to ensure application performance over the WAN.
- The **VMware SD-WAN Orchestrator** is a cloud-hosted centralized management system. You don't have to install it—you just connect to it. VMware SD-WAN Edge devices are configured by the VMware SD-WAN Orchestrator.
- **VMware SD-WAN Gateways** are hosted in PoPs around the world. Traffic is sent to the VMware SD-WAN Gateways and they route it to the final destination, which might be your data center or a cloud provider, like AWS, or Azure.

VMware Horizon is one of the 3,000+ applications that the VMware SD-WAN deep application recognition feature can recognize. It recognizes VMware Horizon traffic and applies a specific policy to it, such as priority, network service link steering, and service class. The benefit of this feature is that VMware SD-WAN can ensure always-on availability of the VMware Horizon application, for the best possible end user experience. It can also provide insights into the delivery of the application across the WAN, which will help with network performance tuning and troubleshooting.

A single vendor approach using VMware SD-WAN with VMware Horizon will improve performance and problem resolution. By using VMware SD-WAN with VMware Horizon, organizations can expect the following benefits:

- Always-on access to the virtualized app/desktops delivered from the data center through traffic steering from one WAN link to another.
- A better user experience by prioritizing VMware Horizon traffic above lower priority applications, as well as the ability to bond WAN links.
- Insights into the delivery of the application across the WAN for improved troubleshooting.
- The ability to expand WAN bandwidth for virtualized apps/desktops cost effectively by allowing all WAN links to be used simultaneously.
- Security via a built-in firewall, third party next generation firewall (NGFW) options, policy-based traffic steering, and strong encryption.

### The VMware SD-WAN solution

#### VMware SD-WAN Edge

A VMware SD-WAN deployment starts with placing a VMware SD-WAN Edge device at each location, such as a branch office and a data center. The VMware SD-WAN Edge connects your sites to the WAN, the Internet, and your applications—in data centers or hosted in the cloud.

The VMware SD-WAN Edge devices and the VMware SD-WAN Gateways communicate with each other to deliver optimization between them. These devices are auto-configured so they're quick and easy to install. Your cost to deploy VMware SD-WAN Edge devices will be much lower than with a typical router that must be configured manually device by device and it can replace the router, simplifying branch office deployments.

#### The VMware SD-WAN Orchestrator

The VMware SD-WAN Orchestrator makes it easy to monitor your devices and the performance of your network connections. It is used to set policies for prioritization of applications on the network to make sure that your most important applications get the top priority. The VMware SD-WAN Orchestrator provides a user interface screen to monitor performance of the network connections and of your applications. The application monitoring features will allow you to troubleshoot issues in much less time, as they provide a comprehensive view of the application performance, as well as the underlying network performance. With the VMware SD-WAN Orchestrator, you can mediate application performance in real time and prevent application down time.

### BENEFITS OF VMWARE SD-WAN

- Optimized link steering
- Error correction
- Bandwidth reservation
- Global visibility
- Flexible security

### VMware SD-WAN Gateways

A benefit of the VMware SD-WAN solution is that you get high performance access to applications in the cloud, such as VMware Horizon on VMware Cloud on AWS. This is done by connecting your office locations through a cloud-based VMware SD-WAN Gateway that is hosted by VMware in a PoP that is close to the applications. Instead of your connections going back to your data center and then going out to the hosted application, your connection goes directly to the application, over the Internet, avoiding expensive private lines with limited bandwidth. The VMware SD-WAN Gateway provides optimization between it and the VMware SD-WAN Edge device in the branch office location—so no matter where your applications reside—you get good performance from your connections to them.

### Cloud delivered network overlay model

VMware SD-WAN simplifies WAN deployment with a cloud delivered model which makes it easy to deploy and manage. VMware SD-WAN is delivered as a service for a subscription with the main components hosted by VMware in the cloud. VMware SD-WAN was designed as a transport independent overlay that can work across any combination of circuits that you might deploy to connect your locations to your applications. It enables connectivity to both enterprise data centers and SaaS applications and infrastructure as a service (IaaS) over the WAN.

### Benefits of using VMware SD-WAN with VMware Horizon

#### Optimized link steering

VMware SD-WAN can prioritize VDI connections between the user and the hosting data center. VMware SD-WAN can see the individual VDI streams and steer them over the better performing WAN link to maintain performance when the network is congested. In this way VMware SD-WAN ensures that VMware Horizon applications are always available. Optimized routing reduces latency for interactive traffic such as keyboard, mouse and touch input, and voice over Internet protocol (VoIP).

#### Error correction

VMware SD-WAN addresses packet loss with real time forward error correction (FEC) and packet order correction. These techniques send duplicate packets and properly sequence out of order packets in real time, avoiding packet retransmission. Each packet can be duplicated over two Internet links using FEC, with VMware SD-WAN at the far end, taking the first packet to arrive and ensuring proper packet order. These features enable VMware SD-WAN to deliver optimum application performance when virtualized applications and desktops are deployed across MPLS, IP VPNs, and other shared network connections.

#### Bandwidth reservation

VMware SD-WAN can reserve bandwidth for VMware Horizon using a built-in application policy. By giving VDI sessions an adequate share of bandwidth, VMware SD-WAN ensures that tasks such as viewing customer records or transferring files don't degrade over the WAN and that bandwidth heavy applications don't impact other critical applications.

### KEY TAKEAWAY

VMware SD-WAN can drastically shrink the attack surface of VDI environments with network segmentation, which is the ability to enforce network security policy on each individual virtual desktop and can enforce user-level network security at the RDSH level.

### Global visibility

VMware SD-WAN provides visibility to application performance, which will help with setting policies and troubleshooting application delivery issues. A major benefit of the VMware SD-WAN architecture is that you get global visibility into network performance and issues. The VMware SD-WAN Orchestrator makes it easy to monitor devices and the performance of applications on the network. The application monitoring features in the VMware SD-WAN Orchestrator ease the task of troubleshooting issues and can prevent poor application performance and application downtime. Using the VMware SD-WAN Orchestrator, you can view overall health of a remote site, quickly assess link quality, and drill down on application usage to see what applications are using your bandwidth.

### Flexible security

VMware SD-WAN provides security via its built-in firewall, third party NGFW options, and policy-based traffic steering. For a smaller location, you can use the built-in firewall on the VMware SD-WAN Edge device. For midsize locations, the VMware SD-WAN Edge device provides a hosting capability to run an NGFW from vendors for this type of service. For a larger branch office that needs to deploy many virtual machines (VMs) for multiple network services, you can use the virtual network function (VNF) infrastructure. Policy-based traffic steering can also be used to send traffic to security services that are hosted in the cloud.

### VMware SD-WAN with VMware Horizon on VMware Cloud on AWS

Organizations are looking to hybrid and multi-cloud solutions to rapidly scale VMware Horizon desktops and applications. Many organizations are doing this with VMware Cloud on AWS. This combination delivers a seamlessly integrated hybrid cloud for virtual desktops and applications. It combines the enterprise capabilities of the VMware Software-Defined Data Center (SDDC), delivered as a service on AWS, with the market-leading capabilities of VMware Horizon.

While there are many benefits of hosting VMware Horizon in the cloud, there is the issue of performance over the WAN to branch offices and remote locations. VMware SD-WAN can help with this. It is possible to run a VMware SD-WAN virtual instance on AWS. The VMware SD-WAN software is available on the AWS marketplace and can connect to the nearest VMware SD-WAN Gateway, providing optimization between the two locations.

### Secure virtual app and desktop environments

VDI brings a host of operational and security advantages to the table for organizations looking to streamline desktop management and reduce hardware costs. However, hosting end user apps and desktops inside the data center also means that attackers have a direct route into the network perimeter.

VMware SD-WAN can drastically shrink the attack surface of VDI environments with network segmentation, which is the ability to enforce network security policy on each individual virtual desktop and can enforce user-level network security at the Remote Desktop Session Host (RDSH) level.

### Better virtual apps and desktops for healthcare providers

Clinicians are increasingly turning to VDI, such as VMware Horizon, to easily use technology at the point of care to access electronic medical records (EMRs). VDI supports multiple devices, such as smartphones and tablets, and it has robust security for the Health Insurance Portability and Accountability Act (HIPAA).

In the report, “VDI Like a Pro – End User Computing State of the Union 2019”, when asked what is the most important business vertical to use your End User Computing (VDI/SBC) environment, for 14.85 percent of those surveyed, healthcare continues to be the largest business vertical market for on-premises VDI and server-based computing (SBC) solutions.<sup>6</sup>

VDI requires high levels of bandwidth, which is often not available in most clinics or branch offices. Patient files and records are now in digital formats, EMRs and electronic health records (EHRs), and organizations increasingly use cloud-based storage and application delivery to give care providers constant access to applications and data.

VMware SD-WAN can help with the ability to bond multiple links to act as one and steer traffic over the best available link, as well as reserve bandwidth based on application policies. With the ability to use any link type, adding bandwidth to remote sites is much easier.

### VMware SD-WAN accelerates and ensures great virtual app and desktop performance

Using desktop virtualization systems like VMware Horizon provides cost savings, control and security benefits compared to running applications locally on the client. Hosting VMware Horizon on VMware Cloud on AWS has the benefit of a scalable, pay as you grow model. However, performance over the WAN can be a limitation. VMware SD-WAN can overcome these limitations by ensuring bandwidth availability, and mitigating congestion, while providing security over the WAN.

For more information visit, [www.velocloud.com](http://www.velocloud.com)

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6. VDI Like a Pro – End User Computing State of the Union 2019