

How Cloud-Hosted Desktop Virtualization With SD-WAN Is Empowering Healthcare Transformation



The combination of cloud-hosted desktop virtualization with SD-WAN gives healthcare organizations a technology foundation to strengthen their remote and mobile capabilities with unprecedented levels of flexibility, speed, uptime, performance, simplicity, security and scale. Here's what you need to know.

The healthcare industry is in the midst of a significant transformation fueled by the use of remote and mobile capabilities. Such technology advances are facilitating major gains in patient care, experiences and outcomes, while improving operational efficiencies and lowering costs for providers.

Growth of Internet of Things (IoT) medical devices, advances in telemedicine, expanded use of desktop virtualization for clinicians, support for mobile applications that empower wellness and value-based care objectives, and other changes were happening prior to COVID-19. But the pandemic has had a huge impact on this transition and, in many cases, accelerated it by:

- Enabling clinicians to continue providing quality care to their patients through telehealth applications and ensure secure engagements, including secure access to patient electronic health records (EHR) in the spirit of maintaining patient health information safety.
- Allowing healthcare organizations with the right tools—including desktop virtualization and secure modern network capabilities—to provide safer work environments, reduce the possibility of spreading infection by sending nonessential staff home and maintain or even increase productivity without affecting clinician systems.
- Providing secure remote patient monitoring through wearable and other wireless devices that give clinicians easy access to patient data and enable them to deliver high-quality care efficiently and cost effectively.

As seen in these examples, the entire healthcare ecosystem experienced a proof of concept in real-time, real-world environments, showing how advances in remote and mobile capabilities could be achieved and prove transformative. The big issue for decision-makers now is how to keep the momentum going and solidify and expand upon these advances.

From a technology standpoint, one of the most important steps healthcare organizations can take is to leverage cloud-hosted desktop virtualization that is supported and empowered by reliable, high-performance software-defined wide-area networks (SD-WAN).

This white paper discusses the transformation taking place in healthcare and how cloud-hosted desktop virtualization with SD-WAN empowers healthcare providers to improve outcomes and support value-based care initiatives. It also explores what to look for in a solution and explains the unique benefits of using VMware Horizon Cloud, VMware SD-WAN as a Service of VMware SASE and Azure Virtual Desktop.

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The Value Proposition of Desktop Virtualization

Over the past decade or so, desktop virtualization has proved to be of significant value to healthcare organizations, particularly in support of agility, flexibility, security and regulatory compliance for doctors, nurses and other clinicians, including home healthcare workers.

With desktop virtualization, clinicians can move from different hospital rooms and other stations and not have to carry a device from location to location. They can instantly log into separate devices in each room and have immediate, secure and compliant access to the data, applications and other resources they need, based on their personal permissions, profiles and policies. Home workers can access resources in real time without exposing the organization to the security and compliance risks of having applications and sensitive data locally stored on devices.

With simple mobility and secure connectivity, desktop virtualization has become a valuable tool for delivering accurate, real-time, actionable information and application access across the healthcare landscape. The value proposition of desktop virtualization has expanded as organizations consume more data driven from IoT medical devices and broaden the role of EHR systems in supporting more flexible, mobile and remote capabilities.

Desktop Virtualization in the New Healthcare Landscape

While desktop virtualization became a mainstay in many healthcare systems prior to COVID-19, the pandemic shone a spotlight on its long-term, transformative value when organizations had to react quickly to empower remote workers and expand telehealth and remote care.

As the pandemic emerged in the second quarter of 2020, more than 40% of U.S. broadband households used a telehealth service, nearly a triple year-over-year increase. More than 80% of consumers who used telehealth services in that time frame had their most recent telehealth visit either completely or partially paid by insurance.¹

Demand for desktop virtualization solutions in healthcare skyrocketed as the pandemic took hold: Vendors reported a three- to fourfold increase in adoption, according to Forbes.² Forrester Research said remote access had become “mission critical” and desktop virtualization became a way “to effect remote access quickly and at scale.”³

Beyond accelerating new deployments, desktop virtualization has proved to be a lifesaver, literally, for organizations that were already using such solutions. These organizations were able to scale up securely with compliance to empower employees who had to work from home and to provide a broad range of telehealth services to patients of all types in all locations. Quality care provided via remote and mobile capabilities created huge value across the ecosystem, and desktop virtualization proved to be an excellent platform in enabling, enhancing and scaling its delivery.

1 “Remote Healthcare Services Anticipate the Future of Telehealth and Home Monitoring at CES 2021,” Parks Perspectives, Jan. 20, 2021

2 “Shifting From Remote-Lite to Remote Right, Businesses Must Prepare for a Post-COVID World,” Forbes, May 14, 2020

3 “The Business Impact of VDI,” Forrester, Oct. 29, 2020



There is no going back to the way things were. According to McKinsey, providers have rapidly scaled offerings and are seeing 50 to 175 times the number of patients via telehealth than they did before.⁴

The potential is staggering. As McKinsey notes, “With the acceleration of consumer and provider adoption of telehealth and extension of telehealth beyond virtual urgent care, up to \$250 billion of current U.S. healthcare spend could potentially be virtualized.”⁵

The New Model: Cloud-Delivered Desktop Virtualization With SD-WAN

The crush to respond to the pandemic, however, exposed some of the limitations of desktop virtualization delivered through traditional on-premises infrastructure models.

While it was easier and faster for healthcare IT to scale virtual desktops vs. traditional client-server solutions, there was still the process of scoping, purchasing and deploying infrastructure—whether that was servers and storage or integrated solutions such as hyper-converged infrastructure.

Acquiring and deploying infrastructure can take months and divert resources that could be used to ensure that other systems are able to adapt to the changing needs of patients and clinicians. During the pandemic, this model was too slow and cumbersome.

There was also the risk of investing in new hardware to satisfy a use case that could be only temporary, which emphasized the value of investing in cloud desktop virtualization. And for many organizations—even those that may have wanted to invest in additional hardware—there were additional constraints caused by constricted supply chains and intense competition for available resources.

Network bandwidth and throughput was another huge challenge. As more healthcare workers and patients came to rely on telehealth, poor application performance due to unreliable connectivity became an issue for all remote users—virtual desktop users in particular because of their reliance on connectivity to access all applications and data.

Poor connectivity for data and applications can be crippling in terms of performance and reliability. This is unacceptable for clinicians and their patients because it limits productivity and creates a frustrating user experience.

Security is another risk: Many users connect through consumer residential networks using their corporate VPN networks, which were not designed to handle the significant traffic loads from the high volume of people working remotely. Plus, there have been constraints due to the bandwidth, scalability and security issues of VPNs.

IT teams have been stressed and pushed to support users beyond the traditional corporate-managed networks, creating significant support challenges with limited resources.

⁴ “Telehealth: A Quarter-Trillion-Dollar Post-COVID Reality?,” McKinsey & Co., May 29, 2020
⁵ Ibid.



Why Cloud-Hosted Desktop Virtualization?

However, while the pandemic exposed some of the limitations of on-premises-delivered virtual desktops, it also highlighted the transformative value of cloud-delivered virtual desktops, particularly in conjunction with SD-WAN technology to address and eliminate the connectivity challenges.

The way healthcare organizations operate has been fundamentally altered by COVID-19. Administrative staff and clinicians no longer need to be in the building to work. Where they work can be dictated by anything from employee and patient demand to future outbreaks.

This makes desktop virtualization even more important, since it enables work to be done regardless of where a user resides. By moving to the cloud as a delivery model for virtual desktops, healthcare IT teams can react more quickly, securely and easily to any adjustments needed, based on business decisions or changes in the healthcare landscape.

With cloud-hosted desktop virtualization, IT doesn't have to worry about the back-office infrastructure and resources to scale and onboard new users at any pace. They can add new users or scale down if necessary, with the assurance of optimized availability, performance, security, uptime and flexibility.

In addition, IT can simplify and accelerate migrations to the cloud using the same VMware Horizon components that are predominant in on-premises environments today. By pairing VMware Horizon Cloud on Azure Virtual Desktop, healthcare organizations can add VMware Horizon capabilities on top of the unique features of Azure Virtual Desktop, including Windows 10 Enterprise multi-session. This capability is unique to Azure Virtual Desktop and delivers a multi-session Windows 10 experience from the cloud.

Azure Virtual Desktop also includes built-in Virtual Desktop Access (VDA) licensing, which customers would otherwise have to buy if they run virtual desktops and applications on premises or in other cloud platforms. This, combined with the economics of Windows 10 Enterprise multi-session, means Azure Virtual Desktop is the least expensive way to deliver Windows 10 from the cloud.

Customers with large environments, or that want to consume resources from multiple locations—on-premises or in the cloud—can benefit from the enterprise capabilities of VMware Horizon. These includes the Horizon Control Plane, which provides a single pane of glass for hybrid management of all Horizon environments. Using the control plane, admins can package and manage applications using VMware App Volumes, monitor all Horizon environments using Cloud Monitoring Service, and provide a single URL for users to access their workloads wherever they happen to be. Horizon also includes features that reduce costs at scale, such as Dynamic Environment Manager, which provides user environment management capabilities, and advanced power management that reduces Azure consumption costs by ensuring that the only resources you're using are powered on.

User experience is also fundamental to Horizon. The Horizon client features specific optimizations for real-time audio video collaboration tools, including Microsoft Teams. The Blast Extreme protocol can adapt to changing network conditions so that a user has a consistent experience regardless of where they're accessing their apps or desktops—in the office or in the attic. Horizon also supports a broad range of thin clients and peripherals, which is crucial in healthcare environments.

In today's environment, healthcare organizations are charged with going down the path of value-based care—and they need an infrastructure that facilitates this journey.

In addition, VMware Horizon features support for real-time audio and video, including specific optimizations for Microsoft Teams. This lets organizations deliver secure and compliant audio-video telehealth use cases, while reducing costs and risks and maximizing security and compliance at scale.

Why SD-WAN?

With the growth of cloud and edge computing, healthcare organizations are under growing pressure to address their connectivity issues. The reality is that healthcare organizations must upgrade connectivity for remote workers and telehealth in the cloud era, regardless of whether they are using virtual desktops or legacy client-server solutions.

That's where SD-WAN comes in. Today, most networks in healthcare are designed with a centralized data center that supports different entities, whether satellite offices, outpatient clinics, labs, regional care hospitals, doctors working out of their home or remote users. Everyone is connected to the corporate data center to access data and applications.

In this model, all traffic from these dispersed locations has to be backhauled to the corporate data center—only to go out again to the internet and the cloud, where more and more resources are being created and stored.

However, this model doesn't work anymore. It is too slow and cumbersome, adds latency and lacks agility for remote and mobile usage. The experience for clinicians and patients becomes frustrating and limits collaboration and productivity.

In today's environment, healthcare organizations are charged with going down the path of value-based care—and they need an infrastructure that facilitates this journey. From a connectivity standpoint, that means moving to SD-WAN to support and empower simple cloud on-ramp, edge computing and secure remote or mobile access to and from all locations.

The VPNs that are widely used today were not designed for the shift to cloud-based, edge and remote healthcare. They don't scale well; don't offer the bandwidth to handle the amount of data in today's environments; are vulnerable to security breaches; and require IT to buy and maintain hardware, i.e., a continuous increase in Capex.

SD-WAN solutions address all of these challenges and more. Research from Enterprise Strategy Group describes seven key benefits of SD-WAN that improve operational efficiencies across the healthcare industry and deliver better user experiences and patient outcomes.⁶ These are:

- **Ease of use**, enabling centralized operations and management; simplified control and enforcement of global application and security policies; ability to deploy connected processes, policies and workflows; and ability to quickly make modifications.
- **Secure access and transport** with zero trust network access to healthcare applications, personal healthcare information and other confidential data work-from-home employees and clinicians need to provide telemedicine services.
- **End-to-end network visibility**, enabling administrators to easily view the entire network to swiftly mitigate potential risk and inventory all connected devices in real time.

⁶ "Healthcare's New Normal: A Highly Connected and Optimized Network Environment," Enterprise Strategy Group, 2020



- **Optimized system performance** with an application-aware network that can distinguish between the types of connected devices and applications.
- **Detailed analytics and artificial intelligence** to effectively understand and benchmark normal day-to-day operations and gain real-time business intelligence and customer insights to improve performance, security and user experience.
- **Sufficient bandwidth for availability, innovation and growth** to support and empower bandwidth-intensive applications such as video and complex data-driven medical imaging use cases such as MRIs, CT scans, X-rays, mammograms and more.
- **An improved return on investment** with improved operational efficiencies so healthcare institutions can devote more of their budgets to supporting innovation and growing the bottom line.

What to Look for in a Set of Solutions

Cloud-hosted desktop virtualization enabled by SD-WAN represents a potentially transformative innovation in the evolution of remote and mobile healthcare, particularly as organizations prepare for a new normal driven by new expectations among clinicians, administrators and patients.

In plotting the best path forward, decision-makers are best served by focusing on solutions that are designed to work together and deliver key capabilities and features, including:

- **Flexibility to use any connectivity technology**, including MPLS, fixed broadband, VPNs and mobile technologies.
- **High levels of performance with built-in security capabilities**, as well as cloud agility, scale and economics.
- **Agility to deploy, scale and manage quickly and efficiency**, with ability to adapt quickly as needs change.
- **Integrated solutions** to empower remote workers and patients wherever they are located.
- **Capabilities to enable data-driven use cases** where bandwidth can be an issue, such as medical imaging.
- **Support for a wide range of user devices**, from full-featured clients to thin clients, to maximize provider and user flexibility.
- **Ability to integrate and migrate with existing systems**, whether on premises or in the cloud, including hybrid Horizon desktop virtualization solutions or healthcare-specific platforms such as Epic.

The Benefits of Solutions from VMware and Microsoft

When it comes to delivering an integrated solution for cloud-hosted VDI, SD-WAN, virtual desktops and cloud, VMware and Microsoft offer unique advantages to the healthcare industry.

With VMware Horizon Cloud on Azure, IT teams can migrate to Microsoft Azure using the same proven tools and technologies from the data center to the edge to the cloud, without the need for third-party tools.

IT can take advantage of “single pane of glass” management to simplify management of multiple environments and ease the burden on IT, with broad peripheral support, flexible licensing models, hybrid deployment models and integration with top healthcare vendors.

The move to cloud-hosted virtual desktops empowered by SD-WAN is an important step in the evolution of remote and virtual care.

Customers can use Horizon Cloud on Microsoft Azure to deliver the features of Azure Virtual Desktop with all the added benefits of VMware Horizon. This helps reduce costs, overhead and maintenance, while improving agility to scale and onboard new users, with full-featured clients on Windows, macOS, Android and all thin clients.

VMware SD-WAN integration with the full suite of Microsoft applications on the Azure cloud gives healthcare providers enormous opportunities for remote collaboration, including optimized Microsoft 365 and Microsoft Teams to facilitate and modernize telehealth with industry-leading audio-video capabilities.

VMware SD-WAN helps customers address existing connectivity challenges to deliver vast improvements in performance to support data-intensive remote and mobile use cases. Key features and capabilities include cloud-hosted gateways; a cloud provider on-ramp; an application recognition engine; dynamic multipath optimization; cloud security; zero trust security; zero touch provisioning; and end-to-end visibility.

The overall integrated VMware-Microsoft solution set delivers built-in security protections with agility, performance and reliability. Healthcare organizations can scale quickly, securely and easily while reducing risk, accelerating digital transformation and enhancing the overall user experience for current and future use cases. Because Azure is a compliance-ready cloud, compliance capabilities are baked in.

Taking the Next Step

This is a flex point for the healthcare industry. As noted by consulting firm Deloitte, “For the healthcare industry, the COVID-19 pandemic is more than a black swan event. It is a global experience that has forever changed the industry as we have known it in unprecedented ways.”⁷

For healthcare IT professionals and their teams, talk about transformation is one thing, but making it happen and moving their organizations forward with the right technologies and strategies is quite another.

Today’s technology investments must reflect the new normal in healthcare, driven by a dramatic increase in remote and mobile care and treatment, as well as the need for improved and secure connectivity to address use cases that will continue to be more data intensive and performance driven.

The move to cloud-hosted virtual desktops empowered by SD-WAN is an important step in the evolution of remote and virtual care. With integrated solutions from VMware and Microsoft, healthcare organizations can invest with the confidence that they will have the agility, security and scale to meet whatever challenges come next.

For more information on how your organization can move forward with cloud-hosted virtual desktops with VMware Horizon Cloud and SD-WAN on Azure, please visit:

[Get High Performance for VMware Horizon Using VMware SD-WAN](#)

[Better Healthcare with VMware SD-WAN and Microsoft Cloud](#)

⁷ “COVID-19 Recovery for the Healthcare System: Gearing Up for the New Normal,” Deloitte, 2021



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