

Ultimate Guide to VDI & DaaS in 2024

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While the debate about returning to the office goes on, the truth is that virtual desktop infrastructure (VDI) and desktop-as-a-service (DaaS) are both growing double digits year over year and are headed to become a combined \$40B industry in just a few years. And with 99% of IT executives moving some of their systems to the cloud, according to a DaaS Pulse Survey, the appeal of DaaS has never been greater.

But like any other technology, there are drawbacks to consider before adopting and a variety of solutions to choose from. Continue reading to explore the pros and cons of building up modern VDI, a comparison of the top DaaS providers, and a list of the top VDI monitoring tools to consider in this ultimate guide.

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Pros and cons of building up VDI in the current market

BRIEN POSEY, MICROSOFT MVP

Like any other technology, virtual desktops and VDI have advantages and disadvantages, so before organizations decide whether to implement the technology, they need to evaluate if VDI is right fit for them.

Organizations shouldn't rush into any business purchase, but VDI requires an exceptionally time and resource intensive setup process, so organizations should take extra time to evaluate the pros and cons of VDI in this modern desktop virtualization market.

Pros and cons of building up modern VDI

Perhaps the single biggest advantage to virtual desktops is that IT teams can make them far more secure than physical desktops. Because virtual desktops run on a back-end server, organizations can lock them down to prevent any alterations or unauthorized software installations. If a user does manage to change anything, administrators can reset the virtual desktop to a pristine state at the end of the session.

Another advantage to virtual desktops is the ease of management. It is typically far easier to centrally manage a collection of virtual desktops than it is to manage a collection of physical PCs. Virtual desktops also work

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well in BYOD environments. Depending on the virtualization platform, organizations can deliver a virtual desktop to several different device types.

Of course, virtual desktops do have some disadvantages, one of which is complexity.

Virtual desktop deployments involve a lot of different components, which tends to make troubleshooting more difficult than it would be in a physical desktop environment. This complexity also means that the initial startup cost tends to be high. An organization must purchase and deploy several components before it can provision the first virtual desktop. These components vary by platform, but can include virtualization hosts, load balancers, security servers and more.

There are also licensing costs to consider, and VDI licensing costs can be quite high. In an environment that uses physical desktops, each desktop needs an OS license. Virtual desktops also require an operating system license. However, users must still use a physical device to access their virtual desktop and that physical device, whatever it is, will need a license for its native operating system.

This native operating system license is a non-issue for some devices. If a user is working from an iPad for example, the OS license is included with the device. If, however, the user is accessing the virtual desktop environment from a Windows PC, then two OS licenses are required --

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one for the native operating system and one for the virtual desktop. These desktop OS licenses are in addition to any server licenses and client access licenses that may be required. Again, the licensing requirements vary by platform and some organizations have found that using an open source technology yields a significant savings.

It's also important to consider whether any users' applications will run on a virtual desktop. While most applications will generally work fine in a virtual desktop environment, some will require minor alterations. There are also applications that either will not work or are not licensed for use in virtual desktop environments.

Virtual desktop administrators must carefully design virtual desktop environments to avoid having any single points of failure. This means organizations must invest in redundant hypervisors, connection brokers, load balancers and more. Redundancy improves reliability and performance, but it also increases hardware and licensing costs. This will affect both upfront costs and monthly payments as well as overall support and maintenance costs.

Is VDI still relevant in 2024?

Given the cost and complexity associated with VDI, organizations must stop and consider whether VDI is even still a viable option in 2024.

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In some ways, VDI is still relevant. In recent years, trends such as hybrid work and BYOD have increasingly gained traction, so users frequently work from outside the office using a wide variety of devices. VDI can go a long way toward meeting the challenges associated with BYOD and hybrid work because it allows users to work from a carefully configured and secure enterprise desktop regardless of where they are working from and what type of device they are using. Additionally, the virtual desktop serves as an abstraction layer, reducing the chances of a user saving corporate data on their personal device.

Another reason why an organization might choose to use VDI in 2024 is because of the need to support legacy applications. One of the best things about VDI environments is that most VDI platforms give administrators a great deal of flexibility for the way that virtual desktops are configured. This means an organization might be able to configure a virtual desktop to run custom and legacy applications, while running the same application on a cloud-based platform might not be an option.

Organizations might also opt to continue using VDI virtual desktops in 2024 because of legal or compliance reasons. VDI environments allow

While there are still VDI implementations being used in production environments, the IT industry is largely moving away from VDI in favor of DaaS.

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virtual desktops to run on virtual machines in the organization's own data center. This may make it easier for an organization to comply with certain regulations, particularly regarding the geographic location of data.

Finally, there are also business reasons to consider. Specifically, if an organization has invested in a pricey virtual desktop environment, then it may not seem prudent to abandon that investment just to move to a cloud-based desktop as a service (DaaS) environment. This may be especially true if the organization has not yet fully depreciated the hardware cost or if the organization is locked into long-term support contracts.

DaaS as an alternative to modern VDI

While there are still VDI implementations being used in production environments, the IT industry is largely moving away from VDI in favor of DaaS. Ultimately, DaaS may or may not be less expensive than using VDI when measured over the long term, but there are some undeniable advantages to using DaaS.

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Comparing VDI vs. DaaS

VDI		DaaS
OS hosted in on-premises data center	INFRASTRUCTURE	OS hosted by cloud service provider
IT department handles desktop maintenance, security, network and storage resources	MANAGEMENT	Provider handles desktop maintenance, security, network and storage resources
Typically a perpetual license per user; plus investment in infrastructure	COST	Subscription model; usually per user, per month

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The biggest advantage is that DaaS is generally offered as a managed service, meaning that IT pros don't have to worry about managing or maintaining the underlying infrastructure. The hosting company handles everything from patch management to hardware refreshes.

Another advantage of using DaaS is that by moving virtual desktops out of a data center, organizations may free up a considerable amount of internet bandwidth for other uses. This is especially true if most of the users work remotely.

Finally, DaaS is likely going to be the obvious choice for organizations that are just getting started with virtual desktops. Setting up a VDI environment from scratch requires a large upfront investment and a considerable

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amount of time. Building up VDI also requires certain skills from the IT department and may take up a significant portion of their time, thus pulling resources away from other tasks. In contrast, organizations can implement a DaaS environment in a matter of hours and for a small fraction of the VDI startup cost.

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When it comes to fixing anything, the first step is to understand the source of the problem.

That is exactly what virtual desktop infrastructure (VDI) monitoring tools are designed to do. They give IT professionals insight into the inner workings of their deployments, including information on login times, application response times and historical trends. IT can harness all this information to diagnose and resolve problems.

IT pros should understand what VDI monitoring tools should measure and some of the top monitoring tools on the market.

Measuring VDI performance metrics

Identifying and monitoring KPIs is one of the most important tasks in keeping a VDI environment healthy. Doing so can help IT to spot and remediate trends affecting the end-user experience.

One of the main differences between virtual desktop monitoring software and server monitoring software lies in the types of monitored resources. Server monitoring tools often focus on raw hardware metrics, such as the load on a server's CPUs. Modern VDI monitoring tools do not require admins to interpret raw performance metrics. Virtual desktop monitoring

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software, on the other hand, tends to focus on the end-user experience instead.

User experience monitoring is generally done either through synthetic transactions or real user monitoring. Synthetic transaction monitoring typically works by logging simulated users into virtual desktops and then using various metrics to gauge the simulated user's experience.

Real user monitoring is what it sounds like. Rather than monitoring simulated user accounts, the monitoring software bases its performance metrics on real user sessions. How synthetic transactions and real user monitoring work vary by vendor, and some vendors blend the two technologies.

VDI processes to monitor

Desktop virtualization uses virtualization software to host a desktop operating system on a collection of virtual machines running on top of virtualization software. Like any other virtualized environment running in the data center, certain processes must be healthy for the desktop environment to work as intended.

Every VDI monitoring tool has differing capabilities, and the granularity of the troubleshooting tools varies from product to product. However, there are certain aspects of the user's experience that VDI monitoring software tends to examine:

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VDI processes to monitor

- VDI resources
- User login times
- Application load time and responsiveness
- Session responsiveness
- Graphical performance
- Capacity planning
- Root cause analytics



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- **VDI resources.** VMs used in VDI deployments share host resources like CPU, storage, network and memory. A big part of VDI monitoring involves ensuring that each virtual desktop receives the hardware resources it needs and that none of the virtual desktops are consuming resources to the point that they are depriving neighboring virtual desktops of necessary resources.
- **User login times.** Most vendors' products monitor how long a user takes to log in to the system. The time it takes users to complete the login process can often gauge the VDI deployment's overall health. Goliath Technologies measures the logon experience for synthetic users to remove user variability and deliver objective

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measurements. A tool like that enables admins to initiate synthetic user sessions from multiple network locations to validate end-to-end connectivity.

- **Application load time and responsiveness.** Real-time application performance monitoring for desktops is hard because end users can be unpredictable in how they use applications. However, IT should know whether a user sees an hourglass icon when an application loads.
- **Session responsiveness.** This refers to how well the OS responds to user input. IT monitoring tools should be able to catch lags when a user opens the start menu or performs a search.
- **Graphical performance.** Monitoring tools can show whether problems occur if a user tries to perform a graphically intensive operation, like playing a video.
- **Capacity planning.** Some virtualization monitoring software can also be used for capacity planning. By monitoring resource consumption and various aspects of the end-user experience, monitoring software may help IT pros determine the optimal number of virtual desktops they should be running on each virtualization host.
- **Root cause analytics.** If the monitoring software finds that the end-user experience is not as good as it should be, it may use the raw performance metrics to assist with root cause analytics. For example, a monitoring tool might find that a user is experiencing poor application response time because one of the databases used by the applications is generating more storage IOPS requests than the storage hardware can deliver.

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How to choose the right VDI monitoring tools

When it comes to VDI monitoring, every organization's needs are different. Even so, there are some features and capabilities to consider when shopping for a VDI monitoring tool. Some such features to consider include the following:

Automation. Like a physical environment, managing a VDI environment can involve significant work. Automation capabilities can help organizations to reduce the required effort by automating some of the more labor-intensive tasks. This may include deploying new virtual machines, creating virtual desktop images, deploying updates or even deprovisioning old desktops.

Integrations. Integrations refer to the hardware and software the monitoring tool natively supports. For example, a tool designed for virtualization monitoring will likely include integrations for Hyper-V, VMware and possibly other hypervisors. Some of the general-purpose monitoring tools include hundreds of integrations.

Plugins. Plugins often refer to community-developed integrations.

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They are essentially modules that admins can download and install to make their monitoring software work with resources that are not officially supported.

Dashboards and reports. Every monitoring tool provides dashboard views of the monitored resources. This view may sometimes consist of little more than raw metrics, while other tools provide rich topology maps. Additionally, most monitoring tools can generate detailed, downloadable reports.

User experience monitoring. Virtual desktop monitoring tools often quantify the end-user experience through user experience monitoring -- using an agent to collect performance metrics from actual user sessions -- or synthetic monitoring. These monitoring tools can help organizations determine whether users have a good or bad overall experience.

VDI monitoring tools

There are many tools available for monitoring VDI deployments. While VDI vendors provide some tools as supplementary products, others are offered by third-party vendors. The following list was chosen using extensive research into the VDI market and a detailed analysis of user reviews. This list is not ranked and instead appears in alphabetical order.

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CITRIX DIRECTOR

Citrix Director is a native tool designed to monitor and troubleshoot Citrix virtual desktops. Director monitors the Citrix infrastructure to ensure the health and performance of virtual desktops and applications while allowing for end-user experience monitoring.

One of the more specialized features provided by Citrix Director is a console that adapts to the role of the IT professional using it. For example, a help desk administrator would have a different interface and overall experience from an administrator responsible for managing the entire stack.

Citrix Director is a free tool built into Citrix Virtual Apps and Desktops.

DYNATRACE

Dynatrace is a full-stack monitoring tool that uses AI to interpret the conditions the software monitors. While many of Dynatrace's capabilities focus on security, the Dynatrace platform also provides application and infrastructure observability and digital experience monitoring through both real and synthetic monitoring. The software even makes it possible to replay a session for troubleshooting purposes.

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Dynatrace uses a complex pricing model that is more similar to that of a hyperscale cloud provider than a software company. The total cost depends on the extent to which the software is used. The price for full-stack monitoring, application monitoring and application security is calculated hourly, real user monitoring by the session and synthetic monitoring based on each synthetic request. Log analytics bills per gigabyte, and the log file retention cost is calculated per gigabyte, per day.

EG ENTERPRISE

EG Enterprise from EG Innovations is an application and infrastructure monitoring tool for cloud and data center operations. This tool helps organizations monitor application performance, public and hybrid clouds, digital workspace, enterprise applications, end user experience and infrastructure.

EG Enterprise provides alerting capabilities and can assist with root cause analysis when problems occur. Additionally, it includes native monitoring support for hundreds of applications, nearly a dozen hypervisors and over 20 different storage devices.

Pricing varies based on the scope of the deployment. A basic subscription starts at \$100 monthly, but the company also offers a SaaS option starting at \$125 monthly. Perpetual licenses start at \$10,000.

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GOLIATH TECHNOLOGIES

Goliath Technologies provides monitoring software for Citrix, VMware, Microsoft, ChromeOS and infrastructure monitoring. The software automatically discovers IT components and then maps how they connect. Like other monitoring tools, Goliath Technologies includes an alert engine that can notify administrators when certain conditions are detected. Goliath can automatically remediate some problems by rebooting a resource or running a script. The software can also proactively test the environment to ensure all infrastructure components work properly.

Goliath Technologies does not disclose pricing information but offers subscription-based pricing and perpetual licenses.

MANAGEENGINE OPMANAGER

ManageEngine OpManager is another multipurpose monitoring platform that can monitor virtual desktop environments. The software heavily emphasizes network monitoring, which is crucial to ensuring a good end-user experience. In addition to its network monitoring capabilities, OpManager provides various visualizations such as Layer2 maps, virtual topology maps and even 3D floor and rack diagrams.

OpManager also includes physical and virtual server monitoring, supporting platforms like Hyper-V, VMware, Citrix and Nutanix.

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ManageEngine offers three different editions of its software, ranging from \$245 for the Standard Edition, which supports 25 devices, to \$11,545 for the Enterprise Edition, which supports 250 devices.

MANAGEENGINE SITE24X7

Site24x7 is another option from ManageEngine that's not a dedicated VDI monitoring tool but can monitor an organization's IT resources. Site24x7 includes tools for monitoring websites, servers (including virtualization hosts), networks, applications and user experience.

Even though Site24x7 is not designed specifically for VDI monitoring, its real user experience monitoring capabilities are well suited to ensuring that virtual desktop users see the expected performance level.

Additionally, the tool's network and server monitoring features are useful for monitoring the VDI infrastructure.

Site24x7 comes in a variety of plans ranging from \$9 per month for the Web Uptime plan to \$449 per month for the Enterprise plan. The plans differ regarding the number of basic and advanced monitors they include and other factors, such as access to add-ons and supported log sizes.

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SOLARWINDS SERVER AND APPLICATION MONITOR

Like Site24x7, SolarWinds Server and Application Monitor is a comprehensive, cross-platform monitoring tool. The software includes over 1,200 monitoring templates, with more than 1,000 additional templates available that the community developed. These templates provide native support for monitoring Citrix XenDesktop environments. Virtualization level monitoring is also supported for other platforms such as VMware and Hyper-V. There is also support for monitoring various back-end infrastructure components.

Among the software's more notable features are dependency mapping capabilities and the ability to perform customized monitoring through APIs or even PowerShell scripts.

Pricing for SolarWinds Server and Application Monitor starts at \$1,813.

SYSKIT MONITOR

Syskit Monitor is another all-in-one monitoring tool. While the software natively includes the ability to monitor Citrix virtual apps and desktops, it features numerous other monitoring capabilities, including application monitoring and usage, user activity monitoring and server performance monitoring.

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In addition to performing these high-level monitoring functions, Syskit Monitor lets IT monitor the Remote Desktop Services and access gateways. It also allows IT to monitor users' remote desktop protocol sessions, which is useful for organizations running Windows-based virtual desktops.

Syskit offers Standard, Professional and Enterprise editions of its software, billed at \$359, \$479 and \$659 per year, respectively.

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ROBERT SHELDON, CONTRIBUTOR

Desktop as a service is an increasingly popular deployment option for organizations that want to deliver secure desktop environments to their employees. DaaS frees up IT teams, increases deployment flexibility and enables employees to work remotely regardless of their circumstances.

But not all DaaS services are the same. Organizations need to carefully vet potential providers to ensure they can deliver their desktop environments efficiently, reliably and at a price they can afford.

Benefits of desktop as a service

DaaS is a cloud subscription service that delivers managed virtual desktops to client systems wherever they're located. End users can access their desktops via the internet from any supported device. In most cases, the virtual desktops can run the same productivity software that users run on their physical systems. The DaaS provider manages the back-end resources and cloud computing environment and ensures that the desktops are maintained and secure while providing varying levels of customer support.

DaaS enables organizations to move from a Capex model to Opex while making it easy to deploy their desktops relatively quickly. The provider maintains the infrastructure, delivers the virtual desktops and ensures

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they're always updated and secure, freeing IT personnel for other initiatives. The DaaS infrastructure also provides a highly scalable environment that enables IT to easily add or remove desktops as requirements change.

The DaaS model is conducive to work-from-home scenarios, which became one of the most important use cases during the COVID-19 pandemic. Employees can be up and running quickly without IT having to set up infrastructure on premises or requiring personnel to be on site, resulting in less downtime and reducing the impact on productivity. DaaS also prevents sensitive data from residing on BYOD devices, which can risk data security and privacy.

Despite the benefits of DaaS, IT teams should still consider whether they would do better with an on-premises virtual desktop infrastructure (VDI) system. VDI offers greater control over the infrastructure, resource allocation, desktop delivery, security and privacy. VDI might also end up being cheaper when considering long-term subscription fees. VDI can be complicated and costly to deploy and maintain, making it difficult to support the mobility and geographic distribution that some organizations require.

DaaS comparison criteria

Once an organization decides to move ahead with DaaS, decision-makers should choose a service that best meets their requirements, keeping in

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mind that providers take different approaches to delivering desktop virtualization.

Some providers might follow a single-session model in which each user receives a dedicated desktop environment or deploy multi-session desktops using either Windows Server, Windows 10 or Windows 11 so multiple users share a single instance of the OS. However, organizations must be aware that multi-session Windows 10 or 11 is only an option if the DaaS platform is deployed with Microsoft's Azure Virtual Desktop service.

A provider's approach to delivering virtual desktops can make a difference in certain circumstances. For instance, some applications might not run on a server-based virtual desktop because they were built specifically for a Windows desktop environment. In most cases, however, end users won't notice the difference, except that multi-session desktops might be more susceptible to performance and connectivity issues.

DaaS service providers might also offer persistent desktops, nonpersistent desktops or both. A persistent desktop is much like a user's physical PC and is typically the most common scenario. Like a PC, the user's personal OS and app settings remain from one session to the next. For example, if a user configures the desktop's theme or wallpaper settings, those settings will stay in place the next time the user logs onto the system.

This isn't the case with nonpersistent desktops, which wipe all personal settings when the user logs off. Although less convenient for the user,

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nonpersistent desktops are cheaper to deploy because they don't require the storage or infrastructure needed to maintain personal data. Even so, nonpersistent desktops are not geared toward the typical user, although they can be useful for shared desktops or kiosks.

When choosing a DaaS provider, decision-makers must ensure that the service can deliver the best user experience while meeting the organization's overall needs. The following table provides an overview of some of the important factors to consider when looking for a DaaS product by comparing seven DaaS products. These tools were chosen using extensive research into the DaaS market, reports from respected research firms such as Gartner, and an analysis of user reviews. This list is not ranked and instead appears in alphabetical order.

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DaaS vendor comparison

PROVIDER	GUEST OSES	DESKTOP DELIVERY	STARTING PRICE	FREE TIER OR TRIAL	SUPPORT
Amazon WorkSpaces	Windows and Linux	Single-session and multi-session	\$7.25/month+ \$0.17/hour	Free tier for 3 months	Multiple support tiers through AWS
Azure Virtual Desktop	Windows	Single-session and multi-session	Free to eligible customers; \$10/month for eligible external customers	Free if using the \$200 credit within 30 days of signing up for Azure	Multiple support tiers through Azure
Citrix DaaS	Windows and Linux	Single-session and multi-session	\$10/month	7-day free trial	Multiple support tiers through Citrix
DinCloud Hosted Workspaces	Windows	Single-session and multi-session	Contact vendor	14-day free trial	24/7 support
Nutanix Frame	Windows and Linux	Single-session and multi-session	\$24/month	12-hour test drive or 30-day free trial after sign-up	Multiple support tiers through Nutanix
V2 Cloud	Windows	Single-session and multi-session	\$40/month	7-day free trial	Phone and chat support
VMware Horizon Cloud	Windows and Linux	Single-session and multi-session	\$12.50/month	60-day free trial	Multiple support tiers through VMware

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Organizations should also consider other products, such as Shells, Itopia Cloud Automation Stack or Cloudalize DaaS. The more knowledgeable decision-makers are about the current market, the better equipped they'll be to choose the right provider.

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1. Amazon WorkSpaces

With Amazon WorkSpaces, customers can house their virtual desktops in 13 AWS regions and, if they meet the requirements, the two AWS GovCloud regions. Administrators can then deploy and manage the desktops through the AWS Management Console. WorkSpaces launches each virtual desktop in a virtual private cloud network and integrates with the AWS Key Management Service (AWS KMS). The desktops can run either Windows or Linux operating systems, and users can access their virtual desktops through the WorkSpaces client -- available for Windows and Mac computers, Chromebooks and tablets -- or through Firefox or Chrome.

Amazon delivers persistent desktops based on Linux or Windows Server, although customers can also bring their own Windows 10 or Windows 11 desktop licenses. Amazon provides a wide range of pricing options and offers two standard bundle virtual desktops for the first three billing cycles as part of the AWS Free Tier. Some users have encountered connectivity and performance issues with WorkSpaces and problems with the WorkSpaces client, but overall, customers view the service favorably.

2. Azure Virtual Desktop

When Microsoft introduced Azure Virtual Desktop, formerly Windows Virtual Desktop, the platform represented a game-changer in virtual desktops by introducing multi-session Windows 10. The multi-session

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delivery model addresses limitations with a server-based approach to desktop delivery while still providing the advantages of multi-session desktops. Azure Virtual Desktop now supports multi-session Windows 11 and includes seamless integration with Microsoft Office, Microsoft Teams and other Microsoft 365 applications.

Microsoft offers Azure Virtual Desktop for free to customers with eligible Windows or Microsoft 365 licenses, although customers must still pay for the virtual machines and storage they use. Organizations should contact Microsoft or one of its partners for other licensing options. Customers have generally responded favorably to Azure Virtual Desktop, although some have complained about the management being too complex. Perhaps the biggest challenge customers face is whether they're willing to lock themselves into the Microsoft/Azure ecosystems more than they already have.

3. Citrix DaaS

Citrix DaaS delivers single-session and multi-session Windows and Linux desktops. When hosted on Azure, Citrix DaaS can deliver multi-session desktops based on Windows 10 or 11. Citrix supports hybrid cloud deployments, enabling IT teams to manage on-premises data centers and public cloud workloads. In addition to Azure cloud, Citrix DaaS can connect to Google Cloud, AWS and on-premises hypervisors such as Citrix Hypervisor, Nutanix AHV, VMware vSphere and Microsoft Hyper-V.

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Citrix DaaS provides a web-based administrative console, Citrix Studio, for provisioning and managing resources. Administrators can also use Citrix Monitor to monitor and troubleshoot their deployments and assist users. In addition, Citrix DaaS integrates with Citrix Analytics for security and performance, although this feature is included only in the Premium Plus plan. Citrix offers relatively few pricing options compared to Amazon WorkSpaces or Azure Virtual Desktops. In addition, some users have experienced slow or lagging connections.

4. DinCloud Hosted Workspaces

Hosted Workspaces from DinCloud, an ATSG company, is a family of products that includes three DaaS offerings: DinCloud Hosted Virtual Desktop (HVD), DinCloud DaaS and DinCloud Remote Desktop Services (DinRDS). DinCloud HVD offers single-session desktops deployed as dedicated or pooled systems. HVD also includes the SSL gateway and broker services. DinCloud DaaS offers similar capabilities as HVD but without support for pooled desktops or the SSL gateway and broker services. DinCloud DinRDS is a multi-session desktop service that uses shared system resources.

The Hosted Workspaces services can be accessed from Windows, Linux, macOS, iOS or Android devices. The services provide multifactor authentication and support local USBs, multiple monitors and local and remote printing. DinCloud offers a 14-day free trial and free demo, but the company doesn't provide pricing information without requesting a quote.

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The HVD service appears to offer multiple plans but not the other services. DinCloud provides relatively little information about any of its DaaS products, making it difficult for organizations to distinguish one offering from the other or fully understand how each works. The lack of information also makes it more difficult to compare Hosted Workspace with the services from other vendors. For specific details about the products, decision-makers must contact DinCloud directly.

5. Nutanix Frame

Nutanix Frame is a versatile DaaS platform that supports hybrid and multi-cloud deployments. Frame offers both Windows and Linux desktops, either persistent or nonpersistent, with support for both single-session and multi-session deployments. IT can implement Nutanix Frame on AWS, Azure, Google Cloud, Nutanix Cloud or on premises. Users connect to their desktops through supported HTML-5 web browsers such as Chrome, Firefox, Safari and Edge. All communications are encrypted with Transport Layer Security and 2,048-bit public key certificates. Frame supports Federal Information Processing Standards mode, offers SOC 2 Type 2 compliance and is FedRAMP-moderate authorized.

Nutanix designed Frame to work with on-premises and cloud-based IT tooling. The platform also provides native access to cloud storage systems such as Box, Dropbox, OneDrive and Google Drive. In addition, Frame offers VPN gateways and VPC/VNET peering to support network communications across application tiers. Frame also provides native

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integration with identity services such as Okta, Google Sign-In, Azure Active Directory and VMware Identity Manager. Nutanix offers several Frame plans with flexible subscription terms, although not as many plans as other DaaS providers. Even so, Nutanix Frame is generally viewed favorably by most customers.

6. V2 Cloud

V2 Cloud has been quickly gaining recognition in the DaaS industry by including such features as NVMe drives, unlimited data transfers, 50 GB of disk space with the ability to expand, unlimited global teleportations and Azure AD integration. V2 Cloud offers three plans -- Basic, Business and Enterprise -- with varying features. For example, only the Business and Enterprise plans include off-site daily backups, antivirus protection, IPSec VPN, API access and integration with on-premises AD and Azure AD DS, and only the Enterprise plan includes multi-region continuous replication and a custom active-active disaster recovery solution.

V2 Cloud offers Windows desktops only, but those desktops can be either single- or multi-session. The multi-session desktops are based on Windows Server and can support up to 250 users per virtual machine, with users getting their own desktops and private folders. Single-session desktops are based on Windows 10 and require a Microsoft 365 subscription. The V2 Cloud service also provides the Dashboard, a centralized console for deploying and managing the desktop infrastructure. Users connect to their desktops through the service's client

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apps, which are available for Windows, macOS, Linux, iOS, Android and Raspberry Pi devices.

7. VMware Horizon Cloud

VMware has the advantage of coming into DaaS with ample virtual desktop experience. The provider released a major update to its DaaS platform, which reduces the customer footprint, simplifies management and increases scalability, so a single Azure subscription can now support up to 5,000 users. Horizon Cloud deploys on a flexible hybrid architecture hosted on Azure, and the service offers single-session and multi-session Windows and Linux desktops.

With Horizon Cloud, customers get features such as a unified management console, automatic updates, usage reporting and integration with on-premises or cloud-hosted Horizon, with support for hybrid and multi-cloud scenarios. The platform is built on an API-driven architecture, enabling integration with existing tooling and the implementation of advanced automation. Horizon Cloud also supports Azure Virtual Desktop features with hybrid VDI and app deployment. VMware offers a 60-day free trial, with prices starting at \$12.50 per user, per month. However, VMware provides few details beyond that. For more specific information, customers should contact VMware directly.

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What to consider when choosing a DaaS provider

Although these seven DaaS services are not the only available options, they provide a good cross section of the market and should serve as a starting point for evaluating DaaS providers. The choice between products depends on an organization's needs and current circumstances.

For example, organizations deeply invested in the VMware ecosystem might lean toward VMware Horizon Cloud, especially if they maintain a Horizon VDI implementation.

However, an organization invested in the Microsoft/Azure ecosystems is more likely to gravitate toward Azure Virtual Desktop, especially if their Windows licenses already include Azure Virtual Desktop.

Subscription fees will always be an important factor in choosing a service, as are data center locations, security and other issues. For instance, a global organization might be more inclined to use services hosted on Azure or AWS because of their extensive reach.

On the other hand, a small startup with few employees might be more concerned with costs and the ability to scale up in the future, in which

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case, the company might consider a platform such as Azure Virtual Desktop, which offers multi-session desktops and can support future scaling needs or even a move to single-session desktops. A different startup might want more flexibility when choosing cloud platforms and operating systems, in which case, it might opt for a service such as Nutanix Frame.

As a result of the COVID-19 pandemic, organizations have come to recognize the importance of moving quickly to ensure business continuity, which can be difficult to achieve without cloud services.

An organization might consider investing in an on-premises infrastructure that can handle an event such as a sudden shift to a remote workforce. However, such a strategy comes with significant costs and administrative overhead. Without this infrastructure, DaaS might be the best way to keep operations going with the fewest disruptions possible.