Scale virtual desktops faster and provision virtual apps more easily with VMware Horizon and VMware App Volumes

Compared to Citrix Virtual Apps and Desktops, VMware Horizon deployed virtual desktops in less time and fewer steps, required fewer tasks to deploy apps, and enabled simulated users to log into virtual desktops in less time

The work-from-home trend will continue into the near future, with potentially 22 percent of US employees working remotely by 2025.[1] Desktop and app virtualization, through Virtual Desktop Infrastructure (VDI) and Desktop-as-a-Service (DaaS), can promptly provide essential productivity applications for remote workers , but IT admins might find it challenging to manage and provision numerous VDI or DaaS sessions. A VMware® Horizon® 8 VDI environment allows IT admins to deploy and provision virtual desktops and accompanying apps quickly and easily, potentially saving time in an admin's workday. Additionally, Horizon could enable remote workers to be more productive by reducing the time they must wait to access essential resources.

At Principled Technologies, we tested the performance of two desktop and app virtualization solutions—VMware Horizon 8 and Citrix® Virtual Apps and Desktops™ 7—in three phases. First, we measured the speed and ease of non-persistent virtual desktop deployments. Next, we focused on app delivery through VMware App Volumes™ 4 and Citrix App Layering.™ Finally, we tested the non-persistent virtual desktop application performance of both VMware and Citrix VDI environments. In each phase, the VMware solution offered advantages over the Citrix solution, which could mean saving time for VDI admins and delivering a better experience to end users.

Scale VDI virtual desktops more quickly

75.9% less time to scale from 50 to 100 VMs

Deploy apps to virtual desktops more easily

13 fewer tasks for VDI admins to complete
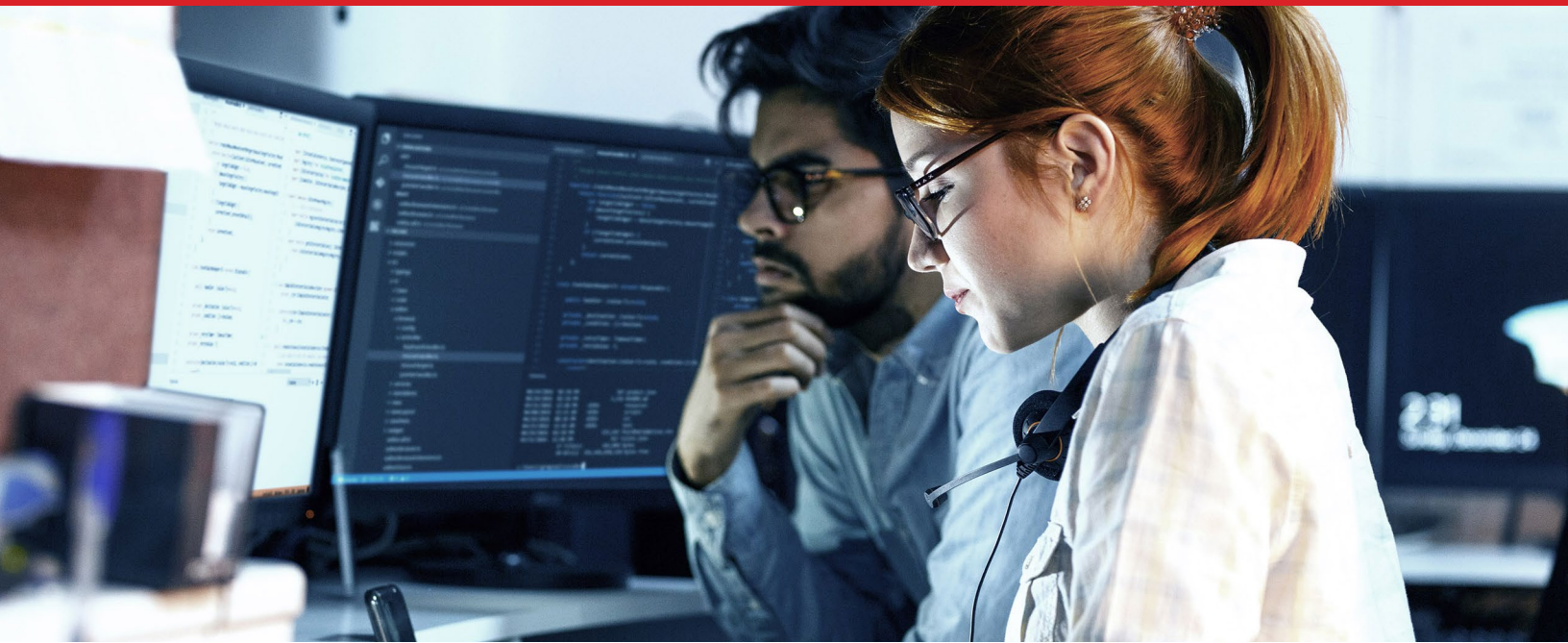
Overview: Non-persistent vs. persistent virtual desktops

Virtual desktops fall into one of two categories: non-persistent and persistent. Non-persistent (or stateless) virtual desktops provide each end user with the same desktop image and revert to the default image at the end of each VDI session. In contrast, persistent (or stateful) virtual desktops provide each end user with access to their own customized desktop image. They retain end-user data and customization from previous sessions.

Because neither customizations nor data is saved when using non-persistent virtual desktops in a VDI environment, IT admins might find it easier to maintain them. In addition, organizations might find that non-persistent virtual desktops help their bottom line because they use only a fraction of the storage capacity that persistent VMs use.

About VMware Instant Clone technology

VMware Horizon offers Instant Clone technology, which allows VDI admins to use a running gold image (or parent) VM to create instant-clone virtual desktop sessions. According to VMware, Instant Clones "share the virtual disk of the parent VM and consume less storage than full VMs."[2] Instant clones also share the memory of the parent VM at first, which "contributes to fast provisioning."[3] VMware Instant Clone technology could have caused or contributed to the time and steps savings we saw in Phase 1 of our testing.

Deploy non-persistent virtual desktops more quickly and easily by using VMware Horizon 8

In Phase 1 of our testing, we compared the time and number of steps to deploy non-persistent virtual desktops using instant clones with VMware Horizon 8 and Citrix Virtual Apps and Desktop 7. Scaling the VMware Horizon non-persistent VMs required up to 75.9 percent less time and 29.6 percent fewer steps than doing so with Citrix Virtual Apps and Desktop.

Phase 1: How we tested

To test the speed and ease of deployment for each VDI solution, we created gold images and deployed a set of 10 virtual desktops as a baseline. We then provisioned 40 additional virtual desktops and measured the amount of time it took to register all 50 and make them available for use. Then, we added 50 more virtual desktops and measured the time it took to make all 100 available for use. Finally, we added 100 virtual desktops and measured the time it took to make all 200 available for use.

Phase 1: Our results

In both the time and number of steps necessary to deploy the virtual desktops and make them usable, the VMware Horizon solution outperformed the Citrix Virtual Apps and Desktop solution.

As Figure 1 shows, scaling with VMware Horizon solution was faster than with Citrix Virtual Apps and Desktop VDI at all three points we measured. The VMware solution scaled from 10 to 50 virtual desktops in 66.7 percent less time, from 50 to 100 virtual desktops in 75.9 percent less time, and from 100 to 200 virtual desktops in 70.1 percent less time.

Deploying additional virtual desktops with VMware Horizon VDI required 19 steps, while doing so with Citrix Virtual Apps and Desktop VDI required 27 steps. This means the deployment of virtual desktops required 29.6 percent fewer steps (see Figure 2). For VDI admins seeking to deploy non-persistent virtual desktops to remote workers, choosing VMware Horizon could make the process faster and easier than the Citrix solution.

Time to deploy 50, 100, and 200 non-persistent virtual desktops and make them usable
Time in minutes and seconds (lower is better)

	VMware Horizon 8	Citrix Virtual Apps and Desktops 7
50	01:55	05:46
100	01:57	08:07
200	04:34	15:17

- ■ VMware Horizon 8
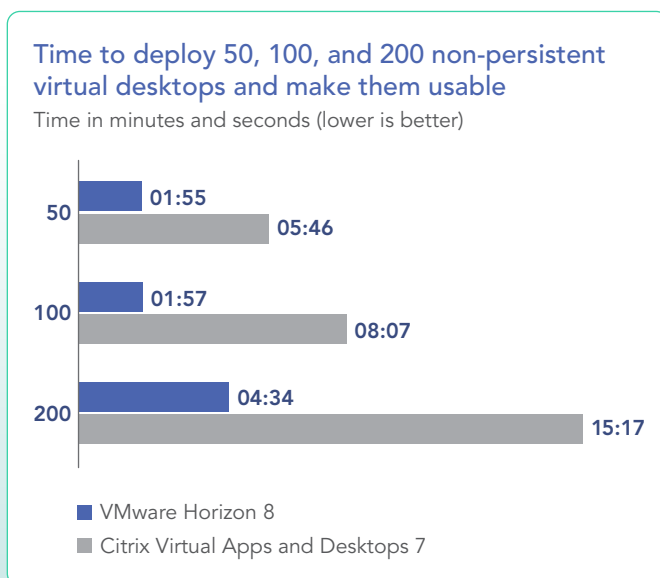- ■ Citrix Virtual Apps and Desktops 7

Figure 1: The elapsed time, in minutes and seconds, for each solution to deploy additional virtual desktops, register them, and make them available to use. Lower is better. Source: Principled Technologies.
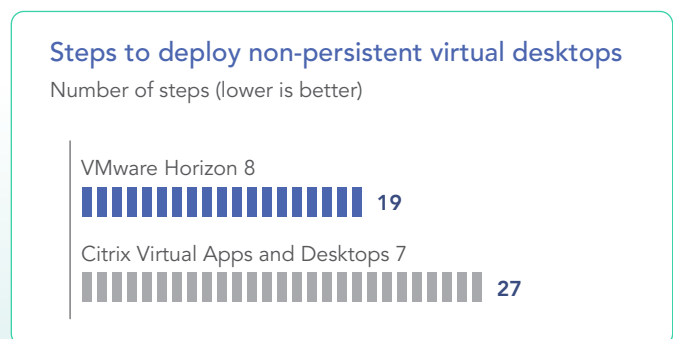
Steps to deploy non-persistent virtual desktops
Number of steps (lower is better)

VMware Horizon 8 — 19

Citrix Virtual Apps and Desktops 7 — 27

Figure 2: The number of steps necessary to deploy VMs using each solution. Lower is better. Source: Principled Technologies.

Deliver virtual apps more easily using VMware App Volumes

The two VDI solutions we tested use different approaches to running non-persistent VDI environments and delivering applications to end users. VMware Horizon VDI uses VMware App Volumes 4, which packages and delivers apps by attaching either a standard virtual machine disk (VMDK) or virtual hard disk (VHD) file to a VM. Citrix Virtual Apps and Desktops uses Citrix App Layering, which stores applications as separate manageable objects in VMDK or VHD files in their own virtual disks. In Phase 2 of our testing, we evaluated the ease and flexibility of deploying virtual apps with both solutions.

Phase 2: How we tested

To determine which VDI solution potentially makes app implementation simpler, we first logged the number of major tasks a VDI admin would need to complete to deploy Microsoft Office 2019 using each solution. We generalized the virtual app deployment process for each solution to major steps to show the relative complexity of each. Then, to explore the flexibility of each solution, we researched whether they could deliver apps on demand and outside of the gold image.

Phase 2: Our results

When we compared app deployment using VMware App Volumes to app deployment using Citrix App Layering, we found that the VMware solution required 14 major tasks to deploy an application—just over half of the 27 major tasks required by the Citrix solution (Figure 3). Fewer major tasks could translate to a lighter burden on VDI admins who need to deploy apps quickly and fewer chances for delay-causing errors.

Number of major tasks to deliver an app to a virtual desktop
Number of tasks (lower is better)

VMware App Volumes 4
14

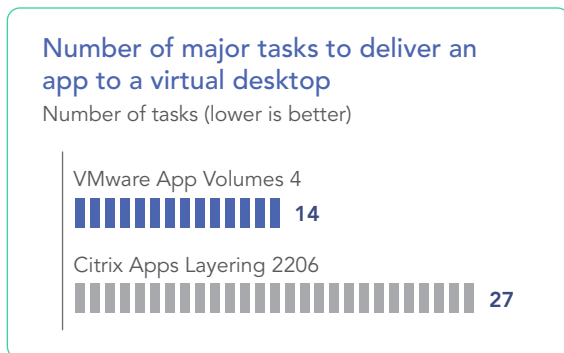Citrix Apps Layering 2206
27

Figure 3: The number of major tasks necessary to deploy an application using each solution. Lower is better.
Source: Principled Technologies.

While both solutions support on-demand application delivery to VMs and users, their support for Microsoft Office—a popular suite of productivity applications—differed. VMware App Volumes offers full support for Microsoft Office and Microsoft 365.[4] In contrast, publicly available information indicates that Citrix App Layering with Elastic Layers does not support on-demand delivery of Microsoft Office or Microsoft 365 as an elastic layer,[5] which is an app layer that VDI admins can assign to users and user groups for app delivery on demand.

About Apps On Demand

Apps On Demand from VMware can help companies with end users who use certain Windows applications regularly but need access to other applications only occasionally. The feature offers occasional access to applications, with a native look, at a lower cost than providing persistent access. According to Ron Oglesby at VMware, "these apps, even though packaged and managed like any other App Volumes app, are still assigned to the user, but are only delivered when the user runs the application."[6]

Faster logins and potentially better app performance for non-persistent VDI environments with VMware Horizon

Delivering virtual apps quickly can help VDI admins and end users, but users also feel the impact of login times and virtual app performance.

Phase 3: How we tested

In Phase 3, we aimed to assess application performance on non-persistent virtual desktops using VMware Horizon 8 and Citrix Virtual Apps and Desktop 7. To do so, we used the LoginVSI Login Enterprise benchmark. First, we used the Knowledge Worker workload to measure how long it took 25 simulated users to log into virtual desktops on a single node running at 60 percent CPU node utilization during a steady state. Next, we captured the Login Enterprise EUX score, which represents the performance a user would experience with any Windows machine, whether it's virtual, physical, in the cloud, or on premises.[7] Finally, we captured the response time, in seconds, for both solutions completing a set of tasks using five Microsoft Office 2019 applications. For comparison, we derived the total application response time for both solutions from the sum of time it took to start Outlook; log into Edge; and start, open a window, open a file, and save a file in Word, Excel, and PowerPoint.

Phase 3: What we found

When we looked at the average login time, we found that the VMware Horizon solution needed 9.5 seconds and the Citrix Virtual Apps and Desktops solution needed 12—meaning the VMware solution needed 20.8 percent less time (see Figure 4).

Running 25 VMs per node at 60 percent CPU node utilization, the VMware Horizon solution had a higher EUX score at 6.9 than the Citrix Virtual Apps and Desktops solution, which scored 6.8 (Figure 5).
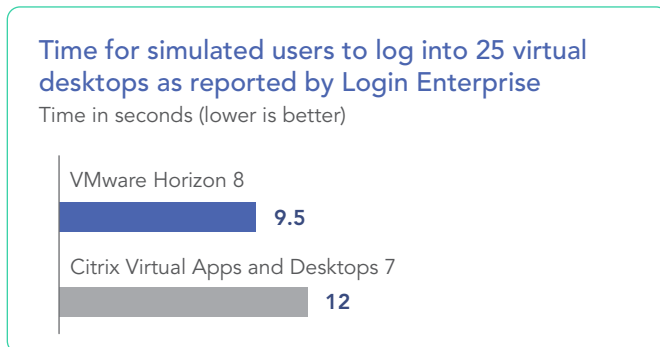

Time for simulated users to log into 25 virtual desktops as reported by Login Enterprise
Time in seconds (lower is better)

VMware Horizon 8: 9.5
Citrix Virtual Apps and Desktops 7: 12

Figure 4: The total login time for each solution. Lower is better. Source: Principled Technologies.

EUX scores as reported by Login Enterprise
Scores (higher is better)

VMware Horizon 8: 6.9
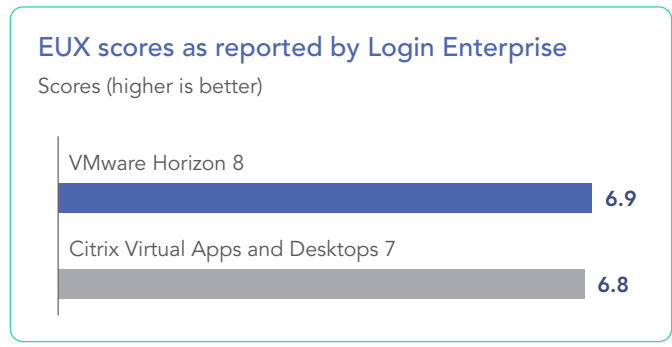Citrix Virtual Apps and Desktops 7: 6.8

Figure 5: The Login Enterprise EUX score for both solutions, each running 25 VMs per node and at 60 percent CPU node utilization. Higher is better. Source: Principled Technologies.

To complete all the Microsoft Office 2019 tasks, the VMware solution needed 23.19 seconds and the Citrix solution needed 24.49 seconds—meaning the VMware solution needed 5 percent less time (see Figure 6).

Our results indicate that VMware Horizon 8 offers significant advantages for VDI admins without a negative impact on the end user experience. The VMware solution potentially could provide a better user experience based on the Login Enterprise EUX score and the better overall application responsiveness in our testing.

Total time to complete all Microsoft Office 2019 tasks as reported by Login Enterprise
Time in seconds (lower is better)

VMware Horizon 8: 23.19
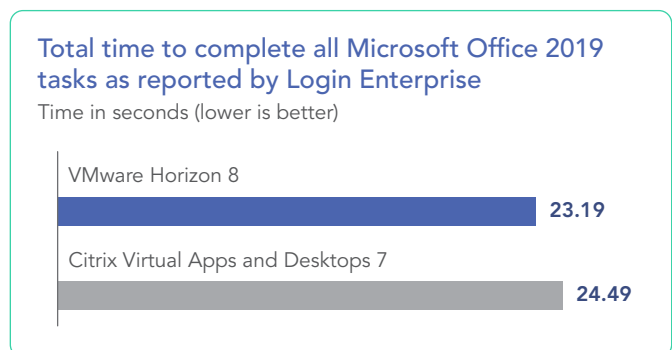Citrix Virtual Apps and Desktops 7: 24.49

Figure 6: The total time, in seconds, for each solution to complete the Microsoft Outlook, Edge, Word, Excel, and PowerPoint tasks. Lower is better. Source: Principled Technologies.

Conclusion

With increasing numbers of employees who need remote access to their desktops, the need for fast and flexible VDI solutions becomes more important. Many organizations would like to reap the cost savings associated with non-persistent VDI environments, but they also want easy administration. In our testing, a VMware Horizon 8 VDI solution with App Volumes 4 offered many advantages over a Citrix Virtual Apps and Desktop 7 and Citrix App Layering.

In our first phase of testing, we found that VMware Horizon scaled from 50 to 100 non-persistent virtual desktops in 75.9 percent less time and required 29.7 percent fewer steps than doing so with Citrix Virtual Apps and Desktop. In our second phase of testing, the VMware solution required just over half the number of steps to deploy an application than the Citrix solution required and supported on-demand deployment of apps that the Citrix solution did not. In our third and final phase of testing, simulated users logging into VMware Horizon virtual desktops needed 20.8 percent less time than simulated users logging into Citrix Apps and Desktops virtual desktops. The VMware VDI solution offered these advantages with no app performance penalty—in fact, the VMware solution offered a slightly better overall application response time. Using VMware Horizon for your VDI environment could save time for your VDI admins and help get non-persistent virtual desktops ready for users sooner.

To explore the features of Horizon in a cloud-based virtual lab environment from VMware, access a free online portal: https://customerconnect.vmware.com/en/web/vmware/evalcenter?p=horizon-hol-gs-22.

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3. VMware, "Instant-Clone Desktop Pools," accessed July 26, 2022, https://docs.vmware.com/en/VMware-Horizon-7/7.13/virtual-desktops/GUID-D7C0150E-18CE-4012-944D-4E9AF5B28347.html.

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Read the science behind this report at https://facts.pt/kcJ6voU ▶

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