

The Forrester Wave™: Server-Hosted Virtual Desktops (VDI), Q3 2015

The Seven Providers That Matter Most And How They Stack Up

by David K. Johnson
September 18, 2015

Why Read This Report

In Forrester's 26-criteria evaluation of server-hosted virtual desktop vendors, we identified the seven most significant software providers — Citrix, Dell, Listeq, Microsoft, Nimboxx, Oracle, and VMware — in the category and researched, analyzed, and scored them. This report details our findings about how well each vendor fulfills our criteria and where they stand in relation to each other to help infrastructure and operations (I&O) professionals select the right partner for their server-hosted virtual desktops.

Key Takeaways

Citrix And VMware Lead The Pack

Forrester's research uncovered a market in which Citrix and VMware lead the pack. Dell and Microsoft offer competitive options. Listeq, Nimboxx, and Oracle offer alternatives for niche scenarios.

The Market Is Growing As I&O Pros Cut Costs, Improve Security, And Increase Flexibility

The digital workspace delivery systems market is growing in part because more I&O pros are seeing server-hosted virtual desktops as a way to address their top workforce enablement challenges. I&O pros are increasingly trusting technology and vendors to deliver an excellent user experience at an affordable cost.

Device And User Experience Enablers Are Key Differentiators In The Market

As employees become more mobile and use a wider range of devices and apps, conventional application delivery and PC management technologies become outdated and less effective. Vendors that provide a superior device and application user experience for the widest range of situations will succeed in the server-hosted virtual desktop market.

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September 18, 2015

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Forrester conducted product evaluations in August 2015 of seven vendor and user companies: Citrix, Dell, Listeq, Microsoft, Nimboxx, Oracle, and VMware.

Related Research Documents

[Accelerate Product Design With Digital Workspaces For 3D Visualization](#)

[Build Digital Workspace Delivery Systems To Give Employees The Right Tools For Their Job](#)

[Match Digital Workspace Delivery Systems To Your Organization's Workforce](#)

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Server-Hosted Virtual Desktops (VDI) Help You Meet Conflicting Goals

It's now more achievable than ever to provide employees with more flexibility to work both inside and outside the office with the devices and apps they prefer while still improving security, manageability, and compliance for the Windows desktop environment. Forrester introduced the concept of digital workspace delivery systems in 2014 to describe the rapidly expanding collection of 14 distinct technology solutions that I&O leaders can employ to ensure that workers have access to the technology they need to use Windows desktops and apps with any device, almost anywhere.¹ The server-hosted virtual desktop, also commonly known as virtual desktop infrastructure (VDI), is a critical piece to achieving the conflicting goals of flexibility and compliance. Thanks to improvements in performance, usability, and costs, it's now arguably the most versatile.

Serve Up Windows Desktops, Apps, And Data From The Data Center

I&O pros and vendors sometimes use the term VDI to refer to other types of digital workspace delivery systems, such as session-hosted desktops (e.g., Citrix XenApp), desktops-as-a-service (e.g., Amazon Workspaces) or local virtual desktops (e.g., VMware Fusion). But Forrester's definition of VDI is specific (see Figure 1):

A desktop-oriented service that hosts complete user desktop environments on remote servers, where each desktop instance runs within a virtual machine on a hypervisor but not on a cloud infrastructure-as-a-service.

Users access the desktops over a network using a remote display protocol, and a connection-brokering service connects users to their assigned desktop sessions. Notable characteristics of VDI systems include:

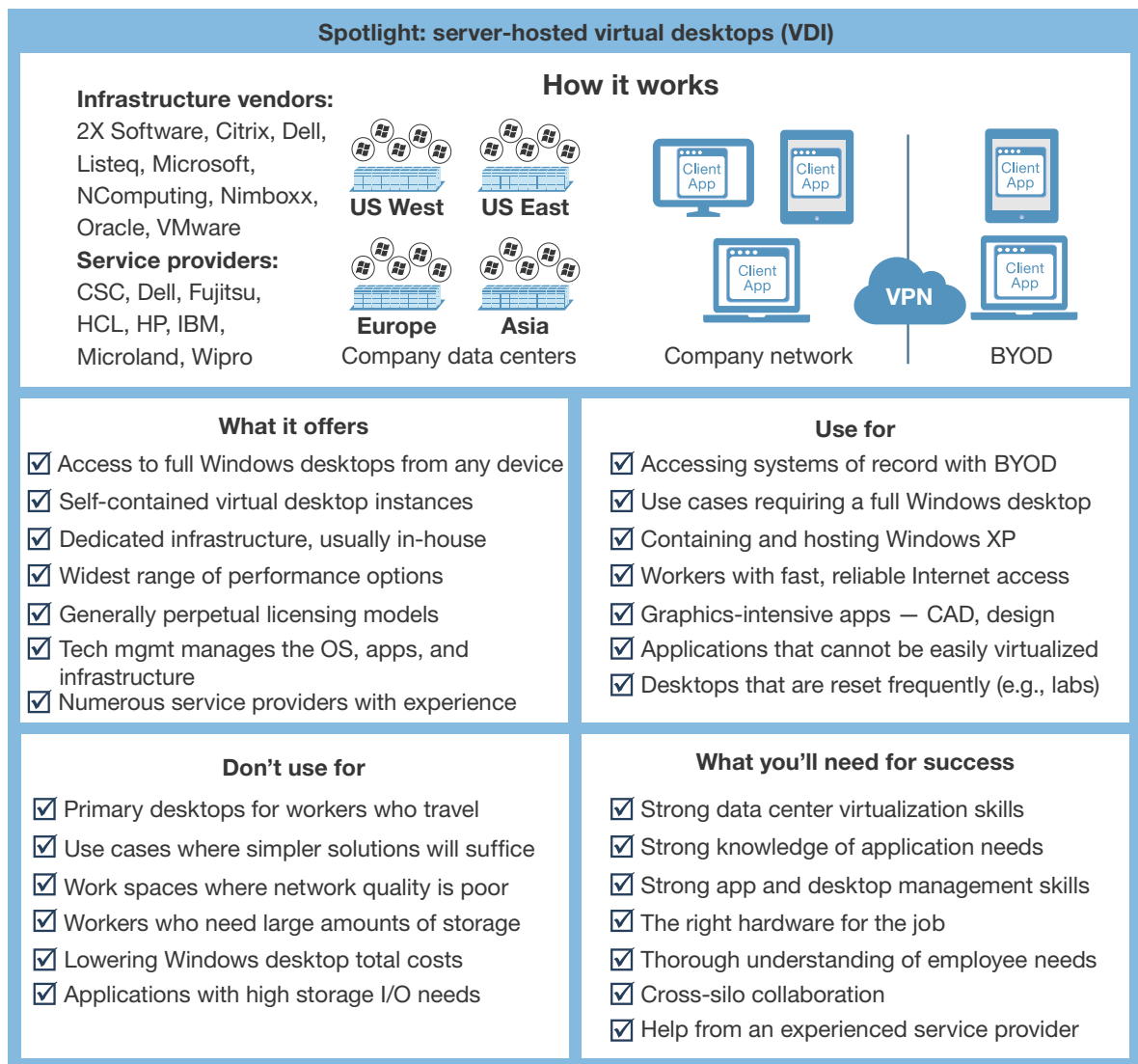
- › **Applications and data remain secure in the data center.** With VDI, only the visual presentation of applications and data traverses the network to the user's endpoint device. This makes VDI very attractive to security and compliance pros and for BYOD programs because it reduces the risk of data theft or loss. But it also has advantages for "chatty" client applications whose traffic patterns aren't optimized for WAN access. This includes apps that work with very large files, such as with 3D CAD engineering and design applications. Apps also benefit from the high performance of data center infrastructure.
- › **Application compatibility and interoperability are generally excellent.** Because VDI instances include a complete copy of a desktop operating system running in a virtual machine container, I&O pros and end users (with proper permissions) can install Windows applications using conventional methods. There are a few differences: Any applications that rely on peripheral hardware such as webcams, USB devices, and local printers may not work properly depending on the VDI vendor and admin-level policy settings. Also, VDI instances can optionally be run in "nonpersistent" mode, which means that some applications may not work properly, or settings and data may not persist between user logins.

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- › **Usability and performance vary with distance, network bandwidth, and latency.** The more latency there is between the client device and the data center, the more lag the user will experience with common activities like typing, clicking the mouse, etc. Additionally, many common use cases like watching a video or using graphics-rich applications like design software or even PowerPoint can consume 10 to 20 times more bandwidth than when using ordinary word processing or enterprise client/server applications in a VDI session. If the bandwidth is limited — as can be the case with public Wi-Fi and 4G LTE networks, the VDI session may be effectively unusable.

FIGURE 1 How Server-Hosted Virtual Desktops (VDI) Work



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Different Digital Workspace Strokes For Different Folks: VDI Isn't For Everyone

VDI makes sense for I&O pros, as it allows them to offer employees corporate access for bring-your-own PCs, Macs, and tablets. For some users, just being able to access their desktop from any location without having to use the same client device every time is a big benefit. Users moving between work locations can access the same desktop environment with their applications and data as they go. Forrester's workforce enablement playbook prescribes that you create segments based on workforce behavior as the foundation of your employee technology strategy.² Server-hosted virtual desktops are most appropriate as:

- › **A primary desktop for onsite knowledge workers who use lots of apps.** This includes accountants, engineers, marketing professionals, and other highly skilled people who work in one or two locations (e.g., a company office and sometimes a home office) nearly all of the time, and seldom, if ever, travel or work from home. They typically use a desktop PC, are usually on a reliable high-speed network while working, and occasionally need to access their desktop environment and apps from home. They need a lot of flexibility to explore new tools and ways of working, but only the minority uses a tablet or a smartphone for work. They need excellent collaboration and communication tools and access to a wide variety of apps and rich information sources both inside and outside the organization, so a VDI solution from Citrix or VMware can serve as their primary desktop.
- › **A secondary desktop for knowledge workers who use lots of apps in many locations.** This includes sales reps, scientists, engineers, consultants, executives, and other highly skilled roles on the go. Their only network link might be a spotty 3G/4G connection to the public Internet. They need lots of flexibility because they're often the ones working with customers directly and must adapt on the fly. They use three or more devices and don't have time to waste, so they want the same documents available across their devices, and they prefer a native app experience on mobile devices. They may prefer to use their own laptop, tablet, or smartphone — including their own software.
- › **A temporary desktop for developers, systems engineers, instructors, and contractors.** One of VDI's main benefits is that it's easy to provision new instances and delete them when you're done with them. Developers can have multiple development and test environments for different operating systems and configurations. Systems engineers like VDI for demonstrating software to clients; instructors like VDI because they can refresh their classrooms at the end of a course with a few clicks; and contractors like VDI because they can use their own computer yet still gain full access to the digital resources they need to perform their work for their clients.

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Technical Innovation And Experience Will Drive VDI Forward

VDI is maturing; most vendors are focusing on niches, but the two Leaders in this evaluation will expand their capabilities to meet the broadest range of enterprise needs. Innovation from VDI vendors centers on:

- › **Incorporating their VDI solution into a cloud workspace solution.** Cloud offers the opportunity to increase ease of access and agility. VMware's cloud workspace strategy centers on the Horizon Air platform it inherited with its acquisition of DeskTone in 2013, and in August 2015, Citrix announced the release of Workspace Cloud. The shift to cloud workspaces is significant because it foretells a change in the way buyers will purchase and consume digital workspaces through 2016 and beyond.
- › **Delivering VDI on converged and hyperconverged infrastructure platforms.** VDI places high demands on storage and network resources and requires specialized automation. Nimboxx is notable here as the only hyperconverged hardware vendor in the evaluation after acquiring the Verde VDI platform from Virtual Bridges in 2014. While it still intends to continue offering Verde as standalone software, Nimboxx's intention is to fully integrate it with its hardware platform. Citrix and VMware both offer a Nutanix-based solution; VMware also offers a VCE-based solution and will soon offer an Evo:Rail-based solution under the code name Project Enzo. Meanwhile, Dell has announced converged platforms for Wyse vWorkspace, Citrix XenDesktop, and VMware Horizon View.
- › **Expanding the depth and breadth of performance-monitoring capabilities.** Maintaining application speed and performance remains a stumbling block for VDI vendors — a problem that organizations struggle with because most operate in silos and lack the tools to detect and diagnose performance problems with VDI; they end up passing the buck from one team to another when there's a problem because no one can isolate it.
- › **Improving the client experience with identity integration and device performance.** Vendors are focused on providing better integration with identity and access management solutions for single sign-on from a cloud portal through the mobile device to the applications they use within the session. They're also working to provide a native client experience on all major device OS platforms, including ChromeOS to support videoconferencing and USB 3.0 devices. Citrix even offers a clever Wi-Fi-based mouse that works with the Citrix receiver on the iOS platform.
- › **Improving performance and scalability for high-end engineering and design needs.** Moving the data off the PC and into the data center opens new doors for 3D engineering and design use cases. VDI opens the door to near-real-time model updates, faster model loading, and better collaboration, security, and analytics.³ In 2014, the results of the partnerships between Citrix, Microsoft, graphics processing unit (GPU) titan Nvidia, and network hardware vendors, and a host of server manufacturers, including Cisco Systems, Dell, HP, and IBM, started bearing fruit. VMware moved quickly to catch up with the similar approach of also using Nvidia GPU technology.

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The VDI Evaluation Overview

To assess the state of the VDI market and see how the vendors stack up against each other, Forrester evaluated the strengths and weaknesses of the top VDI platform vendors.

Evaluated Vendors Have Functional Depth But With Varying Degrees Of Market Maturity

In this Forrester Wave evaluation, Forrester's first evaluation of VDI platform vendors, we looked at how each one delivers a good end user experience across a wide range of employee work styles, devices, applications, and locations. We also looked at what the ongoing ownership and management experience is like for I&O professionals. Forrester included seven vendors in the assessment: Citrix, Dell, Listeq, Microsoft, Nimboxx, Oracle, and VMware. Each of the vendors has (see Figure 2):

- › **A complete VDI platform solution.** The vendors offer a complete VDI platform for which they own the core intellectual property (e.g., connection broker, VDI container code, hypervisor integration, management consoles). A VDI platform is one capable of hosting hundreds of individual instances of the Windows desktop operating system in virtual containers running in a hypervisor on data center server infrastructure.
- › **Evidence of sustainable market traction.** Each vendor has at least 10 unique enterprise customers or five service provider customers for its VDI solution and \$2 million in annual revenue.
- › **An OEM agreement or equivalent for core components provided by third parties.** For credit, vendors must cover products developed by a third party and resold as part of the solution we're evaluating by an OEM or equivalent agreement and first-level support must come from the VDI vendor.
- › **Customer references.** Each of the vendors provided us with at least three reference customers that we interviewed to validate the utility of the product. All of the references provided were in organizations typical of Forrester's client base.
- › **Mindshare within Forrester's client base.** Included vendors are frequently mentioned in Forrester client inquiries and other forms of client interaction.

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FIGURE 2 Evaluated Vendors: Product Information And Selection Criteria

Vendor	Product evaluated	Product version evaluated
Citrix	Citrix XenDesktop	7.6
Dell	Dell Wyse vWorkspace	8.5
Listeq	Listeq BoXedVDI	3.2.1
Nimboxx	Nimboxx Verde	8.x
Oracle	Oracle Secure Global Desktop	5.2
VMware	VMware Horizon View	6.1

Inclusion criteria

A complete VDI platform solution. The vendor offers a complete VDI platform for which they own the core intellectual property (e.g., connection broker, VDI container code, hypervisor integration, management consoles). A VDI platform is one capable of hosting hundreds of individual instances of the Windows desktop operating system in virtual containers running in a hypervisor on data center infrastructure.

Evidence of sustainable market traction. Each vendor has at least 10 unique enterprise customers or five service provider customers for its VDI solution and \$2 million in annual revenue.

An OEM agreement or equivalent for core components provided by third parties. For credit, vendors must cover products developed by a third party and resold as part of the solution we're evaluating by an OEM or equivalent agreement and first-level support must come from the VDI vendor.

Customer references. Each of the vendors provided us with at least three reference customers that we interviewed to validate the utility of the product. All of the references provided were in organizations typical of Forrester's client base.

Mindshare within Forrester's client base. Included vendors are frequently mentioned in Forrester client inquiries and other forms of client interaction.

Evaluation Criteria Include Current Offering, Strategy, And Market Presence

We assessed the products based on past research, workforce technology assessments, and client practitioner inquiries and interviews across 26 criteria involving the vendors' current offering, strategy, and market presence. Strategy scoring takes into account the vendors' corporate strategy per their product vision/road map, channel/ecosystem development, and capitalization, as well as their go-to-market model involving industry penetration and geographical coverage. For market presence, we considered the vendors' revenue, revenue growth, and number of customers. The current offering assessment component covers:

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- › **The solution's end user experience.** We know from our past research that the success or failure of a VDI initiative hangs almost entirely on end user acceptance and maintaining application speed and performance.⁴ This requires sophisticated, tightly coupled capabilities in all four components of the solution — the device experience, graphics performance, user environment management, and support for communication and collaboration software — and smooth voice and video communications through efficient routing and close integration with session-hosted and cloud desktop solutions.
- › **Security and compliance features.** These should be unobtrusive to the user but present to give I&O pros the peace of mind that their VDI solution is secure. Chief among these features is productized support for modern identity and access management methods so that users can enjoy single sign-on from their mobile device through the VDI client to applications within their VDI sessions. I&O pros in more industries tell us that FIPS 140-2 support is essential for them, and they also need fine-grained control of the access and usage policies for the VDI environment.
- › **Platform hypervisor support.** Part of a positive ownership experience is support for other vendors' components when necessary. Because the hypervisor is an integral part of any VDI implementation, it's often easier for I&O pros when the solution supports the hypervisor they're most comfortable with. But when I&O pros need the utmost in performance, having a tight integration throughout the VDI stack offers significant benefits.
- › **Optimization and performance.** The ability to effectively monitor and manage the performance of a VDI environment is also a vital part of maintaining a positive end user experience.
- › **Management console.** As VDI solutions add more capabilities — many of them through acquisitions — the vendors' management consoles multiply until the vendors can merge them over time. In the meantime, admins must suffer with multiple management consoles, none of which contains all of the functionality they need to manage the VDI complete system including the instances, the software inside the instances, and the underlying infrastructure. I&O pros value fewer consoles with more capabilities for managing everything in one place.

Evaluated Vendors Offer A Powerful Mix Of Capabilities

The evaluation uncovered a market in which (see Figure 3):

- › **Citrix and VMware lead the pack.** Citrix and VMware both offer sufficient capabilities and performance to meet a wide range of enterprise VDI needs. All of the vendors offer functional VDI systems capable of serving up commodity Windows 7 virtual desktop instances and connecting users with them. What makes these vendors Leaders is their ability to provide a superior user experience across a wider range of use cases, their differentiation, the completeness of their offerings, and Forrester's confidence in the viability of their solutions and road maps.

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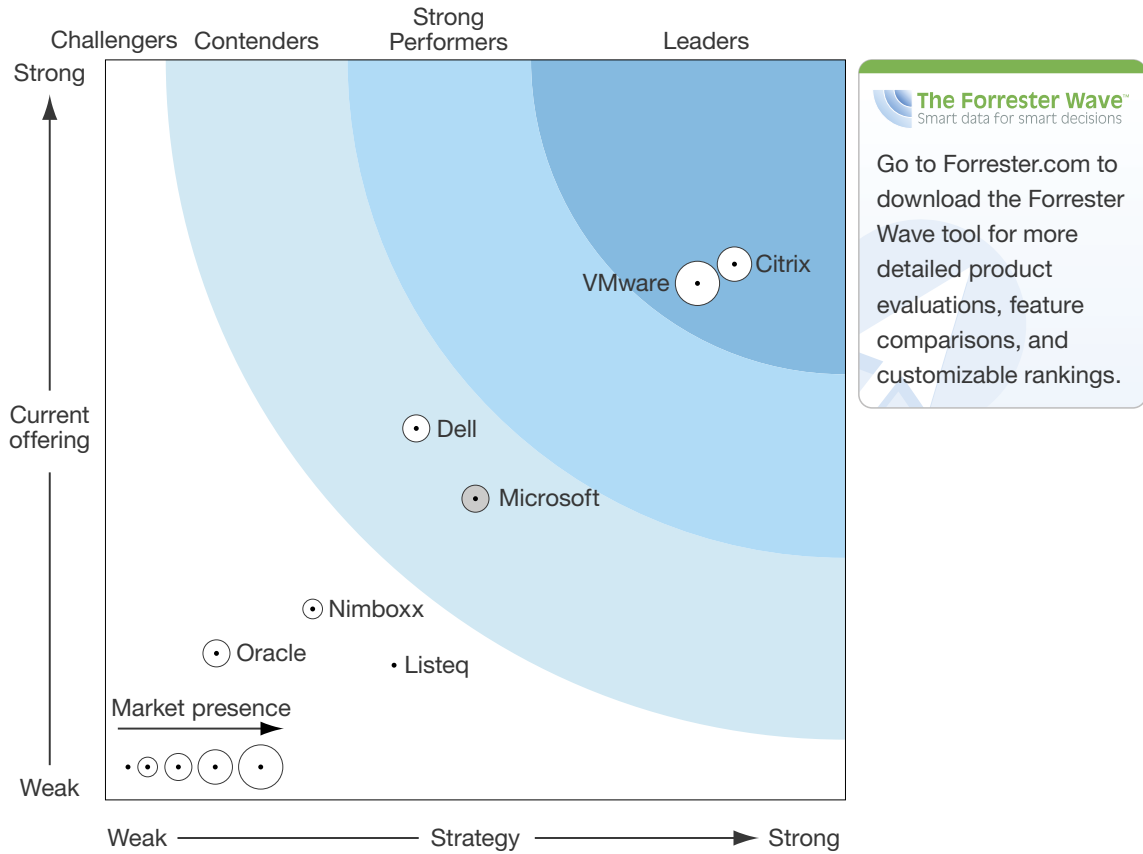
- › **Dell and Microsoft offer competitive options.** Dell and Microsoft both validated their positions as Contenders in this space. Dell's Wyse vWorkspace offering is a good value, scales well, has a strong policy engine, offers session-hosted desktops, and offers a good client experience. Microsoft VDI is a solid offering for smaller organizations and uses the familiar Microsoft RDS client, which is nearly ubiquitous. It also offers session-hosted desktops in addition to persistent and nonpersistent VDI instances, so it's versatile as well.
- › **Listeq, Nimboxx, and Oracle are Challengers.** Listeq, Nimboxx, and Oracle each offer strong enough capabilities to be a good fit for their respective niches. The Nimboxx VDI solution comes from Virtual Bridges and is as strong as Microsoft's solution but is still working through its cloud- and software-only VDI solution strategy independent of its hardware business. Listeq's solution is designed for desktop-as-a-service (DaaS) use cases but is also suitable for enterprise deployments. We liked Listeq's platform automation approach and integration with the Parallels management framework.

This evaluation of the VDI market is intended to be a starting point only. We encourage clients to view detailed product evaluations and adapt criteria weightings to fit their individual needs through the Forrester Wave Excel-based vendor comparison tool.

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FIGURE 3 The Forrester Wave™: Server-Hosted Virtual Desktops (VDI), Q3 '15



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FIGURE 3 The Forrester Wave™: Server-Hosted Virtual Desktops (VDI), Q3 '15 (Cont.)

	Forrester's Weighting	Citrix	Dell	Listeq	Nimboxx	Oracle	VMware
CURRENT OFFERING	50%	3.62	2.51	0.91	1.29	0.99	3.49
User experience	40%	4.55	2.20	1.00	0.20	0.40	4.15
Security and compliance	10%	3.85	1.32	0.66	0.66	0.33	2.31
Platform hypervisor support	10%	3.00	2.00	1.00	1.00	2.00	1.00
Optimization and performance	20%	3.60	3.50	0.70	1.20	1.00	3.50
Management console	20%	2.00	3.00	1.00	4.00	2.00	4.00
STRATEGY	50%	4.25	2.10	1.95	1.40	0.75	4.00
Solution strategy	100%	4.25	2.10	1.95	1.40	0.75	4.00
MARKET PRESENCE	0%	4.00	2.50	0.50	1.50	2.50	4.25
Solution customer count	25%	5.00	3.00	0.00	1.00	3.00	5.00
Solution revenue	25%	5.00	2.00	1.00	1.00	2.00	5.00
Product revenue growth	25%	1.00	0.00	1.00	3.00	0.00	2.00
Global presence	25%	5.00	5.00	0.00	1.00	5.00	5.00

All scores are based on a scale of 0 (weak) to 5 (strong).

Vendor Profiles

Leaders

- › **Citrix brings a comprehensive enterprise-class offering to the VDI landscape.** Citrix's XenDesktop VDI offering is distinctive at several levels, from the user experience with Citrix receiver endpoint clients that offer native HDX protocol support on all device and OS platforms to rich 3D graphics and multiple 4K monitor support and sophisticated features for multimedia and videoconferencing performance. Citrix consolidated its platforms in 2014 and finally has a single management console for the whole VDI stack. It's also the only solution in the evaluation to offer FIPS 140-2 compliance.

On the back end, application layering and personal vDisks help customers make better use of storage resources with pooled desktop instances, and customers can deploy them on Citrix, Microsoft, or VMware hypervisors — a significant advantage. XenDesktop is also part of the most complete suite of digital workspace delivery systems technologies in the industry, which includes XenApp for proven session-hosted desktop capabilities if desired. Citrix also just released its Workspace Cloud offering, giving customers a cloud-based entry point for end user XenDesktop sessions as well. Customers report that the user experience is excellent but that Citrix support is slow to escalate and resolve issues.

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- › **VMware continues to impress with a strong enterprise-class VDI solution.** VMware Horizon View is popular — especially with VMware vSphere customers — thanks to excellent vertical integration from the hypervisor to the VDI instances to the management console and the endpoint clients. End user reviews of the Horizon View client on Google Play and the Apple App Store are the most positive in our evaluation, reinforcing VMware's reputation for quality products. The combination of AppVolumes and Immidio offers compelling personalization approaches, and interoperability with the Horizon Air desktop-as-a-service solution offers customers the option to scale out to the cloud for additional capacity. Horizon will offer FIPS 140-2 compliance in January 2016.

View relies on the PCoIP protocol from OEM partner Teradici, which provides efficient bandwidth usage, rich 3D graphics, and multiple monitor support. VMware also offers Horizon View as part of a complete digital workspace suite that also includes the excellent Horizon Flex local virtual desktops for offline use. Customers told us that the quality of the software is very good with few issues, but some found it frustrating to have to drop into the command line for some configuration operations.

Contenders

- › **Dell's vWorkspace solution is a solid solution but lags in key areas.** Dell inherited the vWorkspace product as part of its acquisition of Quest Software in 2012. Dell Wyse vWorkspace is a solid VDI, offering support for vSphere and Hyper-V with native Windows, Android, iOS, and ChromeOS clients. Accordingly, it inherited Microsoft's vGPU support, which is not as sophisticated or high performing as the support that Citrix and VMware provide. vWorkspace uses Microsoft's latest RemoteFX protocol, so it inherited OpenGL 4.4 and OpenCL 1.1, which provide good performance over the WAN. Other highlights include an excellent policy engine for fine-grained control of session and application access based on a wide range of contextual conditions, including location, device type, and user.

Dell's solution lacks an ecosystem of component vendors and implementation partners. It also only offers simplistic resource optimization and automation capabilities, limited support for modern identity and access management systems, and support for communications and collaboration technologies is limited to Microsoft Lync. The solution can leverage the GPU-sharing features of Hyper-V, but it's an inferior approach to the leading solutions. Customers report that they're generally happy with the solution, but one reference customer cited scalability concerns.

- › **Microsoft VDI is a viable platform but with questionable commitment from Microsoft.** Microsoft continues to steadily improve both its VDI platform's capabilities and the RemoteFX protocol for rich graphics. The solution's highlights include Microsoft's Azure cloud strategy for cloud desktops and applications and support for session-hosted desktops and RemoteApp applications.

The GPU-sharing approach of Microsoft's solution lags the Leaders and doesn't perform as well. Communication and collaboration support is lacking outside of Lync, and Microsoft doesn't have a strong VDI solution vision. Microsoft did not fully participate in the research for this report, so Forrester based its findings on past briefings, products demos, and our customer interviews.

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Challengers

- › **Listeq offers a service-provider-grade VDI platform that you can buy and run yourself.** Based in The Netherlands, Listeq is a young company with a short but growing list of customers split between enterprises and service providers. Listeq licenses the VirtualBox hypervisor platform from Oracle, and highlights of the solution include native client support for Windows 8.1, Mac OS X, iOS and Android, with ChromeOS support via HTML5.

While the solution is functional and customers report good experiences, Listeq lacks key capabilities, such as user environment management. It also offers a mediocre-to-poor user experience on iOS, Android, and other touch-based devices. There are effectively no performance management or network/resource optimization features, and Listeq has no other vendors building capabilities for the platform, nor does it have implementation partners yet.

- › **Nimboxx's Verde platform is functional but uses dated protocols and lacks features.** In 2014, Austin-based Nimboxx purchased the Verde VDI platform from long-time desktop virtualization vendor Virtual Bridges. Highlights of the solution include an excellent management console that covers managing the underlying infrastructure, virtual desktop instances, gold master images, and basic performance metrics.

Under the hood, Nimboxx uses the open source KVM hypervisor and Spice remote desktop protocol, which lack the performance and efficiency of the leading solutions. The solution is also missing key usability features like user environment management, USB 3.0 support, 4K monitor support, GPU virtualization, integration with collaboration tools like WebEx or Lync, and it's not well-integrated with Microsoft's enterprise tools. It also doesn't have any implementation partners yet. Customers say the solution meets their needs and performs well.

- › **Oracle Secure Global Desktop is a proven platform but offers no-frills VDI experience.** Customers can choose either the Oracle VirtualBox, Oracle VM, KVM, Hyper-V, or vSphere, but the product is optimized for Oracle hypervisors. The highlight is the Oracle Enterprise Manager console, which offers an impressive feature set for VDI, including nice performance analytics, plus hypervisor, gold master image, and instance management capabilities.

Tablet apps are available on Google Play and the Apple App Store with mediocre reviews from end users. The solution is not a good fit for general enterprise VDI use cases beyond Oracle application-heavy environments and admin roles.

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Engage With An Analyst

Gain greater confidence in your decisions by working with Forrester thought leaders to apply our research to your specific business and technology initiatives.

Analyst Inquiry

Ask a question related to our research; a Forrester analyst will help you put it into practice and take the next step. Schedule a 30-minute phone session with the analyst or opt for a response via email.

Learn more about inquiry, including tips for getting the most out of your discussion.

Analyst Advisory

Put research into practice with in-depth analysis of your specific business and technology challenges. Engagements include custom advisory calls, strategy days, workshops, speeches, and webinars.

Learn about interactive advisory sessions and how we can support your initiatives.

Supplemental Material

Online Resource

The online version of Figure 3 is an Excel-based vendor comparison tool that provides detailed product evaluations and customizable rankings.

Data Sources Used In This Forrester Wave

Forrester used a combination of three data sources to assess the strengths and weaknesses of each solution:

- › **Vendor surveys.** Forrester surveyed vendors on their capabilities as they relate to the evaluation criteria. Once we analyzed the completed vendor surveys, we conducted vendor calls where necessary to gather details of vendor qualifications.
- › **Product demos.** We asked vendors to conduct demonstrations of their product's functionality. We used findings from these product demos to validate details of each vendor's product capabilities.
- › **Customer reference calls.** To validate product and vendor qualifications, Forrester also conducted reference calls with at least three of each vendor's current customers.

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The Forrester Wave Methodology

We conduct primary research to develop a list of vendors that meet our criteria to be evaluated in this market. From that initial pool of vendors, we then narrow our final list. We choose these vendors based on: 1) product fit; 2) customer success; and 3) Forrester client demand. We eliminate vendors that have limited customer references and products that don't fit the scope of our evaluation.

After examining past research, user need assessments, and vendor and expert interviews, we develop the initial evaluation criteria. To evaluate the vendors and their products against our set of criteria, we gather details of product qualifications through a combination of lab evaluations, questionnaires, demos, and/or discussions with client references. We send evaluations to the vendors for their review, and we adjust the evaluations to provide the most accurate view of vendor offerings and strategies.

We set default weightings to reflect our analysis of the needs of large user companies — and/or other scenarios as outlined in the Forrester Wave document — and then score the vendors based on a clearly defined scale. These default weightings are intended only as a starting point, and we encourage readers to adapt the weightings to fit their individual needs through the Excel-based tool. The final scores generate the graphical depiction of the market based on current offering, strategy, and market presence. Forrester intends to update vendor evaluations regularly as product capabilities and vendor strategies evolve. For more information on the methodology that every Forrester Wave follows, go to <http://www.forrester.com/marketing/policies/forrester-wave-methodology.html>.

Integrity Policy

All of Forrester's research, including Forrester Wave evaluations, is conducted according to our Integrity Policy. For more information, go to <http://www.forrester.com/marketing/policies/integrity-policy.html>.

Endnotes

- ¹ The corporate personal computing environment is now a mix of legacy Windows, client/server, cloud-hosted, and native apps, and a wider array of devices and operating systems, which is not well suited to this evolving, mobile workforce. A growing mosaic of technologies we call digital workspace delivery systems is evolving to offer optimal user experiences for Microsoft Windows-based desktops and applications across devices, locations, and work styles, which helps employees work more effectively. See the "[Build Digital Workspace Delivery Systems To Give Employees The Right Tools For Their Job](#)" Forrester report.
- ² Forrester introduced four personas based on our Business Technographics® workforce data to highlight the impact of mobility on employee technology. Each persona has a mix of digital workspace delivery technologies that are most appropriate for the number of apps and variety of locations where they work. Note that in some cases the mix for each persona includes some of the same technologies as other personas. This is normal because which technology is optimal depends on the characteristics of the apps they use, such as high-performance graphics. In general, these workers are heavy users of Windows applications and will benefit more from investments in digital workspace technologies. See the "[Match Digital Workspace Delivery Systems To Your Organization's Workforce](#)" Forrester report.

The Forrester Wave™: Server-Hosted Virtual Desktops (VDI), Q3 2015

The Seven Providers That Matter Most And How They Stack Up

To truly understand what an employee needs, you have to go straight to the source. While interviewing IT stakeholders can help validate a hypothesis on the right approach, a survey yields invaluable data about not just the tools or behaviors of employees, but also how they cluster into segments. Forrester has developed a methodology called the Workforce Technology Assessment to support this effort. See the [“Build Your Workforce Computing Strategic Plan”](#) Forrester report.

- ³ There are few things more fundamental to the competitiveness of your business than the way engineers design and develop products. Recent innovations in digital workspace delivery technologies, such as GPU virtualization and rich applications-as-a-service are at the forefront because they can offer creative thinkers more autonomy, shrink the distance between teams, and move the design process closer to customers. For more information, see the [“Accelerate Product Design With Digital Workspaces For 3D Visualization”](#) Forrester report.
- ⁴ While savings and security matter, virtualization contributes something far more valuable: the chance to reinvent the way workers conduct business — but only if you can get the employee experience right. If you don’t, you face the wrath of dissatisfied end users and business stakeholders, significant budget overruns, project failure, and reputation damage. For more information, see the [“Five Ways To Ensure That Your Digital Workspace Initiative Doesn’t Fail”](#) Forrester report.

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