White Paper

Modernizing Application Delivery with VMware Horizon

Successful Business Transitions to VMware

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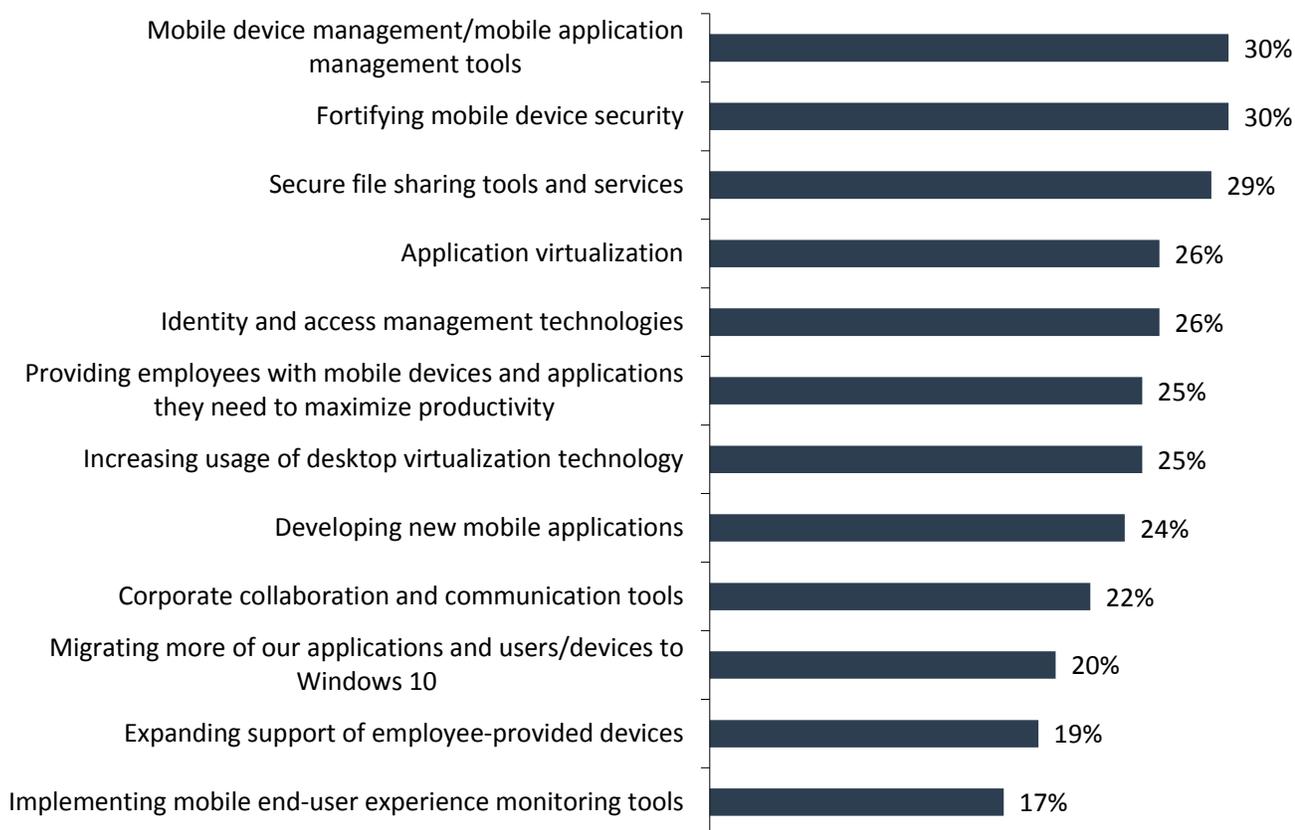
Introduction

Security and manageability are driving IT professionals to reimagine how applications and data are securely delivered to end-users. End-user demand, IT management complexity, and the current threat landscape have companies looking at their existing investments in desktop delivery, application delivery, and endpoint security to determine how their current strategies map with new business, IT, and information security priorities. Businesses are in a state of change as companies prioritize the delivery of applications and data. Businesses are prioritizing investments in management, security, and improved application delivery (see Figure 1).[1] Companies like VMware are locked into these opportunities, and innovating quickly to address changing IT requirements, end-user expectations, and security professional mandates.

Figure 1. Significant Mobility-related Investments Organizations Will Make Over Next 12-18 Months

In which of the following areas of <u>mobility</u> will your organization make the <u>most</u> significant investments over the next 12-18 months? (Percent of respondents, N=430, five responses accepted)

Mobile device management/mobile application management tools	30%
Fortifying mobile device security	30%
Secure file sharing tools and services	29%
Application virtualization	26%
Identity and access management technologies	26%
Providing employees with mobile devices and applications they need to maximize productivity	25%
Increasing usage of desktop virtualization technology	25%
Developing new mobile applications	24%
Corporate collaboration and communication tools	22%
Migrating more of our applications and users/devices to Windows 10	20%
Expanding support of employee-provided devices	19%
Implementing mobile end-user experience monitoring tools	17%

Source: Enterprise Strategy Group

ESG recently spoke with IT professionals at a number of organizations to specifically learn about their Horizon implementation, VMware's virtual desktop and application infrastructure (VDI), and how existing investments are weighing against long-term strategies. This paper focuses on several use cases and talks about how customers are successfully transitioning strategies toward Horizon and related VMware platforms.

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[1] Source: ESG Master Survey Results, *2018 IT Spending Intentions Survey*, December 2017.

VMware Horizon

VMware Horizon is an easy-to-manage, secure platform allowing users to access and customize desktop and application services from a single, digital workspace across devices, locations, and media. With Horizon, IT is able to easily control, manage, and protect Windows- and Linux-based desktops, while meeting compliance and reducing costs. Desktop and application services include remote desktop services (RDS), hosted applications, packaged applications with VMware ThinApp, and software-as-a-service (SaaS) applications, as well as virtualized applications from Citrix. Offering support for two-factor, smart card, and biometric authentication, the solution delivers real-time validation, and streamlined identity management across identity sources such as Active Directory and LDAP.

Customer Successes with VMware Horizon

City of San Antonio

The IT department of the seventh largest city in the United States had to find a way to enable its customers and end-users to perform their jobs from anywhere, at any time, securely and transparently.

ESG spoke with Rich Barnds, Senior IT Manager for the City of San Antonio. Barnds and his team are responsible for every aspect of IT that the City of San Antonio, the second most populous city in Texas and the seventh most populous in the United States, manages. From an international airport, through public safety and public health, to waste disposal, city government, and the library system, the breadth of services Barnds and his team supports is enormous. Barnds likens the city as being 38 separate small- to medium-sized businesses that work together for the common good of the citizens of the city.

The City of San Antonio IT department manages two data centers and 10, 000 users, runs a 24-hour service desk, provides desktop and server support for the city's onsite and remote infrastructures, and codes webpages and other applications within the city.

As Senior IT Manager, Barnds oversees everything infrastructure-related, with the exception of network equipment, communications, and telephony. All the servers, databases, and database administrators fall under his jurisdiction. He also manages the messaging systems including email, all VMware infrastructure, and storage.

Addressing Challenges

It's been almost 10 years since Barnds came to the City of San Antonio. At that time, the city used physical servers running a Citrix Presentation Server 4.5 environment (an early version of XenApp) that was difficult and costly to service and support. It was time for a change. Barnds performed a cost analysis and total cost of ownership for both Citrix and VMware—and the results pointed to the VMware Horizon Enterprise Edition for the following reasons:

- Old web services that Citrix provided were no longer available, which forced Barnds to invest in a NetScaler appliance to get a similar level of functionality

- Existing legacy applications didn't migrate well to newer versions of Citrix

- VMware was already in Barnds' environment, the team was already familiar with VMware and had very good success working with the support organization

Barnds originally brought VMware and the technologies for virtualization into the data center, which quickly took off at a very high adoption rate. Today, the organization is about 95% virtualized in its data centers. The city is running VMware Horizon and VMware AppVolumes (which virtualizes apps from the underlying operating system), and has deployed

virtualized desktops and applications extensively. The team uses VMware Mirage to manage images for physical desktops and point-of-service (POS) devices.

Streamlining Management, Enabling Mobility, Meeting Compliance

Barnds and his team replaced original Citrix RDS published applications with published applications technology from VMware Horizon, which helped improve application management, and enhanced security. The team also took this opportunity to leverage App Volumes to manage their images; and to leverage security groups in Active Directory to help streamline who had access to which applications. It was essential the transition from Citrix to VMware be transparent for the 10,000 users. To accomplish this, Barnds and his team came up with new branding for the VMware environment, calling it "Workspace." They rebranded applications and desktops remotely and built a new webpage for Workspace. Users could easily access their legacy Citrix environments from that one page. Once everyone had been migrated over, IT transitioned users' Citrix application icons to VMware icons.

The transition to VMware was simple. Said Barnds, "Out of 10,000 users, we had very few service tickets come in during the cutover…the campaign was well-orchestrated in terms of training and putting out documentation. We wrote a training guide for users, and trained the service desk to easily provision user applications."

During the initial phase of deployment, most employees are still running a live local desktop, but the plan is to transition employees to virtual desktops. Barnds shared that the virtual desktops have quickly become popular with the executives since the IT team can deploy applications with AppVolumes and executives can bring their own PC, laptop, or tablet while still continuing to use their corporate/city applications.

> *"The transition to VMware was simple…out of 10,000 users we had very few service tickets come in during the implementation."*
>
> **Rich Barnds, Senior IT Manager, City of San Antonio**

Barnds also shared that hardware refreshes are on a case-by-case basis. If something is based on kiosk-type access, the IT team will replace that item with a thin client. Said Barnds, "I don't need a giant desktop or a 20-pound laptop to run applications. I can get a MacBook Air or even a tablet to access my Windows desktop in the background. I have all the horsepower I need to run that from the server side."

Barnds' staff also utilizes VMware to create a common image for their IT administration tools and for many of the applications they manage. "Having the native Windows environment in the data center for IT administration (instead of trying to connect to a VPN to gain access to the server) provides a much more stable and resilient environment, and gives us a better level of support," said Barnds. The IT administration image also enables Barnds and his team to make changes, and updates, and even rollback, if necessary, without having to maintain individual local Windows instances installed on a local machine.

> *"Being able to centrally manage applications in the data center and not having to run them separately on a desktop outside is a big security plus."*

With a mobile staff, having an infrastructure that can provide users with a secure Internet connection anytime and anywhere in the world is critical. From a security perspective, running VMware Horizon and App Volumes ensures the work never leaves the data center. In the HIPAA environment, where compliance is essential, instead of running software on a laptop as well as storing data on that laptop, users can use the laptop as a thin client to connect to the data center. This setup helps to maintain privacy by locking down information.

Because they are such a large organization, the City of San Antonio must comply with most every regulatory compliance mandate including PCI, HIPAA, and criminal justice. Said Barnds, "Being able to centrally manage applications in the data center and not having to run them separately on a desktop outside is a big security plus."

Results

Users are embracing the virtual environment, and though Barnds and his team are still patching desktops, the impact on the user is far less than it used to be. Now, users can go to another desktop or device, log right back into their virtual session or application, and continue working. Said Barnds, "Now calls to the helpdesk are generally a problem with their local client and not a VMware issue."

Future Plans

Barnds sees Windows 10 as part of the city's future plans. Currently, some of the applications are on a Windows 7 image for application compatibility purposes. "If someone wants to use a tablet or another BYOD device, as long as it supports the HTML5 browser, they can continue to do their work."

Barnds and his staff strive to keep the user experience in mind. "When you get the user experience to mirror the desktop they're used to—that's when you win. When the user doesn't have to do anything more than what they normally do— that's when you get acceptance. So, regardless of the type of device they're using, whether it's a Windows 10 device, a Chromebook, or a tablet, when they go to a publicly available link, and as a remote user, they can get their window and they're right back into their old desktop and applications access—they win—and we win."

Schoolcraft College Excels with VMware

ESG spoke with Patrick Turner, Vice President and Chief Information Officer at Schoolcraft College, a public, two-year community college based in Livonia, MI with a satellite campus in Garden City, MI. Boasting approximately 13,000 full-time students and more than 20,000 part-time students, the college offers classes, certificate programs, and associate degrees in 70 areas. Since its founding more than 50 years ago, the school has been focused on progressive innovation, educational excellence, and academic success.

Addressing Challenges

Almost four years ago when Turner joined Schoolcraft, the first task he completed was auditing the college's IT infrastructure. The audit clearly showed the school was in need of a major update, and the college began replacing computer, storage, and phone systems. At that time, there was no enterprise virtualization. Instead, there were 2,500 physical PCs, and 70 labs on campus. Almost half of those PCs were used for labs, and IT would have to refresh them before every term. During the summer, IT would clean up the images on the labs and reconfigure any kind of software deployment. Said Turner, "We had to do this on a room-by-room basis rather than building images in IT, putting them into pools in the data center, and having entitlements to those images in the classrooms." There were also approximately 1,000 applications. Turner commented, "It's not uncommon for higher ed to have the same high number of applications as a Fortune 100 or Fortune 500 company."

Refreshing PCs was neither time- nor cost-effective. The school was spending approximately $500,000 every year on PC refreshes, based on the type of applications being run. Said Turner, "We had everything from GPU-based machines for CAD and computer graphics technology, all the way down to your standard word processing PC. Though we spent $500,000 on an annual basis, we were still looking at a PC lifecycle of 5-7 years—we had a lot of old PCs on campus. With the aging status of our PC infrastructure, we needed something more sustainable and easier to maintain."

In addition, keeping track of patching and operating levels for 2,500 PCs was a daunting task. Given that, having the school's PC infrastructure centralized in the data center—and being able to use non-persistent images that were clones—was definitely the direction in which Turner and his team were moving.

Previous to joining Schoolcraft, Turner gained familiarity with VMware when designing and building a data center, and performing data migrations for virtualization projects. Turner deployed VMware's backup and recovery solutions. Although Turner and his staff spent time looking at Citrix for the Schoolcraft update, they felt that as a public institution they should also look at alternatives. In the end, they chose VMware due to the success Turner had with VMware in the data center, as well as the overall ease of use he felt VMware delivered over Citrix.

Results

> Today, Schoolcraft College has licenses for 1,600 desktops with 600 running concurrently; the school is well over 95% virtualized in its server environment.

Today, Schoolcraft College has licenses for 1,600 desktops, with 600 running concurrently; the school is well over 95% virtualized in its server environment. The IT organization has replaced 2,500 PCs with zero or thin clients, extending the lifecycle of the endpoint, and providing significant cost savings. Primarily a Windows 7 shop, with a group of Windows 8, when the team deploys a fresh virtual desktop image, it's Windows 10. Faculty and staff are trained so they'll understand the differences between the operating systems.

Said Turner, "One of the big things that VDI is doing for us is this: if someone wanted to move a CAD class from one lab to another, previously it was not physically possible because each machine had a graphics processing unit (GPU). Now that GPUs are in the data center, moving a CAD class is as simple as pointing the image to a different physical classroom, or pointing those machines at an image in the data center. It brought with it a lot of efficiencies."

Turner feels very strongly about virtualization: "When you start talking about being able to use virtual desktops on any device from any location, service delivery of higher education classes becomes revolutionized…Before, when a student enrolled in a class, the student would go to a physical room, sit down at a PC and plug in his USB drive to use the software needed. When he unplugged the USB drive, the software would refresh the machine. With virtual desktops and apps, the student doesn't need to physically go to that classroom—he can work from anywhere. It really brings new possibilities to higher education."

> "Now that GPUs are in the data center, moving a CAD class is as simple as pointing the image to a different physical classroom…"
>
> Patrick Turner, VP and CIO, Schoolcraft College

Currently, Turner and his team are in the midst of an Office 365 deployment, bringing in password management along with several other tools. They have updated their security footprint from just virus protection and firewalls—adding identity services, intrusion protection, data loss prevention, and security information and event management (SIEM). The school has also implemented an IT management system and an extensive network monitoring deployment.

Security Is a Huge Focus

As with many public institutions, security is a huge focus. Said Turner, "In case of a breach, the school president may find himself with a microphone pushed into his face, while being asked 'What did you do to prevent this?' One of the main responsibilities of my job is to ensure the president always has the best answer there is. We take the security of personal and private information—credit card numbers, social security numbers, driver license numbers, etc., very seriously. Advanced persistent threat mitigation is technology that is embodied in the next generation firewall, along with intrusion prevention and detection. We have Cisco's Sourcefire. It's all about understanding the threat landscape."

While ransomware is a huge issue in higher education, Turner believes that due to its stringent security posture, Schoolcraft has not encountered a problem in this area. And while the filing of false tax returns due to identity theft could be another issue for the school to tackle, Turner states that having a state-of-the-art security portfolio has helped mitigate this issue. VMware technology forms the backbone of the security posture Turner has put in place.

Additional VMware Technologies

Schoolcraft leverages VMware vSphere for its server environment and vRealize Operations primarily for monitoring and managing the environment, and VMware ThinApp, as well as VMware App Volumes, for application virtualization. The IT organization is looking at Workspace ONE for a simple and secure means of digital workspace delivery.

One of the projects the team is working on is called the Digital Backpack—a means for students to gain remote access to desktops that are pinned to their individual identities and class schedules. Said Turner, "We've been working with VMware for a little over a year, have been through the prototype phase, and are now working on the beta deployment, which would allow students to gain access to lab computers from any location. We anticipate it will be six months to a year before that is deployed."

Group Healthcare Centre Continues to Innovate

Founded by steelworkers in 1963, Group Health Centre (GHC) was among the first union-sponsored community health centers in Canada. As one of the leaders in Canadian ambulatory care, GHC has continued its tradition of innovation in a number of areas over the years, including clinical delivery and technology. A National Best Practice Awards winner, and the site of numerous national and international studies, GHC was also one of the first Canadian health centers to transition to electronic medical records (EMR) in the 1990s.

At GHC, more than 80 physicians, 100 nurses, and 33 allied health professionals serve 80,00 patients across eight sites in Sault Ste. Marie. GHC also hosts the largest community-based diagnostic imaging facility in that area.

ESG spoke with three members of the 25-member Group Health Centre IT team about their challenges, and the successes they've had using VMware: Ralph Barker, Group Health Centre CIO and VP of Information Services; Chris Perriden, responsible for virtual infrastructure implementation, and server and storage management; and Mathew Ginter, with primary responsibilities on the virtualization side, including Exchange, Active Directory, and networking.

Addressing Challenges

Seven years ago, GHC was a Citrix customer. Citrix was significantly deployed throughout the organization (using thin clients for physicians). They needed to justify the cost of updating their infrastructure and environment, and were looking for a total solution. GHC found it made sense to break away from thin clients and move to a zero client model, which is a cost advantage made possible by their virtual desktop and application environment. They also looked at VMware as an alternative to Citrix, and found that VMware licensing costs were lower than those of Citrix—that was enough to justify a change.

> "Right out of the gate it was clear that VMware Horizon licensing costs…were enough to justify our business piece…"
>
> Chris Perriden, GHC

Said Perriden, "Right out of the gate it was clear that VMware Horizon licensing costs as the delta against Citrix licensing costs were enough to justify our business piece….it was significant enough that we did not need to a perform a total cost of ownership assessment."

Results

An important use case/mandate for GHC was delivering applications to users that could act as personal PCs. The team succeeded in doing just that within a year. At that time, VDI penetration rates were at 30-40%. Today, that rate has climbed to 90%. Said Barker, "Currently, we have less than 10 physical PCs, and those exist due to legacy hardware drivers or other ancillary device constraints the team is trying to move away from."

GHC is a multibuilding organization with three buildings on the main campus, which includes the primary data center. Several buildings throughout the community are connected by virtual lines within the organization. Within the data center, they host on-premises. GHC primarily runs on a cluster of 16 Gen8 HP blade servers.

In accordance with GHC's mandate—enabling users to customize their own desktops to suit their needs—the IT department provides each user with a full desktop, which includes two virtual CPUs and accelerator cards that offer users a video conferencing option from every individual endpoint.

For VDI, GHC is using Horizon with third-party applications and user profiling. The IT department provides doctors with their own desktops that can be customized with applications as needed. GHC also has a pool of desktops used in exam rooms. (These desktops only have a handful of applications.) In this scenario, a doctor can come in and unlock her screen, use her desktop, and then lock it when done. This setup allows other health providers to come in, resume their own sessions, and then lock them down.

Help desk break/fix issues have dramatically decreased by GHC moving from thin clients to zero clients. Before restructuring IT, GHC was PC-based and had a large number of help desk technicians focused on break /fix issues. Today, many of those technicians have been allocated to more strategic roles.

> "Running on virtual desktops and apps compared to the physical world has reduced a lot of the complexity of performing tasks like updating our base operating system or a set of applications..."
>
> **Ralph Barker, CIO and VP of Information Services, GHC**

Said Barker, "Running on virtual desktops and apps compared to the physical world has reduced a lot of the complexity of performing tasks like updating our base operating system, or a set of applications...going from a physical PC where you have to troubleshoot a component, to a zero client where we could literally drop one of these into an interoffice envelope and the client could plug it in and be up and running in five minutes. This makes a world of difference for our service requirements, and maintenance is significantly reduced. For example, If a physician wants an application installed on his VM, we ask when he's going to lunch or taking a coffee break—and have him up and running in five minutes."

Other than the odd hardware failure, the team has experienced a few instances where someone has said her desktop is running slowly. "We look in vCenter to determine what the problem is. We can transparently look at the user's desktop, see what the issue is and fix it—so the user is quickly back to normal," said Perriden.

Should a problem affect several users (e.g., three or four users might be using the same blade), IT kicks it into maintenance mode, where VMware vMotion quickly scatters users off of the problem blade, and then reboots when maintenance is finished. Said Perriden, "That's really the only infrastructure issue that crops up with VDI. Day to day, we don't get the equivalent of "my hard drive is making noise or my fan is grinding. It just doesn't exist in the virtual world."

When it comes to authentication, GHC is using single sign-on. If a user is signing in from a known location, authentication will be less stringent, requiring a password rather than the use of biometrics. Remote users in different countries might be blocked because those users might not be authenticated. Said Ginter, "Listed on our VMware wish list is geolocation detection, and our ability to authenticate based on it...with that information we'd be able to make more granular calls."

GHC has done a lot of innovation around disaster recovery. Said Barker, "We've put together what we call 'business continuity desktops.' This is a secondary set of VDI desktops pooled in a more traditional manner, so that in the event of catastrophic failure of the back end or front end of a primary VDI infrastructure, we're able to hit the power buttons and have a second set of VDI stations ready to go."

GHC has already taken advantage of Instant Clone Technology in VMware Horizon. Said Perriden, "In one of our departments, someone clicked on a phishing link and brought down the human resources application. The way things are structured, though, we were able to contain it within the HR organization. We quickly deployed our business continuity desktops for HR users and, within an hour, they were up and running while we cleaned up the virus elements in the background."

Advancing Collaboration

GHC's IT team has worked hard to change the way most knowledge workers collaborate in the organization. People no longer need to attend a meeting carrying a stack of printed presentations and a slide deck. Said Barker, "You'll see people at a meeting where all the rooms have projectors and VDI terminals. If someone wants to add to the conversation with a spreadsheet that's live on their desktop, they just tap in, and five seconds later the spreadsheet is on the screen. This has changed the way people think when they come to meetings."

Future Plans

In the genesis of all the projects at GHC, not just the VDI project, the IT team has tried to take a flexible mobility position. Over the past year, they've spent time testing legacy applications and hardware connectors, drivers, and medical devices. They have a list of noncompatible applications that can be resolved through quick upgrades or other tactics. They're ready to move forward.

Said Barker, "We've been cautious about the Microsoft governance approach. We don't want to be forced to the cloud, or into Microsoft 365 or auto updates. The biggest challenge we face is the corporate enterprise necessity to go forward with what Microsoft has only dealt with on a consumer basis…Regarding Windows 10, Microsoft is saying it's their way or the highway. We're trying to make sure there's enough leeway so we can operate within the confines of Windows 10."

Moving forward, GHC will likely need uplifts for a couple of infrastructure elements. Said Perriden, "Whether it's growing up, or horizontally, we've had success scaling our virtual desktop and app deployment." Currently, the organization has about 550 current users, with more to come.

The Bigger Truth

The IT leaders ESG spoke with illustrate prime examples of how businesses are embracing end-user flexibility, and enjoying simplified IT management and an enhanced security posture with improved economic investments. VMware is helping to lead these organizations with solutions that solve complex and high-risk applications, present desktop and data delivery use cases that simplify IT management responsibilities, enhance the end-user experience, and provide insight for information security professionals.

Companies continue to seek benefits from desktop and application virtualization—and VMware has enhanced its capabilities with a platform encompassing a full purview—one that delivers a great user experience, superior policy-based management, and tight integration with the software-defined data center. Organizations that have invested in VMware in the early days of server consolidation are now seeing the benefits of application and desktop delivery that VMware can deliver.

While the leaders in this paper have compelling examples that have returned value for their respective companies, there is an opportunity for all of these companies to further scale their deployments, and share the benefits with more end-users,

use cases, and IT teams. IT organizations considering existing and new investments in application and desktop delivery should take the time to understand where VMware has come from, how the vendor is assisting businesses today, and what innovation lies ahead.