White Paper

Simplifying and Saving on VDI Deployments Through Hyperconvergence

Citrix XenDesktop VDI Deployment with Nutanix

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Introduction

Given the speed at which business must operate to be competitive, IT organizations are facing increasing challenges to work faster, smarter, and more efficiently in every aspect of their operation. The business needs IT to be more responsive when it comes to arming employees with the tools and applications they need to be successful, spinning up new applications or rolling out upgrades; more resilient to keep critical-business processes up and running 24 x 7 x 365; and of course, more cost-efficient to ensure the company can meet its obligations to investors and continue to invest for growth and competitive advantage.

To address these issues, many companies have turned to virtual desktop infrastructure (VDI) to increase both business continuity and productivity, allowing employees to access their desktops and applications both within and outside the office. VDI enables an enterprise to increase productivity while containing costs, thus translating into positive bottom-line impact. However, as the pace of business increases, the underlying IT infrastructure that supports VDI becomes just as critical to its success. IT has to not only ensure the performance and availability of different sizes of VDI workloads and reduce the time it takes to deploy virtual desktops to new employees (which speeds time to productivity for them), but also operate continuously in a budget-constrained environment. In the current environment, constrained IT budgets do not tolerate overprovisioning of IT equipment.

In recent years, organizations have begun to leverage hyperconverged infrastructure (HCI) as the IT platform for delivering VDI. While the best-of-breed do-it-yourself (DIY) approach and converged infrastructure (CI) have traditionally been the underlying platforms for supporting VDI, incurred costs for deployment of the right amount of resources to support every virtual desktop remain. In both approaches, the server, storage, and networking (storage area network or SAN connectivity) resources are not allocated automatically for a given number of desktops; the allocation requires manual intervention, thus incurring additional time and costs. Both approaches also require significantly more effort in daily administration and management, as they remain disparate IT resources that each need to be handled separately.

With HCI, all components are tightly integrated, relying on a software-defined storage (SDS) architecture to deploy the right resources at any given time for any given number of virtual desktops. By eliminating the manual intervention for deploying individual IT resources, those incurred costs are greatly minimized. Furthermore, HCI allows the business to scale the IT platform supporting VDI even under a constrained budget; HCI allows for a small entry point and the deployment to grow as the workload needs grow, rather than making the significant upfront infrastructure investments that more traditional deployment models demand. Finally, with the integration of servers, storage, and networking components, management of an HCI-based infrastructure becomes easier and less time-consuming.

Given its potential benefits, it makes sense to use HCI as the vehicle for VDI deployment. Easier resource deployment for any-sized virtual desktop, lower capital expenditures since overprovisioning is eliminated, and decreased time for management and administration enhances the ultimate benefits that VDI offers: business continuity, ensured performance and availability, and improved productivity, thus increasing revenue and allowing end-users to add more value.

Nutanix's Hyperconverged Infrastructure (HCI) Solution with Citrix XenDesktop is uniquely designed to meet the challenges IT organizations face when deploying desktop and application virtualization to growing enterprises and maintaining business continuity. Deploying these together creates a symbiotic environment in which the true value of VDI and HCI can be fully realized.

Citrix and Nutanix jointly contracted ESG to conduct research to determine the efficiency levels attained by enterprises using their combined virtualization solution. As a part of this study, ESG interviewed customers to validate the challenges facing enterprises, quantify the pain points, and evaluate the economic impact of deploying Citrix XenDesktop Virtualization with Nutanix HCI. Here is what we found.

Desktop Virtualization Priorities and Challenges

Every year, ESG surveys the IT community to determine how IT justifies its investments to their management. Figure 1 shows the top considerations that the IT community sees as critical in convincing others of the value that a specific solution can deliver.[1] Two of the top reasons—increased employee productivity and improved customer satisfaction—have become the ultimate benefits enterprises experience when implementing VDI.

Figure 1. Most Important Considerations in Justifying IT Investments

Source: Enterprise Strategy Group, 2017

Enterprises continue to leverage VDI as a way to enable business continuity, allowing employees to access their desktops' resources regardless of where they are physically located. Ultimately, employee productivity is maximized as users can accomplish their work without being tied to a specific location. Additionally, employees are less prone to network or equipment outages, as VDI ensures that the virtual desktops remain running regardless of physical issues. The business continuity enabled by VDI also provides the enterprise with an increased potential of improved customer satisfaction. The more productive that employees are, the less time it will take to ultimately fulfill customer requests, which makes customers happy because their needs have been satisfied and ultimately leads to increased revenue. Happy customers are sticky customers.

While the benefits of VDI are known, implementing it introduces a whole set of challenges that may prevent an enterprise from experiencing the benefits described above. As VDI is first deployed and scales, the challenges remain to allocate the right amount of resources allowing all virtual desktops, regardless of their performance or availability requirements, to operate as well, if not better, than physical desktop environments. Conversely, scaling resources to support a growing number of virtual desktops is difficult. Usually, IT departments resort to overprovisioning to meet end-user performance requirements and deal with factors like boot storms, which requires higher upfront costs for all components of the underlying physical infrastructure—servers, storage, storage fabric, and network connectivity. While overprovisioning is a

[1] Source: ESG Research Report, *2017 IT Spending Intentions Survey*, March 2017.

safe approach, it can prove to be expensive, specifically in the current environment of flat IT budgets and "doing more with less."

Many IT departments continue to leverage either a DIY approach—choosing what they view as "best-of-breed" components in the market today; architecting a solution with separate server, storage, networking, and virtualization solutions; and hoping these components work well together—or they buy a fully integrated converged infrastructure solution for building out the physical layer of VDI. Yet, both approaches can complicate the implementation, deployment, and management of VDI, beyond the risk of overprovisioning resources. Regardless of the amount of physical IT resources available, orchestration of those resources to deploy the right amount of storage, bandwidth, and compute resources for each virtual desktop simultaneously is time-consuming, as separate tools still remain for managing aspects of the server, storage, and networking components. The lack of automatic resource coordination and orchestration results in time consumed in deploying, administering, and managing virtual desktops simultaneously, thus increasing IT costs. Scaling VDI also becomes costly as resources must be added to support more users, thus increasing deployment time. This delays onboarding of new users, which impacts time to employee productivity.

With the challenges of DIY and CI cutting into the cost and productivity savings associated with implementing VDI, HCI emerges as a viable alternative. HCI leverages a software-defined storage (SDS) based architecture built on commodity hardware. It seamlessly combines compute, storage, networking, and data services in a single solution running on industry-standard x86 system(s), with the intention of running virtualized and/or containerized workloads. Enabled by a distributed architecture, clustering multiple systems within and between sites forms a shared resource pool and enables high availability, workload mobility, and efficient scaling of performance and capacity. Available HCI solutions typically occupy less space given the smaller form factor, allowing an enterprise to deploy an appropriate amount of resources—server, storage, and networking—to support VDI, especially when starting out with a small deployment. The need to overprovision no longer exists, thus decreasing the upfront costs as well as the price of maintenance contracts and ongoing infrastructure costs (occupied floor space, power, and cooling).

However, the real value of HCI in VDI deployment is the simplicity introduced into IT operations, which then complements and enhances the benefits that VDI brings to an enterprise. Because HCI integrates server, storage, and networking components into one form factor, HCI installation and configuration is simpler than DIY or CI solutions, thus decreasing installation and deployment costs. Also, the integration and especially the software-defined storage capability, which eliminates storage management tasks such as managing LUNs and SAN administration, significantly decrease the time that IT spends on daily administration and management of the HCI solution.

Beyond those benefits that IT can experience, the ultimate benefit that HCI delivers is facilitating predictable performance for virtual desktops. The SDS capabilities within some HCI solutions can allow IT to automate resource orchestration and allocation (e.g., assign extra CPU and memory) to support any number of virtual desktops with minimal manual intervention. Not only does this simplify deployment, but also the automation enables HCI to deliver predictable performance for every virtual desktop. Predictable performance enables VDI to deliver business continuity, thus increasing employee productivity.

The Benefits of Nutanix's Desktop Virtualization Solution with Citrix XenDesktop

In ESG's research of the hyperconverged market and its impact on VDI implementation, we see how Nutanix's HCI Solution enhances the benefits that Citrix XenDesktop can deliver to an enterprise. Based on ESG's customer interviews, we verified the top benefits to be the following:

- Lower total cost of ownership.
- Freedom to choose any hypervisor (hypervisor-agnostic).

- Ease of deployment and management.
- Ease of resource orchestration for VDI support.
- Ease of scale.
- Ensured performance.

Let us examine these benefits individually to see how they ultimately deliver value to an organization running VDI.

Lower Total Cost of Ownership

As IT departments continue to face constrained budgets, they must carefully consider how best to spend their money while keeping the business running. The DIY approach or a CI solution may end up being a costly solution as an enterprise first deploys VDI. Nutanix's VDI Solution allows an enterprise to leverage Nutanix's hyperconverged architecture to deploy the appropriate amount of server, storage, and networking resources that will meet the enterprise's requirements today and scale with the business. Thus, the enterprise has the option to not overprovision resources for a multi-year period, allowing IT to only pay for what they need. Upfront equipment, warranty, and software costs decrease, which then leads to lower maintenance and infrastructure costs.

Hypervisor Choice

Nutanix has designed all of its solutions to be hypervisor-agnostic. IT professionals do not have to worry about changing the VDI infrastructure to fit with a solution, regardless of whether an organization uses VMware vSphere, Microsoft Hyper-V, Citrix XenServer, or Kernel-based Virtual Machine (KVM). Being hypervisor-agnostic eases the actual deployment of the solution, saves time and money in training IT on new technology, and does not incur additional hypervisor licensing costs. These savings also help in further decreasing TCO.

IT professionals also have the option of using the AHV, a hypervisor solution built on KVM technology specific to the Nutanix product line. They can further reduce software licensing costs by using AHV in place of other virtualization solutions.

Ease of Deployment and Management

The Nutanix VDI solution is self-contained in one 2U chassis, with server, storage, and networking components included. The solution can scale out by adding additional nodes. Unlike having to rack and cable multiple servers, storage, and networking components separately, IT professionals can just rack and cable Nutanix nodes as needed and configure with one operating system loaded. Moreover, those separate components must be integrated using multiple software systems unique to each hardware component. Overall, IT labor costs are expected to decrease when working with Nutanix's integrated hardware and software platform.

Nutanix's PRISM GUI-based management system aids in lowering time spent on monitoring the cluster and resolving issues as it provides a comprehensive view of the entire VDI infrastructure. This contrasts with the disparate management systems in alternative CIs.

Ease of Resource Orchestration for VDI Support

Because the Nutanix VDI solution is easy to deploy, not only IT departments but also their VDI customers, the end-users, are affected. Unlike having to install and orchestrate separate server, storage, and networking components for a given number of desktops, the time spent on these activities is greatly reduced in the case of the Nutanix VDI solution.

We should also note that orchestrating resources for virtual desktops is not trivial. Each time a number of virtual desktops is deployed, organizations relying on IT infrastructures that are not fully integrated via software must work on the resources separately and manually. In other words, the people with the server, storage, and networking component responsibilities must coordinate their work to ensure that the right amount of IT resources is deployed for a given number of desktops. Moreover, this coordination has to be repeated when additional virtual desktops are deployed.

The time incurred not only increases IT labor costs, but also increases time to value. The longer it takes for IT to deploy resources for virtual desktops, the longer it takes to onboard end-users, decreasing their productivity and ultimately having a negative impact on the organization's bottom line.

The Nutanix solution is integrated via software and allows IT professionals to deploy the IT resources logically, practically eliminating any need to access server, storage, and networking expertise for the necessary resource coordination.

Ease of Scale

The scale-out architecture of the Nutanix VDI solution allows organizations to grow out their VDI infrastructure without necessarily incurring large upfront capital costs. Rather than forecast the number and size of virtual desktops to be supported over a multi-year period and overprovisioning IT infrastructure, IT professionals can start small and scale out their IT infrastructure as virtual desktops grow in number and/or size. The scalability also applies when dealing with different hardware models and generations. Customers need not replace older generations of hardware, as the Nutanix node architecture is software-defined, enabling all software functionalities to be available across all Nutanix platforms.

Ensured Performance

The Nutanix solution provides the right amount of resources for all Citrix XenDesktop virtual desktops at any given time so that end-users experience consistent performance and availability. Leveraging its software-defined architecture, the Nutanix platform will automatically distribute all data and processes leveraged by the supported virtual desktops across the entire Nutanix cluster. This is key in enabling predictable VDI performance, which not only decreases the time that IT spends in managing the VDI infrastructure but also provides a consistent end-user desktop experience that increases productivity. Both results contribute to lower costs and higher revenue to the organization.

Additionally, with Nutanix's HCI, data locality enables consistent performance as compute and storage resources are combined in the same enclosure, allowing Citrix desktops immediate access to its data. This minimizes latency and helps mitigate issues such as read, write, and boot storms, which can all impact end-user performance and, subsequently, cause downtime and negatively impact productivity. Inconsistent desktop performance can ultimately lead to increased costs and/or decreased revenue.

Nutanix VDI Solution in Action: Customer Successes

Large Regional Healthplan Company

As one of the largest US managed-care entities, this organization serves as a "middle man" between healthcare providers and its 850,000 members, ensuring that members receive the most effective care from the provider network. Currently, the company is generating close to $1 billion in revenue. The company is in the middle of completing a merger with another managed-care entity that will result in adding another 1,100 employees. Approximately one-third of those employees (e.g., case coordinators working in the field) will require virtual desktops over the course of this year. The company has installed 17 Nutanix nodes in its data center.

The company's Nutanix footprint has been operational for over a year. Prior to using Nutanix's solution, the company invested in a traditional three-tiered converged infrastructure to support its Citrix XenDesktop VDI environment. Although

the company had relied on CI to ensure scalability, the ability to scale the CI platform presented a challenge. Because the CI was not truly integrated from a hardware or software perspective, scaling the infrastructure to accommodate additional desktops required specialized expertise of the individual components. Those running the XenDesktop VDI infrastructure had to rely on others to determine how best to orchestrate the server, storage, and networking components to support any given number of endpoints. Additionally, installing and deploying the converged infrastructure required setting up all three components separately before coordinating their use.

The organization was also addressing inconsistent performance of the virtual desktops. As with any workload, IT was looking for ways to better isolate its virtual desktops from "noisy neighbors"—other workloads that would detract from the performance end-users expected from their desktops. The lack of ability to easily fine-tune the converged infrastructure most likely contributed to the issue, as fine-tuning resource allocation required manual intervention of server and storage components. Managing the three-tiered platform also was challenging as the separate components came from different vendors, thus not lending themselves to any seamless interoperability.

No Complexity—Platform 'Just Works'

Considering the merger, IT looked for alternatives and chose to test Nutanix's VDI solution as an easier way to deploy and manage a VDI infrastructure. Of the comments we heard during interviews, this customer placed a high value on the ease of installation and deployment. Based on the customer's experience, Nutanix delivered on being a simple solution to install and deploy, as there is no need for IT specialized knowledge, specifically with servers and storage, to ensure the right hardware and software configurations.

> *"(The Nutanix VDI solution) comes out of the box and ready to go, just rack it, cable it, power it, load the hypervisor, and power it on."*
>
> *"Nutanix, makes the storage conversation go away. I'm not the storage guy, I'm the Citrix guy, and I don't have time to figure out the storage. I just need it to perform, I need to have my desktops to run well."*

The additional value that this customer gained from the Nutanix solution was in delivering a consistent and predictable end-user experience. As we heard during our conversation, Nutanix helped the customer to make its end-users happy and productive.

> *"We are able to provide an always-on environment. While end-users are in the field, applications perform as they should."*
>
> *"If a trouble arises now, I no longer look at storage as the possible cause."*

An additional point that this customer noted was the ease in placing a cost for setting up a new user on the VDI. This became extremely valuable in light of adding new end-users. Since Nutanix's VDI solution is integrated within a few rack units, the customer knows the cost of deploying a given number of desktops per Nutanix node. Delineated costs for deploying a new desktop can now be presented, unlike having to assign costs of using resources in its previous three-tiered architecture. This enables better planning and cost control, which especially helps with today's constrained IT budgets.

Of the benefits that the customer identified, the most notable were:

- Installation of resources for a given number of desktops decreased by at least 90%.
- The number of people needed for installation was reduced by 50%.

- Time to onboard a new user decreased by an average of 70%.
- Trouble tickets with storage as the root cause reduced by at least 95%.

Multinational Biotechnology Firm

One of the largest biotechnology companies develops products that treat a wide variety of illnesses related to areas such as cardiovascular health and cancer. The company generates over $20 billion in revenue annually. Currently, the IT organization supports 4,000 Citrix XenDesktop virtual desktops across three sites. Prior to using Nutanix's solution, the company employed the DIY approach and created its own customized CI called a "pod" using four separate vendors for the server, storage, and networking components. The IT organization developed this idea of a pod to help scale its Citrix XenDesktop VDI, as each pod was designed to support up to 500 virtual desktops.

Although the pod helped in standardizing purchases, IT realized that finding a solution allowing more granularity in scaling its VDI compared with its pods made more sense. The pod enabled predictability in costs (equipment, maintenance, warranty, infrastructure, and installation), yet the business was not necessarily always scaling to that defined number of 500 desktops. The risk of overprovisioning resources, especially if IT wanted to deploy far less than 500 desktops, remained.

Granularity and Simplicity in Deployment and Cost of Virtual Desktops

The company learned about HCI and wanted to leverage it in its virtual desktop environment. It ultimately decided on the Nutanix solution. As the team has evaluated and used the Nutanix VDI solution, it has experienced the simplicity that Nutanix offers in terms of its planning and installation of its virtual desktop environment.

> *"It made sense that (Nutanix) was going to be a lot easier rather than piecemealing different products together. The ease of management and scaling was a lot easier. When we are scaling, we can go even more granular for less than 500 users because of the (Nutanix) node model. We did not have to worry about buying so much hardware whether we are deploying 500 desktops or not."*
>
> *"Going from the piecemeal environment, now our team didn't have to worry about that…just buy a block of what we need and drop it into our VDI."*

Another factor contributing to its simplicity was the way in which desktops were provisioned and deployed. The Nutanix solution employs data deduplication and integration with linked clones on the VMware vSphere side to enable faster deployment of new desktops. In the previous architecture, the customer employed two additional physical servers and an additional back-end storage LUN dedicated to provisioning. Nutanix offers a simpler way of provisioning new desktops with the physical node, which helps in simplifying the overall VDI, freeing up storage to be utilized by virtual desktops, and eliminating steps in the provisioning process. This also leads to additional time and cost savings.

> *"We can now deploy Citrix XenDesktop within minutes as opposed to an hour or so for 100 desktops. We also appreciate the simplicity achieved, not having to worry about knowing or administering additional services to deploy desktops."*

One point that the customer highlighted was the relative ease in estimating a cost per desktop metric to use in tracking its own expenditures and evaluating other solutions. The company performed much analysis on the cost of a Citrix XenDesktop VDI deployment based on Nutanix. Again, the node model aided in the exercise. The customer also discovered that it was potentially paying more for standardizing on its pod when comparing against using Nutanix.

> *"At the end of the data, our cost standardized at $80/desktop, thus helping us to arrive at an estimated monthly VDI cost. In the past, we could not get that granular."*
>
> *"With our previous environment, with all the capital expenses and setup, we almost had to buy a pod even if we were only deploying resources for less than 500 desktops."*

That cost per desktop also helped the customer to realize that even a cloud-based solution may not make sense to pursue for its purposes.

> *"(Our cost per desktop estimate) definitely came in handy when evaluating a cloud-based solution. Even though the competitor quoted a low price, when we added up the other costs we knew would be incurred, the competitor's cost was actually closer to our own internal estimate. Knowing that, we determined that there was really no gain of the cloud solution over an on-premise solution, when you know data is secure, data resides in the company and customization is allowed."*

Management of the VDI became easier according to the customer, as the Nutanix GUI-based management system, PRISM, offered the single pane of glass used across the server, storage, and Citrix XenDesktop VDI teams. This helped IT in reducing the amount of time spent consulting multiple consoles to answer a question or resolve an issue.

> *"With the single pane of glass replacing at least five or six different consoles, no longer am I going to the storage guy to now to check on how much storage I need, I can just see that. One less person to ask, one less console to login into."*

Finally, the customer noted how the Nutanix solution helped it recently recover from a major outage. A database within the VDI solution had been accidently deleted, forcing the customer to rebuild all desktops affected. This customer could not have imagined being without Nutanix to help in the recovery.

> *"We had to rebuild a ton of VMs because we lost a lot of data on them. An outage like this that usually takes 1-2 day of recovery time actually took us about 4 hours to get back online."*

In addition to the benefits described above, the customer identified other benefits experienced, most notably:

- A 25-50% reduction in time spent on monitoring and maintaining the VDI environment.
- Polling statistics on the VDI requires only one console versus the 2-4 consoles usually accessed in the previous environment.
- At least a 50% reduction in the planning and installation of Nutanix across three internal teams.

Summarizing the Economic Benefits

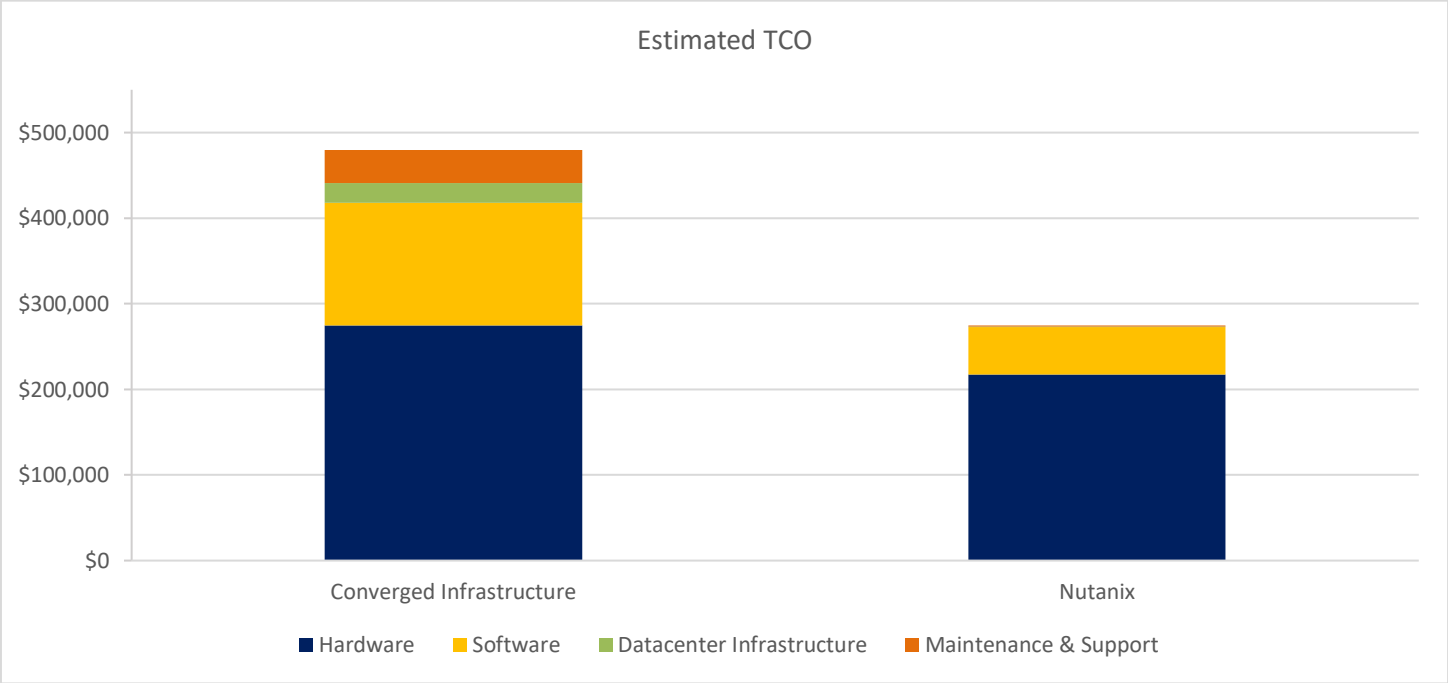
While we only told two specific customer stories in this paper, ESG validated the savings and benefits with other customers—the results were consistent across discussions and projects. Based on the data we gathered, ESG extracted some common overall benefits.

For this exercise, we assumed that the recipient of the benefits is a "blend" of all customers who were interviewed for this paper. The scenario modeled in the paper assumes that the customer has transitioned from a VDI solution comprised of separate server, storage, and networking components to the combined Citrix XenDesktop and Nutanix solution. We

considered an organization that is supporting 1,000 endpoints, each requiring a desktop for general office purposes (e.g., application access, file creation and editing, and email). For this type of desktop, we assumed that each required 30 GB of usable capacity. To calculate maintenance and support costs, we assume that it is 10% of the equipment cost. Infrastructure costs are calculated using specifications from existing datasheets. Finally, we calculated costs and benefits over a three-year period.

Figure 2 shows estimated savings in equipment (hardware and software), maintenance and warranty, and infrastructure (power, cooling, and rack space) achieved using Nutanix over an alternative CI platform. Note that the software costs in the figure do not include licensing costs for Citrix XenDesktop yet do include hypervisor licensing costs.

Figure 2. Comparing Three-year Total Cost of Ownership (TCO) Costs for Supporting 1,000 Endpoints



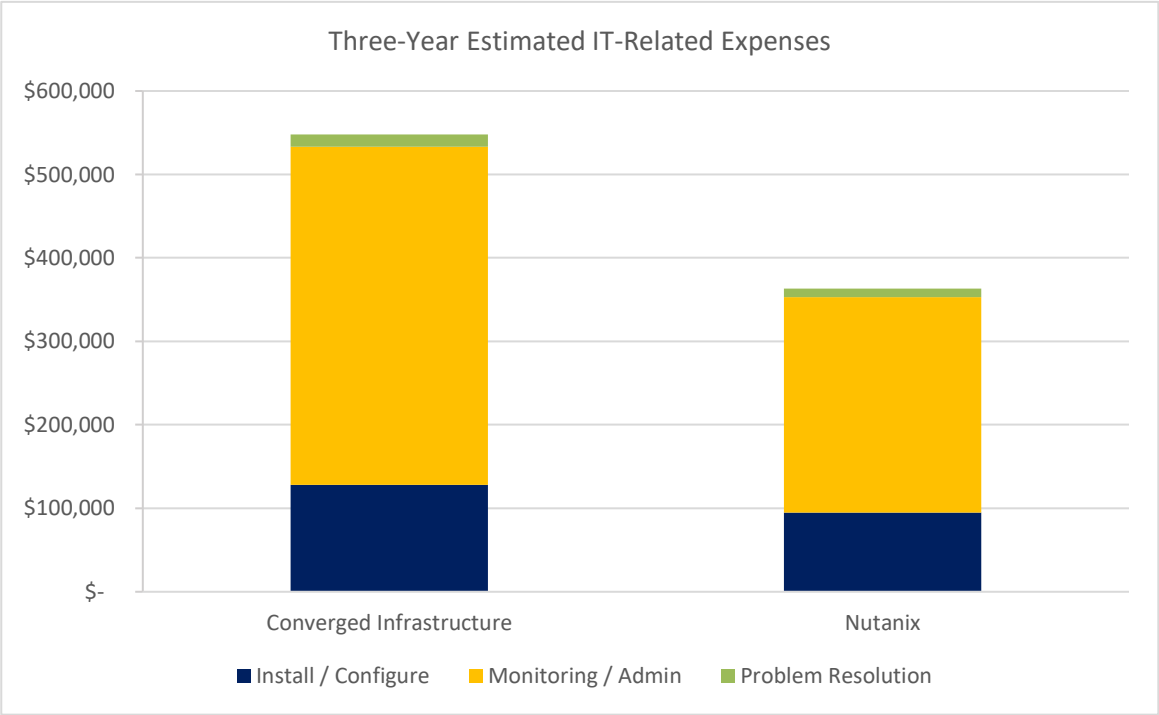
Source: Enterprise Strategy Group, 2017

Based on our assumptions, we can expect the following TCO savings:

- A 35% decrease in equipment costs considering both hardware and software.
- At least a 90% decrease in infrastructure costs.
- At least a 95% decrease in maintenance and warranty costs.

The decrease in equipment costs is expected as a Nutanix node is smaller than the traditional three-tiered CI, as all the server, storage, and networking components are integrated into one unit (a 2 rack-unit (2U) form factor). Buying a CI means purchasing separate components, which typically will be at least 2U in many cases. The compact form factor contributes to the reduction in infrastructure, as the less space the solution occupies, the less power and cooling will be required. The integration of the Nutanix VDI solution helps to decrease the maintenance and warranty costs, as the need to purchase three separate contracts from three different vendors is eliminated.

Figure 3. Comparing Three-year IT-related Expenses for Supporting 1,000 Endpoints



Source: Enterprise Strategy Group, 2017

In calculating IT-related expenses (see Figure 3), we assumed that the IT organization in this scenario is staffed with employees earning an annual salary of $70,000. Trouble tickets are assumed to be generated by issues that IT encounters in supporting 1,000 virtual desktops. ESG estimated the following savings in IT-related expenses:

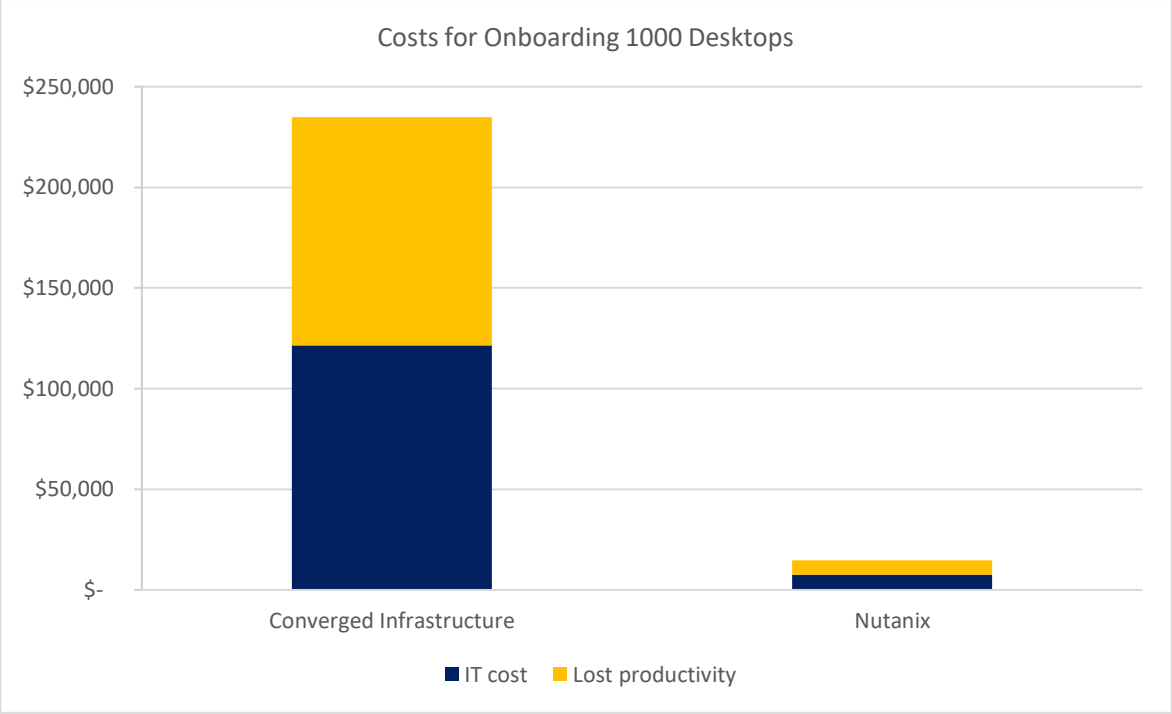
- At least a 26% decrease in the time to install and configure the underlying VDI platform.
- At least a 36% decrease in monitoring and administering VDI platform.
- At least a 35% decrease in resolving trouble tickets submitted by end-users or noted by IT.

As noted in the previous section, Nutanix's small and integrated form factor eases the tasks of installing and configuring such that IT is ready to deploy virtual desktops much faster than with a DIY approach. Not only is the racking and cabling of the solution much easier, but also the number of people needed to perform these tasks decreases, as the need for people with specialized knowledge of the separate components in the CI no longer exists. The software-defined architecture of Nutanix also helps in the configuration of Nutanix nodes, as there is no longer a need to install and coordinate the use of four separate operating systems (server, storage, networking, and virtualization).

The integrated solution allows Nutanix to offer its GUI-based management system, allowing IT to see the entire VDI without having to access up to four different consoles and four people, each with specialized knowledge of the CI components. Less time is also spent having to consult others within IT about the current situation. Resolving problems also requires less time and resources as the GUI allows faster identification of the problem, thus leading to more uptime for the end-users and less time spent on problem resolution overall. ESG should also note that the consistent performance of the Nutanix solution contributes to less time spent in problem resolution, as less end-user-impacting issues are encountered

Finally, we considered the costs to both IT and end-users when onboarding virtual desktops. In this 1,000-endpoint scenario, we estimated the costs incurred and compared them between the CI and Nutanix. Note that these cumulative costs are not related to a specific three-year period, as with our previous cost estimates. Figure 4 depicts our comparison.

Figure 4. Comparing Impact on IT and End-users for Onboarding 1,000 Endpoints



Source: Enterprise Strategy Group, 2017

Our interviews confirm this dramatic decrease, as customers noted that the task for onboarding virtual desktops decreased significantly. The simplicity and integration of the Nutanix architecture allows IT to onboard a desktop easily. With no need to coordinate between multiple people to ensure that the right resources are allocated and configured correctly, one person can onboard a virtual desktop in a matter of minutes as opposed to hours. According to one customer, the time to onboard one desktop went down from 4-8 hours to 15 minutes. Similar estimates that we heard in interviews were the basis for our estimates in Figure 4.

With the IT cost estimates, we also estimated the cost of end-user unproductivity. The longer it takes to onboard a user onto the VDI, the less productive that end-user is. Based on our estimates, the lost productivity for 1,000 users over time decreases by over 90%. It logically follows that more productivity results in less wasted costs and overall increased profitability. We can also estimate that should the number of desktops increase beyond 1,000 in our assumed three-year period, the savings will become more pronounced.

The Bottom Line

To summarize our findings based on our customer interviews and estimates, ESG finds that the combined Citrix/Nutanix solution delivers benefits in the following areas:

- **Faster time to productivity/increased productivity:** The integration between Citrix XenDesktop and Nutanix HCI means that end-users can be up and running faster, speeding time to productivity for each user. On an individual basis, this can have a minimal impact, but across hundreds or thousands of employees the impact can be profound. Additionally, the business continuity features associated with the solution ensure that the solution is

available to support modern workforces that work around the clock and remotely, increasing user satisfaction and productivity.

- VDI administration and problem resolution: With Nutanix's integration and its GUI-based management system, IT no longer has to coordinate between different people and management systems to ensure that the VDI is running smoothly, or to resolve any end-user-impacting issues. Nutanix's management system utilizes one console to assess the entire VDI as a whole, not as separate running parts.

- Equipment and related costs: Nutanix's integrated solution allows a customer to purchase less equipment to support the server, storage, and networking needs for any given number of virtual desktops. The software-defined architecture allows for easier resource configuration and coordination when compared with dealing with a three-tiered CI. Since Nutanix simplified the solution stack with its HCI, IT professionals do not have to deal with multiple vendors, which has a cascade effect, decreasing installation, maintenance/warranty, and infrastructure costs, and lowering overall TCO. Customers can also leverage the Nutanix AHV should they wish to further decrease their software licensing costs. Additionally, the availability of one-click upgrades can further reduce CapEx and OpEx by reducing the number of new nodes required as an organization expands out its Citrix footprint over time. Existing nodes—due to one-click upgrades—continually run faster, have greater capacity, and therefore support more desktops.

- Business efficiency: Finally, the Citrix XenDesktop and Nutanix solution enables the overall business to focus on its business and not spend time ensuring that end-users can access their virtual desktops. Nutanix's simplicity facilitates easy installation and efficient management and administration, allowing IT to deploy Citrix XenDesktop virtual desktops quickly. With end-users quickly onboarded, productivity increases, costs decrease, and ultimately, profitability rises.

The Bigger Truth

As more organizations turn to VDI to efficiently support their global workforce, the underlying architecture makes a larger difference in enabling the business to fully realize the benefits associated with VDI—from increasing end-user satisfaction and productivity to improving IT operational efficiency. Neither the infrastructure nor the VDI solution decision should be made in a vacuum—there needs to be a symbiotic relationship between the two in order to realize the maximum benefit. That's what ESG found when we discussed the Citrix XenDesktop and Nutanix solution. It is clear from the interviews that while VDI can increase productivity and end-user satisfaction on its own, having an easily scalable, adaptable architecture made a big difference in realized benefits.

An IT organization can literally save hundreds of thousands of dollars (or more) over three years on hardware, software, maintenance, and troubleshooting depending on the size of the environment—never mind the benefits associated with speeding time to productivity. As we have seen from these customer examples, the cost benefit of having a symbiotic relationship between your Citrix XenDesktop implementation and underlying Nutanix HCI infrastructure can be profound.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides actionable insight and intelligence to the global IT community.

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