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White Paper

VMware Horizon and NSX Data Center: Network and Security for Virtual Desktops

Organizations Share Successful Strategies Using VMware NSX Data Center

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Contents

VMware NSX Data Center: Securing the Network for VMware Horizon Deployments

As bad actors become increasingly sophisticated in the ways they access business-critical and proprietary information, organizations must be ever vigilant in protecting their intellectual property—and their users. One of the primary means to protect the enterprise and improve security is the use of virtual desktops. In fact, improved security is a primary driver of organizations incorporating virtual desktops into their workspace delivery strategies. As such, companies are continuing to attain success by deploying virtual desktops and improving control of the environment, while reducing the burden on IT to manage images, applications, updates, and patches, and expend valuable resources for ongoing troubleshooting.

While much of the success of virtual desktops has helped address security and operational challenges, IT professionals still have concerns about a growing threat landscape and an expanded security perimeter that they need to protect. Malware, phishing, and other emerging advanced threats can be used to compromise a virtual desktop to serve as a jumping off point for an attacker to move laterally into the rest of the data center. A number of companies have tried to mitigate this risk by employing traditional data center infrastructure approaches (and have attained some success) but have also been left with the expense and responsibility for managing and maintaining the additional infrastructure. IT pros quickly learned that applying traditional network VLANs and firewall appliances created more traffic and complexity that was unnecessary and inefficient.

Is there a more palatable alternative? Yes: VMware NSX Data Center.

NSX Data Center enables IT administrators to create networking and security policies entirely in software that are enforced at the individual virtual desktop level from within the hypervisor itself. This level of granular security is called micro-segmentation, which prevents an attacker from moving laterally across a virtual desktop environment and into the rest of the data center. Because NSX Data Center security policies are defined in software, they are completely automatable. When a virtual desktop is created, the desktop can automatically inherit its security policies and as the desktop moves from one host to the next, or across the data center, its policies will follow. A single rule in NSX Data Center such as "deny all traffic between virtual desktops," can immediately reduce the attack surface of an entire VDI environment and make the organization significantly more secure.

NSX Data Center Benefits for Virtual Desktops

NSX Data Center can be added to VMware Horizon deployments for businesses seeking to achieve the following benefits:

- **Simplified VDI Networking and Security**: Create, change, and manage load balancing and security policies across the entire VDI infrastructure from a centralized software console.
- **Dynamic Policies:** IT administrators set security policies that adapt to users with identity-based firewalling policies based on location, device type, and application access—independent of the physical network infrastructure.
- **Increased Security for Virtual Desktops**: Security policies are defined and enforced at the individual virtual desktop level, providing each desktop with its own perimeter defense through micro-segmentation.
- **Extensibility:** Integration with industry solutions for antivirus, malware, intrusion prevention, and next-gen security services.

Business Successes with VMware NSX Data Center

ESG recently spoke with several IT professionals in education, financial, and municipal services areas to obtain a deeper understanding of how these organizations have benefited from NSX Data Center—as well as the drivers compelling them to adopt NSX Data Center for VMware Horizon virtual desktop deployments. Interviewees shared the challenges they were looking to address, details of implementations, benefits they achieved, and their future plans. Highlights of these successes with NSX Data Center include:

- A public school district network administrator explained, “With AppDefense, we’re securing our servers; and with NSX we’re securing the network the servers are talking to. Those two pieces work together perfectly to protect our environment.”
- The information systems specialist at a municipality stated, “We no longer have to be here after hours. With NSX, we can make changes in the background during normal business hours without the end-users even knowing.”
- The manager of systems engineering at a credit union said, “We began using VMware Horizon, AirWatch, and Workspace ONE in an effort to provide more security for our users within the credit union. When we deployed NSX Data Center for Desktop, everything worked.”
- The director at a state university noted, “There are some areas on campus where we’ve been able to reduce support for managing and maintaining devices by 50%.”

Public School District

Profile

A small but fast-growing southwestern school district employs 1,000 staff members to interact with 7,200 students in several schools encompassing grades pre-K though 12. One of the district’s four network administrators shared details of the district’s current IT environment, which is heavily invested in Google G-Suite for education.

- The district is 98% virtualized; 90% of Windows devices are virtual desktops.
- 5,000+ Chrome OS devices access Windows through VDI.
- Students and staff access the VDI environment through the district’s webpage, or by launching a custom-built, full-screen version.
- 300+ apps (32-bit Windows) of licensed software are still used in a Windows environment.

Challenges

A key driver for using NSX Data Center was a 5-10% growth rate each year for both students and staff. The network administrator told ESG that although they are invested in Google G-Suite (specifically Google Apps for Education), it didn’t make sense to relicense the hundreds of Windows applications that are still in use. He commented that “since we don’t have a dedicated security team, we had to reverse engineer the ports that have to be open, and then learn how to open them. Before NSX, this was a complex process.”

Recognized Benefits of NSX Data Center

The network administrator couldn’t be happier with the move to NSX Data Center. NSX has simplified network administration by saving the administrator time, while providing increased security and better performance. He explained, “With NSX we have just one network label across three different vCenters now. Before we launched NSX, we had to deal with 35 separate network segments exclusively for VDI—now we have just two networks.”

VMware AppDefense has also played a large role in the discovery of those ports that need to be available. AppDefense is an adaptive application security solution that profiles the intended state and behavior of the workloads that comprise applications and monitors for deviations in behavior that indicate threats. The school's goal is to turn pieces of AppDefense to protect mode very soon.

"AppDefense allows us to identify, in learning mode, where to lock down the environment, and create new NSX rules determined by the findings," said the network administrator. "AppDefense opened our eyes to how many applications our servers found. We literally weren't aware of how significant this was, and we've already identified a number of things that need to be protected differently…With AppDefense, we're securing our servers, and with NSX we're securing the network that the servers are talking to. Those two pieces work together perfectly to protect our environment." The network administrator continued, "We are transitioning from a disaster recovery model to a disaster resiliency model based on an NSX and vCenter design…Our VDI is all behind NSX load balancers in order to handle reboots or anything else that may be thrown our way."

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>
> Public School District

Municipality

Profile

For more than six decades, this flood and wastewater district serving a population of over 120,000 has been providing wastewater and flood control service to protect the public's health and safety as well as the environment. Just two information systems specialists manage the district's entire network, storage, and security. One of the information systems specialists talked with ESG about the challenges of the district's pre-NSX IT environment, and what compelled them to deploy NSX Data Center.

- The district is 98% virtualized; 168 virtual machines.
- The organization supports 80 end-user environments including engineering, field ops, pollution control, lab, and finance.
- Each end-user has a thin client with two monitors and can access her desktops and iPhone at any location in the district.
- Each end-user can log in with his iPhone or iPad.

Challenges

After years of dealing with a deteriorating system, it was time for the municipality to deploy NSX Data Center. The information systems specialist noted a few key examples of a system that had clearly outlived its usefulness: "If a machine crashed, we would have to replace the hardware and reload the software." In another instance, they found themselves with servers laying on the data center floor, and keyboards strung across to different monitors with red, blue, and green network cables coming into them—all to try to isolate traffic. It wasn't long before they started noticing network performance issues due to the necessity to hairpin network traffic from a host out to a firewall, and then back in to the same host. Said the information systems specialist, "We just couldn't continue to work with the physical firewall and send traffic out to the firewall and back to the host." Their extremely lean IT department of two people didn't have the time or resources to constantly cable servers, configure vLANs, and create new security rules.

Recognized Benefits of NSX Data Center

The information systems specialist is thrilled with NSX: “It’s pretty unbelievable. I was able to create security rules living in Cisco and mimic them in NSX…With NSX, I was able to turn off all of my Cisco gear while everything kept running.” In addition, they are now able to set up secure access for their auditors on their network using NSX rules in just 20 minutes.

Since deploying NSX Data Center, the municipality has not had to purchase additional networking gear since NSX Data Center comes with a load balancer they can set up in 10-15 minutes. They have already completed micro-segmentation with their corporate and control networks by creating rules that limit and restrict traffic between VMs. Said the information systems specialist, “NSX is like having a third person on our team…we no longer have to be here after hours. With NSX we can make changes in the background during normal business hours without the end-users ever knowing.”

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> Municipality

Looking ahead, the information systems specialist commented they plan to bring in vSAN with their hardware refresh and look into VMware Workspace One for an even better user experience.

Credit Union

Profile

With more than $10 billion dollars in assets, approximately 400,000 members, and 500 employees, this not-for-profit Midwest credit union is one of the largest in the US, offering a range of online, phone, and mobile banking services. ESG spoke with its manager of systems engineering about the organization’s IT challenges and the role of VMware solutions in their organization. Currently, they have 100-150 images, with a 500 VDI image capacity.

Challenges

Three years ago, when the manager of systems engineering first started at the credit union, there was a big push for virtualization. One of his top priorities was ensuring they received end-to-end support from their partners. Said the manager, “Our culture is to make sure we put people in positions, so they succeed. My job is to make sure we partner with vendors that help us succeed as well.” After evaluating VMware and another company’s virtualization solution, they felt VMware was the best solution for them. Since then, the organization has been virtualizing its infrastructure with VMware.

Because the credit union had been going through a digital shift—from being a brick and mortar type of institution to enabling members to use their phones for banking—it was essential that the organization’s infrastructure could keep up with member demands.

> “We began using VMware Horizon, AirWatch, and Workspace ONE in an effort to provide more security for our users within the credit union. When we deployed NSX Data Center for Desktop, everything worked.”
>
> Credit Union

In addition, they needed to separate certain groups of individuals and processes within the credit union. The product they were trying to use (from another vendor) did not work very well. Though the credit union’s network engineers worked with the vendor to get the product to function, it never did. That’s when they turned to VMware.

Said the manager, “We began using VMware Horizon, AirWatch, and Workspace ONE in an effort to provide more security for our employees within the credit union. When we deployed NSX Data Center for Desktop, everything worked. The solution allowed us to isolate individuals and processes so that our users can use PCI compliant desktops, as well as non-PCI compliant desktops, to perform their work."

Recognized Benefits of NSX Data Center

Starting with micro-segmentation, the credit union now uses NSX Data Center as the load balancer for its SharePoint environment. They are able to separate their PCI environment/servers from their non-PCI environment, which allows them to achieve multi-tenancy within their clusters.

Said the manager, "Prior to NSX, our security team wanted us to actually have a physical air gap in our infrastructure between PCI and non-PCI—it was going to be a nightmare. With Horizon and NSX, we are able to use the technology to separate the two groups into their own bubbles, so employees can use PCI and non-PCI desktops to perform their work—and share an audit trail acceptable to the auditors."

Employees are currently using desktops or laptops to do their work. Eventually, the organization will be looking at some type of thin client, which will be phase three.

The manager commented on their VMware deployment. "To use NSX successfully and receive its benefits, it's essential there is collaboration between whoever is in charge of the virtual environments, storage, and the physical networking team—because they all have overlapping responsibilities.

"Though it was a challenge at first, collaboration between the teams was one of the things I focused on…In working together, we've come to understand our roles. The systems engineering team installs NSX and we assist the networking team with configuration and policies. Working hand in hand and understanding each other's roles helps to enable a successful implementation. It's very difficult when you're isolated and siloed…Now that we understand how NSX works and have embraced it, we're looking forward to its other capabilities."

Not only is NSX Data Center able to "dissolve" siloes, but it helps to enhance collaboration between IT teams and sharing of cross-functional knowledge—allowing IT to generate faster, more effective resolutions to IT issues.

State University

Profile

This Southern US university has a faculty and staff of approximately 5,000 serving more than 27,000 students spread out in over 300 buildings across 512 acres. The IT team consists of six people performing a variety of roles. ESG spoke with the director of enterprise systems and the senior virtualization engineer about their challenges, and what compelled them to deploy a range of VMware solutions.

Like many state institutions of higher education, the university was constantly dealing with support and monetary issues. The IT department was tasked with determining how they could make VDI work for them in a conventional data center environment. Once they decided to move to VDI, the IT department began the switchover using their labs as the starting point. Today, almost all 700 labs have been converted. Currently, the IT department is in the midst of converting 700 endpoints to VDI images.

- 1,600 VDI desktops running concurrently, with the goal of all desktops being non-persistent.
- 700 lab systems in dedicated pools, which use a majority of thin clients (with some zero clients).
- 9,000 to 10,000 students are enabled for remote access.
- The VDI environment uses a full stack of VMware products.

Challenges

One of the school's popular majors is architecture, where students are required to use expensive CAD software, high-priced laptops, and licenses. Students from economically challenged areas couldn't afford the laptops, which limited their education to some degree. It was essential for the school to find a way to include all qualified students in the program.

Additionally, in the labs, a number of desktops were always down, infected with a virus, or without the correct software loaded. One of the school labs designed for developing 3-D educational games had an exceptionally inadequate system powering it. Rendering a video could take up to 34 hours, making the process extremely inefficient and expensive, while severely limiting productivity.

Recognized Benefits of NSX Data Center

Less than a year ago, the IT department spent nearly six months building their initial VDI environment, first building the pilot environment, then the production environment. The production environment has grown as they added more labs. They have a geographic separation of pods (they're using cloud pod architecture) so that everything is standards-based.

By removing the original labs, all the expensive CAD software is running within a VDI environment with graphics acceleration. The university's 3-D lab has done a complete turnaround. Using VDI, the time it takes to render a video has dropped dramatically—from 34 hours to 1 ½ hours. Said the director, "It opened up a whole new world of possibilities for them to deliver a quality product."

With virtualization, the machines are highly available, and much less support is needed to manage and maintain devices. Said the director, "There are some areas on campus where we've been able to reduce support for managing and maintaining devices by 50%."

One of their guiding principles was to create a good, consistent user experience across the board. Said the senior virtualization engineer, "We wanted to make the infrastructure as disposable as possible—If that one doesn't work, just spin up another one."

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>
> State University

The university has implemented a full stack of VMware products from vSAN to NSX Data Center. They use NSX Data Center for load balancing, and micro-segmentation to enhance security, providing an additional firewall between every device. Said the senior virtualization engineer, "Because NSX is software-defined networking, it fit into the model we were striving for, giving us a greater amount of security than our VSI environment had given us…NSX is just one part of our security posture when it comes to firewalls." The university is also using NSX Data Center in its virtual server environment to provide routing services.

The university's goal is to tie its student system into its VDI system. Said the senior virtualization engineer, "When a student registers for classes, the VDI system knows the classes they're taking, their professors, and the applications they will need—and will preload everything into a desktop or a Workspace One interface. Each student will have access to the applications they need on any device. No need to purchase expensive laptops or go to a specific lab on campus during hours."

Ultimately, the university's goal is to make it easier for a student to learn.

The Bigger Truth

Based on the interviews ESG conducted with these organizations, VMware NSX Data Center is helping IT professionals achieve:

- Load balancing and micro-segmentation to enhance security.
- Simplified network design and topology without the requirement of additional network infrastructure and expertise.
- Time savings with simplified network policy configuration, which is integrated into the VMware platform.
- Logging for compliance mandates and auditors.
- Improved organizational teamwork through the creation and modification of network policies.

IT professionals no longer have the benefit of a predictable workspace that is only accessed on a known, controlled, and secure network. Employee behavior is also changing while security threats place new demands on businesses. VMware NSX Data Center enables IT to drastically reduce the attack surface of a user’s digital workspace and improve the overall business security posture. IT also benefits with simplified administration, while end-users maintain a safe and productive experience.

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