White Paper

The Business Value of VMware NSX Advanced Load Balancer: A Study of Enterprises Using Next-Generation Application Delivery

Sponsored by: VMware

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EXECUTIVE SUMMARY

Driven by the acute imperative of digital transformation, enterprises and other organizations worldwide have adopted multicloud strategies as springboards to increase business agility and competitive differentiation. At the same time, monolithic application development has been superseded by cloud-native microservices, which entail the decomposition of previously complex applications into independent, modular processes that communicate with each other using language-agnostic APIs.

Unfortunately, existing application delivery infrastructure was designed for the client/server era, not for the cloud era, in which microservices are proliferating and application environments are becoming increasingly distributed across clouds. Physical application delivery controller (ADC) appliances were logical choices when there was a one-to-one relationship between applications and servers in an enterprise datacenter, but they are less tenable in cloud environments, where they often are unable to scale up and down elastically to accommodate changing application requirements and traffic patterns. Even the advent of virtual ADCs (vADCs) — which, architecturally, are still appliances — doesn't fully address these challenges, failing to provide the agility, flexibility, and elastic scale that are required.

As such, there is a need for application delivery to become more agile, more elastic, more distributed, and more orchestrated. We have entered a period where ADC functionality must be recast as application services — elastic pools of network and security services (often referred to as Layer 4–7 services) that ensure optimal application deployment and that also dynamically support the availability, performance, and security of applications. Typical application services address load balancing, application analytics/monitoring, application acceleration, auto-scaling, microsegmentation, and application security and also function as service proxies and enable service discovery.

Business Value Highlights

- 573% three-year ROI
- Five months to payback
- 47% lower cost of operating
- 52% lower ADC solution cost
- 43% more efficient ADC management
- 97% faster to scale capacity
- 8% higher application developer productivity

VMware's NSX Advanced Load Balancer, known as Avi Vantage prior to VMware's acquisition of Avi Networks in 2019, adapts application services to adhere to the principles of software-defined networking (SDN), including the decoupling of the control plane from the data plane. Accordingly, VMware says it is in the business of providing "software-defined application services," though we will refer to them as application services for the remainder of this white paper.

IDC interviewed organizations using NSX Advanced Load Balancer to deploy application services to understand how they are using the product to support their business operations. Study participants explained that moving to NSX Advanced Load Balancer has changed how they pay for and consume application services. With NSX Advanced Load Balancer, they no longer must choose between overprovisioning and potentially having insufficient load-balancing capacity, while having virtualized application delivery resources with NSX Advanced Load Balancer ensures that their application development efforts and business operations are not slowed by manual provisioning processes. IDC's analysis shows that study participants are achieving significant value with NSX Advanced Load Balancer worth an annual average of $4.11 million per organization ($230,891 per Avi Service Engine) by:

- **Reducing the cost of providing application delivery and load-balancing resources** through software-defined principles and use of commodity hardware
- **Providing real agility by sharply reducing the time needed to deliver new load-balancing capacity**, thereby enabling development teams and opening up new ways of serving customers including self-service offerings
- **Supporting the business with elastic scalability and improved network performance**, thus better addressing business opportunities and serving customers and internal application users

SITUATION OVERVIEW

Digital transformation on the 3rd Platform continues to engender sweeping change to business processes and business models. Enterprise IT must respond by ensuring that network infrastructure can support not only legacy applications that function as systems or record but also the new wave of cloud-native applications that function as systems of engagement. In the context of digital transformation, these applications have gained unprecedented importance — delivering content and digital experiences, facilitating communication, enhancing employee productivity, and supporting business transactions. This change places ever-increasing pressure on the network, and those who operate it, to provide for cloud applications that are integral to digital transformation.

Consequently, application services are required to accommodate enterprise requirements for hybrid and multicloud application delivery, in addition to the needs occasioned by increasing mobility, data analytics, and the expansion of the Internet of Things (IoT).

As legacy application workloads migrate to the cloud, and as new workloads are born in the cloud, ADCs and other network infrastructure dedicated to application delivery must adapt to the requirements of hybrid IT, ensuring that applications are delivered consistently, reliably, and securely, not only from on-premises datacenters and private clouds but increasingly from multiple public clouds. Hence the need for a more agile, distributed, and orchestrated approach to application delivery as represented by application services.

What's more, as developers and DevOps teams increasingly embrace distributed, cloud-native environments predicated on containers and microservices, the demand for application services will continue to grow. That's because of the increasing pressure on network and other IT operations teams

to keep pace with advances in application architectures and cloud environments, with DevOps and CI/CD processes setting an ever-faster cadence that infrastructure must have the agility and responsiveness to support. That is why intelligent automation and self-service models are a necessity for every enterprise that relies on applications for its business success.

As such, application services not only align well with the requirements of multicloud, but they also offer business and operational benefits such as agility, increased productivity, and reduced capex and opex costs.

NSX ADVANCED LOAD BALANCER

NSX Advanced Load Balancer is entirely software based, providing application services that can be deployed on bare metal, virtual machines (VMs), and containers, as well as in datacenters and public clouds.

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The solution addresses the application delivery requirements of a wide range of customer organizations, including (but not limited to) those in the retail, financial services, and technology sectors, and service providers. NSX Advanced Load Balancer is particularly suited to organizations that need an automated and orchestrated approach to application delivery, with the ability to elastically scale application services up or down dynamically based on demand.

As such, it enables customers to obtain optimal load-balancing capacity and other application services when needed, and then scale back down as application traffic decreases. NSX Advanced Load Balancer also features REST API-driven automation and provides application performance visibility that can aid reactive troubleshooting as well as proactive capacity planning.

Despite the name, NSX Advanced Load Balancer can be deployed to address application delivery challenges and deliver business value in non-VMware application environments, including those that do not contain VMware NSX Data Center or VMware vSphere. While NSX Advanced Load Balancer is integrated with NSX Data Center to create a complete, declaratively managed, policy-based Layer 2–7 network virtualization fabric, NSX Advanced Load Balancer is also widely deployed without NSX, where it provides all the features and benefits discussed in this paper.

Despite the name, NSX Advanced Load Balancer can be deployed to address application delivery challenges and deliver business value in non-VMware application environments.

In addition, NSX Advanced Load Balancer functions as an ingress controller for Kubernetes-based container environments and provides ingress services such as traffic management, application security, and observability for Kubernetes clusters. It also integrates with VMware's Tanzu portfolio, including the Tanzu Service Mesh, which is based on the Istio open source project, and similarly integrates with other Kubernetes-based platforms, including Red Hat OpenShift. These integrations allow enterprise customers to extend cloud-native container networking and application services across traditional applications in on-premises datacenters as well as across container-based microservices.

This allows NSX Advanced Load Balancer to serve as application delivery infrastructure that can address a comprehensive array of application environments, heterogeneous infrastructure, and multiple clouds. This includes the on-premises datacenter, traditional monolithic applications, cloud and multicloud use cases, container and microservices use cases, and end-user compute (EUC) requirements that involve support for virtual desktops and VDI workloads. In this latter scenario, NSX Advanced Load Balancer integrates with and provides load balancing and other application services for VMware's Horizon EUC platform.

As mentioned previously, NSX Advanced Load Balancer is architected on software-defined principles, decoupling the data and control planes. As a result, it centrally manages and dynamically provisions pools of application services, including load balancing, across multicloud environments (including AWS, Microsoft Azure, Google Cloud Platform [GCP], VMware Cloud Foundation [VCF], and VMware Cloud on AWS [VMC]).

Architecturally, NSX Advanced Load Balancer comprises three core elements: the Avi Service Engines, the Avi Controller, and the Avi Console.

Avi Service Engines take the form of distributed software that runs on bare metal servers, virtual machines, and containers. They implement application services across on-premises datacenters, colocation datacenters, and public clouds. They also collect data relating to application performance, security, and clients. As distributed software, Avi Service Engines are capable of horizontal auto-scaling within minutes while functioning as service proxies for microservices.

The Avi Controller provides central control and management of the Avi Service Engines. It orchestrates policy-driven application services, monitors real-time application performance (leveraging data provided by the Avi Service Engines), and provides for predictive auto-scaling of load balancing and other application services. Furthermore, it is capable of delivering per-tenant or per-application load balancing — increasingly in demand in multicloud contexts — and also facilitates troubleshooting with traffic analytics.

Finally, the Avi Console provides web-based administration and monitoring. It offers a UI for configuration of application services, delivers visualization of network configurations and virtual IPs (VIPs), and displays application health scores and transaction round-trip times. It's also where customers can view performance, security, and client insights, as well as where they can view service interactions.

THE BUSINESS VALUE OF NSX ADVANCED LOAD BALANCER

Study Demographics and NSX Advanced Load Balancer Use

IDC interviewed six organizations for this study asking a variety of quantitative and qualitative questions about the impact of deploying NSX Advanced Load Balancer on their network and IT operations, businesses, and costs. These companies ranged from large enterprises to smaller IT service providers, with an average employee base of 25,343 and revenue of $13.09 billion per year.

The sample of companies involved in the study represented a good mix by geography and by vertical industry. Two companies were United States–based, with the other four based in EMEA markets. Similarly, there was diversity among vertical industries represented, including financial services (2), IT services (2), software, and telecommunications. Table 1 summarizes this information along with other relevant demographic attributes.

TABLE 1

Demographics of Interviewed Organizations

	Average	Median
Number of employees	25,343	12,500
Number of IT staff	2,914	800
Number of external customers	14.5 million	5 million
Number of business applications	1,688	650
Revenue per year	$13.09 billion	$8.62 billion
Countries	United States (2), Lithuania, Netherlands, Switzerland, and United Kingdom	
Industries	Financial services (2), IT services (2), software, and telecommunications	

n = 6

Source: IDC, 2018

Interviewed organizations' criteria for choosing to deploy NSX Advanced Load Balancer for application services focused on cost, agility, and scalability:

- **Much lower costs when compared with hardware-based approaches.** One NSX Advanced Load Balancer customer noted: *"The key factors for us in selecting NSX Advanced Load Balancer were the inflexibility of having a hardware-based solution and the cost of adding hardware. The software-based solution with VMware also made sense financially and that is what we were trying to address."*
- **Agility and elastic scalability in terms of application delivery and load-balancing capacity.** According to one customer, "*We chose NSX Advanced Load Balancer because we needed an ADC platform that gave us more agility and visibility into what was going on using analytics. We needed something that was API managed rather than manually operated. We also needed something that would scale out as our PaaS scales out and that was not bound by physical devices.*"

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To achieve these objectives, interviewed organizations have deployed an average of 18 Avi Service Engines at 3-4 datacenters across their operations. The number of business applications supported by NSX Advanced Load Balancer averaged 507, including varied applications and projects. One organization specified that it is supporting "groundbreaking, digital applications" with NSX Advanced Load Balancer, while another is creating an internal platform-as-a-service (PaaS) offering as part of a broader IT modernization initiative. For the most part, these organizations are running NSX Advanced Load Balancer with on-premises virtualized environments, but two organizations have made NSX Advanced Load

Balancer a core part of containerization initiatives. Almost all study participants reported using NSX Advanced Load Balancer as part of private cloud and software-defined networking initiatives, and about half of study participants deployed it to refresh their load-balancing environments (see Table 2).

TABLE 2

NSX Advanced Load Balancer Environments

	Average	Median
Number of datacenters	4	3
Number of Avi Service Engines	18	16
Data throughput (Gbps)	1.5	1.5
Number of business applications	507	118

n = 6

Source: IDC, 2018

Business Value Analysis: NSX Advanced Load Balancer

NSX Advanced Load Balancer customers reported leveraging its use to make their application services much more efficient and effective. IDC quantifies this value at an annual average of $4.11 million per organization ($230,891 per Avi Service Engine) in the following areas:

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- **Lower costs.** With NSX Advanced Load Balancer, interviewed organizations no longer need to overprovision application services, which was necessary with hardware-based ADC appliances. Using NSX Advanced Load Balancer, they can move capacity through software-defined processes to address fluctuations in demand, enabling them to more efficiently use these resources. Further, the software-defined nature of NSX Advanced Load Balancer and its ability to streamline overall capacity makes management application services, such as load balancing, more efficient.
- **Enhanced agility and elastic scalability.** Because NSX Advanced Load Balancer offers software-defined processes, study participants can scale application services in far less time as required for IT and business operations. With VMware, study participants have nearly eliminated lag time for provisioning these resources, changing fundamentally how IT and application development teams leverage application services resources.
- **Supporting and driving business.** Through the agility and scalability, NSX Advanced Load Balancer easily keeps pace with the speed of business change faced by study participants. Further, their ability to automate application services resources allows them to offer new functionalities such as self-service provisioning for internal users and customers.

Reduced ADC/Load-Balancing Resource Costs

Study participants reported that moving to NSX Advanced Load Balancer has changed how they pay for and consume application services. On average, these NSX Advanced Load Balancer customers reported that they will spend 52% less than they otherwise would. Cost-related benefits fall into three categories:

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- **Optimizing use of capacity through software-defined processes.** The software-defined nature of NSX Advanced Load Balancer means that network teams can move and provision application service resources with ease, allowing optimal use of capacity through higher utilization rates and reuse. As one survey participant stated: "*Whenever we need more load-balancing capacity with NSX Advanced Load Balancer, we can just spin it up.*"
- **Eliminating need to overprovision.** Knowing that NSX Advanced Load Balancer offers the agility and scalability required to match business demand eliminates – for all intents and purposes – the need for study participants to overprovision their application services resources to meet unexpected surges in demand. Commenting on this, one survey participant explained: "*With NSX Advanced Load Balancer, we're not paying to overprovision due to the software-defined nature of the platform … [Previously], we had to have more capacity just sitting around before because we needed high availability. We now can meet that more easily and at lower cost with NSX Advanced Load Balancer.*"
- **Using commodity hardware.** Study participants also referenced their ability to avoid vendor lock-in and reduce hardware costs by running virtualized NSX Advanced Load Balancer environments on less expensive commodity servers compared with costlier appliance-based ADC solutions.

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Study participants reported across the board that they have substantially lowered the cost of providing application services with NSX Advanced Load Balancer. One interviewed NSX Advanced Load Balancer customer customer explained: "*We are saving money now and expect to save more money on capital and operating expenses while getting optimized services and a more flexible architecture …We did a case calculation, comparing licenses and hardware, and estimated that we would save a minimum of 58% for the full stack with NSX Advanced Load Balancer.*"

More Efficient Application Delivery and Load-Balancing Operations

In addition to lower costs in provisioning application services, study participants noted that NSX Advanced Load Balancer has allowed them to more efficiently perform these operations. Previously, they spent too much time – often valuable engineering time – on provisioning and capacity issues and carrying out changes. However, by deploying NSX Advanced Load Balancer, these organizations have freed up network engineering time to take on other projects and support higher priority IT initiatives.

One study participant explained that, by going from relying on more manual processes for provisioning resources to automated processes with NSX Advanced Load Balancer, it has avoided needing to enlarge its network operations team to handle business growth. Another NSX Advanced Load

Balancer customer described reallocating staff resources from running and maintaining a hardware-based environment to supporting other areas of the business – a real value as it tries to maximize the value of scarce IT talent.

For study participants, these staff efficiencies are important; their network engineers deliver more value when they are engaged in business-enabling activities rather than day-to-day operational matters. One study participant explained: "*With NSX Advanced Load Balancer, we haven't grown the teams supporting application delivery … With NSX Advanced Load Balancer, our existing teams can handle the workload. We get more functionality with no additional costs. Our team has the added skills of working with the new automated environment, and this helps us grow our PaaS capabilities.*"

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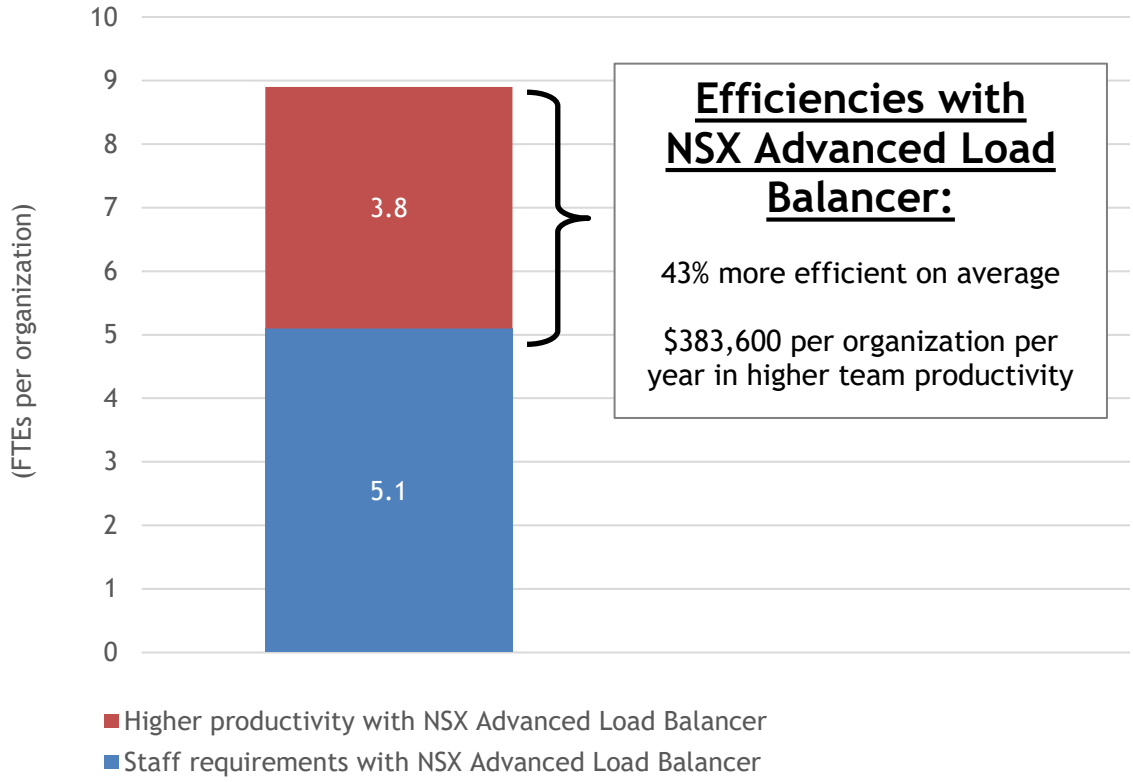
One survey participant described how self-service features – enabled by the elasticity of NSX Advanced Load Balancer– is saving significant amounts of engineering time with every request: "*We gave our customers self-service capabilities with NSX Advanced Load Balancer. Before they had to make a service request, and we would have to assign an engineer to the request. The engineer would have to look at requirements and put in a request for the change with a two-day lead time. At the end of the day, it is moving what was a seven-day journey, down to 5-10 minutes.*"

Figure 1 shows that network operations teams responsible for managing ADC/load-balancing environments are 43% more efficient on average with NSX Advanced Load Balancer, amounting to $383,600 per organization per year in higher team productivity.

FIGURE 1

Staff Impact with Management of ADC/Load-Balancing Environments



Source: IDC, 2018

Overall Cost of Providing Application Services Resources

Figure 2 shows the extent to which these organizations' ability to lower costs of providing application services capacity and more efficient management reduces the cost of operating these environments. IDC calculates that, on average, these organizations are seeing 47% lower costs with NSX Advanced Load Balancer – saving an average of $2.57 million per organization over three years ($144,316 per NSX Advanced Load Balancer) – even as they also substantially improve their ability to address business demand, thanks to much increased agility and flexibility.

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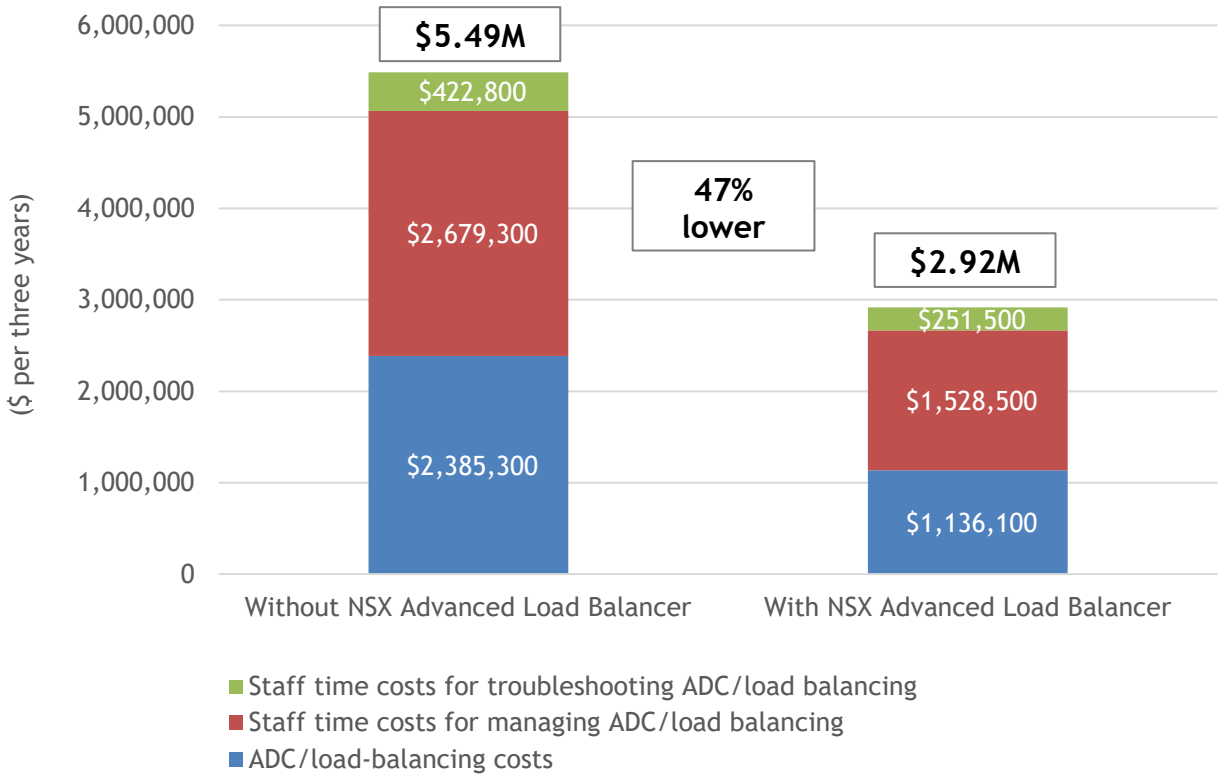
FIGURE 2

Three-Year Cost Comparison



Source: IDC, 2018

Enabling the Business with Agility and Elastic Scalability

Survey participants also described how they have enabled their businesses with NSX Advanced Load Balancer through agility and elastic scalability for their application services. Most importantly, with their legacy environments, they were forced to either overprovision and take on higher and often unnecessary costs or face significant delays to the delivery of resources that their businesses required. When capacity was needed to support a business opportunity, this inability to provision capacity in real time could create a bottleneck to efforts to grow their businesses.

With NSX Advanced Load Balancer, study participants reported that provisioning of application service capacity is no longer a potential business inhibitor. Not only do they know that they can much better identify capacity within their existing VMware environments, but they can scale new resources as needed in far less time. In fact, study participants have gone from needing almost two weeks to deliver application service capacity to only two hours (97% faster) with NSX Advanced Load Balancer. For study participants, this translates not only to staff time savings in handling these requests but also to business enablement through timely and robust delivery of required resources (see Figure 3).

With NSX Advanced Load Balancer, study participants reported that provisioning of application service capacity is no longer a potential business inhibitor.

One NSX Advanced Load Balancer customer explained how sharply reducing the time required to scale has helped it better serve its lines of business: "*Our internal customers are able to spin up capacity with NSX Advanced Load Balancer in minutes to meet their needs. That is much more of a differentiator from the traditional environment – we've gone from weeks to minutes with NSX Advanced Load Balancer.*" Another interviewed organization commented on the extent to which automated deployment with NSX Advanced Load Balancer has brought staff and process efficiencies: "*NSX Advanced Load Balancer has hugely improved deployment time. It avoids people dependencies on change authorizations. In some cases, we have even been able to open up changes for customers and resellers without restrictions.*"

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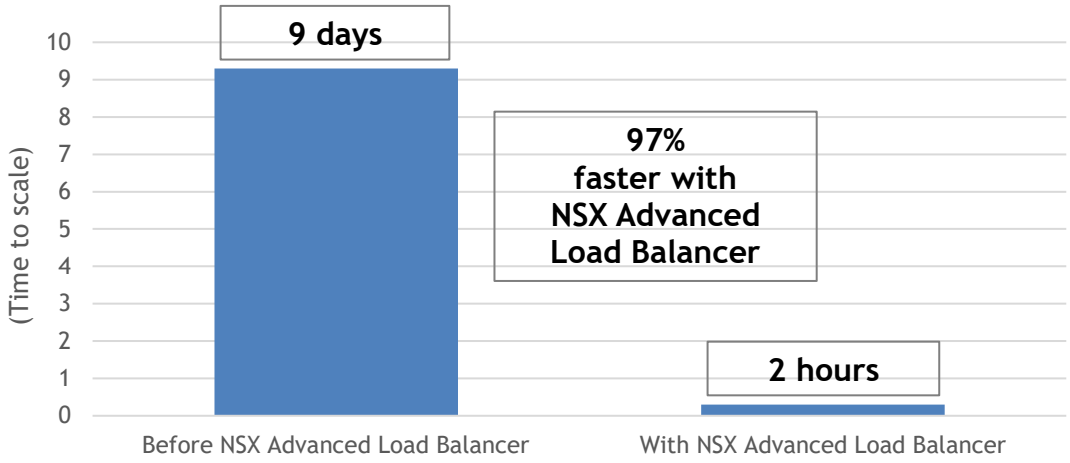
FIGURE 3

Time to Scale ADC/Load-Balancing Resources



Source: IDC, 2018

Supporting More Effective Development Operations

The impact of elastic scalability for application service resources with NSX Advanced Load Balancer is quite evident for study participants in terms of their software development operations. When delivery of application service capacity takes days or even weeks, it slows down developers who need these resources to test and then deploy applications and services, and ultimately hampers their ability to deliver new functionality to employees and customers in a timely fashion.

With NSX Advanced Load Balancer, these companies have eliminated this choke point as they can now deliver these resources on demand. This is impactful for their development teams, especially in terms of actual deployment of new features and applications and pushing out changes. Like many organizations, software development is at the core of what interviewed NSX Advanced Load Balancer customers do. They have hundreds of application developers on average working on NSX Advanced Load Balancer.

One NSX Advanced Load Balancer customer commented on how the cadence of its development efforts has changed: "*NSX Advanced Load Balancer has had a huge impact on application development and delivery. Before deploying NSX Advanced Load Balancer, our goal for releases was quarterly, and now we can release new applications and features on demand. For example, in the last two weeks, we've released a product five times through blue-green development processes.*"

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Overall, this means that these organizations' development teams face fewer impediments and can do more to support their businesses. The result is faster development, coupled with improved ability to deliver on concepts and new ideas in less time. For study participants, this means that their developers create more value for their organizations, with improved developer productivity of approximately 34 FTEs from their use of NSX Advanced Load Balancer (see Table 3).

TABLE 3

Application Development Team Value

	With NSX Advanced Load Balancer	Without NSX Advanced Load Balancer	Difference	Benefit (%)
FTEs per year per organization, equivalent productivity level	422	388	34	8
Equivalent salary value, per year per organization	$42.17 million	$38.83 million	$3.34 million	8

n = 6

Source: IDC, 2018

Enabling Better Business Results and More Efficient Business Operations

Study participants also discussed how NSX Advanced Load Balancer has enabled more efficient business operations. They described NSX Advanced Load Balancer as enabling them to:

- Offer self-service capabilities to customers
- Deliver new services faster to customers
- Improve service performance through enhanced network analytics and better optimization of networking resources

Addressing the benefit of business and revenue enablement, one survey participant said: "*We can create things faster and more robustly with NSX Advanced Load Balancer. I don't know how much revenue improvement is involved, but I can't imagine that there wouldn't be a revenue impact. We're creating things faster, getting them to market faster, and it's more robust.*" Another organization described how it is leveraging NSX Advanced Load Balancer to onboard new customers faster to the benefit of its business: "*We created an external software stack supported by NSX Advanced Load Balancer to request customer certificates. This functionality has changed the default service to lower the cost of onboarding by 10-15%.*"

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The study participants are realizing both operational efficiencies in the form of higher employee productivity and increased revenue with NSX Advanced Load Balancer (see Table 4).

TABLE 4

Business Operations Impact, Productivity Impact, and Revenue

	Per Organization	Per Avi Service Engine
Higher productivity for users		
Number of staff impacted	625	35
Productive hours gained per year	2,322	130
Equivalent FTE gain	1.24	0.07
Value of higher productivity per year	$86,500	$4,853
Business impact, revenue impact from better addressing business opportunities		
Total additional revenue per year	$117,100	$6,574
Total recognized revenue per year*	$17,600	$986

n = 6

* IDC applies a 15% assumed operating margin to all revenue gains.

Source: IDC, 2018

ROI Analysis

IDC based its ROI analysis on interviews with organizations that are using NSX Advanced Load Balancer as their application services solution. Based on these interviews, IDC has calculated the benefits and costs to these organizations of using NSX Advanced Load Balancer. IDC used the following three-step method for conducting the ROI analysis:

1. **Gathered quantitative benefit information during the interviews using a before-and-after assessment of the impact of NSX Advanced Load Balancer.** In this study, the benefits included lower costs associated with offering application services resources, staff time savings and productivity benefits for application developers and other internal users of applications, and increased revenue.
2. **Created a complete investment (three-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of using NSX Advanced Load Balancer and can include additional costs related to planning, consulting, migrations, and staff or user training.
3. **Calculated the ROI and payback period.** IDC conducted a depreciated cash flow analysis of the benefits and investments for the organizations' use of NSX Advanced Load Balancer over a three-year period. ROI is the ratio of the net present value (NPV) and the discounted investment. The payback period is the point at which cumulative benefits equal the initial investment.

Table 5 presents IDC's analysis of the benefits and costs for this group of organizations using NSX Advanced Load Balancer. IDC calculates that these NSX Advanced Load Balancer customers will realize three-year discounted benefits worth an average of $9.72 million per organization ($545,723 per NSX Advanced Load Balancer), based on investment costs of $1.44 million ($81,030 per NSX Advanced Load Balancer). As a result, IDC projects that they will earn an average three-year ROI of 573% and break even on their investment after five months.

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TABLE 5

Three-Year ROI Analysis

	Per Organization	Per NSX Advanced Load Balancer
Benefit (discounted)	$9.72 million	$545,723
Investment (discounted)	$1.44 million	$81,030
Net present value (NPV)	$8.28 million	$464,692
Return on investment (ROI)	573%	573%
Payback period	5 months	5 months
Discount rate	12%	12%

n = 6

Source: IDC, 2018

CHALLENGES AND OPPORTUNITIES

In attempting to address the needs of both cloud-native application environments and more traditional enterprise application environments, VMware's NSX Advanced Load Balancer is competing across the entire spectrum of the ADC marketplace, often against competitors that are entrenched incumbents. While VMware (and previously Avi Networks) has successfully displaced larger rivals at several organizations, it must maintain, extend, and clearly articulate its competitive differentiation if it is to make further inroads.

What's more, leading ADC vendors now keenly appreciate that market dynamics and technology transitions — particularly relating to cloud and the need for cloud-like network as a service (NaaS) — necessitate the need for their product architectures and portfolios to evolve in alignment with the demand for software-based, agile, distributed, and centrally orchestrated application services, increasingly delivered on a per-application basis. Competition will be fierce, especially in multicloud contexts, where vendors will be at pains to demonstrate how their offerings can provide for a uniform means of controlling and orchestrating the delivery of applications services on all form factors (bare metal, VM, and containers) and across application environments spanning on-premises datacenters, private clouds, and major IaaS public clouds.

The enterprise need for software-based, distributed application services will be great, and VMware has the technological capabilities, as well as a growing array of ecosystem partnerships, that will allow it to compete aggressively for the patronage of customer organizations that have come to appreciate that digital transformation must necessarily involve full-stack network transformation.

Still, the enterprise need for software-based, distributed application services will be great, and VMware has the technological capabilities, as well as a growing array of ecosystem partnerships, that will allow it to compete aggressively for the patronage of customer organizations that have come to appreciate that digital transformation must necessarily involve full-stack network transformation, especially at the upper reaches of the stack where the network most intimately supports the needs of applications and workloads.

CONCLUSION

As the results detailed in this document attest, compelling business value can be derived from the deployment of application services.

Indeed, business value materializes on multiple fronts. Lower costs are achieved through a software-defined approach to application delivery that not only leverages industry-standard commodity hardware but also offers the inherent elasticity to accommodate fluctuating demands for resource capacity. Similarly, agility is achieved from how quickly application services resources can be provisioned, adapted, and scaled to meet workload requirements. What's more, the agility and scalability of application services enable IT operations to directly support enterprise business objectives, providing tangible business benefits in the form of faster application and service delivery for both external customers and internal application users.

APPENDIX

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from organizations currently using NSX Advanced Load Balancer as the foundation for the model. Based on interviews with these study participants, IDC performs a three-step process to calculate the ROI and payback period:

- Measure the savings associated with using NSX Advanced Load Balancer in terms of reduced IT costs (staff, hardware, software, maintenance, and IT support), increased user productivity, and business impact measured by revenue over the term of the use of NSX Advanced Load Balancer.
- Ascertain the investment made in deploying and using NSX Advanced Load Balancer.
- Project the costs and savings over a three-year period and calculate the ROI and payback for NSX Advanced Load Balancer.

IDC bases the payback period and ROI calculations on a number of assumptions, which are summarized as follows:

- Time values are multiplied by burdened salary (salary + 28% for benefits and overhead) to quantify efficiency and manager productivity savings. For purposes of this analysis, based on the geographic locations of the interviewed organizations, IDC has used assumptions of an average fully loaded salary of $100,000 per year for IT staff members and an average fully loaded salary of $70,000 per year for non-IT staff members. IDC assumes that employees work 1,880 hours per year (47 weeks x 40 hours).
- The net present value of the three-year savings is calculated by subtracting the amount that would have been realized by investing the original sum in an instrument yielding a 12% return to allow for the missed opportunity cost. This accounts for both the assumed cost of money and the assumed rate of return.

Further, because IT solutions require a deployment period, the full benefits of the solution are not available during deployment. To capture this reality, IDC prorates the benefits on a monthly basis and then subtracts the deployment time from the first-year savings.

Note: All numbers in this document may not be exact due to rounding.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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