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## Business Value Highlights

**431%**  
five-year ROI

**10 months**  
to payback

**46% lower**  
five-year cost of operations

**3% higher**  
net productivity for users of  
applications on FlashStack

**58% improved**  
application performance

**61% more**  
efficient IT infrastructure teams

# FlashStack Delivers Business Value Through Efficiency, Improved Performance, and Scalability

## EXECUTIVE SUMMARY

Converged infrastructure (CI) platforms, which include compute, storage, and networking technology integrated into a single holistic solution, make it easy to quickly deploy proven information technology (IT) infrastructure. All components in these systems are tested together by the vendors to ensure compatibility, and as a result, the systems simplify purchasing, deployment, management, expansion, and support. These are key reasons customers purchase converged infrastructure solutions today. When these offerings include all-flash arrays (AFAs), the result is an IT infrastructure solution that fires on all cylinders for consistently high performance, extremely efficient IT infrastructure (in terms of performance and storage density, ease of administration, and lowered costs), high availability that hits the “six-nines” requirement, and a total cost of ownership (TCO) that is generally 50–80% lower than the TCO of a comparably configured solution that uses hard disk drives (HDDs).

FlashStack combines Cisco Unified Computing System (UCS) servers and Nexus switches with Pure Storage All-Flash Storage Platforms (FlashArrays or FlashBlades). Piecing together compute, storage, and network systems along with management and application software can be a complex process. Cisco and Pure Storage work together to help customers achieve the best performance through Cisco Validated Designs (CVDs). CVDs provide a blueprint to answer the most common questions, highlighting best practices, and offer step-by-step instructions for setting up a converged infrastructure environment — thereby reducing costs and deployment times.

IDC interviewed organizations running various business applications on the FlashStack converged infrastructure solution to understand its impact on their IT and business operations. Substantial improvements to application performance with FlashStack have improved the user and customer experience. Further, study participants reported that FlashStack is cost effective compared with alternative approaches and offers the scalability that their businesses require. IDC calculates that these Cisco and Pure Storage customers will realize average benefits worth \$383,400 per year per 100 users of applications running on FlashStack (\$7.07 million per organization) because they:

- » **Achieve operational efficiencies** when employees leverage much-improved performance to become more productive.
- » **Reduce the frequency and impact of unplanned outages**, thereby minimizing the cost of lost productivity related to downtime.
- » **Enable application developers and IT infrastructure teams** to work more effectively and take on new projects and responsibilities.
- » **Establish a cost-effective infrastructure foundation**, especially by avoiding the need to purchase more storage, even as they benefit from having substantially more usable flash capacity.

## SITUATION OVERVIEW

Given the dynamic nature of today's business operations, IT has had to become more agile and able to respond more rapidly to changing customer requirements and new market opportunities. Infrastructure modernization efforts are underway in most enterprises and are driven by the need to support an evolving set of growing workloads that includes not only legacy applications but also next-generation applications such as mobile computing, social media, big data and analytics, and cloud. The performance, availability, and scalability demands of these workloads are requiring new processor, storage, and networking technologies, and when businesses are growing rapidly, it is particularly difficult to scale these resources as needed to meet requirements.

For many enterprises, continuing to purchase server, storage, and networking technology separately — managing each resource independently — can become a real burden. Enterprise infrastructure based around this approach results in more rigid systems, which are harder to maintain and scale, and siloed management approaches, which can be inefficient. As individual components are upgraded over time, the onus of responsibility is placed onto the customer to ensure the compatibility necessary to maintain optimum performance and availability. Converged infrastructure solutions solve this problem, ensuring access to the latest server, storage, and networking technology in a single integrated solution that offers simple purchasing as well as a centralized point of management and support. The multiple resources form a single integrated and fully compatible solution and make it easy to expand by adding more “pods” (a term that is used to refer to the rack-scale solution that includes all the needed IT infrastructure components).

As a mature technology, flash is broadly available through all five of the major enterprise storage consumption models: appliances, software only, converged infrastructure, hyperconverged infrastructure, and cloud. Different consumption models are targeted at different workload and customer requirements. Converged infrastructure has become a very popular way to simplify the deployment and scaling of IT resources. A converged infrastructure platform is a complete IT infrastructure solution that packages compute, disaggregated (not hyperconverged) storage, and networking into a preconfigured, rackmounted solution. These solutions offer a single point of purchase and support for an integrated, pre-validated hardware/software stack that can feature best-of-breed products from multiple vendors. They are very easy to deploy, because the equipment ships precabled from the factory, and they offer centralized management from a single pane of glass for the entire multivendor solution. Converged infrastructure solutions were a \$7.03 billion market in 2017, and they are expected to grow slowly over the next five years to hit \$7.47 billion in revenue by 2022.

It is important that all-flash storage be included in these types of converged infrastructure offerings. Evolving performance and availability requirements, driven not only by the unpredictability of today's digital markets but also by the real-time urgency of 24 x 7 operations in a connected world, have led the industry toward the use of all-flash storage. Compared with the HDD-based storage platforms of a previous generation, flash provides much higher and more predictable performance, increased storage density, higher reliability, and better economics. As a result, all-flash arrays (AFAs) have come to dominate primary storage spend. IDC expects that in 2018, AFAs will drive almost 80% of primary storage spend, and as larger-capacity solid state disks (SSDs) come down in price, they will also start to penetrate the secondary storage markets.

When configured with the appropriate enterprise-class AFAs, converged infrastructure solutions will offer very high availability. Today's AFAs include mature, proven storage operating environments that support a variety of availability and reliability features, including "scrubbing" for data at rest (to detect and remove data corruption), dynamic multipathing (for transparent recovery from network failures), dual-parity RAID (to withstand up to two simultaneous storage device failures without data loss), and snapshots (which can be used for recoveries requiring low recovery point objective/recovery time objective [RPO/RTO]). Replication supports the implementation of disaster recovery configurations, and stretch clusters allow systems to continue to operate even in the wake of catastrophic events such as the loss of an entire datacenter. Hardware components are redundant and hot pluggable. Further, the best storage systems will support nondisruptive operations not only for firmware and software upgrades but also for system expansion and multi-generational technology refresh.

## FLASHSTACK CONVERGED INFRASTRUCTURE

FlashStack is a converged infrastructure offering that combines technology from two leading enterprise vendors — Cisco and Pure Storage — in a single integrated solution. Featuring server and networking technology from Cisco and all-flash storage technology from Pure Storage, FlashStack provides an IT infrastructure solution that can be used for multi-hypervisor, bare metal, or container deployments. This solution supports the ability to independently scale both compute and storage, and it features proven, validated interoperability between components for quick, easy deployment. FlashStack is virtual machine (VM) aware and hybrid cloud ready, featuring the performance, scalability, and functionality enterprises look for when modernizing their IT infrastructure. FlashStack includes Cisco UCS server platforms, Pure Storage FlashArray or FlashBlade storage, and Cisco Unified Fabric networking technology.

Cisco UCS is a modular system that combines computing, storage, and fabric interconnects to run bare metal and virtualized workloads. Cisco UCS ships as a stateless device that is programmable through the use of UCS service profiles. Service profiles are provisioning templates (which can be customer defined and/or modified) that include server, storage, and networking configuration parameters that simplify and speed system deployment. A service profile is a software definition of a server and its LAN and SAN network connectivity — in other words, a service profile defines a server and its storage and networking characteristics. The service profiles reside in Cisco UCS Manager or Cisco Intersight — tools that automate the configuration delivery of compute, fabric extenders, and interconnects to match the selected service profile.

Cisco UCS B-Series Blade and C-Series Rack Servers are based on Intel Xeon processors and are available as either 2-socket servers or 4-socket servers. Systems can include GPUs to provide increased performance for big data and analytics and/or artificial intelligence/machine learning workloads. Cisco servers feature high-performance density as well as ENERGY STAR certification, integrated security (Cisco Secure Development Lifecycle), and fully programmable Virtual Interface Cards for maximum I/O infrastructure flexibility.

Cisco's technology contribution offers three key differentiators for FlashStack customers. First, the integrated management (discussed in more detail in the following paragraphs) makes the integrated configuration (which includes server, storage, and networking products) much easier to manage than infrastructure that is built from similar components from different vendors and enforces a siloed management approach. Second, compatibility of the separate components is ensured because all components have been pre-validated by Cisco and Pure Storage working together to create what is called a CVD. Integrated solutions such as

FlashStack that are built around CVDs leave nothing to chance, ensuring that the entire configuration will work in a predictable, cost-efficient way for administrators. Third, Cisco's server and networking technology constitutes a complete, end-to-end solution that includes optimizations not available in products that include server, host bus adapter, and networking technology from different vendors.

FlashStack is available in three different storage configurations. FlashStack with FlashArray is targeted for datacenter consolidation or hybrid cloud environments. It features Cisco UCS B-Series or C-Series Servers, all-flash disaggregated block storage from Pure Storage based on the FlashArray, and Fibre Channel (FC)- or iSCSI-based storage networking. FlashStack with FlashBlade is designed for use with data warehouse, analytics, or artificial intelligence/machine learning workloads. It features Cisco UCS B-Series or C-Series Servers and all-flash disaggregated file and/or object storage from Pure Storage based on the FlashBlade and supports NFS or S3 access. FlashStack Mini is targeted for entry-level deployments or specialized applications, featuring Cisco UCS B-Series Blade Servers, all-flash disaggregated block storage from Pure Storage based on the FlashArray, and FC- or iSCSI-based storage networking.

FlashStack configurations feature Cisco Nexus switches as well as Application Centric Infrastructure software-defined networking technology (ACI Anywhere). The Cisco Nexus switches combine storage, data networking, and network services into the Cisco Unified Fabric, a management abstraction that simplifies administration. Cisco ACI Anywhere facilitates application agility and datacenter automation in multicloud networks. With Cisco ACI Anywhere, IT can define application-specific policies, which then automatically provision the elements within the integrated system based on the specific characteristics of the application workload.

For integrated management, FlashStack customers may choose to use Cisco UCS Director, a unified management tool that provides single-pane-of-glass management for all components in CVD-driven configurations such as FlashStack. The UCS Director abstracts individual hardware and software product management into the UCS Director layer, covering server, storage, and networking products as well as software products such as hypervisors and other virtual infrastructure management tools. The automated, end-to-end management workflow replaces the manual provisioning processes, enabling simplified operations of the converged infrastructure.

Cisco Intersight is another management tool currently in development for FlashStack. As a cloud-based platform, Cisco Intersight supports the centralized management of distributed computing environments based around Cisco UCS and is augmented by analytics and machine learning to help optimize operational efficiencies. This unified approach scales easily and seamlessly without increasing complexity and allows IT organizations to efficiently implement automated operations for enterprise infrastructure from the datacenter to the edge.

FlashStack runs Pure Storage's Purity operating environment, featuring a comprehensive set of enterprise-class data services including inline storage efficiency technologies (compression, deduplication, and thin provisioning), dynamic multipathing, dual-parity RAID, space-efficient snapshots, quality of service, encryption, and various replication (synchronous and asynchronous) options including support for stretch cluster configurations (which Pure Storage calls ActiveCluster). ActiveCluster configurations that follow Pure Storage best practices deliver "six-nines" (99.9999%) availability — that's roughly five seconds of downtime per year. Even without ActiveCluster, FlashStack (when configured appropriately) can deliver "five-nines" availability. Data mobility is enabled by Pure Storage's CloudSnap technology, which allows snapshots taken on Pure Storage platforms to be easily shared across different Pure Storage platforms (FlashArray and FlashBlade), any NFS-compliant platform, any DeltaSnap Open API-compliant platform (Rubrik, Actifio, Veeam, CommVault, Catalogic, and Cohesity), and public cloud infrastructure

such as Amazon Web Services. The FlashArray is a scale-up design available in both 12Gb SAS-based and NVMe-based models, while the FlashBlade is a scale-out design that is available only with an NVMe-based performance profile.

All Pure Storage platforms are backed by the Evergreen Storage program. This program is setting new standards in the industry for customer experience and features an all-inclusive software subscription for current and future array software with the base purchase of the array, guaranteed fixed maintenance over the life of the array, Right-Size and 30-day money-back guarantees, controller upgrades every three years (Free Every Three), guarantees around data reduction ratios, and full access to Pure Storage's cloud-based predictive analytics platform (Pure1). Upgrade and expansion activities are nondisruptive, including even across technology generations — the FlashArray is the only AFA on the market that supports online upgrades from 6Gb SAS to 12Gb SAS to NVMe for a “future proofing” promise that is unrivaled in the industry.

The fact that FlashStack is pretested makes it very fast and easy to deploy. Customers do not need to spend any time on compatibility testing for the included components; Cisco and Pure Storage have taken care of all that and confirmed that components work together as part of the CVD validation efforts. Internal cabling between the server, storage, and networking components is handled at the factory prior to shipment, relieving customers of that task — they only connect the system to external LANs or WANs as needed. The UCS Director management interface was built to manage the Cisco and Pure Storage platforms in an integrated way, making it easier to manage than using the three different management interfaces customers might otherwise have for server, storage, and networking products they purchased separately. FlashStack support is optimized for the specific FlashStack configurations, bringing more in-depth knowledge to the table about how these three sets of technologies interact to lead to faster diagnosis and problem resolution. These characteristics make FlashStack much easier to purchase, deploy, and support than separately purchased components.

The integrated support model offered by FlashStack has significant value for customers. If an issue arises, customers can contact the Cisco Technical Assistance Center (TAC) and are assisted by technicians who retain the responsibility for working the problem through to resolution. That includes working with the different product groups within both Cisco and Pure Storage. This is much simpler for customers, who will not have to determine if an issue is a server, storage, or networking problem on their own or manage triage between what might be different vendors for server, storage, and networking technology. The single point of support is one of the key reasons customers purchase CI solutions as they modernize their IT infrastructure.

## THE BUSINESS VALUE OF FLASHSTACK

### Study Demographics

IDC interviewed seven organizations for this study by asking a variety of quantitative and qualitative questions about the impact of deploying FlashStack converged infrastructure on their IT operations, businesses, and costs. As shown in Table 1, organizations surveyed were mostly medium sized with substantial IT and business operations as evidenced by averages of 142 business applications and revenue of more than \$1.6 billion annually. Most companies were United States based, but there was a good level of diversity among vertical industries, with companies representing the cloud service provider, consumer goods, healthcare (2), pharmaceutical, professional services, and utilities sectors.

TABLE 1

Demographics of Interviewed Organizations		
	Average	Median
Number of employees	1,930	1,000
Number of IT staff	181	160
Number of business applications	142	120
Revenue per year	\$1.61 billion	\$508 million
Countries	United States (6), Australia	
Industries	Cloud service provider, consumer goods, healthcare (2), pharmaceutical, professional services, utilities	

n = 7  
Source: IDC, 2018

### FlashStack Use by Interviewed Organizations

Flash storage has become the foundation for many organizations to maximize storage performance and support business growth. The FlashStack customers that IDC interviewed spoke about their need to improve IT performance using state-of-the-art storage that provides the latest in inline storage efficiency technologies (compression, deduplication, etc.). They described multiple reasons for choosing FlashStack over alternative approaches, with the need for simplicity and consolidation, improved performance for key applications, and infrastructure-related cost optimization most often referenced:

- » **Simplicity and consolidation:** “We were looking for quick deployment and wanted a simplified stack for our disaster recovery environment. We wanted to simplify our deployment of it, and we achieved that with FlashStack. We have one rack with server, storage, and networking and have been able to create pods of infrastructure.”
- » **Better performance:** “Our applications keep getting bigger, and historical data gets larger and larger. This meant that both were slower in getting to the end user. We started looking at FlashStack for speed and to reduce our footprint with compression and deduplication.”
- » **Optimization of storage costs:** “We chose FlashStack simply due to cost because in our industry, storage growth is continuous and you have to store everything for a number of years. The enhancement of storage technology was another top reason. We now have a smaller footprint and can store more data on less hardware while consuming less power.”

Table 2 shows how study participants have driven flash storage technology into their IT operations with FlashStack, with 643TB of flash storage out of 883TB in total. In most cases, their FlashStack implementations replaced legacy SAN-based storage and more distributed on-premise server environments.

Two organizations leveraged existing Cisco UCS infrastructure to avoid additional costs, allowing them to avoid expanding their server environments and purchasing new hardware. These Cisco and Pure Storage customers are running a variety of business applications on FlashStack. Table 2 shows significant use of FlashStack with over 2,000 VMs and 64 applications in play, used by almost all users of IT services at these organizations. These applications included, among others, disaster recovery, collaboration, and industry-specific, customer-facing applications. More specifically, key applications running on FlashStack included energy market applications, databases, SharePoint, Exchange, EMR, Epic, and other business-critical implementations.

TABLE 2

FlashStack Use by Interviewed Organizations		
	Average	Median
Number of x86 servers	59	55
Number of virtual machines	2,097	1,700
Number of business applications	64	23
Number of users of applications (internal)	1,844	700
Number of terabytes (total/flash)	883/643	400/400

n = 7  
Source: IDC, 2018

### Business Value Results

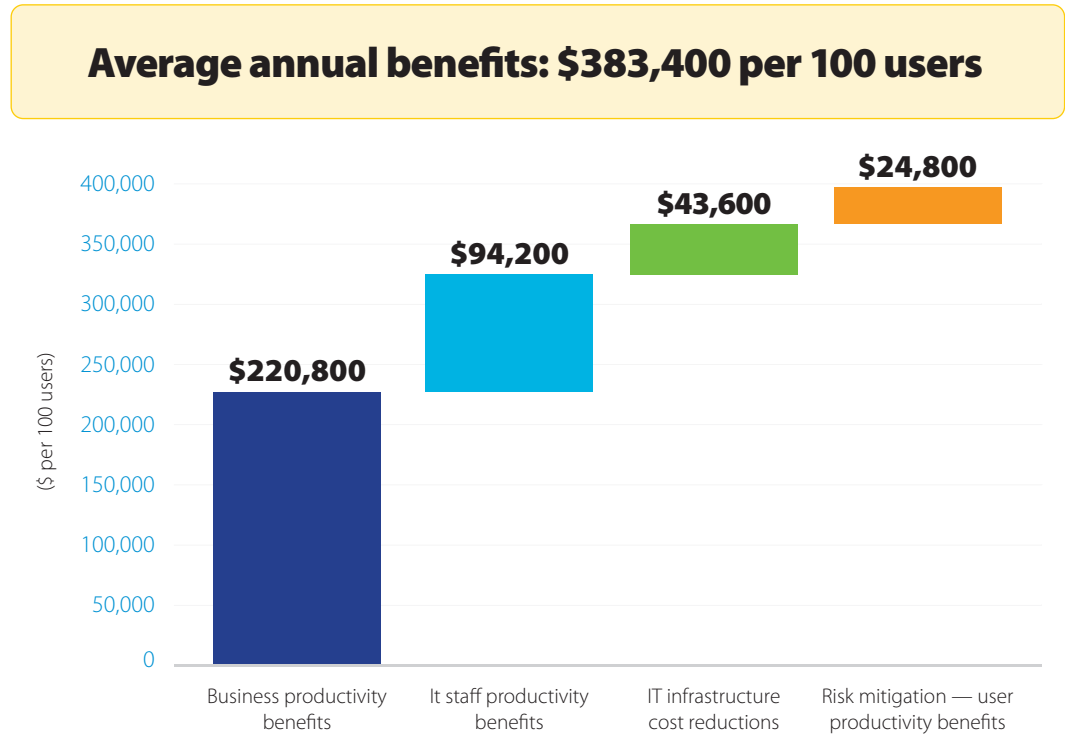
IDC’s research found that Cisco and Pure Storage customers are benefiting from the strong performance and scalability of their FlashStack CI platforms. Most importantly, this means better performance of applications and processes, ensuring an improved user experience. Further, study participants also noted that FlashStack provides a cost-effective and efficient infrastructure foundation, especially given the performance levels it ensures. Based on analysis of the organizations’ experiences with FlashStack, IDC projects that the organizations will achieve average benefits worth \$383,400 per year per 100 users (\$7.07 million per organization) in the following areas (see Figure 1):

- » **IT staff productivity benefits.** Application developers benefit from working on an agile, high-performing IT platform, while IT infrastructure and help desk teams are more efficient due to integration of compute, storage, and networking infrastructure. As a result, these teams deliver more value to their organizations, which IDC quantifies as being worth an average of \$94,200 per 100 users per year (\$1.74 million per organization) in higher-productivity levels for these teams.
- » **IT infrastructure cost reductions.** Study participants lower ongoing costs by having a streamlined and consolidated CI platform, even as they benefit from much-improved performance. Further, they avoid the need to make substantial additional investments in storage capacity. IDC projects that they will save an average of \$43,600 per 100 users per year (\$0.80 million per organization).
- » **Business productivity benefits.** Users of applications running on FlashStack benefit from much-improved performance, thereby increasing their productivity levels. IDC puts the value of higher user productivity at an average of \$220,800 per 100 users (\$4.07 million per organization) per year.
- » **Risk mitigation — user productivity benefits.** Less frequent and impactful unplanned outages mean less productive time lost for employees. IDC calculates that study participants will reduce the cost of lost productivity by an annual average of \$24,800 per 100 users (\$0.46 million per organization).



**FIGURE 1**

Average Annual Benefits per 100 Users



Source: IDC, 2018

**Making IT Teams More Efficient**

Surveyed organizations further described how their IT teams have become more efficient with FlashStack. This means that IT organizations can deliver more value to their organizations and accommodate growth without needing to add staff resources. In particular, they described how application development teams benefit from greater agility and faster deployment of new compute, storage, and networking resources to support various projects, and infrastructure teams benefit from having a converged platform that they can manage efficiently.

One study participant commented on this increased agility: *“The performance of the storage system is the major driving factor in terms of agility derived from FlashStack. We went from 30 minutes to provision a guest VM to 3 minutes. This capability frees up staff to do more on the side of application management and deployment and other things that add value to our business.”*

Increased agility means that development teams can deliver more new features and reduce development life-cycle times. This, in turn, means that users and customers benefit more quickly from new features and apps and faster delivery of enhancements. Study participants cited increasing virtualization, increased capacity, and compute, storage, and networking performance as driving these efficiencies with FlashStack. Commenting on improved delivery time, one study participant noted: *“The speed of deployment of compute and storage resources is a benefit of FlashStack. We couldn’t have spun up the resources we did this year in our testing and production environments and couldn’t have met our goals without FlashStack.”*



Table 3 shows the impacts of FlashStack on application development. For example, the number of new features per year increased by an average of 25%. This translates into 15% higher developer productivity, which is the equivalent of additional value worth over \$1 million per year per organization in terms of higher developer productivity levels.

**TABLE 3**

Impact of FlashStack on Application Development				
	Before/Without FlashStack	With FlashStack	Difference	Change (%)
Number of new features per year	305	381	76	25
Development life cycle for new features (weeks)	10	7.4	2.6	26
Developer productivity per year	\$5.92 million	\$6.96 million	\$1.04 million	15

n = 7  
Source: IDC, 2018

Study participants also discussed how FlashStack positively impacts IT infrastructure and help desk teams on a day-to-day basis. These teams have become much more efficient, as shown in Table 4. This new level of efficiency allows the teams to accommodate business growth and to take on other, more valuable work related to line-of-business or advanced IT projects.

One study participant talked about how the deployment helped avoid hiring to meet business demand: *“We’ve avoided hiring two IT staff members with FlashStack . . . New efficiencies have been applied to application support. We are getting more applications deployed because we’re extending the types of innovation we’re supporting.”* On the benefit of more efficient application management, another said: *“Our tier 2 management team is saving about 50% of their time managing applications with FlashStack . . . This frees up time to focus on other areas of the business, including improving our security position . . . The time spent doing maintenance is night and day with FlashStack.”*

Table 4 drills down on post-deployment metrics for IT team productivity. Especially noteworthy is that staff time to manage infrastructure (FTEs per year) showed a 61% improvement.

**TABLE 4**

Impact of FlashStack on IT Teams				
	Before/Without FlashStack	With FlashStack	Difference	Change (%)
Staff time to manage infrastructure (FTEs per year)	10.7	4.2	6.5	61
Staff time to support — help desk (FTEs per year)	1.1	0.7	0.4	35

n = 7  
Source: IDC, 2018

### Providing a Cost-Effective Infrastructure Foundation

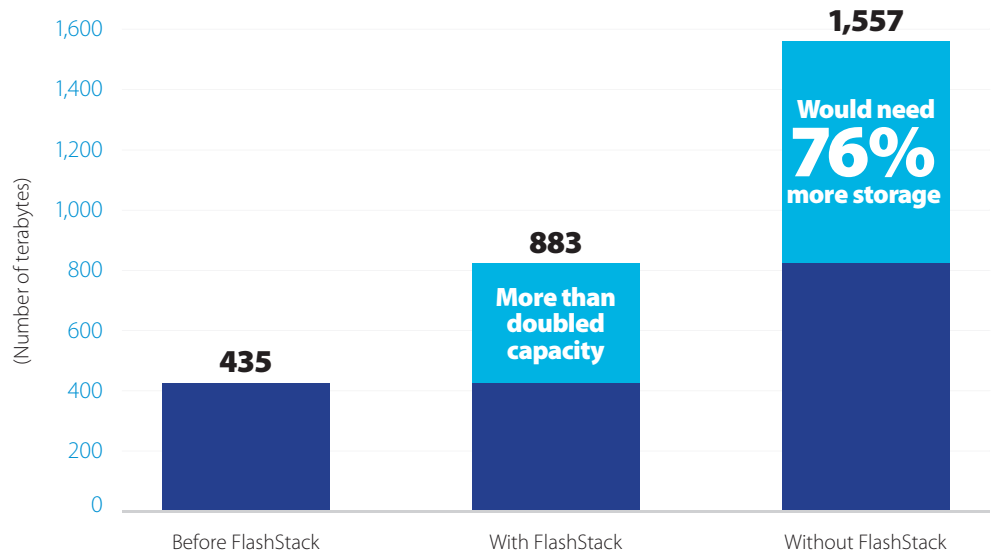
Study participants also cited reduced cost of providing required compute and storage resources as another benefit of FlashStack use. They noted that the FlashStack platform offered lower opex costs involved in running these environments (e.g., power consumption and facilities costs). FlashStack is especially cost effective compared with other approaches in terms of storage-related costs because of Evergreen Storage capabilities that can help IT avoid the need to extend storage. Efficient inline data reduction capabilities contribute significantly to effective storage capacity utilization, while network infrastructure and licensing savings also contribute to lower cost of IT infrastructure.

On the topic of Evergreen Storage, one study participant said: *“The most significant benefit of FlashStack is the Evergreen Storage and the associated cost savings in the footprint and power consumption.”* Commenting on the benefit of having a more efficient infrastructure, another said: *“If we tried to use the old technology for what we’re doing with FlashStack, we’d need at least two to three times the number of raw terabytes that we’re using now . . . There are certain workloads that we can get up to a 13:1 data reduction ratio as compared with 2:1 in our legacy environment.”* Figure 2 highlights the benefit of Evergreen Storage.

On average, these organizations reported that FlashStack will cost 28% less over five years compared with the alternative of refreshing their legacy environments or taking another approach (see Figure 3, IT infrastructure-related costs). This is based on assessing the cost of hardware (servers, storage, network), as well as a number of opex cost areas such as warranty costs, power requirements, and facilities costs.

**FIGURE 2**

### Benefit of Evergreen Storage



Source: IDC, 2018

### Lowering Total Cost of Operations

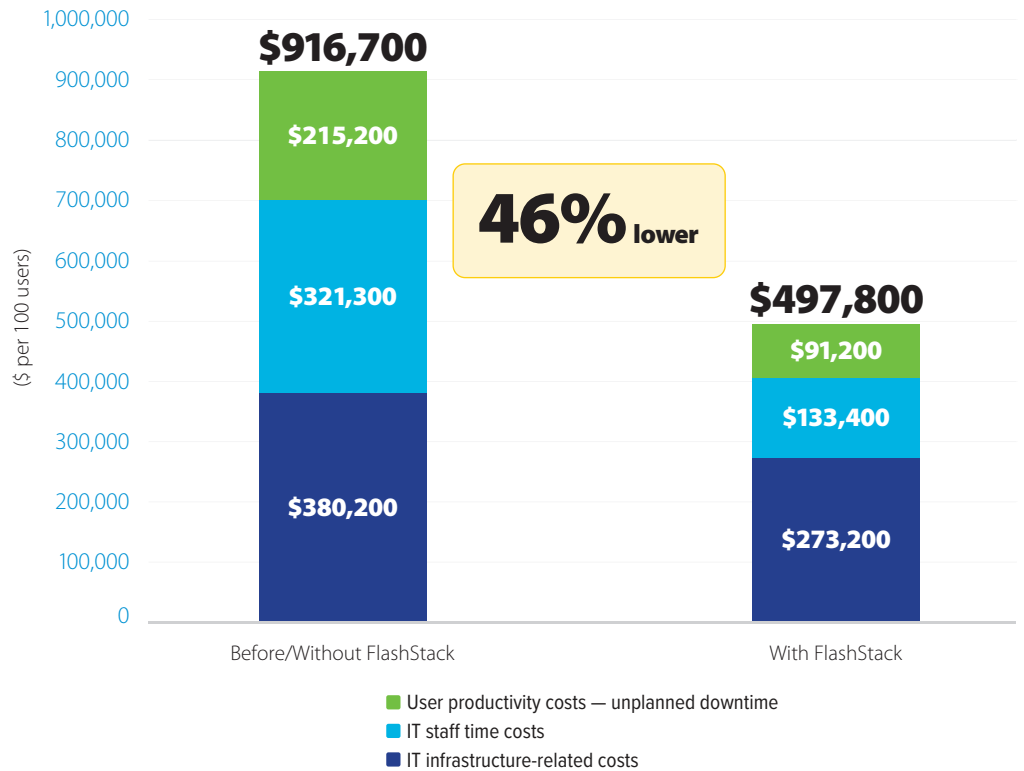
For the organizations surveyed, the benefits cited previously, including lower cost of building out comparable environments and reduced staff time required for management and support, were instrumental in helping them achieve a lower overall cost of running and supporting FlashStack workloads. As shown in Figure 3, interviewed organizations reported that FlashStack is 46% more cost effective, as measured in terms of:

- » IT infrastructure-related expenditures
- » IT staff time for management and support
- » Costs associated with lost productivity

On the benefit of cost-effective infrastructure, one study participant noted: *“For the cost of what we were paying before FlashStack, we’re almost getting FlashStack for free. To do what we’re doing now with FlashStack, we would have had to probably double our storage capacity. Even then we still could not have enjoyed the performance we have now.”*

**FIGURE 3**

### Five-Year Cost of Operations



### Enabling the Business with Strong Performance

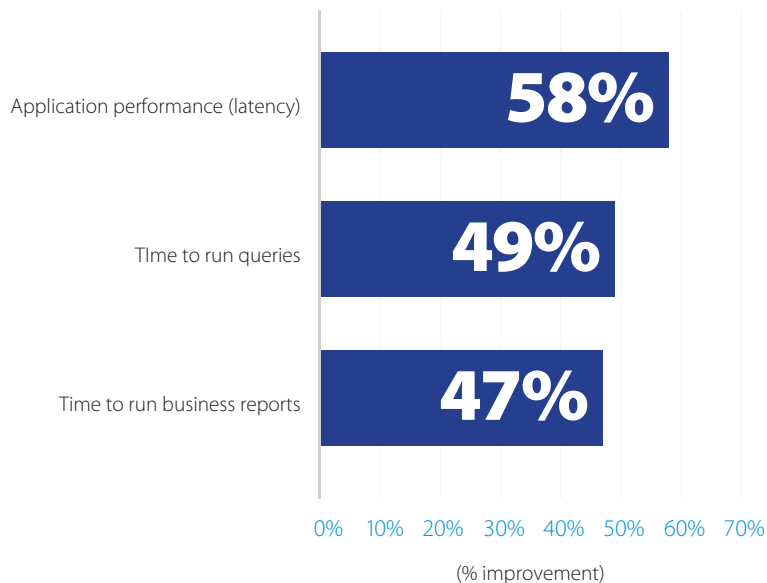
Study participants reported that FlashStack provides the integrated performance required by their business operations to leverage data and create robust applications. As a result, these customers achieved higher levels of employee productivity and increased revenue. Further, these organizations have realized these benefits while substantially increasing the amount of effective storage capacity in use even as they have consolidated on a converged infrastructure environment.

The performance improvements that made this possible were enabled in part by much reduced application latency. As one study participant described it: *“Our latency was pretty low before, but now our application performance is 15 times faster. The bottleneck was the spinning disk.”* Regarding performance and backups, another commented: *“The improved response time is really the biggest benefit for us and its impact on backups. We have better performance and shorter windows for full backups.”*

Figure 4 shows the application performance impacts that these organizations experienced. In particular, the organizations realized the following improvements: 58% reduction in latency, 49% less time needed to run queries, and 47% less time needed to run business reports.

**FIGURE 4**

### Impact of FlashStack on Performance Metrics



Source: IDC, 2018

FlashStack customers also provided details about how the performance improvements cited previously translate to higher user productivity. Users benefit when applications perform better in terms of the twin pillars of performance and scalability. Ultimately, this means a better user experience, enabled by lower latency, fewer performance-related glitches, and the ability to support extensions of new functionality. Regarding the benefit of higher end-user productivity, one study participant said: *“I think we do more with the same amount of people with FlashStack, so we’re avoiding hiring. With hundreds of users, I think we’re avoiding hiring at least 10 people, especially in our distribution operations.”*

Table 5 provides specific improvement metrics for user productivity. The data shows that most application users on FlashStack enjoy the benefit of higher productivity, with a net productivity gain of 3.0% across all organizations. This improvement translates to an annualized monetary value of \$4.07 million.

**TABLE 5**

Business Productivity Benefits: User Productivity Gains		
	Per Organization	Per 100 Users
Number of users impacted	1,540	83
Equivalent FTE gains	58.2	3.2
Value of higher productivity per year*	\$4.07 million	\$220,800

n = 7

\*The IDC model assumes a 15% margin assumption for recognizing user productivity gains.

Source: IDC, 2018

### Ensuring High Availability of Critical Applications

In today's business environments, unplanned outages are costly and involve lost opportunities to secure new business or better support existing customers. Surveyed organizations reported that FlashStack's ability to provide higher availability and resiliency translated into fewer unplanned outages and more consistent overall IT performance. This benefit is enabled in part by the ability to better replicate and restore data in addition to shorter and more effective backup and recovery windows.

One study participant addressed the value of having fewer issues and more efficient data backup and recovery processes: "We are saving time handling performance issues with FlashStack. We have eight people on a team saving a few hours per week collectively. And with automation, we've gained the ability to replicate data more fully and have a more robust approach. Our data backup and data recovery windows have been reduced from 24 hours to 12 hours."

Table 6 provides metrics that quantify the impact of FlashStack on decreasing the incidence of impactful unplanned downtime. Especially noteworthy is that after deployment, there were 63% fewer unplanned outages, translating into 58% fewer hours of productive employee time lost across the survey sample (expressed in Table 6 as productive time lost in terms of FTEs per organization per year).

**TABLE 6**

Impact of FlashStack on Unplanned Downtime				
	Before/Without FlashStack	With FlashStack	Difference	Change (%)
Unplanned outages per year per organization	20.9	7.7	13.2	63
Value of lost productive time per year (FTEs per organization)	11.3	4.8	6.5	58
Value of lost productive time per year per organization	\$793,700	\$336,200	\$457,500	58

n = 7

Source: IDC, 2018

## ROI Analysis

Table 7 presents IDC’s analysis of the benefits and costs for interviewed Cisco and Pure Storage customers of running various applications and workloads on FlashStack converged infrastructure. IDC projects that on average, these organizations will realize discounted benefits worth \$1.37 million per 100 users (\$25.22 million per organization) over five years based on a total discounted investment of \$0.26 million per 100 users (\$4.75 million per organization). These levels of benefits and investment costs would yield a five-year ROI of 431%, with breakeven on investment in FlashStack occurring in 10 months on average.

**TABLE 7**

Five-Year ROI Analysis		
	Five-Year Average per Organization	Five-Year Average per 100 Users
Benefit (discounted)	\$25.22 million	\$1.37 million
Investment (discounted)	\$4.75 million	\$0.26 million
Net present value (NPV)	\$20.47 million	\$1.11 million
Return on investment (ROI)	431%	431%
Payback period	10 months	10 months
Discount rate	12%	12%

Source: IDC, 2018

## CHALLENGES AND OPPORTUNITIES

The converged infrastructure market includes the major established enterprise storage providers. The FlashStack offering includes server and networking technologies from Cisco, the leader in networking and x86 blade servers, and enterprise storage technologies from Pure Storage, and all product combinations have been extensively tested and pre-validated by both Cisco and Pure Storage to ensure that they are well integrated and manageable from a single pane of glass.

Enterprise infrastructure customers will need to make up their own minds about the source of technologies included in converged infrastructure offerings but should note that Cisco and Pure Storage have delivered performance and efficiency while providing a solution that is simple to manage and easy to scale with a single point of support that covers all integrated server, storage, and networking products.

The fact that Cisco and Pure Storage combine strong technology and reputations in a single solution offers opportunities for customers and the vendors. Based upon its reputation in servers and networking, Cisco is already considered a contender in many sales situations that require those types of resources, and the same can be said for Pure Storage in the enterprise storage market. Customers that may have bought those solutions separately in the past now have the opportunity to obtain, deploy, and manage them in a much simpler manner than if each of the technologies was purchased separately. Staunch Cisco and/or Pure Storage customers may be exposed to the other vendor through this partnership, and the vendors themselves may benefit from specific geographic and vertical market strengths that each vendor brings to the table.

The advantages that converged infrastructure offers — simple purchasing, rapid deployment, centralized management, easy expansion, and a single point of support — are clearly attractive to certain types of IT organizations, and in marketing FlashStack solutions, the two vendors (and their channel partners) need to ensure they highlight the integrated nature of these solutions as well as the strengths of each vendor.

## FlashStack Financing

Pure Storage and Cisco offer FlashStack as an outright purchase (capex model) or via Open Pay, a consumption-based utility model. Open Pay enables customers to acquire not only Cisco and Pure Storage technology but also their software, services, support, education, and third-party/partner-provided products as part of the FlashStack solution and to dial capacity up and down, as needed, to maintain control, spread risk, and deliver a cloudlike experience.

## CONCLUSION

Converged infrastructure solutions include server, storage, and networking technologies, all pretested, in a rackmounted system that is easy to deploy and manage and serviced through a single point of support. The Cisco/Pure Storage FlashStack customers interviewed for this study confirmed those benefits, as well as a number of other advantages to deploying such a solution based around proven server, storage, and networking technologies from Cisco and Pure Storage. After having upgraded to FlashStack from previous-generation technologies from other vendors, these customers enjoyed

(on average) a 431% five-year ROI, based on a 46% lower five-year cost of operations and a 61% higher IT infrastructure team efficiency. Application performance improved on average by 58%, and this improvement, combined with the improved IT agility achieved with the Cisco and Pure Storage technologies, drove a 3% higher net productivity for users whose applications ran on FlashStack.

The results of this study confirm the benefits of converged infrastructure in general and FlashStack in particular. The latest server and networking technologies from Cisco, complemented with the proven flash-optimized performance of all-flash storage platforms from Pure Storage, provide compelling value for customers looking to modernize their IT infrastructure and move to a more streamlined model than that offered when purchasing server, storage, and networking components separately. As IT organizations look to modernize their IT infrastructure, they would do well to consider converged infrastructure options built around proven, mature technologies such as those from Cisco and Pure Storage.

## APPENDIX

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from organizations currently using FlashStack converged infrastructure systems as the foundation for the model. Based on interviews with these study participants, IDC has calculated the benefits and costs to these organizations of using FlashStack. 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 FlashStack converged infrastructure systems.** In this study, the benefits included staff time savings and productivity benefits and IT infrastructure-related cost reductions.
- 2. Created a complete investment (five-year total cost analysis) profile based on the interviews.** Investments go beyond the initial and annual costs of using FlashStack and can include additional costs related to migrations, planning, consulting, 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 FlashStack over a five-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.



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 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).
- » Downtime values are a product of the number of hours of downtime multiplied by the number of users affected.
- » The impact of unplanned downtime is quantified in terms of impaired end-user productivity and lost revenue.
- » Lost productivity is a product of downtime multiplied by burdened salary.
- » The net present value of the five-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.
- » Because every hour of downtime does not equate to a lost hour of productivity or revenue generation, IDC attributes only a fraction of the result to savings. As part of our assessment, we asked each interviewed organization what fraction of downtime hours to use in calculating productivity savings and the reduction in lost revenue. IDC then taxes the revenue at that rate.
- » 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.*

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