

# FlashStack Delivers Business Value Through Simplicity, Flexibility, and Speed

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### **BUSINESS VALUE HIGHLIGHTS**

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**446%** five-year ROI

72% reduced total cost of operations

8-month payback period

72% more efficient IT infrastructure staff 8x more staff time spent on innovation-based activities

**37% more** efficient help desk

77% improved storage deployment agility

\$16.0 million additional revenue gained/protected 97% reduction in unplanned downtime

17% more productive end users

45% more applications deployed

# **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. As a result, the systems simplify purchasing, deployment, management, expansion, and support. These are key reasons why customers purchase CI 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 offering step-by-step instructions for setting up a Cl environment — thereby reducing costs and deployment times.

As enterprises modernize their IT infrastructure, many look to converged infrastructure offerings. These solutions combine server, storage, networking, and storage infrastructure software technology into a single SKU, ensuring out-of-the-box compatibility between all components and making them fast and easy to deploy.

A unified management interface, single point of support, and simple scalability into the cloud round out the benefits of converged infrastructure. Enterprises with a preference for either Cisco server or Pure Storage array technology have been buying the Pure Storage FlashStack converged infrastructure offering since 2014.

IDC spoke with organizations in a variety of vertical markets about how they are using FlashStack to optimize their IT and storage operations. FlashStack is offered by a partnership between Cisco and Pure Storage and is a flexible all-flash converged infrastructure solution that combines compute, network, storage hardware, and virtualization software into a single integrated architecture. The stated value proposition of FlashStack is to speed time to deployment, lower overall IT costs, and reduce deployment risk while reducing costs. IDC interviewed 10 organizations using this solution. The survey data obtained and applied to IDC's Business Value model showed that study participants realized significant value with FlashStack.

IDC calculates that these companies will achieve average annual benefits of \$3.67 million per organization (\$535,200 per 100 flash terabytes), resulting in an eight-month payback and a five-year return on investment (ROI) of 446% by:

- Fostering improvements in IT and storage infrastructure staff efficiency and productivity
- Increasing the agility required for managing and deploying storage and compute resources while lowering the cost of operations
- Optimizing application development and deployment thereby supporting business operations and optimizing end-user productivity
- Minimizing the effects of unplanned downtime to lower business risk and further increase end-user productivity

# **Situation Overview**

Converged infrastructure offerings combine compute, storage, and networking technology into a single rack-mounted solution that is easier to buy, deploy, and manage than information technology infrastructure that is integrated by customers themselves working with different vendors. A converged infrastructure solution is deployed as a discrete unit and administered from a unified interface through which compute, storage, and networking resources are managed. All of the components are pre-certified to work together, and the entire solution is supported by a single vendor. Converged infrastructure solutions not only are faster to deploy and much easier to work with but also can result in significant administrative cost savings. Because of these advantages, these types of solutions are very popular with enterprises. The converged infrastructure market generated \$17.8 billion in 2020 and will grow at a compound annual growth rate (CAGR) of 4.0% through 2024 to crest \$21.7 billion.

In addition to the ease of use and cost savings, one other consideration is often taken into account by customers looking to deploy converged infrastructure.



Many enterprises qualify specific server and/or storage hardware for use in their environments and build out infrastructure based on them. For many of them, they have proven over time that the hardware meets their requirements, and they are enjoying a customer experience (CX) that keeps them coming back. Established relationships also often play a part, particularly for those customers that have really come to look at their account team as a trusted provider. For example, customers that have a strong preference for either the servers in the Cisco Unified Computing System or the Pure Storage FlashArrays may naturally gravitate toward FlashStack since that converged infrastructure offering is built around both of those.

Customers that have no prior preference for either of these two components (servers or storage) will compare offerings from different vendors. When evaluating the storage in converged infrastructure offerings, there are a number of factors to consider in cases where the plan is to consolidate a mix of enterprise-class workloads. When evaluating enterprise infrastructure, customers focus on performance, capacity utilization (i.e., data reduction technologies), high availability, and value for the money as the top storage purchase drivers. Storage management capabilities that enable data protection, security, and cloud integration also rank high.

To cover all of these areas, customers should look for these capabilities: host multipathing, thin provisioning, in-line compression and deduplication, dual parity RAID, snapshots, encryption, quality of service, and replication technology as well as the ability to support flexible consumption and new cloud economic models. Systems should support nondisruptive operations covering failed component replacement, firmware and software updates, and multigenerational technology upgrades as well as "air gap" protection (against data corruption and ransomware attacks) and disaster recovery (DR) capabilities that include both stretch clusters and remote site recovery. Cloud integration should include support for REST APIs, Container Storage Interface (CSI) (to provide persistent storage to containers more easily), cloud tiering, and an ability to run the storage operating system itself in the public cloud (on industry-standard hardware).

When workloads have any degree of latency sensitivity, all-flash arrays will probably be the best fit. These systems can consistently deliver sub-millisecond latencies at scale and are much better able to handle I/O spikes without putting performance service-level agreements (SLAs) at risk. While solid state media may still be more expensive than spinning disk media (i.e., hard disk drives) on a raw cost-per-gigabyte basis, AFAs have offered a better total cost of ownership for latency-sensitive workloads since 2015–2016. *Justifying Investment in All-Flash Arrays* (IDC #US41646416, August 2016) explores this topic in detail.

# This IDC research document found that there were six key reasons why all-flash arrays drove a better total cost of ownership:

- A need for far fewer storage devices (to meet both performance and capacity requirements)
- Much lower energy and floor space consumption (due to the higher performance and capacity density of solid state media)
- Need for fewer application servers (due to the lower latencies of all-flash storage that drove much higher server CPU utilization)



- Lower software licensing costs (due to needing fewer CPU cores)
- Lowered administration costs (because of the order of magnitude lower latencies, recurring storage tuning was no longer required)
- Much better device-level reliability (which minimized time spent replacing failed devices)

This is not just a set of theoretical arguments; in 2019, AFAs drove over 80% of all primary external storage revenue, generating \$11.6 billion. Customers clearly "get it."

In primary research performed by IDC in 2020, survey respondents identified improving IT staff productivity, streamlining infrastructure footprint, improving IT resource utilization, and improving operational efficiency as the top reasons for converged infrastructure deployment. These requirements can be directly translated into specific enterprise storage capabilities. Systems that are easy to deploy and manage help make administrators more productive, as do APIs like VMware Virtual Volumes (VVols), Container Storage Interface, and REST APIs that allow storage management features to be integrated into automated workflows for tasks like storage provisioning, backups, and recoveries. Given that most enterprises are moving in the direction of hybrid cloud environments, cloud integration capabilities are important as well.

New storage technologies like NVMe and triple-level cell (TLC) and quad-level cell (QLC) flash media increase the performance and capacity density of storage systems, enabling smaller systems that require less energy and floor space to meet application requirements. Data reduction capabilities like thin provisioning, compression and deduplication, and space-efficient snapshots can all have a huge impact on the effective cost per gigabyte of storage, which can vary significantly depending on workloads and workflows. For NVMe-based systems (which can only use solid state media), how the media is managed at the flash translation layer can have a noticeable impact on performance, endurance, and cost. Together, these latter two capabilities can make a large difference in how well storage performance and capacity resources are utilized, promoting more compact and cost-effective storage infrastructure solutions. And storage systems that are faster and easier to deploy, provision, and expand all help improve operational efficiencies.

# Flashstack from Cisco and Pure Storage: All-Flash Converged Infrastructure

Pure Storage is a \$1.6 billion enterprise AFA vendor with a broad portfolio of all-flash offerings that cover primary and secondary as well as structured and unstructured workloads. The FlashArray//X line covers primary storage, the FlashArray//C addresses tier 2 and other secondary workloads, and FlashBlade covers unstructured (file/object) workloads.



In 2014, Pure Storage collaborated with Cisco to create a converged infrastructure offering called FlashStack. This solution offered customers all the traditional advantages of converged infrastructure — ease of purchase, deployment, and management — built around the differentiating capabilities offered by Cisco UCS servers and the Pure Storage FlashArray. Both vendors have continued to refresh this offering with updated hardware and software functionality, and the latest version of the platform includes the Cisco UCS B-Series Blade Servers or C-Series Rack Servers, the FlashArray//X, integrated networking from Cisco, and the integrated Cisco Intersight cloud operations platform. FlashStack Cisco Validated Designs are available for a number of popular enterprise workloads, including Oracle RAC, Microsoft SQL Server, SAP HANA TCI, and Red Hat OpenShift, as well as critical enterprise environments like VMware vSphere, artificial intelligence and deep learning, and virtual desktop infrastructure.

The FlashArray//X is an NVMe-based all-flash array (NAFA) available in five models, from the entry-level X10 up through the high-end X90. Its storage operating environment, called Purity, is optimized for use with flash media (since these systems do not support HDDs). Purity has been shipping since 2012 and, as such, is a proven, trusted enterprise-class storage operating system supporting a comprehensive range of features. These features include host multipathing, thin provisioning, dual-parity RAID, in-line data reduction (compression and deduplication), snapshots, encryption, and quality of service. Its replication capabilities include both synchronous and asynchronous as well as stretch clusters (which the vendor calls ActiveCluster) and air gap protection. As a unified storage system, the FlashArray natively supports both block- and file-based storage as well as SCSI, Fibre Channel (FC), NFS, and SMB access methods, allowing it to deliver high performance across both structured and unstructured data types and act as an efficient platform for broad storage workload consolidation.

The FlashArray's extensive storage management functionality gives customers the opportunity to design tailored high availability and recovery capabilities into their configurations to meet a variety of SLA requirements. Through the vendor's application-integrated snapshots and replication, storage administrators can design programs to meet any recovery point objective (RPO) and recovery time objective (RTO) requirements. Through its Pure1 cloud-based predictive analytics platform, the vendor keeps a running measure of the overall availability of its installed base, which today stands at "five-nines plus" (99.999%+) availability. Pure1 is an artificial intelligence and machine learning–driven monitoring and management platform that performs predictive fault management, helps manage systems in real time to meet defined performance and availability goals, and provides comprehensive data to facilitate troubleshooting and help resolve issues faster.

The FlashArray is differentiated from alternatives in a number of ways. First, since it only ever supported solid state media, it includes no HDD-based baggage in either hardware or software. Instead of using off-the-shelf solid state disks (SSDs), Pure Storage buys solid state media directly and builds its own storage devices. These devices, called DirectFlash Modules (DFMs), support higher densities than off-the-shelf SSDs (the largest DFM is 49TB), allowing the vendor to build more compact systems that use less energy and floor space to meet a given performance and capacity requirement. Other benefits accrue from this decision as well. When new solid state media becomes available, Pure Storage can get new storage devices based on it out faster than its competitors since it only has to go through one "build" cycle instead of two, and this means its customers can take advantage of newer technology faster.



FlashArrays also manage the solid state media globally instead of depending on disk vendor flash translation layers that manage flash media at the individual device level. Global management allows Pure Storage to manage the media more efficiently to provide better, more consistent performance over time; improve endurance; and reduce overprovisioning (to lower cost).

In addition to the FlashArray's redundant design, which includes dual controllers as well as redundant power and cooling, the FlashArray//X70 and //X90 both support a storage-class memory-based caching tier. While a FlashArray//X using NVMe DFMs and a SCSI-based host attachment (FC or iSCSI based) can deliver consistent 500 microsecond latencies at scale, systems configured with the Intel Optane–based DirectMemory Cache Modules and an NVMe over Fabrics (NVMe-oF) host connection using FC can deliver 150 microsecond latencies at scale. DirectMemory Cache Module–based configurations are often used for SAP HANA and other in-memory database workloads as well as real-time application environments.

The FlashArray supports virtual infrastructure and cloud integration capabilities as well. Pure Storage supports VMware APIs like VVols, VAAI, VADP, VASA, and SRM as well as cloud integration capabilities like CSI, cloud tiering, and a REST API. A software-only version of Purity, the FlashArray storage operating system, called Cloud Block Store, can be run in the public cloud, giving customers a hybrid cloud environment that supports a consistent set of enterprise-class storage management functionality that spans both on-premises and off-premises environments.

Pure Storage covers its FlashArrays with Evergreen Storage. This program provides a number of guarantees — for example, a 30-day money back guarantee, a 4:1 data reduction guarantee, and a fixed maintenance pricing guarantee (at the component level) over the life of the system. Flash media endurance is guaranteed, with the vendor replacing any failed devices for covered systems at no charge, and Evergreen includes 24 x 7 support. For those customers that want them, Evergreen can also include "Free Every Three" (next-generation controller upgrades every three years), "Upgrade Flex" (the option to move to next-generation controllers earlier than every three years with 100% investment protection), and "Capacity Consolidation" (the ability to consolidate existing capacity onto denser storage devices to reduce energy and floor space consumption with 100% investment protection). Hardware and software upgrades internal to the storage array itself are and always have been nondisruptive, which allows customers to extend the life of storage systems far beyond the typical four to five years. This program, along with the ease of use of managing and expanding FlashArrays, contributes to Pure Storage's impressive CX — the vendor has published Net Promoter Score (NPS) numbers since 2015 and has the highest published score of any external enterprise storage provider in the industry (a number in the mid-80s).

Through the integration with Cisco Intersight, a cloud operations platform with modular capabilities for advanced infrastructure, workload optimization, and Kubernetes services, customers can gain the advantage of having one place to manage and orchestrate a fully disaggregated datacenter solution like FlashStack.



## **The Business Value of Flashstack**

### **Study Demographics**

IDC conducted research that explored the value and benefits for organizations in using FlashStack as a converged storage and infrastructure solution. The project included 10 interviews with companies that had experience with or knowledge about the platform's benefits. During the interviews, companies were asked a variety of quantitative and qualitative questions about the impact of the solution on their IT and storage operations, business practices, and costs.

Table 1 presents study demographics and profiles. The organizations that IDC interviewed had a base of 9,720 employees with revenue of \$5.44 billion. This workforce was supported by an IT staff of 640, managing 404 business applications on behalf of 9,451 end users and a large number of external customers (92,800). In terms of geographical distribution, seven companies were based in the United States, with the remainder in Australia and Brazil. In addition, there was a good mix of vertical industries represented including the healthcare, energy, government, IT services, manufacturing, and media and entertainment sectors. (Note: All numbers cited represent averages.)

### TABLE 1

### **Firmographics of Interviewed Organizations**

Firmographics	Average	Median	Range
Number of employees	9,720	4,200	65 to 45,000
Number of IT staff	640	165	1 to 5,000
Number of IT users	9,451	3,405	65 to 45,000
Number of external customers	92,800	8,300	100 to 750,000
Number of business applications	404	150	20 to 2,000
Revenue per year	\$5.4 billion	\$308.0 million	\$4.0 million to \$21.4 billion
Countries	United States (7), Australia (2), and Brazil		
Industries	Healthcare (4), energy (2), government, IT services, manufacturing, and media and entertainment		



### Choice and Use of FlashStack

The companies that IDC surveyed described their usage of FlashStack and provided a snapshot of their IT and business environments. In addition, they discussed the rationale behind their choice of the FlashStack platform. Interviewed companies cited several key decision factors including improvements in deduplication rates and the ability of the solution to reduce hardware silos and sprawl. Study participants also cited other factors such as ease of management, the "trusted provider" nature of the vendor partnership, and better overall total cost of ownership.

### They elaborated on these and other benefits:

#### Better technology and deduplication rates (healthcare):

"We chose FlashStack because of ... how attractive the deduplication rates were and the guaranteed performance. No one would stand behind numbers like that. And Pure Storage knocked it out of the park."

#### Need for a modern infrastructure (media and entertainment):

"Initially, when I took over, this environment was poorly maintained. All the hardware was end of life and out of support ... . We went through a process of reviewing multiple solutions. Initially, the reason for the change was that we were running out of storage with decreased performance of applications for end users and an ancient DR environment."

#### Avoiding disparate hardware (energy):

"We choose FlashStack while we were refreshing legacy systems. Basically, dealing with disparate hardware was the main reason why we went to Pure Storage with Cisco. Another reason was the ability to upgrade as needed."

#### Ease of management (healthcare):

"The feature set of FlashStack was amazing. I don't have to mess with it. It's set it and forget it ... you can create a 4TB volume without having to create LUNs. In fact, you don't have to deal with LUNs at all."

#### Better TCO and support (manufacturing):

"The reasons we chose FlashStack were small file performance, cost of ownership, and overall value. I'd also say the vendor support structure and the overall nature of the vendor relationship were key reasons as well."

Table 2 (next page) describes organizational usage patterns for companies adopting the FlashStack platform. These companies had a substantial flash storage footprint with a total data capacity of 686TB. In addition, they were using an average of 185 FlashStack-supported business applications, constituting 45% of all applications in use (refer back to Table 1). Significantly, the platform supported 97% of all company revenue-related workloads.



### TABLE 2

### Organizational Usage of FlashStack

	Average	Median
Number of physical sites	93	4
Number of servers	63	22
Number of terabytes	755	450
Number of SSD/flash terabytes	686	333
Number of applications	185	81
Percentage of internal users supported	91	100
Percentage of revenue being supported	97	100

n = 10, Source: IDC In-depth Interviews, December 2020

### **Quantifying the Business Value of FlashStack**

IDC's Business Value model quantified the benefits for organizations that have chosen FlashStack to support their IT and storage operations. The survey data obtained from 10 customers was applied to this model to arrive at an array of quantified post-deployment benefits. Using this methodology, IDC found that these customers realized significant value for their storage infrastructure and business operations.

The use of FlashStack has supported more efficient IT and storage operations and increased the overall productivity of the teams that managed those operations. Its use also enhanced the agility needed to deploy storage resources and lowered the cost of operations. Improvements in IT infrastructure efficiency in turn served to optimize the work of the application development teams while minimizing the effects of unplanned downtime and improving overall business operations and results.

# Study participants in a variety of vertical markets commented on these and other benefits:

### **Easier to manage infrastructure (manufacturing):**

"The biggest benefits are the ease of use, ease of administration, and the support model FlashStack provides. We don't have to touch it. They do all the upgrades. They are responsible for it. The partnership with the support team and the account team is incredible."



#### Reduction in infrastructure spending (government):

"The data reduction we get from FlashStack is infinitely better than what we had. There was almost no data reduction before so that means that now we're buying a lot less storage capacity. If we were using our previous solution, I think we would need probably two or three times as much because we're getting a 3:1 data reduction ratio with FlashStack."

### Scaling up to meet business needs (healthcare):

"With the amount of resources that we acquired in this purchase, we can do an emergency spin up in minutes if needed. If we need to grow a product or application, we can do that with very minimal thought. If we have to be fast and just react knee jerk, we can do that. FlashStack gives us the agility to do all that."

#### Solid performance improvements (healthcare):

"We definitely see improved performance. To run some of our reports running on our old equipment, it would take 50 minutes to an hour. That time went down to 4 or 5 minutes, something like a 5x improvement. That's only one example, out of many."

IDC calculated that the total value FlashStack customers are realizing will be worth an annual average of \$3.67 million per organization over five years.

# These calculations can be broken out further in terms of average annual benefits per 100 users (\$42,000), per 100 flash terabytes (\$535,200), and the following categories (see Figure 1, next page):

#### Business productivity benefits:

Greater agility and performance improves business productivity by optimizing applications development and minimizing unplanned downtime. IDC calculates the value of these productivity benefits at an annual average of \$2,358,000 per organization (\$27,000 per 100 users and \$343,700 per 100 flash terabytes).

### Risk mitigation — user productivity benefits:

Deployment of the FlashStack platform results in fewer unplanned outages that can affect application performance and other business-critical IT resources that end users and customers depend upon. IDC calculates the value of higher end-user productivity at an annual average of \$762,000 per organization (\$8,700 per 100 users and \$111,100 per 100 flash terabytes).

### IT staff productivity benefits:

Deployment and use of FlashStack means that IT infrastructure and storage staff spend less of their time allocating and managing storage resources when compared with legacy or alternative approaches. IDC projects that interviewed organizations will realize value through staff time savings and higher productivity worth an annual average of \$504,000 per organization (\$5,800 per 100 users and \$73,400 per 100 flash terabytes).

#### IT infrastructure cost reductions:

FlashStack lowers the cost of operations in terms of both capex and opex. IDC calculates that the solution reduces these costs by an annual average of \$48,000 per organization (\$550 per 100 users and \$7,000 per 100 flash terabytes).







n = 10 | Source: IDC In-depth Interviews, December 2020

### **Improvements in IT and Storage Operations**

Managing datacenter infrastructure poses a number of challenges. IT departments are increasingly looking at converged infrastructure as a way to minimize cost and complexity by standardizing and consolidating applications and workloads. However, many converged solutions still use inefficient disk storage that often can't provide adequate performance or scalability or is plagued by significant downtime impacting end-user productivity.

Flash-based converged systems provide efficient operational advantages for the IT storage and infrastructure teams that manage them. The companies that IDC interviewed confirmed that FlashStack fostered these efficiencies while ensuring the levels of high reliability needed to keep business-critical applications available. Interviewed companies cited a number of key benefits including ease of use and management, significant levels of cost savings, and the platform's ability to free up staff to work on more strategic projects.

### They commented on these and other benefits:

### IT operations are more efficient (healthcare):

"After we had the Pure Storage array, we formed a new company, with another medical group. We were able to spin up 10–15 virtual servers on the existing hardware to meet those needs without having to buy any additional storage or create LUNs. It probably saved us days of setup time plus the time it takes to order the hardware."

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#### FlashStack is easy to run (healthcare):

"FlashStack helps amazingly well. The infrastructure is so sound and so reliable that people don't even think about it anymore. It's like electricity in the wall, the way you don't even think about plugging in an appliance ....."

#### Evergreen options save costs (manufacturing):

"Looking forward, we avoid having to spend \$3.5 million again in three years to upgrade storage with a disruptive forklift upgrade. Evergreen lets us upgrade to next-generation technology nondisruptively in our existing system. My point is that not only did we get much more cost-effective storage than we had to save money now but we will avoid rebuying everything again in three years, which will give us a lot of additional savings."

### IT can better support business needs (information technology):

"We were able to repurpose three to four people. For example, two people were moved to the application team. Before, they were working alongside the application folks to troubleshoot performance issues, and now, they are actually part of the application team. This was possible because they stopped having to deal with all the performance issues being reported by the application team. Overall, those three to four people are now focused more on business alignment."

IDC looked at how FlashStack made it easier for IT teams to manage their infrastructure. Figure 2 quantifies these improvements. Because of the built-in features and performance of FlashStack, IT infrastructure staff were able to recoup 72% of the time required to run and manage various aspects of their storage, network, and compute infrastructure.



### FIGURE 2 Impact on IT Infrastructure Management



Figure 3 addresses the platform's benefits for storage team efficiency. Deployment and use of FlashStack is allowing IT storage teams to focus 50% less on keeping the lights on while increasing the amount of available time to spend on business innovation and direct support eightfold.

### **FIGURE 3** Impact on IT Storage Team Activities



Time spent on keeping the lights on

n = 10 | Source: IDC In-depth Interviews, December 2020

Implementing FlashStack has improved the agility of deploying new storage resources in part because AFA-based arrays are easier to manage than legacy systems. In addition, automated functionality improved operations such as provisioning and capacity expansion. Study participants reported that improvements in the efficiency of IT teams increased agility in deploying the storage and compute resources required by application developers and line-ofbusiness end users. The number of hours needed by staff to deploy new storage was reduced substantially (77%) (see Figure 4). In addition, the number of hours required by staff to deploy new compute (including VMs) was reduced by 52%.

### **FIGURE 4 IT Agility Impact**

#### (% improvement) Staff time to deploy new storage array 77% (hours) Time to deploy new storage array 57% (days) Staff time to deploy new compute/VM 52% (hours) Time to deploy new compute/VM 36% (days)



Study participants reported that help desk teams benefited from the enhanced capabilities offered by FlashStack. IDC quantified these benefits as shown in Figure 5. Because FlashStack improved IT and storage performance and efficiency, IT help desk teams have fewer issues they need to address, and when they do occur, they can more easily be remediated. After deployment, help desk staff were able to address issues 37% faster. In addition, the number of calls was reduced by 11%, while 29% less time was needed to address each call.

### FIGURE 5 **Help Desk Impact**



Study participants also reported that FlashStack served as a cost-effective storage platform that offered the benefit of long-term infrastructure savings. This was possible in part because of the ability of all-flash systems to reduce cooling costs and physical space requirements. Figure 6 summarizes these infrastructure savings, calculated out over a five-year period. The use of alternative flash or legacy converged systems would have cost 25% more over that same five-year period.

### **FIGURE 6**

### **Five-Year Infrastructure Savings**

Cost of FlashStack/alternative environment



**Before FlashStack** 

### With FlashStack



### **Improving Business Operations and Results**

For interviewed companies, the use of FlashStack improved business operations and results. Enhanced storage performance led to better application development and deployment, reductions in unplanned downtime, and an improved ability to meet the ongoing requirements of line-of-business end users. Study participants in various vertical markets cited specific benefits such as the ability to perform faster analytics and queries and to work on more strategic projects.

### They commented on these and related benefits:

#### Better support helps increase revenue (manufacturing):

"The organization has increased their revenue by 20%. It's had a huge impact because what they are seeing is an acceleration of order to cash. We're able to get the order faster, process it faster, and have happier customers because we get the equipment out the door faster and customers end up purchasing more."

#### Better performance is important to the business (media and entertainment):

"Looked at year round, the FlashStack environment is probably overkill for what we require. However, we have a brand that's very much recognized worldwide and the critical nature of our major event means we need a significant increase in performance. While our biggest event is only two weeks of the year, it's an important two weeks."

#### **Faster analytics lead to business opportunities (government):**

"Analytics are affected by FlashStack because we're able to do queries quicker on the database warehouse ... . We could potentially make more money because online and marketing people are saving time. They are able to pull reports quicker."

#### Time to work on more strategic projects (healthcare):

"Our line-of-business applications require a lot of innovation to figure out how to navigate all the new healthcare rules that come out on almost a monthly basis ... . Now we can use a lot of innovation to work that system while trying to maximize our revenue."

IDC quantified business operations benefits in terms of typical performance metrics that define the success of those operations. Figure 7 shows that after FlashStack deployment, the greatest improvements were seen in *application performance* (62%), *reduced batch time runs* (60%), *and faster analytical queries* (48%).

### FIGURE 7 Performance Metrics

(% improvement)





As a result of total improved infrastructure performance, organizations are seeing a major reduction in unplanned downtime events that can affect the applications and database operations running on FlashStack. This improvement is enabled by the platform's robust and consistent performance along with high levels of all-flash availability. Table 3 quantifies these benefits showing that the number of annual outages were reduced by 90%. In addition, when they did occur, remediation was accomplished 67% faster. These benefits combined to yield an annual productivity-based business value of \$781,500.

### TABLE 3 Unplanned Downtime — User Productivity Impact

	Before/Without FlashStack	With FlashStack	Difference	Benefit
Number of outages per year	6.2	0.6	5.6	90%
MTTR (hours)	1.6	0.5	1.1	67%
Lost productive time per organization per year (FTEs)	11.5	0.4	11.2	97%
Hours per user of lost productive time per year	2.3	0.1	2.2	97%
Value of lost productive time per organization per year (based on FTEs)	\$807,800	\$26,400	\$781,500	97%

n = 10 | Source: IDC In-depth Interviews, December 2020

Interviewed companies reported that with better-performing applications and databases and less downtime, their organizations were able to garner additional revenue. As summarized in Table 4, these reductions in disruptive events translated into additional annual revenue in the amount of \$254,000.

### TABLE 4

### **Unplanned Downtime — Revenue Impact**

Business Impact — Revenue from Improved Performance	Per Organization
Total additional revenue per year	\$254,000
Assumed operating margin	15%
Total recognized revenue per year — IDC Business Value model	\$38,000



Study participants reported that FlashStack served as a cost-effective infrastructure platform for their business applications and workloads. Factoring in the infrastructure savings described in Figure 6, IDC evaluated the cost of operations over a five-year period by adding in additional costs for lost productivity and unplanned downtime. Operating an efficient converged storage platform served to reduce IT infrastructure costs including those related to maintenance, power, and space compared against alternatives. Figure 8 shows that aggregate costs for the FlashStack solution totaled \$2.2 million, representing a 73% reduction over the five-year period.



n = 10 | Source: IDC In-depth Interviews, December 2020

In today's application-centric business environments, being able to accelerate developer productivity offers a critical competitive advantage. Study participants reported that they were able to provide application developers with requested storage capacity faster and more consistently deliver the performance needed to support their tasks and operations. This resulted in a 6% boost in developer productivity, which yielded an annual productivity-based business value of \$236,500 (see Table 5).

### TABLE 5

### **Application Development Impact**

	Before/Without FlashStack	With FlashStack	Difference	Benefit
Equivalent FTEs per year per organization	38.5	40.9	2.4	6%
Equivalent productivity value per year per organization (based on FTEs)	\$3.85 million	\$4.09 million	\$236,500	6%



Drilling down further on application development, IDC evaluated how FlashStack improved the overall performance of developers by evaluating a series of metrics typically associated with their work. KPIs showing the greatest improvement included *number of new applications deployed* (45%), *life cycles for new applications* (24%), and *life cycles for new features* (19%) (see Figure 9).

# FIGURE 9 Application Development Metrics

(% improvement)



Table 6 quantifies revenue impacts from better addressing business opportunities. The total average annual revenue that accrued after deployment of the FlashStack platform was \$15,725,000.

### TABLE 6

### **Business Operations and User Impact**

Business Impact – Revenue from Better Addressing Business Opportunities	Per Organization
Total additional revenue per year	\$15,725,000
Assumed operating margin	15%
Total recognized revenue per year — IDC Business Value model	\$2,359,000

n = 10 | Source: IDC In-depth Interviews, December 2020

Table 7 (next page) quantifies end-user revenue impacts showing an annual average productivity gain of 17%. This resulted in an annual business value of \$58,400.



### TABLE 7 End-User Impact

Enhanced User Productivity	Per Organization
Average number of users impacted	4.8
Average productivity gains	17%
Productive hours gained	1,569
End-user impact (FTE equivalent per organization per year)	0.8
Value of end-user time	\$58,400

n = 10 | Source: IDC In-depth Interviews, December 2020

### **ROI Summary**

Table 8 presents IDC's analysis of the financial and investment benefits related to study participants' use of FlashStack. IDC calculates that, on a per organization basis, interviewed organizations will achieve total discounted five-year benefits of \$13.2 million based on IT and storage staff efficiencies, improved performance, better business results, and lower costs. These benefits compare with projected total discounted investment costs over five years of \$2.41 million on a per organization basis. At these levels of benefits and investment costs, IDC calculates that these organizations will achieve a five-year ROI of 446% and break even on their investment in 7.5 months.

### TABLE 8 Five-Year ROI Analysis

Five-Year ROI Analysis	Per Organization	Per 100 Flash Terabytes	Per 100 Internal Users
Benefit (discounted)	\$13.2 million	\$1.92 million	\$150,800
Investment (discounted)	\$2.41 million	\$351,800	\$27,700
Net present value	\$10.8 million	\$1.57 million	\$123,200
ROI (NPV/investment)	446%	446%	446%
Payback (months)	7.5 months	7.5 months	7.5 months
Discount factor	12%	12%	12%



# **Challenges/Opportunities**

For customers moving to all-flash storage for the first time, both administrators and end users will need to reset their expectations. The faster provisioning, order of magnitude lower latency, ability to handle I/O surges without missing a beat, simpler management, and dense workload consolidation that does not put service-level agreements at risk are all positive changes. As each constituency comes to trust FlashStack's ability to consistently deliver better metrics across all of these areas, there is the opportunity to redesign various processes to operate more efficiently given the new storage infrastructure capabilities. FlashStack's ease of use also frees administrators from routine maintenance chores, allowing them to focus on more innovative or strategic tasks that directly drive value for the business. FlashStack's data reduction capabilities alone enable IT operations, DevOps, and end users to rethink budget requirements to handle data growth over time.

While FlashStack has been available since 2014, new Cisco and/or Pure Storage customers may not be aware of its existence. The advantages of converged infrastructure are a proven commodity for many enterprises, and both vendors should continue to ensure that their separate customers as well as the market in general are aware not only of FlashStack's availability but also of the compelling economic case for its use as demonstrated in this Business Value white paper.

# Conclusion

Converged infrastructure and AFAs started on separate trajectories and have single-handedly created their own adherents. When Cisco and Pure Storage brought these two together with the introduction of FlashStack in 2014, it represented the first converged infrastructure offering built around a modern all-flash design. Adoption grew rapidly, and the two vendors have kept the platform updated with the latest versions of their server, storage, and networking platforms. It is clear from the research undertaken as part of this study that customers are reaping strong performance, availability, efficiency, and cost benefits from using the platform.

On a qualitative basis, customers interviewed for this research noted faster, easier storage provisioning that sped time to market for new products and services, a "set it and forget it" administrative paradigm that overdelivered against performance requirements with no ongoing performance tuning and nondisruptive multigenerational technology upgrades that saved significant time, effort, and money by extending the storage product life cycle far beyond that of traditional storage infrastructures. Administrators across all interviewees gave FlashStack high marks for ease of use, high availability, and infrastructure density (ability to more densely consolidate workloads without any performance or management downsides).

On a quantitative basis, our research revealed strong economic benefits. Across the 10 interviewed organizations, they achieved a 446% five-year ROI, a 72% reduced cost of operations, a 77% improvement in deployment and provisioning agility, and a 97% reduction in unplanned downtime. Storage administration was 72% more efficient, freeing up 800% more staff time to spend on innovation-related activities; end users were 17% more productive with their work; and organizations gained an average of \$16 million in additional revenue as a result of faster, more efficient internal operations. These results speak for themselves and provide a reliable indication of what new FlashStack customers can expect.



# **Appendix: Methodology**

IDC's standard ROI methodology was utilized for this project. This methodology is based on gathering data from current users of the FlashStack solution as the foundation for the model.

Based on interviews with organizations using FlashStack, IDC performed a three-step process to calculate the ROI and payback period:

- Gathered quantitative benefit information during the interviews using a before-and-after assessment of the impact of FlashStack. In this study, the benefits included staff time savings and productivity benefits as well as operational cost reductions.
- 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.
- 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 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 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.
- 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 the Analysts**



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More about Harsh Singh



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Eric Burgener is Research Vice President within IDC's Enterprise Infrastructure Practice. Eric's core research coverage includes Storage Systems, Software and Solutions, quarterly trackers, end-user research as well as advisory services and consulting programs. Based on his background covering enterprise storage, Eric's research includes a particular emphasis on flash-optimized arrays, emerging persistent memory technologies, and software-defined storage. He is an active participant in the IT Buyers Research Program at IDC and blogs throughout the year on the topic of Infrastructure and Data Management.

More about Eric Burgener



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