



Dell EMC PowerFlex Helps Enterprise Organizations Streamline IT and Storage Operations

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Executive Summary

The datacenter infrastructure market is undergoing a once in a generation change that is driving a fundamental need to rethink how systems are designed, deployed, managed, utilized, and refreshed.

While enterprise infrastructure has seen steady improvements around resiliency, density, efficiency, and performance with each new product refresh, the impact of these improvements rarely had datacenterwide implications. That is because many datacenters are built with silos of infrastructure (e.g., storage, servers, compute, and networking) that are managed independently by silos of experts. Such a structure has worked well in the past but is leaving an increasing number of IT departments struggling to keep up in a world where major digital transformations are all too common.

To enable business transformation rather than impede it, IT departments are increasingly turning to modern, software-defined infrastructure (SDI). SDI refers to logically pooled resources of compute, memory, storage, and networking, which are managed by software with minimal human intervention. These logically pooled SDI resources are able to abstract the compute, data, and networking services from the hardware, which allows for all features and services to run truly independent of the underlying hardware. This abstraction allows SDI solutions to be built with industry-standard building blocks, most commonly x86 servers.

BUSINESS VALUE HIGHLIGHTS

Click on highlights below to navigate to related content within this white paper.

\$4.49 million
average annual
benefits on a per
organization basis

321%
five-year ROI

9-month
payback period

47% reduced
total cost of operations

70% more
efficient IT
infrastructure staff

46% less
staff time spent on
keeping the lights on

70% improved
storage deployment
agility

98% reduced
unplanned downtime

53% more
new applications
deployed

14% more
productive application
developers

Today's SDI solutions offer a full set of enterprise-class data services/features within multiple deployment options. SDI solutions allow customers to build a software-defined storage (SDS) solution with disaggregated compute and storage resources managed together or a fully converged compute and storage solution known as hyperconverged infrastructure (HCI). Both options have become very popular infrastructure solutions because of their ability to drive down capital costs, increase operational efficiency, reduce risk, increase datacenter agility, and lower datacenter facilities costs associated with power, cooling, and floor space.

Dell EMC PowerFlex is a highly scalable, SDI solution that provides high-performance, scale-out block storage. PowerFlex can be deployed in a disaggregated (two-layer) architecture with compute and storage resources served by separate nodes, an HCI (single-layer) architecture where each node contributes storage and compute resources, or a mix of these architectures in a single deployment. To validate the benefits of Dell EMC PowerFlex, IDC interviewed seven organizations running enterprise workloads supported by the platform. The survey data obtained and applied to IDC's Business Value model showed that study participants realized significant value with Dell EMC PowerFlex. IDC calculates that these companies will achieve average annual benefits of \$4.49 million per organization, which would result in a five-year return on investment (ROI) of 321%, by:

- Fostering more efficient IT and storage infrastructure management staff productivity and freeing up teams from routine tasks to better support business projects
- Significantly improving storage and compute resource agility while also lowering the cost of operations
- Translating IT operational benefits into improved application development, better business results, and increased revenue
- Minimizing the effects of unplanned downtime, thereby contributing to greater business productivity
- Enabling greater productivity and better business outcomes through improved performance

Situation Overview

The IT infrastructure market has been on a path of rapid evolution over the past several years. Customer priorities are shifting from discrete compute, networking, or storage infrastructure to a broader set of requirements around cloud computing, application modernization, and workload management. As such, the types of infrastructure in demand increasingly have the following attributes: are based on industry-standard hardware, are software defined, are highly automated, and are cloud connected. Such attributes have allowed IT teams to rethink their structure and reprioritize the degree to which they are manually interacting with their infrastructure. Directly related to this trend is the increased use of software-defined and hyperconverged infrastructure

solutions that can help remove silos of discrete compute and storage systems and eliminate the inefficiencies related to managing these technologies. The ability for storage computing and network software to be decoupled from the underlying infrastructure and run on industry-standard x86 components has cleared the way for a new set of software-defined infrastructures.

There are multiple factors making the comingling of storage and compute resources on a common set of physical resources a natural outcome in the evolution of a software-defined infrastructure. They include:

- An ever-increasing number of workloads running on virtual infrastructure
- The drive to automate infrastructure, application processes, and workflows, which favors software-centric infrastructure approaches
- The drive to containerized, cloud-native applications to improve agility and time to market
- The drive to a heterogeneous datacenter (i.e., physical, virtual, containerized, multiple hypervisors, and container tools)

Dell EMC PowerFlex Overview

Dell EMC PowerFlex is a software-defined infrastructure solution that delivers enterprise-class storage services in a full software stack that is designed to run on industry-standard servers.

Dell EMC PowerFlex can be deployed in multiple ways:

- **Storage-only system** (i.e., external hosts consume PowerFlex storage)
- **Two-layer, disaggregated storage and compute architecture** to create complete infrastructure solution for your workloads while maintaining abstraction between compute and external storage
- **As an HCI solution** using the same x86 PowerFlex nodes

Regardless of how it is ultimately deployed, PowerFlex architecture can be consumed by a broad set of bare-metal, virtualized and container operating environments. Further, the solution is orchestrated and managed as a single system, rather than a set of independent nodes. The HCI deployments of Dell EMC PowerFlex collapse all required compute and storage resources onto a scale-out architecture, running directly on the same x86 server hardware that host the application and virtual servers. An important distinguishing aspect of Dell EMC PowerFlex (regardless of how it is deployed) is its high-performance characteristics and its ability to scale to thousands of nodes. Further, users are not forced to stick with their initial deployment choice. With PowerFlex, users can scale flexibly at any time by adding either storage, HCI, or compute nodes. This has made the offering particularly appealing to larger enterprise customers and cloud service providers.



With PowerFlex, users can scale flexibly at any time by adding either storage, HCI, or compute nodes.

Dell EMC PowerFlex is designed from the ground up to offer the following benefits:

→ **Flexibility:**

PowerFlex is designed to support multiple deployment options and technologies. Users can deploy PowerFlex appliance or PowerFlex rack. The former is a robust software-defined solution that can start with a modest 4 node footprint but can scale to thousands of nodes. The latter is a rack-scale solution that fully integrates all infrastructure software, servers, and networking. Both PowerFlex rack and appliance solutions are delivered via Dell EMC services to ensure a turnkey experience.

PowerFlex supports flexible deployment architectures. It can be deployed as a disaggregated (two layer), single layer (HCI), storage only, or a mix of these. This allows customers to scale flexibly and meet application needs precisely. PowerFlex also supports broad set of operating environments in a single deployment; bare metal, multiple hypervisors (VMs), and containerized applications can all be deployed in a single deployment, so users can modernize any application and evolve their application architectures flexibly.

→ **Scalability:**

Start small and grow to thousands of nodes, with the same performance benefits gained with each new node added. PowerFlex appliance can start small (just four nodes) and scale over time. Both PowerFlex appliance and rack are able to scale to thousands of nodes. This makes PowerFlex suitable for a wide range of use cases and company sizes.

Scalability also plays an important part in the performance of PowerFlex. The ability to scale linearly is an important part of the solution's performance capabilities, with each newly added node directly contributing to a performance improvement. It's important to also note that input/output (I/O) performance and throughput scale linearly—to thousands of nodes. This allows both transactional applications (databases) and throughput-intensive applications (analytics) to scale without performance bottleneck.

→ **Performance:**

The PowerFlex scale-out, block-based architecture was designed from the ground up to meet the most demanding and mission-critical datacenter applications. PowerFlex provides an efficient, block-based I/O stack. PowerFlex takes up minimal resources on the node, thus allowing greater application density.

The very high-performance capabilities are also attributable to the way in which PowerFlex scales and the degree to which it can do so. Being a scale-out architecture allows for linear system scaling. As stated previously, this linear scaling systems allow each newly added node to directly improve the performance of the overall system. Combined with the ability to scale to thousands of nodes, PowerFlex can support massive amounts of system input/output operations per second (IOPS) and throughput.

Also PowerFlex takes a different approach to data persistence than other offerings. Specifically, it distributes data evenly across all drives in a storage pools, across many nodes. This eliminates I/O bottleneck and also ensures there is no network/throughput bottleneck. It also means a modest-sized PowerFlex cluster can deliver millions of IOPS and sub-millisecond latency.

→ **Availability:**

PowerFlex was designed to support the high availability demands of mission-critical workloads with six-nines (99.9999%) system availability. PowerFlex also supports quick rebuild times, native data replication, and secure snapshots. PowerFlex Manager supports automated life-cycle management, which helps eliminate risks associated with system upgrades. The scale-out nature of PowerFlex ensures users can retire system nodes nondisruptively.

→ **User agility:**

PowerFlex is designed to drive new levels of operation simplicity through automation and consolidated management. Key to this ability is Dell EMC PowerFlex Manager, which can automate many aspects of system management, including initial deployment, ongoing configuration compliance, system expansion, and firmware/software upgrades. PowerFlex also supports the elimination of data migration via its scale-out software-defined architecture. PowerFlex orchestrates and automates life-cycle management tasks across the entire infrastructure — from firmware and basic input/output system (BIOS) to nodes, switches, and hypervisors. This represents a full-stack level of automation that greatly simplifies IT.

The Business Value of Dell EMC PowerFlex

Study Demographics

IDC conducted research that explored the value and benefits for organizations of using Dell EMC PowerFlex (formerly known as Dell EMC VxFlex). The project included seven interviews with organizations that were using this solution and had experience with or knowledge about its benefits and costs. 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, businesses, and costs.

Table 1 (next page) presents study demographics and profiles. Organizations interviewed had a base of 18,329 employees, indicating the involvement of several large companies. This workforce was supported by an IT staff of 880, engaged in managing 559 business applications on behalf of 15,836 users and 18,625 external customers. In terms of geographical distribution, five companies were based in the United States, with the remainder in Australia and Switzerland.

From a vertical industry standpoint, industries represented include the insurance, manufacturing, business services, financial services, and transportation sectors. (Note: All numbers cited represent averages.)

TABLE 1

Firmographics of Interviewed Organizations

Firmographics	Average	Median	Range
Number of employees	18,329	7,500	100–96,500
Number of IT staff	880	250	17–3,000
Number of IT users	15,836	7,500	100–79,613
Number of external customers	18,625	3,000	23–75,000
Number of business applications	559	300	15–2,500
Revenue per year	\$5.55 billion	\$2.23 billion	\$22.8 million to \$20.0 billion
Countries	United States (5), Australia, and Switzerland		
Industries	Insurance (2), manufacturing (2), business services, financial services, and transportation		

Source: IDC, 2020

Choice and Use of Dell EMC PowerFlex

The companies that IDC surveyed described usage patterns for the Dell EMC PowerFlex platform as well as provided a snapshot of their overall IT and business environments. They also discussed the rationale behind their choice of Dell EMC PowerFlex. Interviewed customers cited a number of factors for their choice such as enabling a transition to cloud architecture, having fewer application compatibility issues, and better database performance.

Study participants elaborated on these benefits:

→ Better database performance and storage agility:

“Dell EMC PowerFlex was more streamlined for databases and gave us greater flexibility for future changes. We also wanted more agility and to improve the upgrade process. It’s more seamless with Dell EMC PowerFlex.”

→ Support for modern applications and remote workers:

“We went from a mainframe to a more modern application, and we needed the infrastructure to support it. We also didn’t feel that the network was able to

support other infrastructure alternatives. We have 48 remote offices and some home workers and didn't feel that the network was ready for those options."

→ **More compatible with applications/workloads:**

"We used another solution's blades previously with Dell EMC storage on the back end but had many compatibility issues. We had a good relationship with our Dell EMC reps, and when Dell EMC PowerFlex offered its release and compatibility matrix, we knew we were on the right version."

→ **Enabling IT transformation:**

"Dell EMC PowerFlex is helping our IT transformation strategy because we are trying to get to a cloudlike architecture. What Dell EMC PowerFlex does is virtualize all the hardware and that's the direction we're going in anyway. So this makes it easier if we want to pick up and move."

Table 2 describes organizational usage associated with the deployment of the Dell EMC PowerFlex platform. There was a substantial Dell EMC PowerFlex storage footprint across all companies with an average of 43 Dell Technologies storage systems having a total capacity of 1,017TB. Surveyed companies were running 617 servers along with 325 business applications and 193 databases. IDC calculated that 7,247 users were touched by the Dell EMC PowerFlex platform, representing about 46% of the total end-user base and a significant level of company revenue (73%). Additional usage patterns are presented in Table 2. (Note: All numbers cited represent averages.)

TABLE 2
Organizational Usage of Dell EMC PowerFlex

Dell EMC PowerFlex Use	Average	Median
Number of Dell Technologies storage systems	43	4
Number of terabytes	1,017	357
Number of servers	617	200
Number of sites/branches	146	50
Number of geographical locations	12	1
Number of databases	193	75
Number of applications running	325	200
Number of internal users supported	7,247	1,300
Percentage of revenue being supported	73	80

Source: IDC, 2020

Business Value and Quantified Benefits

IDC's Business Value model expresses the benefits for organizations using the Dell EMC PowerFlex solution to support their ongoing IT and storage operations. Taking into account the use of alternative or previous solutions, survey data obtained from Dell EMC 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 IT infrastructure and business operations.

The use of Dell EMC PowerFlex enabled more efficient IT and storage operations by increasing the productivity of the teams supporting those operations. Interviewed organizations reported that the use of Dell EMC PowerFlex helped them significantly improve storage agility while lowering the cost of operations. These operational benefits, in turn, translated into improved application development, better business results, and increased revenue. In addition, the platform helped minimize the effects of unplanned downtime, thereby contributing to greater productivity.

Study participants described the most significant benefits:

→ PowerFlex is very flexible for organizations:

"The biggest benefit is the flexibility of the platform and the ease of administration because Dell EMC PowerFlex is a self-contained hyperconverged system. The portability of the environment is also important. We can move stuff around, so we appreciate the physical and virtual portability."

→ It has better ability to expand as needed:

"We are looking to continue to expand our environment. We can do this in different ways. For example, if we have a greater storage need, we can increase things just from a storage capacity perspective. If we have a higher compute requirement, we can flex that, but it's also managed within the same framework. We can flex different resources within the environment independent of one another to some degree, but still can keep that same kind of management structure and architecture."

→ Predictability is leading to better user performance:

"Because you can do predictive analysis with Dell EMC PowerFlex [Manager], we are able to say: 'We're currently running at this level, so we need to ramp up and get a few more servers out there because more capacity is coming down the road.' So we can do better planning. As a result, conservatively, end users are experiencing something like 25-30% more performance."

The deployment of Dell EMC PowerFlex resulted in significant levels of value by enabling these organizations to better address business opportunities and generate new business. IDC projects that the total value that interviewed Dell EMC PowerFlex customers are realizing will be worth an annual average of \$4.49 million per organization over five years (\$441,700 per 100TBs deployed) (see Figure 1, next page).



Interviewed organizations reported that the use of Dell EMC PowerFlex helped them significantly improve storage agility while lowering the cost of operations. These operational benefits, in turn, translated into improved application development, better business results, and increased revenue. In addition, the platform helped minimize the effects of unplanned downtime, thereby contributing to greater productivity.

Customers recognized improvements in the following areas:

→ **Business productivity benefits:**

Study participants tied the agility, scalability, and performance benefits that they experienced to higher user productivity leading to improved business results. IDC calculates the value of these productivity benefits at an annual average of \$2,160,000 per organization (\$212,000 per 100TBs deployed).

→ **IT staff productivity benefits:**

Study participants data showed that the use of Dell EMC PowerFlex required less IT infrastructure time to deploy, manage, and support compute and storage resources compared against previous or alternative approaches. IDC projects that interviewed organizations will realize value through staff time savings and higher productivity worth an annual average of \$1,674,000 per organization (\$165,000 per 100TBs deployed).

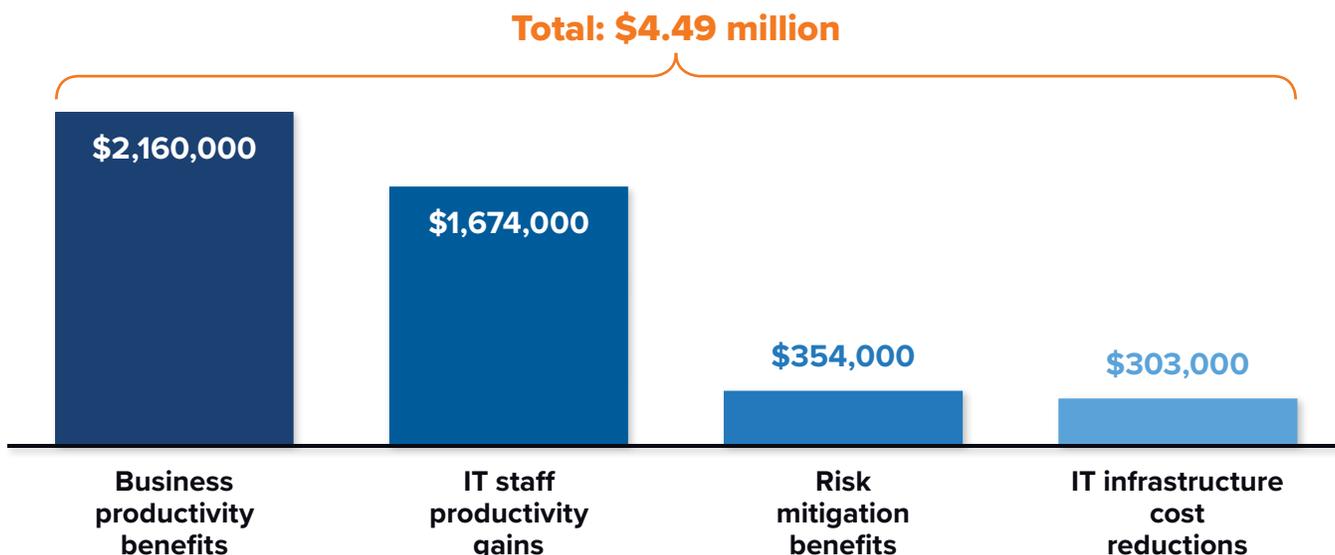
→ **Risk mitigation — user productivity benefits:**

Dell EMC customers reported that, after deployment, they experienced fewer unplanned outages. IDC calculates the resulting value of higher end-user productivity at an annual average of \$354,000 per organization (\$35,000 per 100TBs).

→ **IT infrastructure cost reductions:**

Interviewed organizations reported that the deployment of Dell EMC PowerFlex resulted in lower cost of operations. IDC calculates that study participants were able to reduce costs by an annual average of \$303,000 per organization (\$30,000 per 100TBs).

FIGURE 1
Annual Average Benefits per Organization



Source: IDC, 2020

Improvements in IT and Storage Operations and Management

The key drivers for the popularity of software-defined hyperconverged infrastructure in today's IT environments are agility, scalability, and simplicity, enabled through the use of built-in software automation, life-cycle management functionality, and other features. Beyond these core benefits, there are also major trends occurring that favor HCI adoption including the drive toward datacenter modernization, the growth in edge computing, and hybrid cloud acceleration. Dell EMC PowerFlex converges storage and compute resources to form a hyperconverged, enterprise-grade storage product designed to deliver linearly scalable performance. As the number of storage devices grows, so does throughput and IOPS. PowerFlex customers are able to achieve such outcomes, in part, through PowerFlex Manager, which is an integrated rack management and orchestration tool that simplifies provisioning, managing, monitoring, alerting, life-cycle management, and reporting.

For their IT and storage operations, study participants appreciated the flexibility of the Dell EMC platform and its ease of administration as a self-contained hyperconverged system designed to optimize physical and virtual portability. They discussed the improvements that Dell EMC PowerFlex brought to their organizations including the fact that, using this functionality, IT staff had more time to focus on business-oriented projects. As core benefits, they also cited greater speed and agility in deploying databases and being able to respond to business needs more responsively. Study participants commented on these and related issues:

→ IT infrastructure is more cost effective:

"In terms of the production side, we're saving about \$300,000–400,000 a year in spite of the fact that our workloads increased by about 70%. This is because we can better plan out our needs and isolate things with Dell EMC PowerFlex."

→ IT teams are more responsive to business needs:

"We have the ability to rapidly deploy security patches. It provides better stability for systems which, in turn, provides better protection for the organization. I also have the ability if I need it to just add CPU versus storage. This allows us to be more agile with respect to changing business requirements."

→ It is time to focus on business-oriented projects:

"Our users are getting better performance because we're able to roll out some business intelligence applications and they are getting dashboards. We could have done that before, but our workloads hadn't transitioned to that. We were busy doing more 'lights on' work and we didn't have time for that."

As a result of these benefits, interviewed companies reported that Dell EMC PowerFlex made it easier for IT teams such as database administrators to manage their IT infrastructure. For database operations, as an example, the platform can handle up to 1.8x more database orders per minute. As one database manager commented: *"The reason it impacts the time to market is upgrade processes, where you've got to do data conversion on a database and use SSIS packages to interact with the database. Those times are substantially less. So with one of the upgrades we're doing now ... it could have taken a week and we're doing it in about two days."*



For their IT and storage operations, study participants appreciated the flexibility of the Dell EMC platform and its ease of administration as a software-defined platform designed to optimize physical and virtual portability.

Table 3 quantifies the improvements in IT team efficiency. Staff time required for projects, measured in FTEs per organization, decreased by 70%, representing a substantial improvement (see Table 3). This translated into an annual salary savings of \$443,000.

TABLE 3
IT Infrastructure Management Impact

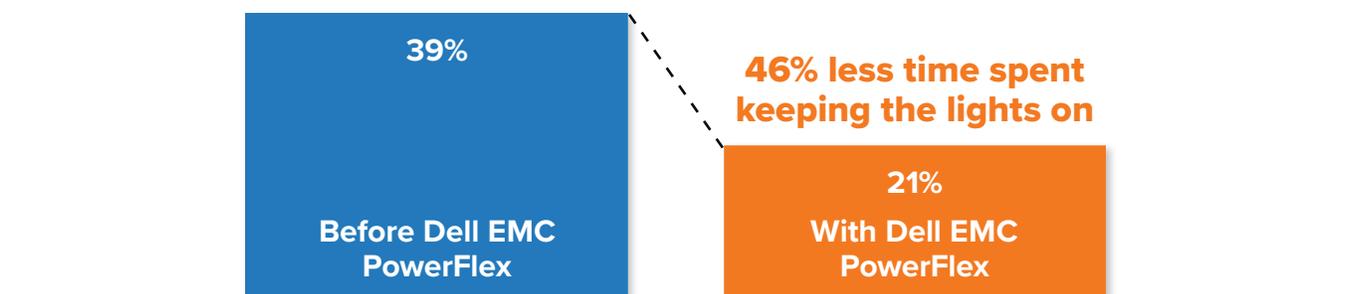
	Before Dell EMC PowerFlex	With Dell EMC PowerFlex	Difference	Benefit
Management of IT storage productivity impact (equivalent FTEs)	6.4	1.9	4.4	70%
Salary cost per year per organization	\$635,000	\$193,000	\$443,000	70%

Source: IDC, 2020

In addition to benefits for IT infrastructure teams, Dell EMC PowerFlex Manager also helped storage infrastructure teams to focus less on “keeping the lights on” and invest more time on business-oriented projects and activities. As one study participant described it: *“We are able to focus on other projects that are needed by the business. We’re able to help the business progress on the things that they need, instead of having to build servers, for example.”*

Figure 2 shows post-deployment impacts on IT storage team efficiency. IT storage management organizations experienced a 46% improvement in the amount of time they did not have to spend on lights on activities, which enabled them to spend more time on business-oriented projects and activities (see Figure 2).

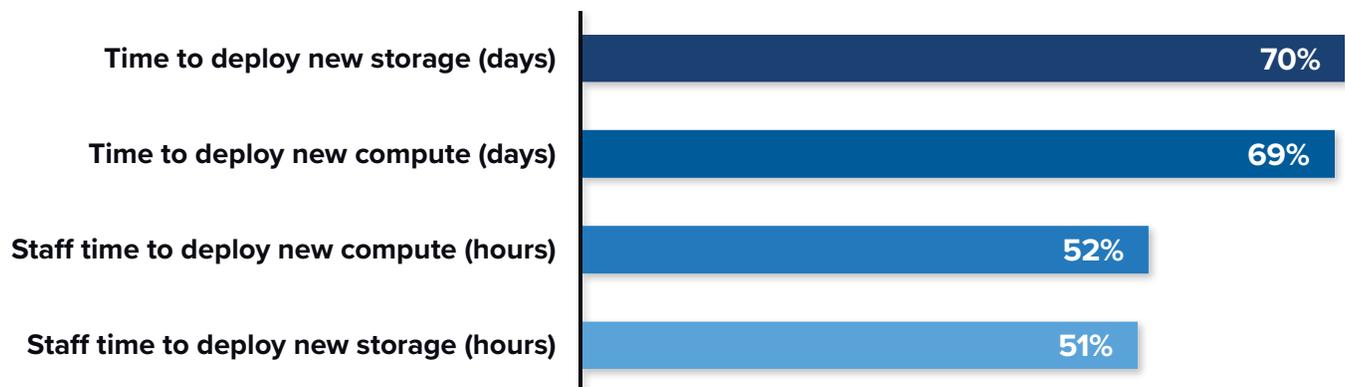
FIGURE 2
Impact on IT Storage Team Activities



Source: IDC, 2020

Implementing the Dell EMC PowerFlex platform has improved the agility of deploying new storage resources based on built-in management features and automated functionality for provisioning and expansion. For example, auto-balancing IT resources across nodes and clusters helped storage teams carry out various tasks more quickly and efficiently. Figure 3 quantifies these agility impacts. The number of days required to deploy new storage resources was reduced by 70% (see Figure 3). In addition, the number of days needed to deploy new compute resources improved 69%. Additional metrics are shown in Figure 3.

FIGURE 3
IT Agility Impact (% of improvement)

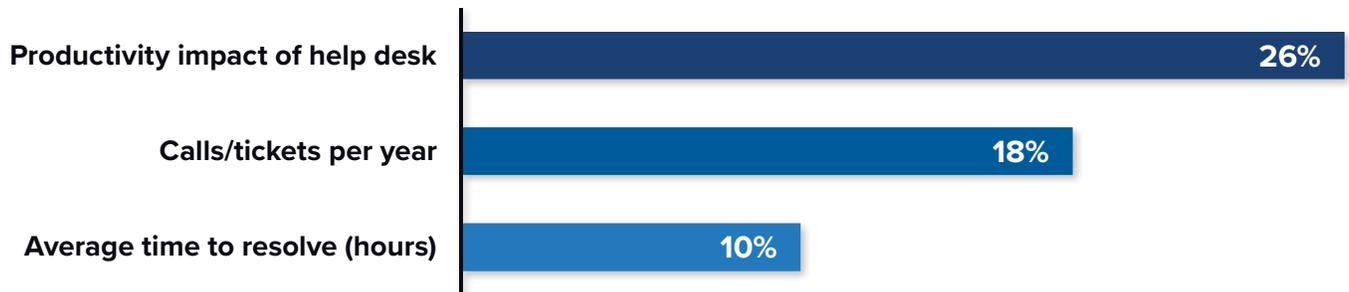


Source: IDC, 2020

IDC also looked at reliability as another key indicator of the platform's value proposition. Study participants reported that improved performance for storage operations and the applications they supported offered greater reliability. The Dell EMC PowerFlex, for example, is designed to provide efficient parallelism and no single points of failure. The platform's reliability and overall performance impacts helped reduce the incidence of helpdesk issues and also the amount of time IT teams needed to spend on mitigating and fixing these issues. As one study participant explained: *"I went back and looked at our tickets and looked at the time that resolution took previously. When a user says they are having a problem, they log in, and then IT has to search through some 50 different servers running their app. It takes them one to three hours. Now, for the applications we support, using [PowerFlex Manager] monitoring features, they can fix those issues better because they can identify them before they happen."*

These benefits are quantified in Figure 4. There was a 26% improvement in help desk productivity (see Figure 4, next page). In addition, the annual number of incoming calls and trouble tickets were reduced by 18% partially because of PowerFlex Manager. When problems did occur, they were resolved 10% more quickly because tools like PowerFlex Manager were able to give these organization insights they need to solve the issue.

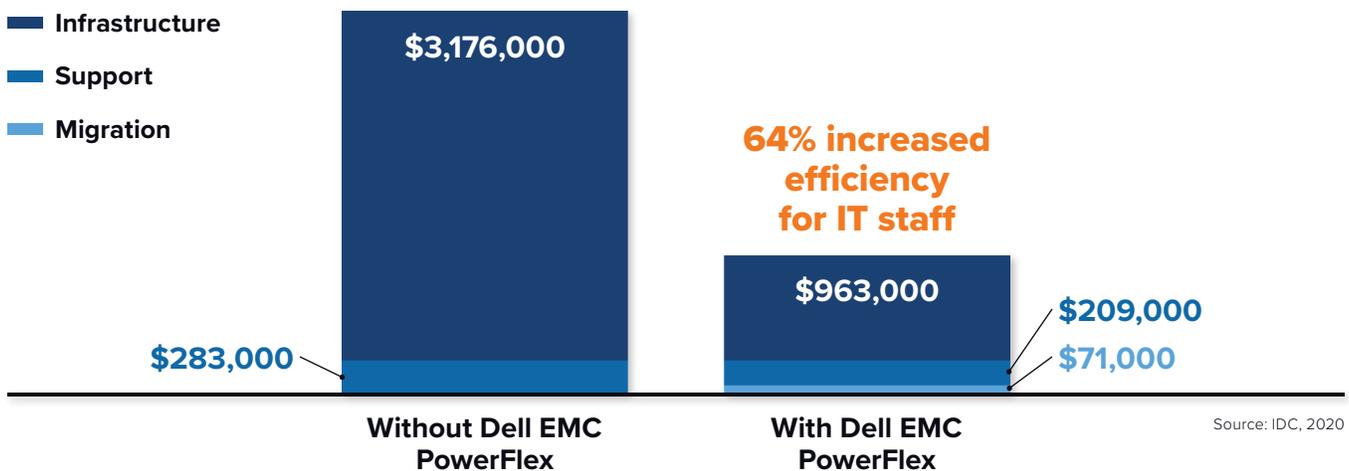
FIGURE 4
Help Desk Impact (% of improvement)



Source: IDC, 2020

Figure 5 shows the total cumulative impact of the above-described improvements for IT infrastructure, support, and migration teams after deployment of Dell EMC PowerFlex, calculated over a five-year period. These teams experienced a 64% increase in overall efficiency (see Figure 5).

FIGURE 5
Total IT Management Impact (Five years)

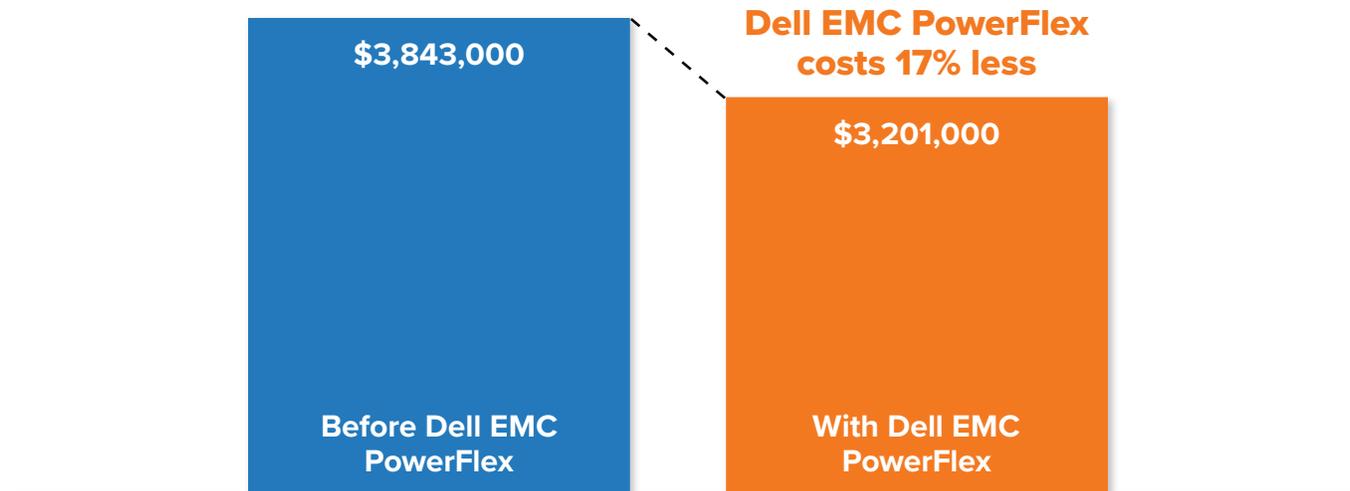


Source: IDC, 2020

Study participants reported that Dell EMC PowerFlex served as a cost-effective IT and storage platform for their application workloads. As a software-defined and efficient IT platform, they noted that it reduced IT infrastructure costs such as storage costs and the maintenance and power needed to support the PowerFlex solution while also delivering greater performance. Figure 6 shows the infrastructure savings that IDC projects will accrue over a five-year period. Aggregate costs for Dell EMC PowerFlex were 17% lower compared against the cost of alternative or legacy solutions (see Figure 6, next page).

FIGURE 6

IT Infrastructure Savings (Five years)



Source: IDC, 2020

Improvements in Business Operations and Results

The benefits that study participants experienced from the deployment of Dell EMC PowerFlex fostered better business results. Interviewed companies realized higher revenue by more optimally addressing business opportunities and enhancing applications' delivery for both end users and customers. Study participants cited benefits such as helping business units innovate more easily, having better capacity for resource spikes and high levels of concurrent usage, and improved applications development and performance. They commented on these and related benefits:

→ Application developers save time:

"Our application developers are saving time, because from a performance perspective, with Dell EMC PowerFlex, we've gone from having a lot of conversations about I/O and latency to having zero conversations about that."

→ Performance can handle large usage:

"Currently, we've got hundreds of concurrent users logging into an application all at one time. We have 20 servers with Dell EMC PowerFlex. If we were doing it with traditional servers, we'd need at least two to three times as many. There's just no way that we could have done this with the same number of servers. There's a big difference in performance compared with traditional servers primarily because it's all flash so we've got many terabytes. I would say we're probably close to an 80-100% performance increase. I can't imagine trying to run this application on traditional architecture."

→ **Improved application performance means more revenue:**

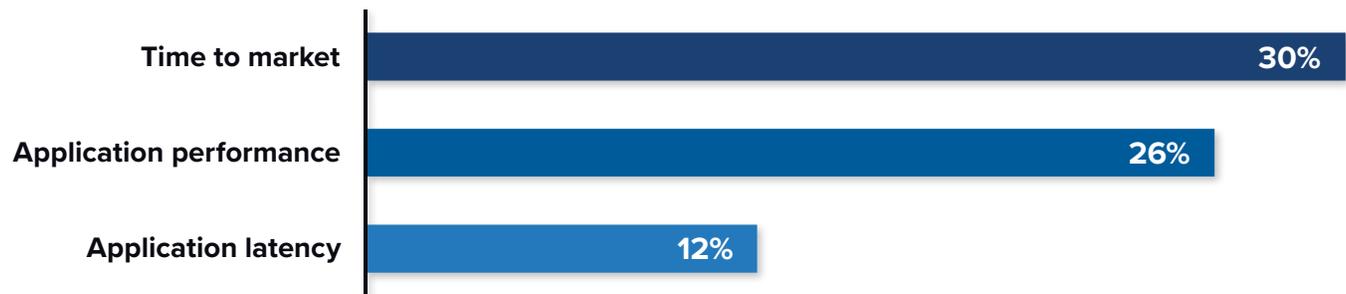
“We are seeing more revenue opportunities because of how applications are running on Dell EMC PowerFlex. We have more visibility and, as a result, are seeing an increase in performance. People can do things quicker from a performance perspective because of applications’ improvements and that leads to more revenue.”

→ **Organization can innovate more:**

“We can do more innovating because we have the resources with Dell EMC PowerFlex to spin up boxes for people to play with. So if I want to test this or that, we can now have more time to do that.”

IDC drilled down further on how these business benefits translated into specific key performance indicators (KPIs). Time to market showed a 30% improvement, while application performance and application latency showed a 26% and 12% improvement, respectively (see Figure 7).

FIGURE 7
Business KPI Impact (% of improvement)



Source: IDC, 2020

Another major benefit of Dell EMC PowerFlex reported by study participants was a substantial reduction in unplanned downtime as a result of the platform reliability previously addressed. Table 4 provides metrics on these impacts. There was a substantial reduction in the annual frequency of downtime events, declining from 12.5 to 1.3 (see Table 4, next page). This represented a significant improvement of 89%. In addition, the time required to resolve downtime events when they did occur was reduced from 2.7 to 1.3 hours, a 52% improvement. In the aggregate, these improvements resulted in a substantial improvement to the tune of 98%, which equates to an annual business value benefit of \$366,400.

TABLE 4

Unplanned Downtime Impact

	Before Dell EMC PowerFlex	With Dell EMC PowerFlex	Difference	Difference (%)
Frequency per year	12.5	1.3	11.2	89%
Time to resolve (hours)	2.7	1.3	1.4	52%
FTE impact (lost productivity due to unplanned outages)	5.3	0.1	5.2	98%
Value of lost productivity per year	\$374,500	\$8,000	\$366,400	98%

Source: IDC, 2020

Application development is another critical area in today's business environments. Study participants reported that Dell EMC PowerFlex helped their development teams deploy applications more easily while also easing concerns about performance issues that might affect the timeliness or quality of their projects. Table 5 shows these impacts. The number of applications that were developed annually increased from 7.8 to 12, representing a substantial improvement (53%) (see Table 5, next page). Similarly, the number of new features developed annually increased from 85 to 100, an 18% improvement. Additional metrics are presented in Table 5.

TABLE 5

Application Development Staff Impact

	Before Dell EMC PowerFlex	With Dell EMC PowerFlex	Difference	Benefit
FTEs per year per organization	89.6	102.4	12.8	14%
Salary cost per year per organization (based on FTEs)	\$9.0 million	\$10.2 million	\$1.3 million	28%
New applications, new logic				
Number per year	7.8	12	4.2	53%
Development life cycle (weeks)	7	5.5	1.5	21%
New features				
Number per year	85	100	15	18%
Development life cycle (weeks)	4.9	4	0.9	18%

Source: IDC, 2020

Drilling down more on business benefits, study participants reported that their end users were more productive because Dell EMC PowerFlex, as previously described, enabled better-performing applications while also reducing the disruptive impacts of downtime. Table 6 quantifies these end-user benefits. After deployment, 35,652 productive hours were gained, resulting in a substantial annual business value of \$1.33 million (see Table 6).

TABLE 6
End-User Impact

Enhanced User Productivity	Per Organization
Number of users impacted	590
Average productivity gains	3%
Productive hours gained	35,652
End-user impact (FTE equivalent per organization per year)	19
Value of end-user time	\$1.33 million

Source: IDC, 2020

As a result of the operational efficiencies described previously, surveyed organizations using Dell EMC PowerFlex were able to leverage its performance attributes to better address business opportunities, move faster to market, and generate more revenue. The total annual additional revenue for study participants amounted to \$6,071,000 (see Table 7).

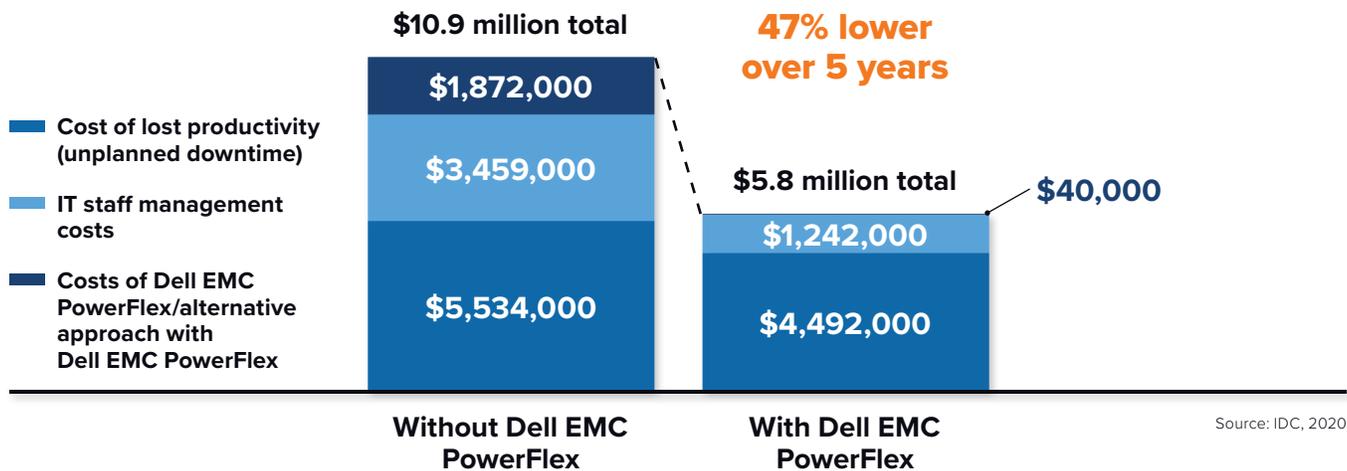
TABLE 7
Revenue Impact

Business Impact: Revenue from Better Addressing Business Opportunities	Per Organization
Total additional revenue per year	\$6,071,000
Assumed operating margin	15%
Total recognized revenue per year (IDC model)	\$911,000

Source: IDC, 2020

Finally, IDC calculated the cumulative costs of operations for surveyed organizations. This calculation factored in IT staff management costs as well as costs associated with lost productivity and unplanned downtime. Over a five-year period, Dell EMC PowerFlex costs were 47% lower overall (see Figure 8, next page).

FIGURE 8
Cost of Operations (Five Years)



ROI Summary

IDC’s analysis of the financial and investment benefits related to study participants’ use of Dell EMC PowerFlex is presented in Table 8. IDC calculates that, on a per organization basis, interviewed organizations will achieve total discounted five-year benefits of \$16.2 million per organization (\$1.59 million per 100TBs) based on IT/storage staff efficiencies, increased business results, and lower costs as described in Table 8. These benefits compare with projected total discounted investment costs over five years of \$3.84 million on a per organization basis (\$378,100 per 100TBs). At these levels of benefits and investment costs, IDC calculates that these organizations will achieve a five-year ROI of 321% and break even on their investment in nine months.

TABLE 8
Five-Year ROI

Five-Year ROI Analysis	Per Organization	Per 100TBs
Benefit (discounted)	\$16.2 million	\$1.59 million
Investment (discounted)	\$3.84 million	\$378,100
Net present value (NPV)	\$12.3 million	\$1.21 million
ROI (NPV/investment)	321%	321%
Payback (months)	9	9
Discount factor	12%	12%

Source: IDC, 2020

Challenges/Opportunities

Decades of innovation have brought us datacenter solutions that are undeniably more capable than anything offered just a few short years ago. That said, too many datacenter teams continue to buy and manage their infrastructure the same way they did 10 or 20 years ago. This process/structure has become untenable. IT departments must look to new datacenter infrastructure technologies like software-defined storage and hyperconverged infrastructure if they want to keep up with unprecedented changes occurring all around them. Importantly, they should look for software-defined solutions that not only deliver the performance, scalability, and availability requirements of the workloads but also provide flexibility and offer an effective management framework to simplify complete infrastructure management.

The benefits and savings listed throughout this white paper are very real and indicative of those seen in other IDC research covering this technology. IDC recommends a measured, commonsense approach when deploying SDI and HCI solutions. Companies may want to start by deploying solutions like Dell EMC's PowerFlex with a limited set of workloads and expand over time. IDC has talked with a large number of organizations that started working with SDI and HCI solutions in a comparable way. Over time, almost all of these companies migrate an increasing number of workloads onto these solutions as benefits of the technology materialize.

Conclusion

Companies of all sizes are looking for ways to modernize their IT infrastructures in order to drive down complexity, risk, and costs that impede their ability to actively enable business transformation. The degree to which this is happening, and the urgency behind datacenter modernization, is difficult to overstate. The measurable results driven by PowerFlex and highlighted throughout this white paper stand as proof that scalable, resilient, high-performance, and highly automated software-defined infrastructure like Dell Technologies' PowerFlex are driving real-world benefits that target these very areas. There is also ample proof that Dell Technologies' PowerFlex is more than capable of being the cornerstone of a truly modern datacenter environment. Companies currently evaluating enterprise-class SDI solutions should view organizations like those interviewed for this IDC white paper as important pioneers that have shown just how SDI solutions can drive real, measurable business value.

Appendix

Methodology

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

Based on interviews with organizations using it, 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 Dell EMC PowerFlex.**
In this study, the benefits included staff time savings and productivity benefits and 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 Dell EMC PowerFlex 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 Dell EMC PowerFlex 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 \$100,000 per year salary for IT staff members and an average fully loaded salary of \$70,000 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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Harsh is responsible for developing return-on-investment (ROI) and cost-savings analysis on enterprise technological products. Harsh's work covers various solutions that include datacenter hardware, enterprise software, and cloud-based products and services. Harsh's research focuses on the financial and operational impact these products have on organizations that deploy and adopt them.

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Eric manages IDC's Quarterly Worldwide Disk Storage Systems Tracker, IDC's Worldwide Storage Software Qview and IDC's Worldwide Quarterly Converged Systems Tracker. This broad storage coverage coupled with his extensive international storage market experiences gives him a unique understanding of the many market forces affecting the storage software market. In addition to these responsibilities, Eric frequently contributes to primary research, custom storage projects and regularly presents market trends at industry events.

[More about Eric Sheppard](#)

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