The Total Economic Impact™ Of Dell EMC PowerScale OneFS Powered Systems

Cost Savings And Business Benefits Enabled By Dell EMC's PowerScale

FORRESTER®

Table Of Contents

Project Director:
Bob Cormier, Vice President and Principal Consultant
June 2020

ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit forrester.com/consulting.

FORRESTER®

Executive Summary

Dell Technologies commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Dell EMC's PowerScale OneFS powered systems (formerly known as Isilon). The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of a PowerScale investment on their organizations.

To better understand the benefits, costs, and risks associated with a PowerScale implementation, Forrester interviewed eight customers with experience using OneFS. Customer interviewees noted that PowerScale required little training and that managing clusters with several PBs of data required about one full-time equivalent (FTE). Interviewees also noted that in addition to scalability and cost effectiveness, the performance and resiliency of their PowerScale clusters help their organizations support fast business growth and reduce downtime. Customers can also run a wide variety of workloads on the same data set within a single platform.

PowerScale is a scale-out network-attached storage (NAS) platform that enables organizations to store, manage, and analyze unstructured data. PowerScale clusters are composed of different node types that can scale from terabytes (TBs) to petabytes (PBs) in a single cluster while maintaining management simplicity. PowerScale clusters can also scale to edge locations and the cloud.

For this TEI study, Forrester has created a composite *Organization* to illustrate the quantifiable benefits and costs of investing in OneFS solutions. See the Composite *Organization* section below for a more in-depth description.

Key Findings

Quantified benefits. The composite *Organization* experiences the following risk-adjusted present value quantified benefits, totaling $15,315,355 over a three-year period (see the Analysis Of Benefits section for more details):

> Storage cost optimization — **$12,349,240.**

> Storage management efficiencies — **$1,306,446.**

> Data center space savings — **$199,113.**

> Business value added — **$1,460,556.**

Costs. The *Organization* experienced the following present value costs totaling $3,670,966 over three years (see the Analysis Of Costs section for more details):

> Dell EMC PowerScale hardware and software costs — **$3,133,412.**

> Implementation and ongoing storage administration labor — **$537,554.**

Key Results

Forrester's interviews with eight existing customers and subsequent financial analysis found that the composite *Organization* experiences benefits of $15.3 million over three years versus costs of $3.7 million, adding up to a net present value (NPV) of $11.6 million, an ROI of 317%, and a payback period of less than six months.

Key Benefits

Cost effectiveness of PowerScale:
$15.3 million saved

Administrative efficiencies:
**Before: 500 TB/admin
With PowerScale: Up to 5 PB/admin**

"PowerScale certainly has contributed to our customer satisfaction. The downtime on PowerScale for our services in the total time we have used it is zero. We continuously do necessary upgrades through the platform and scale capacity without disturbing our customers."

— *Senior service manager, telecommunications*

FORRESTER®

ROI
317%

Benefits PV
$15.3 million

Costs PV
$3.7 million

NPV
$11.6 million

If risk-adjusted costs, benefits, and ROI still demonstrate a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as realistic expectations, as they represent the expected value considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

FORRESTER®

TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing PowerScale.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that PowerScale can have on an organization. Specifically, we:

DUE DILIGENCE
Interviewed Dell EMC stakeholders to gather data relative to PowerScale.

CUSTOMER INTERVIEWS
Interviewed eight organizations using PowerScale to obtain data with respect to costs, benefits, and risks.

COMPOSITE *ORGANIZATION*
Designed a composite *Organization* based on characteristics of the interviewed organizations.

FINANCIAL MODEL FRAMEWORK
Constructed a financial model representative of the interviews using the TEI methodology, and risk-adjusted the financial model based on issues and concerns of the interviewed organizations.

CASE STUDY
Forrester employed four fundamental elements of TEI in modeling PowerScale's impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

> The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

FORRESTER®

The Dell EMC PowerScale OneFS Powered Systems Customer Journey

BEFORE AND AFTER THE POWERSCALE INVESTMENT

Interviewed Customers

For this study, Forrester conducted in depth interviews with eight PowerScale customers. Interviewed customers include the following (each has requested anonymity):

INDUSTRY	REGION	INTERVIEWEE TITLE	TIME WITH POWERSCALE
Software, video services	Headquartered in the United States	Senior director of SaaS	6 years
Telecommunications	Headquartered in Europe	Senior service manager	4 years
Managed IT services provider	Headquartered in the United States	Storage architect	3 years
Visual media	Headquartered in Europe	Senior director of SaaS	10 years
Automotive organization	Headquartered in Europe	• Senior systems engineer • Systems development group leader	3 years
Biotech	Headquartered in the United States	Director of marketing	10+ years
Produce grower	Headquartered in North America	IT manager	8 months
Geospatial data	Headquartered in the United States	• Senior systems engineer • VP of IT	5 years

Prior to using OneFS powered systems, the customer interviewees used traditional storage solutions to store and analyze a rapidly growing volume of unstructured data. The interviewees often managed data in silos and had multiple storage solutions in their previous environments, creating management inefficiencies that prevented IT staff from focusing on more valuable work. These systems lacked the flexibility to scale with growth, and overprovisioning created cost inefficiencies from lower utilization. Additionally, these customer interviewees required continuous delivery of services for customer satisfaction and business growth, and these previous, less flexible systems could not provide the scalability, performance, or availability necessary to avoid costly disruptions to their business.

With PowerScale, the customer interviewees have a storage platform with a single filesystem, single volume, and single namespace that can easily scale to accommodate rapidly growing unstructured data capacity. PowerScale's heterogeneous clusters can support a variety of applications and storage needs, with different tiers of storage appliances as well as a cloud storage tier. Aligning data with the best-fit tier creates cost efficiencies and higher utilization rates from reduced silos and reduced overprovisioning. PowerScale provides significant management efficiencies due to automated tiering with PowerScale SmartPools and CloudPools software and efficient data replication with PowerScale

> "With traditional storage system limitations, eventually you hit a point of growth where the storage had a limit. Dell EMC's PowerScale OneFS powered systems removed that limitation for us so we could grow their single share out to basically unlimited capacity."
>
> *— Storage architect, managed services provider*

FORRESTER®

SyncIQ for disaster recovery.

Key Challenges

The interviewees faced several challenges with their previous storage environments that led them to look for a solution like PowerScale OneFS powered systems:

> Many interviewees used multiple traditional storage systems to manage unstructured data in silos. This resulted in growing management inefficiencies as capacity needs grew as well as cost inefficiencies and low utilization.

> Traditional storage systems had several limitations, including limits to growth and the inability to scale with demand. Most interviewees had to overprovision storage capacity to scale the storage environment, creating higher capex and opex costs than needed based on the storage capacity actually being utilized. One interviewee noted that if the company had kept its previous storage solution, it would need to rearchitect its key applications in response to its storage limitations, which was expected to be a very costly project. Additionally, interviewees noted limitations of previous backup architectures. The types of data being stored did not compress or dedupe, and with long data retention policies, costly backup system capacity was being used quickly.

> Ultimately, traditional storage system challenges affected business growth. Issues with performance and downtime diminished customer satisfaction. Combined with difficulty scaling cost-effectively, the interviewees viewed their previous storage environments as limiting, rather than enabling, growth.

"The main pain that the PowerScale OneFS solved is the flexibility to scale out in a single namespace. Instead of running and fixing unstable, small storage solutions and managing multiple namespaces, we now work with one single namespace that we can scale out. In the previous solution, we had to add more namespaces, manage them, and move files all over, and it took a lot of time. There were a lot of errors, and that affected our business."

— *Senior director of SaaS engineering software company*

Key Results

OneFS powered systems provided interviewed customers with enhanced performance and massive scalability to support their demanding file-based workloads while enabling customers to reduce data center footprint and optimize their storage resources. With Dell EMC's PowerScale, the interviewed customers could modernize their storage infrastructure to support digital transformation.

The customer interviews revealed several key results from the PowerScale investment:

> **Customer interviewees realize both capital and operational cost efficiency with PowerScale.** Interviewees use SmartPools to automatically allocate specific workloads to the most cost-effective storage tier. It scales as capacity needs increase to reduce overprovisioning and maintain higher utilization of the PowerScale infrastructure compared with previous storage infrastructure. Interviewees also noted the overall lower cost per gigabyte for PowerScale storage versus their previous storage. CloudPools help interviewees shift rarely accessed data to the cloud, moving capex costs to opex by freeing up on-premises capacity and reducing data center space requirements. PowerScale's single file system and automation capabilities allow interviewed customers to add capacity in minutes, spending minimal time on management and dramatically reducing time that was previously spent on resolving issues that resulted in downtime.

.

> **PowerScale better supports business growth.** All the customer interviewees struggled with the limitations of traditional storage systems and the effect of these limitations on customer satisfaction and business growth. Interviewees view data storage capacity scalability as pivotal to supporting current and future services, with one interviewee noting: "Without the scalability of the PowerScale, our growth wouldn't be possible. Storage is critical to what we do." Performance and availability are also critical to customer satisfaction, and previous storage solutions struggled to handle spikes in demand, which resulted in several hours of downtime a year. With PowerScale, these challenges go away. One interviewee remarked: "PowerScale certainly has contributed to our customer satisfaction. The downtime on the PowerScale for our services in the total time we have used it is zero."

> **Customer interviewees view Dell EMC as a key partner.** Several interviewees highlighted the benefit of having Dell EMC as a key storage partner. One interviewee noted that the Dell EMC's PowerScale support teams have deep domain and industry knowledge, increasing confidence that the PowerScale investment will meet storage requirements and effectively support business needs. Another interviewee commented on the importance of the PowerScale support team in reducing the storage management burden. Whenever there is an issue with the PowerScale environment, or if a node or hard drive fails, PowerScale engineers will replace defective equipment or help the interviewee troubleshoot. The interviewee stated, "At the end of the day, PowerScale support saves me resources because I don't need these capabilities in-house, and it lets me concentrate more on our business and less on the storage."

"For our services, we needed a storage solution that was easily scalable with a shorter delivery time than the solution we had before and also a solution that could scale in smaller steps. Our previous solution demanded that scaling up be done in very big volumes and was therefore also very expensive to do. We also needed a solution that provided high performance to support our service offers. Dell EMC's PowerScale came out on top."

— Senior service manager, telecommunications

FORRESTER®

Composite *Organization*

Based on the interviews, Forrester constructed a TEI framework, a composite *Organization*, and an associated ROI analysis that illustrates the areas financially affected. The composite *Organization* is representative of the eight companies that Forrester interviewed and is used to present the aggregate financial analysis in the next sections. The composite *Organization* that Forrester synthesized from the customer interviews has the following characteristics:

Description of composite: The composite is a global *Organization* that uses PowerScale to store and manage images and line-of-business applications. The *Organization* is experiencing rapid growth in its data capacity needs, and the PowerScale solution must grow to manage high-volume backup and archive of unstructured data, while driving big data analytics, artificial intelligence (AI), machine learning (ML), and deep learning (DL) workloads and hosting home directories. The *Organization* previously used siloed traditional storage solutions to manage this data.

Deployment characteristics: Data capacity needs increase every year. The *Organization* starts with 1.5 PB of capacity during Year 1 and grows to 7.5 PB of capacity during Year 3. To manage this data, the *Organization* uses H500 nodes for production workloads in its primary data center, and it uses CloudPools to tier aged data to ECS after six months. It uses A200 nodes for disaster recovery in its secondary data center and uses SyncIQ to efficiently replicate data. The *Organization* also uses DataIQ for reporting and monitoring. The *Organization* has an initial utilization range of 65%, peaking at 85% for OneFS powered nodes.

Key assumptions
Initial capacity: 1.5 PB
Year 3 capacity: 7.5 PB

Primary data center cluster:
- ✓ H500 nodes
- ✓ Data to ECS after six months

Secondary data center cluster:
- ✓ A200 nodes

Software used:
- ✓ SmartPools
- ✓ CloudPools
- ✓ SyncIQ
- ✓ DataIQ

FORRESTER®

Analysis Of Benefits

QUANTIFIED BENEFITS AS APPLIED TO THE COMPOSITE *ORGANIZATION*

Total Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Storage cost optimization	$2,921,905	$899,048	$11,912,381	$15,733,333	$12,349,240
Btr	Storage management efficiencies	$208,000	$312,000	$1,144,000	$1,664,000	$1,306,446
Ctr	Data center space savings	$42,000	$42,000	$168,000	$252,000	$199,113
Dtr	Business value added	$400,000	$600,000	$800,000	$1,800,000	$1,460,556
	Total benefits (risk-adjusted)	$3,571,905	$1,853,048	$14,024,381	$19,449,333	$15,315,355

Storage Cost Optimization

The composite *Organization* replaces its previous traditional storage solution with OneFS powered systems, generating significant cost savings with increased storage efficiency and cost-effective options for "colder" data. To calculate this impact, the table below compares the costs needed to support this capacity growth compared with the composite *Organization's* previous storage environment.

Modeling and assumptions. For the composite *Organization*, Forrester assumes that:

> The composite *Organization* requires initial PowerScale storage capacity of 1.5 PB during Year 1, increasing to 7.5 PB during Year 3.

> With OneFS powered appliances, the composite has an average beginning utilization rate of 65% in Year 1, improving to 85% in Year 2. With the additional appliance investments in Year 3, utilization ranges from 65% to 85% for all OneFS powered appliances. In the previous storage environment, the average utilization rate was 63%. This improved efficiency means the *Organization* needs less total capacity with PowerScale to support the same utilized capacity. Row A4 is the total TB capacity the *Organization* would have purchased to support the same utilized capacity with its previous storage, compared to PowerScale TB's in row A1.

> If the *Organization* were to continue with its previous storage environment, the average price for traditional SSD flash would be $2.00/gig, which represents 20% of the previous storage environment, and $1.20 for spinning disk, which represents 80% of the previous storage environment. The 20:80 average price is $1.36/gig as represented in Row A7.

> With PowerScale, the *Organization* can also scale in smaller increments, reducing overprovisioning that occurred with its previous storage environment. To account for this, Row A5 shifts 500 TB to the prior year because the *Organization* used to provision traditional

The table above shows the total of all benefits across the four areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite expects risk-adjusted total benefits to be a PV of over $15.3 million.

Previous storage environment — average utilization rate: 63%
With PowerScale: up to 85%

FORRESTER®

storage in larger increments, paying for that storage further in advance of when it was needed.

> Rows A8 and A10 capture the efficiencies noted above combined with the cost effectiveness of PowerScale compared with previous storage.

In conclusion, the *Organization* pays significantly less with its investment in PowerScale nodes and ECS capacity.

Risks. Storage cost optimization benefits can vary with:

> The previous storage environment, previous storage costs, and ability to replace previous storage with PowerScale.

> The difference in utilization rates between PowerScale and the previous environment.

> Purchase discounts offered by Dell EMC of other vendors.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted PV of $12,349,240.

> Impact risk is the risk that the business or technology needs of the organization may not be met by the investment in PowerScale, resulting in lower total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

Storage Cost Optimization: Calculation Table					
REF.	METRIC	CALC./SOURCE	YEAR 1	YEAR 2	YEAR 3
A1	PowerScale primary storage capacity (average during year, TB)	*Organization*	1,500	1,500	7,500
A2	PowerScale utilization rates	Interviews	65%	85%	70%
A3	Previous storage environment's utilization rate	Interviews	63%	63%	63%
A4	Storage capacity needed with prior solution (TB)	A1*A2/A3 (rounded)	1,548	2,024	8,333
A5	Shift in provisioning of capacity due to reduced scalability in previous environment	500 TBs (rounded)	2,048	2,524	8,833
A6	Capacity added per year, previous solution, TB	*Organization* (rounded)	1,548	476	6,310
A7	Cost of previous storage solution, primary data center	Average cost is $1.36/gig	$1,360	$1,360	$1,360
A8	Cost of previous storage solution, primary data center	A6*A7 (rounded)	$2,104,762	$647,619	$8,580,952
A9	Cost of previous storage solution, backup architecture	$1.00/gig	$1,000	$1,000	$1,000
A10	Cost of previous storage solution, backup architecture	A6*A9 (rounded)	$1,547,619	$476,190	$6,309,524
At	Storage cost optimization	A8+A10	$3,652,381	$1,123,810	$14,890,476
	Risk adjustment	↓20%			
Atr	**Storage cost optimization (risk-adjusted)**		**$2,921,905**	**$899,048**	**$11,912,381**

FORRESTER®

Storage Management Efficiencies

Management of the *Organization's* previous storage systems was complex and time-consuming. Adding capacity and managing the environment required significant effort, and management time was spent on reducing downtime and resolving issues.

With OneFS powered systems, the composite *Organization* can consolidate from multiple silos of storage to a single file system and automate many management tasks using tools like SmartPools, simplifying storage management and generating significant labor savings. Adding new PowerScale nodes to an existing cluster to scale out capacity and performance takes only a few minutes. Once the new nodes are added, the AutoBalance feature of OneFS operating system automatically redistributes data and balances capacities across all nodes in the cluster. This simplifies management, avoids potential "hot spots," and increases overall storage utilization in the cluster.

The composite *Organization* spends some time each year upgrading to the newest firmware, but interviewees noted that this is nondisruptive to end users. Interviewees also noted the high resiliency of OneFS; for some, it eliminates downtime completely. Other management tasks done more easily with OneFS include setting policies and monitoring capacity to ensure enough room for growth, as well as simplifying reporting and monitoring with DataIQ. Unlike the *Organization's* previous storage environment, the OneFS storage management complexity does not increase with added capacity.

Modeling and assumptions. One FTE can manage several petabytes of data (two FTEs for 7.5PBs) with PowerScale, freeing up staff to work on more value-add activities.

For the composite *Organization*, Forrester assumes that:

> In the previous environment, each administrator managed 500 TB of data, on average.

> With PowerScale, each administrator can manage 5 PB of data, on average.

Risks. Storage management efficiencies and resulting benefits can vary with:

> The administrator-to-capacity ratio in the previous storage environment.

> Regional differences in fully loaded labor costs for storage administrators.

> The ability for the *Organization* to standardize on PowerScale for unstructured data storage.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted PV of $1,306,446.
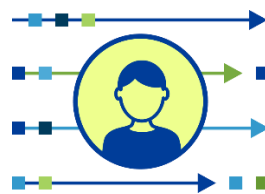
Admin-to-capacity ratio
Before: 500 TB/admin
With PowerScale: 5 PB/admin

FORRESTER®

Storage Management Efficiencies: Calculation Table					
REF.	METRIC	CALC./SOURCE	YEAR 1	YEAR 2	YEAR 3
B1	Storage management labor needed, previous storage environment	Interviews - FTEs	3.0	4.0	13.0
B2	Storage management labor needed, PowerScale	Interviews - FTEs	1.0	1.0	2.0
B3	Average fully loaded compensation, storage administrator	Industry average	$130,000	$130,000	$130,000
Bt	Storage management efficiencies	(B1-B2)*B3	$260,000	$390,000	$1,430,000
	Risk adjustment	↓20%			
Btr	**Storage management efficiencies (risk-adjusted)**		**$208,000**	**$312,000**	**$1,144,000**

Data Center Space Savings

Customer interviewees found that the improved storage efficiency, density, and cloud capability of PowerScale contribute to reduced data center space requirements compared with their previous storage solutions, given the same storage capacity. Higher utilization of PowerScale compared with traditional storage utilization means organizations need less physical capacity in the data center to support the same storage needs. By tiering "cold" data to the cloud, the composite *Organization* can further reduce on-premises physical capacity needed in the data center.

Modeling and assumptions. For the composite *Organization*, Forrester assumes that:

> PowerScale capacity takes significantly less space compared with the previous storage solutions.

> A benefit of using CloudPools is the avoidance of additional H500 node purchases, further reducing data center space needs compared with the previous environment. With CloudPools, the *Organization* needs significantly less space compared with the previous storage solution for the same capacity.

> When including both the primary and disaster recovery data centers, by Year 3 the *Organization* saves 28 racks of space by using PowerScale with SmartPools and CloudPools.

> Data center savings per rack are driven primarily by a reduction in average power and cooling costs of $7,500 per rack.

Risks. Data center space savings can vary with:

> Differences in the previous storage environment, including previous space requirements and utilization rates.

> Whether the storage environment uses a cloud tier or has redundant data center sites.

> Regional differences in utility power costs per KwH.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted PV of $199,113.

In total, the *Organization* reduces data center space needs by over 90% using PowerScale with CloudPools.

FORRESTER®

Data Center Space Savings: Calculation Table					
REF.	METRIC	CALC./SOURCE	YEAR 1	YEAR 2	YEAR 3
C1	Racks needed for previous storage environment	Interviews	9	9	30
C2	Racks needed for PowerScale (42 nodes per rack; one primary, one backup)	Dell EMC	2	2	2
C3	Data center cost savings per rack	Industry average	$7,500	$7,500	$7,500
Ct	Data center space savings	(C1-C2)*C3	$52,500	$52,500	$210,000
	Risk adjustment	↓20%			
Ctr	**Data center space savings (risk-adjusted)**		$42,000	$42,000	$168,000

Business Value Added

Scalability, performance, and availability of storage infrastructure impact the interviewed customers' ability to deliver services that satisfy customers and keep pace with business growth. Some interviewees were able to quantify some of that impact, which ranges from several hundred thousand dollars of benefit per year to several million in incremental revenue. Some of these impacts include the following, as described by the interviewees:

> "It was part of our plan to grow our business and get more customers quickly. Without a system like PowerScale, it wouldn't be possible. Storage is a critical part of our system, and we have a strong vendor in Dell EMC to back us up."

> "From the moment we started with PowerScale, we grew our customer base in a more continuous and stable way than with our previous storage environment. High availability is very important and upgrading the firmware or software for PowerScale can be done without any user impact. This was a very important requirement for selecting PowerScale."

Modeling and assumptions. Some interviewees rely on high performance and availability for the success of revenue-generating projects. Others rely on PowerScale scalability and availability to drive customer reach and customer satisfaction to generate incremental revenue.

Forrester conservatively assumes that the composite *Organization* generates $500,000 in incremental business value in Year 1, increasing to $1 million in business value per year by Year 3.

Risks. Interviewees provided a broad range of quantified impacts that depend on the previous environment, industry, and organization-specific opportunities. To account for this, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted PV of $1,460,556.

"It was part of our plan to increase our business and get more customers quickly. Without a system like PowerScale, it wouldn't be possible. Storage is a critical part of our system, and we have a strong vendor in Dell EMC to back us up."

— Senior director of SaaS engineering, software company

FORRESTER®

Business Value Added: Calculation Table					
REF.	METRIC	CALC./SOURCE	YEAR 1	YEAR 2	YEAR 3
D1	Business value added	Interviews	$500,000	$750,000	$1,000,00
Dt	Business value added	D1	$500,000	$750,000	$1,000,00
	Risk adjustment	↓20%			
Dtr	**Business value added (risk-adjusted)**		**$400,000**	**$600,000**	**$800,000**

Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from customer to customer. There are scenarios in which a customer might choose to implement OneFS powered systems and later realize additional uses and business opportunities:

> A key benefit of PowerScale data lake, which supports a wide range of applications, is the ability to share data more effectively across those applications and potentially surface new insights with in-place analytics. One interviewed customer noted: "A key thing for us is we're advertising PowerScale as our data lake foundation. As we're pushing more big data initiatives and big data services, it's becoming more valuable to us to have multiprotocol access to the same set of data. Based on initial tests, we are able to use PowerScale to eliminate additional infrastructure that would have been required with a traditional Hadoop platform." Potential benefits for future analytics efforts include avoided infrastructure costs, more efficient data analytics projects, and positive business impacts from data insights.

> Interviewees reported additional cost efficiencies with PowerScale's SmartDedupe data deduplication software. Based on the amount of redundant data organizations are storing, SmartDedupe can help them achieve additional storage efficiency by reducing the amount of physical storage needed, helping to avoid unnecessary node purchases and maximizing the use of data center space.

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a future additional Investment. This provides an organization with the "right" or the ability to engage in future initiatives but not the obligation to do so.

"A key thing for us is we're advertising the PowerScale as our data lake foundation. As we're pushing more big data initiatives and big data services, it's becoming more valuable to us to have multiprotocol access to the same set of data. Based on initial tests, we are able to use the PowerScale to eliminate additional infrastructure that would have been required with a traditional Hadoop platform."

— *Storage architect, managed services provider*

FORRESTER®

Analysis Of Costs

Total Costs

REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Etr	OneFS Powered system costs	$1,279,893	$201,695	$201,695	$2,001,119	$3,684,402	$3,133,412
Ftr	Implementation and ongoing storage administration labor	$32,400	$156,000	$156,000	$312,000	$656,400	$537,554
	Total costs (risk-adjusted)	$1,312,293	$357,695	$357,695	$2,313,119	$4,340,802	$3,670,966

OneFS Powered Systems Costs

The composite *Organization* has two OneFS powered clusters, one in the primary data center and one in the disaster recovery data center.

Modeling and assumptions. The *Organization's* data capacity needs increase every year. The *Organization* starts with 1.5 PB of capacity at the beginning of Year 1 and grows to 7.5 PB of capacity during Year 3. To manage this data, the *Organization* uses H500 nodes for production workloads in its primary data center, and it uses CloudPools to tier aged data to ECS after six months. It uses A200 nodes for disaster recovery in its secondary data center and uses SyncIQ to efficiently replicate data. The *Organization* uses DataIQ for reporting and monitoring. It has a maximum utilization of 85% for PowerScale nodes.

> In the primary data center cluster, the *Organization* uses eight H500 appliances for production workflows and tiers data that is older than six months to its ECS cloud.

> The *Organization* replicates its data to 28 A200 appliances in the disaster recovery data center.

> In Year 1, the *Organization* pays for the first year of maintenance for the initial appliances and software purchased and then pays maintenance annually thereafter.

> During Year 3, the *Organization* invests in 28 H500 appliances, 2.6 PB of data in ECS, and 28 A200 appliances to store the replicated data. It also pays for Year 3 maintenance.

> To automate these tiering and data replication policies, the organization uses SmartPools, CloudPools, and SyncIQ. The *Organization* also uses DataIQ for monitoring and reporting.

Risks. PowerScale costs can vary with:

> Different licensing agreements or discounts.

> Differing configurations of appliances, tiering policies, and selections of storage tiers.

> Differing storage growth rates.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted PV of $3,133,412.

The table above shows the total of all costs across the two areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the composite *Organization* expects risk-adjusted total costs to be a PV of about $3.7 million.

Implementation risk is the risk that a proposed Investment in PowerScale may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

FORRESTER®

OneFS Powered Systems Costs— Calculation Table

REF.	METRIC	CALC./ SOURCE	INITIAL	YEAR 1	YEAR 2	YEAR 3
Et	PowerScale costs: 8 H500 nodes, 20 H500 nodes, 28 A200 nodes, ECS hardware and associated switches, cables, chassis and optics. Software included: OneFS, SmartPools, CloudPools and DataIQ. And hardware and software annual maintenance.	Dell EMC	$1,218,946	$192,090	$192,090	$1,905,828
	Risk adjustment	↑5%				
Etr	PowerScale costs (risk-adjusted)		$1,279,893	$201,695	$201,695	$2,001,119

Implementation Costs And Ongoing Storage Administration Labor

Interviewees spent minimal time on PowerScale implementation and ongoing management. They also required minimal training as part of PowerScale implementation because the storage is easy to administer.

Modeling and assumptions. For the composite *Organization*, Forrester assumes that:

> For the initial implementation, the composite *Organization* had several employees spending portions of their time over the course of a few weeks designing PowerScale deployment, working with the network team to ensure the network infrastructure could support PowerScale appliances, and migrating the data to the first PowerScale nodes. The *Organization* spent 160 total hours on implementation.

> Dell EMC (or partner) provided initial implementation help at a cost of $16,000.

> The *Organization* had a few employees participate in a half-day training session, totaling 16 hours spent on training.

> As mentioned in the storage efficiency benefit explanation above, on an ongoing basis, one FTE in Years 1 and 2 and two FTEs in Year 3 are needed for general storage management tasks and are represented in row F4 below.

Risks. Implementation and ongoing storage administration costs can vary with:

> Different staff skill levels.

> Regional differences in fully loaded storage administration FTEs.

> Different previous environments.

> Complexity of data migration efforts.

To account for these risks, Forrester adjusted this cost upward by 20%, yielding a three-year risk-adjusted PV of $537,554.

160 hours
Total implementation time

FORRESTER®

Implementation Costs And Ongoing Storage Administration Labor: Calculation Table

REF.	METRIC	CALC./SOURCE	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Dell EMC or partner implementation fees	Dell EMC	$16,000	0	0	0
F2	Initial implementation and data migration hours	Interviews - hours	160	0	0	0
F3	Initial PowerScale training time	Interviews - hours	16	0	0	0
F4	Ongoing storage administration	Interviews - FTE hours	0	2,080	2,080	4,160
F5	Average fully loaded hourly compensation, storage administrator	$130,000/ 2,080	$62.50	$62.50	$62.50	$62.50
F6	Internal storage implementation and ongoing labor costs	(F2+F3+F4)*F5	$11,000	$130,000	$130,000	$260,000
Ft	Implementation costs and ongoing storage administration labor	F1+F6	$27,000	$130,000	$130,000	$260,000
	Risk adjustment	↑20%				
Ftr	**Implementation costs and ongoing storage administration labor (risk-adjusted)**		**$32,400**	**$156,000**	**$156,000**	**$312,000**

FORRESTER®

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED ANALYSIS

Cash Flow Chart (Risk-Adjusted)
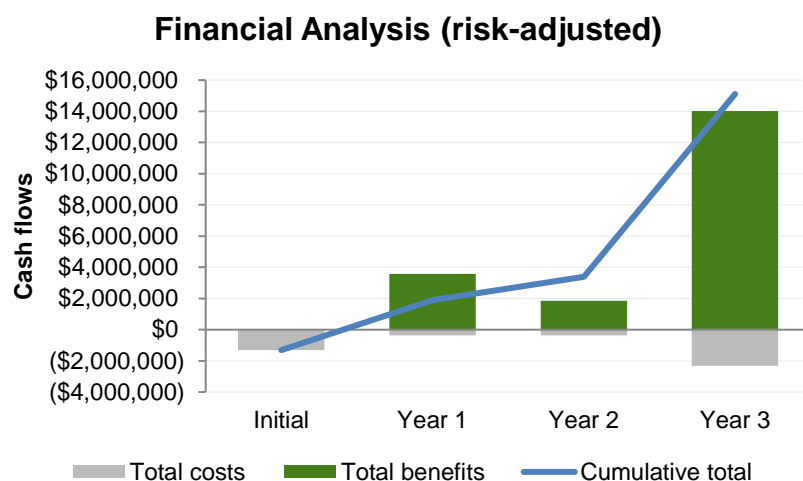
> The financial results calculated in the Benefits and Costs sections can be used to determine the ROI and NPV for the composite *Organization*'s investment in PowerScale. Forrester assumes a yearly discount rate of 10% for this analysis.

Financial Analysis (risk-adjusted)

Legend: Total costs, Total benefits, Cumulative total

These risk-adjusted ROI and NPV values are determined by applying risk-adjustment factors to the unadjusted results in each benefit and cost section.

Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	($1,312,293)	($357,695)	($357,695)	($2,313,119)	($4,340,802)	($3,670,966)
Total benefits	$0	$3,571,905	$1,853,048	$14,024,381	$19,449,333	$15,315,355
Net benefits	($1,312,293)	$3,214,210	$1,495,353	$11,711,262	$15,108,532	$11,644,389
ROI						317%
Payback period						Less than 6 months

If risk-adjusted costs, benefits, and ROI still demonstrate a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as realistic expectations, as they represent the expected value considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

FORRESTER®

PowerScale OneFS Powered Systems: Overview

The following information is provided by Dell EMC. Forrester has not validated any claims and does not endorse Dell EMC or its offerings.

Dell EMC PowerScale OneFS powered systems' is ideal to consolidate, store, manage, protect, and analyze unstructured data with the powerful platform that stays simple, no matter how large the data environment. PowerScale solutions combine the right blend of performance and capacity for a wide range of workloads, including home directories, archiving, in-place data analytics, machine learning (ML), artificial intelligence (AI), and a wide range of high-performance computing applications.

In this data era with no boundaries, customers need to be able to store any data anywhere. In addition, customers need to accelerate intelligent insights to discover, classify, and act on their data to derive value.

PowerScale OneFS operating system provides enhanced performance with massive scalability to support the most demanding file-based workloads, while enabling organizations to reduce data center footprint and optimize storage resources. With Dell EMC storage solutions powered by OneFS, organizations can modernize their storage infrastructure to support digital transformation.

The PowerScale scale-out storage products include:

All-flash nodes. This is high-performance scale-out storage for high-transactional, IOPS-intensive high capacity needs.

Hybrid nodes. These provide a balance of high-performance and large capacity with the flexibility to support a broad mix of applications.

Archive nodes. These highly efficient, highly scalable near-line storage are ideal for active and deep archiving.

With PowerScale's modular architecture, various PowerScale platform nodes may be combined into a single cluster to create a flexible storage solution that meets specific performance and capacity needs.

The OneFS operating system provides the intelligence behind all PowerScale scale-out storage systems. OneFS combines the three layers of traditional storage architectures — file system, volume manager, and data protection — into one unified software layer, creating a single intelligent file system that spans all nodes in a cluster. OneFS powered solutions deliver on a software-defined architecture that provides seamless integration with on-premises storage and multi-cloud solutions.

Key features:
Simple to manage. A single admin can manage petabytes of storage, on-premises or in the cloud.

Highly efficient. Get over 80% usable capacity, automated tiered storage to a choice of multi-cloud options, data deduplication and compression.

Operational flexibility. Multiprotocol capabilities support a wide range of file and object workloads on a single platform.

Data first: Classify, locate, tag, and report on any data on-premises and the cloud to simplify data management. In-place analytics, AI, and ML solutions maximize the business value of data to unlock the data capital.

Massive scalability. Easily expand from terabytes to petabytes in a single cluster, and scale capacity and performance quickly without disruption.

Safeguard data. Robust data protection and security options include data backup, disaster recovery, role-based access control (RBAC), secure access zones, SEC 17a-4 compliant WORM, and self-encrypting drives (SEDs).

Intel Partnership:
Intel has partnered with Dell Technologies to optimize Intel® Xeon® Scalable CPUs, Intel® Optane™ SSDs and Intel® 3D NAND SSDs for storage infrastructure and data services, delivering predictable performance and a seamless storage experience. Intel drives the industry forward in developing new technology standards and contributing to open standard projects.

Intel® 3D NAND SSDs work with Intel Xeon processors to meet today's increasingly demanding service levels and support broader cloud workloads, while reducing storage costs. Packed with a deep feature set, these cloud-

FORRESTER®

inspired SSDs are optimized for cloud infrastructures, offering outstanding quality, reliability, advanced manageability and serviceability to minimize service disruptions.

Architected with 64-layer, Intel® 3D NAND Technology, the Intel® SSD DC P4510 Series delivers performance, Quality of Service (QoS), and capacity to help optimize storage efficiency, enabling data centers to do more per server, minimize service disruptions, and efficiently manage at scale.

For more information about PowerScale OneFS Powered Systems storage, visit http://www.delltechnologies.com/PowerScale.

FORRESTER®

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

Total Economic Impact Approach

Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.

Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.

DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16%.

PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows in years 1 through 3 are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

FORRESTER®