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All-Flash Array Portfolio Comparison

Dell EMC vs. HPE



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Executive Summary

Digital transformation has become the theme of vendor propositions across the IT industry. This is in response to sweeping market changes that are driving significant requirements for new infrastructure. The proposition is relevant—even essential—to business and government interests because most aspects of economic engagement have become digital. As a result, businesses and government agencies are re-engineering their technology infrastructures in order to communicate, create value and stay competitive in the evolving digital world.

In a recent PwC survey, 45 percent of business and IT executives across 51 countries identified growing revenue via digital transformation as a top priority¹. To be successful, businesses must transform their IT infrastructure to achieve new levels of flexibility and responsiveness. At the same time, IT must find a balance between maintaining core services while investing in new business and technology innovations needed to compete in today's dynamic environment.

Flash storage is a cornerstone of IT transformation since it can ratchet up business responsiveness and productivity faster and more cost effectively than any other element in the IT stack. A recent IDC user study found that in 2017, 76% of enterprises will have either adopted—or have a plan to adopt—all-flash array (AFA) systems for production applications.² When IDC looked at user demand, the firm found that the top attributes companies are looking for in AFA buying decisions start with reliability, followed by performance, scalability and performance consistency.

¹ Lauchlan, Stuart, "Top ten digital transformation actions from PwC," Diginomica, October 1, 2015, <http://diginomica.com/2015/10/01/top-ten-digital-transformation-actions-from-pwc/#.Vg5tk8vovmI>

² The Evolving All Flash Array (AFA) Market, IDC, Jan 2017: <https://www.idc.com/getdoc.jsp?containerId=US42256317>

AFA: Reliability is the top criterion for AFA purchase/ consideration³

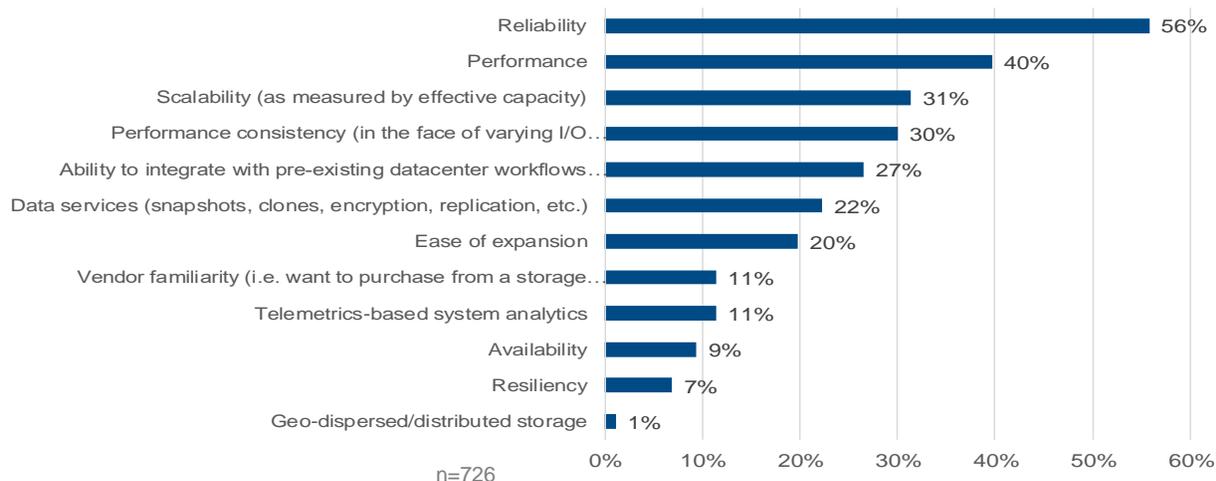


Chart 1 - IDC User Demand Survey

IT decision makers are faced with a lot of choices in AFA solutions. Given their overriding sensitivity to reliability, as the IDC user demand survey reflects, vendor and technology brand reputations often mark the beginning of the solution selection process. This paper focuses on two well-known AFA providers: Dell EMC and HPE.

While both vendors have mature AFA portfolios, Dell EMC has advantages over HPE in terms of market share and brand reputation.⁴ Dell EMC also has a more robust AFA portfolio that makes it easier to find a product that closely meets requirements associated with many different types of workloads, including mission-critical, latency-sensitive, unstructured data, and enterprise-scale cloud infrastructure.

The following table provides a summary of key advantages Dell EMC, in collaboration with Intel, delivers with its more robust AFA portfolio:

³ IDC Storage User Demand Study Survey, 2016, Edition 1: End-User Plans on Open Source, AFA, and Hyperconverged, Natalya Yezhkova: <https://www.idc.com/getdoc.jsp?containerId=US41878216>

⁴ IT Pro 2017 Brand Leader Results: <https://itbrandpulse.com/2017-brand-leader-survey-results/>

AFA portfolio comparison/contrast – summary of advantages for Dell EMC

Important requirements	Dell EMC	HPE
Mission-critical applications	Massive scale of performance, capacity and operations with consistent, predictable sub-millisecond latency with VMAX All Flash	Potential for latency variance with workload scaling ⁵ with 3PAR
Virtual desktop infrastructure (VDI)	Consistent ultra-low latency under demanding operating conditions without requiring special architecting or tuning software with XtremIO X2	Controlled operations ^{6,7} and ongoing tuning to manage latency ⁸ with 3PAR
Critical business processes that require multiple database copies	Instant, space-efficient snapshot capability that uses in-memory metadata with no back-end media or network impact to optimize high-volume read/write activity to snapshots with XtremIO X2	Less optimized capability for high-volume snapshot write activity ⁹ with 3PAR
Efficient, economical IT consolidation with Unified NAS and SAN storage	Consistent performance and functionality across all workloads, no matter the access protocols or I/O behaviors with Dell EMC Unity	Separately licensed, deployed and managed NAS OS ¹⁰ with 3PAR
Value-intensive storage needed to advance IT transformation on a limited budget	Lowest effective \$/GB for flash and hybrid flash ¹¹ with SC Series arrays	No AFA design center with explicit focus on flash economics
Large-scale storage consolidation for unstructured data and cloud service delivery models	Purpose-built platforms with best-in-class capabilities with Isilon and ScaleIO ¹²	Cobbled together solutions using third-party software

⁵ http://www.principledtechnologies.com/Dell/VMAX250F_competitive_0917.pdf.

⁶ HPE 3PAR Operating System - Tuning System Performance Using the 3PAR OS Command Line Interface: https://h20564.www2.hpe.com/hpsc/doc/public/display?docId=emr_na-c05182414.

⁷ HPE 3PAR Data Optimization Suite: <https://www.hpe.com/us/en/product-catalog/storage/storage-software/pip.hpe-3par-data-optimization-software-suite.5336306.html>.

⁸ HPE 3PAR Data Optimization Suite: <https://www.hpe.com/us/en/product-catalog/storage/storage-software/pip.hpe-3par-data-optimization-software-suite.5336306.html>.

⁹ HPE 3PAR Virtual Copy Technical White Paper: <https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA6-4486ENW.pdf>, Apr. 2016, Pg. 15.

¹⁰ HPE 3PAR File Persona User Guide: http://h20565.www2.hpe.com/hpsc/doc/public/display?docId=emr_na-c04777927, [Excerpt: 150 GB of space is initially allocated from the specified CPG per each node for use by File Persona for configuration data].

¹¹ Net usable capacity of Dell array with 5 years of support, after 4:1 data reduction, vs. major competitors net of data reduction. Street price analysis is based on a variety of sources including analyst data, price sheets when available, and public information as of January 2017.

¹² Gartner Magic Quadrant for Distributed File Systems and Object Storage: <https://www.gartner.com/doc/reprints?id=1-4IE870C&ct=171017&st=sb>, [Excerpt: Isilon dwarfs all other distributed file system vendors in this Magic Quadrant in terms of revenue. Isilon alone represents nearly 50% of the total revenue in the market covered by this Magic Quadrant, reflecting the product's continued dominance].

AFA Portfolio Assessments

When looking to leverage AFA solutions to enable IT transformation, several vendor-related criteria need to be considered:

- **Organizational stability and future-proof technology** point to the long-term strengths of the vendor to sustain product lifecycle and deliver solution excellence.
- **Product development philosophy** helps to affirm that the vendor's product vision can align with forward-looking business goals and IT evolution.
- **Product portfolio strength and fit** indicate the vendor's ability to provide solutions that help meet business objectives most effectively.
- **Scope, flexibility and affordability of support** ensures that the vendor can effectively stand behind and help sustain the effectiveness of its solutions in a changing business climate.
- **Ease of purchase** empowers customers to acquire technology based on financial terms and consumption models that are most strategic to their business.

Organizational Stability

Organizational stability is not only about how long a company has been in business or company size, it is about adherence to vision and roadmap stability. In rapidly changing business environments, it is important that vendors react in a clear, consistent manner in order to avoid introducing additional disruptions to customers.

Dell EMC, in collaboration with Intel, has been clear that it is on a mission to make flash the de facto standard for enterprise storage. This position is based on the fact that flash is faster, more reliable, simpler and more cost-effective from an overall TCO perspective. This focus has led the company to be an early and sustained market share leader in the AFA market.¹³

¹³ Sources: IDC Worldwide Quarterly Enterprise Storage Systems Tracker--Q4 2016 and Pure S1 filing. Notes: Time in market month 0 represents the time that each vendor entered the all-flash array market. HPE includes HP Enterprise and New H3C Group revenue. Pure: IDC started tracking Pure Storage in 2014; revenue for 2012 and 2013 is based on S1 filing.

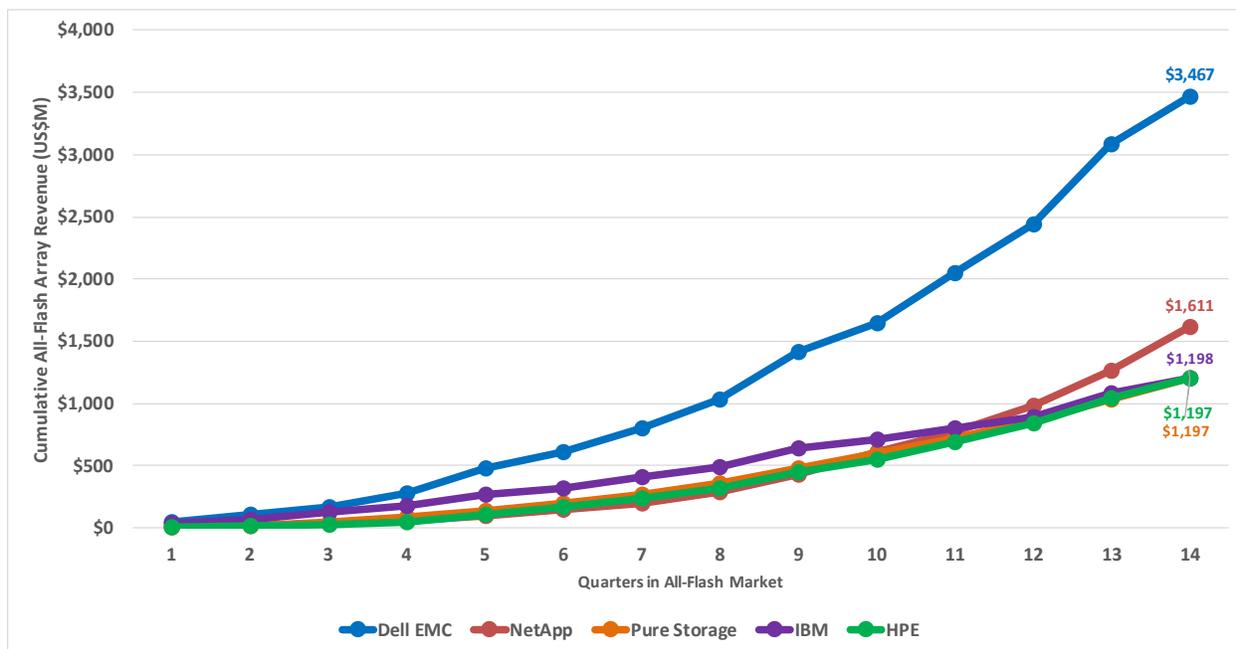


Chart 2 – Worldwide AFA Market Share

Future-proof technology

Dell EMC complements its AFA offerings with a comprehensive package of incentives, guarantees and assurances that help differentiate its AFA offerings around customer satisfaction and investment protection. Coined the Future-Proof Customer Loyalty Program, Dell EMC’s package includes the following provisions:

- **Three-year satisfaction guarantee:** Dell EMC products will perform as advertised for customers, satisfaction guaranteed.
- **4:1 All-Flash Storage Efficiency Guarantee:** Offered without complex pre-assessments and restrictions.
- **Never-worry data migrations:** Customers can seamlessly upgrade to new Dell EMC storage with built-in data migrations that are always online and non-disruptive.
- **Hardware investment protection:** Customers get flexible credit toward storage controller upgrades or trade-in credit toward the purchase of any new product across the Dell EMC portfolio.
- **All-inclusive software:** Dell EMC storage products ship with everything needed to store, manage and protect data with no extra licenses to purchase or maintain.

- **Built-in Virtustream Storage Cloud (for select storage products only):** Customers can automatically tier files and storage snapshots to the cloud with no capacity costs for one year, up to the program allotment.
- **Clear Price:** A maintenance pricing and services approach that provides customers with predictable maintenance rates and additional services when maintenance contracts are renewed.

While the availability of each offering varies per product, the scope of Dell EMC's program is more comprehensive than incentive programs HPE offers with its AFA products. For example, the Nimble Storage Timeless Storage Guarantee allows customers only 30 days to redeem on satisfaction assurances.¹⁴ This contrasts sharply with Dell EMC's 3-year guarantee. Similarly, Dell EMC's hardware investment protection provision gives customers broader upgrade options than the Nimble Storage controller upgrade provision.¹⁵

Product Development Philosophy

Dell EMC

Dell EMC's AFA portfolio focuses on critical elements of applications and their business functions. Many of these offerings feature the latest all-flash technology from Intel. With this approach, Dell EMC excels in capabilities that are key to operational excellence, such as performance consistency, cost effectiveness, consolidation scale, agility and flexibility. The Intel powered VMAX All Flash, for example, is explicitly designed for massive consolidation of tier-1 workloads. XtremIO X2 is a purpose-built all-flash array that delivers unique performance advantages for workloads that dedupe well, like VDI, as well as requirements for actively used snapshots on a large scale. Dell EMC Unity is designed for unified multi-protocol (NAS and SAN) consolidation. SC Series is designed and priced to enable consolidation with lowest flash \$/GB.

¹⁴ Nimble 30-Day Satisfaction Guarantee: <https://www.nimblestorage.com/satisfaction-guarantee/>.

¹⁵ Nimble Timeless Storage Guarantee: https://cdm-cdn.nimblestorage.com/2016/12/21160849/Timeless_Storage.pdf.

HPE

HPE's AFA portfolio focuses on flexibility and simplicity. StoreServ 3PAR is being positioned for general-purpose consolidation optimized for flexibility.¹⁶ HPE is positioning Nimble Storage for general-purpose consolidation, optimized around simplicity.¹⁷ Interoperability is currently not supported between the two platforms.

Product Fit and Function

Storage for mission-critical workloads

Since tier-1 applications support critical functions of business, the demands for storage uptime and performance consistency are paramount. After all, downtime directly relates to lost revenues, and inconsistent performance increases risk and leads to productivity loss. In terms of mission-critical application requirements, several characteristics set Dell EMC VMAX All Flash apart from HPE StoreServ 3PAR. At the highest level, VMAX All Flash is distinguished by capabilities for massive scale of performance, capacity and operations, with consistent and predictable service levels. In Principled Technologies lab tests, HPE StoreServ 3PAR exhibited significantly greater latency increases versus Dell EMC VMAX 250F when workloads were scaled.¹⁸

The following list includes additional advantages that VMAX All Flash brings to mission-critical environments:

- BC/DR with SRDF active/active data center replication for over 6x9s of availability (gold-standard)
- Performance headroom of up to 6.7M IOPS and 150GB/s at sub-microsecond latencies
- Sustained 350 microsecond latency with mixed workload scaling and expansive data reduction
- Hardware-accelerated data compression and data-at-rest encryption
- Automated provisioning of hundreds of volumes in seconds with service-level assurances
- Massive consolidation with support for open systems block and file, as well as Mainframe and IBM i workloads

¹⁶ HPE Community: "Simple vs Flexible - Where Nimble Storage Fits in HPE Storage:"
<https://community.hpe.com/t5/Around-the-Storage-Block/Simple-vs-Flexible-Where-Nimble-Storage-Fits-in-HPE-Storage/ba-p/6973603#.WcwjJE3rsuQ>

¹⁷ *Ibid.*

¹⁸ http://www.principledtechnologies.com/Dell/VMAX250F_competitive_0917.pdf.

Storage for VDI and workloads that actively use snapshots on a large scale

In VDI environments, managing storage latency is a challenge for administrators:

- Up-front sizing for long-term requirements can be imprecise.
- Growth and change can be unpredictable.
- There are many user application variables that impact latency.

This is where the Dell EMC XtremIO X2 delivers distinct advantages over HPE 3PAR. The XtremIO X2 architecture is purpose-built to sustain consistent ultra-low latency under demanding operating conditions without requiring special architecting or tuning software, or controlled use of demanding data services such as deduplication and compression. Managing latency on 3PAR platforms relies on specific operational best practices^{19, 20} and can require use of performance tuning software and selective use of data reduction²¹, for example.

XtremIO X2 has additional advantages related to integration with VMware. In particular, VM cloning with the VMware copy offload primitives (like VAAI Copy Offload or X-COPY for VMware and ODX for Hyper-V/Windows Server) is a control plane operation rather than a data plane operation involving SSDs. Also, XtremIO X2 comes in turnkey, plug-and-play converged infrastructure offerings (VxBlock) that include software elements for virtual desktop orchestration and automation, support desk and application delivery. This deployment model provides time-to-value advantages for Dell EMC customers.

Critical business processes that require multiple copies of each database and application's data for purposes such as development, testing, analytics, operations and offload processing can realize unique benefit from XtremIO Virtual Copy, or XVC technology, which enables instant, high-performance and space-efficient copies of any data set in nearly any quantity. XVC technology abstracts copy operations as a unique in-memory metadata operation with no back-end media or network impact. XVC technology is especially beneficial with regard to space-

¹⁹ HPE 3PAR Operating System - Tuning System Performance Using the 3PAR OS Command Line Interface: https://h20564.www2.hpe.com/hpsc/doc/public/display?docId=emr_na-c05182414.

²⁰HPE 3PAR Data Optimization Suite: <https://www.hpe.com/us/en/product-catalog/storage/storage-software/pip.hpe-3par-data-optimization-software-suite.5336306.html>.

²¹A reference and best practices guide for HPE 3PAR StoreServ Storage: <https://h20195.www2.hpe.com/v2/GetPDF.aspx%2F4AA4-4524ENW.pdf>, pg. 14.

efficient snapshots that have high write activity. Comparatively, 3PAR Virtual Copy technology offers a less optimized capability for high-volume snapshot write activity.²²

Unified multi-protocol (NAS and SAN) storage

Customers look to unified storage systems to reduce capex and opex through broad-scale consolidation. Unified storage arrays combine multi-protocol support with mixed workload agility so that customers can streamline infrastructure and operations to drive up efficiency broadly across the business. Savings are realized from fewer hardware systems to deploy and maintain and less software to license and support. Additional savings result from simpler and more flexible operations.

Intel based Dell EMC Unity arrays are designed to deliver fully integrated unified storage capabilities without compromises. The Dell EMC Unity design center places equal emphasis on NAS and SAN services so that customers get consistent performance and functionality across all workloads, no matter the access protocols or I/O behaviors. Dell EMC Unity is available as a highly integrated purpose-built solution, as well as a software-only solution that can be deployed within a standard virtual infrastructure environment.

This design approach contrasts with HPE's 3PAR platform, where NAS services are enabled through overlay software that carries unique operational burdens and service inconsistencies vis-à-vis SAN, for example, file storage capacity and provisioning limitations.²³

Storage with lowest flash \$/GB

Budget limits have always been a big factor in managing IT. In the current digital transformation era where changes are especially broad-sweeping, uncertain economic conditions have many companies operating under tougher budget strictures than ever before. These are the circumstances that make storage affordability and value a priority in a requirements matrix. How well a storage solution optimizes flash economics directly correlates to how many workloads a customer can host on flash and ultimately how extensively flash can be used to improve business outcomes.

The Dell EMC SC Series All-Flash and hybrid flash arrays, which use the latest Intel Xeon processors to contribute to the performance of the platforms, are explicitly designed to achieve IOPS goals with the least expensive mix of storage media. They also integrate comprehensive data reduction capabilities and have a support pricing model that charges the same for HDDs

²² HPE 3PAR Virtual Copy Technical White Paper: <https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA6-4486ENW.pdf>, Apr. 2016, Pg. 15.

²³ *Ibid*, pg. 62, [Excerpt: Up to 256 File Stores are supported on a node pair: 16 File Stores supported for each VFS].

and SSDs. Together, these factors drive down storage costs even further. As a bonus, the SC Series platforms offer both all-inclusive and perpetual software licensing models that ensure software fees are never included in lifecycle costs going forward. Notably, the software catalog for these arrays increases customer value with support for high-end capabilities such as multi-array federation with seamless data movement between arrays, quality of service automation and automatic transparent workload failover to another SC Series array at a DR site.

With a design center targeting storage economics and high functional value, the SC Series arrays provide the lowest effective \$/GB for all-flash and hybrid flash²⁴, giving companies of any size the affordability advantages they need to compete with a constrained budget in today's fast-changing environment.

None of the disk array platforms in HPE AFA portfolio single out storage economics as a primary design center. Nimble Storage platforms, now part of HPE's portfolio, aim to deliver value through simplifying deployment and management.

Storage for unstructured data and cloud service delivery models

Unstructured data applications such as biotechnology, medical imaging, electronic design automation, and high-performance computing have posed unique storage challenges for some time. As big data analytics proliferate, the unstructured data hurdle becomes far greater. In fact, the performance and capacity requirements of unstructured data are among the biggest challenges businesses face with IT transformation. As a result, IT decision makers are looking to modern architectures to help them meet the extraordinary scaling requirements inherent with massively escalating unstructured data growth. Similarly, IT leaders are looking to software-defined block storage solutions that enable extreme levels of scalability and agility required for large-scale cloud service delivery models.

Dell EMC's approach to challenges of escalating unstructured data and large-scale cloud service delivery models involves explicitly designed products with focus on delivery of best-in-class capabilities. Isilon is Dell EMC's response to escalating unstructured data. Dell EMC has a

²⁴ Net usable capacity of Dell array with 5 years of support, after 4:1 data reduction, vs. major competitors net of data reduction. Street price analysis is based on a variety of sources including analyst data, price sheets when available, and public information as of January 2017.

towering market share lead with the Isilon platform and holds the most prestigious position in the *Gartner Magic Quadrant*.²⁵ ScaleIO is Dell EMC's response to large-scale cloud infrastructure.

HPE's approach to unstructured data involves third-party software. HPE is challenged to meet large-scale cloud service delivery models with a software-defined storage solution that meets the demands of large enterprises.

Scope, Flexibility and Affordability of Support

Dell EMC provides award-winning support services that have been recognized by the Technology Services Industry Association (TSIA) for being focused on getting customers the best outcomes for their technology. The ProSupport Enterprise Suite and ProDeploy Enterprise Suite are comprehensive portfolios that simplify the process of selecting the right level of IT service, inclusive of hardware, software and mission-critical Target Response Objectives (TROs).²⁶ Contrasting this approach, HPE customers need to navigate more complex scenarios, including multiple hardware and software support options to build the right support and deployment offer, while carefully reviewing the fine print to make sure they qualify for all the SLAs advertised, for example, the six-hour guarantee, which is available for only a few customers in very specific cases.²⁷

Flexible Payment Programs

Both Dell EMC and HPE have flexible payment programs that allow businesses to pay as they consume storage in order to avoid upfront capital investments that start to depreciate long before they are actually consumed. Dell EMC and HPE offer payment plans based on usage, however Dell EMC's plans are more flexible and therefore more capable of meeting individual financial policies and usage behaviors. The following table highlights the differences between the two companies' programs:

²⁵ Gartner Magic Quadrant for Distributed File Systems and Object Storage: <https://www.gartner.com/doc/reprints?id=1-4IE870C&ct=171017&st=sb>, [Excerpt: Isilon dwarfs all other distributed file system vendors in this Magic Quadrant in terms of revenue. Isilon alone represents nearly 50% of the total revenue in the market covered by this Magic Quadrant, reflecting the product's continued dominance].

²⁶ <https://www.tsia.com/resources/press-releases/2016-press-releases/tsia-announces-2016-star-awards-winners.html>.

²⁷ HPE Foundation Care Services Data Sheet: <https://www.hpe.com/h20195/V2/GetPDF.aspx/4AA4-8876ENW.pdf>, pg. 6.

Feature	Dell EMC	HPE
Name	OpenScale	Flash Now (3PAR)
Acquire and pay for technology over time, based on set payment and term specifications	Pay as You Grow – Acquire all assets up front and pay as you grow Provision & Pay – Acquire and pay for assets over time	Pre-Provisioning - Acquire up to 50 percent buffer capacity and begin paying for it only if it is consumed. Pay for baseline storage capacity on a monthly plan that meets your business needs
Base + Buffer model with variable monthly payments aligned to usage (flex up only)	Ready Capacity – Acquire base and buffer now while deferring buffer payments until later	Flexible Capacity Basic - Per GB basis with no upfront payments—a pay per use model with the ability to scale up and scale down in line with your business requirements
Base + Buffer model with variable monthly payments aligned to usage (flex up or down)	Flex on Demand – Acquire base + buffer, pay for base now and buffer as you use it	Flexible Capacity Premium - Per GB basis with no upfront payments—a pay per use model with the ability to scale up and scale down in line with your business requirements
Pure pay-per-use consumption model	Datacenter Utility – pay-per-use	Full utility
Terms	Flex: Minimum capacity commitment: 25-90 percent Term commitment: 24- 60 months	Fixed: Minimum capacity commitment: 80 percent Term commitment: 36 months

Table 2 – Dell EMC and HPE Flexible Payment Programs

Summary Observations

Today, data center managers and top business/IT executives are wise to partner with a vendor that has a clear vision and whose portfolio can support any data storage requirements going forward. A key vendor roadmap component for these decision makers to consider is what monies are allocated toward research and development. Dell EMC invests twice what HPE does.

While both Dell EMC and HPE can support a wide variety of requirements, in many cases Dell EMC is at the top of all-flash implementation lists today. Perhaps this owes to the striking difference in the two companies' solution approach to all-flash infrastructure. At the most fundamental level, the differences are summarized in the respective design philosophies the companies have followed with their products. Dell EMC focuses on purpose-built solutions that deliver higher functions to targeted applications. HPE focuses on general-purpose solutions with less targeted capabilities.

Technology requirements aside, organizations need broader choices in how they acquire technology in order to execute on IT transformation strategies in an environment of unpredictable IT demands and changing business requirements. While both HPE and Dell EMC offer consumption plans that minimize up-front capital investment, Dell EMC delivers options that give customers more flexibility in meeting individual financial policies and consumption behaviors. Dell EMC has also taken a more aggressive approach than HPE in delivering incentives, assurances and guarantees that help to future-proof customer investments in its AFA solutions.

Therefore, taking all of the aforementioned perspectives into account, Dell EMC should be at the top of an IT decision maker's selection list when entering the digital marketplace with an all-flash solution.