White Paper

Midrange Customers Demand High-End Functionality at Affordable Prices

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IDC OPINION

The most advanced midrange storage platforms offer all the enterprise-class functionality of traditional high-end platforms and also provide significantly improved ease of use, seamless scalability, increased infrastructure density (performance and capacity), and a much lower overall total cost of ownership (TCO). These newer designs also meet the information technology (IT) agility requirements that today's dynamic business environment demands. Small and medium-sized enterprises looking to modernize their storage infrastructure demand performance, software-defined agility, nondisruptive scalability, self-managing storage, and strong cloud integration capabilities.

Dell EMC's midrange enterprise storage platforms, the Dell EMC Unity and the SC Series, are excellent examples of well-evolved storage solutions that customers are increasingly adopting as they modernize their infrastructure. These systems leverage key storage technologies, like flash, and support streamlined cloud integration — elements that will be required for all storage systems going forward. Dell EMC's products are covered by the Future-Proof Loyalty Program, one of the most complete sets of post-purchase guarantees in the industry. Among enterprise storage vendors, these types of guarantee programs provide meaningful value and customers should use them to help differentiate between vendors.

IN THIS WHITE PAPER

As enterprises undergo digital transformation, storage infrastructure modernization is a key focus. With new storage technologies and architectures available, CIOs have more opportunity than ever to match storage platforms with workload requirements and consolidate workloads where appropriate. This white paper focuses on evolving storage requirements in the midrange market, as enterprises look to improve efficiencies in how they handle enterprise workloads. It also discusses key midrange enterprise storage capabilities CIOs should consider as they modernize infrastructure.

SITUATION OVERVIEW

Changing market conditions are driving a strong need for digital transformation across all industries and among IT organizations of all sizes. Digital transformation is the profound transformation of business and organizational activities, processes, and competencies to leverage the mix of digital technologies that are increasingly dominating business and personal lives (mobile computing, social media, big data analytics). It changes IT infrastructure requirements significantly, forcing businesses to adapt or be left behind.

Traditional purchase drivers for enterprise storage typically include performance, reliability, and scalability. While this is true for enterprises of all sizes, small and medium-sized enterprise also have strong requirements for ease of use and low costs. Enterprises of all sizes are seeing a slow migration of storage management tasks from dedicated storage administration groups toward IT generalists, but this trend is more pronounced among small and medium-sized organizations that in general have more limited resources for managing IT infrastructure. In response, vendors are increasing the level of automation and orchestration available with their storage platforms, offering default settings for common tasks like provisioning, providing policy-driven response to make storage more "self-managing," and offering vendor-developed and tested workflow templates for recurring operations.

Many workflows span products from different vendors, and customers are increasingly evaluating integration points between storage platforms and infrastructure tools, applications, data protection appliances, and cloud offerings. All of these features increase administrative span of control (improving the productivity of those managing the storage), enabling smaller groups of IT generalists to quickly and reliably perform needed storage operations to keep business running smoothly.

Midrange customer expectations around lower cost cover more than just a lower acquisition cost. The use of flash media in all-flash configurations has penetrated datacenter operations rapidly because of not only performance requirements but also the secondary economic benefits of flash deployment at scale. Those benefits include:

- Fewer devices needed to meet storage performance requirements
- Much lower energy and floor space consumption
- Fewer application servers needed because flash enables much higher CPU utilization
- Lower software licensing costs (due to needing fewer servers)
- Lower administration costs
- Much better device-level reliability

As performance requirements increased, systems based only on hard disk drives (HDDs) were becoming less cost effective. Many individual HDDs were required to meet IOPS requirements, resulting in systems that were generally 20-30% over-configured in terms of capacity. Significant time was spent dealing with storage performance complaints against primary storage and in tuning systems to meet service-level agreements (SLAs). All of that over-provisioned storage capacity had to be housed, powered, and cooled, and higher device counts led to not only increased energy consumption but also more device failures.

Flash provides both more performance and higher storage density per rack unit than HDDs. This drives a number of implications. An all-flash array (AFA) designed to meet the same functional requirements as a hard disk drive-only array can have 60-90% fewer devices and 20-40% lower power consumption (at the system level). Lower-latency flash drives significantly increased CPU utilization on application servers, leading to fewer servers and lower software license costs (on the servers). This can lead to needing 5-30% fewer servers. And flash's much better device-level reliability leads to far fewer failures (and the costs associated with resolving them). For a more detailed discussion of these issues and, in general, how all-flash configurations lower array TCO, see *Justifying Investment in All-Flash Arrays* (IDC #US41646416, August 2016).

Flash is quickly coming to dominate primary enterprise storage workloads for performance, economic, and reliability reasons. IDC survey data indicates that most enterprises either already use flash or plan to adopt it within the next two years. Actual usage of flash in either production or test is remarkably similar across organizations of all sizes (see Figure 1).

FIGURE 1

AFA Penetration by Enterprise Size
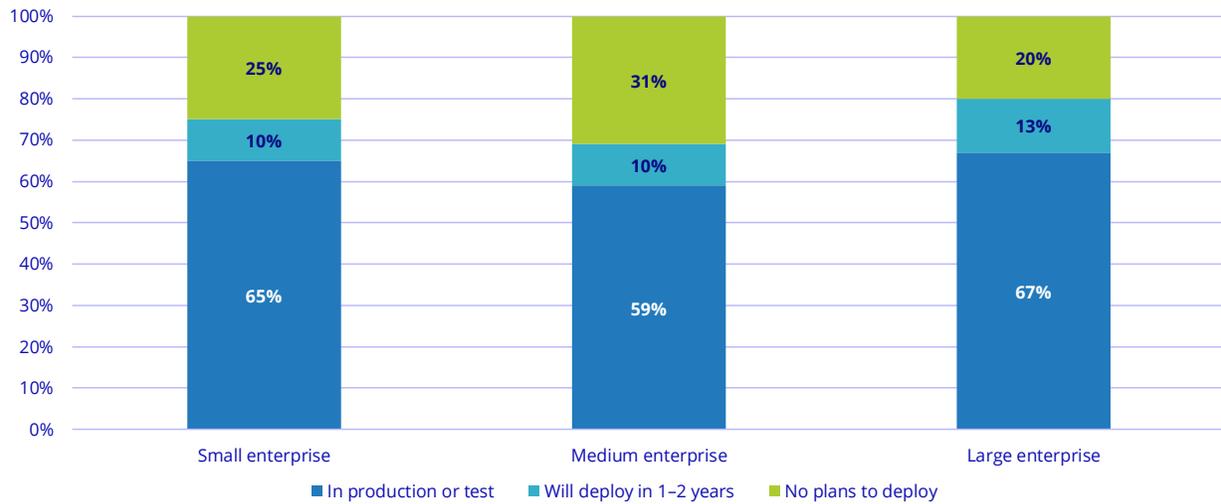
Source: IDC, 2018

While flash storage is more expensive per gigabyte relative to HDDs, it brings efficiencies that result in a lower TCO at a system level for performance-sensitive workloads. At this point, AFA TCO can be 25–40% lower than HDD-only arrays to service a given workload. IDC has predicted that over the next five years, enterprise flash storage costs will decrease at a 26% compound annual growth rate (CAGR), which should only increase flash storage's TCO advantages for these types of workloads.

The rise of cloud-based predictive analytics is driving significant value not only for large enterprises but also for midrange customers. Going beyond the passive remote monitoring of the past, cloud-based predictive analytics platforms remotely collect more detailed data and use big data analytics to improve system availability and functionality and automate operations while lowering cost. Anonymized data across large installed bases allows these types of platforms to provide more insightful aggregate data that drives rapid proliferation of proven best practices by workload type, enables accurate predictive failure diagnosis, and ensures trouble-free upgrades and expansion (through validated compatibility certification). For vendors, it fuels better informed product and service strategy decisions and helps lower overall support costs while increasing system reliability and availability. The fact that these platforms are cloud-based makes them easy to access for all constituencies. Customers should explore a vendor's cloud-based predictive analytics offerings as part of an overall systems purchase, looking for the vendor to explain how it is using this platform to drive better customer value.

While customers need well-thought-out storage platform designs to drive improved efficiencies as they modernize infrastructure, they also need good vendor programs around those products. Vendor programs around enterprise storage products are clearly changing the landscape for the better, particularly among midrange enterprise customers that are looking to maximize ease of use. These programs can span a number of areas, from guarantees about product functionality to those providing lower cost over the life of the product. Prospective buyers should look for these offerings from their vendors, in particular ensuring they understand how these programs drive better value for them. There is significant variability in what different vendors offer in these areas, and some vendors provide strong differentiating value for customers with them.

As customers look to improve the efficiency and capability of their storage solutions during infrastructure modernization, it is important to understand how enterprise workloads are evolving. Workload consolidation in virtual environments has led to a much more varied I/O workload that is much more efficiently handled by flash (rather than HDD). Flash is a key technology that all enterprises should be leveraging for primary workloads. Newer, flash-optimized architectures offer significant opportunity to lower costs while increasing performance, functionality, availability, productivity, scalability, and agility.

Dell EMC's Midrange All-Flash Array Portfolio

Dell EMC is a leading enterprise storage vendor that made an early transition to the use of persistent flash in primary storage platforms. According to IDC data, EMC (and after the merger, Dell EMC) has been the undisputed leader in AFA revenue for the past several years, offering one of the industry's broadest AFA portfolios. Dell EMC's AFA platforms cover block-, file-, and object-based storage solutions as well as scale-up and scale-out architectures, and the company's offerings cover all five enterprise storage consumption models (appliance, software only, converged infrastructure, hyperconverged infrastructure, and cloud) to provide maximum choice for customers. Dell EMC's midrange portfolio includes the Dell EMC Unity and the SC Series. While both of these product families support both all-flash and hybrid (flash plus spinning disk) configurations, the all-flash versions were all refreshed in mid-2018. Both of these array families are also covered by Dell EMC's loyalty program, called the Future-Proof Loyalty Program, which provides significant additional post-purchase value to customers as noted in The Future-Proof Loyalty Program section.

The Dell EMC Unity

Dell EMC Unity is a unified (block/file) storage solution that leverages key modernized infrastructure technologies like flash and cloud. Based around a 2U array enclosure that supports dual active/active controllers, redundant power and cooling, and up to 25 2.5in. SSDs (along with a new 3U 80 drive disk expansion enclosure), the Dell EMC Unity allows customers to scale to achieve the best balance of performance and capacity for their particular workload mix. Building blocks for AFAs within the Dell EMC Unity family come in four sizes — the 350F, the 450F, the 550F, and the 650F — and offer different price points and performance levels. Seven different SSD drive sizes are supported, ranging in capacity from 400GB to 15.36TB, to give customers significant flexibility to meet their capacity requirements. With an entry price point under $50,000, Dell EMC Unity systems can nondisruptively scale to multinode clusters (all managed from a single pane of glass). Multinode clusters can support millions of IOPS and tens of petabytes of raw capacity, providing significant performance and capacity scalability for growing businesses. The arrays also support a comprehensive set of enterprise-class data services bundled with and prelicensed to the full capacity of the array.

In mid-2018, Dell EMC announced significant enhancements to the Dell EMC Unity product portfolio that lower the cost of storage capacity, enable better technology refresh, and improve security. While the platform portfolio has already supported compression, in this release, Dell EMC is adding new data reduction features, including inline deduplication and zero detect, that enable increased storage density at lower cost. These features apply for both block- and file-based storage workloads. With the new in-family, data-in-place upgrades, customers can nondisruptively migrate from smaller to larger array platforms (all flash to all flash or hybrid to hybrid) that deliver increased performance and capacity, making it very easy to accommodate high business growth while preserving investment in existing arrays. The Dell EMC Unity has always offered a rich set of security features, including multiple data-at-rest encryption options, IPv6 Dual Stack Certification, Statement of Volatility, and SHA and FIPS certifications. With this release, Dell EMC is adding support for TLS 1.2 cipher suites (along with an ability to disable TLS 1.0) and announcing that Dell EMC Unity is now on the DOD's Approved Product List (APL). Additional features include MetroSync for zero data loss replication across a metropolitan area and two-way NDMP backup.

The SC Series

The SC Series is a self-optimizing, block-based, tiered storage solution built around an active/active, federated design. SC Series solutions start under $25,000 and are offered in a range of scalable configurations including AFAs (SC5020F, SC7020F) and HFAs (SCv3000, SC5020, SC7020, SC9000). Most models feature a 3U base chassis housing dual controllers and up to 30 initial drives, which are available in a range of capacities from 400GB to 15.36TB. Dense expansion options allow growth to 1,000 drives per array, and multiple SC systems may be linked in federated clusters under unified management, with support for up to 60PB of raw capacity per cluster. Volume movement between federated arrays is seamless, and auto-failover capability provides a built-in disaster recovery solution.

SC Series also supports a very rich and mature set of storage tiering features. Dynamic tiering delivers predictable, cost-effective performance by optimizing data placement across performance- and capacity-intensive drives to help the system adapt to changing SLA requirements in mixed workload environments. As enterprise flash-based storage evolves and new technologies like NVMe and storage-class memory get integrated, tiering will gain additional importance, as Dell EMC's long-term expertise in data placement technology continues to work to customers' advantage.

In mid-2018, Dell EMC announced significant enhancements to the SC Series, with boosts in performance, agility, and cost efficiency. Nondisruptive software and firmware updates more than double the maximum IOPS potential of every shipping array, with three models now exceeding 1 million maximum IOPS. In addition, management has been simplified with a new "Unisphere for SC" web user interface and new 25/100Gb iSCSI I/O options help customers prepare for tomorrow's networks. This release introduces a distributed sparing option that supports faster rebuild times, improves efficiencies, and reduces risk. With the advent of larger disk device options (both flash and HDD), the ability to rebuild failed devices faster is a particularly important enhancement.

CloudIQ

The large installed base of Dell EMC midrange systems provides a wealth of telemetry data on which to base predictive system analysis. This data, anonymized across multiple platforms, provides the basis for CloudIQ, a software-as-a-service (SaaS) cloud-based storage analytics application. It uses near-real-time intelligence, proactive monitoring, and predictive analytics to deliver comprehensive health scores for a variety of Dell EMC products. CloudIQ was initially released for Dell EMC Unity storage systems in 2016, but Dell EMC is not stopping there. A wide range of additional enterprise server and storage products will be supported under the CloudIQ umbrella, providing further value as tool to optimize overall IT health.

CloudIQ is offered as a no-charge, cloud-based service that enables storage and IT generalists to monitor and manage their Dell EMC products using a single health score (see Figure 2). This overall health scoring provides a single, intuitive score that makes it simple to manage storage infrastructure for optimum efficiency.

FIGURE 2

CloudIQ
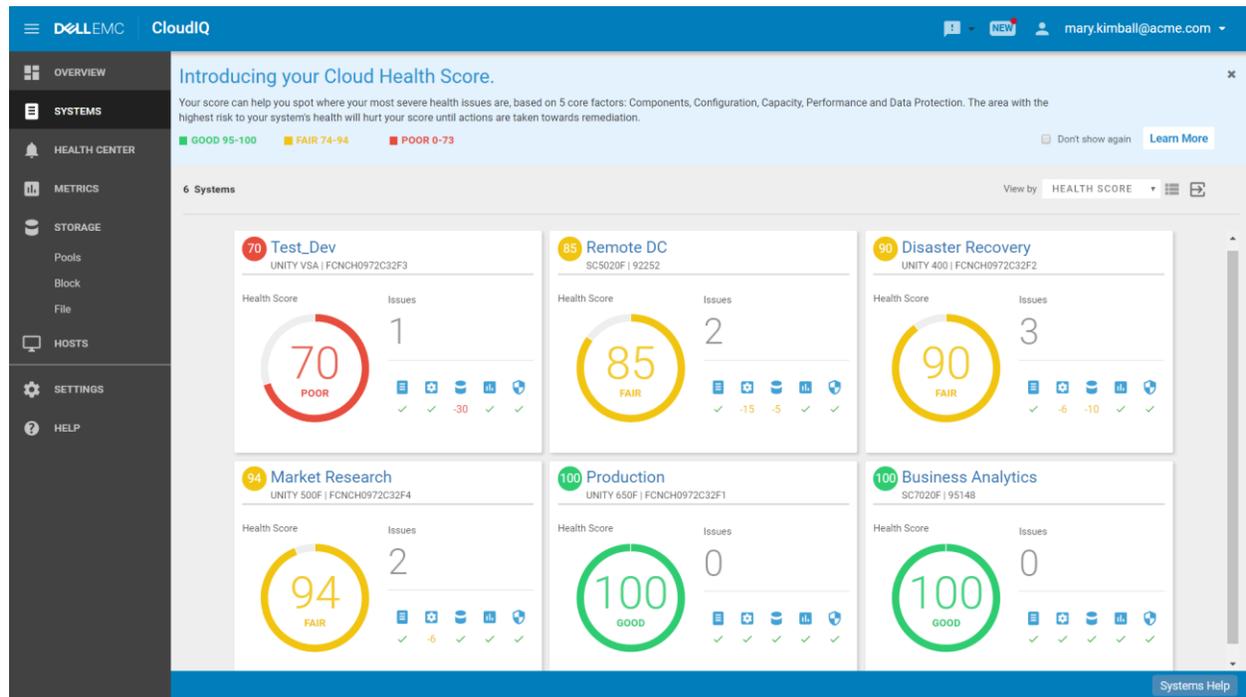
Source: Dell EMC, 2018

The Future-Proof Loyalty Program

Both the Dell EMC Unity and SC Series storage platforms are covered by the Future-Proof Loyalty Program. For those customers that buy a ProSupport maintenance contract and agree to operate the array in accordance with Dell EMC's best practice guidelines, this program offers differentiating value relative to Dell EMC's traditional competitors across seven different areas:

- **Three-year satisfaction guarantee.** Many vendors offer a short-term satisfaction guarantee (30 days), but with this program, Dell EMC has formalized a three-year satisfaction guarantee for all ProSupport customers.

- **4:1 storage efficiency guarantee.** Dell EMC offers a number of storage efficiency technologies on its platforms, including compression, deduplication, thin provisioning, pattern recognition (zero detect), write minimization, and space-efficient snapshots and replication, and guarantees that a system will provide at least a 4:1 data reduction ratio (assuming all available storage efficiency technologies on a platform are in use). This means, for example, that a 1TB flash drive can store at least 4TB of data, lowering the effective cost per gigabyte of arrays.

- **Inclusive software bundling.** In the past, many enterprise storage vendors charged separately for the enterprise-class data services supported on their platforms. Dell EMC has moved to a more inclusive model that bundles a very comprehensive set of data services functionality with the base price of an array, all of which are licensed out to the full capacity of the system.

- **Data migration guarantee.** Dell EMC bundles nondisruptive data migration tools with all storage platforms to ensure that customers can migrate from older systems (Dell EMC and some non-Dell EMC) to newer systems without having to purchase any additional software.

- **Hardware investment protection.** Dell EMC guarantees that trade-in credits for older Dell EMC equipment will always be available to help defray the cost of technology refresh. This is a corporate rather than a sales program, so customers know that trade-in credits will always be available to use at their discretion and on their schedule for technology refresh.

- **Predictable maintenance costs.** Dell EMC commits to maintenance prices that are fixed (on a component basis) at the time of initial purchase. This program provides predictably low maintenance costs over the life of a storage solution.

- **Virtustream cloud storage services.** Virtustream cloud storage is bundled with each Dell EMC Unity array purchase. A high percentage of Dell EMC Unity customers deploy the system, which includes built-in dynamic tiering both within the array and to the cloud, in hybrid cloud environments, so this is a welcome addition. With this program, Dell EMC provides cloud storage capacity that equals 20% of the purchased Dell EMC Unity on-premise capacity at no extra charge.

While this white paper focuses on Dell EMC midrange storage offerings, it is important to note that the Future-Proof Loyalty Program covers most of the major Dell EMC storage platforms, including the Dell EMC VMAX All Flash, XtremIO X2, Isilon All-Flash, Elastic Cloud Storage (ECS) appliances, Data Domain and Integrated Data Protection Appliances, Dell EMC Unity All-Flash and Hybrid, and all SC Series arrays. For specific coverage and program availability by platform, refer to Dell EMC collateral. For all these platforms, the Future-Proof Loyalty Program not only drives much higher value for customers but also ensures more predictable costs over the life of the arrays.

CHALLENGES/OPPORTUNITIES

Dell EMC's midrange all-flash offerings deliver significant value – they offer low-entry price points with good scalability; deliver strong performance density (in terms of IOPS per U); include comprehensive, bundled data services; and are covered by a newly expanded Future-Proof Loyalty Program that is very well positioned against competitors. IDC has noted that some vendors are also providing flash media endurance guarantees, whereas Dell EMC is not, but Dell EMC uses the same features (write minimization, wear leveling, media overprovisioning, and data reduction) as those vendors do to extend media life. Compression, deduplication, thin provisioning, and other storage efficiency technologies that reduce the effective cost per gigabyte of flash capacity are in line on both platforms with the exception of deduplication on the SC Series (which is post-process to ensure no latency impacts). Flash endurance with write-intensive workloads has become almost a nonissue due to these features, and the SC Series offers the ability to tier data placement between write-intensive (higher endurance) and read-intensive (lower cost, lower endurance) SSDs to meet individual requirements. CloudIQ, Dell EMC's cloud-based predictive analytics platform, tracks flash cell usage and provides predictive failure analysis to identify any SSDs that may be approaching end of life, and Dell EMC's three-year money-back guarantee provides an additional layer of security in this respect.

Dell EMC Unity provides a more flash-optimized environment, and it is positioned for more performance-sensitive midrange customers whose business requirements drive the need for unified storage and extremely predictable sub-millisecond latencies. The Dell EMC SC Series is the value-priced option, targeted for customers whose block-based workloads, while requiring flash performance, do not consistently require the same sub-millisecond performance consistency. The SC Series is also a better fit for those customers specifically looking for deep PS Series (EqualLogic) integration.

CONCLUSION

Midrange customers demand performance, reliability, and scalability but also prize ease of use and low cost as virtual administrators take on more comprehensive IT infrastructure management responsibilities. Midrange enterprise storage offerings have evolved to deliver much of the functionality of larger enterprise arrays at a lower price point, and the Dell EMC Unity and SC Series platforms are good examples of that. While providing similar performance and scalability, the families are targeted at different types of users that want to move to modernized infrastructure and integrate AFAs to achieve new levels of performance at reasonable cost while realizing the additional benefits of all-flash configurations. The Dell EMC Unity is targeted at those midrange customers that want unified storage with the highest levels of flash performance. The Dell EMC SC Series customers want a native block-based storage offering that delivers more value for their money. Both platforms are very competitive in their respective market segments, and their inclusion in the Future-Proof Loyalty Program only increases the value they offer midrange customers even further.

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