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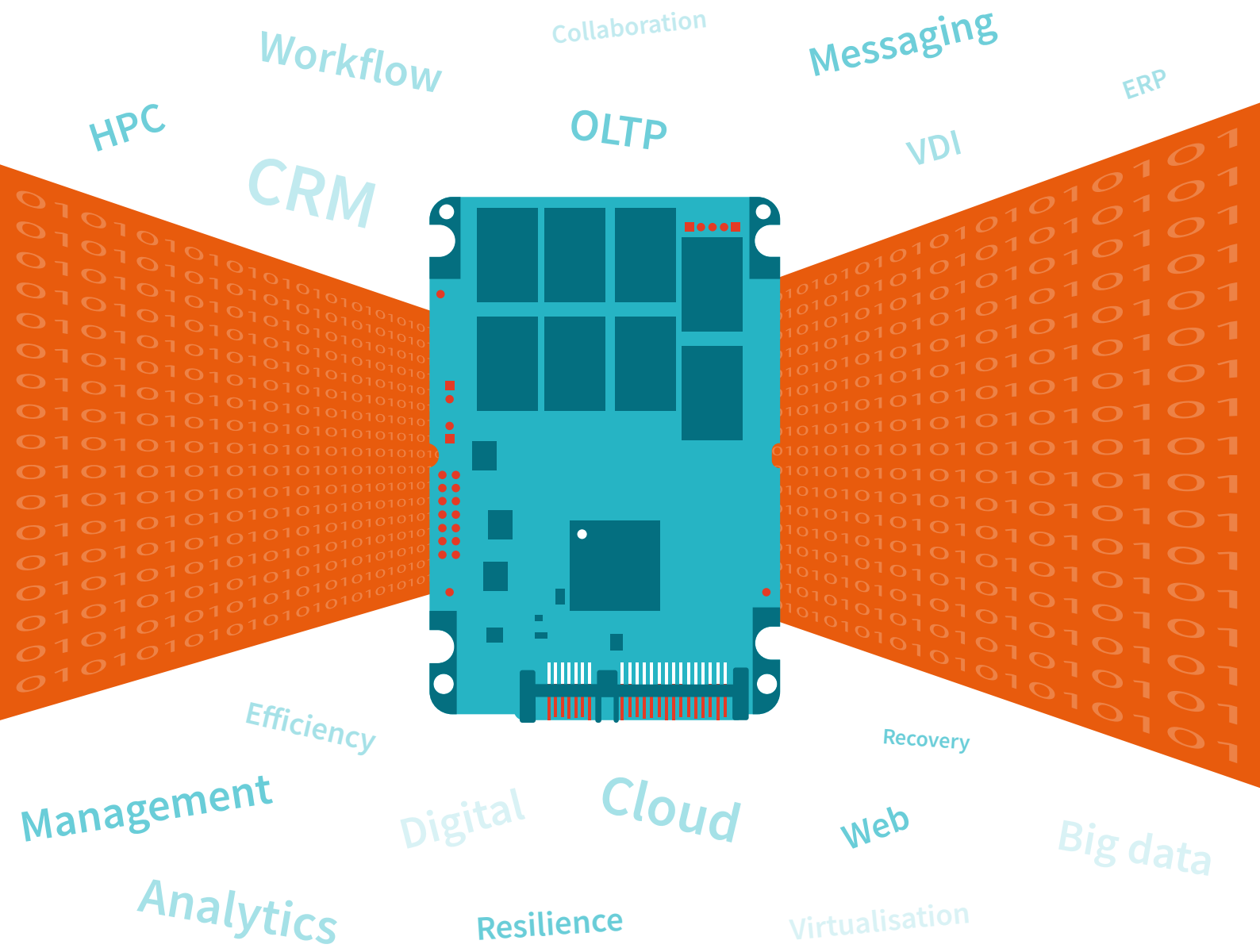


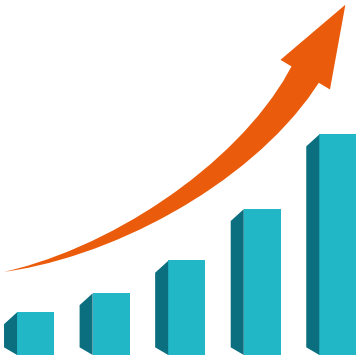
The Enterprise Flash Imperative

From expensive luxury to essential enabler

Freeform Dynamics 2016

The insatiable thirst for more

Greater capacity, increased speed, higher resilience



Keeping up with escalating storage demands is a challenge for even the most competent of IT teams, and it's not just about managing the growth in data volumes in a cost-effective manner. The results of a recent research study in which feedback was gathered from over 360 senior European and North American IT professionals highlights that catering for evolving application and service needs is also a requirement. Demand for high performance and/or resilient storage is already significant, and is set to grow further over the coming 2 years.

How would you describe your organisation's needs in relation to the following and how do you expect these demands to change over the coming 2 years?

	Current requirements	Expected change in next 2 years	
Cost and capacity driven			
General purpose storage to support 'normal' everyday application needs	93%	39%	40%
Low cost storage to support long term storage of slow moving data	84%	27%	42%
The need for speed and resilience			
High performance storage to support high-throughput, low latency application needs	93%	32%	45%
Highly resilient storage to support critical applications intolerant of downtime	85%	30%	37%
Resilient high performance storage to support the most demanding applications	82%	26%	39%

Some areas – Broad Big increase – Some increase

Enter all-flash arrays

Getting attention for good reason

As business expectations for faster and more reliable systems have continued to rise, flash storage options, particularly all-flash arrays, have understandably received more attention. And the research tells us that it's not just the key performance characteristics in terms of low latency and increased throughput that are well appreciated. Many also understand the efficiency, availability and data protection benefits arising from the use of solid-state technology.

How important are these frequently-claimed attributes of all-flash arrays for you?

Performance

	✓✓	✓
Low latency and fast response times	41%	51%
Increased throughput / transfer speeds	37%	53%
More predictable / consistent performance	37%	44%

Efficiency

	✓✓	✓
Better power efficiency (energy savings)	30%	51%
Reduced datacentre footprint (space savings)	28%	45%
Dedupe and compression (capacity savings)	23%	57%

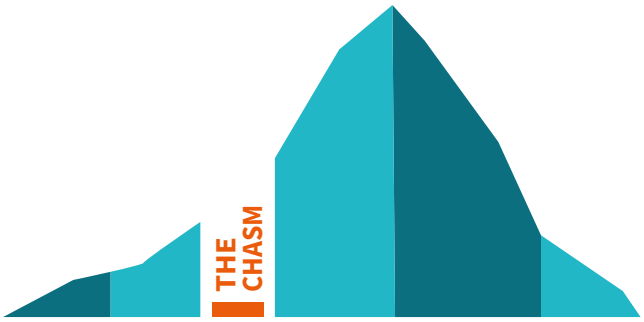
Protection

	✓✓	✓
Fast recovery (e.g. shorter rebuild times)	36%	45%
In-built replication and snapshotting capabilities	29%	47%

✓✓ Compelling ✓ Valuable

Historical questions of readiness

Early adopter experiences have been mixed



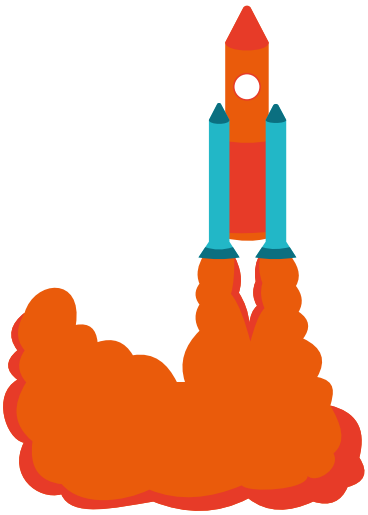
But the promise of all-flash arrays has been marred by a history of high acquisition costs and mixed early experiences with relatively immature and feature constrained first-generation solutions. Legacy networks and lack of both skills and best practice have then often made it hard to realise the full potential.

Have any of these frequently-cited limitations and challenges of all-flash arrays ever got in the way of investment?

	Major inhibitor	Hurdle to jump
Fundamental concerns		
Immaturity of the technology	37%	34%
High cost per unit of storage capacity	30%	34%
Limited automation / operations capability	23%	36%
Poor lifetime / durability of commodity flash	21%	37%
Limitation to flash only media, need to mix media	21%	35%
Overall scalability, capacity limitations (too small)	20%	36%
Enterprise management and control		
Lack of disaster recovery (DR) capabilities	22%	35%
Lack of in-built high-availability (HA) capabilities	22%	37%
Compulsory dedupe (inability to switch on / off)	20%	36%
Implementation concerns		
Complexity of system set-up / admin	24%	34%
Lack of migration best practices	23%	37%
Shortage of skills and experience	20%	38%
Optimising end-to-end performance		
Complexity of tuning and optimisation	22%	38%
Network speed / bandwidth limitations	21%	36%

But momentum is gathering

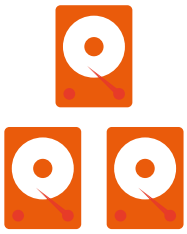
All-flash adoption is really taking off



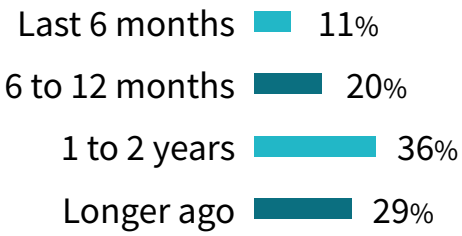
The good news is that many of our research participants now seem to be well-enough past their concerns to work all-flash arrays into their activities. When you compare the relative emphasis on different storage options in relation to recent acquisitions and near-term investment plans, it is clear that all-flash adoption is really taking off. Even bearing in mind the natural bias of surveys towards early-adopters, these findings are extremely encouraging.

When was the last time your organisation procured any of the following and to what degree are you likely to invest in these solutions over the coming 2 years?

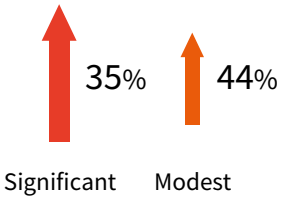
All HDD arrays



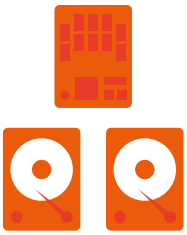
Most recent purchase



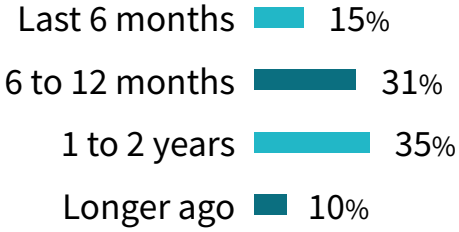
Investment in next 2 years



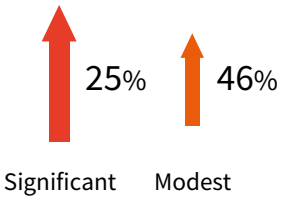
Hybrid arrays



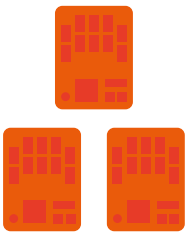
Most recent purchase



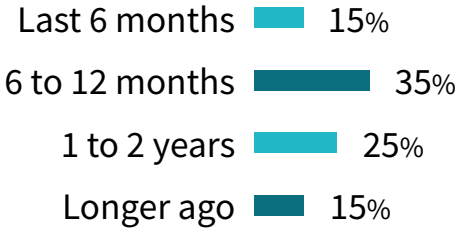
Investment in next 2 years



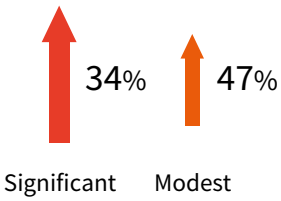
All-flash arrays



Most recent purchase



Investment in next 2 years



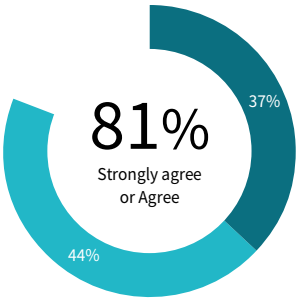
Core technology ready for prime time

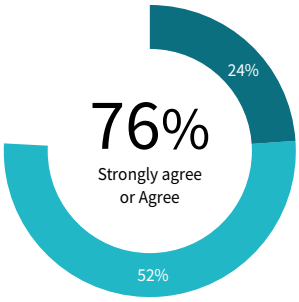
Solutions have evolved and matured

The reasons behind the more recent acceptance and uptake of all-flash arrays within our research sample becomes evident when we look at perceptions of how solutions in this space have matured. In terms of core technology concerns, for example, few now question the inherent durability of flash, and the ability to build resilient systems.

How much would you agree or disagree with the following statements?

The durability of higher end flash technology is now inherently enterprise class

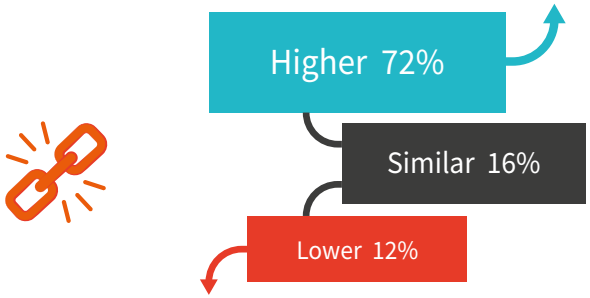




It's nowadays possible to build resilient systems using commodity class flash

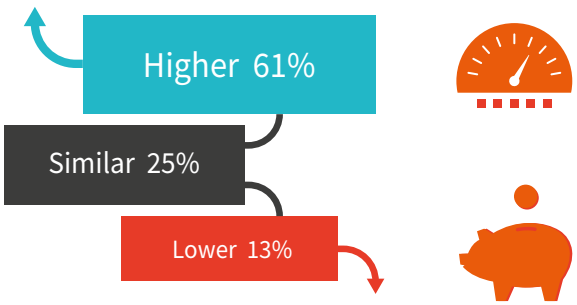
Many actually go beyond telling us that historical challenges of this kind have been resolved. The prevailing view is that flash-based solutions now offer superior durability, and the same is true in relation to price-performance.

How do you think flash storage compares to traditional hard-disk drives in relation to the following?



Durability

(e.g. time to failure)



Price performance

(e.g. cost of IOPS)

These views are understandable. Beyond direct experience of modern enterprise solutions, solid-state storage now surrounds us in our daily lives in mobile phones, tablets, laptops, set-top boxes, etc, and usually 'just works'. Then anyone who has built a large-footprint, power-hungry and difficult-to-tune array with lots small capacity hard-disks to achieve high IOPs will appreciate the appeal of the all-flash option from an overall price-performance perspective.

Stepping up to enterprise requirements

The demand for 2nd generation solutions

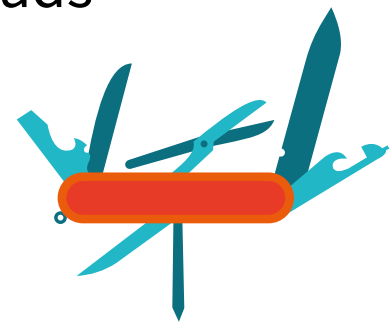
While dealing with basic concerns around durability and economics is a good start, that still leaves all of the enterprise functionality gaps previously identified. This is where the latest 2nd generation solutions, often from vendors with a strong storage heritage, come into play. The rich set of capabilities offered by these represent the difference between a niche product and mainstream enterprise-class solution.

How would you characterise the following so-called 'enterprise class' or '2nd generation' capabilities introduced more recently by some storage vendors?

	Mandatory	Highly desirable	Potentially useful
Enhanced resilience and disaster recovery			
Advanced high availability facilities	31%	41%	21%
Embedded disaster recovery e.g. transport failover	22%	52%	21%
High durability flash	29%	45%	17%
Commodity flash hot-swapping	21%	41%	27%
Advanced management and optimisation			
Integrated management across all-flash hybrid and SDD	25%	39%	24%
Automation of day-to-day storage management / ops	20%	44%	26%
Elimination of need to tune (effort / cost savings)	19%	43%	26%
Fine grain tuning and control			
Granular QoS management at application / dataset level	21%	36%	33%
Ability to switch deduplication / compression on or off selectively for individual workloads / datasets	20%	41%	30%

From point solutions to mixed workloads

All-flash now ready for anything?



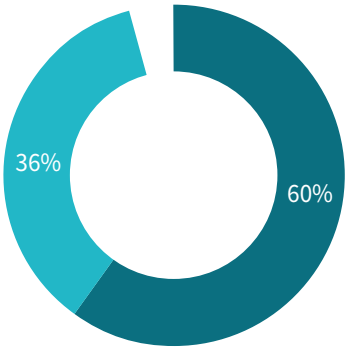
As the technology and economics have evolved, so too has the scope of all-flash suitability. We are now beyond thinking in terms of point solutions dedicated purely to the most demanding applications that justify the historical expense.

How well do you think all-flash arrays support the following application requirements?

While the early market affinity between all-flash arrays and high performance needs is still evident, more efficient, resilient, manageable and tunable 2nd generation solutions have opened the door to serving the needs of many more application types. With digital transformation raising expectations of high performance across the board, all-flash arrays look like the right solution in the right place at the right time.

	Excellent fit (Rated 5 out of 5)	Good fit (Rated 4 out of 5)
High performance OLTP applications	68%	33%
High performance computing (HPC)	67%	23%
Virtual server environments	65%	21%
Email, collaboration and workflow	64%	25%
File storage and management	60%	27%
Big data and analytics / OLAP	61%	26%
Virtual desktop infrastructure (VDI)	61%	24%
On premise private cloud platforms	59%	23%
Other 'everyday' application needs	55%	20%

How well do you think all-flash arrays handle mixed-workloads?



But supporting a broader range of workloads is only the start. Modern all-flash solutions can also handle them simultaneously to create a full shared storage, mixed workload environment.

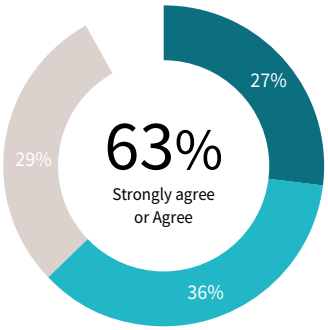
A coherent strategic approach

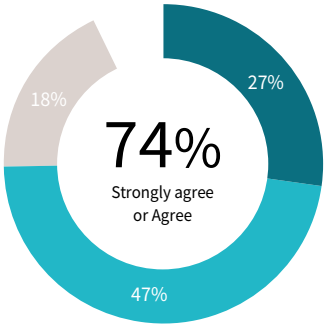
Mixing, matching and integration

Despite the positive view of all-flash arrays, we need to maintain a sense of perspective. IT teams have invested heavily in hard-disk drive (HDD) technology and skills, and will continue to leverage these for some time to come. Furthermore, while the price-performance calculation can often favour all-flash, the HDD option will still make sense when the priority is simply the cost of capacity, e.g. for slow moving or longer term storage. This means mixing and matching.

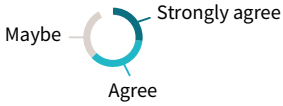
How much would you agree or disagree with the following statements?

Exploiting flash technology is a high priority for us





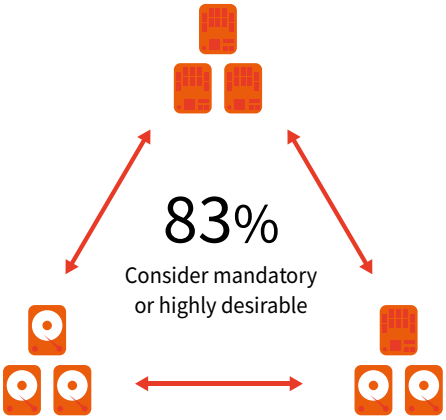
HDD-based storage remains a part of our strategy and plan



As we consider the implications of this, the danger is that all-flash technology ends up being implemented in discrete storage silos. The challenges of the resulting fragmentation in terms of complexity, poor capacity utilisation, administration overheads, and lack of flexibility are well understood. It is therefore no surprise that the integration imperative in relation to platforms, management tools and resilience measures is widely recognised.

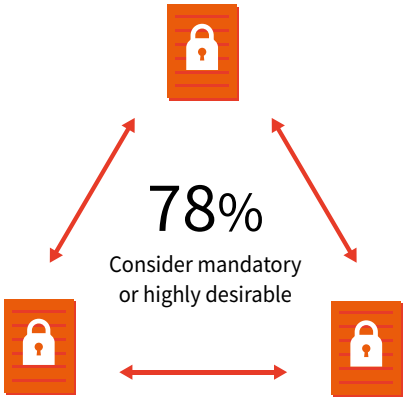
Thinking of your storage environment as a whole, how important is it for all-flash solutions to integrate with the following?

Existing storage systems



Existing management tools and processes

Existing data protection and DR measures



Final thoughts

Considering the broader impact

Based on the findings of the research reported here, it is safe to say that all-flash options are already finding their place alongside traditional storage technologies. It is also clear that the robustness, efficiency and enterprise class feature-set delivered by 2nd generation solutions has broadened the range of applications and workloads that all-flash arrays can support from both a practical and economic perspective.

This 'coming of age' of such a transformational technology has some profound impacts.

From a datacentre facilities perspective, the relentless increase in demand for both capacity and performance has led to the proliferation of larger and larger HDD systems that require a significant amount of rack space and consume increasing amounts of power, both directly and as a result of extensive cooling requirements. The practice of populating arrays with many small spindles as opposed to fewer larger ones in order to meet throughput needs has been a significant aggravating factor here. Switching to all-flash alternatives dramatically reduces both space and power requirements, freeing up valuable and often constraining resources, and providing the freedom to transform datacentre layout and operation.

While policy-driven quality of service (QoS) management is seen as important for enterprise storage systems of any kind, the truth is that all-flash arrays need a lot less tuning and nurturing. With every aspect of the system inherently designed and engineered for high throughput and low latency, and no need to worry about high utilisation causing fragmentation-related slowdown, even the most neglected system will still deliver a reasonable and reliable level of performance. The impact of this is not only lower administration overhead, but a lot less reliance on highly specialist storage management expertise. This in turn means that some of the traditional lines of demarcation can be relaxed, e.g. with application or virtualisation platform teams potentially becoming more self-sufficient from a storage provisioning and management perspective.

The other disciplines impacted positively within IT are application architects and developers. Data access, i.e. retrieval of records, files and other objects from disk, has historically been the slowest runtime link in the application chain. Software has therefore often had to be designed to work around this to avoid responsiveness and usability issues. By removing the latency constraint, all-flash storage (along with any necessary network upgrades) can allow applications to be designed much more naturally, pulling in a more complete set of relevant data without having to worry about performance implications. This is easier and more satisfying for developers, but more significantly, it also results in a much richer experience for users, including your online customers.

And picking up on this last point, richer functionality and higher performance across the board allows a huge mind-set shift. It's now possible to think of delivering fast and reliable data access to applications by default, rather than by exception. And in the context of digital transformation, this elevates all-flash storage technology to the status of strategic business enabler.

About the research

The research upon which this report is based was designed and executed on an independent basis by Freeform Dynamics. Data was collected from 363 senior European and North American IT professionals via an online survey. The respondents were from organisations ranging in size from 500 employees to 5,000+ employees and from a variety of industry sectors (Healthcare / Life Sciences, Retail, Financial Services, Manufacturing, Automotive, Travel & Transport and Telecoms). The study which was completed in October 2016 was sponsored by Fujitsu.

About Freeform Dynamics

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