FREEFORM DYNAMICS

Primary Research Report

In association with

The Register®

and

kaminario.

All-Flash Arrays

A catalyst for transformation

Freeform Dynamics, 2017

Introduction

We live in an age when a lot of technological improvement is incremental. Much of what comes along is merely a bit faster, a bit smaller or a bit cheaper than what went before. At the same time, some new technology – even truly transformative technology – must initially ape older technology in order to win acceptance.

It is vital to recognise that Flash is more than just a fast hard disk.

As a result, we sometimes fail to spot the real innovations until much later, after others have grabbed most of the advantage to be had, because we are still thinking about them within the frame of the old technology we know and understand.

So it is with All-Flash Arrays. It is clear now that Flash storage is enterprise-ready, and that All-Flash is indeed 'the new normal'. Yet in many cases Flash is seen as just another tier of disk – indeed, some AFAs are still constructed using solid-state drives, or SSDs, which are Flash packaged to look and work like a disk drive.

However, while SSDs yield much better performance than disks, and most enterprise applications will perform better on Flash than on disk, there is much more to Flash than that. In particular, the way it works is fundamentally different from a spinning disk.

Transformative technologies can be hard to spot at first – but they are very real, as AFA users have now recognised.

In a recent online study of 305 IT professionals (see Appendix A), we found some early adopters who had already realised this: they recognised that Flash truly can have transformational properties. However, we also found Flash sceptics. The question is how well do people understand Flash's potential benefits and how to exploit them? What have the early adopters learnt, what might the sceptics have missed, and how can the rest of us get the best from the technology?

Flash delivers

We asked both current and prospective users of All-Flash arrays (AFAs) about their experiences and expectations with the technology, and in the case of the former, how they had put it to work and what they had learnt.

The figures speak for themselves: for over 80 percent of AFA users, it has been a good experience. Less than 10 percent said it was not so great, or worse (Figure 1).
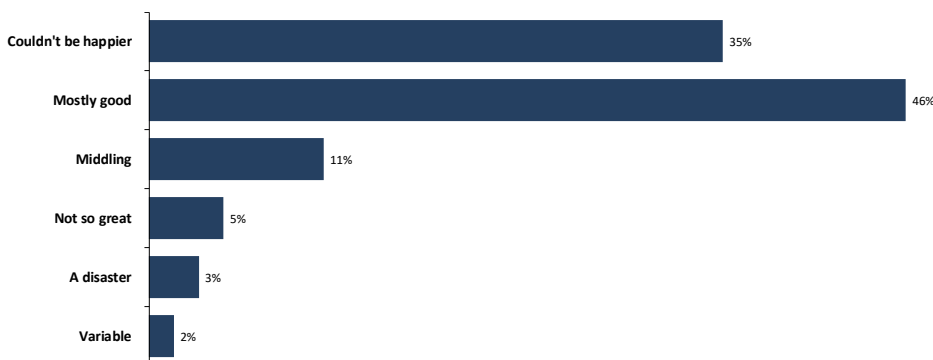
Figure 1

How has your experience with All-Flash Arrays been so far?

Response	Percentage
Couldn't be happier	35%
Mostly good	46%
Middling	11%
Not so great	5%
A disaster	3%
Variable	2%

That positive response comes across a broad range of application areas, too. It is no surprise that the top workloads for AFA users are performance-driven ones such as database applications, virtual server hosting, online transaction processing and VDI.

However, we also see usage right across the spectrum, including key areas for innovation such as cloud environments, mobile apps and services, and analytics of all kinds. In these areas, other Flash advantages may come into play, not just performance, for example, its lower and more consistent latency, and ease of operation (Figure 2).
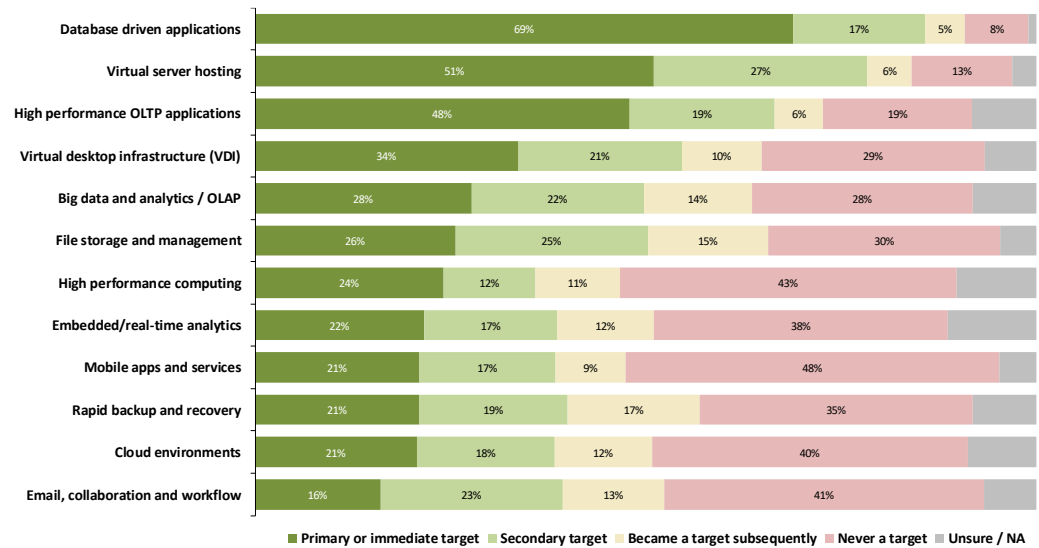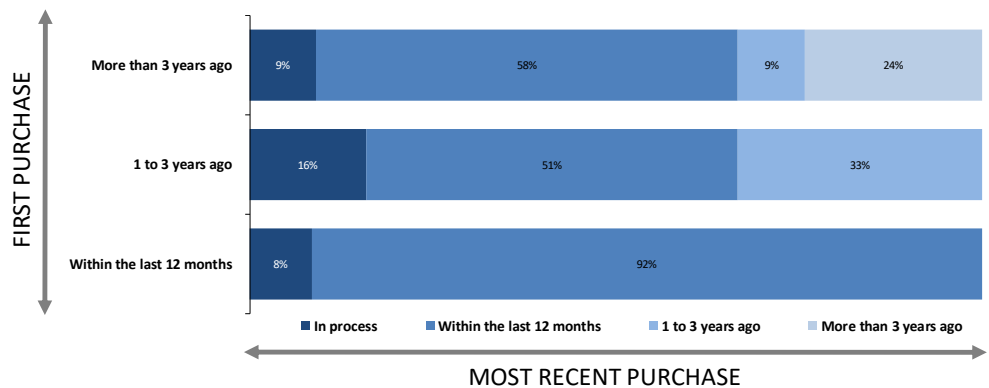
Figure 2

Thinking about your most recent purchase of an All-Flash Array, which workloads was it acquired to support?

	Primary or immediate target	Secondary target	Became a target subsequently	Never a target	Unsure / NA
Database driven applications	69%	17%	5%	8%	
Virtual server hosting	51%	27%	6%	13%	
High performance OLTP applications	48%	19%	6%	19%	
Virtual desktop infrastructure (VDI)	34%	21%	10%	29%	
Big data and analytics / OLAP	28%	22%	14%	28%	
File storage and management	26%	25%	15%	30%	
High performance computing	24%	12%	11%	43%	
Embedded/real-time analytics	22%	17%	12%	38%	
Mobile apps and services	21%	17%	9%	48%	
Rapid backup and recovery	21%	19%	17%	35%	
Cloud environments	21%	18%	12%	40%	
Email, collaboration and workflow	16%	23%	13%	41%	

Getting the Flash habit

AFAs are contagious – most users buy more, and purchase rates are accelerating.

Next, we asked our survey respondents when their organisations first, and most recently, bought AFAs. The most interesting discovery here was that two-thirds of all those who acquired their first AFA more than a year ago had either bought another in the last 12 months or were in the process of buying more. Going All-Flash is contagious it seems, the clear implication being that most AFA users will now have multiple AFA systems, and that purchase rates are accelerating (Figure 3).

Figure 3

When did your current organisation first acquire AFAs? And when was its most recent AFA acquisition?

FIRST PURCHASE

	In process	Within the last 12 months	1 to 3 years ago	More than 3 years ago
More than 3 years ago	9%	58%	9%	24%
1 to 3 years ago	16%	51%	33%	
Within the last 12 months	8%	92%		

MOST RECENT PURCHASE

Mixed early experiences or technology pigeonholing?

Despite the picture being positive overall, almost a quarter of those who bought their first AFA more than three years ago said they had not purchased another one since then. This is quite a small group, however.

It is possible that a few early adopters were disappointed by their lack of functionality, and are not yet ready to trust second-generation AFAs, even though they are much more
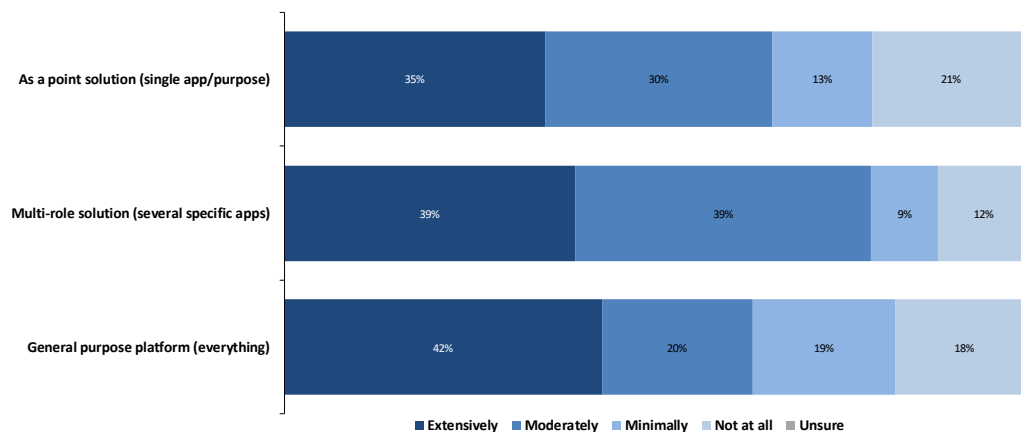
capable. It is equally likely though that they only required an AFA to accelerate a specific application, and that their need has not changed greatly.

Beyond the point-solution

That latter explanation was somewhat corroborated when we asked how people are deploying the technology – a significant proportion still have AFAs deployed as point solutions. It's notable, however, that the majority now have AFAs deployed as multi-role or general purpose storage solutions, and that many organisations are clearly using AFAs in numerous ways (Figure 4).

Figure 4

How much are you using AFAs in the following ways?

	Extensively	Moderately	Minimally	Not at all
As a point solution (single app/purpose)	35%	30%	13%	21%
Multi-role solution (several specific apps)	39%	39%	9%	12%
General purpose platform (everything)	42%	20%	19%	18%

■ Extensively ■ Moderately ■ Minimally ■ Not at all ■ Unsure

Hybrid has been eclipsed

Hybrid arrays combine Flash with tiers of disk storage, and they came in some years ago when enterprise Flash was still a new and expensive technology. Today there are still some areas where hybrid arrays are a good choice, but it seems clear that in other areas, hybrid was merely the interim option. Even though disk is still cheaper for raw capacity, the falling cost and greater reliability and density of Flash, plus its ability to support inline data compression and de-duplication, have made disk redundant in many use cases.

Existing hybrid array users are still buying more, presumably as their storage estate grows, but our survey shows the numbers are declining and that there are now far fewer first-time hybrid buyers than first-time AFA buyers. Three years ago hybrid was selected ahead of AFA, then first-time buyers shifted towards AFA, and within the last 12 months AFA has become the favoured option.
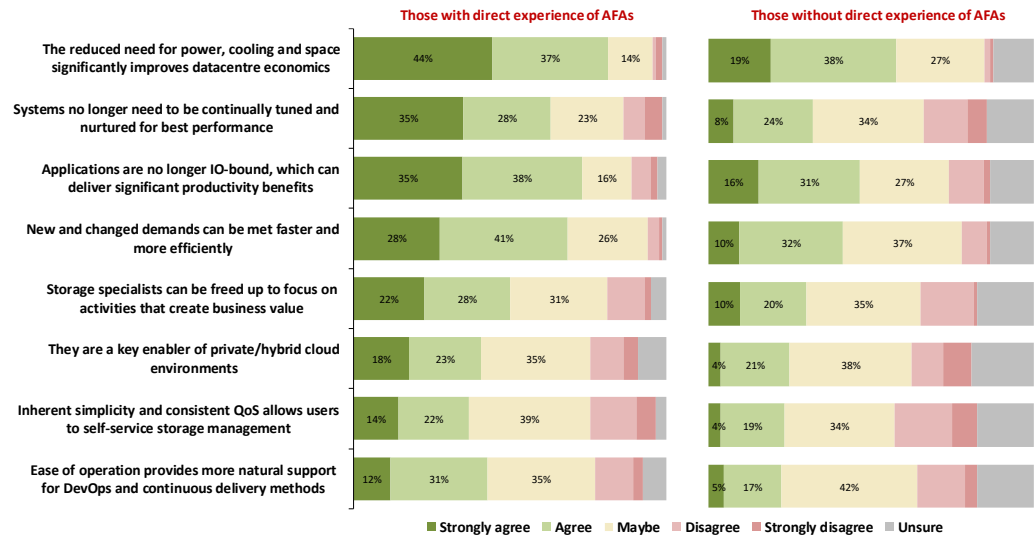
The core benefits of AFA

Most current AFA users are positive about the value of the technology, both to IT specifically and to the wider business. For example, anecdotally there has been some scepticism regarding AFA's ability to improve data centre economics thanks to its reduced need for power, cooling and space, yet we see clearly that barely two percent of those with direct experience disagree with this proposition. More than 80 percent agree that AFA does indeed significantly improve data centre economics (Figure 5).

Figure 5

How much do you agree or disagree with the following statements when it comes to describing the potential benefits of AFAs?

AFAs can bring major automation benefits, such as eliminating the need for system tuning.

There is also a major recognition among experienced users of the automation-related benefits that AFAs can bring in areas such as eliminating the need for system tuning, meeting new user demands faster, and removing IO bottlenecks.
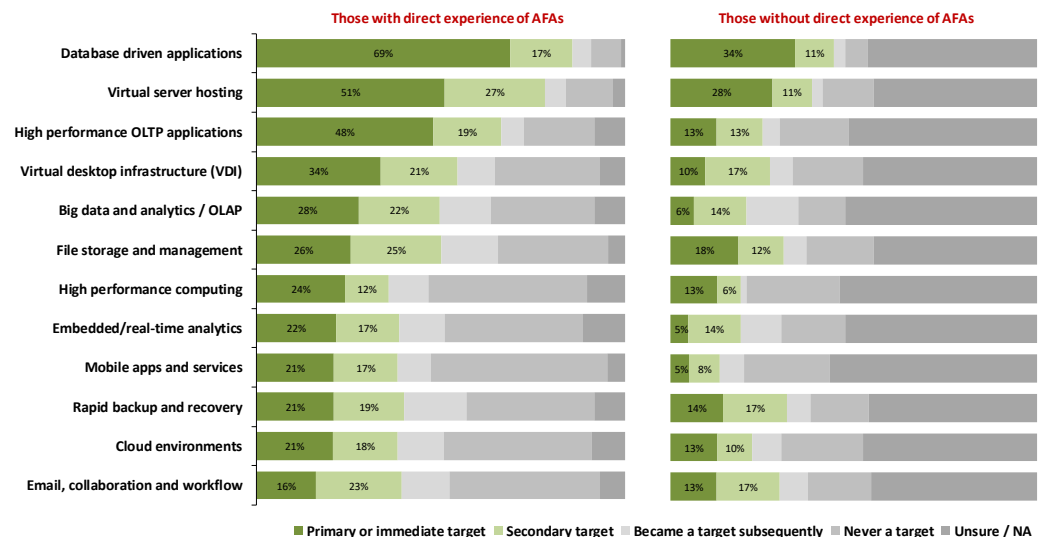
Beware the knowledge chasm

However, Figure 5 also highlights the huge gap in confidence and recognition between those who have direct experience of AFAs and those who do not. Non-users are much more likely to be sceptical or at least cautious about the strategic value and operational benefits of AFA. For some, this scepticism may be well-founded – for example, they may be non-users precisely because AFA technology doesn't suit their specific use-case.

A dose of scepticism is right and proper, but too much AFA scepticism is rooted in lack of experience.

These two groups also have quite different perceptions of its suitability for different workloads. Once again, we see the robust effect of practical experience when it comes to understanding which workloads work well on AFAs. Those with no direct experience of the technology are really only aware of their potential – widely publicised of course – for hosting database applications and virtual servers, and of course the general ability of Flash to act as file storage (Figure 6).

Figure 6

Thinking about your most recent purchase of an All-Flash Array, which workloads was it acquired to support (or if you haven't already purchased an AFA, what workloads would you acquire it to support)?

So while some may be non-users for a good reason, we believe there may also be an element of ignorance and working on out-dated information. As mentioned above, not everyone is aware of how fast AFA technology has evolved over the last couple of years, nor of how quickly its effective price per Gigabyte has fallen, and there is still some residual 'fear, uncertainty and doubt' (FUD) about the enterprise relevance of Flash – which our experienced users tell us is largely unwarranted today.

Our research shows that, when it comes to understanding and achieving the potential of AFA, experience is hugely helpful. Once you have worked with it, you 'get' it.

Can it still go wrong?

*AFAs are not a panacea
and cannot solve all
application
performance woes.*

Just eight survey respondents reported poor experiences, and 75 percent of them had bought their first AFA within the previous 12 months. Are sections of the industry misleading buyers with hype and over-elevated expectations, have some buyers not taken enough time to learn and adapt, or are some people buying without due diligence? AFAs are not a panacea, and especially they are not a quick drop-in fix for any performance problem – you still need to get the planning and implementation right, and acquire a solution that has the characteristics you need.

Transformation ahead

AFAs can have a much broader role too. With business under pressure to become more agile, adaptive and innovative, and with IT under pressure to do more with less, and do it faster, the need for real transformation has rarely been greater. The problem on the IT side is that much of today's technology is already reaching its limits – data management and storage administration techniques originally developed when 100GB was a lot of data are seriously strained in an information era when organisations think nothing of storing multiple petabytes, but still need to protect it all for regulatory compliance.

*In IT today, simply doing
"the same but faster" is
no longer an option:
real transformation is
essential.*

For sure, you can improve data centre efficiency simply by automating and consolidating what you have today, but that just pushes the bottlenecks further into the future, and more importantly it doesn't really give your users anything new or better. What's needed are genuinely new ways of working, in both the data centre and the wider business – transformation, in other words.

Why Flash matters

Of course, bringing in AFAs means faster storage for your existing applications, but the opportunity for transformation goes far beyond that. First there are the infrastructural advantages – reduced power, cooling and space requirements mean that you can rethink your data centre strategy.

Then there are those changes that derive from Flash working differently from disk. A key one here is that its performance is consistent, so it can deliver dependable quality of service, so programmers no longer need to beware going to disk. Instead, they can write code they never would have dared to in the past, such as applications that use more data with less penalty, and operate much closer to real-time.

*The transformational
capability of AFA goes
far beyond just storage.*

Another consequence of AFAs bringing more automation is that they need less management and tuning – this is the second most significant benefit reported in Figure 5. This in turn translates to less service interruption from human error, and an opportunity
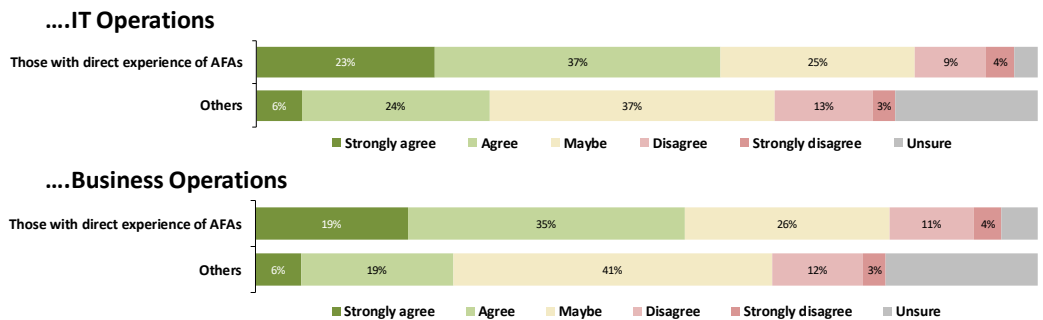
to free up and redeploy skills. With imminent issues such as GDPR and the need to shine a light on dark data, this could be the opportunity to make better use of skilled storage experts who are currently focused on routine tasks.

Greater automation, self-service capabilities, and the fact that AFAs can be an example of software-defined storage can also contribute to breaking down functional boundaries and barriers within IT. With less routine admin work needed, it shifts the skills mix towards generalists and has the potential to smooth out the way IT works. It should also – at last – enable administration to move up the value chain, from infrastructure level SRM (storage resource management) to strategic business ILM (information lifecycle management).

Greater automation can help to break down internal boundaries and move administration up the value chain.

But again, beware those inexperienced sceptics

When we look at the difference in perception between those who have direct experience of AFAs and those who do not, once again we see that users without direct experience are much more sceptical – in this case, about the ability of AFAs to enable both business and IT transformation (Figure 7). At the very least, this may indicate a need for broader education around AFAs, or at least more time working on preparing solid business cases for their procurement.

Figure 7

How much do you agree that AFAs are a strategic enabler for transforming key aspects of...

....IT Operations

	Strongly agree	Agree	Maybe	Disagree	Strongly disagree	Unsure
Those with direct experience of AFAs	23%	37%	25%	9%	4%	
Others	6%	24%	37%	13%	3%	

....Business Operations

	Strongly agree	Agree	Maybe	Disagree	Strongly disagree	Unsure
Those with direct experience of AFAs	19%	35%	26%	11%	4%	
Others	6%	19%	41%	12%	3%	

Look beyond the obvious

There are far more AFA use-cases than the ones everyone talks about.

The top use cases for AFAs in our survey are much as you would expect from reading the literature and the press, for example hosting database and online transaction processing applications, and virtual servers or desktops. It becomes much more interesting though when we bring to the top those named applications and workloads that weren't originally planned for AFA deployment, but which emerged as use-cases after acquisition (Figure 8).

Figure 8

Unplanned workloads that subsequently emerged as AFA use-cases

RECENT ARRIVALS	
Big data and analytics / OLAP	14%
Embedded/real-time analytics	12%
Cloud environments	12%
IT MAINSTAYS	
Rapid backup and recovery	17%
File storage and management	15%
Email, collaboration and workflow	13%

These fall into two groups, the first being those which are obviously well suited to the characteristics inherent in AFAs but are relatively recent arrivals in the mainstream, such

as big data, real-time analytics and cloud environments. For many users, having AFA technology available will have enabled and speeded up the adoption and growth of these applications, all of which also have the potential to broadly transform an enterprise and its business operations.

The second group is long-standing enterprise applications that are IT mainstays but which are also key elements of many digital transformation projects, such as rapid backup and recovery, file storage and management, and email and collaboration. Here we see foresighted technologists recognising that the performance and economics of AFA have reached a point where it really can take over as general purpose storage, not just tier 0/1 high-performance storage.

AFA is an enabler for productivity and digital transformation.

What this shows is the enabling effect of AFA technology operating in two different directions. In each case though, whether it is bringing a new application online or making an existing one work better, AFA is acting as a key enabler for productivity – and indeed, potentially for wider digital transformation.
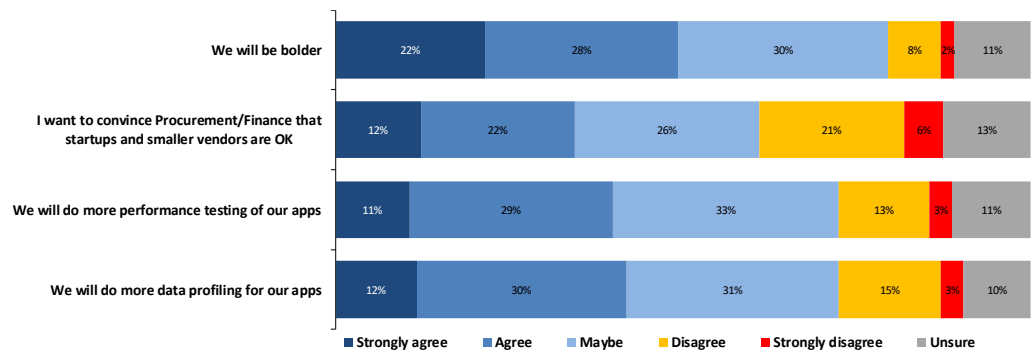
Pulling it all together

Done properly, AFAs are far more than just very-fast storage arrays: they are that rare thing, a transformational technology. Even if you have already invested in AFA technology and obtained good returns simply from the performance boost, there is almost certainly more that could be won from it, such as the opportunity to upskill and free up resources for more important tasks than routine admin.

Achieving those transformations will depend on a couple of factors, however. It will most likely require an investment in second-generation AFA technology as this is where we find significant improvements in areas such as storage automation, the ability to support multiple applications simultaneously, and more granular data reduction.

If you have no practical experience of AFAs, you probably do not know what you are missing.

And it will require a willingness to innovate and transform organisations and processes. So far, the advantage has been to those with practical experience. In a very real sense, if you have no experience of AFAs – for whatever reason, voluntary or involuntary, financial or technical – then you do not know what you are missing. We saw evidence of the power of this learning experience when we asked users what lessons they had gained from their AFA experience for the future (Figure 9).

Figure 9

And in your next AFA project, how much do you agree or disagree with following?

It is telling that almost 80 percent say they will or might be bolder with their next AFA project: their experience tells them that they didn't aim high enough, that they discovered opportunities along the way that they had not known about or planned for. There is a transformative lesson for us all in there.

Appendix A: Research Sample

The study upon which this report is based was designed, executed and interpreted by Freeform Dynamics Ltd in collaboration with Kaminario. Data was gathered from 305 respondents via an online survey completed in Spring 2017.

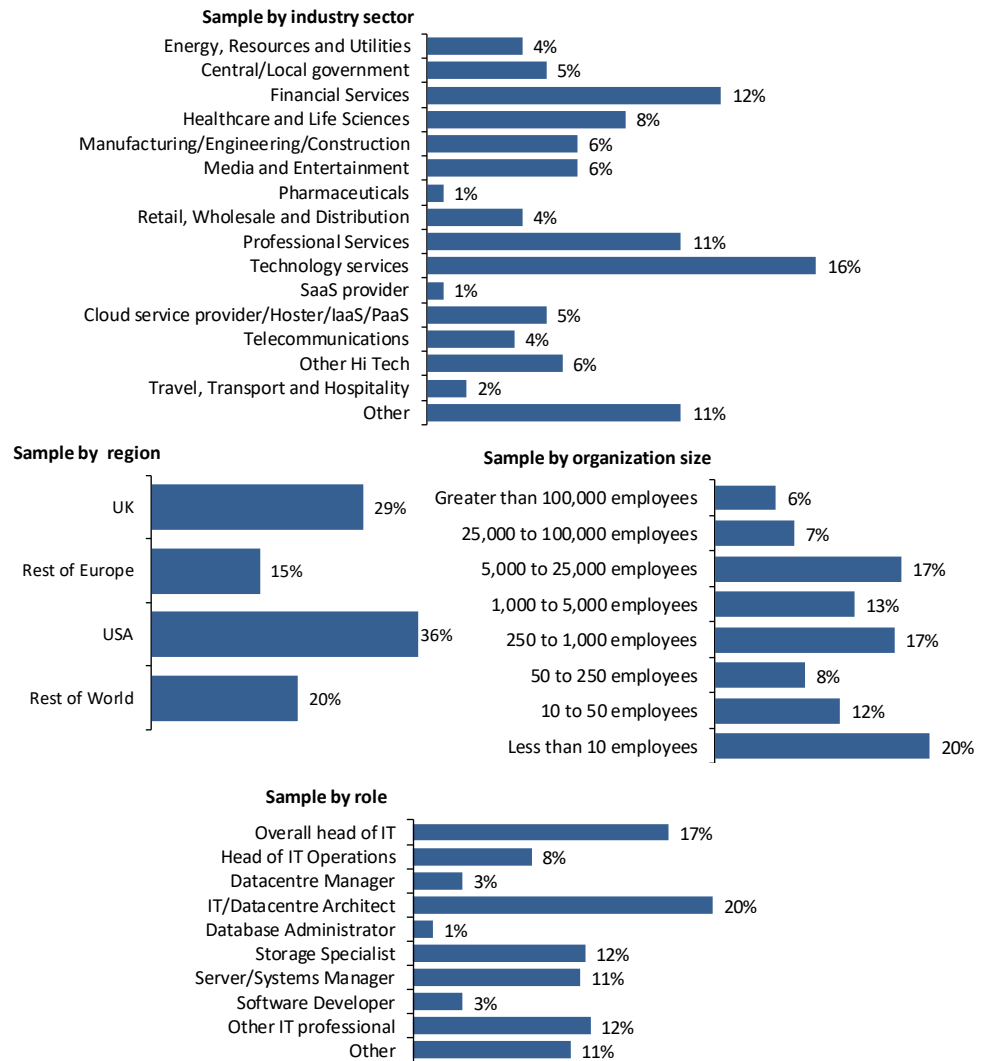The sample distribution for the online survey was as follows:

Figure 10

Composition of research study sample

Sample by industry sector

Sector	%
Energy, Resources and Utilities	4%
Central/Local government	5%
Financial Services	12%
Healthcare and Life Sciences	8%
Manufacturing/Engineering/Construction	6%
Media and Entertainment	6%
Pharmaceuticals	1%
Retail, Wholesale and Distribution	4%
Professional Services	11%
Technology services	16%
SaaS provider	1%
Cloud service provider/Hoster/IaaS/PaaS	5%
Telecommunications	4%
Other Hi Tech	6%
Travel, Transport and Hospitality	2%
Other	11%

Sample by region

Region	%
UK	29%
Rest of Europe	15%
USA	36%
Rest of World	20%

Sample by organization size

Size	%
Greater than 100,000 employees	6%
25,000 to 100,000 employees	7%
5,000 to 25,000 employees	17%
1,000 to 5,000 employees	13%
250 to 1,000 employees	17%
50 to 250 employees	8%
10 to 50 employees	12%
Less than 10 employees	20%

Sample by role

Role	%
Overall head of IT	17%
Head of IT Operations	8%
Datacentre Manager	3%
IT/Datacentre Architect	20%
Database Administrator	1%
Storage Specialist	12%
Server/Systems Manager	11%
Software Developer	3%
Other IT professional	12%
Other	11%

Note on methodology

The survey was conducted online and respondents 'self-selected' into the study. We must therefore be aware of possible sample bias towards more advanced respondents who are generally more enthusiastic and more likely to respond to a research call to action. This does not affect the commentary or conclusions contained in this report, but should be borne in mind when considering the data in another context.

About Freeform Dynamics

Freeform Dynamics is an IT industry analyst firm. Through our research and insights, we aim to help busy IT and business professionals get up to speed on the latest technology developments, and make better-informed investment decisions.

For more information, and access to our library of complementary research, please visit www.freeformdynamics.com.

About The Register

The Register started life as a daily news operation on the web in May 1998. On the first day, 300 readers visited; in November 2013, 9.5 million unique readers visited the site every month, according to an independent audit by ABCe. The Register's blend of breaking news, strong personalities, and its accessible online execution, has made it one of the most popular authorities on the IT industry.

With an international team of journalists and columnists, The Register reports on the IT industry from the inside out – covering everything from enterprise software to chip developments.

About Kaminario

Kaminario, the leading all-flash storage company, is redefining the future of modern data centres.

Its unique solution enables organizations to succeed in today's on-demand world and prepares them to seamlessly handle tomorrow's innovations. Only the Kaminario K2 all-flash array delivers the agility, scalability, performance and economics a data centre requires to deal with today's cloud-first, dynamic world and provide real-time data access — anywhere, anytime. Hundreds of customers rely on Kaminario K2 to power their mission critical applications and safeguard their digital ecosystem.

Kaminario is headquartered in Needham, Massachusetts, with offices in Israel, London, and New York City.

For more information, please visit www.kaminario.com.

Terms of Use