Community Research Report

In association with

Creating the Storage Advantage

Time for proactive modernisation?

January 2015

Management Summary

How are requirements developing, and is technology evolving to meet new and changing demands?

Most organisations are able to deal with their basic storage needs, but how are requirements developing, and is technology evolving to meet new and changing demands? In this report, we consider these questions and others with reference to a recent research study in which feedback was gathered from over 400 business and IT professionals on storage activity today and in the future. While the result is almost as many questions as answers, the findings provide valuable insights for anyone looking to optimise and future-proof their own storage environment.

Key points

Storage needs are driven by much more than data growth

Beyond growth, storage systems must cope with changing business expectations, increasingly virtualised IT landscapes, and alternative service delivery models.

Storage is too often defined by out-of-control costs

Escalating demands make it hard for many to control storage hardware, software and maintenance costs, manage administration overhead, and maintain service levels.

Cloud may help, but optimising internal systems is seen as key

Most see a limited role for hosted cloud in relation to core storage needs, though flexible pooling and sharing of internal storage resources is seen as important.

Faster and smarter technologies are finding their place

Flash, automated tiering, virtualisation and other advanced capabilities are becoming well-established, with a clear trend towards greater use over the coming 3 years.

But software defined storage (SDS) is still plagued by confusion

IT professionals appear equally split on their appetite for SDS. Around half are using, exploring or can see the potential, while the rest remain sceptical or uncertain.

Marketing aside, advanced technology aligns with better results

No one storage technology, including SDS, stands out as a 'magic bullet', but those with broader adoption of advanced solutions are in noticeably better shape.

Ingrained attitudes and behaviour impede modernisation efforts

Lack of management air-cover, inadequate or siloed budgets, and risk aversion conspire to create a reactive investment mindset that undermines strategic progress.

Supplier-related complacency often adds to the inertia

Even though only half are confident in their existing suppliers' ability to meet future needs, too few seem willing to change, e.g. to try smaller, more specialist vendors.

Debates continue to rage on the future of storage

While the general direction of storage towards increased performance, automation and flexibility seems clear, opinions vary on the level of real industry innovation, the merits of hardware commoditisation, the practicalities of embracing cloud and future requirements for specialist skills and expertise.

About this Report

The research upon which this report is based was independently designed and analysed by Freeform Dynamics Ltd. Data was gathered via an online survey executed in collaboration with a mainstream IT news site. 403 responses were gathered from business and IT professionals across a range of industry sectors, geographies and organisation sizes. The study was sponsored by X-IO.

Introduction

Basic requirements might be covered, but not necessarily in an efficient and effective manner.

A basic ability to capture and retrieve electronic data is pretty much essential for any business to function nowadays. Most organisations are therefore able to deal with fundamental storage needs in one way or another. If they couldn't, they simply wouldn't be able to operate.

But that doesn't mean everything is perfect. Basic requirements might be covered, but not necessarily in an efficient and effective manner. Furthermore, limitations of the storage infrastructure may constrain the business operationally, in its use of information, or its ability to handle new and changing demands, which is about much more than simply accommodating growth in data volumes (Figure 1).

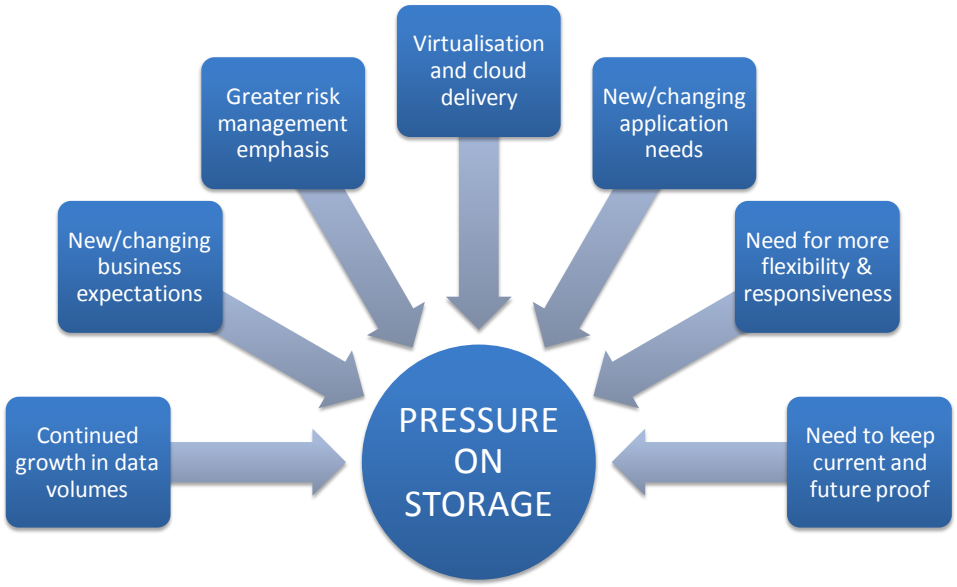


Figure 1

Storage infrastructures are under increasing pressure

During the remainder of this paper, we will be looking at the way in which storage requirements and challenges are evolving, and how some of the latest technologies, and their suppliers, can help organisations as they work to optimise their storage landscapes. Along the way we will be tapping into the findings of a recent research study in which input from over 400 IT and business professionals was gathered (see Appendix A for study overview).

One of the first things of note from this research is a confirmation of the pressures illustrated above, with over three quarters of participants acknowledging each of the factors we see. The other high-level finding that provides important context for our discussion is summed up very effectively by the following participant quote:

> **"We are, and will always be, changing and adapting the storage solutions we use in order to fulfil the latest business needs at the lowest cost."**

Capability gaps will open up, and costs and risks will become harder to manage if you take no action or let things 'free-wheel'.

It's a simple statement, but it serves to underline the principle that storage evolution is an ongoing process that needs continuous attention. Against the backdrop of changing business and technology landscapes, if you take no action or allow things to 'free-wheel', you will see capability gaps open up over time, with costs and risks becoming harder to manage.

Indeed most of those participating in our study are already experiencing this.

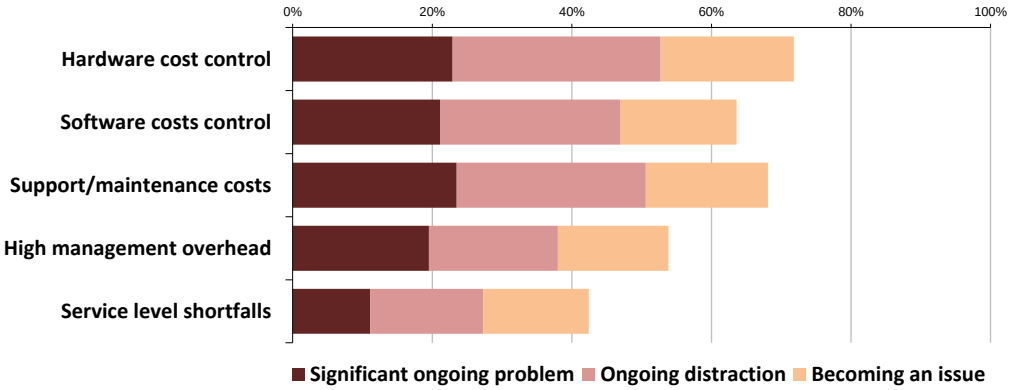
Storage is too often defined by out-of-control costs

Cost control has become a big challenge.

Keeping up with escalating demands for storage along with user expectations can be difficult, making cost control a big challenge for many (Figure 2).

Figure 2

How would you describe the following challenges associated with your storage infrastructure and its management?



Fragmented and outdated systems are used for longer and pushed harder.

The costs listed here are not only concerned with acquiring additional hardware to handle growth, or upgrades to meet demands for better performance, resilience, compliance, and so on; budget also needs to be found for software tools to help deal with larger, more complex and dynamic environments, and, of course, to cover support and maintenance fees levied by suppliers. And when funds are tight, fragmented and outdated systems are used for longer and pushed harder, often resulting in high management overheads and service level shortfalls.

Of course every organisation is different in terms of how challenges and limitations manifest themselves, but it is telling that around 4 out of 5 participants in our study say they are suffering from at least one of the above issues.

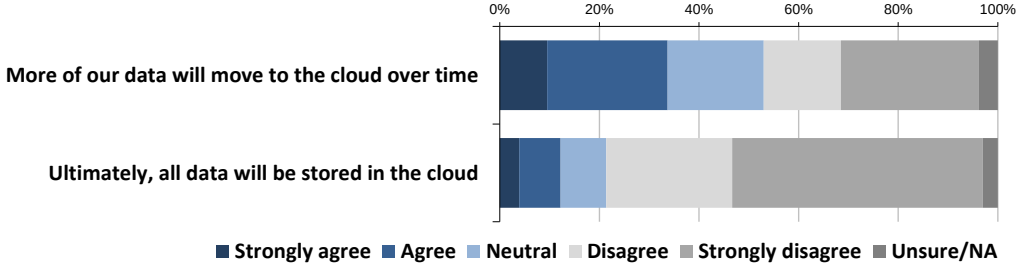
Cloud may help, but optimising internal systems is seen as key

The cloud has a potential role to play, but few think that all of their storage is headed in this direction.

Turning to the practicalities of meeting requirements from a technology perspective, let's clear up one important question right at the start – the cloud has a potential role to play, but few think that all of their storage is headed in this direction (Figure 3).

Figure 3

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



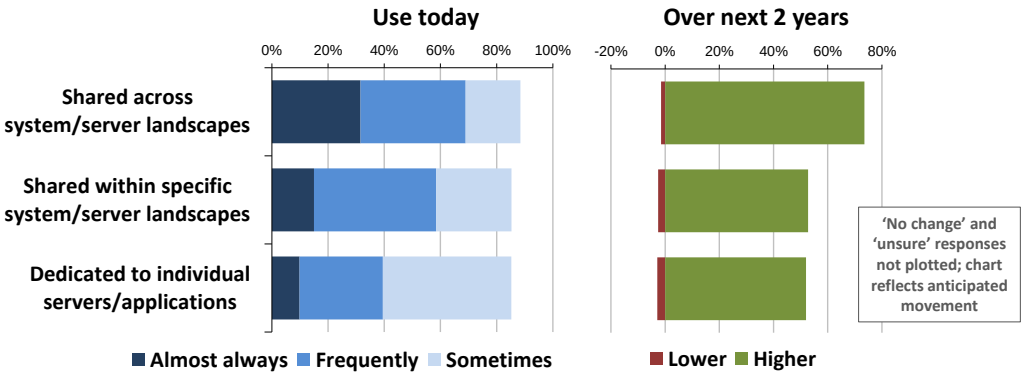
This means that for the overwhelming majority of organisations participating in our study, maintaining an effective internal storage infrastructure will remain important for the foreseeable future.

Virtualisation and private cloud are impacting the nature of storage.

Having said this, continued trends around infrastructure virtualisation and private cloud are impacting the nature of storage in a data centre context. While dedicated storage will remain important to meet the needs of applications with specialised requirements, the overall direction of travel is clearly towards managing storage as a shared resource on as broad a basis as possible (Figure 4).

Figure 4

How much is storage organised and managed in the following ways, and how will this change over the coming 2 years?



These dynamics underline the importance of creating and maintaining an optimum storage infrastructure within your own data centre or computer room, which in turn has an impact on the types and mix of technologies required going forward.

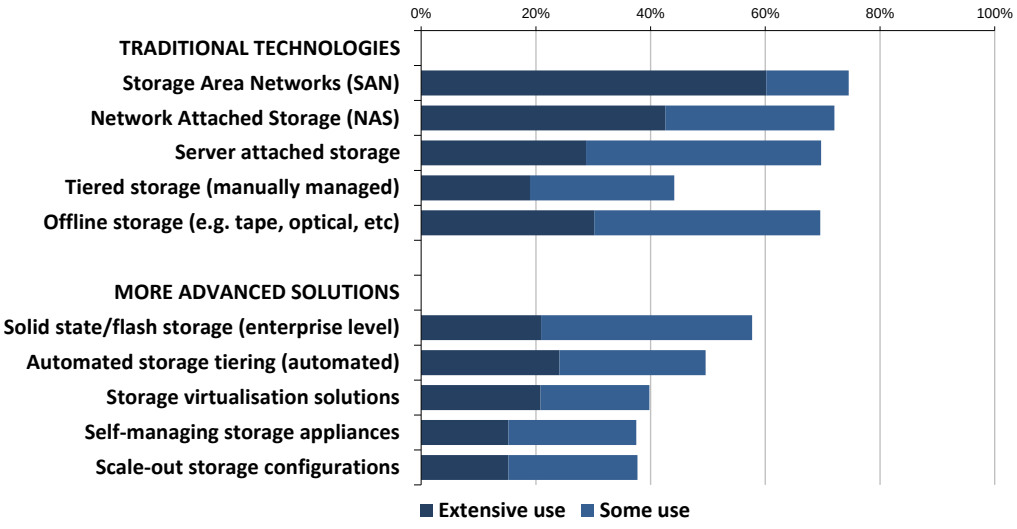
Faster and smarter technologies are finding their place

More advanced solutions are starting to be used to deliver greater performance, scalability, flexibility and automation.

As of today, participants in our study not surprisingly report the use of a range of what we might regard as traditional storage technologies. In addition, however, as IT teams look to tackle evolving demands, more advanced solutions that deliver greater levels of performance, scalability, flexibility and automation are starting to find their place (Figure 5).

Figure 5

Looking across your storage estate, to what degree do you use the following?



And the trend towards use of advanced solutions is set to continue as we look out over the coming three years (Figure 6).

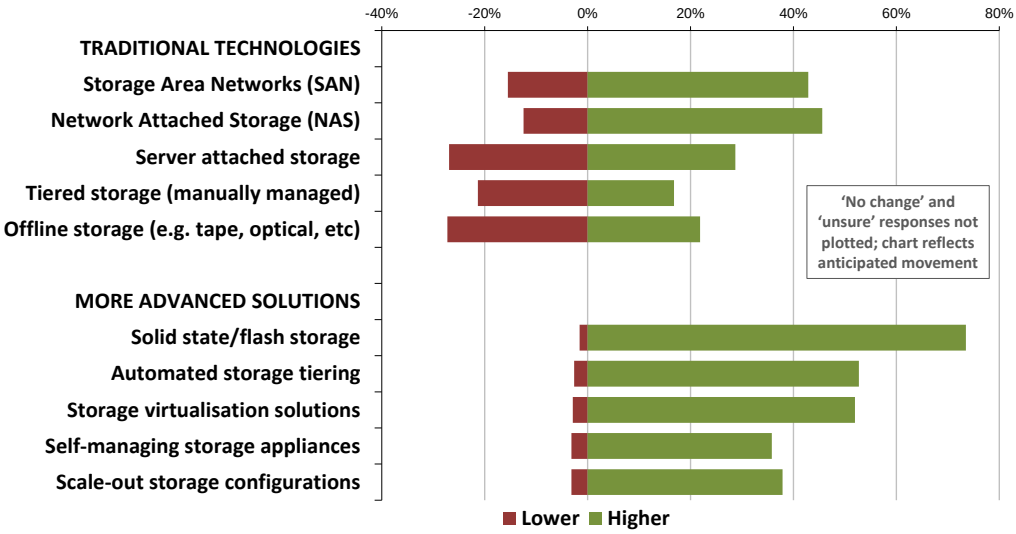


Figure 6

Anticipated change in level of use over next 3 years

The picture we see confirms a general desire for faster and smarter solutions, but we haven't yet mentioned one of the currently most promoted developments in storage.

Software Defined Storage is plagued by confusion and doubt

The problem is that no consensus exists within the industry at the time of writing on what SDS is in specific terms.

Many in the industry are currently advocating 'Software Defined Storage' (SDS) as a transformational concept. This is part of a broader discussion around the notion of moving more control and management functionality from the hardware layer into administration software in a data centre context. This goes hand in hand with terms like 'Software Defined Data Centre' and 'Software Defined Networking'.

The problem is that no consensus exists within the industry at the time of writing on what SDS is in specific terms. It seems as if software is now routinely badged as SDS if it delivers any subset or combination of the broad range of capability normally embedded in storage devices or contained in tightly-coupled toolsets. Indeed some of the latter are being rebranded as SDS even though they remain hardware-specific.

It's for these reasons that we separated SDS from our main list of advanced solutions. When roughly half of our study sample says they are using, exploring or can see the potential of this type of solution (Figure 7), we can't be sure what they have in mind.

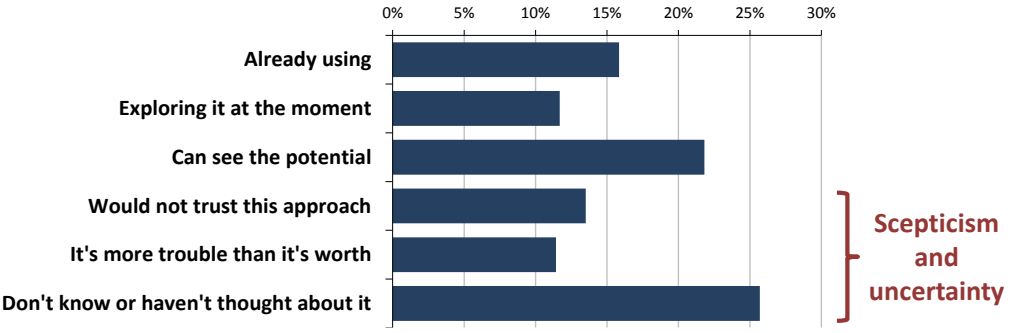


Figure 7

Do you see a role for the software defined storage approach in your environment?

Perhaps more important, when considering the role of solutions promoted under the SDS banner, is the level of scepticism and uncertainty exhibited by the other half of the sample. It's ironic how marketing bandwagons so often inhibit progress.

Marketing aside, advanced technology really does align with better results

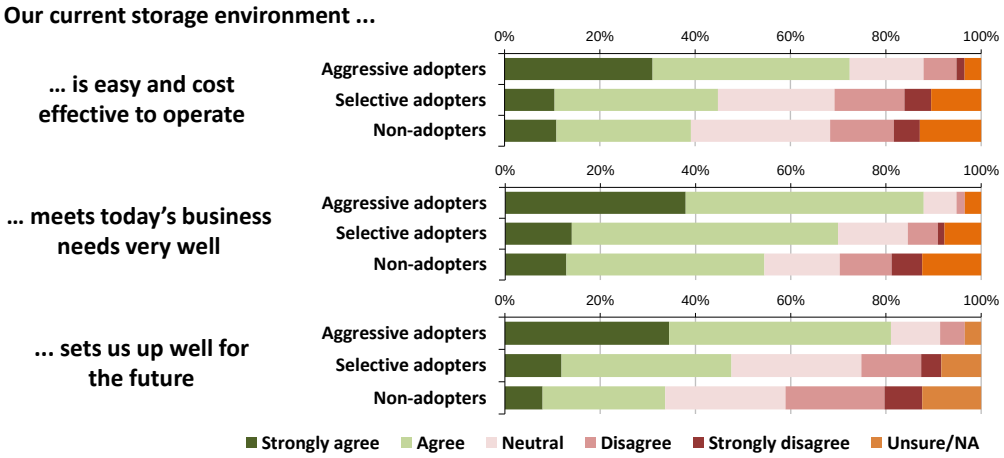
No single type of solution stands out as a 'magic bullet', but embracing advanced technology more broadly appears to make a significant difference.

As we analysed the research data, we looked for correlations between the use of advanced technology and indicators of efficiency, effectiveness and future-proofing. The results tell us that no single type of solution stands out as a 'magic bullet', but embracing advanced technology more broadly appears to make a significant difference. 'Aggressive adopters' (those making extensive use of three or more advanced solutions, approximately 15% of the sample) do quite a bit better than both 'Selective adopters' (using one or two advanced solutions, approximately 35% of the sample) and 'Non-adopters' (approximately 50% of the sample).

While we always need to be careful about inferring causality when looking at correlations like this, there can be no doubt that broader use of advanced technology aligns with better IT and business outcomes (Figure 8).

Figure 8

Relationship between advanced technology adoption and key performance indicators



If anything, the chances are that the impact of advanced storage technologies is under-represented on this chart. Those paying more attention to their storage infrastructure are more likely to be investing in advanced solutions, but they are generally also aiming higher and focusing on the gap between where they are and where they want to be. In absolute terms, the chances are they are outperforming their peers significantly, but their responses in surveys are often guarded and can even communicate degrees of dissatisfaction. At the other end of the spectrum we have those who exist in a state of 'blissful ignorance'. They express a positive view not because they are necessarily in good shape, but because they aren't fully aware of how poorly they are doing and the options that exist to make things better.

The problem is finding the time to investigate solutions, then securing the budget and resources to put them into place.

But regardless of the circumstantial nature of the evidence arising from the research we are discussing here, it doesn't take much working out that modern storage technology allows a range of broadly acknowledged challenges to be tackled in more cost-effective ways. The problem is finding the time to investigate solutions, then securing the budget and resources to put them into place. This becomes abundantly clear when we look at how storage-related purchases are generally made.

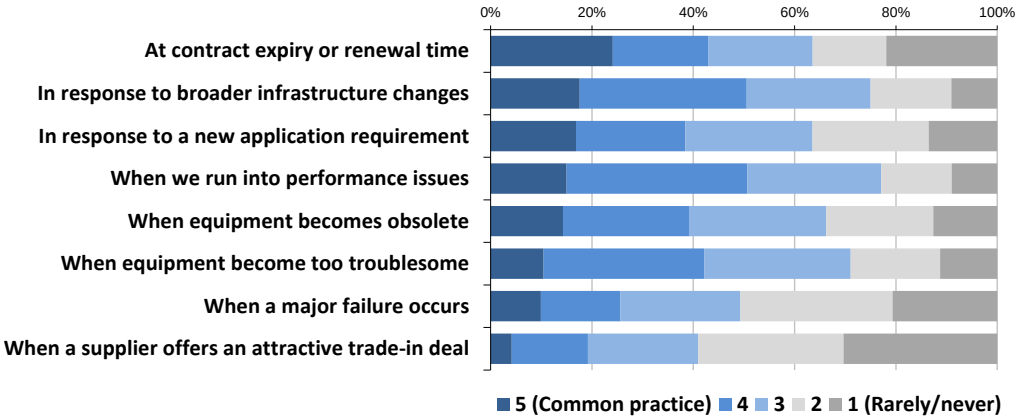
Ingrained attitudes and behaviour frequently impede modernisation efforts

Storage solutions and upgrades are frequently purchased in a very reactive manner.

In an ideal world, the evolution of storage requirements would be considered on an ongoing basis as an integral part of the business planning and review process, with modernisation and investment activity lined up appropriately. The reality, however, is too often very different. Storage solutions and upgrades, along with many other IT areas, are frequently purchased in a very reactive manner in response to commercial events such as contract expiry, vendor offers, or incidents that cause the business a degree of pain such as failures and performance problems (Figure 9).

Figure 9

How frequently do you end up purchasing storage under the following circumstances?



Even when storage investments are made in the context of new application requirements or broader changes to the infrastructure such as virtualisation or private cloud, it can be hard to implement change at a strategic level.

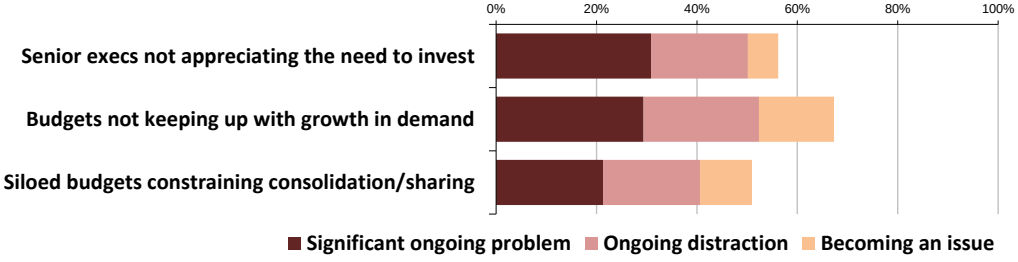
Storage is typically not front of mind for the average business executive!

The reasons for this kind of investment behaviour are two-fold.

Firstly, many participants in our study highlight a lack of senior management air-cover and associated funding issues. The reality is that storage is typically not front of mind for the average business executive, in fact it often isn't even that prominent in IT strategies and plans, taking a back seat to more high-profile investments. This in turn means a constant battle for budget, with a frequent need to tap into local project or departmental pots of money (Figure 10).

Figure 10

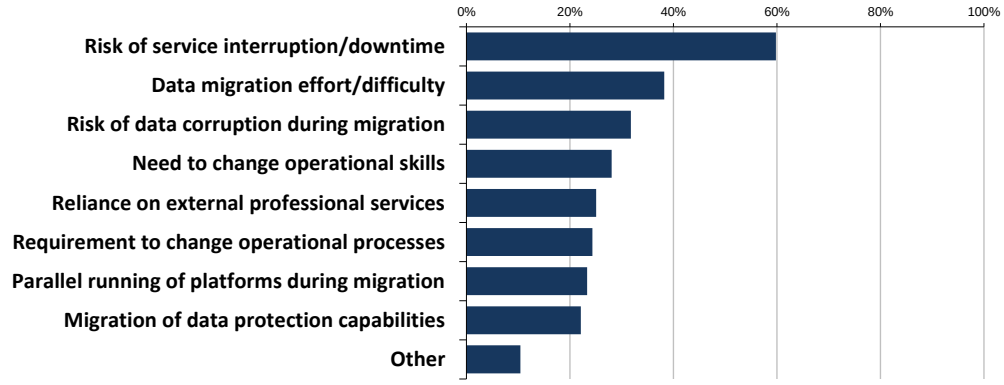
How would you characterise the following challenges in relation to your storage infrastructure?



But study participants also report more practical impediments to significant change. Major modernisation or refresh programs involving switches of critical technology and the migration of important data can be quite daunting (Figure 11).

Figure 11

Which of the following would you regard as significant factors that defer or inhibit major storage refresh projects?



Of course working with suppliers that can contribute relevant best practices and services around emerging ideas and techniques, as well as the necessary technology, can help you plot the right course and deal with the practicalities of moving forward successfully. Given this, a key question is whether your current vendors are the right ones to serve your future needs.

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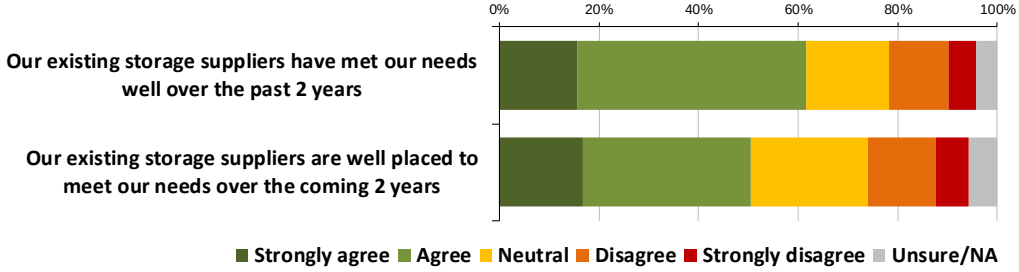
Supplier-related complacency often adds to the inertia

Only 6 in 10 study participants agree that their existing suppliers have met their needs well over the past two years, with even fewer, 5 in 10, being confident they will be able to do so in the coming 2 years (Figure 12).

Figure 12

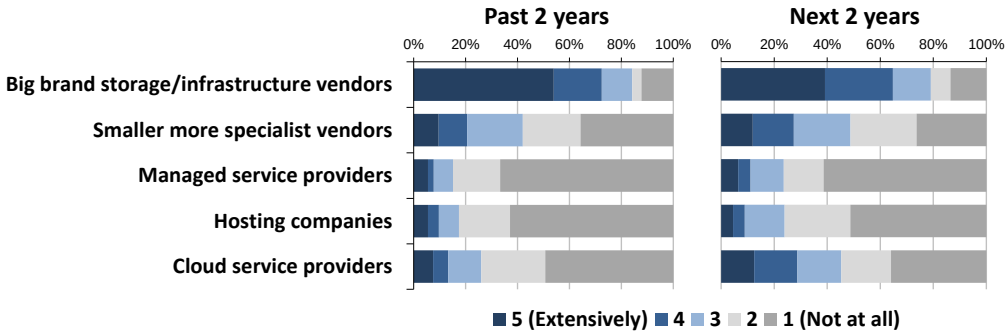
How much would you agree or disagree with the following statements?



Despite the limited confidence in existing suppliers, the overall picture by supplier type is not anticipated to change that much. We see slightly less emphasis on big brand players and a bit more on specialists and cloud providers, but no big shifts overall (Figure 13).

Figure 13

How much have you used the following over the past 2 years, and what will the emphasis be over the next 2 years?

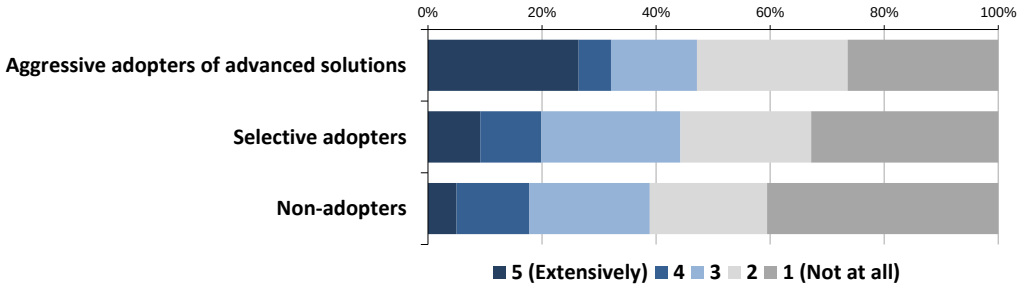


This high level maintenance of the status quo is interesting given that smaller players are often responsible for step-change innovation within the industry. Having said

this, it is telling that 'aggressive adopters' are more likely to be exploiting smaller, specialist vendors (Figure 14), in addition to other types of supplier.

Figure 14

Use of smaller, more specialist vendors over the past 2 years



Aggressive adopters are more likely to be exploiting smaller, specialist vendors.

Of course we shouldn't infer from this that larger players don't innovate too, but perhaps there is a lesson here for those who focus predominantly on established product lines from big-brands to broaden their horizons. That said, we are hearing a lot of chatter at the moment about the level of innovation in the storage industry as a whole, and who will be driving it going forwards. This brings us onto a range of debates taking place about the future of storage in general.

Debates continue to rage about the future of the storage game

It's sometimes hard to tell the difference between speculation, hype, propaganda and reality.

The storage industry is an extremely noisy place. The constant stream of announcements and pronouncements from vendors, analysts and pundits, all with different agendas, can be difficult to interpret, and it's sometimes hard to tell the difference between speculation, hype, propaganda and reality. Against this backdrop, a number of debates are taking place about how the industry is developing, and our research provides a range of views on some of the more topical discussions:

- Start-up innovation vs big vendor marketing
- The role of cloud storage for core systems
- Automation vs specialist skills and expertise
- The commoditisation of storage hardware

So, let's finish off by looking at some of the views and opinions on these talking points gathered during the research in participants' own words.

Start-up innovation vs big vendor marketing

Some clearly feel that the storage industry is stagnating from an innovation perspective.

Some clearly feel that the storage industry is stagnating from an innovation perspective, as expressed succinctly by this comment from one study participant:

> **"There is a clear lack of innovation in the storage field."**

If this were true, it would not bode well for the future. However, others say the problem is mostly confined to larger vendors, with smaller players still innovating strongly and moving the industry forward:

> **"Smaller vendors are way more interesting these days than the big boys. Some rather brilliant offerings. We went from being a single big vendor shop to now having 3 on site. 1 big, 2 small."**

Big players often don't do themselves any favours with the way they 'go to market'.

"Smaller players are changing the way business is done, that's the way to go these days when IT budgets are shrinking like mad."

"The big guys need to wake up - the world is changing!"

But how much of all this is perception versus reality? After all, some of the larger storage vendors spend significant sums on R&D, which frequently does bear fruit. Something that comes through strongly from the commentary is that big players often don't do themselves any favours with the way they 'go to market'.

Smaller players, particularly start-ups, typically have a single core proposition which generally lives or dies on its merits, and is relatively straightforward to market. Large vendors, on the other hand, must continually drive business for established product lines, and when something new is launched, they need to make sure that it looks different enough not to disrupt important parts of their existing business.

Put this together with large promotional budgets and the result is a lot of creative spinning and hype that comes across as the triumph of marketing over innovation:

Let's not forget that today's hot start-up is tomorrow's latest mega-vendor acquisition, and that commercial suppliers play an important role in bringing open source goodness to market.

"I'm not a fan of all the sales jargon and the lies. I want honesty and clarity on the real innovation being delivered."

"Cut the marketing BS and do what you're supposed to be doing, which is R&D and creating more value for customers."

On a more practical level, big vendors then often seem to focus more on their own need to maximise income than they do on the interests of their customers:

"Big storage vendors include too many 'value-adds' which actually adds cost rather than value. They need to offer the choice of less functionality at a better price rather than more functionality at a higher price."

"The main reason we do not touch the larger big brand vendors is because of the way they market and push a 3 year fork lift upgrade."

"The uplift in warranty costs after year 3 is extortionate and drives a needless 4 year upgrade cycle."

It's a shame that such practices distract from the fact that genuine innovation is actually coming out of all parts of the vendor community. And let's not forget that today's hot start-up is tomorrow's latest mega-vendor acquisition, and that commercial suppliers play an important role in bringing open source goodness to market. We therefore shouldn't write off the contribution of large vendors through either direct R&D or scaling and supporting innovations originating elsewhere.

It is no secret that vendors switched from proprietary hardware architectures to industry standard components many years ago.

In the meantime, there's another interesting debate taking place at the opposite end of the spectrum.

The commoditisation of storage hardware

While innovation around rapidly developing aspects of storage continues, it is no secret that vendors switched from proprietary hardware architectures to industry standard components many years ago to deliver much of the core capability found in modern storage solutions. With developments around storage virtualisation, scale out architectures and software defined storage, some say that hardware commoditisation will be pushed even further:

"The trend is towards making storage a commodity layer, with minimal management capability."

"Linux turned the server world upside down with commodity hardware. SDS will do the same thing for storage. Traditional storage arrays will become a niche market and eventually die off."

Many are wary about allowing too much commodity equipment to find its way into their storage infrastructure.

However, many are wary about allowing too much commodity equipment to find its way into their storage infrastructure, particularly when the word 'commodity' is considered to be synonymous with 'cheap':

"I can always go cheaper with hardware, but that's at my own peril."

"Reliability is a big concern. Never cheap out on the disks or controllers."

"Cheap storage is not cheap when it fails."

Some of the feedback we received undoubtedly reflects the impact of all of the confusing marketing noise around the 'software defined' concept:

"Software defined storage, which implies bring-your-own-disk, feels like a risky idea."

"It sounds like an excuse to slip cheap storage into workloads that will cause serious problems when they fail."

"If you don't need enterprise performance or resilience in your hardware, then you don't need enterprise class software to run it."

Many are missing the real point of software defined storage.

Comments such as these suggest that many are missing the real point of software defined storage, which is to provide a combination of automation and flexibility, reducing the reliance on traditional monolithic arrays that do everything for you but in a vendor-specific manner. The reality is that it's perfectly possible to bring flexible, open software together with enterprise-class hardware:

"There are two ways to approach the hardware side of SDS, either by using the cheapest commodity hardware, or enterprise grade servers with high end disks, controllers, and networking. It all depends on what we're trying to achieve."

As the technology matures and more experienced is gained, SDS is likely to find its place. However, in line with the research (as previously seen in Figures 5 and 6), other approaches will also be in demand, including self-contained, self-managing storage appliances which are arguably the polar opposite of SDS.

The role of cloud storage for core systems

Some marketeers and pundits seem to persist in their belief that all aspects of IT will move to the cloud over time, which is misguided.

Moving on to alternative delivery models, some marketeers and pundits seem to persist in their belief that all aspects of IT will move to the cloud over time, which is misguided. As we have already seen (Figure 3), the majority of study participants reject this notion in relation to core storage requirements (excluding end user computing activity defined by Dropbox, Box, OneDrive and the like), with only a third seeing even a partial role for cloud-based storage.

During the study we saw the usual trust, risk and compliance related objections come through in the feedback, which we won't get into here as you will undoubtedly have

You need to take a dispassionate approach to considering how the gravitational pull of 'the cloud' might impact your organisation.

seen it all before. Some, however, take a more pragmatic and considered view, putting cloud-based storage into its proper perspective:

"Storage won't move to the cloud by itself, applications will be dragging storage behind it."

"Cloud applications will continue to grow, but we will always have the need for some local applications with their own, on-site storage. We try to move everything non-core to the business to the cloud - email, file share, office, etc. That frees up a fair amount of storage, but we still need fast, consistent storage on-site to run our business."

Such comments highlight that you need to take a dispassionate approach to considering how the gravitational pull of 'the cloud' might impact your organisation.

On the practical front, quite a few study participants highlight practical issues to be aware of when considering the role of cloud in a core application storage context, particularly around connectivity:

Do your arithmetic on costs, as charging models and rates can vary considerably in relation to both transport and storage.

"Cloud is a good supplement for storage, but you'd need a very big pipe to keep up with the ever growing demands from local applications (which for many reasons cannot be put in the cloud)"

"Bandwidth to the cloud is our real limiting factor for growth in this area."

"Cloud based storage is significantly hamstrung by the fact that data is tremendously difficult to move or migrate. There are other challenges, but the logistical one is the most impactful."

Other feedback underlines the need to do your arithmetic on costs, as charging models and rates can vary considerably in relation to both transport and storage. But considered overall, the following comment sums things up pretty well:

"The cloud can be useful, but it's no magic bullet."

The trick, of course, is to make sure you (or someone else in your organisation) understands the practicalities, strengths and weaknesses of cloud storage, just like any other option that might be considered. This brings us to another key question.

Automation vs specialist skills and expertise

A frequently expressed view in the storage industry is that increasing levels of automation will reduce the need for storage expertise within the IT department.

A frequently expressed view in the storage industry is that increasing levels of automation will reduce the need for storage expertise within the IT department, and some go along with the general notion pretty freely:

"I would expect the basic management of storage resources to become increasingly automated (via virtual environment/hypervisor integration and user self-service) reducing the overall requirement for specialised storage administrators. As tooling and instrumentation increase, I would further expect the amount of time spent on planning infrastructure changes and troubleshooting to similarly decrease."

"Easily managed, highly automated / virtualised storage will be a heavy focus for us. Thus, control moving away from storage admin is a natural and required consequence."

One of the common views is that specialists will still be required, though their role will change or merge with the virtualisation skillset.

"The storage admin is dead. Long live the generalist."

However, about the same number of participants simply say they don't expect anything to change significantly in the foreseeable future, with some going further to defend the role of specialists quite vigorously:

"Storage expertise will remain important. Most IT people know very little about the fundamentals of how an I/O operation works, for example, and other areas critical for designing and tuning systems."

"No technology can ever replace a knowledgeable storage expert with good judgement and experience, in spite of what marketing and sales will tell you about the kit they're trying to sell you."

"Any vendor who tells you 'The equipment will be so simple it will run itself!' is lying, whether they know it themselves or not."

But one of the common views is that specialists will still be required, though their role will change or merge with the virtualisation skillset:

Some argue that specialist storage expertise is something that's only needed in certain circumstances, under which it makes sense to use external resources.

"Storage specialists will spend more time on strategy and governance vs more tactical operational tasks."

"I see an increasing role for the storage specialists to provide flexible, accessible ways of provisioning storage so that application, database and virtualisation specialists can more freely administer storage resources on their own."

"Our storage engineers are also our virtualisation engineers. The same specification used to provision virtual resources for application administrators is used to plan for the provisioning of storage."

"Moving towards specialised storage admins with a lot of virtualisation experience."

Beyond these opinions, some argue that specialist storage expertise is something that's only needed in certain circumstances, under which it makes sense to use external resources.

One of the more insightful takes on this sometimes emotive question, which has a direct bearing on careers and empires, speaks to the cyclic or spiral-like nature of developments in the IT industry:

Storage has never been a more interesting and exciting field to be working in, so we can expect more debates as time goes on – this is very healthy.

"I foresee that there will be a temporary drop in perceived demand for specialist storage administrators as the cost of SSDs begins to eat into the market currently served by mechanical disks. Performance will increase and the careful consideration involved in storage management will matter less for a little while, until the applications fill the enlarged performance envelope. Then storage expertise will come back into demand as businesses realise that they do need people who know what they are doing after all."

We'll have to wait and see whether this prediction is correct.

The discussion points we have highlighted here are by no means exhaustive as there is so much going on in this industry. Contrary to a view being propagated by some sections of the media, storage has never been a more interesting and exciting field to be working in, so we can expect more debates as time goes on – this is very healthy.

Final thoughts

Looking forward, the infrastructure in many businesses will need to become a lot more flexible, efficient and responsive compared to today.

An ability to store, manage and protect data is critical to every organisation, but this criticality has sometimes led to a very conservative approach when considering changes to the storage infrastructure. Together with a frequent lack of interest and understanding among business executives, this has often encouraged an over-cautious, piecemeal and reactive approach to investment, which is probably not sustainable for too much longer.

Against the backdrop of not just data growth, but changing business expectations, virtualised infrastructures, cloud computing and emerging applications in areas such as digital customer engagement and the internet of things, many will need to rethink how storage is done. Looking forward, the infrastructure in many businesses will need to become a lot more flexible, efficient and responsive compared to today, as well as delivering a step change in performance and scalability to support certain classes of emerging application.

The hard part is striking the right balance between the opposing pulls of:

- Agility vs robustness and predictability
- Cost vs performance and reliability
- Automation vs the ability to tune and control
- Openness vs the convenience of end-to-end solutions

It is unlikely that a single approach will ever meet every type of need.

In practical terms, it is unlikely that a single approach will ever meet every type of need, which is why the research revealed that the quest for a magic bullet is futile, and success stems from embracing a range of more advanced solutions.

With this mind, we see a continued role for traditional rich-functionality storage arrays and self-managing appliances at one end of the spectrum, along with 'software defined' configurations at the other. Those exploring the latter, however, must be careful not to assume that clever software can always make up for the limitations of cheap commodity hardware. This may be the case in certain scale-out scenarios, but for the bulk of enterprise requirements you'll still need a hardware foundation that delivers an appropriate level of resilience and performance.

Executives need to be educated on how a modern storage infrastructure makes sense as a business enabler as well as a mechanism for keeping costs under control.

All of which points to an ongoing requirement for at least some storage expertise and experience when it comes to defining needs, evaluating options and implementing solutions, even if you do buy this as professional services on a case by case basis. Despite the rhetoric about simplification, the notion of being able to purchase solutions that will come out of the box meeting all your needs is still largely fantasy in relation to anything but the simplest of systems in the smallest of environments.

But perhaps more important than anything else is the imperative to raise the profile of storage with senior management. Too often it is seen as simply a necessary cost of doing business, and this needs to change. Executives need to be educated on how a modern storage infrastructure makes sense as a business enabler as well as a mechanism for keeping costs under control. Everything becomes so much easier as the business looks to exploit technology for competitive advantage.

On that note, we hope this report has at least stimulated some thoughts as you look to modernise and optimise your own storage environment.

References and further reading

The following research reports and papers are available for free download from the Freeform Dynamics website (www.freeformdynamics.com).

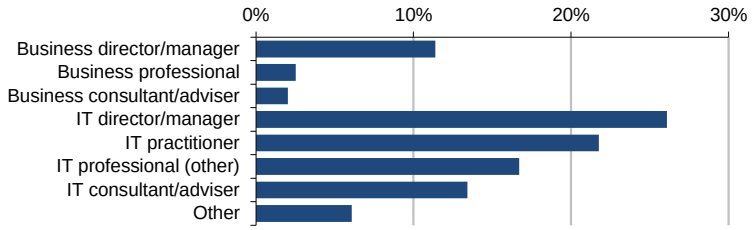
1. **Storage Through the Looking Glass**
   An alternative business-centric view
2. **Storage Anywhere and Everywhere**
   Dealing with the challenges of data fragmentation
3. **The Data Protection Imperative**
   Time to take notice, time to become proactive
4. **Data Protection as a Business Enabler**
   Not all data is created equal
5. **Customer Data Quality in Context**
   A business perspective
6. **Managing Customer Data Quality**
   A view for IT leaders and architects

Appendix A: Research sample

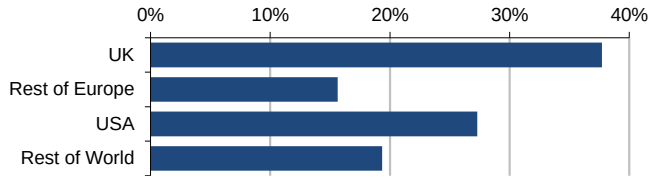
The study upon which this report is based was designed, executed and interpreted on an independent and objective basis by Freeform Dynamics Ltd. Data was gathered from 403 respondents via an online questionnaire hosted on a popular IT news and information website. The study was completed in Q3 2014.

The sample distribution was as follows:

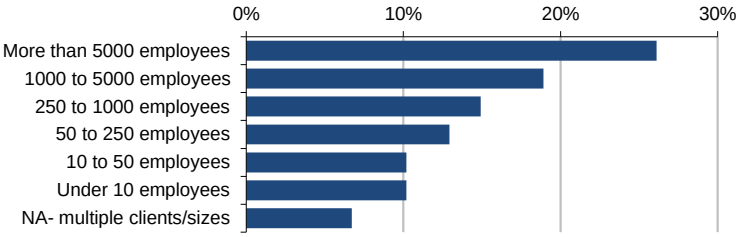
Sample by job function



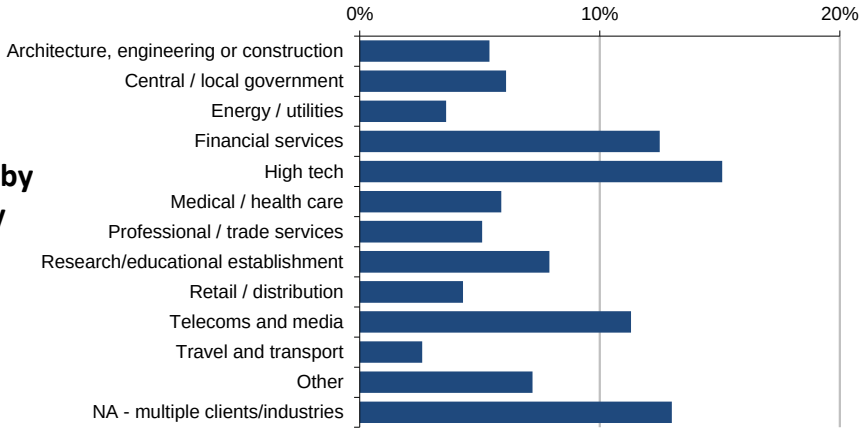
Sample by geography



Sample by number of employees



Sample by industry sector



Notes on methodology and presentation

As with all online research, self-selection of respondents into the survey means there is a possibility of the data being skewed towards those who are more advanced with the topic or have more of an interest in it, and you must bear this in mind when looking at specific percentages shown on the charts. Please also note that in some places we have shortened the labels shown on the charts from their more descriptive 'longer form' versions used in the study questionnaire. Where this has taken place, care has been taken to ensure preservation of the original meaning.

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.

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About X-IO

X-IO Technologies, with its Intelligent Storage Element (ISE) architecture, has solved some of the fundamental challenges of enterprise storage for virtualized environments. ISE addresses the demand of customers for consistent performance, simplified, hypervisor integrated management and true zero-touch reliability in VDI, OLTP and BI-DW environments.

Based in Colorado, the organization has offices throughout North America, Europe, Asia, the Middle East, and Africa and has a proven installation of more than 7,000 units across 1,200+ customers worldwide.

See more at: www.xiostorage.com

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