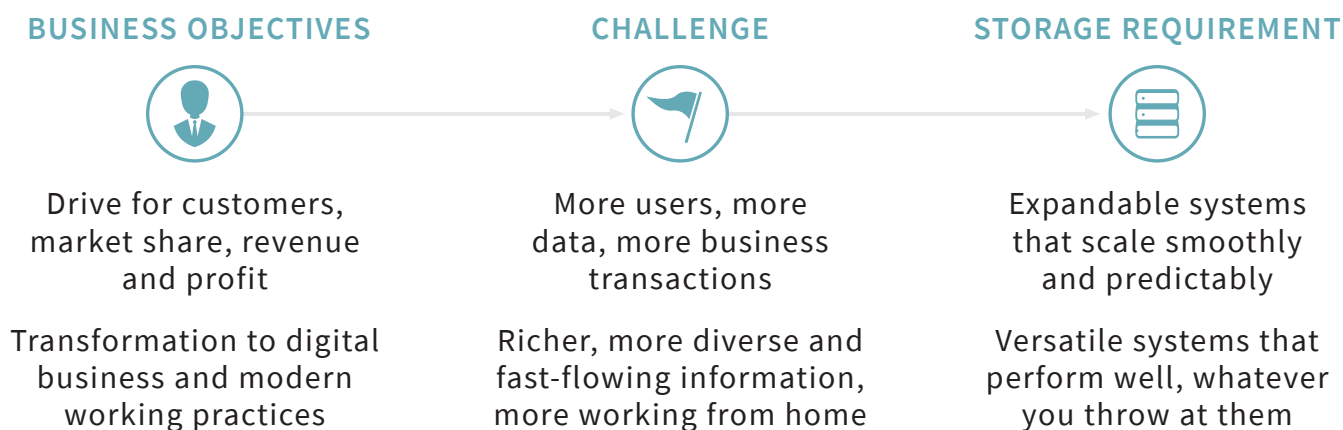# Choice in a Shifting Landscape
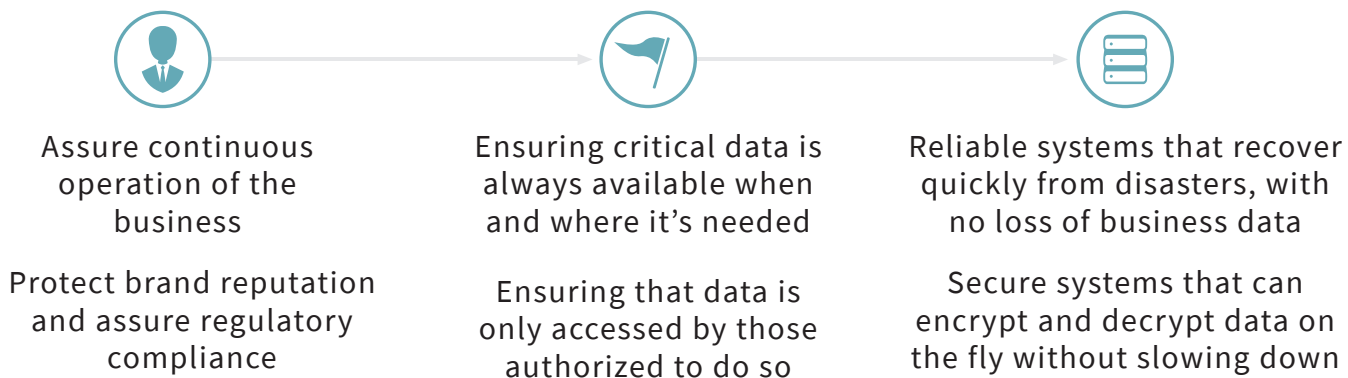
A Business Perspective on Modern Enterprise Storage

Why care about storage?

As you drive for better business performance through key development initiatives and modern working practices, you will inevitably stress your IT infrastructure in new and different ways. This includes the storage systems that hold your essential business information - customer data, transaction records, employee documents, and other digital content your business relies on to function. While this may not be something you worry about day to day, it's becoming ever more important in the new world of 'digital'. So what do you need to know in order to discuss storage requirements and investments with your IT team in an informed and objective manner? Let's start with a look at how the pursuit of business objectives creates data-related challenges that ultimately translate to storage system requirements:
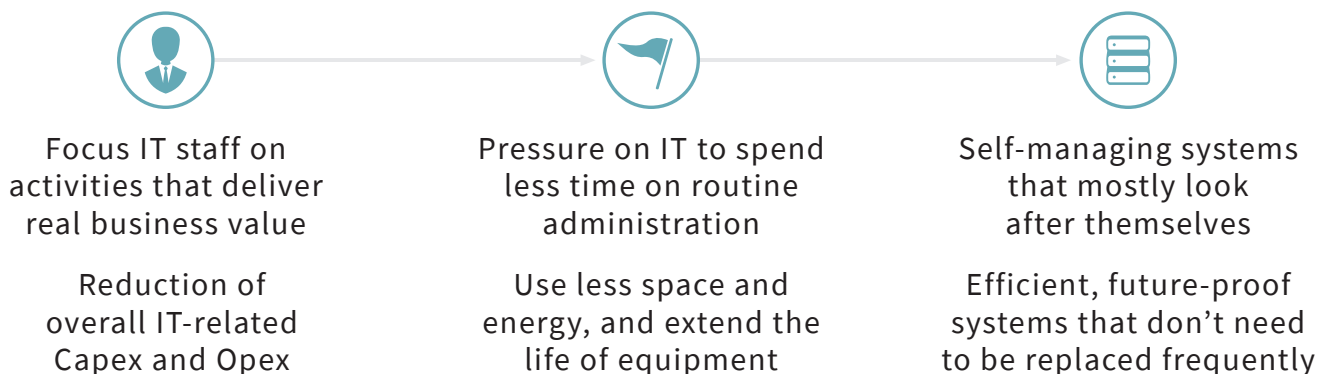
Supporting business growth and development

BUSINESS OBJECTIVES	CHALLENGE	STORAGE REQUIREMENT
Drive for customers, market share, revenue and profit	More users, more data, more business transactions	Expandable systems that scale smoothly and predictably
Transformation to digital business and modern working practices	Richer, more diverse and fast-flowing information, more working from home	Versatile systems that perform well, whatever you throw at them

Keeping the business running safely and securely

Assure continuous operation of the business	Ensuring critical data is always available when and where it's needed	Reliable systems that recover quickly from disasters, with no loss of business data
Protect brand reputation and assure regulatory compliance	Ensuring that data is only accessed by those authorized to do so	Secure systems that can encrypt and decrypt data on the fly without slowing down

Managing resources, costs and overheads effectively

Focus IT staff on activities that deliver real business value	Pressure on IT to spend less time on routine administration	Self-managing systems that mostly look after themselves
Reduction of overall IT-related Capex and Opex	Use less space and energy, and extend the life of equipment	Efficient, future-proof systems that don't need to be replaced frequently

Matching storage to your applications

Buying data storage can be a puzzle, and as new terms such as 'enterprise Flash' and 'NVMe' cross your desk, the potential for confusion grows bigger. It can be hard to filter out the hype and decide what's worth having.

High performance computing

Big data and analytics

Webservers, online shops

Email, collaboration and workflow

Everyday application workloads

File storage and management

Backups, disaster recovery etc

Long term storage, archiving, etc

Data is more dynamic…

Data is static or moves intermittently…

This list is illustrative only, and not a definitive ranking

At one level, it's simple technological progression: just as desktop PCs with spinning disks gave way to laptops with non-mechanical Flash drives, so your data center's old humming disk arrays can be replaced by All-Flash or NVMe arrays whose only moving part is a cooling fan in the power supply. There's even NVMe-oF (NVMe over Fabrics) which allows servers to access both arrays and each other's internal NVMe storage via the network.

The technology only tells part of the story, though. The real key? All data is not equal. Just as there is a continuum from the static backup files that we keep in case of a disaster to the fast-moving information that supports electronic collaboration and online commerce, there is a continuum in data storage too.

Our demands are changing as well. As we use digital technology to boost business speed and effectiveness, we load more applications and other tasks (workloads, in IT-speak) onto our systems. That demands far more performance from our frontline data storage. At the same time, new rules and regulations mean that we also need to pay more attention to how we store, manage and protect long-lasting information such as customer data, transaction records and employee documents.

So it is no longer the simple choice of disk or tape. Yes, there are still jobs that disk and tape can do well, but there are others where different members of the data storage continuum – perhaps NVMe-oF, All-Flash, public cloud archiving, or even S3-based private cloud storage on-site – will be more appropriate.

For cloud-based applications, pretty much the entire data storage continuum is also available running in the cloud. However, for applications that run on your own site, the inevitable network delays may well limit the use of cloud storage to the more static end of the data spectrum, unless the cloud is used in concert with on-site storage acting as a cloud gateway or staging post.

Tip: The choice of storage for a particular workload or data set is not permanent. Most mainstream storage arrays will support shared workloads very well, but new workloads will appear and old ones will evolve, and an allowance for future uncertainty is essential. So consider your data as a continuum, and plan for a storage infrastructure that can incorporate multiple classes of storage, is mostly self-managing, and which makes it easy both to add new workloads and to move old ones around.

Understanding your storage options

All-Flash is now the mainstream, the 'new normal' for front-line applications, but other storage types – in particular hybrid disk and NVMe – also have their place.

Build a workload profile

Every workload has its attributes, here we list some key ones to discuss with your IT team.

The aim is to connect the technical and practical needs of the business – get it wrong, and you either pay too much or suffer poor performance.

The workload's	Low			High
Strategic importance	1	2	3	4
Frequently shifting needs	1	2	3	4
Hunger for performance	1	2	3	4
Rate of data change or growth	1	2	3	4
Need for self-optimization	1	2	3	4

Note that a specific workload's overall 'score' is a guideline, not an absolute. Use it to help build understanding, explore options - including where to consolidate workloads - and align expectations.

Where cost and capacity matter: cloud, disk and tape

WORKLOAD PROFILE

Mostly 1s → Offline and nearline storage such as **cloud, tape and bulk disk** are cost-efficient choices for applications that have a large but relatively predictable need for storage space, and which do not require high performance or fast response times. Backups stored offline may also help you recover from threats such as ransomware.

Mostly 2s → **Hybrid disk arrays** and NAS (network-attached storage) servers combine cheaper spinning disks with fast Flash or NVMe. They can be a good balanced option for many business workloads, especially those which need medium to large volumes of cost-effective storage space, and in cases where their relatively high OpEx is not an issue.

The solid-state generation: enterprise Flash and NVMe

Mostly 3s → **All-Flash arrays** are ideal for applications and platforms that need storage that is not just fast, but consistently fast, whether that is business analytics software, a private cloud platform, or the database behind a webshop, where delays really can cost money. They cost more than disk, but can be cheaper to operate.

Mostly 4s → **End-to-end NVMe** is currently the fastest, most versatile and flexible option. It has the density and performance to easily handle multiple fast-changing workloads in parallel, enabling both consolidation and simplification. It carries a price premium, however, whether as NVMe arrays or networked NVMe-oF, but this is reducing with time.

Tip: In your next big storage investment, ask IT if end-to-end NVMe is part of the specification. If it is not, could that be a problem for future-proofing the infrastructure, or for the acquisition of skills and experience that will be needed to support innovation as NVMe arrays and NVMe-oF come into wider use? For more on this topic, read our introductory guide 'NVMe: a fresh start for storage'.

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