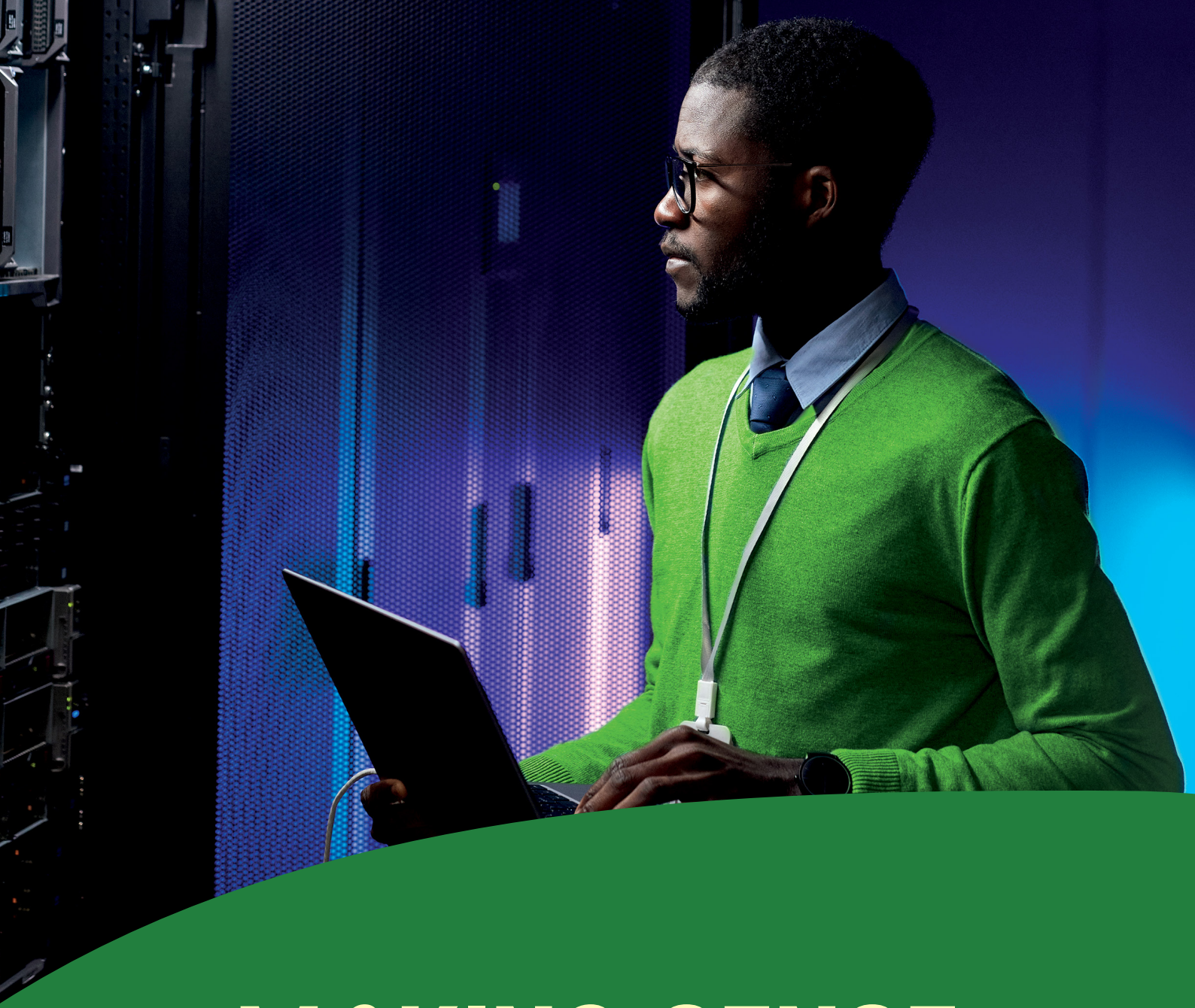


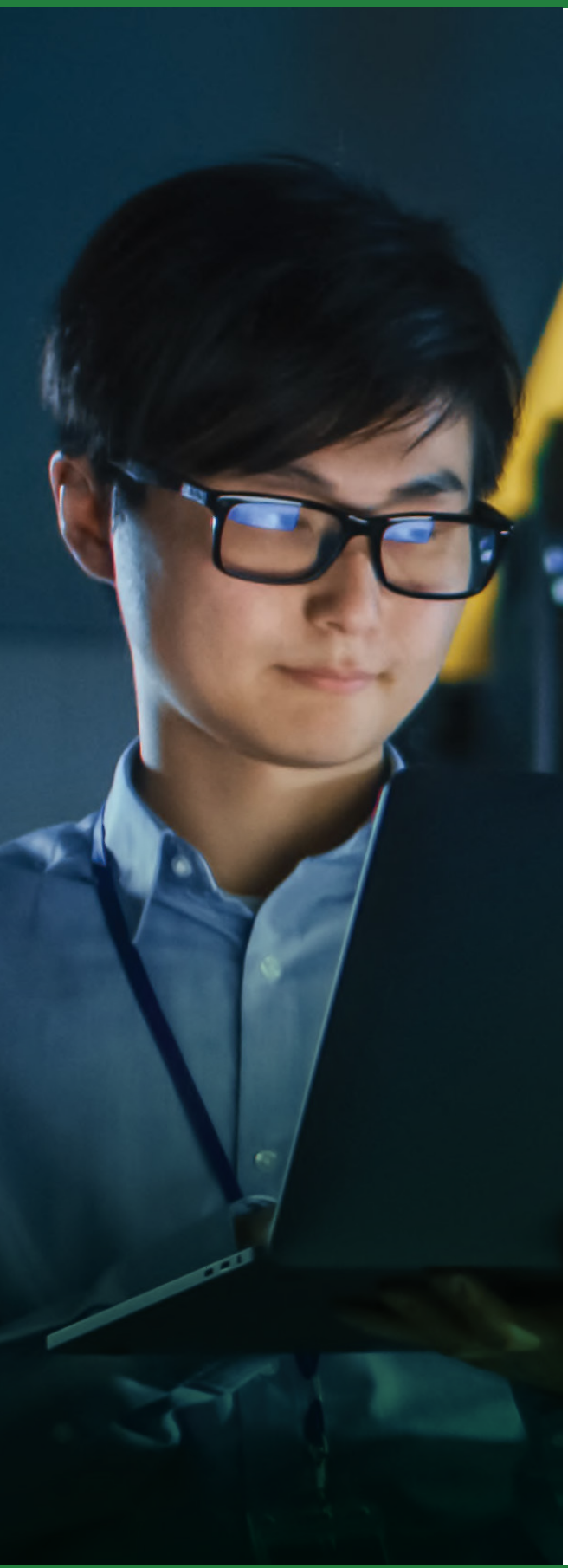
MAKING SENSE OF STORAGE

How to balance performance and cost to shape the ideal storage solution for your business.

NetApp

Aussie Broadband

THE ACTUAL AUSSIE WAY



Contents

Data is power.

Data, and access to it, is crucial to your business operations. We'd go so far as to say it's the lifeblood of your organisation.

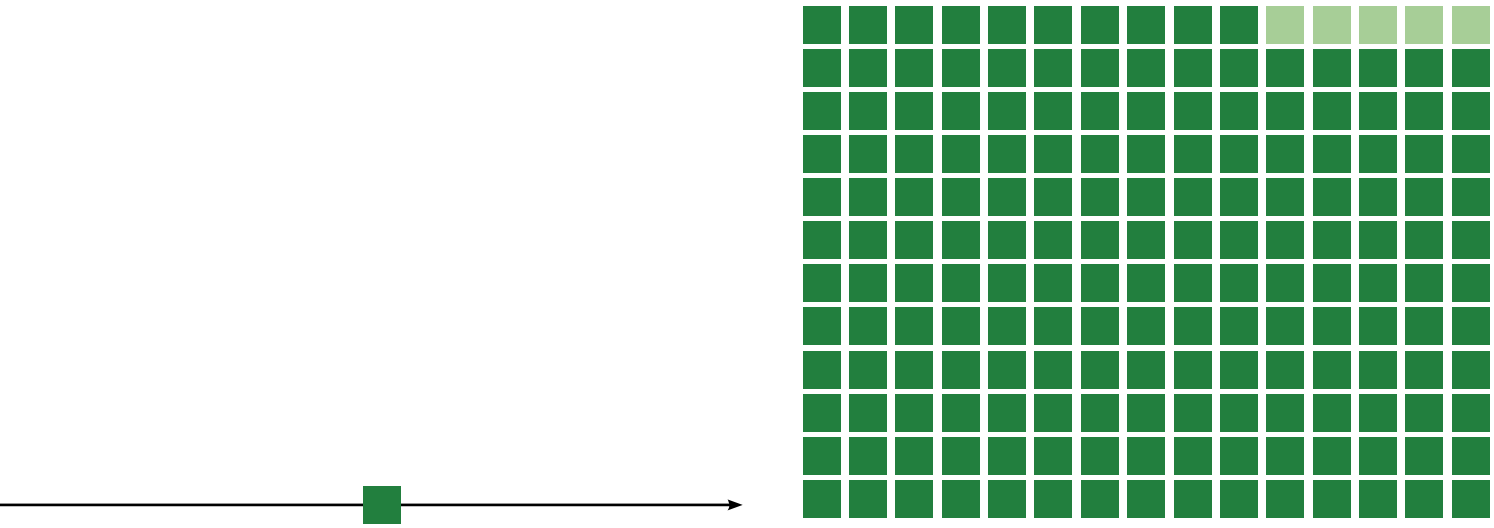
It underpins your infrastructure and directly impacts your ability to make timely decisions. Data powers the quality of your service, operational efficiency and performance of your applications.

The key to getting your data to where it's needed in your business is storage. Storage is the heart that pumps your data through your business.

An effective storage solution boosts the day-to-day performance of your business. Conversely, a poorly tailored solution will slow down your end users and negatively impact everything that it touches.

We've written this guide to help you avoid the usual pitfalls when choosing a storage solution and engineer the optimal set up for your business.

But first, let's talk zettabytes.



1 Zettabyte
2016

175 Zettabytes
2025

A fast-growing problem.

In 2016, it was estimated the world passed one zettabyte in total annual internet traffic and entered the Age of the Zettabyte.

A zettabyte is a measure of storage capacity which equals 10007 (or 1,000,000,000,000,000,000,000) bytes.That's a thousand exabytes, a billion terabytes or a trillion gigabytes.

More recently, market intelligence provider IDC predicted the global data-sphere would balloon to 175 zettabytes by 2025.

While all very interesting, what does that mean to you and your business?

Data growth presents challenges and opportunities for companies like yours. On one hand, the wealth of historical and real time data enables you to generate more astute insights and make better, faster decisions.

On the other hand, the growth of data comes with the challenges of finding adequate storage, accessing it efficiently and doing both at a price you can afford.

This makes your choice of data storage a critical business decision. Unfortunately, it's easy to offset profitability with spiralling storage costs, poor performance and underwhelming user and customer experience.

So, let's talk about what storage solutions are out there and the pros and cons of each.

A Guide To Storage Solutions.

What's hot and what's not.

The good news is you're not short of solutions to choose from.
The bad news is some of them haven't weathered the Age of the Zettabyte well.

Cloud and hybrid cloud 🔥🔥🔥🔥🔥

AT&T launched the first web-based storage service in the 1990s. By the early 2000s, cloud storage was officially a 'thing' as organisations including Amazon Web Services and Dropbox launched their own commercial services.

Cloud and hybrid cloud storage offer significant benefits including costs, scalability, mobility, accessibility and disaster recovery. The cons of cloud storage include spiralling costs if it's incorrectly configured and a dependency on a reliable high-speed internet connection.

NAS 🔥🔥

NAS (Network-attached Storage) is a file-level computer data storage server connected to a computer network. It's great for small business owners as it's simple to operate, cost-effective and offers secure data backup with remote access.

Some of the largest storage systems in the world are built on NAS however, it does have a few drawbacks. Effectiveness in a NAS environment is often limited to its resources and if the number of users requiring access increases, performance slows.

S3 and NFS 🔥🔥🔥

Beloved of application developers are S3 (Amazon Simple Storage Service) and NFS (Network File System), a file storage diehard. The pros of S3 include its scalability, reliability, affordability and documentation. It is more difficult to use for the inexperienced due to its online UI and complex security rules.

NFS enables you to view, store and update files on a remote computer as if they were locally stored. The solution is known for being relatively affordable and easy to use but security is a primary concern for users. It's recommended for use only on a trusted network behind a firewall.

CIFS

Introduced by Microsoft, CIFS (Common Internet File System) is the precursor to the SMB (Server Message Block) protocol that's been around for a couple of decades.

CIFS is now largely obsolete as newer SMB protocols have taken over. Sadly, given the number of enterprise applications still using it, SMB v1 is not expected to disappear from use altogether.

iSCSI

Another traditional storage architecture, iSCSI (Internet Small Computer Systems Interface), is a transport layer protocol that works on top of TCP (Transport Control Protocol).

iSCSI transports block-level data between an iSCSI initiator on a server and an iSCSI target on a storage device. In its favour, iSCSI is inexpensive to install and can be implemented by most IT resources.

However, limitations include security, as iSCSI is vulnerable to packet sniffing and configuring it requires some effort.

Fibre Channel

Fibre channel is used in traditional storage architecture and is well suited for shared network storage. It offers a reliable and scalable protocol and interface with high-throughput and low-latency.

The bad news is fibre channel networks can be complex and require specialised equipment such as switches, adapters and ports. Scaling up also comes at a high cost.

DAS

Direct attached storage (DAS) is digital storage directly connected to the system (i.e., a PC or a server) via a non-shared cable. On the positive side, it's simple to use and performs well.

Sadly, the storage capacity can't be expanded and data can only be accessed from the apps running in the individual server or desktop machine. There's also no network hardware or operating environment to allow for sharing storage resources independently.

What's changed?

Basically, you have.

As business processes and technology evolves, so do your expectations. That's why today's businesses expect that a modern storage solution will support a richer data experience with metadata and better descriptions of files. Effortless scaling combined with efficiency in accessing critical data is the priority.

How does your storage solution measure up?

First, how do you know your storage solution isn't delivering?

Let's start with the tell-tale signs that your storage solution is underperforming. You don't need to look much further than the user experience. Check out their feedback when applications time out or response times are painfully long.

If you're wondering what's considered optimal performance and what's too long, well, it hasn't changed for decades.

According to user experience world leaders Nielson Norman Group, 0.1 seconds is practically instant and optimal. If you're achieving this, well done! Even one second is still acceptable as it's unlikely most users will even notice.

But creep over the one-second mark into five, six or even ten seconds and you'll have a hoard of disengaged users who will typically leave the application entirely.

Effective storage solutions are largely judged by their ability to perform. Your applications require a certain level of throughput (i.e., transactions per second). They need to be able to manage those transactions within that time to deliver a seamless user experience. If there's no lag and no transaction queues, you've got it made.

But there's always more to it than that.

Performance is often seen as the most important element chiefly because modern applications require a certain level of throughput to run at optimal efficiency. After all, if an app struggles to receive the necessary level of performance, the flow-on effect impacts everything from productivity to end user experience.

However, prioritising performance over all other measures will have a huge impact on your budget. As will selecting the highest level of each listed criteria.

What are the key defining features of an effective storage solution?

The traditional measures for comparing and picking a storage solution usually boil down to:

- Performance
- Scalability
- Reliability
- Security
- Cost

What is the make-or-break criteria for choosing the right storage solution for your business?

To ensure you're balancing cost with functionality, you should shape your storage solution to look more like this:

Performance – Does it perform well enough? Will your users notice a reduction in performance?

Scalability – Is it scalable enough? Can you scale out your capacity needs as required? Or is scale up important to you?

Reliability – Is it reliable enough? If a controller or disk fails, will your storage still be available?

Security – Is it secure enough? How can you control who has access to your data?

Cost – Is it affordable?

Let's talk about scalability.

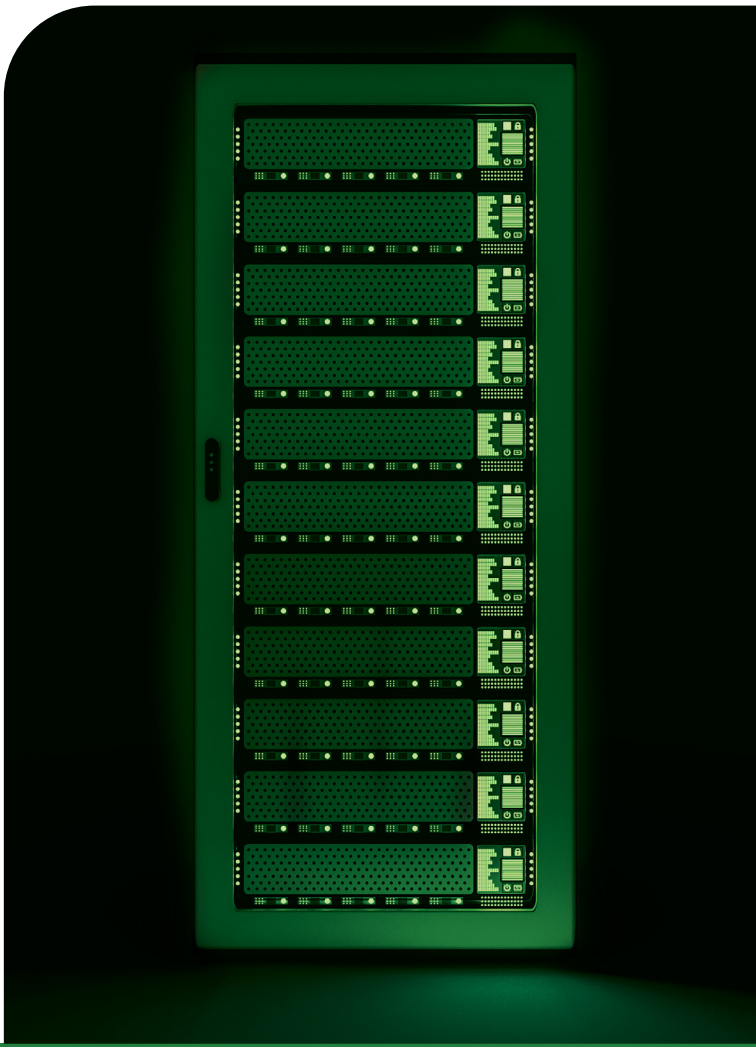
Solution performance and capacity both need to be able to scale as you grow. To understand what's going to work for you, you need to compile a list of the applications your business uses and understand the performance demands of those applications.

IOPS (input/output operations per second) is a common unit of measurement for storage system performance however, relying on it as your sole criteria is a common misstep.

There's a range of performance dimensions that need to be considered including throughput, bandwidth, latency and response time. You also need to factor in the size of your IO and the mix of read/write workloads.

You also need to estimate your expected capacity and growth rate into the medium to long-term and ask your vendor about their capability to manage this growth. Better still, ask them if they have a test environment so you can see the capacity for yourself.

Also, see if the vendor has any options for how you can consolidate or reduce the amount of storage you require.



What really matters when choosing a storage solution?

While storage solutions can be complex, your business objective should be simple.

You need a storage solution that prioritises the performance of the apps and processes that are most critical to making or saving you money.

Think of your data as products in a warehouse. The high-value and high-volume items that fly off the shelves should be on the priority position shelves where they can be accessed and processed quickly and easily. Whereas less-popular items, the ones you pick and pack once a year, can go on the hard-to-reach shelves in the dustiest corners.

This brings us to tiered storage and why it's important to your business objectives.

Tiered storage is a system for assigning data to various types of storage media based on requirements including cost, availability, performance and recovery.

Your commercial goal should be to link your highest-priority data to the highest-performing storage tier. Conversely, your lowest-priority data needs to link to the lowest-performing, and least expensive, storage tier.

In order to construct an effective tiering system, you'll need to first understand what data is important to your business. This may not be as clear cut as you think. Different disciplines within your business will have different data priorities. The best way to determine how your tiering system should be constructed is to use the make money/save money criteria.

Your commercial goal should be to link your highest-priority data to the highest-performing storage tier.

How do you get more value out of your storage solution investment?

Too often, storage is simply thought of as another IT solution. However, to get the most out of your investment, your storage needs to have the functionality that supports specific drivers to your P&L.

There are three steps to achieve this goal.

1. Identify your critical business functions

This step requires you to establish what the business wants and needs to do to lift its performance.

To do this, you need to understand:

- The key functions that make and save money in your business.
- What functions are most important to improving the customer experience?
    - For example, is it decreasing the time required for a specific reporting run?

Finally, establish which business stakeholders you should involve in the conversation.
We suggest:

- Your application owners - They are best positioned to provide feedback on performance requirements.
- Your virtual environment managers (capacity managers) - They can help you understand the medium to long term capacity requirements.

2. Identify the lag

If you don't know where your application performance is struggling, you won't know where to start.

So, it's critical to establish the answer to the 'where' question and then understand if slow performance matters across the board.

Some of your processes may not be priorities. For example, a non-business critical reporting run won't need a speed increase.

Next...
Determine your performance tiering

3. Determine your performance tiering

Lastly, decide which of your applications and functions need the highest performance and categorise them.

To achieve a good economic fit, the most critical make money/ save money functions should align with high-performance solutions. Files and apps that don't require high-performance storage, like file servers, get assigned to low-performance storage. Assigning everything to high-performance may sound good but the reality is it simply adds unnecessary expense.

Using caching mechanisms to store data so future requests can be served more quickly is another excellent way to control costs and should be implemented wherever possible.

The final consideration is capacity. Carry out an initial analysis and prepare a projection of your expected change to capacity requirements in the medium to long term. It is difficult to achieve 100% accuracy in your forecast, so look for a vendor who can tailor an economical capacity solution that includes some leeway for growth.

Assigning everything to high-performance may sound good but the reality is that it simply adds unnecessary expense.

What do most businesses overlook?

Growth

Many businesses overlook growth. New apps get added to storage solutions but performance management is often overlooked. Storage may struggle to handle the new demand and exhibit a range of performance problems.

Performance

Are your existing apps in the right place based on the make money/save money equation? For example, should an existing app be moved to a higher performance storage tier? Or turned into a cloud-based app?

Proper capacity management

Few businesses have a contingency plan for running out of storage. Often, it's not until capacity runs out that the idea of management is contemplated. The reactive nature of capacity management usually leads to a poor decision based on urgency.

Solution management

Businesses often focus on using the upfront cost as the defining metric for purchasing decisions. Weighing up the cost of on-premises storage versus consuming it as-a-Service is not always as simple as taking the upfront cost and converting it to a monthly amount.

For example, a service provider might offer a storage solution at $1 per gigabyte with a 100TB minimum commitment and various performance levels.

On-premises costs that aren't associated directly with the storage solution are frequently overlooked. These include real estate (data centre) costs, cooling and power.

There are usually support contracts associated with storage appliances, software costs depending on functionality and staffing costs to support the environment.

Depending on these costs, you may find your storage platform is costing you the same price per gigabyte as the service provider is offering.

Which storage model suits your business needs?

First, the big question: Is there a best all-purpose set-up for storage?

Yes, there is. The best all-purpose set-up is one that has efficient storage tiering and gives you the ability and flexibility to move your apps between the tiers.

The set up for this all-purpose storage can roughly be broken down to:

1. A small amount of extremely high-performing storage for your critical make money/save money apps and processes.

Note: This is the most expensive component of your storage investment, making it vital that you carefully prioritise the apps and processes assigned to it.

2. A deep-storage component that's used for non-critical apps and workflows.
3. A majority allotment of medium-performance storage that keeps your end-user experience efficient.
4. Archival storage with relatively slow access for non-critical data retained for business compliance.

Next...
What's the best set-up for companies with high data or high compute requirements?

What's the best set-up for companies with high data or high compute requirements?

Cloud storage that's located close to the end user offers the best combination of price, scalability and performance. Closer proximity offsets the speed problems that come with large geographic separations between the two end points.

While the scalability component is expensive, the requirements of high compute businesses still make it a winning option.

However, if you're looking to offset the cost versus performance and scalability, hybrid cloud options offer an excellent middle ground.

Best of all, cloud scales efficiently and on-demand. This is critical given the potentially disastrous outcomes of running out of capacity in a high compute environment. This includes the impact on your make money/save money equation, customer experience and the risk of irreparable damage to your brand.

Lastly, cloud also provides fast access to temporary data.

What's the best set-up for companies with low data or low compute requirements?

The most straightforward and efficient set-up is usually a managed service offering with a pre-defined capacity. However, capacity levels are primarily dependent on the growth rate in your business.

For low-data/low-compute businesses, lifecycle management is usually the biggest risk and most significant cost area. Maintenance on lifecycle management is rarely performed properly in Australia. It often requires something to break before it will be looked at and by the time a failure occurs, it's already too late.

Need help with your data storage?

Aussie Broadband can help boost your performance and keep your processes ticking over with our storage solution.

Our fully managed storage environment delivers the performance, capacity and workload you need to access and retain your data effectively.

Keep your team connected no matter where they're working and skip the hidden charges for accessing your own data.

Grow your business through the power of the cloud.

At Aussie Broadband, we focus on helping our customers reach their commercial goals by harnessing the power of the cloud.

Our leading edge technology is supported by a highly skilled local team who deliver support and services that are aligned to the growth of your business.

Our cloud solutions help your business reduce risk, reduce cost and boost productivity through increased agility, seamless scalability and robust security.

Conclusion

With the volume of data that every business generates growing exponentially, it's critical to find a storage solution which provides efficient access at a price you can afford.

If you're already experiencing negative user feedback due to poor performance, it's probably just the tip of the iceberg. The issues of scalability, reliability, security and cost won't be far behind.

Understanding what an optimised storage solution looks like, and how to get there, is foundational to improvement. As is an experienced partner who can bring the knowledge and expertise needed to turn your challenges into achievable goals.

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