HYBRID STORAGE INFRASTRUCTURE
A BEST PRACTICE GUIDE TO IT

BIG DATA REQUIRES BETTER DATA MANAGEMENT AND SECURITY

Technology and connectivity have changed the way we do business. IT is not the exclusive domain of high-tech industries or multinational, enterprise-class organisations. It is the essence of what enables even the most basic of one-to-one business processes.

The emergence of big data applications and the Internet-of-Things has seen an exponential increase in the volume and variety of data generated every day. Billions of connected devices are generating zetabytes of data every year.

This data needs to be efficiently generated, collated, transmitted, stored and analysed if organisations are to make the most of the potential insights to be gained.

In a big data world, data management and security have become a priority for IT professionals. The sensitive nature of some of the data sets transmitted as a part of day to day operations for many organisations make them attractive targets for cyber criminals. Even an "innocent" loss of data because of user or systems error can have a significant impact.

Big data often represents a challenge for in-house IT departments. The sheer volume of data generated in most businesses puts pressure on storage volumes; particularly if your primary storage site is within an on-premises data centre with a finite physical or virtual resource.

Even if you've moved elements of your infrastructure to the Cloud, there are challenges to effective data management. Many organisations use Cloud storage, back-up and recovery services as a first step to developing a hybrid Cloud infrastructure, but Cloud storage and data management is still an emerging field and some risk-averse organisations are still reluctant to embrace the Cloud fully.

DATA STORAGE AND SECURITY

As organisations leverage technology as a part of their business transformation strategy, maintaining legacy approaches to data management and security can cause problems. Scaling an on-premises infrastructure rapidly to meet growing demand could result in unnecessary cost and complexity.

In a traditional model, data would first be backed up to disk, then to tape. These tapes would be stored offsite as a part of the business continuity or disaster recovery strategy, but the recovery time for data stored offsite would result in significant business disruption.

Even if primary data storage is replicated from one data centre to another (geographically remote) data centre, the benefits of availability can be offset by the increase in capital investment and the costs associated with maintaining redundancy.

This model is not sustainable in a big data environment. Replication creates complexity and increases management overhead. Physical tape backup takes time and exposes your essential business data to unnecessary risk.

Where data is the currency of business, any systems downtime can prove costly. In its 2016 Cost of Data Centre Downtime report, the Ponemon Institute found that the average cost of downtime was £7,000 ($9,000) per minute.

Add to this the continued threat landscape for data loss or theft and it's easy to see why organisations need to rethink their approach to data storage and security.

Since it started its global breach level index in 2013, Gemalto (the world's largest data protection company) has recorded over 5.9 billion lost or stolen records – that's the equivalent of more than 160,000 records per hour.

Where the network itself is vulnerable, encryption can provide a valuable, last line of defence against unauthorised access to your data. Despite the high-profile discussions concerning data encryption over the past five years, only 4% of these breaches were "secure" – where the records in question were encrypted.

A HYBRID STORAGE MODEL

According to ESG, improving back-up and recovery and managing the exponential growth of data are two of the biggest priorities for IT in the coming year (out-ranked only by data security concerns).

A new data landscape requires a new approach to data management. Organisations may be tempted into treating all data the same, but this would be a mistake. Not all data is of a sensitive nature, nor is it essential to day-to-day operations.

The nature of the data itself will impact on several elements of your infrastructure – from the degree of security required to the recovery time objective, from the physical location of the storage arrays to the duration of data storage.

Server downtime tolerances continue to shorten. According to ESG, more than half of all servers have a downtime tolerance of less than 1 hour, with over a third having a tolerance of less than 15 minutes.

Given this emphasis on 99.999% availability and near-instant recovery, IT has adopted agility and availability as the new standard.

A comprehensive approach to data storage and management requires that an organisation looks beyond a simple back-up and recovery solution. A robust solution will compliment back-up with snapshotting, replication and high-availability technologies.

High Availability	Archiving	Backups	Disaster Recovery	Snapshots	Replication	Business Continuity

At its heart, a data storage and management strategy blends the core principles of back-up, snapshot and replication. These technologies feature subtle differences, but work in partnership to deliver a robust strategy.

- Back-up – partial or complete copies of data that sits outside the production stack. This data provides "restore points" from any point in time and is typically held within a high-capacity storage environment.

- Snapshot – incremental "copies" of data from within the production stack that provide near-instant access to a recent point in time

- Replication – an immediate copy of the current working environment, held at a geographically remote location for disaster recovery purposes.
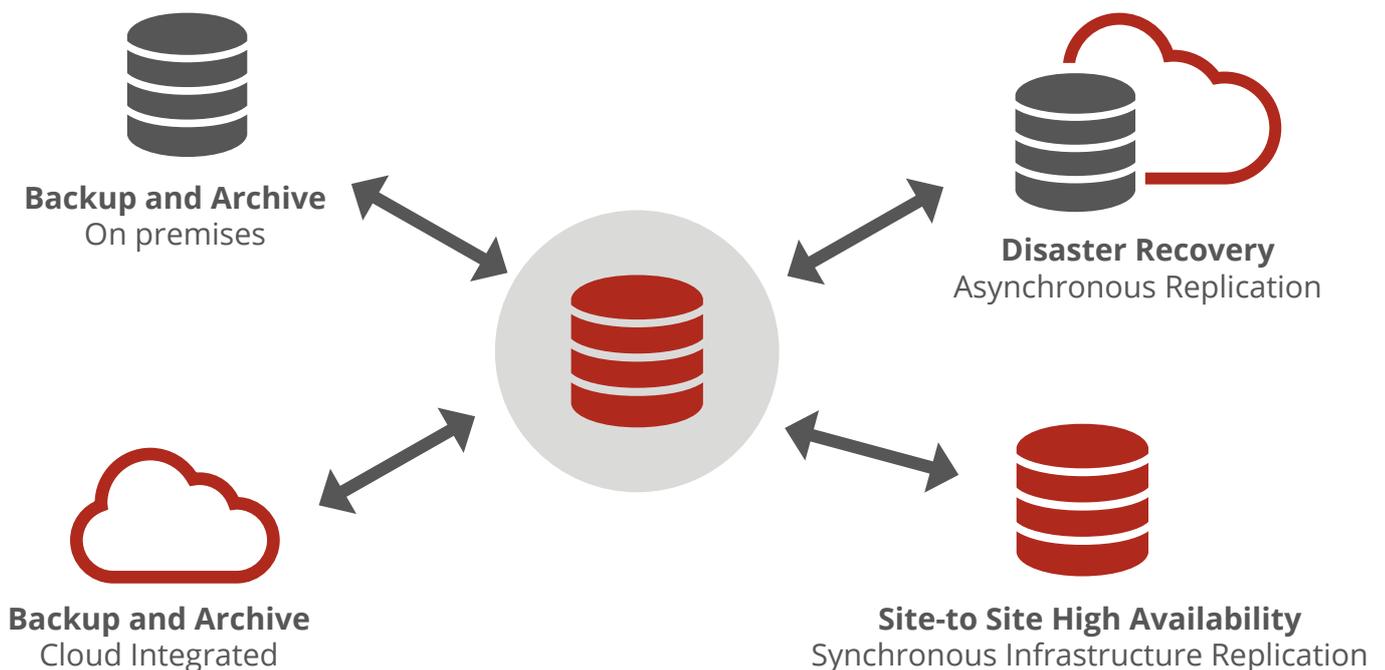
STORAGE TECHNOLOGIES

As Cloud services become an integral part of many organisations' infrastructure, IT departments are presented with a wider range of options when it comes to data management. The key to success is choosing the solution that offers the right balance of availability, security and cost efficiency.

Back-up, snapshotting and replication work in partnership to provide a comprehensive data management strategy; balancing the needs of short and long-term data availability. Leveraging manual snapshots and replicas to resume operations will help organisations to meet the resilience and availability objectives that back-up alone cannot.

For servers with the shortest downtime tolerance (under 15 minutes), organisations need to look to proactive data management technologies such as synchronous replication, with zero data loss and downtime.

For servers with modest tolerances (one or two hours), standard snapshotting and replication provide the ideal solution. For non-essential services, with tolerances of over two hours, a traditional back-up solution provides a cost-effective option.

The following approach is based on the NetApp data protection model and features hybrid elements of on-premises and Cloud-based storage.

Backup and Archive
On premises

Disaster Recovery
Asynchronous Replication

Backup and Archive
Cloud Integrated

Site-to Site High Availability
Synchronous Infrastructure Replication

CLOUD-BASED BACK-UP AND RECOVERY-AS-A-SERVICE

Back-up and disaster recovery as-a-Service is frequently the gateway to a full hybrid infrastructure. The inherent flexibility, scalability and cost-efficiency of Cloud storage solutions make them the obvious choice for organisations experiencing data growth, or those looking to add resilience to their infrastructure.

KEY BENEFITS

RESILIENCE – All the resilience of geographically remote data centres with automatic failover and redundancy; ensuring your data is always available.

FLEXIBILITY – Scale your back-up and storage requirements quickly and easily to reflect changing demand.

COST EFFICIENCY – Hardware and services available on a monthly subscription basis; eliminating the need for capital investment.

SECURITY – End-to-end security includes low-latency encryption of data both at rest and in motion, providing compliant data protection.

PERFORMANCE – Best-in-class hardware and software components deliver rapid back-up and recovery times, in accordance with industry-leading SLAs.

ON-PREMISES BACK-UP AND ARCHIVING

Local storage and recovery of business-critical data is frequently more expensive and takes longer to deploy than a Cloud solution.

However, on-premises solutions also offer faster recovery times and are ideally suited to the storage of sensitive data that is governed by compliance obligations.

Where data must be kept locally, to meet statutory or regulatory compliance, on-premises solutions may be the only answer. They also offer a greater degree of control and security of your data.

DISASTER RECOVERY

Asynchronous replication or "mirroring" provides essential disaster recovery (DR) operations from a second, remote location. It eliminates a single point of failure within the infrastructure and enables organisations to recover data quickly in the event of a service-affecting incident. Although it is more expensive than Cloud or on-premises back-up options, it offers a robust DR solution.

HIGH AVAILABILITY

Synchronous replication is ideal for mission critical data where zero data loss and near-instant recovery are essential to maintaining business operations. Synchronous replication offers the benefits of security and compliance but comes at a cost, due to the additional hardware and networking required.

CHOOSING THE RIGHT SOLUTION

When it comes to choosing the right storage solution for your organisation, look to your data to make the decision for you. Different types of data will be better suited to different storage solutions. As with many aspects of modern infrastructure, a hybrid approach will offer the best combination of price and availability.

Here are some key considerations when you're scoping your ideal storage solution:

1. Analyse your data and work flows from a holistic perspective.

2. Determine what an acceptable recovery time objective (RTO) and recovery point objective (RPO) looks like.

3. Understand the impact of downtime on your organisation.

4. Not all data is the same. Establish what data you can't live without and what you can.

5. Provide instant access to those assets that are essential to business continuity and look for more cost-effective solutions where non-essential data is concerned.

It's important to consider storage management from the outset. Building a hybrid solution that addresses all your data requirements is not going to add the value it could if it proves to be difficult to monitor and manage.

If you have a legacy infrastructure in place, make sure your new solution allows you to make the most of your existing investment. Adding Cloud back-up and storage to an existing on-premises estate can provide instant scalability and agility, but it will need to work seamlessly with your current infrastructure and be transparent to the end user.

CLOUD INTEGRATION

Cloud technologies have revolutionised the way organisations store and manage business-critical data. The inherent scalability, flexibility, availability and security of modern Cloud services, combined with the low-cost utility model, make them an essential component of any storage strategy. The question is, which Cloud? Private, Public or Hybrid?

Whichever deployment model works best for you, any discussion about improving availability and agility needs to include a Cloud strategy. According to ESG research, almost half of all organisations adopting Cloud infrastructure do so for back-up and disaster recovery purposes.

HYBRID USE-CASE

An organisation manages an on-premises community storage environment that supports several big data applications. On-premises computing is an essential component of the IT estate, but this does not necessarily provide the required levels of security and continuity.

KEY CHALLENGES

· Expensive, inflexible legacy storage solution

· Accelerated adoption of new big data applications

· Unnecessary risk associated with on-premises storage

· Lack of DR as a part of business continuity

KEY REQUIREMENTS

· Maximise financial returns on legacy investment in on-premises storage

· Add hybrid flexibility and scalability via Cloud storage to cater for big data applications

· Add resilience to minimise risk of data loss

· Ensure business continuity with cost-effective back-up facility

A HYBRID SOLUTION

The ideal solution comprises two storage arrays, one located on-premises to deliver the high-performance computing required, the second located remotely in the Cloud.

On-premises storage utilises a hybrid array of SSD disks and SATA disks to provide rapid server access and cost-effective storage.

The second array, hosted with a Cloud service provider, is used as an archive and utilises cost-effective capacity disks.

SOLUTION SUMMARY

· Full back-up of all volumes from the primary site

· Asynchronous snapshot copies of data to enable granular, per volume, retention policies

· Policies applied to local storage for LAN speed recovery and off-site for long-term retention

· All volumes and associated recovery points connected back to the primary site within seconds

KEY CONSIDERATIONS WHEN PLANNING YOUR DATA STRATEGY

There was a time when data would be an afterthought when it came to infrastructure planning, with the emphasis placed on the plumbing, not the essential utility travelling through it.

As we have seen IT transform from a provisioner of hardware to a service-led organisation, access to business-critical data and applications has become the only KPI that matters.

When it comes to planning your future data storage and management strategy, make sure you take a holistic view of your data and consider these key factors:

ESTABLISH CLEAR SLAS FOR YOUR DATA

Different data requires different service levels. Adopting an "everything now" approach to data is not cost effective and defaulting to a one hour recovery window is going to have a significant impact on your organisation's ability to function properly in the event of a service-affecting incident. Conduct an audit to segment data by what is mission critical and less essential. Build SLA's around the criticality of the data.

DEVELOP A COMPREHENSIVE STRATEGY

Effective data management requires more than just back-up. Snapshotting, replication and proactive, high-availability technologies are required if you are to provide the agile environment that a connected, big data world demands.

FOCUS ON AVAILABILITY

Whatever combination of back-up, snapshot or replication, Cloud or on-premises technologies you deploy; they will support services with varying downtime tolerances. As RPO and RTO objectives get shorter, your infrastructure needs to focus on one goal – ensuring availability.

A robust back-up solution is the foundation of any data management strategy, but most organisations now realise that back-up alone is not going to provide the resilience and agility necessary to compete in a digital economy.

Best practice means incorporating proactivity, snapshotting and replication to guarantee availability. Data should be placed at the core of your organisation and treated holistically, not seen as an afterthought or as an excuse to create inefficient silos within your infrastructure.

AVAILABLE FROM ONI:

- Managed Services & Support

- Hosting & Colocation

- Networking & Connectivity

- Back-Up & Disaster Recovery

- Cybersecurity Solutions

- Contact Centre Solutions

- Mobility & Collaboration

- Unified Communications