Future-proof Your Digital Assets or get Left Behind

The 'Digital Age'
Whether it's building a relationship, maintaining compliance, enhancing productivity or tracking the success of an enterprise, today's society has come to rely on digital systems and applications for just about every activity. Whilst this move to the digital age has been well adopted, it has not been optimised to its highest potential.

Inherent in our understanding of technology is its ability to move us forward, creating new digital materials. But, what happens to the digital information that we leave behind?

The answer is simple. Digital assets that are not preserved will be unusable in the future. This has, thus, become a dilemma for today's generation to protect information for future generations.

As long as technology continues to advance, digital preservation will be a challenge and present new obstacles with the introduction of new technological tools.

Organisations Playing a Key Role
For organisations, preserving digital material is now a business-critical task, especially for those who must adhere to strict regulatory requirements, such as life science companies. Across all industries, sectors and disciplines, organisations are creating both paper-based and digital assets on a daily basis. However, with the birth of the digital age, many organisations are finding it beneficial to move towards digital materials to reduce their environmental footprint and increase visibility of content. As a result, much of today's information is now 'born digitally', which includes emails, word processed documents, websites, etc. Yet, it is a misconception that information 'born digital' will guarantee both short-term and long-term visibility of that information without proper preservation measures in place.

Additionally, paper-based records are best kept preserved as digital files, as this not only allows for future accessibility and use in the future but also mitigates the risk of degradation and loss. For the preservation of these paper-based records to take place, they must first be digitalised. The National Archives defines digitalisation as, 'the creation of digital copies of records that originated in traditional physical formats, such as paper, parchment, photographs, film and, sound and video.'

This raises the need to address the difference between storage and preservation, as they are not one and the same. Storage alone is not a viable solution for using digital assets in the future and does not translate to digital preservation, as specific, ongoing management needs to be done to ensure digital records remain visible over time.

As we move further into the digital age, we tend to be overconfident in the internet's ability to meet our every need, yet it's important to realise its limitations, especially when it comes to protecting the integrity of digital information. According to The National Archives, 'It is important to note that uploading digital or digitalised assets to the internet alone does not preserve them.' This, in turn, requires organisations and institutions, alike, to look beyond short-term storage solutions and look elsewhere for their long-term preservation needs.

It's a bigger question than how can data be preserved; rather, it's important to consider how the data can be accessed and used in the future. Anyone interested in using digital materials in the future, has stake in the game of digital preservation.

Challenges Organisations Face
The amount of assets is growing in volume and with decades' worth of data stacking up, organisations are seeing increases in storage costs, rising fees for data licences and their environmental footprint surging. And, ever pressing is the introduction of more stringent legal and regulatory requirements that dictate how businesses store, protect, delete and preserve their documents.

The need and associated challenges to preserve digital materials span across countless industry sectors. For government officials, authenticity of digital information must be maintained. For academics, it is important to ensure works cited are unaltered over time. For life science practitioners, it is vital that accurate records are kept and accessible for compliance purposes. For pharmaceutical companies, in particular, it is imperative that documents are kept secure to ensure patient safety and meet regulatory standards. Additionally, it may be beneficial for many businesses to also delete some records once they are permitted to do so.

And, whilst technology advancements are providing a means necessary to preserve data, it's also presenting its share of challenges, as applications are rendered outdated by their new and improved versions. This, in turn, threatens the usability of digital information for the future. Although the application may be at the end of its life cycle, the associated data within the application may need to be retained. Systems are quickly becoming obsolete and unsupported by vendors, and document formats become incompatible with newer versions of software, both of which risk the integrity of digital information becoming compromised (readability and traceability required for regulatory demands) or lost entirely. In fact, experts estimate that by 2020, 50 per cent of all current applications in the data centre will be retired.

Media degradation presents another major challenge for businesses looking to hold on to digital materials. Media on which electronic records are stored is inherently unstable, which can allow the data to deteriorate quickly even though it may not appear as damaged. Yet, this can be solved by choosing the right archiving methods and considering the length of time for which specific data needs to be retained.

Even so, the biggest preservation challenge organisations face today are the increasing rates of mergers and acquisitions. With these business deals, come the transfer of both knowledge and files, and with a digital preservation method in place, these items can be positively transferred without the loss of key data. In cases where a digital preservation strategy is absent, those organisations may find difficulty in gathering all information necessary to operate at its highest potential.

Facing the Challenges Head On

Rarely are data archiving needs simple, rather many organisations' archiving requirements are complex in nature, as their data comes from numerous sources and databases. For example, life science organisations require intuitive systems that can manage complex data, important for ensuring compliance and safety. Disjointed systems, along with do-it-yourself approaches result in high-cost, high-risk methods of archiving, which will be rendered completely unsustainable in the long-term.

Take control by minimising compliance risk, optimising operational efficiency and reducing unnecessary cost by following a set of best practices in choosing a digital preservation solution.

First and foremost, it is important for organisations to ensure the entity's policies and procedures are fit for the digital age, as many are still stuck in the paper age and policies reflect that as such.

The Data Preservation Coalition (DPC) highlights the key decisions that must be considered when searching for a data preservation tool: Open-source vs. commercial software, an enterprise or micro approach and workflow alignment to the current organisational structure.

Those organisations with relatively easy access to developers should consider adopting an industry standard method, such as an Open Archival Information System (OAIS), which will provide a route to proven conversion paths and accepted terminology. The term OAIS also refers to the ISO OAIS Reference Model for an OAIS, which includes a set of responsibilities that an OAIS must follow, which standardises the actions relating to long-term archiving.

Although this reference model is recommended by a consultative committee dealing with space agencies, the OAIS model it has developed has proved useful to a wide variety of other organisations with digital archiving needs. In fact, it now serves as the standard model for digital preservation systems at prominent institutions and organisations, such as the National Archives and Records Administration, Library of Congress, and British Library, among others. Specifically, the OAIS method carries out six functions which help to maintain data integrity and accessibility over the long-term. These functions include ingesting and packaging information for storage, migrating and assigning information to long-term storage, managing data and query requests on regular basis, ensuring compliance and ongoing development of policies and standards, evaluating risk and determining need to update or migrate and lastly, managing the access function to allow users to retrieve information from the archive.

However, those organisations who prefer 'off the shelf' solutions that tend to come with additional support, should consider a commercial software provider. Yet, during the evaluation process, many find that both open-source and commercial software tend to influence and inform each other's solutions. And, as a result, several solutions exist as hybrids between an open-source, off-the-shelf solution.

In the case of deciding between an enterprise or micro solution, enterprise solutions tend to integrate individual applications into one consolidated interface, which can result in rapid progress and allow for immediate learnings and consequently, adjustments to be made. A micro solution is best suited for those organisations that prefer to have more control over the deployment of software, which can take longer to stand up, yet presents the opportunity for a more sustainable solution over time.

Additionally, it is important to understand the associated workflows that come with the chosen method of preservation, as organisational bottlenecks can result in barriers for achieving the desired goals and objectives in preserving the company's digital assets. It is important to understand that an organisation's requirements, workflows and overall needs will likely change over time, so it is vital that the preservation solution provider be evaluated on an ongoing basis to determine if the solution still benefits the organisation at its current state.

When evaluating data preservation solution providers, whether they utilise a cloud-based approach or otherwise, it is important to determine the providers' reliability and durability. If not properly evaluated, this could result in data loss and the inability to recover digital materials.

The Act of Preservation

Once a digital preservation provider is chosen, what is it, exactly, that they do with your assets?

First, existing systems generating records need to be individually evaluated to determine the specific archive requirements and the process for best archiving this content.

Next, metadata is identified and confirmed between the original data source provider and the archivist. Verification of a successful data transfer is then completed and, in some cases which prove to be more complex, the rigorous process of data sampling may be required.

The storage of electronic records must be archived in such a way that ensures reliability, authenticity, integrity and usability at all times. According to the Scientific Archivists Group, an electronic archiving process 'must demonstrate that the system(s) and procedures followed ensure

the usability, reliability, integrity, authenticity and accuracy of the data produced and that the systems being used are secure and protect the records from loss or uncontrolled alteration throughout the life of the record.' These responsibilities are ongoing and are typically maintained by a member of IT staff or a third party. Policies and procedures are built around the data management and access.

A record retention schedule must be implemented to understand which specific pieces of data need to be stored for a specified amount of time based on the business, regulatory and legislative requirements, which can be done by a classification scheme established by the organisation. If and when a record is expected to be destroyed, it is important to retain a record of destruction as a means to provide evidence of compliance and various regulations.

Access to archived materials must be defined and can be further controlled through the use of access levels that come with various levels of restriction. Any authorised alteration to data must be documented.

Data Preservation Roles

The challenges associated with digital preservation span across an organisation with buy-in required on a cultural, managerial and resource level. In order for digital assets to be successfully preserved, appropriate roles must be assigned to ensure the digital preservation strategy is carried out on an ongoing basis. Whilst many preservation providers can automate certain processes and help drive efficiencies, there is a level of management required to maintain an effective preservation strategy.

Whilst digital preservation suggests there's much to be done once a digital asset is used and requires storage, a vital role also exists in the preservation cycle beginning with the creator of the digital content itself. The ease of preserving specific digital assets is directly linked to the manner in which the digital asset was originally created. Organisations can implement procedures around how best to create digital assets and appoint a member of staff to oversee the adherence to the policy. For life science organisations, in particular, appointing diligent, detail-oriented people is key to ensuring procedure adherence and protection of digital assets.

Equally important is the archivist, who is responsible for regular maintenance of the preservation system, assessing fitness of the current system, readability of data, destruction of data and managing access controls. It is important that records are protected by access controls and audit trails, as any permitted alterations to data prior to archiving must be traceable. In many cases, it's important to not only store the altered, most up-to-date version of a record, but to also store the original record.

Don't Wait, Act Now

Born digital or digitalised, digital materials sit at the centre of our day-to-day operations. Preserving these digital assets, according to the DPC, 'protects investment, captures potential and transmits opportunities to future generations and our own.'

For those in the pharmaceutical sector, the need and urgency for data preservation is all the greater. A strategy to protect digital materials within these firms is vital as the aim to adhere to strict regulatory guidelines, whilst ensuring patient safety is paramount.

So, don't wait for more assets to pile up, put a digital preservation strategy in place today and safeguard precious material for the future.

Ben Saxton

Ben heads up the commercial side of Formpipe Life Science with over 15 years' experience working in delivering software solutions. His key role is ensuring that products and services are correctly communicated to our clients and prospects. Within accounts, Ben most enjoys delivering solutions that have a positive financial impact and on encouraging a progressive business culture during periods of change. Away from work, Ben is married with two young daughters and in the small amount of free time he has runs trail marathons and has the discomfort of being a Sheffield Wednesday supporter.