

# Archival Storage Trends and Challenges

by Steve Tongish, Director of Marketing (EMEA), Plasmon

Businesses and government organizations are now beginning to recognize the importance of a secure long-term archival storage strategy for their valuable business information. While industries such as insurance record management and medical imaging have a long history of electronic archival storage, others are only now being faced with the challenge to maintain a growing volume of business records for years or decades. These changing requirements are being driven by three main factors:

- Compliance
- Risk Management
- Competitive Advantage

Compliance with government and corporate regulations on data retention is mandatory for many industries. More and more regulations are being put in place to define the length of record retention and a method of data storage that ensures electronic records are authentic and quickly accessible. There are many examples of country specific regulations that address the storage of legal records, as well as, health and safety related operations. Global regulations like SEC 17a-4, Sarbanes-Oxley and Basel II can also have a direct impact on businesses with international operations. The **necessity** to comply with data archive regulations is forcing many companies to develop more comprehensive archival storage strategies.

Risk Management is a critical consideration for organizations exposed to potential litigation. It's vitally important that they have full access to a wide range of information. Failure to produce authentic records within the discovery period defined by a court can mean the difference between winning and losing a judgement. The loss of a high visibility court case can cost millions and, as many companies have recently experienced, can have catastrophic political consequences. The **fear** of litigation is the second factor driving the growth in demand for secure archival storage.

There is also a Competitive Advantage awaiting those organizations that can effectively exploit their business information. Companies spend vast sums of money creating their information assets, but seldom utilize them to their maximum benefit. A professional data archive that provides access to historic business information can slash development costs, reduce time to market and enable more competitive products and services. Organizations can realize a tremendous **gain** by implementing a sound archival storage strategy.

**Necessity, fear** and **gain** represent the human emotions that lie behind the market drivers of Compliance, Risk Management and Competitive Advantage. While the relative importance of these emotions and business factors varies between organizations and industries, they all play a role in the priorities and decision-making process of virtually every company and have fed the rapid growth of the archival storage market.

## Archival Storage Defined

What exactly is a data archive? This is a question worth exploring since the lifecycle of data involves several stages, each with unique technology and application requirements.

Most data begins life in an "active" state. While active, it is being created, modified or frequently accessed. At some point in the data lifecycle, it moves into a static or "archive" state defined by time or triggered by a specific event. Archive data differs from active data since the authenticity of a given record in the archive is often very critical. As a result, archives must protect data from modification in order to guarantee their authenticity. The length of retention also characterizes archive data. The longer the required retention period

the greater the need to develop an archive strategy that provides long-term record authenticity in a cost effective manner.

There is often confusion between a data archive and a backup. A classic backup application takes periodic images of active data in order to provide a method of recovering records that has been deleted or destroyed. Most backups are retained only for a few days or weeks as later backup images supersede previous versions. Since the archived records are static, there is no reason to include them in periodic backups. Archived records can be placed outside the traditional backup cycle so that the backup operations can focus on protecting the active data that is changing on a frequent basis. Sometimes administrators will “archive” a backup session, but this not the same as an archive. A backup is designed as a short-term “insurance policy” to facilitate disaster recovery and an archive is designed to provide on-going rapid access to decades of business information.

### **Data Stage Requirements**

Active, backup and archive environments are complementary, but each has different fundamental requirements since they service data in different ways at different stages in the lifecycle. It is possible to better understand the interaction and technology options for these three stages by summarizing the most important application requirements.

#### **Active Data Requirements**

- Uninterrupted availability
- High performance read / write and access

#### **Backup and Disaster Recovery Requirements**

- High media capacity
- High performance read / write streaming
- Low storage cost per GB

#### **Archive Requirements**

- Data authenticity
- Extended media longevity
- High performance random read access
- Low Total Cost of Ownership

Because active data is constantly in use, the critical priorities are performance and availability. For many companies, downtime or slow access and read / write performance is simply not acceptable. The only real technology choice for active data is magnetic disk normally configured in redundant RAID systems to deliver the required performance and availability.

Performance is also an important factor for backup, but since most backup operations involve large data sets the ability to quickly stream information to and from the backup media is a first priority. Fast random access to small data sets during restore operations is typically less important. As an insurance policy, it is also necessary to minimum backup expense by reducing the cost of each stored record. The media of choice for backup and disaster recovery applications has traditionally been magnetic tape since it satisfies the performance and cost criteria of most organizations.

Archival storage requirements are quite different from those of active data or backup operations. Media longevity and data authenticity feature much more prominently in archive environments. The storage media used within an archive should have a very stable long life to avoid frequent data migration over decades of storage. In order to comply with corporate and industry regulations on data authenticity, it is crucial that information be protected from modification. Unlike backups, the performance bottleneck for an archive is not read / write streaming, but the ability to provide fast access to potentially millions of records requested by thousands of users. For data archives, fast random access is typically the most critical performance consideration. Where active and backup expenses are analysed using short-

term acquisition and media costs, it is more appropriate to consider the long-term Total Cost of Ownership for an archive environment. Analysis over time provides a much more representative view of the total archive cost over many years. Many regulations specify the use of optical storage for data archives because it provides true Write Once recording with fast random access and unmatched media longevity.

### Archival Storage Technologies

While there are traditional roles for magnetic disk, tape and optical technologies, all of these have been evolving in an effort to expand into new markets. Today there are magnetic disk products targeted at both the backup and archive market, tape products have always played a role in archive environments and optical storage is gaining broader industry acceptance.

One thing that is clear, no single technology can fully satisfy all data storage requirements at all stages of the data lifecycle. The matrix below is designed to provide a general comparison of different storage technologies when applied specifically to an archive environment. Eight key archival storage attributes are contrasted against the characteristics of RAID, tape and three optical formats: DVD, MO and UDO. The shaded areas indicate where the technology provides a good match with the defined attributes.

<b>Archival Storage Attributes</b>	<b>RAID</b>	<b>Tape</b>	<b>DVD</b>	<b>MO</b>	<b>UDO</b>
True Write Once Media	No	No	Yes	No	Yes
Media Longevity	No	No	Yes	Yes	Yes
Removable Media	No	Yes	Yes	Yes	Yes
Professional Quality	Yes	Yes	No	Yes	Yes
Media Capacity	Med/High	High	Low	Low	Medium
Read / Write Speed	High	High	Low	Medium	Medium
Access / Seek Speed	High	Low	Low	Medium	Medium
Low Total Cost of Ownership	High	Low	Low	Med/High	Low

RAID, tape and optical could all be used for long-term archival storage, but there are trade offs. For example, RAID offers unmatched performance, and high capacity, but it is fundamentally a rewritable media with a life of several years. It cannot be taken off-line for secure vaulting and the long-term operating cost for RAID storage is very high. By contrast, tape is removable, has extremely high capacity and offers fast read / write streaming at a very affordable price. Where tape struggles in some archive is with random access performance, like RAID it is a rewritable media which requires special additional maintenance if used for a long-term archive.

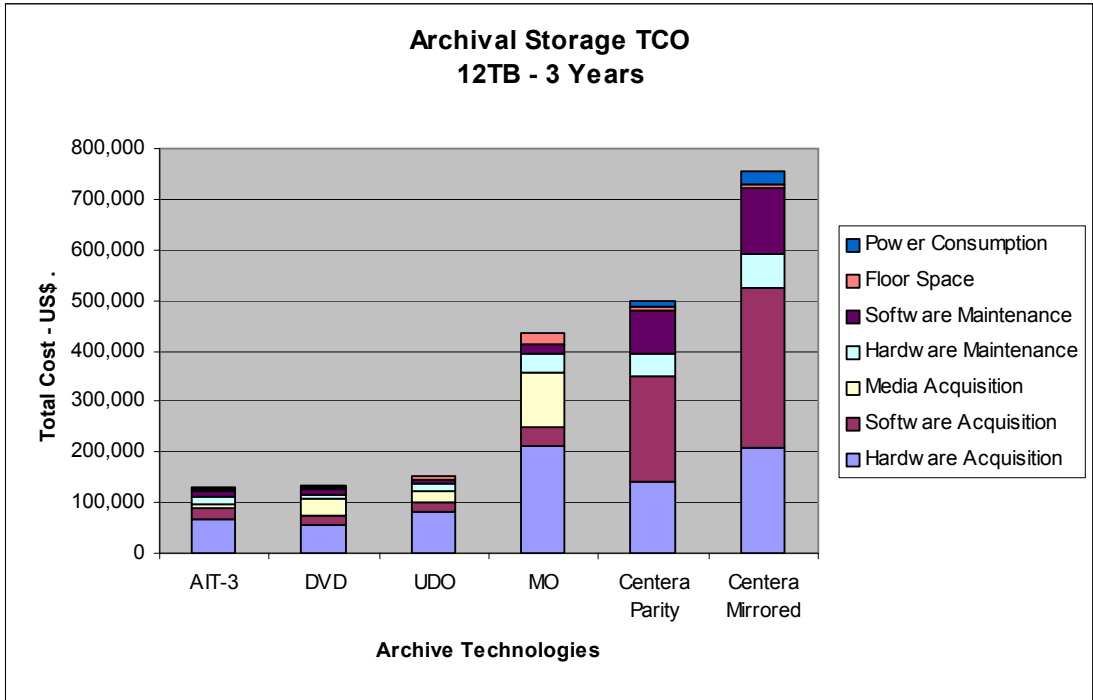
DVD provides an interesting contrast to tape and RAID. It is a true Write Once media with a long life at an affordable cost. But unlike disk and tape it is a consumer grade product with low capacity (9.4GB) and modest performance. Older generation MO (Magneto Optical) meets most of the archive requirements, but its current capacity of 9.1GB means that overall system costs are too high for many environments. UDO (Ultra Density Optical) is the one technology that addresses all the archive attributes. This is not surprising since it is the only contemporary technology designed specifically for long-term archival storage. While no technology will fit the needs of every organization, the attributes of UDO provide an excellent archive solution for a wide range of applications and industries.

### Archival Storage Total Cost of Ownership

One archival storage attribute worth considering in more detail is the Total Cost of Ownership (TCO) of a complete archive system. For many organizations, financial considerations are equally as important as technical attributes. Companies will not invest in new product solutions unless they meet their technical requirements in a cost-effective way.

The bar chart below provides a summary of a detailed TCO analysis that compares a range of common archival storage technologies. In order to develop a representative model for the analysis, an actual case scenario was used. The requirement was for a 12TB archive

measured over 3 years of operation. The archive products selected for comparison were magnetic tape (AIT-3), magnetic disk (Centera) and three optical storage technologies: DVD, MO and UDO. The full version of the Archival Storage TCO Analysis can be downloaded from the Plasmon website at [www.plasmon.co.uk](http://www.plasmon.co.uk).



The results of the analysis clearly show that the TCO for AIT, DVD and UDO are very similar and are far lower than that of MO and Centera. Contemporary optical technologies such as DVD and UDO remain very price competitive with tape storage and are much less expensive than the Centera and MO options. The results also reveal that the annual maintenance and operating costs of RAID systems such as Centera are dramatically greater than any tape or optical library configuration.

**Summary**

There are compelling reasons why the archival storage market has seen such rapid growth in recent years. Both external compliance and internal policies are driving organizations to archive more information for longer periods of time. This pressure is forcing companies to carefully consider how they position and manage their corporate records within a complete data lifecycle. Archival storage should not be confused with active data and backup operations. The requirements of an archive call for a strategy that enables regulatory compliance, data authenticity, media longevity, quick random access and low TCO. A range of storage technologies can be applied to this challenge, each with its own strengths and weaknesses. While no single technology can satisfy every organization, those products that are specially designed for long-term data storage, such as UDO, are best equipped to meet the unique needs of a professional archive. The technical attributes and low TCO make UDO the ideal solution for demanding archival storage environments.

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### **Archival Storage Total Cost of Ownership Analysis**

The TCO Analysis is a detailed report that compares the Total Cost of Ownership for a variety of storage technologies used for long-term archival storage. This report can be downloaded from the Plasmon website at [www.plasmon.co.uk](http://www.plasmon.co.uk)

### **About Plasmon**

Plasmon has provided electronic archival storage solutions since 1985 and is the world leader in professional optical libraries. Thousands of customers around the globe depend on Plasmon's products to create secure, permanent archives for valuable knowledge resources.

Plasmon provides the storage industry's most comprehensive line of professional automated libraries, optical drives, media and software. Storage technologies within Plasmon's product line include: UDO™ (Ultra Density Optical), 5.25 inch MO, DVD, LTO/AIT tape and Raidtec SAN and NAS storage networking solutions.

Plasmon's world-wide headquarters are in Cambridge, England with manufacturing facilities in the US and Ireland and regional sales offices throughout Europe and North America.



### **UDO – Ultra Density Optical**

UDO is the successor to 5.25 inch MO. Using high-density blue laser technology, UDO has been designed for organizations that demand a secure and affordable long-term archive strategy for their valuable business records. 30GB UDO media is available in both Rewritable and true Write Once media formats with a backward compatible roadmap to 60GB and 120GB capacities for future generations.



### **G-Series Libraries Powered by UDO**

Plasmon G-Series libraries are the market-leading solution for professional archival storage. They feature the industry's most reliable architecture, highest data availability and support mixed media configuration with both 30GB UDO and previous generation MO media. Models range from 24 to 638 slots, with corresponding capacities from 218GB to almost 20TB.

Visit the Plasmon website at: [www.plasmon.co.uk](http://www.plasmon.co.uk)