



Data storage: rightsized, all the time

How improved measurement and visualization of data usage have led to more accurate pay-as-you-go consumption models for data storage, eliminating over-provisioning and reducing long-term costs.

Introduction: the importance of data storage in the digital economy

Many mid-sized enterprises have placed digital innovation at the heart of their growth strategies. But in today's fast-paced, data-driven business environment, this approach to expansion requires a commitment to agile IT infrastructure that can be scaled quickly and easily upon demand.

As organizations create and consume more data than ever, storage has become an increasingly important component of flexible digital strategies. Successfully managed, data storage can provide a secure foundation for efficient operations, giving access to the correct information on demand. Data storage can also perform the bedrock for data analytics – providing business leaders with new insight that can result in additional revenue streams.

But implementing a practical approach to data storage depends upon several important considerations. Firstly, where should it be stored – on-premise, in the public cloud, or a hybrid environment? What kind of enterprise-grade technologies should be used – unified

storage, storage-area network, direct-attached storage, or tape storage, to name a few? And then there are capacity considerations. How do you deploy enough data storage to meet data requirements without costly over-provisioning, considering factors like the size of available facilities and future needs?

IT leaders must grapple with these complexities while also being expected to find the time to manage and lead broader efforts around digital innovation. Consequently, many mid-range organizations are looking to technology providers for help to streamline and simplify their approach to data storage. This whitepaper looks at emerging techniques utilizing no-risk, no-surprise consumption models based on pay-as-you-go – providing evergreen data storage solutions that are right-sized all the time.

The challenges to adopting scalable data storage strategies

In recent years, public cloud has provided a route to flexible strategy for many organizations, with storage capacity licenced from a third party. However, several studies have called the cost efficiency of this approach into question. While public cloud often presents a convenient starting point for data storage, costs can rise sharply as organizations scale - with hidden fees often coming into play.

Indeed, research by Capita shows that up to 58 percent of enterprises feel that switching to the cloud has proved more expensive than initially thought. Meanwhile, a survey by IDC (Cloud Pulse 2019) suggested that 85 percent of respondents have considered some form of repatriation from the cloud to on-premise / hybrid architecture, with 42 percent citing cost as the main driver. Clearly, the long-term cost-efficiency of using public cloud architecture for data storage is a cause for concern, with many organizations keen to adopt solutions that give them more transparency and control.

Some organizations must also comply with strict data sovereignty, security, and industry regulations, placing restrictions on where data can be stored and processed. Often, they must adhere to data/security/personally identifiable information (PII) compliance policies while seeking to protect corporate secrets. Such considerations can exclude public cloud infrastructure. Additionally, low-latency processing and apps that are not cloud compatible are other significant reasons for a shift away from public cloud.

But adopting an on-premise approach to data storage brings its own challenges. The market for enterprise-grade data storage systems has been unpredictable lately - buffeted by several global

headwinds. As with many digital technologies, demand for data storage servers fell sharply at the start of the pandemic but has been rising steadily since the end of 2021 as many nations around the world have eased restrictions.

According to the IDC Quarterly Enterprise Storage Systems Tracker, the OEM market grew by 6.1 percent in 2021 over 2020 to \$31.1 billion and will increase by another 7.6 percent in 2022 to \$33.5 billion. However, the knock-on effect of resurgent demand in key regions like EMEA has been the emergence of supply chain issues, which the IDC tracker says could 'limit the ability of supply to meet an otherwise healthy market demand'.

Other factors are also coming into play. The IDC report notes that the conflict between Russia and Ukraine has resulted in a shortage of neon gas used in chip production, worsening the availability of semiconductors. This disruption could further increase the gap between orders and shipments of hardware such as data storage arrays.

So, what does this mean for mid-sized enterprises looking to place scalable data storage at the heart of their digital growth? For organizations that prefer the safety and security of on-premise data centers, the successful implementation of digital innovation can result in a sudden and unpredictable requirement for new storage. However, in a world suffering from supply chain pinch points and logistics delays, extended lead times hold the potential to frustrate innovation strategies and cause costly delays.

IT leaders are also challenged by the frantic pace of technological change. Identifying and onboarding suitable systems and solutions takes

significant resources when many businesses face internal skill shortages. According to Info-Tech Talent Trends 2022, talent scarcity means that 37 percent of IT departments are outsourcing roles to fill internal skill shortages. These pressures make it difficult for enterprises to successfully manage the adoption process for technologies such as data storage, heightening the risk of poorly implemented and integrated projects.

Also, there are funding pressures to consider, too. Traditionally, the adoption of new hardware such as storage arrays has been met through Capex acquisition, with upfront expenditure dictated by refresh cycles of typically between three and five years. Under such an approach, technology setup can be complex and lengthy, and systems can become outdated before they have delivered a return on investment. According to a recent survey of IT leaders, three in five chief information officers would replace half or more of their organization's current technology, with funding restrictions hindering such plans.

So, in short, IT leaders have several obstacles to overcome when considering adopting new data storage solutions and are seeking alternative approaches that would help them to:

- 1 Achieve more transparency and visibility of data storage costs.**
- 2 Provide the highest levels of data sovereignty and security.**
- 3 Deliver a reliable and coherent procurement strategy that overcomes supply chain problems and avoids delay.**
- 4 Manage complexity as technology options proliferate at an ever-increasing rate.**
- 5 Ease the adoption of new solutions through more flexible financing models free of lengthy refresh cycles and CAPEX constraints.**

Identifying new approaches to data storage provision

Set against this list of requirements, many organizations are looking to implement fresh approaches to data storage. For those enterprises preferring on-premise infrastructure, the emergence of new as-a-service concepts provide an opportunity to adopt evergreen storage solutions through no-risk, no-surprise, pay-as-you-go consumption models. These as-a-service models enable businesses to scale with full elasticity, making it possible to add data storage at a rate more closely aligned with business growth.

But when it comes to storage-as-a-service, enterprises are not only seeking flexibility and scalability. They are also demanding transparency and visibility to help them manage monthly expenditures. These expectations have led to the development of innovative technologies that provide a more authentic pay-as-you-go model that measures usage rather than allocation, eliminating over-provisioning and providing IT leaders with real-time cost and utilization insight. Access to this information must be fast and straightforward, allowing IT leaders to plan effectively for future needs.

So how are modern storage-as-a-service solutions structured, and how might they evolve to provide even higher levels of customer satisfaction in the future? Many of these consumption models are supplied as an on-premises file, block and object-as-a-service solutions using technologies such as Lenovo's ThinkSystem DM Series. Other solutions that address the demand for exabyte capacities are also coming to the fore. These consumption models allow for perpetual as-you-grow performance and/or capacity expansion, with no pre-set limits. Upgrade and refresh are non-disruptive, eliminating the need for additional capital investment and costly effort-intensive upgrades.

Increasingly, data storage-as-a-service is being offered as a managed service, from rightsized design and installation through to operation. These services can include benefits such as proactive health checks, providing IT managers with the knowledge that their data storage is operating efficiently – allowing them to exploit the solution to its full potential.

Critical to as-a-service models is the ability to perform genuine consumption-based storage, where enterprises pay for what is being used rather than what is provisioned. Here, the end-user selects the storage class and the required performance level. Enough storage arrays are installed on-premise or at a designated colocation facility to cover immediate and near-term demands. The solution provider monitors usage and supplies additional storage as and when required with no additional fee. Significantly, billing can be based on a simple per terabyte per month fee – not on the total terabyte size of the storage solution that has been provided. This means billing rises or falls directly relative to a system's average terabyte consumption per month.

In addition to accurate metering, the storage-as-a-service model can also use real-time monitoring technology that sits on-site with the storage arrays, providing an accurate overview of how much storage has been consumed at a particular point in time. This information, typically available on remote devices through an online portal, gives end-users complete visibility of their storage systems while also giving the solution provider an accurate indication of future hardware needs. When an end-user is expected to reach an agreed percentage of installed storage capacity within the next 90 days, an automated message can be sent to the provider as a reminder to schedule a capacity plan discussion. This way, end-user needs are always planned for and met without inconvenience or delay.

Performance health checks are also carried out through remote diagnostics. These checks start at installation and are then conducted at regular intervals, providing opportunities for system optimization. These activities – led by a professional services consultant in tandem with the end-user IT team – also present opportunities for collaborative learning, giving the enterprise the chance to stay up to date with storage systems.

Contractually, storage-as-a-service solutions are based on a subscription from one to ten years. Typically, in a Capex model, an enterprise would buy storage systems expected to last for five years. Here, though, the temptation is to over-size the requirements to avoid the need for additional unexpected expenditure during that period. However, this does not represent the most cost-effective means of storage provision. And after five years, the Capex cycle starts again, taking into account the introduction of new technology which offers the latest industry features and efficiencies. This process inevitably involves re-sizing storage requirements and re-running procurement exercises, taking up valuable time and effort.

On a long-term storage-as-a-service subscription, storage arrays can be added quickly and efficiently to meet new demand. At the same time, guaranteed technology refresh is part of the package. So, suppose a new generation of the same storage class comes out. In that case, the as-a-service solution would be updated with individual components such as the controllers or indeed full-stack refresh – depending on the extent of the new product introduction. When the customer remains subscribed to the solution, this technology refresh is expected to happen every three years – should new technology be available on the market – keeping the end-user up to date with cutting-edge infrastructure without disruption or downtime.

Advantages over traditional models

The development of as-a-service models offers a compelling solution for many mid-range enterprises. Still, despite the advantages on offer, a significant percentage of such organizations with on-premise infrastructure still stick to old ways of working, preferring to buy equipment through upfront expenditure.

Part of this reluctance to switch can be attributed to human nature: there is a comfort to be had from familiar approaches. Many IT managers are wary of deviating from the tried and trusted for the risk of being seen to have taken an ill-judged decision. But as-a-service can dispel such fears, as it remains a self-managed service where the internal team retains complete control over the hardware. So, the biggest concern is how to ensure adequate storage is available when needed? That fear is eased through monitoring capacity and proactive deployment of new equipment

Other concerns have been expressed around the complexity of rightsizing and hardware installation, but each deployment can be customized to meet individual end-user needs. This customization process might include the specification of network connectivity through a particular type of fiber channel protocol or a specific class of ethernet adapter. Solutions are also sized with additional headroom for growth from day one. The entire process is designed to be straightforward, eliminating any risk for the end-user and providing peace of mind.



The future of storage-as-a-service

So, what comes next? How might storage-as-a-service evolve over the near to medium-term as technologies change and customer expectations grow? And how are leading providers responding to these demands?

At Lenovo, the TruScale Infinite Storage concept already provides the full range of services and capabilities outlined in this whitepaper. It is a tried-and-trusted solution deployed multiple times across industry sectors. Crucially, it provides full transparency and visibility, with no hidden costs such as data ingress and egress fees – as commonly encountered with public cloud.

Now, the Infinite Storage portfolio is to be expanded from the DM series to incorporate other storage classes and types to accommodate different workloads in the exascale era. This expansion means adding fully-managed and on-demand options and choices for hosting.

Ultimately, storage-as-a-service is here to stay. Companies are faced with ongoing challenges like ensuring the right technology resources are available to support business demands, while protecting data security and aligning storage capacity to actual usage to remain cost-effective. Hybrid solution deployments provide the right balance to solve these complexities.

Data insights and business agility are crucial to forming new competitive advantages and generating value. The constant change and growth of information mean organizations must evaluate more data in less time, speeding processes companywide. Lenovo TruScale Infinite Storage has been engineered to help customers overcome these challenges without delay.

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