Economic Insight

Managed Storage Services – a Model for the Future?

An economic comparison of IBM's Cloud Private Storage to a traditional storage acquisition model

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Evaluator Group

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Executive Summary

A fundamental shift in thinking is taking place among enterprise IT executives. Rather than view infrastructure in terms of system and product lifecycles alone, think of IT more in terms of business application lifecycles.

Cloud computing has taught us that one can separate infrastructure encumbrances from the business application, and that because all of the burdensome infrastructure acquisition and lifecycle support issues become the responsibility of the cloud services provider, we can now focus more effectively on the lifecycle of a business project or application. In addition, it is now clear that IT executives need not rely only on public clouds to gain this advantage. Vendors now offer infrastructure—on premises and within a customer-controlled data center—as a managed service for consumption on a cloud-like pay-as-you go basis.

In this Evaluator Group Economic Insight Report we first develop a case for deploying an entire storage system as a managed service. We then focus-in on one such offering—IBM's Cloud Private Storage service—and compare it economically to a traditional infrastructure acquisition and lifecycle support model. Comparisons are made on both a TCO and business value basis.

The Case for Deploying Storage as a Managed Service

Public clouds are now seen by many enterprise IT organizations as a model worth emulating internally. They are business user-friendly, agile and their services are easy to consume and pay for. Furthermore, they are stimulating a shift in buying patterns that moves IT budget money away from capital expenditures (CAPEX) in favor of operating expenses (OPEX).

Consequently, customer demands for pay-as-you-go infrastructure services are increasing. However, those same customers are also likely to first evaluate whether the infrastructure needs to remain on premises. This is particularly true of storage infrastructure where security, predictable performance and suitability for business-critical applications are primary concerns. As a result, we now see large infrastructure vendors offering storage as a managed service—a complete storage environment implemented, managed and supported by a single vendor that is payed for on a monthly basis.

Targeted use cases for managed storage services include:

- New business initiatives where time to value is critical
- Critical business applications (SAP, Oracle RAC, etc.) requiring high performance/high availability
- Server/data center consolidation and virtualization
- Time-sensitive application workload expansion
- Management of uncontrolled file share growth
- New compliance requirements and regulated environments including GDPR
- Increased need for OPEX-oriented acquisition alternatives
- Single tenant access with enhanced security

Managed storage services offerings vary according to the degree to which the customer or the vendor operate the storage environment. With some, the vendor stages and implements the environment while managing the ongoing lifecycle aspects after the environment becomes operational. With others, the vendor designs, implements and manages both the operational aspects as well as infrastructure lifecycle. One such offering is IBM's Cloud Private Storage (CPS).

IBM Cloud Private Storage (CPS)

IBM Cloud Private Storage (CPS) is available from IBM's Global Technology Services (GTS) group. It offers a dedicated, single-tenant storage environment with operational management and support services layered on top. It can be deployed as an on premises-only service or expanded to IBM public cloud storage resources to yield a dedicated hybrid cloud storage environment. In addition, it can be tailored to a customer's data environment via the use of multiple data tiers for block and file storage.

From an acquisition standpoint, CPS is consumption-based and billed monthly based on allocated or written capacity and performance tier required. After installation, CPS becomes a fully IBM-managed, pay per use storage utility that conforms to an OPEX model. Monthly storage expenses can be predictable given the reporting mechanisms included with the service. As storage needs grow customers can scale up to use more storage with a known storage expense.

Services included with CPS include:

- Storage array hardware and software
- Installation of hardware and software including project management and interfacing to the host network
- Infrastructure management: allocate, provision, upgrade storage
- Tools used by IBM to manage storage as well as support enhancement requests
- Time/labor devoted to management of storage array and storage network Monitoring through proactive reporting, health checks
- Setup and management of replication between Cloud Private Storage arrays
- Integration with security protocols
- Data at Rest Encryption and key management
- Capacity reports to enable billing

Customers choose the physical location which can be in the customer data center, customer contracted co-location facility or an IBM data center, wherever the compute resources are located.

In addition to the on-premises locations listed above, CPS also supports the use of Direct Link Dedicated Hosting. This allows compute resources located in the IBM Cloud (public) to access the All-flash Block and File storage tiers located in a facility near the IBM Cloud facility. To access the storage a "direct link" is required between the compute and storage resources. The direct link dedicated hosting is an additional feature and functionality.

The center of management control can emanate from global resources: in-region resources or in-country resources. All methods utilize remote access for management functions.

Block and File Storage Tiers

Customers can select from different performance and availability tiers: two block and three file tiers. Customers can also choose from private or hybrid cloud architectures as follows:

Block

- All-flash block storage - low latency all-flash array, 4-6 IOPS/GB – up to 500K per device with 99.99% service availability
- Performance block storage - business-critical SAN array, 1 IOPS/GB – up to 100K per device with 99.99% service availability

File

- All-flash file storage with - all-flash NAS array, 2-4 IOPS/GB – up to 350K per device with 99.99% service availability
- Performance file storage - business-critical NAS array, 1 IOPS/GB – up to 100K per device with 99.99% service availability
- Standard file storage - cost-efficient NAS array, 0.5 IOPS/GB – up to 75K per device with 99.99% service availability

Object

- IBM Cloud Private Storage also includes cloud object storage. This tier provides dedicated object storage in the IBM Cloud, either in or across region sites.

Customers can have one, multiple or all six of these data tiers in individual storage clouds in each location.

Pricing Considerations and Terms & Conditions

Pricing for the CPS base offering includes hardware, software and tools for each data tier, and global management resources. Storage usage is measured daily and charged monthly. The monthly capacity usage charge is based on the highest daily measured used capacity in the month. Customers define their initial capacity need based on a six-month outlook. IBM installs initial capacity plus room for growth. In addition, IBM provides monthly capacity usage reports and schedules capacity planning reviews with customers. Customers can choose to have billing based on written or allocated data capacity.

To qualify as OPEX, CPS includes the following characteristics:

- Six-month minimum term, month-to-month thereafter with ability to cancel upon 60-days notice
- Monthly billing on infrastructure usage and management services
- IBM retains title to all infrastructure – no purchase option

TCO Comparison of IBM CPS vs Traditional Storage Acquisition and Management

It is often the case that IT administrators compare storage acquisitions based on total cost of ownership (TCO), regardless of budgetary allocation (CAPEX vs OPEX). To that end, the Evaluator Group did a comprehensive analysis of three configurations, two for block and one for file, delivered as a managed service under IBM's CPS program and compared the same configurations to a CAPEX-based acquisition model that a customer traditionally designs, implements, operates and manages. For the sake of simplicity, a cloud object tier is not included in this TCO analysis.

In order to make a TCO-based evaluation of IBM's CPS vs a traditional storage acquisition and management model, Evaluator Group first configured three storage environments based on infrastructure supplied by leading enterprise-grade storage vendors—two for all-flash block, and one for all-flash file storage. These configurations were then applied to the traditional CAPEX-based acquisition and operational model where the customer essentially does all the "work." Next, we applied these same all-flash block and file configurations to IBM's CPS managed storage services where IBM designs, implements, operates and manages the environment. We ran comprehensive TCO comparisons of each using a five-year time horizon as a baseline. Costs used in the model include:

- Storage hardware, management servers, racks and cables
- Storage system software
- Initial deployment costs
- Hardware/software maintenance and support from the vendor
- IT administrative costs including personnel calculated on an FTE basis
- Environment-related costs including power, cooling and floor space

In our analysis, consideration was given to all phases of an enterprise-grade storage infrastructure life-cycle including hardware, software, implementation, operations and support over a five-year period of deployment. This was done in order to make a realistic assessment of a traditional CAPEX-based model where the customer is responsible for these cost elements as compared to IBM's CPS managed services model where IBM is responsible. Direct Link dedicated hosting is not included in this model. However, it does assume the use of global resources as a center of management control.

The five-year cumulative TCO comparisons are shown in Figure 1 for all-flash block storage and Figure 2 for all-flash file storage below. In these comparisons we used a five-year time horizon which we believe to be realistic considering flash storage array life cycles.

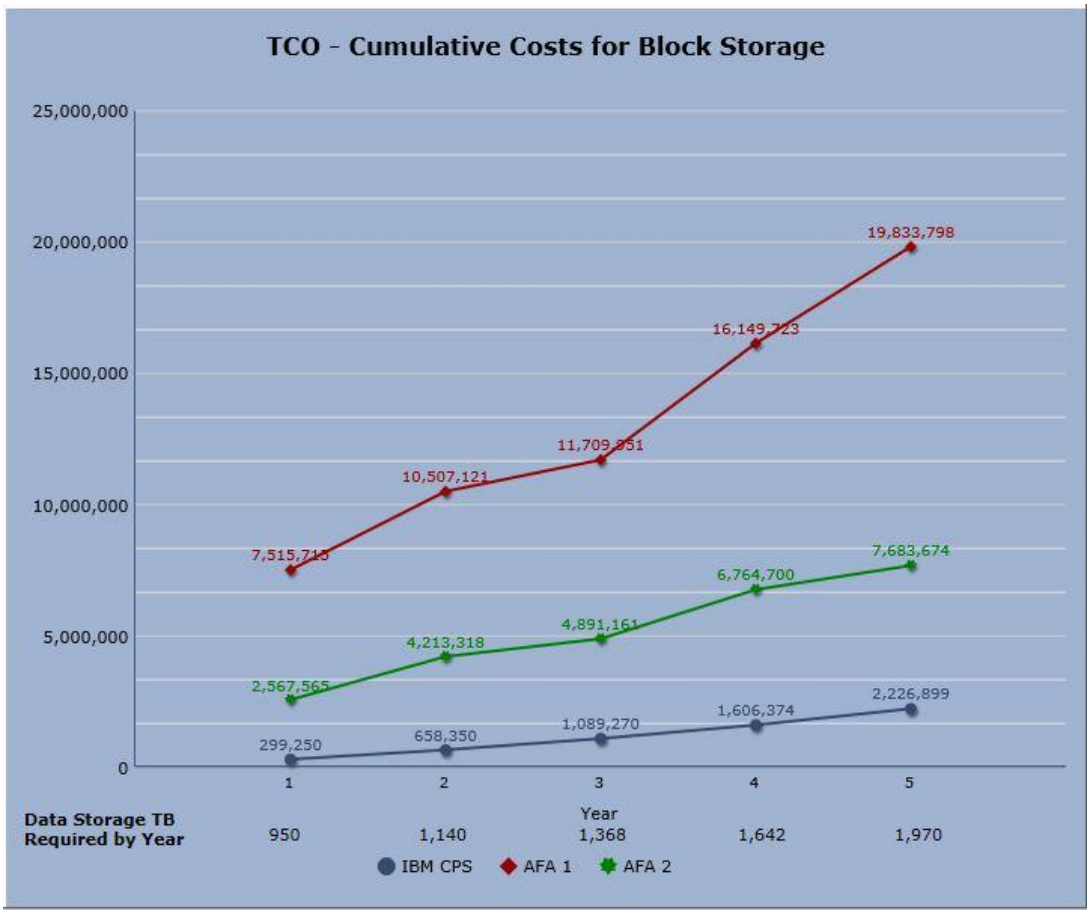

Figure 1. Cumulative TCO comparison of two leading storage vendors' all-flash block storage systems (AFA 1, AFA 2) vs IBM's CPS all-flash block storage managed service over a five-year period

In the analysis above, we assumed an initial capacity 950 TB and a data growth rate of 20% per year. All-flash storage arrays were used as the basis for comparison in all three of the sets of results. Note that IBM CPS gains an initial TCO advantage in the first year because customers pay only for capacity and services consumed while, with a traditional acquisition, the greatest cost for any single year occurs in the first year. This TCO advantage remains consistent throughout each of the following years.

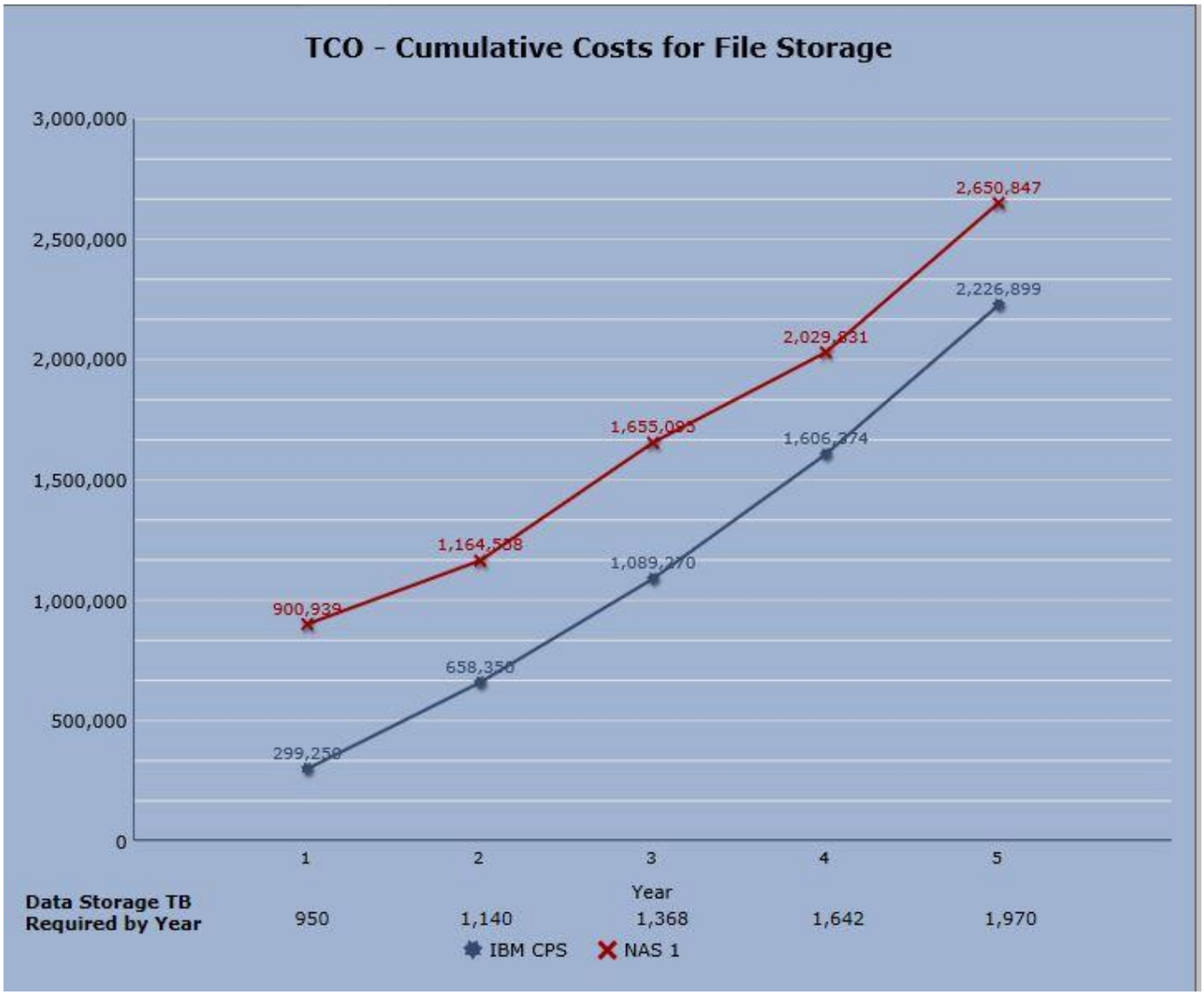

Figure 2. Cumulative TCO comparison of a leading storage vendor's all-flash file storage system (NAS 1) vs IBM CPS all-flash file storage managed service

In the analysis above we again assumed an initial capacity 950 TB and a data growth rate of 20% per year. All-flash storage arrays were used as the basis for comparison. Note once again that IBM CPS gains the initial TCO advantage in the first year which remains consistent throughout each of the following years.

Significant Cost Components

Our analysis shows that the primary reason a managed storage service such as IBM's CPS can offer significant savings over a five-year period vs a traditional storage system purchase is that the user avoids both the initial capital expenditure (CAPEX) purchase of flash storage hardware/software and any

follow-on purchases of hardware and software license fees needed to keep up with a capacity growth rate of 20% per year. For example, at the end of five years, a customer of AFA Vendor 1's all-flash block storage system (Figure 1.) will have spent a total of $19.8M for a starting capacity of 950 TB plus a 20%/year growth rate ending at 1.97 PB in year 5. Approximately 65% of this cost is for hardware alone with another 25% devoted to maintenance and support. In contrast, an IBM CPS customer will pay operational expenses (OPEX) of only $299K for the same starting capacity and a total of $2.227M for the same 1.97PB ending in year 5.

More difficult to quantify but nonetheless significant are administrative costs. For both the block and file storage-based analysis, we also considered staff time devoted to all the phases and staff activities that would typically be required for a new storage system implementation and five-year lifecycle management outlined below:

Planning

- Selection of the team that will manage the project and project planning
- All facets of a POC including hardware and software selection and determination of additional expertise that may be required to fill-in gaps
- Justifying the procurement and time/staff devoted to the procurement process

Initial Implementation

- Hardware infrastructure build and test
- Software downloaded (when required) and installed
- Initial system tests to assure basic functionality

Enablement

- Through test and remediation, produce a working platform that exhibits all intended functions needed to qualify for production
- Data migrations, when required, are planned, performed and managed

Production and Life Cycle Management

- Platform is passed through gates from enablement to full production
- Administrative support of the platform is formulated, assigned and performed on a weekly, monthly and quarterly basis. This also includes time devoted to interfacing with the vendor and internal documentation
- Upgrades and updates are planned, performed and managed
- Asset tracking
- End of life disposal

In our experience, another source of cost worth considering is administrative staff time over a five-year storage system life cycle as detailed above. Therefore, the second source of TCO savings when comparing a traditional storage acquisition to IBM CPS comes from the offloading of customer staff time to IBM CPS expertise.

Total Value Comparisons – Beyond TCO

TCO is one measure commonly used by enterprise IT to cost justify an acquisition proposal. However, it is only part of a total value assessment. A total value determination includes an assessment of positive benefits to be gained. This assessment, while not as deterministic as TCO, is nevertheless as important as TCO. However, because value propositions for comparing a managed storage service to traditional storage acquisitions are subjective, we offer ways to do such an analysis by means of the following examples:

Speed and Agility

Business user and developer groups have become accustomed to using public clouds for their speed and agility. Storage as a managed service delivers needed storage resources for these groups with speed and agility as well. But in this case and because the data remains on premises, the enterprise avoids issues regarding security, performance, multi-tenancy and unanticipated costs with public clouds.

Cash-flow Positive Starting Day 1

Proposed capital acquisitions for enterprise storage often get bogged down in writing cost justifications and spinning through approval cycles. With storage as a managed service, there is no up-front, six- or seven-figure capital outlay to justify. As we see in the above graphics, new project storage costs start at zero. Once functional, the user pays a monthly charge for services used. This means that a new business initiative supported by a managed storage service can show a return on money spent from day 1. Assuming the new venture produces revenue immediately, cash flow can also be positive starting at day 1.

Advancing Hybrid Cloud Initiatives

Instantiating a hybrid cloud IT environment is now the desired goal for most enterprise IT organizations—one that bridges the enterprise data center to public clouds so that applications are given optimal hosting resources. However, for many the journey can require technological and staffing capabilities that need to be built over time. Data storage is fundamental to hybrid cloud. Therefore, bringing in storage as a managed service that gets a foundational hybrid cloud storage layer built and running in weeks allows developers to move forward on new business-generating applications without delay.

Managing Shadow IT

We have become aware of situations where business user groups spin-up public cloud services that are later turned over to centralized IT for support. Because of factors like uncontrolled cost and the sensitivity of data, IT decides to move the applications to a private cloud environment. In these situations, time can be of the essence. Bringing in a fully functional managed storage service helps to get the private cloud operational as soon as possible while maintaining application availability during the transition.

Conclusion

In an IT environment where transformation and hybrid cloud discussions are occurring regularly, reliable, operationally-qualified storage remains a bedrock requirement. The challenge for executives is to bring the foundational storage layer into transformed and hybridized IT. A managed storage service that is responsive to the needs of the enterprise in terms of business compatibility and risk-related operational requirements can form this layer in a way that minimizes both initial and on-going costs.

Here we have evaluated IBM's loud Private Storage service in terms of its potential economic impact. It is based on sound, operationally proven infrastructure and management practices. Our analysis shows, perhaps surprisingly, that it is more cost-effective and value-rich than acquiring storage systems as a capital expenditure. As such, CPS is more relevant to cloud computing as it helps enterprise executives separate infrastructure complexities from the business applications that will matter most in the future.

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