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Value from Innovation

CLOUDIAN TCO REPORT RESPONSE

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Executive Summary

A recent Cloudian TCO report, **Tape vs. Object Storage**, claims significant TCO savings by using the Cloudian Object Storage system vs. LTO 6 tape. It estimates a 35% Capex savings and a 79% Opex saving when storing 10 PB of data for 10 years.

However, the study is based on older LTO 6 tape at 2.5 TB, uses very high tape solution Capex costs, speculative Opex costs, and questionable solution design. By architecting a more modern tape solution using **StrongLink** and LTO 7 tape at 6.0 TB, a completely different TCO picture emerges, with **Tape TCO being 78% less than the Cloudian Object Store Solution.**

A fundamental flaw with the Cloudian report is the assumption that a customer would keep 10 PB of primary data on disk with no backup or archive copies. They rationalize this approach based on the Cloudian Object Store system using erasure coding.

However, this architecture exposes the customer to the risk of data loss. If the single copy of data is corrupted or accidentally deleted, then that data would be lost. Best practice for data storage is a tiered strategy; active data on-line, and lower cost disk or tape for on-site backup and an off-site tape copy for disaster recovery.

For this report, an Improved Tape Solution that incorporates StrongLink, a 300 TB disk cache, Q80 tape libraries and LTO 7 tape drives and media is configured for a tiered storage architecture. It provides a robust solution; two copies of all data (one on-site tape and another off-site tape) and rapid access to more active data using the disk cache. It eliminates the need for the archive software in the Cloudian Tape Solution and addresses the operational costs.

Using the Fujifilm 10 TB TCO tool and other estimates detailed below, the 10-year TCO of the Improved Tape Solution is estimated to be $3.96 M. This compares to $9.4 M for the Cloudian Object Store and $17.7 M for the Cloudian Tape Solution.

Capex Analysis

As shown in Figure 1, the Cloudian report estimates its tape solution Capex to be $12.99 M and includes $2.1 M of archive software acquisition costs. Using the **10 TB version of the Fujifilm TCO** tool the Improved Tape Solution Capex is estimated to be $1.96 M or 85% less than the Cloudian Tape Solution while providing better data protection.

The lower cost is possible due to the use of LTO 7 tape drives and media and much more realistic tape solution pricing. Further, the $2.1 M of cost for the archive software is replaced by the lower cost of the StrongLink solution. Additional TCO savings are accrued by lower disk storage, technology refresh, support, power, cooling, and real estate expenses.

Figure 1 Tape Capex Comparison

Capital Expenditure	Cloudian Object Storage	Cloudian Tape Solution	Improved Tape Solution	Tape TCO Difference
Hardware with Support Contract	$4,500,000	$4,964,000	$276,111	-$4,687,889
Staging Storage	$0	$425,000	$61,901	-$363,099
Archive Software	$0	$2,100,000	$899,420	-$1,200,580
Media	$0	$2,500,000	$217,167	-$2,282,833
Technology/Media Refresh	$2,000,000	$1,000,000	$184,307	-$815,693
Support	$660,953	$913,165	$22,680	-$890,485
Real Estate	$168,000	$588,000	$112,000	-$476,000
Power and Cooling	$1,075,200	$460,800	$116,874	-$343,926
Offsite Storage	$0	$42,000	$75,000	$33,000
Capex Total	$8,404,153	$12,992,965	$1,965,460	-$11,027,505

Following is a more detailed examination of each of the cost components that highlights the lower Capex costs for tape

Hardware with Support Contract

The initial hardware acquisition cost for the Cloudian Tape Solution of $4.96 M is significantly greater than the $276,111 in the Improved Tape Solution with LTO 7. Part of the reason for the $4.68 M difference is the use of LTO 6. However, the Cloudian Tape Solution is configured with far more drives than required; it includes 10,000 library slots and 20 LTO 6 tape drives. They also assume the library has a total of only 11 TB read/write per day, or about 4% of the available data rate of 20 LTO-6 drives at 276.5 TB per day (20 LTO 6 drives @ 160 MB/sec * 86,400 secs/day). The Q80 tape library with LTO 7 is a much more cost-effective solution. To store 10 PB requires three Q80 tape libraries with a total of nine LTO 7 tape drives.

Staging Storage

Cloudian includes the cost of a 300 TB disk system in their tape TCO calculations. This disk is used as a staging area for tape data and costs $425,000. However, for the Improved Tape Solution, the Fujifilm TCO tool estimates the cost for a high capacity, low-cost disk system of this capacity to be $61,901. This is $363,099 less than the Cloudian estimate. In the Improved Tape Solution, the disk cache is managed by StrongLink and used for more active data.

Archive Software

The Cloudian report includes $2.1 M in archive software for the tape configuration, but none for the Object Store. For the Improved Tape Solution, rather than spend $2.1 M on archive software, StrongLink is included with the necessary servers and support. The StrongLink subscription, LTFS subscription, and five servers have a 10-year total cost of $899,420. This is a 57% savings versus the Cloudian Archive software.

Tape Media

Cloudian estimates the cost of the initial tape media as being $2.5 M. In the Improved Tape Solution, using LTO 7 tape media, only 1,667 tape cartridges are needed for the on-site storage and an additional 1,667 cartridges for the off-site copy. The initial cost would only be $217,210 at current market prices. This is $2.28 M less than the Cloudian Tape Solution, a 91% savings.

Technology Media Refresh

Cloudian estimates the cost of refreshing the tape media and drives at $1.0 M. The Improved Tape solution estimate is $184,307 and includes 834 LTO Gen 9 cartridges and three drives. This is 82% less than the Cloudian estimate.

Support

Five-year extended warranties are included in the Improved Tape Solution including next day, on-site support for the library and drives. New LTO 9 drives are purchased in year 6, also with 5-year extended warranties. The only additional tape library maintenance is for years 6-10 and amounts to $22,680. Cloudian estimates their tape support cost to be $913,165. The Improved Tape Solution is 98% less.

Real Estate

The Fujifilm TCO tool does not include Real Estate costs. However, we can develop an estimate based on the Cloudian report. The Cloudian Object Store 10 PB solution contains 25 of the 4U HyperStore devices. They require three standard 42U racks. Over 10 years, or 30 rack years, the cost is $168,000 or $5,600/rack/year. The LTO 7 libraries also require three racks, but only for the first five years. With the move to LTO 9, only one library is needed in one rack. Using the same $5,600/rack per year figure, the LTO library estimated cost is $112,000, not the $588,000 included in the Cloudian report for an 81% savings.

Power and Cooling

The power and cooling costs are projected to be $60,415 for the Improved Tape Solution libraries and drives. Adding in the cost for the StrongLink servers of $37,580 and disk cache of $18,879 generates a total of $116,874. Cloudian estimated their tape solution power and cooling cost to be $460,800. The Improved Tape Solution estimate is 75% less than the Cloudian tape estimate.

Offsite Storage

Offsite Storage is the one cost component where the Improved Tape Solution estimate is higher than the Cloudian report; the ten-year TCO tool estimate is $75,000 versus the Cloudian Estimate of $42,000, an increase of $33,000.

Opex Analysis

The Cloudian report estimates the tape solution 10-year Opex to be $4.75 M versus $1.0 M for the Cloudian Object Store. According to the report, the tape solution needs four FTE versus one for the object store, driving $4.0 M in cost for tape versus $1.0 M for Cloudian. In addition, due to the long recovery process and loss of data access, the tape solution incurs an additional $750,000 in downtime and SLA costs.

These costs are substantially smaller with the Improved Tape Solution. Using LTO 7 tape technology, only 1,667 tapes are stored in the libraries. Four FTE are not going to be needed to manage this number of tapes, especially when only 11 TB of data is read or written each day, amounting to a maximum of two tape cartridges. More realistically, only one FTE would be needed to manage the tape environment. Further, we estimate that one more FTE would be needed to manage the StrongLink environment for a total of two FTE. The use of StrongLink and the disk cache also eliminates the data access and data recovery costs. Figure 2 highlights the differences.

Figure 2 Tape Capex Comparison

Opex	Cloudian Object Storage	Cloudian Tape Solution	Improved Tape Solution	Tape TCO Difference
Daily Ops and Maintenance	$1,000,000	$4,000,000	$2,000,000	-$2,000,000
Data Recovery Costs (Downtime)	$0	$500,000	$0	-$500,000
Data Access Costs (SLA)	$0	$250,000	$0	-$250,000
Opex Total	$1,000,000	$4,750,000	$2,000,000	-$2,750,000

A more detail review of the Opex savings follows.

Daily Ops and Maintenance

Cloudian estimates one FTE is required for the Object Store environment and four FTE are required for the tape environment. Their tape estimate is based on a total of 20,000 tapes being managed. However, with LTO 7, this number is reduced to 3,334 (including on-site and off-site copies). If one FTE is required for every 5,000 tapes (20,000/4 FTE), then only one FTE is needed with LTO 7. However, in the Improved Tape Solution, StrongLink is added, and this overall system must be managed. To be conservative, one more FTE is incorporated into the revised operations costs. The total cost drops from $4.0 M over 10 years to $2.0 M, a 50 % reduction in operational costs versus the Cloudian tape environment.

Data Recovery Cost

Cloudian estimates that an additional half FTE is required to run health checks, delete files, replace tapes and perform ongoing maintenance. They also have included the cost of the downtime associated with loss of access to the data. The Improved Tape Solution effectively eliminates these tasks, and whatever work remains can be managed by the two FTE already included.

Data Access Costs

The Cloudian tape solution also includes one-quarter FTE to retrieve and load tapes. In the Improved Tape Solution, this workload is absorbed by the two FTE already included in the Improved Tape Solution.

Summary

The Improved Tape Solution with LTO 7, StrongLink, more realistic pricing, and a better solution architecture not only provides better data protection but is substantially less expensive than the Cloudian Object Storage solution. Cloudian seems to be advocating a single copy of 10 PB of user data. That is a highly risky solution exposing the enterprise to the potential loss of data. A modern tape solution that incorporates StrongLink, a small disk cache and two tape copies of all data provides a responsive, much lower cost solution while protecting the enterprise's valuable information.