

Storage Economics Engagement Customer Summary

INDUSTRY: Security and commodity exchanges
REGION: Americas
BUSINESS SIZE: Enterprise



TRANSFORM VIRTUALIZATION ECONOMICS RELIABLE TRUSTED INNOVATE INFO
 TION GLOBAL CHANGE INTELLIGENT TECHNOLOGY SERVICES VALUE INSIGHT
 PORTUNITY SOCIAL INFRASTRUCTURE INTEGRATE ANALYZE DISCOVER COMPET

Executive Summary

The nature of storage needs for XYZ Inc. require 8 to 9 times the amount of raw storage to be purchased compared to the amount of data. This is a result of very high performance requirements (RAID overhead and DBA headroom). XYZ Inc. has an above-average cost of storage asset depreciation. Annual software and hardware maintenance fees total US\$812,000 and US\$1,363,000 respectively. Currently TCO/terabytes/year is US\$5,207.17.

HDS recommends solutions for migration, hardware and software maintenance, tiered architecture, thin provisioning, and virtualization. By implementing these solutions, XYZ Inc. will benefit directly from capex avoidance, environmental savings, and reduced storage area management costs. Hitachi Data Systems (HDS) has identified a total of US\$49,723,559 in savings that XYZ Inc. can claim over 4 years. These savings will come as XYZ Inc. implements respective HDS architecture and tools. The proposed HDS solution reclaims 539TB (18.6%) of current capacity. These combined

solutions will bring TCO/terabytes/year from US\$5,207.17 down to US\$1,484.52 in year 4.

XYZ Inc. savings breakdown:

- Data remastering: Migration 39%.
- Hardware and software maintenance savings: 29%.
- Purchase avoidance: Tiered storage 18%.
- Environmental savings: 8%.
- Reclamation: Virtualization 3%.
- Storage area management 2%.
- Reclamation: Thin provisioning 1%.

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Key Financial Metrics

| Category | Key Financial Metrics |
|-------------------------------|---|
| Investment | \$0 |
| Estimated payback period | 3 months after implementation |
| Savings | US\$38,488,317 (total 4-year savings) US\$29,411,362 (Net present value) |
| Internal rate of return (IRR) | 10.5% |
| Return on investment (ROI) | N/A (Savings /# of years / Investment) |

Company Information

| | |
|-------------------------------------|----------------------------------|
| Company name | XYZ Inc. |
| Region | Americas, Chicago/New York City |
| The country of company headquarters | United States |
| Company size (employees) | 2,300 |
| Company size (revenue) | US\$1.6 billion |
| Industry | Security and commodity exchanges |

Business Information (before HDS engagement)

XYZ Inc. faces continued demands in storage growth, increased data performance, and new cost sensitivities.

Taking a business-as-usual approach will result in higher TCO (even with disk price erosion) as total capacity could extend beyond 10PB in the next 4 years. Strains on labor, provisioning, migration, and data protection could increase with these large growth rates unless new architectures and operational processes are introduced.

The XYZ Inc. unit costs as measured in our ward is within the normal range, compared to other high-end storage users above 1PB in size. Labor costs are uncharacteristically low and power

and cooling costs are low, but these numbers are offset by the above-average cost of depreciation of storage assets. Due to very high performance requirements (RAID overhead and DBA headroom), 8 to 9 times the amount of raw storage is required to be purchased as compared to the amount of data.

XYZ Inc. is experiencing a very high growth rate, with allocated rates of 65% per year and raw capacity growth of over 100%. In the baseline TCO model, XYZ Inc. starts with a current usable capacity of 1.4PB on 41 different arrays in 3 data centers.

| | |
|--------------------|---|
| Business overview | CONFIDENTIAL |
| Corporate vision | CONFIDENTIAL |
| Corporate goals | <p>Economical</p> <ul style="list-style-type: none"> ■ Capex avoidance — lower cost of growth. ■ Capex avoidance — reclamation due to archive. ■ Storage management, labor effort. ■ Backup infrastructure, media, libraries, effort. <p>Technical</p> <ul style="list-style-type: none"> ■ Manage 65% data growth. |
| Challenges | <ul style="list-style-type: none"> ■ Continued demands in storage growth. ■ Increased data performance and new cost sensitivities. ■ Total capacity could extend beyond 10PB in the next 4 years. ■ Strains on labor, provisioning, migration, and data protection will increase without new architecture and new operational processes being introduced. |
| Cost sensitivities | <ul style="list-style-type: none"> ■ Hardware lease/depreciation ■ Hardware maintenance ■ Software maintenance ■ Storage mgmt. labor ■ Backup and DR labor ■ Migration ■ Power and cooling ■ Cost of growth |

Technical Information (before HDS engagement)

The blended unit cost of storage has been calculated to be \$10,976 per TB/year. The XYZ Inc. cost factors that make up this TCO number are defined as follows:

Depreciation

- Depreciation as a combined total is 41% of the TCO.
- There are 2 segments of the total depreciation cost for the 1.4PB of storage at XYZ Inc.
 - Written-to data (1st instance of the database).
 - DBA headroom. This includes copies, and unused but allocated space kept in reserve by the DBA.
 - This ratio is 3:1, and is consistent with the high performance needs of XYZ Inc.
- 2 segments, used or written to date and headroom data.

Hardware and software maintenance

- 13% of TCO.
 - Maintenance will increase with the age of the assets (warranty costs are pre-paid, but long migration times or extending the useful life of an asset will increase vendor maintenance costs.
- Power, cooling, and floor space.
 - Only 5% of the TCO.
 - This number is suspiciously low. More work has been started to review the BTU and kVA ratings of all arrays.
 - DC3 has better cost factors than the other 2 centers.

Storage Management Labor

- Currently 8% of the TCO for XYZ Inc.
- This is a very low ratio and indicates 1 of several possibilities:
 - Staff is highly skilled, and efficient.
 - Some work is shifted to contractors.
 - Some tasks are not getting done because staff is stretched thin.
 - Other.

Migration Costs

- Currently 10% of the TCO.
- As the assets get older, and more data is required to be moved to new arrays, this number will spike. Looking forward, and with no change in how data is migrated (or remastered):
 - This cost element will grow to 14-16% of the TCO.
 - Virtualization as a single investment can reduce the cost of migration (per terabyte) by 90%.

Cost of growth

- 11% of TCO.
 - This represents the current year investments needed to meet new demand.
 - Virtual, thin-storage architectures can slow down the cost of growth.

Backup

- 12% of TCO.
 - This cost includes media servers, licenses and labor.
 - This does not include the VTL or tape library infrastructure.
- Data circuits and SAN.
 - <1% of TCO.
 - SAN switches, DWDM devices.
 - Local and long distance leased circuits.

Storage Hardware

- Annual hardware maintenance fees: US\$1,363,000.
- Raw capacity: 2.9PB.
- Usable capacity: 1.4PB on 41 different arrays in 3 data centers.
- Allocated capacity: 894TB.
- Written capacity: 358TB.
- US\$12.9M NBV.
- Price of storage.
 - Tier 1 US\$7/gigabyte.
 - Tier 3 US\$1/gigabyte.

Storage Software

- Annual software maintenance fee: \$812,000.

Applications

- SRDF.
- Timefinder.
- EMC Control Center.
- Hitachi Storage Navigator.
- Symmetrix Performance Analyzer.
- Hitachi Replication Manager.
- Hitachi Tuning Manager.
- Hitachi Device Manager.
- Cisco Fabric Manager Server.
- Symcli.
- Navisphere Manager.
- NetApp Operations Manager.
- NetApp Filerview.
- NetApp Snapmirror.
 - Netapp client.
 - Symmetrix performance manager.
 - Symmetrix Optimizer.
 - Cisco Device Manager.
 - PowerPath.
 - OpenReplicator.
 - Open Migrator.
 - Symmetrix Management Console.
 - EMC Storage Scope.
 - Hitachi Universal Replicator.

Storage Metrics (where previously measured)

- TCO/TB/Year (US\$).
 - Year 1: \$4203.05.
 - Year 2: \$5539.33.
 - Year 3: \$3897.70.
 - Year 4: \$2934.46.

Solution and Services Information (our products and solutions deployed)

Solutions for XYZ Inc. to consider:

- Create a storage services catalog — XYZ Inc. needs to define different tiers of storage (based on performance, cost, and service levels) in order to implement additional options such as virtualization and thin provisioning. Not all technical and operational recommendations in this report would apply to the highest level of storage or application. The existence of a catalog will, in part, assist in defining and rebalancing total capacity at XYZ Inc.
- Virtualization (in the controller) can be introduced to lower-tiered storage pools at XYZ Inc. Existing HDS USPV arrays are capable with most of the hardware and software already in place. Arrays that are virtualized will significantly reduce (by 90%) the cost of migration and the cost of usable but unallocated capacity (by 60%). The reclaimed space can be used for organic growth of Tier 1 disks.
- Dynamic tiering and capacity rebalancing of the virtualized storage pools will help reduce the cost of growth.
- Thin provisioning for Tiers 2 and 3 will reduce the cost of growth as well as provide a onetime capacity reclamation for the storage pools that migrate from thick to thin.
- Archive functions can remove infrequently used data or copies to a very low cost of searchable/indexed archive storage.
- Capacity on demand for lower tiers can be negotiated with the storage vendors to present burst-mode reserve capacity. XYZ Inc. is currently holding and financing the reserve capacity (and should still do so for Tier 1), but should consider moving this expense to the vendors for Tiers 2 and 3 only.

Resulting Benefits

Results of Possible Changes and Investments

- Blended unit costs for all tiers (all sites) will be reduced by 15% within the first full year, and by a total of 30% after 4 years.
- Tier 2 and Tier 3 DBA reserve capacities can be reduced by 60-70%.
- Usable but unallocated capacities can be cut by 80-90%. Vendors can be carrying all burst mode growth reserve capacity within the virtualized storage pool.
- Cost of migrations will save XYZ Inc. US\$14 million over 4 years.
- Total storage demand will drop by 1.5-2.5 PB (from a projected 10PB to 7.5-8.5PB).
- Reclaimed capacity in the first few years may present a capex “holiday” of 3-6 months.
- Projects and end users will have visibility into the true cost of their storage decisions.
- The capital review board will have transparency into utilization, cost factors, and consumption behaviors as decisions are being made.

| Investment (US\$) | 0 | Savings Summary (US\$) | |
|----------------------|------------|------------------------|-------------------|
| 4 year savings | 38,488,317 | Labor, migrate | 15,074,992 |
| NPV of savings | 29,441,362 | Capex Avoid | 10,637,134 |
| Incremental IRR | – | Environmental | 4,076,191 |
| Payback term | 3 months | Maint. fees | 8,700,000 |
| Return on investment | – | Total | 38,488,317 |
| Reclaimed Disk | 539TB | | |

| TCO/TB/YEAR (US\$) | | | | | |
|---------------------------------|----------|---------|---------|---------|----------|
| | Baseline | Year 1 | Year 2 | Year 3 | Year 4 |
| Advanced Arch (Virt+Thin+Tiers) | \$1,442 | \$1,531 | \$2,198 | \$3,155 | \$4,530 |
| Business as usual | \$1,442 | \$2,379 | \$3,926 | \$6,478 | \$10,688 |

Sources of Savings

- Purchase avoidance: Tiered Storage: 21%.
- Data Remastering: Migration: 37%.
- Hardware and software maintenance savings 23%.
- Environmental savings: 11%.
- Reclamation: virtualization: 4%.
- Storage area management: 2%.
- Reclamation: thin provisioning: 2%.

Technical

- Capacity reclaimed: 539TB.

USE CASE

Economic

| Cash investment (savings US\$) | Year 1 | Year 2 | Year 3 | Year 4 |
|-------------------------------------|------------------|-------------------|-------------------|-------------------|
| Environmental | 380,606 | 653,006 | 1,120,364 | 1,922,216 |
| Purchase avoidance (tiered storage) | 559,289 | 1,324,985 | 2,376,937 | 3,824,930 |
| Storage area management | 62,487 | 124,286 | 185,444 | 246,007 |
| Reclamation (virtualization) | 1,712,748 | 0 | 0 | 0 |
| Reclamation (thin provisioning) | 838,246 | 0 | 0 | 0 |
| Hardware/software maintenance | 2,175,000 | 2,175,000 | 2,175,000 | 2,175,000 |
| Data remastering (migration) | 1,356,000 | 3,649,900 | 5,377,218 | 4,073,650 |
| Sum of savings | 7,084,375 | 7,927,177 | 11,234,963 | 12,241,802 |
| Net cash flow | 7,084,375 | 7,927,177 | 11,234,963 | 12,241,802 |
| Cumulative cash flow | 7,084,375 | 15,011,552 | 26,246,515 | 38,488,317 |

Cost reduction

- 4 Year Savings: US\$38,488,317.
- NPV of Savings: US\$29,411,362 (based on a 10.5% client-supplied IRR).
- Pay back term: 3 months.

Which costs reduced?

- Capex.
 - Capex avoid: US\$10,637,134.
- Opex.
 - Labor/migrate: US\$10,074,992.
 - Environmental: US\$4,076,191.
 - Maintenance Fees: US\$8,700,000.
- ROI: 3 months (months taken to recover cost).

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