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USE CASE

Storage Economics Engagement Customer Summary

INDUSTRY: Government
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

In reviewing the XYZ City environment, Hitachi took many parameters into consideration. The analysis leverages actual XYZ City numbers along with empirical Industry data to calculate potential savings that XYZ City can achieve with the proposed storage architecture refresh.

HDS recommends that the XYZ City:

- Consolidate their environment: Arrays and SAN.
- Focus on decommissioning the older arrays and SAN.
- Be more aggressive in their movement to archive.
- Create a storage portfolio to align capabilities with SLA/SLO requirements.

XYZ City can save a total of US$13,113,507 by updating their current storage architecture to the proposed Hitachi solution. This solution will reduce cost/terabyte/year from the original US$3,078.05 down to US$2,442.00.

Contents

Key Financial Metrics

Category	Key Financial Metrics
Investment	$0 (total 4-year investment)
Savings	$13,113,507 (total 4-year savings) $10,125,514 (net present value)
Return on investment (ROI)	N/A (savings/# of years/investment)

Company Information

Company name	XYZ City
Region	Americas
The country of company headquarters	**CONFIDENTIAL**
Company size (employees #)	**CONFIDENTIAL**
Company size (revenue $)	**CONFIDENTIAL**
Industry	Government

Business Information (before HDS engagement)

Business overview	**CONFIDENTIAL**
Corporate vision	**CONFIDENTIAL**
Corporate goals	**Economical** ■ Capex reduction. ■ Opex reduction. **Technical** ■ Manage 38% data growth.
Challenges	**Data growth %** ■ Underutilization of assets. ■ Labor issue. ■ Performance issues. ■ Migration disruption.
Cost sensitivities	■ Hardware lease/depreciation. ■ Software depreciation. ■ Hardware maintenance. ■ Software maintenance. ■ Storage management labor. ■ Backup and DR labor. ■ Migration/remastering. ■ Floor space. ■ Power and cooling. ■ Cost of copies. ■ Backup infrastructure. ■ Backup media. ■ Storage area networking.

Technical Information (before HDS engagement)

Hardware

- Average Asset Age: 3 years.
- Most of the storage is configured as RAID 5 7+1.
- 5-year life cycle.

Overview (terabytes allocated)

- Raw: 583TB.
- Usable: 466TB.
- Allocated: 304TB.

Breakdown

- Total NAS 125TB.
- Total SAN 341TB.
- Tier 1.
  - USP 44TB usable.
  - USP V 10TB usable.
- Tier 2.
  - USP VM 50TB usable.
  - AMS 2500 48TB SAS.
  - Test/dev 9585* 31 TB.
- Tier 3.
  - AMS2500 50TB.
  - AMS2100 33TB.
  - WMS100 3TB.
- Other.
  - NetApp Production: 55TB.
  - NetApp backup: 70TB.

*Note: 9585 and AMS 500 will both be decommissioned later this year. Additional capacity is being added to T2 production AMS 2500 and T3 (AMS 2500 COC) to prepare for the migration. Hence, there is an overlap in the disk capacity.

Storage Growth

	Tier 1	Tier 2 (prod)	Tier 2 (test/dev)	Tier 3	Tier 4
Purchase Cost per GB (US$)	$20.56	$16.28	$3.8	$2.25	$2.25
Growth rate of the tier	25	40	40	48	40
Total Capacity, or %	13.5	34.7	21.1	26.5	4.2

Amount of data that is copies:

- Mostly, it is the databases (SQL or Oracle) that have multiple copies. Unstructured data on NetApp rarely except Livelink on NetApp, which they have 2.5TB copied data from the 4TB data source. However, if the users on home drive or departmental shared drive decide to make multiple copies, we will not know.
- For databases, about 80% will have a test copy, a development copy, and a production copy.
- Some odd 20% databases such as POSSE or PeopleSoft may have 7 or 8 copies plus a training database.
- The test/dev database instances reside on T2 Test/Dev; that is, AMS 2500 with SAS and SATA drives. T2 Test/Dev AMS 2500 is virtualized behind USP V. Production instances will reside on either T2 Prod (USP VM), T1 (USP) or AMS 2500 (SAS) virtualized behind USP VM. Totaling up the disk space on each array type will give a snapshot of the amount of disk used.
- In terms of backup, there are always 2.5 iterations for Oracle databases (2 iterations and extra swing space for Oracle rman to perform post compression and 3 iterations for SQL databases. They all reside on T3 (AMS 2500 with SATA drives).

Maintenance:

- USP — US$269,129 for 1 year until July 2012.
- USP V — standard 5 years of maintenance included with purchase.
- T2 Prod AMS 2500 (SAS) — standard 5 years of maintenance included with purchase.
- T3 Prod AMS 2100 (SATA) — standard 5 years of maintenance included with purchase.
- T2 USPVM — standard 5 years of maintenance included with purchase of 9585 US$29,889.80.
- HCAP (AMS 2100 backend) — standard 5 years of maintenance included with purchase of AMS 500 US$27,601 for 1 year until October 2012.
- WMS 100 — standard 5 years of maintenance included with purchase.

Additional parameters:

- Cost of labor.
  - Storage admin: $160,000.
  - Backup admin: $80,000.
  - Others: 2FTE storage admin, 2.5 FTE backup admin.

Description of the type of storage architecture (network topology) currently used.

- Production data is kept in COC data center. T1 is USP, which stores data that requires replication for disaster or service continuity purposes. Most of the data is stored on T2 storage arrays, which are comprised of USP VM and AMS 2500 (SAS). AMS 2500 is virtualized behind USP VM. T3 is AMS 2500 (SATA), which stores mostly backup. AMS 2500 (SATA) is also virtualized behind USP VM. There is HCP in COC with AMS 2100 (SATA) as backend storage. AMS 2100 is also virtualized behind USP VM.
- The COC SAN fabric is made up of 2 fabrics: Brocade/McData i10K and Brocade DCX. Brocade DCX has a Brocade 5300 attached as an edge switch. Each McData i10K and Brocade DCX fabric is connected to a Brocade 5300 fabric switch in Manchester — SAN is extended from COC to Manchester. In Manchester, there is a standalone fabric consists of a McData 4700 for DR/service continuity purposes. In addition, there is a 4th fabric connecting all the tape devices (tape fabric).
- In the secondary site (Manchester), there is USP V, which is the replication target for USP in COC. Virtualized behind USP V is AMS 2500, which contains a mix of SAS and SATA drives. AMS 2500 stores test/development data.

Frequency and time involved for each of the following storage management processes (out of 2 storage resources; that is, 200%):

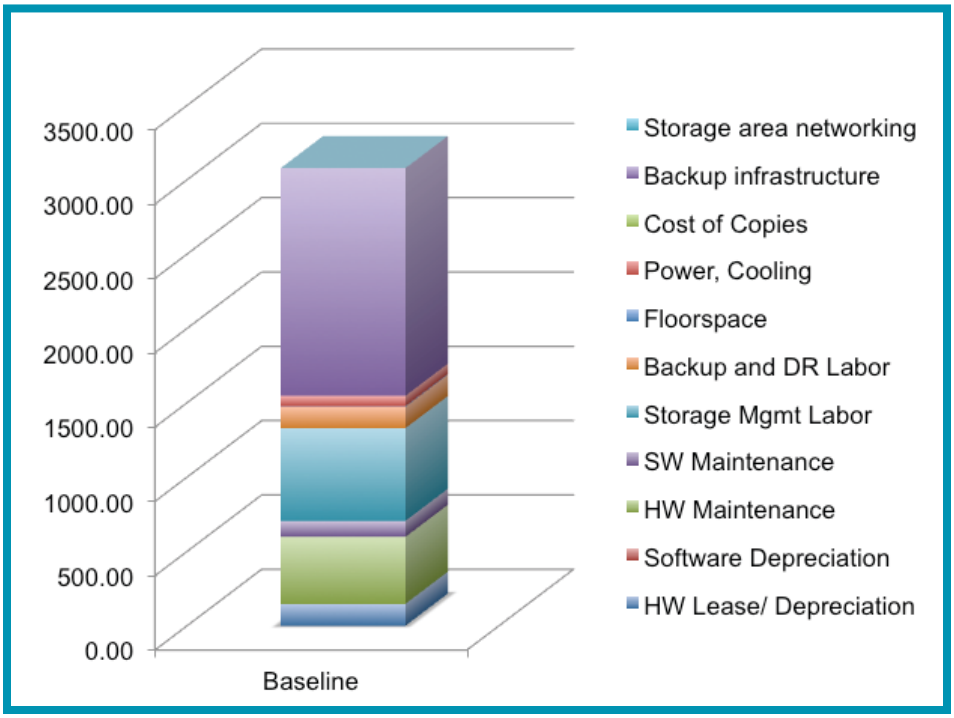
- Management reports, capacity management, and general storage planning — 60%.
- Storage provisioning (LUN expand, delete), tuning — 50%.
- Troubleshooting, bottleneck analysis, and storage or SAN problem analysis —15%.
- Data lifecycle management and data remastering — 25%.
- Time and effort involved to copy databases to other locations for development and testing — 5%.
- SAN configuration and compatibility analysis — 10%.
- Chargeback and asset management analysis — 15%.
- Security Analysis and provisioning — 5%.
- Heterogeneous Storage Management — 15%.
- Storage procurement (RFI, RFP, etc.) — 0% (RFP/RFI is not done by the storage administrator).

Backup:

- Daily incremental on all servers and full backup once a week.

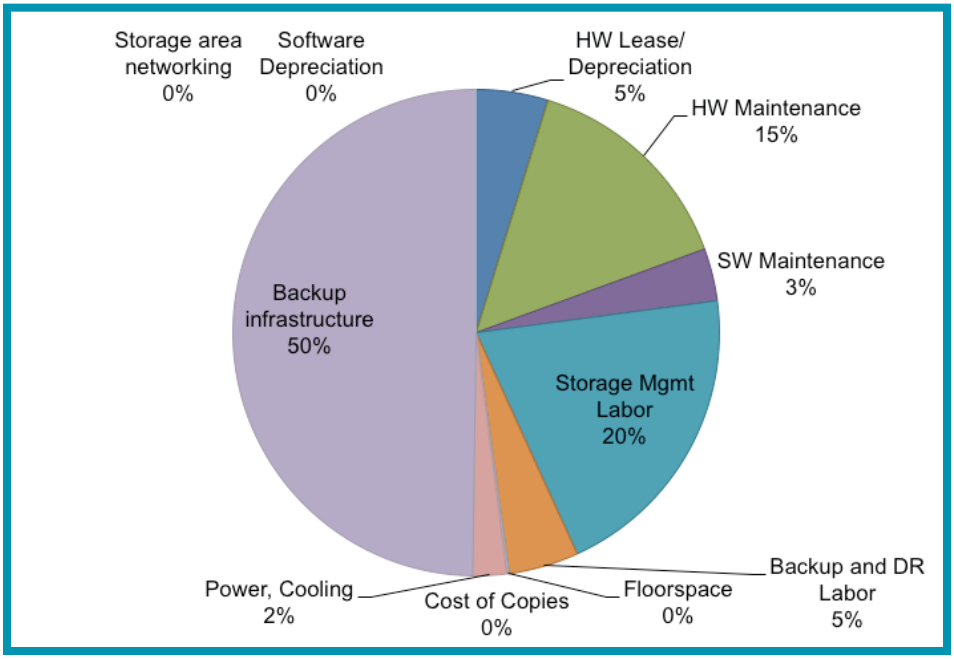
Solution and Services Information (our products and solutions deployed)

TCO Analysis: TCO/TB/YR (US$)



- Approximately US$3,100 per year based on current measurements.
- Lower than typical starting point that HDS sees when viewing most common cost elements.

TCO Analysis: Highest Costs



Top costs: SAN and backup

- Can be addressed with minimal disruption to current architecture.
- Make up 76% of TCO baseline.

SAN

- 3x to 4x than commonly observed.
- Observed figure is ~US$1500/port (assumes purchase discount has been applied).
  - US$1,100 for HBA, US$200 for the edge port on the switch (1/24 the switch cost), some portion of the ISL, storage array port, and director costs, plus software, cables, etc.
  - If the server has 2 HBAs, then the count is doubled.
- City has 924 ports times US$1,500 = US$1.4 million.
- Solutions that have been proven to reduce this cost:
  - SAN consolidation.
  - SAN and data network aggregation.

Backup/infrastructure

- The 2nd-largest individual cost element; will be compounded as the environment grows.

	Year 0
Capacity — total usable terabytes	466
Full backup capacity per period	121.6TB
Full backup capacity per year	1264.6TB
Incremental backup capacity per event	86.4TB
Incremental backup capacity per year	**1871.9TB**
Annual backup capacity	**3,136.6TB**
Business as usual backup costs	**US$1,254,624.80**

TCO: Everything else

- Current tier distribution looks great.
  - T1 = 13.5%.
  - T2 = 55.8%.
  - T3 = 26.5%.
  - T4 = 4%.
- Use of HTsM
  - Low migration costs.
  - Used US$1500/terabyte

Storage hardware and software

- Hardware.

Recommendations:

- Consolidate environment – arrays, SAN – short-term impact will be realized.
  - Get those old arrays off the floor – SAN?
- More aggressive movement to archive.
- Create storage portfolio to align capabilities with SLA/SLO requirements. This will alter consumer behavior if the business unit is to be charged for storage- related services.
  - Includes more than just technology.

Resulting Benefits

OVERVIEW					
	Comparative TCO (US$)				
	Current	Year 1	Year 2	Year 3	Year 4
New architecture(s)	0.00	2865.00	2661.20	2729.90	2518.95
Business as usual	3078.05	3728.11	4120.39	3819.60	3422.62

CASH FLOW SUMMARY (US$)					
		Year 1	Year 2	Year 3	Year 4
Cash investment		0	0	0	0
Savings	Environmental savings	– 476	– 678	– 968	– 1,381
	Purchase avoidance – tiering	0	0	0	0
	Storage area management	14,539	29,202	43,999	58,940
	Reclamation – virtualization	0	0	0	0
	Reclamation – thin provisioning	0	0	0	0
	HW and SW maintenance	190,700	210,000	260,000	260,000
	Data remastering – migration	0	0	0	0
Sum of Savings		**204,764**	**238,524**	**303,031**	**317,560**
Net cash flow		204,764	238,524	303,031	317,560
Cumulative cash flow		204,764	443,287	746,318	1,063,878
Total investment		**0**			
Total savings		**1,063,878**			

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