

Tackling the cost challenge of long term data storage



Fujifilm
6th Annual Global IT Summit

Brad Johns, President
Brad Johns Consulting LLC
brad.johns@bradjohnsconsulting.com
www.bradjohnsconsulting.com

Long term data storage is not a new problem



But the amount of information is much greater, and we have different storage technologies

There is no shortage of available technology choices

Flash Disk Systems



Tape Libraries



The Cloud



Low Cost Disk Systems



Features vary considerably

Feature	Flash Disk System	Tape Library	Low Cost Disk Filer	The Cloud
Technology Description	Flash Modules	LTO Gen 6	4 TB 3.5" HDD	Amazon Glacier
Max Capacity Per System	40 TB Useable	PB's	PB's	Unlimited
IOPS (Read)	1.1 M	Low	000's	Batch
Latency (time to first byte)	135 microseconds	Seconds to Minutes	milliseconds	3-5 hours
Data Rate (MB/Second)	8000	160 MB/s/drive	Hundreds MB/second	Network dependent
\$/TB Acquisition Cost	\$3900*	\$98	\$280	0
Energy Consumption	625 W/Unit	110 W – Library 24 W – Drive 0 W - Cartridge	15 W/TB	0

* 5:1 compression

Total Cost of Ownership (TCO) Components

- Initial Acquisition Costs (Capex)
 - Hardware Purchase Price
 - Software Initial License Charges
 - Extended Warranties
 - Installation Charges
- Operational Costs (Opex)
 - Maintenance and Support
 - Power and Cooling
 - Floor Space
- *...And Technology Refresh*
 - Replace initial system with new technology
 - Drivers – Reliability, Economic, Technological



There is a good chance that the data is going to outlive the system that it resides on

"Prediction is very difficult, especially if it's about the future."

- Neils Bohr, Nobel laureate in Physics
- ▶ TCO estimates require projections of future technology capacities and price points which will not be 100% accurate
- ▶ We don't need perfect accuracy to reach actionable conclusions



Technology Systems and Projections

Enterprise Flash

System Type	IBM Flashsystem 840
Initial Technology	4 TB eMLC Flashcard
Refresh	Year 6
Annual % Rate Improvement	36%

Tape Library

System Type	V80 Tape Library
Initial Technology	LTO Gen 6
Refresh	Year 5 – Gen 8
Annual % Improvement	39%

Cloud

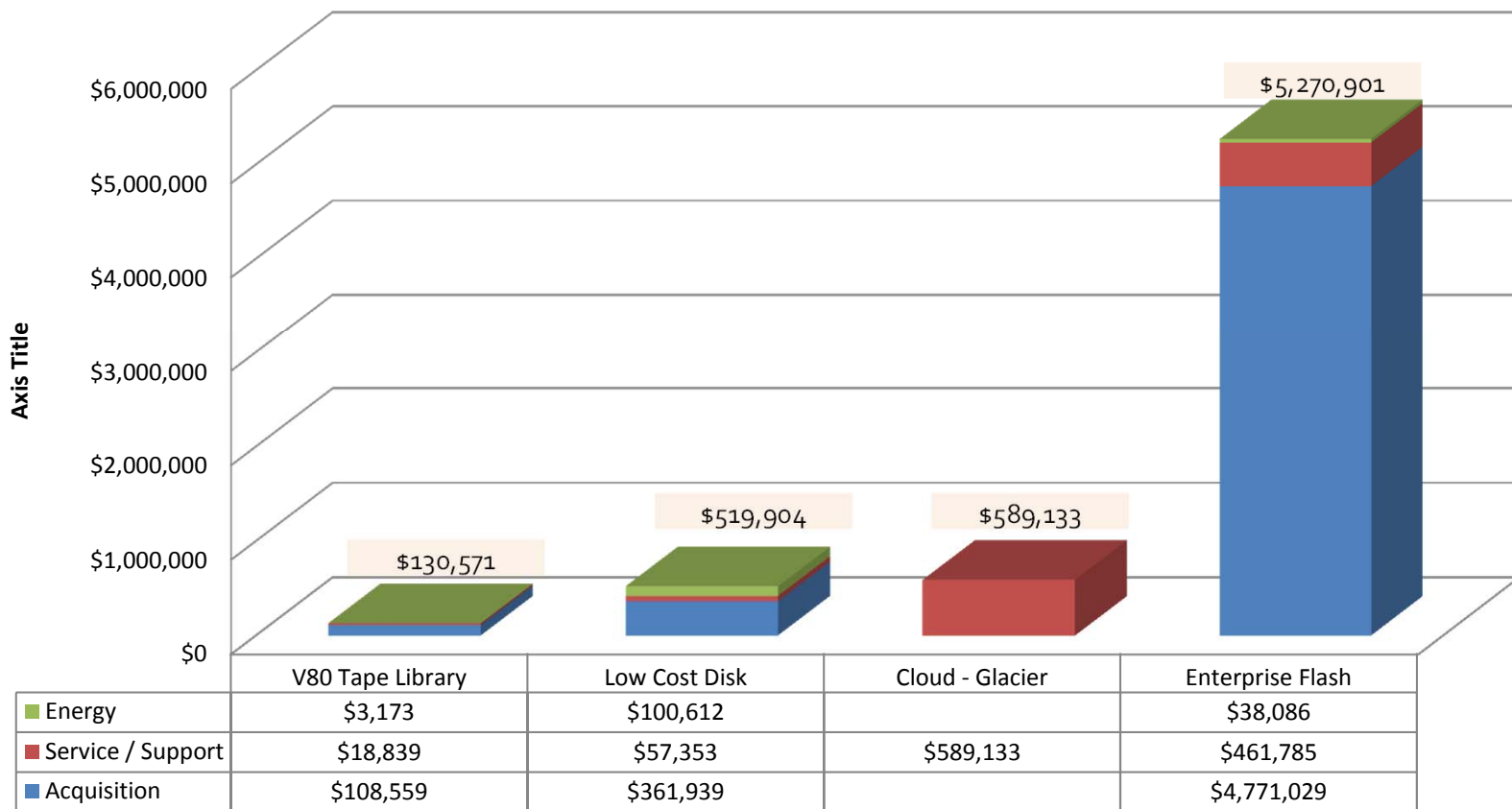
System Type	Amazon
Initial Technology	Glacier
Refresh	Annually
Annual % Rate Improvement	20%

Low Cost Disk Systems

System Type	Composite
Initial Technology	4 TB SATA HDD's
Refresh	Year 6
Annual % Rate Improvement	26%

Projected TCO

1 Petabyte, non-compressible data - 10 Year TCO



Conclusions

- Tape is the lowest cost solution and provides significant energy savings under any reasonable set of projections
- Cloud Storage is an interesting solution, but cost saving is not its primary benefit
- There are many use cases for FlashStorage, but long term data retention is not one of them
- Intelligent tiered solutions with integrated tape storage have the potential to support services levels while significantly lowering costs

