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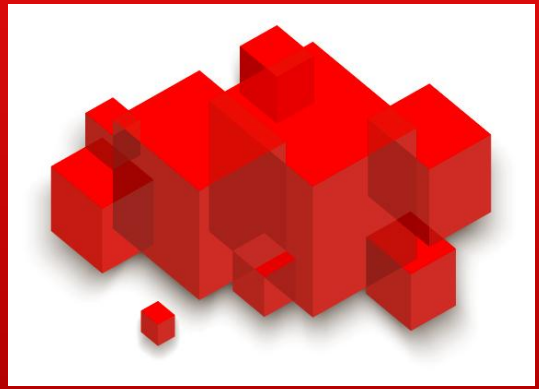
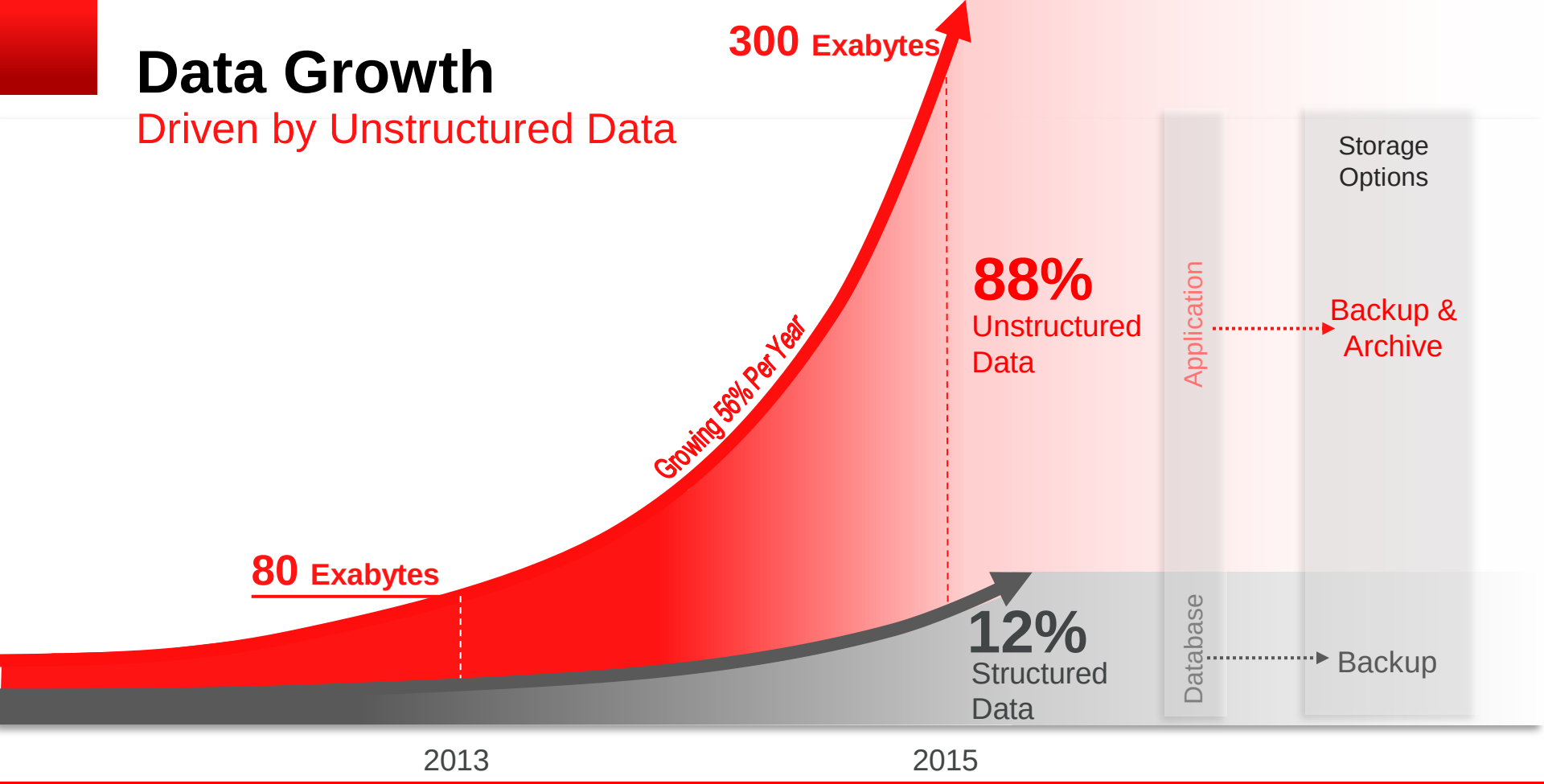
Media for Long-Term Archiving

June 2014



Data Growth

Driven by Unstructured Data



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** Source: ESG Digital Archive Market Forecast*

What's Driving Digital Archiving?

Factors Driving The Keep Everything Forever Mindset

- Business Opportunity
- Data & Content Growth
- Compliance & E-Discovery
- Cultural Preservation
- Digitization

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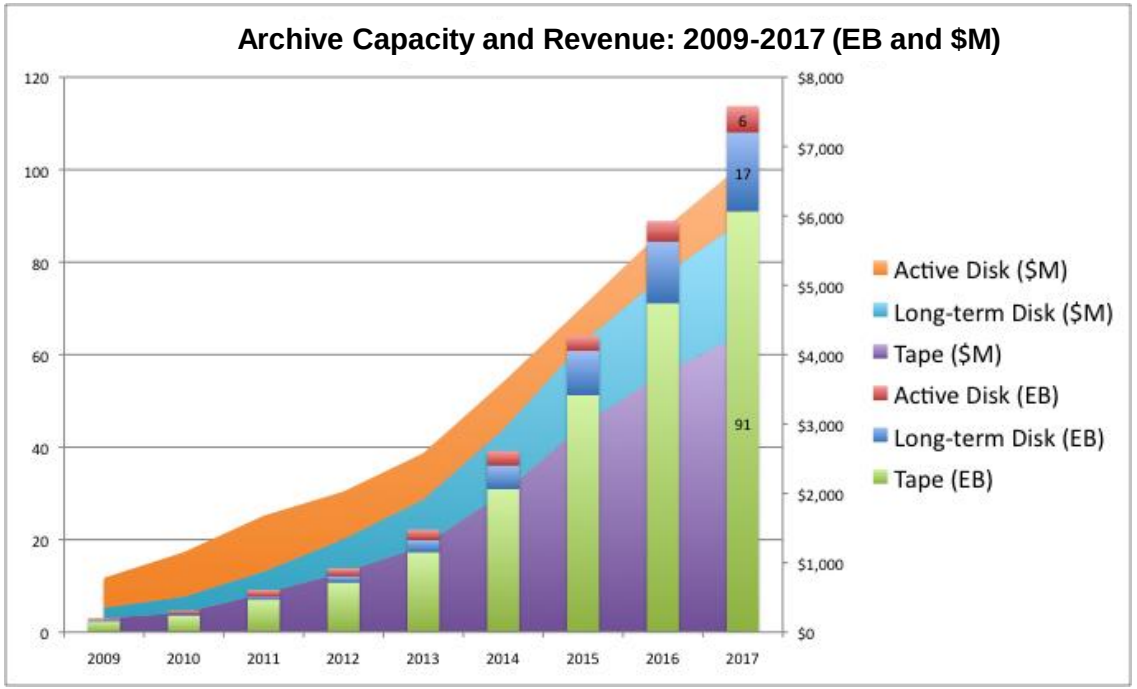
The Digital Archive Market

Tape is the Largest Tier



Storage for archive and retention is a $3B Market growing to over $7B in 2017

- Use case for archive storage is becoming distinct from primary or backup use case
- Tape is established as primary storage tier for long-term archive retention

IDC Market Analysis. Worldwide Archival Storage Solutions Forecast: Archiving Needs Thrive in an Information-Thirsty World. (IDC #230762)

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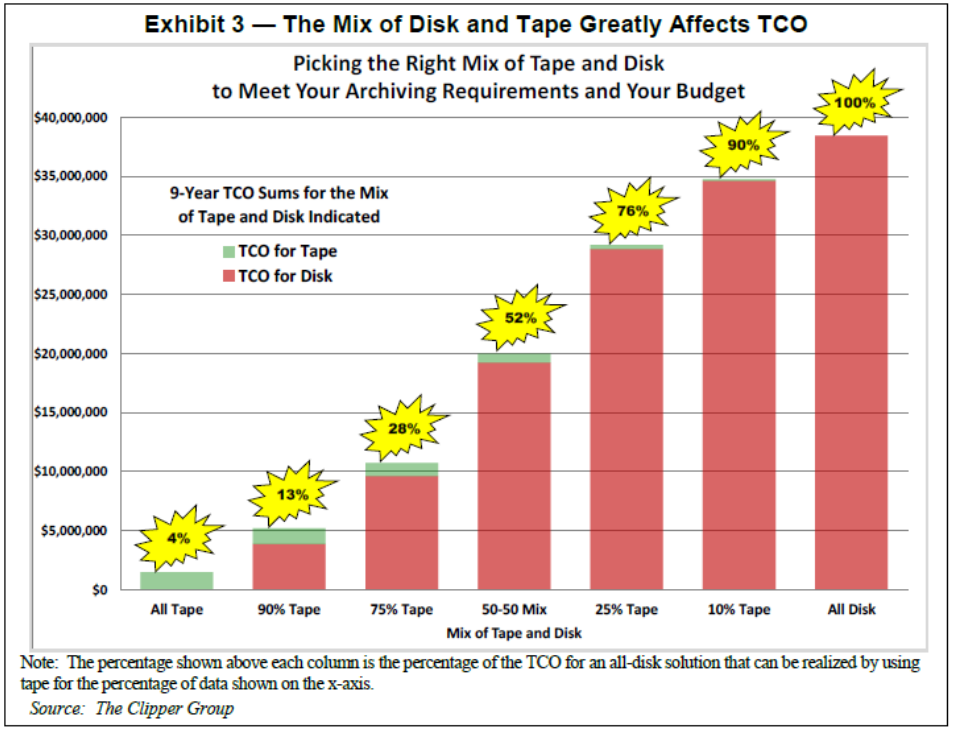
Tape Costs Less Than Disk

NEW Study Concludes Disk Costs 26 Times More Than Tape

Study compares a 1 PB archive growing at 45% annually for 9 years on disk and tape.

Assumes 1:1 compression



*** Includes equipment, media, maintenance, energy, and floor space**

The Clipper Group, http://www.oracle.com/us/corporate/analystreports/industries/clipper-tco-storage-2013-1959019.pdf

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Storage Technologies Areal Density Trends

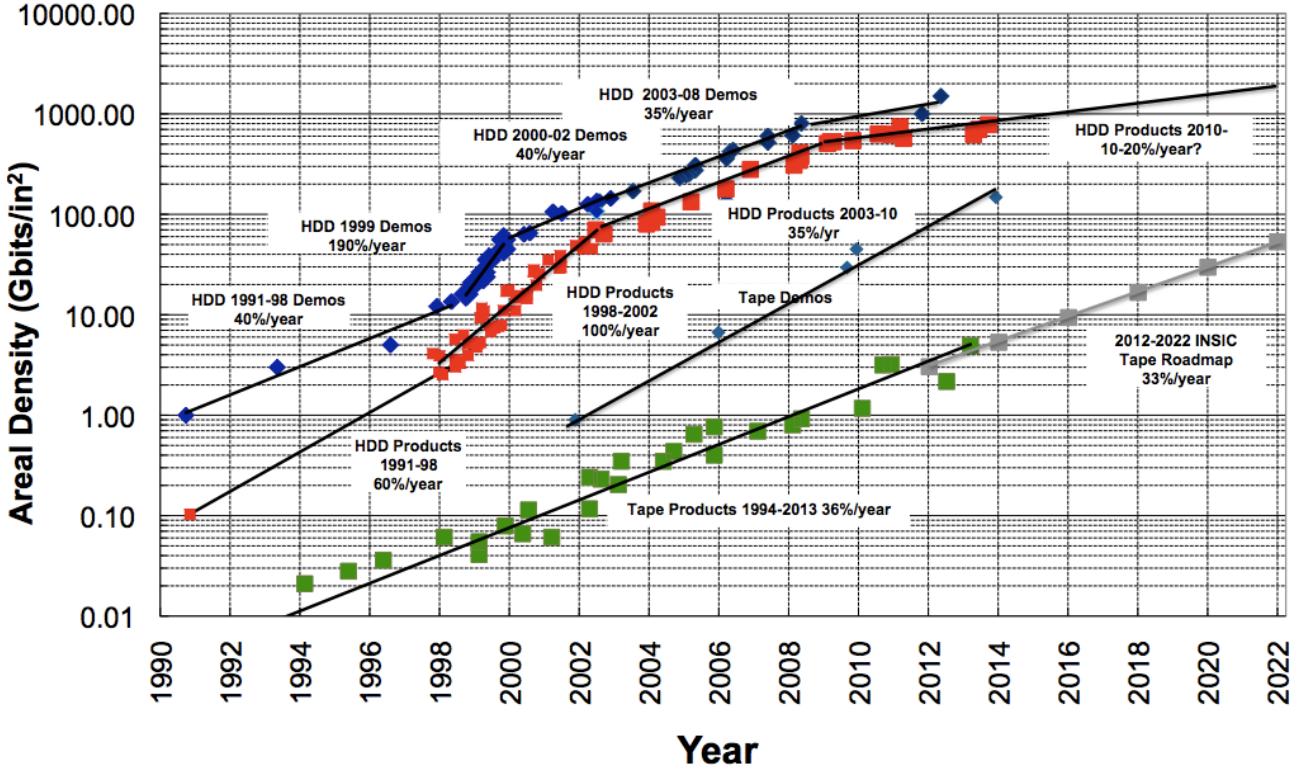

Chart courtesy of INSIC

Tape gets its capacity by having 1000X the recording surface area comparing a 1/2 inch cartridge to a 3 1/2 inch disk.

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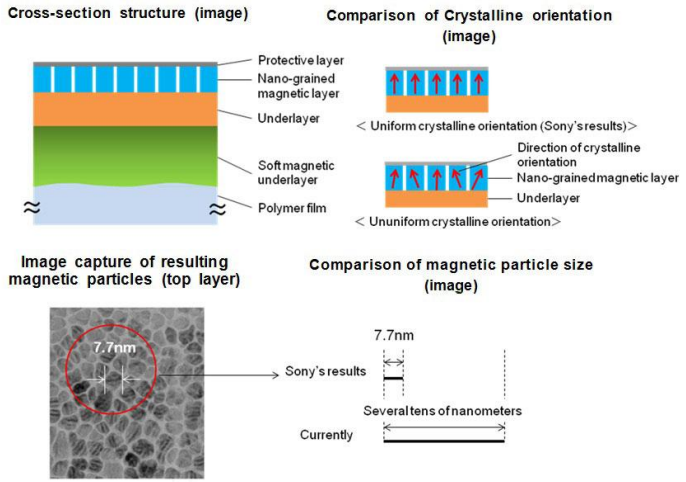
Tape Demo Sets New Record

- Sony Areal Density Demo[1,2,3]
  - 148 Gbits/inch^2
  - Capacities ~ 185 TB in a single cartridge
  - Sputtered perpendicular media



T2 BaFe is 20nm

1. http://www.sony.net/SonyInfo/News/Press/201404/14-044E/
2. http://www.bbc.com/news/technology-27282732
3. http://www.theregister.co.uk/2014/04/30/sony_nanotechnicians_invent_magnetic_tape_that_stores_148_gb_per_square_inch/

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IDC is observing a shifting trend in cloud and Web-scale architectures to a multitier storage strategy in order to sustain growth while maintaining existing data.

IDC

Technology Assessment: Cold Storage is Hot Again

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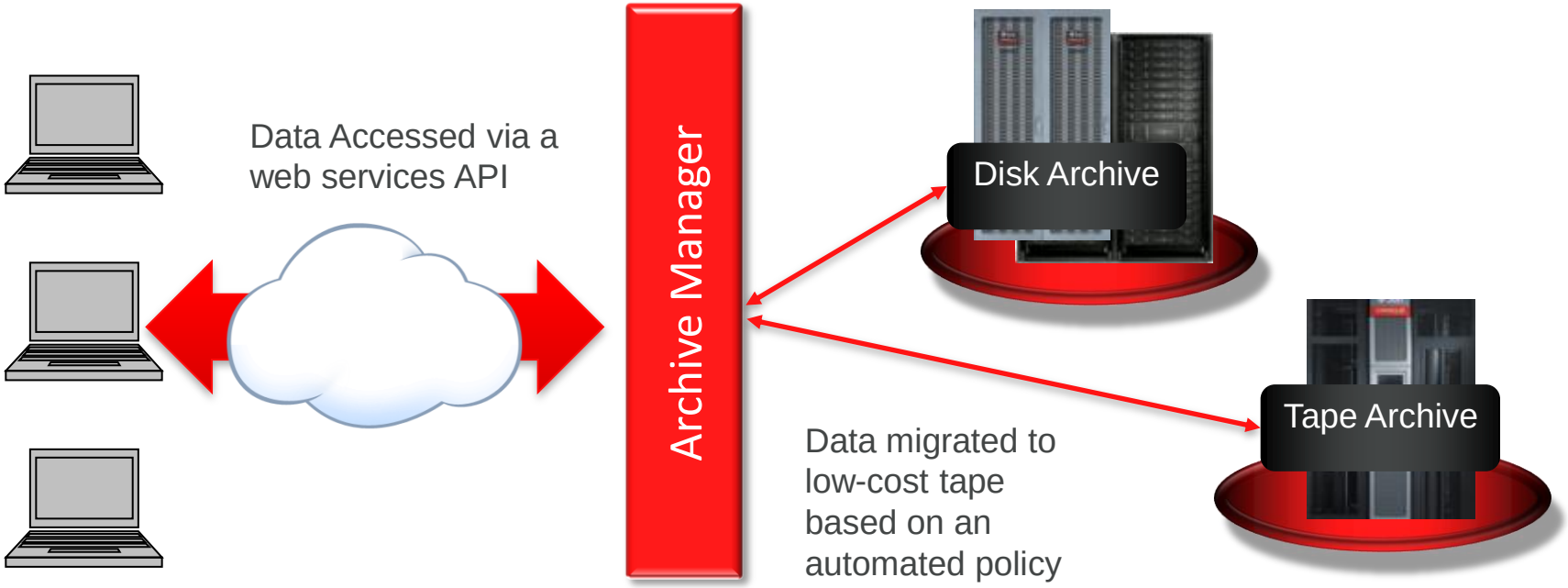
Tape Web Interface for Cold Storage / Archive

Simplify the use of Tape



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“Glacier is almost 10 times as expensive as an on-premise tape system with support.”

Jack Clark, ZDNet

AWS Glacier's dazzling price benefits melt next to the cost of tape

http://www.zdnet.com/aws-glaciers-dazzling-price-benefits-melt-next-to-the-cost-of-tape-7000003068/

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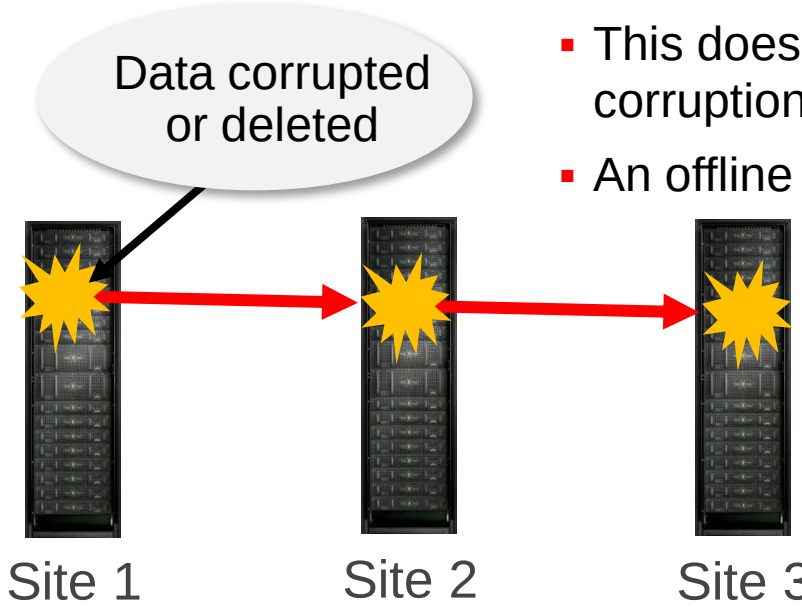
Protect Against the Risk of Data Loss

- Cloud storage typically stores multiple copies of data on disk across data centers
- This does not prevent against software bugs, corruption, or accidental deletion
- An offline copy on tape is **best practice**



Offline Copy on Tape is Protected

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Tape Solution Example – Import/Export

LTFS Transfer

LTFS is a Self-Describing Format

Cloud Storage

LTFS Tapes are imported or exported with the Cloud Storage Provider

"**Tape is more suitable** for physical transportation of large amounts of data as it is less vulnerable to mechanical damage during transportation compared with disk."

IDC Report. April, 2011. "IDC's Archival Storage Solutions Taxonomy

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Summary

Key Points

- Archive Data growing 56% per year to 303 EB in 2015
- Tape is the predominant medium for storing archive data
- Tape is 26x less expensive than disk
- The price advantage for tape is projected to increase
- There is a trend towards multiple tiers of cloud storage
- Tape is ideal for cold storage
- A web interface for tape simplifies the use of tape for cold storage

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