

1st ASTERICS-OBELICS Workshop

12-14 December 2016, Rome, Italy.



H2020-Astronomy ESFRI and Research Infrastructure Cluster
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Oracle Long-Term Storage Solutions

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Philippe Deverchère
Oracle EMEA Storage CTO

Storage Continues to Grow



Media & Entertainment

Growing Video Formats



Healthcare

Medical Imaging &
Digital Records



Content Management

File Lifecycle Management



HPC & Big Data

Expanded Computational
Modeling



Video Surveillance

Real-Time Monitoring



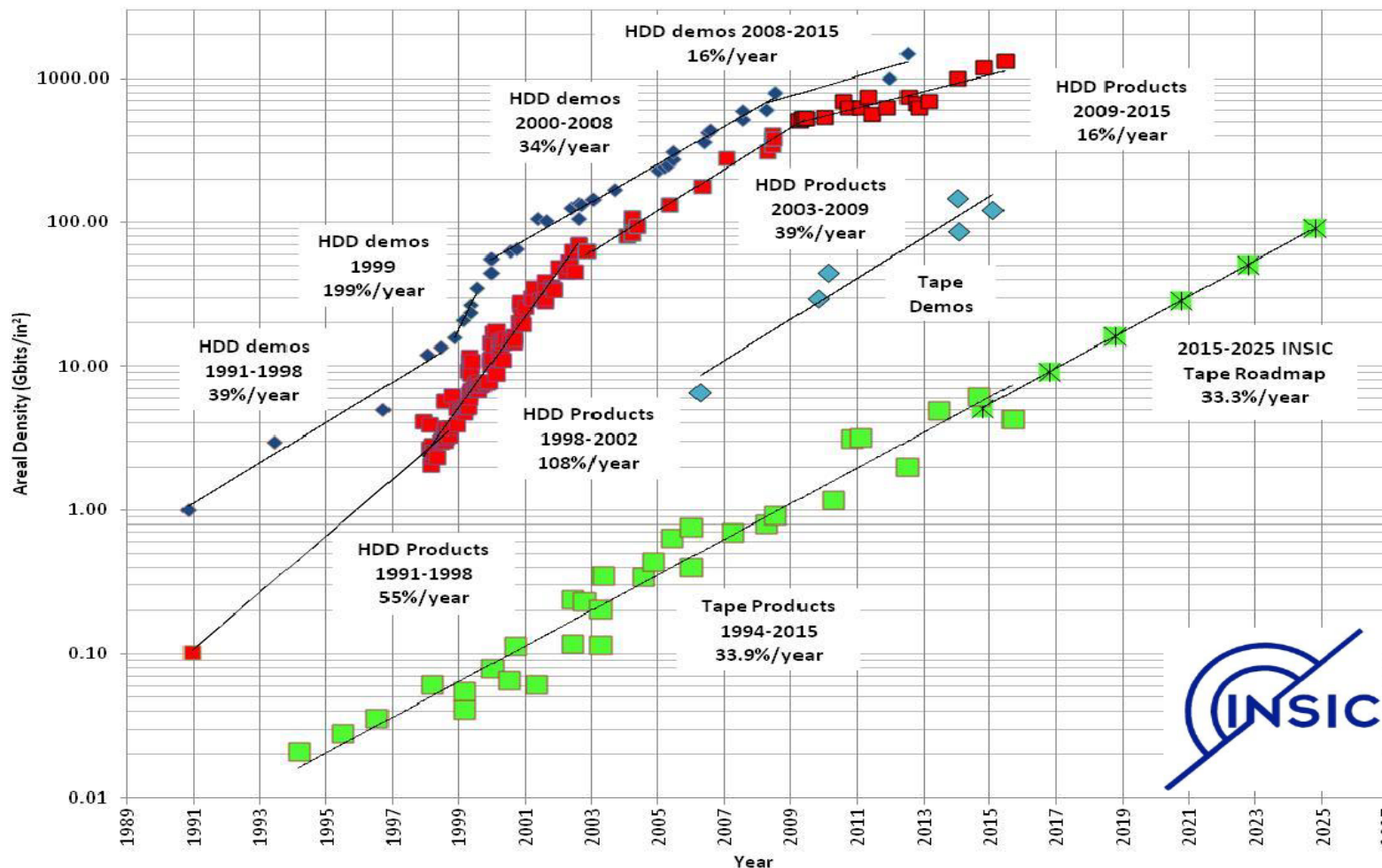
Preservation

Digital Curation

What is Generating all this Data?

- New generation of scientific data
 - By 2025, storing and processing genome data will exceed the computing challenges of running YouTube and Twitter (up to 40 exabytes)
- Internet, Social Media, video
 - By 2019, nearly 1,000,000 minutes of video content across network every second
 - New high resolution video formats and reality content technologies
 - 24 hours of video can generate up to 85 TB
- Sensor data
 - 40 TB/hr from Boeing 787 aircraft in flight
 - Self driving car generates data at 1 GB/s or 2 PB/year

Areal Density Trends

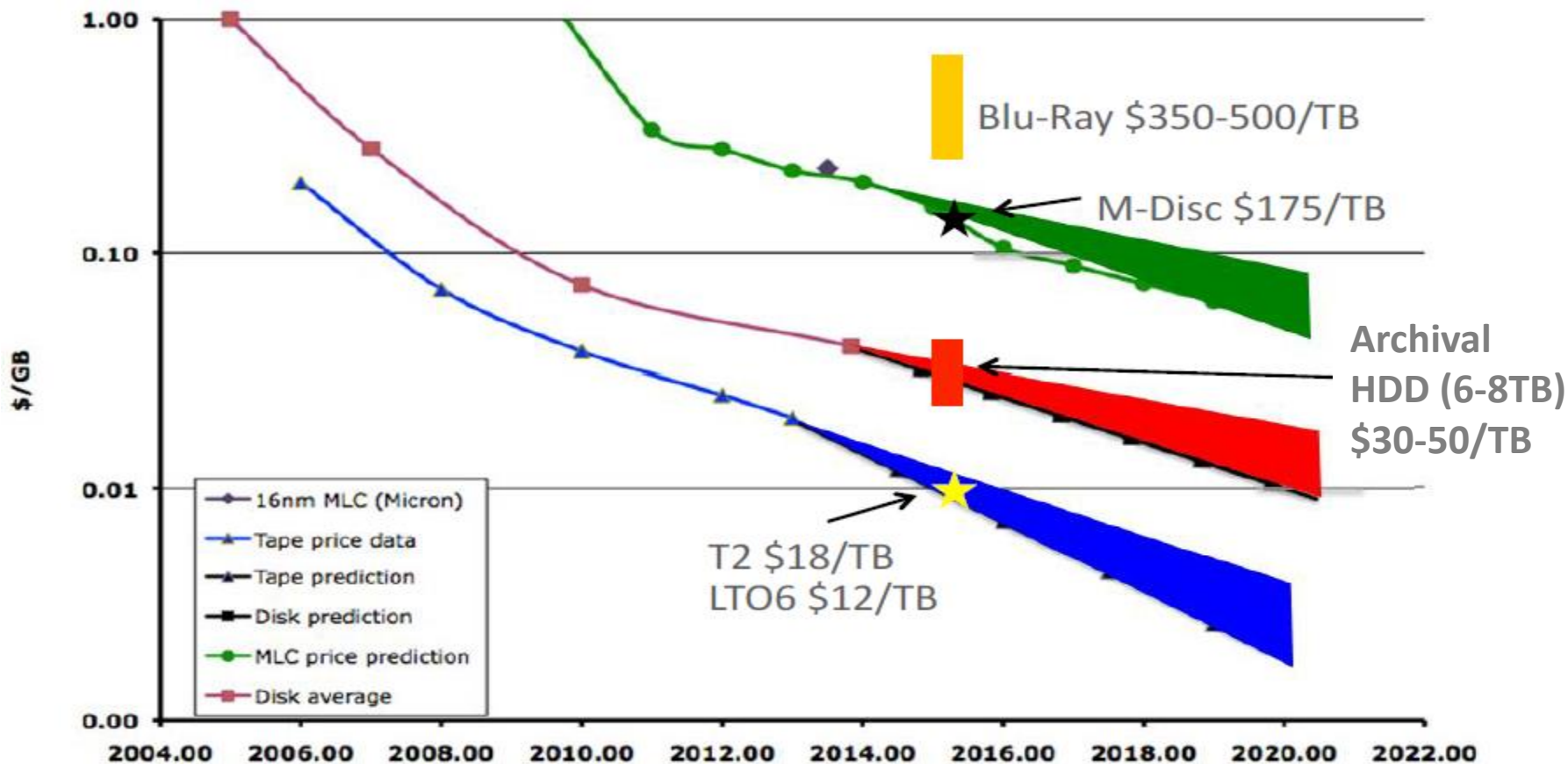


Tape gets its capacity by having 1000X the recording surface area comparing a 1/2 inch cartridge to a 3 1/2 inch disk.

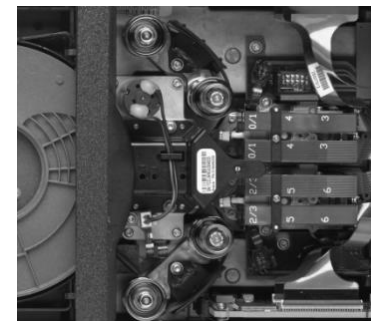


Chart provided courtesy of the Information Storage Industry Consortium (INSIC)

Storage Device Price Trends and Predictions



Tape Use Cases



- Large scale data protection
 - Low cost insurance scenario
 - Secondary long term copies, Disaster Recovery, Off-Line
- “Inactive” Storage (Cold Storage, Deep Storage, etc.)
 - Cost avoidance
 - Policies to move data to lower cost media
 - Disk/Disk/Disk storage policy modified to a Disk/Tape copy
- Archiving
 - Preservation strategy
 - Deliberate approach to keeping a finite number of copies of data for an extended period of time

Data Protection Needs Offline Storage



Internal & External Threats

“If a hacker with a grudge managed to break into CERN’s data center, he could delete all 50 petabytes of the disk-based data in minutes. To delete the same amount from the organisation’s tapes would take years.”

Alberto Pace, Head of Data Storage, CERN



Software Bugs

A software bug destroyed 40,000 Gmail accounts stored on the first storage tier within minutes.

“Since the tapes are offline, they’re protected from such software bugs.”

*Ben Treynor
VP Engineering,
Google*



Cyber Crime

Distribute IT – 4800 Australian businesses wiped out in 30 minutes

“...not only was the production data erased during the attack, but also key backups, snapshots and other information...” the company said in its final blog post

The Register, June 21, 2011



Cloud and Tape

- Large scale tape systems have always been “cloudy”
 - Common shared environment for multiple users and applications
- Tape is ideally suited for the Public Cloud
 - Readily scales to exabytes
 - Tape is most cost effective at large scale
 - High power efficiency
 - Can be used for import/export services
- Off-line protection complements multiple synchronous / asynchronous copies
- Cloud can provide the end-user the cost effectiveness of tape without requiring the expertise
- Cloud drives tape innovation that benefits the entire industry

Oracle Tape Portfolio

Open Software Stack

- Oracle HSM (SAM/QFS)
- Front Porch DIVA
- ELS Software
- Tape Analytics
- LTFS-LE
- ACSLS
- Encryption



LTO



T10000



SL150



SL3000



SL8500



VSM & VLE

Cloud Environments

- Oracle Archive Cloud
- Storage Cloud Service
- DIVACloud

Oracle Storage Cloud Service – Archive Storage



\$0.001
GB/Mo
(\$1000 PB/Mo)

Lowest
cost per
gigabyte
in the
industry!

Key Features

- On-demand capacity, scales to petabytes
- Multiple redundant copies of data for best availability (99.9%) and durability (11 x 9's)
- Supports customer encrypted data
- Automatic data integrity checks for durability
- Industry standard RESTful APIs (OpenStack Swift)



General Industry Trends

- Price/GB of Flash, Disk and Tape are differentiated
 - Pay for Performance
- High IOPS – Flash and Appliances
- Primary Storage – Disk
- Data Protection – Appliances, Disk, Tape
 - Short-term data protection typically cached to disk
 - Tape used for longer term data protection
 - Tape for off-line protection
- Archiving – Tape, Disk and Flash
 - Flash for metadata; Disk for cache
 - Tape holds majority of data