

Tape Library Based Data Integrity Verification

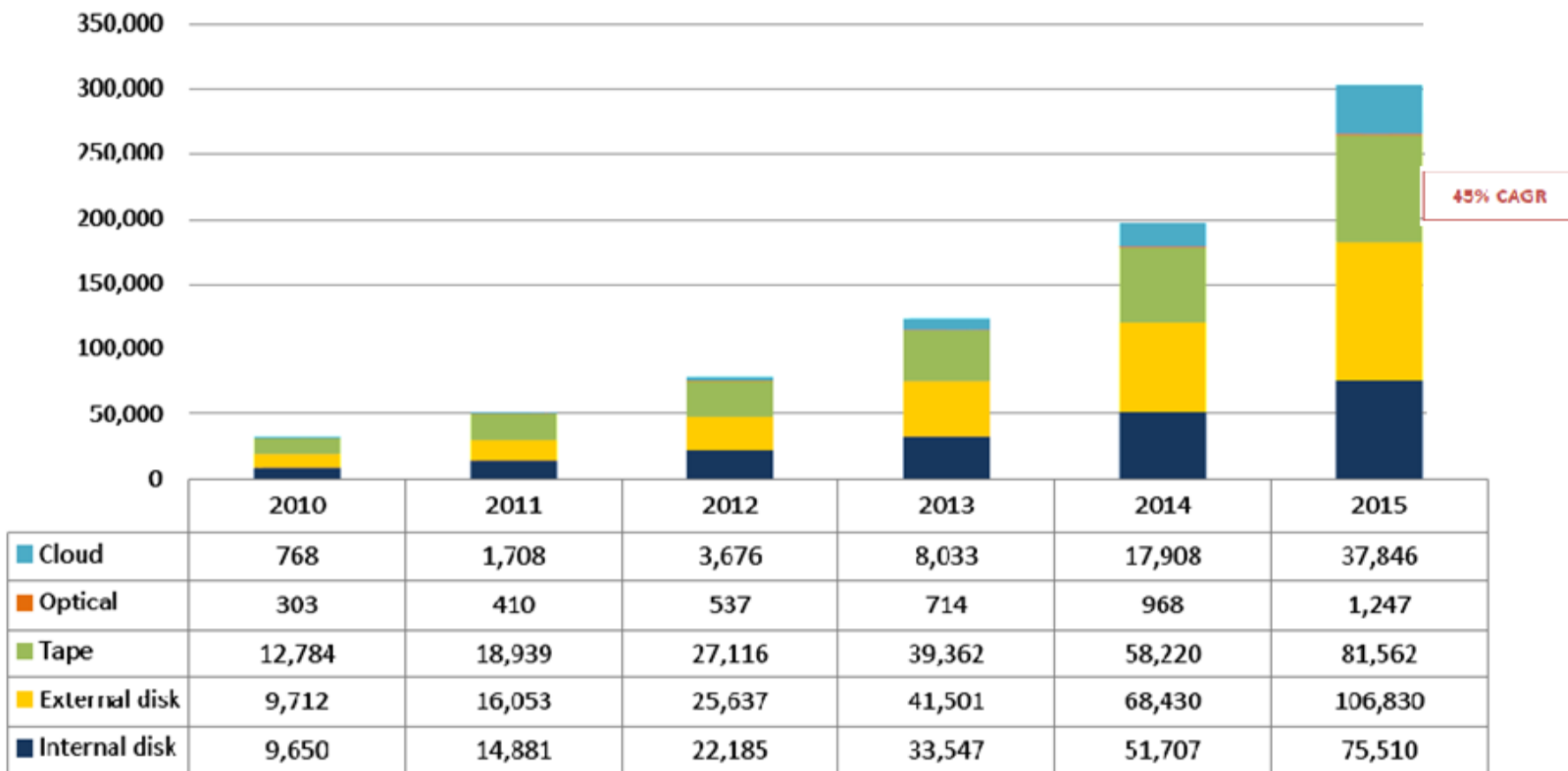


Changing The World of Storage

Tape is Growing in IT File Archive

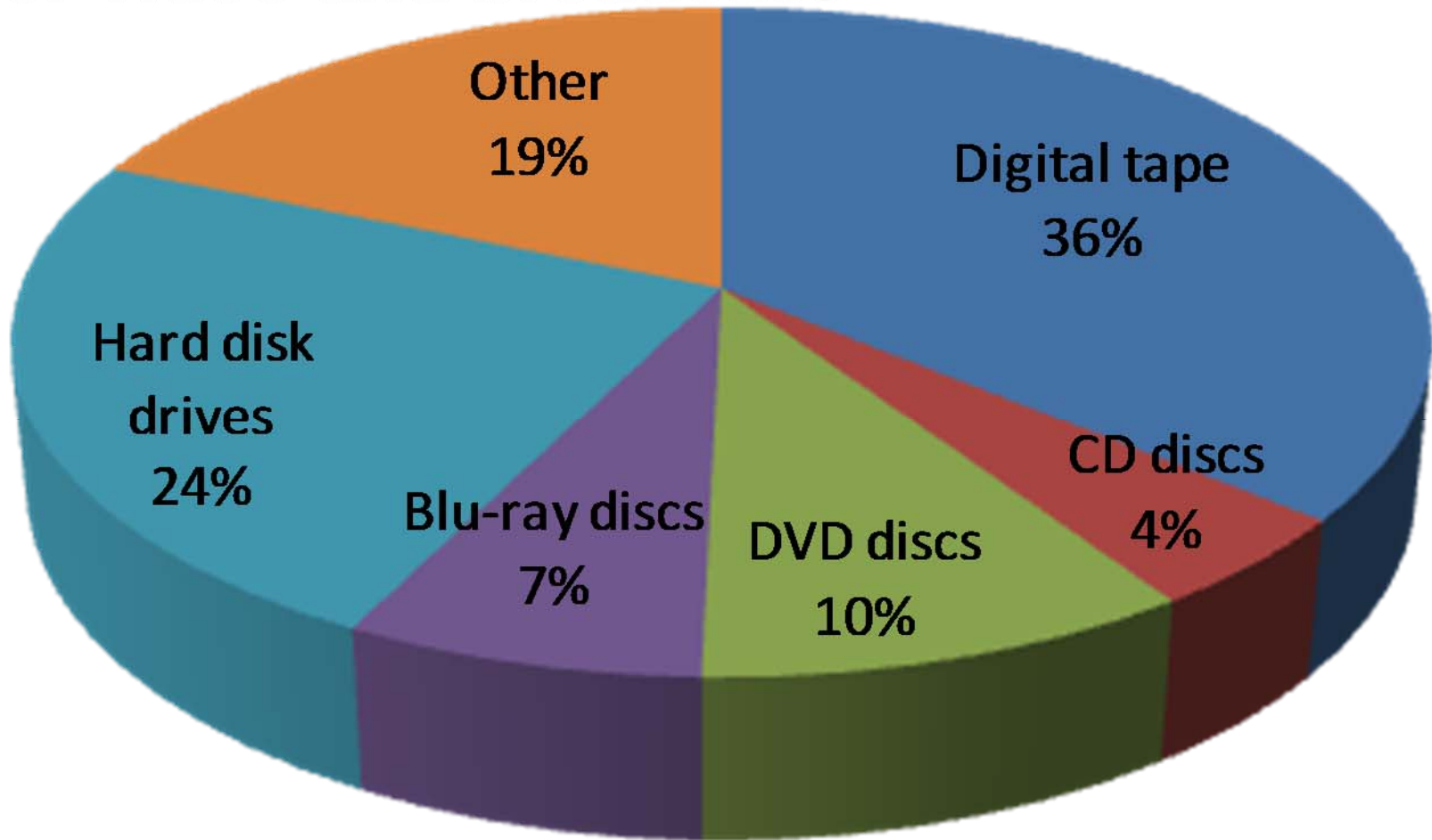
Figure 5. Total Worldwide Digital Archive Capacity, by Media Type, 2010-2015

Total Worldwide Digital Archive Capacity, by Media Type, 2010-2015 (Petabytes)



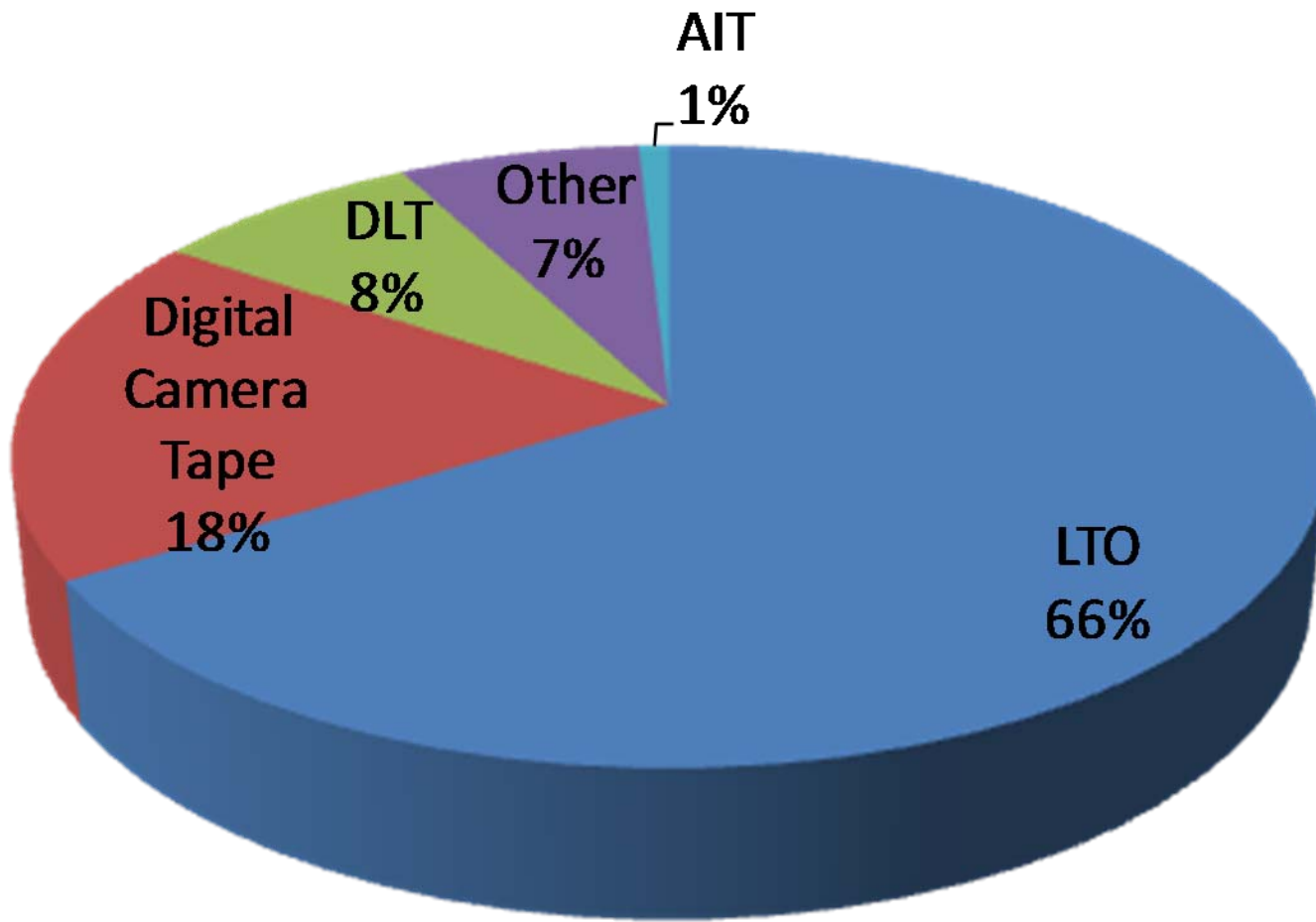
Source: Enterprise Strategy Group, 2010.

Percentage of digital long-term archives for video and broadcast



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Percentage of tape formats used in digital archiving for video and broadcast



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Percentage growth rate of archival media types for video and broadcast

	2010	2009
Digital tape	76.1%	69.2%
Hard disk drives	56.6%	63.5%
DVD discs	32.7%	32.7%
Blu-ray discs	26.5%	25.0%
CD discs	21.2%	26.9%
Other	19.5%	27.9%

Tape's Role in the Cloud

Used in Public, Hybrid, Private Clouds today

1. Security

- AES-256 bit encryption
- Data Integrity Verification

2. Highest ROI

- Single service, single administrative resource can manage PBs of data
- Tape costs/GB drop with scale. Disk does not.
 - Shared Cloud data does not get same deduplication efficiencies as corporate backups
- Most power efficient

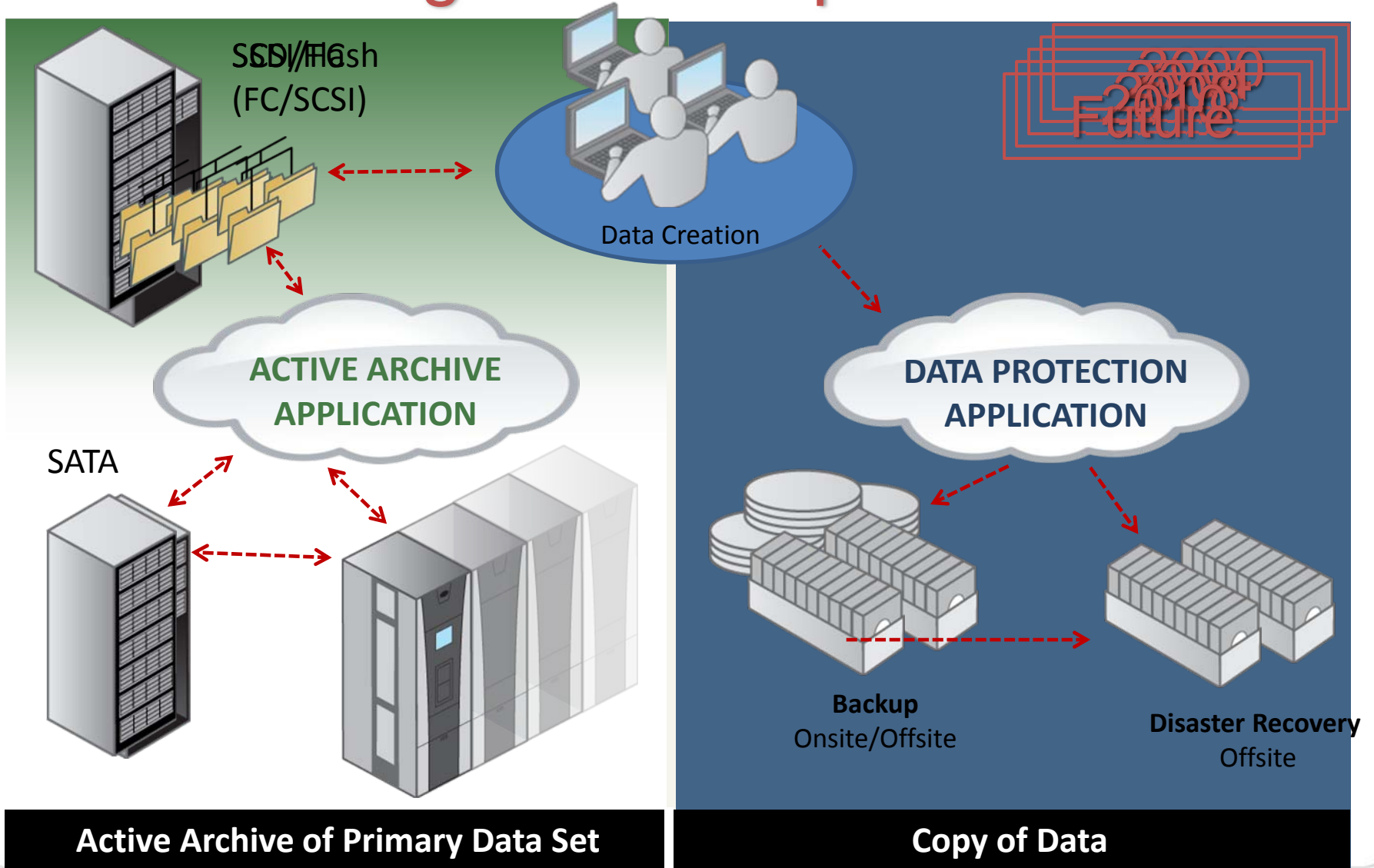
3. Scalability

- Capacity on Demand (CoD) model enables selling the service before buying capacity

Sizing the HPC Market and Needs with InterSect360

- What percentage of your data is *currently* stored on tape?
- What percentage of your data do you believe will be stored on tape *two years from now*?
- How is tape used for your HPC applications? Check all that apply.
 - . The data on tape is a backup of data that is also stored on disk.
 - . The data on tape is also stored in a redundant location that is also on tape.
 - . The data on tape is the primary copy and not replicated elsewhere.
- Which applications do you use for migrating data to tape? Check all that apply.
 - . HPSS
 - . NetBackup
 - . TSM
 - . Other vendor-provided application
 - . Other open-source application
 - . Other in-house application

The Evolving Role of Tape



Requirement for Digital Archive Storage

Strong ROI and low TCO

- Low cost / TB initial investment to lower CapEx
- High density & power efficient to optimize OpEx

Easily accessible by users and administrators

- ✓ Data directly accessible through file systems
- ✓ Supported by metadata management software
- ✓ Fast streaming capability
- ✓ Long term roadmap and solution for data migration
- ✓ *Integrated data integrity verification*

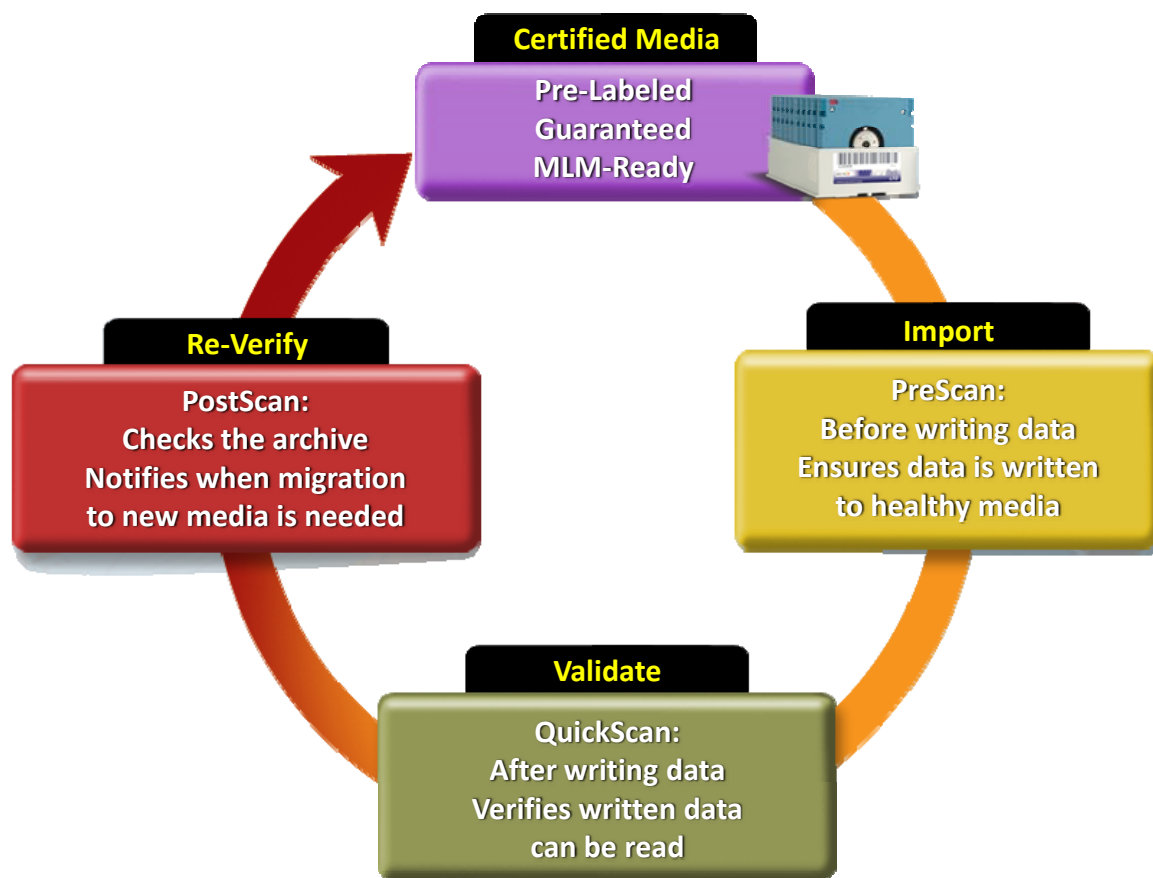
Tape Library-based Data Integrity Verification

Designed to address the concern of:

“will I be able to get my data back?” from my tape archive



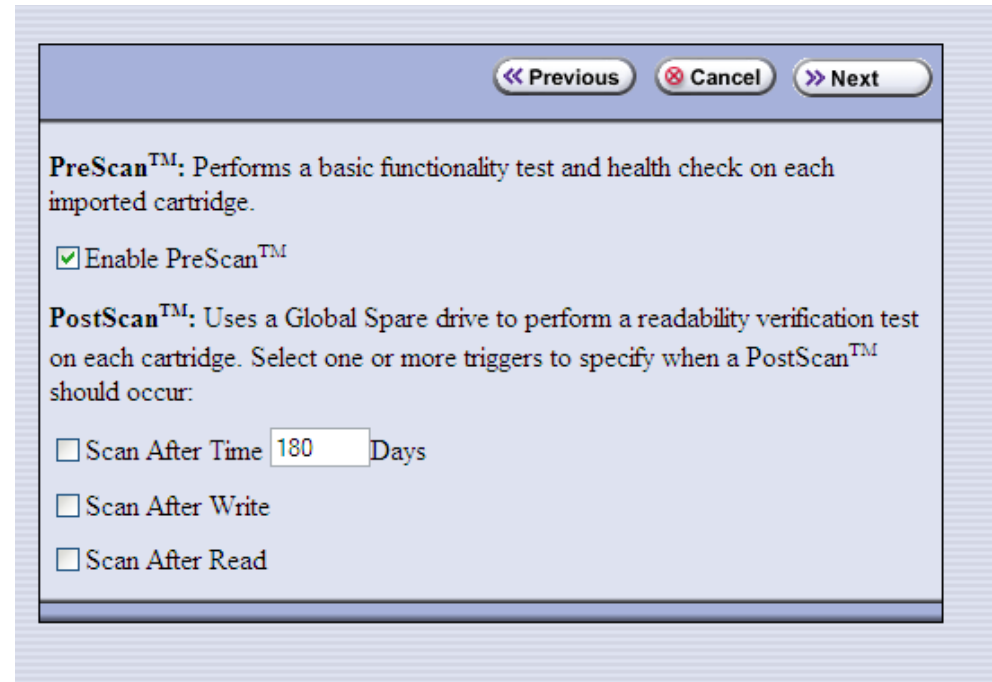
3 Levels of Data Integrity Assurance



Level 1: PreScan™

Checks for:

- Broken Leader
- Write Protect
- Mismatched Encryption Key
- Red MLM Tape Health



The screenshot shows a configuration dialog box with a light blue background. At the top, there are three buttons: '<< Previous', 'Cancel', and '>> Next'. The main content area contains the following text:

PreScan™: Performs a basic functionality test and health check on each imported cartridge.

Enable PreScan™

PostScan™: Uses a Global Spare drive to perform a readability verification test on each cartridge. Select one or more triggers to specify when a PostScan™ should occur:

Scan After Time Days

Scan After Write

Scan After Read

*** Won't write data to tapes that fail PreScan

Level 2: QuickScan™

- Single pass, fast verification, for high duty cycle environments
- Supplement, not replacement, for full PostScan check

PreScan™: Performs a basic functionality test and health check on each imported cartridge.

Enable PreScan

PostScan™: Performs a readability verification test on each cartridge. To enable PostScan, select either FullScan or QuickScan and select one or more triggers which specify when a PostScan should occur.

FullScan: Uses Global Spare drives to perform verification tests. Moves to drives in a configured partition are not impacted.

QuickScan: Uses drives within the partition to perform verification tests. Normal moves will be delayed up to 3 minutes when cartridges are being verified.

QuickScan using Global Spares: Uses Global Spare drives to perform quick cartridge verifications. Moves to drives in a configured partition are not impacted.

Scan After Time Days

Scan After Write

Scan After Read

*** Notifies immediately after data is written if tape is not readable

Level 3: PostScan™

- Performs complete checksum verification of all data on tape
- Notifies when data migration to new media is needed
- Recommend running PostScan all archived data tapes every 6-12 months

PostScan™ Blackout Periods
Specified in hours of the day (to unset day, set both Start and Stop to 0)

Sunday:	Start	0	Stop	0
Monday:	Start	0	Stop	0
Tuesday:	Start	0	Stop	0
Wednesday:	Start	0	Stop	0
Thursday:	Start	0	Stop	0
Friday:	Start	0	Stop	0
Saturday:	Start	0	Stop	0

» Save

» Discover Media Media discovery is not required - all media have been identified.

» Manual PostScan Manual PostScan™

» Delete Records Delete exported media MLM records

» Download MLM DB Download the MLM Database in comma separated value (CSV) form

Data Integrity Verification requires modern library server capabilities as well

- Single pass, fast verification, for high duty cycle environments
- Faster application speed and processing
- Quicker response times management interfaces
- Supports hyper-threading
- Increased capacity to track larger number of tape media
- Faster inventory times
- More memory capacity for processing and larger code base
- Increased log storage for long-term reference



What's Next?

1. Moving from early adopter to main stream usage
2. Integration with archive applications
 - Automated media copy from software side
 - API from tape library side
3. Formalize “best practice policies”

Questions?



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