

A promotional banner for the Fujifilm 6th Annual Global IT Executive Summit. The background is a photograph of the New York City skyline, featuring the Freedom Tower and the New York Public Library. The text is overlaid on the image. At the top, 'FUJIFILM' is written in white. Below it, '6th Annual' is in orange, and 'Global IT Executive Summit' is in a larger orange font. The dates 'SEPT. 10-13, 2014' and the location 'New York Marriott Downtown' are in white. At the bottom, the slogan 'INTO TOMORROW WITH TAPE TECHNOLOGY... preserving and protecting critical data.' is written in white.

FUJIFILM
6th Annual
Global IT Executive Summit
SEPT. 10-13, 2014
New York Marriott Downtown

INTO TOMORROW WITH TAPE TECHNOLOGY...
preserving and protecting critical data.

The Archival Upheaval

Petabyte Pandemonium – Developing Your Game Plan

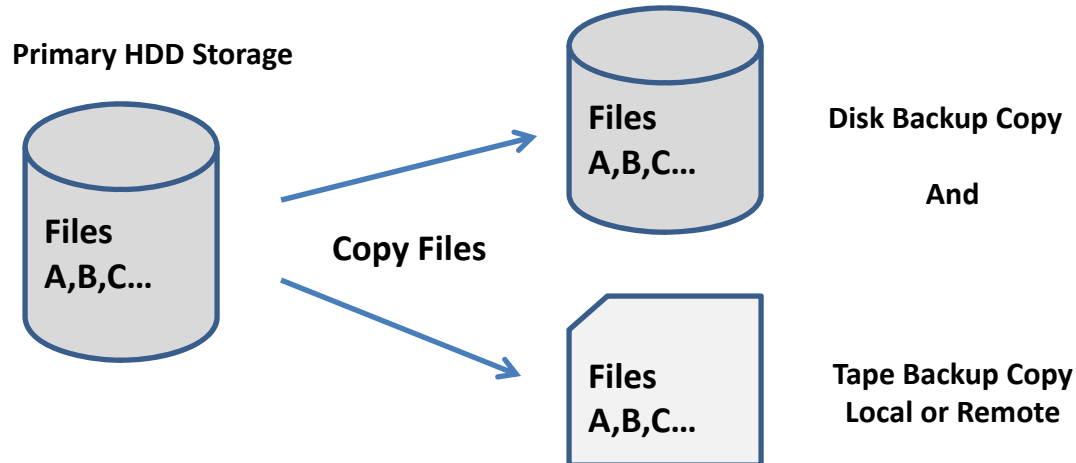
Fred Moore President
www.horison.com



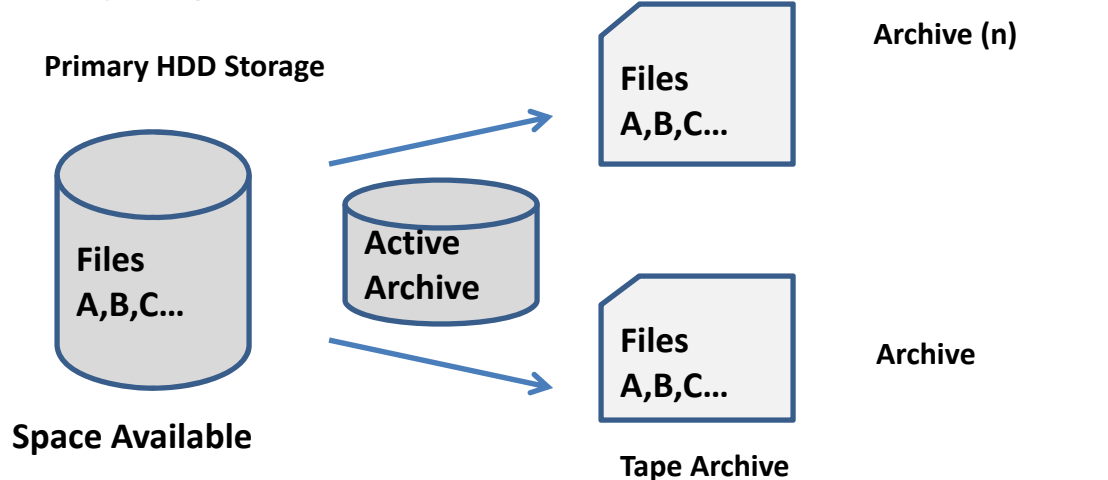
Did You Know?

Backup and Archive are **Not** the Same!

Backup



Archive



Backup: (Copy)

Back up - or the process of backing up - is making **copies** of data which may be used to *restore* or *recover* the original after a data loss event. Short-term storage.

Archive: (Move)

An archive **moves** data to a new location and refers to data specifically selected for long-term retention.

Archives are usually data that is not actively used and was removed from its initial location. Long-term storage.

Note: Archive data should have a second copy.

Archive Scenario - 2014

Industry Trends: 2014 State of Storage survey of 254 IT Professionals - May 2014. Twin Strata Inc.

- 56% of organizations estimate that at least half of all data stored is inactive.
- 20% state that at least 75% of their data is inactive.
- 53% of all organizations store inactive data on SANs (all disk)
 - 81% of organizations using SANs and NAS store inactive data on them (all disk)
 - 22% keep inactive data exclusively on SANs or NAS devices (all disk)

Archive Data Growth > 50% CAGR (Fastest Growing Category)

The capacity needed to store unstructured data (~70% of all data) continues to escalate far beyond the capacity required for structured database (~20% of all data). Most archival data is unstructured.

Backup Window Pressure

Even with backup to disk with data compression and data deduplication, backup windows face constant pressure from data growth rates that can exceed a 50% cagr.

There's no point in repeatedly backing up unchanged data – especially if it's seldom used.

Big Data - Data Mining, Analytics, and Knowledge Retention From Archives

In the era of Big Data, organizations now realize archives are potential gold mines - but **less than 5%** of all data stored is ever analyzed!

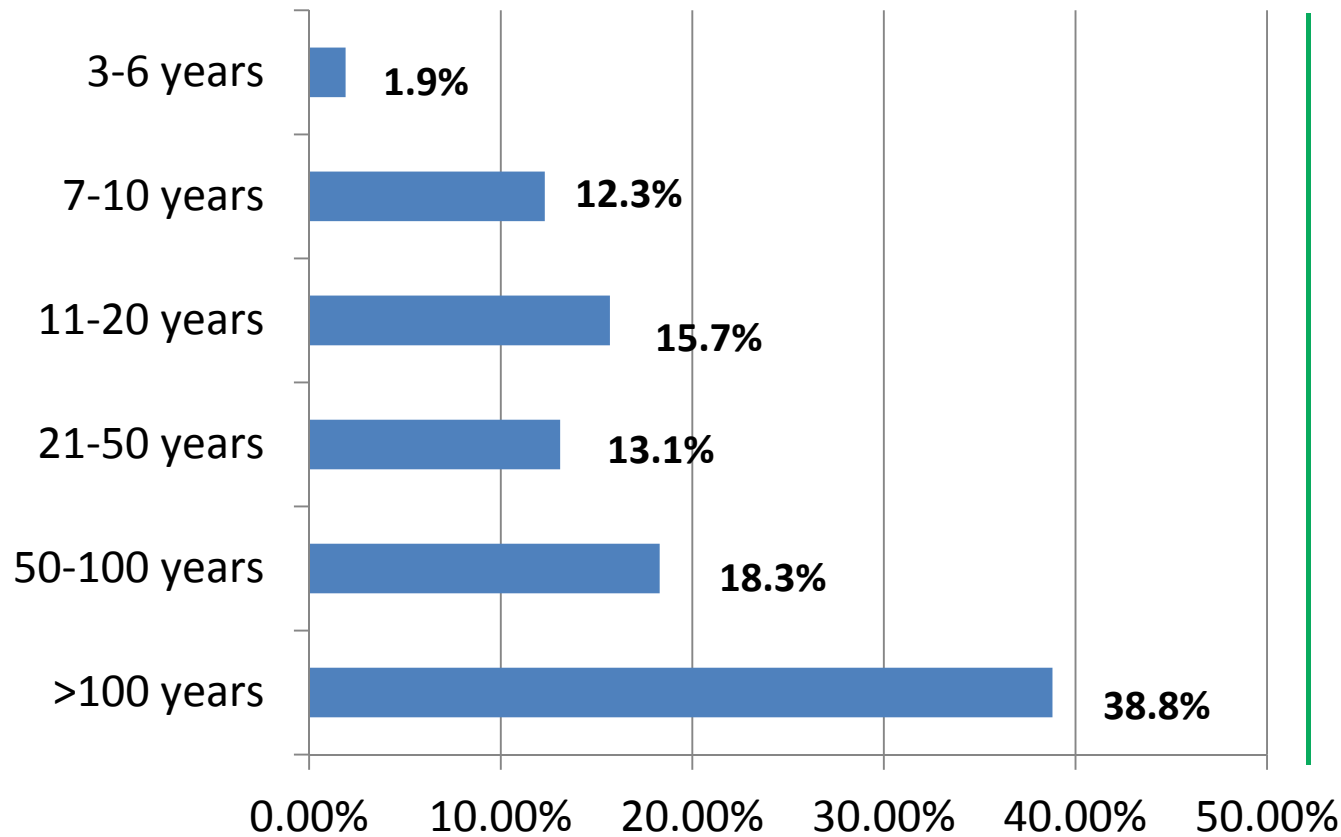
The Value of Data

All data is not created equal. Classify your data based on business value. The value of data can change based on circumstances making any archival data potentially valuable - at any time.

Archive Retention Requirements

Signals Need for Advanced Long-term Archival Solutions

Retention period



Percent of respondents

What They Say...

- Long-term Storage Requirements Increasing
- 20+ Years Retention Required by 70% of respondents
- 50+ Years Retention Required by 57% of Respondents
- Key Driving factors
 - Compliance
 - Legal risk
 - Business risk
 - Security risk

Building an Archive Strategy

Getting Started

Step 1

Classify Your Data by Value
(Develop Your Data Profile)

- Mission Critical
- Vital
- Sensitive
- Non-critical
- No Value

Step 2

Determine Which Data Types
To Archive

- Criteria for Archiving Data
- Legal Regulations
- Internal Requirements

Step 3

Develop Archive and
Security Policies

- Last Access Date
- Age of Data
- Space Consumption
- Frequency of Access
- Encryption, WORM

Step 4

Determine How Long
Data Will Remain in Archive

- Months
- Years
- Infinite...

Step 5

Select Software Solution to
Enable the Archive Process

- Choose HSM or Archive SW Product
- Several Choices Exist

Step 6

Select Optimal Technology and
Location to Store Archived Data

- Automated Tape, HDD
- Active Archive
- Remote and/or Local Archive
- Cloud/Granite Mountain

Step 7

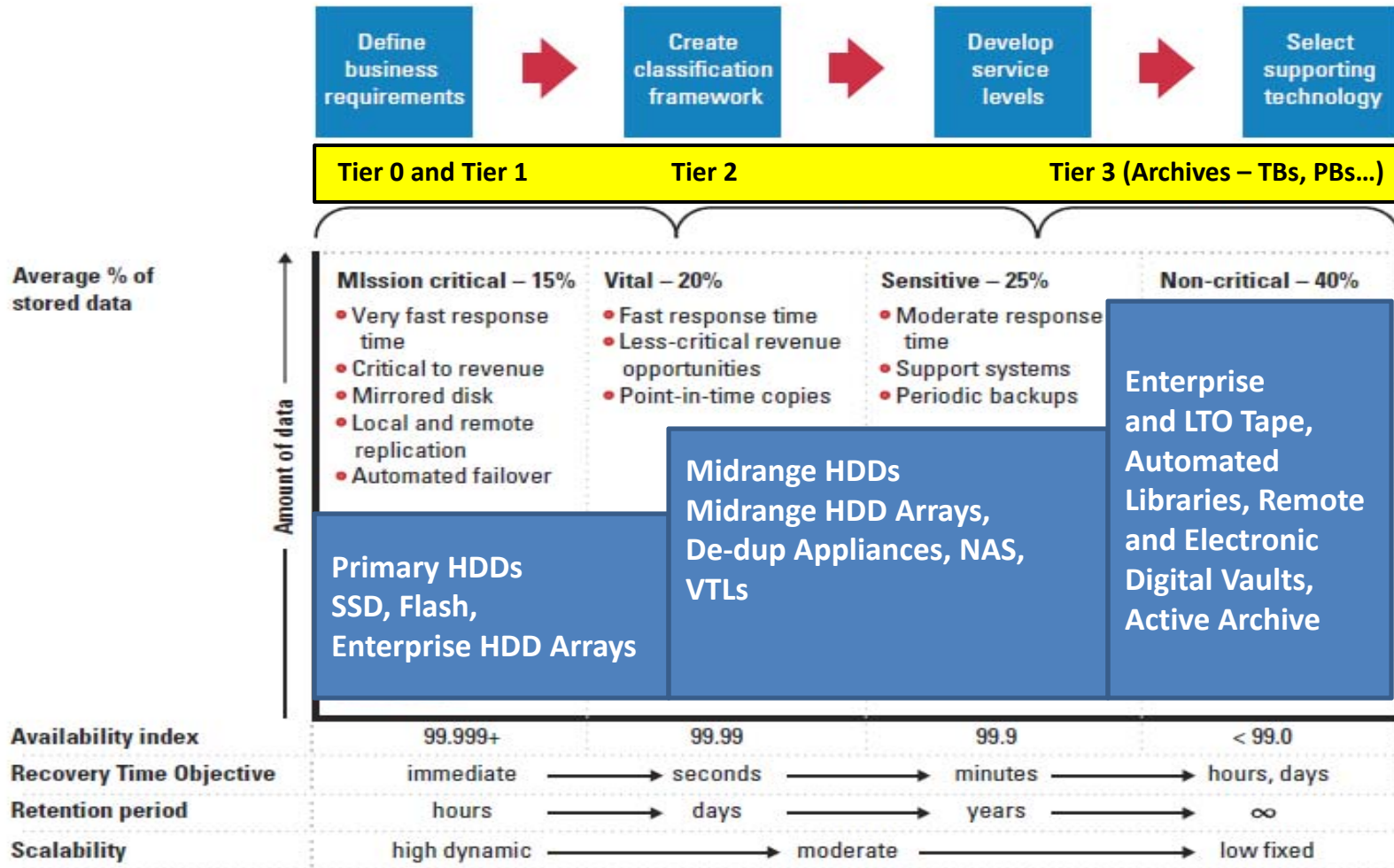
Set Rules for Who Can
Access the Archive

- Security Codes
- PWs
- Forensic IDs
- Empower a leader!

Classify Your Data

Understand the Relative Importance of Your Data

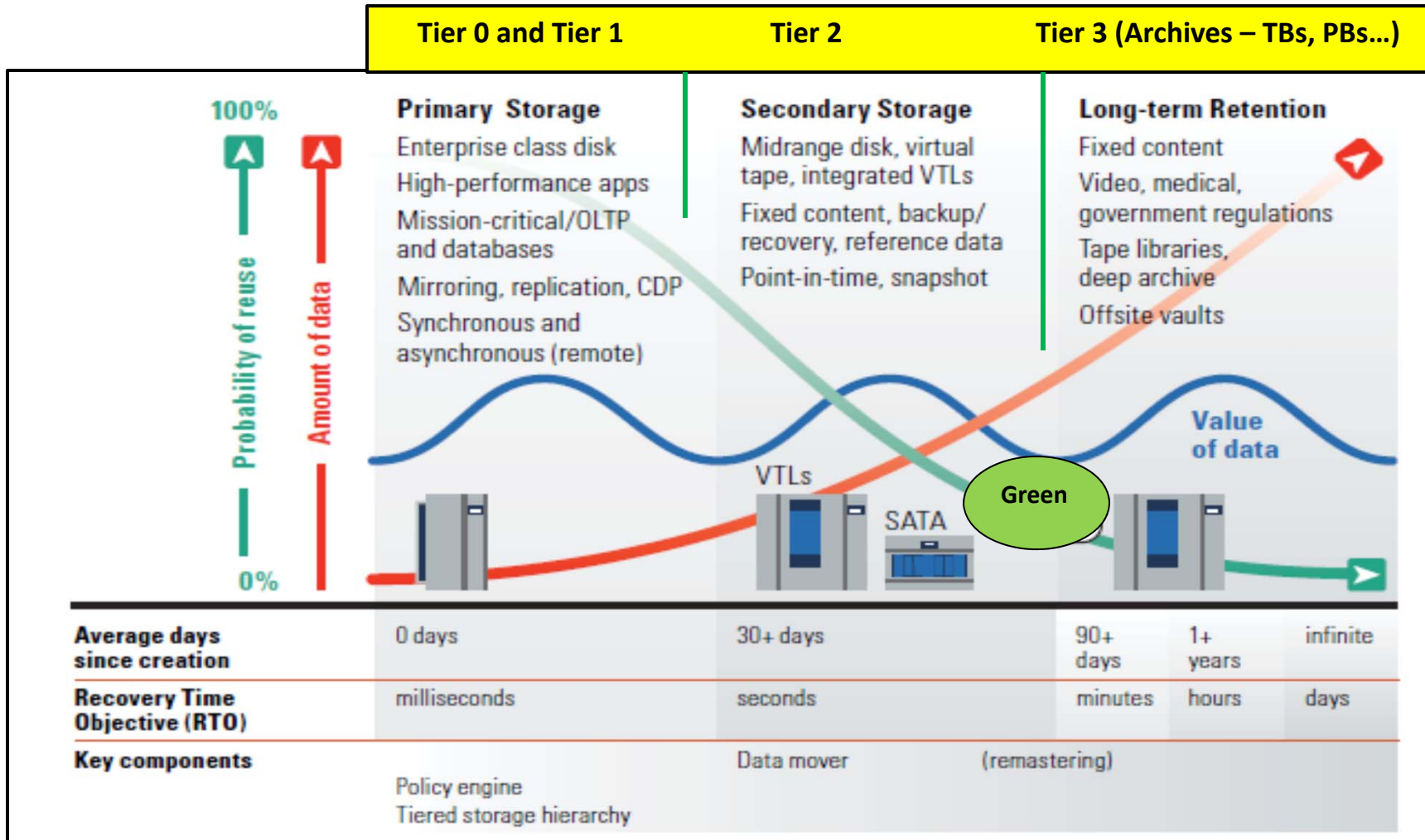
Data Classification Model



Source: Horizon Information Strategies

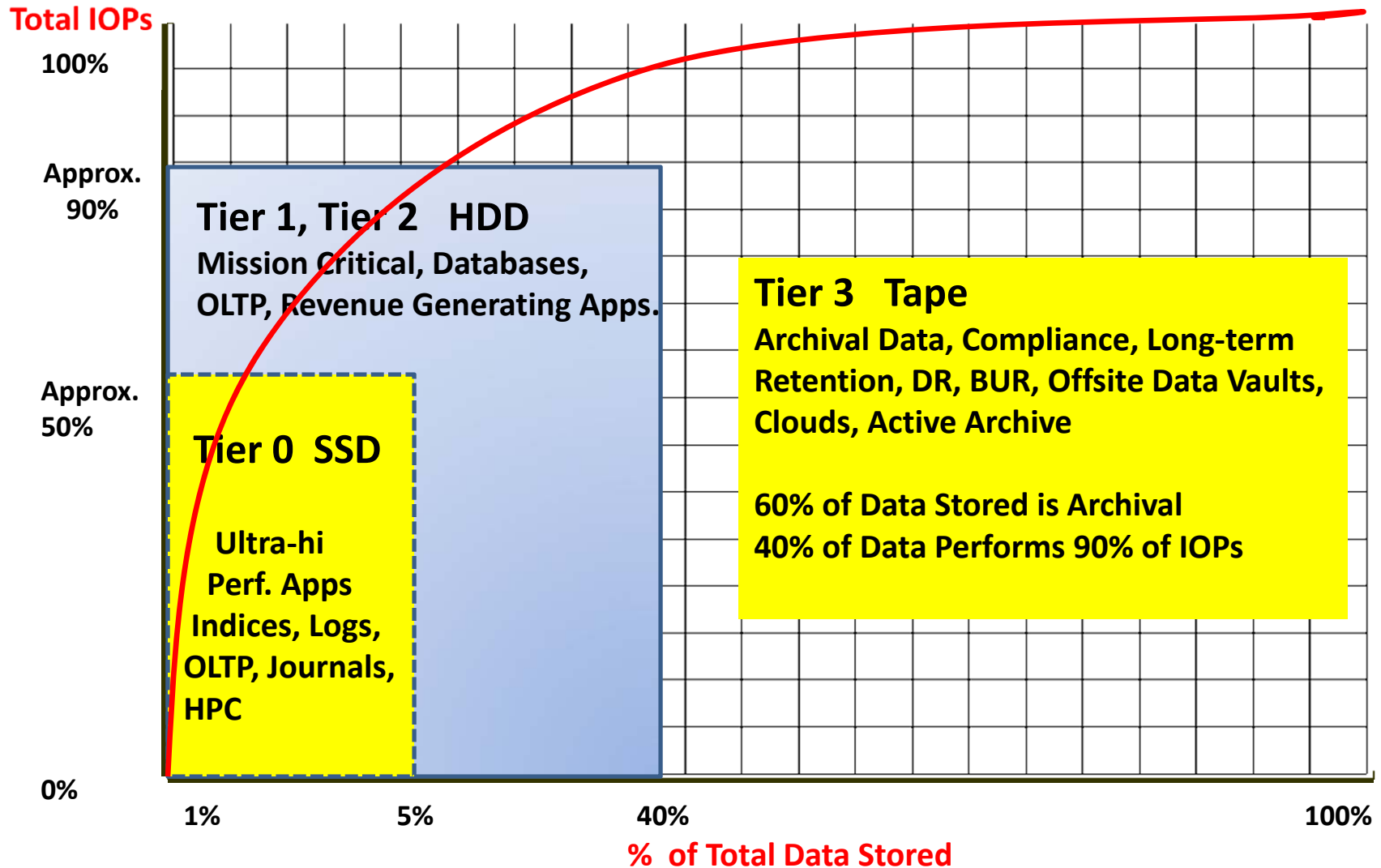
The Data Lifecycle Model

From Creation to End of Life



Capacity – Performance Profile

Planning for Tiered Storage



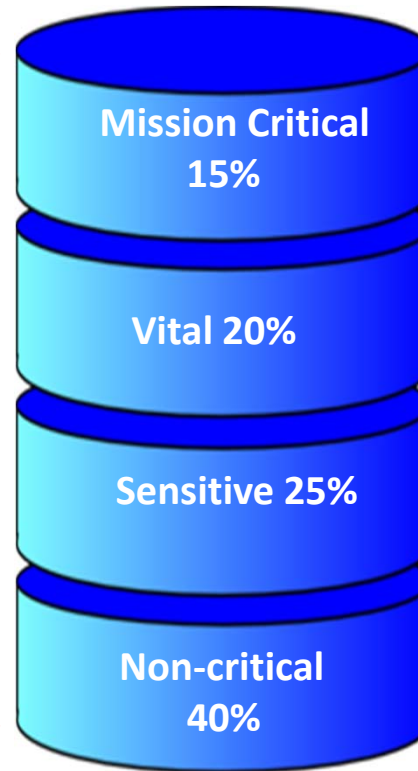
What's Happening on Disk?

Preparing for the Archive Strategy

Disk Utilization Profile

System Overhead, RAID, Control Fields	5%
Orphaned (Inactive or Unknown Files)	5%
Allocated - Used (Live Data)	40%
Allocated - Unused (Gas)	20%
Inert – Free Space (Available for Use)	30%

Classification of Data by Value



Mission critical data is revenue generating, loss can place the survival of the business at risk requiring instantaneous recovery

Vital data doesn't require "instantaneous" recovery

Sensitive data can take up to several hours for recovery without causing major operational impact.

Non-critical data is not critical for immediate business survival but is often valuable, retained for secure archives.

Note: Average Disk Allocation Levels for Open Systems

Source: Horison, Inc.

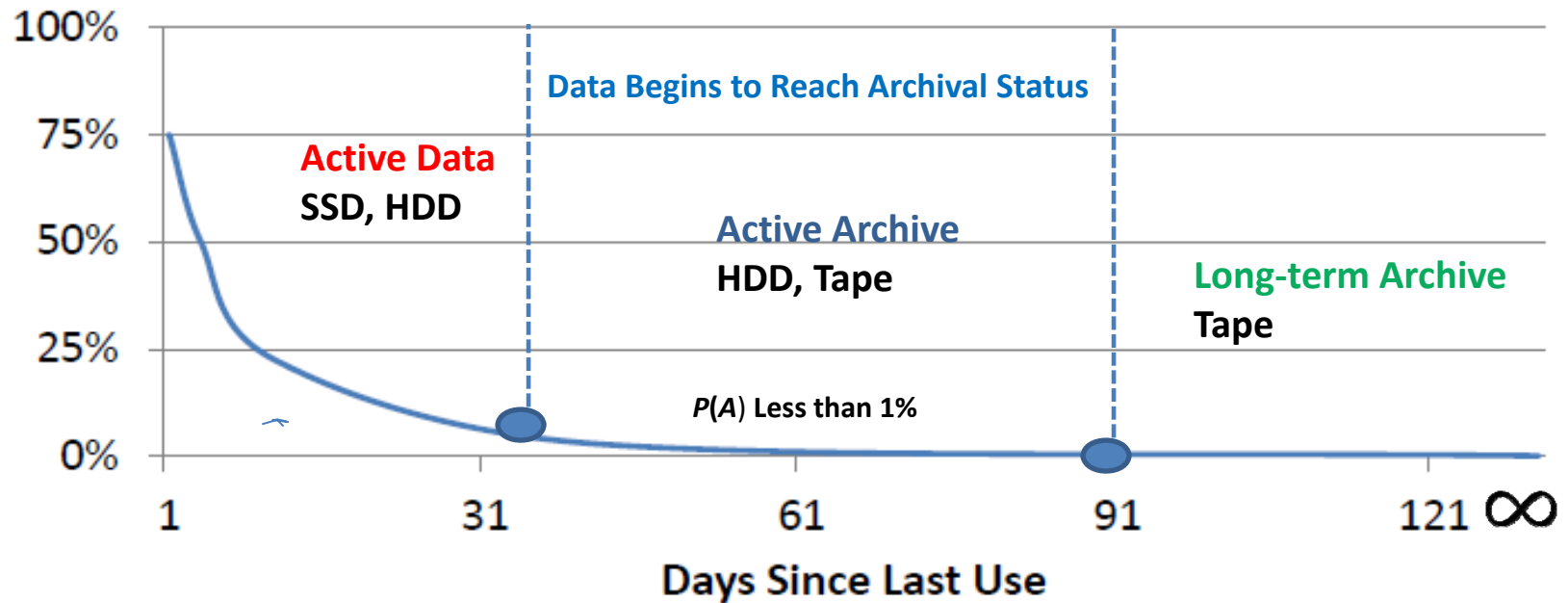
When Does Data Reach Archival Status?

Most Archive Data is Worn - or Worse

WORN: Write Once, Read Never

WORSE: Write Once, Read Seldom if Ever

Probability a Digital File Will Be Viewed Again



Select HSM - Archive Solution

Hierarchical Storage Management (HSM)

- A policy-based data storage technique, which automatically moves data between high-cost and low-cost storage media. [Note: some HSM products also perform backup functions]
- In a typical HSM scenario, data files which are frequently used are stored on disk drives, but are eventually *migrated or archived* to tape if they are not used for a certain period of time, typically a few months.
- User policy based migration criteria includes: time since last access, age of data, frequency of access, criticality, legal or application specific requirements.

Selected HSM and Archive Products

DFHSM, Tivoli Storage Mgr., HPSS (HPC)	IBM
StorNext	Quantum
SAM-QFS	Oracle
DMF	SGI
DiskXtender	EMC
NetBackup Storage Migrator	Veritas (Symantec)
HP HSM	HP
CA-Disk	CA
Simpana	Commvault
StrongBox Data Manager	Crossroads
FileStor/HSM	Fujifilm

This is a partial list of HSM products.
Source: Horison Inc.

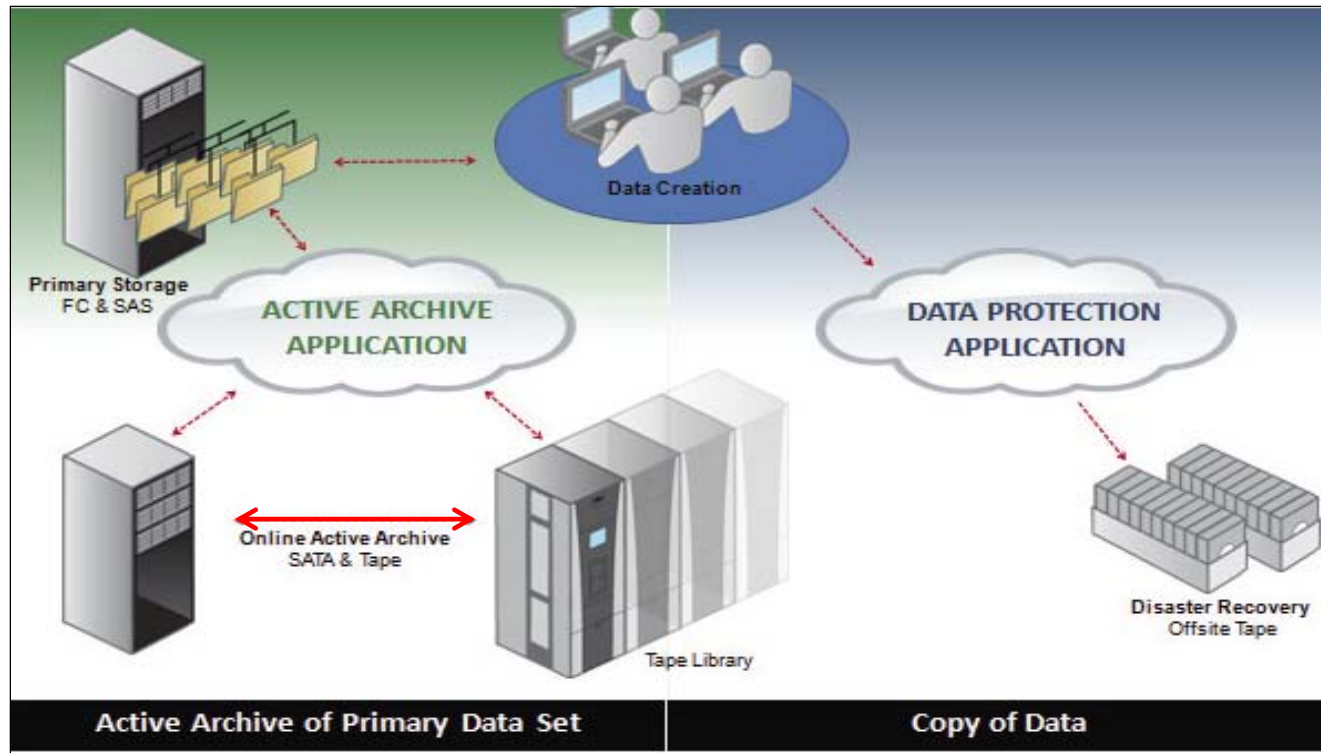
Select Optimal Archive Storage Platform

Compare Archival Capabilities

Tier 3 Capability	Tape	Disk
Long-life media for Archive	✓ Yes, 30 years or more on all new media.	~4-5 years for most HDDs before upgrade or replacement.
Reliability	✓ Tape BER has surpassed disk.	BER not improving as fast as tape.
Portability	✓ Yes, media completely removable and easily transported.	Disks are difficult to remove and to safely transport.
Data Rate	✓ Max Drive Data Rate – 252 MB/sec	Max Drive Data Rate – 160 MB/sec
Inactive data does not consume energy	✓ Yes, this is becoming a goal for most data centers. “If the data isn’t being used, it shouldn’t consume energy”.	Rarely for disk, except in the case of “spin-up, spin-down” disks.
Hardware encryption and WORM for highest security level and performance	✓ Encryption and WORM available on all midrange and enterprise tape drives.	✓ Available on selected disk products, PCs and personal appliances.
Capacity growth rates	✓ Roadmaps favor tape over disk with 154 TB capability demonstrated with few limits.	Continued steady but slower capacity growth as roadmaps project disk to lag tape. Recording limits on horizon.
Total Cost of Ownership (TCO)	✓ Favors tape for backup (2-4:1) and archive (15:1).	Higher TCO, more frequent conversions and upgrades. High energy costs.
Storage Admin Capability	✓ Can manage PBs of data (1×10^{18})	Can manage TBs of data (1×10^{15})

The Active Archive

Improved Archive Performance



The Active Archive combines low-cost disk as a cache to front-end long-term tape archives.

An Active Archive holds more frequently accessed archival data. [Ex: data that is 30-90 days old]

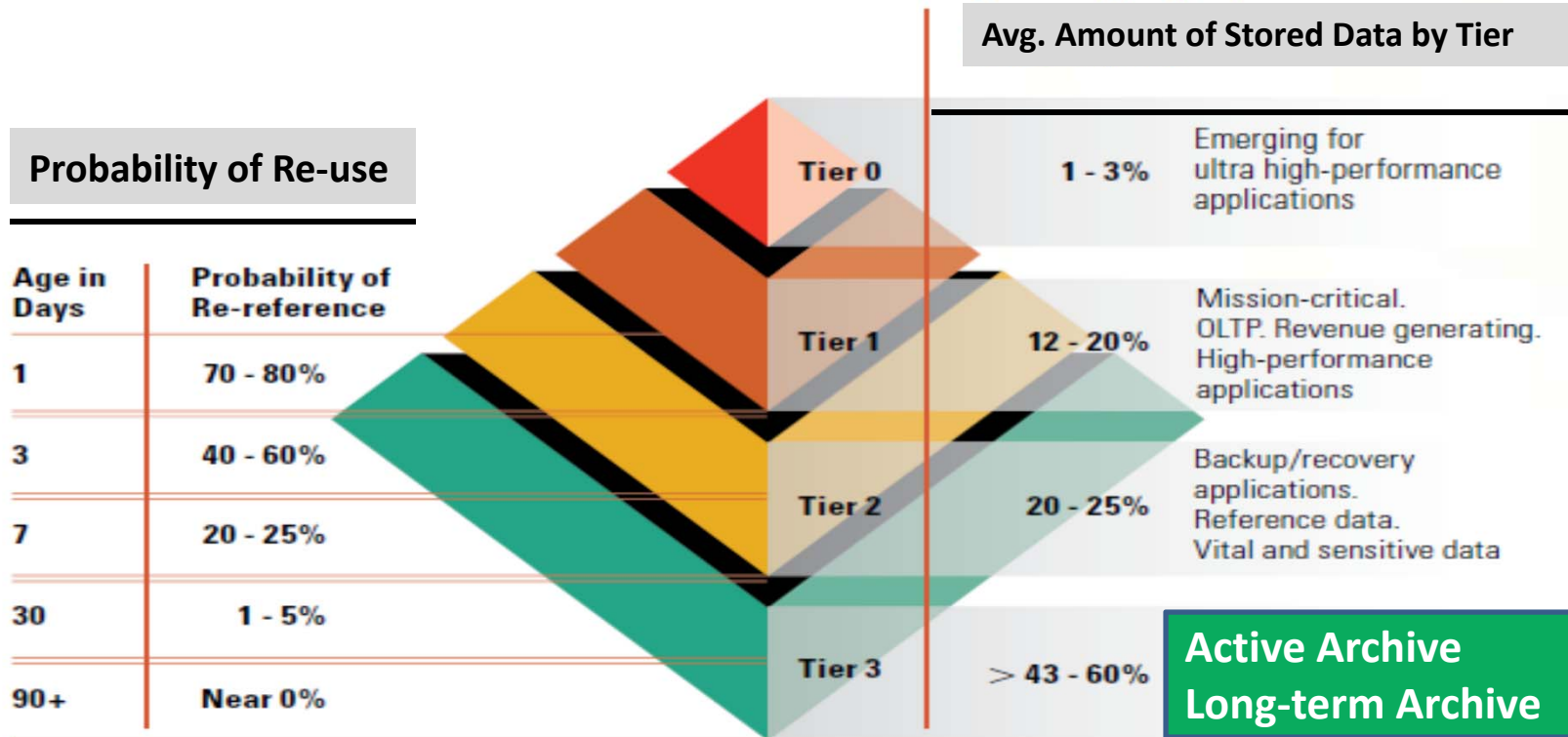
An Active Archive can be contrasted with a long-term archive which holds data that is infrequently accessed - but must be kept indefinitely for compliance or other business reasons.

The Active Archive becomes the optimal archival storage choice because it offers performance and reduces IT administrator intervention. [Disk and Tape are Complimentary]

Source: INSIC, the Active Archive Alliance and Horison, Inc.

The Tiered Storage Hierarchy

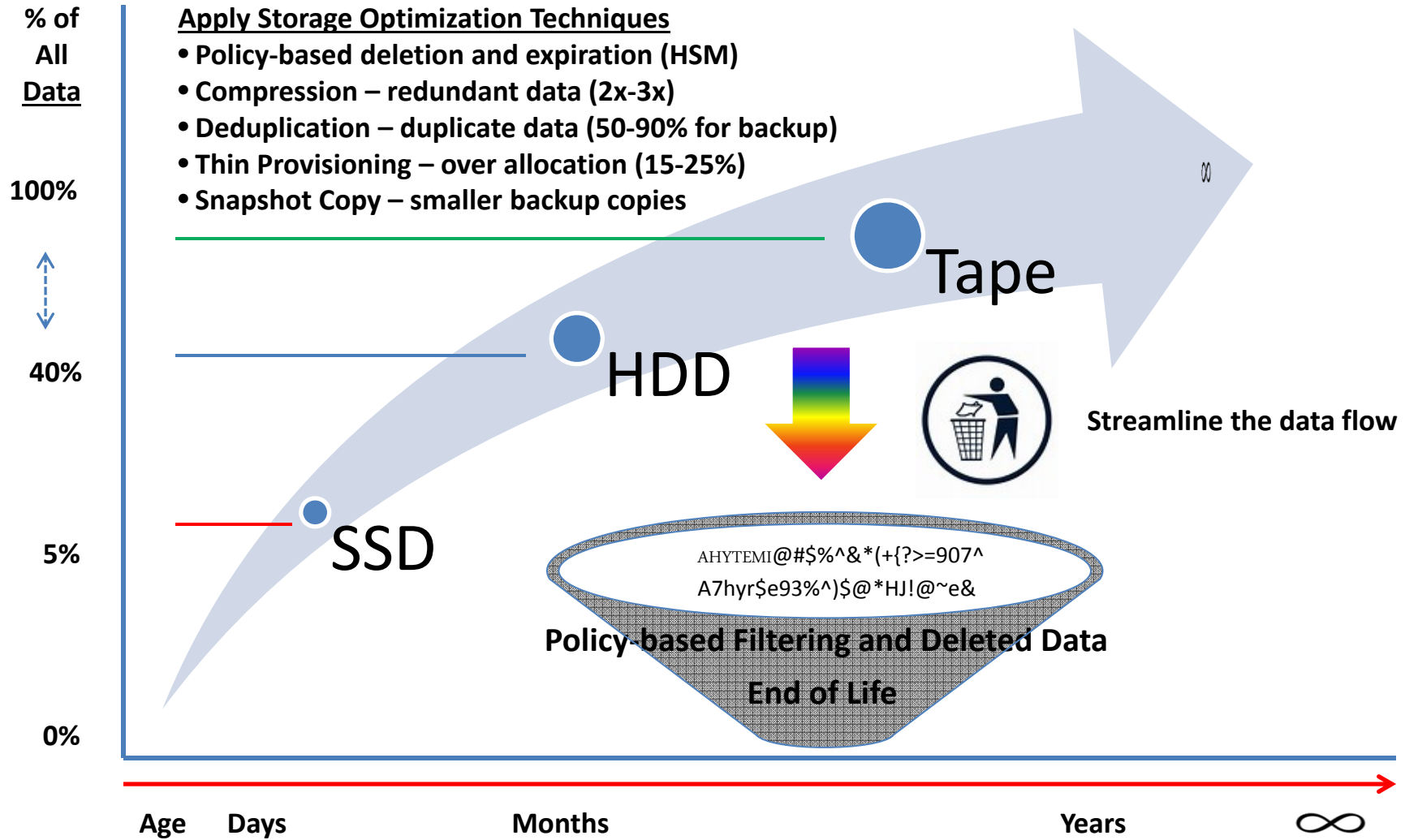
Build the Optimal Storage Infrastructure



Availability Index %	Primary Technology Used
Tier 0 – 99.999%	Flash & DRAM SSDs
Tier 1 – 99.999%	Enterprise Disk Arrays FC, SAS, RAID, Mirrors, Replication
Tier 2 – 99.99%	Midrange Disk Arrays SAS, SATA, VTLs, Dedup
Tier 3 – 99.999%	Tape Libraries, Remote Electronic Tape Vaults, Active Archive

Archive Optimization

Controlling Petabyte Pandemonium



Cost Reduction Using Tiered Storage

Optimize data Placement - Move Archival Off of Disk

<i>Example For 1PB of Storage</i>	Cost/GB ASP	% Alloc. One HDD Tier	Total Cost	% Alloc. Two HDD Tiers	Total Cost	% Alloc. Four Tiers	Total Cost
Tier 0	\$30.00	0		0	0	2	\$600K
Tier 1	\$4.00	100	\$4M	50	\$2.0M	13	\$520K
Tier 2	\$1.50	0	0	50	\$750K	32	\$480K
Tier 3 <i>(Archive)</i>	\$0.05	0	0	0	0	53	\$26.5K
Totals			\$4M		\$2.75M		\$1,626.5M <i>-59.35%</i>

Allocation Percentages Use Industry Average Data Distribution per Tier

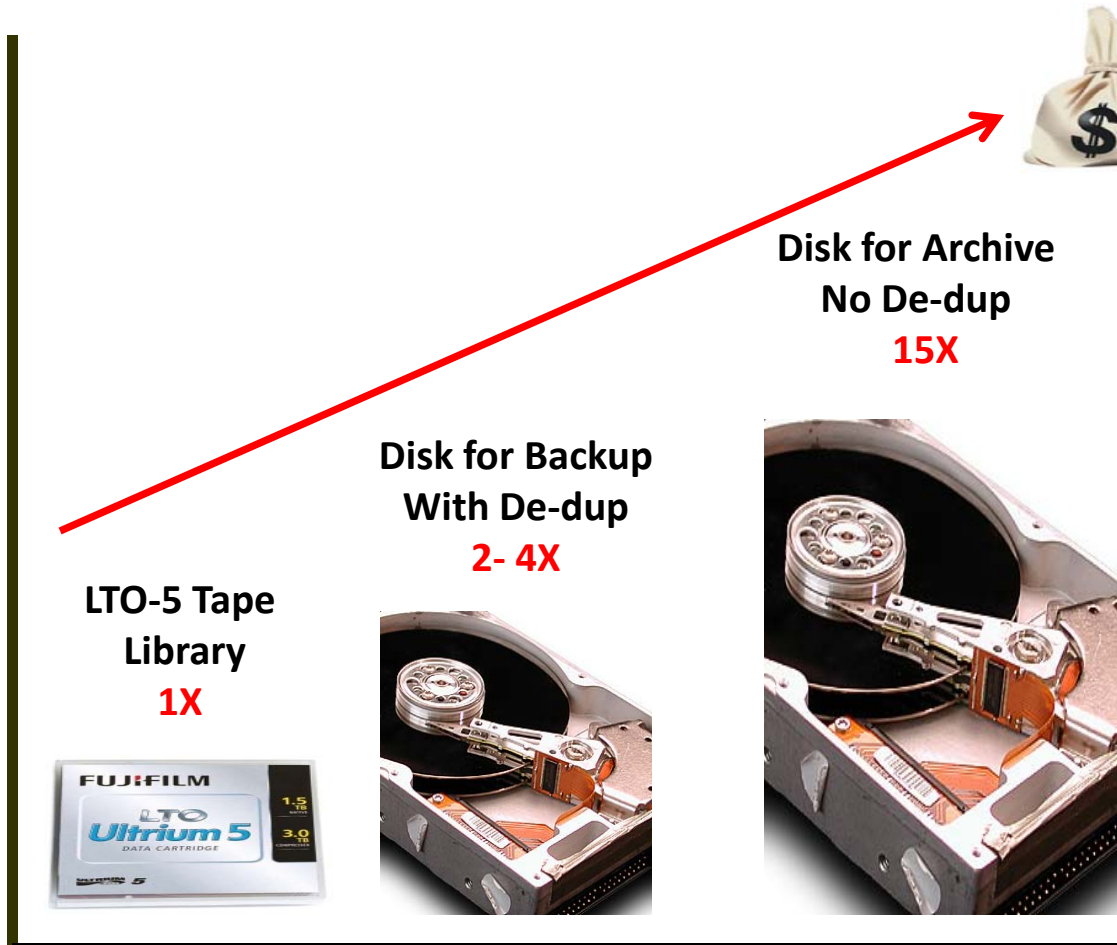
Pricing Uses ASP (Average Selling Price Per GB), Not List Price

Source: Horison Inc.

TCO Comparisons – Disk and Tape

Total Cost of Ownership

5 Year
TCO



TCO Components

Capital Costs:

- Hardware
- Software
- Infrastructure
- Facilities
- Security

Labor Costs:

- Operations Staff Support
- Storage Admin.
- Insurance

Services Costs:

- Outsourcing
- Disaster Recovery
- Cloud (opt.)

The 5-Year TCO for Disk Ranges 2-15x Higher Than Tape for Backup and Archive Applications – the Gap is Widening

Archiving – Isn't It About Time to Start?



Points to Remember:

- **Between 50-75% of All Data is “Low Activity” and a Prime Candidate for Archiving**
- **Management Tools Are Available to Implement a Successful Archive Strategy**
- **Storage Cost Savings Can Range 60-75% by Implementing Archiving and Tiered Storage**
- **Tape has Become the Optimal Archive Technology – Price, TCO, Capacity, Media life, Reliability, Energy...**