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Designing Storage Architectures for Digital Collections

Panel 1:

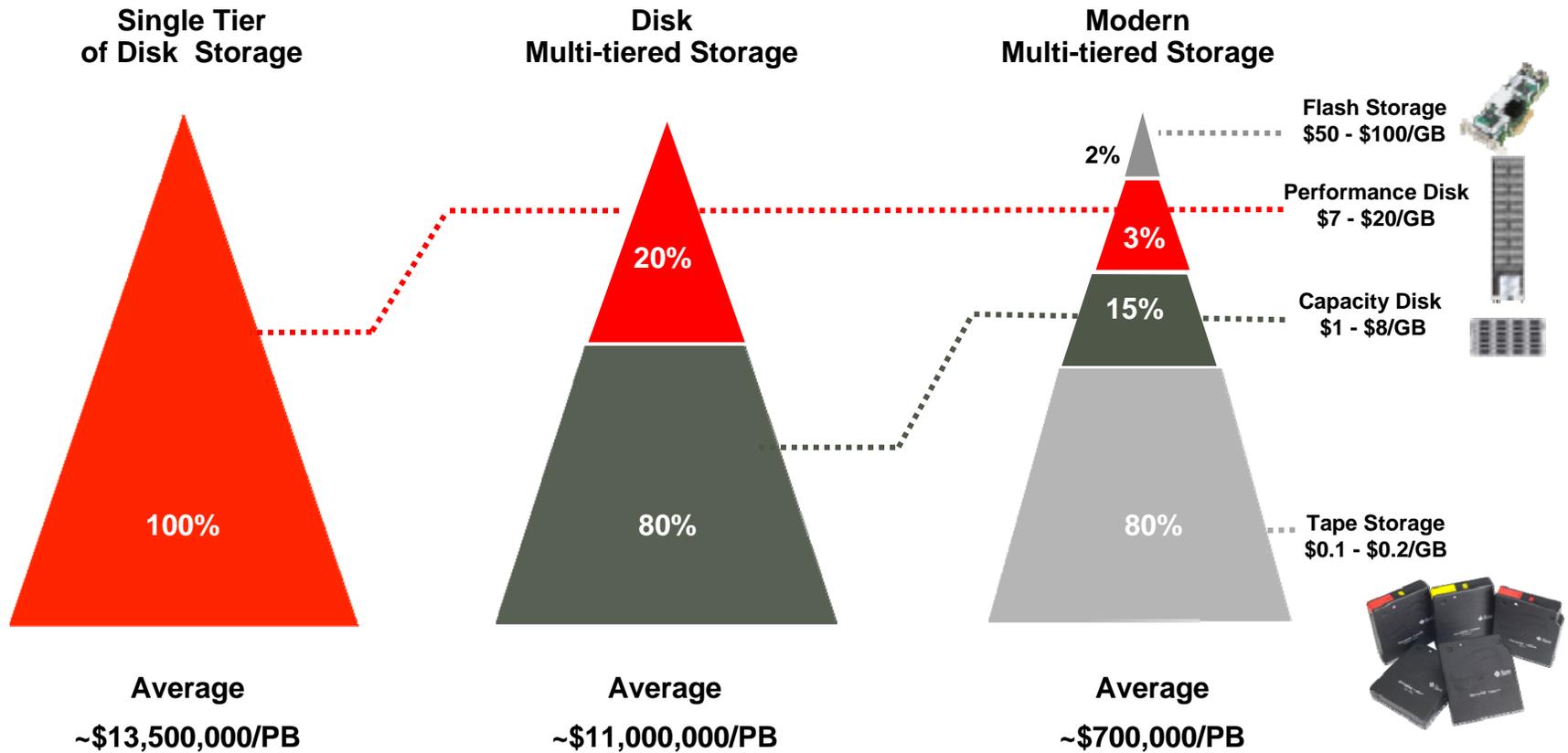
How to store stuff at specified sizes and specified dates in the future?

Robert M. Raymond

Economics of Tiered Storage

Tape is the Foundation: Most of the data; lowest cost

Storage Software Used to Move Data Between Storage Tiers



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Considerations for 2012 Architecture

- Percentages on Flash, Disk, and Tape likely to remain constant across 5, 20, and 50PB archives
 - Flash for Metadata
 - Disk for ingest and recall
 - Tape for long-term storage and data protection copies
- Reliability Concerns:
 - Protection for Metadata
 - Tape provides highest reliability for data
 - Highest uncorrected bit error rate
 - Multiple copies offers improved data protection at low cost
 - Data Integrity Validation ensure data integrity during transmission and storage
 - Tape systems offer multiple redundant and hot-swappable components to minimize schedule and unscheduled downtime so data is accessible when recall is needed

Possible Archive Scenarios

2012	#Disk	#Tape		
PB	1.00%	100.00%		
5	25	1000		
20	100	4000		
50	250	10000		
2015	#Disk	#Tape		
PB	1.00%	100.00%		
5	14	417		
20	57	1667		
50	143	4167		
2018	#Disk	#Tape		
PB	1.00%	100.00%		
5	8	156		
20	33	625		
50	83	1563		
	2012	2015	2018	
Tape size TB	5	12	32	40%/year ¹
Disk size TB	2	3.5	6	20%/year

1) INSIC 2012 Tape Roadmap

Future: It's still tiered storage, but cost of tape tier likely to drop faster than disk

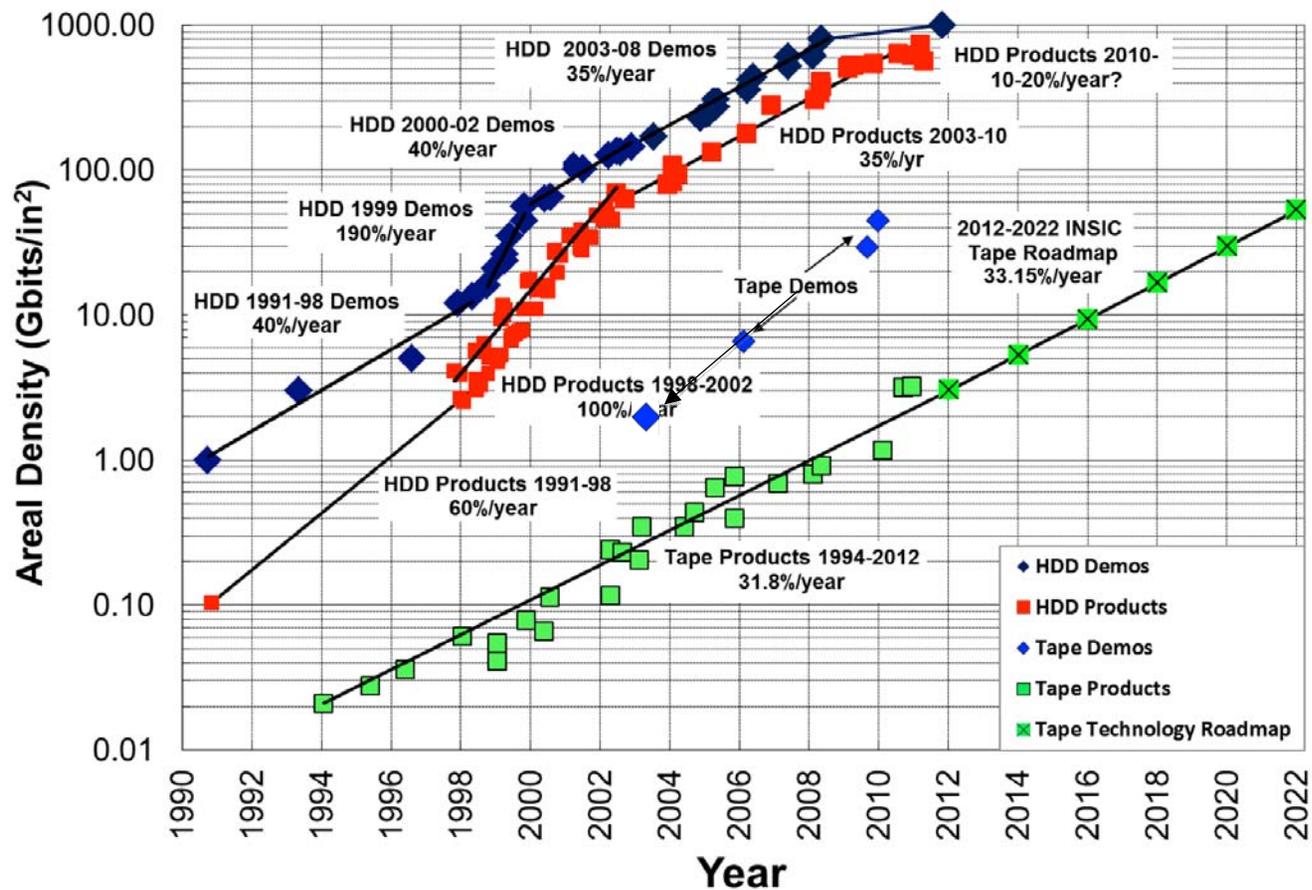


Chart courtesy of INSIC

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

Hardware and Software

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