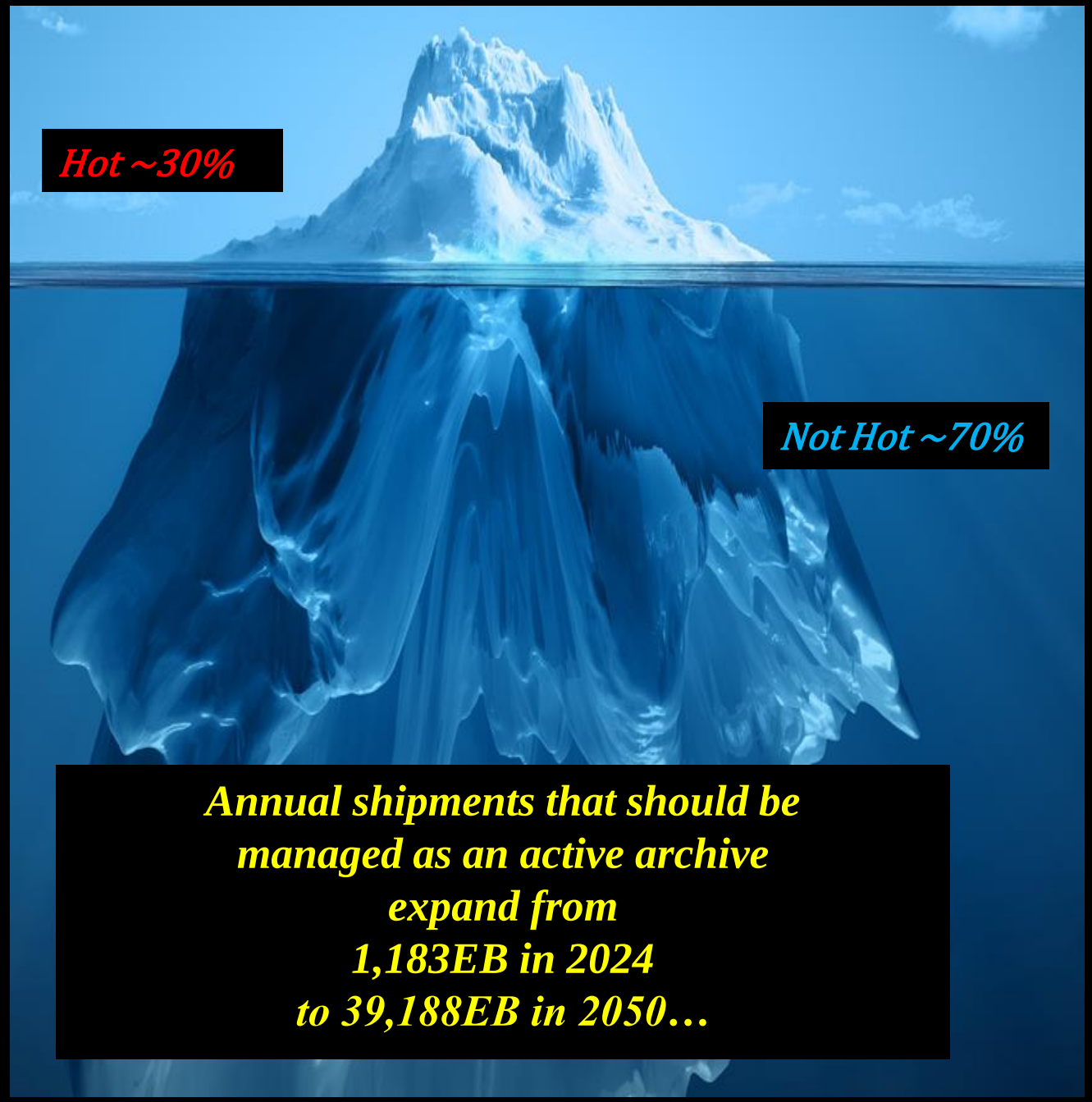

Annual shipments that should be managed as an active archive expand from 1,183EB in 2024 to 39,188EB in 2050…

The Growing Immensity of "Frostbitten" DATA:

Active-Archive Storage Markets, 2001-2050

Without transformative new technologies, 2031-2050 annual growth rates that merely mimic historic 25% norms cannot be feasibly sustained.

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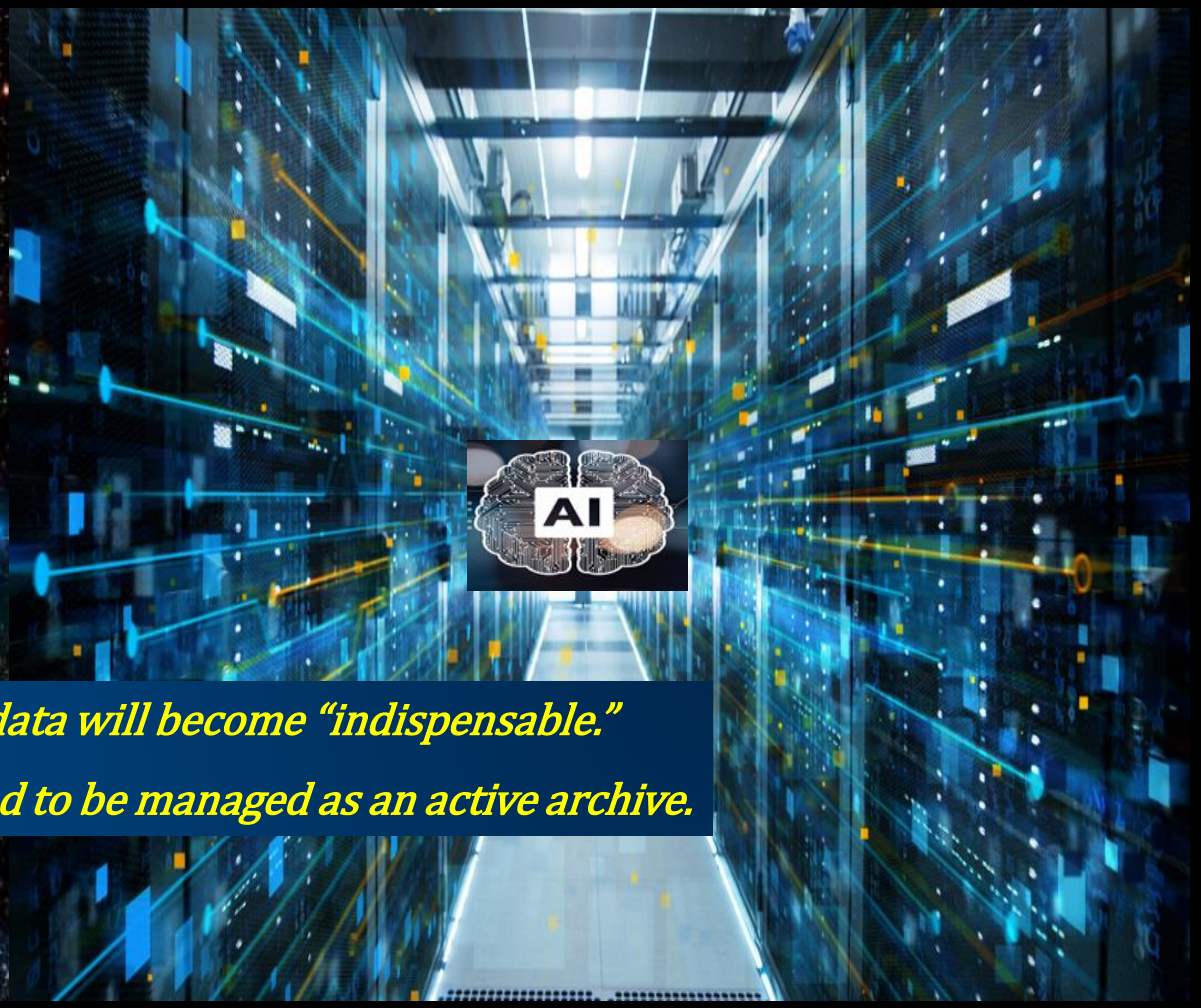
OUR EXPANDING DATAVERSE

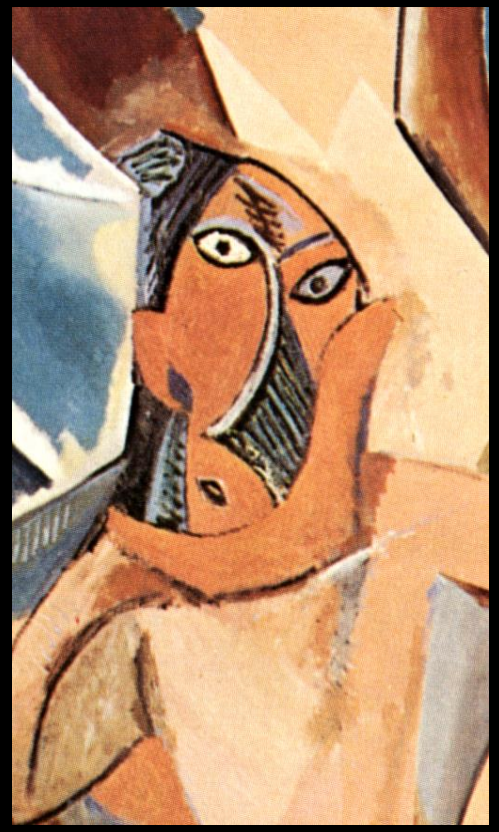


In the GenAI era, all stored data will become "indispensable."

~70% of all stored data will need to be managed as an active archive.

- *One thing is certain: The billions of people and systems and sensors connected in the global dataverse have generated and will continue to generate immense quantities of data…~70% of which will be relegated to active-archive status within 60 days of their creation…*

PRELIMINARY EXPECTORATION



- *Analyzing storage dynamics is like walking through a maze whose walls rearrange themselves with each step that you take…*

Enduring Question: *Will the Past be Prologue, or Will History Be Bunk?*

Note—My forecasts are always devised with these precautionary adages in mind:

- *The only thing we know with certainty about any forecast is that it will be wrong.—Anonymous*
- *He who foretells the future lies, even if he tells the truth.—Arab Proverb*

SHIPMENTS AND NEW FORECASTS, 2010-2050 SUMMARIES

Enterprise EB Likely Annual Shipment Scenario, 2001-2050

Annual Expansion Rates Decline from 25.5% in 2025 to 9.8% in 2050

	2010	CAGR 2001-2010	2020	CAGR 2010-2020	2030	CAGR 2020-2030	2040	CAGR 2030-2040	2050	CAGR 2040-2050
Compressed* Enterprise SSD EB (Tracking Begins in 2007)	<1	-	131	>1000%	1,130	24.1	7,098	20.2	16,601	8.9
Uncompressed HDD Enterprise EB	45	>1000%	680	31.1	4,299	20.3	1,256	-11.6	0	EOL 2046
Compressed** LTO+IBM TS1100 Tape EB	30	17.7	136	16.2	821	19.7	1,453	5.9	0	EOL 2048
Enterprise Emerging Storage (2025 Onward)	-	-	-	-	469	>1000%	12,087	38.4	39,382	12.5
Total Enterprise EB	76	27.9	947	28.8	6,719	21.6	21,894	12.5	55,983	9.8
Active Installed Base (Tracking Begins in 2006)	252	-	2,962	27.9	22,633	22.5	88,252	14.6	246,324	10.8
SSD % of Total EB	*0.3*		*13.8*		*16.8*		*32.4*		*29.7*	
HDD % of Total EB	*59.8*		*71.8*		*64.0*		*5.7*		*0.0*	
Tape + Emerging % of Total EB	*39.9*		*14.4*		*19.2*		*61.8*		*70.3*	
Unsustainable Shipment Scenario of a Consistent 25% CAGR, 2031-2050:							*62,575*		*582,772*	
X times greater than likely scenario:							*2.9*		*10.4*	
Unsustainable Installed Base in a Shipment Scenario of 25% CAGR, 2031-2050:							*210,351*		*1,959,045*	
X times greater than likely scenario:							*2.4*		*8.0*	

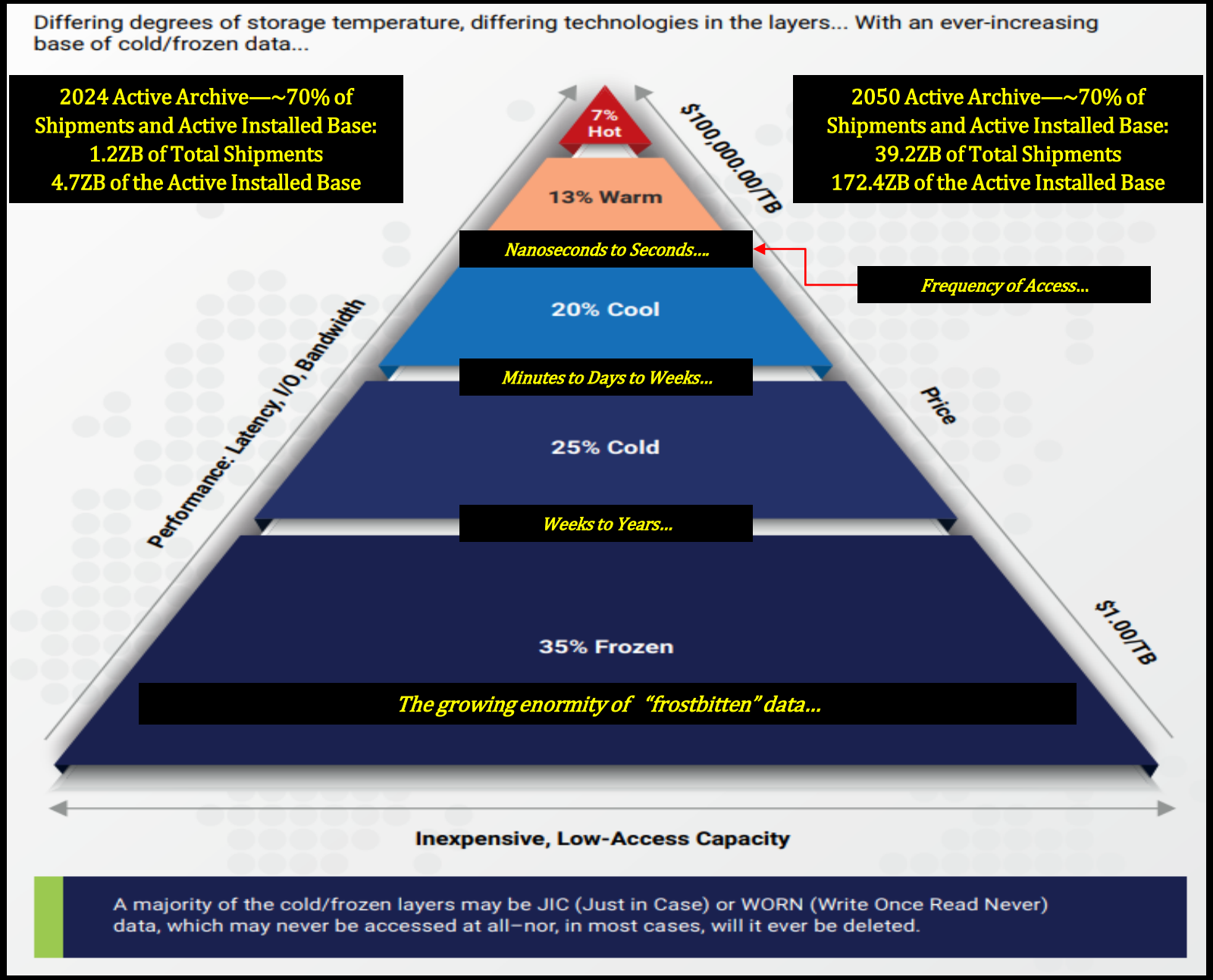
*SSD capacities reflect an approximate 5x compression ratio, but only for approximately 5% of all enterprise SSD EBs shipped, the vast majority of which (~95%) are configured in server/direct-attached storage (DAS) systems, with little or no data compression, not in fabric-attached solid-state arrays (SSAs), wherein sophisticated data compression software is the norm. HDD capacities are raw/uncompressed, since so few enterprise HDDs utilize any form of data compression.

**Tape capacities include both LTO and IBM TS1100 shipments and reflect a global average of 2.5x data compression.

Source: Furthur Market Research and Brad Johns Consulting (March, 2025)

- There are colossal differences of opinion regarding the ability and the willingness of the SSD and HDD makers to invest adequately to build to a feasible—but unlikely, and possibly profitless—storage demand of staggering dimensions.
- With the advent of new tape and enterprise emerging storage technologies, we have forecast that active-archive shipments will expand to comprise more than 50% of the fresh enterprise petabytes delivered in 2037. But these ~8.7 zettabytes may still fall far short of servicing the ~70% (~10.7 zettabytes) of new shipments in 2037 that will be destined, within 60 days, to become an active archive.

THE EVOLVING STORAGE PYRAMID…



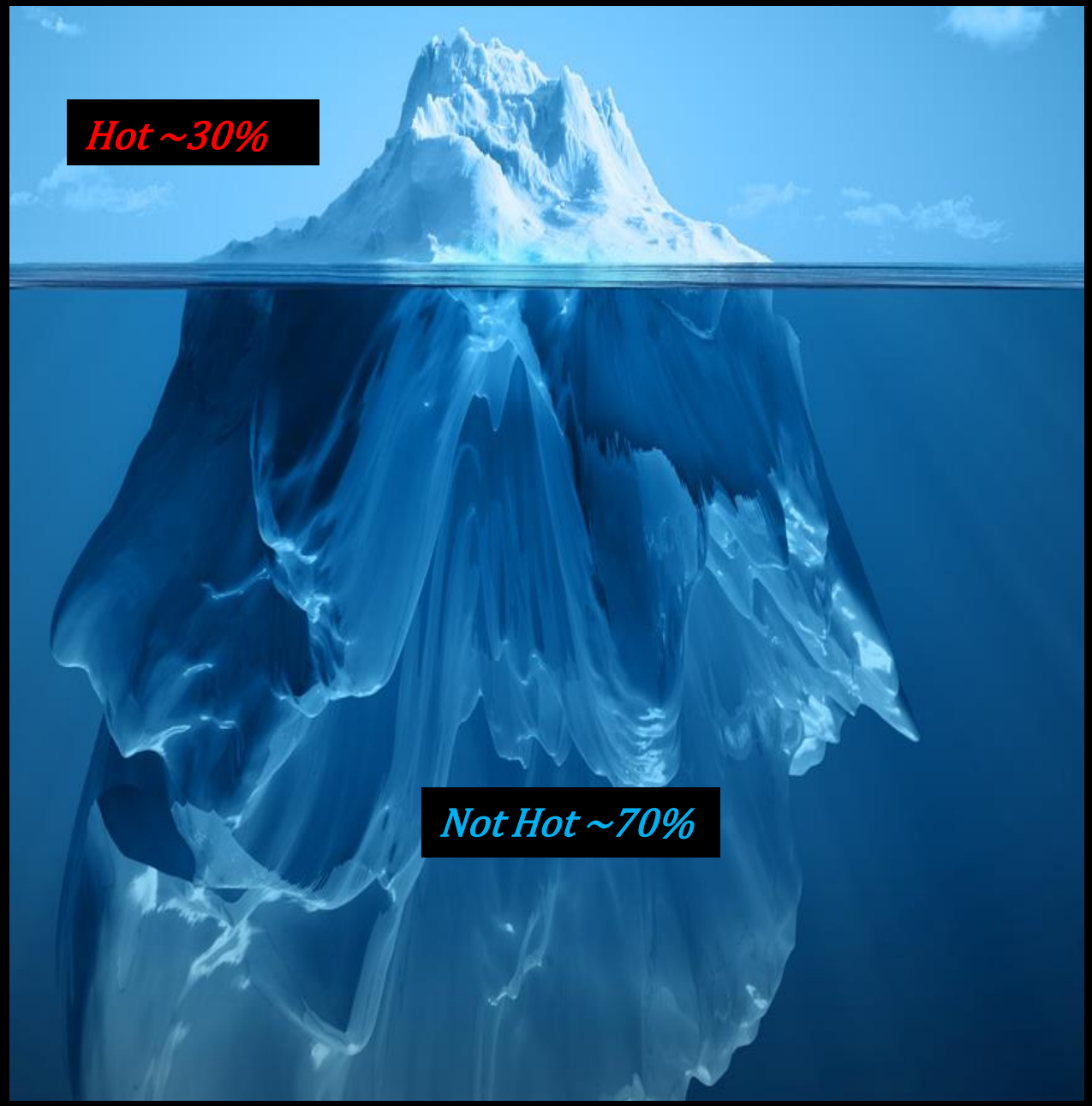
Source: Further Market Research, March, 2025

2024%s of Total Exabytes Delivered:

SSDs—17.9% (2020:13.8%)
HDDs—67.3% (2020: 71.8%)
Tape—14.8% (2020: 14.4%)

In 2024, tape serviced only ~21% of the data destined to become, within 60 days, an active archive…

Σ *Blindingly blatant "fact": Huge numbers of HDDs and a significant number of SSDs are managing and likely will continue to manage far too many of the active-archive workloads at far too great a cost per terabyte while consuming an inordinate share of available energy.*



Source: Further Market Research, March, 2025

THE EVOLVING STORAGE PYRAMID…

2025-2035 (both-and-and, SSD-HDD-Tape-Emerging scenario): complicated integrations of diverse enterprise technologies used in concert and conjunction with each other.

2035-2050 (either-or , SSD-Emerging scenario): With the advent of more strictly enforced corporate archive and access rules, and the growing need to conduct AI/ML business at the speed of flash, in most data centers ~30% of the data will be classified as hot, while the warm and cool and cold data layers diminish to insignificance, and the active-archive data layer grows to ~70% of the total—there will be no fine distinctions, either the data is hot, or it's not.

INCONCLUSIVE CONCLUSIONS: PERFORMANCE, POWER, COSTS

- Despite the impacts of GenAI and its expansive high-speed need to summon and scrutinize increasingly gigantic chunks of data, not all data will need to be accessed and analyzed simultaneously.
  "Even with GenAI, you don't need to plow a field with a Ferrari"—in most cases, oxen will suffice.
- The costs of managing our multi-zettabyte-fold dataverse over increasingly lengthy time periods will continue to swell, and the power demands of enterprise storage—accelerated and exacerbated by GenAI server farms—will continue to increase as a percentage of the overall data center energy budget.
- There are already a multitude of CO2 emission compliance regulations in place throughout the world (with much stricter regulations in Europe) and growing scarcities of total available energy for datacenters in many small communities and metropolitan areas.

Storage now accounts for 33% of operational and 61% of embodied emissions in Microsoft Azure DCs…
Hyperscalers are now investing in their own small nuclear power plants…

INCONCLUSIVE CONCLUSIONS: CONVERGENCE OF THE FISCAL AND THE ECOLOGICAL…

- New enterprise data infrastructures must not only cost less but must also consume less power to be in crucial and resilient alignment with the total availability of energy.
- Healthy ecosystems have become more crucial considerations in all IT purchasing decisions, and many data center managers will soon be ***forced***—by upper-level management edict or by compliance regulations—to use tape and various enterprise emerging technologies as ultra-low-cost, sustainable storage alternatives.
- In the active-archive enterprise data layers, the most cost-effective and power-efficient technologies will inevitably prevail, because they make the greatest fiscal ***and*** ecological sense.

In the end, the CFOs will always have the final say…

APPENDICES

ENTERPRISE DATA DEFINITIONS

GRANULAR SHIPMENT DETAILS, 2001-2050

ENTERPRISE DATA DEFINITIONS

We define "enterprise exabytes" as the total capacities delivered on all enterprise-class SSDs, HDDs, tape, and—in the near future—enterprise emerging storage media. This definition specifically excludes exabyte shipments of consumer-grade SSDs, HDDs, and flash modules delivered to PCs, entertainment devices, cell phones, home video surveillance, and other consumer and industrial applications (such as aircraft and telecom installations), the vast majority of which are already backed up in, and therefore reflected by, the enterprise-grade exabytes serviced by corporate and cloud data centers.

The following notes are relevant to all forecast tables:

—SSD capacities reflect an approximate 5x compression ratio, but only for approximately 5% of all enterprise SSD EBs shipped, the vast majority of which (~95%) are configured in server/direct-attached storage (DAS) systems, with little or no data compression, not in fabric-attached solid-state arrays (SSAs), wherein sophisticated data compression software is the norm.

—HDD capacities are raw/uncompressed, since so few enterprise HDDs utilize any form of data compression.

—Tape capacities include both LTO and IBM TS1100 shipments and reflect a global average of 2.5x data compression.

—Enterprise optical shipments remain minimal at <1,000PB/year—less than half of 1% of the 2023 total—and have not been included in our estimates of historical shipments or the current active installed base. That said, there should be huge opportunities for what we are now referring to collectively as "enterprise emerging storage" technologies to play major roles in future markets, as indicated in our 2025-2050 growth estimates. The "Total 'Active-Archive' Storage Opportunity" is the sum of all LTO+IBM+enterprise emerging technology shipments. See Slide 21 for examples of enterprise emerging storage technologies.

—We estimate the active installed base of enterprise data was 94.6 exabytes in 2006 and will likely grow to exceed 200 zettabytes in 2050. For the active installed base, we assume a 5-year infrastructure refresh/replacement cycle, retiring, for example, all 2010 shipments in 2015 while adding 2015 shipments to the installed base of the prior year, and we repeat this cycle through 2050.

Enterprise EB Shipment History, 2001-2010

	2001	2002	2003	2004	2005	CAGR 2001-2005	2006	2007	2008	2009	2010	CAGR 2005-2010 / 2001-2010
Compressed* Enterprise SSD EB								0	0	0	0	
YoY Growth %					*Tracking of Enterprise SSD Begins in 2007*			-	*300.0*	*900.0*	*400.0*	***NA***
Raw, Uncompressed Mission-Critical Enterprise HDD EB	1	1	1	2	3		3	4	6	6	9	
YoY Growth %	-	*45.3*	*58.5*	*39.9*	*58.3*	***50.3***	*28.0*	*7.1*	*53.0*	*3.0*	*58.6*	***27.9***
Raw, Uncompressed Business-Critical Enterprise HDD EB									9	16	36	
YoY Growth %				*Tracking of Enterprise Business-Critical/Nearline HDD Begins in 2008*					-	*77.3*	*130.1*	***NA***
Total Raw, Uncompressed HDD Enterprise EB	1	1	1	2	3		3	4	14	21	45	
YoY Growth %	-	*45.3*	*58.5*	*39.9*	*58.3*	***50.3***	*28.0*	*7.1*	*289.5*	*48.1*	*110.6*	***75.5***
												>1000
Total SSD+HDD Enterprise EB	1	1	1	2	3		3	4	14	22	45	
YoY Growth %	-	*45.3*	*58.5*	*39.9*	*58.3*	***50.3***	*28.0*	*7.1*	*289.5*	*48.3*	*111.1*	***75.7***
Compressed** LTO+IBM TS1100 Tape EB	6	9	14	20	18		25	36	39	35	30	
YoY Growth %	-	*47.5*	*58.6*	*41.3*	*-7.2*	***32.3***	*35.9*	*44.3*	*9.0*	*-10.3*	*-13.0*	***10.8***
Enterprise Emerging Storage (2025 Onward)												*17.7*
YoY Growth %												
Total "Active-Archive" Storage (Tape+Emerging)	6	9	14	20	18		25	36	39	35	30	
YoY Growth %	-	*47.5*	*58.6*	*41.3*	*-7.2*	***32.3***	*35.9*	*44.3*	*9.0*	*-10.3*	*-13.0*	***10.8***
												17.7
Total Compressed Shipments of Enterprise EB	6	9	15	21	21		28	39	53	56	76	
YoY Growth %	-	*47.3*	*58.6*	*41.2*	*-1.9*	***34.1***	*34.9*	*39.7*	*35.6*	*5.7*	*34.5*	***29.4***
												27.9
SSD EB % of Total Annual Shipments	-	-	-	-	-		-	0.0	0.0	0.1	0.3	
HDD EB % of Total Annual Shipments	8.3	8.2	8.2	8.1	13.0		12.4	9.5	27.2	38.2	59.8	
SSD+HDD EB % of Total Annual Shipments	*8.3*	*8.2*	*8.2*	*8.1*	*13.0*		*12.4*	*9.5*	*27.3*	*38.3*	*60.1*	
Compressed** LTO+IBM TS1100 Tape % of Total EB	91.7	91.8	91.8	91.9	87.0		87.6	90.5	72.7	61.7	39.9	
Enterprise Emerging Storage (2025 Onward) % of Total EB	-	-	-	-	-		-	-	-	-	-	
"Active-Archive" Storage (Tape+Emerging) % of Total EB	*91.7*	*91.8*	*91.8*	*91.9*	*87.0*		*87.6*	*90.5*	*72.7*	*61.7*	*39.9*	
Active Installed Base EB				*Active Installed Base Tracking Begins 2006*			95	124	163	198	252	
YoY Growth %							-	*31.4*	*30.7*	*21.5*	*27.7*	***27.8***

Source: Furthur Market Research and Brad Johns Consulting (March, 2025)

- Tape's share of total shipments rapidly declined after the introduction of nearline HDDs in 2008.
- Even with the enormous growth in nearline HDDs, the total annual growth rates declined from 2001-2010.

Enterprise EB Shipment History, 2011-2020

	2011	2012	2013	2014	2015	CAGR 2010-2015	2016	2017	2018	2019	2020	CAGR 2015-2020 / 2010-2020
Compressed* Enterprise SSD EB	1	2	4	8	14		21	35	62	80	131	
YoY Growth %	*250.0*	*114.3*	*153.3*	*110.5*	*68.8*	***132.2***	*58.5*	*64.0*	*76.4*	*28.8*	*64.1*	***57.5***
												>1000
Raw, Uncompressed Mission-Critical Enterprise HDD EB	12	14	16	19	22		19	20	21	20	16	
YoY Growth %	*28.0*	*21.0*	*11.8*	*18.6*	*12.6*	***18.2***	*-10.7*	*2.1*	*9.2*	*-5.1*	*-22.2*	***-6.0***
Raw, Uncompressed Business-Critical Enterprise HDD EB	41	52	75	98	136		199	242	312	465	664	***5.4***
YoY Growth %	*12.8*	*27.2*	*44.7*	*30.9*	*39.1*	***30.4***	*46.5*	*21.7*	*28.9*	*49.4*	*42.7*	***37.4***
Total Raw, Uncompressed HDD Enterprise EB	52	66	91	117	157		218	261	333	486	680	***33.9***
YoY Growth %	*15.9*	*25.8*	*37.5*	*28.7*	*34.7*	***28.3***	*38.7*	*20.0*	*27.4*	*45.9*	*40.0*	***34.0***
												31.1
Total SSD+HDD Enterprise EB	53	67	94	125	171		239	297	395	565	811	
YoY Growth %	*17.0*	*26.9*	*40.1*	*32.0*	*36.9*	***30.3***	*40.3*	*23.9*	*33.2*	*43.2*	*43.4*	***36.6***
												33.4
Compressed** LTO+IBM TS1100 Tape EB	43	53	62	86	98		124	136	125	134	136	
YoY Growth %	*43.4*	*22.9*	*16.4*	*38.3*	*15.0*	***26.6***	*25.8*	*9.8*	*-7.7*	*7.1*	*1.3*	***6.7***
Enterprise Emerging Storage (2025 Onward)												***16.2***
YoY Growth %												
Total "Active-Archive" Storage (Tape+Emerging)	43	53	62	86	98		124	136	125	134	136	
YoY Growth %	*43.4*	*22.9*	*16.4*	*38.3*	*15.0*	***26.6***	*25.8*	*9.8*	*-7.7*	*7.1*	*1.3*	***6.7***
												16.2
Total Compressed Shipments of Enterprise EB	96	121	156	210	269		363	432	520	700	947	
YoY Growth %	*27.5*	*25.1*	*29.6*	*34.5*	*28.0*	***28.9***	*35.0*	*19.1*	*20.3*	*34.5*	*35.3*	***28.6***
												28.8
SSD EB % of Total Annual Shipments	0.7	1.2	2.4	3.8	5.0		5.9	8.1	11.9	11.4	13.8	
HDD EB % of Total Annual Shipments	54.4	54.6	58.0	55.5	58.4		60.0	60.5	64.0	69.4	71.8	
SSD+HDD EB % of Total Annual Shipments	*55.1*	*55.9*	*60.4*	*59.3*	*63.4*		*65.9*	*68.6*	*75.9*	*80.8*	*85.6*	
Compressed** LTO+IBM TS1100 Tape % of Total EB	44.9	44.1	39.6	40.7	36.6		34.1	31.4	24.1	19.2	14.4	
Enterprise Emerging Storage (2025 Onward) % of Total EB	-	-	-	-	-		-	-	-	-	-	
"Active-Archive" Storage (Tape+Emerging) % of Total EB	*44.9*	*44.1*	*39.6*	*40.7*	*36.6*		*34.1*	*31.4*	*24.1*	*19.2*	*14.4*	
Active Installed Base EB	321	402	505	659	853		1,119	1,431	1,795	2,285	2,962	
YoY Growth %	*27.1*	*25.4*	*25.6*	*30.5*	*29.3*	***27.6***	*31.3*	*27.9*	*25.4*	*27.3*	*29.7*	***28.3***
												27.9

Source: Furthur Market Research and Brad Johns Consulting (March, 2025)

- **Tape's share of total shipments dramatically declined 2011-2020. Expanding data demands were mostly fulfilled by nearline HDDs.**

Enterprise EB Shipment History, 2021-2024, and Forecasts, 2025-2030

	2021	2022	2023	2024	2025	CAGR 2020-2025	2026	2027	2028	2029	2030	CAGR 2025-2030 / 2020-2030
Compressed* Enterprise SSD EB	179	208	144	303	404		529	675	750	969	1,130	
YoY Growth %	*36.9*	*16.0*	*-30.5*	*109.8*	*33.3*	***25.3***	*31.0*	*27.7*	*11.1*	*29.2*	*16.5*	***22.8*** / ***24.1***
Raw, Uncompressed Mission-Critical Enterprise HDD EB	15	6	4	2	1		1	1	0			
YoY Growth %	*-7.0*	*-61.2*	*-33.3*	*-60.5*	*-40.0*	***-43.6***	*-22.2*	*-28.6*	*-60.0*	*EOL*		
Raw, Uncompressed Business-Critical Enterprise HDD EB	944	936	1,035	1,135	1,399		1,828	2,309	2,819	3,645	4,299	
YoY Growth %	*42.2*	*-0.9*	*10.6*	*9.7*	*23.3*	***16.1***	*30.7*	*26.3*	*22.1*	*29.3*	*17.9*	***25.2***
Total Raw, Uncompressed HDD Enterprise EB	959	942	1,039	1,137	1,400		1,829	2,310	2,819	3,645	4,299	***20.5***
YoY Growth %	*41.1*	*-1.8*	*10.3*	*9.4*	*23.2*	***15.5***	*30.6*	*26.3*	*22.1*	*29.3*	*17.9*	***25.2*** / ***20.3***
Total SSD+HDD Enterprise EB	1,138	1,149	1,183	1,439	1,804		2,358	2,985	3,569	4,614	5,429	
YoY Growth %	*40.4*	*1.0*	*2.9*	*21.6*	*25.3*	***17.3***	*30.7*	*26.6*	*19.6*	*29.3*	*17.6*	***24.7*** / ***20.9***
Compressed** LTO+IBM TS1100 Tape EB	190	207	228	251	276		311	383	481	619	821	
YoY Growth %	*39.5*	*8.8*	*10.5*	*9.7*	*10.1*	***15.2***	*12.7*	*23.3*	*25.4*	*28.8*	*32.6*	***24.4***
Enterprise Emerging Storage (2025 Onward)					8		29	88	181	296	469	***19.7***
YoY Growth %	*Enterprise Emerging Tracking Begins 2026*				-		*249.4*	*203.4*	*105.7*	*63.5*	*58.4*	***124.1***
Total "Active-Archive" Storage (Tape+Emerging)	190	207	228	251	284		340	471	662	915	1,290	*NA*
YoY Growth %	*39.5*	*8.8*	*10.5*	*9.7*	*13.4*	***15.9***	*19.6*	*38.7*	*40.4*	*38.3*	*41.0*	***35.3*** / ***25.2***
Total Compressed Shipments of Enterprise EB	1,328	1,356	1,412	1,690	2,088		2,697	3,456	4,231	5,530	6,719	
YoY Growth %	*40.3*	*2.1*	*4.1*	*19.7*	*23.5*	***17.1***	*29.2*	*28.1*	*22.4*	*30.7*	*21.5*	***26.3*** / ***21.6***
SSD EB % of Total Annual Shipments	13.5	15.3	10.2	17.9	19.3		19.6	19.5	17.7	17.5	16.8	
HDD EB % of Total Annual Shipments	72.2	69.4	73.6	67.3	67.1		67.8	66.8	66.6	65.9	64.0	
SSD+HDD EB % of Total Annual Shipments	*85.7*	*84.8*	*83.8*	*85.2*	*86.4*		*87.4*	*86.4*	*84.4*	*83.4*	*80.8*	
Compressed** LTO+IBM TS1100 Tape % of Total EB	14.3	15.2	16.2	14.8	13.2		11.5	11.1	11.4	11.2	12.2	
Enterprise Emerging Storage (2025 Onward) % of Total EB	-	-	-	-	0.4		1.1	2.5	4.3	5.4	7.0	
"Active-Archive" Storage (Tape+Emerging) % of Total EB	*14.3*	*15.2*	*16.2*	*14.8*	*13.6*		*12.6*	*13.6*	*15.6*	*16.6*	*19.2*	
Active Installed Base EB	3,927	4,851	5,742	6,732	7,873		9,242	11,342	14,162	18,001	22,633	
YoY Growth %	*32.6*	*23.5*	*18.4*	*17.2*	*16.9*	***21.6***	*17.4*	*22.7*	*24.9*	*27.1*	*25.7*	***23.5*** / ***22.5***

Source: Furthur Market Research and Brad Johns Consulting (March, 2025)

- There were unanticipated, unprecedented declines in post-COVID demand 2022-2023 after 3 consecutive 40+% upticks 2019-2021, but GenAI requirements in conjunction with other traditional demand drivers will help to spur 2024-2030 growth rates to >25%.

Enterprise EB Shipment Forecasts, 2031-2040

	2031	2032	2033	2034	2035	CAGR 2030-2035	2036	2037	2038	2039	2040	CAGR 2035-2040 / 2030-2040
Compressed* Enterprise SSD EB	1,386	1,879	2,384	2,970	3,629		4,134	4,789	5,166	6,397	7,098	
YoY Growth %	*22.7*	*35.6*	*26.9*	*24.6*	*22.2*	***26.3***	*13.9*	*15.8*	*7.9*	*23.8*	*11.0*	***14.4***
												20.2
Raw, Uncompressed Mission-Critical Enterprise HDD EB												
YoY Growth %												
Raw, Uncompressed Business-Critical Enterprise HDD EB	4,650	4,355	4,221	3,873	3,398		2,855	2,438	2,072	1,789	1,256	
YoY Growth %	*8.2*	*-6.3*	*-3.1*	*-8.2*	*-12.3*	***-4.6***	*-16.0*	*-14.6*	*-15.0*	*-13.7*	*-29.8*	***-18.0***
Total Raw, Uncompressed HDD Enterprise EB	4,650	4,355	4,221	3,873	3,398		2,855	2,438	2,072	1,789	1,256	*-11.6*
YoY Growth %	*8.2*	*-6.3*	*-3.1*	*-8.2*	*-12.3*	***-4.6***	*-16.0*	*-14.6*	*-15.0*	*-13.7*	*-29.8*	***-18.0***
												-11.6
Total SSD+HDD Enterprise EB	6,036	6,234	6,605	6,843	7,027		6,989	7,227	7,238	8,186	8,354	
YoY Growth %	*11.2*	*3.3*	*6.0*	*3.6*	*2.7*	***5.3***	*-0.5*	*3.4*	*0.2*	*13.1*	*2.1*	***3.5***
												4.4
Compressed** LTO+IBM TS1100 Tape EB	1,030	1,267	1,525	1,807	1,995		2,033	1,890	1,599	1,510	1,453	
YoY Growth %	*25.4*	*23.0*	*20.4*	*18.5*	*10.4*	***19.4***	*1.9*	*-7.0*	*-15.4*	*-5.6*	*-3.8*	***-6.1***
Enterprise Emerging Storage (2025 Onward)	704	1,111	1,693	2,456	3,782		4,932	6,806	8,081	9,867	12,087	*5.9*
YoY Growth %	*50.1*	*57.8*	*52.4*	*45.1*	*54.0*	***51.8***	*30.4*	*38.0*	*18.7*	*22.1*	*22.5*	***26.2***
Total "Active-Archive" Storage (Tape+Emerging)	1,734	2,378	3,218	4,263	5,777		6,965	8,696	9,680	11,377	13,540	*38.4*
YoY Growth %	*34.4*	*37.1*	*35.3*	*32.5*	*35.5*	***35.0***	*20.6*	*24.9*	*11.3*	*17.5*	*19.0*	***18.6***
												26.5
Total Compressed Shipments of Enterprise EB	7,770	8,612	9,823	11,106	12,804		13,954	15,923	16,918	19,563	21,894	
YoY Growth %	*15.6*	*10.8*	*14.1*	*13.1*	*15.3*	***13.8***	*9.0*	*14.1*	*6.2*	*15.6*	*11.9*	***11.3***
												12.5
SSD EB % of Total Annual Shipments	17.8	21.8	24.3	26.7	28.3		29.6	30.1	30.5	32.7	32.4	
HDD EB % of Total Annual Shipments	59.8	50.6	43.0	34.9	26.5		20.5	15.3	12.2	9.1	5.7	
SSD+HDD EB % of Total Annual Shipments	*77.7*	*72.4*	*67.2*	*61.6*	*54.9*		*50.1*	*45.4*	*42.8*	*41.8*	*38.2*	
Compressed** LTO+IBM TS1100 Tape % of Total EB	13.3	14.7	15.5	16.3	15.6		14.6	11.9	9.5	7.7	6.6	
Enterprise Emerging Storage (2025 Onward) % of Total EB	9.1	12.9	17.2	22.1	29.5		35.3	42.7	47.8	50.4	55.2	
"Active-Archive" Storage (Tape+Emerging) % of Total EB	*22.3*	*27.6*	*32.8*	*38.4*	*45.1*		*49.9*	*54.6*	*57.2*	*58.2*	*61.8*	
Active Installed Base EB	27,705	32,861	38,453	44,030	50,115		56,299	63,610	70,705	79,162	88,252	
YoY Growth %	*22.4*	*18.6*	*17.0*	*14.5*	*13.8*	***17.2***	*12.3*	*13.0*	*11.2*	*12.0*	*11.5*	***12.0***
												14.6

Trillions of $USD investments in new NAND fab capacity will be required to achieve these enterprise-grade SSD production capabilities...

Source: Furthur Market Research and Brad Johns Consulting (March, 2025)

- Active-archive prices will drop to below $1.00/TB during the 2030s; active-archive shipments will quickly expand.

Enterprise EB Shipment Forecasts, 2041-2050

	2041	2042	2043	2044	2045	CAGR 2040-2045	2046	2047	2048	2049	2050	CAGR 2045-2050 / 2040-2050
Compressed* Enterprise SSD EB	8,921	9,595	10,831	12,832	13,565		14,387	15,688	16,007	16,379	16,601	
YoY Growth %	*25.7*	*7.6*	*12.9*	*18.5*	*5.7*	***13.8***	*6.1*	*9.0*	*2.0*	*2.3*	*1.4*	***4.1*** / ***8.9***
Raw, Uncompressed Mission-Critical Enterprise HDD EB												
YoY Growth %												
Raw, Uncompressed Business-Critical Enterprise HDD EB	988	721	535	304	230		50					
YoY Growth %	*-21.3*	*-27.0*	*-25.8*	*-43.2*	*-24.3*	***-28.8***	*-78.3*	*EOL*				
Total Raw, Uncompressed HDD Enterprise EB	988	721	535	304	230		50					
YoY Growth %	*-21.3*	*-27.0*	*-25.8*	*-43.2*	*-24.3*	***-28.8***	*-78.3*					
Total SSD+HDD Enterprise EB	9,909	10,316	11,366	13,136	13,795		14,437	15,688	16,007	16,379	16,601	
YoY Growth %	*18.6*	*4.1*	*10.2*	*15.6*	*5.0*	***10.6***	*4.7*	*8.7*	*2.0*	*2.3*	*1.4*	***3.8*** / ***7.1***
Compressed** LTO+IBM TS1100 Tape EB	1,299	1,085	904	782	690		451	328	143			
YoY Growth %	*-10.6*	*-16.5*	*-16.7*	*-13.5*	*-11.8*	***-13.8***	*-34.6*	*-27.3*	*-56.4*	*EOL*		
Enterprise Emerging Storage (2025 Onward)	15,155	17,863	19,788	21,874	23,867		26,296	30,544	33,782	36,286	39,382	
YoY Growth %	*25.4*	*17.9*	*10.8*	*10.5*	*9.1*	***14.6***	*10.2*	*16.2*	*10.6*	*7.4*	*8.5*	***10.5***
Total "Active-Archive" Storage (Tape+Emerging)	16,454	18,948	20,692	22,656	24,557		26,747	30,872	33,925	36,286	39,382	***12.5***
YoY Growth %	*21.5*	*15.2*	*9.2*	*9.5*	*8.4*	***12.6***	*8.9*	*15.4*	*9.9*	*7.0*	*8.5*	***9.9*** / ***11.3***
Total Compressed Shipments of Enterprise EB	26,363	29,264	32,058	35,792	38,352		41,184	46,560	49,932	52,665	55,983	
YoY Growth %	*20.4*	*11.0*	*9.5*	*11.6*	*7.2*	***11.9***	*7.4*	*13.1*	*7.2*	*5.5*	*6.3*	***7.9*** / ***9.8***
SSD EB % of Total Annual Shipments	33.8	32.8	33.8	35.9	35.4		34.9	33.7	32.1	31.1	29.7	
HDD EB % of Total Annual Shipments	3.7	2.5	1.7	0.8	0.6		0.1	0.0	0.0	0.0	0.0	
SSD+HDD EB % of Total Annual Shipments	*37.6*	*35.3*	*35.5*	*36.7*	*36.0*		*35.1*	*33.7*	*32.1*	*31.1*	*29.7*	
Compressed** LTO+IBM TS1100 Tape % of Total EB	4.9	3.7	2.8	2.2	1.8		1.1	0.7	0.3	0.0	0.0	
Enterprise Emerging Storage (2025 Onward) % of Total EB	57.5	61.0	61.7	61.1	62.2		63.9	65.6	67.7	68.9	70.3	
"Active-Archive" Storage (Tape+Emerging) % of Total EB	*62.4*	*64.7*	*64.5*	*63.3*	*64.0*		*64.9*	*66.3*	*67.9*	*68.9*	*70.3*	
Active Installed Base EB	100,661	114,002	129,142	145,371	161,829		176,650	193,946	211,820	228,693	246,324	
YoY Growth %	*14.1*	*13.3*	*13.3*	*12.6*	*11.3*	***12.9***	*9.2*	*9.8*	*9.2*	*8.0*	*7.7*	***8.7*** / ***10.8***

Source: Furthur Market Research and Brad Johns Consulting (March, 2025)

- **Ever more trillions of $USD investments in new NAND fabs will be required, and expanding e-grade SSD shipment capacity to ~10ZBs/year may not be profitably feasible. Active-Archive storage technologies can add cost-effective capacity far more quickly and will expand to ~70% of all enterprise EB delivered.**