

STORAGE DEVELOPER CONFERENCE



BY Developers FOR Developers

Long Term Preservation and Archive Storage

Shashidhar Joshi

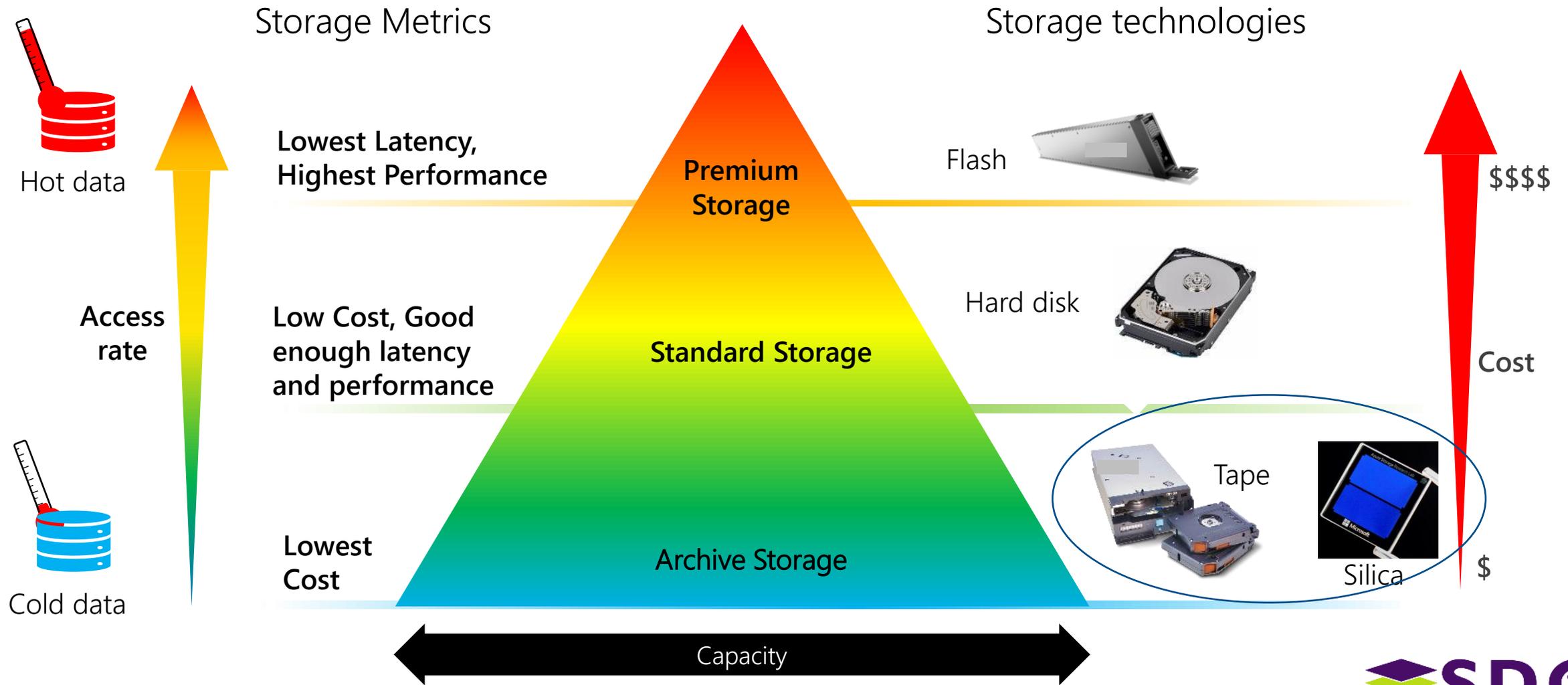
Framing the Discussion

Framing the Discussion for Today

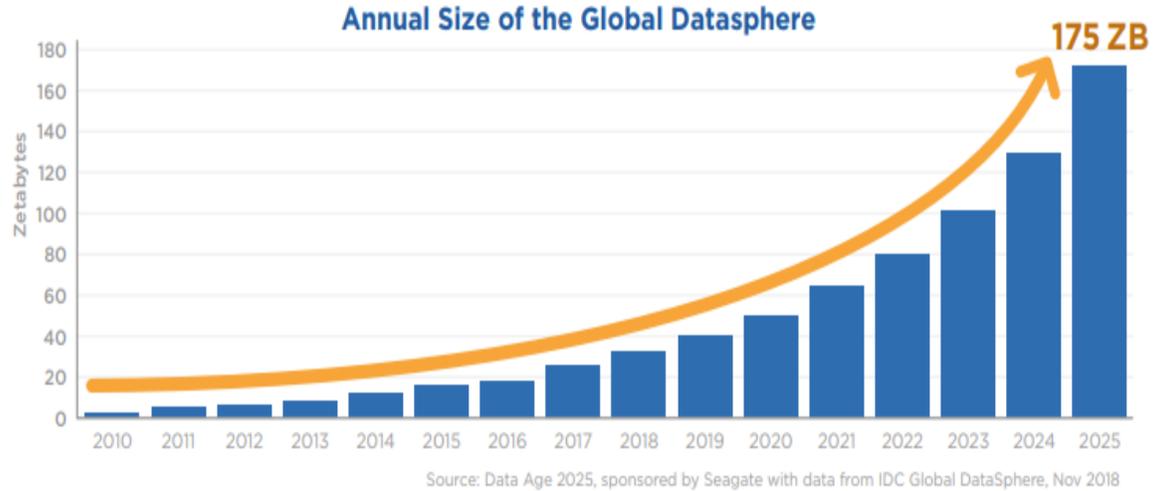
- Storage Growth, Data Lifecycles and Extended Value from Archive data is expanding Archive Services
- Technology and Economic challenges are limiting factors to unblock Archive growth
- Workloads point us to the possibility of creating a ground up Storage Technology that is better suited to address the challenges
- We will introduce Silica and explain the benefits associated with this technology
- Opportunity for Industry to contribute towards Silica

Archive Landscape and Problem Statement

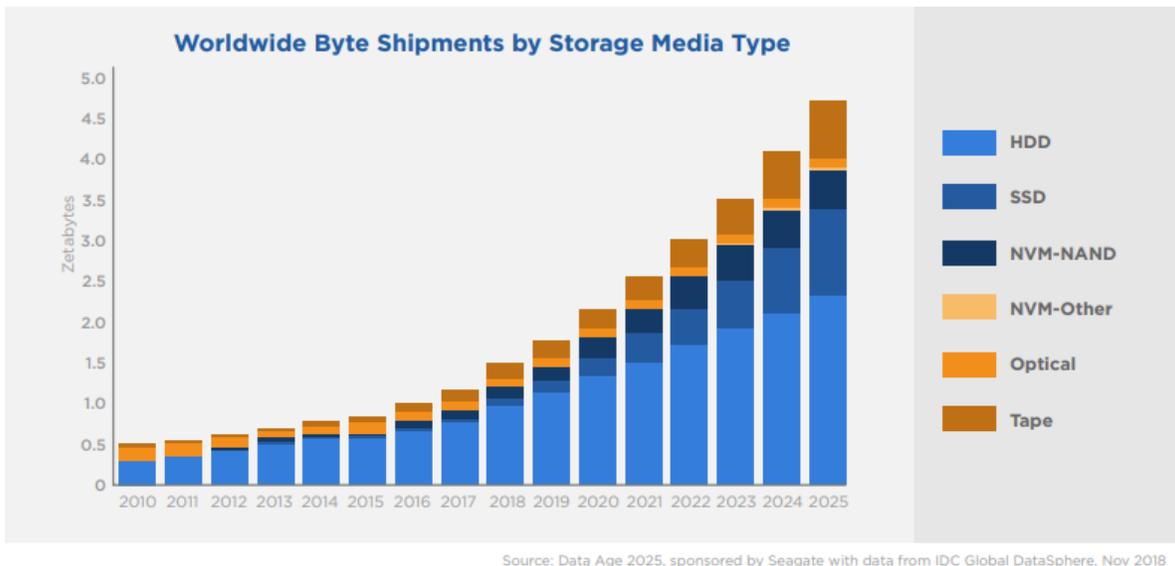
Today's cloud storage landscape



Data Growth and Storage



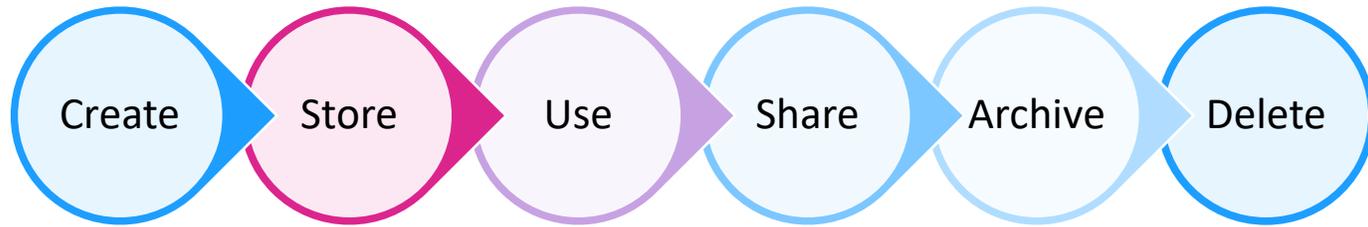
While short-term macro economic aberrations will continue to happen, the long-term trend will continue



Only a fraction of the generated data is Stored

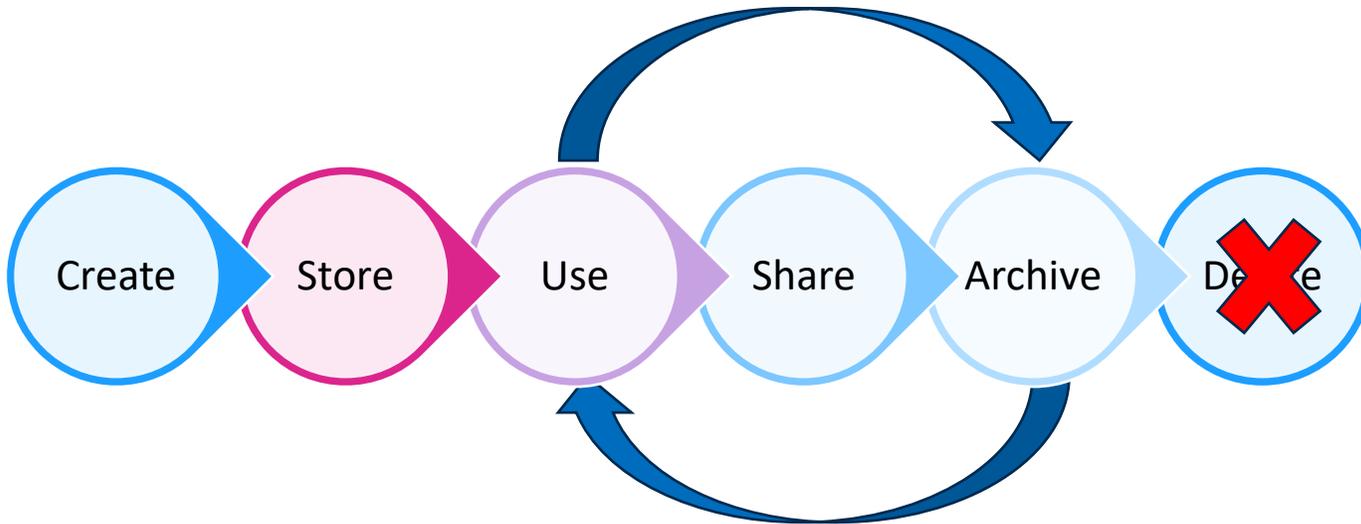
Source: Data Age 2025: IDC

Data LifeCycle and Value Creation



Two main reasons to delete data

1. Does not provide anymore value
2. Provides value, but is not economical to keep storing



Market Dynamics

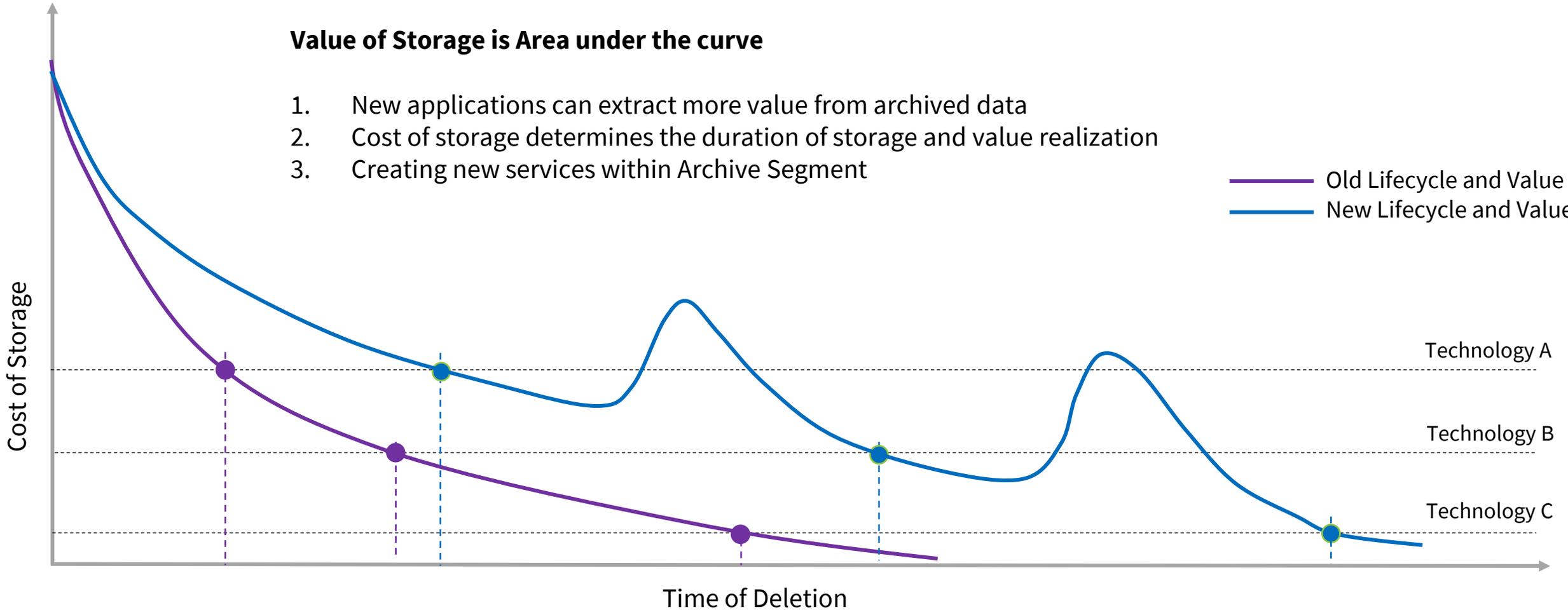
1. New applications can extract more value
2. Lower cost can enable storing data for longer duration

Value Creation

Value of Storage is Area under the curve

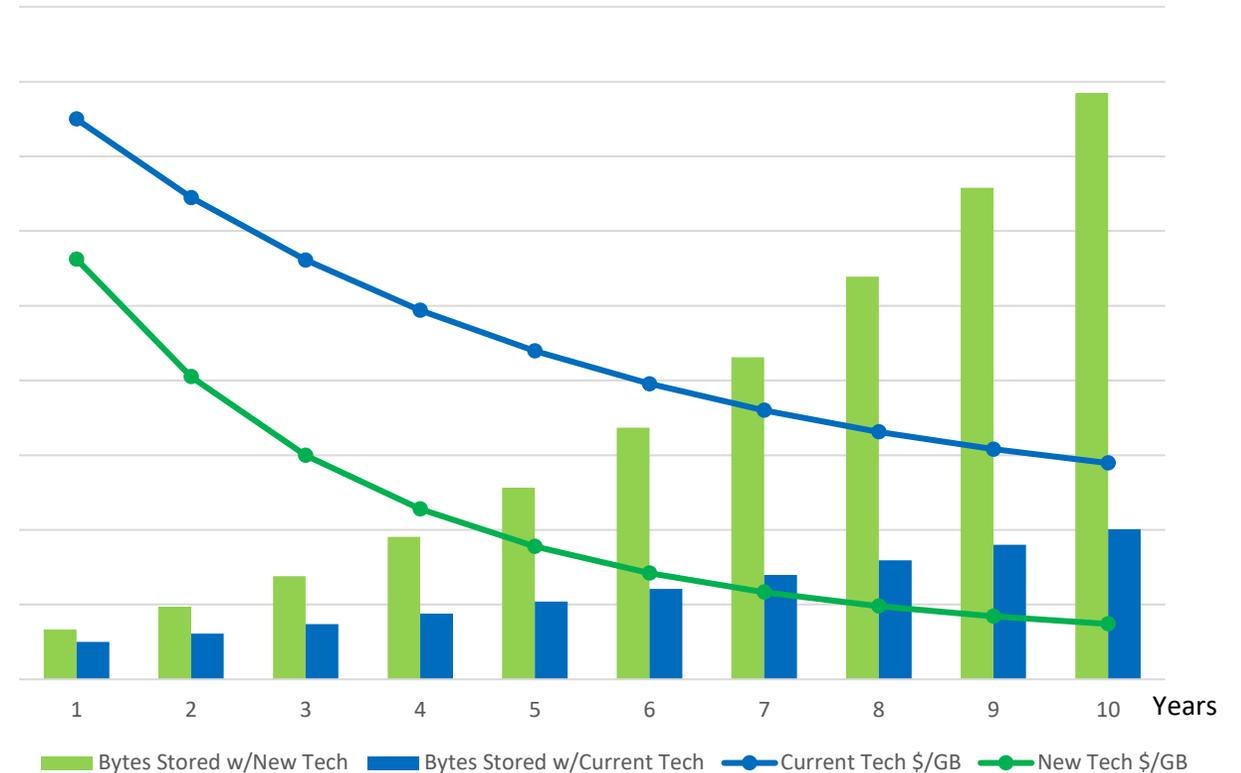
1. New applications can extract more value from archived data
2. Cost of storage determines the duration of storage and value realization
3. Creating new services within Archive Segment

— Old Lifecycle and Value
— New Lifecycle and Value



Can we Store it all ? Simple Budget Problem

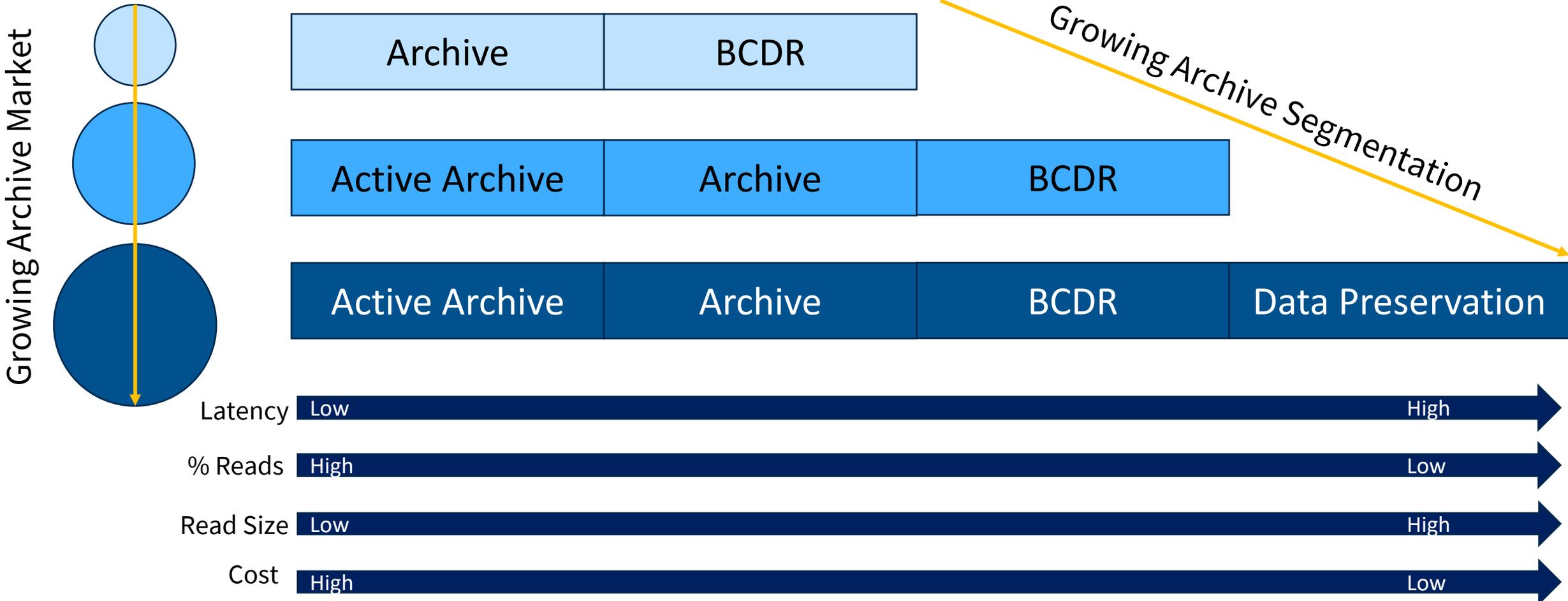
- Budgets (% of Revenue) – Assuming Revenue Grows, Storage Budgets Grows
- Storage Costs – Need to reduce to deploy more storage with the allotted budget
- Current technologies do not have line of sight towards enabling step function changes in cost
- Need to develop new storage technologies, built with grounds up approach for cost and longevity



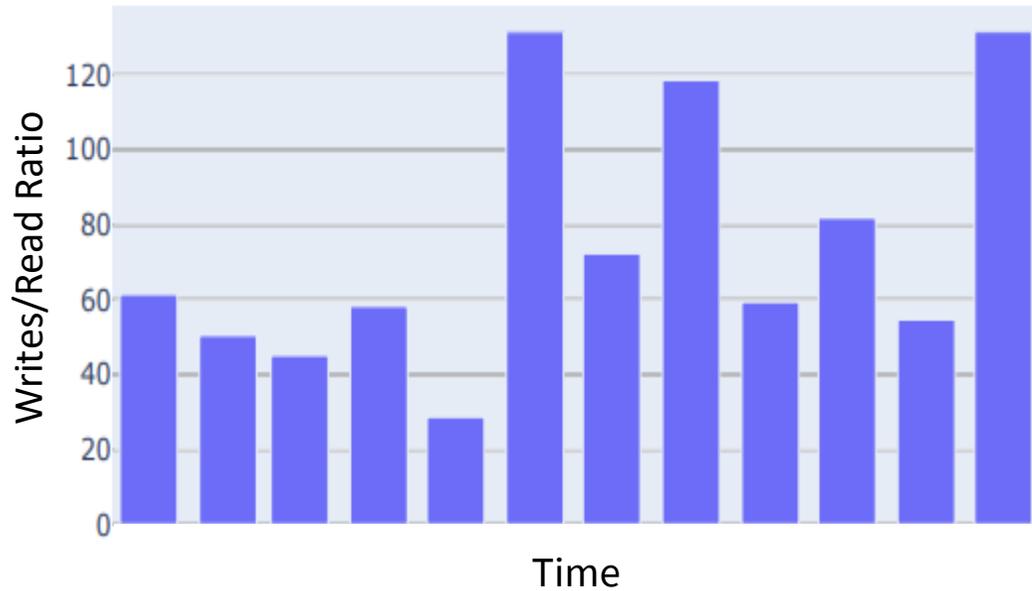
Workloads and Technology Requirements

Archive Landscape

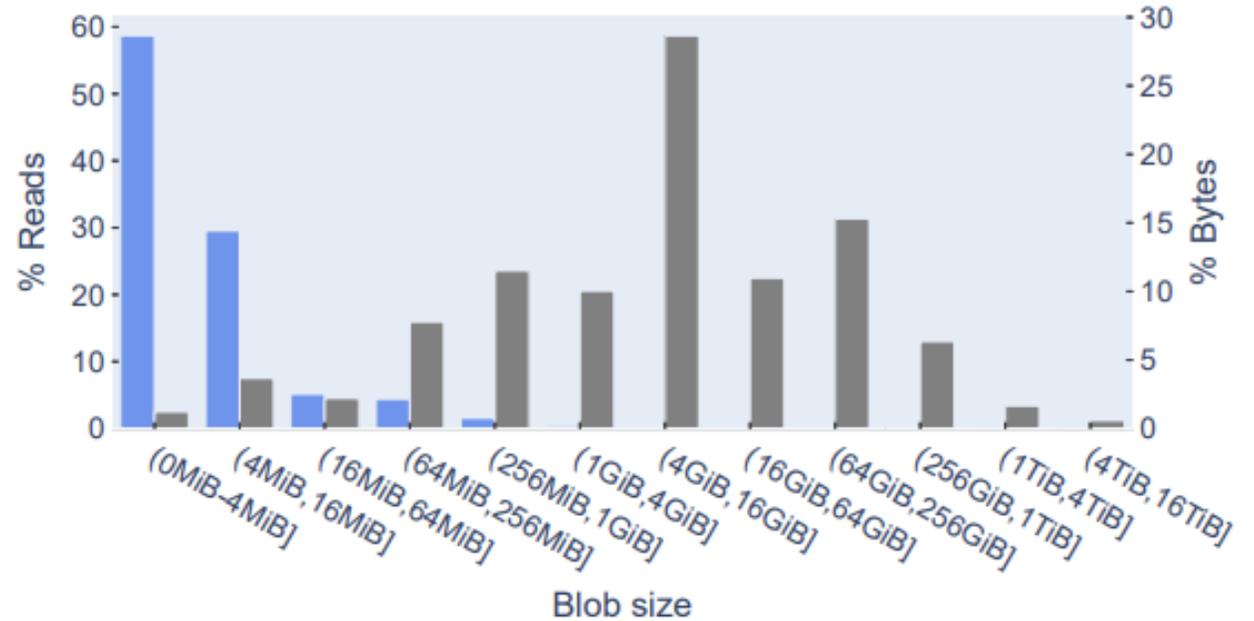
- Business Segments**
- Medical Records
 - Financial Regulations
 - Advanced Driver Assistance System
 - Government Archives
 - Media & Entertainment



Archive Workloads



- Writes are multiple orders higher than Reads
- Lots of Data Stored
- Read very Infrequently



- Small Read Sizes – Random Access and Low Latency
- Large Reads Sizes – Better Thruput
- Dynamic Provisioning

Storage Technology Requirement

Lowest TCO

Cost of Storage

- Acquisition Cost, Power Consumption, Media Refresh

Resilient

Media Properties

- Media characteristics that make data Immutable and Durable

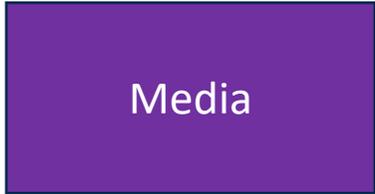
Flexible & Available

Read/Write/Media Disaggregation

- Scale and deploy as needed

Silica – A Potential Solution

Silica at a Glance

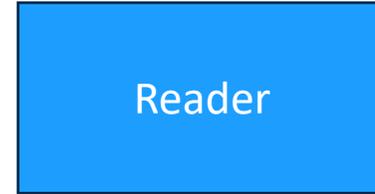
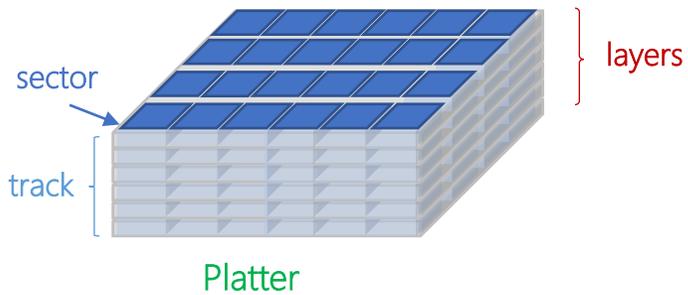


Media: Glass



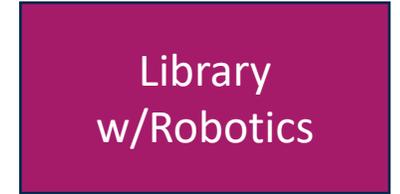
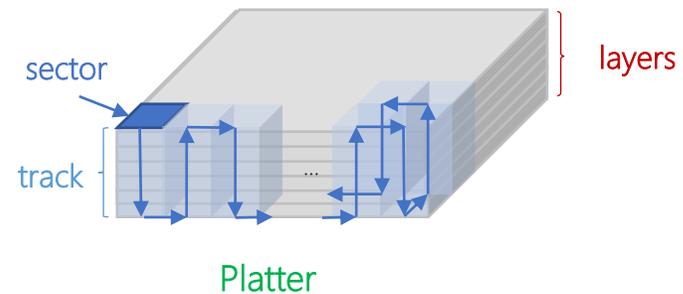
Writer

- Optical Components
- Write Sequentially in Layers



Reader

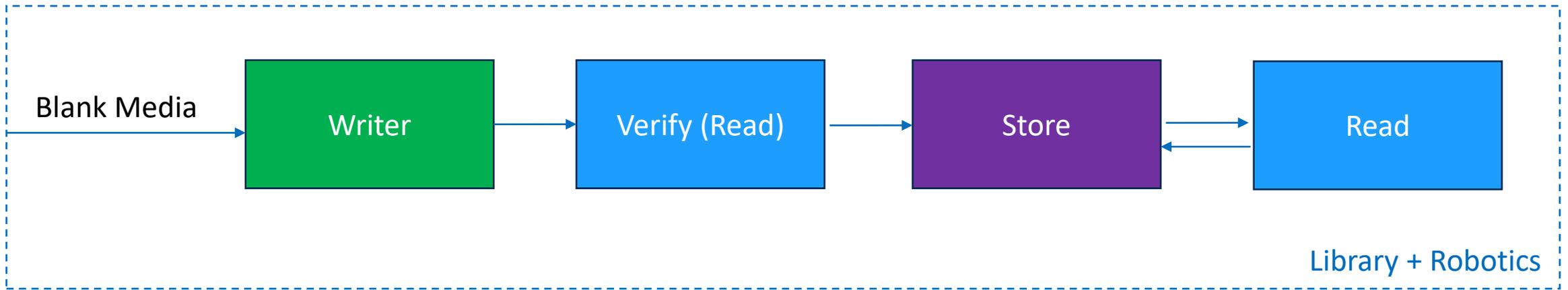
- Optical Components
- 3D Serpentine Layout
- Read Sequentially or Randomly



Library

- Simple
- Flexible
- Tunable
- Scalable
- Modular
- Low Power

Silica Data Flow



Media

- Blank Media enters the Writer
- Once Written, Media is sent to Verification (Reads)
- Once Verified, Media is Stored in the Library
- Upon Request, Media can be read as many times as needed
- Library + Robotics manage the handling of Media

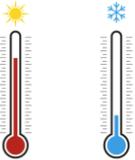
Unique Media Properties



- In abundance and Inexpensive



- Write Data “into the Media” vs “onto the surface”



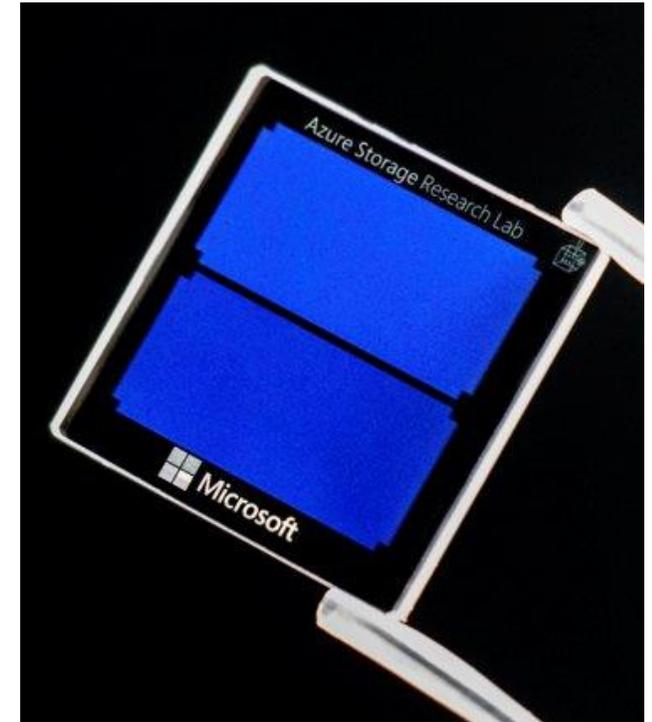
- Media is Resilient to environmental conditions, EMP Proof



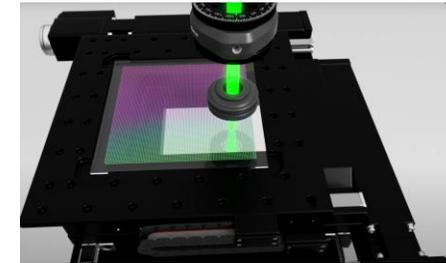
- Data is immutable, No Bit Rot or Data Corruption



- Media Consumes No Power and is Recyclable

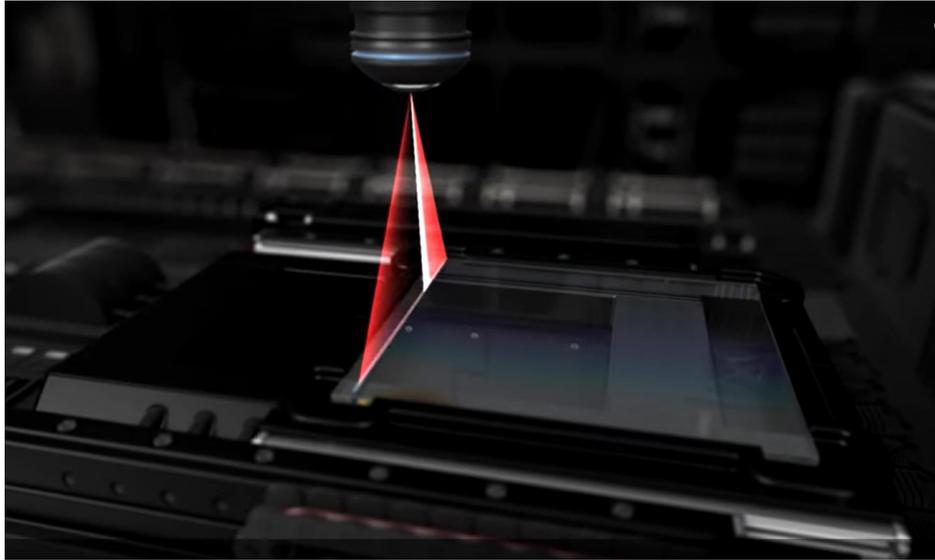


Disaggregation of Read/Write/Media



- HDDs and TAPE lack of disaggregation leads to fewer opportunities for optimizations
- For Silica, each of the modules can scale independently of each other depending on requirements
 - Scale Writers to Ingest Data
 - Scale Readers to enable Customer SLAs
 - Scale Library and Robotics for Quick Access vs Long Term Preservation

Challenges

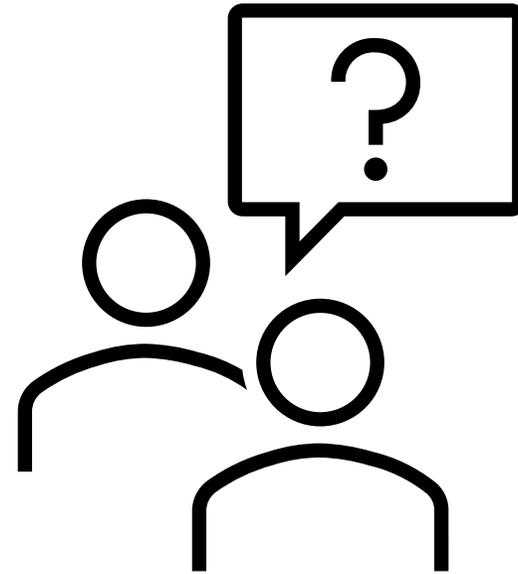


- Physics Works !!!
- Need to Solve Engineering Problems
 - Developing new Grounds-up Hardware
 - New Data Pipeline for Encoding and Decoding
 - Dynamic Scaling of Independent sub-systems

Opportunities for Industry Collaboration

- Hardware Design – Writer, Reader
- Library Mechanics – Evolve to account for all Media Types
- New Supplier Base – Lasers, Cameras, Optics
- Safety Enclosures
- Media Cleaning
- Data Center Footprint – Cloud, OnPrem

THANK YOU !!!
QUESTIONS





Please take a moment to rate this session.

Your feedback is important to us.