

Object Storage: Trends, Use Cases

Live Webcast

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Today's Presenters



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Storage Protocols (block, file, object)

Securing Data

Technologies We Cover

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Agenda

- Object Storage Characteristics
- Object Storage Use Cases
- Object Storage Acceleration with Computational Storage
- Roundtable Q&A





Object Storage Characteristics

Alex McDonald

Object Storage

- How can we visualize object storage?

(Hugely simplified!)

Block



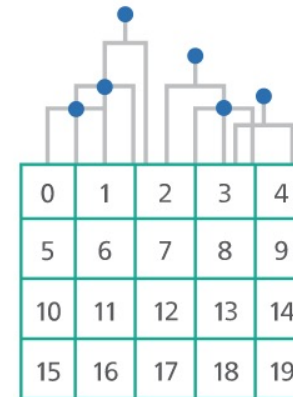
Client Via OS

Fixed Sys Attributes

Transactional Data

Performance

File



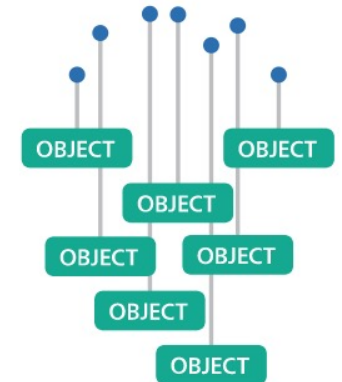
Client Via OS

Fixed Sys Attributes

Shared Changing File

Access, Single Site

Object



Client is App

Custom Metadata

Shared Semi-Static File

Scalable, Multi-Site

Object vs. Key Value

- Similarities:

- The object identifier or the URI (the equivalent of the key) can be an arbitrary string
- The data part can be any size

- Differences:

- Object stores can have metadata or attributes
- Key value offers strong consistency
- Key Value storage is device level only; object stores can span many devices and can have location independence

- An object is made up of

- A unique key (the object ID)
- A value (the data associated with the key)
- Zero or more metadata attributes (which may not be unique)

Objects, Amazon S3 and Kubernetes COSI

- Amazon S3

- Internet based object store & access via HTTP
- Not quite a flat nameless environment
 - Objects stored in named buckets

- Kube COSI: Why another object interface?

- “Kubernetes abstracts file/block storage via the CSI standard”
- “Primitives for file/block storage do not extend well to object storage”
- “No common protocol for consumption across various implementations of object storage” (!)

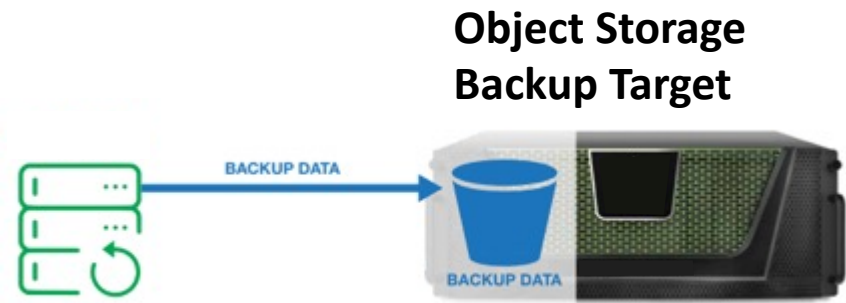


Object Storage Use Cases

Jon Toor

Ransomware Protection

1



Backup your data

2



BU software applies Object Lock

3



Ransomware cannot change it

4



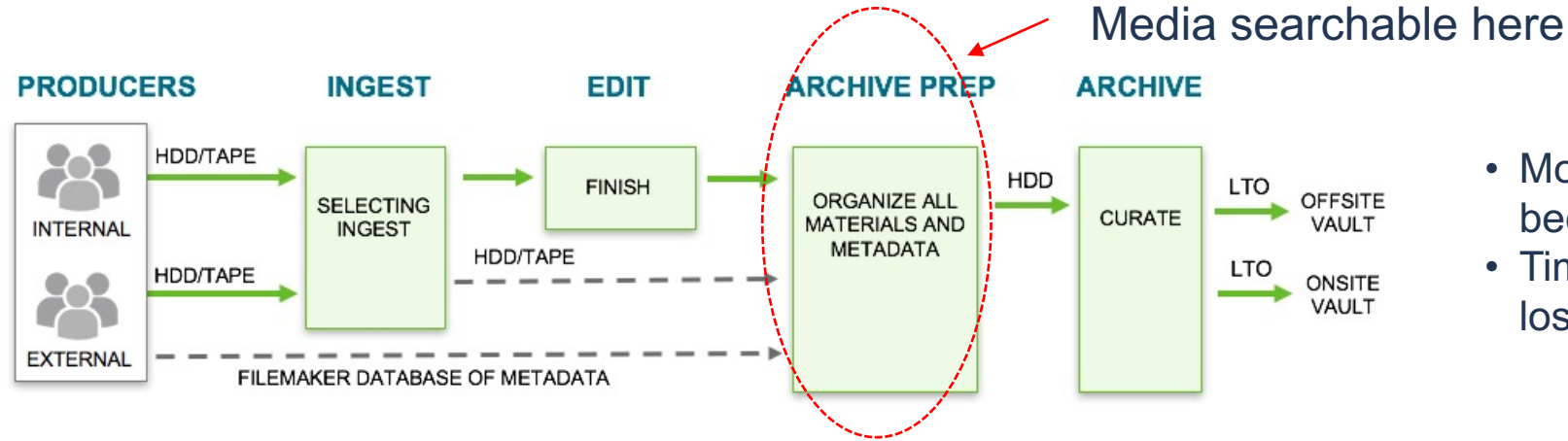
Clean copy for restore!

Ransomware protection as part of automated backup workflow

Media and Entertainment

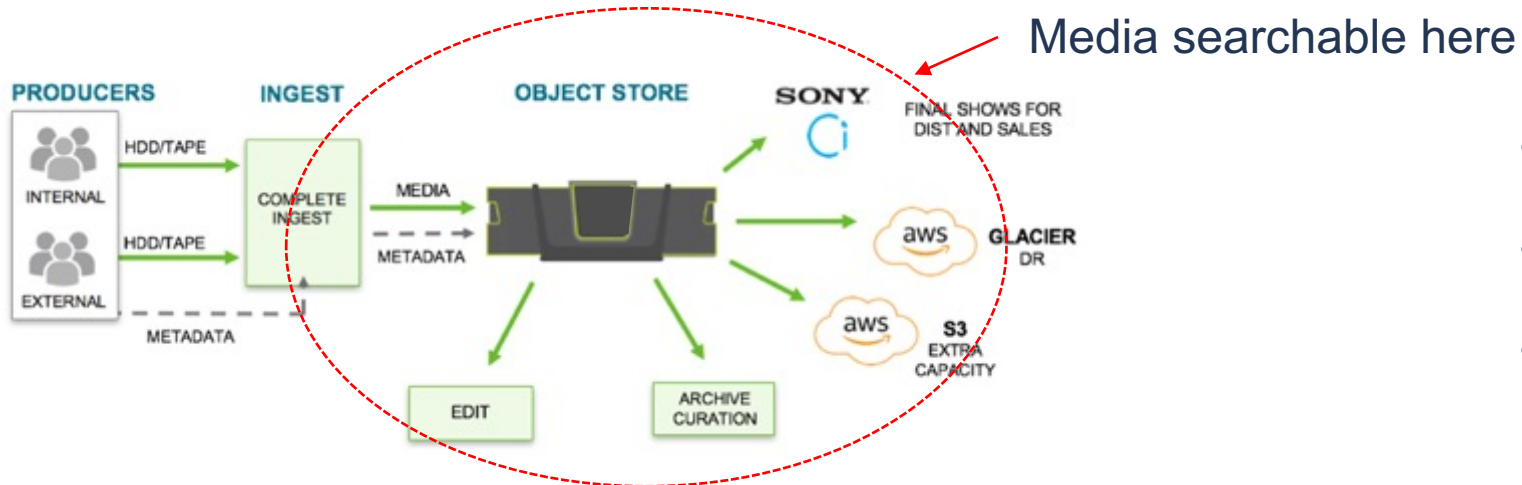


Before



- Months until media become searchable
- Time-sensitive material loses its value

After



- Searchable as soon as the media enters the workflow
- Archive process immediately adds value to the media
- Monetize more media sooner

Cloud Services

Objective:

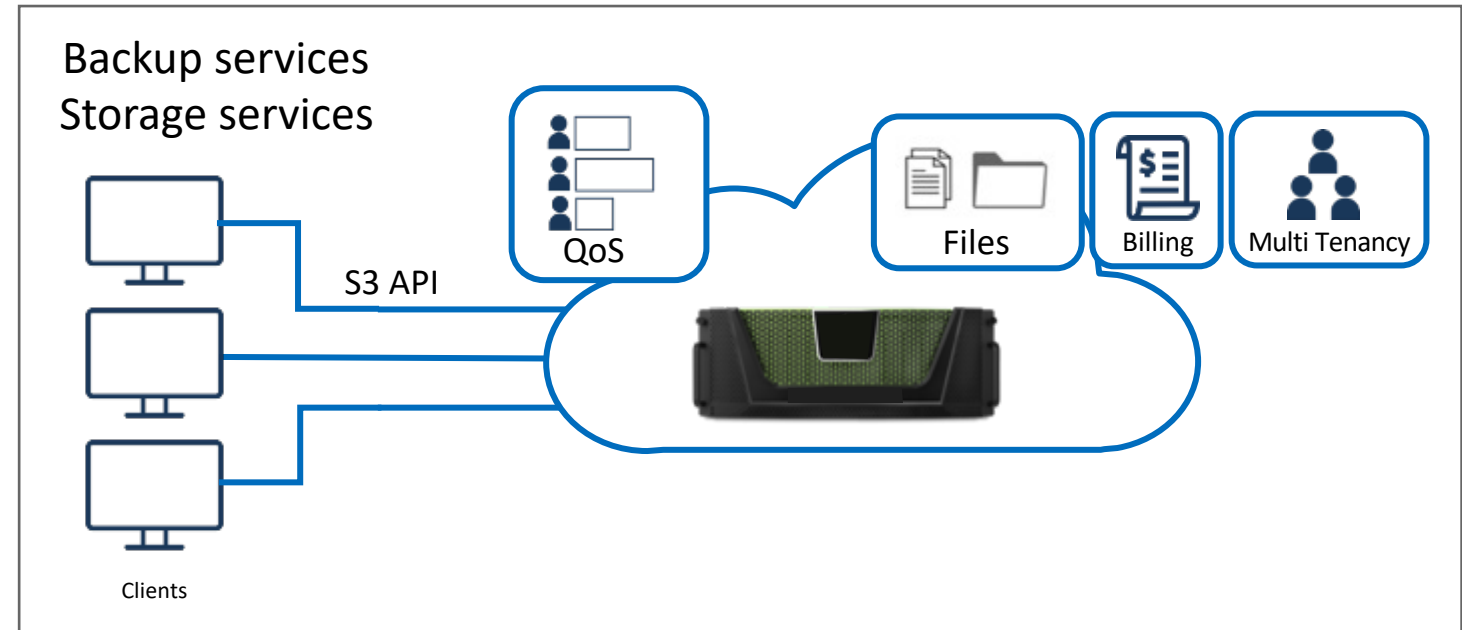
- Scalable storage service
- Backup as a service

Requirements:

- Compatible with backup solution
- S3 API

Solution:

- S3 compatible object storage
- Distributed across two sites



Data Sovereignty

- Data privacy concerns when using U.S.-based public cloud
- Opportunity for regional cloud service providers

Object Storage = Cloud storage within geographic boundaries



European Commission



REPUBLIC OF AUSTRIA
Parliament



Data Management

Objective:

- Scalable storage for video and digital evidence management
- Disaster Recovery (DR) capability (Hurricane risk!)

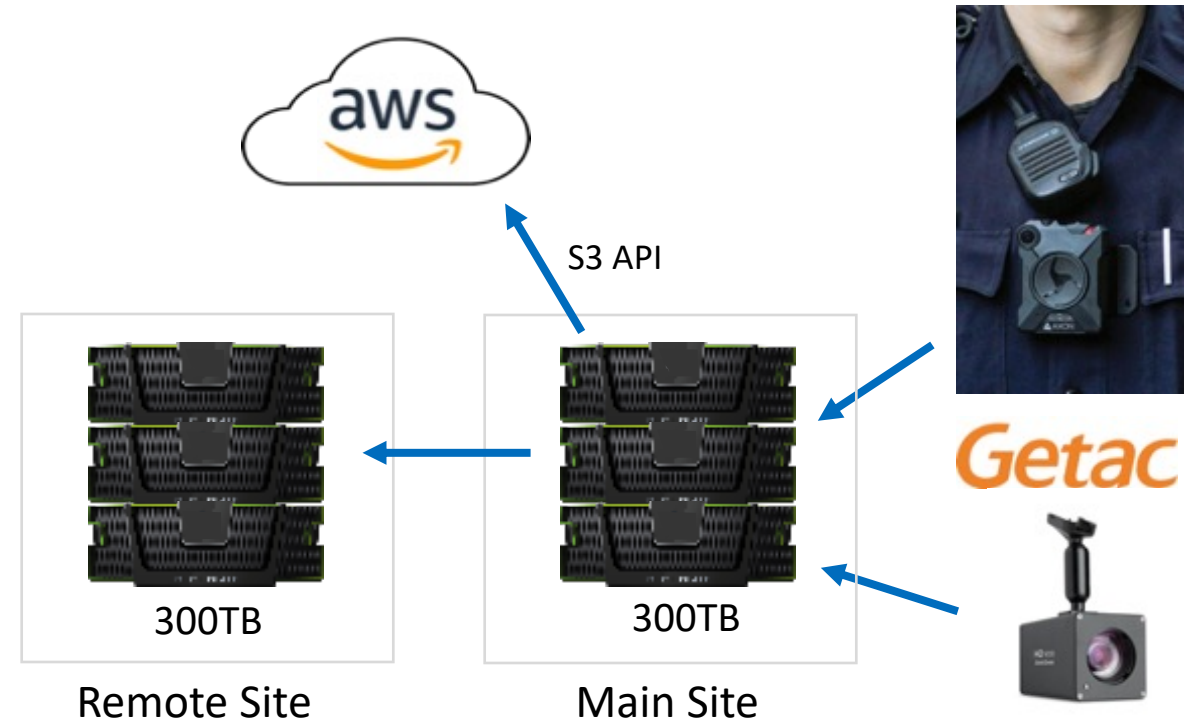
Requirements:

- Compatible with Getac evidence management
- AWS S3 compatibility

Solution:

- Object storage at two sites
- Replication to AWS S3 for DR

Calcasieu, LA
Sheriff



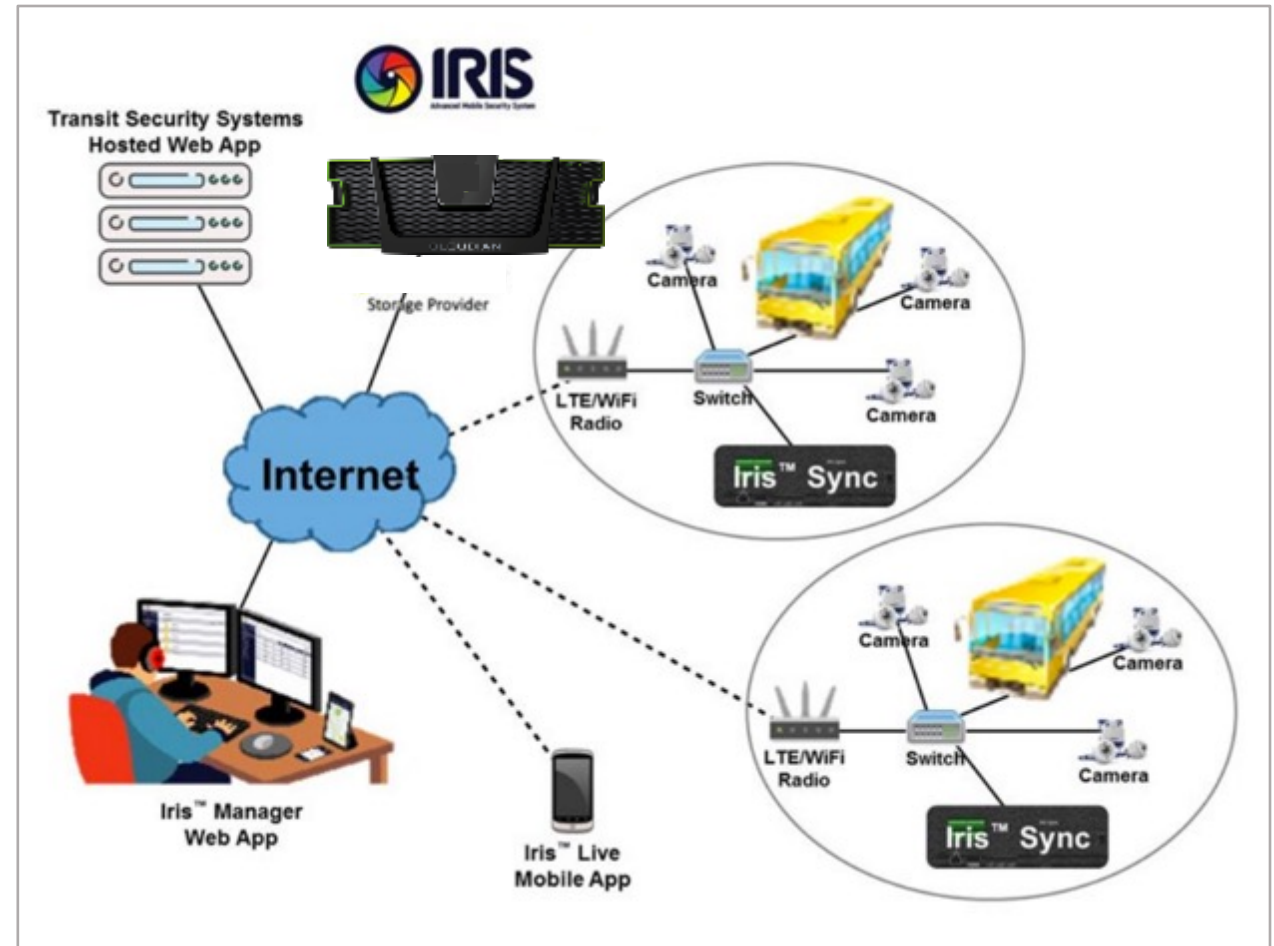
IoT / Video Surveillance

Requirements

- S3-compatible object storage
- Multi-part upload
- Rich metadata tagging

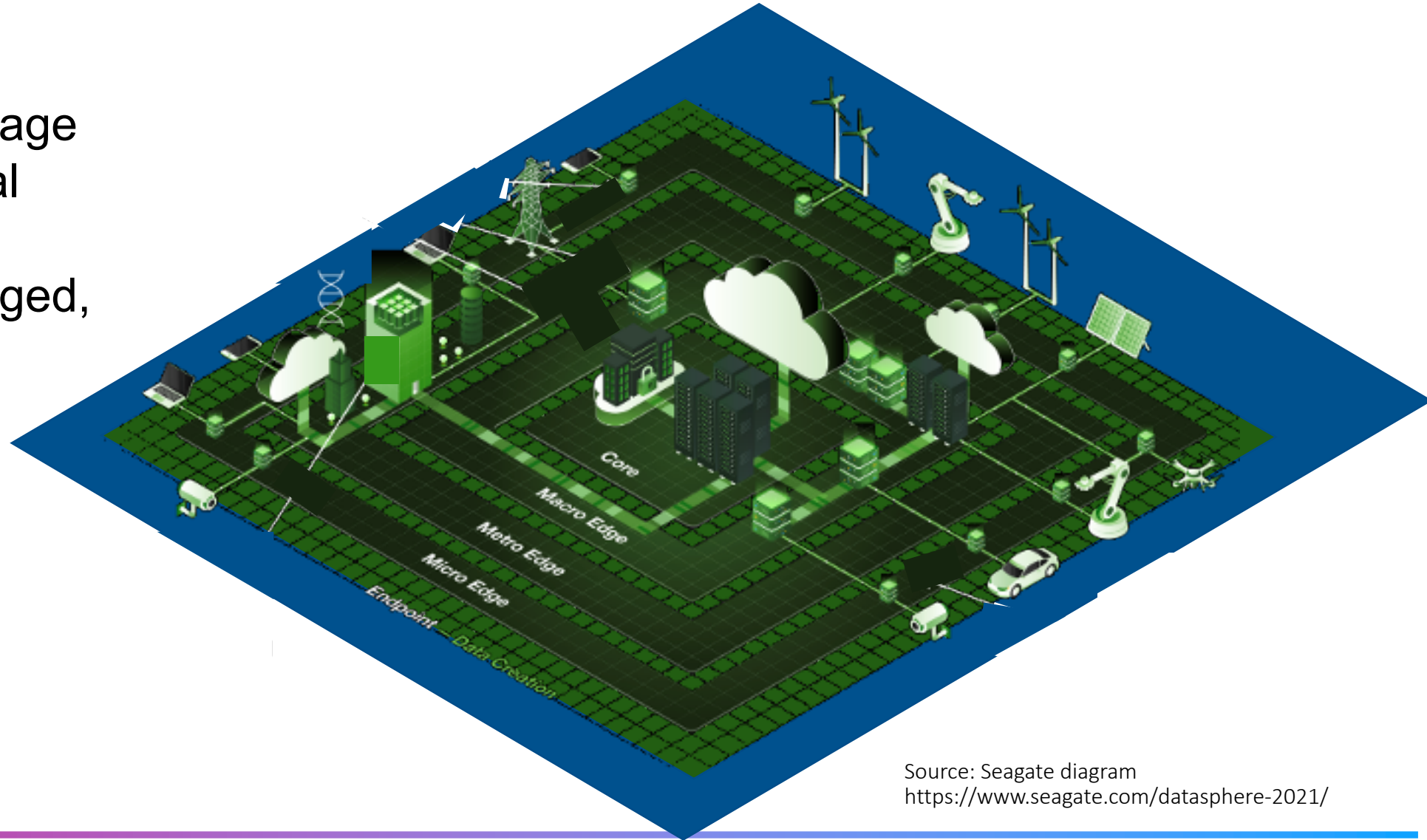
Solution

- Object storage at central location
- Configurable metadata tag sizes
- Collects sensor data + video data



In 2025, 75% of Enterprise-Generated Data Will Be at the Edge

- Distributed storage becomes critical
- Centrally managed, locally sited



Source: Seagate diagram
<https://www.seagate.com/datasphere-2021/>



Object Storage Acceleration with Computational Storage

David McIntyre

High Performance Object Storage Acceleration on S3 SELECT

Object Storage Queries

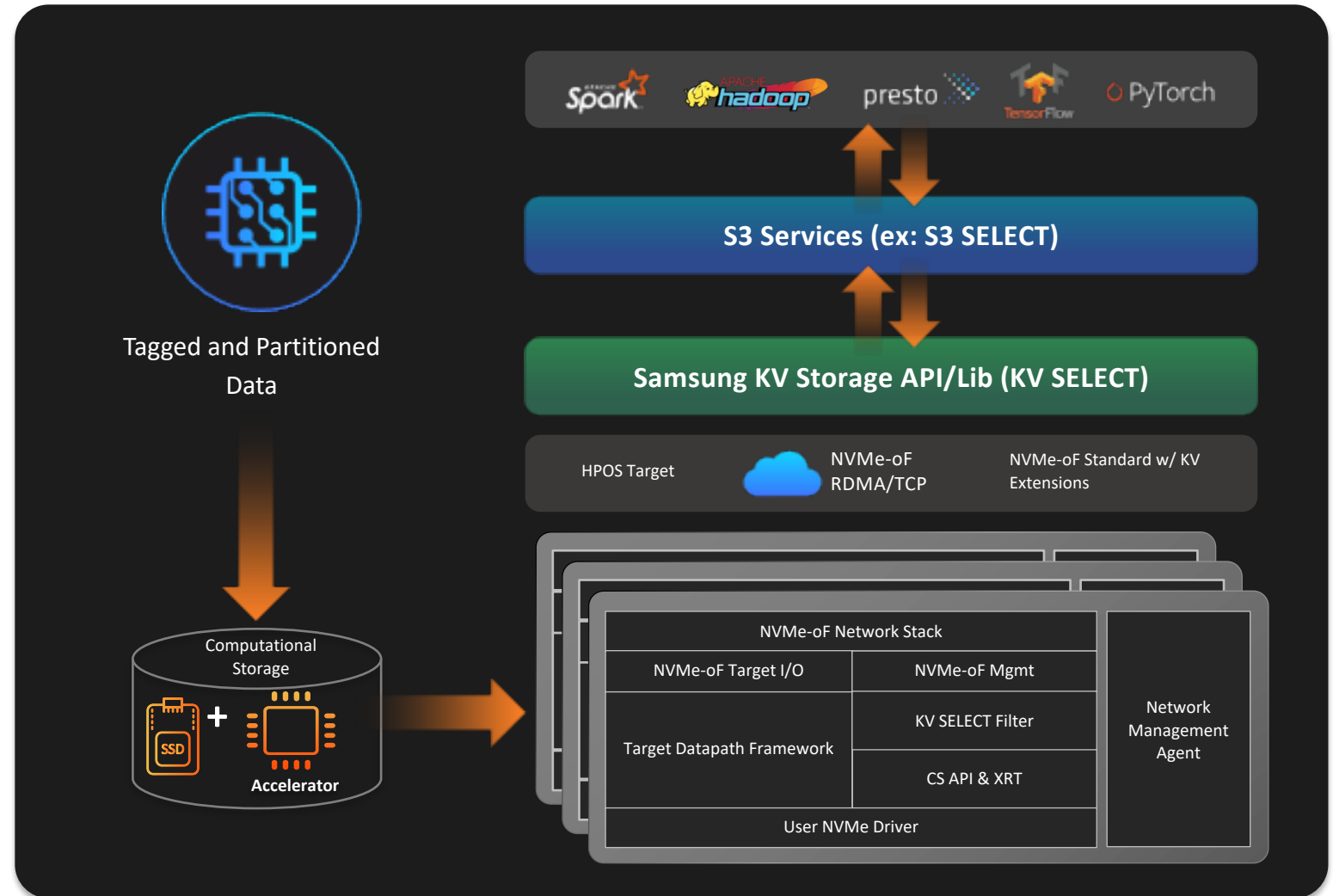
- 1) Data transformed to Key Value stores
- 2) Data is tagged and portioned
- 3) Queries are run on computational storage as NVMe-oF target

Benefits

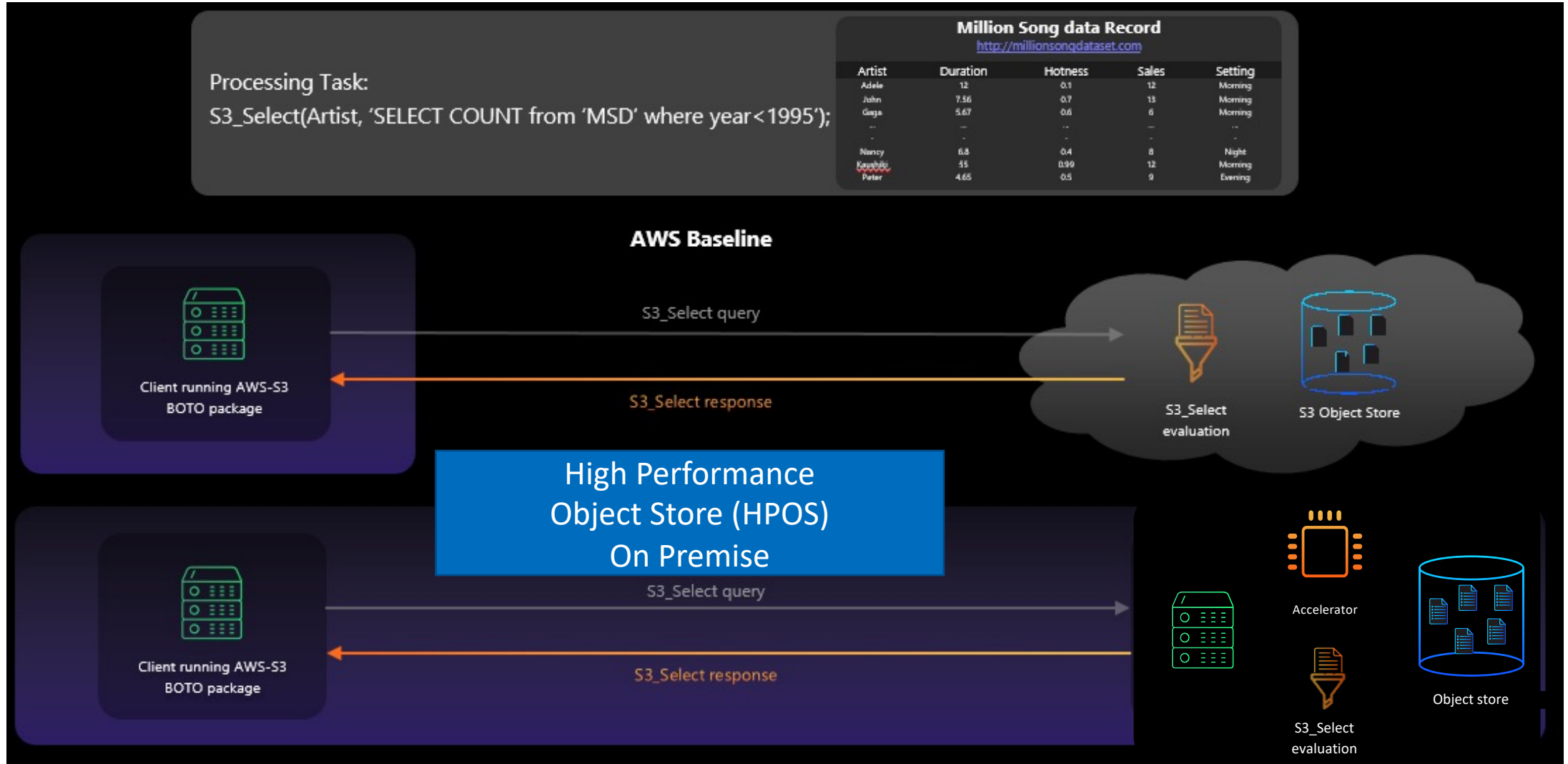
- **Faster** queries
- **Lesser** network traffic
- **Lower TCO** due to reduced CPU and network traffic

Use Cases

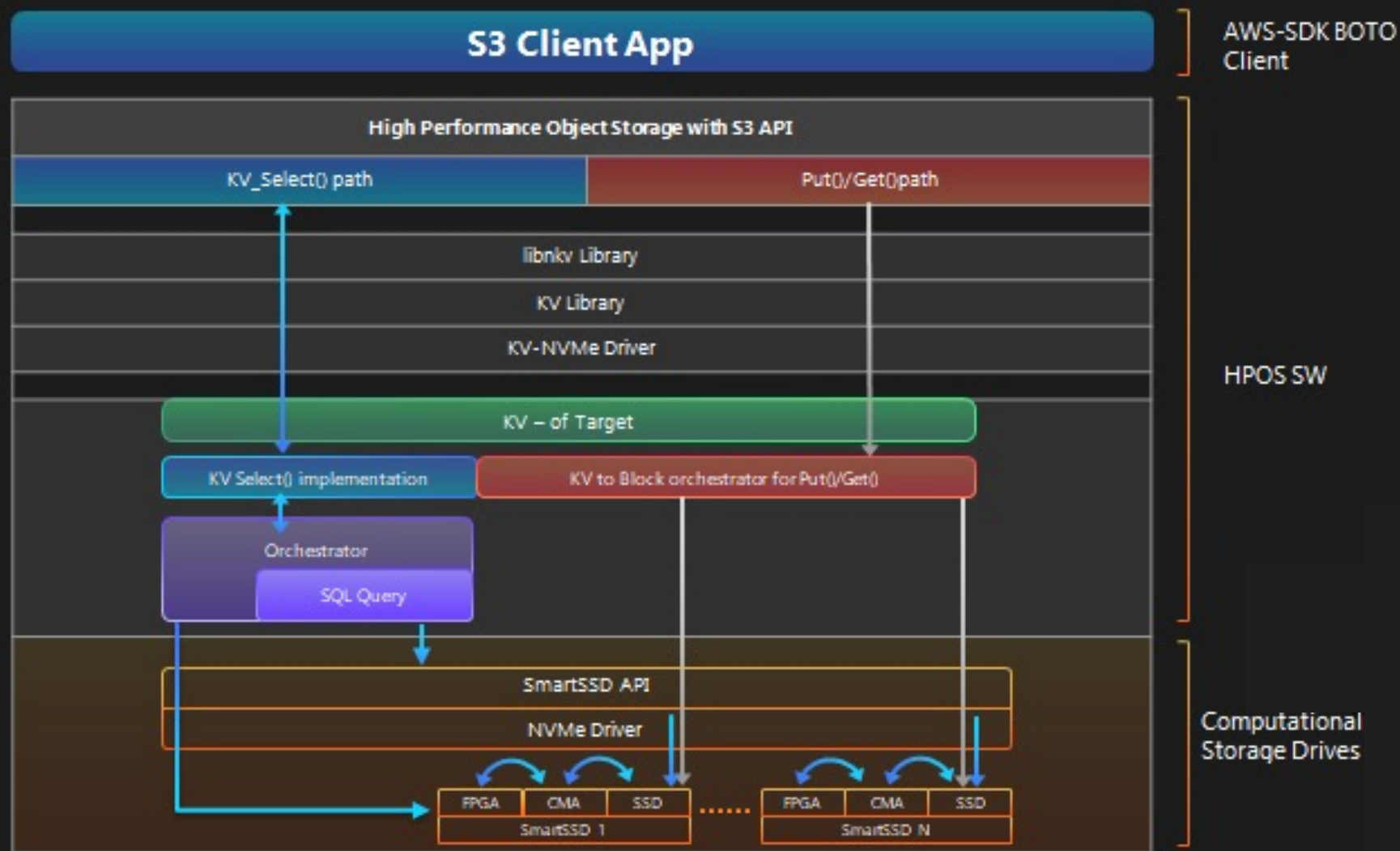
Large scale real time analytics - Smart City, Smart Home, eHealth, IoT, Images, Video, Security



Near Data Processing for S3 Select with Computational Storage



End-to-End S3_Select with HPOS

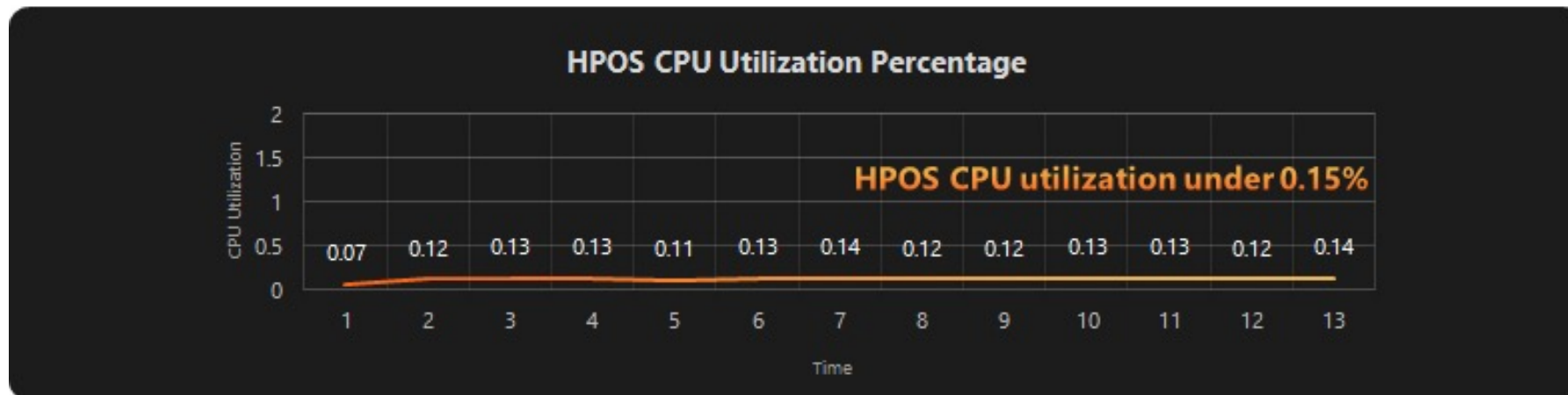
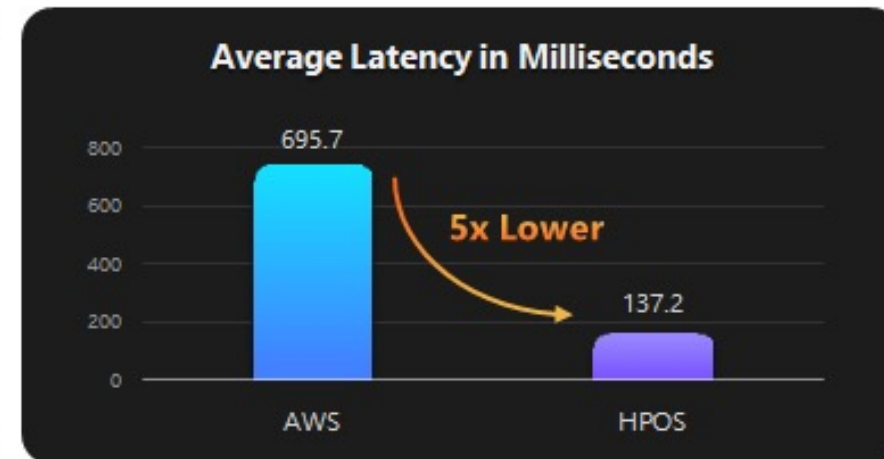
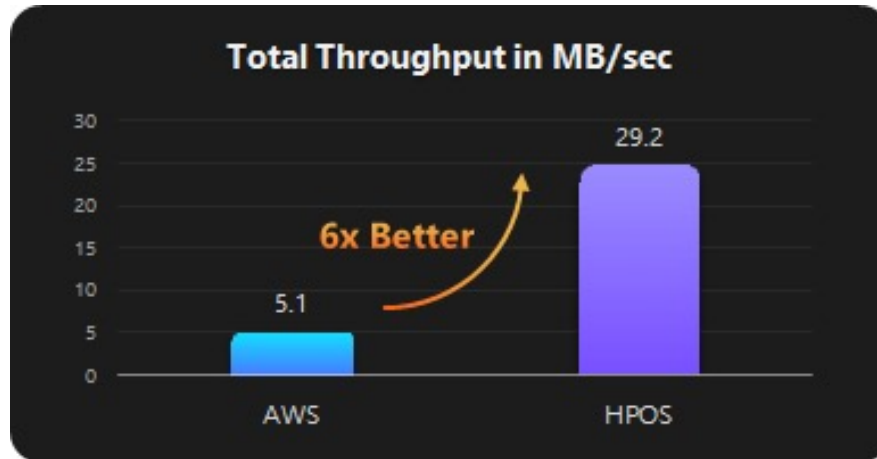


→ Normal data path

→ Path for SmartSSD offload

CMA Computational Memory Area

AWS S3 Select vs HPOS* S3 Select



* HPOS: High Performance Object Store

Summary

- AWS' S3 object storage service introduced object storage to a broader audience
- The growth of object storage has mirrored the growth of containers
- Object storage is suitable for a broad range of today's essential use cases
- Object storage and Computational storage can be complementary technologies used to improve performance



Roundtable Q&A

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