

CA 1[™] Flexible Storage[™]

January 5, 2023

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| Presenters



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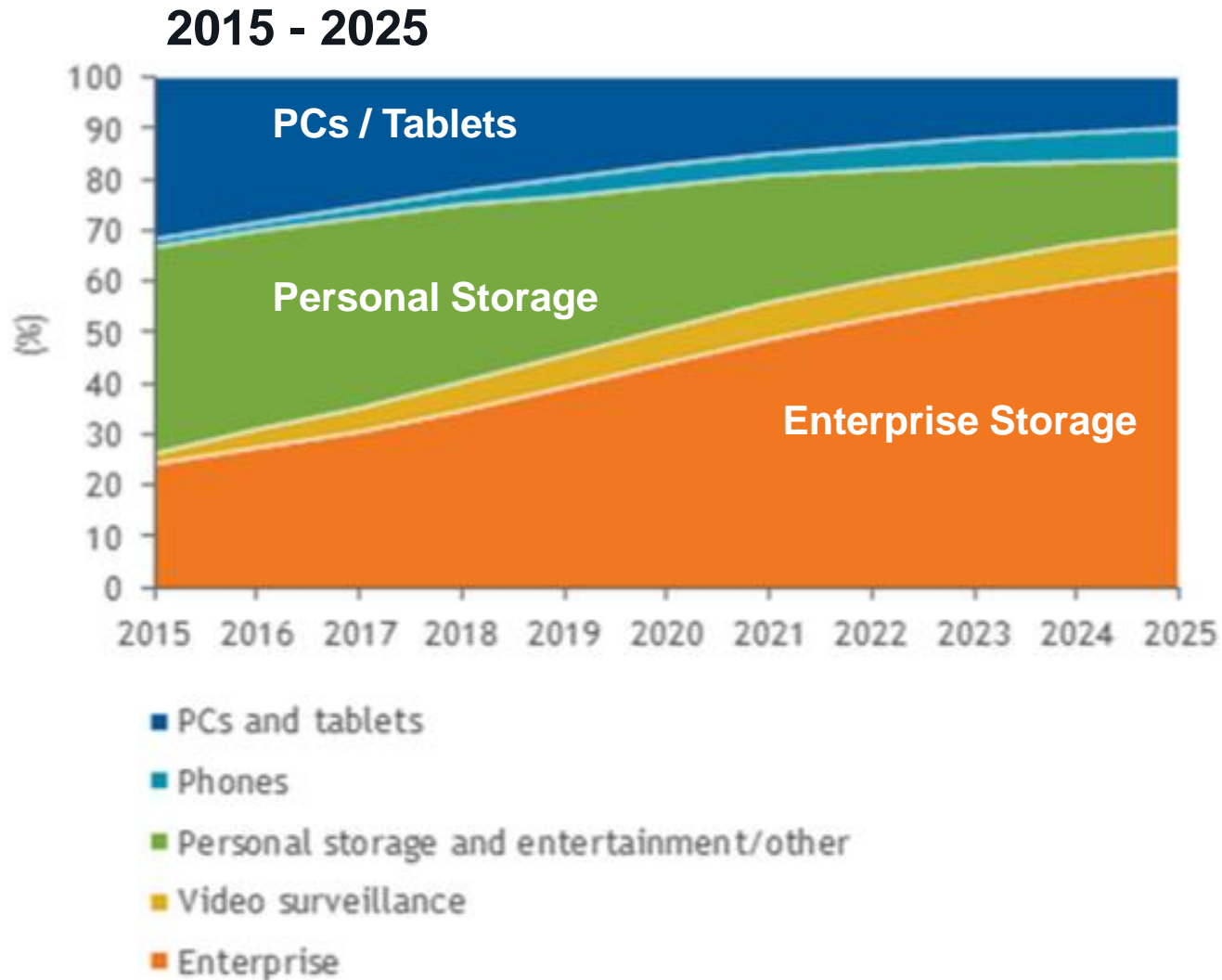
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| Agenda

- ❑ Cloud Storage Industry Trends
- ❑ Business Use Cases
- ❑ CA 1™ Flexible Storage™ Overview
- ❑ Next Level Storage Security
- ❑ Performance Testing
- ❑ Summary

Data Storage Requirements Growing Rapidly



❑ All Installed storage is growing at 19.2% annually

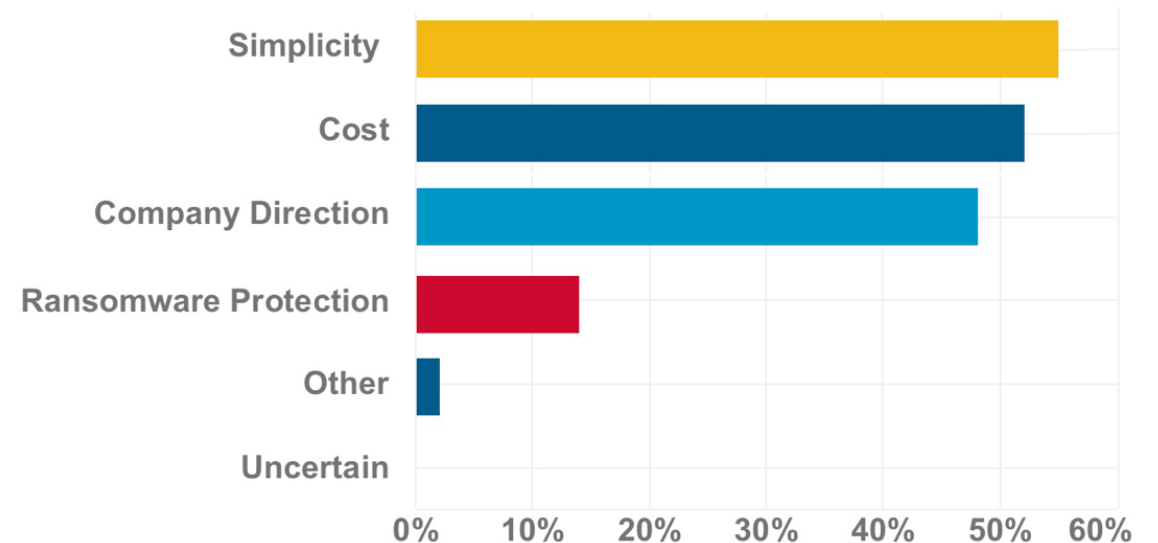
❑ Enterprise Storage is growing at 27.9% annually

Findings from Evaluator Group Research Study

Top Reasons for Using Cloud Storage:

1. Infrastructure simplification
2. Lower cost than on-premise storage
3. Company mandate to use Cloud

Main Reasons for Use of Cloud with Mainframe



Evaluator Group

[DOWNLOAD THE FULL REPORT](#)

<https://mainframe.broadcom.com/download-mainframe-shifts-in-cloud-storage-usage-technical-report>

| Storage Administrators Are Challenged Today

How can I **reduce hardware costs**?

How can I **leverage existing investments**?

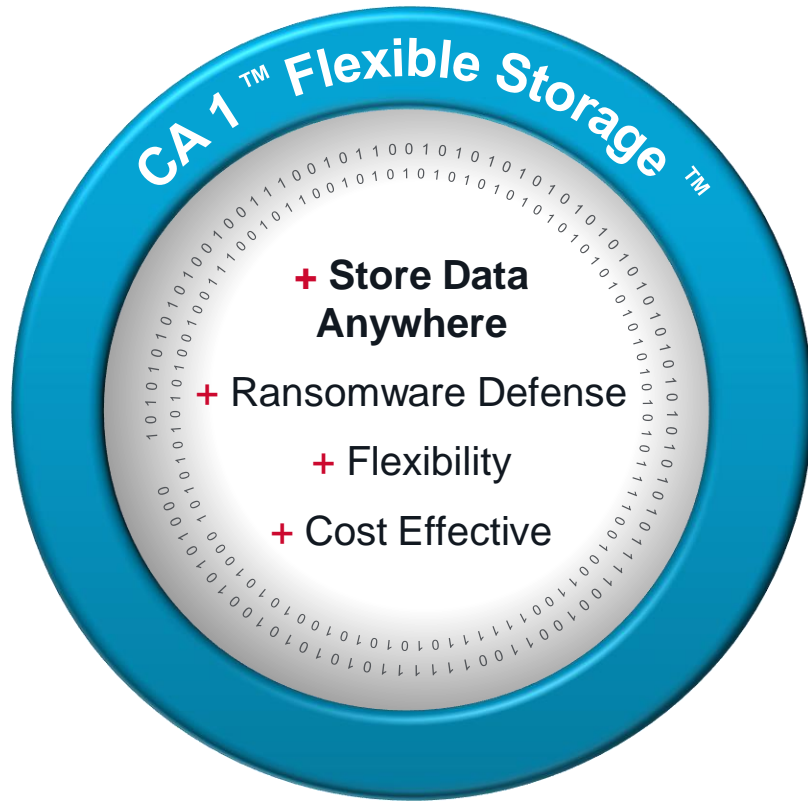
How can I **use the cloud for backups and cold storage** (company mandate)?

How can I **maintain security**?

How can I **move off devices that are no longer supported**?



Changing the Mainframe Storage Landscape



CA 1™ Flexible Storage™ *

- **Flexible: Store data anywhere**
 - Physical Tape
 - Virtual Tape
 - Cloud – On-Premise or Off-Premise
 - Commodity storage already in the data center
- **Easy:** Simply point CA 1™ Flexible Storage™ to any new storage targets
- **No changes required** to your operations or applications

*Current CA 1™ customers are automatically entitled at no additional cost.

Use Case 1: Ransomware

Protection Against Hackers and Ransomware



Ransomware or a malicious insider corrupting or encrypting critical business data making it impossible for the company to conduct business until the compromised data is restored.

Immutability

- ✓ Immutable backups for data restoration or system Initial Program Load (IPL)
- ✓ Quickly restore critical systems/data and minimize revenue loss
- ✓ Immutable volumes (unchangeable and can never be deleted)

Global Ransomware Impact:

- \$20B+ projected business costs in 2021
- Average downtime of 21 days
- 46% of recovered data is corrupted
- 90% of financial Institutions targeted

Ransomware Examples:

- \$40M Payout – Large Financial Corp.
- \$4.4M Payout – Colonial Pipeline

Use Case 2: Zero Trust

Meet Audit Requirements, Company Policies, or Government Regulations



Verify every user device while enforcing security policies at the data set level. File level encryption allows you to verify all users and devices inside and outside.

- Data Security**
- ✓ Prevent stolen data by bad actors.
 - ✓ File level data encryption enforces need-to-know access.
 - ✓ Quantum safe encryption algorithms (z16).

Global Data Breaches:

- Cost \$4.2M in 2021, up 10% from 2020
- \$180 per record (Customer PII)

Use Case 3: Archive Backup

Ensure that Master Backup Copies Can Be Restored



Ensure master backup copies of critical data are secured in a cloud location in case tape backup procedures fail.

Backup Vault

- ✓ Prevent breach in data retention policy that results in regulatory fines
- ✓ Golden copy is now available if all other recovery procedures fail
- ✓ No specialized hardware required

Global examples of regulatory fines:

- Up to 50K per violation (HIPAA)
- \$40K per violation (FTC COPPA)
- 4% annual Revenue (GDPR)
 - \$23.4M Large hotel chain
 - \$37.3M Large clothing retailer

Use Case 4: Return on Investment (ROI)

Reduce Storage Costs (administration, hardware infrastructure and software)



Drive down data retention costs. Policies require data to be kept for years costing \$14M over 10 years per petabyte.

Savings

- ✓ 1PB of data backed up to the cloud saves approximately \$7M over 5 years
- ✓ Solution requires no special hardware
- ✓ Freedom of choice to use low cost commodity storage

On Premise Storage Cost:

1 Petabyte costs \$1.4M annually fully burdened
(administration, hardware infrastructure and software)

Use Cases (Summary)

CA 1™ Flexible Storage™

Ransomware

Prevent a malicious actor from encrypting/corrupting critical business data, making it impossible for the company to conduct business.

Business Impact:
Avoid loss in revenue due to critical systems being down.

Zero Trust

Verify every user/device in your organization, while enforcing security policies at the data set level.

Business Impact:
Pass audits and prevent stolen data, which can cost on average \$4.2M (2021).

Archive Backup

Ensure master backup copies of critical data are secured in a cloud location in case tape backup procedures fail.

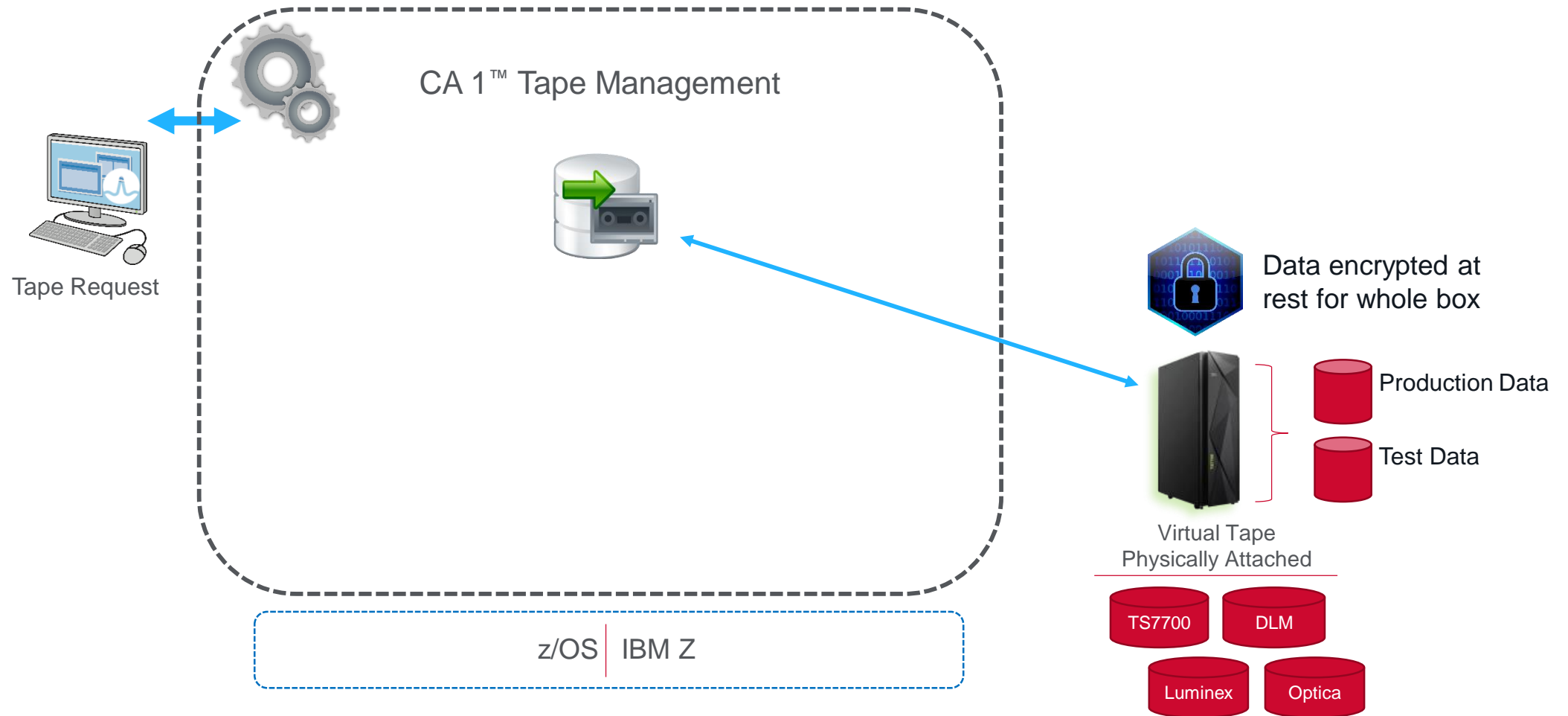
Business Impact:
Avoid steep regulatory fines.

ROI

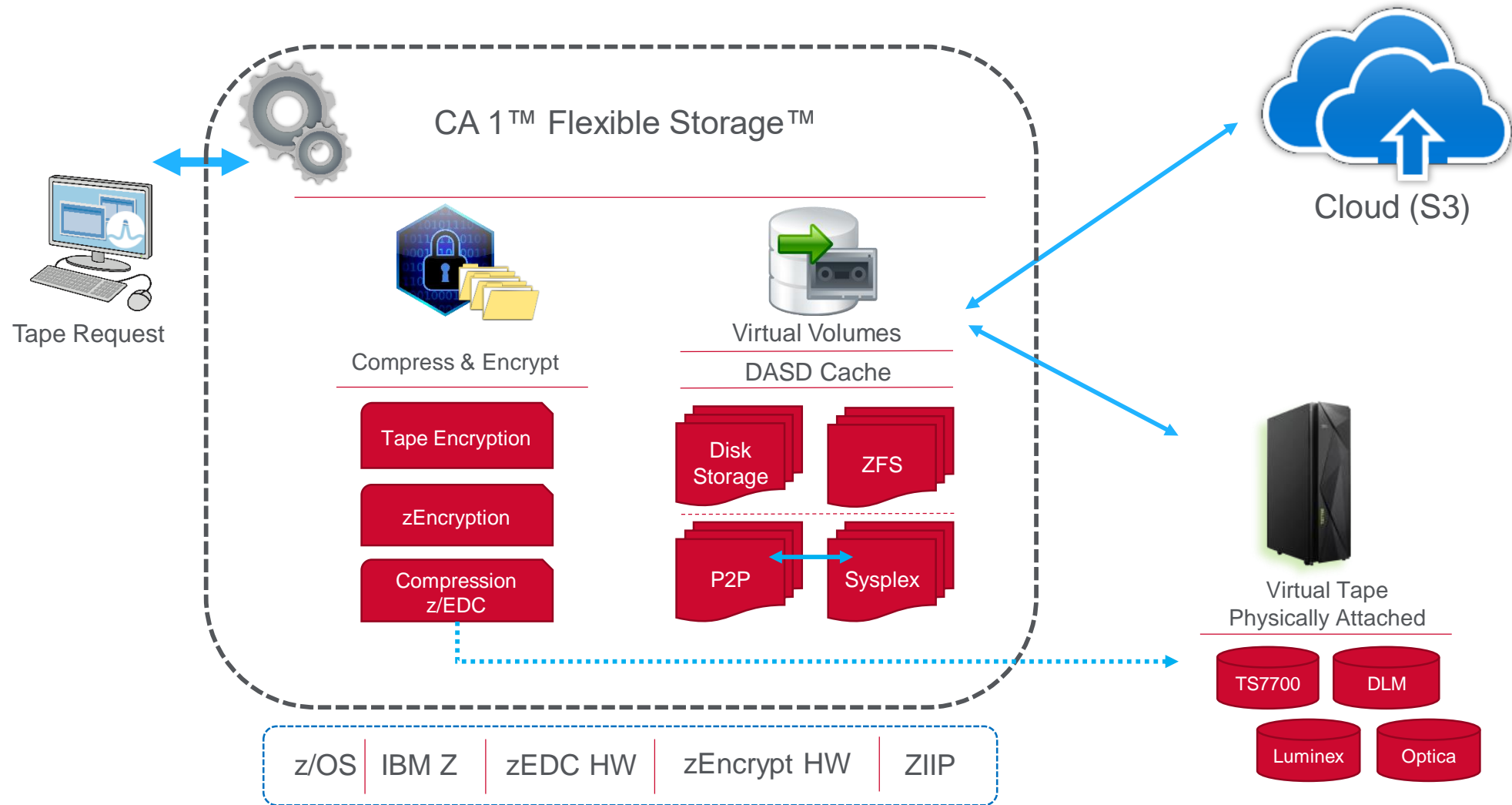
Drive down data retention costs. Policies require data to be kept for years costing \$14M over 10 years per petabyte.

Business Impact:
Save \$1.4M over annually per petabyte stored in the cloud.

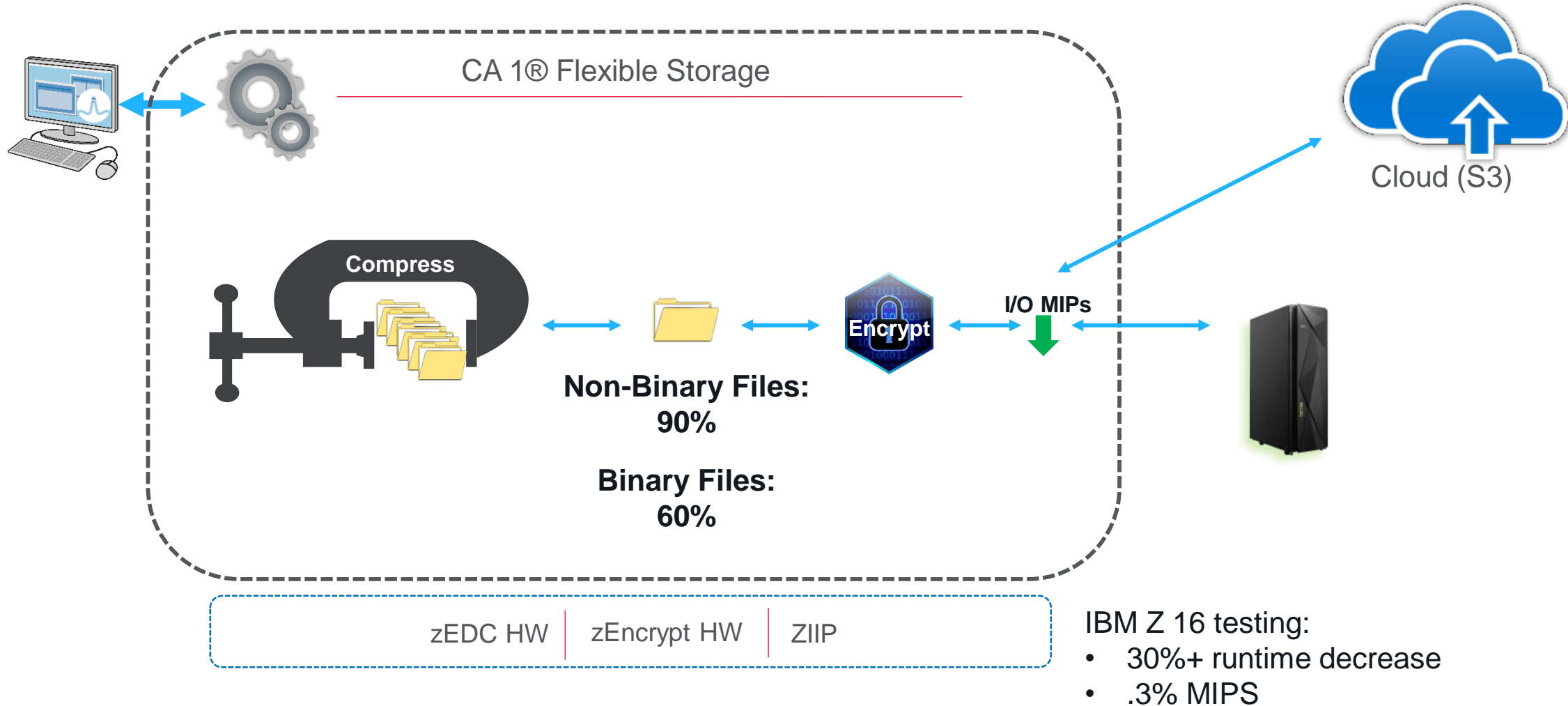
CA 1™ Tape Management Architecture Today



CA 1™ Flexible Storage™ Architecture



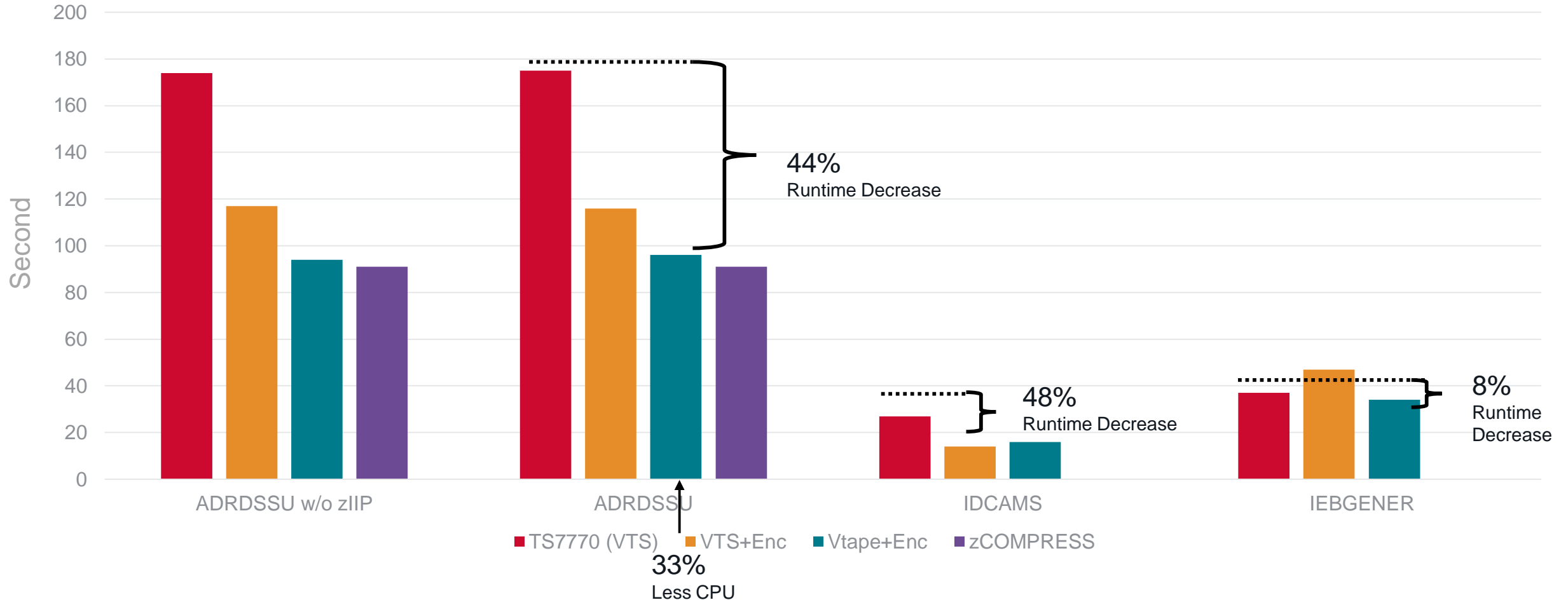
CA 1™ Flexible Storage™ with Compression



CA 1 Flexible Storage Performance Testing

z/16 with zIIP engines

Results of using new Encryption/Compression Services



| Simple Storage Service (S3) (cloud support)

CA 1™ Flexible Storage™

What is S3:

Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance.



Hosted Providers:

1. AWS S3
2. Google Cloud Storage
3. Spaces
4. Bunny
5. Vultr
6. Cloud Files
7. IBM
8. Alibaba OSS
9. Azure Blob Storage
10. Oracle Storage
11. etc.

Self-Hosted:

1. Minilo – open-source
2. Ceph
3. Zenko
4. Riak S2
5. Triton
6. LeoFS
7. HyperStore
8. Etc.

Security - Leveraging z16 Features

File-level encryption: Each file is assigned an encryption key

- No one can read the data, even with access to the volume

Quantum Encryption Algorithm support NIST (July 2022) first 4 algorithms

- (CRYSTALS-Kyber and CRYSTALS-Dilithium)

Pervasive Encryption using ICSF key database

Immutable Volumes (Fixed, unchangeable and cannot be deleted)

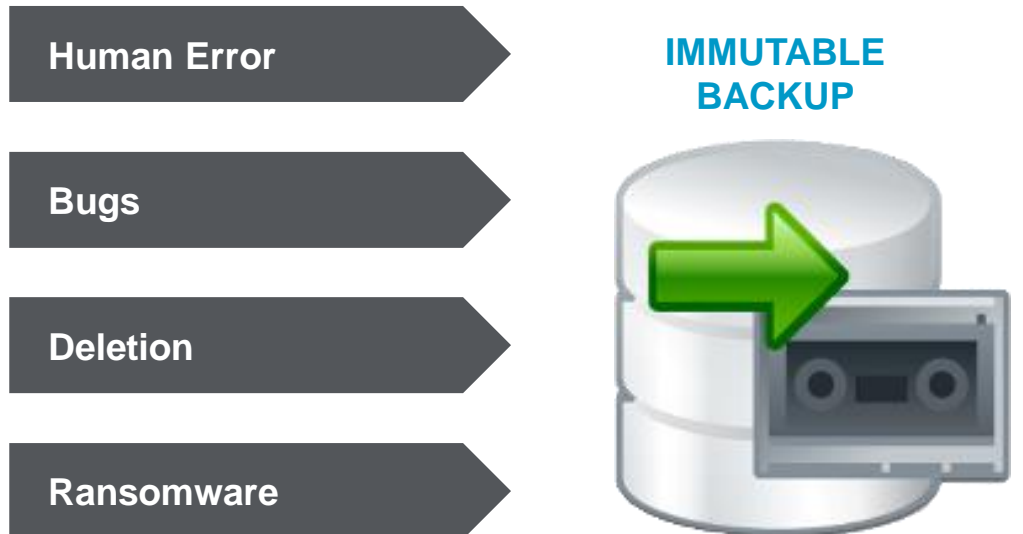


What are Immutable Volumes?

Immutability: The state or condition of being unchangeable

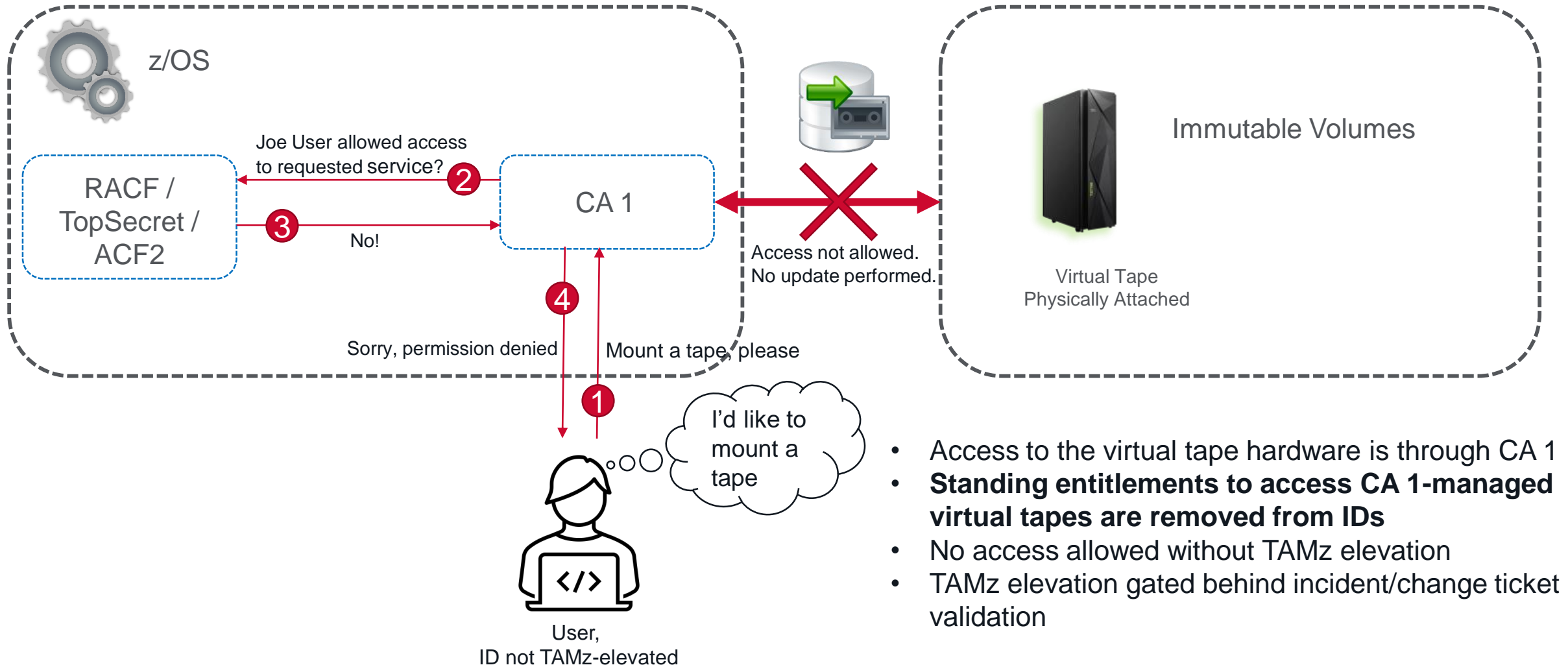
Immutable Volumes:

- Fixed, unchangeable and cannot be deleted
- Ensures a copy of the data is always recoverable
- Immutable backups cannot be altered or changed, and are impervious to ransomware infections



Immutable Volumes & Trusted Access Manager for Z (TAMz)




CA 1™ Flexible Storage™

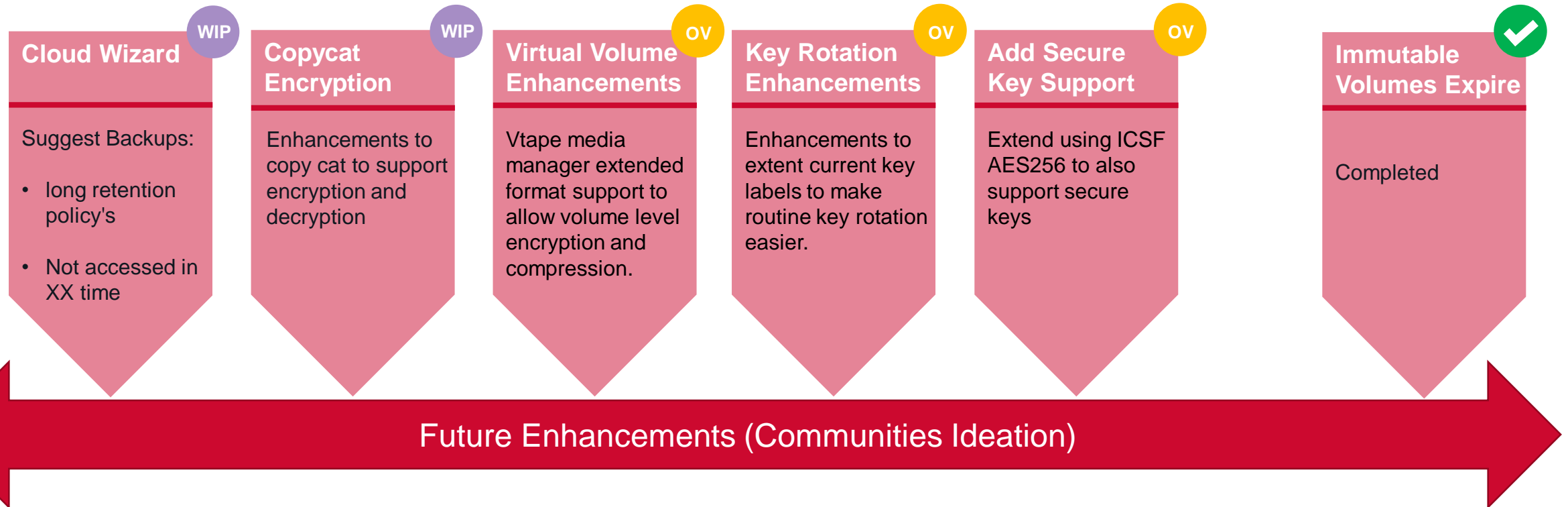


- Access to the virtual tape hardware is through CA 1
- **Standing entitlements to access CA 1-managed virtual tapes are removed from IDs**
- No access allowed without TAMz elevation
- TAMz elevation gated behind incident/change ticket validation

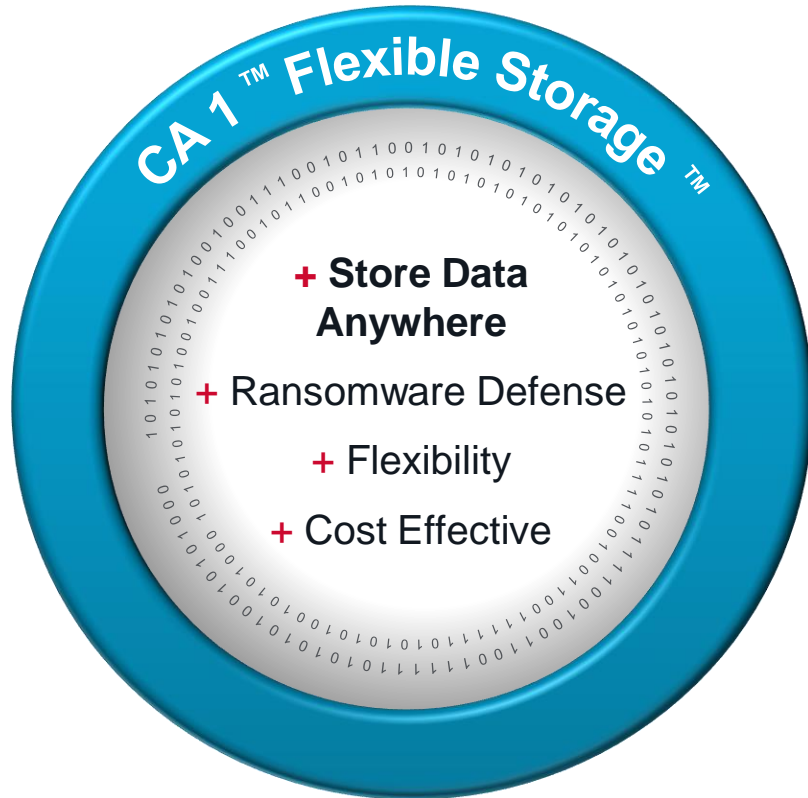
Proposed Future Enhancements

Pending Client Validation

-  Work in progress
-  Open for voting
-  Delivered



| Summary: CA 1™ Flexible Storage™



- **Flexible** – Store data anywhere
- **Secure** – Protect against ransomware
- **Efficient** – Reduce batch processing by up to 20%
- **Reduces Costs** – Save millions in storage costs over time (\$1.4M per petabyte)
- **Software-only Solution** – No additional hardware required
- **CA 1™ Customers** – Automatically entitled at no cost

| CA 1™ Flexible Storage™ - Links

Product Brief: <https://docs.broadcom.com/doc/CA1-Flex-Stor-PB>

Press Release: <https://www.broadcom.com/company/news/product-releases/60786>

Blog: <https://mainframe.broadcom.com/blog/broadcom-drives-new-innovation-for-mainframe-storage>

Video from SHARE Columbus: <https://share.vidyard.com/watch/Ed8KkV1oRVR9TEHDVQiCgG?>

Mainframe Technical Exchange recoded session: <https://gateway.on24.com/wcc/eh/3686843/category/105363/storage-and-output-management>

IBM Redbook for System IPL from backup: <https://www.redbooks.ibm.com/redbooks/pdfs/sg248464.pdf>

| CA 1™ Flexible Storage™ - Tech Docs

Upgrading to CA 1™ Flexible Storage™ (r15.0):

<https://techdocs.broadcom.com/us/en/ca-mainframe-software/performance-and-storage/ca-1-tape-management-system/15-0/installing/migration.html>

Enable the encryption/compression services they should look here:

<https://techdocs.broadcom.com/us/en/ca-mainframe-software/performance-and-storage/ca-1-tape-management-system/15-0/encryption-and-compression-services.html>

Going to the cloud and already have Vtape installed and active:

<https://techdocs.broadcom.com/us/en/ca-mainframe-software/traditional-management/ca-vtape-virtual-tape-system/12-6/configuring/vtape-cloud-adapter-vca.html>

| Contact Us



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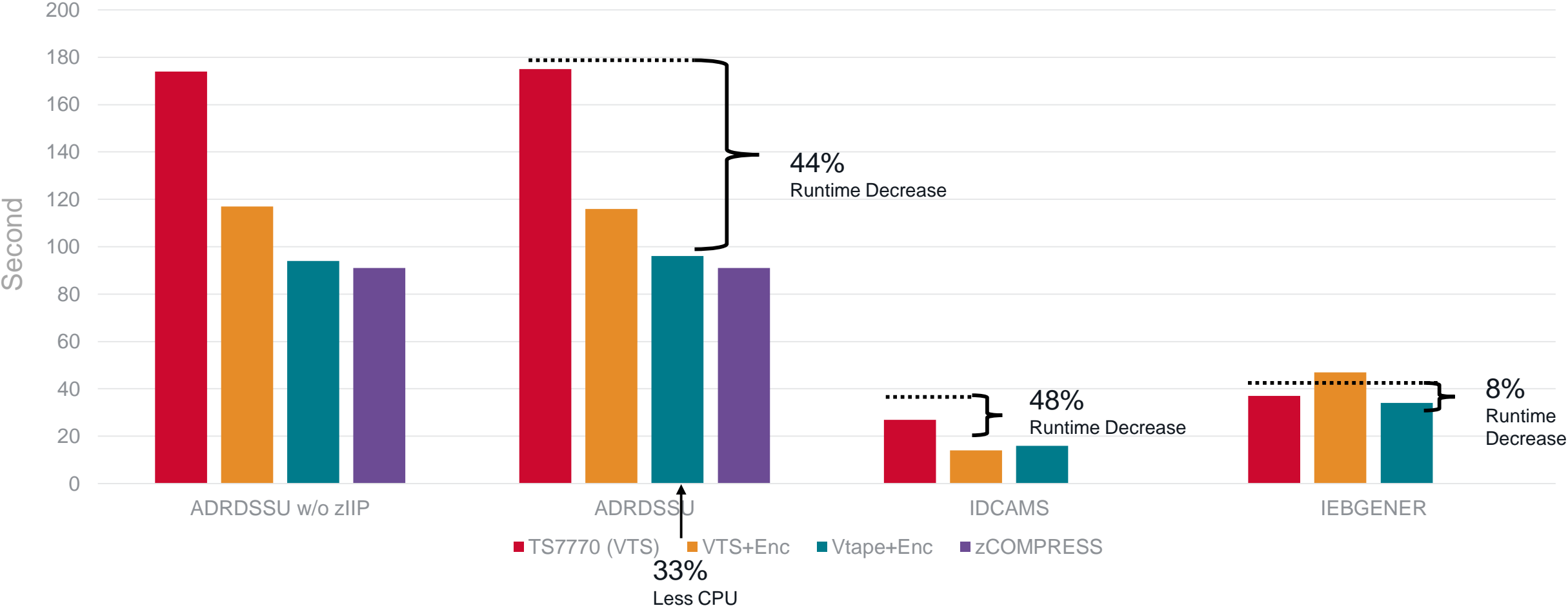
| Additional Content

Backup Slides

CA 1 Flexible Storage Performance Testing

z/16 with zIIP engines

Results of using new Encryption/Compression Services



z/16 with zIIP engines

ADRDSSU saw a 33% decrease with Encryption/Compression on a TS7770

Also saw a 44% decrease in run-time when run to Vtape device with encryption/compression services enabled

If ADRDSSU used the new ZCOMPRESS option, it saw a 5% reduction than Vtape with encryption/compression but at a 4-times increase in CPU.

IDCAMS saw a 48% reduction with Encryption/Compression services on a TS7770

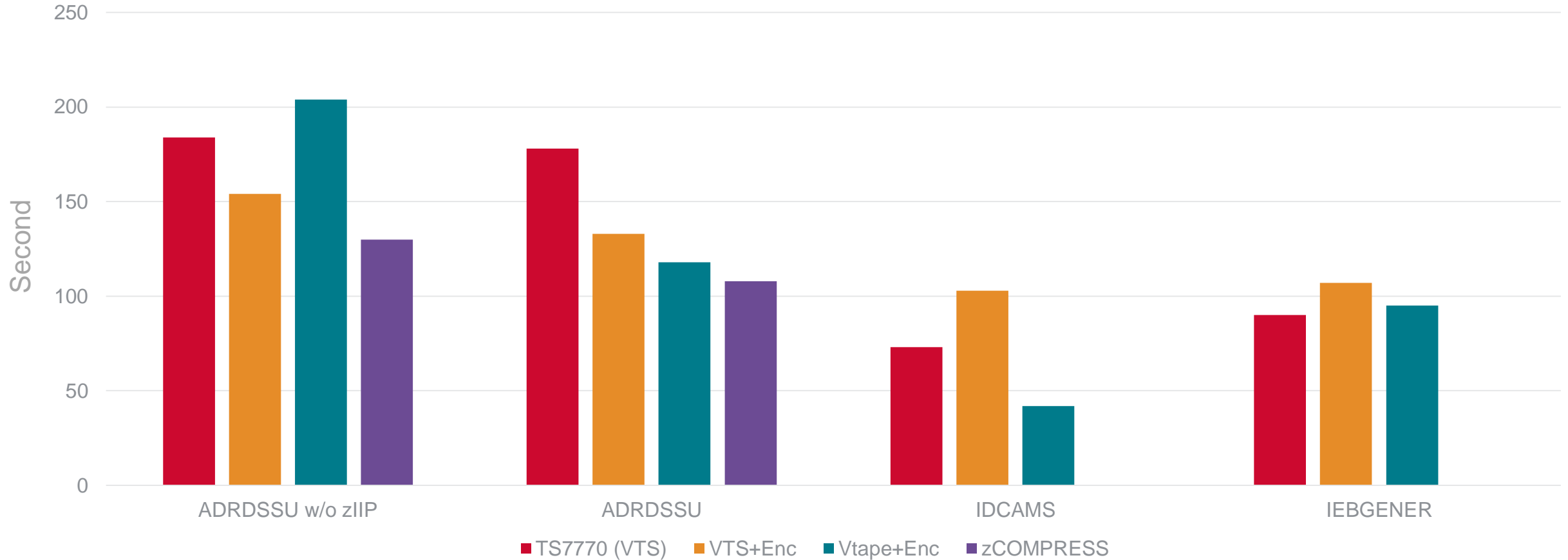
But, saw only a 40% reduction when run to a Vtape device with encryption/compression services enabled

IEBGENER saw a 27% INCREASE with Encryption/Compression services

But, saw a 8% decrease when written to Vtape with encryption/compress

z/15 with zIIP engines

Results of using new Encryption/Compression Services



z/16 with zIIP engines

ADRDSSU saw a 25% decrease with Encryption/Compression on a TS7770

Also saw a 34% decrease in run-time when run to Vtape device with encryption/compression services enabled

If ADRDSSU used the new ZCOMPRESS option, it saw a 8% reduction than Vtape with encryption/compression but at a 5-times increase in CPU.

IDCAMS saw a 41% INCREASE with Encryption/Compression services on a TS7770

But, saw a 42% reduction when run to a Vtape device with encryption/compression services enabled

IEBGENER saw a 19% INCREASE with Encryption/Compression services

And saw a 6% INCREASE when written to Vtape with encryption/compress