What's New on the IBM DS8A00 Storage Family

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Agenda

DS8000 G10 Product Introduction

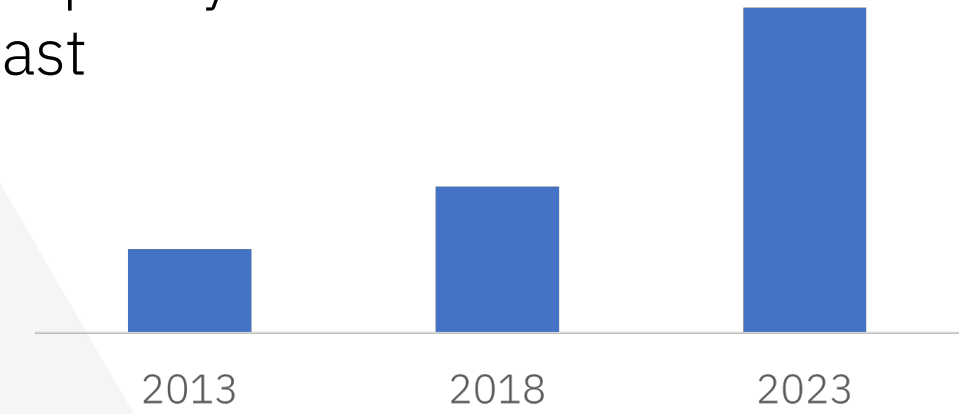
10.1

Mainframe usage is growing

IBM mainframes run ~70% of the world's transactions by value

~3x growth

installed capacity over the last decade



Workload as measured by installed Million Instructions Per Second (MIPS)

Managing the world's most important data

- 67 of the Fortune 100
- 77 of the world's top 100 **banks**
- 8 of the top 10 **insurers**
- 4 of the top 5 **airlines**
- 7 of the top 10 global **retailers**
- 8 out of the top 10 **telcos**

Introducing IBM Storage DS8000 (10th generation)

Always available, performing, innovating, ready

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Always Available

Maximize the continuity of vital business operations

With 8-9's of data availability, multi-site replication, advanced data protection

Strengthen your resilience and deny cyber attackers

The only solution integrated with Cyber Vault on the most secure platform in the world with 2X increase in resources available for immutable Safeguarded Copies

Always Performing

Accelerate application responsiveness

Up to 2X more IOPS for high volume transaction processing with new PCIe Gen 4 flash enclosure

Reduce transaction time

Up to 2.5X with zHyperLink for transactional workloads

Always Innovating

Improve data center efficiency and sustainability through consolidation

Up to 2X capacity in the same physical space with thin provisioning and hardware compressed FCM 4 flash drives

Leverage Z and DS8000 Synergies

With more than 30 advanced capabilities optimized for Z and Power Servers by design

Always Ready

Ensure the integrity and confidentiality of all data at rest and in flight

With Fibre Channel Endpoint Security (IFCES) – required by zNext available in DS8000 today

IBM Storage DS8000 G10
Three-layer, shared everything architecture

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Layer 1
Up to 32 Host Adapters
(128 32Gb ports)

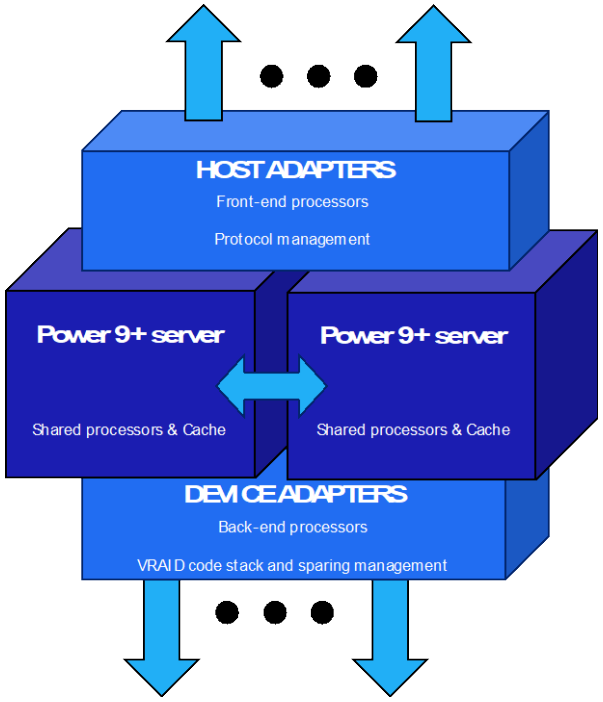
- Deliver data to applications
- Replicate data to other DS8000 systems
- Encrypt data in-flight (Fibre Channel Endpoint Security)

Layer 2
POWER 9+ Controllers

- Improve cache hit rate AND speed for background operations like replication and Safeguarded Copy
- Speed write I/Os with expanded write cache. Up to 256GB of Non-volatile Storage

Layer 3
Up to 16 distributed Software RAID Adapters

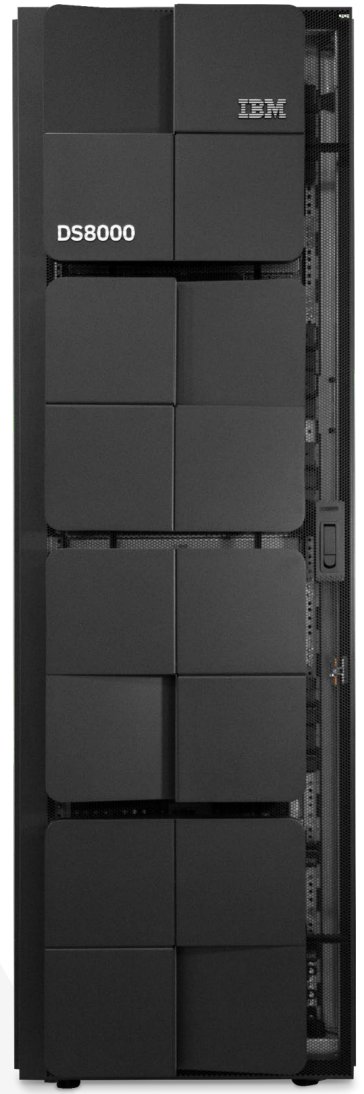
- Reduce latency with NVMe over PCIe Gen 4 connectivity
- Improve availability with new dual-active architecture
- Compression with FCM 4 media



IBM DS8900F functional focus areas

 Ultra low latency	Process more data faster to improve customer satisfaction and capitalize new business opportunities	• IBM zHyperLink technology
 Cyber Resilience	Continuously deliver the intended business outcomes despite adverse cyber events	• IBM Safeguarded Copy
 Replication	High Availability, Disaster Recovery, and Multi-Site	• Metro Mirror, Global Mirror, Global Copy, FlashCopy
 Security	Protect 100% of customer and corporate data wherever it resides	• Fibre Channel Endpoint Security • Authentication and Authorization
 Cloud and Object integration	Provide business efficiency and flexibility with seamless integration to Cloud and Object environments	• Transparent Cloud Tiering (TCT) • TS7700 object store
 Storage Efficiency	Lower the cost per GB with the ability to store and manage data consuming the least amount of system resources	• Thin Provisioning & Easy Tier • Workload consolidation
 Management and Monitoring	Manage and monitor all advanced system functions and capabilities with extraordinary simplicity	• Management GUI, DS CLI, REST API

IBM Storage DS8000
Meet the family



IBM DS8000

Flexible configurations

Multi frame, single frame, or rack mount in existing 19-inch rack infrastructure

Flash options

Always encrypted, optionally compressed

IBM FlashCore Module* or industry standard flash

* IBM FCM with compression available in DS8000 G10

Extraordinary scale

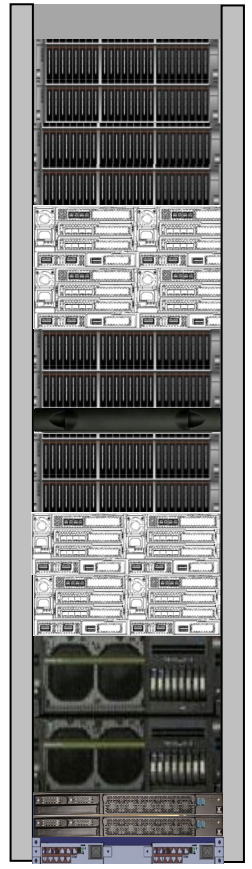
Capacity for your growth

Systems from 1PiB maximum usable capacity up to 32PiB

The story of an architecture evolution

33” rack
40U

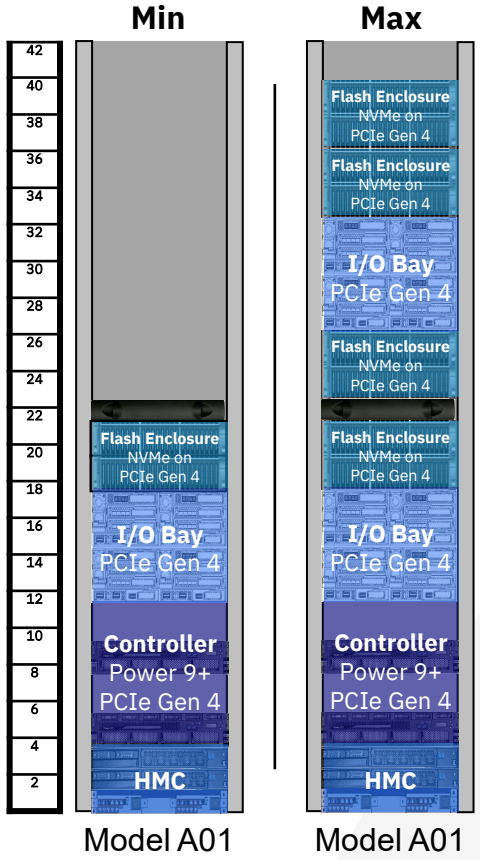
	DS8300	DS8700	DS8800	DS8870	DS8880	DS8900F	DS8A00
Disk	FC	FC	SAS	SAS	SAS	SAS	NVMe
Power	Bulk	Bulk	Bulk	DC-UPS	DC-UPS	iPDU	iPDU
CEC	p5/p5+	p6	p6	p7/p7+	p8	p9	p9+
IO Bay	RIOG	PCIe-1	PCIe-1	PCIe-2	PCIe-3	PCIe-3	PCIe-4
Adapters	4Gb/2Gb	4Gb/2Gb	8Gb/8Gb	16Gb/8G	16Gb/8G	32Gb/16Gb	32Gb
Rack	33”	33”	33”	33”	19”	19”	19”



19” rack 42U
Industry std

IBM Storage DS8000 G10
Under the covers

DS8A10
Single Frame



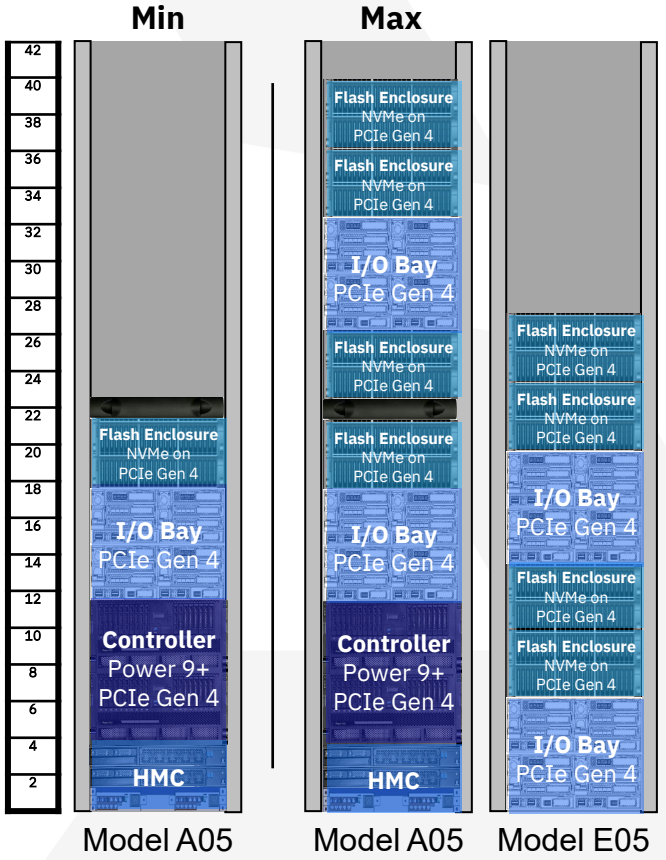
Controller

- 20 Power 9+ Processor Cores
- 256GB or 512GB of System Memory
- 16GB or 32GB of Write Cache

I/O Bay

- 8 to 64 Host ports
- Zero to 4 zHyperLink

DS8A50
Multiframe



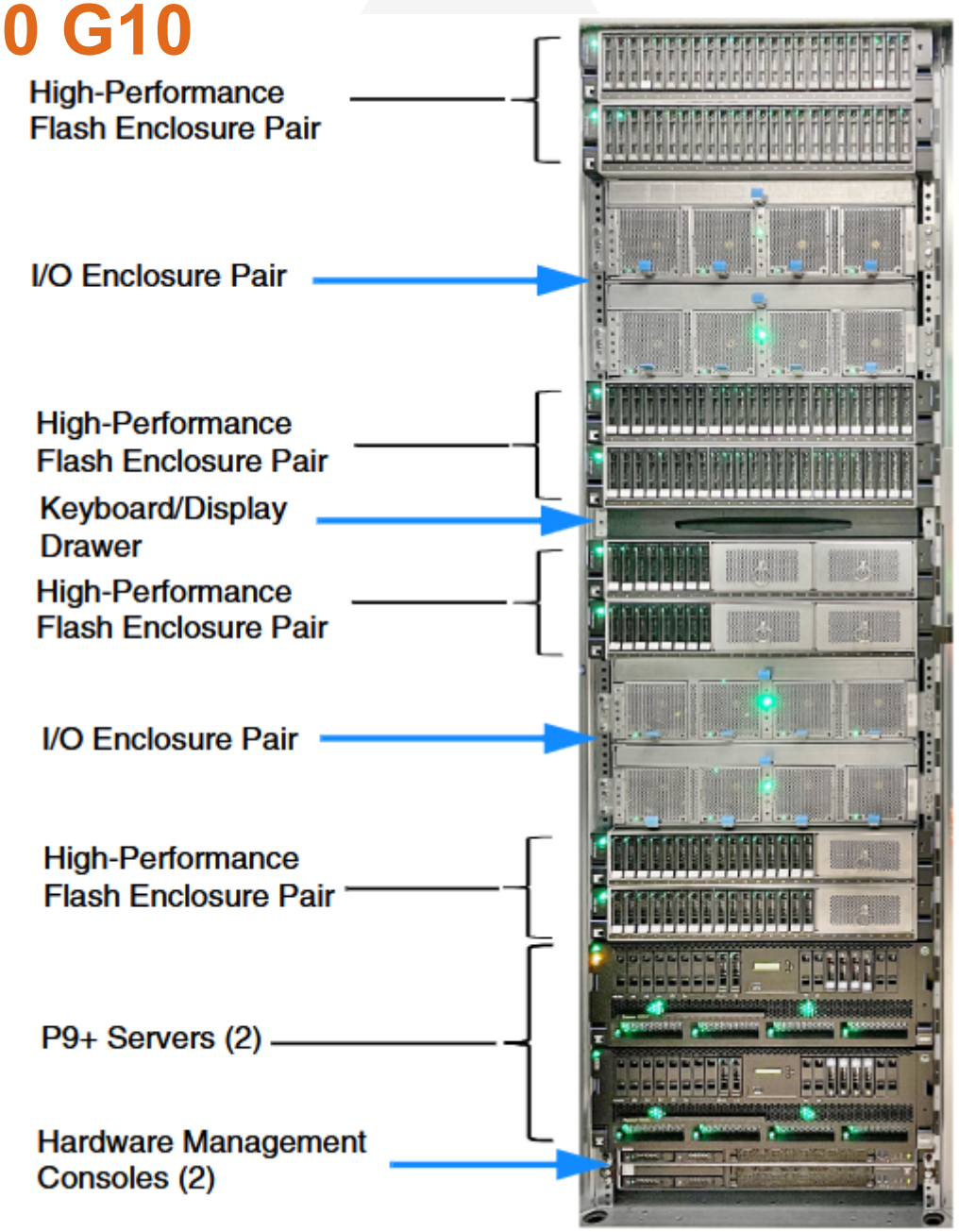
Controller

- 40 Power 9+ Processor Cores
- 1024GB, 2048GB or 3574GB of System Memory
- 64GB, 128GB, or 192GB of Write Cache

I/O Bay

- 8 to 128 Host ports
- Zero to 10 zHyperLink

IBM Storage DS8000 G10
Under the covers



DS8A50 components (base frame)

IBM Storage DS8000 G10
Under the covers

New I/O Bay

Compact performance

8 adapter slots in 3u of rack space

- 4x Host adapters
- 2x Device adapters
- 2x zHyperLink ports
- Plus controller connections

Reliable connectivity

- Installed in pairs for redundancy and cross-connectivity to controllers
- Hot plug adapter cards
- Concurrent maintenance and upgrade

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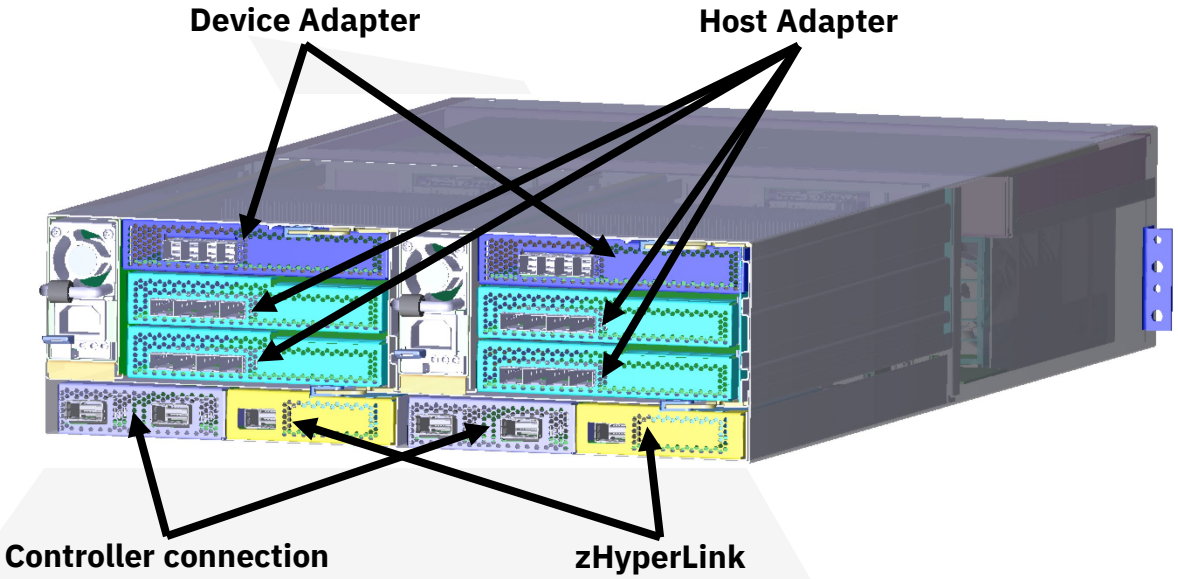
PCIe Gen 4

Double

the bandwidth

at 2GB/s per lane



IBM Storage DS8000 G10
Under the covers

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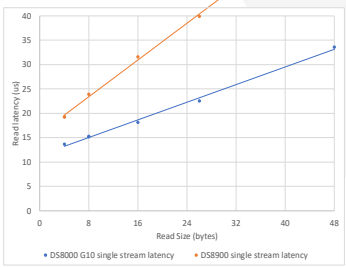
New zHyperLink

- PCIe Gen 4
- New software support for
  - larger Db2 and VSAM reads
  - MQ log writes

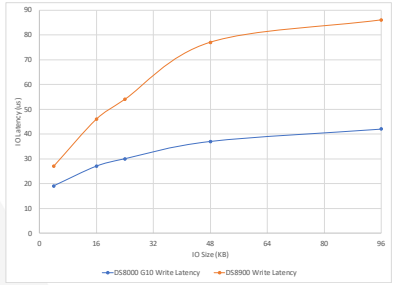
Faster Reads

- **30% increase** in throughput
- **30% reduction** in read latency
- Software option to enable larger reads



Faster Writes

- **250% increase** in per link write throughput for larger writes
- Up to **20% reduction** in write latency



Evolution of High Performance Flash Enclosure

HPFE Gen 1 — 2016

HPFE Gen 2 — 2017

HPFE Gen 3 — 2024

Features		HPFE Gen 1		HPFE Gen 2		HPFE Gen 3	
Rack Size in Rack Unit		1U		4U		4U	
Flash Media options		400 / 800 GB		800 / 1600 / 1900/ 3200 / 3800 / 7600 / 15000 GB		Standard: 1.6 / 1.9 / 3.8 / 7.6 TB FCM4: 4.8 / 9.6 / 19.2 TB	
Compression Support		No		No		Yes - FCM	
Number of supported Drives		16 or 30 (1.8")		16, 32 or 48 (2.5")		16, 32 or 48 (2.5")	
Min/Max raw capacity		24 TB		12800 / 720000 GB		25600 / 921600 GB	
RAID protection		5 / 10		5 / 6 / 10		6 / 10	
Protocol and Fabric from DS8k to RAID Engine		SIS on PCIe Gen 2		SIS on PCIe Gen 3		SIS on PCIe Gen 4	
Protocol and Fabric from RAID Engine to Media Enclosure		SAS 6Gb		SAS 6Gb		NVMe on PCIe Gen 4	
Drive Install groups		2 install groups of 16 Flash drive and 14 Flash Drives (4 array sites)		3 install groups of 16 Flash drive each (6 array sites)		3 install groups of 16 Flash drive each (6 array sites)	
Install Increments		Populate in increments of a single High-Performance Flash Enclosure		Populate in increments of a single High-Performance Flash Enclosure Gen2		Populate in increments of a single High-Performance Flash Enclosure Gen3	
Performance		IOPS	Throughput	IOPS	Throughput	IOPS	Throughput
	Read	395,000	3.8 GB/s	**DS8910/DS8950** 900,000 RAID 5/6 **DS8980** 1,300,000 RAID 5/6	14 GB/s RAID 5/6	1,560,000 RAID 6	19.7 GB/s RAID 6
	Write	146,000	2.6 GB/s	300,000 RAID 5 225,000 RAID 6	10.5 GB/s RAID 5 9 GB/s RAID 6	720,000 RAID 6	15.4 GB/s RAID 6

IBM Storage DS8000 G10
Under the covers

New Flash Enclosure

Flexible

Third-generation design

- 16, 32, or 48 drives
- RAID 6 or 10

High capacity

28%

more raw capacity

Potentially even more usable capacity with new compression-capable FlashCore Modules

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Lightening fast

Double

the throughput, double the IOPS

with NVMe on PCIe Gen 4

High Performance Flash Enclosure (HPFE Gen 3)

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Under the covers

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New Flash Media

Industry Standard NVMe Flash
- **1.6TB, 1.9TB, 3.8TB, 7.6TB**

IBM FlashCore Module (FCM 4)
- **4.8TB, 9.6TB, 19.2TB**

Secure
Always encrypted

- XTS-AES-256 bit encryption
- FIPs 140-3 certification
- Supports cryptographic erasure and Secure Data Overwrite

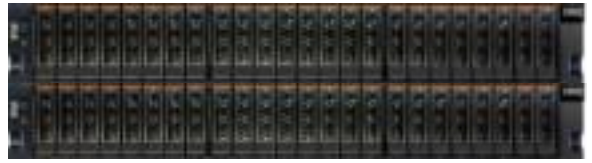
Efficient
Optionally Compressed

- When choosing FCM media, data is compressed by LZ77 + Dynamic Huffman Encoding on 16K Byte Blocks

IBM FlashCore Module 4 (FCM 4)

- Hardware compression and encryption
- Data Reduction storage pools created from FCM will be Thin Provisioned
- 19.2TB raw capacity will report 3x or 57.7TB writeable capacity
  - 9.6TB raw = 3x or 28.8TB writeable
  - 4.8TB raw = 4.58x or 21.9TB writeable

DS8A10/DS8A50/DS8A80 AFA Media Options – All Encryption Capable



- **Flash – 2.5” Capacity Tier 1**
  - 1.60TB Flash cards
- **Flash – 2.5” Capacity Tier 2**
  - 3.84 / 7.6TB Flash cards
- **Flash – 2.5” Compression Tier (FCM)**
  - 4.8 / 9.6 / 19.2TB Flash cards

- **Data is always encrypted on write to Flash and then decrypted on read**
  - Data stored on Flash is encrypted
  - Data in flight is not encrypted unless Pervasive Encryption or Fibre Channel Endpoint Security utilized
- **Media does the encryption at full data rate**
  - No impact to response times
  - Uses AES 256 bit encryption
- **Supports cryptographic erasure data**
  - Change of encryption keys
- **Internal or External key server supported**
  - External Key server options
    - IBM Guardium Key Lifecycle Manager (GKLM – formerly SKLM)
      - SKLM + IBMJCEFIPS provider is FIPS140-2 certified
    - z/OS2.4 Container Extensions (zCX) can run IBM Security Key Lifecycle Manager in a container
    - KMIP compliant key manager such as Gemalto SafeNet KeySecure, Thales Vormetric Data Security Manager, Thales CipherTrust Manager
  - Key exchange with key server is via 256 bit encryption

IBM Storage DS8000 G10
Under the covers

The Terminology of Compression

Exploiting compression

Systems with compression will also be thin provisioned and exploiting compression means over provisioning

Estimating compression

z/OS utility to estimate compressibility DS8000 G10 FlashCore Modules

Capacity increases

Provisioned capacity

Expanded by thin provisioning

Writeable capacity

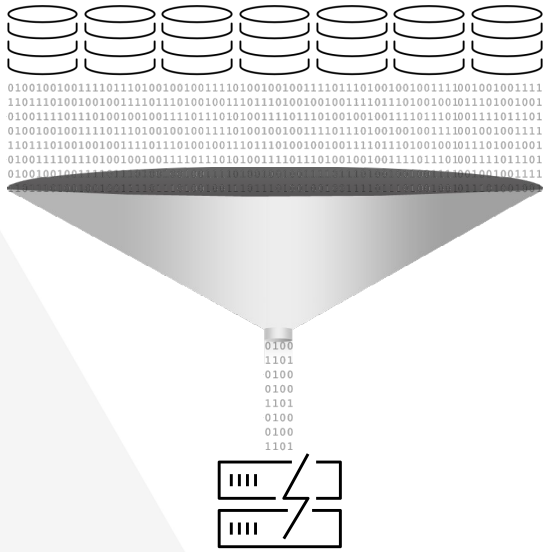
Expanded by compression

Usable capacity

Reduced by RAID and spares

Raw flash capacity

Data reduces



IBM Storage DS8000 G10 - FCM Compression Terminology

- **Total Logical Capacity**
  - The total amount of capacity that can be written. This is the total addressable space. Also referred to as **total effective capacity**. It is the total Logical Block Addressable (LBA) range
- **Total Physical Capacity**
  - The total amount of capacity that can be stored on media. This is the raw physical capacity that can be stored after all data reduction techniques
- **Used Logical Capacity**
  - The total amount of capacity that has been written from the host. This is the written addressed space before any data reduction techniques have been performed. Also referred to as **used effective capacity**
- **Used Physical Capacity**
  - The total amount of capacity stored on the media. This is the raw physical capacity that has been consumed after data reduction techniques
- **Configured Capacity**
  - The amount of volume configured capacity

IBM Storage DS8000 G10
Under the covers

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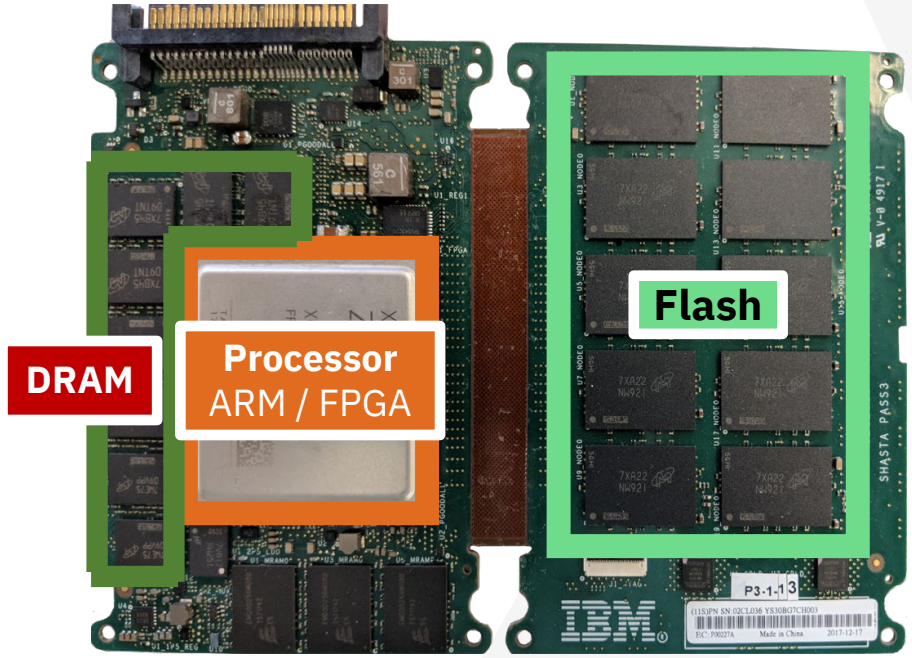
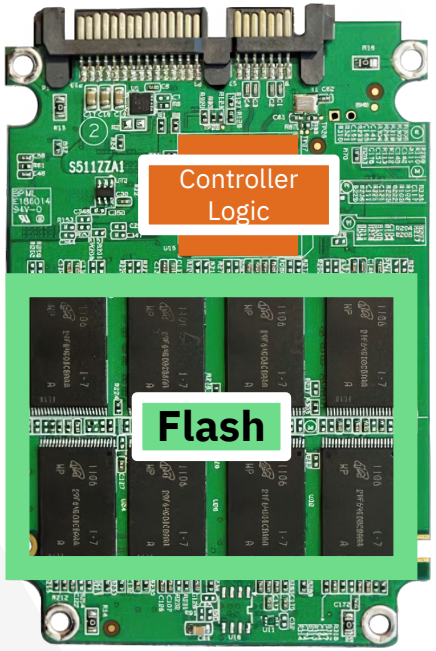
IBM FlashCore Module 4



IBM FlashCore Modules are computational storage

- Hardware encryption
- Hardware compression
- Higher density, higher capacity
  - Internal tiering on dual-mode SLC / QLC flash

Industry Standard Flash



Read the Redbook

Capacity and Extents Sizes

- DS8A00 volume management
  - Extent Space Efficient (ESE) Volumes (Thin Provisioned)
  - Standard Volumes (Full Provisioned)
  - All Volumes are now Extent Space Efficient (ESE) Type Volumes that are either
    - Full Provisioned
    - Thin Provisioned
- Number of extents is being double from 128M to 256M to increase usable/provisioned capacity
- Provisioned Capacity to be 2x of Usable Capacity. Designed for 3x, however, memory structures and ERP times may limit total amount

Data Type	Small Extent Size	Large Extent Size
CKD	21 cylinders*	1113 cylinders
FB	16MB	1GB

*CKD Extent size is the same as the dataset allocation unit on EAV of 21 cylinders

Maximum physical and virtual capacity for extents based on the cache size

Model		DS8900				DS8A00			
System Memory	Volume Type	Large Extents		Small Extents		Large Extents		Small Extents	
		Maximum provisioned capacity	Maximum usable capacity	Maximum provisioned capacity	Maximum usable capacity	Maximum provisioned capacity	Maximum usable capacity	Maximum provisioned capacity	Maximum usable capacity
≤ 512	FB:	4096 TiB	4096 TiB	1090 TiB	512 TiB	8192 TiB	8192 TiB	2048 TiB	1024 TiB
	CKD:	3652 TiB	3652 TiB	971 TiB	551 TiB	7304 TiB	7304 TiB	1826 TiB	1102 TiB
> 512	FB:	8160 TiB	16384 TiB	4234 TiB	2048 TiB	~32768 TiB	32768 TiB	~8192 TiB	4096 TiB
	CKD:	7263 TB	14608 TiB	3775 TiB	2205 TiB	~29216 TiB	29216 TiB	~7304 TiB	4410 TiB

Maximum usable/provisioned capacity will depend on the amount of memory installed

IBM Storage DS8000 G10 - Small / Large Extent Recommendations

- **Small extents**
  - A **fine granularity** (using small extents) leads to the **best space efficiency**
    - Lots of volume growth requires a quick process to claim and initialize space
    - For sequential writes small extents will enable more disk ranks to be used for the write stream because a smaller extent size will cause the write to move to the next disk rank sooner (16 MB versus 1 GB)
    - z/OS common usage factors favors small extent selection
    - **Small extents will be the default in the GUI/CLI for all volume creation**
- **Large extents**
  - A coarse granularity (using large extents) might be less space efficient for the application but means fewer extent allocations as the volume's data usage grows
    - Larger capacity is allocated at one time and fewer larger allocations are slightly more efficient than a lot of smaller allocations
    - **Reduction in global metadata access and fewer updates**
  - Use extent pools with large extents if you want to use fully provisioned volumes and do not plan to use thin provisioned volumes or require provisioned capacity/usable capacity greater than what is supported via small extents
  - Use of FCMs with Large extents will help with physical space consumption
- **What Extent Size to Use?**
  - Use small extents for all applications unless capacity requirements can not be met by small extents
  - When using Large extents, pair with FCMs to reduce allocation of physical space since FCM drives are Thin Provisioned

IBM Storage DS8000 G10
Under the covers

Expanded Write Cache

Up to 256GB per system

Small footprint

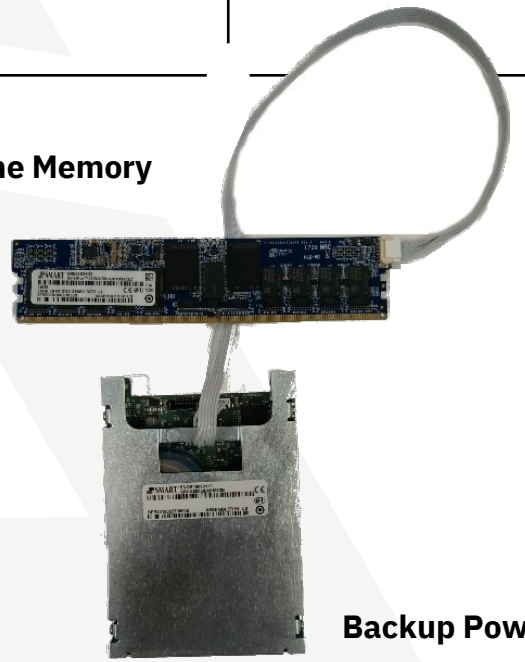
No need for bulky Uninterruptible Power Supply (UPS)

Non-Volatile Storage (NVS)

Expandable

- 16GB or 32GB NVDIMMs
- 2 to 4 NVDIMMs per controller

Non-Volatile Dual Inline Memory (NVDIMM)



Backup Power Module

IBM Storage DS8000 G10
Under the covers

Modernized

- 2x Power 9 servers
- 1u side-by-side design for Ethernet switches
- Dual power for redundancy
- Secure Boot

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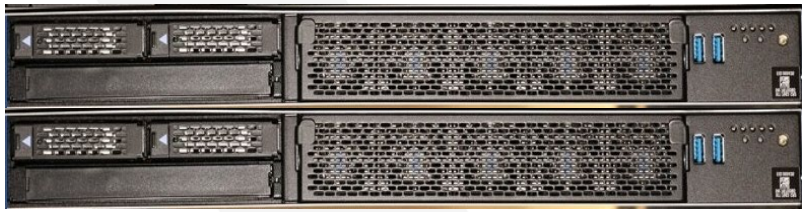
Simplified

Removes custom hardware and firmware found in previous generations

New Hardware Management Console (HMC)

Hardware Management Consoles



Ethernet Switches

Utility Drawer to Common Rack Mounted Hardware

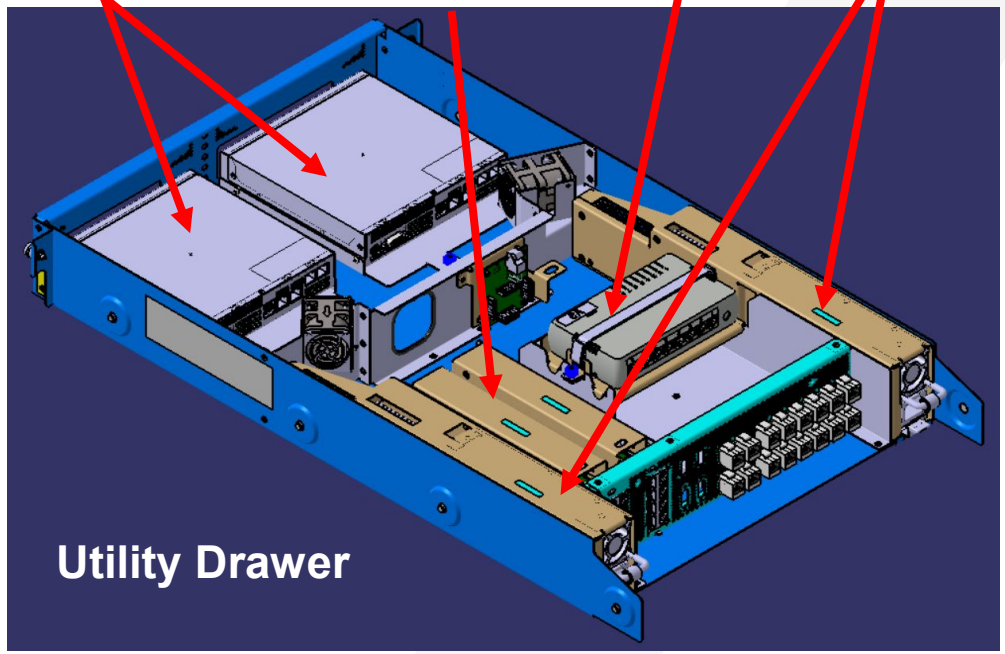
DS8900F

Two Intel Based Hardware Management Consoles

Two Rack Power Control Cards

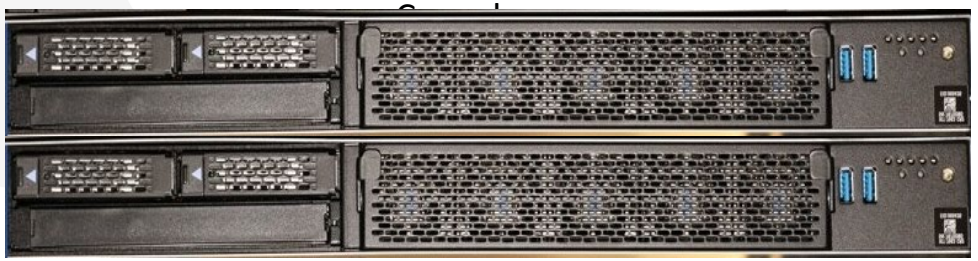
Two Ethernet Switches

Two PSUs



DS8A00 Gen 10

Two Power Based Hardware Management



Two Ethernet Switches

Removal of Custom Utility Drawer

- Reduced Complexity of system
- Removal of Custom Hardware
- Removal of Firmware in Power CEC / DS8k to manage Utility Drawer

IBM Z end-to-end integration with storage means…

Security

Prevent intruders from reading data as it passes through the SAN

Fibre Channel Endpoint Security
*Required starting with zNext (now that z17 has GA'ed)

Authenticate identity

of both IBM Z and storage before a link is established

Encrypt data

in-flight without application changes and without consuming IBM Z CPU resources

IBM Fibre Channel Endpoint Security (IFCES) : April 2024 SOD

Who: FICON storage vendors and IBM Z clients

What: IBM intends to require the use of IBM Fibre Channel Endpoint Security for all FICON connected devices starting with IBM zNext+1. All new FICON-connected storage systems introduced into the market on or before December 31st, 2024 will be able to continue to connect to IBM zNext+1 generation servers without the use of IBM Fibre Chanel Endpoint Security.

When: IBM zNext+1 timeframe (for client usage) and FICON-connected storage systems introduced after 2024 (storage vendor support)

Why:

- With the increasing focus on security from all sides, including regulatory groups and governments providing new and tighter regulations, there is a particular importance on the protection of critical infrastructure. As many IBM Z clients run the most mission critical applications, operate in highly regulated industries, and have an increasing amount of sensitive data, IBM must provide the best tools for securing client data and have a strong technology roadmap to continue to do so.
- As data is being moved within and across data centers, authentication of the identities exchanging data and transparent encryption of the data in flight are required to strengthen security of the data. IBM Fibre Channel Endpoint Security (IFCES) is an end-to-end solution that is designed to provide a means to help ensure the integrity and confidentiality of all data flowing on Fibre Channel links between authorized server and storage devices, creating a trusted storage network that encrypts data in flight.

Link to the Statement of Direction:

- Future required adoption of IBM Fibre Channel Endpoint Security on FICON-attached devices - IBM Documentation

IBM Storage DS8000 G10 - License Structure Explained

- **Base Function Group (BF)**
  - Raw Capacity

- **z-Synergy Services Function Group (zsS)**
  - Raw CKD Capacity

- **Copy Services Function Group (CS)**
  - Provisioned Capacity
    - Provisioned capacity is the sum of the host volumes allocated on the system
    - If you are doing overprovisioning or compression, we limit the maximum Copy Services license to the raw capacity
    - If you are not doing overprovisioning or compression, the maximum provisioned capacity is the usable capacity
    - Sub-capacity licensing is based on the provisioned capacity in host volumes in Copy Services, including both source and targets
    - Sub-capacity licensing requires the client to have an active Storage Insights installation that will be used for monitoring usage

- **Transparent Cloud Tiering Function Group (TCT)**
  - Raw CKD Capacity

- ***Note: All capacities are based on decimal TB**

IBM Storage DS8000 has great support!

- **IBM Storage DS8000 Expert Care & Storage Insights**

	Advanced	Premium
Access to fixes, updates, and new releases of IBM Spectrum Virtualize	Yes	Yes
Installation, usage, and configuration support line	Yes	Yes
Predictive alerting	Yes	Yes
Automated ticket management	Yes	Yes
View of live infrastructure shared between client and IBM for collaborative problem resolution	Yes	Yes
Proactive issue resolution	Yes	Yes
Storage Insights Pro entitlement		Yes
Hardware service	24x7 Same day	24x7 Same day
Code upgrades 2x / year	Customer Code Load	Remote Code Load
Dedicated Technical Account Manager		Yes
30-minute Severity 1 & 2 response		Yes

Agenda

DS8000 G10 Product Introduction

10.1

IBM Storage DS8000 G10

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IBM DS8A10

For small/medium-sized organizations

Single frame integrated rack or install directly into an IBM Z or standard 19-inch rack

IBM DS8A50

For large organizations

Consolidate workloads across IBM Z

IBM DS8A80

For consolidation

Expand workload possibilities to AI, Business Intelligence and Machine Learning

Consistent software capabilities

Introducing the IBM DS8A00 G10 Family

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DS8A10

2025 2024

The perfect balance between performance, capacity and cost to support a wide variety of workloads and rackable in client environment

DS8A50

2024

Provides the ideal combination of high performance, capacity and cost for a wide variety of workloads

DS8A80

2025

Designed to deliver superior performance and capacity to satisfy the most demanding business requirements

Power 9+ CEC
- Power PCIe Gen 4 CEC
- Increased Cores / Cache for DS8A10 and DS8A80

New IO Bay
- PCIe gen 4 IO Bay
- Increased BW

New High Performance Flash Enclosure Gen 3
- PCIe gen 4 NVMe SSD and FCM Support
- Build in Compression via FCM Media
- **Increased IOPs/BW of up to 3x**

Built from the DS8900F code base
- Inherits Advanced Function from DS8900F Family

Performance
- **Increase in System IOPs**
- **Increased in system BW**
- Lower Latency across all models
- Double the write cache for cache configuration over 2TB

2 x
More Physical Capacity

2 X
Write Cache
Increased write cache for Larger cache configurations
More buffering for write workload

Up to 15%
Faster IOPs Target

Up to 12%
Lower Latency Target

100%
Peace of Mind
Encryption of data everywhere
Cyber Resiliency
8-9s availability

IBM Storage DS8000 G10
Under the covers

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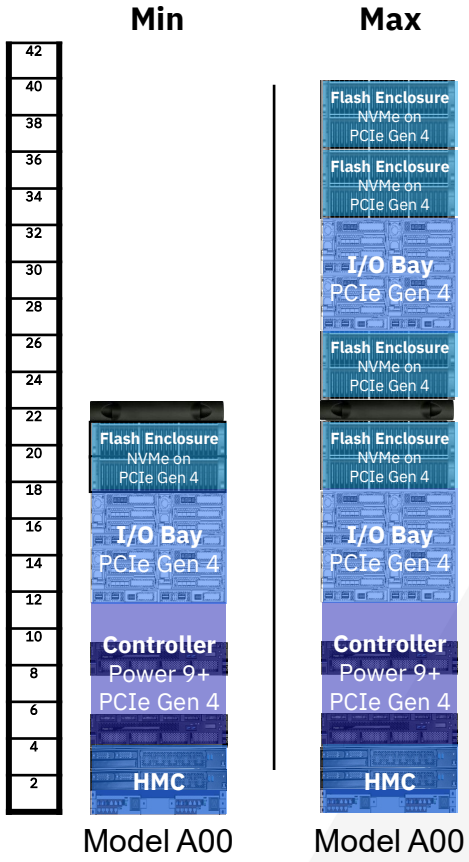
10.1 4Q2H25

DS8A10
Rack Mount



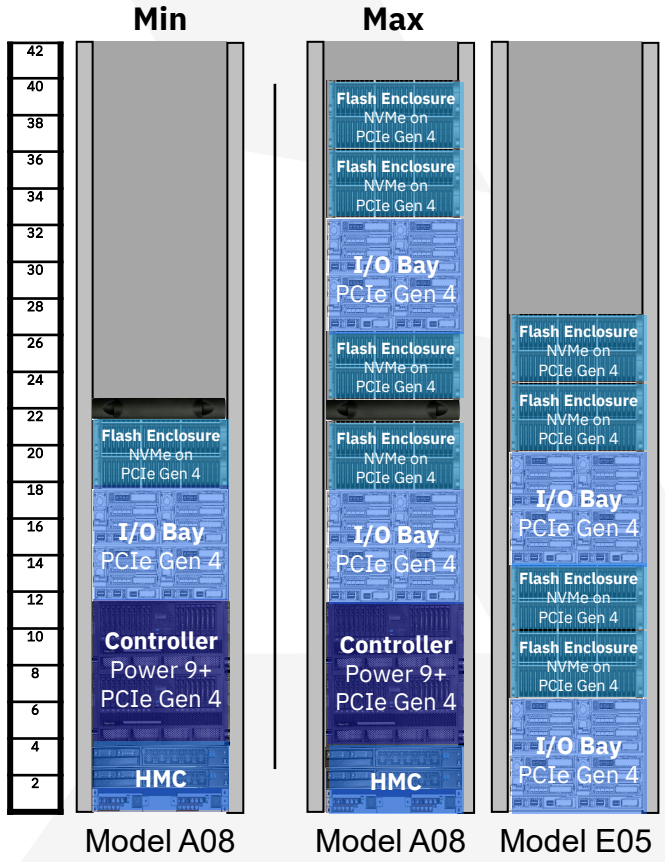
Controller

- 20 Power 9+ Processor Cores
- 256GB or 512GB of System Memory
- 16GB or 32GB of Write Cache

I/O Bay

- 8 to 64 Host ports
- Zero to 4 zHyperLink

DS8A80
Multiframe



Controller

- 48 Power 9+ Processor Cores
- 4800GB of System Memory
- 256GB of Write Cache

I/O Bay

- 8 to 128 Host ports
- Zero to 12 zHyperLink

IBM Storage DS8000 G10 Configuration Options

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Model	Processors per System	System Memory (GB)	System NVS (GB)	Expansion Frame	Min / Max Host Adapters	Min / Max zHyperLink	Min / Max Flash Enclosures	Min / Max Flash Drives
10.1								
A08 Multiframe	48-cores	4800	256	0 to 1	2 (8 ports) / 32 (128 ports)	0 / 12	1 / 8	16 / 384
10.0								
A05 Multiframe	40-cores	1024 2048 3584	64 128 192	0 to 1	2 (8 ports) / 32 (128 ports)	0 / 10	1 / 8	16 / 384
10.0								
A01 Single Frame	20-cores	256 512	16 32	n/a	2 (8 ports) / 16 (64 ports)	0 / 4	1 / 4	16 / 192
10.1								
A00 Rack Mount	20-cores	256 512	16 32	n/a	2 (8 ports) / 16 (64 ports)	0 / 4	1 / 4	16 / 192

IBM Storage DS8000 G10 10.1 – FCM4 Ransomware Threat Detection (RTD)

FCM 4 are Computational Storage Devices that collect per write IO operations in the **Summarizer**

As Volumes are spread across all FCMs, the **Aggregator** collects metrics from each FCM. Aggregated feature information is used to

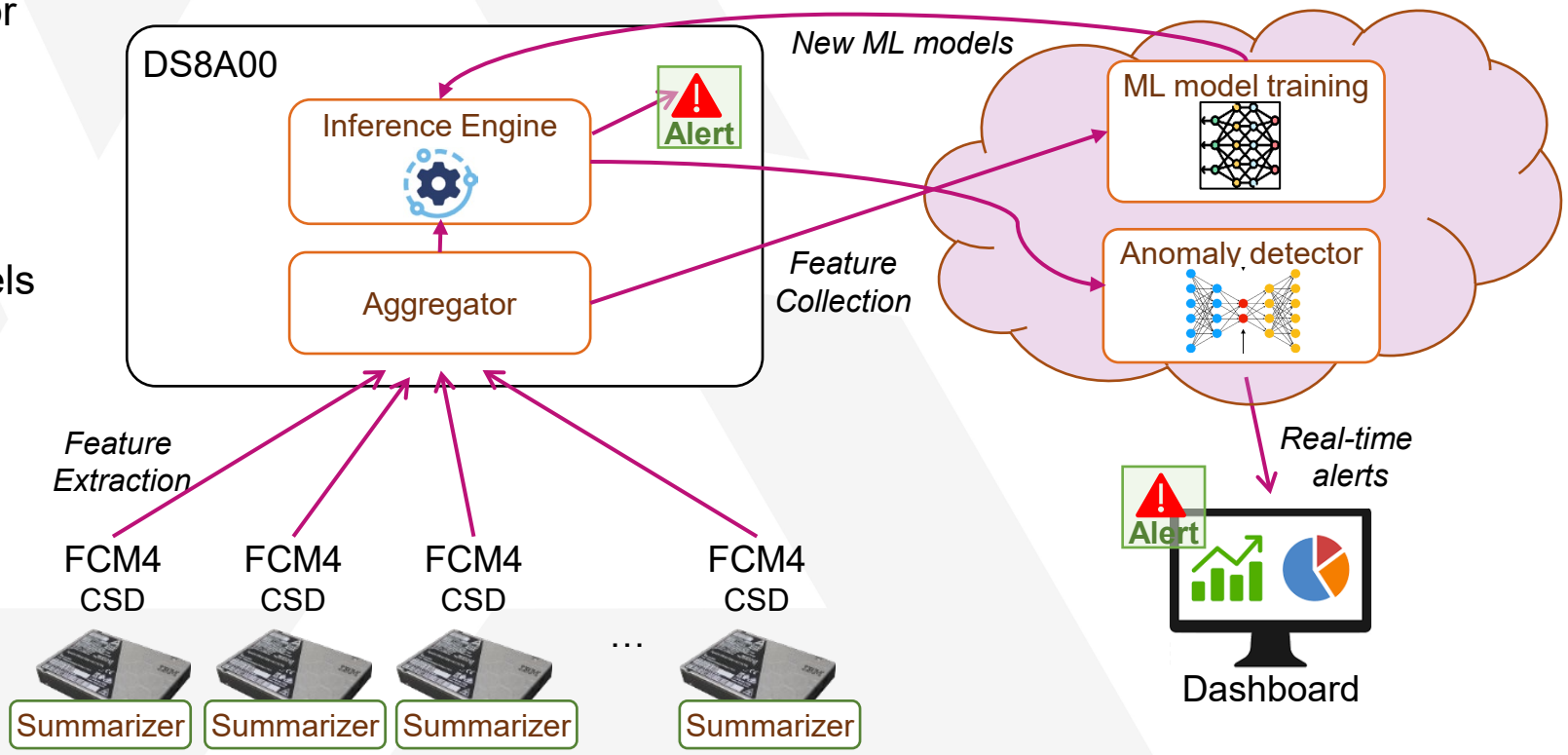
- Run inference to detect malicious behavior
- Train new ML-models (outside the storage system)
- Runs on DS8A00 HMC

The **Inference Engine** detects anomalous behavior based on system-specific ML models

Periodic retraining of **ML models** happens in Storage Insights (SI)

Alerting and mitigation

- Alerts in DS8000 UI and SI Pro
- Freeze known good snapshots



License Structure for the DS8000 G10 – Security Function Group for 10.1

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Base Function Group	z Synergy Function Group	Copy Services Function Group	Transparent Cloud Tiering Function Group	Security Function Group
▪ Logical configuration support for FB	▪ Logical configuration support for CKD	▪ FlashCopy	▪ Multi-Cloud on/off Premises Support	▪ 7 Categories of Capacity
▪ Operating Environment License (OEL)	▪ zPAV / Hyper-PAV / Super PAV	▪ Metro Mirror	▪ Encryption Support on/off Premises Support	▪ 5 subscription options (by year)
▪ Thick/Thin Provisioned Volume support	▪ High Performance FICON (zHPF)	▪ Global Mirror	▪ Compression Support to TS7700	
▪ Space reclamation (Unmap)	▪ zHPF Extended Distance II	▪ Global Copy		
▪ Dynamic Volume Expansion	▪ FICON Dynamic Routing, Forward Error Correction	▪ Metro/Global Mirror		
▪ FB Compression via FCM	▪ Dynamic Volume Expansion	▪ Multi-Target-PPRC		
▪ Encryption Authorization SSD/FCM	▪ zDDB, IBM Sterling MFT Acceleration with zDDB	▪ Multi-Target-GM		
▪ Local Key Manager for Data at Rest	▪ Thick/Thin Provisioned Volume support	▪ Cascaded Incremental Resync (6-Site Replication)		
▪ Easy Tier	▪ IBM z/OS Distributed Data Backup	▪ CSM		
▪ Secure Boot	▪ zHyperWrite	▪ Safeguarded Copy		
▪ Multifactor Authorization	▪ zHyperLink	▪ Sub capacity Licensing		
▪ LDAP	▪ Z/DS8000 EasyTier Application	▪ HyperSwap		
	▪ GDPS Heat Map Transfer			
	▪ Fibre Channel Endpoint Security – Auth and EDiF			
	▪ CKD Compression via FCM			

- Introduced with G10 R10.0
- Introduced with G10 R10.1

IBM DS8000 G10 – Security Function Group License for Ransomware Threat Detection

Product Summary:

FCMs provide real-time telemetry and analytics at the storage layer, monitoring I/O patterns and data entropy to detect ransomware-like behavior, such as unusual write spikes or access anomalies. By enabling RTD service, customer will receive ongoing updates throughout the subscription period and real-time notifications if a threat is detected.
This only applies to customers with FCM4s. If they have Industry Standard flash, there is no need for this license.

Product Structure

- **New Function:** Security Function Group
- **Machine Type:** 9372 **Models:** 001,002,003,004 & 005 **(Years 1-5)**
- **Features Range:** BAE0-BAEZ based on RAW capacities

Scope:

- **Release 10.1 (Phase1):** No notification to the customer by the DS8000 itself. Notification will only be to IBM, the team training the AI model may each out to the customer for more information on workload to tune the AI.
- **Release 10.2 (Phase2+):** Enable notification to the customer from the DS8000 if they have acquired the subscription. Target 4Q/26

zHyperLink Performance Statistics Support on ESSNI

Included new zHyperlink performance information when querying the Logical Volume performance.

- zHyperLink Read Requests & Hits
- zHyperlink Write Requests & Hits

Created two new services that will allow the query of the zHyperlink Link statistics as well as its diagnostic parameters.

```
dscli> showckdvol -metrics BF00
ID                              BF00
Date                            08/04/2025 15:43:28 MST
....
zHLReadRequest                  0
zHLReadRequestHits              0
zHLWriteRequest                 0
zHLWriteRequestHits             0
zHLReadPrefetchIORequests       0
```

```
dscli> showzhyperlinkport -metrics HL0006
ID                              IBM.2107-75NA901/HL27
Date                            Mon Jun 02 15:54:34 MST 2025
Link ID                         0060
Remote Link ID                  0000
WWNN                            5005075308FFC775
Remote WWN                      0000000000000000
Oversubscription Status         Normal
TxLayerErr                      0
DataLayerErr                    0
PhyLayerErr                     0
Type                            Optical
Speed                           PCIe GEN4
Width                           8
State                           Handshake Complete
```

DS8A00 MES Support Schedule

R10.02 (GAed 04/2025)	R10.1 (GA target 09/2025)
Expansion Rack Add (C5E only)	Expansion Rack Add (C5F support)
iPDU Pair Install (base rack only)	iPDU Pair Install (expansion rack support)
I/O Enclosure Pair Install	zHyperLink Adapter Install/Remove
Host Adapter Install/Remove	CEC Memory Upgrade
Storage Enclosure/DA Pair Install/Remove	TCT 10Gb/s Ethernet Adapter Install
Drive Set Install/Remove All	Discontinue Rack (RPQ only)

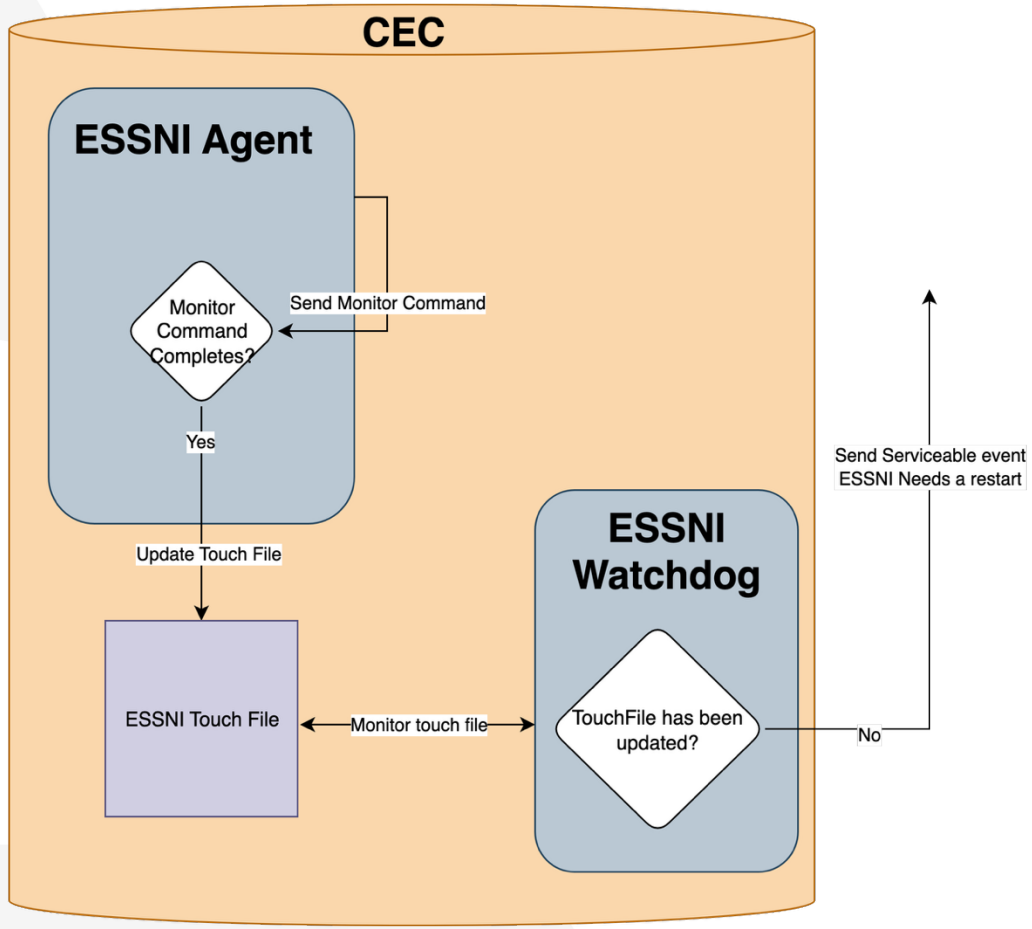
ESSNI auto-recovery on CEC

ESSNI can be auto-recover in one of the CECs if necessary

With the use of continuous monitoring commands observing the ESSNI communication path, we can detect command processor issues

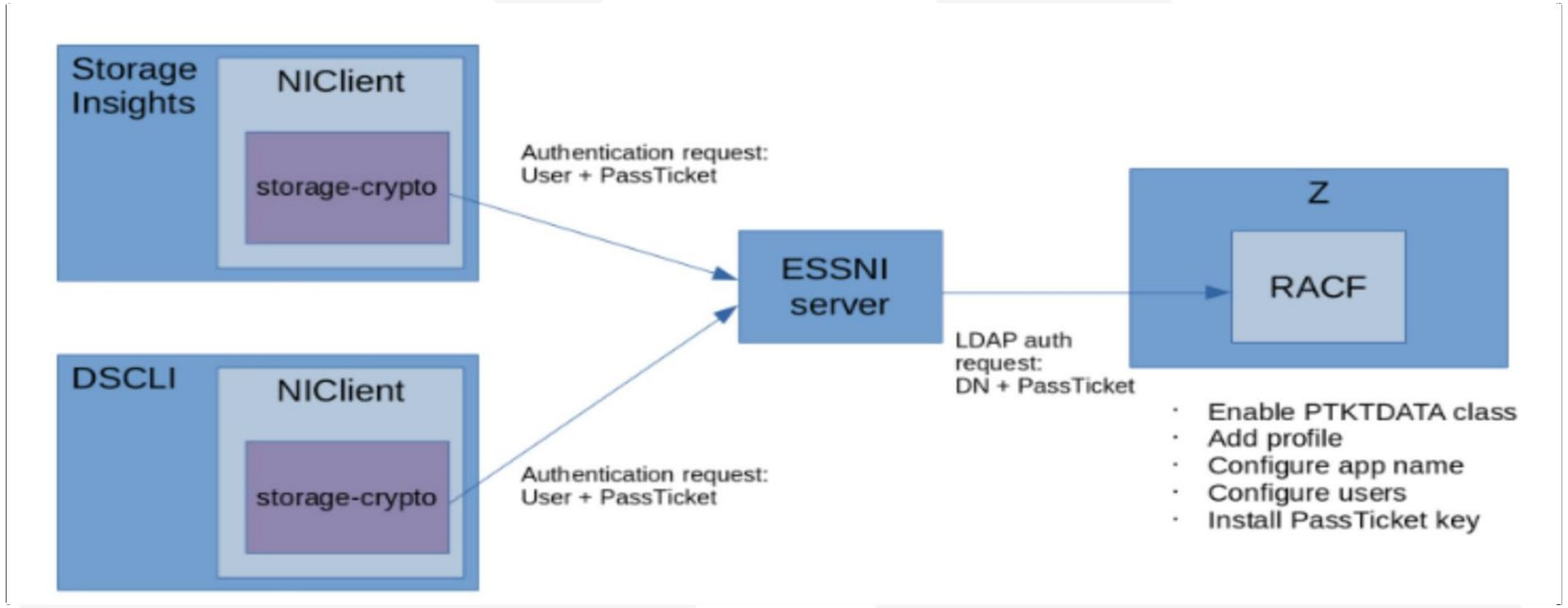
There is a new Watchdog process to determine if we have an optimal system.

If the Watchdog process detects an issue, it will trigger a serviceable event and causes the ESSNI auto recovery action to be executed on the CEC



Passticket Implementation as Authentication method

- The RACF® PassTicket is a one-time password which can be used within an LDAP environment.
- Communication between NIClient-ESSNI, and ESSNI-RACF remains untouched.
- Administrator must install encryption key using managepassticket DSCLI Command
- Once PassTicket is configured, the user should be able to run inline commands with no pwd parameter specified



Encrypted port 1756

- ESSNI used port 1755 without encryption for anything related to transferring files.
- We have implemented a new port 1756, which will use encryption and will require a TLSv1.3 or TLSv1.2 in order to connect and communicate through this port.
- Ports 1755 and 1756 are still available for its use, 1756 being the default and failing back to port 1755 whenever TLS is not configured, impeding the communication with the secure port

Dual Control

Introduction

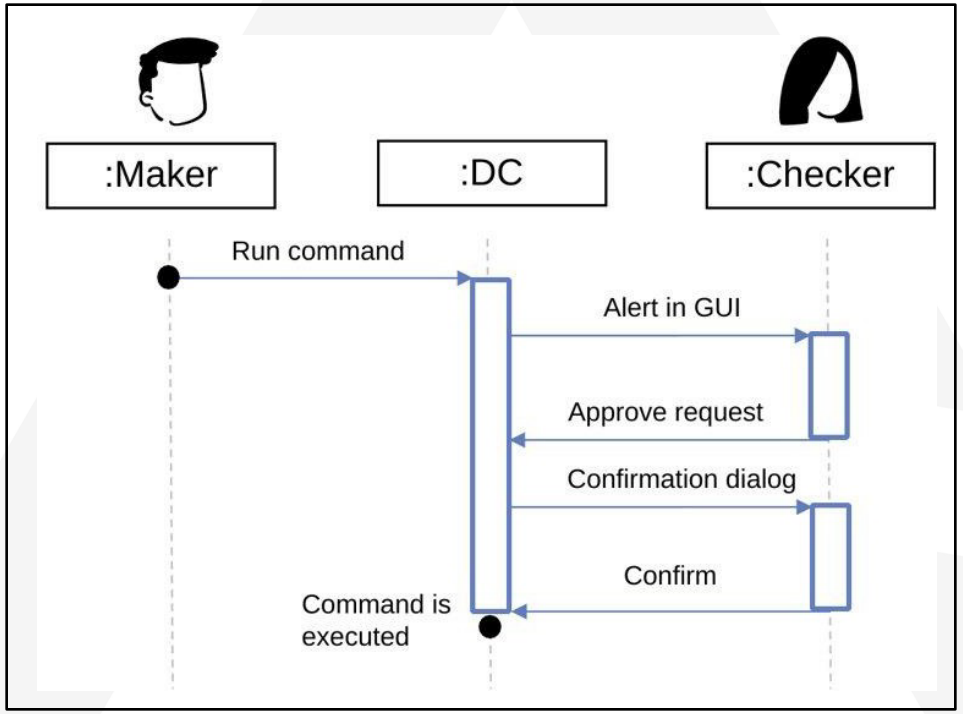
An administrator can set the DS8000 into a mode where every high-risk command must be approved by a separate user so that:

1. Commands can be double checked by a separate user to ensure accuracy.
2. A single user is prevented from maliciously causing damage.
3. A client with multi-tenancy can establish a centralized approver for all tenants.

Dual Control

User Interfaces:

- DSGUI
- DSCLI
- REST API
- ESSNI



Dual Control – Protected Tasks

PERMANENT (Always Protected)

- Enable/Disable Dual Control
- Create Administrator users
- Modify user passwords (other users)
- Grant/Remove Checker Authority
- Authentication policy changes
- Remove DC protection from a user

STORAGE

- Delete volumes and safeguarded capacity
- Reinitialize volumes
- Remove cloud servers

DaR (Data at Rest)

- Data at Rest Encryption operations
- Key server management

SERVICE

- Update HTTPS certificate
- Modify network settings
- System updates and services restarts
- Service access modifications
- Opening/closing ports

FC (Fibre Channel)

- IBM Fibre Channel Endpoint Security operations
- Modify Fiber Channel port configurations
- Key server management

G10 R10.1 Replication Features

The following 9.4 functions are now supported:

- MultiTarget Global Mirror
- Cascaded Incremental Resync
- 4 PPRC primaries
- 6-site support
- SGC Stale Volume Support (also known as Empty Backup or Optimize SGC Space Usage)
- SGC Destage Grouping

SGC Backup Volumes Increases from up to 500 per Volume to 1024

G10 R10.1 Transparent Cloud Tiering (TCT)

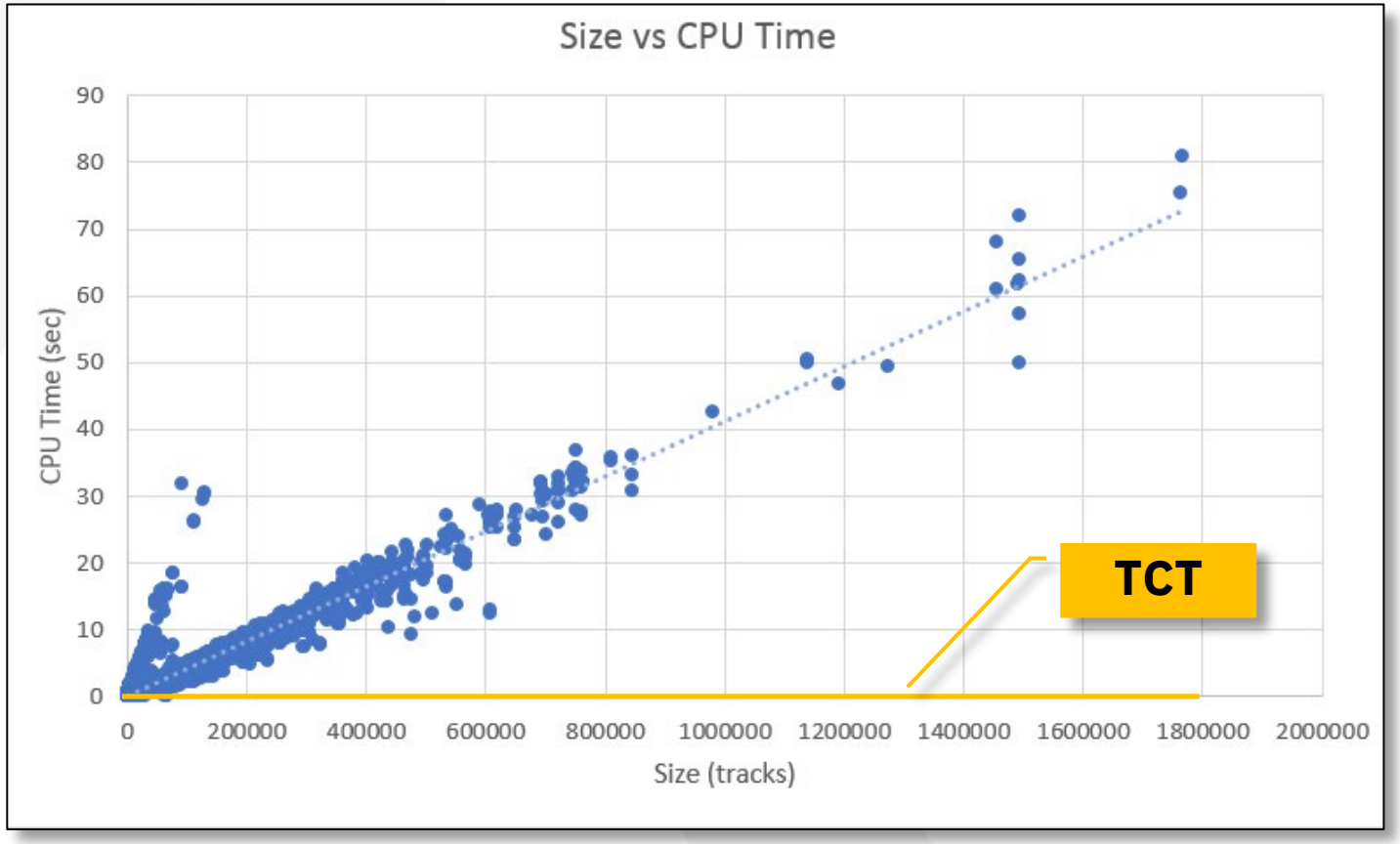
The new TCT functionality will become generally available with a 10.1.1 release which is targeted for 4Q2025.

Any customer currently using TCT with Release 10.0 should not update to a 10.1.0.x release.

Client ‘X’ Data Scatterplot

Scatterplot of CPU / Tracks for Primary Space Management

Excluded FSRs that didn’t move data:
RC > 0, Migration Reconnects



Remember, reduction is based on the size of the data being moved. Clients with mostly small data sets will see modest reductions.

Note: CPU times *will* vary:
https://www.ibm.com/support/knowledgecenter/SSLTBW_2.2.0/com.ibm.zos.v2r2.ieag200/cputvari.htm

Transparent Cloud Tiering (TCT) Highlights

- Supported in Simplex, Flashcopy, Metro Mirror, Global Mirror, MGM Environments
  - Includes support for Hyperswap
- DS8000 can target up to 8 different object store entities
  - S3 object stores (IBM Cloud, Amazon AWS, public and on-premise clouds)
  - TS7700 as an on-prem object store
- Secure Data Transfer – TLS1.2 and TSL1.3, AES256 bit encryption
  - Client-side encryption (key manager) supported for s3 clouds. 10.1 adds support for TS7700.

DFSMSdss: *"Reduce CPU by **up to 98%** for z/OS DFSMSdss full volume dump operations **of mod54 volumes or larger** using DS8000 Transparent Cloud Tiering."*

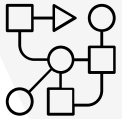
DFSMShsm: *"Customers have seen over **50%** MIPS reduction **using DS8000 Transparent Cloud Tiering**."*

- Object compression support for TS7700 targets. 10.1 adds support option for S3 (contact IBM for enablement)
- System Z TCT Applications:
  - DFSMShsm Automatic Dataset Migration by management class
  - DB2 Image Copies (Db2 Offline using DSS Flash copy and MIGRATE STORAGEGROUP
  - DSS Dataset Disk Backup for HSM storage groups
  - Native DSS Full Volume Dumps
  - Db2 System Level Backups using HSM
  - DFSMShsm managed DSS Full Volume Dumps

Transparent Cloud Tiering (TCT)

TCT evolves and with it the requirements from TS7700 products.

FC 5283 is mandatory to use TS7700 as an object cloud in TCT.



TCT is now more robust, No disruptions adding or removing clouds.

managecloudserver command from DSCLI is not longer needed.

TCT saves storage and gives more security.

TS7700 and S3 objects store can be Compressed and Encrypted

TCT has several general new improvements.

From Security vulnerabilities fixes to Performance Improvements

Transparent Cloud Tiering (TCT) – Feature Code 5283 is mandatory

Object replication is only handled inside TS7700 grid via FC 5283

- ✓ TS7700 grid must have FC 5283 (DS8K Grid Object Store feature) installed to be used in DS8K TCT
- ✓ FC 5282 (DS8K Object Store feature) is no longer supported (End of support)

TCT no longer requires connectivity to all TS7700 IPs in both CECs to validate TS7700 clouds

- ✓ Each CEC can have connectivity only to specific IPs and TCT will not fail
- ✓ Now TCT can be configured in network topologies different than all-to-all

Transparent Cloud Tiering (TCT)

managecloudserver command from DSCLI is no longer needed

User can issue cloud configurations without disturbing any working Cloud

- ✓ The user can create a new cloud without stopping ongoing operation in clouds already configured
- ✓ The user can remove an existing cloud without disturbing any other clouds in the system

DSCLI will continue accepting the command to maintain backwards compatibility

DS CLI

```
dscli> managecloudserver -action applypndgconfig
Date/Time: August 4, 2025 at 9:28:46 AM MST IBM DSCLI Version: 7.10.10.272 DS: -
CMUC00619E managecloudserver: The command managecloudserver is unsupported for code level 10.10 and higher.
dscli>
```

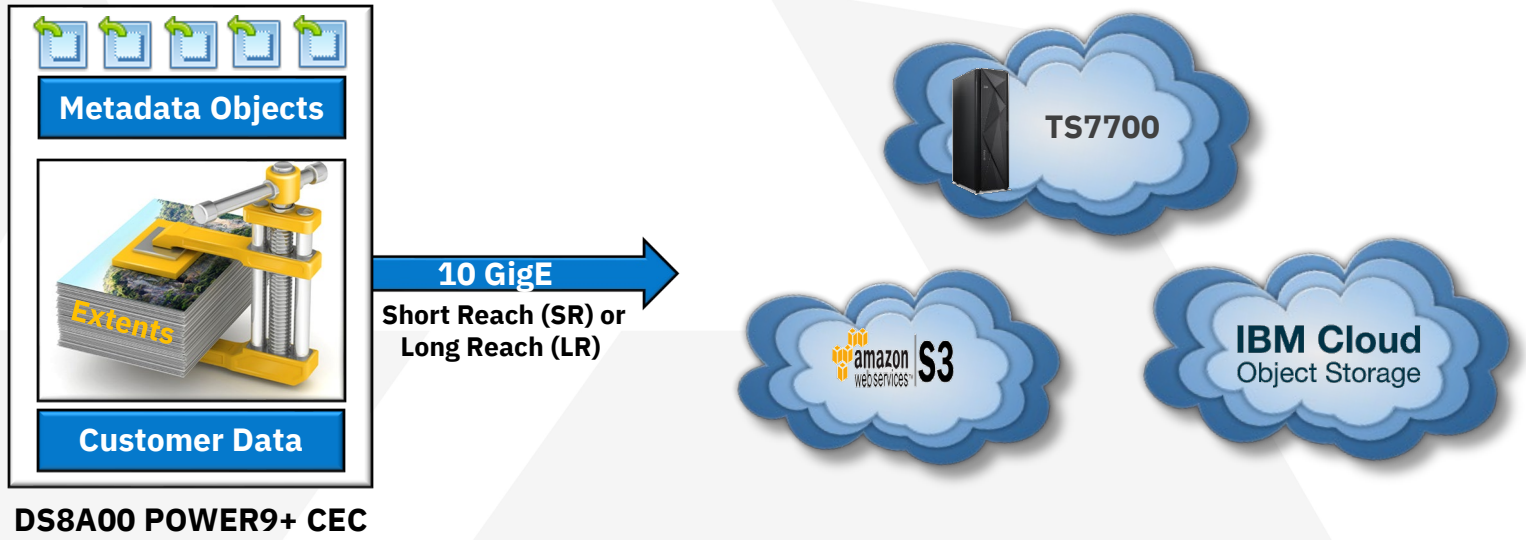
Transparent Cloud Tiering (TCT)

Compression is now available for S3 clouds

- ✓ Available with R10.1.1, no additional Feature Codes
- ✓ Only customer data is compressed and it only can be decompressed when the data is recalled to DS8A00

Same compression method as TS7700 clouds

- ✓ Powered by the NX842 hardware compression engine
- ✓ DFSMS controls the use of compression

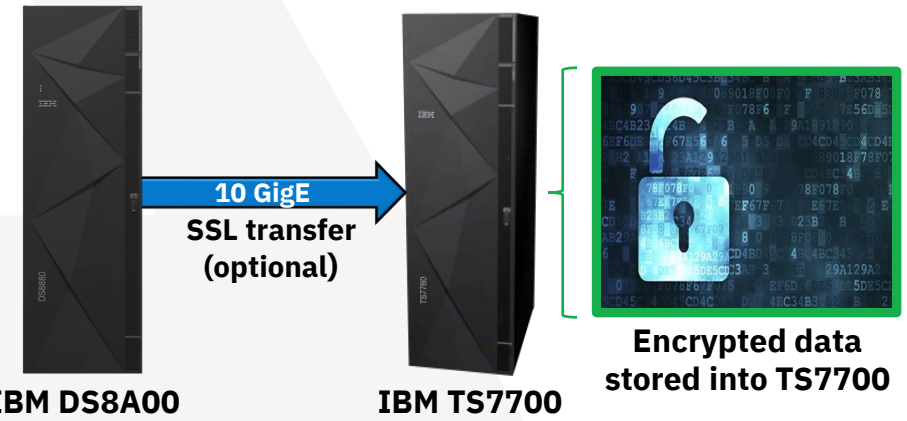


Transparent Cloud Tiering (TCT)

TCT data encryption enabled in TS7700 clouds

- ✓ "Client-Side encryption" – Customer data is stored encrypted and decrypted when recalled
- ✓ Requires an *External Key manager*
  - ➢ mkcloudserver must use –keygroupid flag
  - ➢ S3 and TS7700 can use the same Key manager/group
- ✓ DFSMS controls when to encrypt the data
- ✓ Secure Data transfer and TCT data encryption can be combined

Note: TCT data encryption is different than Secure Data Transfer (SSL, TLS)



Transparent Cloud Tiering (TCT)

General improvements

Security Fixes

- ✓ TCT removed security vulnerabilities associated to JAVA code

Performance improvement to TS7700 offload

rmcloudserver: CA/SS certificates can be removed from the system

- ✓ New -rmcerts flag added

mkcloudserver: User can avoid to exercise all the API linked to the cloud provider in the validation step - notest flag implemented

- ✓ New -notest flag implemented

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