

IBM z17 and LinuxONE Emperor 5 Technical Overview



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Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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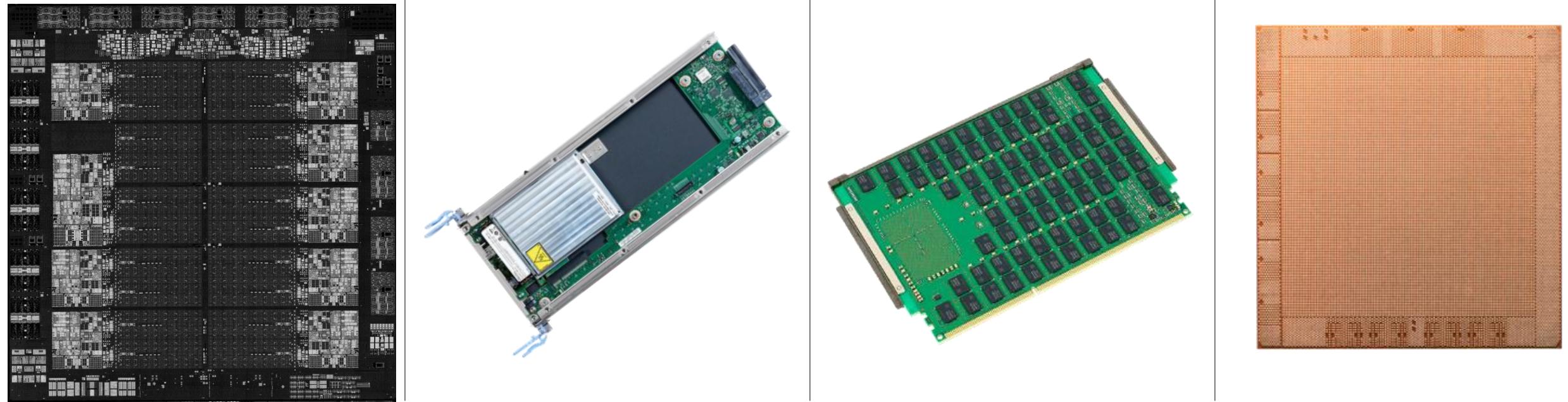
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IBM z17 Multi-frame and LinuxONE Emperor 5 Technical Overview



IBM LinuxONE 5

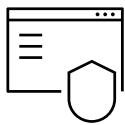


- End-to-end cyber security and privacy
- Optimized IT for energy and cost savings
- Built-in AI, engineered for better outcomes

Enabling security,
cost-efficiency, and
protected AI



IBM LinuxONE 5: Unlocking potential



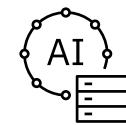
End-to-end cyber security and privacy

- Deploy confidential containers, built to protect your data and applications
- Address quantum-enabled cybersecurity risks with IBM's pioneering quantum-safe encryption
- Scale and unify your encryption across the enterprise



Optimized IT for energy and cost savings

- Optimize your data center efficiency, consolidating workloads to save energy and space, and other operational costs
- Lower total cost of ownership by consolidating workloads to on-premises accelerated computing
- Increase operational efficiency with industry-leading availability



Built-in AI, engineered for better outcomes

- Build AI models in hybrid cloud and collocate to inference with data and applications in a trusted execution environment
- Deploy multiple AI models designed to improve prediction accuracy and create intelligent applications with gen AI*
- Scale AI while optimizing energy efficiency

*Available 4Q2024 with IBM Spyre Accelerator



z17 versus z16

z16

- Machine Type: 3931
- 1 Model
 - A01
 - 1-4 standard 19-inch frames to align with today's data centers.
 - Top Exit I/O and/or Top Exit power options
- Processor Units (PUs)
 - Up to **200** Configurable Engines
- Up to 85 LPARs
- Memory – up to **40** TB
 - **256** GB Fixed HSA
- I/O
 - 85 Max Crypto Domains with up to 60 co-processors
 - 192 I/O Cards Max



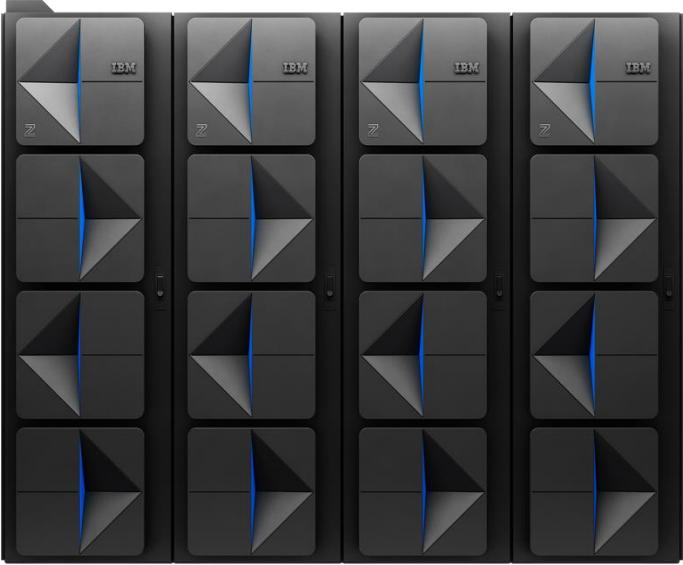
z17

- Machine Type: 9175
- 1 Model
 - ME1
 - 1-4 standard 19-inch frames to align with today's data centers.
 - Top Exit I/O and/or Top Exit power options
- Processor Units (PUs)
 - Up to **208** Configurable Engines
- Up to 85 LPARs
- Memory – up to **64** TB
 - **884** GB Fixed HSA⁶
- I/O
 - 85 Max Crypto Domains with up to 60 co-processors
 - 192 I/O Cards Max
 - **New I/O Adapters**

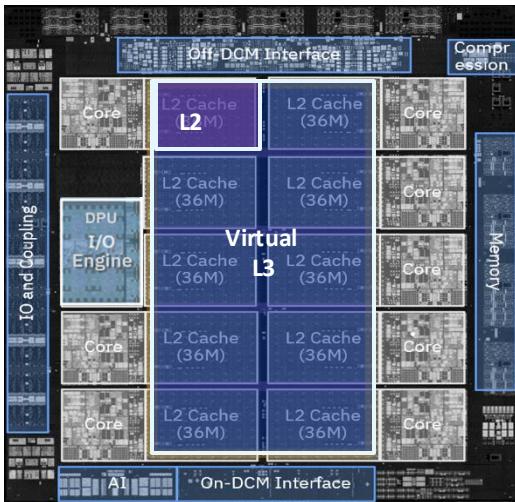


IBM z17 System Design Changes

- 5nm Silicon Lithography*
- 8 Cores per PU Chip design
 - +1 I/O Engine per chip - DPU
- Dual Chip Module packaging
- 4 PU DCMs per Drawer, up to four CPC drawers
- Integrated I/O with PCIe Gen5
- 2nd Gen IBM Accelerator for Artificial Intelligence (AIU) – on chip



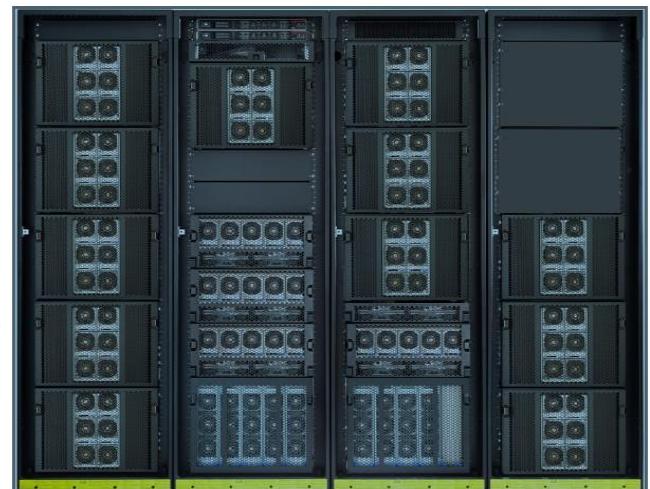
- Improved cache design
- Crypto Express8S (single/dual HSM)
- FICON Express32G (4 port)
- Network Express
 - Common Hardware for:
 - OSA/RoCE/Coupling LR
- IBM zHyperLink 2.0
- ICA SR 2.0
- Coupling Express3 Long Reach
- AI Spyre PCIe Adapter



CPC Drawer



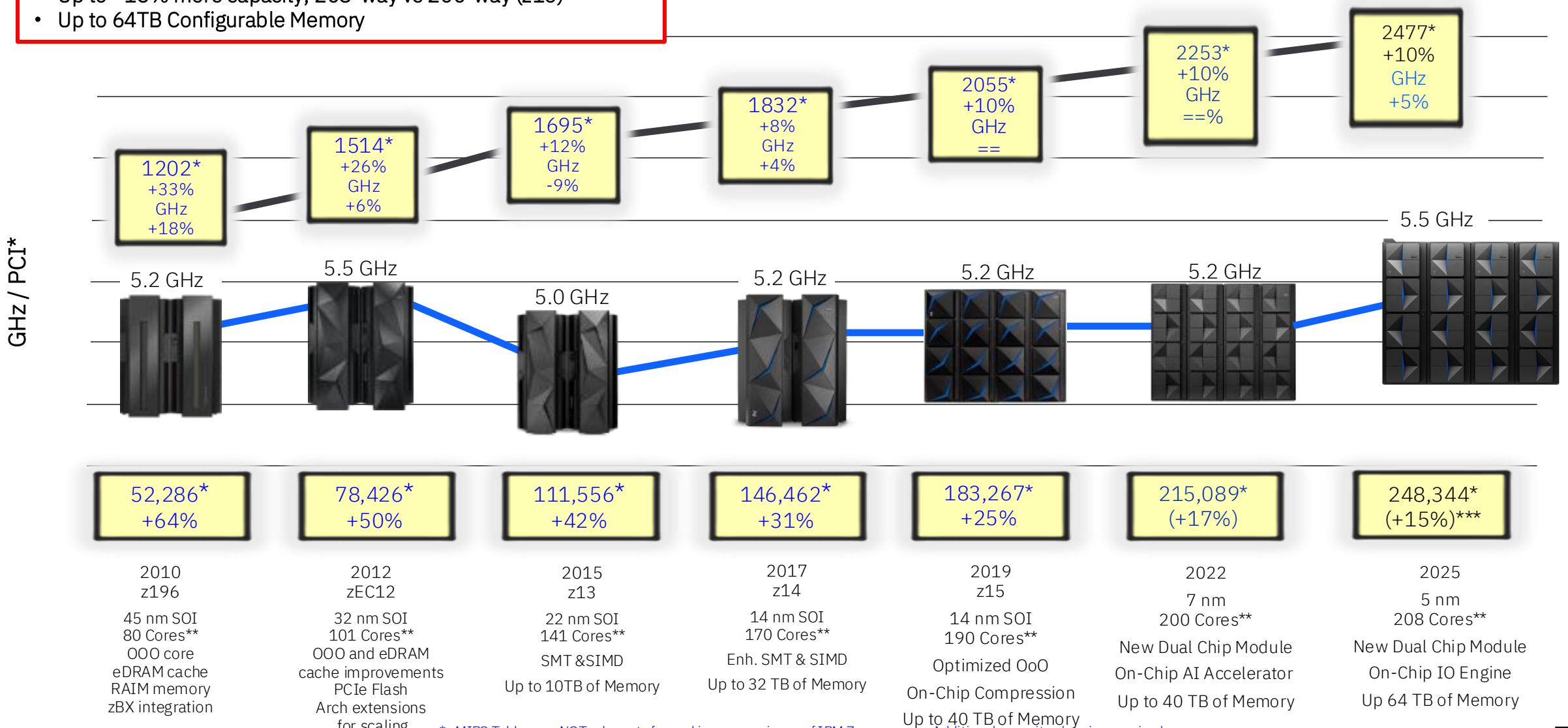
Back



Front

z17 continues the CMOS

- Up to ~15% more capacity, 208-way vs 200-way (z16)
- Up to 64TB Configurable Memory



ME1 Full and Sub-Capacity CP Offerings

CP Capacity – Relative to Full Capacity Uni

701 = 100% ≈ 2,477 PCI (IBM MIPS)

601 ≈ 66% ≈ 1,642 PCI

501 ≈ 41% ≈ 1,030 PCI

401 ≈ 12% ≈ 296 PCI

- Subcapacity CPs, up to 43 may be ordered.
If more CPs are ordered all must be full 7xx capacity.
- All CPs on an ME1 CPC must be the same capacity (except during Recovery Boost).
- All specialty engines are full capacity.

701-7K8

601-643

501-543

401-443

400 = 100% ICF and/or IFL only

7xx

6xx

5xx

4xx

MSU Sub Capacity

*Capacity and performance ratios are based on measurements and projections using standard IBM benchmarks in a controlled environment. Actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload.

Max43

Max90

Max136

Max183

Max208



IBM z17 Processor Design and Structure

CPC Drawer

CP Layout

- 8 CPs in 4 Dual Chip Modules (DCMs)
- Built on 5 nm technology
- Up to 2 PCIe Gen5 interfaces per CP
- Up to 1 memory controller per CP
- 1 Integrated Accelerator for AI per CP
- 1 zEDC Accelerator per CP
- 1 DPU per CP

Fanouts

- 12 PCIe slots for both I/O fanouts and ICA 2.0 SR Coupling links

Memory

- 8 4U DDR4/DDR5 DDIMMs per Memory Controller
- Max 48 DIMMs per CPC Drawer

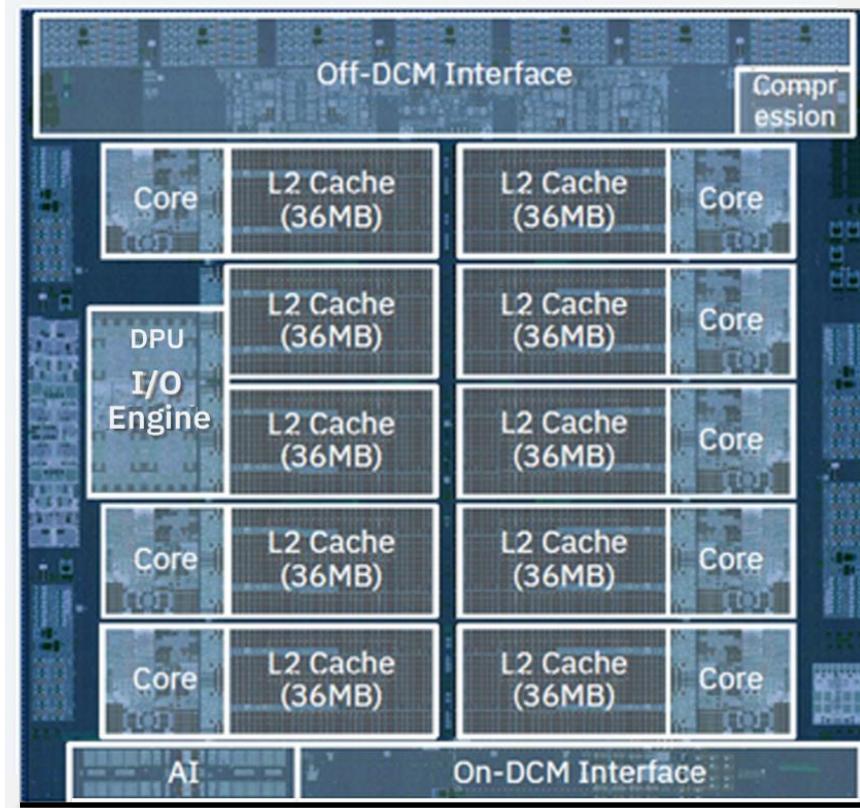
Rear



Front



8-Core Telum II Processor Chip



5nm 5HPP Technology

- 8 cores per CP
- 1 IO Engine
- 24.1 Miles of wire per chip (5.3 more miles than z16)
- ~23 mm x 22 mm
- 31.0B transistors (7.5B more than IBM z16)

- 8 processor chips per CPC Drawer in 4 DCMs
- Up to 8 active cores per chip
- One DPU per chip
- One Integrated Accelerator for AI on every Telum II chip
- **On-Core L1 Cache**
 - Private 128K L1I and 128K L1D
- **On-Core/Chip L2 Cache**
 - Each core has access to a private 36 MB cache
 - Up to 18 MB of each cache can be used by other cores as virtual cache depending on the current activity
 - L2 cache of an inactive core becomes shared virtual L3 cache by the active cores of the chip
 - L2 cache of an inactive core of another CP can become virtual L4 cache
- **I/O buses**
 - Each CP chip will support up to 2 Gen-5 PCIe buses

Dedicated low-latency Integrated Accelerator for AI

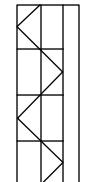
Centralized on-chip accelerator shared by all cores



With IBM z17, process up to 5 million inference operations per second with less than 1ms response time using a Credit Card Fraud Detection model



Very low and consistent inference latency and scalable capacity



New Function with the z17

- Transform function between different data layouts/types
- Gaussian Error Linear Unit function
- NNPA instruction can be dispatched to any available accelerator in a drawer

Every CP chip has one Integrated Accelerator for AI built-in



9175 ME1 Processing Units

Offering	Feature Code Description	Chips/CPs	Dual Chip Modules	IFLs/uIFLs	zIIPs uzIIPs	ICFs uICFs	Std SAPs	Std. Spares	IFP
ME1	Max43	8 0-43	4	0-43 0-42	0-42 0-41	0-43 0-42	5	2	2
	Max90	16 0-90	8	0-90 0-89	0-89 0-88	0-90 0-89	10	2	2
	Max136	24 0-136	12	0-136 0-135	0-135 0-134	0-136 0-135	16	2	2
	Max183	32 0-183	16	0-183 0-182	0-182 0-181	0-183 0-182	21	2	2
	Max208	32 0-208	16	0-208 0-207	0-207 0-206	0-208 0-207	24	2	2

1. At least one CP, IFL, or ICF must be purchased in every machine.
2. The IFP is conceptually an additional, special purpose SAP – used by PCIe I/O features and some other functions.
3. Additional SAPs have been dropped



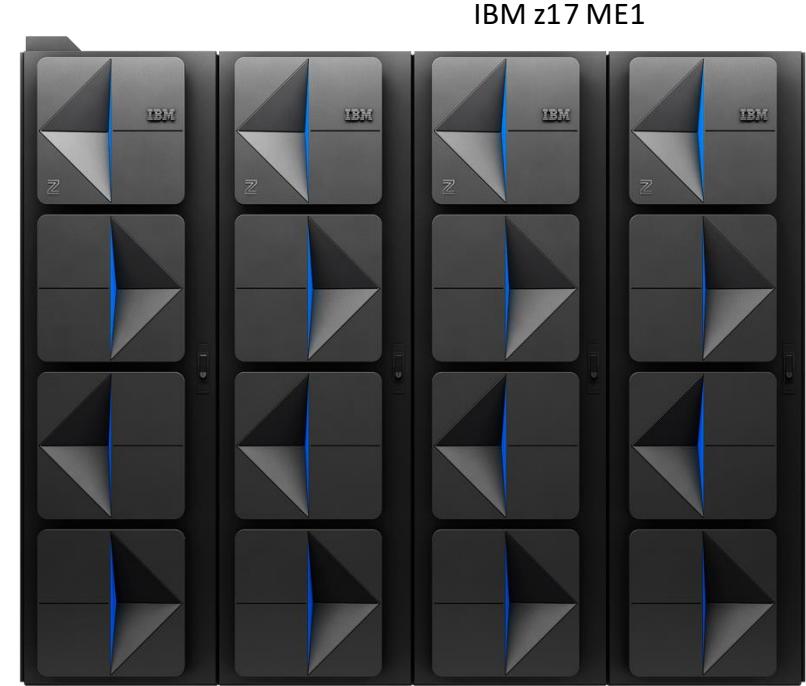
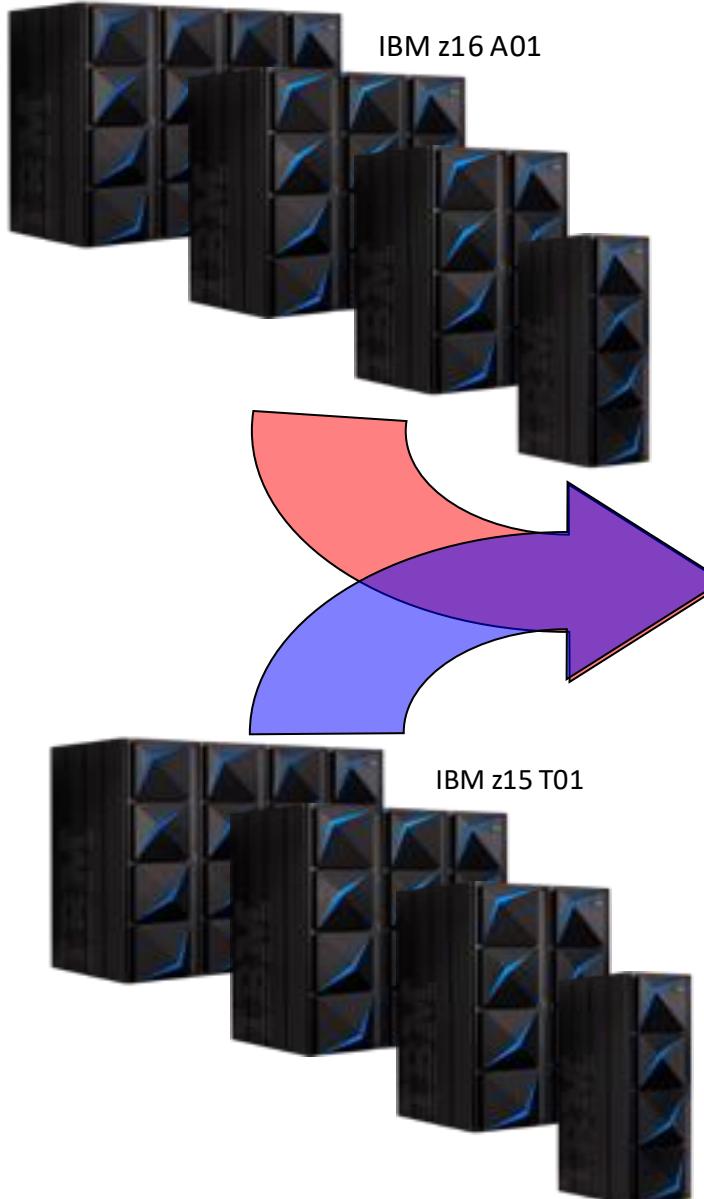
9175 ML1 Processing Units

Offering	Feature Code Description	Chips/ CPs	Dual Chip Modules	IFLs/ uIFLs	Std SAPs	Std. Spares	IFP
ML1	Max43	8 0-1	4	1-43 0-42	5	2	2
	Max90	16 0-1	8	1-90 0-89	10	2	2
	Max136	24 0-1	12	1-136 0-135	16	2	2
	Max183	32 0-1	16	1-183 0-182	21	2	2
	Max208	32 0-1	16	1-208 0-207	24	2	2

1. At least one IFL must be purchased in every machine.
2. The IFP is conceptually an additional, special purpose SAP – used by PCIe I/O features and some other functions.
3. Additional SAPs have been dropped



IBM z17 System Upgrades*



- IBM z17 to IBM z17 model upgrades
 - IBM z17 ME1 Max43 to Max90, Max136
 - No field upgrade to Max183 or Max208 (these features are Factory built and shipped only).
 - ***Additional I/O Drawers can be added based on available space in current frames and/or I/O expansion frames***
- Any IBM z15 T01 (8561, all models) to any IBM z17 (frame roll)
- Any IBM z16 A01 (3931, all models) to any IBM z17 (frame roll)

IBM z17 Memory

IBM z17 memory considerations

Offering	Feature	Min	Max
ME1/ML1	Max43	512 GB	16 TB
ME1/ML1	Max90	512 GB	32 TB
ME1/ML1	Max136	512 GB	48 TB
ME1/ML1	Max183	512 GB	64 TB
ME1/ML1	Max208	512 GB	64 TB

- An additional **884 GB** of memory is reserved above the customer purchase amount for the Hardware System Area (HSA)
- DIMMs **include RAIM overhead**
- RAIM design implemented to improve RAS

- Concurrent memory upgrades via licensed internal code (LICC) are available at several capacity levels.
 - DDR4 Memory DIMMS (32, 64, 128 GB)
 - DDR5 Memory DIMMS (32, 64, 128, 256, 512 GB)

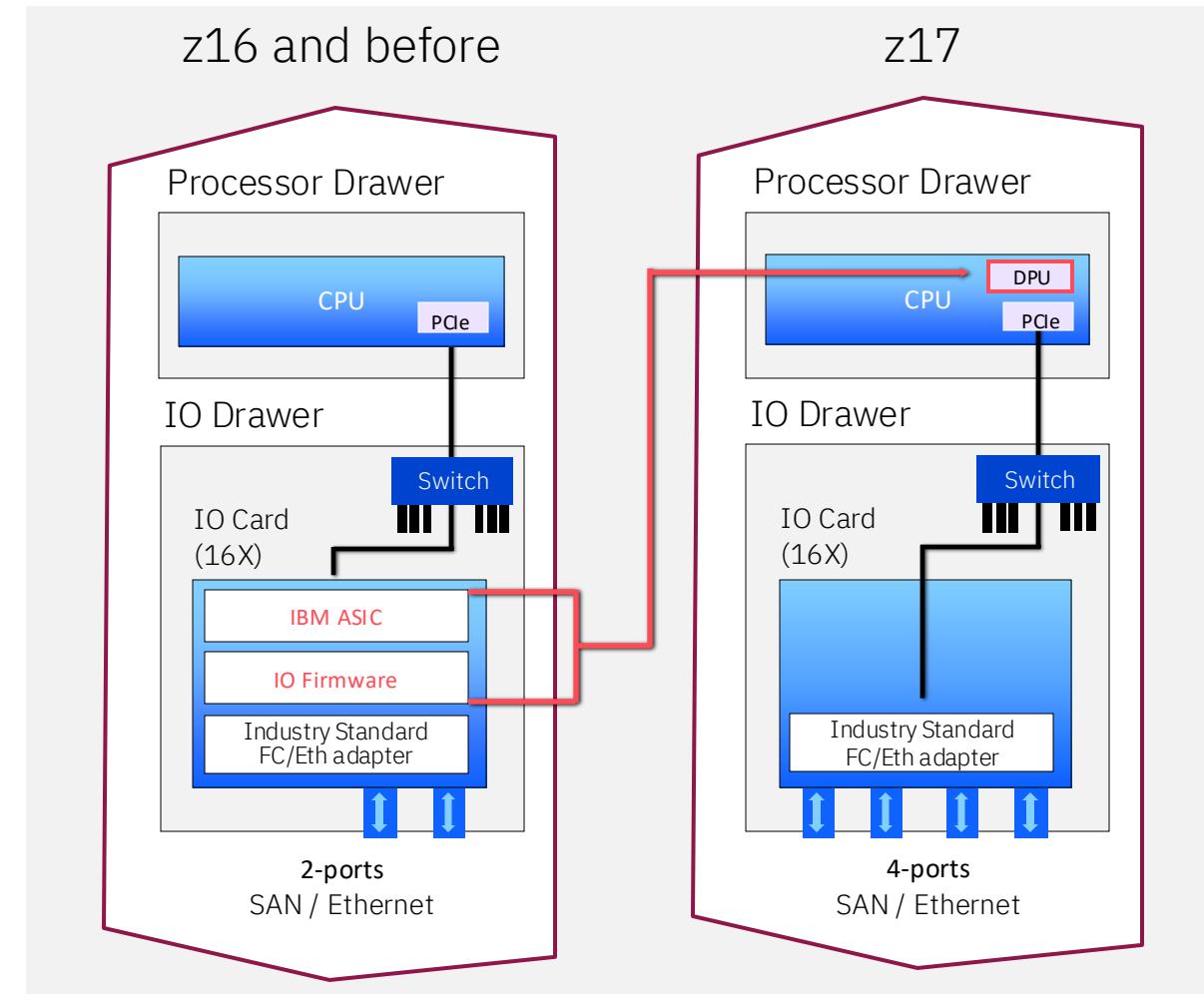
IBM z17 New Features and Functions

Next-gen I/O Infrastructure

The I/O firmware stack has evolved on ASICs platforms over the past 30 years. In our next-gen system, we are pulling that I/O ASIC functionality, across the PCI bus, and into the mainframe processor chip – much like the on-chip AIU engine in IBM z16, and the on-chip compression acceleration engine in IBM z15.

This will allow IBM Z® to:

- Provide better I/O RAS
- Use higher I/O density (4-port FICON® cards and converged network adapter)
- Be agile in delivery of new I/O feature function every generation. We always put out a new processor chip, so we get a chance to innovate on the I/O each time, versus once every ~10 years



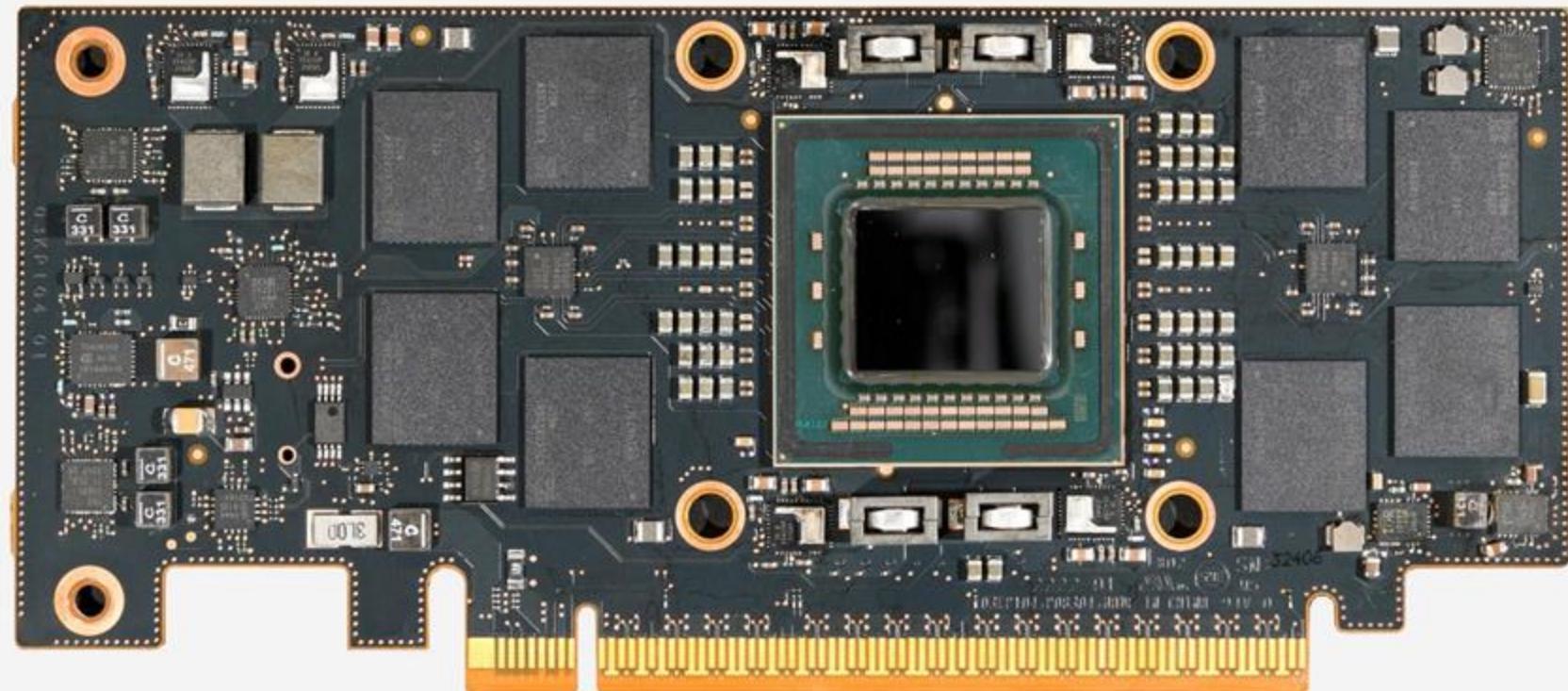
IBM Spyre Accelerator PCIe attached card

- 75W PCIe gen5 x16 adapter
- 128GB of LPDDR5 memory
- 300+ TOPS
- Up to 8 cards per I/O drawer
- Generative AI: 8 cards form a logical cluster
- 1TB of aggregate memory
- 1.6TB per second aggregate memory bandwidth



IBM Washington
Systems Center

Designed to handle Large Language Models
and Generative AI use cases



Supported I/O features



New Build I/O Features

Description	Feature Code	Ports	Max Features	Comments - CHPID Types (FID Types)
ICA SR2.0	NEW 0216	2	48	CS5
Coupling Express3 LR 10GB	NEW 0498	2	64	CL5
Coupling Express3 LR 25GB	NEW 0499	2	64	CL6
Network Express SR 10G	NEW 0524	2	48	OSH, (NETH)
Network Express LR 10G	NEW 0525	2	48	OSH, (NETH)
Network Express SR 25G	NEW 0526	2	48	OSH, (NETH)
Network Express LR 25G	NEW 0527	2	48	OSH, (NETH)
OSA-Express7S 1.2 GbE SX	0455	2	48	OSD, OSC
OSA-Express7S 1.2 GbE LX	0454	2	48	OSD, OSC
OSA-Express7S 1.2 10GbE SR	0457	1	48	OSD
OSA-Express7S 1.2 10GbE LR	0456	1	48	OSD
OSA-Express7S 1.2 25GbE SR	0459	1	48	OSD
OSA-Express7S 1.2 25GbE LR	0460	1	48	OSD

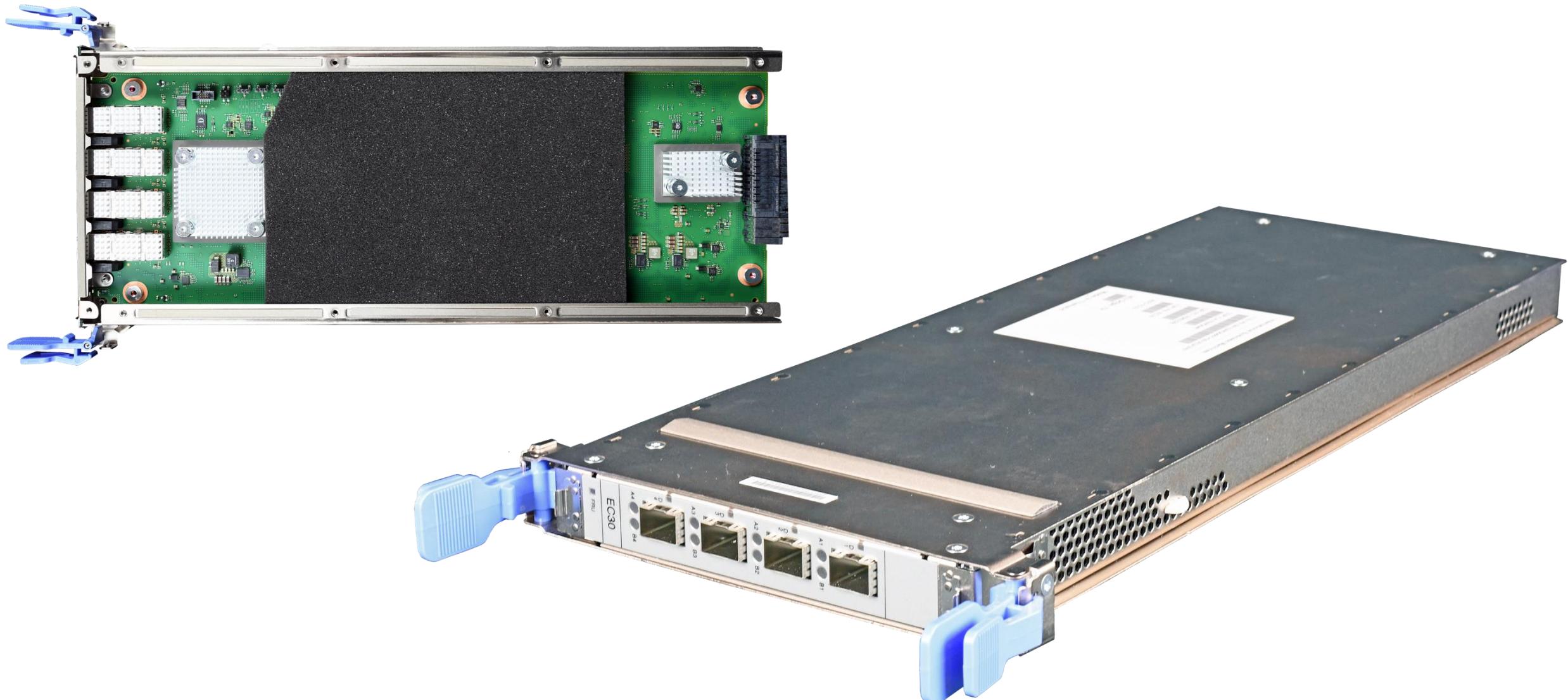


New Build I/O Features

Description	Feature Code	Ports	Max Features	Comments- CHPID Types
zHyperLink Express2.0 NEW	0351	2	16	HYL
Crypto Express8S (1 HSM)	0909	N/A	16	
Crypto Express8S (2 HSM)	0908	N/A	30	
IBM Adapter for NVMe 1.1	0448	N/A	16	(NVMe) customer supplied NVMe
IDAA Internal Storage - 15TB NEW	0528	N/A	16	(NVMe) IBM supplied NVMe LinuxONE Only
Reserved Spyre (AI Adapter) NEW	0061	N/A	48	Sets of 8
FICON Express32-4P LX NEW	0387	4	96	FC, FCP
FICON Express32-4P SX NEW	0388	4	96	FC, FCP

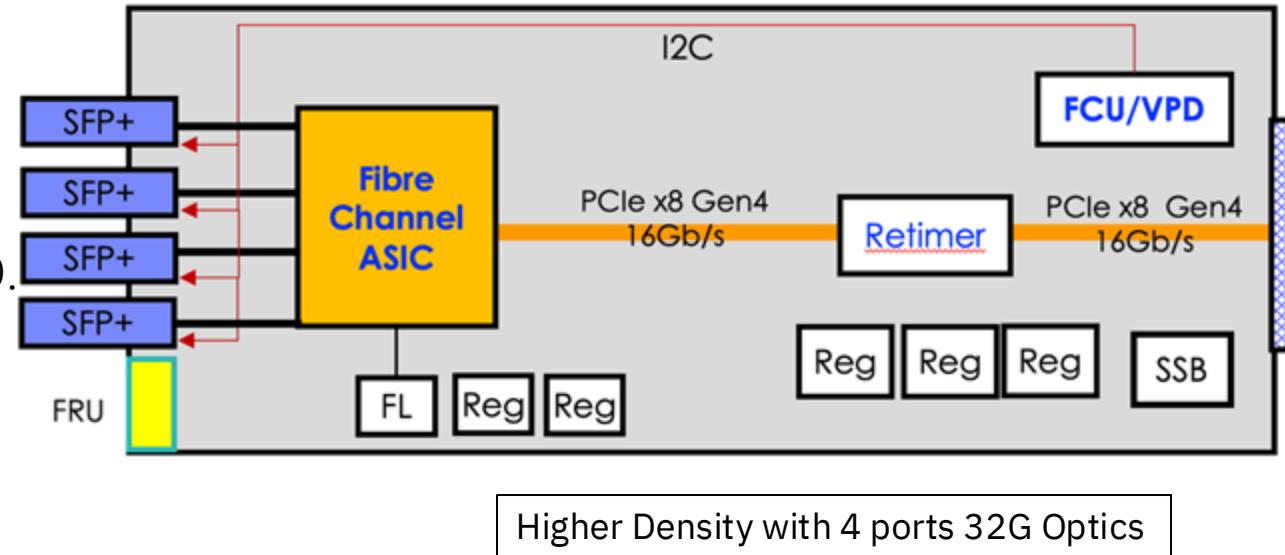


FICON



FICON Express32-4P

- For FICON®, zHPF, and FCP
 - Order on IBM z17
 - FC 0387 (LX) & 0388 (SX)
 - CHPID types: FC and FCP
 - The card has 4 ports, each of which is a PCHID.
 - The PCHIDs are managed by the DPU.
- Auto-negotiates to 8, 16 or 32 Gbps
 - 4 Gbps connectivity not supported for point to point connections
- IBM Fibre Channel Endpoint Encryption
 - Enables IBM Fibre Channel Endpoint Encryption (aka EDiF)
 - No Charge Feature
- Concurrent repair/replace of small form factor pluggable (SFP) optics
 - Port components can be replaced instead of the entire adapter
 - 10KM LX – 9-micron single mode fiber
Unrepeated distance - 10 kilometers (6.2 miles)
 - SX: 50- or 62.5-micron multimode fiber
Distance variable with link data rate and fiber type



All distances are measured point to point or actual distance (not 'paid' distance)

Qualified 3rd-party FICON switches

Partner	FICON Switches Supported		Firmware Supported
	Broadcom Name	IBM Name	
Broadcom/ Brocade	X7-8	SAN512B-7	FOS 9.1.1d
	X7-4	SAN256B-7	
	G720	SAN64B-7	
	7850	SAN42B-R7	FOS 9.2.0c1
Cisco Name		IBM Name	NX-OS 9.4(1a)
Cisco	MDS 9710	SAN384C-6	
	MDS 9706	SAN192C-6	
	MDS 9220i	SAN16C-R	

Note: for up-to-date hardware support and service dates, please visit the End-of-Life pages for [Cisco](#) and [Broadcom](#).



End-to-end solution for data-in-flight protection

IBM Fibre Channel Endpoint Security enables FICON or Fibre Channel Protocol (FCP) Links

Challenges	Customer Value
<ul style="list-style-type: none">• Encrypt all data in-flight by corporate directive• Protect the integrity and confidentiality of data in-flight	<ul style="list-style-type: none">• Gain confidence that all data flowing within and across data centers is traveling between trusted entities• Ensure ability to provide auditable information verifying that customer data is only accessed by trusted IBM Z and storage devices• Use on all IBM Z operating systems• New Statement of Direction<ul style="list-style-type: none">– Given the increasing importance of providing the highest level of data protection to IBM Z clients, IBM intends to require the use of IBM Fibre Channel Endpoint Security for all FICON connected devices starting with the release of IBM z17+1. This direction will require investment by IBM Infrastructure teams, FICON storage vendors and IBM Z clients as an important step towards continuing to secure the most mission critical workloads. In support of this direction, all new FICON-connected storage systems introduced after December 31, 2024, will be required to support IFCES to connect to z17+1.



* Not Official Language

IBM z17

Networking Options



Networking updates and strategy

- The introduction of the Network Express adapter on IBM z17 will enable converging of legacy OSA and ROCE into one hardware offering
- The OSH CHPID type will support all legacy functions available with OSD, utilizing enhanced QDIO (EQDIO) architecture (CHPID type OSH) for OSA-style I/O.
 - OSH CHPID not supported in z/OS 2.4 and earlier releases nor z/VSE
 - OSA Express7S 1.2 adapter is available on the IBM z17
 - Customers who require the legacy QDIO architecture (CHPID type OSD) must use OSA-Express7S 1.2 adapter.
 - CHPID type OSC requires a OSA Express7S 1.2 GbE SX/LX
 - CHPID type OSE will not be supported on IBM z17 generation
 - 1000Base-T copper SFP is no longer supported on IBM z17 generation.



Networking Summary

How to determine how many Networking Express ports to order?

- Order at least the number of ports equal to the greater of:
 - Current number of OSA ports
 - Current number of RoCE Ports

[z/OS 2.5 and Higher](#)
[z/VM 7.3 and Higher](#)

For general Networking:

- Use Networking Express Adapters for 10/25 GbE communication
 - CHPID: OSH

For OSA-ICC communication:

- Use OSA Express 7S 1.2 GbE
 - CHPID: OSC

For SMC-R communication:

- Use Networking Express Adapters for 10/25 GbE communication
 - FID: NETH
 - z/OS only
 - Recommended to limit SMC-R to 16 VFs per port
 - Must use the same PCHID as the paired OSH

[z/OS 2.4 or lower](#)

For general Networking:

- Use OSA Express 7S 1.2 10/25/GbE
 - CHPID: OSD

For OSA-ICC communication:

- Use OSA Express 7S 1.2 GbE
 - CHPID: OSC

For SMC-R communication:

- Use Networking Express Adapters for 10/25 GbE communication
 - FID: NETH
 - Recommended to limit SMC-R to 16 VFs per port

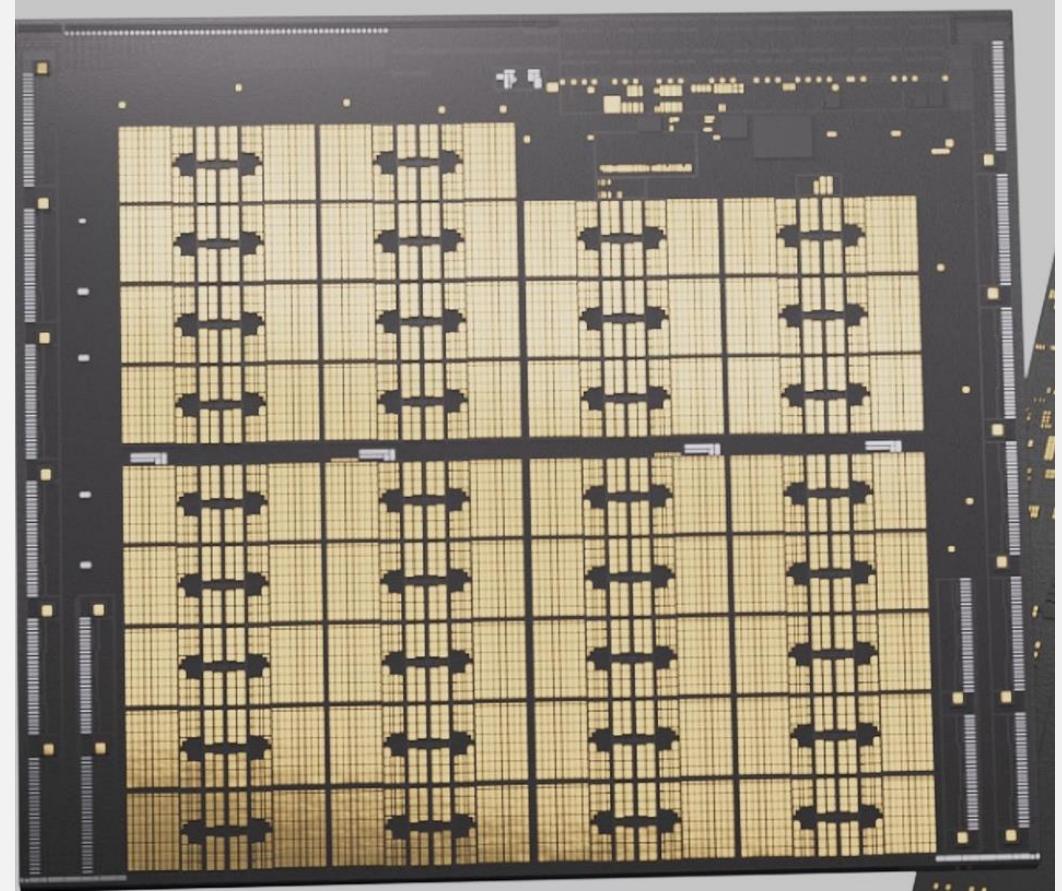
[Linux](#)

For general Networking:

- Use Networking Express Adapters for 10/25 GbE communication
 - FID: NETH
 - Limited to 127 VFs per port



IBM z17 Artificial Intelligence Enhancement Spyre Accelerator

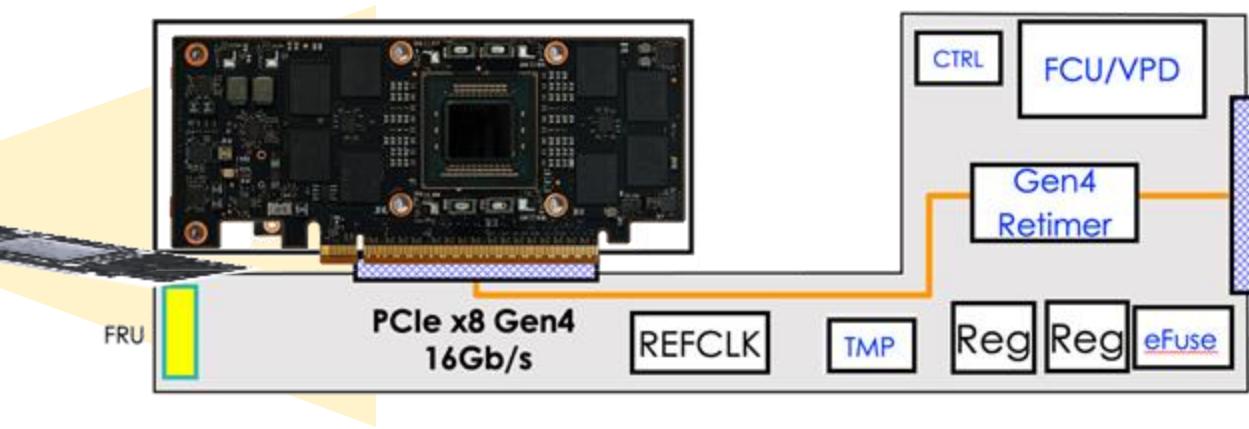


z17 PCIe attached AI accelerator placements

Frame C
3 IO drawer

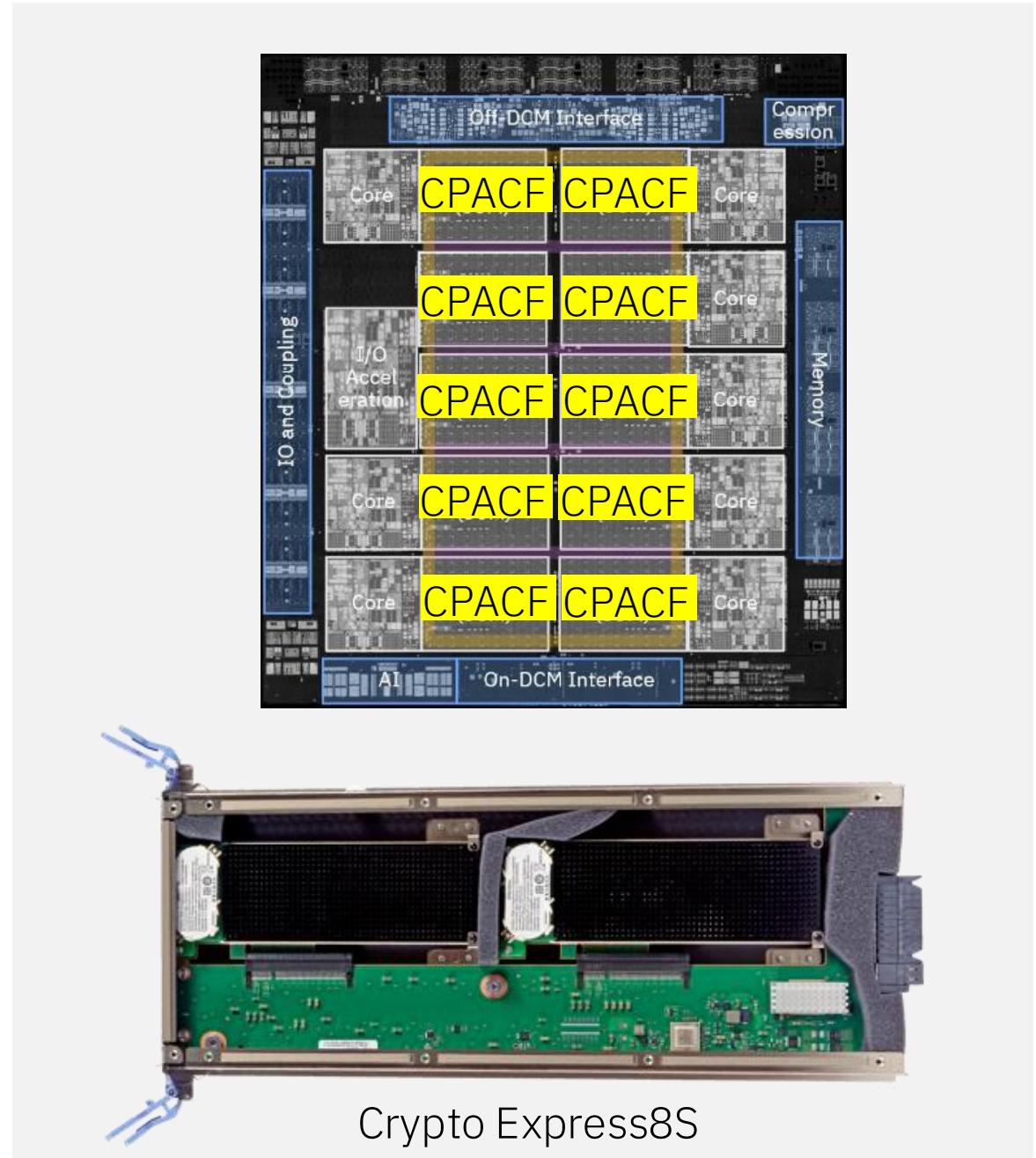
Frame B
3 IO drawer

Frame Z
5 IO drawer



- Minimum 8 adapters
- Adapters are spread out across the fewest IO drawers due to power and cooling impacts
- Max of qty (8) AI accelerators in a single IO drawer
- Max of 48 total AI accelerators
- Qty (48) accelerators could be split in as little as 6 IO drawers

Cryptography



Crypto Express8S

- Supports up to 60 HSMs each 85 domains
- Max of 16 for FC 0909 for Single HSM
- Max of 30 (60 HSMs) for FC 0908 for Dual HSM
 - Dual HSM cards provide additional HSM scalability and reduced physical card footprint
- Up to 5100 Virtual HSMs
- Designed for Compliance with **FIPS140-2 Level 4**, PCI HSM and Common Criteria EAL4+

Features and functionality:

- Quantum-safe support with APIs and Hardware acceleration
- Automated Toggle off/on following MCL install
- **New** CCA 8.2 adds support for crypto features
- **New** CCA 8.3/8.4 will add support for two of the first NIST standardized high performance post quantum cryptographic algorithms

- Crypto Express7S may be carried forward or decremented
- 3 different operational modes:

Accelerator		CCA Coprocessor		EP11 Coprocessor	
TKE	N/A	TKE	OPTIONAL	TKE	REQUIRED
CPACF	NO	CPACF	REQUIRED	CPACF	REQUIRED
UDX	N/A	UDX	YES	UDX	NO
CDU	N/A	CDU	YES (Seg3)	CDU	NO

Clear Key RSA operations and SSL acceleration

Secure Key crypto operations

Secure Key crypto operations



Trusted Key Entry (TKE) and TKE LIC

10.0 LIC is minimum level required if you choose to use the TKE to manage a Crypto Express8S Hardware Security Modules (HSMs). TKE 10.1 is will be available with IBM z17.

New with TKE 10.1 with IBM z17

- New smart card part (03GN391):
 - Needed because the CHIP for the current SC (00RY790) has gone End-of-Life
 - Needed to exploit new TR31 operational key feature. (Very few users)
- New Smart Card Utility Program (SCUP)
 - Changes to methods used to interact with smart cards.
 - New GUI experience. Also, some white smart card (SC) limitations
 - Can't use a white CA or MCA smart card to initialize a SC, unblock a PIN, enroll an SC in an alternate zone, or enroll the TKE's HSM in a zone.
 - **RECOMMENDATION:** With Old SCUP, use the backup CA or MCA function to create a backup onto any version of BLUE smart card.
 - The CA applet on a blue smart card must be at applet version V0.10.
 - **RECOMMENDATION:** Replace all white smart cards with blue smart cards. Copy existing content to blue smart cards when appropriate.
 - New Load All new master keys experience. Less clicks. Select all 1st, 2nd, or 3rd key parts from the reader at the same time.

Description	FC	Comments
TKE 10.1 LIC	0883	Crypto Express6S
TKE 10.0 LIC	0882	Crypto Express7S
		Crypto Express8S - NEW
Workstation Rack	0057	New. Includes 4770 HSM
Workstation Tower	0058	New. Includes 4770 HSM
4770 TKE Crypto Adapter/HSM	0851	Loose piece adapter to convert older TKE workstations. 0851 added automatically for carry fwd
Smart Card Reader	0886 0885 0891	New Build Carry Forward Carry Forward
Additional smart cards	0889 0892 0900	New Build Carry Forward Carry Forward
TKE rack mount	0085/0 087	Carry Forward
TKE Tower	0086/0 088	Carry Forward
Rack KMM	0156	NB & Carry Forward
Table Top KMM	0157	NB & Carry Forward
Client KMM	0190	NB & Carry Forward

What is **not** offered on z17 (MT 9175)?

- Crypto Express6S
- FICON Express16S+
 - LX,SX (4/8/16 GbPS)
- OSA Express7S 1.2
 - 1000BaseT
- OSA Express6S
 - 1 port (10G, 25G) and 2 port (1G)
- OSA CHPID Type OSE
- RoCE Express3
 - 2 port SR/LR (10/25GbPS)
- 10GbE RoCE Express 2.1 / 2.0
 - 2 port SR (300M; 10GbPS)
- 25GbE RoCE Express 2.1 / 2.0
 - 2 port (25GbPS)
- ICA-SR 1.1
- ICA-SR
- zHyperlink™ Express
- zHyperlink Express 1.1
- Coupling Express2 LR CL5
 - 2 Port LR (10km; 10 Gb/PS)

Parallel Sysplex®

IBM z17 CFCC Level 26

The IBM z17 can connect with coupling links to the following servers:

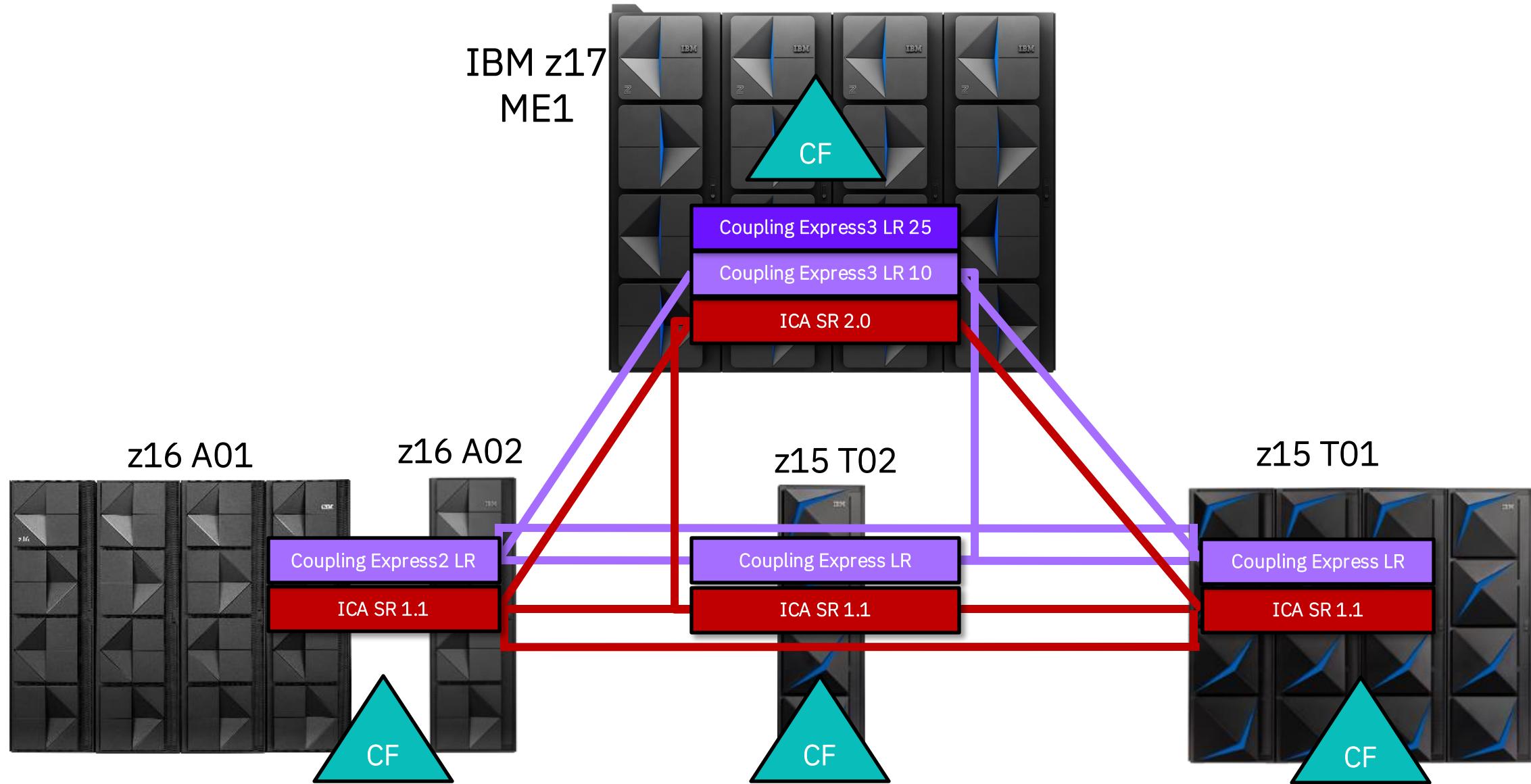
z16 (3931/3932) at Driver 51

z15 (8561/8562) at Driver 41

See the Driver Exception Letter for service levels

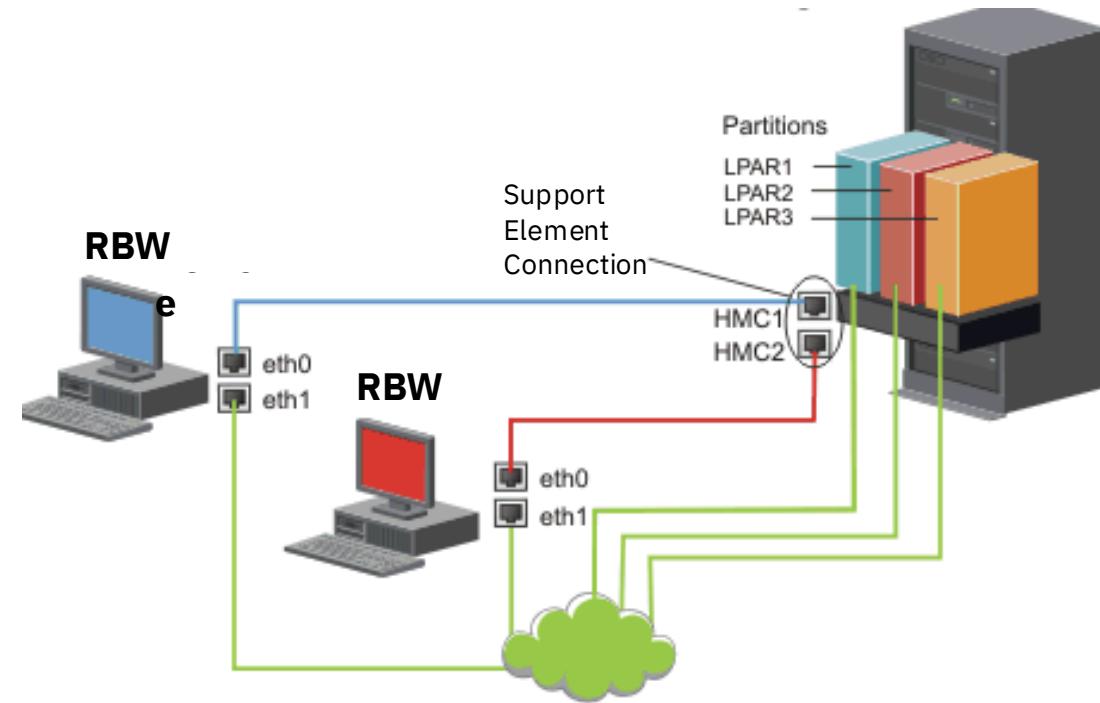


IBM z17 coupling connectivity



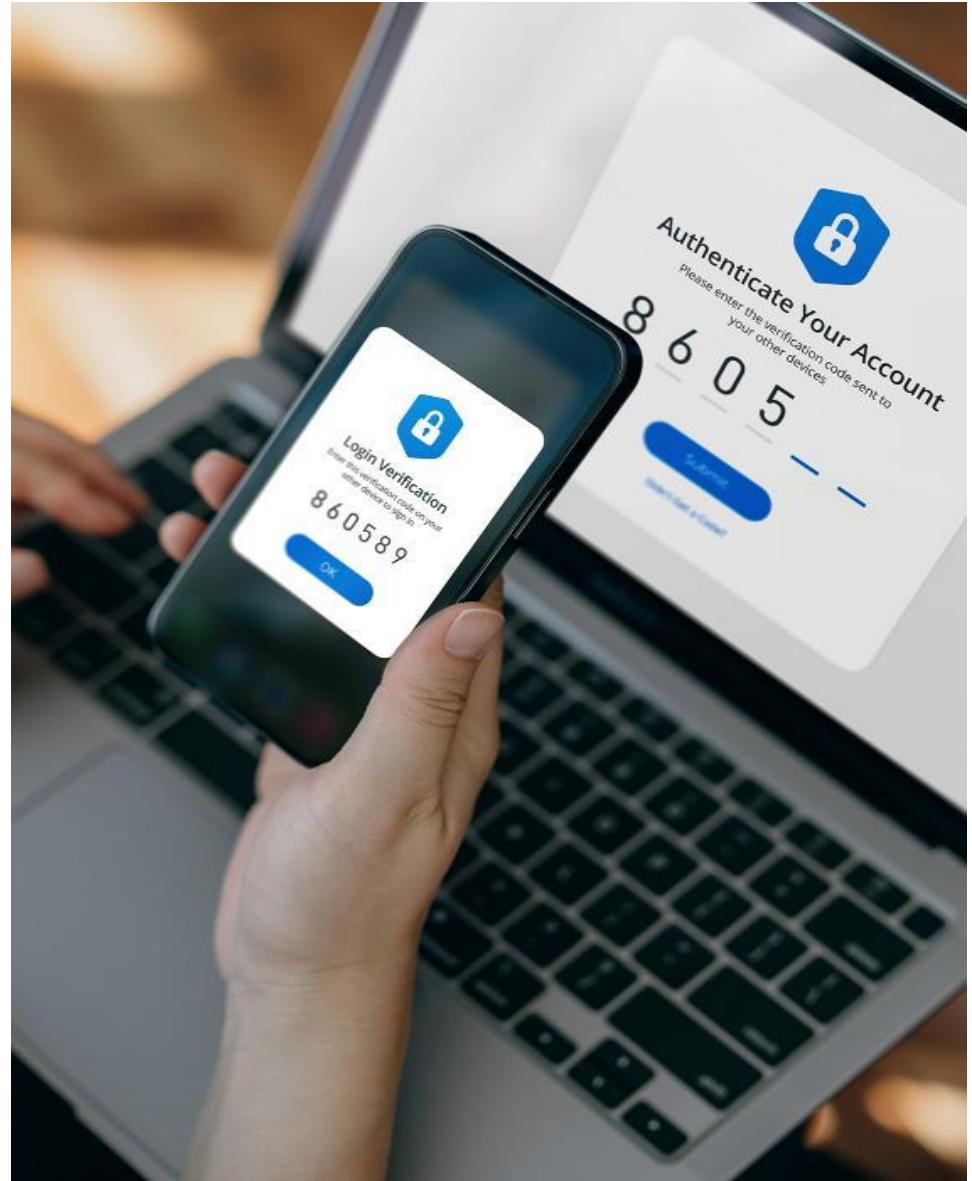
IBM z17 Multi-frame

HMC/SE



HMC Dual Control

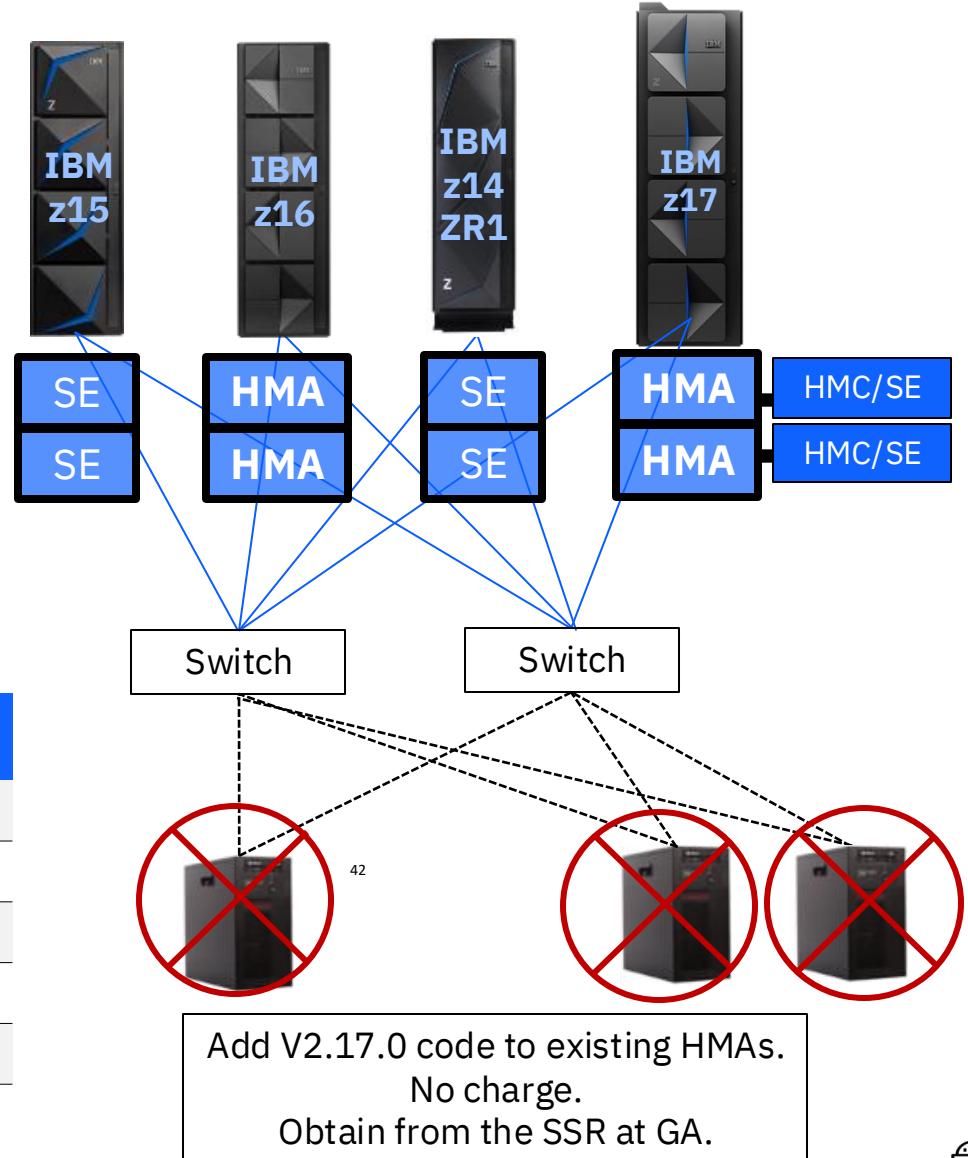
- Dual Control is in response to feedback that a single HMC user is no longer adequate to support client security policy.
 - Protect against malicious insider attacks
 - Protect against user actions mistakes
- The HMC solution will address providing a second user authorization of a requested action of a different user and reviewing the selections actions for correctness.
- This optional Dual Control will be provided for disruptive tasks and Crypto related settings
 - User would make all selections for a given Dual Control task
 - Real time notification for Authorization User Review/ Confirm request



Hardware Management Appliance (HMA)

- The HMC code runs as an appliance on two high performance top-of-rack servers
- HMCs are peers and support data replication
- The HMA can be on the IBM z17, z16, or z15
- One HMA feature code provides two HMAs
- Logon to HMC remotely from your browser
- Logon to Support Element from the HMC
- FC 0355 (new feature code, optional)
 - No external HMCs
 - MES available for HMA

Machine Family	Machine Type	Firmware Driver	SE Version
z17 ME1	9175	61	2.17.0
z16 A02	3932	51	2.16.0
Z16 A01	3931	51	2.16.0
z15 T02	8562	41	2.15.0
z15 T01	8561	41	2.15.0



Power and Cooling

Utility Power and connections

- Power Estimation Tool
- Similar to previous systems, a web-based Power/Weight Estimation Tool will be available via IBM Systems Hardware website
 - The tool does not verify that the specified configuration can be physically built
 - Tool provides the estimated system power consumption based on the provided system configuration. It is meant for installation planning purposes
 - **Inputs:** CPC config, iPDU/BPA, Line voltage, Temp/Alt, Memory capacity, VFM, Flexible memory, I/O cards, etc.
 - **Outputs:** Utility Power, heat load, phase currents, exhaust air temps, system airflow, weights (many given by frame)
 - Exact system power consumption may vary somewhat based on a variety of factors (e.g., system workload, etc.)
 - Power is calculated for each line cord pair on a per phase basis
 - **New** Carbon Footprint calculation
 - Note: actual system power consumption can be confirmed using the HMC Monitors Dashboard task or through the secure HMC REST interface.



Client Supported Power Line Cords (3-phase only)

- *New*, starting with z17, only connectorized line cords are provided as part of standard ordering.
- If cut-end line cords are required, please consult IBM Sales for special ordering provisions.

Geography	Rated Current	Rated Voltage	Voltage Configuration	Line Cord Connector	Customer Plug	PDU Feature Code	Line Cord Feature Code	Note
NA & Japan	60A	250V	Delta	Amphenol	IEC-309 460P9W/ HBL460P9V05	0563	7971	
World Trade	63A	250V	Delta	Amphenol	IEC-309 460P9W	0563	7977	
World Trade	63A	250V	Delta	Amphenol	IEC-309 460P9W	0563	7980	LSZH
NA & Japan	30A	380-415V	WYE	Souriau UTG	IEC-309 530P6W/ HBL530P6V02	0564	7946	
World Trade	32A	380-415V	WYE	Souriau UTG	IEC-309 530P6W	0564	7976	
World Trade	32A	380-415V	WYE	Souriau UTG	IEC-309 530P6W	0564	7979	LSZH

Note:

- LSZH=Low Smoke Zero Halogen
- 250V on this page applies to 200 – 240 VAC applications
- NA & Japan includes: USA, Canada, all Caribbean Nations, Latin America (except Argentina), and Japan
- World Trade includes: All countries except USA, Canada, Mexico, and Japan

Physical Planning and Configuration



System Structure Overview



IBM z17™ continues to extend system design change deployed for IBM z14® ZR1, IBM z15® and IBM z16® with 1 to 4 “19 inch” frames

- System can only come with internal radiator cooling
- Power distribution Unit (iPDU) based power for operation
 - **IBF feature not available on the IBM z17**
- Up to four frames possible depending on the amount of CP and I/O cards ordered
 - Allowing up to a max of 4 CPC drawers and 12 I/O drawers
 - **Optional plugging rules starting with Z-Frame**
 - *By default, systems reserve space for up to 2 additional CPC drawers* in the A Frame Reserve CPC FCs: 2933/2934
 - Clients may not be able to add additional CPC drawers if they override plan ahead features



Configuration Overview

CPC Racks (dependent on configuration and options)

- A-Frame -> Up to 3 CPC drawer positions + #I/O + power; Always present
- B- Frame -> Up to 1 CPC drawer positions + #I/O + power; Factory Build Only

I/O expansion Frames (installed order shown in red)

- Z-Frame -> Max 5 I/O drawer positions
 - **SoD** - Clients can prepare to carry the Z-Frame forward into their z17+ system by choosing the Z frame 1st FC.
- C-Frame -> Max 3-5 I/O drawer positions

MT 9175
ME1/ML1
5.5 GHz
208 CPs
1-4 CPC
1-4 Frames
Radiator
PCIe+ I/O

PDU
1 CPC dwr; 0-6 I/O
2-4 CPC dwrs; 0-12 I/O

42	SW	SE	
41	SW	SE	
40		SW	
39		SW	
38	IO 12		IO 9
37	2	IO 4	9
36		1	
35			IO 8
34			8
33			
32			
31			
30	IO 11		
29	3		
28			
27			
26			
25			
24			
23			
22	IO 15	IO 10	CPC 2
21	12	4	7
20			
19			
18			
17			
16			
15	IO 14		CPC 1
14	11	CPC 3	6
13		CPC 0	6
12			
11			
10			
9			
8		Cooling	Cooling
7			
6	IO 13		5
5	10		
4			
3			
2			
1			

**Density-focused
Maximum Configuration**

42	SW	SE	
41	SW	SE	
40		SW	
39		SW	
38	IO 12		IO 9
37	7	4	5
36		6	
35			IO 8
34			4
33			
32			
31			
30	IO 11		
29	8		
28			
27			
26			
25			
24			
23			
22	IO 15	IO 10	CPC 2
21	12	9	3
20			
19			
18			
17			
16			
15	IO 14		CPC 1
14	11	CPC 3	2
13		CPC 0	
12			
11			
10			
9		Cooling	Cooling
8			
7			
6	IO 13		1
5	10		
4			
3			
2			
1			



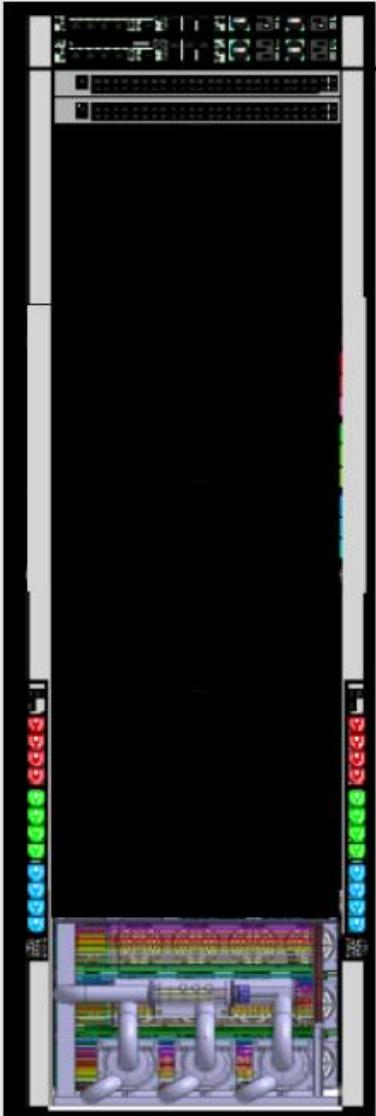
**Z-frame 1st I/O (FC 0352)
Maximum Configuration**

IBM z17 Configuration: PDU based single frame Rear View



Max 43

- 2 line cords required
- Up to 43 CPs
- Up to 3 I/O Drawers (48 I/O Cards) without CPC Reserve FCs 2933 and 2934



Max 90

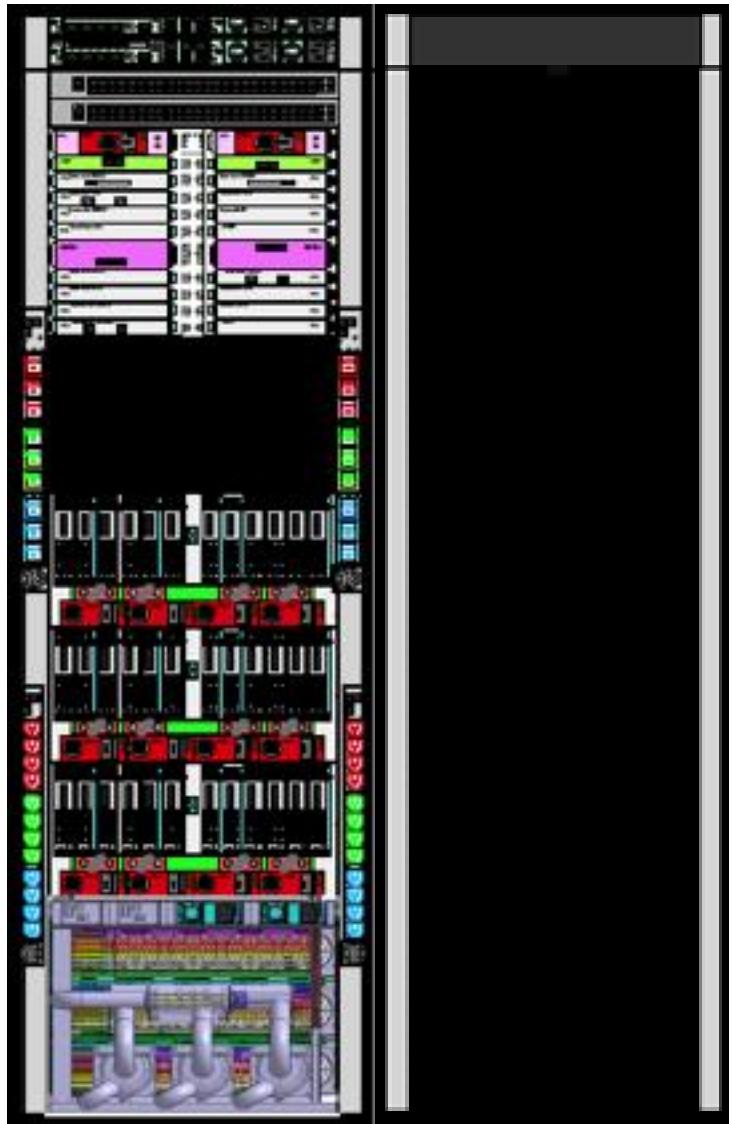
- 4 line cords required
- Up to 90 CPs
- Up to 2 I/O Drawers (32 I/O Cards) without CPC Reserve FC 2934



Max 136

- 4 line cords required
- Up to 136 CPs
- 1 I/O Drawers (16 I/O Cards)
- **Default A-Frame configuration** with CPC Reserve FCs 2933 and/or 2934

IBM z17 Configuration: PDU based I/O Expansion Rear View



Max 43/90/136

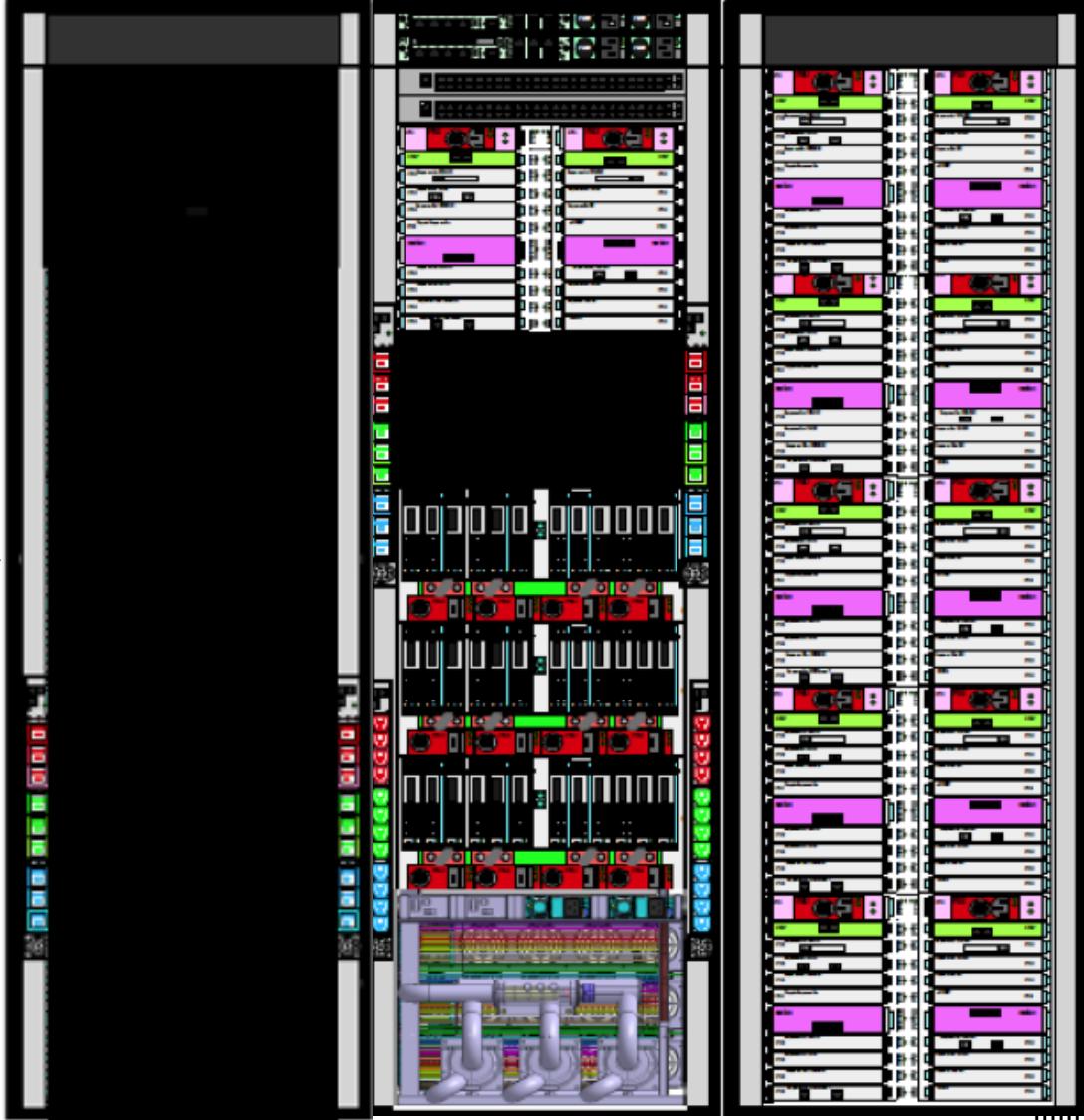
- 4 line cords required
- From 43 to 136 CPs
- 2-7 I/O Drawers (112 I/O Cards Max)

Optional plugging
rules starting with Z
Frame

Max 90/136

- 6 line cords required
- Up to 136 CPs
- 7-12 I/O Drawers (192 I/O Cards Max)

Max43 can only plug 6
I/O drawers



IBM z17 Configuration: PDU based CP Expansion Rear View



Max 183/208

- 6 line cords required
- 183 or 208 CPs (**Factory Build Only**)
- 1-4 I/O Drawers (64 I/O Cards Max)

IBM z17 Configuration: PDU base I/O and CP Expansion

Max 183/208

- 4 frame expansion
- 8 line cords required
- 183-208 CPs (**Factory Build Only**)
- 9-12 I/O Drawers (192 I/O Cards Max)



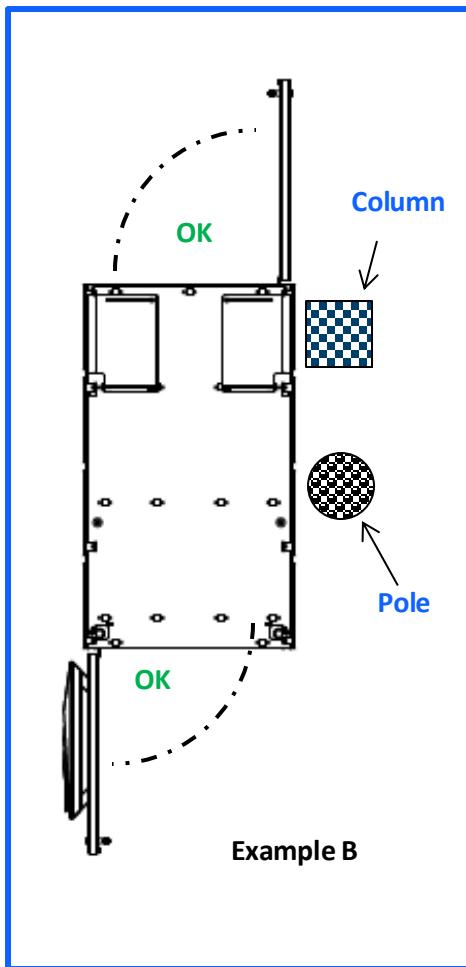
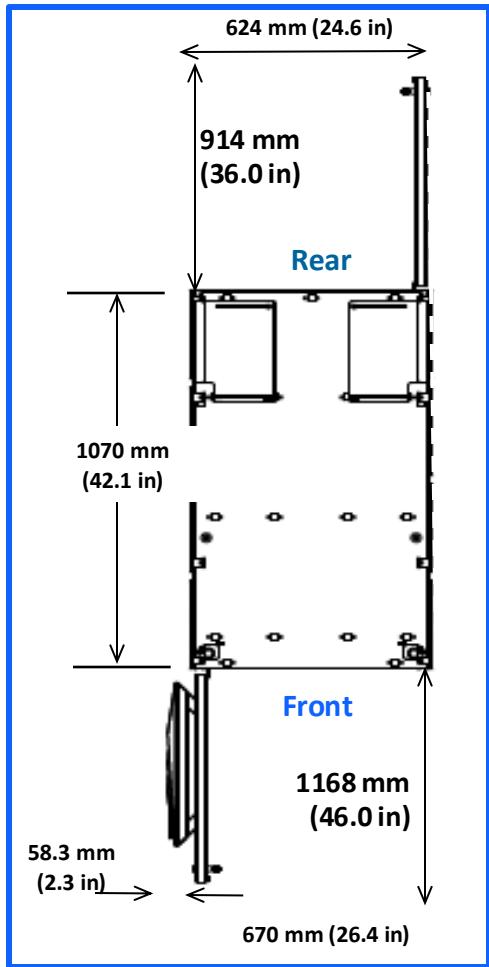
Max 183/208

- 3 Frame Expansion
- 6 line cords required
- 183-208 CPs (**Factory Build Only**)
- 4-9 I/O Drawers (144 I/O Cards Max)

Optional plugging
rules starting with Z-
Frame

Machine and Service Clearance Areas

- Machine area is the actual floor space covered by the system (includes covers).
- System service clearance area includes the machine area plus the added space required to open the doors for service access.
- Service clearance area must be free of all obstacles so as not to impede system accessibility
- **New**, an “above the system” **vertical service clearance** of 18” is recommended to address elevated (ladder) service activities.



Single Frame Machine Area m ² (ft ²)	Service Clearance Area m ² (ft ²) (typical, excludes left side wall limit for service tool*)
0.751 m ² (8.08 ft ²)	Front service clearance = 0.783 m ² (8.43 ft ²) Rear service clearance area = 0.570 m ² (6.14 ft ²)

Allowable Wall Location

58.3 mm (2.3 in) minimum frame to wall clearance (excluding space for service)

If data center aisles are at least 1.2 meters, that is “2 floor tiles” wide, then this is the only clearance area you need to be concerned with.

600 mm (23.6 in) W x 1168 mm (46 in) D area required for service lift tool use & ladder use. This area is only an adder for the front, left most frame

The diagram illustrates Example C, showing a machine area with a vertical service clearance requirement. A dashed circle indicates the vertical clearance area above the machine. A red dashed box highlights an adder area for service lift tool use and ladder use, specifically for the front, left-most frame. Labels include "wall", "OK", and "Example C".

Figure 3. Aisle and service clearances

Package Shipping Specifications

Systems shipment:

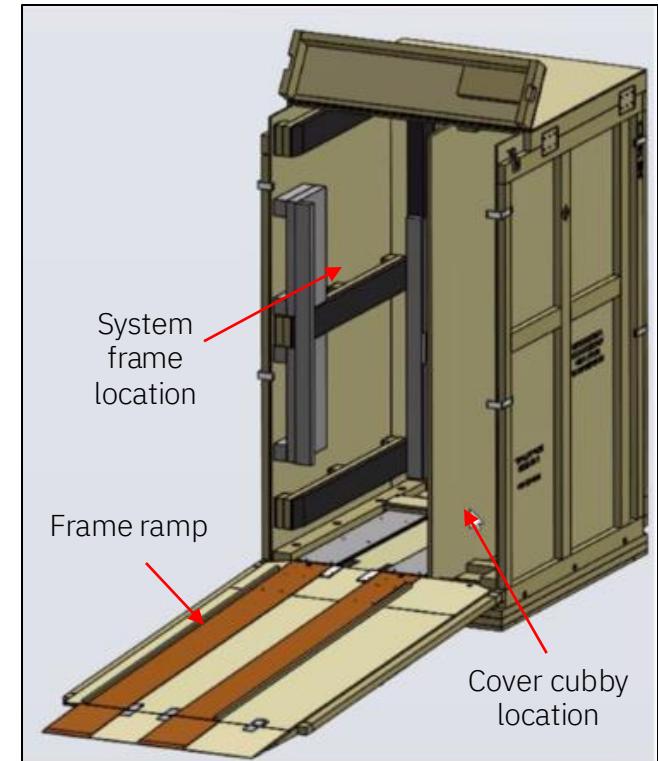
- System frames are wrapped in a VpCI (Vapor Phase Corrosion Inhibitor) polybag and shipped in a fully enclosed wooden and palletized crate.
- New shipping container has been developed for z17 to minimize carbon footprint impact
 - Container will include both the system frame as well as its front and rear doors (i.e., will longer have a separate package for the door set to ship and/or dispose of).
- VpCI cups are included in the container to prevent rusting of metal components.

Packaged System Shipping Specifications (per system frame):

Width mm (in)	Depth mm (in)	Height mm (in)	Max. Weight kg (lb.)
940 mm (37.0 in)	1334 mm (52.5 in)	2286 mm (90.0 in)	TBD

Height Reduction (FC 9975):

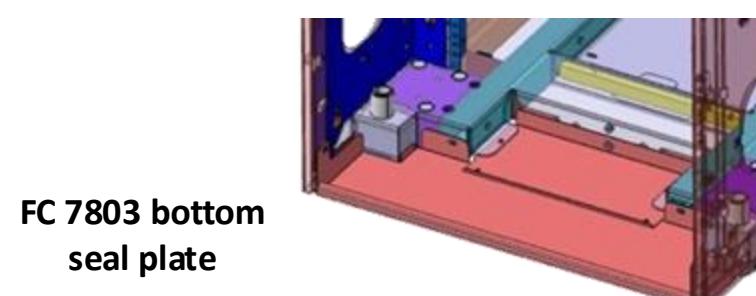
- If during movement of the system frame there are openings/doorways less than 2032 mm (80.0 in) high, FC 9975 should be ordered.
- This feature reduces the frame height to 1900 mm (74.8 in), with the frame's top hat and side covers shipped in a separate carton.
- Height reduction "Ship to Return Packaging" (FC 9976)



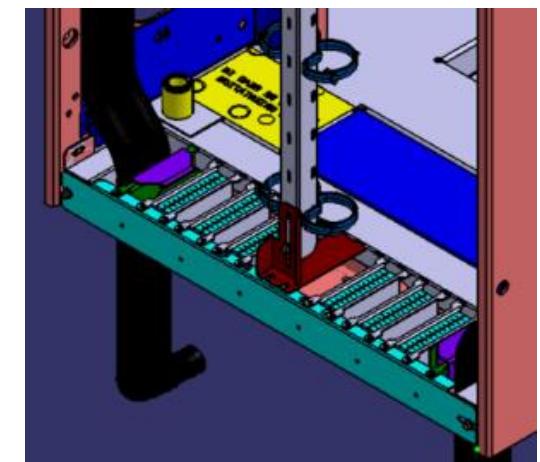
z17 Shipping Container

IBM z17 External Cable Management Hardware Feature Codes

- **Top exit and bottom exit options (applicable to both power and I/O cabling)**
 - Three feature codes available for both power and I/O cable management.
- **FC 5823 New Top Exit Cable Enclosure**
 - Must be ordered in conjunction with either FC 7803, 7804, and/or FC 7998.
 - Includes additional top hat hardware for strain relief or flat sealing surface at top back of system if required by your particular cold/hot air containment barrier's contact location.
- **FC 7803 No Bottom Exit Cabling/Power (therefore Top Exit is only used)**
 - Should be ordered for non-raised floor (on slab install).
 - Comes with a cover to seal the bottom of the frame. Cabling and power must be top exit.
- **FC 7804 Bottom Exit Cabling/Power**
 - Must be ordered to provide the necessary hardware to allow cabling or power in/out the bottom of the frame for raised floor installations.
 - Hardware also supports installation of fiber quick connect brackets at bottom rear I/O tailstock.



FC 5823
Top Exit Cable Enclosure

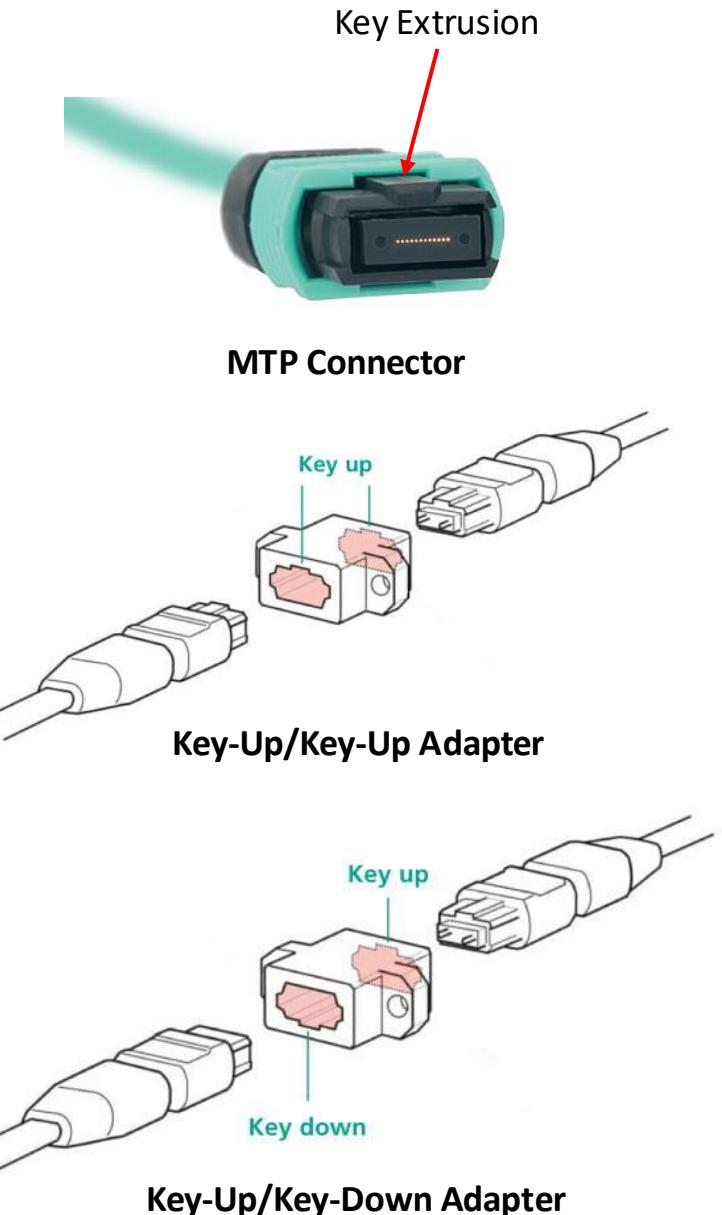


FC 7804
bottom tail gate



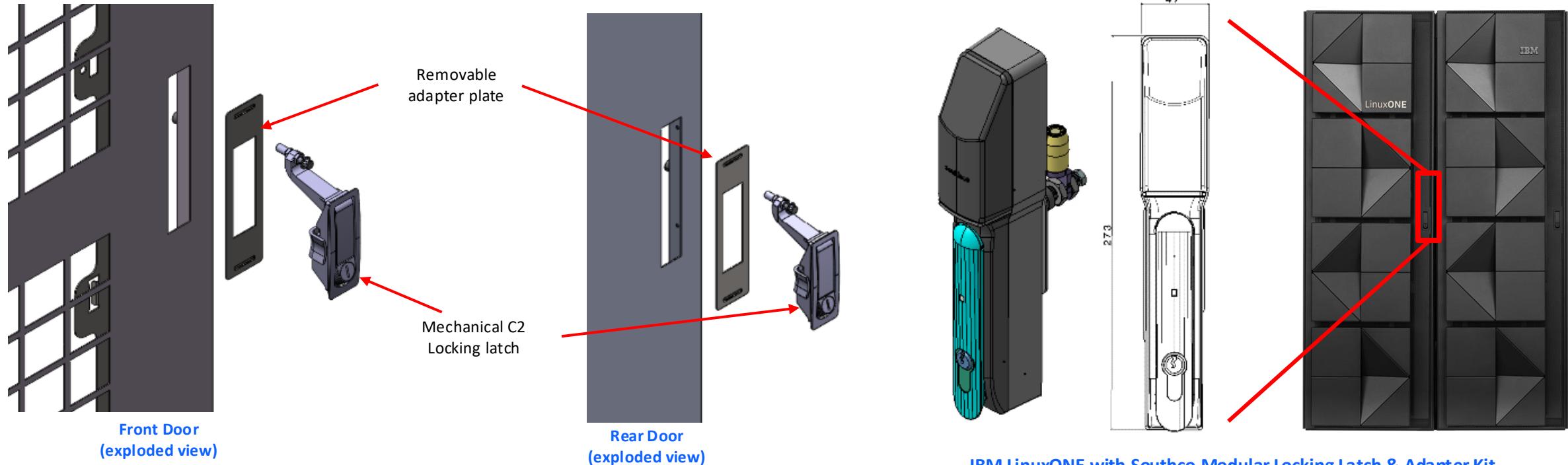
IBM z17 Cabling Adapters

- **Top Exit Enclosure**
 - **FC 5824** is an **optional** addition to **Top Exit Enclosure Feature Code 5823**, supporting structured cabling with only **Key Up / Key Down** interconnect polarity.
 - **FC 5826** is an **optional** addition to **Top Exit Enclosure Feature Code 5823**, supporting structured cabling with only **Key Up / Key Up** interconnect polarity.
- **Bottom Exit Enclosure**
 - **FC 5827** is an **optional** addition to **Bottom Exit Enclosure Feature Code 7804**, supporting structured cabling (fiber quick-connect) with only **Key Up / Key Down** interconnect polarity.

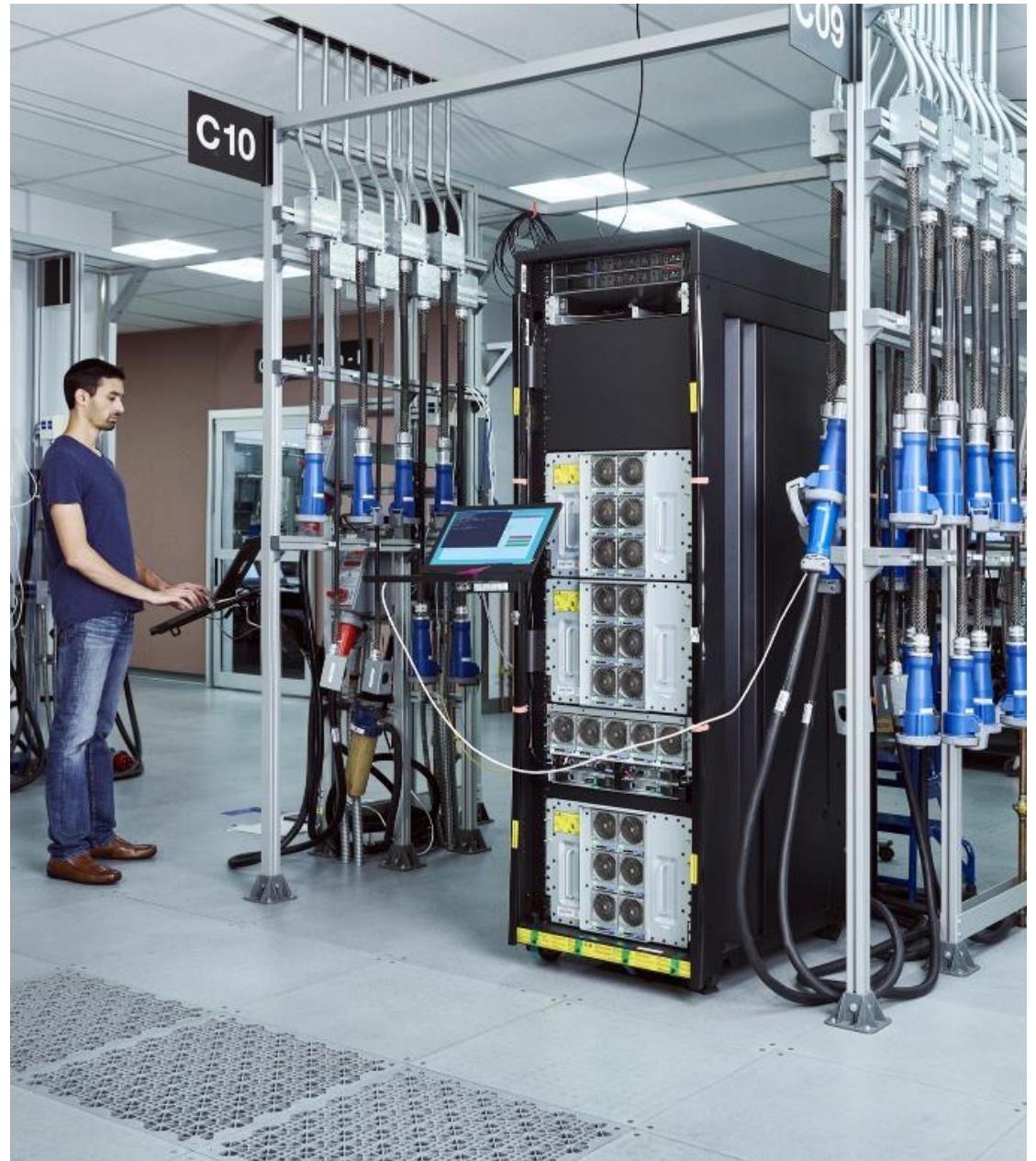


Electronic Locking Latch Enablement

- IBM is enabling the ability to exchange the provided mechanical (key activated) locking front and rear door latches with electronic versions.
- **New** and unlike its predecessor offerings, z17 system doors have been redesigned with an incorporated adapter plate that allows various H3-style swing handle door latches to be installed without the previously required adapter kit. In doing so, the style and sourcing of an electronic latch version has been expanded.

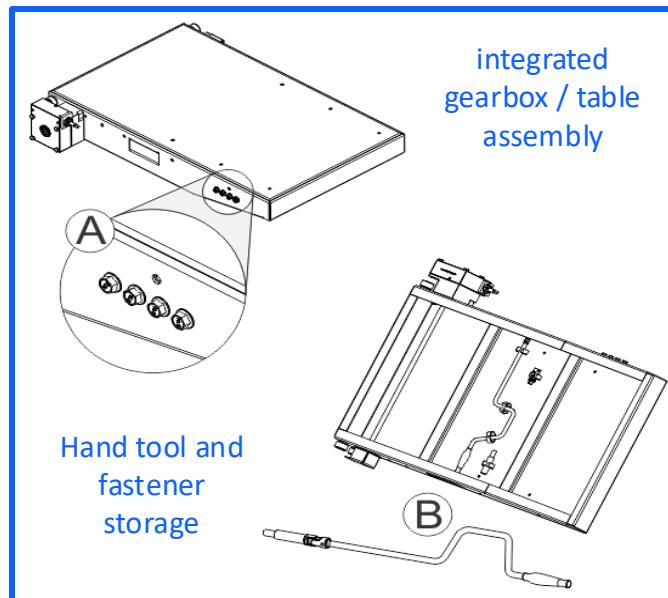
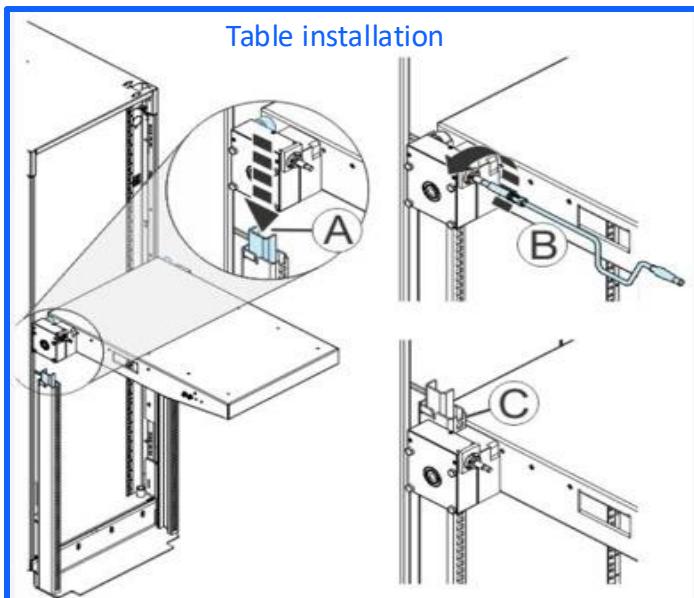


IBM z17 and IBM® LinuxONE Next Site Tools

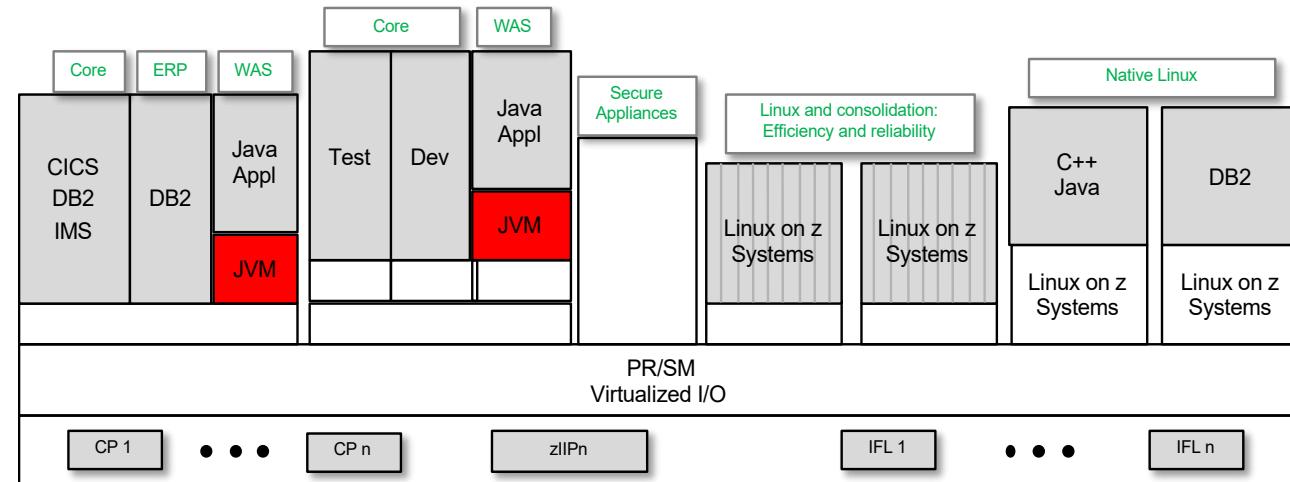


Site Tools

- **Lift Tool FC 3100**
 - Same as the z16, z15 & z14 ZR1
 - 5 separate components that attach to the front of the system
 - Each site requires at least one for all 19" systems
- **Extension Ladder FC 3101**
 - Same as the z16, z15 & z14 ZR1
 - Each data center requires at least one for all 19" systems
- **Fill and Drain Tool Is Not Required**
 - System and FRUs are shipped filled with coolant



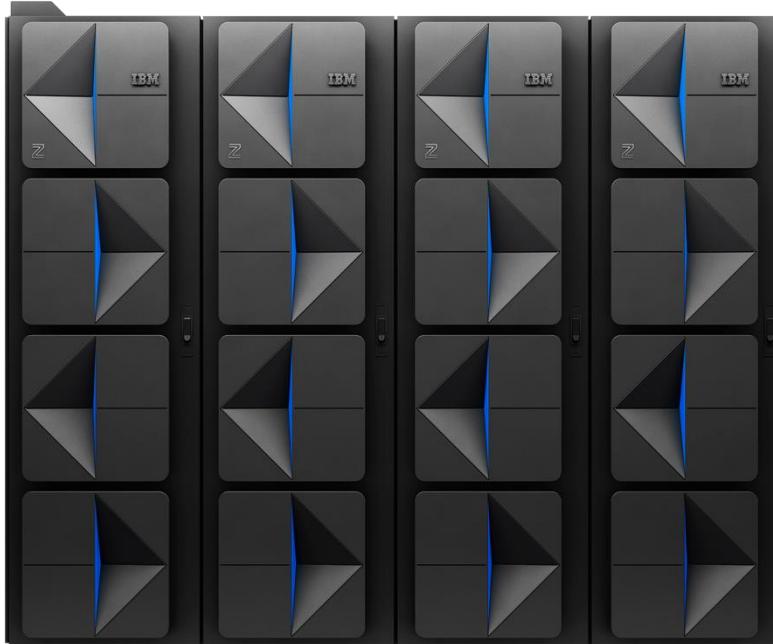
IBM z17 Multi-frame operating systems



IBM z17 operating system support

z/OS

- z/OS V3.2 with PTFs
- z/OS V3.1 with PTFs
- z/OS V2.5 with PTFs
- z/OS V2.4 with PTFs for toleration only, Extended Support Required after Sept 2024



z/VM

- z/VM® 7.4 with PTFs
- z/VM 7.3 with PTFs

VSEⁿ

- [VSEⁿ V6.3 – 21st Century Software](#)

z/TPF

- z/TPF 1.1 with PTFs

Linux® on IBM Z

Minimum Distributions:

- SUSE SLES 15 SP6
- SUSE SLES 12 SP5
- Red Hat RHEL 9.4
- Red Hat RHEL 8.10
- Canonical Ubuntu 24.04 LTS
- Canonical Ubuntu 22.04 LTS

IBM cannot legally discuss IBM z17 multi frame exploitation prior to GA from distributors.

Officially Tested list [here](#).

**Break
10 Minutes**

