

Creating an exceptional user experience

- The IBM z13
 - Improved ability to meet service level agreements with new processor chip technology that includes simultaneous multithreading, analytical vector processing, redesigned and larger cache, and enhanced accelerators for hardware compression and cryptography
 - Better availability and more efficient use of critical data with up to 10 TB available RAIM memory
 - Validation of transactions, network management, and assignment of business priority for SAN devices available with updates to the I/O subsystem
 - Continued management of heterogeneous workloads with IBM® z BladeCenter Extension (zBX) Model 004 and IBM z Unified Resource Manager.
- IT infrastructure with new economics
 - New consolidation savings with 40% more total capacity in the same footprint, improved scaling and connectivity for coupling, improved sharing for networking and cryptographic features, and increased LPAR support.
 - Large memory on z/OS® which can be used to improve transaction response times, lower CPU costs, simplify capacity planning and ease deploying memory-intensive workloads.
 - Potential to lower client costs, and to improve performance and availability by supporting the sharing of switches between FICON® and FCP.
 - Technology Update Pricing for IBM z13.
- Trustful, reliable, and secure operations to lessen business risk
 - Stronger and faster protection and integrity of data across an enterprise cloud environment with new Crypto Express5S cryptographic adapter
 - Enhanced public key support for constrained digital environments using Elliptic Curve Cryptography (ECC) for users such as Chrome, Firefox, and Apple's iMessage
 - Ability to minimize reformatting of databases with new exploitation of VISA format preserving encryption (FPE) for credit card numbers
 - Faster insight into the health of your Linux™ system with new IBM zAware pattern recognition analytics extended to Linux on z Systems™
- Full upgradability to IBM z13 from IBM zEnterprise® EC12 and zEnterprise 196, and full upgradability within the IBM z13 family.

This announcement extends IBM z Systems leadership with:

- Up to 40% more total system capacity compared to the zEC12.
- Up to 10 terabytes (TB) of available Redundant Array of Independent Memory (RAIM) real memory per server.
- Cryptographic performance improvements with new Crypto Express5S.
- Economies of scale with simultaneous multithreading offering more throughput for Linux and zIIP-eligible work.
- Improved performance of complex mathematical models, perfect for analytics processing, with Single Instruction Multiple Data (SIMD).
- IBM zAware cutting-edge pattern recognition analytics for fast insight into system health extended to Linux on z.
- A reduction in elapsed time for I/O-bound batch jobs with new FICON Express16S versus FICON Express8S.
- Support for larger memory configurations planned to be supported on z/OS systems, which can be used to improve transaction response times, lower CPU costs, simplify capacity planning and ease deploying memory-intensive workloads.
- I/O service time improvement when writing data remotely using the new zHPF Extended Distance II.
- Support for up to 256 coupling CHPIDs, which provides enhanced connectivity and scalability for a growing number of coupling channel types.
- IBM Integrated Coupling Adapter (ICA SR), which offers greater short reach coupling connectivity than existing link technologies and enables greater overall coupling connectivity per IBM z13 than prior server generations.
- Capability to extend z/OS workload management policies into the SAN fabric.
- New rack-mounted Hardware Management Console (HMC), helping to save space in the data center.
- Nonraised floor option, offering flexible possibilities for the data center.
- Optional water cooling, providing the ability to cool systems with user-chilled water.
- Optional high-voltage dc power, which can help IBM z Systems clients save on their power bills.
- Optional top exit power and I/O cabling designed to provide increased flexibility.
- New IBM z BladeCenter Extension (zBX) Model 004 in support of heterogeneous resources managed by IBM z Unified Resource Manager.

Hardware requirements

- The hardware requirements for the IBM z Systems and its features and functions are identified.
 - A new driver level is required. HMC (V2.13.0) plus MCLs and the Support Element (V2.13.0) are available.
- NOTE:** You should review the PSP buckets for minimum Machine Change Levels (MCLs) and software PTF levels before IPLing operating systems.

HMC system support (see further enhancements on page 3 - top left)

The new functions available on the Hardware Management Console (HMC) version 2.13.0, apply exclusively to z13 and 2458-004. However, the HMC version 2.13.0 will also support all the systems listed in the table below.

Family	Machine Type	Firmware Driver	SE Version
zBC12	2828	15	2.12.1
zEC12	2827	15	2.12.1
z114	2818	93	2.11.1
Z196	2817	93	2.11.1
z10 BC	2098	79	2.10.2
z10 EC	2097	79	2.10.2
z9® BC	2096	67	2.9.2
z9 EC	2094	67	2.9.2

Support for **VISA Format Preserving Encryption (VFPE)** algorithms in CCA-Based callable services. This support will rely on the CryptoExpress5S coprocessor. Format Preserving Encryption (FPE) refers to a method of encrypting data such that the resulting cipher-text has the same format and length as the input-clear text. This helps allow legacy databases to contain encrypted data of sensitive fields without having to restructure the database or applications.

Ref: Announcement 115-001



IBM System z has been renamed to IBM z Systems. This new name will encompass every IBM Mainframe from S/360 through the new z13, and all future systems. The name change serves to signal evolution of the product line, positioning of expanding capabilities, and the role of a mainframe in the new digital era of IT.

The IBM z13 provides the infrastructure that will help differentiate you as a refined digital business. It offers the capacity and processing power to improve business performance and growth. It helps better protect sensitive transactions to minimize business risk and client exposure, and it helps to deliver on service level agreements for an exceptional customer experience. New economic efficiencies allow the IBM z13 to offer more throughput and capabilities with less impact to the IT budget.

z/OS V2.1 running on IBM z13 sets the groundwork for digital business by providing the foundation you need to support demanding workloads such as **operational analytics and clouds** alongside your traditional mission-critical applications. z/OS V2.1 continues to support the **z Integrated Information Processor (zIIP)** which can take advantage of simultaneous multithreading.

z/OS V2.1 is designed to support the **new vector extension facility (SIMD)** instructions available on IBM z13 servers to provide a powerful framework for development of new Business Analytics workloads, porting math-intensive workloads from other platforms, and accelerating Business Analytics workloads on the IBM z13.

z/OS features **many I/O-related enhancements** such as extending the reach of workload management into the SAN fabric. With enhancements to management and operations, z/OS V2.1 and z/OS Management Facility V2.1 can help systems administrators and other personnel handle configuration tasks with ease.

Recent **Mobile Workload Pricing** for z/OS can help reduce the cost of growth for mobile transactions processed by programs such as IBM CICS® Transaction Server for z/OS, IMS™, and DB2® for z/OS.

The IBM z13 brings a new approach for **enterprise-grade Linux** with offerings and capabilities for availability, virtualization with z/VM, and a focus on open standards and architecture with new **support of KVM on the mainframe**

z13 innovative architecture

- The new 141-core design delivers massive scale across all workloads and enables cost-saving consolidation opportunities
- z/VM® V6.3 has been enhanced to exploit simultaneous multithreading offered on the new processor chip.
 - When running on IBM z13, z/VM supports twice as many processors (up to 64) or as many as 64 threads for Linux workloads.
 - With support for sharing OSA-Express Port Groups across z/VM systems within a central processor complex (CPC), z/VM V6.3 delivers increased optimization of OSA-Express and reduced cost of ownership for IEEE 802.3 Link Aggregation networking environments.
- There is unmatched support for data including a strong, fast I/O infrastructure, cache on the processor chip to bring data close to processing power, security and compression capabilities of the coprocessors and I/O features, and the 99.999% data availability design of our coupling technologies.
- The IBM z13 intelligent design delivers new levels of performance and capacity for large-scale consolidation and growth.

The IBM z13 is designed to provide:

- Up to 10% faster uniprocessor performance as compared to zEC12
- Up to 40% system capacity performance improvement over zEC12 101 way
- 141 cores to configure (versus 101 on zEC12)
- 231 capacity settings (versus 161 on zEC12)
- Up to 10 TB RAIM memory to improve transaction response times, lower CPU costs, simplify capacity planning, and ease deploying memory-intensive workloads
- z/Architecture® enhancements designed to enable performance improvements in Linux, Java™, and DB2
- Enhanced cache design which is designed to provide twice as much second level cache and substantially more third and fourth level caches compared to the zEC12 helping to avoid untimely swaps and memory waits while maximizing the throughput of concurrent workloads
- New features and functions for the Storage Area Network:
 - The newest generation of FICON features, FICON Express16S 10KM LX and FICON Express16S SX are designed to support a link rate of 16 Gbps with reduced latency for large read/write operations and increased bandwidth.
 - Forward Error Correction (FEC) capabilities have been added to the FICON Express16S channels which allows those channels to operate at higher speeds, over longer distances with reduced power and higher throughput, while retaining the same resiliency and robustness that clients have come to expect from their FICON channels.
 - FICON Dynamic Routing enables exploitation of Storage Area Network (SAN) dynamic routing policies in the fabric to lower cost, improve performance, and simplify systems management for supporting I/O devices.
 - Storage Area Network (SAN) Fabric I/O Priority extends the z/OS Work Load Manager to the SAN fabric providing improved resilience and autonomic capabilities.
 - High Performance FICON for z Systems (zHPF) has been enhanced to allow all large write operations (> 64 KB) at distances up to 100 km to be executed in a single round trip to the control unit thereby not elongating the I/O service for these write operations at extended distances.
 - Improved channel subsystem (CSS) scalability supports six logical channel subsystems (LCSS), four subchannel sets (to support more devices per logical channel subsystem), and 32K devices per FICON channel.
- Support for up to 256 coupling CHPIDs per CPC to provide enhanced connectivity and scalability for a growing number of coupling channel types
- IBM Integrated Coupling Adapter (ICA SR) which offers greater short reach coupling connectivity than existing link technologies & enables greater overall coupling connectivity/CPC footprint than prior server generations.
- Flash Express® to handle paging workload spikes and improve application availability.
- IBM zAware support for Linux on z Systems for improved problem determination.
- Cryptographic performance improvements with Crypto Express5S and CP Assist for Cryptographic Function (CPACF)
- Improved performance of complex mathematical models, perfect for analytics processing, with Single Instruction Multiple Data (SIMD).
- z/VM support for IBM z13 including:
 - Improved price performance with support for multithreading technology for Linux workloads
 - Support for twice as many processors - 64 threads when simultaneous multithreading (SMT) is enabled or 64 cores when SMT is not enabled
 - Increased availability and reduced cost of ownership in network environments by sharing OSAs across z/VM systems
- zBX Model 004 standalone upgradability from zBX Model 002 and zBX Model 003.

Simultaneous multithreading (SMT)

- Incremental throughput is achieved partly because the new processor chip offers intelligently implemented 2-way simultaneous multithreading.
 - Simultaneous multithreading (SMT) allows two active instruction streams per core, each dynamically sharing the core's execution resources. SMT will be available in IBM z13 for workloads running on the Integrated Facility for Linux (IFL) and the IBM z Integrated Information Processor (zIIP).

NOTE: Each software Operating System / Hypervisor has the ability to intelligently drive SMT in a way that is best for its unique requirements. z/OS SMT management consistently drives the cores to high thread density, in an effort to reduce SMT variability and deliver repeatable performance across varying CPU utilization - thus providing more predictable SMT capacity. z/VM SMT management optimizes throughput by spreading a workload over the available cores until it demands the additional SMT capacity.

"Next" generation availability

- Improved soft error resilience in the processor cores
- Lane shadowing, hardware buffer retry, & independent channel recovery which are designed to improve the DIMM interface
- Continued use of RAIM in the main memory to protect DRAM
- Improved robustness in the level 3 and level 4 cache
- Improved FRU isolation with the addition of integrated time domain *reflectometry* logic to chip interfaces
- RAS changes to adjust to the new CPC drawer structure
- Enhanced integrated spares designed to reduce the complexity and number of repair actions.

IBM zAware: With IBM zEnterprise EC12 and BC12, IBM introduced a new technology, IBM zAware, based on machine learning developed by IBM Research. The new version of IBM zAware introduces a new generation of technology with improved analytics to provide better results. The previous version of IBM zAware required message streams with well-formed message IDs; now IBM zAware can process message streams that do not have message IDs. This opens up new possibilities going forward with the ability to handle a broader variety of unstructured data. (see page 2 - top left side)

Greater than 16 Domain support

- Support to allow a cryptographic coprocessor to be shared across more than 16 domains, up to the maximum number of LPARs on the system. This support relies on enhanced firmware available with a minimum microcode level for the Crypto Express4S and Crypto Express5S coprocessors.
- NOTE:** Customers will have the flexibility of mapping individual LPARs to unique crypto domains or continuing to share crypto domains across LPARs.

IBM zAware delivered on IBM z13 builds on previous IBM zAware function with:

- Support for Linux on z Systems message log analysis
- Support for native or guest Linux on z Systems images
- The ability to process message streams with no message IDs
- The ability to group multiple systems that have similar operational characteristics for modeling and analysis
- Recognition of dynamic activation and deactivation of a Linux image into a group, and appropriate modeling and analysis.
 - Aggregated Sysplex view for z/OS and system views.
 - User-defined grouping. For Linux on IBM z Systems, the user can group multiple systems' data into a combined model: by workload (one for all web servers, one for all databases, and so on); by "solution" (for instance, one model for your cloud); or by VM host.
- Heat map display which provides a consolidated/aggregated/higher level view with the ability to drill down to detail views
- Improved usability and GUI functional enhancements addressing many customer requirements
 - Enhanced filtering and visualization, with better use of GUI real estate
 - Improved UI navigation
 - Display of local time in addition to UTC time
 - Enhancements based on IBM One UI guidelines
- Enhanced analytics
- More robust data store
- Expanded browser support with Mozilla Firefox 31 and Internet Explorer 9, 10, and 11.

Designed for Common Criteria EAL5+ certification for security of logical partitions.

- This means that the IBM z13 is designed to prevent an application running on one operating system image on one LPAR from accessing application data running on a different operating system image on another LPAR on the server.

Greater than 16 Domain support

- Support to allow a cryptographic coprocessor to be shared across more than 16 domains, up to the maximum number of LPARs on the system.
 - This support relies on enhanced firmware available with a minimum microcode level for the Crypto Express4S and Crypto Express5S coprocessors.
 - With the adjunct processor (AP) extended addressing (APXA) facility installed, the z Systems crypto architecture can support greater than 16 domains in an AP. Customers will have the flexibility of mapping individual LPARs to unique crypto domains or continuing to share crypto domains across LPARs.

Trusted Key Entry (TKE) 8.0 Licensed Internal Code (LIC - Brief)

The Crypto Express5S Coprocessor support: TKE 8.0 is required for managing Crypto Express5S cryptographic coprocessors and manages them through the same Crypto Module notebook functions as previous generations of Cryptographic modules.

- The configuration migration tasks feature of the TKE is planned to be enhanced to also support the Crypto Express5S coprocessor.

The Crypto Express5S Coprocessor support: TKE 8.0 is required for managing Crypto Express5S cryptographic coprocessors and manages them through the same Crypto Module notebook functions as previous generations of Cryptographic modules. The configuration migration tasks feature of the TKE is planned to be enhanced to also support the Crypto Express5S coprocessor. You can use TKE 8.0 to collect data from previous generations of Cryptographic modules and apply the data to Crypto Express5S coprocessors.

FIPS Certified Smart Card: A FIPS certified smart card, part number 00JA710, is now included in the smart card reader and additional smart cards optional features.

Crypto Coprocessors with more than 16 domains: TKE 8.0 is planned to allow the management of domains beyond the current limit of 16. This support will require the latest levels of code on the IBM z13 to allow more than 16 domains on the Crypto Express5S.

Note: This support is only available with z13.

Full function migration wizard for EP11: The full function migration wizard is designed to provide the ability to quickly and accurately collect and apply data to the Crypto Express features configured as EP11 coprocessors. This wizard previously supported CCA, however Crypto Module Group support has been removed. CryptoModule Groups are no longer supported on TKE 8.0. All group management must now be done from a Domain Group.

New master key management functions: TKE 8.0 is planned to allow support of two new master key management functions which are available when managing any type of master key:

1. Generate a set of master key parts wizard-like feature which allows you to create a new key part for each of the different types of master keys.
2. Load all new master keys wizard-like feature which allows you to load a new key for each of the different types of master keys.

Usability Enhancements: TKE 8.0 is planned to have many usability enhancements including the ability for users to select a check box that allow them to change their passphrase on the logon screen for a passphrase profile. NOTE: Users can now select multiple items in the Hosts container, Crypto Module Groups container, or Domain Groups container of the main window of the TKE application.

ENC-Zero Verification Pattern for 24-byte DES Operational Keys: TKE 8.0 is planned to support an ENC-Zero verification pattern that is computed and displayed with 24-byte DES operational keys.



Five models are offered: N30, N63, N96, NC9, and NE1. The model name indicates the maximum number of processor units (PUs) available for purchase ("C9" stands for 129 and "E1" for 141). A PU is the generic term for the IBM z/Architecture processor unit (processor core) on the SCM.

zAAPs are not available on z13. The zAAP workload is done on zIIPs.

IBM zAware is designed to use near real-time continuous learning algorithms, providing a diagnostics capability intended to help you quickly pinpoint problems, which in turn, can lead to better availability and a more efficient system..

The new FICON Express16S channel will work with your existing fiber optic cabling environment, both single mode and multimode optical cables.

In laboratory measurements, using FICON Express16S in an IBM z13 with the FCP protocol for small data transfer I/O operations, FICON Express16S operating at 16 Gbps achieved a maximum of 110,000 I/Os/sec, compared to the maximum of 92,000 I/Os/sec achieved with FICON Express8S operating at 8 Gbps.

In laboratory measurements, using FICON Express16S in an IBM z13 with the FCP protocol and FICON Express16S operating at 16 Gbps, FICON Express16S achieved a maximum throughput of 2560 MB/sec (reads + writes) compared to the maximum of 1600 MB/sec (reads + writes) achieved with FICON Express8S operating at 8 Gbps. This represents approximately a 60% increase.

With the PTF for APAR VM65586, z/VM will support up to 64 logical processors on z13:

All in-service releases of IBM CICS Transaction Server for z/OS (CICS TS) will support the z13 hardware.

The onsite upgrade to an IBM z BladeCenter Extension (zBX) Model 004 continues to support workload optimization and integration for zEnterprise. The zBX Model 004 is available as an upgrade from an existing zBX Model 002 or Model 003.

The ICA SR fanout resides in the PCIe I/O fanout slot on the IBM z13 CPC drawer, which supports 10 PCIe I/O slots. Up to 10 ICA SR fanouts and up to 20 ICA SR ports are supported on an IBM z13 CPC drawer.

FICON Express16S - a new generation for FICON, zHPF, and FCP

IBM is releasing a **new I/O infrastructure** that will strengthen the synergy between DS8870 and IBM z Systems, delivering improved, predictable, and repeatable performance, and enhanced resiliency for mission-critical environments.

- IBM plans to announce the support of this new I/O infrastructure for DS8870 Storage Systems
- With the introduction of **FICON Express16S on the IBM z13**, you now have additional growth opportunities for your Storage Area Network (SAN). FICON Express16S supports a link data rate of 16 gigabits per second (Gbps) and auto negotiation to 4 or 8 Gbps for synergy with existing switches, directors, and storage devices. With support for native FICON, High Performance FICON for z Systems (zHPF), and Fibre Channel Protocol (FCP), the IBM z13 server enables you to position your SAN for even higher performance -- helping you to prepare for an end-to-end 16 Gbps infrastructure to meet the lower latency and increased bandwidth demands of your applications. **FICON Dynamic Routing can help clients reduce costs!**

FICON Dynamic Routing

With the IBM z13 server, FICON channels are no longer restricted to the use of static Storage Area Network (SAN) routing policies for Inter Switch Links (ISLs) for cascaded FICON directors. The z Systems feature that supports dynamic routing in the Storage Area Network (SAN) is called FICON Dynamic Routing (FIDR).

- It is designed to support the dynamic routing policies provided by the FICON Director manufacturers, for example, Brocade's Exchange Based Routing (EBR) and Cisco's Open Exchange ID Routing (OxID).

Improved High Performance FICON for z Systems (zHPF) I/O Execution at Distance

High Performance FICON for z Systems (zHPF) has been enhanced to allow all large write operations (> 64 KB) at distances up to 100 km to be executed in a single round trip to the control unit thereby not elongating the I/O service time for these write operations at extended distances.

- zHPF Extended Distance II allows customers to achieve service level agreements after a disaster or when a storage control unit failure causes a HyperSwap® event.

Improved Channel Subsystem (CSS) Scalability

The IBM z13 server has improved the channel subsystem (CSS) scalability with support for six logical channel subsystem (LCSSs) which are required to support the eighty five LPARs for the FICON z13, four subchannel sets (to support more devices per logical channel subsystem), and 32K devices per FICON channel up from 24K channels in the previous generation.

- A fourth subchannel set for each logical channel subsystem (LCSS) is provided to facilitate elimination of single points of failure for storage after a disk failure by simplifying the exploitation of IBM's DS8870 Multi-target Metro Mirror storage replication with GDPs and TPC-R HyperSwap.

z/VM Support for the IBM z13 (z13)

With the PTF for APAR VM65577, z/VM provides support that will enable guests to exploit zEC12 function supported by z/VM on the IBM z13 (z13). z/VM support for IBM z13 includes support for:

- **New hardware facilities**
 - z/VM supports the following new hardware facilities transparently:
 - 64 cores are supported w/ multithreading disabled
 - 32 cores (up to 2 threads per core) are supported with multithreading enabled.
 - z/VM V6.3 continues to support up to 32 logical processors on prior machines.
- Load/Store-on-condition Facility 2
- Load-and-Zero-Rightmost-Byte Facility
- Decimal-Floating-Point Packed Conversion Facility
- Delay Facility

New facility bits have been defined that will be passed to a guest and can be tested to determine if a hardware facility is available. A guest can use the STFL instruction to obtain the facilities list.

- CPU-Measurement Counter Facility collection enhancement: Host exploitation is provided for a new instruction to allow collection of multiple counters simultaneously, when the store-CPU-counter-multiple facility is installed.
 - This is expected to reduce the overhead for collecting CPUMF data for z/VM monitor records.
- New I/O related architectures: Support is provided for new I/O related architectures and features of z13 including:
 - PCI function measurement block enhancements for the RDMA over Converged Ethernet (RoCE) adapter
 - Dynamic I/O support for new channel path type CS5 (Coupling over PCIe)
 - Dynamic I/O support for specifying virtual channel IDs (VCHIDs) for HyperSockets™ (IQD) channels
- Crypto Express5S and enhanced domain support for Crypto Express4S and Crypto Express5S

z/VM SMT support

With the PTF for APAR VM65586, z/VM provides host exploitation support for SMT on IBM z13, which will enable z/VM to dispatch work on up to two threads (logical CPUs) of an IFL processor core. z/VM simultaneous multithreading support is enabled only for IFL processors in a Linux only mode or z/VM mode logical partition.

- z/VM exploitation of SMT enables z/VM on z13 to dispatch work on an individual thread of a core, allowing a core to be shared by two guest CPUs or z/VM Control Program tasks.
 - This can result in increased throughput per core from more efficient use of shared core resources.
- Simultaneous multithreading support is available on a z/VM system only if the facility is installed on the hardware and enabled on the z/VM system with the MULTITHREADING system configuration statement.
 - The MULTITHREADING statement is optional, and multithreading is disabled if the statement is omitted.
- z/VM host simultaneous multithreading exploitation support does not virtualize threads for guest exploitation.
 - However, Linux guests may benefit from the host support because the first level z/VM system is able to achieve higher throughput from the multithreaded IFL cores.
- z/VM CPU pools provide a mechanism for limiting the CPU resources consumed by a group of virtual machines to a specific capacity. In an environment without SMT, these capacities are enforced in terms of a number of cores.
 - In an SMT environment, these capacities are enforced in terms of a number of threads; consequently, it might be necessary to increase the capacities of CPU pools, in order to provide adequate resource to CPU pool members.

Parallel Sysplex® Environment

ISC-3 links are not supported on IBM z13. **The IBM Integrated Coupling Adapter (ICA SR)**, introduced on the IBM z13 platform, is a two-port, short distance coupling fanout that utilizes a new coupling channel types.

- IBM z13 will support up to 256 Coupling CHPIDs, twice the 128 coupling CHPIDs supported on zEC12. This provides enhanced connectivity and scalability for a growing number of coupling channel types and facilitates consolidation of multiple Sysplexes into the same set of physical servers. Note that each CF image will continue to support a maximum of 128 coupling CHPIDs.
- Up to 141 ICF engines can be ordered on a single server across multiple Coupling Facility LPARs. This helps limits environments that use a server hosting multiple Coupling Facilities to support multiple Parallel Sysplexes. There is still a limit of 16 ICF engines for a single Coupling Facility LPAR.
- CFCC Level 20 supports the Coupling Facility use of Large Memory to improve availability for larger CF cache structures and data sharing performance with larger DB2 Group Buffer Pools (GBP).

Hardware Management Console (HMC)

Alternative to USB Flash Memory Drive:

- With the Hardware Management Console 2.13.0, the USB Flash Memory Drive will continue to be supported.
- The Hardware Management Console 2.13.0 will also provide alternative options for each task currently has an option to utilize a USB Flash Memory Drive, and this will allow customers to eliminate the requirement for USB Flash Memory Drive.
- These alternatives such as FTP Servers and Remote Browser from workstation will be documented in IBM Knowledge Center. If you prefer no USB Flash Memory Drive usage, select the Feature Code 0845 "Read-Only Media Option" if presented to you during certain eConfig options.
- Note that these USB FlashMemory Drive options are only available for managed IBM z13 systems. The legacy managed systems (zEC12 or earlier) still have a requirement for the USB Flash Memory Drive.

Discontinuance of System Activity Display Task:

- With the Hardware Management Console 2.13.0, the System Activity Display task is no longer supported for the IBM z13 systems.
- The Monitors Dashboard task (available since z196) provides equivalent functionality.
- The System Activity display functionality is available for legacy systems (zEC12 or earlier) which are managed by the Hardware Management Console 2.13.0.

Hardware Management Console Data Replication Versioning:

- The Hardware Management Console 2.13.0 Data Replication task has added versioning support, and this requires all Hardware Management Consoles to update to the 2.13.0 level in order for Data Replication to replicate data between the Hardware Management Consoles.
- Any Hardware Management Console at 2.12.1 level or earlier will not be able to perform the data replication with a Hardware Management Console 2.13.0.

Hardware Management Console Time Source Change:

- The Hardware Management Console 2.13.0 will no longer define its time source using the Add Object Definition.
- The time source is now defined on the Customize Console Date/Time task.
- This will provide a clearer identification of all defined time sources including validation of Server Time Protocol (STP) Coordinated Timing Network IDs (CTN IDs).

User Management Dashboard:

- The Hardware Management Console 2.13.0 has re-engineered user related tasks by establishing a User Management Dashboard task which replaces the following tasks:
 - User Profiles, Customer User Controls, Password Profiles, Manage Enterprise Directory Server Definitions, User Templates, and User ID Patterns.
- Note:** This User Management Dashboard task provides additional functionality such as more granular user management controls and inheritance controls for objects added to groups. It is recommended to look at the Hardware Management Console What's New section in the online help or IBM Knowledge Center to view detailed descriptions for this new task including getting started tutorials for different usage scenarios.

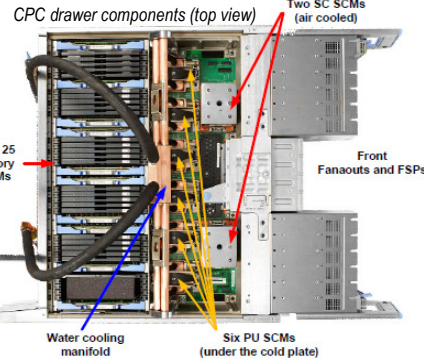
Enhancements to Advanced Workload License Charges

- Technology Update Pricing for the IBM z13 extends software price/performance provided by AWLC for z13 servers.
- The new and revised Transition Charges for Sysplex programs provide a transition to Technology Update Pricing for the IBM z13 for sysplex customers who have not yet fully migrated to z13 servers.
- This ensures that aggregation benefits are maintained and also phases in the benefits of Technology Update Pricing for the IBM z13 pricing as customers migrate.
- NOTE:** When a z13 server is in an actively coupled Parallel Sysplex or a Loosely Coupled Complex, you may choose either aggregated AWLC pricing or aggregated Parallel Sysplex License Charges (PSLC) pricing, subject to all applicable terms and conditions. For additional information about software pricing for the z13 server, refer to Software Announcement 215-001, dated January 14, 2015, Technology Transition Offerings for the IBM z13 offer price-performance advantages.

The CPC drawer is divided in to two nodes.

Each node contains the following components:

- Three eight-core processor unit (PU) SCMs, with six, seven, or eight active cores, depending on the machine model.
- One storage controller (SC) SCM, with a 480 MB L4 cache.
- Five DDR3 DIMM slots per memory controller, for a total of 15 per node.
- Each CPC drawer contains two nodes, which altogether consist of the following components:
 - Six eight-core PU SCMs, with 39 or 42 active processor units (PUs), depending on the model.
 - Two Storage Controller SCMs, with 960 MB L4 cache total.
 - Dual in-line memory modules (DIMMs) plugged in to 20 or 25 DIMM slots of the total of 30 DIMM slots available, providing 320 - 3,200 GB of physical memory and 256 - 2,560 GB of addressable (customer available) memory.
 - Ten PCIe Generation 3 (PCIe Gen3) slots for PCIe I/O drawer fanouts or PCIe coupling links fanouts.
 - Four GX++ slots for I/FB fanouts or InfiniBand coupling fanouts.
 - Two flexible service processor (FSP) cards for system control.
 - Four DC Converter Assemblies (DCAs) that provide power to the CPC drawer. Loss of one DCA leaves enough power to satisfy the drawer's power requirements (n+1 redundancy).
 - > The DCAs can be concurrently removed and replaced (one at a time).
- Water-cooling manifold for PU chips.



A Frame has the following major components (from top to bottom of the frame):

- Two support element (SE) servers that are installed at the top of the A frame.
 - In previous z Systems, the SEs were notebooks in the Z Frame.
 - For z13, the SEs are replaced by the 1U servers, which are mounted at the top of the 42U EIA frame.
- Two optional Internal Battery Features (IBFs), which provide the function of a local uninterrupted power source. The IBF enhances the robustness of the power design, increasing power line disturbance immunity.
- One PCIe I/O drawer. The presence of this PCIe I/O drawer depends on the I/O configuration of the z13.
- Two System Control Hubs (SCH). The SCHs are the replacement of the Bulk Power Hubs that were used in previous z Systems.

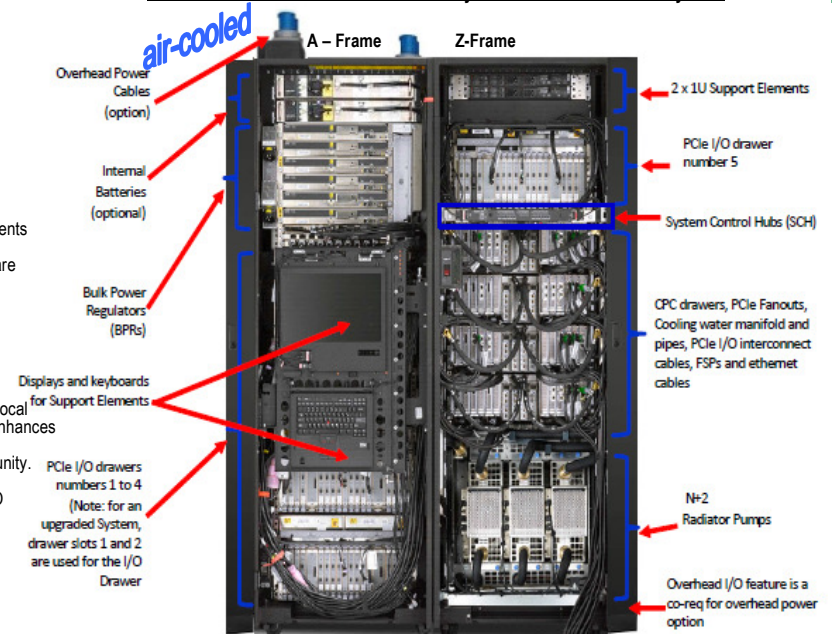
- Up to four CPC drawers. The number of the CPC drawers depends on the model number of the z13. At least one CPC drawer is installed; the additional ones are filled up from the bottom to the top.
- The cooling units for the closed loop water-cooling system of the CPC drawers in the bottom of the A Frame differ for air-cooled or water-cooled systems:
 - For an air-cooled z13, three pumps and three blowers (N+2 redundant design) are installed.
 - For a water-cooled z13, two Water Conditioning Units (WCUs) are installed. The WCUs are connected to a customer-operated (data center) chilled water supply.

Z Frame has the following major components (from top to bottom of the frame):

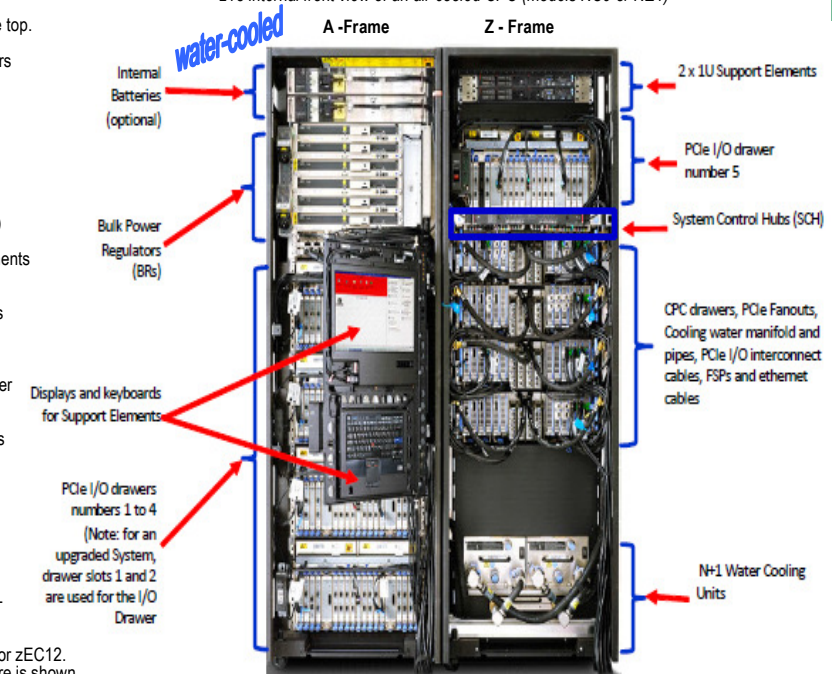
- Two or four optional Internal Battery Features (IBFs). The number of batteries depends on the number of bulk power regulators (BPRs) that are installed. IBFs are always installed in pairs.
- Bulk power regulators (BPR). The number of BPRs varies depending on the configuration of the z13.
- The Keyboard and Display tray, which is in front of the I/O drawer slots, contains the keyboard and the display that are connected to the SEs.
- Up to four drawers, which can be any combination of up to two I/O drawers and up to four PCIe I/O drawers:
 - The PCIe I/O drawer is used for all new installations or can be carried forward through miscellaneous equipment specification (MES).
 - The I/O drawer itself can be carried forward only with an MES from z196 or zEC12.
- An optional overhead power cable feature is shown (top right - air cooled).

Note: When this feature is ordered, it is present on the Z frame. The top I/O exit cabling feature also must be installed in this case.

The z13 can be delivered as an air-cooled system or as a water-cooled system.



z13 internal front view of an air-cooled CPC (models NC9 or NE1)



z13 internal front view of a water-cooled CPC (models NC9 or NE1) without the optional top exit I/O and power feature is shown.