



# IBM z14, designed to help you build leadership in trusted digital experiences

## Table of contents

<a href="#">2 Overview</a>	<a href="#">24 Product number</a>
<a href="#">2 Key prerequisites</a>	<a href="#">56 Publications</a>
<a href="#">2 Planned availability date</a>	<a href="#">58 Technical information</a>
<a href="#">3 Description</a>	<a href="#">75 Terms and conditions</a>
<a href="#">21 Product positioning</a>	<a href="#">77 Prices</a>
<a href="#">22 Statement of general direction</a>	<a href="#">122 Order now</a>

## At a glance

### Announcing the IBM<sup>®</sup> z14

Today's announcement extends IBM Z<sup>®</sup> leadership with:

- Agile innovation through a trusted cloud infrastructure  
With IBM z14 you can rapidly develop and deliver high-quality services deployed on a trusted cloud infrastructure that is flexible, efficient, and resilient, and includes enhanced security features.
- The use of pervasive encryption for most extended format data sets can help address compliance requirements around encryption of data on disk and tape devices.
- New high-performance processors, large memory, and synchronous I/O to storage are designed to deliver significant performance improvements, driving faster user response times.
- New scale is designed to help you manage more workloads at less cost with increases in capacity per core and increases in single system capacity.
- Developers and administrators with no mainframe resources can rapidly develop new services, and monitor and provision resources without the need for new specialized skills.

- Trusted insight built into everything you do with advanced cognitive and analytics processing

With IBM z14 in the era of cognitive business you can build trusted insight into everything you do for smart operations, intelligent transactions and interactions, as well as intuitive business processes. The IBM z14 provides the ideal hardware platform for running these cognitive and analytical workloads.

- Clients can build new cognitive and analytical applications by taking advantage of data natively created on IBM Z using industry-standard tools like Apache Spark.
- Clients can help enhance the productivity of data scientists and improve time to value of Machine Learning (ML). Deploying ML on IBM Z gains the benefits of data gravity, high security, and IBM Z resiliency.
- Integrated IBM Z data sources allow clients to capture new business value by leveraging insights from dark transactional data in their systems of insight.

- IBM Blockchain, driving next-generation business networks

With IBM z14 you can help ensure compliance and protect your business network by deploying Blockchain on IBM Z. IBM Z is the system of record for major organizations around the globe, handling the most sensitive data and critical

transactions. Blockchain is a distributed ledger technology that is transforming businesses. IBM is building a blockchain for business where security, availability, and performance are fundamental. With support for pervasive encryption, as well as improvements to I/O performance, z14 provides the perfect platform for this next generation of ledgers for any industry.

---

## Overview

---

### **IBM z14 provides the cornerstone for the trust economy**

The world is in the midst of a transformation. It's having a profound effect on us as individuals, in business, and in society at large. As businesses adapt to capitalize on digital, trust will be the currency that drives this new economy.

Trust is the foundation of digital relationships. Consumer, client, and partner expectations have grown. They demand security, transparency, and greater value in every interaction and transaction as this new currency is exchanged.

Data is the new source of business value and differentiation. The ability to rapidly derive actionable insights will enable progressively smarter business decisions and improve customer experiences, leading to new revenue streams. Data protection is paramount for trust across the ecosystem.

Digital experiences are delivered through the cloud. Businesses must be open and connected in order to drive innovation at speed. They must accelerate development and delivery of secure, scalable services with new economic models.

### **Introducing the new IBM z14, designed for trusted digital experiences**

---

## Key prerequisites

---

See the [Hardware requirements](#) and [Software requirements](#) sections of this announcement.

---

## Planned availability date

---

- September 13, 2017
  - Features and functions for the IBM z14
  - IBM z14 Models M01, M02, M03, M04, and M05
  - zEC12 air-cooled upgrades to IBM z14 air-cooled
  - zEC12 air-cooled upgrades to IBM z14 water-cooled
  - zEC12 water-cooled upgrades to IBM z14 water-cooled
  - z13™ air-cooled upgrades to IBM z14 air-cooled
  - z13 air-cooled upgrades to IBM z14 water-cooled
  - z13 water-cooled upgrades to IBM z14 water-cooled
  - Field installed features and conversions on IBM z14 that are delivered solely through a modification to the machine's Licensed Internal Code (LIC)
  - TKE 9.0 LIC (#0879) on z14, z13, and z13s
  - HMC (#0082) on z14, z13, and z13s
  - HMC Rack Mount (#0083) on z14, z13, and z13s
  - TKE Rack Mount w/4768 (#0085) on z14, z13, and z13s
  - TKE w/4768 (#0086) on z14, z13, and z13s
  - Coupling Express<sup>(R)</sup> LR (#0433) on z14, z13, and z13s

- December 15, 2017
  - z/VM<sup>®</sup> guest exploitation support for the Instruction Execution Protection Facility
  - z/VM guest exploitation support for pause-less garbage collection
  - z/VM support for encrypted paging
- December 31, 2017
  - MES features for Models M01, M02, M03, M04, and M05
  - IBM HMC Mobile for Z and LinuxONE

---

## Description

---



The newest member of the IBM Z<sup>®</sup> family, the IBM z14 (z14), is designed to be the cornerstone for a trust economy. IBM z14 provides a scalable, highly available platform that delivers differentiated value to enable business growth, reduce cost, and protect existing investments.

Today's announcement extends IBM Z leadership with IBM z14, offering:

- More total system capacity as compared to the z13 for exceptional scale in a single footprint.
- Faster uniprocessor performance as compared to z13.
- 170 cores to configure (versus 141 on z13).
- Up to 32 terabytes (TB) of available Redundant Array of Independent Memory (RAIM) real memory per server to help improve transaction response times, lower CPU costs, simplify capacity planning, enlarge in-memory buffer pools, and ease deploying memory-intensive workloads.
- 2x more on-chip cache per core, compared to z13, to minimize memory waits while maximizing the throughput of concurrent workloads -- perfectly optimized for data serving.
- A design for pervasive encryption allowing you to encrypt many new data sets transparently, which can help you to provide an envelope of protection around data placed on IBM Z. This includes cryptographic performance improvements with the Crypto Express6S (#0893) and the IBM Z processor based cryptography

with the CP Assist for Cryptographic Functions that helps enable the protection of data in flight or at rest.

- Hardware accelerated encryption on every core with the Central Processor Assist for Cryptographic Function (CPACF) feature which is designed to provide faster encryption and decryption than previous servers.
- Economies of scale with next-generation multithreading (SMT) for Linux™ and zIIP eligible workloads, new support for the I/O System Assist Processor (SAP), 2x AES performance over z13, a True Random Number Generator, SHA3 support, and RSA/ECC acceleration.
- New instructions in Single Instruction Multiple Data (SIMD) which are designed to give a performance boost for traditional workloads using COBOL and new applications like analytics.
- FICON<sup>®</sup> Express16S+ (#0427, 0428) which is designed with a boost in I/O rates and a reduction in single stream latency to help absorb large application and transaction spikes driven by large unpredictable analytic and mobile workloads.
- Improved compression ratio (using Huffman coding) and order-preserving compression for the on-chip compression coprocessor which results in fewer CPU cycles to enable further compression of data, improving memory, transfer, and disk efficiency.
- 10 GbE RoCE Express2 with 4x more virtual functions per adapter and a performance improvement.
- Coupling Express LR (#0433), for long range coupling connectivity. It is a replacement for the existing InfiniBand 1x HCA3-O LR coupling links.
- IBM Hardware Management Console (HMC) 2.14 with simplification updates to improve workspace and manage system time. New security features include Multifactor Authentication and a new HMC Mobile application for monitor and recover action controls.
- IBM Secure Service Container (formerly called z Appliance Container Infrastructure -- zACI) which can be used to create isolated partitions for protecting data and applications automatically -- helping to keep them safe from insider threats as well as external cybercriminals.
- IBM Dynamic Partition Manager enhancements which provide a simplified, consumable, enhanced IBM Z experience, reducing the barriers of adoption for new and existing Linux on z Systems™, KVM, and z/VM clients.
- Trusted Key Entry (TKE) 9.0 License Internal Code (LIC).
- Optimized z/OS<sup>®</sup> Platform for Apache Spark.
- Java™ performance: support for reducing program pauses during Java Garbage Collection.
- IBM Virtual Flash Memory (#0604), the replacement for the Flash Express features (#0402, #0403), offering up to 6.0 TB of virtual flash memory in 1.5 TB increments for improved application availability and to handle paging workload spikes.
- IBM zHyperLink Express (#0431), which uses a direct connect short distance link (zHyperLink) to deliver low latency connectivity between z14 and FICON storage systems. Working in conjunction with your existing FICON SAN infrastructure, zHyperLink Express delivers the next generation of I/O for IBM Z storage.
- 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 clients save on their power bills.
- Optional top exit power and I/O cabling designed to provide increased flexibility.
- New ASHRAE class A3 for robustness, data center flexibility, and energy savings.
- The inclusion of IBM zAware function for cutting-edge pattern recognition analytics for fast insight into system health as part of the IBM software product IBM Operations Analytics for z Systems V3.1 -- see Software Announcement [216-373](#), dated September 13, 2016.
- Upgradability to IBM z14 from IBM z13™ and IBM zEnterprise<sup>®</sup> EC12 and upgradability within the IBM z14 family.

## ***The performance advantage***

IBM's Large Systems Performance Reference (LSPR) method is designed to provide comprehensive z/Architecture<sup>(R)</sup> processor capacity ratios for different configurations of Central Processors (CPs) across a wide variety of system control programs and workload environments. For IBM z14, the z/Architecture processor capacity indicator is defined with a 4XX, 5XX, 6XX, or 7XX notation, where XX is the number of installed CPs.

In addition to the general information provided for z/OS V2.2, the LSPR also contains performance relationships for z/VM, KVM, and Linux operating environments.

The capacity per processor engine of an IBM z14 (3906) processor is expected to provide approximately a 10% increase over that of a z13 (2964), with some variation, based on workload and configuration. The largest IBM z14 (3906-7H0) is expected to provide up to 35% more capacity than the largest z13 (2964-7E1). The IFL and zIIP processors on the IBM z14 also provide an optional IBM z14 multithreading technology capability; with the multithreading function enabled, the performance capacity of an IFL or zIIP is expected to typically be up to 25% higher than without the multithreading function enabled.

The LSPR contains the Internal Throughput Rate Ratios (ITRRs) for IBM z14 and the previous-generation IBM Z processor families based upon measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user may experience will vary depending upon considerations such as the level of multiprogramming in the user's job stream, the I/O configuration, the workload processed, and the LPAR configuration. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance estimates stated.

For more detailed performance information, consult the Large Systems Performance Reference (LSPR) available at the [Resource Link<sup>\(R\)</sup>](#) website.

## ***Next-generation availability***

The IBM z14 processor builds upon the Reliability, Availability and Serviceability (RAS) of the z13 family, with the following RAS improvements:

- IBM z14 Level 3 cache enhancements using powerful symbol ECC that now spreads cache data over multiple physical cache arrays. This enables the detection and correction of multibit errors, making the Level 3 cache more resilient and fault tolerant.
- Preemptive DRAM marking added to main memory to isolate and recover failures more quickly.
- Improved small array error handling in the processor cores.
- Additional error thresholding to the processor core to isolate "sick but not dead" failure scenarios.
- An increase in the number of "Resource Groups" (from 2 to 4) to reduce the impact of firmware updates and failures.

## ***Common Criteria Evaluation Assurance Level 5+ (EAL 5+) certification***

The IBM z14 is designed for Common Criteria Evaluation Assurance Level 5+ (EAL5+) certification for security of logical partitions. This means that the IBM z14 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.

## ***Common Cryptographic Architecture (CCA) enhancements***

## ***PCI PTS HSM compliance***

The Crypto Express6S coprocessor with CCA 6.0 is designed to comply with the Payment Card Industry (PCI) Pin Transaction Security (PTS) Hardware Security Module (HSM) Standard. PCI security standards are developed by the Payment Card Industry Security Standards Council to help ensure security in the payment card industry with guidance and direction to HSM vendors to help meet the security needs of the financial payments industry.

The requirements in PCI PTS HSM standards are intended to enhance security for operations that process sensitive data with requirements in key management, HSM API functions, device physical security, controls during manufacturing and delivery, device administration, and a number of other areas.

The Crypto Express6S manufacturing and delivery processes are enhanced with IBM z14 to comply with PCI PTS HSM and with CCA 6.0 introduces several new capabilities both for PCI PTS HSM compliance mode and for general use:

1. A **new derived key hierarchy** so that PCI PTS HSM compliance-tagged key tokens may be used alongside existing keys and services in a nondisruptive fashion -- with existing master keys.
2. **Nondisruptive transition to PCI PTS HSM mode:** Using TKE 9.0, a domain of the Crypto Express6S coprocessor with CCA 6.0 may be placed in PCI PTS HSM compliant mode with no disruption to other domains or to normal/legacy services using the domain that is moved to PCI PTS HSM compliant mode.
3. **Secure Audit Log** hosted from the Crypto Express6S coprocessor with CCA 6.0. Required by the PCI PTS HSM standard, this audit log covers all administrative actions and is managed by TKE 9.0. The new audit log is nondisruptive to normal application processing for domains where it is active.
4. **Secure public key infrastructure:** The Crypto Express6S coprocessor with CCA 6.0 adds native X.509 certificate support including PKCS #10 certificate request generation through a new PKI hosted from the coprocessor. Trust chain certificates are managed via TKE 9.0.
5. **Migration planning assistance** through active application reporting. The Crypto Express6S coprocessor with CCA 6.0 can report in real time what operations and keys will need attention if they are planned for use with PCI PTS HSM compliant-tagged keys. Report details and activity depend on host access library/operating system configuration.
6. **CPACF exportable AES cipher key** support added for AES cipher keys created using new options in CCA 6.0.

### ***Trusted Key Entry (TKE) 9.0 Licensed Internal Code (LIC)***

The following functions are planned to be supported in the TKE 9.0 level of LIC:

- **Crypto Express6S Coprocessor support:** TKE 9.0 is required for managing Crypto Express6S cryptographic coprocessors and manages them through the same Crypto Module notebook functions as previous generations of Cryptographic modules.
- **Key material copy to alternate zone:** TKE 9.0 allows you to copy key material from smart cards in one TKE zone to smart cards in another zone. You might have old 1024 bit strength TKE zones, and may wish to move/copy the key material in those zones into a new, stronger TKE zone. To use this new feature you create new TKE and/or EP11 smart cards on your TKE 9.0 system. You enroll the new TKE and/or EP11 smart cards in an alternate zone. This allows you to copy smart card content from a smart card enrolled in the alternate zone.
- **Save TKE data directory structure with files to USB:** TKE data can be saved to, or restored from, removable media in the same directory structure they were found on the TKE.
- **Create key parts without opening a host:** The TKE application now has the ability for administrators to create key parts without opening a host. This allows the key administrator to create key parts while being offline or before any hosts are defined. This feature can be found in the TKE application under the **Utilities > Create CCA key parts** pull down menu.
- **New TKE Audit Log application:** There is a new **TKE Audit Log** application available for the Privileged Mode Access ID of AUDITOR. This application provides

a new, easy-to-use interface to view the TKE workstation security audit records from the TKE workstation.

- **Heartbeat audit record:** TKE workstations cut an audit record when the TKE boots or when no audit events have occurred during a client-configured duration of time. The record shows the serial number of the TKE local crypto adapter and indicates if the local crypto adapter has been changed since the last check.
- **Performance improvements for domain groups:** With CCA 5.3 and later firmware levels, and TKE 9.0, performance may be improved for operations performed with large domain groups. For example, consider a domain group of 85 domains and a Clear New Master Key Register operation is performed from the TKE. The number of TKE commands issued to the Crypto Express coprocessor from the TKE will be reduced from 85 to 1, thereby reducing the time to complete the operation.
- **Master key part entry on EP11:** Known master key parts can now be entered and saved on smart cards for coprocessors configured in EP11 mode using TKE 9.0. This enables key custodians to manage EP11 master key parts in a fashion that is consistent with coprocessors configured in CCA mode.
- **Smart card readers:** With TKE 9.0, if you have HID/OMNIKEY smart card readers you may continue to use them. See the *TKE User's Guide* for more detailed smart card reader information.
- **New certificate manager for domains:** Every domain will now have the ability to manage a set of parent X.509 certificates for validating operating X.509 certificates used by applications running in the domain. The Crypto Express6S with CCA 6.0 is designed to meet the PCI-HSM PIN Transaction Security v3.0, 2016 standard.

The following features are related to support for the Crypto Express6S with CCA 6.0.

- **Domain mode management:** With CCA 6.0, individual domains are in one of the following modes:
  - Normal mode
  - Imprint mode
  - Compliant mode

Imprint and compliant modes were added to help customers migrate to a PCI-HSM compliant mode and meet PCI-HSM PIN Transaction Security v3.0, 2016 requirements. TKE is required to manage Host Crypto Module domains in imprint and compliant mode.

- **Set clock:** With TKE 9.0, you now have the ability to set the host crypto module's clock. The clock must be set before a domain can be placed in imprint mode.
- **Domain-specific Host Crypto Module Audit Log management:** Domains in imprint mode or compliant mode on a Crypto Express6S maintain a domain-specific module audit log. The TKE provides a feature for downloading the audit records so they can be viewed.
- **Domain-specific roles and authorities:** Domains in imprint mode or compliant mode on a Crypto Express6S must be managed using domain-specific roles and authorities. The TKE provides new management features for the domain-specific roles and authorities. The roles are subject to forced dual control policies which prevent roles from being able to both issue and cosign a command. See the *TKE User's Guide* for detailed information on how to manage imprint and compliant mode domains.
- **Setup PCI Environment Wizard:** To help simplify the management of a PCI compliant domain, the TKE now provides a setup wizard that will create a minimum set of required dual control roles and authorities needed to manage a PCI compliant domain. See the *TKE User's Guide* for detailed information on how to manage imprint and compliant mode domains.

### ***FICON Express16S+***

With the introduction of **FICON Express16S+ on the IBM z14**, 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 autonegotiation 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 z14 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.

The new FICON Express16S+ adapter will work with your existing fiber optic cabling environment, both single mode and multimode optical cables. The FICON Express16S+ feature running at end-to-end 16 Gbps link speeds will provide reduced latency for large read/write operations and increased bandwidth compared to the FICON Express8S feature.

**Increased throughput for the zHPF protocol :** In laboratory measurements using FICON Express16S+ in a z14 with the zHPF protocol and small data transfer I/O operations, FICON Express16S+ operating at 16 Gbps achieved a maximum of 300,000 IOs/sec. In laboratory measurements, using FICON Express16S+ in a z14 with the zHPF protocol and a mix of large sequential read and write data transfer I/O operations, FICON Express16S+ operating at 16 Gbps achieved a maximum throughput of 3200 MB/sec (reads + writes) compared to a maximum of 2560 MB/sec (reads + writes) achieved with FICON Express16S operating at 16 Gbps. This performance data was measured in a controlled environment running an I/O driver program under z/OS. The actual throughput or performance 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.

**Increased throughput for the FCP protocol :** A FICON Express16S+ feature, when defined as CHPID type FCP, conforms to the Fibre Channel Protocol (FCP) standard to support attachment of SCSI devices, to complement the classical storage attachment supported by FICON and zHPF channels. In laboratory measurements, using FICON Express16S+ in an IBM z14 with the FCP protocol for small data transfer I/O operations, FICON Express16S+ operating at 16 Gbps achieved a maximum of 380,000 IOs/sec, compared to the maximum of 110,000 IOs/sec achieved with FICON Express16S operating at 16 Gbps. In laboratory measurements, using FICON Express16S+ in an IBM z14 with the FCP protocol and FICON Express16S+ operating at 16 Gbps, FICON Express16S+ achieved a maximum throughput of 3200 MB/sec (reads + writes). This represents approximately a 25% increase in throughput. The actual throughput or performance 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.

The FCP protocol is supported by z/VM, z/VSE<sup>(R)</sup>, KVM, and Linux on IBM z Systems<sup>TM</sup>. See the [Software requirements](#) section.

**Cleaning discipline for FICON Express16S fiber optic cabling :** With the introduction of 16 Gbps link data rates, it is even more critical to ensure your fiber optic cabling infrastructure performs as expected. Proper fiber optic cleaning and maintenance is required to help ensure that the "data gets through." With 16 Gbps link data rates over multimode fiber optic cabling, link loss budgets and distances are reduced. Single-mode fiber optic cabling is more "reflection sensitive." With high link data rates and single-mode fiber optic cabling there is also less margin for error. The cabling is no longer scratch-tolerant and contaminants such as dust and oil can present a problem. To keep the data flowing, proper handling of fiber trunks and jumper cables is critical as well as thorough cleaning of fiber optic connectors. Work with your data center personnel or IBM personnel to ensure you have fiber optic cleaning procedures in place.

**Channel subsystem (CSS) scalability:** The IBM z14 server, like the IBM z13 server, has support for six logical channel subsystems (LCSSs) which are required to support the 85 LPARs for IBM z14, and four subchannel sets.

### **OSA-Express6S - an Ethernet technology refresh**



A new generation of Ethernet features is being introduced for use in the PCIe I/O drawer and continues to be supported by the 16 Gbps PCIe Gen3 host bus. This is an introduction of the full family of features -- 1000BASE-T Ethernet for copper environments, in addition to 10 Gigabit Ethernet (10 GbE) and Gigabit Ethernet (GbE) for single-mode and multimode fiber optic environments. The performance characteristics are comparable to the OSA-Express5S features. They also retain the same form factor and port granularity -- two ports per feature for the 1000BASE-T Ethernet and Gigabit Ethernet features, and one port per feature for the 10 Gigabit Ethernet features.

The OSA-Express6S family of features (#0422, #0423, #0424, #0425, #0426) is exclusive to the z14. They are supported by z/OS, z/VM, z/VSE, z/TPF, Linux on z Systems, and KVM hypervisor. See the [Software requirements](#) section.

### **IBM Virtual Flash Memory**

IBM Virtual Flash Memory (VFM) is the replacement for the Flash Express features (#0402, #0403) which were available on the IBM zEC12 and IBM z13. No application changes are required to change from IBM Flash Express to VFM.

IBM Virtual Flash Memory is designed to help improve availability and handling of paging workload spikes when running z/OS V2.3, V2.2, or V2.1, or on z/OS V1.13\*. With this support, z/OS is designed to help improve system availability and responsiveness by using VFM across transitional workload events such as market openings, and diagnostic data collection. z/OS is designed to help improve processor performance by supporting middleware exploitation of pageable large (1 MB) pages.

Using VFM can help availability by reducing latency from paging delays that can occur at the start of the workday or during other transitional periods. It is also designed to help eliminate delays that can occur when collecting diagnostic data during failures. VFM can also be used in Coupling Facility images to provide extended capacity and availability for workloads making use of WebSphere<sup>®</sup> MQ Shared Queues structures.

VFM can therefore help organizations meet their most demanding service level agreements and compete more effectively. VFM is designed to be easy to configure, and to provide rapid time to value.

\* z/OS V1.13 has additional requirements. See the [Software requirements](#) section.

### **IBM zHyperLink Express**

IBM zHyperLink Express is a direct connect short distance, IBM Z I/O adapter offering extremely low latency connectivity to FICON storage systems. Working in conjunction with your existing FICON SAN infrastructure, zHyperLink fosters a new I/O paradigm for IBM mainframes. zHyperLink improves application response time, cutting I/O sensitive workload response time by up to 50% without requiring application changes. zHyperLink Express is a 2 port adapter which resides in the PCIe I/O drawer and supports direct connectivity to FICON storage systems at distances up to 150 m.

Note: This response time estimate is based on IBM internal measurements and projections that assume 75% or more of the workload response time is associated with read DASD I/O and the storage system random read cache hit ratio is above 80%. The actual performance that any user will experience may vary.

### **Dynamic Partition Manager (DPM)**

Dynamic Partition Manager (DPM) provides simplified hardware and virtual infrastructure management, including partition lifecycle and integrated dynamic I/O management for Linux running in an LPAR, under KVM on z, and under z/VM 6.4. Using DPM, an environment can be created, provisioned, and modified without disrupting running workloads, and monitored for troubleshooting. Currently, DPM supports FCP storage. Enhancements to DPM simplify the installation of the Linux operating system, and support additional hardware adapters. These enhancements include:

- Support for autoconfiguration of devices to simplify Linux operating system installation, where Linux distribution installers exploit function
- Secure FTP through HMC for booting and installing an operating system via FTP
- Support for OSA-Express 6S, FICON Express 16S+, Crypto Express6S, and RoCE Express2 adapters

A CPC can be configured in either the Dynamic Partition Manager mode or PR/SM™ mode. The mode is enabled prior to the CPC power-on reset (POR).

Dynamic Partition Manager mode requires two OSA-Express 1000BASE-T Ethernet features for primary and backup connectivity (OSA-Express6S 1000BASE-T Ethernet, #0426 or OSA-Express5S 1000BASE-T Ethernet, #0417), along with associated cabling (HW for DPM, #0016).

### ***The IBM Secure Service Container***

The IBM Secure Service Container is a framework for securely deploying software appliances on IBM Z and LinuxONE. Currently, there are three offerings that exploit the Secure Service Container:

- IBM Blockchain High Security Business Network
- IBM Operations Analytics for z Systems- zAware
- IBM z/VSE Network Appliance

The Secure Service Container consists of both a firmware framework and a software framework.

The following is an enhancement to the z14 IBM Secure Service Container firmware framework:

- Simplification - Dynamic Partition Manager support for dynamic resource management and creation of Secure Service Container LPARs without needing to re-IML.

The following are enhancements that have recently been made to the IBM Secure Service Container software framework:

- Security
  - Enable secure boot of appliance via system unique key smart card access such that the Secure Service Container or system administrator cannot utilize privileged credentials to see or access the key.
  - Runtime and tamper protection via BTRFS Filesystems for root and data volumes.
- Appliance management
  - Support the addition of FCP (and ECKD™) storage to different disk pools via the appliance UI.
  - Support network configurations managed by IPv4, IPv6, and VLAN configurations from the appliance UI.
  - Enable appliance updates including import from a prior, saved and exported configuration -- avoid losing configuration data (going back to a "Factory Install"-like state); particularly useful for Blockchain, which typically utilizes many concurrently running instances.
  - Support different users and groups via Local LDAP server and UI management.
  - Support starting appliance installer from a running appliance without having to interface with the HMC.
- Usability
  - Avoid appliance spoofs by ensuring that a trusted and uniquely signed instance of an appliance is booted only in one LPAR, not multiple LPARs.

### ***z/Architecture mode***

As announced on January 14, 2015 with Hardware Announcement [115-001](#), dated January 14, 2015, beginning with IBM z14, all IBM Z systems will only support operating systems running in z/Architecture mode. This applies to operating systems running native on PR/SM as well as operating systems running as second-level guests. IBM operating systems that run in ESA/390 mode are either no longer in service or only currently available with extended service contracts, and they are not usable on systems beginning with IBM z14. However, IBM z14 does provide ESA/390-compatibility mode, an environment supporting a subset of DAT-off ESA/390 applications in a hybrid architectural mode.

All 24-bit and 31-bit problem state application programs originally written to run on the ESA/390 architecture will be unaffected by this change.

### ***z/OS support for the IBM z14***

New functions in z/OS continue to enhance the role of IBM Z, with support for the IBM z14 and its role in helping you provide solutions for a trusted digital economy. Capabilities designed to optimize high availability, performance, security, and operational flexibility can help organizations grow and secure their most critical transaction environments.

In addition to base processor support, z/OS provides the support for these IBM z™ 14 functions and features as described in IBM Software Announcement [217-246](#), dated July 17, 2017, IBM z/OS Version 2 Release 3 -- Engine for digital transformation, dated July 17, 2017:

- Improved cryptographic capabilities that can be leveraged to begin implementation of IBM's pervasive data encryption strategy.
- The IBM zHyperLink Express feature (also, see the **IBM zHyperLink Express** section of this announcement).
- Cryptography enhancements available with the Crypto Express6s feature.
- Asynchronous Memory Clear using System Assist Processors (SAPs).
- Additional new I/O attachment options including the OSA-Express 6S, RoCE Express 2, and FICON Express 16S+ features.
- Coupling Facility Level (CFLEVEL) 22 and new Coupling link features (also, see the **Parallel Sysplex<sup>®</sup> enhancements** section of this announcement).
- The Guarded Storage Facility, exploited by IBM SDK for z/OS, Java Technology Edition, Version 8 (5655-DGG).
- The Instruction Execution Protection Facility.
- IBM Virtual Flash Memory.

See the [Software requirements](#) section of this announcement for the minimum z/OS requirements for the IBM z14 and its features.

### ***Container Pricing for IBM Z***

IBM is introducing Container Pricing for IBM Z for qualified solutions running on IBM z13 and z14 servers. Container Pricing will provide simplified software pricing for qualified solutions, combining flexible deployment options with competitive economics that are directly relevant to those solutions.

Container Pricing can scale from collocated solutions within existing LPARs, through to separate LPARs, up to multiple-LPAR solutions, without directly impacting the cost of unrelated workloads.

Additionally, Container Pricing will simplify pricing and billing on the IBM Z platform, by superseding a number of existing price offerings and by fully automating the billing process.

IBM initially announces three solutions that will be enabled with Container Pricing:

- The New Application Solution will provide a highly competitive stand-alone priced offering for new z/OS applications, such as CICS<sup>®</sup> TS or WebSphere applications.

The New Application Solution is the strategic replacement for the current zCAP and IWP priced offerings.

- The Application Development and Test Solution will provide highly competitive stand-alone pricing for z/OS based development and test workloads. Modern DevOps tooling can be optionally added at uniquely discounted prices.
- The Payments Solution will provide a "per payment" pricing option for IBM Financial Transaction Manager for z/OS deployments. This new offering directly ties operational cost to business value by basing the price on the number of payments processed, rather than capacity used to process them.

Container Pricing for IBM Z is planned to be available by year end 2017 and enabled in z/OS V2.2 and z/OS V2.3 with the PTFs for APARs associated with fix category IBM.Function.PricingInfrastructure. z/OS will enhance both the Workload Manager capability of z/OS (z/OS WLM) and the Sub-Capacity Reporting Tool (SCRT) to support Container Pricing. This includes:

- The introduction of a new Tenant Resource Group capability within z/OS WLM to allow the metering and optional capping of workloads, along with the ability to map those workloads directly to Container Pricing.
- Enhancements to SCRT to capture eligible Container Pricing workloads, allowing for the billing of those solutions independently of traditional Sub-Capacity pricing.

### ***z/VM support for the IBM z14***

With the PTF for APAR VM65942, planned to be available August 25, 2017, z/VM V6.3 and V6.4 provide support that will enable guests to exploit function supported by z/VM on IBM z14, which includes:

- ***z/Architecture support:*** The z/VM Stand-Alone Program Loader (SAPL) utility, DASD Dump Restore (DDR), and the Stand-Alone Dump utility have been enhanced to run entirely in z/Architecture mode. z/Architecture support for these utilities is in the base of z/VM V6.4 and provided for z/VM V6.3 with the available PTF for APAR VM65856. z/Architecture support for the Stand-Alone Dump utility is in the base of z/VM V6.4 and provided for z/VM V6.3 with the available PTFs for APARs VM65921 and VM65922.
- ***New hardware facilities:*** z/VM will enable guest use of new instructions and capabilities available on IBM z14.
- ***ESA/390-compatibility mode for guests:*** IBM z14 does not support the full ESA/390 architectural mode. However, IBM z14 does provide ESA/390-compatibility mode, an environment supporting a subset of DAT-off ESA/390 applications in a hybrid architectural mode. z/VM will provide the support necessary for DAT-off guests to run in this new compatibility mode, which allows guests such as CMS, GCS, and those that start in ESA/390 mode briefly before switching to z/Architecture mode to continue to run on IBM z14.

The available PTF for APAR VM65976 provides infrastructure support for ESA/390 compatibility mode within z/VM V6.2, V6.3, and V6.4, and must be installed on all members of an SSI cluster before any z/VM V6.3 or V6.4 member of the cluster is run on an IBM z14 server.

- ***Support for Crypto Express6S:*** z/VM support for the new Crypto Express6S (CEX6S) adapter is included for both shared and dedicated guest use. As with the prior crypto adapter support, the CEX6S adapter can be configured as an accelerator or as an IBM Common Cryptographic Architecture (CCA) coprocessor for shared or dedicated use by z/Architecture guests. When the CEX6S adapter is configured as an IBM Enterprise Public-Key Cryptography Standards (PKCS) #11 (EP11) coprocessor, the domains on the adapter can be dedicated to z/Architecture guests, but not shared. With Crypto Express6S support and support for the new and enhanced CPACF functions, z/VM V6.3 and V6.4 provide the prerequisite IBM z14 encryption support to enable exploitation by guests in support of pervasive encryption of data in flight and at rest.
- ***Dynamic I/O support:*** Dynamic I/O support is provided for managing the configuration of OSA-Express 6S OSD CHPIDs, FICON Express 16S+ FC and

FCP CHPIDs, Regional Crypto Enablement (RCE), zHyperLink Express, and RoCE Express 2 functions. The available PTF for APAR VM65865 provides dynamic I/O support for the Coupling Express LR adapter in z/VM V6.3 and z/VM V6.4, and is applicable to z13, z13s, and z14.

- **RoCE Express2 support:** Guest exploitation support for RoCE Express2 allows the adapters to be brought online and attached to supporting guests for exploitation.
- **Improved memory management support:** The IBM z14 processor design allows greater concurrency in address translation. This improvement may increase z/VM workloads' performance compared to z13, particularly when z/VM is configured to exploit multithreading.

### **Installing z/VM on the IBM z14**

z/VM V6.3 cannot be installed directly on an IBM z14 server. Instead, z/VM V6.3 must be installed on a prior IBM Z server and the PTFs for APARs VM65942, VM65921, and VM65922 must be applied prior to moving the image to z14. After applying all required service and before IPLing z/VM V6.3 on an IBM z14 server, an updated SAPL must be installed by using the updated SALIPL MODULE provided by the PTF for APAR VM65856. Otherwise, z/VM V6.3 will not successfully IPL on a z14 server. In addition, after applying the PTFs for APARs VM65921 and VM65922, the stand-alone dump program must be re-installed using the updated SDINST utility.

z/VM V6.4 can be installed directly on a z14 server with an image obtained from IBM after August 25, 2017. The PTF for APAR VM65942 must be applied immediately after installing z/VM V6.4.

### **Guest exploitation support for the Instruction Execution Protection Facility**

With the PTF for APAR VM65986, planned to be available December 15, 2017, z/VM V6.4 will provide support for guest exploitation of the IBM z14 Instruction Execution Protection Facility. This facility provides functionality to help improve the security of programs running on IBM Z by allowing virtual memory elements to be identified as containing only data. If an attempt is made to fetch an instruction from an address in such an element or if an address in such an element is the target of an execute-type instruction, a Protection Exception will occur.

### **Guest exploitation support for pause-less garbage collection**

With the PTF for APAR VM65987, planned to be available December 15, 2017, z/VM V6.4 will provide support for guest exploitation of the z14 Guarded Storage Facility. This facility is designed to improve the performance of garbage-collection processing by various languages, in particular Java.

### **Encrypted paging support**

With the PTF for APAR VM65993, planned to be available December 15, 2017, z/VM V6.4 will provide support for encrypted paging, in support of the z14 pervasive encryption philosophy of encrypting data in flight and at rest. Cipherring will occur as data moves between active memory and a paging volume owned by z/VM. Included in the support is the ability to dynamically control whether a running z/VM system is encrypting this data.

### **Sub-capacity pricing terms for z/VM and select z/VM-based programs**

Sub-capacity pricing for the z/VM V6 operating environment is available to clients running z/VM Version 6 Release 3 or higher. Software pricing at less than full machine capacity can provide more flexibility and improved cost of computing as a client manages the volatility and growth of new workloads. For more information about Sub-capacity pricing terms for z/VM and z/VM-based programs, see Software Announcement [217-267](#), dated July 17, 2017.

### **z/VM continuous delivery philosophy**

IBM has adopted a new practice for z/VM, known as the continuous delivery (CD) support model, for delivering new function via PTFs to assist enterprises in receiving function more quickly. IBM will deliver new function via PTFs, while continuing to recognize that base stability is a critical component. Clients will continue to receive the same world-class support and assistance from IBM to which they are accustomed as part of the standard Software Subscription and Support (S&S) offering. The z/VM [service page](#) provides details on new z/VM functions that have been or will be provided using this continuous delivery model and allows for subscribing to be alerted when new functions have been made available.

### **Additional z/VM V6.4 enhancements during 2017**

The following enhancements for z/VM V6.4 are planned during 2017:

- **Concurrent I/O support for the IBM XIV<sup>®</sup> Storage System:** With the available PTF for APAR VM65929, the z/VM SCSI container enables multiple I/O requests to be issued concurrently to EDEVICES backed by IBM XIV Storage System hardware, which may improve performance. This support particularly benefits EDEVICE paging I/O or volumes containing multiple minidisks.
- **Distributed IUCV enhancements:** With the available PTF for APAR VM65872, the rules for Distributed IUCV CONNECT in a single system image (SSI) environment are revised. This support allows IUCV CONNECT to work in cases that were originally restricted, primarily because they involved a Multiconfiguration Virtual Machine (IDENTITY) user.

This support also makes it easier for an administrator to change the Distributed IUCV policy for an SSI cluster. Previously, the Distributed IUCV policy within an active SSI cluster could be changed only by shutting down all members at the same time. As this new support is applied to each system, it will be possible for that member to join the cluster regardless of its Distributed IUCV configuration.

- **NICDEF security control enhancements:** With the PTFs for APARs VM65925, VM65926, and VM65931, planned to be available August 4, 2017, the NICDEF directory statement is enhanced to provide a set of new operands referred to as Directory Network Authorization (DNA). With DNA, a system administrator can configure and consolidate a virtual NIC device and its network properties in a centralized location --z/VM's User Directory. Operational differences between PORTBASED and USERBASED VSwitches have been eliminated with this support. A system administrator has the option to manage a VSwitch by user, by port number, or using a combination of the two methods. While the management of USERBASED and PORTBASED VSwitches is simplified, Live Guest Relocation of a guest connected to a VSwitch still requires the destination system to have a VSwitch with a PORTBASED or USERBASED designation matching that of the source system.
- **RACF<sup>®</sup> security policy enhancements:** With the available PTFs for APARs VM65930 and VM65982, the z/VM RACF Security Server feature supports the following security policy enhancements:
  - Read-Only Auditor (ROAUDIT): This new user role allows many of the common auditing tasks to be performed without the ability to modify settings or manipulate audit logs.
  - XAUTOLOG.ON control: This enhancement introduces new security policy requirements for the ON operand of the CP XAUTOLOG command. This changes default behavior of this operand when an ESM is installed on your system.
  - List the current VMXEVENT profile: This enhancement updates the SETEVENT LIST command to provide an authorized user with the names of the VMXEVENT profiles activated and in use by RACF.

**Note:** The PTF for APAR VM65923 provides infrastructure support in z/VM V6.2, V6.3, and V6.4 and must be installed on all the members of an SSI cluster before any V6.4 member is running with the PTF for APAR VM65930.

- **Crypto Express APVIRT support for the z/VM TLS/SSL server and LDAP/VM:** With the available PTF for APAR PI72106, the z/VM System SSL cryptographic library is updated to offload cryptographic operations to Crypto Express hardware associated with your IBM Z or LinuxONE hardware, which may

improve performance. This support is intended for clear-key RSA operations. To enable this support, add the CRYPTO APVIRTUAL statement to the pertinent service virtual machine entries in the z/VM User Directory.

- **EAV minidisk support:** With the PTFs for APARs VM65943 and VM65945, planned to be available August 25, 2017, enhanced EAV support for 3390-A DASD devices supporting 28-bit cylinder addresses is provided. This support will allow non-fullpack minidisks to reside anywhere on the volume, including beyond the current restriction of the 64K cylinder boundary (0-65519), and up to the one terabyte limit currently supported.
- **Dump processing enhancements:** With the available PTF for APAR VM65989, the amount of time it takes for z/VM to write a hard abend or snap dump to 3390 DASD may be reduced. The improvements were achieved via changes to the I/O channel program used to write central memory to z/VM pool space located on 3390 DASD. This APAR also provides support for reducing dump size by excluding PGMBKs from snap dumps.
- **Alternate subchannel set dynamic I/O support:** With the PTF for APAR VM65942, planned to be available August 25, 2017, z/VM V6.4 provides dynamic I/O commands within the z/VM hypervisor for supporting define, modify, and delete of a device within either the default or alternate subchannel sets. HCD support is currently not available.

### ***z/VSE support for the IBM z14***

**z/Architecture support:** Starting with z/VSE V5.2, z/VSE and its stand-alone utilities run entirely in z/Architecture mode.

### **Access to a Parallel Sysplex environment**

Parallel Sysplex is a synergy between hardware and software -- a highly advanced technology for clustering designed to enable the aggregate capacity of multiple z/OS systems to be applied against common workloads. z/OS combined with z14, z13, z13s, zEC12, and zBC12 servers, Coupling Facilities, Server Time Protocol (STP), Parallel Sysplex InfiniBand (PSIFB) 1x and 12x coupling links, and ICA SR and CE LR coupling links, depending on processor type, allows you to harness the power of multiple systems as though they were a single logical computing system.

Coupling links provide a path to transmit and receive Coupling Facility (CF) data as well as Server Time Protocol (STP) timekeeping messages. The CF data may be exchanged between z/OS and the CF or between CFs.

**STP - Time synchronization for Parallel Sysplex Server Time Protocol (STP)** is designed to allow events occurring in different servers to be properly sequenced in time. STP is designed for servers that have been configured in a Parallel Sysplex or a basic sysplex (without a Coupling Facility), as well as servers that are not in a sysplex but need time synchronization.

STP is a server-wide facility that is implemented in the Licensed Internal Code (LIC), presenting a single view of time to Processor Resource/Systems Manager™ (PR/SM). STP uses a message-based protocol in which timekeeping information is passed over externally defined coupling links between servers. The STP design introduced a concept called Coordinated Timing Network (CTN), a collection of servers and Coupling Facilities that are time-synchronized to a time value called Coordinated Server Time.

### **STP enhancements**

IBM z14 will introduce an additional stratum level 4 for Server Time Protocol (STP) synchronization. With the additional stratum level, STP can synchronize systems up to 3 steps away from the Current Time Server (CTS). Prior systems allowed synchronization only up to level 3, or up to 2 steps from the CTS. This additional stratum level is not intended for long-term use; rather, it is specifically intended for short-term use during configuration changes for large timing networks, to avoid some of the cost and complexity caused by being constrained to a 3-stratum timing configuration.

IBM z14 will also introduce a new Graphical User Display for the STP network and configuration. The new user interface has been revamped for a quick, intuitive view of the various pieces of the STP relationship network map, including the status of the components of the timing network. The new z14 support allows the new level of HMC to manage older systems using the same new interface.

### ***Parallel Sysplex enhancements***

A number of exciting new enhancements are available for IBM z14 for use within Parallel Sysplex environments.

For long range coupling connectivity, the new **Coupling Express Long Reach (CE LR) link** (FC #0433) is available with z14. This CE LR link is concurrently being made available on, and is compatible with z13 and z13s systems, which allows for sysplex connectivity back to these systems. Unlike the 1x IFB InfiniBand coupling links, which were plugged into the processor drawer, the CE LR link is plugged within a PCIe I/O drawer slot, taking advantage of more industry-standard I/O technology, such as converged Ethernet. The location inside the PCIe I/O drawer allows users to fan links out across multiple 2-port CE LR cards, up to a maximum of 32 features (64 links maximum) for z14 and z13 servers, and up to a maximum of 16 features (32 links maximum) for z13s servers, in 2 link increments. Compared to the HCAO-3 IFB InfiniBand LR with 4-port and 4-link increments, the CE LR link allows for more granularity when scaling up or completing maintenance. Link performance is similar to the InfiniBand 1x coupling link and uses identical single-mode fiber. The CE LR link provides point-to-point coupling connectivity at distances of 10 km unrepeated and 100 km with a qualified dense wavelength division multiplexing (DWDM) device.

Per prior Statements of Direction, IBM will remove support for both the HCA3-O LR fanout for 1x IFB InfiniBand coupling links and the HCA3-O fanout for the 12x IFB InfiniBand coupling links for future high-end and midrange IBM Z systems. The z14 server will be the last high-end IBM Z server to support HCA3-O LR 1x IFB InfiniBand coupling links or HCA3-O 12x IFB InfiniBand coupling links, while z13s is the last midrange IBM Z server to support the HCA3-O LR 1x IFB InfiniBand coupling links or HCA3-O 12x IFB InfiniBand coupling links.

IBM Z enterprises should plan to migrate off of InfiniBand coupling links.

- For high-speed short-range coupling connectivity, enterprises should migrate to the Integrated Coupling Adapter (ICA-SR).
- For long-range coupling connectivity, enterprises should migrate to the new CE LR coupling adapter. For long-range coupling connectivity requiring a DWDM, enterprises will need to determine their desired DWDM vendor's plan to qualify the CE LR. See Hardware Announcement [117-031](#), dated March 14, 2017.

**Coupling Facility (CF) processor scalability:** The IBM z14 provides a new level of the Coupling Facility Control Code (CFCC), CFLEVEL 22, which provides new capabilities as described below. Coupling Facility work management and dispatching changes for IBM z14 CFLEVEL 22 allow improved efficiency and scalability for Coupling Facility images. Together, these changes will improve the processor scalability and throughput for a CF image.

- First, ordered work queues have been eliminated from the CF in favor of first-in / first-out queues, avoiding the overhead of maintaining ordered queues.
- Second, protocols for system-managed duplexing have been simplified to avoid the potential for latching deadlocks between duplexed structures.
- Third, the CF image is now able to use its processors in a specialized manner to perform specific work management functions when the number of processors in the CF image exceeds a threshold.

**CF list notification enhancements:** There are significant enhancements in z14 CFLEVEL 22 to CF notifications that inform users about the status of shared objects within a Coupling Facility. The combination of these notification enhancements provides flexibility to accommodate notification preferences among various CF exploiters, and yields more consistent, timely notifications.



- First, structure notifications can use a round-robin scheme for delivering immediate and deferred notifications that avoids excessive "shotgun" notifications, reducing notification overhead.
- Second, there is now an option for delivering "aggressive" notifications, which can drive a notification when new elements are added to a queue, providing initiative to get new work processed in a timely manner.
- Third, notifications can now be driven when a queue transitions between full and not-full, allowing exploiters to redrive messages that could not previously be written to a full queue.

**Coupling link constraint relief** : IBM z14 provides additional physical coupling link connectivity compared to z13. The maximum number of physical ICA SR coupling links (ports) is increased from a maximum of 40 per CEC to 80 per CEC. These higher limits on z14 support higher levels of connectivity and physical consolidation using ICA SR, as well as the concurrent use of InfiniBand coupling, ICA SR, and CE LR links, for coupling link technology migration purposes.

**CF encryption:** z/OS V2.3 provides support for end-to-end encryption for both CF data in flight and data at rest in CF structures (as part of a more pervasive encryption solution). Host-based CPACF encryption is used for high performance and low latency. IBM z14 CFLEVEL 22 CF images are not required, but are recommended in order to simplify some sysplex recovery and reconciliation scenarios involving encrypted CF structures. (Note that the CF image itself never decrypts, nor encrypts, any data.) IBM z14 z/OS images are not required, but are recommended for the improved AES CBC encrypt/decrypt performance that z14 provides.

### **Hardware Management Console (HMC)**

**HMC/SE user interface:** The z14 Hardware Management Console and Support Element will support only the Tree Style user interface. The Classic Style user interface is no longer supported.

The following enhancements have been made to the Tree Style user interface to aid with new users of Tree Style as well as address pain points of existing users.

- A new Masthead with Favorites and Search controls will help users quickly find and launch tasks.
- Tasks will now open in tabs within the user interface (instead of separate browser windows) to make finding and managing running tasks easier.
- There is also the ability to have the task tab "pop-out" into a separate window, giving users the ability to have a similar parallel task display window as on previous Tree Style controls and allowing the task displays to be viewed on other physical displays.

**Manage System Time:** The Manage System Time task replaces the System (Sysplex) Time task on HMC. The new Manage System Time task provides a simplified workflow for system time management including:

- Improved help tools to complement and improve system administrator skills:
  - Inline definition of technical terms.
- Improved user experience with visual representation of configuration panels:
  - Guidance provided within the workflows.
  - Topology displays of system time networks.
  - Errors surfaced in visualization for easier problem resolution of setup errors.
- Single point of system time management for multiple systems.

**IBM Hardware Management Console (HMC) 2.14.0 security enhancements:** New security features in the Hardware Management Console (HMC) 2.14.0 available with IBM z14 include Multifactor Authentication, Enhanced Computing in support of NIST Standard 800-147B, Crypto Compliance Levels, FTP through HMC, SNMP/BCPii

API Security Controls, Secure Console to Console Communication Enhancements, Remote Browser IP Address Limiting, and more.

- **Multifactor Authentication** : The Hardware Management Console will now offer an optional control of Multifactor Authentication in addition to the userid/password controls provided today. If the Multifactor option is selected for a given user, that user will now be required to enter a second authentication factor using a TOTP (Time-based One-Time Password) defined by RFC 6238. RFC 6238 is implemented by freely available smartphone and web apps utilizing a secret key provided per HMC user.
- **HMC Mobile for Z and LinuxONE**: New iOS and Android mobile apps are planned to be available for the HMC 2.14.0 supporting z14, z13, and z13s systems. HMC Mobile will help enable HMC users to securely monitor and manage systems from anywhere. The apps provide system and partition views, status monitoring, hardware messages, operating system messages, and the ability to receive push notifications from the HMC using the existing zRSF (z Systems Remote Support Facility) connection. HMC Mobile is disabled by default and, once enabled, provides a robust set of security controls. Administrators can restrict usage to specific HMC users and IP addresses, require the use of app passwords, enable multifactor authentication, restrict the app to read-only access, and more.
- **Firmware tamper detection** : z14 will also offer an enhancement on the Support Element that provides notification if tampering with booting of firmware on the server (CPC) is detected. This enhancement is designed to meet the BIOS Protection Guidelines recommended and published by the National Institute of Standards and Technology (NIST) in Special Publication 800-147B. If tampering is detected, the Support Element will issue a customer alert via a warning or a lock of the Support Element, depending on the configuration. If "call home" support is enabled on a z14 Hardware Management Console managing the Support Element, additional analysis of the Support Element will be performed and displayed by IBM Resource Link.

In addition to this support, the Hardware Management Console also has been enhanced to provide attempted tamper monitoring and reporting. A newly manufactured Hardware Management Console directly ordered with z14, or at a later time, is required for this protection. Any detected events of attempted tampering will be logged and will issue a customer alert via a warning or a lock of the Hardware Management Console, depending on setup configuration. In addition, if "call home" support is enabled on the Hardware Management Console, supplementary analysis of events logged by the Hardware Management Console will be available on IBM Resource Link.

Although customers can carry forward their Hardware Management Consoles on z14, these tamper protection capabilities will be delivered only on newly manufactured Hardware Management Consoles. The z14 environment can contain both Hardware Management Consoles that have been carried forward and newly manufactured Hardware Management Consoles.

- **IBM Enhanced Remote Support Facility**: The IBM Enhanced Remote Support Facility was first introduced on zEC12/zBC12 systems and for those systems and z13/z13s, both the Enhanced and Legacy Remote Support Facility support could be utilized. The Enhanced support provided improved problem data uploads and fix data downloads. z14 processors will no longer connect to the legacy IBM Support Facility.
- z14 HMCs supporting older z10EC/z10BC -z13 systems will still require connections to the legacy IBM Support Facility.
- z14 HMCs supporting only z14 systems only require IBM Enhanced Support Facility connections.
- A connection to the IBM Enhanced Support Facility is required to support z14 HMCs regardless of the CPC they are supporting.

If you had not previously configured firewalls and proxy support with the ability to connect to the Enhanced Support Facility, this will be required for z14 HMC and CPC connections per above rules.

- **Global OSA/SF:** The HMC Global OSA/SF will now provide a global view of all OSA PCHIDs and the monitoring and diagnostic information previously available in the Query Host command.
- **New characters supported for Load parms:** Starting with z14 the Load parameter for Load task, Activation Load and Image Profiles will now allow three new characters: @#\$ . z13/z13s or older systems support a character set of A-Z, 0-9, "." (period) and " " (blanks). z14 systems will support a character set of A-Z, 0-9, "." (period), " " (blanks), "@", "#", and "\$".
- **FTP through HMC:** To maximize security features, IBM recommends that customers keep their IBM Z on a dedicated network with one HMC network used for that network and the second HMC network used for outward communication (IBM Support Facility, remote browsing, automation). However, for systems prior to z14, this created a security challenge for FTP operations originating from the SE. Customers have to either put their FTP server on the IBM Z dedicated network or put their IBM Z on their intranet network.

Starting with z14, all FTP operations originating from the SE will be proxied through a managing HMC. This now allows the FTP SE originated operations to follow IBM security recommendations. In addition, all HMC/SE tasks that support FTP will provide three options of FTP: FTP, FTPS, and SFTP.

- FTPS is SSL based and uses certificates to authenticate servers.
  - SFTP is SSH based and uses SSH keys to authenticate servers.
  - Username and passwords are required for client authentication in all three protocols.
- **Console to console communications:** HMC consoles have used anonymous cipher suites for some inter-console communication purposes. These cipher suites, while providing encryption and integrity validation, do not provide cryptographic authentication. Network security scanners can detect this, and anonymous cipher suites may not be acceptable to some customers' security policies. Starting with the IBM z14 HMC/SE, the console to console communications solution, when security is enabled, will no longer use anonymous cipher suites and will begin using an industry standard based password driven cryptography system. This system provides cryptographic encryption, integrity validation, and authentication.
  - **SNMP/BCPii API enhancements:** Prior to z14, when you enabled SNMP BCPii via controls for the HMC/SE, it was enabled for all LPARs to have equal send and receive command capability. Starting with z14 there are new "BCPii Permission" controls which allow you to have granular LPAR/System BCPii command controls. The HMC/SE can be configured for Enable/disable send capability, Enable/disable receive capability, Enable for all senders, and Enable for list of origin partitions. These controls can be specified for CPC via the System Details task (HMC or SE) or can be specified for Images via the Image profile and Change LPAR Security task (HMC or SE). Some additional changes have been made to improve the performance for z/OS BCPii, for query operations Profiles, LPAR Controls/Security data, and EC/MCL data.
  - **Removal of Common Infrastructure Module (CIM) Management Interface:** The HMC 2.14.0 will no longer support the Hardware Console Common Infrastructure Module (CIM) Management Interface. The Hardware Management Console Simple Network Management Protocol (SNMP), and Web Services Application Programming Interfaces (APIs) will continue to be supported.

### ***Enhancements to software pricing Technology Transition Offerings***

Complementing the announcement of the z14 server IBM is introducing:

- A new Technology Transition Offering (TTO) called Technology Update Pricing for the IBM z14.

- New and revised Transition Charges for Sysplexes or Multiplexes TTOs for actively coupled Parallel Sysplexes (z/OS), Loosely Coupled Complexes (z/TPF), and Multiplexes (z/OS and z/TPF).

Technology Update Pricing for the IBM z14 extends the software price/performance provided by AWLC and CMLC for z14 servers. The new and revised Transition Charges for Sysplexes or Multiplexes offerings provide a transition to Technology Update Pricing for the IBM z14 for customers who have not yet fully migrated to z14 servers. This ensures that aggregation benefits are maintained and also phases in the benefits of Technology Update Pricing for the IBM z14 pricing as customers migrate.

When a z14 server is in an actively coupled Parallel Sysplex or a Loosely Coupled Complex, you may choose either aggregated Advanced Workload License Charges (AWLC) pricing or aggregated Parallel Sysplex License Charges (PSLC) pricing, subject to all applicable terms and conditions.

When a z14 server is part of a Multiplex under Country Multiplex Pricing (CMP) terms, Country Multiplex License Charges (CMLC), Multiplex zNALC (MzNALC), and Flat Workload License Charges (FWLC) are the only pricing metrics available, subject to all applicable terms and conditions.

When a z14 server is running z/VSE, you may choose Mid-Range Workload License Charges (MWLC), subject to all applicable terms and conditions.

For more information about AWLC, CMLC, MzNALC, PSLC, MWLC, or the Technology Update Pricing and Transition Charges for Sysplexes or Multiplexes TTO offerings, see the [Software Pricing](#) website.

### **Machines eligible to participate in Country Multiplex Pricing**

The z14 is the first new generation of IBM Z hardware since the introduction of Country Multiplex Pricing (CMP).

At the time a client first implements a Multiplex, machines currently eligible to be included in the new Multiplex cannot be older than two generations prior to the most recently available server. The most recent server at any given point in time will be considered generation N, and the prior two generations as N-1 and N-2 respectively.

### **IBM Z hardware family generations concurrent with the general availability of the z14:**

<b>Full name</b>	<b>Short name</b>	<b>Machine type</b>	<b>CMP Machine Generation as of 13 Sep 2017</b>
IBM z14	z14	3906	N
IBM z13	z13	2964	N-1
IBM z13s	z13s	2965	N-1
IBM zEnterprise EC12	zEC12	2827	N-2
IBM zEnterprise BC12	zBC12	2828	N-2
IBM zEnterprise 196	z196	2817	N-3
IBM zEnterprise 114	z114	2818	N-3

Concurrent with the general availability of the z14, the z196 and z114 machines will be designated as previously eligible CMP machines.

Clients are not eligible to create a Multiplex until machines running z/OS or z/TPF (along with any associated CBU machines) that are older than generation N-2 are upgraded, or that workload is transferred to eligible machines, or the older ineligible machines are converted to no longer run z/OS nor z/TPF software. Once a client establishes a Multiplex they may keep the machines originally included in their Multiplex indefinitely, including any machines subsequently designated as previously

eligible. Going forward, any machine to be added to an existing Multiplex must conform to the machine types that satisfy the generation N, N-1, and N-2 criteria at the time that machine is added.

Upon the general availability of the z14 (generation N), clients who are still using a generation N-3 machine (z196 or z114) will have a 3-month grace period to transition into CMP while including that generation N-3 machine. This means the client's first CMP invoice must happen the month following 90 days from the general availability of the z14 (September 13, 2017) which means any transition into CMP for a client with a z196 or z114 machine running z/OS or z/TPF must occur no later than January 1, 2018.

---

### **Accessibility by people with disabilities**

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the [IBM Accessibility](#) website.

---

### **Section 508 of the US Rehabilitation Act**

IBM z14 servers are capable on delivery, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act of 1973, 29 U.S.C. Section 794d, as implemented by 36 C.F.R. Part 1194, provided that any Assistive Technology used with the Product properly interoperates with it.

IBM makes no representation about the Section 508 status of the third-party products included in this offering. Contact the vendor for specific, current information on the Section 508 status of these products.

---

## **Product positioning**

IT today is experiencing a time of exponential growth in data and transaction volumes driven by digital transformation. Businesses must be able to manage, store, and protect the information, and, most important, use it for competitive advantage. This is creating the demand to apply intelligence and insight to the data to build new services wrapped for a customized user experience. From a user perspective, IT must create an environment where users have confidence that data is protected and available from anywhere and any device. This ability to be fast and flexible in delivery of new services, with insight and security, will differentiate a business. The z14 delivers unique capabilities to help with that differentiation.

At the core of every enterprise lies core business data, assets which if lost or compromised could often cause irreparable damage. Core business data is also often governed by regulatory requirements designed to protect data and safeguard privacy, often with high penalties in the event of loss or inadvertent disclosure. Internal and external pressures to protect customer data have changed the perspective around how core business data should be handled and protected. Establishing a "perimeter" around core data using encryption is one of the most impactful ways to protect data and prevent against loss. The objective is to create a fortified perimeter around core business data, wherever it may physically reside. The IBM z14 platform provides pervasive encryption capabilities designed to enable you to protect data efficiently, and without requiring application changes.

The IBM z14 platform provides the hardware infrastructure, in a balanced system design, with the encryption capabilities that now make it possible to create a fortified perimeter around critical business data. The Central Processor Assist for Cryptographic Function (CPACF) is standard on every z14 core, and is enabled via feature code #3863. The CPACF has both the cryptographic suite and performance characteristics that can enable bulk encryption of sensitive business data that makes it possible to fortify, intrinsically protecting business data using encryption technology. Working with the new Crypto Express6S feature (#0893), the key materials used to create this fortified data perimeter are protected, using the IBM

Z® unique protected key CPACF in which the keys used in the encryption process are not visible to the applications and operating system in clear text form.

The IBM Z operating environments, such as z/OS<sup>(R)</sup>, are designed to take advantage of the z14 platform imbedding the use of the z14 cryptographic engines within the operating environment to help create an environment where policies can be enforced that govern intrinsic data protection, helping clients build the perimeter around business data. For more information on IBM Z operating environments' use of the hardware capabilities of z14 see Software Announcement [217-246](#), dated July 17, 2017, IBM z/OS Version 2 Release 3 -- Engine for digital transformation, dated July 17, 2017.

The z14 provides the infrastructure to meet the demands of a digital business. With up to 170 configurable cores, z14 has performance and scaling advantages over prior generations, and more capacity than the z13 141-way. The new FICON<sup>(R)</sup> Express 16S+ features (#0427 and 0428) deliver an increase in I/O rates and in link bandwidth, and a reduction in single-stream latency, providing the system the ability to absorb large applications and transaction spikes driven by unpredictable mobile and IoT devices. Next-generation SMT on z14 delivers improved virtualization performance to benefit Linux<sup>TM</sup>. High-speed connectivity out to the data is critical in achieving exceptional levels of transaction throughput. The new IBM zHyperLink Express adapter (#0431) is a direct connect short distance, IBM Z I/O adapter offering extremely low latency connectivity to FICON storage systems.

With up to 32 TB of real memory, z14 can open opportunities such as in-memory data marts, large buffer pools for data access, and in-memory analytics while giving you the necessary room to tune applications for optimal performance. By exploiting the Vector Packed Decimal Facility that allows packed decimal operations to be performed in registers rather than memory, using new fast mathematical computations, compilers, such as Enterprise COBOL for z/OS, V6.2, Enterprise PL/I for z/OS, V5.2, z/OS V2.3 XL C/C++, the COBOL optimizer, Automatic Binary Optimizer for z/OS, V1.3, and Java<sup>TM</sup>, are optimized on z14. These compilers and optimizer are designed to help improve application performance, reduce CPU usage, and reduce operating costs. Java improvements and the use of crypto acceleration will deliver additional improvements in throughput per core, which gives a natural boost to z/OS Connect EE, WebSphere<sup>(R)</sup> Liberty in CICS<sup>(R)</sup>, Spark for z/OS, and IBM Java for Linux on z Systems<sup>TM</sup>.

To take advantage of new unstructured data, businesses on IBM Z can leverage the use of application programming interfaces (APIs) that can help with the creation and delivery of innovative new services. Linux on z Systems brings additional value to the platform in the form of the co-location advantages in performance and operational efficiency by running Linux side-by-side with z/OS, z/VSE<sup>(R)</sup>, or z/TPF, as well as providing a unique Linux platform for any Linux solution requiring high availability, security, or scalability. Linux on z Systems supports a wealth of new IBM, ISV, and open source products. Many are familiar to application developers, such as Go, Python, Scala, Node.js, Docker, Spark, MongoDB, PostgreSQL, and MariaDB. Access to data previously unavailable, without the need for Extract Transform and Load (ETL), will allow development of intelligent transactions and intuitive business processes.

---

## Statement of general direction

---

**Stabilization of z/VM V6.3 support:** IBM z14 is planned to be the last IBM Z® high-end server and z13s is planned to be the last midrange IBM Z server supported by z/VM V6.3 and the last IBM Z servers that will be supported when z/VM V6.3 is running as a guest (second level). z/VM V6.3 will continue to be supported until December 31, 2017, as announced in Withdrawal Announcement [915-025](#), dated February 03, 2015.

**Future z/VM release guest support:** z/VM V6.4 will be the last z/VM release supported as a guest of z/VM V6.2 or older releases.

**Disk-only support for z/VM dumps:** z/VM V6.4 will be the last z/VM release to support tape as a media option for stand-alone, hard abend, and snap dumps. Subsequent releases will support dumps to ECKD™ DASD or FCP SCSI disks only.

**IBM z14 will be the last IBM Z high-end server to support FICON Express8S:** z14 will be last IBM Z high-end server to support FICON Express8S (#0409 and #0410) channels. Enterprises should begin migrating from FICON Express8S channels to FICON Express16S+ channels (#0427 and #0428). FICON Express8S will not be supported on future high-end IBM Z servers as carry forward on an upgrade.

**IBM z14 will be the last IBM Z server to support HCA3-O and HCA3-O LR adapters:** z14 will be last IBM Z server to support HCA3-O fanout for 12x IFB (#0171) and HCA3-O LR fanout for 1x IFB (#0170). As announced previously, z13s is the last midrange IBM Z server to support these adapters. Enterprises should begin migrating from HCA3-O and HCA3-O LR adapters to ICA SR and/or Coupling Express Long Reach (CE LR) adapters on z14, z13, and z13s. For high-speed short-range coupling connectivity, enterprises should migrate to the Integrated Coupling Adapter (ICA-SR). For long-range coupling connectivity, enterprises should migrate to the new Coupling Express LR coupling adapter. For long-range coupling connectivity requiring a DWDM, enterprises will need to determine their desired DWDM vendor's plan to qualify the planned replacement long-range coupling link.

**OSA-Express6S 1000BASE-T adapters:** OSA-Express 6S 1000BASE-T adapters (#0426) will be the last generation of OSA 1000BASE-T adapters to support connections operating at 100 Mb/second link speed. Future OSA-Express 1000BASE-T adapter generations will support operation only at 1000 Mb/second (1Gb/s) link speed.

**Dynamic Partition Manager support of ECKD:** IBM intends to deliver support for adding and configuring ECKD FICON disks to partitions created in Dynamic Partition Manager (DPM) mode for Linux running in LPAR, under KVM on z, and under z/VM 6.4.

**New DB2<sup>(R)</sup> Analytics Accelerator deployment option on the IBM Z infrastructure :** The DB2 Analytics Accelerator for z/OS extends IBM Z and DB2 for z/OS to form a hybrid environment, which is capable of running both transactional and analytical SQL query workload. This extension is currently delivered via two deployment options: either as an appliance, based on IBM PureData<sup>(R)</sup> System for Analytics, or as a hosted cloud environment. In addition to these two form factors, IBM intends to deliver a new DB2 Analytics Accelerator deployment option on the IBM Z infrastructure. This would further extend deployment options available to DB2 Analytics Accelerator clients. This new deployment option would allow for deeper integration with the IBM Z infrastructure. Clients would benefit with the flexibility to deploy the form factor that best suits their requirements to enable unified homogeneity of service, support, and operations and deeper integration with their processes, such as for their disaster recovery.

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remain at our sole discretion.

---

## Reference information

---

For more information about the IBM z13, see Hardware Announcement [115-001](#), dated January 14, 2015.

For more information about Software withdrawal and support discontinuance: IBM z Systems™ platform selected products, see Withdrawal Announcement [915-025](#), dated February 03, 2015.

For more information about z/OS V2.2, see Software Announcement [215-267](#), dated July 28, 2015.

For more information on the IBM z13s and IBM LinuxONE, see Hardware Announcement [116-002](#), dated February 16, 2016.

For more information on the Enhanced support for shipping of IBM z13™ and z13s servers, see Hardware Announcement [116-058](#), dated June 07, 2016.

For more information about the z/VM 6.4 announcement, see Software Announcement [216-075](#), dated October 25, 2016.

For more information about the z/OS 2.3 preview announcement, see Software Announcement [217-085](#), dated February 21, 2017.

For more information about zSystems Long Distance Coupling, see Hardware Announcement [117-031](#), dated March 14, 2017.

For more information about IBM z/OS Version 2 Release 3 -- Engine for digital transformation, see Software Announcement [217-246](#), dated July 17, 2017.

For more information about Sub-capacity pricing terms for z/VM and z/VM-based programs, see Software Announcement [217-267](#), dated July 17, 2017.

---

## Product number

---

Description	Machine type	Model	Feature
IBM z14	3906	M01	
		M02	
		M03	
		M04	
		M05	
MTU 1 --D			0001
MTU 100 --D			0002
MTU 1 --V			0003
MTU 100 --V			0004
GTU 1 -D			0005
GTU 100 -D			0006
GTU 1 -V			0007
GTU 100 -V			0008
GTU 1000 -D			0009
GTU 1000 -V			0010
Exchange Pgm Machine			0012
Exchange Pgm Machine + Covers			0013
Migration Offering Machine			0014
Blue Letter Internal			0015
HW for DPM			0016
Customized MRRreport			0017
Cost Analysis Sizing			0018



TKE Rack Mount w/4768	0080
TKE w/4768	0081
HMC	0082
HMC Rack Mount	0083
TKE Rack Mount w/4768	0085
TKE w/4768	0086
WWPN Persistence	0099
Mouse	0152
HMC Tower Keyboard	0153
HMC Rack Keybd/Monitor/Mouse	0154
TKE Tower Keyboard	0155
TKE Rack Keybd/Monitor/Mouse	0156
Client Must Provide Mouse	0186
Client Must Provide HMC Keybd	0187
Client Must Provide HMC KMM	0188
Client Must Provide TKE Keybd	0189
Client Must Provide TKE KMM	0190
Client Must Provide Display	0191
1 CPE Capacity Unit	0116
100 CPE Capacity Unit	0117
10000 CPE Capacity Unit	0118
1 CPE Capacity Unit-IFL	0119
100 CPE Capacity Unit-IFL	0120
1 CPE Capacity Unit-ICF	0121
100 CPE Capacity Unit-ICF	0122
1 CPE Capacity Unit-zIIP	0125
100 CPE Capacity Unit-zIIP	0126
1 CPE Capacity Unit-SAP	0127
100 CPE Capacity Unit-SAP	0128
A Fr Radiator	4029
A Fr Water	4030
Air w/o TEIO & w/o HtrR	0072
Air w/o TEIO & w/HtR	0073
Air w/ TEIO & w/o HtrR	0074
Air w/TEIO & w/HtR	0075
Wat w/o TEIO & w/o HtrR	0076
Wat w/o TEIO & w/ HtrR	0077
Wat w/TEIO & w/o HtrR	0078
Wat w/TEIO & w/HtR	0079
Air w/o TEIO & w/o HtrR	0105
Air w/o TEIO & w/HtR	0106
Air w/TEIO & w/o HtrR	0107
Air w/TEIO & w/HtR	0108
Wat w/o TEIO & w/o HtrR	0109
Wat w/o TEIO & w/HtR	0110
Wat w/TEIO & w/o HtrR	0111
Wat w/TEIO & w/HtR	0112
Standard Cover Set	0160
Thin Cover Set	0161
Fanout Airflow GX++	0165
HCA3-O LR Fanout	0170
HCA3-O Fanout	0171
ICA SR Fanout	0172

PCIe Fanout	0173
Fanout Airflow PCIe	0174
Manage FW Suite	0019
Automate FW Suite	0020
Ensemble membership	0025
PCIe Interconnect	0401
10 GbE RoCE Express2	0412
OSA-ICC 3215 Enablement	0034
OSA-Express6S GbE LX	0422
OSA-Express6S GbE SX	0423
OSA-Express6S 10 GbE LR	0424
OSA-Express6S 10 GbE SR	0425
OSA-Express6S 1000BASE-T	0426
FICON Express16S+ LX	0427
FICON Express16S+ SX	0428
zEDC Express	0420
zHyperLink Express	0431
Coupling Express LR	0433
IBM Virtual Flash Memory	0604
Read Only Media Option	0845
TKE workstation w/4768	0849
4768 TKE Crypto Adapter	0844
TKE Addl Smart Cards	0892
32GB USB Backup Media	0848
TKE 9.0 LIC	0879
TKE Smart Card Reader	0891
Crypto Express6S	0893
RFID Tag	0035
RFID Tag	0036
RFID Tag	0037
<b>UID Label for DoD</b>	<b>0998</b>
STP Enablement	1021
EMEA Special Operations	1022
32 GB Mem DIMM(5/feat)	1627
64 GB Mem DIMM(5/feat)	1628
128 GB Mem DIMM(5/feat)	1629
256 GB Mem DIMM(5/feat)	1630
512 GB Mem DIMM(5/feat)	1631
LICCC Ship Via Net Ind	1750
64GB Memory Capacity Incr	1893
256GB Memory Capacity Incr	1894
16GB FTR Converted Mem z12	1895
32GB FTR Converted Mem z12	1896
32GB FTR Converted Mem z13	1897
32GB Memory Capacity Incr	1898
16GB FTR Converted Mem z13	1900
32GB Memory Capacity Incr >1TB	1938
64GB Memory Capacity Incr >1TB	1939
256GB Memory Capacity Incr >1TB	1940
32GB Preplanned memory	1990
64GB Preplanned Memory	1991
64GB VFM Preplanned Memory	1999

<b>UID Label for DoD</b>	<b>0998</b>
Line Cord Plan Ahead	2000
256 GB Memory	1660
320 GB Memory	1661
384 GB Memory	1662
448 GB Memory	1663
512 GB Memory	1664
576 GB Memory	1665
704 GB Memory	1666
832 GB Memory	1667
960 GB Memory	1668
1088 GB Memory	1669
1216 GB Memory	1670
1344 GB Memory	1671
1472 GB Memory	1672
1600 GB Memory	1673
1856 GB Memory	1674
2112 GB Memory	1675
2368 GB Memory	1676
2624 GB Memory	1677
2880 GB Memory	1678
3136 GB Memory	1679
3392 GB Memory	1680
3648 GB Memory	1681
3904 GB Memory	1682
4416 GB Memory	1683
4928 GB Memory	1684
5440 GB Memory	1685
5952 GB Memory	1686
6464 GB Memory	1687
6976 GB Memory	1688
7488 GB Memory	1689
8000 GB Memory	1690
US English	0235
France	0236
German/Austrian	0237
LA Spanish	0238
Spain	0239
Italian	0240
French Canadian	0241
Portuguese	0242
UK English	0243
Norwegian	0244
Sweden Finland	0245
Netherlands	0246
Belgian French	0247
Denmark	0248
Swiss French/German	0249
Flat Panel Display	6096
Balanced Power Plan Ahead	3003
BPD Pair	3014
BPR Pair	3015
Internal Battery IBF	3216

<b>UID Label for DoD</b>	<b>0998</b>
Universal Lift Tool Upg Kit	3103
Universal Lift Tool/Ladder	3105
FDT Adapter Kit	3379
Fill and Drain Kit	3380
Serv Docs Optional Print	0033
CPACF Enablement	3863
PCIe I/O Drawer	4013
14ft Water Hose	7801
FQC Bracket & Mounting Hdw	7923
LC Duplex 6.6 ft Harness	7924
LC Duplex 8.5ft Harness	7925
LC Duplex 12 ft Harness	7926
Top Exit I/O Cabling	7942
Side Covers	7949
Non Raised Floor Support	7998
4-in-1 Bolt Down Kit	8003
3-in-1 Bolt Down Kit-W	8004
Bolt Down Kit, NRF	8005
380-520V DC TE Cord BPE-1	8947
200V 3PH TE Cord BPE-11	8952
380-520V DC TE Cord BPE-2	8953
200V 3PH TE Cord BPE-2	8955
14 ft 380-520V DC line cord	8963
14ft 200V 3PH cord	8993
480V 3PH TE Cord	8950
14 ft. 480V 3PH Line Cord	8983
14 ft 380-415V 3PH	8976
380-415V 3PH TE Cord	8977
Non RSF On/Off CoD	0032
Multi Order Ship Flag	9000
Multi Order Rec Only Flag-NB	9001
Multi Order Rec Only Flag-MES	9002
RPO Action Flag	9003
Downgraded PUs Per Request	9004
On/Off CoD 100 IFL Days	9874
On/Off CoD 100 ICF Days	9875
On/Off CoD 100 CP Days	9876
On/Off CoD 100 zIIP Days	9877
On/Off CoD 100 SAP Days	9878
On/Off CoD Act IFL Day	9888
On/Off CoD Act ICF Day	9889
On/Off CoD authorization	9896

On/Off CoD Act Cap CP Day	9897
Perm upgr authorization	9898
CIU Activation (Flag)	9899
On-Line CoD Buying (Flag)	9900
On/Off CoD Act zIIP Day	9908
On/Off CoD Act SAP Day	9909
CBU authorization	9910
CPE authorization	9912
OPO Sales authorization	9913
1 MSU day	9917
100 MSU days	9918
10000 MSU days	9919
1 IFL day	9920
100 IFL days	9921
1 ICF day	9922
100 ICF days	9923
1 zIIP day	9924
100 zIIP days	9925
1 SAP day	9928
100 SAP days	9929
Weight Distribution Kit	9970
Height Reduce Ship	9975
Height reduce for return	9976
CP4	1929
CP5	1930
CP6	1931
CP7	1932
IFL	1933
ICF	1934
SAP (optional)	1935
zIIP	1936
Unassigned IFL	1937
Additional CBU Test	6805
Total CBU Years Ordered	6817
CBU Records Ordered	6818
Single CBU CP- Year	6820
25 CBU CP-Year	6821
Single CBU IFL Year	6822
25 CBU IFL Year	6823
Single CBU ICF Year	6824
25 CBU ICF Year	6825

Single CBU zIIP Year		6828
25 CBU zIIP Year		6829
Single CBU SAP Year		6830
25 CBU SAP Year		6831
CBU Replenishment		6832
Capacity for Planned Event		6833
OPO Sales Flag		6835
OPO Sales Flag Alteration		6836
0-Way Processor CP4		2001
1-Way Processor CP4		2002
2-Way Processor CP4		2003
3-Way Processor CP4		2004
4-Way Processor CP4		2005
5-Way Processor CP4		2006
6-Way Processor CP4		2007
7-Way Processor CP4		2008
8-Way Processor CP4		2009
9-Way Processor CP4		2010
10-Way Processor CP4		2011
11-Way Processor CP4		2012
12-Way Processor CP4		2013
13-Way Processor CP4		2014
14-Way Processor CP4		2015
15-Way Processor CP4		2016
16-Way Processor CP4		2017
17-Way Processor CP4		2018
18-Way Processor CP4		2019
19-Way Processor CP4		2020
20-Way Processor CP4		2021
21-Way Processor CP4		2022
22-Way Processor CP4		2023
23-Way Processor CP4		2024

24-Way Processor CP4		2025
25-Way Processor CP4		2026
26-Way Processor CP4		2027
27-Way Processor CP4		2028
28-Way Processor CP4		2029
29-Way Processor CP4		2030
30-Way Processor CP4		2031
31-Way Processor CP4		2032
32-Way Processor CP4		2033
33-Way Processor CP4		2034
1-Way Processor CP5		2035
2-Way Processor CP5		2036
3-Way Processor CP5		2037
4-Way Processor CP5		2038
5-Way Processor CP5		2039
6-Way Processor CP5		2040
7-Way Processor CP5		2041
8-Way Processor CP5		2042
9-Way Processor CP5		2043
10-Way Processor CP5		2044
11-Way Processor CP5		2045
12-Way Processor CP5		2046
13-Way Processor CP5		2047
14-Way Processor CP5		2048
15-Way Processor CP5		2049
16-Way Processor CP5		2050
17-Way Processor CP5		2051
18-Way Processor CP5		2052
19-Way Processor CP5		2053
20-Way Processor CP5		2054
21-Way Processor CP5		2055

22-Way Processor CP5		2056
23-Way Processor CP5		2057
24-Way Processor CP5		2058
25-Way Processor CP5		2059
26-Way Processor CP5		2060
27-Way Processor CP5		2061
28-Way Processor CP5		2062
29-Way Processor CP5		2063
30-Way Processor CP5		2064
31-Way Processor CP5		2065
32-Way Processor CP5		2066
33-Way Processor CP5		2067
1-Way Processor CP6		2068
2-Way Processor CP6		2069
3-Way Processor CP6		2070
4-Way Processor CP6		2071
5-Way Processor CP6		2072
6-Way Processor CP6		2073
7-Way Processor CP6		2074
8-Way Processor CP6		2075
9-Way Processor CP6		2076
10-Way Processor CP6		2077
11-Way Processor CP6		2078
12-Way Processor CP6		2079
13-Way Processor CP6		2080
14-Way Processor CP6		2081
15-Way Processor CP6		2082
16-Way Processor CP6		2083
17-Way Processor CP6		2084
18-Way Processor CP6		2085
19-Way Processor CP6		2086



20-Way Processor CP6		2087
21-Way Processor CP6		2088
22-Way Processor CP6		2089
23-Way Processor CP6		2090
24-Way Processor CP6		2091
25-Way Processor CP6		2092
26-Way Processor CP6		2093
27-Way Processor CP6		2094
28-Way Processor CP6		2095
29-Way Processor CP6		2096
30-Way Processor CP6		2097
31-Way Processor CP6		2098
32-Way Processor CP6		2099
33-Way Processor CP6		2100
1-Way Processor CP7		2101
2-Way Processor CP7		2102
3-Way Processor CP7		2103
4-Way Processor CP7		2104
5-Way Processor CP7		2105
6-Way Processor CP7		2106
7-Way Processor CP7		2107
8-Way Processor CP7		2108
9-Way Processor CP7		2109
10-Way Processor CP7		2110
11-Way Processor CP7		2111
12-Way Processor CP7		2112
13-Way Processor CP7		2113
14-Way Processor CP7		2114
15-Way Processor CP7		2115
16-Way Processor CP7		2116
17-Way Processor CP7		2117

18-Way Processor CP7		2118
19-Way Processor CP7		2119
20-Way Processor CP7		2120
21-Way Processor CP7		2121
22-Way Processor CP7		2122
23-Way Processor CP7		2123
24-Way Processor CP7		2124
25-Way Processor CP7		2125
26-Way Processor CP7		2126
27-Way Processor CP7		2127
28-Way Processor CP7		2128
29-Way Processor CP7		2129
30-Way Processor CP7		2130
31-Way Processor CP7		2131
32-Way Processor CP7		2132
33-Way Processor CP7		2133
400 Capacity Marker		2519
401 Capacity Marker		2520
402 Capacity Marker		2521
403 Capacity Marker		2522
404 Capacity Marker		2523
405 Capacity Marker		2524
406 Capacity Marker		2525
407 Capacity Marker		2526
408 Capacity Marker		2527
409 Capacity Marker		2528
410 Capacity Marker		2529
411 Capacity Marker		2530
412 Capacity Marker		2531
413 Capacity Marker		2532
414 Capacity Marker		2533

415 Capacity Marker	2534
416 Capacity Marker	2535
417 Capacity Marker	2536
418 Capacity Marker	2537
419 Capacity Marker	2538
420 Capacity Marker	2539
421 Capacity Marker	2540
422 Capacity Marker	2541
423 Capacity Marker	2542
424 Capacity Marker	2543
425 Capacity Marker	2544
426 Capacity Marker	2545
427 Capacity Marker	2546
428 Capacity Marker	2547
429 Capacity Marker	2548
430 Capacity Marker	2549
431 Capacity Marker	2550
432 Capacity Marker	2551
433 Capacity Marker	2552
501 Capacity Marker	2553
502 Capacity Marker	2554
503 Capacity Marker	2555
504 Capacity Marker	2556
505 Capacity Marker	2557
506 Capacity Marker	2558
507 Capacity Marker	2559
508 Capacity Marker	2560
509 Capacity Marker	2561
510 Capacity Marker	2562
511 Capacity Marker	2563
512 Capacity Marker	2564

513 Capacity Marker	2565
514 Capacity Marker	2566
515 Capacity Marker	2567
516 Capacity Marker	2568
517 Capacity Marker	2569
518 Capacity Marker	2570
519 Capacity Marker	2571
520 Capacity Marker	2572
521 Capacity Marker	2573
522 Capacity Marker	2574
523 Capacity Marker	2575
524 Capacity Marker	2576
525 Capacity Marker	2577
526 Capacity Marker	2578
527 Capacity Marker	2579
528 Capacity Marker	2580
529 Capacity Marker	2581
530 Capacity Marker	2582
531 Capacity Marker	2583
532 Capacity Marker	2584
533 Capacity Marker	2585
601 Capacity Marker	2586
602 Capacity Marker	2587
603 Capacity Marker	2588
604 Capacity Marker	2589
605 Capacity Marker	2590
606 Capacity Marker	2591
607 Capacity Marker	2592
608 Capacity Marker	2593
609 Capacity Marker	2594
610 Capacity Marker	2595

611 Capacity Marker	2596
612 Capacity Marker	2597
613 Capacity Marker	2598
614 Capacity Marker	2599
615 Capacity Marker	2600
616 Capacity Marker	2601
617 Capacity Marker	2602
618 Capacity Marker	2603
619 Capacity Marker	2604
620 Capacity Marker	2605
621 Capacity Marker	2606
622 Capacity Marker	2607
623 Capacity Marker	2608
624 Capacity Marker	2609
625 Capacity Marker	2610
626 Capacity Marker	2611
627 Capacity Marker	2612
628 Capacity Marker	2613
629 Capacity Marker	2614
630 Capacity Marker	2615
631 Capacity Marker	2616
632 Capacity Marker	2617
633 Capacity Marker	2618
701 Capacity Marker	2619
702 Capacity Marker	2620
703 Capacity Marker	2621
704 Capacity Marker	2622
705 Capacity Marker	2623
706 Capacity Marker	2624
707 Capacity Marker	2625
708 Capacity Marker	2626

709 Capacity Marker			2627
710 Capacity Marker			2628
711 Capacity Marker			2629
712 Capacity Marker			2630
713 Capacity Marker			2631
714 Capacity Marker			2632
715 Capacity Marker			2633
716 Capacity Marker			2634
717 Capacity Marker			2635
718 Capacity Marker			2636
719 Capacity Marker			2637
720 Capacity Marker			2638
721 Capacity Marker			2639
722 Capacity Marker			2640
723 Capacity Marker			2641
724 Capacity Marker			2642
725 Capacity Marker			2643
726 Capacity Marker			2644
727 Capacity Marker			2645
728 Capacity Marker			2646
729 Capacity Marker			2647
730 Capacity Marker			2648
731 Capacity Marker			2649
732 Capacity Marker			2650
733 Capacity Marker			2651
IBM z14	3906	M01	
Model M01 Air Cooled			1023
Model M01 Water Cooled			1028
IBM z14	3906	M02	
Model M02 Air Cooled			1024
Model M02 Water Cooled			1029

IBM z14	3906	M03	
Model M03 Air Cooled			1025
Model M03 Water Cooled			1030
IBM z14	3906	M04	
Model M04 Air Cooled			1026
Model M04 Water Cooled			1031
IBM z14	3906	M05	
Model M05 Air Cooled			1027
Model M05 Water Cooled			1032
IBM z14	3906	M02	
		M03	
		M04	
		M05	
8512 GB Memory			1691
9024 GB Memory			1692
9536 GB Memory			1693
10048 GB Memory			1694
10560 GB Memory			1695
11072 GB Memory			1696
11584 GB Memory			1697
12096 GB Memory			1698
12608 GB Memory			1699
13120 GB Memory			1700
13632 GB Memory			1701
14144 GB Memory			1702
14656 GB Memory			1703
15168 GB Memory			1704
15680 GB Memory			1705
16192 GB Memory			1706
34-Way Processor CP7			2134
35-Way Processor CP7			2135
36-Way Processor CP7			2136
37-Way Processor CP7			2137
38-Way Processor CP7			2138
39-Way Processor CP7			2139
40-Way Processor CP7			2140
41-Way Processor CP7			2141
42-Way Processor CP7			2142
43-Way Processor CP7			2143

44-Way Processor CP7	2144
45-Way Processor CP7	2145
46-Way Processor CP7	2146
47-Way Processor CP7	2147
48-Way Processor CP7	2148
49-Way Processor CP7	2149
50-Way Processor CP7	2150
51-Way Processor CP7	2151
52-Way Processor CP7	2152
53-Way Processor CP7	2153
54-Way Processor CP7	2154
55-Way Processor CP7	2155
56-Way Processor CP7	2156
57-Way Processor CP7	2157
58-Way Processor CP7	2158
59-Way Processor CP7	2159
60-Way Processor CP7	2160
61-Way Processor CP7	2161
62-Way Processor CP7	2162
63-Way Processor CP7	2163
64-Way Processor CP7	2164
65-Way Processor CP7	2165
66-Way Processor CP7	2166
67-Way Processor CP7	2167
68-Way Processor CP7	2168
69-Way Processor CP7	2169
<hr/>	
734 Capacity Marker	2652
735 Capacity Marker	2653
736 Capacity Marker	2654
737 Capacity Marker	2655
738 Capacity Marker	2656



739 Capacity Marker	2657
740 Capacity Marker	2658
741 Capacity Marker	2659
742 Capacity Marker	2660
743 Capacity Marker	2661
744 Capacity Marker	2662
745 Capacity Marker	2663
746 Capacity Marker	2664
747 Capacity Marker	2665
748 Capacity Marker	2666
749 Capacity Marker	2667
750 Capacity Marker	2668
751 Capacity Marker	2669
752 Capacity Marker	2670
753 Capacity Marker	2671
754 Capacity Marker	2672
755 Capacity Marker	2673
756 Capacity Marker	2674
757 Capacity Marker	2675
758 Capacity Marker	2676
759 Capacity Marker	2677
760 Capacity Marker	2678
761 Capacity Marker	2679
762 Capacity Marker	2680
763 Capacity Marker	2681
764 Capacity Marker	2682
765 Capacity Marker	2683
766 Capacity Marker	2684
767 Capacity Marker	2685
768 Capacity Marker	2686
769 Capacity Marker	2687

IBM z14	3906	M03	
		M04	
		M05	
16704 GB Memory			1707
17216 GB Memory			1708
17728 GB Memory			1709
18240 GB Memory			1710
18732 GB Memory			1711
19264 GB Memory			1712
19776 GB Memory			1713
20288 GB Memory			1714
20800 GB Memory			1715
21312 GB Memory			1716
21824 GB Memory			1717
22336 GB Memory			1718
22848 GB Memory			1719
23360 GB Memory			1720
23872 GB Memory			1721
24384 GB Memory			1722
70-Way Processor CP7			2170
71-Way Processor CP7			2171
72-Way Processor CP7			2172
73-Way Processor CP7			2173
74-Way Processor CP7			2174
75-Way Processor CP7			2175
76-Way Processor CP7			2176
77-Way Processor CP7			2177
78-Way Processor CP7			2178
79-Way Processor CP7			2179
80-Way Processor CP7			2180
81-Way Processor CP7			2181
82-Way Processor CP7			2182
83-Way Processor CP7			2183
84-Way Processor CP7			2184
85-Way Processor CP7			2185
86-Way Processor CP7			2186
87-Way Processor CP7			2187
88-Way Processor CP7			2188
89-Way Processor CP7			2189
90-Way Processor CP7			2190

91-Way Processor CP7		2191
92-Way Processor CP7		2192
93-Way Processor CP7		2193
94-Way Processor CP7		2194
95-Way Processor CP7		2195
96-Way Processor CP7		2196
97-Way Processor CP7		2197
98-Way Processor CP7		2198
99-Way Processor CP7		2199
100-Way Processor CP7		2200
101-Way Processor CP7		2201
102-Way Processor CP7		2202
103-Way Processor CP7		2203
104-Way Processor CP7		2204
105-Way Processor CP7		2205
770 Capacity Marker		2688
771 Capacity Marker		2689
772 Capacity Marker		2690
773 Capacity Marker		2691
774 Capacity Marker		2692
775 Capacity Marker		2693
776 Capacity Marker		2694
777 Capacity Marker		2695
778 Capacity Marker		2696
779 Capacity Marker		2697
780 Capacity Marker		2698
781 Capacity Marker		2699
782 Capacity Marker		2700
783 Capacity Marker		2701
784 Capacity Marker		2702
785 Capacity Marker		2703

786 Capacity Marker			2704
787 Capacity Marker			2705
788 Capacity Marker			2706
789 Capacity Marker			2707
790 Capacity Marker			2708
791 Capacity Marker			2709
792 Capacity Marker			2710
793 Capacity Marker			2711
794 Capacity Marker			2712
795 Capacity Marker			2713
796 Capacity Marker			2714
797 Capacity Marker			2715
798 Capacity Marker			2716
799 Capacity Marker			2717
7A0 Capacity Marker			2718
7A1 Capacity Marker			2719
7A2 Capacity Marker			2720
7A3 Capacity Marker			2721
7A4 Capacity Marker			2722
7A5 Capacity Marker			2723
IBM z14	3906	M04	
		M05	
24896 GB Memory			1723
25408 GB Memory			1724
25920 GB Memory			1725
26432 GB Memory			1726
26944 GB Memory			1727
27456 GB Memory			1728
27968 GB Memory			1729
28480 GB Memory			1730
28992 GB Memory			1731
29504 GB Memory			1732
30016 GB Memory			1733
30528 GB Memory			1734
31040 GB Memory			1735
31552 GB Memory			1736
32064 GB Memory			1737
32576 GB Memory			1738
106-Way Processor CP7			2206

107-Way Processor CP7	2207
108-Way Processor CP7	2208
109-Way Processor CP7	2209
110-Way Processor CP7	2210
111-Way Processor CP7	2211
112-Way Processor CP7	2212
113-Way Processor CP7	2213
114-Way Processor CP7	2214
115-Way Processor CP7	2215
116-Way Processor CP7	2216
117-Way Processor CP7	2217
118-Way Processor CP7	2218
119-Way Processor CP7	2219
120-Way Processor CP7	2220
121-Way Processor CP7	2221
122-Way Processor CP7	2222
123-Way Processor CP7	2223
124-Way Processor CP7	2224
125-Way Processor CP7	2225
126-Way Processor CP7	2226
127-Way Processor CP7	2227
128-Way Processor CP7	2228
129-Way Processor CP7	2229
130-Way Processor CP7	2230
131-Way Processor CP7	2231
132-Way Processor CP7	2232
133-Way Processor CP7	2233
134-Way Processor CP7	2234
135-Way Processor CP7	2235
136-Way Processor CP7	2236
137-Way Processor CP7	2237
138-Way Processor CP7	2238

139-Way Processor CP7	2239
140-Way Processor CP7	2240
141-Way Processor CP7	2241
7A6 Capacity Marker	2724
7A7 Capacity Marker	2725
7A8 Capacity Marker	2726
7A9 Capacity Marker	2727
7B0 Capacity Marker	2728
7B1 Capacity Marker	2729
7B2 Capacity Marker	2730
7B3 Capacity Marker	2731
7B4 Capacity Marker	2732
7B5 Capacity Marker	2733
7B6 Capacity Marker	2734
7B7 Capacity Marker	2735
7B8 Capacity Marker	2736
7B9 Capacity Marker	2737
7C0 Capacity Marker	2738
7C1 Capacity Marker	2739
7C2 Capacity Marker	2740
7C3 Capacity Marker	2741
7C4 Capacity Marker	2742
7C5 Capacity Marker	2743
7C6 Capacity Marker	2744
7C7 Capacity Marker	2745
7C8 Capacity Marker	2746
7C9 Capacity Marker	2747
7D0 Capacity Marker	2748
7D1 Capacity Marker	2749
7D2 Capacity Marker	2750
7D3 Capacity Marker	2751
7D4 Capacity Marker	2752

7D5 Capacity Marker			2753
7D6 Capacity Marker			2754
7D7 Capacity Marker			2755
7D8 Capacity Marker			2756
7D9 Capacity Marker			2757
7E0 Capacity Marker			2758
7E1 Capacity Marker			2759
IBM z14	3906	M05	
142-Way Processor CP7			2242
143-Way Processor CP7			2243
144-Way Processor CP7			2244
145-Way Processor CP7			2245
146-Way Processor CP7			2246
147-Way Processor CP7			2247
148-Way Processor CP7			2248
149-Way Processor CP7			2249
150-Way Processor CP7			2250
151-Way Processor CP7			2251
152-Way Processor CP7			2252
153-Way Processor CP7			2253
154-Way Processor CP7			2254
155-Way Processor CP7			2255
156-Way Processor CP7			2256
157-Way Processor CP7			2257
158-Way Processor CP7			2258
159-Way Processor CP7			2259
160-Way Processor CP7			2260
161-Way Processor CP7			2261
162-Way Processor CP7			2262
163-Way Processor CP7			2263
164-Way Processor CP7			2264

165-Way Processor CP7		2265
166-Way Processor CP7		2266
167-Way Processor CP7		2267
168-Way Processor CP7		2268
169-Way Processor CP7		2269
170-Way Processor CP7		2270
7E2 Capacity Marker		2760
7E3 Capacity Marker		2761
7E4 Capacity Marker		2762
7E5 Capacity Marker		2763
7E6 Capacity Marker		2764
7E7 Capacity Marker		2765
7E8 Capacity Marker		2766
7E9 Capacity Marker		2767
7F0 Capacity Marker		2768
7F1 Capacity Marker		2769
7F2 Capacity Marker		2770
7F3 Capacity Marker		2771
7F4 Capacity Marker		2772
7F5 Capacity Marker		2773
7F6 Capacity Marker		2774
7F7 Capacity Marker		2775
7F8 Capacity Marker		2776
7F9 Capacity Marker		2777
7G0 Capacity Marker		2778
7G1 Capacity Marker		2779
7G2 Capacity Marker		2780
7G3 Capacity Marker		2781
7G4 Capacity Marker		2782
7G5 Capacity Marker		2783
7G6 Capacity Marker		2784



7G7 Capacity Marker			2785
7G8 Capacity Marker			2786
7G9 Capacity Marker			2787
7H0 Capacity Marker			2788

Description	Machine type	Model	Feature
z13	2964	N30	
		N63	
		N96	
		NC9	
		NE1	
		L30	
		L63	
		L96	
		LC9	
		LE1	

**All countries except China**

TKE Rack Mount w/4768		0080	
TKE w/4768		0081	
4768 TKE Crypto Adapter		0844	
TKE workstation w/4768		0849	

**All countries except China**

HMC		0082	
HMC Rack Mount		0083	
TKE Rack Mount w/4768		0085	
TKE w/4768		0086	
TKE 9.0 LIC		0879	
Coupling Express LR		0433	

Description	Machine type	Model	Feature
z13s	2965	N10	
		N20	
		L10	
		L20	

**All countries except China**

TKE Rack Mount w/4768		0080	
TKE w/4768		0081	
4768 TKE Crypto Adapter		0844	
TKE workstation w/4768		0849	

**All countries except China**

HMC		0082	
HMC Rack Mount		0083	
TKE Rack Mount w/4768		0085	
TKE w/4768		0086	
TKE 9.0 LIC		0879	
Coupling Express LR		0433	

**Features that may carry forward on an upgrade:**

The following features may be retained if they are installed at the time of an upgrade to the IBM z14.

Description	Machine type	Model	Feature
IBM z14	3906	M01	
		M02	

Description	Machine type	Model	Feature
		M03	
		M04	
		M05	
HMC			0092
HMC Rack Mount			0094
HMC			0095
HMC Rack Mount			0096
TKE Rack Mount w/4767			0097
TKE w/4767			0098
OSA-Express4S 1000BASE-T			0408
OSA-Express5S GbE LX			0413
OSA-Express5S GbE SX			0414
OSA-Express5S 10 GbE LR			0415
OSA-Express5S 10 GbE SX			0416
OSA-Express5S 1000BASE-T			0417
FICON Express8S 10KM LX			0409
FICON Express8S SX			0410
FICON Express16S LX			0418
FICON Express16S SX			0419
10GbE RoCE Express			0411
TKE workstation			0842
TKE workstation w/4767			0847
Addl smart cards			0884
TKE Smart Card Reader			0885
Crypto Express5S			0890
Fill and Drain Kit			3378
Universal Lift Tool/ Ladder			3759

### Model conversions

From Machine type	From Model	To Machine type	To Model		Description
2827	H20	3906	M01	(*)	H20 r to M01 a
2827	H20	3906	M02	(*)	H20 r to M02 a
2827	H20	3906	M03	(*)	H20 r to M03 a
2827	H20	3906	M04	(*)	H20 r to M04 a
2827	H20	3906	M05	(*)	H20 r to M05 a
2827	H20	3906	M01	(*)	H20 r to M01 w

<b>From Machine type</b>	<b>From Model</b>	<b>To Machine type</b>	<b>To Model</b>		<b>Description</b>
2827	H20	3906	M02	(*)	H20 r to M02 w
2827	H20	3906	M03	(*)	H20 r to M03 w
2827	H20	3906	M04	(*)	H20 r to M04 w
2827	H20	3906	M05	(*)	H20 r to M05 w
2827	H43	3906	M01	(*)	H43 r to M01 a
2827	H43	3906	M02	(*)	H43 r to M02 a
2827	H43	3906	M03	(*)	H43 r to M03 a
2827	H43	3906	M04	(*)	H43 r to M04 a
2827	H43	3906	M05	(*)	H43 r to M05 a
2827	H43	3906	M01	(*)	H43 r to M01 w
2827	H43	3906	M02	(*)	H43 r to M02 w
2827	H43	3906	M03	(*)	H43 r to M03 w
2827	H43	3906	M04	(*)	H43 r to M04 w
2827	H43	3906	M05	(*)	H43 r to M05 w
2827	H66	3906	M01	(*)	H66 r to M01 a
2827	H66	3906	M02	(*)	H66 r to M02 a
2827	H66	3906	M03	(*)	H66 r to M03 a
2827	H66	3906	M04	(*)	H66 r to M04 a
2827	H66	3906	M05	(*)	H66 r to M05 a
2827	H66	3906	M01	(*)	H66 r to M01 w
2827	H66	3906	M02	(*)	H66 r to M02 w
2827	H66	3906	M03	(*)	H66 r to M03 w
2827	H66	3906	M04	(*)	H66 r to M04 w
2827	H66	3906	M05	(*)	H66 r to M05 w
2827	H89	3906	M01	(*)	H89 r to M01 a
2827	H89	3906	M02	(*)	H89 r to M02 a
2827	H89	3906	M03	(*)	H89 r to M03 a
2827	H89	3906	M04	(*)	H89 r to M04 a
2827	H89	3906	M05	(*)	H89 r to M05 a
2827	H89	3906	M01	(*)	H89 r to M01 w

<b>From Machine type</b>	<b>From Model</b>	<b>To Machine type</b>	<b>To Model</b>		<b>Description</b>
2827	H89	3906	M02	(*)	H89 r to M02 w
2827	H89	3906	M03	(*)	H89 r to M03 w
2827	H89	3906	M04	(*)	H89 r to M04 w
2827	H89	3906	M05	(*)	H89 r to M05 w
2827	HA1	3906	M01	(*)	HA1 r to M01 a
2827	HA1	3906	M02	(*)	HA1 r to M02 a
2827	HA1	3906	M03	(*)	HA1 r to M03 a
2827	HA1	3906	M04	(*)	HA1 r to M04 a
2827	HA1	3906	M05	(*)	HA1 r to M05 a
2827	HA1	3906	M01	(*)	HA1 r to M01 w
2827	HA1	3906	M02	(*)	HA1 r to M02 w
2827	HA1	3906	M03	(*)	HA1 r to M03 w
2827	HA1	3906	M04	(*)	HA1 r to M04 w
2827	HA1	3906	M05	(*)	HA1 r to M05 w
2827	H20	3906	M01	(*)	H20 w toM01 w
2827	H20	3906	M02	(*)	H20 w toM02 w
2827	H20	3906	M03	(*)	H20 w toM03 w
2827	H20	3906	M04	(*)	H20 w toM04 w
2827	H20	3906	M05	(*)	H20 w toM05 w
2827	H43	3906	M01	(*)	H43 w toM01 w
2827	H43	3906	M02	(*)	H43 w toM02 w
2827	H43	3906	M03	(*)	H43 w toM03 w
2827	H43	3906	M04	(*)	H43 w toM04 w
2827	H43	3906	M05	(*)	H43 w toM05 w
2827	H66	3906	M01	(*)	H66 w toM01 w
2827	H66	3906	M02	(*)	H66 w toM02 w
2827	H66	3906	M03	(*)	H66 w toM03 w
2827	H66	3906	M04	(*)	H66 w toM04 w
2827	H66	3906	M05	(*)	H66 w toM05 w
2827	H89	3906	M01	(*)	H89 w toM01 w

<b>From Machine type</b>	<b>From Model</b>	<b>To Machine type</b>	<b>To Model</b>		<b>Description</b>
2827	H89	3906	M02	(*)	H89 w toM02 w
2827	H89	3906	M03	(*)	H89 w toM03 w
2827	H89	3906	M04	(*)	H89 w toM04 w
2827	H89	3906	M05	(*)	H89 w toM05 w
2827	HA1	3906	M01	(*)	HA1 w toM01 w
2827	HA1	3906	M02	(*)	HA1 w toM02 w
2827	HA1	3906	M03	(*)	HA1 w toM03 w
2827	HA1	3906	M04	(*)	HA1 w toM04 w
2827	HA1	3906	M05	(*)	HA1 w toM05 w
2964	N30	3906	M01	(*)	N30 a to M01 a
2964	N30	3906	M02	(*)	N30 a to M02 a
2964	N30	3906	M03	(*)	N30 a to M03 a
2964	N30	3906	M04	(*)	N30 a to M04 a
2964	N30	3906	M05	(*)	N30 a to M05 a
2964	N30	3906	M01	(*)	N30 a to M01 w
2964	N30	3906	M02	(*)	N30 a to M02 w
2964	N30	3906	M03	(*)	N30 a to M03 w
2964	N30	3906	M04	(*)	N30 a to M04 w
2964	N30	3906	M05	(*)	N30 a to M05 w
2964	N63	3906	M01	(*)	N63 a to M01 a
2964	N63	3906	M02	(*)	N63 a to M02 a
2964	N63	3906	M03	(*)	N63 a to M03 a
2964	N63	3906	M04	(*)	N63 a to M04 a
2964	N63	3906	M05	(*)	N63 a to M05 a
2964	N63	3906	M01	(*)	N63 a to M01 w
2964	N63	3906	M02	(*)	N63 a to M02 w
2964	N63	3906	M03	(*)	N63 a to M03 w
2964	N63	3906	M04	(*)	N63 a to M04 w
2964	N63	3906	M05	(*)	N63 a to M05 w
2964	N96	3906	M01	(*)	N96 a to M01 a

<b>From Machine type</b>	<b>From Model</b>	<b>To Machine type</b>	<b>To Model</b>		<b>Description</b>
2964	N96	3906	M02	(*)	N96 a to M02 a
2964	N96	3906	M03	(*)	N96 a to M03 a
2964	N96	3906	M04	(*)	N96 a to M04 a
2964	N96	3906	M05	(*)	N96 a to M05 a
2964	N96	3906	M01	(*)	N96 a to M01 w
2964	N96	3906	M02	(*)	N96 a to M02 w
2964	N96	3906	M03	(*)	N96 a to M03 w
2964	N96	3906	M04	(*)	N96 a to M04 w
2964	N96	3906	M05	(*)	N96 a to M05 w
2964	NC9	3906	M01	(*)	NC9 a to M01 a
2964	NC9	3906	M02	(*)	NC9 a to M02 a
2964	NC9	3906	M03	(*)	NC9 a to M03 a
2964	NC9	3906	M04	(*)	NC9 a to M04 a
2964	NC9	3906	M05	(*)	NC9 a to M05 a
2964	NC9	3906	M01	(*)	NC9 a to M01 w
2964	NC9	3906	M02	(*)	NC9 a to M02 w
2964	NC9	3906	M03	(*)	NC9 a to M03 w
2964	NC9	3906	M04	(*)	NC9 a to M04 w
2964	NC9	3906	M05	(*)	NC9 a to M05 w
2964	NE1	3906	M01	(*)	NE1 a to M01 a
2964	NE1	3906	M02	(*)	NE1 a to M02 a
2964	NE1	3906	M03	(*)	NE1 a to M03 a
2964	NE1	3906	M04	(*)	NE1 a to M04 a
2964	NE1	3906	M05	(*)	NE1 a to M05 a
2964	NE1	3906	M01	(*)	NE1 a to M01 w
2964	NE1	3906	M02	(*)	NE1 a to M02 w
2964	NE1	3906	M03	(*)	NE1 a to M03 w
2964	NE1	3906	M04	(*)	NE1 a to M04 w
2964	NE1	3906	M05	(*)	NE1 a to M05 w
2964	N30	3906	M01	(*)	N30 w to M01 w

<b>From Machine type</b>	<b>From Model</b>	<b>To Machine type</b>	<b>To Model</b>		<b>Description</b>
2964	N30	3906	M02	(*)	N30 w to M02 w
2964	N30	3906	M03	(*)	N30 w to M03 w
2964	N30	3906	M04	(*)	N30 w to M04 w
2964	N30	3906	M05	(*)	N30 w to M05 w
2964	N63	3906	M01	(*)	N63 w to M01 w
2964	N63	3906	M02	(*)	N63 w to M02 w
2964	N63	3906	M03	(*)	N63 w to M03 w
2964	N63	3906	M04	(*)	N63 w to M04 w
2964	N63	3906	M05	(*)	N63 w to M05 w
2964	N96	3906	M01	(*)	N96 w to M01 w
2964	N96	3906	M02	(*)	N96 w to M02 w
2964	N96	3906	M03	(*)	N96 w to M03 w
2964	N96	3906	M04	(*)	N96 w to M04 w
2964	N96	3906	M05	(*)	N96 w to M05 w
2964	NC9	3906	M01	(*)	NC9 w to M01 w
2964	NC9	3906	M02	(*)	NC9 w to M02 w
2964	NC9	3906	M03	(*)	NC9 w to M03 w
2964	NC9	3906	M04	(*)	NC9 w to M04 w
2964	NC9	3906	M05	(*)	NC9 w to M05 w
2964	NE1	3906	M01	(*)	NE1 w to M01 w
2964	NE1	3906	M02	(*)	NE1 w to M02 w
2964	NE1	3906	M03	(*)	NE1 w to M03 w
2964	NE1	3906	M04	(*)	NE1 w to M04 w
2964	NE1	3906	M05	(*)	NE1 w to M05 w
3906	M01	3906	M02	(*)	M01 a to M02 a
3906	M01	3906	M03	(*)	M01 a to M03 a
3906	M01	3906	M04	(*)	M01 a to M04 a
3906	M02	3906	M03	(*)	M02 a to M03 a
3906	M02	3906	M04	(*)	M02 a to M04 a
3906	M03	3906	M04	(*)	M03 a to M04 a

<b>From Machine type</b>	<b>From Model</b>	<b>To Machine type</b>	<b>To Model</b>		<b>Description</b>
3906	M01	3906	M02	(*)	M01 w to M02 w
3906	M01	3906	M03	(*)	M01 w to M03 w
3906	M01	3906	M04	(*)	M01 w to M04 w
3906	M02	3906	M03	(*)	M02 w to M03 w
3906	M02	3906	M04	(*)	M02 w to M04 w
3906	M03	3906	M04	(*)	M03 w to M04 w

(\*) Parts removed or replaced become the property of IBM and must be returned.

### Feature conversions

The feature conversion list for IBM z14 is now available in the Library section of Resource Link<sup>(R)</sup>. This list can be obtained at [Resource Link](#).

Using the instructions on the Resource Link panels, obtain a user ID and password. Resource Link has been designed for easy access and navigation.

---

## Publications

The following publications are available now in the *Library* section of Resource Link:

<b>Title</b>	<b>Order number</b>
IBM 3906 Installation Manual for Physical Planning (IMPP)	GC28-6965
PR/SM™ Planning Guide	SB10-7169
IOCP User's Guide for ICP	SB10-7172
Planning for Fiber Optic Links	GA23-1408

The following publications are shipped with the product and will be available at planned availability in the *Library* section of Resource Link:

<b>Title</b>	<b>Order number</b>
IBM 3906 Installation Manual	GC28-6964
IBM 3906 Service Guide	GC28-6966
Service Guide for TKE Workstations (Version 7.0)	GC28-6980
Systems Safety Notices	G229-9054
IBM Important Notices	G229-9056
IBM 3906 Safety Inspection	GC28-6963
Systems Environmental Notices and User Guide	Z125-5823
Statement of Limited Warranty	GC28-6979
License Agreement for Machine Code	SC28-6872
License Agreement for Machine Code Addendum for Elliptic Curve Cryptography	GC27-2635

The following publications will be available at planned availability in the *Library* section of Resource Link:

<b>Title</b>	<b>Order number</b>
IBM 3906 Parts Catalog	GC28-6967
Service Guide for 2461 HMC	GC28-6981



<b>Title</b>	<b>Order number</b>
Service Guide for 2461 Support Element	GC28-6982
Service Guide for HMCs and SEs	GC28-6983
Hardware Management Console Security	SC28-6987
SNMP Application Programming Interfaces	SB10-7171
Capacity on Demand User's Guide	SC28-6985
CHPID Mapping Tool User's Guide	GC28-6984
Hardware Management Console Web Services API (V2.14.0)	SC27-2636
IBM Dynamic Partition Manager (DPM) Guide	SB10-7170
Secure Service Container User's Guide	SC28-6978
Integrating the HMC's Broadband RSF into your Enterprise	SC28-6986
SCSI IPL - Machine Loader Messages	SC28-6948
Stand-Alone IOCP User's Guide	SB10-7173
Ensemble Workload Resource Group Management Guide	GC27-2633
Ensemble Planning Guide	GC27-2631
OSA-Express Customer Guide and Reference	SA22-7935
OSA Integrated Console Controller User's Guide	SC27-9003
OSA/SF on the Hardware Management Console	SC14-7580
FICON CTC Reference	SB10-7174
Maintenance Information for Fiber Optic Links	SY27-7696

**Resource Link:** Publications for IBM Z® can be obtained at the [Resource Link](#) website.

Using the instructions on the Resource Link panels, obtain a user ID and password. Resource Link has been designed for easy access and navigation.

### **HMC and SE console documentation**

At planned availability, the Hardware Management Console (HMC) and Support Element (SE) console documentation (Version 2.14.0) will be available from IBM Knowledge Center.

[IBM Knowledge Center](#) provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access.

The following Redbooks<sup>(R)</sup> publications are available now. To order, contact your IBM representative.

<b>Title</b>	<b>Order number</b>
IBM z14 <a href="#">Technical Introduction</a>	SG24-8450-00
IBM z14 <a href="#">Technical Guide</a>	SG24-8451-00
IBM z14 <a href="#">Configuration Setup</a>	SG24-8460-00
IBM z Systems <a href="#">Connectivity Handbook</a>	SG24-5444-17
IBM z Systems <a href="#">Functional Matrix</a>	REDP-5157-02

To download these Redbooks publications, go to the [IBM zEnterprise<sup>\(R\)</sup> System Redbooks](#) website.

For other IBM Redbooks publications, go to the main [IBM Redbooks](#) website.

**IBM Knowledge Center** provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems,

and server software. Through a consistent framework, you can efficiently find information and personalize your access. See the [IBM Knowledge Center](#) website.

To access the IBM Publications Center Portal, go to the [IBM Publications Center](#) website.

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. A large number of publications are available online in various file formats, which can currently be downloaded.

### **National language support**

Not applicable

---

## **Services**

---

### **Global Technology Services**

---

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an on-demand business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or go to the [IBM Global Technology Services<sup>\(R\)</sup>](#) website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the [Resiliency Services](#) website.

Details on education offerings related to specific products can be found on the [IBM authorized training](#) website.

---

## **Technical information**

---

### **Specified operating environment**

---

#### ***Physical specifications***

#### **Physical specifications - IBM z14 Air Cooled Machine**

Dimensions (rounded to the nearest 0.1 in or 0.1 cm):

#### **Systems with all covers**

	<b>Depth **</b>	<b>Width</b>	<b>Height</b>
Inches	73.5	63.6	79.3
Centimeters	186.7	156.5	201.3
Inches (O/H I/O cable exit)	73.5	72.7	84.8 *
Centimeters (O/H I/O cable exit)	186.7	184.7	215.3

Notes:

\* The height with overhead I/O cable exit differs from the standard height only with the optional optical cable organizer feature installed.

\*\* System depth for air cooled machines with thin covers is reduced by 14.7 in (37.33 cm).

### Systems with all covers and height reduction

	Depth **	Width	Height
Inches	73.5	61.6	70.3
Centimeters	186.7	156.5	178.5

\*\* Note: System depth for air cooled machines with thin covers is reduced by 14.7 in (37.33 cm).

### Each frame with one side cover and without packaging

	Depth **	Width	Height
Inches	50.0	30.7	79.3
Centimeters	127.0	78.0	201.3

\*\* Note: System depth for air cooled machines with thin covers is reduced by 14.7 in (37.33 cm).

### Each frame on casters with one side cover and with packaging (domestic)

	Depth **	Width	Height
Inches	57.4	32.4	79.8
Centimeters	145.8	82.2	202.6

\*\* Note: System depth for air cooled machines with thin covers is reduced by 14.7 in (37.33 cm).

### Each frame with one side cover and with packaging (ARBO crate)

	Depth **	Width	Height
Inches	63.4	36.5	87.6
Centimeters	161.0	92.7	222.5

\*\* Note: System depth for air cooled machines with thin covers is reduced by 14.7 in (37.33 cm).

### Approximate weight:

#### System with IBF feature

	Newbuild Minimum System Model M01 No I/O drawer	Newbuild Maximum System Model M05 Max # of I/O drawers
kg	1461	2705
lb	3219	5961
kg (O/H I/O cable exit)	1531	2775
lb (O/H I/O cable exit)	3375	6117

#### System without IBF feature

	Newbuild Minimum System Model M01 No I/O drawer	Newbuild Maximum System Model M05 Max # of I/O drawers
kg	1258	2400
lb	2772	5290
kg (O/H I/O cable exit)	1328	2471
lb (O/H I/O cable exit)	2928	5446

To ensure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

The dc power feature has no effect on the machine dimensions and weight.

### Physical specifications -IBM z14 Water Cooled Machine

Dimensions (rounded to the nearest 0.1 in or 0.1 cm):

**Systems with all covers**

	Depth	Width	Height
Inches	77.5	61.6	79.3
Centimeters	196.9	156.5	201.3
Inches (O/H I/O cable exit)	77.5	72.7	84.8*
Centimeters (O/H I/O cable exit)	196.9	184.7	215.3

\*Note: The height with overhead I/O cable exit differs from the standard height only with the optional optical cable organizer feature installed.

**Systems with all covers and height reduction**

	Depth	Width	Height
Inches	77.5	61.6	70.3
Centimeters	196.9	156.5	178.5

**Each frame with one side cover and without packaging**

	Depth	Width	Height
Inches	54.0	30.7	79.3
Centimeters	137.2	78.0	201.3

**Each frame on casters with one side cover and with packaging (domestic)**

	Depth	Width	Height
Inches	61.4	32.4	79.8
Centimeters	156.0	82.2	202.6

**Each frame with one side cover and with packaging (ARBO crate)**

	Depth	Width	Height
Inches	68.0	36.5	87.6
Centimeters	171.7	92.7	222.5

**Approximate weight:**

**System with IBF feature**

	Newbuild Minimum System Model M01 No I/O drawer	Newbuild Maximum System Model M05 Max # of I/O drawers
kg	1518	2752
lb	3346	6065
kg (O/H I/O cable exit)	1589	2823
lb (O/H I/O cable exit)	3502	6221

**System without IBF feature**

	Newbuild Minimum System Model M01 No I/O drawer	Newbuild Maximum System Model M05 Max # of I/O drawers
kg	1343	2447
lb	2961	5394
kg (O/H I/O cable exit)	1589	2518
lb (O/H I/O cable exit)	3081	5550

To ensure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

The dc power feature has no effect on the machine dimensions and weight.

## Operating environment

### Operating environment -IBM z14 Air Cooled Machine

Environmental class - ASHRAE 3

Temperature: 5° to 40°C (41° to 104°F) for all models up to 900 meters above sea level; maximum ambient reduces 1°C per 300 meters above 900 meters.

Relative Humidity: 8% to 85%

Wet Bulb (Caloric Value): 25°C (77°F)

Operating Mode Max Dew Point: 24°C (75.2°F) - Operating Mode

### Electrical Power (maximum)

Utility	M01	M02	M03	M04	M05	Power Factor
200-240 V ac	10.4 kVA	19.0 kVA	23.3 kVA	28.3 kVA	29.9 kVA	0.996
380-415 V ac	10.6 kVA	19.3 kVA	23.8 kVA	28.9 kVA	30.6 kVA	0.978
480 V ac	10.9 kVA	20.0 kVA	24.7 kVA	29.9 kVA	31.6 kVA	0.961
400 V dc	10.1 kW	18.3 kW	22.6 kW	27.4 kW	29.0 kW	-

Capacity of Exhaust: 6370 cubic meters / hour (3800 CFM)

Noise level:

- Typical Configuration (Model M02):
  - Declared A-Weighted Sound Power Level, LWAd(B) = 7.8
  - Declared A-Weighted Sound Pressure Level, LpAm(dB) = 59
- Maximum Configuration (Model M05):
  - Declared A-Weighted Sound Power Level, LWAd(B) = 8.1
  - Declared A-Weighted Sound Pressure Level, LpAm(dB) = 62

Leakage and Starting Current: 70 mA / 170 A (approximately 100 microseconds)

## Systems

To ensure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

### Operating environment -IBM z14 Water Cooled Machine

Environmental class - ASHRAE 3

Temperature: 5° to 40°C (41° to 104°F) for all models up to 900 meters above sea level; maximum ambient reduces 1°C per 300 meters above 900 meters.

Relative Humidity: 8% to 85%

Wet Bulb (Caloric Value): 25°C (77°F)

Operating Mode Max Dew Point: 24°C (75.2°F) - Operating Mode

### Electrical Power (maximum)

Utility	M01	M02	M03	M04	M05	Power Factor
200-240 V ac	10.0 kVA	18.1 kVA	22.3 kVA	26.4 kVA	27.9 kVA	0.996

Utility	M01	M02	M03	M04	M05	Power Factor
380-415 V ac	10.2 kVA	18.6 kVA	22.9 kVA	27.1 kVA	28.6 kVA	0.978
480 V ac	10.5 kVA	19.3 kVA	23.7 kVA	28.1 kVA	29.6 kVA	0.958
400 V dc	9.7 kW	17.7 kW	21.6 kW	25.6 kW	27.6 kW	-

Capacity of Exhaust: 5950 cubic meters / hour (3500 CFM)

Noise level:

- Typical Configuration (Model M02)
  - Declared A-Weighted Sound Power Level, LWAd(B) = 7.9
  - Declared A-Weighted Sound Pressure Level, LpAm(dB) = 60
- Maximum Configuration (Model M05)
  - Declared A-Weighted Sound Power Level, LWAd(B) = 8.0
  - Declared A-Weighted Sound Pressure Level, LpAm(dB) = 61

Leakage and Starting Current: 70 mA / 170 A (approximately 100 microseconds)

## Systems

To ensure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

### Hardware requirements

The hardware requirements for the IBM Z® servers, features, and functions are identified. **A new driver level is required.** HMC (V2.14.0) plus MCLs and the Support Element (V2.14.0) are planned to be available on September 13, 2017.

You should review the PSP buckets for minimum Machine Change Levels (MCLs) and software PTF levels before IPLing operating systems.

### HMC system support

The new functions available on the Hardware Management Console (HMC) version 2.14.0, as described, apply exclusively to IBM z14. However, the HMC version 2.14.0 will also support the systems listed in the table below.

Family	Machine type	Firmware driver	SE version	Ensemble node potential
z14	3906	32	2.14.0	Yes
z13	2964	27	2.13.1	Yes
z13s	2965	27	2.13.1	Yes
zBX Node	2458 Mod 004	22	2.13.0	Required
zBC12	2828	15	2.12.1	Yes
zEC12	2827	15	2.12.1	Yes
z114	2818	93	2.11.1	Yes
z196	2817	93	2.11.1	Yes
z10™ BC	2098	79	2.10.2	No
z10 EC	2097	79	2.10.2	No

### Peripheral hardware and device attachments

IBM devices previously attached to IBM z114, z196, zBC12, zEC12, z13s, and z13 servers are supported for attachment to IBM z14 channels, unless otherwise

noted. The subject I/O devices must meet the FICON and Fibre Channel Protocol (FCP) architectures to be supported. I/O devices that meet OEMI architecture requirements are supported only using an external converter. Prerequisite Engineering Change Levels may be required. For further detail, contact IBM service personnel.

While the IBM z14 supports devices as described above, IBM does not commit to provide support or service for an IBM device that has reached its End of Service effective date as announced by IBM.

Note: IBM cannot confirm the accuracy of performance, compatibility, or any other claims related to non-IBM products. Questions regarding the capabilities of non-IBM products should be addressed to the suppliers of those products.

Information on switches and directors qualified for IBM Z FICON and FCP channels can be found in the *Library* section of [Resource Link](#).

### **Software requirements**

#### **IBM z14 requires at a minimum:**

- z/OS V2.3 with PTFs.\*
- z/OS V2.2 with PTFs.
- z/OS V2.1 with PTFs.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM V6.4 with PTFs (compatibility including Crypto Express6S and OSA-Express6S support, z/Architecture<sup>®</sup> IPL).
- z/VM V6.3 with PTFs (compatibility including Crypto Express6S and OSA-Express6S support, z/Architecture IPL).
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- z/TPF V1.1 with PTFs (compatibility, including Crypto Express6S and OSA-Express6S support).
- Linux on z Systems-IBM plans to support running the following Linux on z Systems distributions on IBM z14:
  - SUSE SLES 12 SP2 with service and SUSE SLES 11 SP4 with service.
  - Red Hat RHEL 7.3 with service and Red Hat RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.

- KVM for IBM z<sup>™</sup> 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

\* IBM z/OS V2.3 with IBM z14 will require a minimum of 8 GB of memory. When running as a z/VM guest or on a IBM System z<sup>®</sup> Personal Development Tool, a minimum of 2 GB will be required for z/OS V2.3. If the minimum is not met, a warning WTOR will be issued at IPL. Continuing with less than the minimum memory could impact availability. A migration health check is planned to be introduced for z/OS V2.2 and z/OS V2.1 with PTFs to warn you when an LPAR on a z14 system has been configured with less than 8 GB.

#### **The following software requirements are listed for features and capabilities supported on IBM z14:**

**FICON Express16S+ (CHPID type FC)** when utilizing FICON or Channel-To-Channel (CTC), requires at a minimum:

- z/OS V2.3.
  - z/OS V2.2 with PTFs.
  - z/OS V2.1 with PTFs.
  - z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
  - z/VM V6.4.
  - z/VM V6.3.
  - z/VSE V6.2 with PTFs.
  - z/VSE V6.1 with PTFs.
  - z/VSE V5.2 with PTFs.
  - z/TPF V1.1 with PTFs.
  - Linux on z Systems:
    - SLES 12 SP2 with service and SLES 11 SP4 with service.
    - RHEL 7.3 with service and RHEL 6.9 with service.
    - Ubuntu 16.04 LTS (or higher) with service.
    - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.
- Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service March 2018).

**FICON Express16S+ (CHPID type FC)** for support of zHPF single-track operations requires at a minimum:

- z/OS V2.3.
  - z/OS V2.2 with PTFs.
  - z/OS V2.1 with PTFs.
  - z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
  - z/VM V6.4.
  - z/VM V6.3 for guest exploitation.
  - z/VSE V6.2 with PTFs.
  - z/TPF V1.1 with PTFs.
  - Linux on z Systems:
    - SLES 12 SP2 with service and SLES 11 SP4 with service.
    - RHEL 7.3 with service and RHEL 6.9 with service.
    - Ubuntu 16.04 LTS (or higher) with service.
    - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.
- Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**FICON Express16S+ (CHPID type FC)** for support of zHPF multitrack operations requires at a minimum:

- z/OS V2.3.



- z/OS V2.2 with PTFs.
- z/OS V2.1 with PTFs.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM V6.4.
- z/VM V6.3 for guest exploitation.
- z/VSE V6.2 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**FICON Express16S+ (CHPID type FCP)** for support of SCSI devices requires at a minimum:

- z/VM V6.4.
- z/VM V6.3.
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.

**FICON Express16S+ (CHPID type FCP) support of hardware data router** requires at a minimum:

- z/VM V6.4 for guest exploitation.
- z/VM V6.3 for guest exploitation.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**T10-DIF support** by the FICON Express16S+ features when defined as CHPID type FCP requires at a minimum:

- z/VM V6.4 for guest exploitation.
- z/VM V6.3 for guest exploitation.
- Linux on z Systems:
  - SLES 12 SP2 with service (DIF and DIX) and SLES 11 SP4 with service (DIF and DIX).
  - RHEL 7.3 with service (DIF and DIX) and RHEL 6.9 with service (DIF only).
  - Ubuntu 16.04 LTS (or higher) with service (DIF and DIX).
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**OSA-Express6S GbE LX (#0422) and GbE SX (#0423) require at a minimum:**

CHPID type OSD:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4 with PTFs.
- z/VM V6.3 with PTFs.
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- z/TPF V1.1 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

CHPID type OSD without maximum port exploitation (one port on the PCIe adapter is available for use):

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4 with PTFs.
- z/VM V6.3 with PTFs.
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.

- z/VSE V5.2 with PTFs.
- z/TPF V1.1 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**OSA-Express6S 10 GbE LR (#0424) and 10 GbE SR (#0425)** require at a minimum:

CHPID type OSD:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4 with PTFs.
- z/VM V6.3 with PTFs.
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- z/TPF V1.1 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

CHPID type OSX for access control to the intra-ensemble data network (IEDN) from IBM z14 to Unified Resource Manager functions:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4 to define, modify, and delete OSX CHPID types when z/VM is the controlling LPAR for dynamic I/O.
- z/VM V6.3 to define, modify, and delete OSX CHPID types when z/VM is the controlling LPAR for dynamic I/O.

- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- z/TPF V1.1 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**OSA-Express6S 1000BASE-T Ethernet (#0426)** requires at minimum:

CHPID type OSC supporting TN3270E and non-SNA DFT:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4.
- z/VM V6.3.
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- z/TPF V1.1 (support for port 0 only).

CHPID type OSD with exploitation of two ports per CHPID:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4 with PTFs.
- z/VM V6.3 with PTFs.
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- z/TPF V1.1 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.

CHPID type OSD without maximum port exploitation (one port on the PCIe adapter is available for use):

- z/OS V2.3.
  - z/OS V2.2.
  - z/OS V2.1.
  - z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
  - z/VM V6.4 with PTFs.
  - z/VM V6.3 with PTFs.
  - z/VSE V6.2 with PTFs.
  - z/VSE V6.1 with PTFs.
  - z/VSE V5.2 with PTFs.
  - z/TPF V1.1.
  - Linux on z Systems:
    - SLES 12 SP2 with service and SLES 11 SP4 with service.
    - RHEL 7.3 with service and RHEL 6.9 with service.
    - Ubuntu 16.04 LTS (or higher) with service.
    - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.
- Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**Checksum offload for IPv6 packets** (CHPID type OSD):

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4 for guest exploitation.
- z/VM V6.3 for guest exploitation.

**Checksum offload for LPAR-to-LPAR traffic** for IPv4 and IPv6 packets (CHPID type OSD):

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4 for guest exploitation.
- z/VM V6.3 for guest exploitation.

**Large Send for IPv6 packets** (CHPID type OSD):

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).

- z/VM V6.4 for guest exploitation.
- z/VM V6.3 for guest exploitation.

**CHPID type OSE** supporting 4 or 2 ports per feature:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required).
- z/VM V6.4.
- z/VM V6.3.
- z/VSE V6.2.
- z/VSE V6.1.
- z/VSE V5.2.

**CHPID type OSM for intranode management network (INMN):**

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM V6.4 to define, modify, and delete CHPID type OSM when z/VM is the controlling LPAR for dynamic I/O.
- z/VM V6.3 to define, modify, and delete CHPID type OSM when z/VM is the controlling LPAR for dynamic I/O.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.

**Crypto Express6S (#0893) Toleration**, which treats Crypto Express6S cryptographic coprocessors and accelerators as Crypto Express5 coprocessors and accelerators, requires at a minimum:

- z/OS V2.3 with PTFs.
- z/OS V2.2 with PTFs or:
  - z/OS V2.2 with Cryptographic Support for z/OS V1R13 -z/OS V2R2 (HCR77B1) with PTFs, or
  - z/OS V2.2 with Cryptographic Support for z/OS V2R1 -z/OS V2R2 (HCR77CO) with PTFs.
- z/OS V2.1 with PTFs or:
  - z/OS V2.1 with Cryptographic Support for z/OS V1R13 -z/OS V2R1 (HCR77A1) with PTFs or
  - z/OS V2.1 with Enhanced Cryptographic Support for z/OS V1R13 -z/OS V2R1 (HCR77B0) with PTFs or
  - z/OS V2.1 with Cryptographic Support for z/OS V1R13 -z/OS V2R2 (HCR77B1) with PTFs or
  - z/OS V2.1 with Cryptographic Support for z/OS V2R1 -z/OS V2R2 (HCR77CO) with PTFs.
- z/VM V6.4 with PTFs for guest exploitation and exploitation within the z/VM TLS/SSL server.
- z/VM V6.3 with PTFs for guest exploitation.

- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- z/TPF V1.1 with PTFs .
- Linux on z Systems: IBM is working with its Linux distribution partners to provide support via maintenance or future distribution releases for:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**Crypto Express6S (#0893) support of VISA® Format Preserving Encryption** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1 with the Enhanced Cryptographic Support for z/OS V1R13-z/OS V2R1 (HCR77B0) web deliverable installed.
- z/VM V6.4 with PTFs for guest exploitation.
- z/VM V6.3 with PTFs for guest exploitation.

**Crypto Express6S (#0893) support of greater than 16 Domains** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2
- z/OS V2.1 with the Enhanced Cryptographic Support for z/OS V1R13-z/OS V2R1 (HCR77B0) web deliverable installed.
- z/VM V6.4 with PTFs for guest exploitation and exploitation within the z/VM TLS/SSL server.
- z/VM V6.3 with PTFs for guest exploitation.
- z/VSE V6.2 with PTFs.
- z/VSE V6.1 with PTFs.
- z/VSE V5.2 with PTFs.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**Crypto Express6S (#0893) Exploitation** requires at a minimum:

- z/OS V2.1 with Cryptographic Support for z/OS V2R1 -z/OS V2R3 (HCR77C1).

- z/OS V2.2 with Cryptographic Support for z/OS V2R1 -z/OS V2R3 (HCR77C1).
- z/OS V2.3 with Cryptographic Support for z/OS V2R1 -z/OS V2R3 (HCR77C1).
- z/VM 6.4 with PTFs for guest exploitation.
- z/VM 6.3 with PTFs for guest exploitation.
- z/TPF V1.1 with support for Crypto Express6S (APAR PJ44689).
- Linux on z Systems: IBM is working with its Linux distribution partners to provide support in future distribution releases.

**Crypto Express6S (#0893) support of PCI-HSM compliance** requires at a minimum:

- z/OS V2.1 with Cryptographic Support for z/OS V2R1 -z/OS V2R3 (HCR77C1).
- z/OS V2.2 with Cryptographic Support for z/OS V2R1 -z/OS V2R3 (HCR77C1).
- z/OS V2.3 with Cryptographic Support for z/OS V2R1 -z/OS V2R3 (HCR77C1).
- z/VM 6.4 with PTFs for guest exploitation.
- z/VM 6.3 with PTFs for guest exploitation.

**10GbE RoCE Express2 (#0412) for Shared Memory Communications - Remote Direct Memory Access (SMC-R)** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2 with PTFs.
- z/OS V2.1 with PTFs.
- z/VM V6.4 with PTFs for guest exploitation.
- z/VM V6.3 with PTFs for guest exploitation.
- Linux on z Systems: IBM is working with its Linux distribution partners to include support in future distribution releases.

**10GbE RoCE Express2 (#0412) for Ethernet communications (which does not require a peer OSA) including Single Root I/O Virtualization (SR-IOV)** requires at a minimum:

- z/VM V6.4 with PTFs for guest exploitation.
- z/VM V6.3 with PTFs for guest exploitation.
- Linux on z Systems: IBM is working with its Linux distribution partners to provide support via maintenance or future distribution releases for:
  - SLES 12 SP2.
  - RHEL 7.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.

- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**IBM Integrated Coupling Adapter Fanout (ICA SR) (#0172)** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1 with PTFs.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).



- z/VM 6.4 to define, modify, and delete CHPID type CS5 when z/VM is the controlling LPAR for dynamic I/O.
- z/VM V6.3 to define, modify, and delete CHPID type CS5 when z/VM is the controlling LPAR for dynamic I/O.

**Support for 256 Coupling CHPIDs** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1 with PTFs.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM V6.4 for guest exploitation.
- z/VM V6.3 for guest exploitation.

**Coupling Express LR (#0433)** requires at a minimum:

- z/OS V2.3 with PTFs.
- z/OS V2.2 with PTFs.
- z/OS V2.1 with PTFs.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM V6.4 with PTFs to define, modify, and delete CL5 CHPID types when z/VM is the controlling LPAR for dynamic I/O.
- z/VM V6.3 with PTFs to define, modify, and delete CL5 CHPID types when z/VM is the controlling LPAR for dynamic I/O.

**CF Scalability Enhancements** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2 with PTFs.
- z/OS V2.1 with PTFs.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM 6.4 for guest coupling exploitation.
- z/VM 6.3 for guest coupling exploitation.

**CF List Notification Enhancements** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2 with PTFs.
- z/OS V2.1 with PTFs.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM 6.4 for guest coupling exploitation.
- z/VM 6.3 for guest coupling exploitation.

**zHyperLink Express (#0431)** requires at a minimum:

- z/OS V2.3 with PTFs.
- z/OS V2.2 with PTFs.
- z/OS V2.1 with PTFs.

**zEDC Express (#0420)** requires at a minimum:

- z/OS V2.3 with the zEnterprise data Compression (zEDC) for z/OS feature.
- z/OS V2.2 with the zEnterprise data Compression (zEDC) for z/OS feature.
- z/OS V2.1 with the zEnterprise data Compression (zEDC) for z/OS feature.

- z/VM V6.4 for guest exploitation.
- z/VM V6.3 for guest exploitation.
- Linux on z Systems:
  - SLES 12 SP2 with service.
  - RHEL 7.3 with service.
  - Ubuntu 16.04 LTS (or higher) with service.
  - IBM will be working to support the KVM hypervisor which is offered with the following Linux distributions: SLES 12 SP2 with service, and Ubuntu 16.04 LTS (or higher) with service.

Note: For minimum required and recommended distribution levels see the [IBM Z](#) website.
- KVM for IBM z 1.1.2 with latest Fixpack (toleration mode, until End of Service in March 2018).

**IBM Virtual Flash Memory (VFM) (#0604)** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 with PTFs, the z/OS V1.13 RSM Enablement Offering web deliverable installed, and an extended support contract for IBM Software Support Services. The web deliverable is available at the [z/OS downloads](#) website.

**XL C/C++ support of ARCH(12) and TUNE(12) parameters** requires at a minimum:

- z/OS V2.3 with PTFs.

**Transactional memory** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 (compatibility only, extended support contract for IBM Software Support Services for z/OS required with PTFs).
- z/VM V6.4 for guest exploitation.
- Linux on z Systems:
  - SLES 12 SP2 with service and SLES 11 SP4 with service.
  - RHEL 7.3 with service and RHEL 6.9 with service.
  - Ubuntu 16.04 LTS (or higher) with service.

**2 GB Large Pages** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 with PTFs, the z/OS V1.13 RSM Enablement Offering web deliverable installed, and an extended support contract for IBM Software Support Services. The web deliverable is available at the [z/OS downloads](#) website.
- z/TPF V1.1 with PTFs.
- Linux on z Systems: IBM is working with its Linux distribution partners to provide support via future distribution releases.

**z/OS global resource serialization (GRS) support for FICON CTCs** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2.
- z/OS V2.1.
- z/OS V1.13 with an extended support contract for IBM Software Support Services and PTFs.

**Guarded Storage** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2 with PTFs.
- z/VM V6.4 with PTFs for guest exploitation (December 15, 2017 availability).
- Linux on z Systems: IBM is working with its Linux distribution partners to provide support via future distribution releases.

**Instruction Execution Protection Facility** requires at a minimum:

- z/OS V2.3.
- z/OS V2.2 with PTFs.
- z/VM V6.4 with PTFs for guest exploitation (December 15, 2017 availability).
- Linux on z Systems: IBM is working with its Linux distribution partners to provide support via future distribution releases.

## Planning information

---

### ***Customer responsibilities***

Information on customer responsibilities for site preparation can be found in the [Library](#) section of Resource Link.

### ***Cable orders***

Not applicable

### ***Installability***

The average installation time for an IBM z14 is approximately 22 installer hours. This does not include planning hours. This assumes a full System Assurance Product Review, and implementation of the cable services have been performed. See your IBM representative for details on these services.

## Security, auditability, and control

---

The IBM z14 uses the security and auditability features and functions of host hardware, host software, and application software.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

---

## Terms and conditions

---

### **IBM Global Financing**

---

Yes

### **Products - terms and conditions**

---

#### ***Warranty period***

One year

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM. An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

### ***Warranty service***

The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country and location specific information. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. The following service is available as warranty for your machine type.

- 24 hours per day, 7 days a week, same day response

### ***Warranty service upgrades***

The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country and location specific information.

IBM On-site Service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

The following service is provided.

- 24 hours per day, 7 days a week, same day response.

### ***Usage plan machine***

No

### ***IBM hourly service rate classification***

Three

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

## ***General terms and conditions***

---

### ***Field-installable features***

Yes

### ***Model conversions***

Yes

### ***Machine installation***

Installation is performed by IBM. IBM will install the machine in accordance with the IBM installation procedures for the Machine.

Contact IBM at 1-800-IBM-SERV (426-7378).

**Graduated program license charges apply**

No

**Licensed Internal Code**

IBM Licensed Internal Code (LIC) is licensed for use by a customer on a specific machine, designated by serial number, under the terms and conditions of the IBM License Agreement for Machine Code, to enable a specific machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting the [License Agreement for Machine Code and Licensed Internal Code](#) website.

Specific Machine Type Model:

- 3906-M01
- 3906-M02
- 3906-M03
- 3906-M04
- 3906-M05

**Licensed Machine Code**

Not applicable

**Machine Code License Acceptance Requirement**

A.) Acceptance-By-Use Machine: Yes, acceptance of the Machine Code license terms is conveyed through the user's initial use of the Machine.

**Other Installed Licensed Code**

None

**Educational allowance**

Not applicable

---

**Prices**


---

For additional information and current prices, contact your local IBM representative.

**Product charges**

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
IBM z14	3906	M01		**		X	
		M02		**		X	
		M03		**		X	
		M04		**		X	
		M05		**		X	
MTU 1 - D			0001	**			MES
MTU 100 - D			0002	**			MES
MTU 1 - V			0003	**			Both

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
MTU 100 - V			0004	**			Both
GTU 1 -D			0005	**			MES
GTU 100- D			0006	**			MES
GTU 1 - V			0007	**			MES
GTU 100 - V			0008	**			MES
GTU 1000 - D			0009	**			MES
GTU 1000 - V			0010	**			MES
Exchange Pgm Machine			0012	**			Both
Exchange Pgm Machine + Covers			0013	**			MES
Migration Offering Machine			0014	**			Init
Blue Letter Internal			0015	**			MES
HW for DPM			0016	**			Both
Customized MRReport			0017	**			MES
Cost AnalysisS zing			0018	**			Both
TKE Rack Mount w/4768		0080		**			MES
TKE w/4768		0081		**			MES
HMC		0082		**			Both
HMC Rack Mount		0083		**			Both
TKE Rack Mount w/4768		0085		**			Both
TKE w/4768		0086		**			Both
WWPN Persistence		0099		**			Both
Mouse		0152		**			Both
HMC Tower Keyboard		0153		**			Both
HMC Rack Keybd/ Monitor/Mouse		0154		**			Both
TKE Tower Keyboard		0155		**			Both
TKE Rack Keybd/ Monitor/Mouse		0156		**			Both
Client Must Provide Mouse		0186		**			Both
Client Must Provide HMC Keybd		0187		**			Both

Client Must Provide HMC KMM	0188	**	Both
Client Must Provide TKE Keybd	0189	**	Both
Client Must Provide TKE KMM	0190	**	Both
Client Must Provide Display	0191	**	Both
1 CPE Capacity Unit	0116	**	Both
100 CPE Capacity Unit	0117	**	Both
10000 CPE Capacity Unit	0118	**	Both
1 CPE Capacity Unit-IFL	0119	**	Both
100 CPE Capacity Unit-IFL	0120	**	Both
1 CPE Capacity Unit-ICF	0121	**	Both
100 CPE Capacity Unit-ICF	0122	**	Both
1 CPE Capacity Unit-zIIP	0125	**	Both
100 CPE Capacity Unit-zIIP	0126	**	Both
1 CPE Capacity Unit-SAP	0127	**	Both
100 CPE Capacity Unit-SAP	0128	**	Both
A Fr Radiator	4029	**	Both
A Fr Water	4030	**	Both
Air w/o TEIO & w/o HtrR	0072	**	Both
Air w/o TEIO & w/HtR	0073	**	Both
Air w/TEIO & w/o HtrR	0074	**	Both
Air w/TEIO & w/HtR	0075	**	Both
Wat w/o TEIO & w/o HtrR	0076	**	Both
Wat w/o TEIO & HtR	0077	**	Both
Wat w/TEIO & w/o HtrR	0078	**	Both
Wat w/TEIO & w/HtR	0079	**	Both
Air w/o TEIO & w/o HtrR	0105	**	Both
Air w/o TEIO & w/HtR	0106	**	Both
Air w/TEIO & w/o HtrR	0107	**	Both
Air w/TEIO & w/HtR	0108	**	Both
Wat w/o TEIO & w/o HtrR	0109	**	Both
Wat w/o TEIO & w/HtR	0110	**	Both

Wat w/TEIO & w/o HtR	0111	**	Both
Wat w/TEIO & w/ HtR	0112	**	Both
Standard over Set	0160	**	Both
Thin Cover Set	0161	**	Both
Fanout Airflow GX ++	0165	**	Both
HCA3-O LR Fanout	0170	**	Both
HCA3-O Fanout	0171	**	Both
ICA SR Fanout	0172	**	Both
PCIe Fanout	0173	**	Both
Fanout Airflow PCIe	0174	**	Both
Manage FW Suite	0019	**	Both
Automate FW Suite	0020	**	Both
Ensemble membership	0025	**	Both
PCIe Interconnect	0401	**	Both
10 GbE RoCE Express2	0412	**	Both
OSA-ICC 3215 Enablement	0034	**	Both
OSA-Express6S GbE LX	0422	**	Both
OSA-Express6S GbE SX	0423	**	Both
OSA-Express6S 10 GbE LR	0424	**	Both
OSA-Express6S 10 GbE SR	0425	**	Both
OSA-Express6S 1000BASE-T	0426	**	Both
FICON Express16S + LX 0427	0427	**	Both
FICON Express16S + SX	0428	**	Both
zEDC Express	0420	**	Both
zHyperLink Express	0431	**	Both
Coupling Express LR	0433	**	Both
IBM Virtual Flash Memory	0604	**	Both
ReadOnly Media Option	0845	**	Both
TKE workstation w/4768	0849	**	MES
4768 TKE Crypto Adapter	0844	**	MES
TKE Addl Smart Cards	0892	**	Both
32GB USB Backup Media	0848	**	Both
TKE 9.0 LIC	0879	**	Both
TKE Smart Card Reader	0891	**	Both



Crypto Express6S	0893	**	Both
RFID Tag	0035	**	Both
RFID Tag	0036	**	Both
RFID Tag	0037	**	Both
<hr/>			
UID Label for DoD	0998		Both
STP Enablement	1021	**	Both
EMEA Special Operations	1022	**	Both
<hr/>			
32 GB Mem DIMM(5/feat)	1627	**	Both
64 GB Mem DIMM(5/feat)	1628	**	Both
128 GB Mem DIMM(5/feat)	1629	**	Both
256 GB Mem DIMM(5/feat)	1630	**	Both
512 GB Mem DIMM(5/feat)	1631	**	Both
<hr/>			
LICCC Ship Via Net Ind	1750	**	MES
64GB Memory Capacity Incr	1893	**	Both
256GB Memory Capacity Incr	1894	**	Both
16GB FTR Converted Mem z12	1895	**	MES
32GB FTR Converted Mem z12	1896	**	MES
32GB FTR Converted Mem z13	1897	**	MES
32GB Memory Capacity Incr	1898	**	Both
16GB FTR Converted Mem z13	1900	**	MES
32GB Memory Capacity Incr >1TB	1938	**	Both
64GB Memory Capacity Incr >1TB	1939	**	Both
256GB Memory Capacity Incr >1TB	1940	**	Both
32GB Preplanned Memory	1990	**	Both
64GB Preplanned Memory	1991	**	Both
64GB VFM Preplanned Memory	1999	**	Both
Line Cord Plan Ahead	2000	**	Both
<hr/>			
256 GB Memory	1660	**	Both
320 GB Memory	1661	**	Both
384 GB Memory	1662	**	Both

448 GB Memory	1663	**	Both
512 GB Memory	1664	**	Both
576 GB Memory	1665	**	Both
704 GB Memory	1666	**	Both
832 GB Memory	1667	**	Both
960 GB Memory	1668	**	Both
1088 GB Memory	1669	**	Both
1216 GB Memory	1670	**	Both
1344 GB Memory	1671	**	Both
1472 GB Memory	1672	**	Both
1600 GB Memory	1673	**	Both
1856 GB Memory	1674	**	Both
2112 GB Memory	1675	**	Both
2368 GB Memory	1676	**	Both
2624 GB Memory	1677	**	Both
2880 GB Memory	1678	**	Both
3136 GB Memory	1679	**	Both
3392 GB Memory	1680	**	Both
3648 GB Memory	1681	**	Both
3904 GB Memory	1682	**	Both
4416 GB Memory	1683	**	Both
4928 GB Memory	1684	**	Both
5440 GB Memory	1685	**	Both
5952 GB Memory	1686	**	Both
6464 GB Memory	1687	**	Both
6976 GB Memory	1688	**	Both
7488 GB Memory	1689	**	Both
8000 GB Memory	1690	**	Both
US English	0235	**	Both
France	0236	**	Both
German/Austrian	0237	**	Both
LA Spanish	0238	**	Both
Spain	0239	**	Both
Italian	0240	**	Both
French Canadian	0241	**	Both
Portuguese	0242	**	Both
UK English	0243	**	Both
Norwegian	0244	**	Both
Sweden Finland	0245	**	Both
Netherlands	0246	**	Both
Belgian French	0247	**	Both
Denmark	0248	**	Both
Swiss French/ German	0249	**	Both
Flat Panel Display	6096	**	Both
Balanced Power Plan Ahead	3003	**	Both
BPD Pair	3014	**	Both
BPR Pair	3015	**	Both
Internal Battery IBF	3216	**	Both
Universal Lift Tool Upgr Kit	3103	**	Both
Universal Lift Tool/ Ladder	3105	**	Both

FDT Adapter Kit	3379	**	Both
Fill and Drain Kit	3380	**	Both
Serv Docs Optional Print	0033	**	Both
CPACF Enablement	3863	**	Both
PCIe I/O Drawer	4013	**	Both
14ft Water Hose	7801	**	Both
FQC Bracket & Mounting Hdw	7923	**	Both
LC Duplex 6.6 ft Harness	7924	**	Both
LC Duplex 8.5ft Harness	7925	**	Both
LC Duplex 12 ft Harness	7926	**	Both
Top Exit I/O Cabling	7942	**	Both
Side Covers	7949	**	Both
Non Raised Floor Support	7998	**	Both
4-in-1 Bolt Down Kit	8003	**	Both
3-in-1 Bolt Down Kit-W	8004	**	Both
Bolt Down Kit, NRF	8005	**	Both
380-520V DC TE Cord BPE-1	8947	**	Both
200V 3PH TE Cord BPE-11	8952	**	Both
380-520V DC TE Cord BPE-2	8953	**	Both
200V 3PH TE Cord BPE-2	8955	**	Both
14 ft 380-520V DC line cord	8963	**	Both
14ft 200V 3PH cord	8993	**	Both
480V 3PH TE Cord	8950	**	Both
14 ft. 480V 3PH Line Cord	8983	**	Both
14 ft 380-415V 3PH	8976	**	Both
380-415V 3PH TE Cord	8977	**	Both
Non RSF On/Off CoD	0032	**	Both
Multi Order Ship Flag	9000	**	Both
Multi Order Rec Only Flag-NB	9001	**	Both
Multi Order Rec Only Flag-MES	9002	**	MES
RPO Action Flag	9003	**	MES
Downgraded PUs Per Request	9004	**	Both

On/Off CoD 100 IFL Days	9874	**		MES
On/Off CoD 100 ICF Days	9875	**		MES
On/Off CoD 100 CP Days	9876	**		MES
On/Off CoD 100 zIIP Days	9877	**		MES
On/Off CoD 100 SAP Days	9878	**		MES
On/Off CoD Act IFL Day	9888	**		MES
On/Off CoD Act ICF Day	9889	**		MES
On/Off CoD authorization	9896	**		Both
On/Off CoD Act Cap CP Day	9897	**		MES
Perm upgr authorization	9898	**		Both
CIU Activation (Flag)	9899	**		MES
On-Line CoD Buying (Flag)	9900	**		MES
On/Off CoD Act zIIP Day	9908	**		MES
On/Off CoD Act SAP Day	9909	**		MES
CBU authorization	9910	**		Both
CPE authorization	9912	**		Both
OPO Sales authorization	9913	**		Both
1 MSU day	9917	**		MES
100 MSU days	9918	**		MES
10000 MSU days	9919	**		MES
1 IFL day	9920	**		MES
100 IFL days	9921	**		MES
1 ICF day	9922	**		MES
100 ICF days	9923	**		MES
1 zIIP day	9924	**		MES
100 zIIP days	9925	**		MES
1 SAP day	9928	**		MES
100 SAP days	9929	**		MES
Weight Distribution Kit	9970	**		Both
Height Reduce Ship	9975	**		Both
Height reduce for return	9976	**		MES
CP4	1929	**		Both
CP5	1930	**		Both
CP6	1931	**		Both
CP7	1932	**		Both
IFL	1933	**	X	Both
ICF	1934	**	X	Both

SAP (optional)	1935	**			Both
zIIP	1936	**	X		Both
Unassigned IFL	1937	**			Both
Additional CBU Test	6805	**			Both
Total CBU Years Ordered	6817	**			Both
CBU Records Ordered	6818	**			Both
Single CBU CP-Year	6820	**			Both
25 CBU CP-Year	6821	**			Both
Single CBU IFL Year	6822	**			Both
25 CBU IFL Year	6823	**			Both
Single CBU ICF Year	6824	**			Both
25 CBU ICF Year	6825	**			Both
Single CBU zIIP Year	6828	**			Both
25 CBU zIIP Year	6829	**			Both
Single CBU SAP Year	6830	**			Both
25 CBU SAP Year	6831	**			Both
CBU Replenishment	6832	**			MES
Capacity for Planned Event	6833	**			Both
OPO Sales Flag	6835	**			Both
OPO Sales Flag Alteration	6836	**			MES

<b>Description</b>	<b>Machine type</b>	<b>Model</b>	<b>Feature code</b>	<b>**</b>	<b>EWFe</b>	<b>MMMC indicator</b>	<b>INIT/MES</b>
0-Way Processor CP4			2001	**		X	Both
1-Way Processor CP4			2002	**		X	Both
2-Way Processor CP4			2003	**		X	Both
3-Way Processor CP4			2004	**		X	Both
4-Way Processor CP4			2005	**		X	Both
5-Way Processor CP4			2006	**		X	Both
6-Way Processor CP4			2007	**		X	Both

<b>Description</b>	<b>Machine type</b>	<b>Model</b>	<b>Feature code</b>	<b>**</b>	<b>EWFe</b>	<b>MMMC indicator</b>	<b>INIT/MES</b>
7-Way Processor CP4			2008	**		X	Both
8-Way Processor CP4			2009	**		X	Both
9-Way Processor CP4			2010	**		X	Both
10-Way Processor CP4			2011	**		X	Both
11-Way Processor CP4			2012	**		X	Both
12-Way Processor CP4			2013	**		X	Both
13-Way Processor CP4			2014	**		X	Both
14-Way Processor CP4			2015	**		X	Both
15-Way Processor CP4			2016	**		X	Both
16-Way Processor CP4			2017	**		X	Both
17-Way Processor CP4			2018	**		X	Both
18-Way Processor CP4			2019	**		X	Both
19-Way Processor CP4			2020	**		X	Both
20-Way Processor CP4			2021	**		X	Both
21-Way Processor CP4			2022	**		X	Both
22-Way Processor CP4			2023	**		X	Both
23-Way Processor CP4			2024	**		X	Both

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
24-Way Processor CP4			2025	**		X	Both
25-Way Processor CP4			2026	**		X	Both
26-Way Processor CP4			2027	**		X	Both
27-Way Processor CP4			2028	**		X	Both
28-Way Processor CP4			2029	**		X	Both
29-Way Processor CP4			2030	**		X	Both
30-Way Processor CP4			2031	**		X	Both
31-Way Processor CP4			2032	**		X	Both
32-Way Processor CP4			2033	**		X	Both
33-Way Processor CP4			2034	**		X	Both
1-Way Processor CP5			2035	**		X	Both
2-Way Processor CP5			2036	**		X	Both
3-Way Processor CP5			2037	**		X	Both
4-Way Processor CP5			2038	**		X	Both
5-Way Processor CP5			2039	**		X	Both
6-Way Processor CP5			2040	**		X	Both
7-Way Processor CP5			2041	**		X	Both
8-Way Processor CP5			2042	**		X	Both

<b>Description</b>	<b>Machine type</b>	<b>Model</b>	<b>Feature code</b>	<b>**</b>	<b>EWFe</b>	<b>MMMC indicator</b>	<b>INIT/MES</b>
9-Way Processor CP5			2043	**		X	Both
10-Way Processor CP5			2044	**		X	Both
11-Way Processor CP5			2045	**		X	Both
12-Way Processor CP5			2046	**		X	Both
13-Way Processor CP5			2047	**		X	Both
14-Way Processor CP5			2048	**		X	Both
15-Way Processor CP5			2049	**		X	Both
16-Way Processor CP5			2050	**		X	Both
17-Way Processor CP5			2051	**		X	Both
18-Way Processor CP5			2052	**		X	Both
19-Way Processor CP5			2053	**		X	Both
20-Way Processor CP5			2054	**		X	Both
21-Way Processor CP5			2055	**		X	Both
22-Way Processor CP5			2056	**		X	Both
23-Way Processor CP5			2057	**		X	Both
24-Way Processor CP5			2058	**		X	Both
25-Way			2059	**		X	Both



Processor Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/ MES
Processor CP5						
26- Way Processor CP5		2060	**		X	Both
27- Way Processor CP5		2061	**		X	Both
28- Way Processor CP5		2062	**		X	Both
29- Way Processor CP5		2063	**		X	Both
30- Way Processor CP5		2064	**		X	Both
31- Way Processor CP5		2065	**		X	Both
32- Way Processor CP5		2066	**		X	Both
33- Way Processor CP5		2067	**		X	Both
1-Way Processor CP6		2068	**		X	Both
2-Way Processor CP6		2069	**		X	Both
3-Way Processor CP6		2070	**		X	Both
4-Way Processor CP6		2071	**		X	Both
5-Way Processor CP6		2072	**		X	Both
6-Way Processor CP6		2073	**		X	Both
7-Way Processor CP6		2074	**		X	Both
8-Way Processor CP6		2075	**		X	Both
9-Way Processor CP6		2076	**		X	Both
10- Way		2077	**		X	Both

Processor	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
Processor CP6							
11-Way Processor CP6			2078	**		X	Both
12-Way Processor CP6			2079	**		X	Both
13-Way Processor CP6			2080	**		X	Both
14-Way Processor CP6			2081	**		X	Both
15-Way Processor CP6			2082	**		X	Both
16-Way Processor CP6			2083	**		X	Both
17-Way Processor CP6			2084	**		X	Both
18-Way Processor CP6			2085	**		X	Both
19-Way Processor CP6			2086	**		X	Both
20-Way Processor CP6			2087	**		X	Both
21-Way Processor CP6			2088	**		X	Both
22-Way Processor CP6			2089	**		X	Both
23-Way Processor CP6			2090	**		X	Both
24-Way Processor CP6			2091	**		X	Both
25-Way Processor CP6			2092	**		X	Both
26-Way Processor CP6			2093	**		X	Both

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
27-Way Processor CP6			2094	**		X	Both
28-Way Processor CP6			2095	**		X	Both
29-Way Processor CP6			2096	**		X	Both
30-Way Processor CP6			2097	**		X	Both
31-Way Processor CP6			2098	**		X	Both
32-Way Processor CP6			2099	**		X	Both
33-Way Processor CP6			2100	**		X	Both
1-Way Processor CP7			2101	**		X	Both
2-Way Processor CP7			2102	**		X	Both
3-Way Processor CP7			2103	**		X	Both
4-Way Processor CP7			2104	**		X	Both
5-Way Processor CP7			2105	**		X	Both
6-Way Processor CP7			2106	**		X	Both
7-Way Processor CP7			2107	**		X	Both
8-Way Processor CP7			2108	**		X	Both
9-Way Processor CP7			2109	**		X	Both
10-Way Processor CP7			2110	**		X	Both
11-Way Processor CP7			2111	**		X	Both

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
12-Way Processor CP7			2112	**		X	Both
13-Way Processor CP7			2113	**		X	Both
14-Way Processor CP7			21141	**		X	Both
15-Way Processor CP7			2115	**		X	Both
16-Way Processor CP7			2116	**		X	Both
17-Way Processor CP7			2117	**		X	Both
18-Way Processor CP7			2118	**		X	Both
19-Way Processor CP7			2119	**		X	Both
20-Way Processor CP7			2120	**		X	Both
21-Way Processor CP7			2121	**		X	Both
22-Way Processor CP7			2122	**		X	Both
23-Way Processor CP7			2123	**		X	Both
24-Way Processor CP7			2124	**		X	Both
25-Way Processor CP7			2125	**		X	Both
26-Way Processor CP7			2126	**		X	Both
27-Way Processor CP7			2127	**		X	Both
28-Way			2128	**		X	Both

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
Processor CP7							
29-Way Processor CP7			2129	**		X	Both
30-Way Processor CP7			2130	**		X	Both
31-Way Processor CP7			2131	**		X	Both
32-Way Processor CP7			2132	**		X	Both
33-Way Processor CP7			2133	**		X	Both
400 Capacity Marker			2519	**			Both
401 Capacity Marker			2520	**			Both
402 Capacity Marker			2521	**			Both
403 Capacity Marker			2522	**			Both
404 Capacity Marker			2523	**			Both
405 Capacity Marker			2524	**			Both
406 Capacity Marker			2525	**			Both
407 Capacity Marker			2526	**			Both
408 Capacity Marker			2527	**			Both
409 Capacity Marker			2528	**			Both
410 Capacity Marker			2529	**			Both
411 Capacity Marker			2530	**			Both
412 Capacity Marker			2531	**			Both
413 Capacity Marker			2532	**			Both

<b>Description</b>	<b>Machine type</b>	<b>Model</b>	<b>Feature code</b>	<b>**</b>	<b>EWFe</b>	<b>MMMC indicator</b>	<b>INIT/MES</b>
414 Capacity Marker			2533	**			Both
415 Capacity Marker			2534	**			Both
416 Capacity Marker			2535	**			Both
417 Capacity Marker			2536	**			Both
418 Capacity Marker			2537	**			Both
419 Capacity Marker			2538	**			Both
420 Capacity Marker			2539	**			Both
421 Capacity Marker			2540	**			Both
422 Capacity Marker			2541	**			Both
423 Capacity Marker			2542	**			Both
424 Capacity Marker			2543	**			Both
425 Capacity Marker			2544	**			Both
426 Capacity Marker			2545	**			Both
427 Capacity Marker			2546	**			Both
428 Capacity Marker			2547	**			Both
429 Capacity Marker			2548	**			Both
430 Capacity Marker			2549	**			Both
431 Capacity Marker			2550	**			Both
432 Capacity Marker			2551	**			Both
433 Capacity Marker			2552	**			Both
501 Capacity Marker			2553	**			Both

<b>Description</b>	<b>Machine type</b>	<b>Model</b>	<b>Feature code</b>	<b>**</b>	<b>EWFe</b>	<b>MMMC indicator</b>	<b>INIT/MES</b>
502 Capacity Marker			2554	**			Both
503 Capacity Marker			2555	**			Both
504 Capacity Marker			2556	**			Both
505 Capacity Marker			2557	**			Both
506 Capacity Marker			2558	**			Both
507 Capacity Marker			2559	**			Both
508 Capacity Marker			2560	**			Both
509 Capacity Marker			2561	**			Both
510 Capacity Marker			2562	**			Both
511 Capacity Marker			2563	**			Both
512 Capacity Marker			2564	**			Both
513 Capacity Marker			2565	**			Both
514 Capacity Marker			2566	**			Both
515 Capacity Marker			2567	**			Both
516 Capacity Marker			2568	**			Both
517 Capacity Marker			2569	**			Both
518 Capacity Marker			2570	**			Both
519 Capacity Marker			2571	**			Both
520 Capacity Marker			2572	**			Both
521 Capacity Marker			2573	**			Both
522 Capacity Marker			2574	**			Both

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
523 Capacity Marker			2575	**			Both
524 Capacity Marker			2576	**			Both
525 Capacity Marker			2577	**			Both
526 Capacity Marker			2578	**			Both
527 Capacity Marker			2579	**			Both
528 Capacity Marker			2580	**			Both
529 Capacity Marker			2581	**			Both
530 Capacity Marker			2582	**			Both
531 Capacity Marker			2583	**			Both
532 Capacity Marker			2584	**			Both
533 Capacity Marker			2585	**			Both
601 Capacity Marker			2586	**			Both
602 Capacity Marker			2587	**			Both
603 Capacity Marker			2588	**			Both
604 Capacity Marker			2589	**			Both
605 Capacity Marker			2590	**			Both
606 Capacity Marker			2591	**			Both
607 Capacity Marker			2592	**			Both
608 Capacity Marker			2593	**			Both
609 Capacity Marker			2594	**			Both
610 Capacity Marker			2595	**			Both



Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
611 Capacity Marker			2596	**			Both
612 Capacity Marker			2597	**			Both
613 Capacity Marker			2598	**			Both
614 Capacity Marker			2599	**			Both
615 Capacity Marker			2600	**			Both
616 Capacity Marker			2601	**			Both
617 Capacity Marker			2602	**			Both
618 Capacity Marker			2603	**			Both
619 Capacity Marker			2604	**			Both
620 Capacity Marker			2605	**			Both
621 Capacity Marker			2606	**			Both
622 Capacity Marker			2607	**			Both
623 Capacity Marker			2608	**			Both
624 Capacity Marker			2609	**			Both
625 Capacity Marker			2610	**			Both
626 Capacity Marker			2611	**			Both
627 Capacity Marker			2612	**			Both
628 Capacity Marker			2613	**			Both
629 Capacity Marker			2614	**			Both
630 Capacity Marker			2615	**			Both
631 Capacity Marker			2616	**			Both

Description	Machine type	Model	Feature code	**	EWFe	MMMC indicator	INIT/MES
632 Capacity Marker			2617	**			Both
633 Capacity Marker			2618	**			Both
701 Capacity Marker			2619	**			Both
702 Capacity Marker			2620	**			Both
703 Capacity Marker			2621	**			Both
704 Capacity Marker			2622	**			Both
705 Capacity Marker			2623	**			Both
706 Capacity Marker			2624	**			Both
707 Capacity Marker			2625	**			Both
708 Capacity Marker			2626	**			Both
709 Capacity Marker			2627	**			Both
710 Capacity Marker			2628	**			Both
711 Capacity Marker			2629	**			Both
712 Capacity Marker			2630	**			Both
713 Capacity Marker			2631	**			Both
714 Capacity Marker			2632	**			Both
715 Capacity Marker			2633	**			Both
716 Capacity Marker			2634	**			Both
717 Capacity Marker			2635	**			Both
718 Capacity Marker			2636	**			Both
719 Capacity Marker			2637	**			Both

720 Capacity Marker			2638	**		Both
721 Capacity Marker			2639	**		Both
722 Capacity Marker			2640	**		Both
723 Capacity Marker			2641	**		Both
724 Capacity Marker			2642	**		Both
725 Capacity Marker			2643	**		Both
726 Capacity Marker			2644	**		Both
727 Capacity Marker			2645	**		Both
728 Capacity Marker			2646	**		Both
729 Capacity Marker			2647	**		Both
730 Capacity Marker			2648	**		Both
731 Capacity Marker			2649	**		Both
732 Capacity Marker			2650	**		Both
733 Capacity Marker			2651	**		Both
IBM z14	3906	M01				
Model M01 Air Cooled			1023	**	X	Both
Model M01 Water Cooled			1028	**	X	Both
IBM z14	3906	M02				
Model M02 Air Cooled			1024	**	X	Both
Model M02 Water Cooled			1029	**	X	Both
IBM z14	3906	M03				
Model M03 Air Cooled			1025	**	X	Both

Model M03 Water Cooled			1030	**	X	Both
IBM z14	3906	M04				
Model M04 Air Cooled			1026	**	X	Both
Model M04 Water Cooled			1031	**	X	Both
IBM z14	3906	M05				
Model M05 Air Cooled			1027	**	X	Both
Model M05 Water Cooled			1032	**	X	Both
IBM z14	3906	M02				
		M03				
		M04				
		M05				
8512 GB Memory			1691	**		Both
9024 GB Memory			1692	**		Both
9536 GB Memory			1693	**		Both
10048 GB Memory			1694	**		Both
10560 GB Memory			1695	**		Both
11072 GB Memory			1696	**		Both
11584 GB Memory			1697	**		Both
12096 GB Memory			1698	**		Both
12608 GB Memory			1699	**		Both
13120 GB Memory			1700	**		Both
13632 GB Memory			1701	**		Both
14144 GB Memory			1702	**		Both
14656 GB Memory			1703	**		Both

15168 GB Memory	1704	**		Both
15680 GB Memory	1705	**		Both
16192 GB Memory	1706	**		Both
34-Way Processor CP7	2134	**	X	Both
35-Way Processor CP7	2135	**	X	Both
36-Way Processor CP7	2136	**	X	Both
37-Way Processor CP7	2137	**	X	Both
38-Way Processor CP7	2138	**	X	Both
39-Way Processor CP7	2139	**	X	Both
40-Way Processor CP7	2140	**	X	Both
41-Way Processor CP7	2141	**	X	Both
42-Way Processor CP7	2142	**	X	Both
43-Way Processor CP7	2143	**	X	Both
44-Way Processor CP7	2144	**	X	Both
45-Way Processor CP7	2145	**	X	Both
46-Way Processor CP7	2146	**	X	Both
47-Way Processor CP7	2147	**	X	Both
48-Way Processor CP7	2148	**	X	Both
49-Way Processor CP7	2149	**	X	Both
50-Way Processor CP7	2150	**	X	Both
51-Way Processor CP7	2151	**	X	Both

52-Way Processor CP7	2152	**	X	Both
53-Way Processor CP7	2153	**	X	Both
54-Way Processor CP7	2154	**	X	Both
55-Way Processor CP7	2155	**	X	Both
56-Way Processor CP7	2156	**	X	Both
57-Way Processor CP7	2157	**	X	Both
58-Way Processor CP7	2158	**	X	Both
59-Way Processor CP7	2159	**	X	Both
60-Way Processor CP7	2160	**	X	Both
61-Way Processor CP7	2161	**	X	Both
62-Way Processor CP7	2162	**	X	Both
63-Way Processor CP7	2163	**	X	Both
64-Way Processor CP7	2164	**	X	Both
65-Way Processor CP7	2165	**	X	Both
66-Way Processor CP7	2166	**	X	Both
67-Way Processor CP7	2167	**	X	Both
68-Way Processor CP7	2168	**	X	Both
69-Way Processor CP7	2169	**	X	Both
734 Capacity Marker	2652	**		Both
735 Capacity Marker	2653	**		Both
736 Capacity Marker	2654	**		Both

737 Capacity Marker	2655	**	Both
738 Capacity Marker	2656	**	Both
739 Capacity Marker	2657	**	Both
740 Capacity Marker	2658	**	Both
741 Capacity Marker	2659	**	Both
742 Capacity Marker	2660	**	Both
743 Capacity Marker	2661	**	Both
744 Capacity Marker	2662	**	Both
745 Capacity Marker	2663	**	Both
746 Capacity Marker	2664	**	Both
747 Capacity Marker	2665	**	Both
748 Capacity Marker	2666	**	Both
749 Capacity Marker	2667	**	Both
750 Capacity Marker	2668	**	Both
751 Capacity Marker	2669	**	Both
752 Capacity Marker	2670	**	Both
753 Capacity Marker	2671	**	Both
754 Capacity Marker	2672	**	Both
755 Capacity Marker	2673	**	Both
756 Capacity Marker	2674	**	Both
757 Capacity Marker	2675	**	Both
758 Capacity Marker	2676	**	Both

759 Capacity Marker			2677	**	Both
760 Capacity Marker			2678	**	Both
761 Capacity Marker			2679	**	Both
762 Capacity Marker			2680	**	Both
763 Capacity Marker			2681	**	Both
764 Capacity Marker			2682	**	Both
765 Capacity Marker			2683	**	Both
766 Capacity Marker			2684	**	Both
767 Capacity Marker			2685	**	Both
768 Capacity Marker			2686	**	Both
769 Capacity Marker			2687	**	Both
IBM z14	3906	M03			
		M04			
		M05			
16704 GB Memory			1707	**	Both
17216 GB Memory			1708	**	Both
17728 GB Memory			1709	**	Both
18240 GB Memory			1710	**	Both
18752 GB Memory			1711	**	Both
19264 GB Memory			1712	**	Both
19776 GB Memory			1713	**	Both
20288 GB Memory			1714	**	Both
20800 GB Memory			1715	**	Both
21312 GB Memory			1716	**	Both



21824 GB Memory	1717	**		Both
22336 GB Memory	1718	**		Both
22848 GB Memory	1719	**		Both
23360 GB Memory	1720	**		Both
23872 GB Memory	1721	**		Both
24384 GB Memory	1722	**		Both
70-Way Processor CP7	2170	**	X	Both
71-Way Processor CP7	2171	**	X	Both
70-Way Processor CP7	2172	**	X	Both
72-Way Processor CP7	2173	**	X	Both
73-Way Processor CP7	2174	**	X	Both
74-Way Processor CP7	2175	**	X	Both
75-Way Processor CP7	2176	**	X	Both
76-Way Processor CP7	2176	**	X	Both
77-Way Processor CP7	2177	**	X	Both
78-Way Processor CP7	2178	**	X	Both
79-Way Processor CP7	2179	**	X	Both
80-Way Processor CP7	2180	**	X	Both
81-Way Processor CP7	2181	**	X	Both
80-Way Processor CP7	2182	**	X	Both
82-Way Processor CP7	2183	**	X	Both

83-Way Processor CP7	2184	**	X	Both
84-Way Processor CP7	2185	**	X	Both
85-Way Processor CP7	2186	**	X	Both
86-Way Processor CP7	2186	**	X	Both
87-Way Processor CP7	2187	**	X	Both
88-Way Processor CP7	2188	**	X	Both
89-Way Processor CP7	2189	**	X	Both
90-Way Processor CP7	2190	**	X	Both
91-Way Processor CP7	2191	**	X	Both
90-Way Processor CP7	2192	**	X	Both
92-Way Processor CP7	2193	**	X	Both
93-Way Processor CP7	2194	**	X	Both
94-Way Processor CP7	2195	**	X	Both
95-Way Processor CP7	2196	**	X	Both
96-Way Processor CP7	2196	**	X	Both
97-Way Processor CP7	2197	**	X	Both
98-Way Processor CP7	2198	**	X	Both
99-Way Processor CP7	2199	**	X	Both
100-Way Processor CP7	2200	**	X	Both
101-Way Processor CP7	2201	**	X	Both
102-Way Processor CP7	2202	**	X	Both

103-Way Processor CP7	2203	**	X	Both
104-Way Processor CP7	2204	**	X	Both
105-Way Processor CP7	2205	**	X	Both
770 Capacity Marker	2688	**		Both
771 Capacity Marker	2689	**		Both
772 Capacity Marker	2690	**		Both
773 Capacity Marker	2691	**		Both
774 Capacity Marker	2692	**		Both
775 Capacity Marker	2693	**		Both
776 Capacity Marker	2694	**		Both
777 Capacity Marker	2695	**		Both
778 Capacity Marker	2696	**		Both
779 Capacity Marker	2697	**		Both
780 Capacity Marker	2698	**		Both
781 Capacity Marker	2699	**		Both
782 Capacity Marker	2700	**		Both
783 Capacity Marker	2701	**		Both
784 Capacity Marker	2702	**		Both
785 Capacity Marker	2703	**		Both
786 Capacity Marker	2704	**		Both
787 Capacity Marker	2705	**		Both

788 Capacity Marker			2706	**		Both
789 Capacity Marker			2707	**		Both
790 Capacity Marker			2708	**		Both
791 Capacity Marker			2709	**		Both
792 Capacity Marker			2710	**		Both
793 Capacity Marker			2711	**		Both
794 Capacity Marker			2712	**		Both
795 Capacity Marker			2713	**		Both
796 Capacity Marker			2714	**		Both
797 Capacity Marker			2715	**		Both
798 Capacity Marker			2716	**		Both
799 Capacity Marker			2717	**		Both
7A0 Capacity Marker			2718	**		Both
7A1 Capacity Marker			2719	**		Both
7A2 Capacity Marker			2720	**		Both
7A3 Capacity Marker			2721	**		Both
7A4 Capacity Marker			2722	**		Both
7A5 Capacity Marker			2723	**		Both
IBM z14	3906	M04				
		M05				
24896 GB Memory			1723	**		Both
25408 GB Memory			1724	**		Both
25920 GB Memory			1725	**		Both

26432 GB Memory	1726	**		Both
26944 GB Memory	1727	**		Both
27456 GB Memory	1728	**		Both
27968 GB Memory	1729	**		Both
28480 GB Memory	1730	**		Both
28992 GB Memory	1731	**		Both
29504 GB Memory	1732	**		Both
30016 GB Memory	1733	**		Both
30528 GB Memory	1734	**		Both
31040 GB Memory	1735	**		Both
31552 GB Memory	1736	**		Both
32064 GB Memory	1737	**		Both
32576 GB Memory	1738	**		Both
106- Way Processor CP7	2206	**	X	Both
107- Way Processor CP7	2207	**	X	Both
108- Way Processor CP7	2208	**	X	Both
109- Way Processor CP7	2209	**	X	Both
110- Way Processor CP7	2210	**	X	Both
111- Way Processor CP7	2211	**	X	Both
112- Way Processor CP7	2212	**	X	Both

113-Way Processor CP7	2213	**	X	Both
114-Way Processor CP7	2214	**	X	Both
115-Way Processor CP7	2215	**	X	Both
116-Way Processor CP7	2216	**	X	Both
117-Way Processor CP7	2217	**	X	Both
118-Way Processor CP7	2218	**	X	Both
119-Way Processor CP7	2219	**	X	Both
120-Way Processor CP7	2220	**	X	Both
121-Way Processor CP7	2221	**	X	Both
122-Way Processor CP7	2222	**	X	Both
123-Way Processor CP7	2223	**	X	Both
124-Way Processor CP7	2224	**	X	Both
125-Way Processor CP7	2225	**	X	Both
126-Way Processor CP7	2226	**	X	Both
127-Way Processor CP7	2227	**	X	Both
128-Way Processor CP7	2228	**	X	Both
129-Way Processor CP7	2229	**	X	Both

130-Way Processor CP7	2230	**	X	Both
131-Way Processor CP7	2231	**	X	Both
132-Way Processor CP7	2232	**	X	Both
133-Way Processor CP7	2233	**	X	Both
134-Way Processor CP7	2234	**	X	Both
135-Way Processor CP7	2235	**	X	Both
136-Way Processor CP7	2236	**	X	Both
137-Way Processor CP7	2237	**	X	Both
138-Way Processor CP7	2238	**	X	Both
139-Way Processor CP7	2239	**	X	Both
140-Way Processor CP7	2240	**	X	Both
141-Way Processor CP7	2241	**	X	Both
7A6 Capacity Marker	2724	**		Both
7A7 Capacity Marker	2725	**		Both
7A8 Capacity Marker	2726	**		Both
7A9 Capacity Marker	2727	**		Both
7B0 Capacity Marker	2728	**		Both
7B1 Capacity Marker	2729	**		Both

7B2 Capacity Marker	2730	**	Both
7B3 Capacity Marker	2731	**	Both
7B4 Capacity Marker	2732	**	Both
7B5 Capacity Marker	2733	**	Both
7B6 Capacity Marker	2734	**	Both
7B7 Capacity Marker	2735	**	Both
7B8 Capacity Marker	2736	**	Both
7B9 Capacity Marker	2737	**	Both
7C0 Capacity Marker	2738	**	Both
7C1 Capacity Marker	2739	**	Both
7C2 Capacity Marker	2740	**	Both
7C3 Capacity Marker	2741	**	Both
7C4 Capacity Marker	2742	**	Both
7C5 Capacity Marker	2743	**	Both
7C6 Capacity Marker	2744	**	Both
7C7 Capacity Marker	2745	**	Both
7C8 Capacity Marker	2746	**	Both
7C9 Capacity Marker	2747	**	Both
7D0 Capacity Marker	2748	**	Both
7D1 Capacity Marker	2749	**	Both
7D2 Capacity Marker	2750	**	Both
7D3 Capacity Marker	2751	**	Both



7D4 Capacity Marker			2752	**		Both
7D5 Capacity Marker			2753	**		Both
7D6 Capacity Marker			2754	**		Both
7D7 Capacity Marker			2755	**		Both
7D8 Capacity Marker			2756	**		Both
7D9 Capacity Marker			2757	**		Both
7E0 Capacity Marker			2758	**		Both
7E1 Capacity Marker			2759	**		Both
IBM z14	3906	M05				
142- Way Processor CP7			2242	**	X	Both
143- Way Processor CP7			2243	**	X	Both
144- Way Processor CP7			2244	**	X	Both
145- Way Processor CP7			2245	**	X	Both
146- Way Processor CP7			2246	**	X	Both
147- Way Processor CP7			2247	**	X	Both
148- Way Processor CP7			2248	**	X	Both
149- Way Processor CP7			2249	**	X	Both
150- Way Processor CP7			2250	**	X	Both
151- Way Processor CP7			2251	**	X	Both

152-Way Processor CP7	2252	**	X	Both
153-Way Processor CP7	2253	**	X	Both
154-Way Processor CP7	2254	**	X	Both
155-Way Processor CP7	2255	**	X	Both
156-Way Processor CP7	2256	**	X	Both
157-Way Processor CP7	2257	**	X	Both
158-Way Processor CP7	2258	**	X	Both
159-Way Processor CP7	2259	**	X	Both
160-Way Processor CP7	2260	**	X	Both
161-Way Processor CP7	2261	**	X	Both
162-Way Processor CP7	2262	**	X	Both
163-Way Processor CP7	2263	**	X	Both
164-Way Processor CP7	2264	**	X	Both
165-Way Processor CP7	2265	**	X	Both
166-Way Processor CP7	2266	**	X	Both
167-Way Processor CP7	2267	**	X	Both
168-Way Processor CP7	2268	**	X	Both

169-Way Processor CP7	2269	**	X	Both
170-Way Processor CP7	2270	**	X	Both
7E2 Capacity Marker	2760	**		Both
7E3 Capacity Marker	2761	**		Both
7E4 Capacity Marker	2762	**		Both
7E5 Capacity Marker	2763	**		Both
7E6 Capacity Marker	2764	**		Both
7E7 Capacity Marker	2765	**		Both
7E8 Capacity Marker	2766	**		Both
7E9 Capacity Marker	2767	**		Both
7F0 Capacity Marker	2768	**		Both
7F1 Capacity Marker	2769	**		Both
7F2 Capacity Marker	2770	**		Both
7F3 Capacity Marker	2771	**		Both
7F4 Capacity Marker	2772	**		Both
7F5 Capacity Marker	2773	**		Both
7F6 Capacity Marker	2774	**		Both
7F7 Capacity Marker	2775	**		Both
7F8 Capacity Marker	2776	**		Both
7F9 Capacity Marker	2777	**		Both
7G0 Capacity Marker	2778	**		Both

7G1 Capacity Marker	2779	**	Both
7G2 Capacity Marker	2780	**	Both
7G3 Capacity Marker	2781	**	Both
7G4 Capacity Marker	2782	**	Both
7G5 Capacity Marker	2783	**	Both
7G6 Capacity Marker	2784	**	Both
7G7 Capacity Marker	2785	**	Both
7G8 Capacity Marker	2786	**	Both
7G9 Capacity Marker	2787	**	Both
7H0 Capacity Marker	2788	**	Both

Description	Machine type	Model	Feature (**)	EWFe	MMMC indicator	Init/MES
IBM z13	2964	N30				
		N63				
		N96				
		NC9				
		NE1				
		L30				
		L63				
		L96				
		LC9				
		LE1				

**All countries except China**

TKE Rack Mount w/4768	0080	**	MES
TKE w/4768	0081	**	MES
4768 TKE Crypto Adapter	0844	**	MES
TKE workstation w/4768	0849	**	MES

**All countries except China**

HMC Tower	0082	**	Both
HMC 1U Rack Mounted	0083	**	Both
TKE 1U Rack Mounted	0085	**	Both
TKE Tower	0086	**	Both
TKE 9.0 LIC	0879	**	Both
Coupling Express LR	0433	**	Both

Description	Machine type	Model	Feature (**)	EWFe	MMMC indicator	Init/MES
IBM z13s	2965	N10				
		N20				
		L10				
		L20				
<b>All countries except China</b>						
TKE Rack Mount w/4768		0080	**		MES	
TKE w/4768		0081	**		MES	
4768 TKE Crypto Adapter		0844	**		MES	
TKE workstation w/4768		0849	**		MES	
<b>All countries except China</b>						
HMC Tower		0082	**		Both	
HMC 1U Rack Mounted		0083	**		Both	
TKE 1U Rack Mounted		0085	**		Both	
TKE Tower		0086	**		Both	
TKE 9.0 LIC		0879	**		Both	
Coupling Express LR		0433	**		Both	

#### Features that may carry forward on an upgrade:

The following features may be retained if they are installed at the time of an upgrade to the IBM z14.

Description	Machine type	Model	Feature (**)	EWFe	MMMC indicator	Init/MES
IBM z14	3906	M01			X	
		M02			X	
		M03			X	
		M04			X	
		M05			X	
HMC			0092	**		Both
HMC Rack Mount			0094	**		Both
HMC			0095	**		Both
HMC Rack Mount			0096	**		Both
TKE Rack Mount w/4767			0097	**		Both
TKE w/4767			0098	**		Both
OSA-Express4S; 1000BASi;-T			0408	**		Both
OSA-Express5S;			0413	**		Both

Description	Machine type	Model	Feature	(**)	EWFe	MMMC indicator	Init/MES
GbE LX							
OSA-Express5; GbE SX			0414	**			Both
OSA-Express5; 10 GbE LR			0415	**			Both
OSA-Express5; 10 GbE SX			0416	**			Both
OSA-Express5; 1000BASi-T			0417	**			Both
FICON Express8; 10KM LX			0409	**			Both
FICON Express8; SX			0410	**			Both
FICON Express16; SX LX			0418	**			Both
FICON Express16; SX			0419	**			Both
10GbE RoCE Express			0411	**			Both
TKE workstation			0842	**			Both
TKE workstation w/4767			0847	**			Both
Addl smart cards			0884	**			Both
TKE Smart Card Reader			0885	**			Both
Crypto Express5; SX			0890	**			Both
Fill and Drain Kit			3378	**			Both
Universal Lift Tool/Ladder			3759	**			Both

### Annual minimum maintenance charges

Not applicable

### ServiceElect (ESA) charges

For ServiceElet (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

**Model conversion purchase price**

<b>From Machine type</b>	<b>Model</b>	<b>To Machine type</b>	<b>Model</b>	<b>Returned Parts</b>	<b>Continuous Maintenance</b>
2827	H20 r	3906	M01 a	Y	Y
2827	H20 r	3906	M02 a	Y	Y
2827	H20 r	3906	M03 a	Y	Y
2827	H20 r	3906	M04 a	Y	Y
2827	H20 r	3906	M05 a	Y	Y
2827	H20 r	3906	M01 w	Y	Y
2827	H20 r	3906	M02 w	Y	Y
2827	H20 r	3906	M03 w	Y	Y
2827	H20 r	3906	M04 w	Y	Y
2827	H20 r	3906	M05 w	Y	Y
2827	H43 r	3906	M01 a	Y	Y
2827	H43 r	3906	M02 a	Y	Y
2827	H43 r	3906	M03 a	Y	Y
2827	H43 r	3906	M04 a	Y	Y
2827	H43 r	3906	M05 a	Y	Y
2827	H43 r	3906	M01 w	Y	Y
2827	H43 r	3906	M02 w	Y	Y
2827	H43 r	3906	M03 w	Y	Y
2827	H43 r	3906	M04 w	Y	Y
2827	H43 r	3906	M05 w	Y	Y
2827	H66 r	3906	M01 a	Y	Y
2827	H66 r	3906	M02 a	Y	Y
2827	H66 r	3906	M03 a	Y	Y
2827	H66 r	3906	M04 a	Y	Y
2827	H66 r	3906	M05 a	Y	Y
2827	H66 r	3906	M01 w	Y	Y
2827	H66 r	3906	M02 w	Y	Y
2827	H66 r	3906	M03 w	Y	Y
2827	H66 r	3906	M04 w	Y	Y
2827	H66 r	3906	M05 w	Y	Y
2827	H89 r	3906	M01 a	Y	Y
2827	H89 r	3906	M02 a	Y	Y
2827	H89 r	3906	M03 a	Y	Y
2827	H89 r	3906	M04 a	Y	Y
2827	H89 r	3906	M05 a	Y	Y
2827	H89 r	3906	M01 w	Y	Y
2827	H89 r	3906	M02 w	Y	Y
2827	H89 r	3906	M03 w	Y	Y
2827	H89 r	3906	M04 w	Y	Y
2827	H89 r	3906	M05 w	Y	Y
2827	HA1 r	3906	M01 a	Y	Y
2827	HA1 r	3906	M02 a	Y	Y
2827	HA1 r	3906	M03 a	Y	Y
2827	HA1 r	3906	M04 a	Y	Y
2827	HA1 r	3906	M05 a	Y	Y
2827	HA1 r	3906	M01 w	Y	Y
2827	HA1 r	3906	M02 w	Y	Y
2827	HA1 r	3906	M03 w	Y	Y

<b>From Machine type</b>	<b>Model</b>	<b>To Machine type</b>	<b>Model</b>	<b>Returned Parts</b>	<b>Continuous Maintenance</b>
2827	HA1 r	3906	M04 w	Y	Y
2827	HA1 r	3906	M05 w	Y	Y
2827	H20w	3906	M01 w	Y	Y
2827	H20 w	3906	M02 w	Y	Y
2827	H20 w	3906	M03 w	Y	Y
2827	H20 w	3906	M04 w	Y	Y
2827	H20 w	3906	M05 w	Y	Y
2827	H43 w	3906	M01 w	Y	Y
2827	H43 w	3906	M02 w	Y	Y
2827	H43 w	3906	M03 w	Y	Y
2827	H43 w	3906	M04 w	Y	Y
2827	H43 w	3906	M05 w	Y	Y
2827	H66 w	3906	M01 w	Y	Y
2827	H66 w	3906	M02 w	Y	Y
2827	H66 w	3906	M03 w	Y	Y
2827	H66 w	3906	M04 w	Y	Y
2827	H66 w	3906	M05 w	Y	Y
2827	H89 w	3906	M01 w	Y	Y
2827	H89 w	3906	M02 w	Y	Y
2827	H89 w	3906	M03 w	Y	Y
2827	H89 w	3906	M04 w	Y	Y
2827	H89 w	3906	M05 w	Y	Y
2827	HA1 w	3906	M01 w	Y	Y
2827	HA1 w	3906	M02 w	Y	Y
2827	HA1 w	3906	M03 w	Y	Y
2827	HA1 w	3906	M04 w	Y	Y
2827	HA1 w	3906	M05 w	Y	Y
2964	N30 r	3906	M01 a	Y	Y
2964	N30 r	3906	M02 a	Y	Y
2964	N30 r	3906	M03 a	Y	Y
2964	N30 r	3906	M04 a	Y	Y
2964	N30 r	3906	M05 a	Y	Y
2964	N30 r	3906	M01 w	Y	Y
2964	N30 r	3906	M02 w	Y	Y
2964	N30 r	3906	M03 w	Y	Y
2964	N30 r	3906	M04 w	Y	Y
2964	N30 r	3906	M05 w	Y	Y
2964	N63 r	3906	M01 a	Y	Y
2964	N63 r	3906	M02 a	Y	Y
2964	N63 r	3906	M03 a	Y	Y
2964	N63 r	3906	M04 a	Y	Y
2964	N63 r	3906	M05 a	Y	Y
2964	N63 r	3906	M01 w	Y	Y
2964	N63 r	3906	M02 w	Y	Y
2964	N63 r	3906	M03 w	Y	Y
2964	N63 r	3906	M04 w	Y	Y
2964	N63 r	3906	M05 w	Y	Y
2964	N96 r	3906	M01 a	Y	Y
2964	N96 r	3906	M02 a	Y	Y
2964	N96 r	3906	M03 a	Y	Y
2964	N96 r	3906	M04 a	Y	Y
2964	N96 r	3906	M05 a	Y	Y
2964	N96 r	3906	M01 w	Y	Y



<b>From Machine type</b>	<b>Model</b>	<b>To Machine type</b>	<b>Model</b>	<b>Returned Parts</b>	<b>Continuous Maintenance</b>
2964	N96 r	3906	M02 w	Y	Y
2964	N96 r	3906	M03 w	Y	Y
2964	N96 r	3906	M04 w	Y	Y
2964	N96 r	3906	M05 w	Y	Y
2964	NC9 r	3906	M01 a	Y	Y
2964	NC9 r	3906	M02 a	Y	Y
2964	NC9 r	3906	M03 a	Y	Y
2964	NC9 r	3906	M04 a	Y	Y
2964	NC9 r	3906	M05 a	Y	Y
2964	NC9 r	3906	M01 w	Y	Y
2964	NC9 r	3906	M02 w	Y	Y
2964	NC9 r	3906	M03 w	Y	Y
2964	NC9 r	3906	M04 w	Y	Y
2964	NC9 r	3906	M05 w	Y	Y
2964	NE1 r	3906	M01 a	Y	Y
2964	NE1 r	3906	M02 a	Y	Y
2964	NE1 r	3906	M03 a	Y	Y
2964	NE1 r	3906	M04 a	Y	Y
2964	NE1 r	3906	M05 a	Y	Y
2964	NE1 r	3906	M01 w	Y	Y
2964	NE1 r	3906	M02 w	Y	Y
2964	NE1 r	3906	M03 w	Y	Y
2964	NE1 r	3906	M04 w	Y	Y
2964	NE1 r	3906	M05 w	Y	Y
2964	N30 w	3906	M01 w	Y	Y
2964	N30 w	3906	M02 w	Y	Y
2964	N30 w	3906	M03 w	Y	Y
2964	N30 w	3906	M04 w	Y	Y
2964	N30 w	3906	M05 w	Y	Y
2964	N63 w	3906	M01 w	Y	Y
2964	N63 w	3906	M02 w	Y	Y
2964	N63 w	3906	M03 w	Y	Y
2964	N63 w	3906	M04 w	Y	Y
2964	N63 w	3906	M05 w	Y	Y
2964	N96 w	3906	M01 w	Y	Y
2964	N96 w	3906	M02 w	Y	Y
2964	N96 w	3906	M03 w	Y	Y
2964	N96 w	3906	M04 w	Y	Y
2964	N96 w	3906	M05 w	Y	Y
2964	NC9 w	3906	M01 w	Y	Y
2964	NC9 w	3906	M02 w	Y	Y
2964	NC9 w	3906	M03 w	Y	Y
2964	NC9 w	3906	M04 w	Y	Y
2964	NC9 w	3906	M05 w	Y	Y
2964	NE1 w	3906	M01 w	Y	Y
2964	NE1 w	3906	M02 w	Y	Y
2964	NE1 w	3906	M03 w	Y	Y
2964	NE1 w	3906	M04 w	Y	Y
2964	NE1 w	3906	M05 w	Y	Y
3906	M01 a	3906	M02 a	Y	Y
3906	M01 a	3906	M03 a	Y	Y
3906	M01 a	3906	M04 a	Y	Y
3906	M02 a	3906	M03 a	Y	Y

From		To		Returned Parts	Continuous Maintenance
Machine type	Model	Machine type	Model		
3906	M02 a	3906	M04 a	Y	Y
3906	M03 a	3906	M04 a	Y	Y
3906	M01 w	3906	M02 w	Y	Y
3906	M01 w	3906	M03 w	Y	Y
3906	M01 w	3906	M04 w	Y	Y
3906	M02 w	3906	M03 w	Y	Y
3906	M02 w	3906	M04 w	Y	Y
3906	M03 w	3906	M04 w	Y	Y

\*\* Parts removed or replaced become the property of IBM and must be returned.

### Feature conversion purchase price

Contact your IBM representative for feature conversion prices.

### IBM Global Financing

IBM Global Financing provides purchasing power to help create the competitive advantage and financial stability customers need to save, re-invest, and innovate their IT infrastructure. IBM Global Financing offers credit qualified customers a range of customizable leasing options and payment plans, ready to be tailored to meet specific project needs. Financing solutions from IBM Global Financing can help your customers stretch their budget and affordably acquire new technology solutions. IBM Global Financing's offerings include financing for IT acquisition, including hardware, software, and on and off premises services from both IBM and other manufacturers or vendors. Beyond the initial acquisition, our end-to-end approach to IT management can also help keep technology current, reduce costs, minimize risk, and preserve customers' ability to make flexible IT infrastructure decisions throughout the entire technology lifecycle. Contact your local IBM [Global Financing](#) organization for more information.

IBM Global Financing offerings are provided through IBM subsidiaries and divisions worldwide to qualified commercial and government clients. Rates and availability are based on a client's credit rating, financing terms, offering type, and equipment and product type and options, and may vary by country. Non-hardware items must be one-time, non-recurring charges and are financed by means of loans. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice and may not be available in all countries. IBM and IBM Global Financing do not, nor intend to, offer or provide accounting, tax, or legal advice to clients. Clients should consult with their own financial, tax, and legal advisors. Any tax or accounting treatment decisions made by or on behalf of the client are the sole responsibility of the client.

### Order now

To order, contact the Americas Call Centers, your local IBM representative, or your IBM Business Partner. To identify your local IBM representative or IBM Business Partner call 800-IBM-4YOU (426-4968). For more information, contact the Americas Call Centers.

Phone: 800-IBM-CALL (426-2255)

Fax: 800-2IBM-FAX (242-6329)

For IBM representative: [callserv@ca.ibm.com](mailto:callserv@ca.ibm.com)

For IBM Business Partner: [pwcs@us.ibm.com](mailto:pwcs@us.ibm.com)

**Mail:**

IBM Teleweb Customer Support  
ibm.com<sup>(R)</sup> Sales Execution Center, Americas North  
3500 Steeles Ave. East, Tower 3/4  
Markham, Ontario  
Canada L3R 2Z1

**Reference:**

YE001

The Americas Call Centers, our national direct marketing organization, can add your name to the mailing list for catalogs of IBM products.

**Note:** Shipments will begin after the planned availability date.

**Trademarks**

z13, IBM z13, z Systems, IBM z Systems, PR/SM, ECKD, IBM z, Processor Resource/Systems Manager and z10 are trademarks of IBM Corporation in the United States, other countries, or both.

IBM, Express<sup>(R)</sup>, z/VM, System z, FICON, Resource Link, Global Technology Services, z/OS, zEnterprise, z/Architecture, z/VSE, WebSphere, Parallel Sysplex, CICS, XIV, RACF, DB2, IBM PureData, Redbooks and ibm.com are registered trademarks of IBM Corporation in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Oracle and Java are trademarks of Oracle and/or its affiliates in the United States, other countries, or both.

Other company, product, and service names may be trademarks or service marks of others.

**Terms of use**

IBM products and services which are announced and available in your country can be ordered under the applicable standard agreements, terms, conditions, and prices in effect at the time. IBM reserves the right to modify or withdraw this announcement at any time without notice. This announcement is provided for your information only. Additional terms of use are located on

[Terms of use](#)

For the most current information regarding IBM products, consult your IBM representative or reseller, or visit the IBM worldwide contacts page

[IBM United States](#)