



IBM zEnterprise BC12 (zBC12) extends modern mainframe capabilities for enterprises of all sizes to help cut costs, improve service, and fuel innovation for business growth

Table of contents

2 Overview	17 Product number
3 Key prerequisites	26 Publications
3 Planned availability date	32 Technical information
4 Description	48 Terms and conditions
14 Product positioning	51 Prices
14 Statement of general direction	51 Announcement countries
	52 Corrections

At a glance

As the newest member of the zEnterprise™ family, the IBM® zEnterprise BC12 (zBC12) is designed to help enterprises of all sizes improve customer service by exploiting the latest capabilities of the zEnterprise System. These include an efficient and flexible cloud delivery model, real-time data analytics, and enterprise mobility, all helping you leverage a highly secure and resilient infrastructure.

As an entry point for Enterprise Systems computing, the zBC12 is designed to enable new business capabilities while delivering increased performance and granular growth options in a smaller, more cost-effective footprint.

The zBC12 is also designed to provide continued investment protection to allow you to start small and rapidly expand. You can upgrade from the IBM System z10® Business Class (z10™ BC) or the IBM zEnterprise 114 (z114) to the zBC12, as well as from the zBC12 to the IBM zEnterprise EC12 (zEC12) for maximum capacity to support your continued business growth.

Combined with the newly enhanced IBM zEnterprise BladeCenter® Extension (zBX) Model 003 and IBM zEnterprise Unified Resource Manager (zManager), the zBC12 offers a proven hybrid computing design that can help you manage and integrate workloads across multiple architectures (System z® , UNIX™ , and Intel™) with the simplicity of a single system.

The zBC12 is designed to provide an optimized infrastructure that allows you to:

- Energize your applications through integration, embedded real-time analytics, and enterprise mobility
- Consolidate distributed workloads with Linux™ on System z and reinvest potential savings to fuel business growth
- Protect your valuable data and brand reputation with trusted security

Energize your applications with more performance, flexibility, and scalability

- A 4.2 GHz processor designed to deliver up to a 36% performance increase per core to help boost software performance for business-critical workloads
- Up to six general purpose processors (CPs) designed to deliver up to 58% more capacity as compared to the z114, which had five general purpose processors

- Up to a 2x increase in available memory (496 GB) compared to the previous generation (z114) for improved performance of memory-demanding workloads such as DB2® , IBM WebSphere® , and Linux on System z
- Up to 20% greater granularity with 156 capacity settings on each model, giving you the freedom to choose the right capacity setting for your needs with the flexibility to scale on demand as workload demands increase

Refresh your technology now to help you save more money

- Improved platform economics for an upgrade opportunity that is more affordable than ever
- The same low-cost entry-level offering as the z114 with twice the capacity, designed to provide increased value
- Continuation of the IBM System z Solution Edition Series to help dramatically lower the cost of deploying new business applications
- Up to 13 Integrated Facility for Linux (IFL) processors to help consolidate 62% more work while gaining a 27% price performance improvement for Linux on System z , making it an attractive choice for distributed workload consolidation
- Up to 27% price performance improvement across the entire portfolio of specialty engines to help significantly lower costs for new workloads

For more information on the IBM System z Solution Edition Series visit

<http://www-03.ibm.com/systems/z/solutions/editions/>

Secure it all with confidence with a trusted and resilient infrastructure

- Extended cryptographic algorithms for IBM Enterprise Public-Key Cryptography Standards (PKCS) #11 (EP11) to support higher-quality digital signatures
- New Trusted Key Entry (TKE) workstation with a setup wizard for simplification of startup TKE tasks and a full-function migration wizard for the quick and accurate deployment of Crypto Express4S features configured as EP11 coprocessors
- A system designed for Common Criteria Evaluation Assurance Level 5+ (EAL5+) certification for security of logical partitions; designed to help secure sensitive data and business transactions

Overview

Organizations around the world are recognizing the increasing role that technology plays in driving change as they shift investments from infrastructure maintenance toward new projects that drive business innovation. The explosive growth of new mobile devices, big data, cloud, and social media represents a clear opportunity to reshape business models, create competitive advantage, and help to deliver significant business value. In order to capitalize on these emerging opportunities, IBM recognizes there is a need to respond with increased agility to deliver new services, while addressing cost, complexity, and risk. This requires an optimized infrastructure that is integrated, flexible, and secure.

The IBM zEnterprise System is a modern mainframe that is uniquely suited to deliver industry-leading innovation and value. It allows your organization to exploit new technologies to help improve efficiency and speed time-to-market. It is designed to unlock the power of big data with the integration of business intelligence and transactional processing to help deliver competitive advantages through actionable insights gained from real-time analytics. Advanced virtualization features like multisystem virtualization and Live Guest Relocation with System z , z/VM® , and Linux on System z help to provide an efficient infrastructure for deploying private clouds for workloads that scale both horizontally and vertically at a low total cost of ownership. And, with its high level of security, you can put your trust in the IBM zEnterprise System to protect your most valuable information, helping to reduce organizational and reputational risk.

The IBM zEnterprise BC12 (zBC12) is the newest member of the IBM zEnterprise System family. It is designed as an affordable entry point for enterprise computing,

and embraces all the same flexible growth options, industry-leading virtualization, and innovative capabilities of the massively scalable IBM zEnterprise EC12. The zBC12 continues the heritage of mainframe qualities of service with a lower and more granular cost structure, with significant improvements in packaging, performance, and total system scalability over prior generations.

Key prerequisites

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

Planned availability date

September 20, 2013

- Features and functions for the IBM zEnterprise BC12
- IBM zEnterprise BC12 (zBC12) Models H06 and H13
- IBM zEnterprise BladeCenter Extension (zBX) Model 003 attached to a zBC12
- IBM zEnterprise 114 (z114) upgrades to zBC12 Models H06 and H13
- z114 with zBX Model 002 upgrades to zBC12 Models H06 and H13 with zBX Model 003
- IBM System z10 Business Class (z10 BC) upgrades to zBC12 Models H06 and H13
- IBM zEnterprise 196 (z196) with zBX Model 002 upgrades to zBX Model 003 attaching to a new zBC12
- z114 with zBX Model 002 upgrades to zBX Model 003 attaching to a new zBC12
- zBX Model 003 move from a zEC12 to a new zBC12
- Field-installed features and conversions that are delivered solely through a modification to the machine's Licensed Internal Code (LIC)
- IBM zEnterprise Unified Resource Manager enhancements:
 - CPU management enhancement to the Automate Firmware Suite (#0020) for the IBM BladeCenter HX5 blade in the zBX Model 003
 - Availability management enhancement to the Automate Firmware Suite (#0020) for the IBM BladeCenter HX5 and IBM BladeCenter PS701 blades in the zBX Model 003
- IBM zAware (#0138, #0139, #0140, #0141, #0142, #0143, #0150, #0151)
- Flash Express® (#0402)
- zEDC Express (#0420)
- 10GbE RoCE Express (#0411)
- Crypto Express4S (#0865)
- Common Cryptographic Architecture (CCA) enhancements on zBC12
- Crypto Express4S EP11 enhancements
- TKE workstation (#0842)
- TKE 7.3 LIC (#0872) on zBC12, z196, and z114
- 24k subchannels for FICON® Express
- OSA-Express5S (#0413, #0414, #0415, #0416, #0417)
- Coupling Facility Control Code (CFCC) Level 19
- Hardware Management Console (#0092)

September 30, 2013

- IBM zEnterprise Data Compression (zEDC) for z/OS® V2.1 for SMF log data

October 31, 2013

- MES features with already existing PCIe I/O drawers (#4009)
 - Flash Express (#0402)
 - zEDC Express (#0420)
 - 10GbE RoCE Express (#0411)
 - Crypto Express4S (#0865)
 - FICON Express8S (#0409, #0410)
 - OSA-Express5S (#0413, #0414, #0415, #0416, #0417)

December 31, 2013

- MES features for zBC12 and zBX Model 003
- Model conversions - zBC12 Model H06 to zBC12 Model H13
- zBX Model 003 move from one zBC12 to an existing zBC12
- zBX Model 003 move from a zEC12 to a zBC12
- z196 with zBX Model 002 upgrades to zBX Model 003 attaching to an existing zBC12
- z114 with zBX Model 002 upgrades to zBX Model 003 attaching to an existing zBC12

Fourth quarter 2013

- CCA enhancements on z196 and z114
- GDPS® automated multisite recovery for zBX

Availability of programs with an encryption algorithm in France is subject to French government approval.

Description

The IBM zEnterprise System is designed to offer a total systems approach for enabling fit-for-purpose application deployment and advanced heterogeneous systems management capabilities that is unmatched in the industry. The zBC12 is designed to allow enterprises of all sizes to leverage the strengths of the IBM mainframe to help you grow your business.

Inherent in the design of the zBC12:

- A 4.2 GHz processor designed to deliver up to a 36% performance increase per core compared to the z114
- Up to six general purpose processors (CPs) designed to deliver up to 58% more capacity as compared to the z114
- Up to 20% greater granularity with 156 capacity settings on either the Model H06 or Model H13
- Up to 13 Integrated Facility for Linux (IFL) processors to help consolidate up to 62% more work for Linux on System z
- Up to a 2x increase in available memory (496 GB) compared to the z114 for improved performance of memory-demanding workloads such as DB2 , IBM WebSphere , and Linux on System z
- Top Exit I/O and power cabling
- Investment protection with upgrade paths from the z10 BC and z114 to the zBC12

New features and functions:

- Capacity limit enforcement with an LPAR enhancement

- Enhanced CPU and availability management for zManager environments
- GDPS automated multisite recovery for zBX
- Continued support to help rapidly address service disruptions with IBM System z Advanced Workload Analysis Reporter (IBM zAware)
- Compression acceleration with the zEDC Express feature
- Reduced latency and lower CPU overhead with the 10GbE RoCE Express feature
- Enhanced cryptographic support of the Common Cryptographic Architecture and the IBM zEnterprise Public-Key Cryptography Standards
- Enhanced Trusted Key Entry workstation support with new functions for ease of use and continued industry compliance
- Improved resilience and performance for coupling environments with a new level of Coupling Facility Control Code (Level 19) for exploitation of Coupling Thin Interrupts

The performance advantage

IBM Large Systems Performance Reference (LSPR) method is designed to provide comprehensive z/Architecture® processor capacity ratios for different configurations of Central Processors (CPs) across a wide variety of system control programs and workload environments. For zEnterprise BC12 (zBC12, machine type 2828), the z/Architecture processor **capacity indicator** is defined with three characters, one alphabetical and two numerical. The alphabetical character corresponds to the "effective" cycle time of the processor and the numerical characters indicate the number of installed CPs. For example, the 2828-Z06 implies the base cycle time with the maximum of 6 CPs while the 2828-A01 represents the slowest "effective" cycle time with a single CP.

In addition to the general information provided for z/OS V1.13, the LSPR also contains performance relationships for z/VM and Linux on System z operating environments.

The performance of a zBC12 (2828) processor is expected to be up to 1.36 times the performance of a z114 (2818) based on workload and model. The largest zBC12 (2828-Z06) is expected to provide up to 1.58 times the capacity of the largest z114 (2818-Z05).

The LSPR contains the Internal Throughput Rate Ratios (ITRRs) for the zEnterprise BC12 and the previous-generation zSeries® and System 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 amount of multiprogramming in the user's job stream, the I/O configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated.

For more detailed performance information, consult the Large Systems Performance Reference (LSPR) available at

<https://www.ibm.com/servers/resourcelink/lib03060.nsf/pages/lspindex?OpenDocument>

LPAR enhancement to provide physical capacity limit enforcement

Processor Resource/Systems Manager™ (PR/SM™) and the Hardware Management Console (HMC) tool have been enhanced to support an option to limit the amount of physical processor capacity consumed by an individual logical partition (LPAR) when a processor unit (PU) is defined as a general purpose processor (CP) or an Integrated Facility for Linux (IFL) shared across a set of LPARs.

This enhancement is designed to provide a physical capacity limit enforced as an absolute (versus relative) limit; it is not affected by changes to the logical or physical configuration of the system. This physical capacity limit can be specified in units of CPs or IFLs. The "Change LPAR Controls" and "Customize Activation Profiles"

tasks on the Hardware Management Console have been enhanced in support of this new function. Refer to the [Publications](#) section for the document *Hardware Management Console Web Services API (Version 2.12.1)*, SC27-2626. Refer to the [Hardware requirements](#) and [Software requirements](#) sections.

Support of 2 GB pages for middleware performance improvements

zBC12, zEC12, and z/OS 2 GB page support is designed to reduce memory management overhead and improve overall system performance by enabling middleware to use 2 GB pages. These improvements are expected due to improved effective translation lookaside buffer (TLB) coverage and a reduction in the number of steps the system must perform to translate a 2 GB page virtual address.

Exploitation is provided for the IBM 31-bit SDK for z/OS , Java™ Technology Edition, V7.0.0 (5655-W43) and SDK7 IBM 64-bit SDK for z/OS , Java Technology Edition, V7.0.0 (5655-W44). Also, along with this support, z/OS is designed to make the pageable link pack area (PLPA) and common page data sets optional, used only for quick and warm start IPLs. For z/OS support refer to the [Software requirements](#) section.

IBM zEnterprise Unified Resource Manager (zManager) enhancements

Enhancements to the Automate Firmware Suite (#0020)

- **CPU management:** Ability to manage resource optimization through user-defined workload policies

Automatic virtual CPU capacity adjustments in accordance to user-defined workload policies are allowed across virtual servers running in the IBM BladeCenter HX5 (machine type 7873) blade in the zBX Model 003. This enhanced function was previously available for the IBM BladeCenter PS701 blades in the zBX Model 003 (machine type 2458).

- **Availability management:** Ability to create user-defined availability policies for availability management of virtual servers, along with monitoring and reporting functions to help ensure virtual servers are executing in line with the defined policies

This enhanced function is available for virtual servers (logical partitions), HX5 blades, and PS701 blades in the zBX Model 003.

These enhancements to the Automate Firmware Suite (#0020) are exclusive to the zBC12 and zEC12. The latest driver is required. Refer to the [Hardware requirements](#) section.

Updated hypervisor levels for PS701 (PowerVM™) and HX5 (KVM-based) blades in the zBX Model 003 are implemented, along with additional Microsoft™ Windows™ and Linux Guest Operating Systems on HX5 blades in the zBX Model 003.

For details on hypervisor levels and supported operating systems on the zBX Model 003, refer to

http://www.ibm.com/systems/z/hardware/zenterprise/zbx_specs.html

Extending zBX connectivity options to Layer-2: Customer experience with the IBM zEnterprise BladeCenter Extension (zBX) has led IBM to depart from its original requirement to exclusively support Layer-3 connectivity between the external data network and the intraensemble data network (IEDN) top-of-rack (TOR) switches in the zBX. A Redpaper is now available, illustrating a set of pre-tested configuration examples in support of both Layer-2 and Layer-3 connectivity. The Redpaper, *IBM zEnterprise BladeCenter Extension: Network Connectivity Options* (REDP-5036), includes a description of limitations and trade-offs when deploying Layer-2 versus Layer-3 connectivity.

The Redpaper can be accessed at the following website

zManager, z/VM V6.3, and OpenStack: IBM zEnterprise Unified Resource Manager (zManager) is designed to provide systems management capabilities across the multi-architecture environment of zEnterprise . Many of you are planning to exploit these system management capabilities to deploy a framework for a heterogeneous cloud environment, thereby providing an effective means to help deliver IT services. To accelerate the delivery of its cloud offerings, IBM recently announced plans to base all of its cloud services and software on open architecture and standards, including OpenStack.

OpenStack is an infrastructure as a service (IaaS) cloud computing open source project. IBM joined the project in 2012 and in support of System z is making contributions to the OpenStack project that are designed to enable z/VM V6.3 to be the first System z operating environment that can be managed with these open cloud architecture-based interfaces.

The management of z/VM environments in zManager is now stabilized as part of the evolution of the IBM cloud strategy and adoption of OpenStack. Accordingly, zManager does not provide systems management support for z/VM V6.3. However, zManager will continue to play a distinct and significant role in the management of virtualized environments created by zEnterprise integrated firmware hypervisors - PR/SM , PowerVM , and x hypervisor based on Kernel-based Virtual Machine (KVM).

Looking ahead, IBM will continue to enable OpenStack to provide heterogeneous systems management across zEnterprise , z/VM , and distributed platforms, which in turn can be exploited by subsequent IBM SmartCloud™ offerings. These offerings are designed to provide you enablement for enterprise-wide cloud deployments and greater flexibility by removing the need to develop specific interfaces for different cloud services.

GDPS automated multisite recovery for zBX

GDPS products currently support the start, stop, and switching of applications executing on virtual servers in a zBX; however, this requires that the target virtual servers be active. For example, when a planned site switch from site 1 to site 2 is performed, GDPS will stop the applications executing on virtual servers in a site 1 zBX, reverse disk replication and online the disk to the target active virtual servers in site 2 zBX, and start the workloads on the target virtual servers. With this announcement, GDPS/PPRC will exploit zManager APIs and no longer require the target virtual servers be active. For example, when a planned site switch from site 1 to site 2 is performed, GDPS will stop the applications executing on virtual servers in a site 1 zBX, deactivate the virtual servers in site 1, reverse disk replication, activate the target virtual servers in site 2 zBX, and start the workloads.

GDPS/PPRC is designed to provide a metro distance continuous availability/disaster recover capability. For greater system resiliency GDPS/PPRC is adding failover support for zManager, or Hardware Management Console (HMC). If the primary HMC becomes unreachable from the GDPS/PPRC controlling system then GDPS will communicate with the alternate HMC to request that it takes over as the primary. After the alternate HMC assumes the primary role, GDPS will begin communicating with it. GDPS/PPRC supports starting and stopping zBX virtual servers that boot from IBM System Storage® DS8000® series.

This is designed to extend GDPS/PPRC continuous availability and disaster recover capabilities to virtual servers in a zBX for planned and unplanned outages. The planned availability is fourth quarter 2013 with GDPS/PPRC v3.10 SPE.

IBM zAware enhancement

Ignore Messages support: When a new workload is added to a system being monitored by IBM zAware, or moved to a different system, it often generates messages that are not recognized by IBM System z Advanced Workload Analysis Reporter (IBM zAware). These messages are subsequently flagged as irregular and

cause orange bars to appear on the IBM zAware analysis panel. This enhancement will allow the user, using a graphical user interface (GUI) panel, to mark the desired messages as "ignore." An ignored message is not be a part of the IBM zAware analysis and scoring.

IBM zAware, first introduced on the zEC12, is designed to use near real-time continuous learning algorithms, providing a diagnostics capability intended to help you quickly pinpoint problems, which in turn, can help you to more rapidly address service disruptions. Refer to Hardware Announcement [ZG12-0262](#), dated August 28, 2012 , IBM zEnterprise EC12 - proven hybrid computing designed to manage multiple workloads, with the simplicity of a single system.

This IBM zAware (#0011, #0138, #0139, #0140, #0141, #0142, #0143, #0150, #0151) enhancement is exclusive to the zBC12 and zEC12 and is supported by z/OS . Refer to the [Software requirements](#) section.

Flash Express for improved availability and responsiveness

The Flash Express feature, with exploitation by z/OS , is designed to help improve system availability and responsiveness by using Flash Express across transitional workload events such as market openings, and diagnostic data collection. Together they are also designed to help improve processor performance by supporting middleware such as IMS™ , with its exploitation of pageable large (1 MB) pages. For more details regarding z/OS support, refer to Software Announcement [ZP13-0371](#), dated July 23, 2013 .

The Flash Express feature (#0402) is exclusive to the zBC12 and zEC12 and is for use exclusively in the PCIe I/O drawer (#4009). Refer to the [Software requirements](#) section.

Compression acceleration for resource optimization with zEDC Express

IBM zEnterprise Data Compression (zEDC) for z/OS V2.1 and the zEDC Express feature are designed to support a new data compression function to help provide high-performance, low-latency compression without significant CPU overhead. This may help to reduce disk usage, provide optimized cross-platform exchange of data, and provide higher write rates for SMF data. Initially, z/OS is designed to allow you to specify compression for SMF data written to log streams. Further support is planned. Refer to [Statement of general direction](#) section. For more details regarding z/OS support, refer to Software Announcement [ZP13-0371](#), dated July 23, 2013 .

The zEDC Express feature (#0420) is exclusive to the zBC12 and zEC12 and is for use exclusively in the PCIe I/O drawer (#4009). It is supported by z/OS . Refer to the [Software requirements](#) section. Refer to the [Planned availability date](#) section for exploitation by z/OS .

10GbE RoCE Express - helping to optimize network communications

The term RoCE refers to Remote Direct Memory Access (RDMA) over Converged Ethernet. The 10 Gigabit Ethernet (10GbE) RoCE Express feature is designed to help provide System z with access to the low latency, increased network bandwidth and efficient host CPU utilization benefits of RDMA technology. Utilizing the 10GbE RoCE Express feature along with the new Shared Memory Communications - Remote Direct Memory Access (SMC-R) communication protocol in z/OS V2.1 helps to facilitate:

- A reduction in network latency for TCP/IP workloads with interactive request/response traffic patterns (such as WebSphere application servers accessing a DB2 database)
- A reduction in CPU cycles consumed by the networking stack for TCP/IP workloads with streaming data patterns where large amounts of data flow in one direction (such as with File Transfer Protocols)

Exploitation of SMC-R is transparent to applications and can be used for z/OS LPAR-to-LPAR communications on a single system or z/OS server-to-server communication in a multiple CPC environment.

The 10GbE RoCE Express feature (#0411) is exclusive to the zBC12 and zEC12 and is for use exclusively in the PCIe I/O drawer (#4009). It is supported by z/OS . Refer to the [Software requirements](#) section.

Cryptographic enhancements for security-rich protection

System z offers standard and optional hardware-based encryption features and functions to help satisfy application encryption requirements. In addition, System z hardware and software is designed to deliver greater physical security as well as the features and functions essential to help you easily manage the cryptographic configuration in a manner that is integrated with other System z management capabilities.

The cryptographic hardware available on the zBC12 includes the following features and functions:

- Central Processor Assist for Cryptographic Functions (CPACF)
- Crypto Express4S configured as:
 - Common Cryptographic Architecture (CCA) coprocessor
 - IBM Enterprise Public-Key Cryptography Standards (PKCS) #11 (EP11) coprocessor
 - Accelerator
- Trusted Key Entry (TKE) workstation
- TKE 7.3 Licensed Internal Code (LIC)
- Smart Card Reader
- Smart Cards

Common Cryptographic Architecture (CCA) enhancements

When the Crypto Express4S PCIe adapter is configured as a CCA coprocessor, the following cryptographic enhancements are supported:

Export Triple Data Encryption Standard (TDES) key under Advanced Encryption Standard (AES) transport keys: The AES encryption algorithm has greater security than the TDES encryption algorithm. CCA has added the ability to use AES key-encrypting keys (KEKs) to wrap your TDES keys to help begin moving to AES for key management. All of the TDES key wrapping functions are still available, but a parallel set of AES wrapping functions are now available for use.

Diversified Key Generation Cipher Block Chaining (CBC) support: During the Europay, Mastercard and Visa (EMV) smart card personalization process, session keys are derived and then used to secure messages to the EMV cards. Some EMV card personalization specifications require the use of TDES CBC mode to derive these session keys. This enhancement adds that capability to the existing key derivation options in CCA.

Initial PIN Encrypting Key (IPEK) support: The IPEK is the initial key that is loaded into a point-of-sale (POS) terminal before it is deployed for use, when that terminal will use the Derived Unique Key Per Transaction (DUKPT) key protocol. CCA has added a function that allows the Hardware Security Module (HSM) to securely derive an IPEK and return it to the application program in an encrypted key token, which can then be securely installed in a POS terminal.

Remote Key Export (RKX) key wrapping method support: In a previous release, CCA added the capability to wrap keys using a proprietary enhanced mode algorithm. This included the ability to set a default preference for the

wrapping method to be used, as well as options to override that default in most CCA functions. The RKX function now supports that ability as well.

Integration of User Defined Extensions (UDX) into CCA: A UDX is designed to allow you to add custom functions to the CCA application programming interface (API) running in the Hardware Security Module (HSM). CCA has included the following three UDXs in the standard CCA APIs avoiding the requirement for a UDX: Recover PIN from Offset, Symmetric Key Export with Data, and Authentication Parameter Generate.

These CCA enhancements are available on zBC12 and select zEC12, z196, and z114 servers. They are supported by z/OS and z/VM for guest exploitation. Refer to the [Hardware requirements](#) and [Software requirements](#) sections.

IBM Enterprise PKCS #11 (EP11) enhancements

A configuration option for the Crypto Express4S feature supports IBM Enterprise Public-Key Cryptography Standards (PKCS) #11 (EP11), which is designed to provide open, industry-standard cryptographic services.

When the Crypto Express4S PCIe adapter is configured as an EP11 coprocessor, the following cryptographic enhancements are supported:

PKCS #11 v2.1 Probabilistic Signature Scheme (PSS) : EP11 now supports the latest algorithm that is used in digital signature applications, offering enhanced security characteristics over prior digital signature algorithms.

EP11 Key agreement algorithms supported:

- Diffie-Hellman: 1024-bit, 2048-bit
- Elliptic Curve Diffie-Hellman
 - National Institute of Standards and Technology (NIST): 192-bit, 224-bit, 256-bit, 384-bit, 521-bit
 - Brainpool: 160-bit, 192-bit, 224-bit, 256-bit, 320-bit, 384-bit, 512-bit

Offload Generation of Domain Parameters are necessary inputs for the creation of Digital Signature Algorithm (DSA) and Diffie-Hellman key pairs. This enhancement is designed to provide the ability to offload the task of generating domain parameters to EP11, helping to reduce consumption of CPU resources. These domain parameters can then be used to create key pairs.

These EP11 enhancements are exclusive to the Crypto Express4S feature and are available on zBC12 and select zEC12 servers. They are supported by z/OS and by z/VM for guest exploitation. Refer to the [Hardware requirements](#) and [Software requirements](#) sections.

Trusted Key Entry (TKE) 7.3 Licensed Internal Code (LIC)

The following functions are supported in the TKE 7.3 level of LIC:

- **Full function migration wizard for EP11:** The full function migration wizard is designed to provide the ability to quickly and accurately collect and apply data to the Crypto Express features configured as EP11 coprocessors. This wizard previously supported CCA, and has now been enhanced to also support EP11.
- **Workstation setup wizard:** The setup wizard performs the most common TKE workstation initialization functions, ensuring speed and accuracy of new TKE hardware deployment. It simplifies the process while greatly reducing errors. The wizard can also be run to verify the TKE workstation has been configured correctly.
- **Allow Set Master Key from the TKE workstation:** Initially setting or changing any type of master key on a Crypto Express feature must be done carefully. If a master key is set or changed when key stores have not been properly prepared for the new master key, the keys in the store will become unusable. In an initial

setup or recovery situation, establishing or changing the master key quickly is critical. The TKE workstation will allow you to set any master key from the TKE workstation. The Crypto Express feature is intended for initial setup or recovery situations where key stores are prepared for the master key that will be set by the TKE workstation.

- **Restricted PIN support:** The latest CCA enhancements are designed to allow users to prevent the automatic generation of certain PIN values, or the replacement of existing PINs with certain PIN values. The TKE 7.3 LIC includes a new tab for specifying restricted PIN values. This enhancement is exclusive to the TKE 7.3 LIC.
- **New AES operational keys:** Five new AES operational keys can be managed from the TKE 7.3 workstation. The key types are MAC, PINCALC, PINPROT, PINPRW, and DKYGENKY.
- **Close Host and Unload Authority Signature Key:** The Close Host enhancement is designed to allow you to explicitly sign off a host. The Unload Authority Signature Key enhancement allows you to explicitly remove the current authority signature key without ending the TKE application. When you have many users with different roles, users no longer have to end the TKE application before the TKE workstation is utilized by another user.
- **New access control for managing host list entries:** The TKE workstation profile role has a new access control point to allow you to create, change, or delete a host list entry. This is designed to provide stronger separation of duties between users of a host list entry and users that manage the entries.
- **Domain Group changes:**
 - When creating or changing a domain group, a domain can only be included in the group once. This ensures that domain commands are only sent to a domain once.
 - If you manage a host crypto module role from a domain group, the user must explicitly select which Domain Access Control Points are to be set. The user either specifies every domain access control point is selected for every crypto module in the group, or only the domain access control points for the domains in the group are selected. This enhancement allows you to manage a "module-scoped role" from inside a domain group.
- **User-defined CCA and EP11 Domain Control lists:** When managing CCA or EP11 Domain Control Points, the user can save the settings to a file which can then later be applied to other domains. This enhancement allows for fast and accurate deployment of new or recovered domains.
- **Increased session key strength:** When using the latest version of smart cards on a TKE 7.3 workstation, a 256-bit AES session key will be used for all smart card operations. Refer to the *TKE Workstation User's Guide, TKE Version 7.3, SC14-7511*, in the Library, Hardware products for servers, TKE workstation section of Resource Link® for further information.

Access Resource Link at

<http://www.ibm.com/servers/resourcelink>

The TKE 7.3 LIC (#0872) is supported on zBC12, zEC12, z196, and z114.

Previously announced zEC12 security enhancements that also apply to the zBC12 can be found at:

<http://www.ibm.com/systems/z/advantages/security/zec12cryptography.html>

Channel subsystem enhancement

Increased addressing with up to 24k subchannels per channel (port) for the FICON Express features: To help facilitate growth as well as continuing to enable server consolidation, we are now supporting up to 24k subchannels per FICON Express channel (channel path identifier - CHPID). Now you will be able to define more devices per FICON channel, which includes primary, secondary, and alias devices. The maximum number of subchannels across all device types addressable within an LPAR remains at 63.75k for subchannel set 0 and 64k-1 for subchannel sets 1 and higher.

This support is exclusive to the zBC12 and zEC12. It applies to the FICON Express8S, FICON Express8, and the FICON Express4 features when defined as CHPID type FC. This is supported by z/OS , z/VM , and Linux on System z . Refer to the [Software requirements](#) section.

FCP channels support T10-DIF for Linux on System z

Recognizing that high reliability is important to maintaining the availability of business-critical applications, the System z Fibre Channel Protocol (FCP) implemented support of the American National Standards Institute's (ANSI) T10 Data Integrity Field (DIF) standard in September of 2011. This support is now available for Linux on System z environments as well as z/VM for guest exploitation.

Data integrity protection fields are generated by the operating system and propagated through the storage area network (SAN). System z helps to provide added end-to-end data protection between the operating system and the storage device.

An extension to the standard, Data Integrity Extensions (DIX), provides checksum protection from the application layer through the host bus adapter (HBA), where cyclical redundancy checking (CRC) protection is implemented.

T10-DIF support by the FICON Express8S and FICON Express8 features, when defined as CHPID type FCP, is supported on the zBC12, zEC12, z196, and z114. Exploitation of the T10-DIF standard is supported by z/VM for guest exploitation and by Linux on System z . Exploitation is also required by the storage device. Refer to the [Software requirements](#) section.

OSA-Express5S - 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 8 Gbps PCIe Gen2 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-Express4S 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. And, the first time offered for networking, the OSA-Express5S features have **small form factor pluggable+ (SFP+) transceivers**.

The OSA-Express5S family of features (#0413, #0414, #0415, #0416, #0417) is exclusive to the zBC12 and zEC12. They are for use exclusively in the PCIe I/O drawer (#4009) and are supported by z/OS , z/VM , z/VSE® , z/TPF, and Linux on System z . Refer to the [Software requirements](#) section.

OSA/SF now available on the HMC: OSA Advanced Facilities on the Hardware Management Console (HMC) has been enhanced to provide configuration, validation, activation, and display support exclusively for the OSA-Express5S and OSA-Express4S features. For these features, the Advanced Facilities function on the HMC is used instead of the Open Systems Adapter Support Facility (OSA/SF) - a component of z/OS , z/VM , and z/VSE .

OSA/SF on the HMC is exclusive to the zBC12 and zEC12. The latest driver level is required. OSA/SF on the HMC is required for the OSA-Express5S features. Either OSA/SF on the HMC or the OSA/SF operating system component can be used for the OSA-Express4S features. The OSA/SF operating system component must be used for the OSA-Express3 features. OSA/SF on the HMC can be used to configure channel path identifier (CHPID) type OSE. It can be used to manage (query/display) CHPID types OSD, OSE, and OSN. Refer to the [Hardware requirements](#) and [Publications](#) sections.

Investment protection for Coupling environments

Improved performance with CFCC Level 19: Coupling Facility Control Code (CFCC) Level 19 now supports Coupling Thin Interrupts for improved performance in environments which are sharing Coupling Facility engines. Further support is planned. Refer to [Statement of general direction](#) section.

Coupling Thin Interrupts is designed to improve the efficiency of environments where shared engines are used as Coupling Facilities. While dedicated engines continue to be recommended to obtain the best Coupling Facility performance, Coupling Thin Interrupts may help to facilitate the use of a shared pool of engines, helping to lower hardware acquisition costs.

You may now experience CF response time improvements or more consistent CF response times when using Coupling Facilities with shared engines. This may also allow more environments with multiple CF images to coexist in a server, and share CF engines with reasonably good performance. The response time for asynchronous CF requests may also be improved as a result of using Coupling Thin Interrupts on the z/OS host system, regardless of whether the CF is using shared or dedicated engines.

Coupling Thin Interrupts is exclusive to the zBC12, zEC12, and to z/OS . Refer to the [Software requirements](#) section.

Enhancements to Advanced Entry Workload License Charges

Enhancements to Advanced Entry Workload License Charges and Technology Transition Offerings: Coinciding with the announcement of the zBC12 server, IBM is making available a new Technology Transition Offering (TTO) called Technology Update Pricing for Advanced Entry Workload License Charges (AEWLC). Technology Update Pricing for AEWLC offers price-performance advantages for zBC12 servers. IBM is also updating the Technology Update Pricing for Advanced Workload License Charges (AWLC) offering and two Transition Charges for Sysplex offerings to add the zBC12. In addition, zSeries Entry License Charge (zELC) pricing applies to the zBC12 capacity setting A01, the entry zBC12 server.

Technology Update Pricing for AEWLC extends the software price-performance provided by AEWLC for stand-alone zBC12 servers, and applies to eligible z/OS , z/TPF, and z/VSE operating systems and their associated middleware programs. AEWLC and Tiered Workload License Charges (TWLC) are the only pricing metrics available on a stand-alone zBC12 server, with the exception of the zBC12 capacity setting A01.

When a zBC12 server is in an actively coupled Parallel Sysplex® , you may choose either stand-alone AEWLC, aggregated AWLC pricing, or aggregated Parallel Sysplex License Charges (PSLC) pricing, subject to all applicable terms and conditions.

For additional information about software pricing for the zBC12 server, refer to Software Announcement [ZP13-0385](#), dated July 23, 2013 .

For more information about AWLC, PSLC, or the Transition Charges for Sysplexes TTO offerings, refer to

<http://ibm.com/systems/z/swprice/>

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

http://www.ibm.com/able/product_accessibility/index.html

Product positioning

The IBM zEnterprise System offers a total systems approach for enabling fit-for-purpose application deployment and advanced heterogeneous systems management capabilities that are unmatched in the industry.

The zBC12 is best viewed as a money-saving platform, facilitating consolidation of Linux on System z , as well as an efficient, agile, and scalable cloud delivery model.

The zBC12 has been designed to allow you to consolidate hundreds of distributed workloads onto a single system to help improve efficiency, reduce costs, and reinvest savings into new growth opportunities. Its enhanced Enterprise Linux Server solution has 62% more virtual server capacity and a 27% price and performance improvement compared to the previous generation (z114). Using z/VM V6.3, you have support for more virtual servers than any other platform in a single footprint.

The zBC12 also has a unique hybrid design that is designed to allow for the optimal deployment of workloads on best-fit technology with a single point of control. It supports multiarchitecture platform requirements with the IBM zEnterprise BladeCenter Extension (zBX) Model 003 coupled with enhancements to IBM zEnterprise Unified Resource Manager (zManager). These allow the zBC12 to extend management strengths to other systems and workloads running on AIX® , POWER7® , Linux on System x® , and Microsoft Windows on System x .

Support of select IBM System x blades in the zBX is designed to allow the zEnterprise to access a whole new application portfolio. Front-end applications that need access to centralized data serving would be a good fit for running on the blades, as well as applications that are a front end to core CICS® or IMS transaction processing such as IBM WebSphere .

From the microprocessor to the software that exploits it, the zBC12 is designed for analytics to help efficiently store, manage, retrieve, and analyze vast amounts of data. Complementing your zEnterprise environment, the IBM DB2 Analytics Accelerator is designed as a workload-optimized appliance that tightly integrates into the DB2 for z/OS database. This appliance is designed to help enable businesses to derive fast, compelling insights in a secure and highly available environment, without unnecessary cost or complexity.

The zBC12 continues our concentrated focus on security and encryption, seeking to protect data that is at rest or in transit across the network.

New zEnterprise innovations are extended to the zBC12, making it a cost-effective choice without the need to compromise functionality. IBM zAware and Flash Express are designed to help deliver new creative availability solutions. zEDC Express introduces a compression accelerator designed to allow higher write rates for SMF data when hardware compression is enabled. The 10GbE RoCE Express feature is designed to provide the networking fabric for z/OS LPAR-to-LPAR or server-to-server communications, helping to reduce latency with lower processor overhead than traditional TCP/IP communications.

With improved processor performance, increased capacity, more granular growth options, new hybrid computing capabilities, and new zEnterprise innovations, the zBC12 is a perfect fit for infrastructure simplification, efficient cloud delivery, real-time data analytics, and secure mobile applications to help enterprises of all sizes improve customer service.

Statement of general direction

IBM WebSphere DataPower® Integration Appliance XI52 Virtual Edition for use within the IBM zEnterprise BladeCenter Extension provides flexible deployment options: IBM intends to introduce a version of the WebSphere

DataPower Integration Appliance XI52 Virtual Edition for use within the IBM zEnterprise BladeCenter Extension (zBX). IBM intends for this virtual appliance to run on System x blades installed within a zBX and it is designed to provide industry-leading security, integration, and optimization capabilities for System z similar to the physical WebSphere DataPower appliance models. Refer to Software Announcement [ZP13-0421](#), dated July 23, 2013 .

CFCC Level 19 exploitation of Flash Express : IBM intends to provide exploitation of the Flash Express feature (#0402) on zEC12 and zBC12 servers with Coupling Facility Control Code (CFCC) Level 19 for certain Coupling Facility list structures in the first half of 2014. This new function is designed to allow list structure data to be migrated to Flash Express memory as needed when the consumers of data do not keep pace with its creators for some reason, and migrate it back to real memory to be processed. When using WebSphere MQ for z/OS Version 7 (5655-R36), this new capability is expected to provide significant buffering against enterprise messaging workload spikes and provide support for storing very large amounts of data in shared queue structures, potentially allowing several hours' data to be stored without causing interruptions in processing.

z/VM guest exploitation of zEDC Express feature: In a future z/VM deliverable IBM plans to offer z/VM support for guest exploitation of the zEDC Express feature (#0420) on the IBM zEnterprise EC12 and IBM zEnterprise BC12 systems.

zEDC Express exploitation by z/OS for BSAM and QSAM access methods: IBM intends to provide additional exploitation of the zEDC Express feature with support in z/OS for the BSAM and QSAM access methods. This support is planned to be made available by the end of first quarter 2014.

zEDC Express exploitation by z/OS for DFSMSdss and DFSMSHsm: IBM intends to provide exploitation of the zEDC Express feature for DFSMSdss and DFSMSHsm by the end of third quarter 2014.

z/VM support of 10GbE RoCE Express : In a future z/VM deliverable IBM plans to offer support for guest exploitation of the 10GbE RoCE Express feature (#0411) on the IBM zEnterprise EC12 and IBM zEnterprise BC12 systems. This support is designed to allow guests to utilize Remote Direct Memory Access over Converged Ethernet (RoCE) for optimized networking.

IBM Java exploitation of zEC12 and zBC12 features and functions: IBM plans for future updates of IBM 31-bit and 64-bit SDK7 for z/OS Java Technology Edition, Version 7 (5655-W43 and 5655-W44) (IBM SDK for z/OS Java) to provide exploitation of the following: the zEDC Express feature and Shared Memory Communications-Remote Direct Memory Access (SMC-R) which is utilized by the 10GbE RoCE Express feature.

Removal of support for 3-in-1 Bolt Down Kits: The IBM zEnterprise EC12 and IBM zEnterprise BC12 are planned to be the last System z servers to offer ordering of the 3-in-1 Bolt Down Kits for raised-floor and non-raised-floor environments. This applies to the zEC12 features #8000, #8001, and #8002 and to the zBC12 features #8016 and #8017. Alternate solutions are available.

Removal of support for the HCA2-O fanouts for 12x IFB and 1x IFB InfiniBand coupling links: The IBM zEnterprise EC12 and the IBM zEnterprise BC12 are planned to be the last System z servers to support the following features as **carry forward on an upgrade:** HCA2-O fanout for 12x IFB coupling links (#0163) and HCA2-O LR fanout for 1x IFB coupling links (#0168). Enterprises should continue migrating to the HCA3-O fanout for 12x IFB (#0171) and the HCA3-O LR fanout for 1x IFB (#0170).

Removal of support for connections to an STP Mixed CTN: The IBM zEnterprise EC12 and the IBM zEnterprise BC12 are the last System z servers to support connections to an STP Mixed CTN. This includes the Sysplex Timer® (9037). After the zEC12 and the zBC12, servers that require time synchronization, such as to support a base or Parallel Sysplex , will require Server Time Protocol (STP), and all servers in that network must be configured in STP-only mode.

Removal of ISC-3 support on System z : The IBM zEnterprise EC12 and the IBM zEnterprise BC12 are planned to be the last System z servers to offer support of the InterSystem Channel-3 (ISC-3) for Parallel Sysplex environments at extended distances. ISC-3 will not be supported on future System z servers as **carry forward on an upgrade**. Previously we announced that the IBM zEnterprise 196 (z196) and IBM zEnterprise 114 (z114) servers were the last to offer ordering of ISC-3. Enterprises should continue migrating from ISC-3 features (#0217, #0218, #0219) to 12x InfiniBand (#0171 - HCA3-O fanout) or 1x InfiniBand (#0170 - HCA3-O LR fanout) coupling links.

Removal of OSA-Express3 support on System z : The IBM zEnterprise EC12 and the IBM zEnterprise BC12 are planned to be the last System z servers to offer support of the Open System Adapter-Express3 (OSA-Express3 #3362, #3363, #3367, #3370, #3371) family of features. OSA-Express3 will not be supported on future System z servers as **carry forward on an upgrade**. Enterprises should continue migrating from the OSA-Express3 features to the OSA-Express4S (#0404, #0405, #0406, #0407, #0408) and OSA-Express5S (#0413, #0414, #0415, #0416, #0417) features.

Removal of support for IEEE 802.3 Ethernet frame types: The IBM zEnterprise EC12 and IBM zEnterprise BC12 are planned to be the last System z servers to support IEEE 802.3 Ethernet frame types on OSA-Express QDIO interfaces in Layer 3 mode. This statement applies to CHPID types OSD and OSX when they are used in Layer 3 mode. These OSA-Express CHPID types in Layer 3 mode are planned to support Ethernet DIX Version 2 (DIX V2) exclusively on future System z servers. OSA-Express non-QDIO (CHPID type OSE) supporting SNA/APPN/HPR with Link Station Architecture (LSA), TCP/IP passthru environments with LAN Channel Station (LCS), and QDIO CHPID types OSD and OSX running in Layer 2 mode are not affected by this change.

Removal of FICON Express4 support on System z : The IBM zEnterprise EC12 and the IBM zEnterprise BC12 are planned to be the last System z servers to offer support of the FICON Express4 features (#3318, #3321, #3322). FICON Express4 will not be supported on future System z servers as **carry forward on an upgrade**. Enterprises should continue migrating from the FICON Express4 features to the FICON Express8S features (#0409, #0410).

Removal of Crypto Express3 support on System z : The IBM zEnterprise EC12 and the IBM zEnterprise BC12 are planned to be the last System z servers to offer support of the Crypto Express3 features (#0864 and #0871 - zBC12 only). Crypto Express3 will not be supported on future System z servers as **carry forward on an upgrade**. Enterprises should continue migrating from the Crypto Express3 features to the Crypto Express4S feature (#0865).

IBM System z Integrated Information Processor (zIIP) and IBM System z Application Assist Processor (zAAP) simplification: The IBM zEnterprise EC12 and the IBM zEnterprise BC12 are planned to be the last System z servers to offer support for zAAP specialty engine processors. IBM intends to continue support for running zAAP workloads on zIIP processors ("zAAP on zIIP"). This is intended to help simplify capacity planning and performance management, while still supporting all the currently eligible workloads.

Stabilization of z/VM V5.4 support: The IBM zEnterprise EC12 and IBM zEnterprise BC12 are planned to be the last System z servers supported by z/VM V5.4 and the last System z servers that will support z/VM V5.4 running as a guest (second level). z/VM V5.4 will continue to be supported until December 31, 2014, or until the IBM System z9® EC and IBM System z9 BC are withdrawn from support, whichever is later. Refer to Withdrawal Announcement [ZP12-0335](#), dated August 07, 2012 , Software withdrawal/discontinuance of service: IBM System z selected products.

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

Refer to the following associated announcements:

Hardware Announcement [ZG13-0192](#), dated July 23, 2013

Software Announcement [ZP13-0371](#), dated July 23, 2013

Software Announcement [ZP13-0376](#), dated July 23, 2013

Product number

Description	Machine type	Model	Feature
IBM zEnterprise BC12	2828	H06 H13	
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
HMC			0092
I/O Cage ISC-D Airflow			0113
I/O Cage Full Card Airflow			0114
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-ZAAP			0123
100 CPE Capacity Unit-ZAAP			0124
1 CPE Capacity Unit-zIIP			0125
100 CPE Capacity Unit-zIIP			0126
1 CPE Capacity Unit-SAP			0127
100 CPE Capacity Unit-SAP			0128
Fanout Airflow			0165
PCIe Fanout			0169
HCA3-0 LR fanout for 1x IFB			0170
HCA3-0 fanout for 12x IFB			0171
Manage FW Suite			0019
Automate FW Suite			0020
Ensemble membership			0025
ZBX Detach			0030
ZBX Attach			0031
Automate FW IFL			0060
Manage FW DP			0064
Manage FW Pwr Blade			0065
Manage FW IBM System x B1			0066
Automate FW DP			0067
Automate FW Pwr Blade			0068
Automate FW IBM System x B1			0069

IBM zAware	0011
IBM zAware CP 2pack	0138
IBM zAware CP 4pack	0140
IBM zAware CP 6pack	0142
IBM zAware CP 10pack	0150
IBM zAware DR CP 2pack	0139
IBM zAware DR CP 4pack	0141
IBM zAware DR CP 6pack	0143
IBM zAware DR CP 10pack	0151
PCIe Interconnect Card	0400
Flash Express	0402
FICON Express8S 10Km LX	0409
FICON Express8S SX	0410
10GbE RoCE Express	0411
OSA-Express5S GbE LX	0413
OSA-Express5S GbE SX	0414
OSA-Express5S 10 GbE LR	0415
OSA-Express5S 10 GbE SR	0416
OSA-Express5S 1000BASE-T	0417
zEDC Express	0420
Month Indicator	0660
Day Indicator	0661
Hour Indicator	0662
Minute Indicator	0663
TKE workstation	0842
TKE 7.3 LIC	0872
Crypto Express4S	0865
Addl smart cards	0884
TKE Smart Card Reader	0885
UID Label for DoD	0998
STP Enablement	1021
EMEA Special Operations	1022
4 GB Mem DIMM(10/feat)	1600
8 GB Mem DIMM(10/feat)	1601
16 GB Mem DIMM(10/feat)	1603
32 GB Mem DIMM(10/feat)	1609
LICCC Ship Via Net Ind	1750
8GB Memory Capacity Incr	1903
8GB FTR Converted memory	1904
Preplanned memory	1993
16 GB Memory	3610
24 GB Memory	3611
32 GB Memory	3612
40 GB Memory	3613
48 GB Memory	3614
56 GB Memory	3615
64 GB Memory	3616
72 GB Memory	3617
80 GB Memory	3618
88 GB Memory	3619
96 GB Memory	3620
104 GB Memory	3621
112 GB Memory	3622
144 GB Memory	3628
176 GB Memory	3629
208 GB Memory	3630
240 GB Memory	3631
US English	2924
France	2928
German	2929
Spanish - Non Spain	2930
Spain	2931
Italian	2932
Canadian French	2935
Portuguese	2978
Brazilian Portuguese	2979

UK English	2980
Norwegian	2983
Sweden Finland	2987
Netherlands	2988
Belgian French	2989
Denmark	2993
Swiss French & German	2997
Luxembourg-Belgium ordered	5560
Iceland-Ordered in Denmark	5561
China-Ordered in Hong Kong	5562
Flat Panel Display	6096
Balanced Power Plan Ahead	3003
BPR Pair Air Model	3004
BPD Pair Air Model	3008
Internal Battery IBF-E	3213
Universal Lift Tool/Ladder	3759
Serv Docs Optional Print	0033
CPACF Enablement	3863
PCIe I/O Drawer	4009
Top Exit w/Power	7901
FQC Bracket & Mounting Hdw	7907
LC Duplex 6.6ft Harnesses	7909
LC Duplex 8.5ft Harnesses	7911
Top Exit Cabling	7920
Side Covers	7921
Non Raised Floor Support	7998
3-in-1 Bolt Down Kit	8016
Bolt Down Kit NRF	8017
14ft 380-520V DC cut cord	8964
14ft HiLoV 3Ph cut TE	8970
14ft HiLoV 1Ph cut TE	8972
14ft 380-520V DC cut TE	8974
14ft HiLoV 3Ph cut cord	8988
14ft HiLoV 1Ph cut cord	8991
14ft HiV 3Ph cut line LSZH	8998
Multi Order Ship Flag	9000
Multi Order Rec Only-NB	9001
Multi Order Rec Only-MES	9002
RPO Action Flag	9003
Downgraded PUS Per Request	9004
On/Off CoD Act IFL Day	9888
On/Off CoD Act ICF Day	9889
On/Off CoD Act ZAAP Day	9893
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 ZAAP day	9926
100 ZAAP days	9927
1 SAP day	9928

100 SAP days	9929
Site Tool Kit	9969
Height Reduce Ship	9975
Height Reduce for Return	9976
CP-A	5765
CP-B	5766
CP-C	5768
CP-D	5769
CP-E	5770
CP-F	5771
CP-G	5772
CP-H	5773
CP-I	5774
CP-J	5775
CP-K	5776
CP-L	5777
CP-M	5778
CP-N	5779
CP-O	5780
CP-P	5781
CP-Q	5782
CP-R	5783
CP-S	5784
CP-T	5785
CP-U	5786
CP-V	5787
CP-W	5788
CP-X	5789
CP-Y	5790
CP-Z	5791
IFL	5794
ICF	5795
SAP (optional)	5796
ZAAP	5797
ZIIP	5798
Unassigned IFL	5799
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 ZAAP-Year	6826
25 CBU ZAAP-Year	6827
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 A00	5905
1-Way Processor A01	5906
1-Way Processor B01	5907
1-Way Processor C01	5908
1-Way Processor D01	5909
1-Way Processor E01	5910
1-Way Processor F01	5911
1-Way Processor G01	5912
1-Way Processor H01	5913
1-Way Processor I01	5914
1-Way Processor J01	5915
1-Way Processor K01	5916
1-Way Processor L01	5917
1-Way Processor M01	5918
1-Way Processor N01	5920

1-Way Processor	O01	5921
1-Way Processor	P01	5922
1-Way Processor	Q01	5923
1-Way Processor	R01	5924
1-Way Processor	S01	5925
1-Way Processor	T01	5926
1-Way Processor	U01	5927
1-Way Processor	V01	5928
1-Way Processor	W01	5929
1-Way Processor	X01	5930
1-Way Processor	Y01	5931
1-Way Processor	Z01	5932
2-Way Processor	A02	5933
2-Way Processor	B02	5934
2-Way Processor	C02	5935
2-Way Processor	D02	5936
2-Way Processor	E02	5937
2-Way Processor	F02	5938
2-Way Processor	G02	5939
2-Way Processor	H02	5940
2-Way Processor	I02	5941
2-Way Processor	J02	5942
2-Way Processor	K02	5943
2-Way Processor	L02	5944
2-Way Processor	M02	5945
2-Way Processor	N02	5946
2-Way Processor	O02	5947
2-Way Processor	P02	5948
2-Way Processor	Q02	5949
2-Way Processor	R02	5950
2-Way Processor	S02	5951
2-Way Processor	T02	5952
2-Way Processor	U02	5953
2-Way Processor	V02	5954
2-Way Processor	W02	5955
2-Way Processor	X02	5956
2-Way Processor	Y02	5957
2-Way Processor	Z02	5958
3-Way Processor	A03	5959
3-Way Processor	B03	5960
3-Way Processor	C03	5961
3-Way Processor	D03	5962
3-Way Processor	E03	5963
3-Way Processor	F03	5964
3-Way Processor	G03	5965
3-Way Processor	H03	5966
3-Way Processor	I03	5967
3-Way Processor	J03	5968
3-Way Processor	K03	5969
3-Way Processor	L03	5970
3-Way Processor	M03	5971
3-Way Processor	N03	5972
3-Way Processor	O03	5973
3-Way Processor	P03	5974
3-Way Processor	Q03	5975
3-Way Processor	R03	5976
3-Way Processor	S03	5977
3-Way Processor	T03	5978
3-Way Processor	U03	5979
3-Way Processor	V03	5980
3-Way Processor	W03	5981
3-Way Processor	X03	5982
3-Way Processor	Y03	5983
3-Way Processor	Z03	5984
4-Way Processor	A04	5985
4-Way Processor	B04	5986
4-Way Processor	C04	5987
4-Way Processor	D04	5988
4-Way Processor	E04	5989
4-Way Processor	F04	5990
4-Way Processor	G04	5991

4-Way Processor H04	5992
4-Way Processor I04	5993
4-Way Processor J04	5994
4-Way Processor K04	5995
4-Way Processor L04	5996
4-Way Processor M04	5997
4-Way Processor N04	5998
4-Way Processor O04	5999
4-Way Processor P04	6000
4-Way Processor Q04	6001
4-Way Processor R04	6002
4-Way Processor S04	6003
4-Way Processor T04	6004
4-Way Processor U04	6005
4-Way Processor V04	6006
4-Way Processor W04	6007
4-Way Processor X04	6008
4-Way Processor Y04	6009
4-Way Processor Z04	6010
5-Way Processor A05	6011
5-Way Processor B05	6012
5-Way Processor C05	6013
5-Way Processor D05	6014
5-Way Processor E05	6015
5-Way Processor F05	6016
5-Way Processor G05	6017
5-Way Processor H05	6018
5-Way Processor I05	6019
5-Way Processor J05	6020
5-Way Processor K05	6021
5-Way Processor L05	6022
5-Way Processor M05	6023
5-Way Processor N05	6024
5-Way Processor O05	6025
5-Way Processor P05	6026
5-Way Processor Q05	6027
5-Way Processor R05	6028
5-Way Processor S05	6029
5-Way Processor T05	6030
5-Way Processor U05	6031
5-Way Processor V05	6032
5-Way Processor W05	6033
5-Way Processor X05	6034
5-Way Processor Y05	6035
5-Way Processor Z05	6036
6-Way Processor A06	6037
6-Way Processor B06	6038
6-Way Processor C06	6039
6-Way Processor D06	6040
6-Way Processor E06	6041
6-Way Processor F06	6042
6-Way Processor G06	6043
6-Way Processor H06	6044
6-Way Processor I06	6045
6-Way Processor J06	6046
6-Way Processor K06	6047
6-Way Processor L06	6048
6-Way Processor M06	6049
6-Way Processor N06	6050
6-Way Processor O06	6051
6-Way Processor P06	6052
6-Way Processor Q06	6053
6-Way Processor R06	6054
6-Way Processor S06	6055
6-Way Processor T06	6056
6-Way Processor U06	6057
6-Way Processor V06	6058
6-Way Processor W06	6059
6-Way Processor X06	6060
6-Way Processor Y06	6061
6-Way Processor Z06	6062

A00 Capacity Marker	9069
A01 Capacity Marker	9070
B01 Capacity Marker	9071
C01 Capacity Marker	9072
D01 Capacity Marker	9073
E01 Capacity Marker	9074
F01 Capacity Marker	9075
G01 Capacity Marker	9076
H01 Capacity Marker	9077
I01 Capacity Marker	9078
J01 Capacity Marker	9079
K01 Capacity Marker	9080
L01 Capacity Marker	9081
M01 Capacity Marker	9082
N01 Capacity Marker	9083
O01 Capacity Marker	9084
P01 Capacity Marker	9085
Q01 Capacity Marker	9086
R01 Capacity Marker	9087
S01 Capacity Marker	9088
T01 Capacity Marker	9089
U01 Capacity Marker	9090
V01 Capacity Marker	9091
W01 Capacity Marker	9092
X01 Capacity Marker	9093
Y01 Capacity Marker	9094
Z01 Capacity Marker	9095
A02 Capacity Marker	9096
B02 Capacity Marker	9097
C02 Capacity Marker	9098
D02 Capacity Marker	9099
E02 Capacity Marker	9100
F02 Capacity Marker	9101
G02 Capacity Marker	9102
H02 Capacity Marker	9103
I02 Capacity Marker	9104
J02 Capacity Marker	9105
K02 Capacity Marker	9106
L02 Capacity Marker	9107
M02 Capacity Marker	9108
N02 Capacity Marker	9109
O02 Capacity Marker	9110
P02 Capacity Marker	9111
Q02 Capacity Marker	9112
R02 Capacity Marker	9113
S02 Capacity Marker	9114
T02 Capacity Marker	9116
U02 Capacity Marker	9117
V02 Capacity Marker	9118
W02 Capacity Marker	9119
X02 Capacity Marker	9120
Y02 Capacity Marker	9121
Z02 Capacity Marker	9122
A03 Capacity Marker	9123
B03 Capacity Marker	9124
C03 Capacity Marker	9125
D03 Capacity Marker	9126
E03 Capacity Marker	9127
F03 Capacity Marker	9128
G03 Capacity Marker	9129
H03 Capacity Marker	9130
I03 Capacity Marker	9131
J03 Capacity Marker	9132
K03 Capacity Marker	9133
L03 Capacity Marker	9134
M03 Capacity Marker	9135
N03 Capacity Marker	9136
O03 Capacity Marker	9137
P03 Capacity Marker	9138
Q03 Capacity Marker	9139
R03 Capacity Marker	9140
S03 Capacity Marker	9141

T03	Capacity Marker	9142
U03	Capacity Marker	9143
V03	Capacity Marker	9144
W03	Capacity Marker	9145
X03	Capacity Marker	9146
Y03	Capacity Marker	9147
Z03	Capacity Marker	9148
A04	Capacity Marker	9149
B04	Capacity Marker	9150
C04	Capacity Marker	9151
D04	Capacity Marker	9152
E04	Capacity Marker	9153
F04	Capacity Marker	9154
G04	Capacity Marker	9155
H04	Capacity Marker	9156
I04	Capacity Marker	9157
J04	Capacity Marker	9158
K04	Capacity Marker	9159
L04	Capacity Marker	9160
M04	Capacity Marker	9161
N04	Capacity Marker	9162
O04	Capacity Marker	9163
P04	Capacity Marker	9164
Q04	Capacity Marker	9165
R04	Capacity Marker	9166
S04	Capacity Marker	9167
T04	Capacity Marker	9168
U04	Capacity Marker	9169
V04	Capacity Marker	9170
W04	Capacity Marker	9171
X04	Capacity Marker	9172
Y04	Capacity Marker	9173
Z04	Capacity Marker	9174
A05	Capacity Marker	9175
B05	Capacity Marker	9176
C05	Capacity Marker	9177
D05	Capacity Marker	9178
E05	Capacity Marker	9179
F05	Capacity Marker	9180
G05	Capacity Marker	9181
H05	Capacity Marker	9182
I05	Capacity Marker	9183
J05	Capacity Marker	9184
K05	Capacity Marker	9185
L05	Capacity Marker	9186
M05	Capacity Marker	9187
N05	Capacity Marker	9188
O05	Capacity Marker	9189
P05	Capacity Marker	9190
Q05	Capacity Marker	9191
R05	Capacity Marker	9192
S05	Capacity Marker	9193
T05	Capacity Marker	9194
U05	Capacity Marker	9195
V05	Capacity Marker	9196
W05	Capacity Marker	9197
X05	Capacity Marker	9198
Y05	Capacity Marker	9199
Z05	Capacity Marker	9200
A06	Capacity Marker	9201
B06	Capacity Marker	9202
C06	Capacity Marker	9203
D06	Capacity Marker	9204
E06	Capacity Marker	9205
F06	Capacity Marker	9206
G06	Capacity Marker	9207
H06	Capacity Marker	9208
I06	Capacity Marker	9209
J06	Capacity Marker	9210
K06	Capacity Marker	9211
L06	Capacity Marker	9212

M06 Capacity Marker	9213
N06 Capacity Marker	9214
O06 Capacity Marker	9215
P06 Capacity Marker	9216
Q06 Capacity Marker	9217
R06 Capacity Marker	9218
S06 Capacity Marker	9219
T06 Capacity Marker	9220
U06 Capacity Marker	9221
V06 Capacity Marker	9222
W06 Capacity Marker	9223
X06 Capacity Marker	9224
Y06 Capacity Marker	9225
Z06 Capacity Marker	9226

Description	Machine type	Model	Feature
IBM zEnterprise BC12 Model H06	2828	H06	1147
8 GB Memory			3609
IBM zEnterprise BC12 Model H13	2828	H13	1148
272 GB Memory			3632
304 GB Memory			3633
336 GB Memory			3634
368 GB Memory			3635
400 GB Memory			3636
432 GB Memory			3637
464 GB Memory			3638
496 GB Memory			3639

Features that may carry forward on an upgrade:

The following features cannot be ordered on the IBM zEnterprise BC12. If they are installed at the time of an upgrade to the IBM zEnterprise BC12 they may be retained.

Description	Machine type	Model	Feature
IBM zEnterprise BC12	2828	H06	
		H13	
Ethernet switch			0070
HMC			0091
HCA2-C Fanout			0162
HCA2-O fanout for 12x IFB			0163
HCA2-O LR fanout			0168
ISC-Mother Card			0217
ISC-Daughter Card			0218
ISC-3 link on F/C 0218			0219
IFB-MP Daughter Card			0326
STI-A8 Mother Card			0327
OSA-Express4S 1 GbE LX			0404
OSA-Express4S 1 GbE SX			0405
OSA-Express4S 10 GbE LR			0406
OSA-Express4S 10 GbE SR			0407
TKE workstation			0841
Crypto Express3			0864
Crypto Express3-1P			0871
FICON Express4 - 2C SX			3318
FICON Express4 10KM LX			3321
FICON Express4 SX			3322
FICON Express8 10KM LX			3325
FICON Express8 SX			3326
OSA-Express3 GbE LX			3362
OSA-Express3 GbE SX			3363

OSA-Express3 1000BASET-EN	3367
OSA-Express3-2P1000BASETEN	3369
OSA-Express3 10 GbE LR	3370
OSA-Express3 10 GbE SR	3371
OSA-Express3-2P GbE SX	3373
I/O Drawer	4000

14ft HiV 1Ph cut LSZH 8999

Notes :

1. Memory DIMMs do NOT carry forward.
2. Support Elements do NOT carry forward.

Model conversions

From		To		Description
M/T	Model	M/T	Model	
2098	E10	2828	H06 (*)	E10 to H06
2098	E10	2828	H13 (*)	E10 to H13

From		To		Description
M/T	Model	M/T	Model	
2818	M05	2828	H06 (*)	M05 to H06
2818	M05	2828	H13 (*)	M05 to H13
2818	M10	2828	H06 (*)	M10 to H06
2818	M10	2828	H13 (*)	M10 to H13

From		To		Description
M/T	Model	M/T	Model	
2828	H06	2828	H13 (*)	H06 to H13

From		To		Description
M/T	Model	M/T	Model	
2828	H13	2827	H20 (*)	H13 to H20r

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

Feature conversions

The feature conversion list for IBM zEnterprise BC12 is available now in the *Library* section of Resource Link . This list can be obtained at Resource Link by accessing the following website

<https://www.ibm.com/servers/resourcelink/lib03011.nsf/pages/2098to2828featureconversion s?OpenDocument>

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 :

Title	Order number
zBX Installation Manual for Physical Planning (2458-003)	GC27-2619

zEnterprise BC12 Installation Manual - Physical Planning (IMPP)	GC28-6923
zEnterprise BC12 System Overview	SA22-1089
IOCP User's Guide	SB10-7037
PR/SM Planning Guide	SB10-7156
Functional Matrix	ZSW0-1335

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

Title	Order number
Systems Safety Notices	G229-9054
License Agreement for Machine Code Addendum for Elliptic Curve Cryptography	GC27-2612
zBX Installation Manual (2458-003)	GC27-2618
System z Statement of Limited Warranty	GC28-6883
zBX Service Guide	GC28-6884
Service Guide for TKE Workstations	GC28-6901
zEnterprise BC12 Safety Inspection	GC28-6921
zEnterprise BC12 Installation Manual	GC28-6922
zEnterprise BC12 Service Guide	GC28-6924
License Agreement for Machine Code	SC28-6872
zBX Safety Inspection	GC28-6889
Systems Environmental Notices and User Guide	Z125-5823

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

Title	Order number
Application Programming Interfaces for Java	API-JAVA
Planning for Fiber Optic Links	GA23-1406
Ensemble Planning and Configuring Guide	GC27-2608
Introduction to Ensembles	GC27-2609
Ensemble workload Resource Group Management Guide	GC27-2621
Service Guide for HMCs and SEs	GC28-6861
CHPID Mapping Tool User's Guide	GC28-6900
zBC12 Parts Catalog	GC28-6925
OSA-Express Customer Guide and Reference	SA22-7935
Application Programming Interfaces	SB10-7030
Common Information Model (CIM) Management Interface	SB10-7154
Stand-Alone IOCP User's Guide	SB10-7152
FICON CTC Reference	SB10-7157
OSA/SF on the Hardware Management Console	SC14-7580
Advanced workload Analysis Reporter (IBM zAware) Guide	SC27-2623
Hardware Management Console web Services API (Version 2.12.1)	SC27-2626
Capacity On Demand User's Guide	SC28-2605
SCSI IPL - Machine Loader Messages	SC28-6839
Maintenance Information for Fiber Optic Links	SY27-7693

Resource Link

Publications for zEnterprise BC12 can be obtained at Resource Link by accessing the following website

<http://www.ibm.com/servers/resourcelink>

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 documentation

At planned availability, the Hardware Management Console (HMC) and Support Element (SE) documentation will be available from the System z HMC and SE (Version 2.12.1) Information Center

<http://pic.dhe.ibm.com/infocenter/hwmca/v2r12m1/index.jsp>

Redbooks®

The following Redbooks publications are available now:

Title	Order number
IBM System z Connectivity Handbook	SG24-5444
IBM zEnterprise EC12 Technical Guide	SG24-8049
IBM zEnterprise EC12 and IBM zEnterprise BC12 Technical Introduction	SG24-8050
IBM zEnterprise BC12 Technical Guide	SG24-8138

To download these Redbooks publications, go to

<http://www.redbooks.ibm.com/Redbooks.nsf/pages/zEnterprise?Open>

For other IBM Redbooks publications, refer to

<http://www.redbooks.ibm.com/>

The IBM Systems Information 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 IBM Systems Information Center is at

<http://publib14.boulder.ibm.com/infocenter/systems>

IBM Publications Center Portal

<http://www.ibm.com/shop/publications/order>

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, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

Services

IBM Systems Lab Services and Training

IBM Systems Lab Services and Training has the intellectual and technical leverage of the IBM System z development lab, which can assist clients in taking advantage of emerging technologies on the IBM System z platform.

Our teams span a wide breadth and scope of services that are designed to assist clients worldwide, including:

- Server and storage solutions for IBM System z
- Security, availability, networking, and data serving solutions for z/OS , z/VM , and Linux on System z environments
- Applications and Middleware Solutions for System z
- Smarter Planet™ Solutions
- Cloud and Smart Analytics Solutions

- Platform-independent total cost of operating (TCO) consulting for IT Optimization, Information Lifecycle Management (ILM), and Virtualization studies, providing a business case comparison of the client's current and future costs as compared with the cost of running on IBM server and storage solutions
- Platform-independent data center facilities consulting for power, cooling, I/O, data center best practices, and data center energy efficiency studies
- Education and training

On a billable basis, IBM Systems Lab Services and Training can provide customized solutions, leading-edge consulting and support services, proof of concepts, and benchmarking to satisfy both your clients' current business requirements and strategic initiatives, as well as their System z plans and objectives. If you are interested in engaging the team, contact systemz@us.ibm.com.

In support of this announcement, IBM Systems and Technology Group, Lab Services and Training is announcing the following new offering:

- **New Technology Exploitation/Implementation Offering for SMC-R and zEDC Express :**

This offering is designed to:

- Provide network design and implementation assistance on the zEC12 and zBC12 to help utilize Shared Memory Communications-Remote Direct Memory Access (SMC-R) in z/OS V2.1 and the 10GbE RoCE Express feature for optimized network communications
- Provide Systems Infrastructure implementation assistance on zEC12 and zBC12 to help enable zEnterprise Data Compression (zEDC) for z/OS V2.1 and the zEDC Express feature, which are designed to help provide high-performance, low-latency data compression without significant CPU overhead

In addition, IBM Systems and Technology Group, Lab Services and Training can assist you with your System z migration requirements. Our experienced Lab Services consultants can provide new clients a quick start approach to moving forward with their new hardware investment. For existing clients, they can develop a customized migration plan, help manage the application environment, and provide assistance when upgrading hardware and software levels in a complex enterprise that may include z/OS , z/VM , and Linux on System z .

To find out more about the IBM System z portfolio and other related products and services contact systemz@us.ibm.com or visit

<http://www.ibm.com/systems/services/labservices>

IBM Systems and Technology Group, Lab Services and Technical Training supports many IBM offerings. These include both introduction and advanced classes in z/OS , z/VM , and Linux on System z , as well as our hardware update classes.

For additional information on these classes and STG events in your region, visit

<http://www.ibm.com/training>

Global Technology Services (GTS)

IBM Global Technology Services can leverage business, industry, and IT insights and assess your infrastructure end-to-end to improve time to value and optimize your resources. These services can be delivered in a modular approach, giving clients flexibility to buy what they need when they need it, to help reduce risk and complexity.

For a zEnterprise BC12 environment, Global Technology Services helps you assess and design your IT architecture and align your IT strategy and business priority. This includes developing the business case and high-level transition plan, and a roadmap for an optimized infrastructure. Global Technology Services also enables the client to build and run a smarter zBC12 environment. With these services, you can migrate effectively and efficiently to a current System z environment, and create a more

cost-effective and manageable computing environment with server, storage, and network integration and implementation services. Moreover, GTS provides managed services and cloud services for ongoing management to effectively run, utilize, and manage the zBC12.

The following is a list of Global Technology Services services available for the zBC12:

- Strategy, Design, Optimization, and Integration
 - IBM IT Transformation Strategy and Design Services (6950-92B)
 - IBM IT Transformation Strategy and Design Services - server architecture, design and planning (6948-17T)
 - IBM Data Center and Facilities Strategy Services - data center strategy and plan (6948-76T)
 - IBM Server Optimization and Integration Services - server consolidation and virtualization (6948-39T)
 - IBM Implementation Services for Parallel Sysplex (6948-74Z)
 - IBM Implementation Services for Parallel Sysplex Middleware (6948-84A)
 - IBM Healthcheck Services for System z (6948-39J)
 - IBM Implementation Services for GDPS (6948-76L)
- Implementation & Migration
 - IBM Implementation Services for System z (6948-75A)
 - zEnterprise setup and migration (6948-L96)
 - z/VM and Linux implementation (6948-L30)
 - z/VM and Linux performance assessment (6948-K61)
 - zBX and Unified Resource Manager (6948-L66)
 - Network virtualization for zBX (6948-M35)
 - Server Time Protocol (6948-J56)
 - Capacity provisioning (6948-J60)
 - IT process automation (6948-G57)
 - Onsite daily assist (6948-M10)
 - IBM Implementation Services for Cloud - Linux on z/VM (6948-M62)
 - IBM Migration Services for System z (6948-75B)
- Managed Services and Cloud
 - IBM Server Managed Services (6950-94G)
 - IBM SmartCloud Enterprise+ for System z (6941-01E)
- Maintenance & Support (Technical Support Services)
 - IBM Hardware Maintenance Service (6950-95A)
 - IBM Enhanced Technical Support (6942-73J)
 - Support Line for z/OS , and Linux , including Linux Subscription (SoftwareXcel in US): Support Line Service Offering ID (6950-95B)

These services can help you integrate, manage, and maintain your server, storage, networks 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 for System z , contact your IBM representative or visit:

- System z product services
<http://www-935.ibm.com/services/us/en/it-services/server-product-services-for-system-z.html>
- Server services
<http://www-935.ibm.com/services/us/en/it-services/server-services.html>

- System z services
<http://www-935.ibm.com/services/us/index.wss/itservice/imc/a1030882>
- Data center services
<http://www-935.ibm.com/services/us/igs/smarterdatacenter.html>
- Cloud services
<http://www.ibm.com/cloud-computing/us/en/>

IBM Global Technology Services - IBM Facilities Cabling Services

IBM Global Technology Services offers a set of solutions that can help with the setup of a high-availability, resilient cabling network for your data center. IBM Facilities Cabling Services (Service Offering ID: 6950-94D) provides the IBM Fiber Transport System (Service Product ID: 6948-83G) and the ESCON® to FICON migration (Service Product ID: 6948-97D) to facilitate a seamless integration of your System z in a new or existing data center infrastructure:

- **IBM Facilities Cabling Services - fiber transport system** is a structured service that provides comprehensive connectivity planning as well as onsite consultation, installation, and integration of the fiber optic cabling infrastructure for enterprise data centers. It includes assessment, design, and planning for data centers, storage area networks, and server farms, for single-mode and multimode fiber optic cabling solutions.
- **IBM Facilities Cabling Services - ESCON to FICON migration** is a strategic simplification solution that allows customers to enjoy the benefits of deploying 100% FICON channels on the host while maintaining access to ESCON (and B/T) devices supporting select mission-critical applications. This approach simplifies the future System z cutover, streamlines ongoing operations, and provides you with greater flexibility to manage the transition to a FICON-only environment in the future.

An additional benefit of ESCON to FICON migration is the reduction of space, power, maintenance, and cooling expenses associated with ESCON director technology.

IBM Facilities Cabling Services offers solutions in addition to the IBM Fiber Transport System and the ESCON to FICON migration such as Smarter Enterprise Connectivity, Passive Optical LAN and Cabling Infrastructure Audit, and Health Checks.

Additional information about IBM Facilities Cabling Services offerings and capabilities is available by contacting cabling@us.ibm.com. Refer also to:

- IBM Facilities Cabling Services
<http://www-935.ibm.com/services/us/en/it-services/facilities-cabling-services.html>

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 visit

<http://www.ibm.com/services/>

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/index.html>

Select your country, and then select the product as the category.

Technical information

Specified operating environment

Physical specifications

Dimensions (rounded to the nearest 0.1 inch or 0.1 centimeter):

	Depth	width	Height
Without Top Exit I/O			
- Inches	62.0	30.9	79.3
- Centimeter	157.5	78.4	201.3
With Top Exit I/O			
- Inches (O/H IO cable exit)	62.0	36.9	84.8
- Centimeter (O/H IO cable exit)	157.5	93.6	215.3

Approximate weight:

	Maximum System Model H06	Maximum System Model H13
System without IBF Feature		
- kg	865.0	946.0
- lb	1946.0	2086.0
System with IBF Feature		
- kg	965.0	1049.0
- lb	2172.0	2312.0

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.

Towers for the Top Exit I/O feature add approximately 43 kg (95 lb) to the total system weight.

Standards

The 10GbE RoCE Express feature (#0411) is designed to conform to the following standards:

- RoCE uses the InfiniBand Trade Association-defined (IBTA-defined) transport headers and invariant (end-to-end) cyclical redundancy checking (CRC) (adapter-to-adapter) to protect the InfiniBand transport payload. Refer to the supplement to the InfiniBand Architecture Specification Volume 1 Release 1.2.1, Annex A16 for details.
- RoCE uses the IEEE-assigned EtherType of 0x8915.

- The 10 GbE-capable switch must have Pause frame enabled as defined by the IEEE 802.3x standard.
- 10 Gigabit Ethernet (10GBASE-SR)
 - IEEE 802.3ae
 - IEEE 802.1q
 - IEEE 802.3x - flow control
 - DIX Version 2 (DIX V2)

The 10GbE RoCE Express feature (#0411) has the following characteristics:

- Data rate: 10 gigabits per second (10 Gbps)
- Operating mode: Full duplex
- Maximum transmission unit (MTU): 10GbE RoCE Express is restricted to an InfiniBand transport MTU of 1K bytes (1024 bytes).
- Connector type: LC Duplex
- Port count: Two short reach (SR) ports (one port exploited by z/OS)
- Cable type: Multimode fiber optic cabling (50 or 62.5 micron)
- Unrepeated distance:
 - With 50 micron fiber at 2000 MHz-km (OM3): 300 meters (984 feet)
 - With 50 micron fiber at 500 MHz-km (OM2): 82 meters (269 feet)
 - With 62.5 micron fiber at 200 MHz-km (OM1): 33 meters (108 feet)

The OSA-Express5S features are designed to conform to the following standards:

- 10 Gigabit Ethernet (10GBASE-LR, 10GBASE-SR)
 - IEEE 802.3ae
 - IEEE 802.1q
 - IEEE 802.3x - flow control
 - DIX Version 2 (DIX V2)
- Gigabit Ethernet (1000BASE-LX, 1000BASE-SX)
 - IEEE 802.3ac
 - IEEE 802.1q
 - IEEE 802.3x - flow control
 - IEEE 802.3z
 - DIX Version 2 (DIX V2)
- Ethernet (1000BASE-T)
 - IEEE 802.1p
 - IEEE 802.1q
 - IEEE 802.3ab
 - IEEE 802.3ac
 - IEEE 802.3u
 - IEEE 802.3x - flow control
 - DIX Version 2 (DIX V2)

The OSA-Express5S features have the following characteristics:

OSA-Express5S 10 Gigabit Ethernet LR (long reach) (#0415)

- Data rate: 10 gigabits per second (10 Gbps)
- Operating mode: Full duplex
- Defined as: CHPID types OSD and OSX
- Maximum transmission unit (MTU) for 802.3: 1492 bytes, DIX V2: 1500 bytes, jumbo frames: 9000 bytes
- Connector type: LC Duplex
- Port count: One LR port

- Cable type: Single-mode fiber optic cabling (9 micron)
- Unrepeated distance: 10 km (6.2 miles)

OSA-Express5S 10 Gigabit Ethernet SR (short reach) (#0416)

- Data rate: 10 gigabits per second (10 Gbps)
- Operating mode: Full duplex
- Defined as: CHPID types OSD and OSX
- Maximum transmission unit (MTU) for 802.3: 1492 bytes, DIX V2: 1500 bytes, jumbo frames: 9000 bytes
- Connector type: LC Duplex
- Port count: One SR port
- Cable type: Multimode fiber optic cabling (50 or 62.5 micron)
- Unrepeated distance:
 - With 50 micron fiber at 2000 MHz-km (OM3): 300 meters (984 feet)
 - With 50 micron fiber at 500 MHz-km (OM2): 82 meters (269 feet)
 - With 62.5 micron fiber at 200 MHz-km (OM1): 33 meters (108 feet)

OSA-Express5S Gigabit Ethernet LX (long wavelength) (#0413)

- Data rate: 1000 Mbps (1 Gbps)
- Operating mode: Full duplex
- Defined as: CHPID type OSD
- Maximum transmission unit (MTU) for 802.3: 1492 bytes, DIX V2: 1500 bytes, jumbo frames: 9000 bytes
- Connector type: LC Duplex
- Port count: Two LX ports per feature
- Cable type: Single-mode fiber optic cabling (9 micron)
- Unrepeated distance: 5 km (3.1 miles)

OSA-Express5S Gigabit Ethernet SX (short wavelength) (#0414)

- Data rate: 1000 Mbps (1 Gbps)
- Operating mode: Full duplex
- Defined as: CHPID type OSD
- Maximum transmission unit (MTU) for 802.3: 1492 bytes, DIX V2: 1500 bytes, jumbo frames: 9000 bytes
- Connector type: LC Duplex
- Port count: Two SX ports
- Cable type: Multimode fiber optic cabling (50 or 62.5 micron)
- Unrepeated distance:
 - With 50 micron fiber at 500 MHz-km (OM2): 550 meters (1804 feet)
 - With 62.5 micron fiber at 200 MHz-km (OM1): 275 meters (902 feet)
 - With 62.5 micron fiber at 160 MHz-km: 220 meters (722 feet)

OSA-Express5S 1000BASE-T Ethernet (#0417)

- Data rate: 100 or 1000 Mbps
- Operating modes: Autonegotiate, full duplex
- Defined as: CHPID types OSC, OSD, OSE, OSM, OSN
- Maximum transmission unit (MTU) for 802.3: 1492 bytes, DIX V2: 1500 bytes, jumbo frames: 9000 bytes (1000 Mbps only)
- Connector type: RJ-45

- Port count: Two 1000BASE-T ports
- Cable type: EIA/TIA Category 5 Unshielded Twisted Pair (UTP) cable with a maximum length of 100 meters (328 feet)

For more information on cable types and supported distances, refer to the document *Planning for Fiber Optic Links*, GA23-1406, which can be found in the Library section of Resource Link at

<http://www.ibm.com/servers/resourcelink>

Operating environment

- Operating temperature and altitude:
 - Minimum temperature = 10°C (50°F)
 - Maximum temperature = 35°C (95°F) up to 3000 feet, then a derating of 1°C (1.8°F) for every 1000 feet above 3000 feet
 - Maximum altitude: 10,000 feet (28°C (82.4°C) with derating)
- Relative humidity: 20% to 80% RH, maximum dewpoint = 21°C (69.8°F)
- Electric power (absolute maximum)
 - H06: 5.5 kW
 - H13: 7.5 kW

Acoustical category 1B

- H06: 5.2 bels
- H13: 7.4 bels

Capacity of exhaust

- 2100 cubic meters/hr (1235 CFM) normal room
- 2900 cubic meters/hr (1700 CFM)

Ambient > 28°C or altitude > 3000 feet

Acoustical noise level (nominal conditions):

Principal Configuration: Model H06

- Declared A-Weighted Sound Power Level, LWAd(B) = 7.3
- Declared A-Weighted Sound Pressure Level, LpAm(dB) = 55

Maximum Configuration: Model H13

- Declared A-Weighted Sound Power Level, LWAd(B) = 7.5
- Declared A-Weighted Sound Pressure Level, LpAm(dB) = 57

Leakage and Starting Current : 60 mA / 170A (less than on millisecond)

Homologation

This product is not certified for direct connection by any means whatsoever to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

Hardware requirements

The hardware requirements for the zBC12 and its features and functions are identified.

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

HMC support

The Hardware Management Console (HMC) version 2.12.1 supports the features and functions described in this announcement. The HMC version 2.12.1 also supports the systems listed in the table below.

Family	Machine type	Firmware driver	SE version
zBC12	2828	15	2.12.1
zEC12	2827	15	2.12.1
zEC12	2827	12	2.12.0
z196	2817	93	2.11.1
z114	2818	93	2.11.1
z10 EC	2097	79	2.10.2
z10 BC	2098	79	2.10.2
z9® EC	2094	67	2.9.2
z9 BC	2096	67	2.9.2
z990	2084	55	1.8.2
z890	2086	55	1.8.2
z900	2064	3G	1.7.3
z800	2066	3G	1.7.3

Common Cryptographic Architecture (CCA) enhancements: When the Crypto Express PCIe adapter is configured as a CCA coprocessor, the cryptographic enhancements identified in this announcement apply to the following:

Family	Machine type	Firmware driver	SE version
zBC12	2828	15	2.12.1
zEC12	2827	15	2.12.1
z196	2817	93 MCL	2.11.1
z114	2818	93 MCL	2.11.1

IBM Enterprise PKCS #11 (EP11) enhancements: When the Crypto Express4S PCIe adapter is configured as an EP11 coprocessor, the cryptographic enhancements identified in this announcement apply to the following:

Family	Machine type	Firmware driver	SE version
zBC12	2828	15	2.12.1
zEC12	2827	15	2.12.1

Machine Change Levels (MCLs) may be required.

Descriptions of the MCLs are available now on Resource Link .

Access Resource Link at

<http://www.ibm.com/servers/resourcelink>

MCLs are designed to be applied concurrently. Contact IBM service personnel for further information.

Peripheral hardware and device attachments

IBM devices previously attached to zEC12, z196, z114, z10 , and z9 servers are supported for attachment to zBC12 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 zBC12 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 System z FICON and FCP channels can be found in the Library, Hardware products for servers, Switches and directors qualified for IBM System z FICON and FCP channels section of Resource Link .

<http://www.ibm.com/servers/resourcelink/>

Software requirements

IBM zEnterprise BC12 (zBC12) requires at a minimum:

- z/OS V2.1.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with required maintenance (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with required maintenance (2).

After September 30, 2013, an extended support contract for z/OS V1.10 will be required. Contact your IBM representative for details.

- z/VM V6.3 with PTFs.
- z/VM V6.2 with PTFs.
- z/VM V5.4 with PTFs.
- z/VSE V5.1 with PTFs.
- z/VSE V4.3 with PTFs.
- z/TPF V1.1.
- Linux on System z distributions:
 - SUSE Linux Enterprise Server (SLES): SLES 11 and SLES 10.
 - Red Hat Enterprise Linux (RHEL): RHEL 6 and RHEL 5.

For z/OS :

1. z/OS V1.11 supports zBC12. However, z/OS V1.11 support was withdrawn September 30, 2012. With the z/OS Lifecycle Extension (5657-A01), z/OS V1.11 supports the zBC12. Speak with your IBM representative for details. No exploitation of new zBC12 functions is available with z/OS V1.11. Certain functions and features of the zBC12 require later releases of z/OS . For the complete list of software support, see the PSP buckets and the software requirements listed. For more information on the IBM Lifecycle Extension for z/OS V1.11, refer to Software Announcement [ZP12-0032](#), dated April 11, 2012 .
2. z/OS V1.10 supports zBC12. However, z/OS V1.10 support was withdrawn September 30, 2011. With the z/OS Lifecycle Extension (5656-A01), z/OS V1.10 supports the zBC12. Speak with your IBM representative for details. No exploitation of new zBC12 functions is available with z/OS V1.10. Certain functions and features of the zBC12 require later releases of z/OS . For the complete list of software support, see the PSP buckets and the software requirements listed. For more information on the IBM Lifecycle Extension for z/OS V1.10, refer to Software Announcement [ZP11-0006](#), dated February 15, 2011 . After September 30, 2013, an extended support contract for z/OS V1.10 will be required. Contact your IBM representative for details.

LPAR enhancement to provide physical capacity limit enforcement requires at a minimum:

- z/OS V2.1 with PTFs.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs.
- z/VM V6.3 with PTFs.

Exploitation of 2 GB pages requires at a minimum:

- z/OS V2.1.
- z/OS V1.13 with the z/OS V1.13 RSM Enablement Offering web deliverable and PTFs installed. The web deliverable is available at <http://www.ibm.com/systems/z/os/zos/downloads/>

IBM zAware (#0011) requires at a minimum:

- z/OS V2.1.
- z/OS V1.13 with PTFs.

Note: z/OS V1.13 LPARs on prior server generations (for example, z196, z114, or z10) can provide data to the IBM zAware LPAR if PTFs are installed and the LPAR is configured to exploit IBM zAware.

Flash Express (#0402) requires at a minimum:

- z/OS V2.1.
- z/OS V1.13 with PTFs and the z/OS V1.13 RSM Enablement Offering web deliverable installed. The web deliverable is available at <http://www.ibm.com/systems/z/os/zos/downloads/>
- Linux on System z distributions:
 - SLES 11 SP3.
 - RHEL 6.4.

zEDC Express (#0420) for compression acceleration requires at a minimum:

- z/OS V2.1 with PTFs and the zEDC for z/OS feature.
- z/OS V1.13 with PTFs (software decompression support only).
- z/OS V1.12 with PTFs (software decompression support only).

For availability of support for SMF log data refer to the [Planned availability date](#) section.

10GbE RoCE Express (#0411) requires at a minimum:

- z/OS V2.1 with PTFs.
- z/OS V1.13 with PTFs (compatibility support only).
- z/OS V1.12 with PTFs (compatibility support only).
- Linux on System z distributions:
 - IBM is working with its Linux distribution partners to include support in future Linux on System z distribution releases.

Crypto Express CCA enhancements when the PCIe adapter is configured as CCA coprocessor (supported on zBC12 and select zEC12, z196, and z114 servers): Export TDES key under AES transport key, Diversified Key Generation CBC, IPEK, RKX key wrapping method, and Integration of UDX into CCA require at a minimum:

- z/OS V2.1 with the Cryptographic Support for z/OS V1R13-z/OS V2R1 web deliverable (FMID HCR77A1).

- z/OS V1.13 with the Cryptographic Support for z/OS V1R13-z/OS V2R1 web deliverable (FMID HCR77A1).
- z/VM V6.3 for guest exploitation.
- z/VM V6.2 with PTFs for guest exploitation.
- z/VM V5.4 with PTFs for guest exploitation.

Crypto Express4S (#0865) EP11 enhancements when the Crypto Express4S PCIe adapter is configured as an EP11 coprocessor (supported on zBC12 and select zEC12 servers) PKCS #11 v2.1 PSS, EP11 Key agreement algorithms, and Offload Generation of Domain Parameters require at a minimum:

- z/OS V2.1 with the Cryptographic Support for z/OS V1R13-z/OS V2R1 web deliverable (FMID HCR77A1).
- z/OS V1.13 with the Cryptographic Support for z/OS V1R13-z/OS V2R1 web deliverable (FMID HCR77A1).
- z/VM V6.3 for guest exploitation.
- z/VM V5.4 with PTFs for guest exploitation.

Crypto Express4S (#0865) exploitation including Enterprise Security PKCS #11-Hardware Security Module (HSM), DUKPT for MAC and Data Encryption, Cipher Text Translate CCA Verb, PKDS/TKDS Constraint Relief, Random Number Cache, FIPS on Demand, and Wrapping Keys with Strong Keys requires at a minimum:

- z/OS V2.1.
- z/OS V1.13 with the Cryptographic Support for z/OS V1R12-V1R13 web deliverable (FMID HCR77A0).
- z/OS V1.12 with the Cryptographic Support for z/OS V1R12-V1R13 web deliverable (FMID HCR77A0).
- z/VM 6.3 for guest exploitation.
- z/VM 5.4 with PTFs for guest exploitation.

Crypto Express4S (#0865) toleration, which treats Crypto Express4S cryptographic coprocessors and accelerators as Crypto Express3 coprocessors and accelerators, requires at a minimum:

- z/OS V2.1 with PTFs.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with either the Cryptographic Support for z/OS V1R9-V1R11 web deliverable (FMID HCR7770) and PTFs; or the Cryptographic Support for z/OS V1R10-V1R12 web deliverable (FMID HCR7780) and PTFs; or the Cryptographic Support for z/OS V1R11-V1R13 web deliverable (FMID HCR7790) and PTFs.
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with either the Cryptographic Support for z/OS V1R9-V1R11 web deliverable (FMID HCR7770) and PTFs or the Cryptographic Support for z/OS V1R10-V1R12 web deliverable (FMID HCR7780) and PTFs.
- z/VM V6.3 for guest exploitation.
- z/VM 5.4 with PTFs for guest exploitation.
- z/VSE V5.1 with PTFs.
- Linux on System z distributions:
 - SLES 11 SP1 (maintenance update) and SLES 10 SP4 (maintenance update).
 - RHEL 6.2 and RHEL 5.8.
 - For secure-key cryptography with Linux on System z , CCA 4.2 is available. For details see

<http://www.ibm.com/security/cryptocards/pciicc/ordersoftware.shtml>

Crypto Express3 (#0864, #0871) toleration, if carried forward, requires at a minimum:

- z/OS V1.12 with PTFs.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3 for guest exploitation.
- z/VM 5.4 with PTFs for guest exploitation.
- z/VSE 5.1 with PTFs.
- z/VSE 4.3 with PTFs.
- Linux on System z distributions:
 - SLES 11 SP1 (maintenance update).
 - SLES 10 SP4 (maintenance update).
 - RHEL 6.2.
 - RHEL 5.8.

For secure-key cryptography with Linux on System z , CCA 4.2 is available. For details refer to

<http://www.ibm.com/security/cryptocards/pciicc/ordersoftware.shtml>

24k subchannel support for FICON Express8S, FICON Express8, and FICON Express4 features when defined as CHPID type FC requires at a minimum:

- z/OS V2.1 with PTFs.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V5.4.
- Linux on System z distributions:
 - SLES 11 and SLES 10.
 - RHEL 6 and RHEL 5.

T10-DIF support by the FICON Express8S and FICON Express8 features when defined as CHPID type FCP on zEC12, zBC12, z196, and z114 requires at a minimum:

- z/VM 6.2 for guest exploitation.
- z/VM 5.4 with PTFs for guest exploitation.
- Linux on System z distributions:
 - SLES11 SP2 (DIF and DIX).
 - RHEL 6.4 (DIF only).

FICON Express8S (CHPID type FC) (#0409, #0410) when utilizing FICON or Channel-To-Channel (CTC), requires at a minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V5.4.
- z/VSE V5.1.

- z/VSE V4.3.
- z/TPF V1.1.
- Linux on System z distributions:
 - SLES 11 and SLES 10.
 - RHEL 6 and RHEL 5.

GRS FICON CTC toleration requires at a minimum:

- z/OS V2.1.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs.
- z/OS V1.11 with the Lifecycle Extension for z/OS 1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS 1.10 with PTFs (2).

FICON Express8S (CHPID type FC) (#0409, #0410) for support of zHPF single-track operations requires at a minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3 for guest exploitation.
- z/VM 6.2 with PTFs for guest exploitation.
- Linux on System z distributions:
 - SLES 11 SP1.
 - RHEL 6.

FICON Express8S (CHPID type FC) (#0409, #0410) for support of zHPF multitrack operations requires at a minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3 for guest exploitation.
- z/VM V6.2 with PTFs for guest exploitation.
- Linux on System z distributions:
 - SLES 11 SP2.
 - RHEL 6.1.

FICON Express8S (CHPID type FCP) (#0409, #0410) for support of SCSI devices requires at a minimum:

- z/VM V5.4 with PTFs.
- z/VSE V5.1.
- z/VSE V4.3.
- Linux on System z distributions:
 - SLES 11 and SLES 10.
 - RHEL 6 and RHEL 5.

FICON Express8S (CHPID type FCP) (#0409, #0410) support of hardware data router requires at a minimum:

- z/VM V6.3 for guest exploitation.
- Linux on System z distributions:
 - SLES 11 SP3.
 - RHEL 6.4.

OSA-Express5S GbE LX (#0413) and GbE SX (#0414) require at minimum:

CHPID type OSD with exploitation of two ports per CHPID:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3.
- z/VM V6.2 with PTFs.
- z/VM V5.4 with PTFs.
- z/VSE V5.1.
- z/VSE V4.3.
- z/TPF V1.1 PUT 5.
- Linux on System z distributions:
 - SLES 11 and SLES 10 SP2.
 - RHEL 6 and RHEL 5.2.

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

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3.
- z/VM V6.2 with PTFs.
- z/VM V5.4.
- z/VSE V5.1.
- z/VSE V4.3.
- z/TPF V1.1 PUT 5.
- Linux on System z distributions:
 - SLES 11 and SLES 10.
 - RHEL 6 and RHEL 5.

OSA-Express5S 10 GbE LR (#0415) and 10 GbE SR (#0416) require at a minimum:

CHPID type OSD:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.

- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3.
- z/VM V6.2 with PTFs.
- z/VM V5.4.
- z/VSE V5.1.
- z/VSE V4.3.
- z/TPF V1.1 PUT 5.
- Linux on System z distributions:
 - SLES 11 and SLES 10.
 - RHEL 6 and RHEL 5.

CHPID type OSX for access control to the intraensemble data network (IEDN) from zBC12 to Unified Resource Manager functions:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3 to define, modify, and delete OSX CHPID types when z/VM is the controlling LPAR for dynamic I/O.
- z/VM 6.2 with PTFs.
- z/VM V5.4 with PTFs to define, modify, and delete OSX CHPID types when z/VM is the controlling LPAR for dynamic I/O.
- z/VSE V5.1.
- z/TPF V1.1 PUT 8.
- Linux on System z distributions:
 - SLES 11 SP1 (maintenance update) and SLES 10 SP4.
 - RHEL 6 and RHEL 5.6.

OSA-Express5S 1000BASE-T Ethernet (#0417) requires at minimum:

CHPID type OSC supporting TN3270E and non-SNA DFT with exploitation of two ports per CHPID:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V5.4.
- z/VSE V5.1.
- z/VSE V4.3.

CHPID type OSD with exploitation of two ports per CHPID requires at minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3.

- z/VM V6.2 with PTFs.
- z/VM V5.4 with PTFs.
- z/VSE V5.1.
- z/VSE V4.3.
- z/TPF V1.1 PUT 5.
- Linux on System z distributions:
 - SLES 11 and SLES 10 SP2.
 - RHEL 6 and RHEL 5.2.

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

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3.
- z/VM V6.2 with PTFs.
- z/VM V5.4.
- z/VSE V5.1.
- z/VSE V4.3.
- z/TPF V1.1 PUT 5.
- Linux on System z distributions:
 - SLES 11 and SLES 10.
 - RHEL 6 and RHEL 5.

CHPID type OSE supporting 4 or 2 ports per feature requires at minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V5.4.
- z/VSE V5.1.
- z/VSE V4.3.

CHPID type OSM for intranode management network (INMN) requires at minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3 to define, modify, and delete OSX CHPID types when z/VM is the controlling LPAR for dynamic I/O.
- z/VM 6.2.
- z/VM V5.4 with PTFs to define, modify, and delete CHPID type OSM when z/VM is the controlling LPAR for dynamic I/O.
- Linux on System z distributions:
 - SLES 11 SP2 and SLES 10 SP4 (maintenance update).

- RHEL 6 and RHEL 5.2.

CHPID type OSN for OSA-Express for NCP (does not use ports; all communication is LPAR-to-LPAR) requires at minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V5.4.
- z/VSE V5.1.
- z/VSE V4.3.
- z/TPF V1.1.
- Linux on System z distributions:
 - SLES 11 and SLES 10.
 - RHEL 6 and RHEL 5.

12x InfiniBand (12x IFB) coupling links (#0171, #0163) and 1x InfiniBand (1x IFB) coupling links (#0170, #0168) require at a minimum:

- z/OS V2.1.
- z/OS V1.13.
- z/OS V1.12.
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).

Exploitation of CFCC Level 19 requires at a minimum:

- z/OS V2.1 with PTFs.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs.
- z/VM V6.3 for guest exploitation.
- z/VM V6.2 with PTFs for guest exploitation.
- z/VM V5.4 with PTFs for guest exploitation.

CFCC Level 19 Coupling Thin Interrupts requires at a minimum:

- z/OS V2.1 with PTFs.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs.

Runtime Instrumentation requires at a minimum:

- Linux on System z distributions:
 - SLES 11 SP3.
 - RHEL 6.4.

Transactional Execution requires at a minimum:

- Linux on System z distributions:
 - SLES 11 SP3.
 - RHEL 6.4.

Java exploitation of Transactional Execution requires at a minimum:

- IBM 31-bit and 64-bit SDK7 for z/OS Java Technology Edition, Version 7 SR3 (5655-W43 and 5655-W44)
- IBM Java 7 SR3 with Linux on System z distributions:
 - SLES 11 SP3.
 - RHEL 6.4.

z/OS XL C/C++ exploitation of zBC12 or zEC12 machine instructions using ARCH (10) or TUNE (10) parameters requires at a minimum:

- z/OS V2.1 with the XL C/C++ feature.
- z/OS V1.13 with the XL C/C++ feature and PTFs.

Exploitation of zBC12 or zEC12 machine instructions using High Level Assembler requires at a minimum:

- z/OS V2.1 with PTFs.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs. z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V5.4 with PTFs.

CPU Measurement Facility requires at a minimum:

- z/OS V2.1.
- z/OS V1.13 with PTFs.
- z/OS V1.12 with PTFs
- z/OS V1.11 with the Lifecycle Extension for z/OS V1.11 with PTFs (1).
- z/OS V1.10 with the Lifecycle Extension for z/OS V1.10 with PTFs (2).
- z/VM V6.3.
- z/VM V6.2 with PTFs.
- Linux on System z distributions:
 - SLES 11 SP3.
 - RHEL 6.4.

Planning information

Cable orders

Cabling responsibilities

Fiber optic cables, cable planning, labeling, and placement are all customer responsibilities for new installations and upgrades. Fiber optic cables cannot be ordered as features. Installation Planning Representatives (IPRs) and System Service Representatives (SSRs) will not perform the fiber optic cabling tasks without a services contract.

The following tasks are required to be performed by the customer prior to machine installation:

- All fiber optic cable planning.
- All purchasing of correct fiber optic cables.
- All installation of any required Conversion Kits.
- All routing of fiber optic cables to correct floor cutouts for proper installation to server.

- Use the Physical Channel Identifier (PCHID) report or the report from the Channel Path Identifier (CHPID) Mapping Tool to accurately route all cables.
- All labeling of fiber optic cables with PCHID numbers for proper installation to server.
- Use the PCHID report or the report from the CHPID Mapping Tool to accurately label all cables.

Additional service charges may be incurred during the server installation if the above cabling tasks are not accomplished as required.

For further details, refer to the *Installation Manual for Physical Planning (IMPP)*, available on Resource Link .

Refer also to *Planning for Fiber Optic Links, GA23-1406*, available on Resource Link .

Installability

The average installation time for a zBC12 is approximately 11 installer hours. This does not include planning hours. This assumes the Pre-Installation Configuration Service, 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 zBC12 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.

Global Technology Services

Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.

IBM Electronic Services

Electronic Service Agent™ and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support all at no additional cost to you.

Now integrated into the base operating system of AIX 5.3, AIX 6.1, and AIX 7.1, Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM , which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type "smitty esa_main", and select "Configure Electronic Service Agent ." In addition, ESA now includes a powerful web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent , refer to

<http://www.ibm.com/support/electronic>

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

Benefits

Increased uptime: The Electronic Service Agent tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting and uploading system information to IBM Support. This can translate to less wasted time monitoring the "symptoms," diagnosing the error, and manually calling IBM Support to open a problem record. Its 24x7 monitoring and reporting mean no more dependence on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

Security: The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM . The Electronic Service Agent tool securely transmits via either the Internet (HTTPS or VPN) or modem, and can be configured to communicate securely through gateways to provide customers a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a customer's system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. It is viewable only by the customer and IBM . The customer's business applications or business data is never transmitted to IBM .

More accurate reporting: Since system information and error logs are automatically uploaded to the IBM Support center in conjunction with the service request, customers are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM , problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

Customized support: Using the IBM ID entered during activation, customers can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Support website at

<http://www.ibm.com/support/electronic>

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent . Reports are available for any system associated with the customer's IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Electronic Service Agent information that has been collected from their system, customers are able to see search results that apply specifically to their systems.

For more information on how to utilize the power of IBM Electronic Services, contact your IBM Systems Services Representative, or visit

<http://www.ibm.com/support/electronic>

Terms and conditions

Warranty period

One year

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. 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 effective on its date of installation. 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.

Extended Warranty Service

Warranty service

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend on the time of your call, machine technology and redundancy, and availability of parts. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine's standard warranty service.

CRU and On-site Service

At IBM's discretion, you will receive specified CRU service, or 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 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.

- IBM Onsite Repair, Same Business Day 6 hours average Onsite Response Time, 24 hours per day, 7 days a week

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.

There are no warranty service upgrades.

Warranty service upgrades

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.

Maintenance service offerings

This machine is eligible under Terms and Conditions of the IBM ServiceSuite® (SSU) or the IBM Enterprise Service Agreement (ESA), or under the IBM Maintenance Agreement. Consult your IBM representative for details.

The maintenance service offerings are as follows:

- IBM Onsite Repair, Same Business Day Onsite Response Time, 9 hours per day, Monday through Friday excluding holidays, Latest Call Registration 12:00.
- ESA & SSU customers will receive 2 hours coverage extensions for no charge: IBM Onsite Repair, Same Business Day Onsite Response Time, 11 hours per day, Monday through Friday excluding holidays, Latest Call Registration 12:00.
- IBM Onsite Repair, Same Business Day Onsite Response Time, 18 hours per day, Monday through Saturday excluding holidays, Latest Call Registration 18:00.
- IBM Onsite Repair, Same Business Day 6 hours average Onsite Response Time, 24 hours per day, 7 days a week.

Committed Services (CS) For service options with a committed level of service or any other special service option, contact your IBM representative. Refer to the following European documents:

- Announcement Letter ZS03-0150 for IBM Customer Agreement (ICA)
- Announcement Letter ZS04-0135 for Enterprise Agreement Contract
- Announcement Letter ZS98-0118 for ServiceSuite Contract
- Hardware Maintenance Operational Guides and Service Level Code Description Table available at

<http://www-5.ibm.com/services/europe/maintenance/>

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 the local IBM office.

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

http://www.ibm.com/systems/support/machine_warranties/machine_code.html

Specific Machine LIC Type Model

2828-H06

Terms for use of IBM zAware: The terms for use of IBM zAware are specified in the IBM Customer Agreement, Attachment for the IBM zAware Offering (in the US, form number Z125-8993-US). Each enterprise is required to sign this contract one time within a given country before IBM will accept an order for its first-ever instance of the IBM zAware enablement feature (feature #0011).

Elliptical Curve Cryptography technology (ECC) is included with the zEnterprise BC12 cryptography features. This technology is delivered through the machine's Licensed Internal Code, and requires license terms in addition to the standard IBM License Agreement for Machine Code (LMC) referenced above. These additional terms are delivered through the LMC's Addendum for Elliptical Curve Cryptography, which is available at

http://www.ibm.com/systems/support/machine_warranties/machine_code_cryptadd.html

The terms of this ECC Addendum are included with the LMC when a cryptography feature is included in the zEnterprise BC12 order, or when a cryptography feature is carried forward as part of an MES order into zEnterprise BC12.

Acceptance-By-Use Machine: No

Machine Code License Acceptance Requirement

The Machine Code license requires signed acceptance by the machine's end user directly with IBM, applicable to orders for a new machine, machine type conversion MES, and machines transferred to another user.

Prices

For all local charges, contact your IBM representative.

IBM Global Financing

IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, from both IBM and other manufacturers or vendors. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization or visit

<http://www.ibm.com/financing>

IBM Global Financing offerings are provided through IBM Credit LLC in the United States, and other IBM subsidiaries and divisions worldwide to qualified commercial and government customers. Rates are based on a customer's credit rating, financing terms, offering type, equipment type, and options, and may vary by country. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice.

Financing solutions from IBM Global Financing can help you stretch your budget and affordably acquire the new product. But beyond the initial acquisition, our end-to-end approach to IT management can also help keep your technologies current, reduce costs, minimize risk, and preserve your ability to make flexible equipment decisions throughout the entire technology lifecycle.

Announcement countries

All European, Middle Eastern, and African countries except Iran, Sudan, and Syria.

Trademarks

zEnterprise, z10, Processor Resource/Systems Manager, PR/SM, PowerVM, IBM SmartCloud, IMS, Smarter Planet and Electronic Service Agent are trademarks of IBM Corporation in the United States, other countries, or both.

IBM, System z10, BladeCenter, System z, DB2, WebSphere, z/VM, Express, FICON, z/OS, GDPS, z/Architecture, zSeries, System Storage, DS8000, Resource Link, z/VSE, Parallel Sysplex, AIX, POWER7, System x, CICS, DataPower, Sysplex Timer, System z9, Redbooks, ESCON, z9 and ServiceSuite are registered trademarks of IBM Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Intel is a trademark of Intel Corporation or its subsidiaries in the United States and other countries.

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

Microsoft and Windows are trademarks of Microsoft Corporation 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. Reference to other products in this announcement does not necessarily imply those products are announced, or intend to be announced, in your country. Additional terms of use are located at

<http://www.ibm.com/legal/us/en/>

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

<http://www.ibm.com/planetwide/>

Corrections

(Corrected on October 15, 2013)

Revisions were made in the "Description" and "Software requirements" sections.

(Corrected on August 15, 2013)

Revisions were made in the "Statement of general direction" and "Standards" sections.

(Corrected on July 29, 2013)

In the Prices section, the "Init/MES" entry for feature 9001 was changed.