



# IBM zEnterprise EC12 enhancements enable data, cloud, and security-ready capabilities

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## At a glance

Smarter Computing is the IBM® approach and vision for the IT infrastructure for the future. It is understood that with Smarter Computing new technologies in the market today are transforming business. An IT infrastructure must be able to empower an organization to unleash new innovation through mastering big data, building the most efficient and flexible cloud, and securing it all. Smarter Computing requires an optimized infrastructure that is designed to allow you to energize your applications through integration, improved performance, and networking innovations. Smarter Computing is also designed to help you save money with consolidation opportunities and compression acceleration, securing it all with confidence using a trusted and resilient infrastructure. Smarter Computing requires the powerful, hybrid offering from System z®, the IBM zEnterprise™ System.

Today we are introducing enhancements to the IBM zEnterprise EC12 (zEC12), the IBM zEnterprise BladeCenter® Extension (zBX) Model 003, and the IBM zEnterprise Unified Resource Manager (zManager) to help strengthen the core attributes of zEnterprise - today's modern mainframe.

### Energizing your applications

- zManager enhancements
  - **CPU management** for the IBM BladeCenter HX5 (7873) blade in the zBX Model 003 for increased policy-driven workload management
  - **Availability management** for monitoring and reporting availability of workloads spanning virtual servers in logical partitions, on HX5 blades, and on PS701 blades
- z/OS® V2.1 Shared Memory Communications over Remote Direct Memory Access (SMC-R) and a new high-speed networking link, 10GbE RoCE Express® , a great combination helping to transparently optimize z/OS server-to-server communications in a multiple-CPC environment, and z/OS LPAR-to-LPAR communications in a single-server environment, with reduced latency and lower CPU overhead than traditional TCP/IP communications
- Technology refresh for Ethernet environments with OSA-Express5S

### Helping you save money

- LPAR absolute hardware capacity setting to limit an LPAR to a specific amount of hardware processor capacity, designed to offer improved granularity and flexibility for non-z/OS systems.
- IBM zEnterprise Data Compression (zEDC) for z/OS V2.1 and the zEDC Express feature, designed to support a new data compression function that provides high-

performance, low-latency compression without significant CPU overhead. Refer to the [Planned availability date](#) section.

- Increased number of subchannels per FICON® port; now up to 24k from 16k to support more base and alias devices.
- Coupling Thin Interrupts to help improve the efficiency of environments where shared engines are used as Coupling Facilities.

### Securing it all

- 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
- EAL5+ Common Criteria certification for the zEC12

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## Overview

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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, we recognize 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.

Today we are announcing enhancements to the zEnterprise EC12. Compression acceleration is now available for SMF log data using the zEDC Express feature, which offers fast, policy-based compression when used with the zEnterprise Data Compression (zEDC) feature for z/OS V2.1. There is a technology refresh for the Ethernet environment with the introduction of OSA-Express5S. And, in support of a new z/OS server-to-server communications capability, we are introducing the 10GbE RoCE Express feature, which is designed to deliver reduced latency and lower CPU overhead compared to traditional TCP/IP communications.

Security and availability are cornerstones of System z servers, which offer unmatched resiliency and availability. We are enhancing Public Key Cryptography Standards for digital signatures with additional cryptographic algorithms and introducing the Trusted Key Entry 7.3 level of Licensed Internal Code (LIC) with migration wizard updates to help simplify initialization functions. We are also announcing a new exploiter for Flash Express, the Coupling Facility, for improved resilience for MQ shared queues. Coupling Thin Interrupts is designed to improve service times for shared engine Coupling Facilities, and to help improve the response time for asynchronous CF operations.

In support of our commitment to the hybrid computing environment, we are announcing enhancements to the zBX Model 003 and zManager, which were communicated on August 28, 2012. Businesses with a zBX Model 003 are now able

to support performance policy management of service levels for System x® blades. A new zManager management area, Ensemble Availability Management, is designed to offer alert and notification capability for blade virtual servers to help promote continuous operations.

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## Key prerequisites

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

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## Planned availability date

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September 20, 2013

- Features and functions for the zEC12
- Common Cryptographic Architecture (CCA) enhancements on zEC12
- TKE 7.3 LIC (#0872) on zEC12, IBM zEnterprise 196 (z196), and IBM zEnterprise 114 (z114)
- Hardware Management Console (#0092) on zEC12 and zBX Model 003

September 30, 2013

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

October 31, 2013

- MES features for zEC12 Models H20, H43, H66, H89, and HA1
  - zEDC Express (#0420)
  - 10GbE RoCE Express (#0411)
  - OSA-Express5S (#0413, #0414, #0415, #0416, #0417)

Fourth quarter 2013

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

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## Description

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The zEnterprise System remains a perfect fit for Smarter Computing - a premier solution for centrally managing your data and enterprise cloud environments as well as continuing to provide you a platform for large-scale consolidation and growth.

Today's announcements for the zEC12 are designed to provide:

- Capacity limit enforcement with an LPAR enhancement
- Support for 2 GB pages for middleware performance improvements
- 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

To wrap it all up, the IBM zEnterprise EC12 has received Common Criteria certification at EAL5+.

### **LPAR enhancement to provide physical capacity limit enforcement**

Processor Resource/Systems Manager™ ( PR/SM™ ) and the Hardware Management Console 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**

zEC12, zBC12, 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/Advanced Management 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/Advanced Management Firmware Suite (#0020) are exclusive to the zEC12 and zBC12 servers. 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](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

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

**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**

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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**

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**Ignore Messages support:** When a new workload is added to a system being monitored by IBM System z Advanced Workload Analysis Reporter (IBM zAware), or moved to a different system, it often generates messages that are not recognized by 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 will not be a part of the IBM zAware analysis and scoring.

IBM zAware is designed to use near real-time continuous learning algorithms, providing a diagnostics capability intended to help you quickly pinpoint problems, which in turn, can help you to more rapidly address service disruptions. Refer to Hardware Announcement [112-155](#), 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, #0101, #0102) enhancement is exclusive to the zEC12 and zBC12 and is supported by z/OS. Refer to the [Software requirements](#) section. The latest driver is required. Refer to the [Hardware requirements](#) section.

## **Compression acceleration for resource optimization with zEDC Express**

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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 [213-292](#), dated July 23, 2013.

The zEDC Express feature (#0420) is exclusive to the zEC12 and zBC12 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**

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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 zEC12 and zBC12 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**

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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 are designed to deliver greater physical security, as well as the essential features and functions 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 zEC12 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**

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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 (RXX) 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 RXX 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 by z/VM for guest exploitation. Refer to the [Hardware requirements](#) and [Software requirements](#) sections.

### **IBM Enterprise PKCS #11 (EP11) enhancements**

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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:** 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)**

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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. The latest driver is required. Refer to the [Hardware requirements](#) section.
- **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 a user is 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 specifies that either 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 security enhancements for the zEC12 can be found at

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

## **Channel subsystem enhancement**

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**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 zEC12 and the zBC12 and applies to the FICON Express8S, FICON Express8, and 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**

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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 zEC12, zBC12, 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**

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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 zEC12 and to zBC12. 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 zEC12 and zBC12. 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.

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## **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 that 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 zEC12 and zBC12, and to z/OS . Refer to the [Software requirements](#) section.

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## **PR/SM on the zEC12 received Common Criteria certification at EAL5+**

IBM Processor Resource/Systems Manager ( PR/SM ) on the IBM zEnterprise EC12, with Driver Level D12K, was certified effective February 19, 2013, at Evaluation Assurance Level (EAL) 5+. Common Criteria (CC) certification at EAL5+ provides assurance that many disparate applications running in different operating environments in separate logical partitions on one IBM zEnterprise EC12 server will be secure and distinct from each other. The zEnterprise EC12 servers now join the IBM zEnterprise 196 and IBM zEnterprise 114 servers, and previous IBM mainframes, as the world's only servers with the highest level of hardware security certification, Common Criteria Evaluation Assurance Level 5+.

The certification, BSI-DSZ-CC-0846-2013, is listed on BSI's website

[https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Zertifizierung/Reporte08/0846a\\_pdf.html](https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Zertifizierung/Reporte08/0846a_pdf.html)

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## **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](http://www.ibm.com/able/product_accessibility/index.html)

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

zEnterprise EC12 servers are capable on delivery, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act of 1973, 29 U.S.C. Section 794d, as implemented by 36 C.F.R. Part 1194, provided that any Assistive Technology used with the product properly interoperates with it.

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## **Product positioning**

The IBM zEnterprise EC12 is designed to deliver new levels of performance and capacity for large-scale consolidation and growth. IBM zEnterprise continues

to provide a smarter business infrastructure through augmentation of IBM zEnterprise Unified Resource Manager (zManager), which is designed to virtualize and manage all resources of a System z ensemble as a single pool of resources, integrating system and workload management across the multisystem, multitier, multiarchitecture environment.

Support of select IBM System x blades in the zBX allows 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 zEC12 is designed for analytics with its ability to efficiently store, manage, retrieve, and analyze vast amounts of data for business insight without unnecessary cost or complexity. The zEC12 continues our concentrated focus on security and encryption, seeking to protect data that is at rest or in transit across the network. IBM zAware and Flash Express are designed to deliver new creative availability solutions. The zEDC Express feature, a new compression accelerator, is designed to allow higher write rates for SMF data when hardware compression is enabled. The 10GbE RoCE Express feature expands the alternatives for your networking fabric and z/OS LPAR-to-LPAR communications, helping to reduce latency with potentially lower processor overhead than traditional TCP/IP communications.

zEC12 continues to focus on energy efficiencies in the data center with options for water cooling and high-voltage dc power as well as the non-raised floor option.

The zEC12 supports heterogeneous platform requirements with the updated zBX Model 003 and zManager, allowing the zEC12 to extend management strengths to other systems and workloads running on AIX® on POWER7® , Linux on IBM System x , and Microsoft Windows on IBM System x .

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## Statement of general direction

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**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 [213-328](#), 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 zEnterprise EC12 and 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 DFSMSshm:** IBM intends to provide exploitation of the zEDC Express feature for DFSMSdss and DFSMSshm 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 zEnterprise BC12, 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 (#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 - zEnterprise BC12). 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 [912-144](#), 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.

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## Reference information

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Refer to the following associated announcements:

Hardware Announcement [113-121](#), dated July 23, 2013

Software Announcement [213-292](#), dated July 23, 2013

Software Announcement [213-297](#), dated July 23, 2013

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## Product number

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Description	Machine type	Model	Feature
IBM zEnterprise EC12	2827	H20 H43 H66 H89 HA1	

Automate FW IBM System x Bl	0071
HMC	0092
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
TKE workstation	0842
TKE 7.3 LIC	0872

Description	Machine type	Model	Feature
zBX HMC	2458	003	0092
IBM zEnterprise 114	2818	M05 M10	
TKE 7.3 LIC			0872
IBM zEnterprise 196	2817	M15 M32 M49 M66 M80	
TKE 7.3 LIC			0872

### Feature conversions

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#### z196 (2817) to zEC12 (2827) zBX Model 003 and zManager conversions

From		To		Description
M/T	FC	M/T	FC	
2817	0046	2827	0071	Adv Mgmt FW System x Blade (#0046) Automate FW IBM System x Bl (#0071)

#### zEC12 (2827) to zEC12 (2827) zBX Model 003 and zManager conversion

From		To		Description
M/T	FC	M/T	FC	
2827	0053	2827	0071	Adv Mgmt FW System x Blade (#0053) Automate FW IBM System x Bl (#0071)

### Business Partner information

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If you are a Direct Reseller - System Reseller acquiring products from IBM , you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=113-119>

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## 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
zEC12 Installation Manual for Physical Planning	GC28-6914
zEC12 System Overview	SA22-1088
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
ZBX Safety Inspection	GC28-6889
Service Guide for TKE Workstations	GC28-6901
zEC12 Safety Inspection	GC28-6912
zEC12 Installation Manual	GC28-6913
zEC12 Service Guide	GC28-6915
License Agreement for Machine Code	SC28-6872
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
zEC12 Parts Catalog	GC28-6916
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 EC12 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®

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The following Redbooks publications are available now:

Title	Order number
IBM System z Connectivity Handbook	SG24-5444
IBM zEnterprise EC12 Technical Guide	SG24-8049

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

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<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.

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## Services

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### IBM Systems Lab Services and Training

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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 current business requirements and strategic initiatives, as well as your System z plans and objectives. If you are interested in engaging the team, contact [systemz@us.ibm.com](mailto: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](mailto: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>

### **IBM Global Technology Services - IBM Facilities Cabling Services**

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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](mailto: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>

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## Services

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### **Global Technology Services**

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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.

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## Technical information

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### **Specified operating environment**

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

#### ***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 (#0413, #0414, #0415, #0416, #0417) 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)

#### **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)

### **Operating environment**

#### **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 zEC12 and its features and functions are identified. **A new driver level is required.**

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

#### **HMC support**

The new functions available on the Hardware Management Console (HMC) version 2.12.1 are 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
zEC12	2827	15	2.12.1
zEC12	2827	12	2.12.0
zBC12	2828	15	2.12.1
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

## **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 zEC12 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 zEC12 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 EC12 (zEC12)** 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 [212-025](#), 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 [211-002](#), dated February 15, 2011 . After September 30, 2013, z/OS V1.12 will require extended support.

**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 they have the PTFs installed and are configured to exploit IBM zAware.

**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 require 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 V6.3 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 the 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 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.

**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).

**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 with PTFs to define, modify, and delete CHPID type OSM 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.

**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**

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### ***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 zEC12 is approximately 22 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***

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The zEC12 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.

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## **IBM Electronic Services**

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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**

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***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 either via 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

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## Terms and conditions

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***MES discount applicable***

No

***Field installable feature***

Yes

***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.

## Customer setup

No

## Machine code

Same license terms and conditions as base machine

## Optional features warranty period

- Optional features - One year

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## Prices

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For all local charges, contact your IBM representative.

Description	Mach type	Mod	Feat	**	EW Fe	MMMC Ind	Init/ MES
IBM zEnterprise EC12	2827	H20		**		X	
		H43		**		X	
		H66		**		X	
		H89		**		X	
		HA1		**		X	
Automate FW IBM System x B1			0071	**			Both
HMC			0092	**			Both
10GbE RoCE Express			0411	**			Both
OSA-Express5S GbE LX			0413	**			Both
OSA-Express5S GbE SX			0414	**			Both
OSA-Express5S 10 GbE LR			0415	**			Both
OSA-Express5S 10 GbE SR			0416	**			Both
OSA-Express5S 1000BASE-T			0417	**			Both
ZEDC Express			0420	**			Both
TKE workstation			0842	**			Both
TKE 7.3 LIC			0872	**			Both

Description	Mach type	Mod	Feat	**	EW Fe	MMMC Ind	Init/ MES
zBX HMC	2458	003	0092	**			Both
IBM zEnterprise 114	2818	M05					
		M10					
TKE 7.3 LIC			0872	**			Both
IBM zEnterprise 196	2817	M15					
		M32					
		M49					
		M66					
		M80					
TKE 7.3 LIC			0872	**			Both

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## **Corrections**

### **(Corrected on October 15, 2013)**

Revisions were made to the "Product number," "Description," and "Software requirements" sections.

### **(Corrected on August 15, 2013)**

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