Faster data access with FICON Express8 for System z10

At a glance

The future does run on System z®, and with today's introduction of new features for the storage area network (SAN), we are delivering faster access to your data with significantly increased performance and a link data rate of 8 gigabits per second (Gbps) for the System z10 Enterprise Class (z10 EC) and System z10 Business Class (z10 BC) servers. With Common Criteria Evaluation Assurance Level 5 (EAL5) certification for the z10 BC servers received May 4, 2009, we are continuing to deliver security for operating systems and applications in logical partitions. The z10 EC servers received EAL5 certification October 29, 2008.

The newest generation of FICON® features for the z10 EC and z10 BC servers, FICON Express8 10KM LX and FICON Express8 SX, are designed to support a link rate of 8 Gbps with autonegotiation to 2 or 4 Gbps to support existing devices for added investment protection.

FICON Express8 may also allow for the consolidation of existing FICON Express, FICON Express2, and FICON Express4 channels onto fewer FICON Express8 channels while maintaining and enhancing performance.

High Performance FICON for System z now supports multitrack operations along with the IBM® System Storage™ DS8000™ series. Support of multitrack operations can help increase system performance and improve FICON channel efficiency.

FICON Express8 performance improvements for native FICON, High Performance FICON for System z (zHPF), and Fibre Channel Protocol (FCP) ensure the System z10 servers continue to allow your systems to grow as your business grows.

With FICON Express8 operating at 8 Gbps, performance improvements for small data transfer I/O operations can help provide optimizations for online transaction processing (OLTP) workloads -- diverse business functions including order entry, inventory tracking, hotel reservations; applications such as DB2®, VSAM, PDSE, and zFS which transfer small blocks of fixed size data (4K blocks).

- For small data transfer I/O operations that can exploit the zHPF protocol, laboratory measurements reflected a 70% increase in maximum I/Os per second compared to a FICON Express4 channel operating at 4 Gbps.
- For small data transfer I/O operations using native FICON or FCP, laboratory measurements reflected a 40% increase in maximum I/Os per second compared to a FICON Express4 channel operating at 4 Gbps.

With FICON Express8 operating at 8 Gbps, performance improvements for large sequential I/O operations can help reduce the duration of your backup/copy operations.

- Using the zHPF protocol or FCP, laboratory measurements reflected an 80 to 100% increase in maximum MB/sec when processing large sequential read or write I/O operations compared to a FICON Express4 channel operating at 4 Gbps.
- Using the native FICON protocol, laboratory measurements reflected a 45 to 55% increase in maximum MB/sec when processing large sequential read or write I/O operations compared to a FICON Express4 channel operating at 4 Gbps.

Resource Measurement Facility (RMF™) has been enhanced to support FICON Express8. RMF is an IBM product designed to simplify management of single and multiple system workloads. RMF gathers data and creates reports that help your system programmers and administrators optimally tune your systems, react quickly to system delays, and diagnose performance problems.

EAL5 certification of IBM Processor Resource/Systems Manager™ (PR/SM™) logical partition (LPAR) for the z10 BC servers was received May 4, 2009. EAL5 certification provides assurance that many disparate applications running in different operating environments in separate logical partitions on one z10 BC will be secure and distinct from each other. The z10 BC servers now join the z10 EC 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 System z10 servers represent the continuing commitment to the evolution of the mainframe while laying the foundation for future growth.

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

Today, businesses are facing intensified challenges economically, socially, and from the competition. In this time of rapid change, organizations need to lay a foundation that will not only address these challenges but also pave the way for new business opportunities and growth.

New expectations are being set for breakthrough innovation, accelerated value creation, and increased throughput. In order to achieve these objectives, it is time to start thinking differently about infrastructure. That is why IBM has developed a strategy for a Dynamic Infrastructure® that will help organizations address higher service expectations, rising cost pressures, as well as new risks and threats. It also lays a foundation for dramatic increases in productivity and the increased flexibility needed to achieve the faster pace demanded by a smarter planet.

At the heart of a Dynamic Infrastructure is the need to get to data fast and to scale with business demands and growth. The new generation of FICON -- FICON Express8 -- is designed to provide faster access to data with a link data rate of 8 gigabits per second (Gbps) and also to provide the ability to autonegotiate to 2 or 4 Gbps, offering investment protection for existing infrastructures -- servers, switches, directors, storage devices, printers. With its performance improvements, FICON Express8 may also provide opportunities for growth of your FICON infrastructure when you are limited by availability of I/O slots. You may be able to "do more with less."

Key prerequisites

Refer to the Hardware requirements and Software requirements sections of this announcement.

Planned availability dates

- July 31, 2009: New build systems and MES orders
- August 21, 2009: FICON support of System Storage DS8000 series for zHPF multitrack operations

Description

Getting ready for an 8 Gbps SAN infrastructure with FICON Express8

With the introduction of FICON Express8 on the System z10 EC and System z10 BC family of servers, you now have additional growth opportunities for your storage area network (SAN). FICON Express8 supports a link data rate of 8 gigabits per second (Gbps) and autonegotiation to 2 or 4 Gbps for synergy with existing switches, directors, and storage devices. With support for native FICON, High Performance FICON for System z (zHPF), and Fibre Channel Protocol (FCP), the System z10 servers enable you to position your SAN for even higher performance -- helping you to prepare for an end-to-end 8 Gbps infrastructure to meet the increased bandwidth demands of your applications.

High performance FICON for System z -- improving upon the native FICON protocol: The FICON Express8 features support High Performance FICON for System z (zHPF) which was introduced in October 2008 on the System z10 servers. zHPF provides optimizations for online transaction processing (OLTP) workloads. zHPF is an extension to the FICON architecture and is designed to improve the execution of small block I/O requests. zHPF streamlines the FICON architecture and reduces the overhead on the channel processors, control unit ports, switch ports, and links by improving the way channel programs are written and processed. zHPF-capable channels and devices support both native FICON and zHPF protocols simultaneously (CHPID type FC).

High Performance FICON for System z now supports multitrack operations: zHPF support of multitrack operations can help increase system performance and improve FICON channel efficiency when attached to the IBM System Storage DS8000 series. zFS, HFS, PDSE, and other applications that use large data transfers with Media Manager are expected to benefit.

In laboratory measurements, multitrack operations (for example, reading 16x4k bytes/IO) converted to the zHPF protocol on a FICON Express8 channel achieved a maximum of up to 40% more MB/sec than multitrack operations using the native FICON protocol.

zHPF and support for multitrack operations is exclusive to the System z10 servers and applies to all FICON Express8, FICON Express4, and FICON Express2 features (CHPID type FC). Exploitation is required by z/OS® and the control unit. Refer to the Software requirements section.

zHPF with multitrack operations is available in the DS8000 series Licensed Machine Code (LMC) level 5.4.3.xx (bundle version 64.3.xx.xx) or later with the purchase of DS8000 series feature #7092.

Previously, zHPF was limited to read or write sequential I/Os transferring less than a single track size (for example, 12 4k byte records or 12x4k bytes/IO). Refer to Hardware Announcement 109-431, dated July 14, 2009.

FICON Express8 performance improvements for zHPF and native FICON on the System z10 servers: A FICON Express8 channel exploiting the High Performance FICON for System z (zHPF) protocol, when operating at 8 Gbps, is designed to achieve a maximum throughput of up to 800 MBps when processing large sequential read I/O operations and up to 730 MBps when processing large sequential write I/O operations. This represents an 80 to 100% increase in performance compared to a FICON Express4 channel operating at 4 Gbps on a System z10 server. For those large sequential read or write I/O operations that

use the native FICON protocol, the FICON Express8 channel, when operating at 8 Gbps, is designed to achieve up to 510 MBps. This represents a 45 to 55% increase compared to a FICON Express4 channel operating at 4 Gbps on a System z10 server.

The FICON Express8 channel, when operating at 8 Gbps, is also designed to achieve a maximum of 52,000 IO/sec for small data transfer I/O operations that can exploit the zHPF protocol. This represents approximately a 70% increase compared to a FICON Express4 channel operating at 4 Gbps and executing zHPF I/O operations on System a z10 server. For those small data transfer I/O operations that use the native FICON protocol, the FICON Express8 channel, when operating at 8 Gbps, is designed to achieve a maximum of 20,000 IO/sec, which represents approximately a 40% increase compared to a FICON Express4 channel operating at 4 Gbps on a System z10 server. The FICON Express8 features support both the native FICON protocol and the zHPF protocol concurrently in the server Licensed Internal Code.

These measurements for FICON (CHPID type FC) using both the native FICON and zHPF protocols are examples of the maximum MB/sec and IO/sec that can be achieved in a laboratory environment using one FICON Express8 channel on a System z10 server with z/OS V1.10 and no other processing occurring and do not represent actual field measurements. Details are available upon request.

FICON Express8 performance at 2 or 4 Gbps link data rate -- it may be time to migrate to a FICON Express8 channel: Performance benefits may be realized by migrating to a FICON Express8 channel and operating at a link data rate of 2 or 4 Gbps. If you migrate now, you may be able to realize performance benefits when your SAN is not yet 8 Gbps-ready.

In laboratory measurements using the zHPF protocol with small data transfer I/O operations, FICON Express8 operating at 2 Gbps achieved a maximum of 47,000 IO/sec, compared to the maximum of 52,000 IO/sec achieved when operating at 4 Gbps or 8 Gbps. This represents approximately a 50% increase compared to a FICON Express4 channel operating at 2 Gbps on a System z10 server.

In laboratory measurements using the native FICON protocol with small data transfer I/O operations, FICON Express8 operating at 2 Gbps or 4 Gbps achieved a maximum of 20,000 IO/sec, which represents approximately a 40% increase compared to a FICON Express4 channel operating at 2 Gbps or 4 Gbps on a System z10 server.

In laboratory measurements using FCP with small data transfer I/O operations, FICON Express8 operating at 4 Gbps, compared to FICON Express4 operating at 4 Gbps, achieved a maximum of 84,000 IO/sec, which represents approximately a 40% increase compared to a FICON Express4 channel operating at 4 Gbps on a System z10 server.

FICON Express8 performance improvements for FCP on the System z10 servers: The FICON Express8 FCP channel, when operating at 8 Gbps, is designed to achieve a maximum throughput of up to 800 MBps when processing large sequential read I/O operations and up to 730 MBps when processing large sequential write I/O operations. This represents an 80 to 100% increase compared to a FICON Express4 FCP channel operating at 4 Gbps on System z10.

The FICON Express8 FCP channel is designed to achieve a maximum of 84,000 IO/sec when processing read or write small data transfer I/O operations. This represents approximately a 40% increase compared to a FICON Express4 FCP channel when operating at 4 Gbps on a System z10 server.

These measurements for FCP (CHPID type FCP supporting attachment to SCSI devices) are examples of the maximum MB/sec and IO/sec that can be achieved in a laboratory environment, using one FICON Express8 channel on a System z10 server with z/VM® V5.4 or Linux® on System z distribution Novell SUSE SLES 10 with no other processing occurring, and do not represent actual field measurements. Details are available upon request.

FICON Express8 for channel consolidation: FICON Express8 may also allow for the consolidation of existing FICON Express, FICON Express2, or FICON Express4

channels onto fewer FICON Express8 channels while maintaining and enhancing performance.

To request assistance for ESCON® or FICON channel consolidation analysis using the zCP3000 tool, contact your IBM representative. They will assist you with a capacity planning study to estimate the number of FICON channels that can be consolidated onto FICON Express8. They can also assist you with ESCON to FICON channel migration.

Resource Measurement Facility (RMF): RMF has been enhanced to support FICON Express8. RMF is an IBM product designed to simplify management of single and multiple system workloads. RMF gathers data and creates reports that help your system programmers and administrators optimally tune your systems, react quickly to system delays, and diagnose performance problems. RMF may assist you in understanding your capacity requirements. RMF output is used by the zCP3000 tool to assist with your channel consolidation potential.

FICON end-to-end data integrity checking: FICON Express8 continues the unparalleled heritage of data protection with its native FICON, zHPF, and channel-to-channel (CTC) intermediate data checking and end-to-end data integrity checking for all devices (such as disk and tape), which is transparent to operating systems, middleware, and applications. With end-to-end data integrity checking, Cyclical Redundancy Check (CRC) is generated at the end points for quality of service. This applies to CHPID type FC.

Fibre Channel Protocol (FCP) transmission data checking: FICON Express8 continues the transmission data checking for an FCP channel (communicating with SCSI devices) with its full-fabric capability. FCP performs intermediate data checking for each leg of the transmission. This applies to CHPID type FCP.

FICON Express8 10KM LX and SX: The System z10 servers continue to support your current fiber optic cabling environments with the introduction of FICON Express8.

1. FICON Express8 10KM LX (#3325), with four channels per feature, is designed to support unrepeated distances up to 10 kilometers (6.2 miles) over 9 micron single mode fiber optic cabling without performance degradation. To avoid performance degradation at extended distance, FICON switches or directors (for buffer credit provision) or Dense Wavelength Division Multiplexers (for buffer credit simulation) may be required.
2. FICON Express8 SX (#3326), with four channels per feature, is designed to support 50 or 62.5 micron multimode fiber optic cabling.

For details regarding the unrepeated distances for FICON Express8 10KM LX and FICON Express8 SX refer to *System z Planning for Fiber Optic Links* (GA23-0367) available on System z10 servers at planned availability in the "Library" section of Resource Link™.

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

All channels on a single FICON Express8 feature are of the same type -- 10KM LX or SX.

Both features support small form factor pluggable optics (SFPs) with LC Duplex connectors. The optics continue to permit each channel to be individually serviced in the event of a fiber optic module failure.

The FICON Express8 features, designed for connectivity to servers, switches, directors, disks, tapes, and printers, can be defined as:

- Native FICON, zHPF, and FICON channel-to-channel (CTC) (CHPID type FC)
- Fibre Channel Protocol (CHPID type FCP for communication with SCSI devices)

The FICON Express8 features are exclusive to z10 EC and z10 BC servers. Refer to the Software requirements section for operating system support for CHPID types FC and FCP.

Cleaning discipline for FICON Express8 fiber optic cabling

With the introduction of 8 Gbps link data rates, it is even more critical to ensure your fiber optic cabling infrastructure performs as expected. With proper fiber optic cleaning and maintenance, you can be assured that the "data gets through."

With 8 Gbps link data rates over multimode fiber optic cabling, link loss budgets and distances are reduced. Single mode fiber optic cabling is more "reflection sensitive." With high link data rates and single mode fiber optic cabling there is also less margin for error. The cabling is no longer scratch-tolerant and contaminants such as dust and oil can present a problem.

To keep the data flowing, proper handling of fiber trunks and jumper cables is critical as well as thorough cleaning of fiber optic connectors. Work with your data center personnel or IBM personnel to ensure you have fiber optic cleaning procedures in place.

Information regarding related Global Technology Services offerings is available at the following Web site

   http://www-935.ibm.com/services/us/index.wss/offering/its/a1027996

The Optimized Airflow Assessment for Cabling reviews existing data center cabling and prioritizes tactical plans across the data center to help increase system availability, adapt to changing technologies and transmission protocols, and reduce energy-related cooling costs through optimized airflow.

   http://www-935.ibm.com/services/us/index.wss/offering/its/a1028860

The Facilities Cabling Services - fiber transport system helps lower the operating cost of the data center, supports the highest level of availability for an IT infrastructure, and allows the latest technologies and transmission protocols to be transported, while reducing clogs of unstructured cabling under floor tiles.

If you need further support or assistance on this matter please send an e-mail to cabling@us.ibm.com with your request.

EAL5 certification for System z10 Business Class server

As of May 4, 2009, the IBM System z10 Business Class (z10 BC) servers joined previous IBM mainframes as the world's only servers with the highest level of hardware security certification -- Common Criteria Evaluation Assurance Level 5 (EAL5) -- for its logical partitions (LPARs).

The EAL5 ranking gives you confidence that you can host many disparate applications running on different operating systems -- z/OS, z/VM, z/VSE™, z/TPF, and Linux on System z. Even when the applications contain confidential data, such as payroll, human resources, e-commerce, ERP, and CRM systems, you can be assured that a z10 BC server divided into logical partitions keeps each application's data secure and distinct from the others.

The z10 BC server architecture is designed to prevent the flow of information among logical partitions on a single system. All businesses that currently trust their critical business transactions to the IBM mainframe, as well as government agencies who deal with national security issues, can benefit from the privacy certification received by the z10 BC servers. The z10 EC servers received EAL5 certification October 29, 2009.

Accessibility by people with disabilities

A U.S. 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

Section 508 of the U.S. Rehabilitation Act

System z10 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.

Product positioning

The future does run on System z. The System z10 server's quad-core processor chip represents a revolution in the IBM System z family of products. The quad-core processor chip allows expanded scalability, and when combined with larger memory capacity, faster internal bandwidth, and more subcapacity options, the System z10 EC and System z10 BC servers are positioned to offer greater growth for your business and enable consolidation on a new level. Businesses of all sizes are able use the mainframe to run traditional workloads as well as new applications with hundreds or thousands of virtual servers in a single energy-efficient server.

FICON Express8, with its increased performance and its support of a link data rate of 8 gigabits per second (Gbps), provides connectivity to servers, directors, switches, and devices (control units, disk, tape, printers) in a storage area network (SAN). Investment protection with your current infrastructure is assured; each port/channel is capable of autonegotiating to 2 Gbps, 4 Gbps, or 8 Gbps and is designed to provide existing channels increased throughput compared to FICON Express4, FICON Express2, or FICON Express channels. FICON Express8 is also designed to support cascading (the connection of two FICON Directors in succession) to help reduce implementation costs for business continuity and disaster recovery applications. FICON Express8 provides a foundation for future growth of your FICON infrastructure and faster access to your data.

Additionally, in April 2009 IBM announced support of Linux on System z (Novell SUSE SLES 10 SP2) on IBM XIV Storage System -- a revolutionary open disk system that represents the next generation of high-end disk storage, offering self-tuning and self-healing for consistently high performance and reliability as well as management simplicity and lower total costs.

The XIV Storage System is compatible (4 Gbps link data rate) with the System z10 FICON Express8 channel (CHPID type FCP for attachment to SCSI devices) when attached to a supported FICON/FCP director or switch. System z10, FICON Express8, and Linux on System z (in an LPAR or as a z/VM guest) combined with the phenomenal capabilities of XIV Storage System can help support today's fast-growing, dynamic environments.

Requisites, code levels, restrictions, and further information regarding XIV Storage System can be found at

http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD105187

Product number

Description	Machine type	Model	Feature
System z10 EC	2097	E12	

```
                                          E26
                                          E40
                                          E56
                                          E64
      FICON Express8 10KM LX                       3325
      FICON Express8 SX                            3326

                                   Machine
      Description                    type    Model  Feature

      System z10 BC                  2098     E10

      FICON Express8 10KM LX                       3325
      FICON Express8 SX                            3326
```

Business Partner information

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=109-417

Education support

Visit the following Web site for additional information

   http://www.ibm.com/training/us

Call IBM IT Education Services at 800-IBM-TEACH (426-8322) for catalogs,
schedules, and enrollments.

Publications

The following publications have been updated and are available now in the "Library"
section of Resource Link:

```
        Title                        Order number

z10 EC Installation Manual - Physical   GC28-6865
Planning (IMPP)
z10 BC Installation Manual - Physical   GC28-6875
Planning (IMPP)
System z10 PR/SM Planning Guide         SB10-7153
z10 EC System Overview                  SA22-1084
z10 BC System Overview                  SA22-1085
System z Functional Matrix              ZSW0-1335
```

The following publications are shipped with the product. They have been updated
and are available in the "Library" section of Resource Link.

```
        Title                        Order number

z10 EC Installation Manual              GC28-6864
z10 EC Service Guide                    GC28-6866
z10 BC Installation Manual              GC28-6874
z10 BC Service Guide                    GC28-6878
```

The following publications have been updated and will be available at planned
availability in the "Library" section of Resource Link:

```
        Title                        Order number

System z Planning for Fiber Optic Links   GA23-0367
System z Maintenance Information for      SY27-2597
Fiber Optic Links
System z Fiber Optic Cleaning Procedure   SY27-2604
```

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System z Fibre Channel Connection        SA24-7172
(FICON) I/O Interface Physical Layer
```

Publications for the System z10 servers can be obtained at Resource Link by accessing the following Web site

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.

The following Redbook has been updated and is available now.

```
        Title                          Order number
```

```
FICON Implementation Guide             SG24-6497
```

For other IBM Redbooks® publications, refer to

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

Services

Global Technology Services

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

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

For details on available services, contact your IBM representative or visit

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

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

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

For details on education offerings related to specific products, visit

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

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

Technical information

Specified operating environment

Physical specifications

The FICON Express8 features have the following characteristics:

FICON Express8 10KM LX (#3325)

- Data rate: 2, 4, or 8 Gbps
- Defined as: CHPID types FC (native FICON, zHPF, CTC) and FCP (communication with SCSI devices)
- Connector type: LC Duplex
- Port count: Four channels per feature

- Cable type: Single mode fiber optic cabling (9 micron)

FICON Express8 SX (#3326)

- Data rate: 2, 4, or 8 Gbps
- Defined as: CHPID types FC (native FICON, zHPF, CTC) and FCP (communication with SCSI devices)
- Connector type: LC Duplex
- Port count: Four channels per feature
- Cable type: Multimode fiber optic cabling (50 or 62.5 micron)

For details regarding the unrepeated distances for FICON Express8 10KM LX and FICON Express8 SX refer to *System z Planning for Fiber Optic Links* (GA23-0367) available on System z10 at planned availability in the "Library" section of Resource Link.

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

Standards

The FICON Express8 features are designed to conform to the following standards:

- Fibre Channel Single-Byte Command Code Sets-3 (FC-SB-3). The INCITS 374-2003, Information Technology - Fibre Channel Single-Byte Command Code Sets-3 (FC-SB-3) standard describes the channel mapping protocol associated with the Single-Byte Command Code Sets. This standard was developed by Task Group T11 of Accredited Standards Committee INCITS during 2002-2003. The standards approval process started in 2002. SB-3 is a mapping protocol, referred to as an FC-4. An FC-4 is a mapping protocol that maps a particular Upper Level Protocol (ULP) instance to Fibre Channel. The SB-3 ULP is based on the SB-2 ULP, which is based on the Single-Byte Command Code Set.
- Fibre Channel - Framing and Signaling (FC-FS). The INCITS 373, Information Technology - Fibre Channel - Framing and Signaling (FC-FS) standard provides a general transport vehicle for Upper Level Protocols (ULPs) (for example, Small Computer System Interface (SCSI) command sets, Internet Protocol (IP), and others).
- FCP - Fibre Channel Protocol. The ANSI INCITS Project 1144D "Fibre Channel Protocol for SCSI, Second Version (FCP-2)" is the FCP analogy to FC-SB-3 and describes the mapping of SCSI onto Fibre Channel.
- Fibre Channel-Physical Interface-4 (FC-PI-4) revision 8.00 to INCITS.

Hardware requirements

You should review the PSP buckets for minimum Machine Change Levels (MCLs) and software PTF levels before IPLing operating systems. To support new functions and features, MCLs are required.

Descriptions of the MCLs are available now through Resource Link.

Access Resource Link at

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

Select:

   Fixes, Hardware, Exception Letters
   Click on *System z10 EC* or *System z10 BC*
   Click on *Driver 76 Customer Exception Letter*

The most recent driver information is at the top of the list.

Peripheral hardware and device attachments

IBM devices previously attached to IBM System z9® and zSeries® servers are supported for attachment to System z10 channels, unless otherwise noted. The subject I/O devices must meet ESCON or FICON/FCP architecture requirements 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 System z10 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.

Software requirements

Listed are the operating system minimum versions and releases. Select the releases appropriate to your operating system environments.

Note: Refer to the z/OS, z/VM, and z/VSE subsets of the 2097DEVICE and 2098DEVICE Preventive Service Planning (PSP) buckets prior to installing a System z10.

IBM Lifecycle Extension for z/OS V1.7:z/OS V1.7 support was withdrawn September 30, 2008. The Lifecycle Extension for z/OS V1.7 (5637-A01) makes fee-based corrective service for z/OS V1.7 available through September 2010. With the Lifecycle Extension, z/OS V1.7 supports the System z10 servers (z10 EC, z10 BC). Certain functions and features of the z10 servers require later releases of z/OS. For the complete list of software support, see the PSP buckets. For more information on the IBM Lifecycle Extension for z/OS V1.7, refer to Software Announcement 208-283, dated August 12, 2008.

FICON Express8 (CHPID type FC) when utilizing native FICON or Channel-To-Channel (CTC) on the z10 EC and z10 BC servers requires at a minimum:

- z/OS V1.7 with the IBM Lifecycle Extension for z/OS V1.7 (5637-A01).
- z/VM V5.3.
- z/VSE V4.1
- z/TPF V1.1.
- TPF V4.1 at PUT 16.
- Linux on System z distributions:
    - Novell SUSE SLES 9, SLES 10, and SLES 11.
    - Red Hat RHEL 4 and RHEL 5.

FICON Express8 (CHPID type FC) for support of zHPF single-track operations on the z10 EC and z10 BC servers requires at a minimum:

- z/OS V1.8, V1.9, or V1.10 with PTFs.
- z/OS V1.7 with the IBM Lifecycle Extension for z/OS V1.7 (5637-A01) with PTFs.
- Linux on System z distributions:
    - IBM is working with its Linux distribution partners to include support in future Linux on System z distribution releases.

FICON Express8 (CHPID type FC) for support of zHPF multitrack operations on the z10 EC and z10 BC servers requires at a minimum:

- z/OS V1.9 and V1.10 with PTFs.

FICON Express8 (CHPID type FCP) for support of SCSI devices on the z10 EC and z10 BC servers requires at a minimum:

- z/VM V5.3.
- z/VSE V4.1.
- Linux on System z distributions:
  - Novell SUSE SLES 9, SLES 10, and SLES 11.
  - Red Hat RHEL 4 and RHEL 5.

Planning information

Customer responsibilities

Information on customer responsibilities for site preparation can be found in the "Library" section of Resource Link at

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

Cable orders

Fiber optic cable orders

Fiber optic cables for the z10 EC, z10 BC, z9™ EC, z9 BC, z990, and z890 are available from IBM Site and Facilities Services.

IBM Site and Facilities Services has a comprehensive set of scalable solutions to address IBM cabling requirements, from product-level to enterprise-level. The IBM Facilities Cabling Services - fiber transport system and the IBM IT Facilities Assessment, Design, and Construction Services - optimized airflow assessment for cabling, offered by IBM Site and Facilities Services, provides services for small, medium, and large enterprises:

- Assessment and planning for IBM Fiber Transport System (FTS) trunking components
- Planning and installation services for individual fiber optic connections

IBM Global Technology Services has the expertise and personnel available to effectively plan and deploy the appropriate cabling with the future in mind. These services may include assessment, planning, consultation, cable selection, installation, and documentation, depending upon the services selected.

These services are designed to be right-sized for your products or the end-to-end enterprise, and to take into consideration the requirements for all of the protocols and media types supported on the System z10, System z9, and zSeries (for example, ESCON, FICON, Coupling Links, OSA) whether the focus is the data center, the storage area network (SAN), the local area network (LAN), or the end-to-end enterprise.

IBM Site and Facilities Services are designed to deliver convenient, packaged services to help reduce the complexity of planning, ordering, and installing fiber optic cables. The appropriate fiber cabling is selected based upon the product requirements and the installed fiber plant.

The services are packaged as follows:

Under **IBM Facilities Cabling Services** there is the option to provide IBM Fiber Transport System (FTS) trunking commodities (fiber optic trunk cables, fiber harnesses, panel-mount boxes) for connecting to the z10 EC, z10 BC, z9 EC, z9 BC, z990, and z890. IBM can reduce the cable clutter and cable bulk under the floor. An analysis of the channel configuration and any existing fiber optic cabling is performed to determine the required FTS trunking commodities. IBM can also help organize the entire enterprise. This option includes enterprise planning, new cables, fiber optic trunking commodities, installation, and documentation.

Under IBM IT Facilities Assessment, Design, and Construction Services there is the option to provide the Optimized Airflow Assessment for Cabling to provide you with a comprehensive review of your existing data center cabling infrastructure.

This service provides an expert analysis of the overall cabling design required to help improve data center airflow for optimized cooling, and to facilitate operational efficiency through simplified change management.

See the Planning information section of this announcement for more information or contact IBM Global Technology Services for details.

Refer to the "Services" section of Resource Link for further details. Access Resource Link at

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

Cabling responsibilities

Fiber optic cables, cable planning, labeling, and placement are all customer responsibilities for new installations and upgrades. Fiber optic conversion kits and Mode Conditioning Patch (MCP) cables are not orderable as features on a z10 EC and z10 BC. 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 Mode Conditioning Patch (MCP) 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.

Fiber Quick Connect (FQC), a fiber harness integrated in the z10 EC and z10 BC frame for "quick" connect, is offered as a feature on the z10 EC and z10 BC for connection to ESCON and FICON LX channels.

Cables for ICB links continue to be available as features. Refer to the "Special features" section of the *Sales Manual* on the Web for a list of these features and cables for ICB links.

http://www.ibm.com/common/ssi/OIX.wss

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

Note: IBM Site and Facilities Services can satisfy your fiber optic as well as your copper cabling requirements.

Security, auditability, and control

The z10 EC and z10 BC use 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.

IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

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

Terms and conditions

MES discount applicable

No

Field installable feature

Yes

Warranty period

One year

This feature assumes the same warranty or maintenance terms as the machine in which it is installed for the full warranty or maintenance period announced for such machine.

Customer setup

No

Machine code

Same license terms and conditions as base machine

Prices

 14

For all charges, contact your IBM representative.

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                         Mach                MMMC    Init/
Description              type  Mod Feat ** indicat MES

System z10 EC            2097  E12           X
                              E26           X
                              E40           X
                              E56           X
                              E64           X

FICON Express8 10KM LX         3325 **           Both
FICON Express8 SX              3326 **           Both


                         Mach                MMMC    Init/
Description              type  Mod Feat ** indicat MES

System z10 BC            2098  E10           X

FICON Express8 10KM LX         3325 **      Both
FICON Express8 SX              3326 **      Both
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** If field installed on a purchased machine, parts removed or replaced become the property of IBM and must be returned.

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