

The future runs on System z10, the future begins today



## IBM System z10 Enterprise Class



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### Highlights

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- **Unprecedented capacity and virtualization to meet consolidation needs**
- **Specialty engines offer an attractive alternative when running new workloads**
- **Improvements connecting to data and the network can help provide faster access to data**
- **Enhanced accuracy to a time External Time Source**
- **Just-In-Time deployment of resources**

### The future runs on System z

In today's world, IT is woven in to almost everything that a business does and consequently is pivotal to a business. Yet technology leaders are challenged to manage sprawling, complex distributed infrastructures and the ever growing flow of data while remaining highly responsive to the demands of the business. And they must continually evaluate and decide when and how to adopt a multitude of innovations to keep the company competitive. The IBM System z10™ Enterprise Class (z10 EC) can help to reset the economics of IT and can dramatically improve operational efficiency. It also can help reduce and control rising costs and improve provisioning speed and data center security and resiliency—at any scale. It will allow you to be highly responsive to any user need. And it aligns technology and business—giving you the freedom and the tools you need to innovate and be competitive. IBM System z® is an excellent choice as the foundation for a highly responsive infrastructure.

The z10 EC™ delivers a world class enterprise server designed to meet all the challenges of today's world and be a cornerstone in your dynamic architecture by delivering superior business and IT services with agility and speed. The server provides new levels of performance and capacity for growth and large scale consolidation, improved security, resiliency and availability to reduce risk and introduces just in time resource deployment to help respond to changing business requirements. As environmental concerns raise the focus on energy consumption, the z10 EC is designed to reduce energy usage and save floor space when consolidating distributed servers. Specialty engines continue to help users expand the use of the mainframe for a broad set of applications, while helping to lower the cost of ownership. The z10 EC is at the core of the enhanced System z platform that delivers technologies that businesses need today along with a foundation to drive future business growth.

### **Leadership virtualization and consolidation**

z/VM® is the brain behind the software side of mainframe virtualization technology. z/VM supports test and development servers running side by side on the same hardware as production. This can help to improve resource utilization and offer significant operational benefits as well. You may be able to deploy new servers in minutes, expediting your response to market fluctuations. z/VM may even help reduce the need for server and storage hardware, software licensing, floor space and utilities through consolidation. And workload consolidation can help to balance IT budget spending.

The z10 EC is designed to reduce energy usage by greater than 80% and save floor space by greater than 85% when used to consolidate x86 servers. With increased capacity the z10 EC virtualization capabilities can help to support hundreds or thousands of virtual servers in a single 2.83 square meters footprint. When consolidating on System z you can create virtual servers on demand; achieve network savings through HiperSockets™ (internal LAN);

provide security to enable and support new and existing applications; improve systems management of virtual servers; and most importantly, consolidate software from distributed processors to fewer consolidated processors.

### **Scale to support a changing IT world**

The z10 EC provides a record level of capacity over the previous System z servers, achieved by both increasing the performance of the individual processor cores as well as increasing the number of cores per server. The z10 EC is expected to deliver up to approximately 50% more capacity on average for a n-way processor compared to the IBM System z9® Enterprise Class (z9® EC) and approximately 70% more capacity on a fully configured server than a z9 EC Model S54, for average LSPR workloads running z/OS 1.8.

The z10 EC is built using IBM's modular multi-book design that supports one to four books per server. Each z10 EC book contains a multi-chip module

(MCM), which hosts the newly redesigned CMOS 11S cores, storage control chips and high speed interfaces for I/O. The quad core processor chip targets high frequency and was introduced at 4.4 GHz and can help improve the execution of CPU intensive workloads on the z10 EC. The memory and books will be interconnected with a point-to-point symmetric multiprocessor (SMP) network for improved performance and availability. This design approach facilitates the high-availability and dynamic capabilities that differentiate the z10 EC from other servers.

The z10 EC has the machine type of 2097, with five model offerings between 1 to 64 configurable cores and can support up to 64 cores in a single z/OS® image (with z/OS V1.9). Four models (E12, E26, E40 and E56) have 17 cores per book and the high capacity z10 EC Model E64 has one 17 core book and three 20 core books. The second two digits of the model number indicate the number of customer orderable cores available on the z10 EC—for example the E12 is a 1 to 12-way server.

Each z10 EC will have up to two spare cores and there is a graduated scale up of System Assist Processors (SAPs) used for I/O processing, depending on the number of books installed in the server. The customer orderable cores can be characterized as Central Processors (CPs); Integrated Facility for Linux (IFL) processors; System z10 Application Assist Processors (zAAPs); System z10 Integrated Information Processors (zIIPs); Internal Coupling Facility (ICF) processors; or additional SAPs. The z10 EC has subcapacity processors available on servers configured with twelve or fewer CPs.

The z10 EC Models E54 and E64 supports up to 1.5 TB of real memory. This is three times the maximum memory available on the z9 EC. The increased available memory on the server can help to benefit workloads such as DB2®, WebSphere® and Linux® that perform better with large memory configurations. In addition to the customer purchased memory, an additional 16 GB of memory is included for the Hardware System Area (HSA). The HSA holds the I/O configuration data for the server. On the z10 EC, the HSA memory is entirely fenced from customer memory.

High speed connectivity and high bandwidth out to the data and the network are critical in achieving high levels of transaction throughput and enabling resources inside and outside the server to maximize application requirements. The z10 EC has a new host bus interface with a link data rate of 6 GB using the industry standard InfiniBand® protocol to help satisfy coupling, cryptography, I/O and LAN requirements; for ICF and server-to-server connectivity, for Crypto Express2 with secure coprocessors and SSL transactions, for I/O connectivity using ESCON®, FICON® or FCP, for LAN connectivity using the OSA-Express3 Gigabit, 10 Gigabit and 1000 BASE-T Ethernet features. The High Performance FICON for System z (zHPF) brings new levels of performance when accessing data on zHPF enabled storage devices such as the IBM System Storage™ DS8000®.

The z10 EC can utilize up to four channel subsystems (CSSs), each with up to 256 channels. I/O constraint relief using Multiple Subchannel Sets (MSS) can help support larger I/O configurations.

And the DS8000 V3.1, combined with z/OS V1.10, can help address z/OS storage constraint issues by offering an Extended Address Volume (EAV) capacity to enable volume growth past the current 65,520 (55.7 GB) cylinder capacity limit. With z/OS V1.10, you will be able to define up to 262,668 cylinders (223 GB) per Extended Address Volume. The DS8000 HyperPAV function will allow dynamic, real-time scaling of I/O rates against these larger volumes.

### **Just in time deployment of IT resources**

Infrastructures must be more flexible to changing capacity requirements and provide users with just-in-time deployment of resources. Having the dedicated HSA on the z10 EC means that some preplanning configuration changes and associated outages may be avoided. IBM Capacity Upgrade on Demand (CUoD) provides a permanent increase in processing capacity that can be initiated by the customer. IBM On/Off Capacity on Demand (On/Off CoD) provides temporary capacity needed for short term spikes in capacity or for testing new applications. Capacity Backup Upgrade (CBU) can help provide reserved emergency backup capacity for multiple processor configurations.

A temporary capacity offering on the z10 EC is Capacity for Planned Events (CPE), a variation on CBU. If unallocated capacity is available in a server, it will allow the maximum capacity available to be used for planned events such as planned maintenance in a data center. The three-day CPE contract can be purchased at a fixed price.

The z10 EC introduces a new architectural approach for temporary offerings that can change the thinking about on demand capacity. One or more flexible configuration definitions can be used to solve multiple temporary situations and multiple capacity configurations can be active at once. This means that On/Off CoD can be active and up to seven other offerings can be active simultaneously. Tokens can be pre-purchased for On/Off CoD so hardware activations can be prepaid.

By having flexible and dynamic configuration definitions, when capacity is needed, activation of any portion of an offering can be done (for example activation of just two CBUs out of a definition that has four CBUs is acceptable). And if the definition doesn't have enough resources defined, an order can

easily be processed to increase the capacity (so if four CBUs aren't enough it can be redefined to be six CBUs) as long as enough server infrastructure is available to meet maximum needs.

All activations can be done without having to interact with IBM—when it is determined that capacity is required, no passwords or phone connections are necessary. As long as the total z10 EC can support the maximums that are defined, then they can be made available. Also, z10 EC feature now makes it possible to add permanent capacity while a temporary capacity is currently activated, without having to return first to the original configuration.

The activation of On/Off CoD on z10 EC can be simplified or automated by using z/OS Capacity Provisioning (available with z/OS V1.9 and above). This capability enables the monitoring of multiple systems based on Capacity Provisioning and Workload Manager (WLM) definitions. When the defined conditions are met, z/OS can suggest capacity changes for manual activation from a z/OS console or the system can add or remove temporary capacity automatically and without operator intervention.

### **Providing protection**

Protection of the IT infrastructure continues to be important. The System z10 processor chip has on board cryptographic functions. Standard clear key integrated cryptographic coprocessors provide high speed cryptography for protecting data in storage. CP Assist for Cryptographic Function (CPACF) supports DES, TDES, Secure Hash Algorithms (SHA) for up to 512 bits, Advanced Encryption Standard (AES) for up to 256 bits and Pseudo Random Number Generation (PRNG). Audit logging has been added to the TKE workstation to enable better problem tracking.

System z is investing in accelerators that provide improved performance for specialized functions. The Crypto Express2 feature for cryptography is an example. The Crypto Express2 feature can be configured as a secure key coprocessor or for Secure Sockets Layer (SSL) acceleration. The feature includes support for 14, 15, 16, 17, 18 and 19 digit Personal Account Numbers for stronger protection of data. And the tamper-resistant cryptographic coprocessor is certified at FIPS 140-2 Level 4.

In 2008, the z10 EC received Common Criteria Evaluation Assurance Level 5 (EAL5) certification for security of logical partitions. System z security is one of the many reasons why the world's top banks and retailers rely on the IBM mainframe to help secure sensitive business transactions.

### **Always available**

All day—everyday—the IT system needs to be available to support customers that need access to the company website, line of business personnel that need access to the system, application development that is constantly keeping the environment current and the IT staff that is operating and maintaining the environment. If applications are not consistently available, the business can suffer.

The z10 EC continues our commitment to deliver improvements in hardware Reliability, Availability and Serviceability (RAS) with every new System z server. These include microcode driver enhancements, dynamic segment sparing for memory as well as the fixed

HSA. The z10 EC is a server that can help keep applications up and running in the event of planned or unplanned disruptions to the system.

IBM System z servers stand alone against competition and have stood the test of time with our business resiliency solutions. Our coupling solutions with Parallel Sysplex® technology allow for greater scalability and availability. The InfiniBand Coupling Links on System z10 support high speed coupling up to 150 meters (492 feet).

The Server Time Protocol (STP) feature is designed to provide the capability for multiple servers and Coupling Facilities to maintain time synchronization with each other, without requiring a Sysplex Timer®. STP enhancements on System z10 allow for better accuracy when attaching to an External Time Source (ETS). An alternative method to obtain accurate time is from a NTP server. NTP client support is available on System z9 servers configured in a STP-only Coordinated Timing Network. System z10 offers further redundancy of the ETS by allowing the server to be configured as a Network Timer Protocol (NTP), not just an NTP client.

An important IBM offering, GDPS® is designed to provide a comprehensive end-to-end continuous availability and/or disaster recovery solution for System z servers. Now, Geographically Dispersed Open Clusters (GDOC) is designed to address this need for distributed systems. GDPS will support GDOC for coordinated disaster recovery across System z and non-System z servers if Veritas Cluster Server or Tivoli® Systems Automation Multiplatform Application Manager is already installed. GDPS and the Basic HyperSwap™ (available with z/OS V1.9) solutions help to ensure system failures are invisible to employees, partners and customers with dynamic disk-swapping capabilities that ensure applications and data are available.

**Specialty engines offer an attractive alternative**

The z10 EC continues to support the use of specialty engines that can help users expand the use of the mainframe for new workloads, while helping to lower the cost of ownership.

The zIIP is designed to support selected data and transaction processing and network workloads and thereby make the consolidation of these workloads on to System z more cost effective. Workloads eligible for the zIIP (with z/OS V1.7 or a later) include remote connectivity to DB2 to help support these workloads: Business Intelligence (BI), Enterprise Relationship Management (ERP), Customer Relationship Management (CRM) and Extensible Markup Language (XML) applications. In addition to supporting remote connectivity to DB2 (via DRDA® over TCP/IP) the zIIP also supports DB2 long running parallel queries—a workload integral to Business Intelligence and Data Warehousing solutions. A solution from IBM Global Business Services (GBS), IBM Scalable Architecture for Financial Reporting™ (SAFR), a highly efficient and scalable business intelligence reporting solution, can be enabled for the zIIP. The zIIP (with z/OS V1.8 and above) also supports IPSec processing, making the zIIP an IPSec encryption engine helpful in creating highly secure connections in an enterprise. In addition,

zIIP (with z/OS V1.10) supports select z/OS Global Mirror (formerly called Extended Remote Copy, XRC) disk copy service functions. z/OS V1.10 also introduces zIIP Assisted HiperSockets for large messages—available on System z10 servers only.

Available on System z since 2004, the zAAP is designed to support new application technologies, such as Java™ and XML and helps make running these new application technologies on z/OS more cost effective. Workloads eligible for the zAAP (with z/OS V1.8) include all Java processed via the IBM Solution Developers Kit (SDK) and XML processed locally via z/OS XML System Services.

The z10 EC offers the IFL to support Linux and open standards. Linux brings a wealth of available applications that can be run in a real or virtual environment under the z10 EC. An example is the z/VSE™ strategy which supports integration between the IFL, z/VSE and Linux on System z to help customers

integrate timely production of z/VSE data into new Linux applications, such as data warehouse environments built upon a DB2 data server.

### **Monitoring of energy consumption**

Power and cooling discussions have entered the budget planning of every IT environment. As energy prices have risen and utilities have restricted the amount of power usage, it is important to review the role of the server in balancing IT spending. To assist in energy planning, Resource Link™ provides tools to estimate server energy requirements before a new server purchase. And once the z10 EC is installed and operational, the mainframe monitoring tool, introduced on the System z9 servers, provides power and thermal information via the System Activity Display (SAD). The tool offers an energy consumption point-in-time reference. With a z10 EC, this information can be fed into IBM Systems Director Active Energy Manager™ (AEM) for Linux on System z V3.1. AEM for Linux on System z will allow tracking of trends for both the z10 EC as well as multiple server platforms. With this trend analysis, a data center administrator will

have the data to help properly estimate power inputs and more accurately plan data center consolidation or modification projects.

### **Numerical computing on the chip**

Speed and precision in numerical computing are important for all our customers. The z10 EC offers up to 10x improvement in decimal floating point instructions, because each z10 processor chip has its own hardware decimal floating point unit, designed to improve performance over that provided by the System z9. Decimal calculations are often used in financial applications and those done using other floating point facilities have typically been performed by software through the use of libraries. With a hardware decimal floating point unit some of these calculations may be done directly and accelerated.

### **Liberating your assets with System z**

Enterprises have millions of dollars worth of mainframe assets and core business applications that support the heart of the business. The convergence of SOA and mainframe technologies can help liberate these core business assets by making it easier to enrich, modernize, extend and reuse them well

beyond their original scope of design. The z10 EC, along with the inherent strengths and capabilities of a z/OS environment, provides an excellent platform for being an enterprise hub. Innovative System z software solutions from WebSphere, CICS®, Rational® and Lotus® strengthen the flexibility of doing SOA.

### **Evolving for your business**

The z10 EC is the next step in the evolution of the large scale System z mainframe, fulfilling our promise to deliver technology improvements in areas that the mainframe excels in: virtualization, scalability, security, reliability, availability, and energy efficiency. The redesigned z10 processor chip helps the z10 EC make high performance compute-intensive processing a reality. Flexibility and control over capacity gives IT the upper edge over planned or unforeseen demands. Improvements in I/O and networking allow for faster access to data. And new technologies can benefit from the inherent strengths of the mainframe. This evolving technology delivers a compelling case for the future to run on the System z10 EC.

**Benefit****Feature/Function****Availability/Reliability**

- CICS subspace group facility
- CICS subsystem storage protect
- Concurrent Book Add
- Concurrent ESCON, FICON, OSA-E and Coupling Link maintenance
- Concurrent Hardware Management Console (HMC) and Support Element
- Concurrent Licensed Internal Code (LIC) maintenance for CP, SAP, SE, PR/SM™, LPAR, HMC, OSA-E
- Concurrent power and thermal maintenance
- Dual Support Elements
- Dynamic Change to Partition Cryptographic Coprocessor Configuration
- Dynamic Channel Path Management
- Dynamic I/O Reconfiguration
- Dynamic memory sparing
- Dynamic Oscillator Switchover
- Dynamic LCSS Add
- Dynamic Subchannel Set Add
- Dynamic Partition Add
- Enhanced Application Preservation
- Enhanced Book Availability
- Enhanced Driver Maintenance
- Enhanced Dynamic Reconfiguration Management
- Enhanced Firmware Simulation
- Failure Containment for MBA
- Fault Tolerant Interconnect Design
- FICON Purge Path Extended
- FICON Express4 Pluggable Optics for individual servicing
- Fixed HSA
- Frame Bolt Down Feature
- Hybrid cooling
- Internal Battery Feature
- Multipath IPL—ESCON (CNC), FICON (FC) with z/OS
- N+1 power supply technology
- OSA-Express3 and OSA-Express2 Link Aggregation Support
- OSA-Express3 and OSA-Express2 Network Traffic Analyzer
- Partial memory restart
- Plan ahead memory
- Point to Point SMP Fabric
- QDIO Diagnostic Synchronization
- Redundant I/O Interconnect
- Remote operations support
- Sparing for Storage Protect Preservation Keys
- System Assist Processor (SAP) reassignment and sparing
- System-Initiated CHPID Reconfiguration
- Transparent CP Sparing

Benefit	Feature/Function
<b>Security</b>	<ul style="list-style-type: none"> <li>• Advanced encryption standard (AES) 128, 192, 256</li> <li>• Certified for LPAR isolation</li> <li>• Configurable Crypto Express2 (secure coprocessor or SSL acceleration)</li> <li>• CP Assist for Cryptographic Function</li> <li>• Crypto Express2 FIPS 140-2 Level 4 Certified</li> <li>• Data Encryption Standards (DES), Triple DES</li> <li>• Common Criteria Evaluation Assurance Level 5 (EAL5) certified for the security of its logical partitions</li> <li>• LDAP support for HMC user authentication</li> <li>• Open Architecture Distributed Transaction Enablement</li> <li>• Pseudo random number generator (PRNG)</li> <li>• Remote key load for ATMs</li> <li>• Secure hash algorithm-SHA1, SHA-224, SHA-256, SHA-384, SHA-512</li> <li>• Support for up to 19 digit Personal Account Numbers</li> <li>• SSL Acceleration for Linux and z/OS</li> <li>• Tamper-proof Cryptographic Support</li> </ul>
<b>Capacity on Demand</b>	<ul style="list-style-type: none"> <li>• API for Capacity Provisioning Management</li> <li>• API for On/Off CoD activation</li> <li>• Capacity Backup for both full and subcapacity CPs</li> <li>• Capacity Backup for zAAP, zIIP, IFL, ICF and SAP</li> <li>• Capacity for Planned Event (CPE)</li> <li>• Capacity Tokens for On/Off CoD</li> <li>• Capacity Upgrade on Demand</li> <li>• Customer Initiated upgrades</li> <li>• On/Off Capacity on Demand</li> <li>• More than 200 configuration records may be staged on Support Element</li> <li>• Up to eight active configurations stored on SEEPROM</li> </ul>
<b>Specialty Engines</b>	<ul style="list-style-type: none"> <li>• Integrated Facility for Linux (IFL)</li> <li>• Internal Coupling Facility (ICF)</li> <li>• System z10 Application Assist Processor (zAAP)</li> <li>• System z10 Integrated Information Processor (zIIP)</li> </ul>
<b>I/O Connectivity</b>	<ul style="list-style-type: none"> <li>• InfiniBand (IFB) host bus; 24 IFBs for I/O HCA2-C Fanout</li> <li>• IBM ESCON CTC native and basic mode</li> <li>• FCP support for SCSI devices by Linux, z/VM and z/VSE (disks)</li> <li>• Fibre Connection (FICON, zHPF) 1, 2, 4 Gbps auto-negotiation</li> <li>• Fibre Channel Protocol (FCP) 1, 2, 4 Gbps auto-negotiation</li> <li>• FICON CTC</li> <li>• FICON full duplex data transfer</li> <li>• Full fabric FCP support</li> <li>• IBM ESCON half duplex data transfer</li> <li>• Multiple Image Facility (MIF)</li> <li>• Multiple Subchannel Sets (MSS)</li> <li>• N_Port ID virtualization (NPV) for FCP</li> <li>• QDIO designed for high speed networking</li> <li>• Up to four Logical Channel SubSystems (LCSS)</li> </ul>

Benefit	Feature/Function
<b>Networking</b>	<ul style="list-style-type: none"> <li>• IBM HiperSockets IPv6</li> <li>• OSA for NCP (OSN)</li> <li>• OSA Layer 3 VMAC</li> <li>• OSA-Express3, OSA-Express2 Layer 2 Support</li> <li>• OSA-Express Integrated Console Controller (1000BASE-T Ethernet)</li> <li>• OSA-Express2 (Gigabit Ethernet, 10 Gigabit Ethernet, 1000BASE-T Ethernet)</li> <li>• OSA-Express3 (Gigabit, 10 Gigabit Ethernet, 1000BASE-T Ethernet)</li> </ul>
<b>Cluster Systems</b>	<ul style="list-style-type: none"> <li>• CFCC Level 16</li> <li>• Dynamic CF Dispatching</li> <li>• ETR – Sysplex Timer attachment (standard)</li> <li>• GDPS</li> <li>• InfiniBand Coupling links</li> <li>• Internal Coupling channel (IC)</li> <li>• Integrated Cluster Bus-4 (ICB-4)</li> <li>• InterSystem Channel-3 (Peer mode only) (ISC-3)</li> <li>• MBA and HCA-O Fanout</li> <li>• NTP Client support for STP</li> <li>• NTP Server for STP</li> <li>• Parallel Sysplex clustering technology</li> <li>• Server Time Protocol (STP)</li> <li>• Shared ICFs and CPs</li> <li>• Sysplex Distributor</li> <li>• System-Managed CF Structured Duplexing</li> <li>• Transparent ICF Sharing</li> <li>• z/VM Virtual Parallel Sysplex</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>• Compare-and-move extended</li> <li>• DB2 sort assist</li> <li>• Flexible Memory Options</li> <li>• Hardware-assisted data compression</li> <li>• Hardware Decimal Floating Point</li> <li>• HiperDispatch</li> <li>• Hipersorting</li> <li>• High Performance FICON for System z (zHPF)</li> <li>• IBM Hiperbatch™</li> <li>• IEEE binary floating point support for advanced IBM Lotus Domino® and Java performance</li> <li>• Long Displacement Facility</li> <li>• Modified Indirect Data Address Word (MIDAW) Facility</li> <li>• OSA Dynamic LAN idle</li> <li>• Performed Locked Operations for enhanced IP performance</li> <li>• Up to 1.5 TB memory</li> </ul>

Benefit	Feature/Function
<b>Management</b>	<ul style="list-style-type: none"> <li>Balanced Power Plan Ahead</li> <li>(SE) maintenance</li> <li>HMC Panel Wizard</li> <li>HMC and SE IPv6 Support</li> <li>IBM Systems Director Active Energy Manager (AEM) for Linux on System z Support</li> <li>LPAR Group Capacity Limits</li> <li>Cancel I/O Requests</li> <li>Power Monitoring Display</li> <li>Power Estimation tool</li> </ul>
<b>z/Architecture®</b>	<ul style="list-style-type: none"> <li>Intelligent Resource Director</li> <li>System z10 Processor Chip</li> <li>Superscalar Processor</li> <li>Tri-modal addressability</li> <li>Up to 60 LPARs each with 64-bit central memory addressability</li> </ul>

### IBM System z10 Enterprise Class (2097) at a glance

#### Processor core types: CP/IFL/ICF/zAAP<sup>1</sup>/zIIP<sup>1</sup>

Model	Minimum	Maximum	Increments
E12	1 / 1 / 1 / 0 / 0	12 / 12 / 12 / 6 / 6	1 / 1 / 1 / 1 / 1
E26	1 / 1 / 1 / 0 / 0	26 / 26 / 16 / 13 / 13	1 / 1 / 1 / 1 / 1
E40	1 / 1 / 1 / 0 / 0	40 / 40 / 16 / 20 / 20	1 / 1 / 1 / 1 / 1
E56	1 / 1 / 1 / 0 / 0	56 / 56 / 16 / 28 / 28	1 / 1 / 1 / 1 / 1
E64	1 / 1 / 1 / 0 / 0	64 / 64 / 16 / 32 / 32	1 / 1 / 1 / 1 / 1

#### Coupling Links

ISC-3 <sup>2</sup>	48
IC	32
ICB-4 <sup>3</sup>	16
Maximum # Links	64 <sup>4</sup>
InfiniBand Coupling Links	32

#### Channels

Minimum: 0 / 0 / 0 / 0 / 0 / 0 / 0	ESCON / FICON Express4 / FICON Express2 <sup>5</sup> / FICON Express <sup>5</sup> / OSA-Express3 / OSA-Express2
Maximum: 1024 / 336 / 336 / 120 / 96:486 / 48	ESCON / FICON Express4 / FICON Express2 <sup>5</sup> / FICON Express <sup>5</sup> / OSA-Express3 / OSA-Express2
Increments: 4 / 4 / 4 / 2 / 4 / 2 / 2 / 1	ESCON / FICON Express4 / FICON Express2 <sup>5</sup> / FICON Express <sup>5</sup> / OSA-Express3 GbE, 1000BASE-T / OSA-Express3 10 GbE / OSA-Express2 GbE, 1000BASE-T / OSA-Express2 10 GbE

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## IBM System z10 Enterprise Class (2097) at a glance

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**HiperSockets** Up to sixteen high-speed 'virtual' Local Area Networks (LANs)

**Cryptographic**<sup>7</sup>  
Crypto Express2 Optional up to 8 features (16 PCI-X adapters), minimum order is 2 features

### Processor Memory

Model	Minimum	Maximum <sup>8</sup>
E12	16 GB	384 <sup>9</sup> GB
E26	16 GB	752 GB
E40	16 GB	1136 GB
E56	16 GB	1520 GB
E64	16 GB	1520 GB

**Upgradeability** Upgradeable within the z10 EC family  
Upgrading to the E64 from other z10 EC models will require a planned outage  
Upgradeable from IBM System z9 Enterprise Class (z9 EC) and IBM eServer™ zSeries® 990 (z990)

<b>Physical Configuration</b>	Model E12, minimum <sup>10</sup>	Model E64, maximum <sup>11</sup>
Weight	1248 kg (2807 lbs)	2271 kg (5110 lbs)
Footprint	2.83 Sq meters (30.44 Sq ft)	2.83 Sq meters (30.44 Sq ft)
Service	5.73 Sq meters (61.60 Sq ft)	5.73 Sq meters (61.60 Sq ft)
Input	9.7 kW	27.5 kW
Heat	33.1 KBTU/hr	93.8 KBTU/hr
Air Flow Nominal <sup>12</sup>	CFM 1155 m <sup>3</sup> /m	CFM 2465, m <sup>3</sup> /m
Height	201.32 cm (79.26 inches)	201.32 cm (79.26 inches)
General	Conforms to EIA guidelines for frames	

### Supported Operating Systems

z/OS:	z/OS V1.7 (plus zIIP Web deliverable) and subsequent releases
z/VM:	z/VM 5.2 and subsequent releases
Linux on System z:	Red Hat RHEL 4 and subsequent releases, Novell SUSE SLES 9 and subsequent releases, Linux as z/VM guest
z/VSE:	z/VSE V3.1, V4.1
TPF:	TPF 4.1
z/TPF:	z/TPF 1.1

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## For more information

For more information about the IBM System z10 Enterprise Class, contact your IBM marketing representative or IBM Business Partner or visit the following IBM Web site:

[ibm.com/systems/z/hardware/z10ec/](http://ibm.com/systems/z/hardware/z10ec/)

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<sup>1</sup> If ordering a zAAP or a zIIP, one or more general purpose processor (CP) per the specialty engine is required. One CP can satisfy the requirement for either or both of the specialty engines.

<sup>2</sup> ISC-3 Peer mode only

<sup>3</sup> ICB-4 Not available on E64

<sup>4</sup> 64 external and 32 internal

<sup>5</sup> Available only when carried forward on an upgrade

<sup>6</sup> OSA-Express3 2-ports per CHPID (except for 10 Gigabit adapters)

<sup>7</sup> Initial order of Crypto Express2 requires 2 features, maximum of 8 features

<sup>8</sup> Excludes the standard fixed size of 16 GB HSA

<sup>9</sup> Full installed capacity can not be used until second book is installed due to 32 GB increments for memory between 256-512 GB

<sup>10</sup> Model E12 with one I/O cage and no Internal Battery Feature (IBF)

<sup>11</sup> Model E56 with three I/O cages and IBF with a combined max of 64

<sup>12</sup> Airflow is designed to increase as the local ambient room temperature increases. Nominal airflow assumes 77 degrees F ambient.



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