

## IBM System z10 Business Class (z10 BC)



In today's world, IT is woven into 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. IBM has a vision that can help—the new enterprise data center—an evolutionary model that helps 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. 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. System z™ is an excellent choice as the foundation for a highly responsive infrastructure.

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### Highlights

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- **Industry leading combination of System z10 security, resiliency, virtualization and connectivity technologies packaged specifically as a midrange enterprise solution**
- **Specialty engines offer an attractive alternative when running new workloads**
- **Save energy via consolidation of disparate workloads and reduce costs via virtualization capabilities for more efficient resource sharing**
- **Enables future growth—as a modern platform for a growing portfolio of business solutions**
- **Up to 50% more performance at half the price for incremental Linux workloads (\*)**

New world. New business. A whole new mainframe. Meet the new IBM System z10™ Business Class (z10™ BC), the technology that could change the way you think about Enterprise solutions. The technology that delivers the scalability, flexibility, and breakthrough performance you need—at the lower capacity entry point you want. This is the technology that fights old myths and perceptions—that's not just for banks and insurance companies. This is the technology for any business that wants to ramp up innovation, boost efficiencies and lower costs—pretty much any enterprise, any size, any location. This is a new mainframe technology for a new kind of data center—resilient, responsive, energy efficient—the new enterprise data center. This is z10 BC. And it's about to rewrite the rules and deliver new freedoms for your business. Whether you want to deploy new applications quickly, grow your business without growing IT costs or consolidate your infrastructure for reduced complexity, look no further—**z Can Do IT.**

### **Smart Technology for a changing IT world**

The z10 BC has the machine type of 2098, with one model (E10) offering between one to ten configurable Processor Cores. This model design offers increased flexibility over the two model System z9® BC by delivering seamless growth within a single model, both temporary and permanent.

The z10 BC delivers improvements in both the granular increments and total scalability compared to previous System z midrange servers, achieved by both increasing the performance of the individual core as well as increasing the number of cores per server. The z10 BC delivers up to 1.4X more capacity on average for a uni-processor compared to the IBM System z9 Business Class (z9™ BC) and up to 1.5X more capacity on a fully configured server than a z9 BC Model S07, for average LSPR workloads running z/OS® 1.9.

The z10 BC advances the innovation of the System z10 platform and brings value to a wider audience. It is built using a new redesigned air cooled drawer package which replaces the prior “book” concept in order to reduce cost and increase flexibility. A redesigned I/O drawer offers higher availability and can be concurrently added or replaced when at least two drawers are installed. Reduced capacity and priced I/O features will continue to be offered on the z10 BC to help lower your total cost of acquisition. The new quad core design z10 processor chip delivers higher frequency and will be introduced at 3.5 GHz which can help improve the execution of CPU intensive workloads on the z10 BC up to 2.5x compared to z9 BC. These new design approaches facilitate the high-availability, dynamic capabilities and lower cost that differentiate this z10 BC from other servers.

The z10 BC supports from 4 GB up to 120 GB of real memory with options up to 248 GB planned in June 2009. This is almost four times the maximum

memory available on the z9 BC. The increased available memory on the server can help to benefit workloads that perform better with larger memory configurations, such as DB2®, WebSphere® and Linux®. In addition to the customer purchased memory, an additional 8 GB of memory is included for the Hardware System Area (HSA). The HSA holds the I/O configuration data for the server and 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 BC has a new host bus interface with a link data rate of 6 GB using the industry standard InfiniBand® protocol to help satisfy requirements for coupling (ICF and server-to-server connectivity), cryptography (Crypto Express2 with secure coprocessors and SSL transactions), I/O (ESCON®, FICON® or FCP) and LAN (new OSA-Express3 Gigabit, 10 Gigabit and 1000BASE-T Ethernet features). New High Performance FICON for System z (zHPF) also brings new levels of performance when accessing data on zHPF enabled storage devices such as the IBM System Storage DS8000™.

### **Think Big, Virtually Limitless**

The Information Technology industry has recognized the business value of exploiting virtualization technologies on any and all server platforms. The leading edge virtualization capabilities of System z, backed by over 40 years of technology innovation, are the most advanced in the industry. With utilization rates of up to 100%, it's the perfect platform for workload consolidation, both traditional and new.

- *Want to deploy dozens—or hundreds—of applications on a single server for lower total cost of ownership? Want a more simplified, responsive infrastructure?*
- *Want investment protection where new generation technology typically allows application growth at no extra cost?*

The virtualization technology found in z/VM® with the System z platform may help clients achieve all of these operational goals while also helping to maximize the financial return on their System z investments.

The z10 BC can have big advantages over traditional server farms. The z10 BC is designed to reduce energy usage and save floor space when

used to consolidate x86 servers. With increased capacity the z10 BC virtualization capabilities can help to support hundreds of virtual servers in a single 1.42 square meters footprint. When consolidating on System z you can create virtual servers on demand; achieve network savings through HiperSockets™ (internal LAN); improve systems management of virtual servers; and most importantly, consolidate software from many distributed servers to a single consolidated server.

So why run hundreds of stand-alone servers when z10 BC could do the work more efficiently, in a smaller space, at a lower cost? Less power. Less space. Less impact on the environment.

### **Keep cool—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 BC is installed and operational, the mainframe power 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 BC, 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 BC 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.

### **Serve and Protect, Providing affordable protection**

Today's world mandates that your systems are secure and available 24/7. The z10 BC employs some of the most advanced security technologies in the industry—helping you to meet rigid regulatory requirements that include encryption solutions, access control management, and extensive auditing features. It also provides disaster recovery configurations and is designed to deliver 99.999% application availability to help avoid the downside of planned downtime, equipment failure, or the complete loss of a data center.

When you need to be more secure, more resilient, z Can Do IT. The 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 new 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 13, 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. To help customers scale their Crypto Express2 investments for their business needs, Crypto Express2 is also available on z10 BC as a single PCI-X adapter which may be defined as either a coprocessor or an accelerator.

The z10 BC is designed to meet Common Criteria Evaluation Assurance Level 5 (EAL5) certification for the security of its 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. z Can Do IT securely.

### **More Solutions, More Affordable**

Today's businesses with extensive investments in hardware assets and core applications are demanding more from IT—more value, more transactions, more for the money. Above all, they are looking for business solutions that can help enable business growth while driving costs out of the business. System z has an ever growing set of solutions that are being enhanced to help you lower IT costs. From enterprise wide applications such as SAP or Cognos® BI to the consolidation of infrastructure workloads, z10 BC has low cost solutions that also help you save more as your demand grows. So, consider consolidating your IT workloads on the z10 BC server if you want the right solutions on a premier platform at a price you can afford.

The convergence of Service-Oriented Architecture (SOA) and mainframe technologies can also 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 ultimate implementation of flexibility for today's On Demand Business is a Service Oriented Architecture—an IT architectural style that allows you to design your applications to solve real business problems. The z10 BC, along with the inherent strengths and capabilities of multiple operating system choices and innovative System z software solutions from WebSphere, CICS®, Rational® and Lotus® strengthen the flexibility of doing SOA and strengthen System z as an enterprise hub.

### **Balanced design with a choice in operating systems**

Delivering the technologies required to address today's IT challenges also takes much more than just a server; it requires all of the system elements to be working together. IBM system z10 operating systems and servers are designed with a collaborative approach to exploit each other's strengths. The z10 BC is also able to exploit numerous operating systems concurrently on a single server, these include z/OS,

z/VSE™, z/VM, z/TPF, TPF and Linux for System z. Operating systems designed to support existing application investments without anticipated change and help you realize the benefits of the z10 BC. z10 BC—the new business equation.

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

Speed and precision in numerical computing are important for all our customers. The z10 BC offers improvements for decimal floating point instructions, because each z10 processor chip has its own hardware decimal floating point unit, designed to improve performance 10X 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.

### **Pay for what you use, Use what you need**

It may sound revolutionary, but it's really quite simple. In the highly unpredictable world of On Demand business, you should get what you need, when you need it. And you should pay for only what you use. Radical? Not to

IBM. It's the basic principle underlying IBM capacity on demand for the IBM System z10.

Today's infrastructures work harder to be more flexible to changing capacity requirements and providing users with just-in-time deployment of resources. 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 new temporary capacity offering on the System z10 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 BC also 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 (for example, activation of just two CBUs out of a definition that has four CBUs is acceptable). This means that On/Off CoD can be active and up to seven other offerings can be active simultaneously. Tokens can be purchased for On/Off CoD so hardware activations can be prepaid.

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 BC can support the maximums that are defined, then they can be made available. A new 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.

Hardware working with software is critical. The activation of On/Off CoD on z10 BC can be simplified or automated by using z/OS Capacity Provisioning (available with z/OS V1.10 and z/OS

V1.9). 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. z10 BC can do IT better.

#### **Special workloads, Specialty engines, affordable technology**

The z10 BC continues the long history of providing integrated technologies to optimize a variety of workloads. The use of specialty engines can help users expand the use of the mainframe for new workloads, while helping to lower the cost of ownership. The IBM System z specialty engines can run independently or complement each other. For example, the zAAP and zIIP processors enable you to purchase additional processing capacity exclusively for specific workloads, without affecting the MSU rating of the IBM System z model designation. This means that adding a specialty engine will not cause increased charges for IBM System z software running on general purpose processors in the server.

The z10 BC has lowered prices on IFLs, zAAPs and zIIPs by 50%. Now \$47,500.\*\* Additionally, a 62% price reduction on memory for System z10 BC or z10 EC when purchased after October 21, 2008 and with the Specialty Engine for new workloads, now \$2250 per GB\*\*.

In order of introduction:

The Internal Coupling Facility (ICF) processor was introduced to help cut the cost of Coupling Facility functions by reducing the need for an external Coupling Facility. IBM System z Parallel Sysplex® technology allows for greater scalability and availability by coupling mainframes together. Using Parallel Sysplex clustering, System z servers are designed for up to 99.999% availability.

The Integrated Facility for Linux (IFL) processor offers support for Linux and brings a wealth of available applications that can be run in a real or virtual environment on the z10 BC. 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. To consolidate distributed servers onto System z, the IFL with Linux and the System z virtualization technologies fulfill the qualifications for business-critical workloads as well as for infrastructure workloads. For customers interested to use a z10 BC only for Linux workload, the z10 BC can be configured as a server with IFLs only.

The System z Application Assist Processor (zAAP) is designed to help enable strategic integration of new application technologies such as Java™ technology-based Web applications and XML-based data interchange services with core business database environments. This helps provide a more cost-effective, specialized z/OS application Java execution environment. 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 System z Integrated Information Processors (zIIP) is designed to support select data and transaction processing and network workloads and thereby make the consolidation of these workloads on to the System z platform more cost effective. Workloads eligible for the zIIP (with z/OS V1.7 or 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. The zIIP (with z/OS V1.8) 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).

### **Always available, Always on**

In today's on demand environment, downtime is not only unwelcome—it's costly. If your applications aren't consistently available, your business suffers. The damage can extend well beyond the financial realm into key areas of customer loyalty, market competitiveness and regulatory compliance. High on the list of critical business requirements today is the need to keep applications up and running in the event of planned or unplanned disruptions to your systems.

While some servers are thought of offering weeks or even months of up time, System z thinks of this in terms of achieving years. The z10 BC continues our commitment to deliver improvements in hardware Reliability, Availability and Serviceability (RAS) with every new System z server. They include microcode driver enhancements, dynamic segment sparing for memory and fixed 8 GB HSA, as well as a new I/O drawer design. Having the dedicated HSA on the z10 BC means that some pre-planning configuration changes and

associated outages may be avoided. The z10 BC 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 new InfiniBand Coupling Links on the z10 BC 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 the System z10 allow for better accuracy when attaching to an External Time Source (ETS). An alternative method to obtain accurate time is from an NTP server. NTP client support is available on System z9 servers configured in an STP-only Coordinated Timing Network.

The 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.

Geographically Dispersed Parallel Sysplex™ (GDPS®) is designed to provide a comprehensive end-to-end continuous availability and/or disaster recovery solution for System z servers, Geographically Dispersed Open Clusters (GDOC) is designed to address this need for open systems. When available, GDPS 3.5 will support GDOC for coordinated disaster recovery across System z and non-System z servers if Veritas Cluster Server is already installed. GDPS and the new 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. z10 BC—big on service, low on cost.

### **The New Face Of System z**

IBM's mainframe capabilities are legendary. Customers deploy systems that remain available for years because they are expected to, and continue to, work above expectations. However, these systems have seen significant innovative improvements for running new applications and consolidating workloads in the last few years, and customers can see real gains in price/performance by taking advantage of this new technology.

IBM provides affordable world-class technology to help today's enterprises respond to business conditions quickly and with flexibility. From automation to advanced virtualization technologies to new applications supported by open industry standards such as SOA, IBM servers teamed with IBM's Storage Systems, Global Technology Services and IBM Global Financing help deliver competitive advantages for the New Enterprise Data Center.

**z Can Do IT.** The future runs on IBM System z and the future begins today!

## IBM System z10 Business Class (2098) at a glance

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

Model	Minimum	Maximum	Increments
E10	1 / 1 / 1 / 0 / 0	5 / 10 / 10 / 5 / 5	1 / 1 / 1 / 1 / 1

### Coupling Links<sup>2</sup>

ISC-3 <sup>3</sup>	48
IC	32
ICB-4	12
Maximum # Links	64 <sup>4</sup>
InfiniBand Coupling Links	12

### Channels

Minimum: 0 / 0 / 0 / 0 / 0 / 0	ESCON / FICON Express4 / FICON Express2 <sup>5</sup> / FICON Express <sup>5</sup> / OSA-Express3 / OSA-Express2
Maximum: 480 / 128 / 80 / 40 / 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

**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>
E10	4 GB	120 GB (248 GB in June 2009)

### Upgradeability

Upgradeable from IBM System z9 Business Class (z9 BC)  
Upgradeable from IBM eServer™ zSeries® 890 (z890)  
Upgradeable within the z10 BC Model E10  
Upgradeable to z10 EC Model E12

## IBM System z10 Business Class (2098) at a glance

Physical Configuration	Model E10, minimum <sup>9</sup>	Model E10, maximum <sup>10</sup>
Weight	857.3 kg (1890 lbs)	953 kg (2100 lbs)
Footprint	1.42 Sq meters (15.22 sq ft)	1.42 Sq meters (15.22 sq ft)
Service	3.50 Sq meters (37.62 sq ft)	3.50 Sq meters (37.62 sq ft)
Input <28° C, >28° C	3.7, 4.3 KW	6.2, 7.35 KW
Heat <28° C, >28° C	12.5, 14.7 KBTU/hr	21.3, 24.7 KBTU/hr
Air Flow Nominal <sup>11</sup>	780 CFM (22.09 m <sup>3</sup> /m)	1320 CFM (37.38, m <sup>3</sup> /m)
W x D x H	785 x 1854 x 2013mm (30.9 x 71 x 79.3 inches)	

### Supported Operating Systems

z/OS <sup>12</sup>	z/OS V1.8 and subsequent releases
z/VSE	z/VSE V3.1, V4.1 and subsequent releases
z/VM	z/VM 5.2 and subsequent releases
Linux on System z	Novell SUSE SLES 9 and subsequent releases, Red Hat RHEL 4 and subsequent releases, Linux is supported as a z/VM guest or natively in an LPAR
TPF	TPF 4.1 and subsequent releases
z/TPF	z/TPF 1.1 and subsequent releases

<sup>1</sup> One zAAP and/or zIIP maximum per general purpose processor (CP); one CP can satisfy the requirement of one or both specialty engines

<sup>2</sup> At least one I/O feature (ESCON or FICON) or Coupling Link feature (ICB-4, ISC-3, or InfiniBand) must be present in a server

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

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

<sup>5</sup> Available only when carried forward on an upgrade (z9 BC maximums for FICON Express2=80, FICON Express=40)

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

<sup>7</sup> Initial order of Crypto Express2-1P / Crypto Express2 requires 2 features, maximum of 8 features

<sup>8</sup> Excludes the standard fixed size of 8 GB HSA; 248 GB maximum planned for June 2009 availability. Statements regarding IBM Future direction and intent are subject to change or withdrawal, and represents goals and objectives only.

<sup>9</sup> One I/O drawer and no Internal Battery Feature (IBF)

<sup>10</sup> Four I/O drawers and Internal Battery Feature (IBF)

<sup>11</sup> Airflow is designed to increase as the local ambient room temperature increases. Nominal airflow assumes 77 degrees F ambient

<sup>12</sup> z/OS R1.7 + zIIP Web Deliverable required for System z10 to enable HiperDispatch on System z10 (does not require a zIIP). 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 2009. With this Lifecycle Extension, z/OS V1.7 supports the z10 BC server. Certain functions and features of the z10 BC server require later releases of z/OS. For a complete list of software support, see the PSP buckets and the Software Requirements section of the System z10 BC announcement letter, dated October 21, 2008.





### For more information

To learn more about the IBM System z10 Business Class or IBM Global Financing, please contact your IBM marketing representative or IBM Business Partner, or visit:

[ibm.com/systems/z/hardware/z10bc/](http://ibm.com/systems/z/hardware/z10bc/)

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### IBM Funds IT

IBM Global Financing can help you reduce the initial financial risk and budget impact of an IT acquisition. IBM Global Financing provides an additional source of funding and helps lower the overall cost of technology acquisition as you install new hardware, software, service acquisitions and upgrades from IBM and other vendors.

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\* Specialty engines and associated memory on z10 BC are priced 50% and 60% less, respectively, compared to the z9 BC. "incremental" refers to the addition or expansion of IFLs on a new or upgraded z10 BC. 50% performance gain based on multi-core performance improvement as measured by IBM for 5 IFL cores. 40% for single cores. ICFs excluded.

\*\*Prices stated in US currency, Prices may vary in other countries, Limited to 16GB per engine



Recyclable, please recycle.