IBM zEnterprise 114 (z114)

IBM's premier midrange "systems of systems" platform for integrated, centrally managed workload deployment

Highlights

- Unique hybrid design integrates Mainframe, POWER7 and IBM System x technologies in a single unified, centrally managed system.
- Designed and right-sized as an entry level mainframe server and on-ramp for any growing business looking to exploit mainframe technologies, now starting under US$75K[1]
- Industry-leading virtualization, security, resiliency, and connectivity technologies cost-effectively packaged as a midrange enterprise solution
- Up to 18 percent performance improvement per core and up to 12 percent more capacity within the same energy footprint as the z10 BC
- Consolidate an average of 30 distributed servers or more on a single core, or an average of 300 in a single footprint, delivering a virtual Linux server for under US$1.45 day[2]

At the core of the zEnterprise™ System for midrange and small enterprises is the next generation mainframe—the zEnterprise 114 (z114). As the newest member of the System z® family, the z114 offers new levels of freedom and a whole new world of capabilities for a broader set of businesses, delivering the scalability, flexibility, and breakthrough performance you need—at a lower capacity and attractive entry price point you want.

Designed specifically as a midrange zEnterprise offering with extensive growth options, industry-leading virtualization and consolidation capabilities, the z114 continues the heritage in mainframe qualities of service with a more granular cost structure and significant improvements in packaging, performance and total system scalability over prior generations. And as a highly workload-optimized system, the z114 extends the unique value of hybrid computing capabilities to businesses of all sizes for integrated, centrally managed workload deployment—all within an environmentally friendly footprint.

These exclusive hybrid capabilities are designed to address the complexity and inefficiency of today's multiarchitecture data centers. The z114 can extend the strengths and capabilities of the mainframe—as in security, fault tolerance, efficiency, extreme virtualization and dynamic resource allocation—to other systems and workloads running on AIX®, Linux on System x, and now Microsoft Windows—fundamentally changing the way your data center can be managed.

When configured with a zEnterprise™ BladeCenter® Extension (zBX), you can combine System z, UNIX and Intel server technologies into a single unified system—integrating workloads with affinity to mainframe applications and data—and manage it all with the same tools, techniques and resources for consistent, automated and reliable service delivery. This capability provides the unique ability to extend the strategic role of your mainframe across your business and an opportunity to simplify and reduce the range of skills necessary for managing the IT infrastructure.

For the first time you can have a single, integrated view of the entire workload or business process. This revolutionary yet simplified multi-architecture design helps drive operational efficiencies in deployment, integration and management. It is designed to enhance the attractiveness of hosting applications on the mainframe by providing the freedom and ease of selecting the right architecture and operating system for application deployment within a common management infrastructure for both mainframe and distributed-system resources.

The z114 is powered by up to 14 microprocessors running at 3.8 GHz and delivers up to 18 percent improvement in performance per core and up to 12 percent increase in total system capacity for z/OS®, z/VM®, and Linux on System z workloads compared to its predecessor, the z10™ BC.

The new microprocessor chip has a higher-frequency superscalar design, improved cache structure, new "out of order" execution sequence and over 100 new hardware instructions that delivers world-class per-thread performance for DB2®, WebSphere® and Linux workloads. For CPU intensive workloads, additional gains of up to 25 percent can be achieved via multiple compiler level improvements.[3]

The z114 is available in two models; a single central processing drawer model, the M05 and a two drawer model, the M10 which offers the additional flexibility for I/O and coupling expansion and/or increased specialty engine capability. With up to 10 configurable cores, the model naming is indicative of how many total processor units are available for customer characterization. The cores can be configured as general purpose processors (CPs), Integrated Facilities for Linux (IFLs), System z Application Assist Processors (zAAPs), System z Integrated Information Processors (zIIPs), Internal Coupling Facilities (ICFs), additional System Assist Processors (SAPs), or used as additional spares. And on the M10, you can have up to two "dedicated" spares as well, a first for the midrange product offering.

With 130 available capacity settings and granular cost structure offered across either model, you have the freedom to choose the right capacity setting for your needs with the flexibility to scale on demand as workload demands increase. The z114 offers a range of scaling capabilities:

- Scale up—over 3100 general purpose MIPS in a single footprint
- Scale out—consolidate up to 300 distributes servers[4]
- Scale within—specialty engines, cryptographic processors, hypervisors
- Scale beyond its traditional boundaries—when configured with the zBX—supports the integration of up to 112 distributed blade servers and workload optimizers[5]

With improved processor performance, increased capacity, new hybrid computing capabilities, and significant power, space and cooling benefits, the z114 is now a genuine "data-center in a box" solution and a perfect fit for infrastructure simplification and true Cloud Computing. Unlike other proclaimed cloud solutions that are defined by a siloed architecture resource pool, the z114 leaps beyond this approach by including heterogeneous compute resources in the pool that can be fully optimized and all managed at the platform level to business requirements.

The virtualization capabilities of the z114 can support an average of 30 distributed servers or more on a single core depending on the workload, or up to hundreds in a single footprint, delivering a virtual Linux server for under US$1.45 day.[2]

To help secure sensitive data and business transactions, the z114 is designed for Common Criteria Evaluation Assurance Level 5 (EAL5) certification for security of logical partitions. And support for the next generation of public key technologies is available with Elliptic Curve Cryptography (ECC) which is ideal for constrained environments such as mobile devices. The z114 also offers support for key ANSI and ISO standards for the banking and finance industry.

The z114 supports up to 248 GB of customer purchased real (usable) RAIM-protected memory—an industry exclusive currently available only on System z. The increased available capacity and new fault tolerant memory on the server can help improve throughput for workloads such as DB2, WebSphere and Linux. Beyond the customer purchased memory, there is an additional 8 GB of memory for the Hardware System Area (HSA) which holds the I/O configuration data for the server.

For ease of installation, the z114 is a single frame, air cooled system that now supports either top or bottom exit I/O and power; raised floor and nonraised floor options and high-voltage DC power, providing increased flexibility to accommodate small data center installations and support for future data center design and efficiencies.

The z114 offers leading edge technology for any business that wants to ramp up innovation, boost efficiencies and lower costs. The system takes IT to a whole new dimension and allows you to deliver new freedoms for your business. The freedom to innovate, reduce costs and maximize the use of existing investments.

Whether you want to deploy new applications quickly, grow your business without growing IT costs, consolidate your infrastructure for reduced complexity, or extend the classic strengths of System z to heterogeneous workloads, look no further than the z114.

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Models	**M05**	**M10**
Processor Core Types: CP[6]/IFL[7]/ICF/zAAP[8]/zIIP[8]/Std SAP/Addl SAP/Spares/zBX		
Minimum[9]	0/0/0/0/0/2/0/0/0	0/0/0/0/0/2/0/0/0
Maximum	5/5/5/2/2/2/2/0/1	5/10/10/5/5/2/2/2/1
Coupling Links		
IC maximum	32	32
Maximum # external coupling links	56[10]	72[10]
ISC-3 maximum[11]	48	48
12x InfiniBand maximum	8	16
1x InfiniBand maximum	16	32
CHPID maximum	128	128
Channels: ESCON/FICON Express 8S/FICON Express8/FICON Express4/OSA-Express4S/OSA-Express3/OSA-Express2		
Minimum:	0/0/0/0/0/0	0/0/0/0/0/0
Maximum:	240/128/64/64/96/64/32	240/128/64/64/96/64/32
HiperSockets™	Up to 32	Up to 32
Cryptographic		
Crypto Express3	Minimum order is two features, one thereafter; maximum is eight features (8/16 PCIe adapters)	
System Memory[12]		
Minimum	8 GB (plus 8 GB for HSA)	16 GB (plus 8 GB for HSA)
Maximum	120 GB (plus 8 GB for HSA)	248 GB (plus 8 GB for HSA)
Physical Configuration		
Max Weight (Base/w Batteries/w Batteries & Overhead I/O cabling/w batteries, Overhead I/O & Balanced Power)	1802 lbs/2028 lbs/2123 lbs/2235 lbs	2064 lbs/2290 lbs/2385 lbs/2497 lbs
Footprint	30 in. W × 50 in. D or 0.97 sq meters (10.42 sq ft)	30 in. W × 50 in. D or 0.97 sq meters (10.42 sq ft)
Service	36 in. W × 140 in. D or 3.16 sq meters (30.38 sq ft)	36 in. W × 140 in. D or 3.16 sq meters (30.38 sq ft)

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Models	M05	M10
Product Dimensions (W × D × H)[13]	30.87 × 62 × 79.26 in. (784 × 1575 × 2013 mm)	30.87 × 62 × 79.26 in. (784 × 1575 × 2013 mm)
Input <28°C and altitude <3000 ft, >28°C and altitude >3000 ft	4.526 KW, 5.256 KW	6.309 KW, 7.364 KW
Heat <28°C and altitude <3000 ft, >28°C and altitude >3000 ft	15.4 KBTU/hr, 17.9 KBTU/hr	21.5 KBTU/hr, 25.1 KBTU/hr
Air Flow Nominal[14]	1100 CFM	1230 CFM
Upgradeability		
	Upgradeable from IBM System z10 Business Class (z10 BC) and IBM System z9® Business Class (z9 BC)	
	Upgradeable within the Model	
	Upgradeable within the z114 family (M05 to M10)[15]	
	M10 upgradeable to the zEnterprise 196 (machine type 2817) M15	
Supported Operating Systems		
z/OS[16]	z/OS V1.11, 1.12, 1.13 or higher z/OS V1.10, V1.9 and V1.8 in Lifecycle Extension zBX Ensemble support: z/OS V1.10 or higher[16]	
z/VM	z/VM 5.4 and subsequent releases. z/VM 6.1 for zBX support	
Linux on System z	Red Hat RHEL 5 and subsequent releases, Novell SUSE SLES 11 and subsequent releases, Linux as a z/VM guest	
z/VSE®	z/VSE V4.2 and subsequent releases	
z/TPF	z/TPF 1.1	
AIX® (on BladeCenter PS701 Express blades installed in IBM zEnterprise™ BladeCenter® Extension)	AIX 5.3, AIX 6.1 and AIX 7.1 and subsequent releases PowerVM™ Enterprise Edition	
Linux on System x (on IBM BladeCenter HX5 blades installed in IBM zEnterprise BladeCenter Extension	Red Hat RHEL 5.5, 5.6, 6.0 and Novell SLES 10 (SP4),11 SP1	
Microsoft Windows (on IBM BladeCenter HX5 blades installed in IBM zEnterprise BladeCenter Extension	Microsoft Windows Server 2008 R2 Datacenter Edition	
IBM zEnterprise BladeCenter Extension (zBX) Model 002[17]		
IBM Smart Analytics Optimizer V1.1	5 solution sizes: 7, 14, 28, 42, 56	
IBM WebSphere DataPower Integration Appliance XI50 for zEnterprise	Minimum: 0	Maximum: 28[17]
POWER7 blades	Minimum: 0	Maximum: 112[17]
IBM BladeCenter HX5 blade	Minimum: 0	Maximum: 28[17]

For more information

To learn more about the zEnterprise 114, please contact your IBM sales representative or IBM Business Partner, or visit the following website: **ibm.com**/systems/zenterprise114

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[8] 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.

[9] Must be configured with a minimum of one CP, IFL or ICF

[10] The maximum external links is obtained with a combination of ISC-3 and 1x InfiBand links.

[11] ISC-3 Peer mode only.

[12] Can be acquired in increments of 8 GB or 32 GB; Excludes the standard fixed size of 8 GB HSA which is separately managed; RAIM standard.

[13] Optional overhead I/O cabling feature adds 6 in. to the width.

[14] Airflow is designed to increase as the local ambient room temperature increases. Nominal airflow assumes 77° F ambient.

[15] Upgrading from the M05 to the M10 or from the M10 to M15 will require a planned outage.

[16] z/OS V 1.10 is the minimal level required to support an ensemble.

[17] The BladeCenter PS701 Express blades, BladeCenter HX5 blades and DataPower XI50z can share the same BladeCenter chassis—note that DataPower XI50z blades are "doublewide" and use two slots. They can be mixed in the same zBX with IBM Smart Analytics Optimizer for DB2 for z/OS V1.1 blades—but not in the same BladeCenter Chassis. Total zBX capacity cannot exceed 112 total blades.

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[1] Pricing based on entry level configuration and may vary by country.

[2] Linux on System z virtual servers can be: Less than $1545 for three years; Less than $515 per year; Less than $1.45 per day. Based on US Enterprise Linux Server pricing. Pricing may vary by country. Model configuration included 10 IFL cores running a mixed workload averaging 31 virtual machines per core with varying degrees of activity. Includes zEnterprise hardware and z/VM virtualization software. Does not include Linux OS or middleware software.

[3] The z114 will exhibit up to 25 percent performance improvement, based on measurements and projections for CPU intensive workloads as provided by multiple C/C++ compiler level improvements when going from XL C/C++ V1R9 to V1R12.

[4] Based on IBM measurements and projections. Results may vary depending on workload(s).

[5] IBM BladeCenter PS701 Express and IBM BladeCenter HX5 server blades and workload optimizers such as IBM Smart Analytics Optimizer for DB2 for z/OS V1.1 (IBM Smart Analytics Optimizer) and WebSphere DataPower Integration Appliance XI50 for zEnterprise (DataPower XI50z).

[6] No CP is required if ordering an IFL or ICF only server.

[7] No IFL is required unless ordering an IFL only server.

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