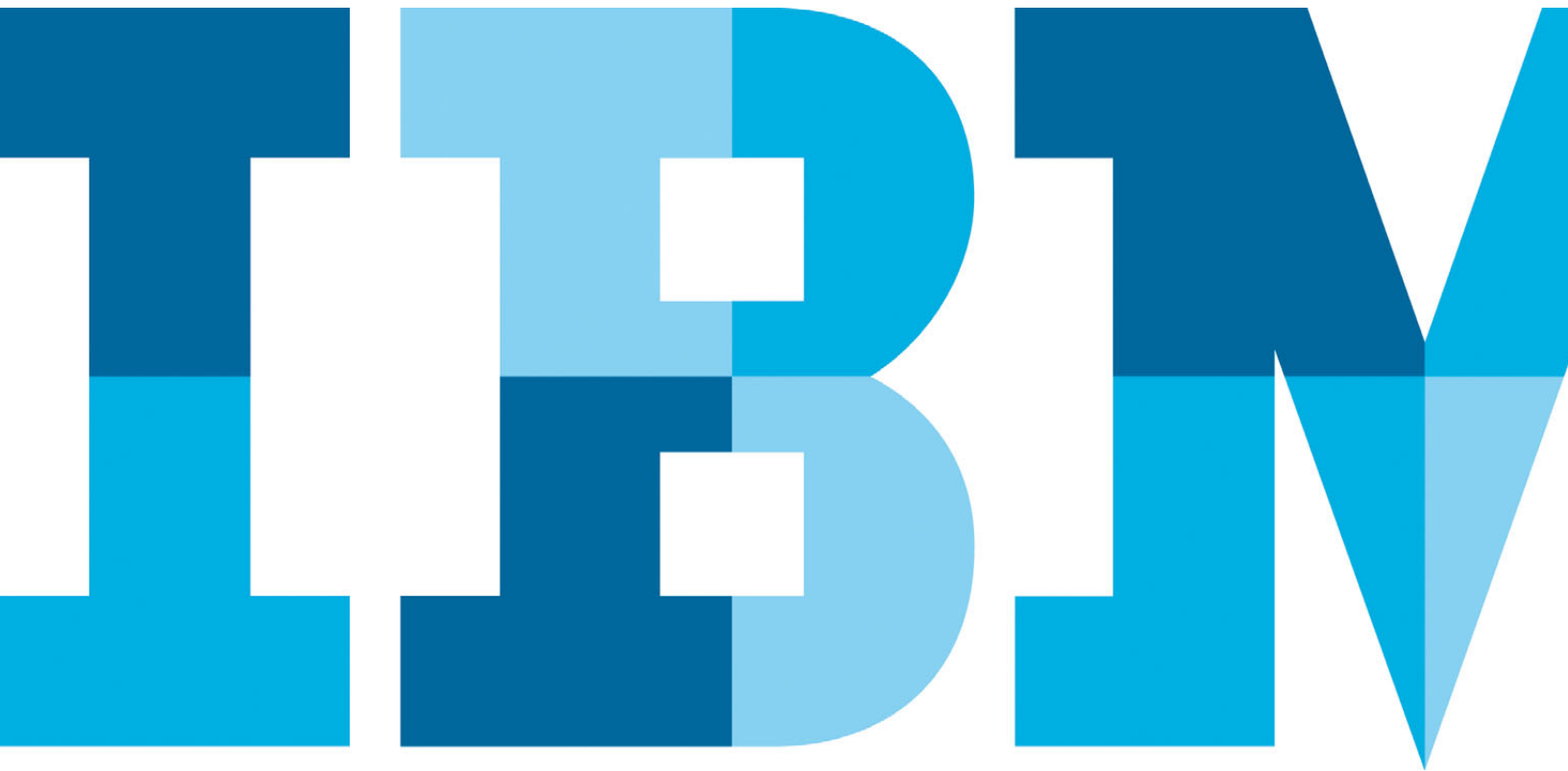


Smarter IT Optimization and Consolidation with IBM zEnterprise System



Life in the fast lane

The marketplace is experiencing an acceleration of trends that will place enormous pressure on information technology organizations just as enterprises are becoming more dependent on flawless IT execution in order to achieve business success. Globalization, once a cliché, is now a necessity as existing and emerging globally-integrated companies leverage global markets to access the best capabilities, knowledge and assets from wherever they reside in the world and apply them wherever required in the world. Savvy web-oriented consumers, raised on the rich experience delivered by entertainment and social networking sites, expect the same experience from all their web transactions. Advanced analytics is fast becoming a staple of business processing. Demand for ad hoc, “what if” queries and an intense focus on risk management are driving the need for real-time intensive processing of vast amounts of data.

All of this is unfolding at a time when IT managers are keenly focused on building out virtualized computing infrastructures and cloud service delivery models to drive costs out of their budgets. Not only do they need to reduce operational costs and complexity, but they also need to achieve breakthrough productivity gains in order to fund new business initiatives. The demand for improved service is relentless; not only must the IT staff improve the quality of existing services, but they must also meet customer expectations for real-time, dynamic access to innovative new services, with no room for false starts due to security, reliability, or resiliency issues.

IBM zEnterprise™ represents a new class of enterprise computing that enables information technology managers to more effectively deliver business value when it is needed, with superior qualities of service, and at a lower cost than “one architecture fits all” alternatives. zEnterprise integrates IBM BladeCenter® technologies with world-class System z® compute facilities to provide a level of workload optimization and consolidation that is unmatched in the industry. With

zEnterprise, companies can optimize their IT spending to more closely align with the demands of their business, helping drive down costs while at the same time enabling the rapid adoption of new technologies and solutions needed for marketplace success and competitive advantage.

Introducing the IBM zEnterprise System

IBM zEnterprise System takes a bold new step in addressing the challenges of enterprise computing. For the first time, it will be possible to deploy a truly integrated hardware platform that spans the enterprise, encompassing mainframe, UNIX® and x86 technologies. zEnterprise is an integrated environment that can effectively consolidate islands of computing, reducing complexity, improving security, and bringing applications closer to the data they need. With zEnterprise you can extend mainframe-like governance and qualities of service to special purpose workload optimizers and IBM POWER7® and IBM System x® blades. Integrating the management of these heterogeneous environments is the new IBM zEnterprise Unified Resource Manager. It provides energy monitoring and management, goal-oriented policy management, increased security, virtual networking, and data management consolidated into a single user interface that allows server applications spanning multiple architectures to work in concert according to business requirements.

zEnterprise is comprised of two major components: the IBM zEnterprise 196 (z196) and the IBM zEnterprise BladeCenter Extension (zBX). The z196 is the next generation of IBM mainframe technology. It is the world’s fastest server, and is ideally suited for enterprise-class workload consolidation. The zBX infrastructure works with the z196 to support this new multiplatform environment. Installed in the zBX will be special purpose workload optimizers like the new IBM Smart Analytics Optimizer for DB2® for z/OS® V1.1 and IBM POWER7® and System x blades for general purpose application use. With zEnterprise, you can run an application

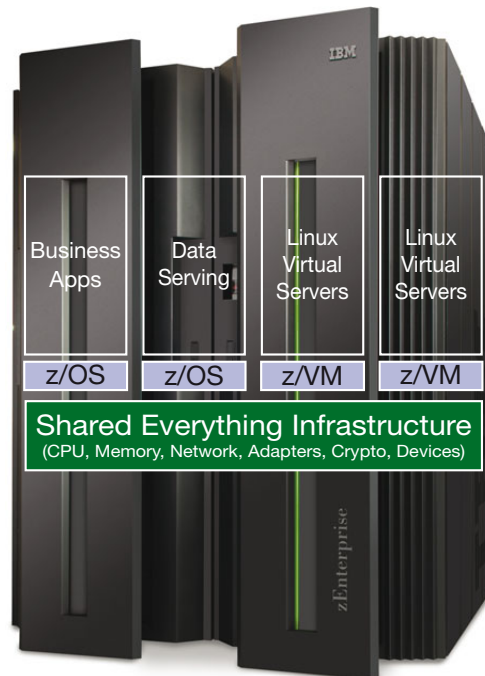
environment that spans z/OS, Linux® on System z, AIX® on POWER®, and Linux on System x under a single management umbrella. The Unified Resource Manager provides the end-to-end virtualization and management services to optimize resource deployment according to individual workload requirements. Companies can now maximize the business value of their IT investments by deploying software components on the “best fit” architecture with a level of management simplicity never before experienced.



Advancing the art of server consolidation with Linux on System z

Linux on System z has been broadly accepted by the System z user community, bringing a new set of enterprise-class applications to the platform that can easily integrate with z/OS data and transaction services and exploit the more-than-forty years of virtualization innovation on System z. The “secret sauce” of server consolidation on System z is the z/VM® product, IBM’s premier virtualization software solution.

Mainframe virtualization support has been an essential element of its architecture since its inception in the 1960s. Over the course of many years, IBM has refined the System z infrastructure with a coordinated investment in hardware, firmware, hypervisors and operating systems to enable exceptional qualities of service for hosting virtual servers. When System z clients look for enhancements in the areas of speed, scalability, resource efficiency and security, IBM has introduced function in the proper technology layer, or set of layers, to provide the desired business results. Much of the value clients attribute to the function-rich z/VM product is due to the “share everything, run anything” design of the System z ecosystem.



Some of the distinguishing characteristics of server consolidation on z/VM include:

- Superior levels of resource sharing and virtualization efficiency, helping users optimize their spending on energy, floor space, software license fees, and staffing
- An extensive set of management and governance functions that help users maintain service agreements during peak periods and satisfy business demands with incredible speed and agility, including the provisioning of virtual servers in seconds instead of hours or days
- The redundancy of mainframe hardware and the ability to allocate CPU, memory and I/O assets on demand when needed allows businesses to limit the duplication of hardware otherwise needed for disaster recovery and business continuance

zEnterprise extends the economic and operational advantages of running Linux on the mainframe in several dimensions:

- The faster speed of Integrated Facility for Linux (IFL) specialty processors (up to 60 percent faster) in conjunction with the larger cache memory structure of z196 enables users to host even more virtual servers per processor core—depending on the workload, a z196 running Linux on z/VM can host more than three times the number of virtual servers per core than x86 virtualization alternatives².
- The z196 offers 25 percent more processor cores than the IBM System z10® Enterprise Class machine: Up to 80 IFLs and 96 total system cores. z196 users can configure their machine with up to 3 TBs of memory for memory-hungry virtual servers—twice the capacity of z10 EC machines. The extreme virtualization capabilities of z196 and z/VM means users can potentially host more than 3,000 virtual servers in a single z196 machine.
- The list price for z196 IFLs is 33 percent less than z10 EC IFLs—“spend less and consolidate more” is an economic reality every IT manager will appreciate.

- The z196 is extremely energy efficient—save up to 75 percent on energy costs compared to x86 alternatives³; and the more you grow your workload inside a z196 machine, the greater your energy savings.
- The extremely high reliability of z/VM and z196, and the ability to provision hardware assets and virtual servers quickly and flexibly, makes Linux on z/VM a very valuable platform for hosting business-critical workloads that demand high availability and responsiveness to workload growth requirements.
- The extreme density of virtual server hosting on z196 with Linux and z/VM increases the productivity of the IT staff, allowing them to command and control a large virtual server environment with the highest levels of efficiency and business responsiveness. For some workloads, organizations can boost staff productivity by up to 70 percent⁴ compared to virtualized x86 alternatives.

Based on recent survey data, mainframe customers are using Linux on System z to host a very diverse set of workloads. A particularly popular and “best fit” class of workload is database solutions like Oracle, DB2 for Linux, or other data-serving applications. The business and technology profiles for these types of applications are well suited for System z: They tend to be business critical and I/O intensive, two hallmarks of mainframe computing that differentiate the platform from UNIX and x86 alternatives.

Business analytic applications such as Cognos and web application support via WebSphere® Application Server are also popular choices among System z Linux clients. Development and Test support is also a “best fit” use of Linux on System z. This is largely due to the resource-sharing efficiencies of the z/VM hypervisor and its ability to allocate hardware assets on a very granular basis. z/VM also provides an extensive set of trace and debug facilities for developers and testers who need to monitor and debug at a virtual machine level.

zEnterprise BladeCenter Extension provides consolidation flexibility

zEnterprise introduces the integration of IBM blade technologies with the zEnterprise BladeCenter Extension (zBX), giving users the added flexibility of matching business requirements with a diverse set of service levels available in a multi-architecture environment. zEnterprise users can integrate applications running on Power and x86 architectures with z/OS. The same technology provides added levels of business and operational value for server consolidation solutions that exploit the extreme consolidation capabilities of Linux on z/VM:

- Host a complete solution suite on zEnterprise by running “companion” applications on zBX blades in conjunction with Linux applications running on z/VM.
- User Power and x86 blades for compute-intensive application logic that does not require z/VM and System z qualities of service.
- Use Linux on z/VM to host workloads initially deployed on blades that may require higher qualities of service (e.g., greater levels of reliability, business continuance, resource sharing, workload management, dynamic growth, and scalability)

Optimize your IT Infrastructure with zEnterprise Unified Resource Manager

The zEnterprise Unified Resource Manager is a new platform management capability included with zEnterprise that configures, monitors, and governs workloads that are deployed across zEnterprise assets, including Linux virtual machines running on z/VM. It provides a single policy and view of resources across System z and extends this view to POWER7 and System x blades.

The Unified Resource Manager is a unique technology in the marketplace in that it provides heterogeneous virtualization management across multiple processor architectures, enabling

zEnterprise clients to lower the costs associated with managing multiple server architectures. This increases the economic attractiveness of using zEnterprise to optimize workload fit across a mix of architectures with a level of service integration that delivers superior business results compared to single-architecture alternatives. It is important to keep in mind that platform selection and workload optimization is not always a single point-in-time exercise. There are numerous technology factors and business considerations that can render a server platform choice as non-optimal should circumstances change, for example:

- The importance of a new solution deployed on an x86 infrastructure may unexpectedly achieve a level of business criticality that demands the superior service and business continuance available with a System z environment like z/OS and Linux on z/VM.
- Virtual server scalability requirements are sometimes difficult to predict. The unexpected demand for rapid growth in an x86 or UNIX virtual server environment may prove to be a better fit for the extreme virtualization capabilities available with Linux on System z.
- Conversely, if a virtual server solution that is expected to exploit the dynamic growth capabilities of Linux on z/VM fails to experience significant growth requirements, one might be better served hosting that workload on an IBM POWER7 or System x blade.
- The I/O intensity for a set of applications running in x86 virtual machines significantly increases, and at the same time, the business need to host an additional set virtual servers with unpredictable growth requirements presents itself. This is another “best fit” scenario for Linux on System z with z/VM.

zEnterprise and the Unified Resource Manager provide an operational environment that facilitates the cost-effective adoption of multiple server architectures to satisfy changing business requirements. zEnterprise users are in a position to optimize their workload placement across different server

architectures as business demands and usage patterns change. Companies committed to a “one architecture fits all” server strategy may find themselves spending more money than expected on hardware assets, energy, floor space, people, and software because they lack the flexibility of workload optimization available with zEnterprise.



zEnterprise: the epitome of enterprise cloud computing

zEnterprise provides new capabilities that simplify the effort of running applications across a mix of server architectures for optimal application placement, cross-system workload governance, and business responsiveness. The function-rich, highly secure zEnterprise infrastructure makes it an ideal platform for enterprise-class cloud computing. A typical cloud solution forces providers and users to limit their application hosting options to a single system architecture. This can result in system and workload inefficiencies that drive up costs and reduce

For more information

To learn more about how IBM zEnterprise System can help optimize your IT investments and consolidate your workloads for business success, please contact your IBM marketing representative or IBM Business Partner, or visit the following websites:

- ibm.com/systems/zenterprise
- ibm.com/systems/z/software

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² Based on IBM “Friendly Bank” workload scenario.

³ Based on zEnterprise comparison to virtualized x86 alternative.

⁴ Based on life cycle management testing of large-scale virtual server environment conducted by IBM.



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