

## WHITE PAPER

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# IBM zEnterprise System Brings Hybrid Computing Capabilities to Midsize Organizations

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## EXECUTIVE SUMMARY

Many customers have deployed end-to-end workloads that span their enterprise or midsize organization. Multitier computing has taken hold, leveraging components of end-to-end workloads that span the computing systems of many departments and divisions in large enterprises and midsize businesses. Although the applications have "grown up" on separate servers — large and small — the overall business would benefit if they could be brought closer together.

Technical change offers a new way to support business processes — and to improve end-to-end performance of workloads — leveraging faster network links, close-in memory, and workload management to arrive at business answers faster, and more accurately, than is currently possible. Business decisions could be made more quickly, responding to changing market conditions, if analytics could find the patterns in the data more quickly. Faster processing would also allow businesses to identify fraudulent credit card activity sooner — and to take action on it immediately. And, if the data warehouses could be searched more quickly and effectively, then the answers could be returned to the line-of-business executives in minutes rather than hours.

But the promise of end-to-end workloads often depends on one-off, customized system integration, which can be an expensive and time-consuming task. It could take months, or years, to design, build, and deploy a new, optimized solution for cross-tier computing. That's why, in these challenging economic times, the industry is seeing a new focus on efficiency and results associated with IT and data processing.

Recognizing this trend, IBM introduced its hybrid computing solution in July 2010, combining IBM zEnterprise mainframe workloads (e.g., applications, databases) with workloads running on blade servers within a blade chassis — and attached through optimized, high-speed network links. With the July 12, 2011, announcement, IBM is pricing the z114 from \$75,000, thus reducing the entry price of the System z server line by 25% and memory prices by up to 75%. The new product offering and the new price points are being offered with the aim of extending this hybrid solution to midsize businesses, departments and divisions of large enterprises, government agencies, and universities.

This paper focuses on the IBM z114 cross-tier solution, which brings IBM AIX Unix and Linux workloads into the mix, with Microsoft Windows support to follow in the future. This blended approach to computing allows workloads running on any of those operating systems to communicate more quickly and effectively with the System z, producing business benefits from the orchestration, or coordination, of management for all of the workloads running across all of the linked platforms.

## SITUATION OVERVIEW

The datacenter is being transformed — based on multiple changes taking place in technology. For one thing, the design of application workloads has changed, with components of end-to-end workloads running across multiple tiers of the computing infrastructure. This cross-tier computing includes the Web-serving, application-serving, and database-serving tiers, where components of the end-to-end workloads reside. Today, business services are supported by these end-to-end workloads, which leverage zEnterprise capabilities and are thereby protected by the security, firewall, and directory services of the zEnterprise system.

The evolution toward deploying more end-to-end workloads across siloed computing tiers came about in this way:

- ☒ Rapid proliferation of technology platform choices over the past few decades
- ☒ Buildout of IT infrastructure via mergers or acquisitions
- ☒ Independent IT planning driven by regional or departmental initiatives
- ☒ The move to service-oriented architecture, or SOA, as well as a focus on business services, which is redefining application development, deployment, management, and maintenance of the servers
- ☒ Improvements in management across server platforms, brought about by middleware that has been ported to all of the attached servers, use of open standards, and orchestration software that coordinates workload management
- ☒ The rapid growth of data — including both structured data and unstructured data — and the drive to gain business insights through intensive analysis of that data (Business intelligence [BI] and analytics software uncovers the patterns, or trends, in the transactional data that is being created by businesses — and it speeds the identification of patterns in the unstructured data types that are being generated by social media and content-based workloads.)

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## Midmarket Scenarios for Deployment

In recent years, many customers have deployed end-to-end workloads that span their enterprise or organization. Often, these deployments were the result of globalization so that multiple business units — each geographically dispersed around the globe or across a country — could work in a collaborative way. In other cases, systems were deployed to support individual business units, departments, or government agencies — and they were operated separately, becoming isolated information "silos" that were not linked to other systems, even if they were colocated in the same datacenter.

The ability to link applications and data can speed the time to results for the midmarket, bringing the same business benefits that larger enterprises would gain from the same technology. This includes small and medium-sized businesses (SMBs), small and medium-sized enterprises, regional banks (or other regional operations of larger businesses), business units, and academic groups within university communities.

Prime examples of this style of computing are the analytics workloads or BI workloads that allow applications running on bladed systems to access data stored on a central-site scalable system, such as a scalable datacenter server hosting a corporate database or data warehouse. The potential of applying these blended computing technologies to midsize companies, to departments/divisions of large enterprises, and to government agencies presents a new way to gain information from large amounts of transactional data and the large data repositories holding that data.

Other examples include supply chain workloads (e.g., SAP ERP), which tap the Web-serving tier, the application-serving tier, and the database-serving tier of IT infrastructure. Often called "landscapes," these workloads comprise multiple modules, some of which reside on scalable servers, such as the IBM zEnterprise System. Meanwhile, the other components continue to reside on distributed servers, including rack-optimized servers and blade servers that are located closer to the end users who are accessing the system.

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## **The Problem Set**

Many IT sites feature a number of separate computing systems, developed at different times for different reasons — and they lack connectivity to other data resources that have related information.

How did this happen? Often, systems were deployed to support individual business units, departments, or government agencies — and they were operated separately, becoming isolated information "silos" that were not linked to other systems, even if they were colocated within the same datacenter. Examples include hospitals that have different systems dedicated to specific workloads run by the departments that funded them (e.g., radiology, pathology, hospital administration).

Others dated from different eras of computer deployments. The waves of change that brought mainframes, Unix servers, and x86 servers into the datacenter began decades apart — and so were related to specific projects that brought new systems into the datacenter. Blade servers are among the newest systems to appear in the datacenter — arriving in the mid-2000s — while many Unix servers were originally installed in the 1990s and many traditional datacenter platforms, including mainframes, have been mainstays since the 1970s.

The result of this kind of dedication to specific server platforms is that the organizations that own them have difficulty viewing data that reflects the "snapshot," "big picture," or "single version of the truth" that many organizations would like to see to inform daily decision making. For example, fast searches of transactional data can reveal whether a given retail promotion is working or not, and a quick scan of credit card information can find whether a given financial transaction should be approved, even while the customer is calling into a service representative.

However, many organizations cannot acquire this kind of computing capability, especially when the solution includes scalable systems that support data warehouses. The modifications that would have to be made to their current IT infrastructure would cost too much or would be impractical to implement. But the potential of applying these blended computing technologies to midsize companies, to

departments/divisions of large enterprises, and to government agencies presents a new way to gain information from large amounts of transactional data and the large data repositories holding that data.

## **BLENDED WORKLOADS SOLUTIONS**

To move toward a more unified view, many sites are looking to blended systems, combining the capabilities of scalable servers with central-site data and the capabilities of bladed systems with business applications and links to Web-enabled applications. To reach this goal, companies would like to improve the links between different types of server systems and be able to orchestrate the way workloads are managed across the entire IT infrastructure.

Among these workloads will be analytics, BI, decision support, and end-to-end workloads that tap scalable databases and enterprise applications. Often, blade servers may be accessing workloads that have been consolidated onto scalable servers for more efficient management and daily IT operations. For this reason, IDC finds that analytics workloads are increasingly being applied to large data repositories to speed time to decision, based on rapid analysis of transactional data. Examples include cell phone fraud investigations and retail store sales results (based on analysis of sales promotions).

Management of these types of end-to-end workloads should be cross-tier because orchestration is key to improving overall throughput. The business benefits of implementing this approach to cross-tier computing take many forms, including:

- Combinations of workloads to bring new business insights
- Reducing the management costs for cross-tier computing
- Improving IT flexibility and business agility

Without optimized solutions, many organizations could not afford to acquire this kind of computing capability, especially when the solution includes scalable systems that support data warehouses. The modifications that would have to be made to their current IT infrastructure would cost too much or would be impractical to implement.

IDC believes that five workload types are most likely to be optimized for use in these blended computing environments, as shown in Figure 1. This data comes from IDC's annual workloads study of 1,000+ professionals and conforms with the large workloads categories from that study.

**FIGURE 1**

Workloads Primed for Optimization



Source: IDC, 2011

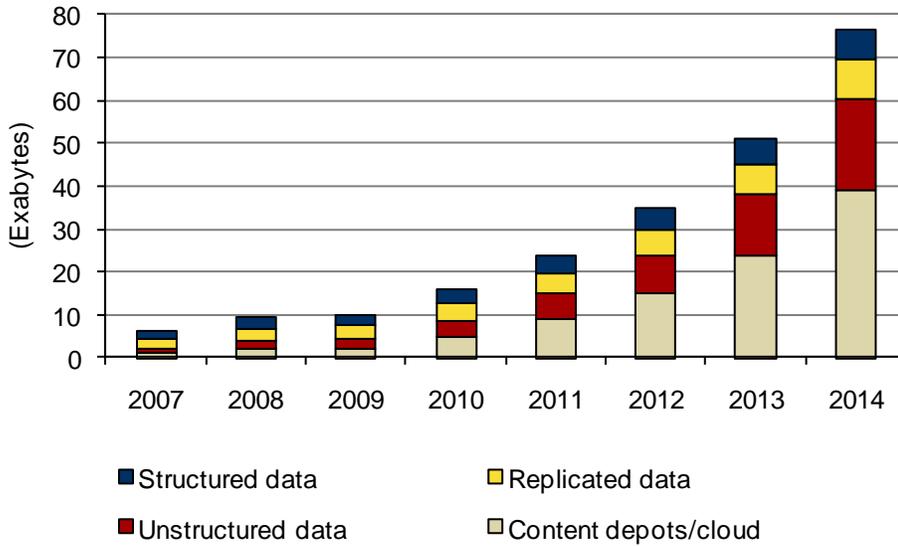
The workload types most likely to be leveraged for optimization are business intelligence, business applications (such as ERP), collaboration (including email and groupware), and database/online transaction processing (OLTP); you can see infrastructure workloads at the bottom of Figure 1. Next to each category, the amount of IT spend that IDC expects to see for servers supporting these workloads in 2011 is shown — resulting in a total of \$53 billion in 2011 server spend.

Combinations of these workloads, as described in this paper, provide business insights — and getting the components on separate tiers to work together faster would bring those insights more quickly, speeding time to decision for business managers.

As Figure 2 shows, the rapid growth of data is causing many organizations to work in new ways and, by using business intelligence and analytics software, to unlock the business information that can be found within the data. Ultimately, the ability to sort through the large amounts of data, and to glean useful information from it, represents a net-new opportunity to improve business agility. Often, the cost of processing such large quantities of data can be prohibitive — and the effort itself is time-consuming. However, by leveraging new software and hardware technologies, these capabilities are becoming more affordable in the marketplace and easier to adopt.

**FIGURE 2**

The Rapid Growth of Role-Based Storage: IDC Worldwide Enterprise Storage Consumption Model



Source: IDC, 2011

### What Does This Mean to the Midmarket?

Midmarket organizations — those with between 100 and 1,000 employees — face many of the same challenges as large organizations with 1,000 or more employees but may have more limited IT budgets to work with as a percentage of total revenue.

In a midmarket organization, IT staff size is limited and integration costs are high. It's easier to leave the computing tiers as they are; the costs of doing custom systems integration work are high in terms of time and money and IT skill sets.

If midsize organizations would benefit from cross-tier computing, and improved management links, why doesn't it happen more often? Limited resources, in terms of both capitalization and personnel, play a major role. However, applying technology solutions that have been pretested and preintegrated reduces IT staff time for deploying and maintaining a system.

That's why systems that leverage a template, or reference architecture, would improve cross-tier, or hybrid, computing, especially for smaller organizations with tight budgetary constraints and limited IT staff resources. Clearly, there are benefits to having a smaller, more flexible organizational structure. Many midmarket organizations have a flatter organizational structure than larger organizations with the result that senior management has broad responsibility and fewer layers exist between senior management and IT management. Often, this has the effect of making IT changes more immediate and visible, showing the impact of IT simplification, workload consolidation, and unified management across multiple computing tiers.

The ability to link applications and data can speed the time to results for the midmarket. This includes SMBs, small and medium-sized enterprises, regional banks (or other regional operations of larger businesses), business units, and academic groups within university communities.

## IBM HYBRID COMPUTING SOLUTION

Given the separation between computing tiers and the rapid growth of data, more organizations would like to optimize their end-to-end workloads to achieve better business results. Many organizations find that it has been too expensive to change their current multitier computing infrastructure to optimize performance of the analytics applications that process large amounts of data in data warehouses managed by scalable servers. The modifications that would have to be made to their current IT infrastructure would cost too much or would be impractical to implement.

IBM has addressed these issues by designing a blended system offering that integrates hardware and software and optimizes workflows between the computing tiers. The combined systems support blended workloads that are managed in a unified way.

### Products Within the IBM Hybrid Computing Solution

- ☒ IBM zEnterprise 114. This system, which is powered by up to 14 cores, is a smaller version of the z196, which has 96 cores. The smaller footprint and new packaging of the z114 result in a reduction in the entry price for growing businesses looking to leverage the System z capabilities and mainframe-level security and availability for business workloads. The z114 supports a number of operating systems — z/OS; z/VM (which supports virtualized Linux environments with many hundreds of Linux instances); z/VSE (which supports DOS/VSE workloads); Linux; and z/TPF (for the Transaction Processing Facility environment).
- ☒ IBM zEnterprise BladeCenter Extension (zBX) with POWER7 blades running IBM AIX (the IBM Unix operating system) and IBM HX5 System x blades running Linux. IBM has made a statement of direction for support of Microsoft Windows on the System x blades by 2012. The zBX ships with one to four racks and supports up to 112 blades and specialized workload optimizers in all.
- ☒ Hardware price reductions of 25% from the IBM System z10 Business Class to the z114, and memory price reductions of up to 75%.
- ☒ IBM Smart Analytics Optimizer. This optimizer, which is housed in a separate zBX chassis, combines hardware and software to accelerate select database queries and capitalizes on IBM technologies to accelerate business analytics functions that enable the integration of business insights into operational processes.
- ☒ IBM WebSphere DataPower Integration Appliance for zEnterprise (DataPower X150z). Announced in February 2011, the DataPower X150z is a multifunction hardware appliance that provides connectivity, gateway functions, data transformation, protocol bridging, and intelligent load distribution. It can be used to support Web services for core System z applications or to establish a secure environment enabling service-oriented architecture (SOA) and XML applications to support seamless integration of distributed and System z platforms.
- ☒ zEnterprise Unified Resource Manager. This is system management firmware (implemented as a hardware feature) that manages across the z114 and the zBX blades and optimizers. It works with the firmware's instruction set to manage the workloads across system-specific high-speed links. The Unified Resource Manager supports visualization of workload management on a single, unified system management console (the Hardware Management Console), supporting single-pane-of-glass management for system administrators.
- ☒ Support for IBM specialty engines in the z114, including the Integrated Facility for Linux (IFL), zIIP, and zAAP — all of which are shipped on the larger z196 system. These engines support new workloads on the System z and reduce ongoing costs of operation through support for workload consolidation onto the System z for faster processing.
- ☒ Support for extremely high levels of availability via the IBM GDPS (Geographically Dispersed Parallel Sysplex) capability, with clustering at a distance, and active/active configurations that support production of applications on an ongoing basis — and use of the z114 for disaster recovery purposes, if needed. Improved security for Linux workloads is provided via "inheritance" of System z security for the Linux workloads that run on IFLs.
- ☒ New price points for the z114 system, similar to the way that the System z Business Class systems (z9 BC and z10 BC) complemented the high-end System z models. The z9 BC and z10 BC models were designed to meet the needs of small and medium-sized enterprises.
- ☒ Support for the full portfolio of IBM enterprise software — including IBM Tivoli for management, IBM Lotus/Domino for collaborative software, IBM Rational development tools, and IBM WebSphere for application serving. The solutions support thousands of ISV applications, which have been tested and certified for use on System z and the zEnterprise solution.
- ☒ Support for raised-floor and non-raised-floor installations of the z114 and zBX.
- ☒ Ability to scale from 26 MIPS to 3100 MIPS (millions of instructions per second) of general-purpose capacity — in addition to the capacity offered by the additional specialty engines (e.g., IFL, zIIP, and zAAP) on board each z114 system.
- ☒ Support for upgrade from the z9 Business Class and z10 Business Class systems.

Some examples of these blended workloads addressed by the IBM zEnterprise hybrid computing solution set include:

- ☒ **Real-time analytics** — quickly searching deep data repositories for "patterns in the data" that support rapid decision making for business managers. Examples include retail (large numbers of transactions) and telecommunications (searching for fraudulent cell phone activity). This approach to real-time analytics leverages the IBM Smart Analytics Optimizer, which is part of the IBM System z solution.
- ☒ **Workload consolidation** — efficiently managing dozens, or hundreds, of Linux workloads in the same frame, allowing a few IT administrators to manage large numbers of virtual servers in place of physical servers. This can be more efficient than managing the same number of physical servers, and it reduces costs for power/cooling and maintenance.
- ☒ **ERP workloads, with components on multiple server systems.** This deployment model supports ERP landscapes that include modules running on the Web tier, the application tier, and the database tier. Although blades and scalable System z servers coexist in datacenters today, the hybrid computing solution improves network performance, speeding throughput, and manages across multiple systems more easily with fewer IT administrators.
- ☒ **Management point — or hub — for enterprise cloud computing.** The IBM System z can be the engine for private cloud services, providing the business with data that can be accessed, on demand, by end users across the enterprise. This prevents overbuilding infrastructure for the "peaks" of processing demand and an approach to providing near-real-time "snapshots" of the business to support executive decision making.

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## Deployments of the IBM Hybrid Computing Solution

Figure 3 shows a typical deployment of the z114 solution, including the z114 system, the zBX chassis, and the zEnterprise Unified Resource Manager connecting the two.

The new IBM z114 offering reduces the barriers to entry to hybrid computing for a wider range of customers, many of whom could not afford to install the System z196 configuration — or might not need that much processing capacity — in addition to the zBX bladed server chassis and blades.

**FIGURE 3**

**IBM zEnterprise 114 (z114): A Hybrid Computing Solution for a Broader Set of Businesses**



**IBM zEnterprise 114 (z114)**

*The next generation midrange mainframe delivering extensive growth options, flexibility, efficiency and improved price performance.*

**zEnterprise Unified Resource Manager**

*Centralized management of heterogeneous resources for simplification and resiliency*

**zEnterprise BladeCenter Extension (zBX)**

*Integrated IBM POWER7 blades, IBM System x blades, and High-performance optimizers and appliances*

Source: IBM, 2011

These hybrid computing capabilities, originally introduced with IBM zEnterprise 196 (z196) in the summer of 2010, are now being brought to new price points so that smaller organizations — or departments within organizations — can leverage these powerful capabilities for multitier workloads that access databases and data warehouses running on System z.

Importantly, unified management will allow businesses to manage across separate types of servers, orchestrating workflows. In addition, the availability and security "-ilities" of the System z (e.g., reliability, availability, serviceability) can now be inherited by workloads that originated not on System z but on blades that are linked to the System z114 hybrid computing solution. More technical information about the IBM z114 announcement can be found at the IBM Web site, as follows: <http://www.ibm.com/systems/z/news/announcement/whatsnew.html>.

Customers who identify the distributed workloads that leverage data managed by System z will gain IT and business benefits. Further, the reduction in IT "churn" — in terms of both IT staff time and deployment time for distributed computing workloads — will pay off in rapid deployment, reduced IT staff time, and reduced operational costs.

The business benefits will include rapid deployment of new workloads to meet changing business conditions and faster time to decision based on faster processing of large amounts of data. IT will gain in efficiency by being able to leverage small IT groups to deploy, manage, and maintain more workloads, improving IT staff productivity.

Examples of demographics for the IT customers addressed by the IBM z114 include the following: a department or division within a large enterprise; a midmarket business with 100–1,000 employees; and a government agency that could not have afforded this technology previously (or required the capacity and scale of the z196) but can do so at the new price points.

Barriers remain in today's datacenters. Interoperability issues, lack of APIs, and the lack of a unified approach to system management that uses a common set of software tools all must be improved in order to optimize the running of end-to-end workloads. However, it is also clear that the use of shared middleware and common components improves cross-tier communications, leading to better performance for end-to-end workloads hosted across the computing tiers.

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## **Identifying Workloads for Optimization**

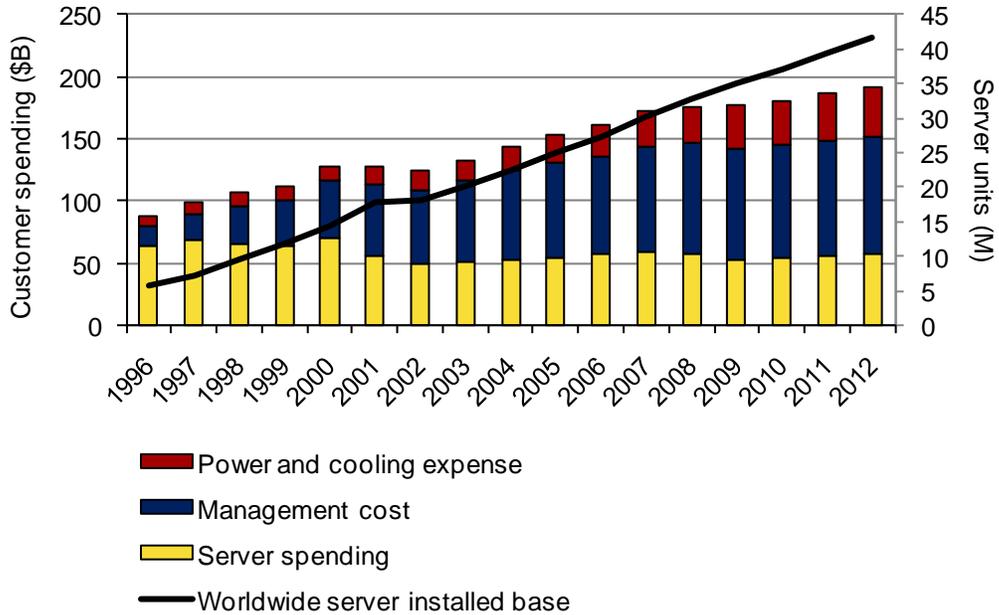
All of this suggests an action item for IT organizations: They should take stock by making an "inventory" of workloads — identifying which workloads have the greatest affinity for IT optimization. If that can be done, then the workloads that would benefit most from being brought closer together would have the greatest potential to improve overall business results. They are the ones that IT managers should seek to include in optimized server deployments for end-to-end workloads.

## **UNIFIED SYSTEMS MANAGEMENT ACROSS THE IBM HYBRID SOLUTION**

In the server market, IT organizations have done a good job of controlling capital expenditures (capex), as the yellow bars in Figure 4 show. (Server revenue for each year, in billions of dollars, is shown on the left axis of the chart, and the unit shipments, in millions of units, are shown on the right axis.) However, many of the operational costs (opex), including costs for management and administration and power and cooling, have risen sharply since the early 2000s and are expected to grow even more by 2015. This means that IT managers must look to reduce these operational costs by reducing IT staff time associated with management and maintenance and by reducing power/cooling costs through energy-efficient deployments.

**FIGURE 4**

Worldwide Spending on Servers, Power and Cooling, and Management/Administration



Source: IDC, 2011

And, as we can see with the thin line rising from left to right, the worldwide installed base of servers has increased sharply as well — with more than 35 million servers installed worldwide by 2010. The last two years shown in Figure 4 are forecast data for 2011–2012.

Clearly, technologies that can reduce operational expenditures, or opex costs, will have the effect of reducing overall costs, benefiting the business. Efficiency in management, and automation, which reduces IT staff time associated with manual system admin tasks, will impact these opex costs, wherever it can be applied.

A key objective of zEnterprise is to extend traditional System z qualities of service (QoS) across the enterprise to hybrid computing environments supported by the zBX blades, which are housed in the zBX chassis. The zBX blades now include IBM Power blades based on IBM POWER7 processors running IBM AIX (IBM's Unix operating system) and IBM System x HX5 blades running Linux on Intel Xeon x86 processors. IBM has also made a statement of direction, indicating that the x86 blades will also support Microsoft Windows by the end of 2012.

The architecture of zEnterprise with zBX provides operational efficiency, performance, and availability advantages, as well as enhanced security for hybrid workloads, compared with loosely coupled hybrid configurations. One source of efficiency for the new hybrid computing model comes from the closely coupled architecture of the overall solution. Now, high-speed internal network connections are

linking the zEnterprise 114 CPC with the zBX containing IBM POWER7 and IBM System x HX5 blades, and this results in optimized communications across the hybrid components.

Another key architectural component of zEnterprise is provided by IBM's zEnterprise Unified Resource Manager. The zEnterprise Unified Resource Manager provides an integrated facility for hardware and platform management across the hybrid components supported by zEnterprise. IBM engineering has added firmware to the zEnterprise and to the zBX chassis that contains logic that links the two chassis together. The firmware, when used in conjunction with the unified management software, optimizes performance for end-to-end workloads that span the zEnterprise and the blades. It does so by reducing the transit time for a request from one of the workloads that is running on the blades to reach the System z.

Management functions that span the systems include the following:

- Discovery and definition of hardware components across the zEnterprise CPC and zBX
- Definition and management of virtual environments
- Definition and management of LPARs, virtual machines, and virtualized LANs
- Definition and management of workloads and workload policies
- Energy monitoring and management
- Goal-oriented policy management and data management for physical and logical resources

The objective is to provide end-to-end management of hybrid workloads in the context of a single virtualized heterogeneous system. A workload context is introduced to optimize the physical and virtual resources that are needed to support an application to meet overall service-level agreement (SLA) requirements.

On July 12, 2011, IBM announced the addition of several new management capabilities to the z114 system. The Unified Resource Manager runs on the IBM Hardware Management Console (HMC), including the ability to monitor the performance of the CPUs (processors), energy, and workloads running on the system. The HMC provides hardware and platform management for the system — controlling the resources of the zEnterprise 114 (inclusive of the logical partitions [LPARs] and virtual machines running on the system), the zBX infrastructure, and the attached blades and optimizers. IBM has announced a future direction to deliver APIs to enable management of the Unified Resource Manager from external tools as well.

By linking what had formerly been "islands" or "silos" of information gathered within the datacenter and by providing unified management capabilities, IBM is unlocking the potential of data analysis across the enterprise that could lead to competitive advantage through timely knowledge about sales patterns in retail organizations, cell phone fraud in telecommunications, public utility "grid" flows of electricity or water, and irregular transactions within financial services institutions.

## ACQUIRING AND FINANCING IBM'S HYBRID COMPUTING SYSTEMS

IBM is offering reduced system pricing, along with financing plans, for the z114 and the hybrid computing solution including z114, zBX, and the Unified Resource Manager. System z acquisition costs were reduced by 25% (z114 compared with earlier z10 Business Class models); memory prices were reduced by up to 75%; and specialty engine (e.g., IFLs, zIIP, and zAAP) prices were reduced up to 27%.

With these pricing changes and improved financial terms, the IBM cross-tier, hybrid computing deployments are being made more affordable so that more organizations can consider acquisition via purchase or lease.

The aim of the reduced pricing is to enable business benefits as follows:

- ☒ Faster performance for end-to-end workloads
- ☒ More flexible deployment that addresses IT's peaks and valleys of computing — such as seasonal peaks for end-of-quarter processing, end-of-year processing, holiday periods, and periods of high transaction volumes, such as those caused by Web-based sales promotions
- ☒ The ability to analyze larger databases, including data warehouses and data marts
- ☒ Better leverage for the IT skill sets that already reside within organizations
- ☒ Improved service-level system management across tiers, which in turn improves availability of applications
- ☒ Faster "time to decision" based on insights gained from analyzing the data that's already stored within the datacenter — and doing so more quickly

## CHALLENGES/OPPORTUNITIES

The worldwide server market is a competitive one, with five top systems vendors worldwide and dozens of others competing more closely at the regional and country levels. Server platforms continue to compete in terms of price, performance, and price/performance as well as in their capacity to support virtualized workloads and their ability to provide reliability, availability, and serviceability to IT staff and end users. A number of companies are looking at ways to integrate hardware and software functionality to speed deployments, to simplify ongoing operations, and to minimize IT staff costs associated with updating and modifying systems. Each vendor is taking its own approach to this process of optimization and integration and branding its solutions to differentiate them in the marketplace.

IBM recognizes that its ability to integrate functionality, while supporting open computing standards, is the basis for much of its differentiation and business value as it goes to market with its server solutions. That is why IBM is emphasizing its role as a provider of reliable mainframe System z servers and demonstrating how these systems will do well in supporting business-critical and mission-critical workloads and analysis of transactional data that will lead to a deepening of business value.

## CONCLUSION

Midsized companies, in challenging times, have a lot to gain by moving more rapidly into analysis of the business data that has been gathered by everyday transactions but needs to be identified accurately. Vital information can be found more quickly, based on same-day business results, and action taken by senior executives and business managers who need to know more about the patterns in the data. But reducing the opportunity cost to arriving at such a solution can pose a big challenge to many midsized businesses, departments, and agencies. Often, the prospect of rearchitecting current IT infrastructure is too expensive and time-consuming to consider.

IBM's decision to reduce the price of the IBM System z — blending its mainframe computing power with widely deployed blade servers — reflects many of today's datacenter realities. It offers new entry points to a style of computing that is already providing business value to larger companies that have adopted it with the IBM z196 enterprise solution. This support of cross-tier, end-to-end computing allows businesses to identify key trends in the data and to take action in a more timely manner. This style of processing can produce real-time results that allow businesses to deny credit or to reward customers, depending on the results of a given analysis, while they are speaking with a customer representative.

The increased accessibility of this optimized end-to-end solution, with the networking and software optimization built into it, will benefit a broad range of organizations, including midsized businesses, departments, and agencies that need to simplify infrastructure, leverage skill sets, and extract vital information from the mountains of data that are generated by their daily operations.

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