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ZEnterprise Should Change The Role Of The Mainframe In Application Strategy Decisions

by Phil Murphy

for Application Development & Delivery Professionals

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by Phil Murphy
with John R. Rymer, Brad Day, and Sander Rose

EXECUTIVE SUMMARY

On July 22, 2010, IBM released a series of product announcements under the banner of *zEnterprise* that will force firms with both mainframe and distributed systems to rethink their application strategies. The announcement heralds a vastly improved z server (z196) combined with a zBladeCenter Extension (zBX) tied together via private data networks and managed by a single point of control. Why do application professionals care? zEnterprise is a big leap forward in simplicity for applications running on multiplatform environments. Rather than using a brittle maze of connections across myriad vendors, zEnterprise provides a pre-integrated multiplatform application environment. We expect synergistic offerings from IBM Tivoli and IBM Rational as well as from BMC Software (BMC), CA, Compuware, and others to further enrich this offering — the first zEnterprise announcement is only the beginning of the story.

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NOTES & RESOURCES

To write this report, Forrester coalesced information available from IBM engineers, cooperating and competing vendors, customer reactions, and analyst knowledge.

Related Research Documents

"A Workable Application Modernization Framework Is Job No. 1 Now"
April 26, 2010

"Managing The Virtual World Is An Evolution, Not A Revolution"
April 22, 2010

"The New IBM Mainframe: Should You Make The Move To System z10?"
April 23, 2008

IS ZENTERPRISE A LAND-GRAB BY IBM OR A BADLY NEEDED BLOW FOR SIMPLIFICATION?

At its core, zEnterprise is a mix of hardware and systems management software improvements that change the way applications professionals can think about multiplatform computing; zEnterprise melds the traditional boundary lines of mainframe and distributed silos.[1] The announcement offers customers myriad scalability configurations by combining zEnterprise *nodes* and *ensembles*.

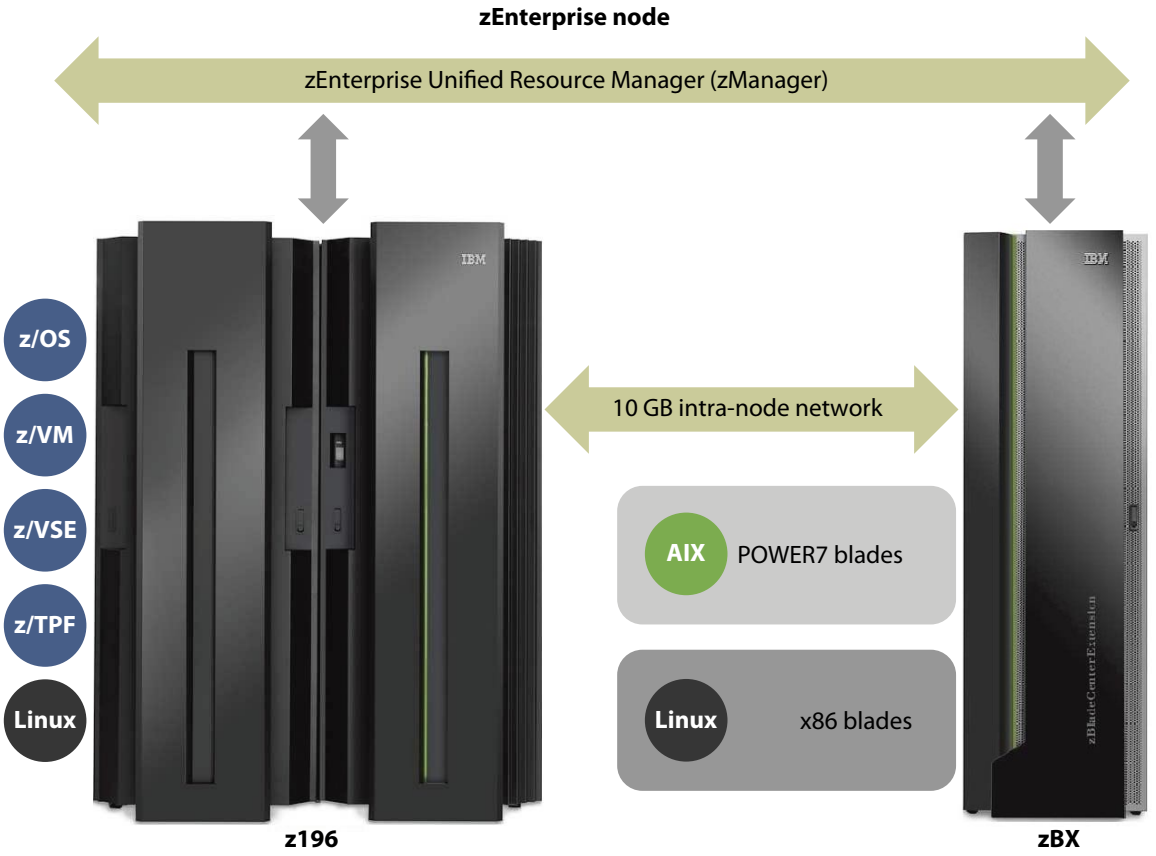
A zEnterprise Node Combines z And Blade Servers, Networks, And Administration In A Box

Think of a zEnterprise node as a hybrid machine that houses servers, networking, and management capabilities in a single unit: a node (see Figure 1). A node includes the following components:

- **A powerful new mainframe server . . .** The z196 processor operates at 5.2 GHz, up from 4.4 GHz in the z10, and has a total capacity of 50 billion instructions per second (BIPS) — up 60% from its z10 predecessor.
- **. . . combined with x86 and POWER7 blade servers . . .** In addition to the z196, the zBladeCenter Extension (zBX) adds up to four racks of select POWER7 and IBM x86 blades with up to two blade centers per rack for a maximum of 112 blades per node.
- **. . . connected by a private, intra-node data network . . .** IBM baked in a 10 GB private intra-node data network so that all servers within a node can communicate directly. The private network is physically isolated from all other networks, switches, and routers, permitting administrators to safely remove firewalls.
- **. . . and exposed for monitoring and management via a single point of control.** The most significant feature of the announcement is the zEnterprise Unified Resource Manager (zManager), which is delivered as firmware. zManager exposes the controls needed to monitor and manage the node as a pool of resources for provisioning, monitoring, optimization, diagnosis, and service.

Critics may infer that zEnterprise is a land-grab by IBM, as its initial release only includes select IBM POWER7 and x86 servers. Whether the claims have merit remains to be seen; however, if IBM had attempted to certify all other variants in the initial release, this would have doomed zEnterprise to failure. Also, zManager can't reasonably be characterized as a systems software land-grab, because it exposes a single point of interface/control so the multiplatform environment can be managed by systems management tools from CA, BMC, Tivoli, and other vendors. Expect vendors that haven't already done so to jump on the zManager bandwagon with complementary products and services.

Figure 1 zEnterprise Node Links The z196 And zBX Via A 10 GB Intra-Node Private Data Network

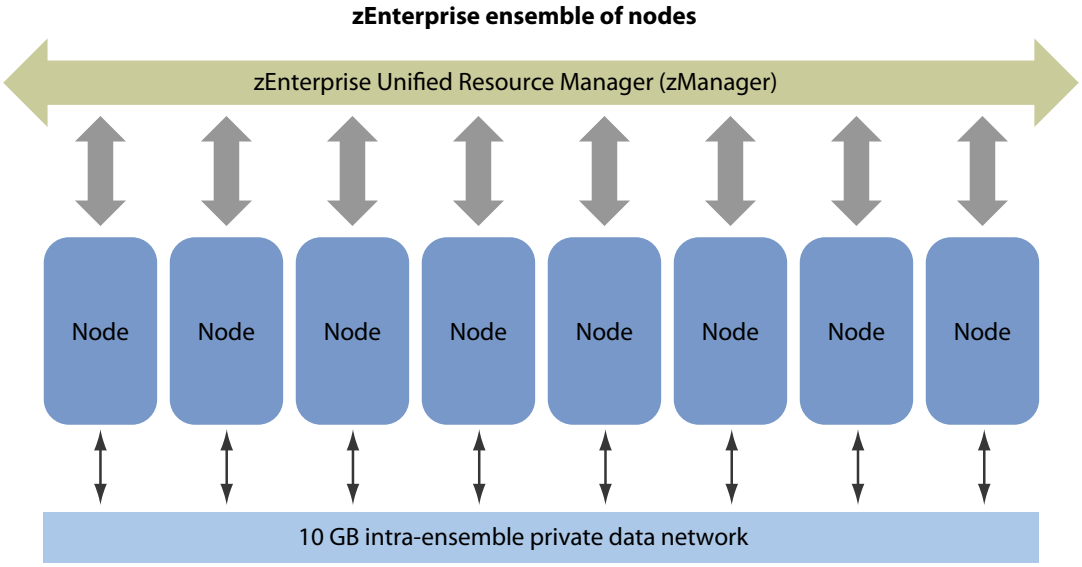


57822 Source: Forrester Research, Inc.

zEnterprise Ensemble Links Up To Eight Nodes In A Unified, Virtually Managed Environment

When the zEnterprise node isn't enough horsepower, the zEnterprise ensemble couples up to eight nodes together with a 10 GB private data intra-ensemble network (see Figure 2). As with the zEnterprise node, zManager exposes the ensemble's administration, management, provisioning, and virtualization functions to external management software via a single point of control.

Figure 2 zEnterprise Ensemble Links Nodes Via A 10 GB Intra-Ensemble Private Data Network



57822 Source: Forrester Research, Inc.

THE NODE IS THE NEW TARGET FOR MULTIPLATFORM APPLICATION DEVELOPMENT

Developing and deploying large multiplatform applications has become hopelessly complex — multiple operating systems, application servers, protocols, data representation, and database servers are a nightmare for applications professionals to develop, implement, diagnose, and maintain. Myriad routing, switching, and network cabling between them all introduce potential points of failure and latency issues, and end-to-end diagnoses to locate faults and improve performance are a real challenge.

Few if any firms have the luxury of throwing it all away to redevelop on new platforms and databases; instead, they must modernize the existing applications inventory and evolve it forward to meet business needs. zEnterprise simplifies the chaos by allowing firms to:

- **Exploit new compiler advancements to improve application performance.** zEnterprise has 73 new instructions embedded in the microprocessor for current and future exploitation by compilers and by various software subsystems such as IBM DB2. Look for a METAL C compiler for low-level programming, better XML and Java support in the Enterprise COBOL compiler, and enhanced CICS, DB2, and IMS support in both the Enterprise COBOL and Enterprise PL/I compilers. Embedding the instructions optimizes the runtime environment for better performance.

- **Increase mainframe headroom capacity and leverage specialty analytics processors.** Many facets of the announcement will improve overall capacity and application performance; the new capacity of 50 *billion* instructions per second (BIPS) represents a big increase in overall headroom — and lack of headroom has forced some firms to consider a lift-and-shift migration off the mainframe to avoid costly third-party software upgrade charges. Processor advancements will speed up computational processing, and dedicated blade optimizers such as IBM Smart Analytics Optimizer (SAO) expedite the process of complex DB2 queries in parallel.

- **Simplify and shorten transaction paths in multiplatform application environments.** A pre-integrated and preconnected node without internal firewalls has tangible application benefits. It shortens the paths traversed between applications, servers, and data, reducing the number of network hops by more than 10 to 1 for one early customer.[2] Fewer network hops means less latency and higher end-to-end transaction throughput. Multiplatform application designs will co-locate data, applications, and other application resources to reduce overall transaction latency.

- **Improve the applications-to-operations handoff process.** A simpler applications environment will reduce some of the chaos in the handoff to operations staff as well as help operations staff balance workloads on the most appropriate server type — whether the application workload is data intensive, transaction intensive, or compute intensive.

- **Accelerate ISPF replacement by a modern IDE from Rational, ISPW, or another vendor.** Green-screen interfaces are a legacy that once fit monolithic development environments well but that no longer fit modern needs. The trend to multiplatform application development forces those who haven't already to finally trade ISPF for a modern, eclipse-based integrated development environment (IDE) that permits multiplatform development — for example, an IDE from Rational or ISPW. Adopting a more modern IDE will help firms mitigate some of the anticipated skills and generational and cultural issues.[3]

SEVERAL APPLICATION FACTORS WILL AFFECT YOUR ZENTERPRISE DECISION

Platforms decisions are largely made by infrastructure and operations (I&O) professionals; however applications influence platform decisions, as evidenced by the adoption of client/server, eBusiness, and mobile platforms. Consider the size of your investments in mainframe applications as you decide whether to adopt zEnterprise.

Size Matters Because Your Level Of Investment Affects Migration Feasibility

Firms with small mainframes often choose to leave the mainframe to reduce the total cost of the platform — costs from IBM enter into the decision, but third-party software costs commonly finalize it. Similarly, firms with larger mainframes that only have a few remaining mainframe applications *may* choose to rewrite or replace them with packaged applications to consolidate on fewer platforms.

However, large firms with large investments in mainframes choose to retain them because they need that level of power, reliability, scalability, and quality of service (QoS). Even when competitive hardware and software is available at a similar QoS, the applications are the big stumbling block: To enable a move, firms must migrate, replace, or rewrite them en masse. These firms can't simply rewrite or replace all applications with new languages, platforms, and databases all at once — the risk, cost, and time it would take are untenable. Evolutionary change is far less risky than big-bang change, and its costs can be absorbed more readily over time, making it an easier sell to business leaders.

MIPS, COBOL, And Third-Party Tool Limitations Further Define Migration Feasibility

Programming language plays a role in the decision as well. For example, you are more likely to be forced to replace or rewrite PL/I and Assembler applications than a COBOL application; COBOL's ubiquity translates to a wealth of COBOL developers and makes COBOL a more lucrative market for third-party tool vendors.[4] Firms with COBOL applications on small mainframes may investigate whether moving to a smaller platform would save them money; however, the decision isn't so simple for firms with larger investments.

A "Lift-And-Shift" COBOL Migration May Save Small Firms Money

At the small end of the MIPS spectrum, firms with fewer than 200 million instructions per second (MIPS) routinely move their COBOL applications off the mainframe in an operation commonly referred to as a "lift-and-shift" migration. The primary driver of this migration is reducing the total cost of the small mainframe hardware and software environment. In a lift-and-shift migration, the COBOL source code is moved off the host and recompiled to run in a Windows or Unix environment using an assortment of third-party compilers, runtime software, and scripts that create COBOL object modules, replace CICS functionality, and emulate batch job streams.[5] Above a few hundred MIPS — from 500 to perhaps 1,000 MIPS — the application workload characteristics begin to influence whether a lift-and-shift migration makes sense:

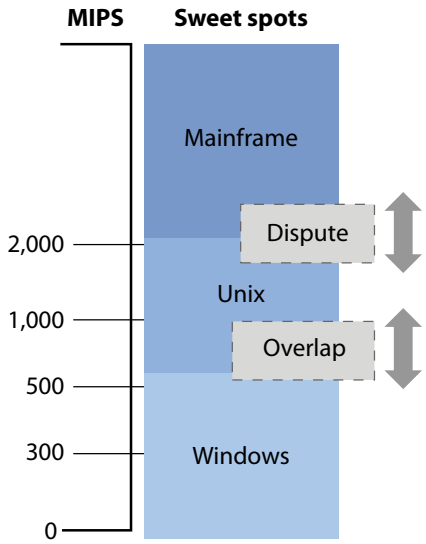
- **Retail firms have migrated simple batch workloads of several hundred to 1,000 MIPS.** For example, one retail firm with nearly 1,000 MIPS executed its lift-and-shift migration to Wintel successfully; the steady stream of relatively simple retail transactions posed few problems despite the number of MIPS.

- **Financial services firms with higher expectations found problems at 500 MIPS.** Lift-and-shift migrations to Windows have been less successful in more-demanding use cases. A US bank migrated a 500 MIPS workload to Windows, co-locating it with a new data warehouse for performance reasons. After 18 months of experience running the new environment, the bank's technical staff members still took issue with the overall lack of operational maturity in the COBOL-on-Windows applications environment and the difficulty of running large batch processes with complex job-step interdependencies.

- **Unix supports higher MIPS loads.** If you've decided to move your COBOL from the mainframe, Windows isn't your only choice; Unix is also an option, and firms that have targeted Unix for COBOL lift-and-shift migrations cite success in the 1,500 MIPS range up to a few thousand MIPS.

While the vendors involved may dispute the locations of the boundary lines, there exist some *general* guidelines for the stratification of the MIPS ranges where a lift-and-shift migration makes sense (see Figure 3).

Figure 3 Size Matters: The Sweet Spots, Overlaps, And Platform Boundary Lines In Dispute



57822 Source: Forrester Research, Inc.

EXPECT THIRD-PARTY ENRICHMENT, CLOUD OPPORTUNITIES, AND SOME RESISTANCE

There is plenty of good news in zEnterprise for large-scale multiplatform computing environments, and perhaps some future good news for smaller firms:

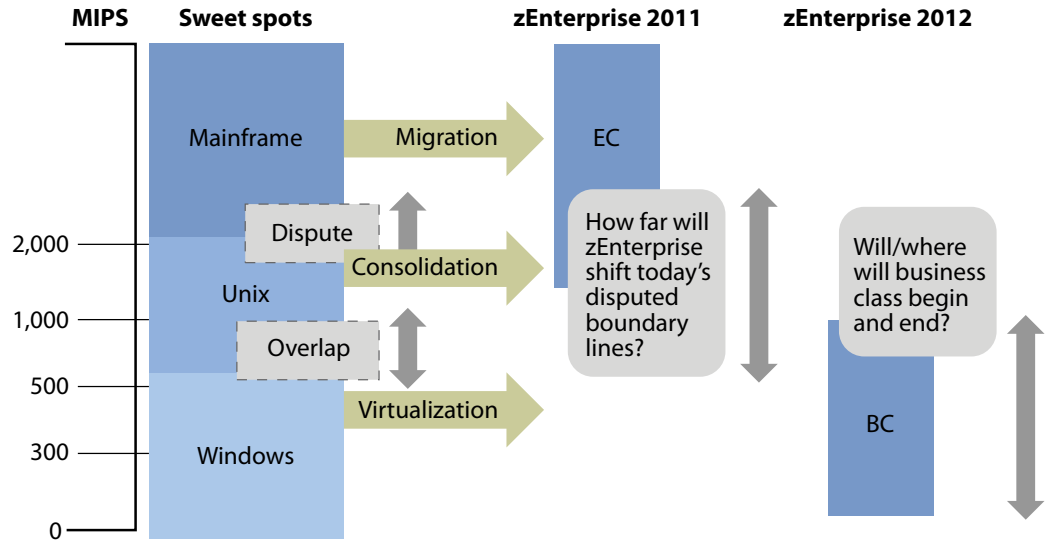
- **A potential subsequent announcement could extend the range of zEnterprise.** History suggests that there is *potential* for IBM to follow up with a business class (BC) version of zEnterprise — typically 12 to 18 months after the initial enterprise class (EC) machine. To the extent that IBM follows on with a BC version in 12 months time, zEnterprise will also draw the attention of much smaller firms (see Figure 4).

- **zManager opens the door to new complementary products and services.** The greatest value in the announcement is the door that zManager *opens*: Exposing a single point of control to enable provisioning, virtualization, and monitoring heralds interesting opportunities for zEnterprise. We expect BMC, CA, Rational, and Tivoli to all develop complementary products for zManager and zEnterprise. What else will zEnterprise set in motion? Will it become the ultimate target environment for large-scale multiplatform firms to move their back-office applications to the cloud? Exactly how will zEnterprise's inherent multiplatform nature influence complementary software and services from IBM Rational (RDz), IBM Tivoli, and other vendors such as BMC, CA, and Compuware? Will/when and how will zBX extend its support beyond POWER7 and IBM's x86 blades to other hardware vendors and potentially other operating systems?

- **Multiplatform transparency will spawn demand for more transparency.** zManager creates multiplatform hardware transparency that will open the floodgates for more transparency in other areas — real-time transparency into application inventories, runtime dependencies, and configuration information — melding application portfolio management (APM) metrics with solid operational statistics. Solid views of as-is application and operational information will satisfy many roles — enterprise architecture (EA), ops, apps, the project management office (PMO), and the CIO — but it won't be enough. Applications professionals will eventually extend transparency even further by linking in project portfolio management (PPM) information to create enterprisewide views of historic, current, and planned IT activity (projects, enhancements, maintenance, upgrades, bug fixes, etc.). With this information, work within IT can be orchestrated to avoid the bottlenecks that cause so much of the delay, cost overrun, and outright failure we experience today.[6]

- **Don't expect everyone to love the new reality.** Multiplatform is the new reality, and smarter, simpler, self-managing systems are the inevitable corollary. But don't expect everyone to love the idea of centralized management transparency. Traditionally, distributed platforms do not enforce anywhere near the operational rigor that is the norm on mainframe systems — which sets the stage for active and passive resistance to scuttle adoption of unified management. Where adoption of zEnterprise makes sense, CIOs and CFOs will need to ensure that the benefits that more-centralized administration brings to the whole organization are not usurped by systems administrators with personal agendas and fiefdoms to protect.

Figure 4 zEnterprise Will Intensify The Conflict Around The Boundary Lines



57822 Source: Forrester Research, Inc.

RECOMMENDATIONS

USE THESE BOUNDARY LINES TO GUIDE YOUR ZENTERPRISE DECISION

Should your organization consider zEnterprise? The answer to that question will be simple for firms with very large and very small commitments to mainframe applications, and the middle ground will be an interesting battleground over the next two years.

Most Large, Committed Mainframe Customers Should Adopt zEnterprise Immediately

Firms in banking and insurance as well as other financial services firms, energy and utilities firms, and telecom firms have applications on many platforms due to the merger and acquisition (M&A) activity of years past. Federal, state and local governments face similar challenges: They need to consolidate departmental-computing chaos of decades past to alleviate tomorrow's budget pressures.

- **The largest mainframe customers should begin planning for zEnterprise.** Global firms and large firms with sizeable existing investments in mainframe applications and a mix of distributed applications should already be planning for zEnterprise. These highly heterogeneous IT organizations have become too costly and complex to continue as they are, and their investments in mainframe and distributed applications are too large to abandon either one. zEnterprise doesn't force them to choose one over the other.

- **Firms with more than 2,000 MIPS should investigate and will likely embrace zEnterprise.** Firms at the smaller end of this group — down to around 2,000 MIPS — *likely* have enough mainframe applications that they should adopt zEnterprise sooner rather than later.
- **Large firms with smaller workloads should second-guess moving to Wintel.** Where large firms once may have considered moving sub-500 MIPS workloads off the mainframe to Wintel, zEnterprise's increased manageability and other benefits may represent a better, more flexible, and more manageable alternative to application server sprawl.

Customers With Fewer Than 2,000 MIPS: Investigate, Perhaps Strongly Consider Adoption

The range that falls below 2,000 MIPS brings the overlap of mainframe, Unix, and Wintel sweet spots into play; here, the total cost of the platform, the total cost to migrate away from the platform, and the relative immaturity of JCL batch and online emulation are all significant factors.

- **Firms with 1,000 to 2,000 MIPS have a very strong case to adopt zEnterprise.** Firms with 1,000 to a few thousand MIPS have a strong case to adopt but must still evaluate whether the *total* business case for zEnterprise makes sense. Collect the cost data objectively — don't let platform zealots on either side skew the fact-gathering and lead you to an erroneous forgone conclusion. Evaluate IBM costs *and* third-party software costs, making sure to account for the differences in systems administration staffing costs in a centrally managed versus a highly distributed environment as well as the increased licensing costs as server sprawl occurs due to anticipated growth. Factor in your mix of mainframe and distributed applications — will it benefit from the centralized management, collocation, and other features zEnterprise offers?
- **Firms with 500 and 1,000 MIPS may have a weaker case for adopting zEnterprise.** Platform cost is likely a spoiler at 500 MIPS, as there is a minimum level of expense — a *barrier to entry* cost — to run a mainframe that third-party software affects greatly. The question for firms in this range is: "How much has zEnterprise lowered the barrier to entry — is it now more attractive than it was 12 months ago?" Firms in this range should still investigate the price and performance of the smallest configurations and make an informed decision.
- **Firms with fewer than 200 MIPS can safely ignore zEnterprise.** The smallest IBM mainframe customers are a no-brainer decision: Those with fewer than 200 MIPS can largely ignore zEnterprise. The comparatively small number of applications and staff these firms have can be transitioned to other platforms at a fairly low cost, so unless price points change dramatically, the barrier to entry costs make the platform too expensive for firms to run at this scale. Although the smallest zEnterprise MIPS ratings are in the range of a few hundred MIPS, the range from 200 to 500 MIPS is *likely* to remain a sweet spot for migration away from mainframe technology. Do the math so you know for sure.

- **Firms that are borderline on zEnterprise's value *today* should keep an eye on the horizon.** Firms that evaluate zEnterprise and find its price and performance *almost* compelling but not quite enough should keep an eye on the horizon. A zEnterprise BC version *could* fundamentally change the value proposition for firms with fewer than 1,000 MIPS in the 2012 to 2013 time frame.

Nonmainframe Customers Should Probably Stay That Way

Expect zEnterprise to have little to no impact on non-IBM customers for now. Whatever market forces influence an HP versus Sun versus POWER7 versus x86 decision before zEnterprise will hold true in the wake of the zEnterprise announcement.

WHAT IT MEANS

ZENTERPRISE IS A GIANT STEP TOWARD SIMPLER MULTIPLATFORM COMPUTING

The zEnterprise announcement by IBM is a critical first step down a long road toward simplicity. As technology grows inexorably more complex, it must become more transparent and self-managing — automation of monitoring, diagnosis, and repair and recovery are becoming the norm. As they do, the platform boundaries become less divisive — less a religious-war with technology zealots on both sides and more a matter of intelligent choice based on application workload characteristics. To the extent that zEnterprise fulfills that vision, it should have every firm that runs mixed mainframe/distributed workloads — today or in the future — rethinking where it places its applications.

ENDNOTES

[1] On July 22, 2010, IBM announced its latest large-scale computing environment. Source: "IBM Unveils zEnterprise System, Ushers in Era of Smarter Data Centers," IBM press release, July 22, 2010 (http://www-03.ibm.com/press/us/en/pressrelease/32166.wss).

[2] IBM cites the experiences of one retail client that noted a 12 to 1 reduction in the number of network hops when it switched to zEnterprise and was able to remove the blade firewalls.

[3] Green-screen interfaces hold no allure for members of younger generations who have used browser-based applications since they were very young. Modernizing the interface fits hand in glove with other IBM initiatives to alleviate mainframe skills issues. See the March 19, 2008, "Academic Programs Are Beginning To Offset Anticipated Mainframe Talent Shortages" report.

Use of a unified multiplatform IDE will erode some of the cultural issues as well. See the October 24, 2006, "CIOs: Avoid War Between IT's Twentysomethings And More Mature Workers" report.

[4] Although commonly used in systems-level software, Assembly language was once used for applications software because it yielded better performance than COBOL. See the October 2, 2009, "Modernization Decisions: Migrate, Rewrite, Or Replace A 40-Year-Old Assembler Application?" report.

[5] Third-party software to run COBOL applications on Windows and Unix is available in software offerings from vendors such as Clerity Solutions, Micro Focus, and Veryant.

[6] IT portfolio management goes by many names, including enterprise portfolio management and integrated IT management, as foreshadowed in earlier Forrester research. See the February 2, 2005, "Integrated IT Management Drives Efficiency" report.

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