CLABBY ANALYTICS

Research Report

How IBM's New zEnterprise/Blade Environment Can Be Used to Break Down IT Organizational Barriers

Executive Summary

Clabby Analytics conducts information technology (IT) research all around the world. We regularly produce case studies that are based upon on-site interviews with IT executives. And we have met literally thousands of IT practitioners at industry conferences over the past several years — and these practitioners also share their views on computer architectures, infrastructure, and management environments with us. And sometimes business and IT executives/practitioners talk about their organizational challenges…

What we have consistently found during the course of these discussions is that many IT organizations have become "factionalized". On one side of the organization, IT managers and administrators promote a centralized computing model; on the other side, IT managers promote a distributed computing model. Further, each group promotes its own infrastructure and management schema (example: centralized computer advocates who operate mainframes use advanced z/OS and z/VM virtualization; while x86 advocates prefer EMC VMware or Microsoft Hyper-V) — creating infrastructure/management silos within their organizations.

> *Each group advocates for its own architecture, drives its own philosophy for management, promotes the use of its own product solutions — and contends for the same budget that the other group contends for — thus factionalizing IT departments. This factionalization creates "integrational inefficiencies" within IT organizations.*

To prevent siloed management and to eliminate IT infighting, some enterprises have chosen to standardize on a single systems architecture and a standardized set of tools for infrastructure and systems management. And this approach works very well — with two exceptions: 1) homogeneous servers do not handle all workloads optimally; and, 2) the management of physical and virtual resources within homogeneous environments is highly human resource intensive.

> *IBM can help enterprises overcome these two issues by using a new technological approach (a hybrid mainframe/blade architecture) that can provide a standardized infrastructure and management environment across heterogeneous server environments. This new environment allows IT managers to choose the best system within their heterogeneous environments to handle a specific workload, while also reducing human related systems management labor costs due to management automation. Clabby Analytics believes that enterprises that use this approach can reduce IT operational costs (is some cases by a whopping 62%!) — while also creating organizational harmony within heterogeneous datacenters.*

In this *Research Report*, *Clabby Analytics* takes a closer look at the organizational benefits that can be achieved by moving to a standardized management/governance environment for heterogeneous IT environments. We explain what IBM's new hybrid zEnterprise

server/zEnterprise BladeCenter Extension (zBX)/Unified Resource Management offering is all about — and we discuss how it can be used to overcome centralized/distributed systems conflicts. Finally, this report concludes with a summary and a call-to-action aimed at high-level business and IT executives: "*make time to understand this new zEnterprise/blade environment — and deploy this environment to greatly improve operational efficiency and to overcome organizational conflicts*".

The Problem: "Factionalization"

When visiting IT managers around the world, we see three types of IT organizations:

- *Unified homogeneous IT organizations* — these organizations are characterized by their choice to standardize on a single platform architecture (usually x86-based), a single infrastructure (either J2EE- or .NET-based), and standardized management tools (such as EMC VMware or Microsoft Hyper-V for virtualization management).
    - Through standardization, these organizations are able to overcome application and database integration issues; virtualization and provisioning issues, systems/storage/networking issues — and the like. Further, these organizations can build a common and consistent set of management skills (the same skills are used to manage across a homogeneous environment).
    - The downside of this approach is that x86 servers do not handle all jobs well — and virtualization/provisioning and workload management in these environments are comparatively immature (when compared to mainframe virtualization/provisioning/workload management products).
- *Unified heterogeneous IT organizations* — these organizations are characterized by an understanding that heterogeneous systems architectures do different jobs well. These organizations focus on running the right workloads on the right systems — and on delivering the expected computing resources needed to meet their clients' varying service level requirements.
    - Note, however, that these IT organizations are often siloed from an infrastructure and management perspective. The mainframe people do their thing — while the distributed systems people do their thing. Adapters and connectors (based on Web services and XML) are often used to enable applications and databases to communicate with one and other).
    - Despite these silos, these unified heterogeneous IT organizations work well together. The reason, we believe, that this is the case is because upper-level business and IT management won't tolerate internal infighting — and these managers take an active leadership role in unifying their IT organization.
- *Factionalized heterogeneous IT organizations* — these organizations are characterized by the existence of distributed computing and centralized computing factions.
    - *The distributed computing faction* — is characterized by comparatively lower systems/software acquisition costs (when compared to the acquisition costs of centralized servers); the heavy use of networking to communicate between servers; the underutilization of x86 and midrange servers; and the tremendous amount of human labor that it takes to manage and secure resources across the a distributed systems and storage environment.

- *Clabby Analytics believes that this "lower acquisition cost argument is a façade — and that, due to heavy labor costs as well as hidden software costs (such as the cost for securing hundreds or even thousands of servers) — this architecture is expensive to operate.*
- *The centralized computing faction — is characterized by high acquisition cost (the cost to acquire a centralized server environment can be several times greater than the cost to acquire "industry standard" servers"). Note, however, that centralized servers offer greater resiliency, richer security, more advanced management tools, and a host of other features/functions that are included in the acquisition price). Centralized environments are also known for advanced virtualization and management tools; and sheer processing power (especially when it comes to batch/transaction processing).*

Notice that the unified homogeneous environments and the unified heterogeneous environments have one thing in common: <u>both environments improve operational efficiency while lowering organizational conflict by standardizing their information infrastructure and management environments</u>. In the case of the unified homogeneous IT organizations, this standardization comes at a price: these organizations standardize on only one platform type which may or may not run particular applications well. In the case of the unified heterogeneous IT organizations, infrastructure and management across hetero-geneous environment are often siloed — creating operational and organizational inefficiencies.

Based-upon these observations, we conclude that:

- Moving to a homogeneous environment has clear merits in that organizational infighting is eliminated and a common skill set can be used to manage infrastructure and IT resources across an entire organization. But the drawbacks may outweigh this benefit in that this approach is human labor intensive (from a management point of view) — and enterprises are not able to use the best system/server for the best job (for instance, if an organization standardizes on x86 architecture but has to run very large batch processing jobs, a Unix server or a mainframe may be able to run those jobs in a fraction of the time it takes an x86 server to do so).
- If the benefits of the homogeneous approach could be imitated in a heterogeneous environment, then enterprises could realize huge *operational* cost savings by breaking down infrastructure and management silos — while also eliminating *organizational* infighting. Further, these organizations would be free to choose from a variety of platforms — and would therefore be able to choose the best platform to run particular workloads.

We believe that IBM's new, integrated mainframe/blade server environment can unify heterogeneous server environments — eliminating silos while greatly lowering IT management costs. And we believe that this architecture has the potential to eliminate internal distributed system/centralized system disputes, allowing IT managers to focus on workload optimization across heterogeneous systems, on improved service levels, and on new corporate initiatives.

How IBM's New zEnterprise/Blade Environment
Can Be Used to Break Down IT Organizational Barriers

IBM's New Hybrid Architecture: The New zEnterprise and zEnterprise BladeCenter Extension
In July, 2010, IBM announced a highly integrated System z/blade server environment that uses a common infrastructure scheme and common management tools to manage distributed blade servers — all under the control of IBM's advanced mainframe management/governance umbrella. Enterprises that adopt this approach can simplify and unify their centralized and distributed computing environments — and can realize tremendous savings in terms of operational efficiency (by some estimates, these enterprises can save up-to 62% of their systems management costs by adopting this hybrid architecture). But, of equal importance, these enterprises can also eliminate internal centralized/distributed infighting by standardizing on a common management scheme using common governance. By doing this, enterprise executives can improve operational/-organization efficiency. And, by improving operational and organizational efficiency, enterprises can refocus their IT organizations on supporting business initiatives and goals, rather than defending their respective turfs.

IBM's announcement consisted of three components:

1. a new mainframe;
2. tighter integration of IBM's zEnterprise BladeCenter Extension (zBX) with that mainframe; and,
3. a new, low-level management environment known as the Unified Resource Manager (or sometimes called the "zManager"). This environment manages virtualization interactions between mainframes and blades — as well as for provides an automated mechanism for distributing firmware updates.
   a. When combining the Unified Resource Manager with IBM's System Director and Tivoli management offerings, IT managers can build a management environment that can update and manage systems at the firmware level, at the physical systems level, and at the virtual (logical) systems level. And the Tivoli products extend this by allowing automating provisioning and workload management functions and by allowing business process flows to be orchestrated.

> *This announcement represents a great leap forward in the management of data centers. What it offers is the ability for IT management to take advantage of advanced mainframe management facilities to cut systems management costs by 62%. Further, by taking advantage of mainframe virtualization services, enterprises will be able to greatly increase the utilization rate on attached blades (better utilization = better return-on-investment). (Note: mainframes typically run at between 80-100% utilization, providing enterprises that use mainframes with the highest utilization rates in the industry). And, by placing blades under a mainframe governance umbrella, advanced mainframe services (such as IBM's EAL level 5 security) can be extended to blades — thus helping enterprises manage risk and compliance more easily than in the distributed systems world. And, by optimizing communications between blades and mainframes, record-setting performance advantages can be achieved. And last but not least, by using this architecture, a path to IT organizational harmony can be found.*

This new environment is unique — we've never seen anything remotely like this architecture from an heterogeneous system integration and management point of view. To wit, *Clabby Analytics* has written a complete critique of this architecture in a report entitled "What IBM's Announcement of the New zEnterprise, Unified Resource Manager, and zBX Really Means" that can be found at www.ClabbyAnalytics.com.

Adoption Hurdles and Opportunities

At the heart of enterprise IT dysfunctionality is the distributed systems design model. Distributed systems architecture designers frequently build environments where servers serve single applications (these are called application servers) or that run single databases (database servers). And these servers are often utilized at only 5-10% of their capacity in order to leave headroom for spikes in activity. Plus these servers jam the network with traffic as they communicate with one another. Better designs that involve server consolidation, virtualization, and provisioning help solve these underutilization and network congestion problems.

But the big problem that consolidation/virtualization and provisioning will not solve in distributed systems architecture, however, is the problem related to human labor. The management of physical systems in these environments is manual labor intensive — and the management of virtual systems adds further flame to this fire. Simply stated: from our perspective *the distributed computing model is broken because as more and more systems, storage devices and network components are added — and as more virtual machines are added — more and more human labor is required to manage those devices.*

> *Solving this human labor problem involves automation. And this is where the use of a mainframe as a centralized infrastructure management hub comes in. Mainframes offer the most highly automated and advanced management services in the computing industry. And because of the maturity of mainframe management offerings, far fewer people are needed to manage mainframes as compared with distributed computing environments. And, as more computing resources are added to mainframe environments, the number of mainframe managers does not need to spike in the same way it does in distributed computing environments (because mainframe tools make it possible to manage additional resources more easily than distributed computing tools).*

Another reason that using a mainframe as a central hub makes sense is because of the level of maturity of mainframe software. One of the best ways to illustrate this is to compare mainframe virtualization to one of the best x86 virtualization packages in the industry: VMware (see Figure 1). Note that in Figure 1 (next page), EMC's VMware is substantially behind IBM's PowerVM and z/VM operating environments in every category. What IBM is proposing with its zEnterprise/zBX architecture is to extend its best-in-the-industry, mainframe-class virtualization down to the blade level.

A Major Opportunity: Get the Most Modern Virtualization/Provisioning/Workload Management Environment Today Rather Than Piecemeal x86 Solutions

Just to be clear, in the distributed world, virtualization and provisioning is currently more about creating and distributing images and managing them over their lifecycle. But mainframe zOS managers and administrators have long had the ability to dynamically configure and customize existing images when deploying new applications and workloads. (mainframers have been doing image distribution and mobile partitioning for many years). And this situation raises an intriguing question: "*why would a CEO/CIO allow his or her IT managers to use a comparatively immature virtualization solution when a far superior one is available?*" (Incidentally, this same type of question applies to security: "*why would a CEO/CIO allow his or her IT managers to deploy a bunch of piecemeal security solutions when a mainframe could act as a security hub for all of IT and provide EAL level 5 (the highest security ranking in the industry) to underlying systems?*"

> *The point here is that a mainframe hub can offer better and deeper automated management than is available on any other platform. It offers the best in the industry virtualization facilities. And it is unsurpassed in systems security. With these clear operational and risk management advantages, it is becoming more and more difficult for the distributed computing camp to argue that their consolidation of piece-part point solutions is more cost effective and less complex than the services offered on mainframes.*

Figure 1 — Key Virtualization Distinctions Between x86, Power, and z

Attribute	VMware ESX 4.0	PowerVM	z/VM V6.1
Scalability and Performance			
Real CPU sharing	Up to 20 VMs per CPU (workload dependent)	Micro-partitioning allows dynamic adjustments of 1/100th of a CPU between running VMs	Architecturally limitless; more than 60 VMs per CPU (workload dependent)
Architected maximum number of VMs	320 per copy of VMware	1000 per physical server using PowerVM	Thousands per copy of z/VM
Practical maximum number of VMs	Tens per copy of VMware	Hundreds per server using PowerVM	Hundreds per copy of z/VM
Real CPU and memory capacity on demand	No	Yes, non-disruptively	Yes, non-disruptively
In-memory support	Shared virtual memory pages (detected via background operation)	Active memory sharing dynamically flows memory between running VMs	Minidisk cache; Virtual Disks in Storage; DCSS (shared program executables)
Virtual Machine (VM) scalability	Up to 8 CPUs, 255 GB of memory, modest I/O bandwidth	Up to 256 CPUs, 8TB of memory, extensive I/O bandwidth	Up to 64 CPUs, 1 TB of memory, extensive I/O bandwidth
Run multiple copies of hypervisor on single server	No	No	Yes; share CPU, I/O, and networking resources with up to 60 copies of z/VM on one mainframe
Flexible Operations			
Command and control, monitoring, automation infrastructure	Modest, yet easy to use	Extensive, robust	Pervasive, robust, time-tested
System co-residency with z/OS	No	No	Yes; LPAR technology lets users run z/VM side-by-side z/OS inside the same machine
Hypervisor-on-hypervisor support	No	No	Yes; run multiple copies of z/VM as guests of z/VM (even new release levels on old releases)
Resource over-commitment support (memory, CPU, network, I/O)	Modest	Extensive	Extensive
Virtual Machine mobility support	Yes; essential for workload mgmt across multiple copies of VMware	Yes, live partition migration supported across (and between) POWER6 and POWER7 servers and blades	Planned future support; dynamic scalability of z/VM lessens need to relocate guest images
Infrastructure Economics			
Cost-efficient disaster recovery	No; typically requires a duplication of hardware and software license fees	Yes, including PowerHA and VMControl system pools	Yes; Capacity Backup on Demand CPUs offer inexpensive multi-system failover options
Cost-efficient technology refresh	No; typically requires re-purchasing new hardware and application verification	Yes, including live migration of VMs from POWER6 to POWER7 servers	Yes; mainframe upgrades offer investment protection and application compatibility

Source: IBM Corporation — April, 2010

Listening to the CEO and CIO

One of the major responsibilities of chief executive officers (CEOs), chief information officers (CIOs), and chief technology officers (CTOs) is to drive organizational efficiency. Organizational efficiency lowers human-related labor costs in sales, general, and administrative (SG&A) functions — and resulting cost saving pass directly to an enterprise bottom line in terms of profitability.

According to a recent IBM survey of 1,541 CEOs, general managers and senior public sector leaders, one of the major hurdles they face is "*complexity*" (according to these CEOs, it is the number one issue facing business and government leaders today). Interweaved, interconnected economies; sophisticated buying behaviors; new, advanced technologies, the information explosion, and complex business process flows between the business and its supply chain partners (as well as between a business and its customers) are

all contributing to this belief that managing businesses and governments is becoming too complex.

To help overcome this complexity, many CEOs are realigning their strategies to better serve customer needs — and they are focusing on streamlining their organizations to improve organizational efficiency. (To hear several CEOs describe their approaches to overcoming complexity, visit http://www-935.ibm.com/services/us/ceo/ceostudy2010/lessons-learned.html — an IBM site that features excerpts from five CEO interviews that talk about enterprise strategies and corresponding actions).

From the CEO's Office — The Getinge USA Example
When listening to these CEO interviews, consider the comments of Andrew G. Ray, the CEO of Getinge USA. As Getinge USA set out to improve organizational efficiency, the company embarked on an "aggressive process to break down silos" in order to align the company's strategy and structure to better meet customer requirements. As the company realigned itself, Mr. Ray states (in a video segment called "Align Strategy and Structure to Meet Your Customers' Requirements") that "I underestimated the cultural power within each of these [the company's] individual organizations". Each business unit had strong beliefs; individual P&Ls; and established practices and processes that needed to be joined together for maximum organizational efficiency. Over time, Getinge USA managed to establish joint P&Ls, co-located members from its various divisions, and realigned its process flows to better serve customer needs.

> *Now imagine if IBM's new zEnterprise/zBX combo was available at the time Mr. Ray was reorganizing his company. By aligning his IT resources around a common infrastructure and management scheme, his IT people could then be freed-up from having to manage physical and virtual systems — and could then turn their attention toward supporting Mr. Ray's business goals (organizational changes, joint P&Ls, and so on). IBM's zEnterprise/zBX architecture greatly reduces complexity while automating management functions — and, accordingly, can go a long way toward helping CEOs like Mr. Ray solve operational cost as well as organizational challenges.*

Citi "Gets It" — Strong Executive Leadership And Using the Right System for the Right Job
Over a year ago, New York City-based Citi formed a "CIO Council" to unify its IT organization and focus it on "client centric innovative thinking". "We focus on getting the right workloads on the right systems" says Martin Kennedy, Citi's managing director in its enterprise systems and infrastructure group. For instance, applications with demands for high input/output and quality of service requirements for high availability and security often find their way to a mainframe — whereas x86 and POWER-based servers are excellent for computational applications. And x86 servers are also attractive when a lot of memory is required (due to economical x86 memory prices).

"At Citi" he continued, "we collaborate — we have fantastic talent and a culture that is already ready for IBM's new hybrid z/blade environment". He added: "executive leadership has been very important in building this culture — our CIO council helped drive us to the position that we're in today".

Unigroup: Another CIO Provides Strategic Direction and Guidance
Enlightened management that provides clear strategic direction that focuses on workloads and not systems architectures in order to help quell the differences between the mainframe and distributed systems camps. And at St. Louis-based Unigroup, the company's CIO, Randall C. Poppell, provided this guidance and direction. After evaluating both a distributed systems approach as well as a mainframe approach, Unigroup determined that the centralized mainframe approach had several major benefits. "Our mainframe people knew the business processes, the governance issues, change management, and the policies and procedures we needed to run our business," recalls Jill Anderson, manager of Technical Services/Data Administration at UniGroup. The distributed computing people at Unigroup recognized that, due to advanced virtualization and provisioning on IBM mainframes, the process of creating application servers for development by exploiting unused processing capacity on a mainframe was far simpler than ordering physical servers, waiting for those servers to arrive, and then loading the software needed to do development work.

Today, both organizations work well together — and both recognize the role that a mainframe can play in governance, in serving process flow, and in change management. Each group now focuses on the requirements of the business, not on architectural differences.

> *See Mainframe Executive Magazine's January/February 2010 issue for an in depth description of Unigroup and how it overcame organizational issues when centralizing its computing on an IBM mainframe.*

Summary Observations
Unfortunately, for many enterprises, computers are not part of the solution — they're part of the complexity problem. Enterprises frequently create islands of information, and fail to share that information across the organization. Programs fail to communicate with other programs, leading to process flow breakdowns. Underconfigured, underutilized system designs waste computing and storage resources. Networks become bogged with too much traffic, leading to slow service or communications breakdowns. And so on…

A big part of the problem in systems complexity rests in the architectural design of distributed, networked computer systems (too much distributed processing managed by too many people — and not enough centralized control).

> *However, a major contributing factor to the complexity of information systems designs resides in organizational turf wars that pit distributed systems designers against centralized systems designers. Organizations that discourage these kinds of turf wars are finding that they can overcome systems complexity problems — and instead can focus on managing their process flows more effectively.*

With the announcement of a new System z combined with a tightly coupled blade environment and the introduction of a new, low-level management environment (the Unified Resource Manager), IBM is ready to reposition its venerable mainframe environment as a centralized governance system that can manage underlying, heterogeneous systems. Using these products, and adding IBM System Director and Tivoli products, gives an enterprise the ability to seamlessly manage and optimize underlying blade servers — and the ability to automate workflows and process flows. Enterprises that

use this type of centralized mainframe management approach can expect significant operational cost savings — especially in the areas of human management labor and in energy savings. In some cases, the management savings that can be expected from using this approach could be as high as a 62%! Additionally, this type of product can help eliminate internal turf wars and IT infighting.

With a case this compelling, logic would dictate that this new, integrated mainframe/blade management environment would be a huge boon to enterprises looking to reduce their operational costs. But there is one major obstacle to the adoption of this architecture: organizational dynamics. Many information technology environments are comprised of managers who are big believers in distributed systems architecture — and some who are believers in centralized systems architecture. And these two different views of computing lead to turf wars as each group defends its own architecture.

What is needed to overcome these differences are two things: 1) enlightened executive leadership; and, 2) a refocus on the ultimate goal of information systems (information systems are tools that can ultimately be used to streamline business process flows and for information analysis). Using information systems properly leads to increased operational and organizational efficiency.

> *The bottom line is this: IBM's new mainframe/hybrid blade environment can be used to create a harmoniously managed heterogeneous datacenter environment. It can deliver substantial (and we mean HUGE) operational cost savings; and it can reduce or eliminate internal IT turf wars — helping to create organizational advantages. What is needed to make this architecture successful is enlightened C-level executive management. C-level executives owe it to themselves and their enterprise to at least investigate the potential of this new architecture.*

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