

A New Unit of IT Manageability — IBM BladeCenter as Infrastructure

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Management Summary

The IT world can be unsettling. On one hand, you have vendors telling you about the performance and dependability of their products. On the other hand, you have vendors – often the same vendors – telling you to aggregate your assets into vast pools of capabilities upon which you can draw as needed. You sit in the middle, trying to get the applications that support a business process to work right. Neither the box nor the whole-environment perspective is directly pertinent.

Turning your mind to manageability does not improve things. You have left the familiar pains of device management for the better land of device self-management, and the boon of remote manageability. You have seen the grandeurs of system management. But again, the middle ground is left underserved. While you can aggregate assets supporting an application or process on a screen, from those vast pools, you often cannot protect them from events beyond your neat tree of assets. If there be monsters out there affecting your performance, it can be hard to determine where, and what, they are.

You need a right size of assets, manageability, and capability to get the work done. You need the ability to optimize and apply whatever enrichments of function or manageability you need to make your business process work for your enterprise.

You are asking for a new unit of infrastructure. Today, IBM BladeCenter's aggregation of blades in an intelligent chassis, is such a unit. It is manageable, both internally and as part of another environment. It can be outfitted with features to fit the use to which it may be put – features like virtual machines, low latency protocols for high performance, and application-aware switching. IBM's BladeCenter is much more than a smaller-form-factor opportunity for server consolidation.¹ IT is the kind of infrastructure you need to optimize and evolve with deftness. Read on for more details about BladeCenter as Infrastructure.

¹ For information on how BladeCenter has evolved as a product, see *IBM BladeCenter 2003 – Update on Promises Made and an Eye on the Horizon* in **The Clipper Group Navigator** dated November 20, 2003, at <http://www.clipper.com/research/TCG2003063.pdf>.

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Changing the Unit of Optimization

The unit of optimization has, in the past, been a single processor, or else some form of SMP server. As we seek to manage and optimize business processes, a need has grown for a unit of optimization that can include all the applications involved with that process. To optimize the process further, it can be helpful if the contributing applications are closely co-located. The *IBM Blade Center* is just such a fair-sized unit of aggregation. Its blades can work cooperatively, or they can be subdivided further into virtual machines. It can monitor network traffic, as well as the nodes involved, making rapid fault isolation and compensatory actions more possible.

It is useful to think of the BladeCenter as a sub-network. We will save the concept of grid for situations where extensibility and heterogeneity need to be being optimized² – where workloads are run opportunistically when there is an environment that meets their needs. By contrast, sub-networks are units of optimization. **How the available resources (processing power, memory, etc.) are deployed will depend on the nature of the applications, not vice versa as in a grid scenario.**

Any unit of infrastructure must be able to manage and optimize internal processes, and to be managed as part of a larger environment. Traditional centralized schemes sought to organize the resulting complexity by rules and automating scripts. **Today you have to manage complexity in a way that allows continuous and rapid evolution, as IT supports more and more of the evolving businesses they serve.** Enterprises must move to tiers automation and self-management. IBM's BladeCenter, other IBM products, both software and hardware, and BladeCenter Partner capabilities provide a rich array of resources to use for the benefit of the enterprise as needed.

² See *Computational Grids – Server Consolidation for an On-Demand World* in **The Clipper Group Explorer** dated June 21, 2002, at <http://www.clipper.com/research/TCG2002021.pdf>.

Enhancements from IBM

Management - IBM Director

IBM Director is a system management product for heterogeneous systems. It is also a new model of infrastructure control. Where traditional management frameworks were reactive structures based on the feasibility of centralized management and the pervasiveness of human interpreters, IBM Director presumes the self-management of SNMP-based devices, and the availability of modeling tools to make uptime maintenance an exercise in prevention rather than over-provisioning and fast reactions. IBM Director is not just for BladeCenter, but there it can take advantage of BladeCenter's separate management system of service processors – a system inspired by the self-manageability of IBM's *zSeries* mainframe.

The IBM Director is sited on a server, managed by a Web-based console, and operates through a raft of standards-based agents. These agents allow it to discover, check for presence, manage access/permissions, and also gather the metrics to determine when something may be about to go wrong. In complex environments, this is more useful to the administrator than tiers of dashboards.

IBM Director not only provides local management, but it can be a link of larger system management products (like Tivoli System Management), as well, making sure that the infrastructure is both optimized for its tasks and a policy-abiding member of the larger environment.

Power Blades

Blades featuring *Power* processors will be generally available in March 2004. These blades will run applications on AIX or Linux applications in a 64-bit environment. The Power-processor blades include VMX acceleration circuitry³. Each blade can come with up to 4 GB of memory. By offering blades with Power processors,

³ This acceleration allows a single instruction to be implemented across multiple instances of data.

IBM enriches the number of applications that can be run in a blade environment. It also allows enterprises to aggregate more freely the applications that should run together more effectively, instead of segregating them by platform.

Tivoli Orchestrator

Tivoli Orchestrator, a product from IBM's ThinkDynamics acquisition, monitors a heterogeneous environment (such as a blade server) and directs the responses of additional provisioning and configuration (of servers, operating systems, middleware, applications and network devices) that are needed to keep the system not only up and running but also meeting its service level guarantees. Orchestrator interfaces with a number of Tivoli products that automate the routines underlying its directives. Orchestrator also can do patch management, and supports pay-per-use chargeback schemes.

eWLM

A response-time-based load balancer, IBM's *eWLM* was developed for heterogeneous, distributed environments and can balance workloads of multiple server blades - or of virtual servers within a blade, as described below.

BladeCenter Standby Capacity on Demand

IBM will ship BladeCenter with inactive blades, which can be activated through the management console as they are needed. Payment is tied to capacity usage, and is calculated by the blade list price at the time it is activated.

Third Party Accessories

As with the IBM products listed above, these are only *some* of the options that can be used as needed to enhance BladeCenter for the particular needs of the enterprise.

Traffic Management – F5 Networks

F5 Networks' *Big IP* controller can run on a blade. It provides application-aware traffic management. The application awareness means that the controller can do more than just divvy up the bandwidth – it can rebalance what is available, according to

policy-based priorities. In the process, it also can virtualize the blades to let them be managed as a single entity by external frameworks, if this is desired.

Consolidated Switching – Nortel Networks

Nortel Networks' Layer 2-7 Switch allows enterprises to consolidate their switching, which is often tiered into layers 2-3 and layers 4-7. As infrastructure, the BladeCenter offers an opportunity for tighter sub-network integration. Nortel's switch can allow blades to be upgraded or patched without shutting down the system, as the switch recognizes the outage and switches the traffic to an alternate standby blade

Virtual Machines - VMware

VMware enriches BladeCenter's capabilities by allowing more than one application to run, with full isolation, on a single Intel-processor blade. Now that VMware's virtual machine can span two processors, it can take advantage of IBM's dual-processor Intel blades. VMware also allows a virtual SMP to be created out of multiple 2-way blades. This supports a degree of scale-up, highly-integrated processes, as well as the many-servers-from-one of scale-out.

But there is more. In addition to the slicing and aggregation, VMware's virtual machines have been able to share memory opportunistically as well as by portion or by zoning, depending on the policy chosen. Virtual machines use processors only while they are active. So you get a lot more use out of your environment than you would just slicing it up.

VMware's *Virtual Center* management software allows the VM environments to be managed and the loads balanced. The management of virtual machine templates let that scaling up be quick and easy. It also lets the environment downscale cleanly as necessary.

VMotion, a new capability, adds the ability to move functioning virtual machines from one processor to another. This lets applications stay up when a processor must be brought down for service. It also changes

how you test and deploy and how you evolve your environment. You can test the benefit of change, and reverse it easily. You can do real benchmarking transparent to the end users – just set the policies so that they will not be impacted

Clustered File System – PolyServe

PolyServe's *Matrix Server* integrates high-availability services with a shared file system, and can work with a great variety of configurations and applications. A shared file system, with no central metadata or lock server, is particularly useful in a dynamic infrastructure like BladeCenter. All servers see – and, with permission, share – the same data, so moving an application from one blade to another (or one virtual machine to another) does not interfere with data access. This file system also gives a way to share access to a database, web server, file server or other application without undue data replication and the ballet of synchronization that replication involves.

Low Latency Interconnect – Myricom

Myrinet is a standard high-performance interconnect technology. *Myricom* supplies the hardware and software interfaces, switches, and cables. The Myrinet high-performance, low-latency technology may be useful to applications and application clusters supporting high-transaction business processes. Myrinet is available as a BladeCenter option.

Automating Presentation – Citrix

Citrix *MetaFrame* is now certified with BladeCenter. Citrix has long been used to manage the application server farms that present dozens of applications to thousands of users at large enterprises. Citrix, working with the dynamic environment of Blade Center, promises a way to more closely but safely) right-size the supply of resources.

Automated Deployment and Change Management - Novadigm

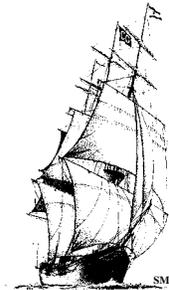
In a blade environment, the ability to reprovision blades calls for an automated way to test and manage software configurations, patches and change manage-

ment. Novadigm automates deployment and change management of client environments using its *Radia* technology.

Conclusion

IBM BladeCenter and these accessory products contribute to a new kind of management. Provisioning is from images or templates, not a handcrafted (and potentially irregular or error-filled) process. Deprovisioning can be clean and orderly, not the stuff of nightmares. Workload balancing can be coordinated at many levels. Planned downtime can be avoided, and the resilience provided by virtual machines and a clustered file system can speed recovery, often to the point that it is transparent to end users. Bandwidth can be shared (not simply divided) between applications according to policy.

IBM BladeCenter is like getting a car with an automatic shift – there's a lot you don't have to do manually – but still a lot you can tinker with, to make the environment suit your needs. All of this is a pleasing prospect as enterprises plan for the future.



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