Advisory

IBM's BladeCenter Foundation vs. Cisco's Unified Computing System: A Price and Value Discussion

Executive Summary

As we travel around the world we constantly run into a class of information technology (IT) buyer that believes that all x86-based servers are essentially the same. These buyers base their acquisition decisions almost exclusively on *low-cost and simplicity* (which are indeed valid buying criteria). But, we believe that they are doing themselves a disservice by failing to look more closely at the *system design* of the x86 servers that they purchase.

> ***Failure to closely examine the systems design of x86 servers can result in the purchase of servers that underperform, that have expandability limitations, and that limit future growth.***

To illustrate this point, we like to compare Cisco's Unified Computing System (UCS) blade environment (we consider this a "barebones" environment) to IBM's BladeCenter environment (a feature rich environment with an excellent system design). With UCS, Cisco offers a perfectly adequate x86-based blade server environment that can run a wide variety of Linux, Windows, and even Unix applications. *But when we dig deeper into the UCS systems design, we find system design limitations in management, networking, and energy consumption that lead to constrained performance and increased operating costs* when compared to IBM's BladeCenter system design.

> ***We also note that IBM's BladeCenter environment can cost 15-20% less than a UCS blade environment. And given this lower cost combined with a richer system design — we'd rather see IT buyers spend their money on a more functionally-rich, better integrated environment that offers several different network options and better management software. And this means that we'd rather see IT buyers gravitate toward IBM's BladeCenter offerings.***

In this *Advisory*, *Clabby Analytic*s shows why x86 system design and related software extensions should also be important considerations when purchasing x86 servers. We start by defining the issue at hand (a concept known as "good enough computing") — followed by some basic market analysis that shows how Cisco and IBM are positioned in the blade server marketplace. After comparing these blades, we show how choosing a feature-rich blade environment helps position an enterprise for elastic, cost saving cloud computing.

What our analysis ultimately shows is that IT buyers who choose to buy less functional blade environments may actually be paying more in the long run thanks to lesser performance, and higher power, implementation and integration costs.

> ***Buying cheap, simple computers may actually end up costing an enterprise more money than buying better designed, more functional computers.***

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The Problem in a Nutshell

There is an IT buying/deployment behavior in the computer industry known as "good enough computing" — a behavior that is driven by the belief that all x86 servers are essentially the same, as well as by a desire for greater simplicity. (This behavior actually saw its origin in the camera industry when camera buyers demanded simpler cameras without all the advanced bells and whistles — just point and shoot). Good enough computing is the manifestation of the same demand for greater simplicity — only applied to information systems.

For many camera buyers, a point and shoot solution is ideal. They have no desire to deal with focus, color, light, and other camera settings when taking a picture. And, for the most part, these buyers are happy with the end result. But note, there is very little financial impact if a picture doesn't work out…

For good-enough computer users, there can be major financial impacts that result from choosing the wrong computer system. For example:

- ***Some x86 servers underperform*** (due to system design issues such as network performance bottlenecks). ***As a result, IT buyers need to purchase more servers to get their work done***. And purchasing more servers has a ripple effect as more servers consume more power and require more management effort. *If your organization could purchase a better performing blade architecture that offered superior communications and networking facilities at the same (or lesser) cost than a good enough computing environment — why wouldn't it?*
- ***System failures*** can lead to lost revenue, reduced productivity, and increased risk (should data be lost). Some blade architectures offer reliability/availability extensions such as redundant components, or even small, almost unnoticeable extensions such as redundant AC/DC redundant power chassis busses (power connections etched onto a blade board) that enable power to continually be supplied should one bus fail. *If your organization could buy a more reliable/available systems architecture at the same (or lesser) cost — why wouldn't it?*
- Some blade makers ***integrate*** their blades with accompanying storage. Integration work of any kind can be expensive and time consuming. *So if your vendor pre-integrates your system/storage environment, why would you not want to take advantage of that integration?*
- Some vendors' blade designs ***consume less power*** than other blade designs. For instance, an IBM BladeCenter consumes approximately 26% less power than an equivalent Cisco UCS blade environment. Further, increased power usage generates more heat — contributing to increased cooling costs. Energy is expensive — especially when considered over a five-year equipment lifecycle. *So why would your organization choose a "simpler" blade solution that costs more to run than a power optimized blade solution?*

The key point in discussion above is that paying closer attention to blade systems design — and choosing a more functionally rich, better tuned blade environment — can save enterprises big money in terms of acquisition and operational costs.

Market Positioning: IBM BladeCenter vs. Cisco UCS

Both IBM and Cisco are strategically committed to helping their customers build cloud computing environments (a cloud is a flexible, virtualized computing environment that can offer a variety of services [security, high availability, management] and/or self-services [Software-as-a-Service, Infrastructure-as-a-Service, Platform-as-a-Service, etc.] to users of the cloud).

To build a cloud, IT buyers need servers, systems software, networking, storage and management components. IBM makes its own servers, storage, and software products — and builds some network switches and partners for others. Cisco is a networking company that builds servers and some management software — and allies with EMC for infrastructure and storage products.

The remainder of this section takes a closer look at IBM and Cisco in the areas of servers, system software, networking, storage integration, and management software.

Server Environments

In March, 2009, Cisco — the world's largest networking company — announced its entry into the computer server marketplace with its "unified computing system" (UCS — a blade computing environment). And many research analysts (including *Clabby Analytics*) dismissed Cisco as coming to market with too little and too late. Hewlett-Packard (HP), IBM, and Dell were the blade market leaders at that time (and HP and IBM still are by a very wide margin).

At the time of the UCS announcement, John Chambers (Cisco's chief executive officer) claimed that Cisco's move into blade computing was *not an attempt to move into the commodity server marketplace*. Instead, Cisco positioned its UCS to serve customers who run large Websites and/or deliver movies to PCs and mobile devices.

> ***Cisco resellers, however, had other ideas — and have been positioning Cisco's low cost blade servers as general purpose commodity servers —taking aim at market leaders HP, IBM and Dell.***

IBM, on the other hand, got into the blade server market in 2002 — initially bringing a line of x86-based blades to market, followed by blades based on its POWER microprocessor design. Unlike Cisco, IBM has built its blade environments to serve a variety of market needs (not just movies and Websites).

IBM offers five different blade chassis designs:

- IBM's BladeCenter S provides an integrated, high-performance SAN ideal for small offices and remote branch environments;
- IBM's BladeCenter H is a performance-oriented, high density chassis designed for very challenging application environments (and designed to minimize datacenter floor space usage);
- IBM's BladeCenter E focuses on energy efficiency and is ideal for space and power constrained data centers.
- IBM's BladeCenter T is a NEBS-3/ETSI-compliant chassis ideal for harsh environments and running applications under the most demanding conditions; and

- IBM's IBM BladeCenter HT is also a ruggedized NEBS-3/ETSI-compliant chassis — designed for next-generation, high-performance applications.

IBM's BladeCenter system designs address a much broader set of requirements than Cisco's UCS design.

Systems Software

From a software perspective, both IBM and Cisco offer Linux and Windows operating environments on their respective blade servers. And both offer support for a variety of third party software programs that improve the utilization rates of their servers (for instance, both support EMC's VMware and Microsoft's HyperV for virtualization). Further, note that IBM also aggressively supports open source KVM virtualization on its platforms. And both vendors can run the same applications on their respective platforms.

These two companies diverge, however, when it comes to systems software (infrastructure, middleware, and security) in that IBM offers its own systems software products (including products from its WebSphere and Tivoli organizations) which IBM pretests and pre-integrates for its customers. Cisco does not build its own systems software products — instead relying on the x86 ecosystem to fill its clients' needs for virtualization, infrastructure, middleware and security products.

To us, the company that owns its own systems software has a distinct competitive advantage over one does not. By building its own system software IBM can tune and integrate that software to run optimally on its own x86 servers. Further IBM controls the pricing of that system software — and the packaging. This gives IBM the ability to structure pre-integrated/pretested software environments that the company can bundle and sell at reduced costs. These bundles save IT buyers money as compared with having to buy a bunch of point products — and these bundles save IT managers and administrators from having to perform additional testing and integration work.

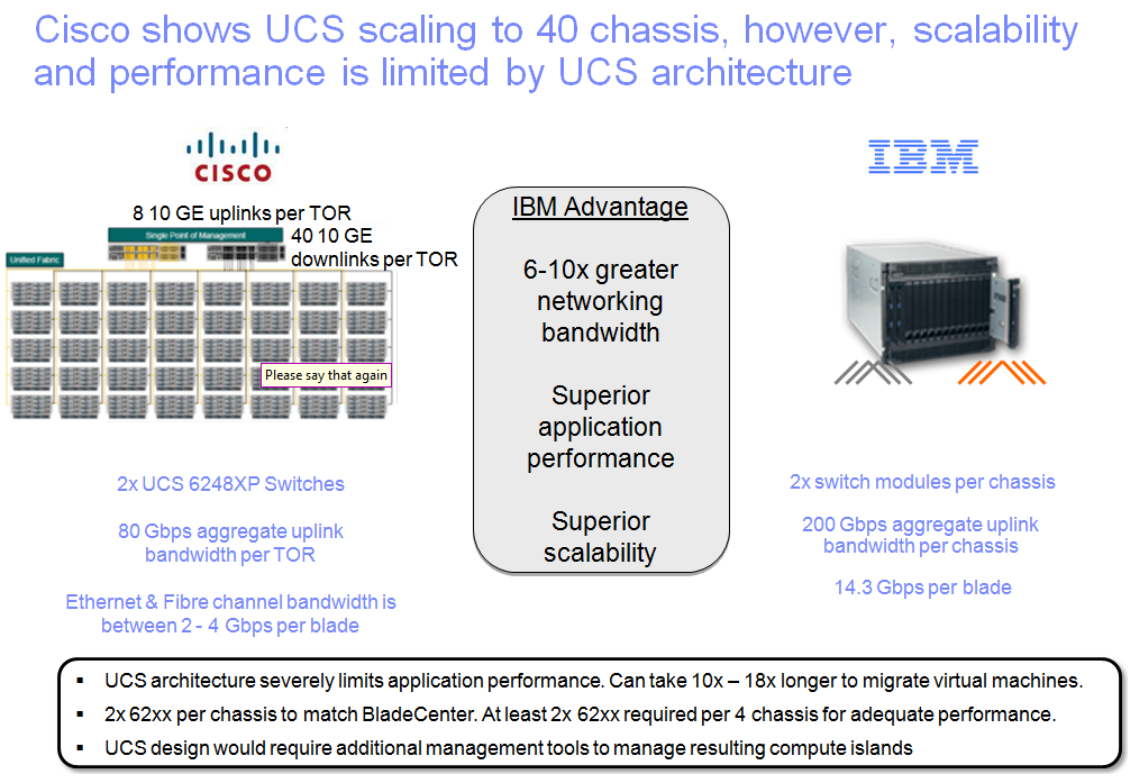
Networking

Cisco's market niche is networking — the company is considered the worldwide market leader when it comes to networking the enterprise. But what is really interesting about Cisco's market position is that IBM's blade servers offer more networking bandwidth, superior application performance, and greater scalability than Cisco's blades (see Figure 1 — next page).

Figure 1 shows a Cisco UCS configuration powered by 2 UCS 6248XP switches in a ToR (top of rack) configuration — and an IBM BladeCenter with two internal switch modules per chassis. The Cisco configuration can provide up to 80 Gbps (Gigabits per second) of aggregated uplink bandwidth per ToR — whereas IBM's BladeCenter can offer up to 200Gbps (giving IBM's BladeCenter up to a 6-10x networking bandwidth advantage — and enabling superior application performance with greater scalability). Also note that the Cisco design provides between 2-4 Gbps per blade in an Ethernet or Fibre channel configuration — as compared with IBM's 14.3 Gbps per blade maximum performance.

It should be readily obvious that buying a less sophisticated, speed-constrained design will result in less performance. And this could lead an IT buyer to have to overbuy Cisco servers — costing an organization more money than it would have to spend if it bought a more efficient systems design.

Figure 1: Cisco UCS 6140XP Switches as Compared with IBM's BladeCenter Approach



Source: IBM Corporation, August, 2011

Part of the reason that IBM's BladeCenter outperforms Cisco's UCS configuration is that IBM uses 3rd party network switches as well as its own network switch to provide different speeds and feeds. It uses Emulex' Virtual Fabric Advanced adapter, its own BNT Virtual Fabric 10Gb Switch that supports 10Gb uplinks (IBM acquired BLADE Network Technologies to get this technology), and IBM uses QLogic's Virtual Fabric Extension Module for 8Gb fibre channel connections. Cisco's UCS design uses slower Cisco networking products.

IBM's Virtual Fabric

But networking hardware is not the only differentiator between IBM and Cisco. IBM has engineered a virtual fabric environment for its blades that can be used to virtualize and manage different network interfaces and differing protocols. Like system virtualization (where unused systems resources are returned to resource pools when they can be used), network virtualization finds and pools network resources. IBM's virtual fabric allows for the creation of multiple virtual ports running various protocols (Ethernet, FCoE, and iSCSI) that can use single physical port for communications. Further, *bandwidth can be shared across multiple applications at line rate speeds (this is important because IT buyers can get maximum performance using IBM's virtual fabric approach as compared with Cisco's slower communications hardware).* And finally, his environment performs intelligent failure monitoring, so if a virtual port fails, the failover is initiated automatically.

Cisco does not offer a functionally equivalent virtual fabric environment for its blades.

Storage

When it comes to storage, IBM is a storage company and Cisco is not. IBM builds a complete line of storage arrays and tape drives that serve small businesses all the way up to very large enterprises. To compete with IBM, Cisco structured a relationship with EMCs VMware and storage organization to create an independent coalition known as VCE (VCE structures "infrastructure packages" known as VBlock).

The latest news that we have on how the VCE coalition is doing is that the organization appears to have accumulated $132 million in losses since its inception.

A closer look at IBM's BladeCenter shows that IBM has done a lot of integration work, particularly with its DS3500 Fibre Channel Storage environment. IBM's DS3524 and EXP3524 are tightly integrated with its BladeCenter environment where it is primarily used as image/scratch space for VM images. This environment can scale from 7.2 TB to 59 TB; it has dual controllers for maximum resiliency — and offers a turbo performance mode as an option.

Management

When comparing Cisco and IBM, management perspective, there are huge differences in the breadth and depth of IBM's systems/storage/network/application management environments as compared with Cisco's primarily network focused management environment. Because IBM is in the systems/storage and software businesses, the company has worked for years to integrate its management environments. Because Cisco has only recently entered the systems business, it's management products pale in comparison from a breadth and depth perspective to IBM's management environments.

An analysis of Cisco's UCS Manager shows that it has been designed to manage Cisco blade servers and a limited set of Cisco network devices — whereas IBM's Open Fabric management environment can manage IBM blades, IBM switches, and several 3rd party switches. Further, Cisco's UCS Manager was not designed to manage storage devices — whereas IBM's System Director software can be used to manage both systems and storage.

When comparing Cisco's UCS Manager to IBM's System Director and Tivoli product offerings it should be noted that UCS can be found "lacking" when it comes to automating tasks (UCS cannot, for instance, setup event action plans allowing customers to define tasks based on hardware alerts — nor does it allow IT managers/administrators to create custom scheduled tasks). IBM's System Director and Tivoli products enable IT managers/-administrators to automate a wide range of tasks.

The Power of Packaging Integrated Systems Environments

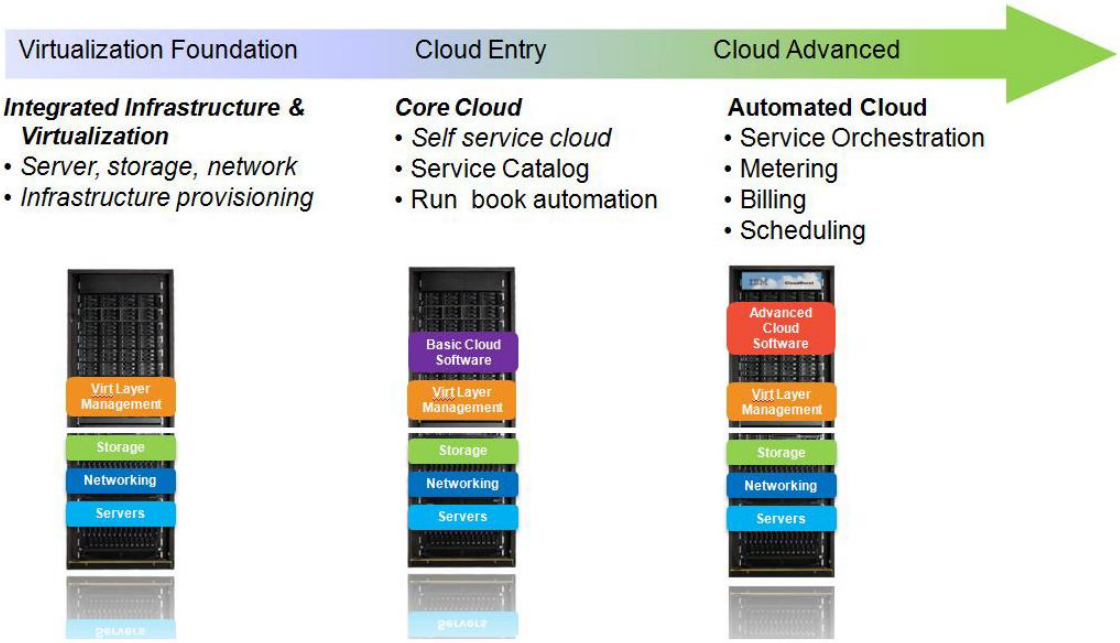
Up to this point, this *Advisory* has shown how choosing a less functional blade systems design can have a negative impact on operating costs, and on future growth and expandability. But another way to show the impact of a good systems design is to show how IBM's BladeCenter can serve as the integrated foundation for future cloud designs.

Based-on discussions that we've had with IT buyers all around the world, we have identified three kinds of cloud computing environments: 1) a virtualized, pooled resource environment; 2) a virtualized/automated/provisioned environment; and, 3) a virtualized/-automated/provisioned environment that includes service delivery functions. We have talked with dozens of IT buyers who have simply virtualized their x86 environments — and refer to those environments as a cloud. We've talked to other IT buyers who take the next step and automate the provisioning of their IT environments — and also refer to their environments as a cloud. And we've come across several IT buyers who have virtualized and automated their IT environments — and are now working on automating services that their clouds provide.

All of these environments can be considered cloud environments — with the primary difference being that some environments are more automated than others.

In August, 2011, *Clabby Analytics* accepted a briefing from IBM on what IBM calls its BladeCenter Foundation for Clouds. And what we found during the course of this briefing was that IBM has packaged integrated cloud solutions for each of the above mentioned cloud scenarios. IBM describes its three packages as a virtualization foundation; a cloud entry, and the cloud advanced environment in Figure 2 (below).

Figure 2 — Three Types of Cloud Environments



Source: IBM Corporation — August, 2011

What should be evident after reviewing Figure 2 is that IBM has a wealth of products — and has integrated these products into cloud packages designed to simplify the deployment of a cloud environment. On the first page of this report we described the goal of some IT buyers as being able to purchase simplified, lower cost x86 server environments. What IBM has done with its three cloud offerings is exactly that — simplified the deployment of cloud architecture while at the same time reducing cost.

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Summary Observations

In this *Advisory* we have attempted to show you, the reader, why it is very important to pay close attention to a systems design when evaluating x86 servers. What we showed was that a systems design has a big impact on how a system performs — and choosing the wrong design can lead to increased acquisition and operating costs.

We also described the ecosystem that goes into building a well-managed cloud environment. We showed how important it is to choose a vendor that offers a rich management environment, storage integration, advanced networking options, and its own system software. Notice in Figure 3 how an integrated server/networking/storage/-management environment can lead to faster time-to-value, less complexity, and lesser cost.

Figure 3 — Integrated x86 Environments: Simpler and Less Costly

An integrated, converged platform with network, servers, storage, and management that enables a fast, complete virtualized platform deployment

Client Benefits

- **Quick time to value-** Rapidly deliver a virtualized platform that is preloaded and integrated
- **Improved innovation-** Help improve business agility and resiliency with smart workload management and robust infrastructure
- **Decrease IT cost** – Maximize current capital usage and reduce need for future capital with a converged infrastructure
- **Reduce complexity and risk-** Pre-loaded and integrated means the human error factor is minimized
- **Allows for evolution** – migrate to cloud when ready without rip and replace

IBM BladeCenter Foundation for Cloud

Source: IBM Corporation — October, 2011

At this point, this *Advisory* has come full circle. IT buyers who desire simpler and less costly solutions should pay close attention to their vendor's x86 system design — and also to the integration of servers with network and storage components. IT buyers who are truly looking for simpler/less costly solutions are better served by vendors that can perform x86/cloud integration — and that can deliver integrated, packaged solutions that, in the long run, are significantly less expensive than buying cheap, non-integrated x86 server solutions.

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