Opinion

How the Oracle Acquisition of Sun Has Changed the Competitive Dynamics in the Server Business

Introduction

For those who read *Clabby Analytics* research reports on a regular basis, you know that we believe that the midrange and high-end server markets are consolidating around three microprocessor architectures: x86 multi-cores, POWER, and z. We have reached this conclusion based on a number of factors, including:

- The ascendancy of Xeon multi-cores into the midrange and high-end (Intel has finally allowed Xeon to compete with Itanium, POWER, and UltraSPARC).
- The impending collapse of the Itanium ecosystem (Microsoft has announced that it will no longer develop Windows for Itanium; Red Hat has discontinued building Linux on Itanium starting with Rev. 6; VMware doesn't run on Itanium; etc.); and,
- Migration trends away from Hewlett-Packard's (HP's) Itanium-based servers and away from Sun UltraSPARC servers.
    - Over the past four years, IBM is reporting that over 2,700 customers have moved from other platforms to IBM servers and storage, with the majority of the migrations coming from Hewlett-Packard and Oracle/Sun.
    - In Q1, 2010, IBM reported that 117 server or storage customers moved from Oracle/Sun iron to IBM platforms and storage — and that 95 moved from HP servers (total: 212 migrations from other platforms to IBM POWER, IBM z, or IBM x86-based servers).

As this server market consolidation takes place, we believe that the server market will bifurcate into two camps:

1. A group of homogeneous x86-based systems makers (HP, IBM, Oracle/Sun, Dell, Fujitsu, CISCO, and several other up-and-coming x86 multi-core blade suppliers); and,
2. A single heterogeneous systems maker (IBM). (Note: IBM actually plays in both camps — but is distinct because it also offers other platform choices).

As we watch the market realign, we are particularly interested in the competitive dynamics that are shaping-up at the high end of the server market between Oracle and IBM. Note that:

- Both companies are building high-end, database optimized server environments designed to serve the business intelligence, data warehousing and decision support markets (IBM's initiative is called "Smarter Planet"; Oracle has no such moniker).
- Both companies build their own infrastructure and database software, as well as server hardware — giving each company packaging flexibility and distinct volume purchase agreement discounting advantages.

- Each company is going to market differently. Oracle appears to be moving towards a "*single stack*" on homogeneous x86 multi-core servers approach — while IBM is taking a heterogeneous "*workload optimization*" across multiple distinct servers (x86 multi-cores, POWER, and z) approach.

In this *Opinion*, *Clabby Analytics* takes a closer look at how these two vendors' strategies compare now that Oracle has entered the server market.

x86 Multi-cores: The Game Changer

For almost eight years *Clabby Analytics* has been a harsh critic of Intel's strategy to push Itanium as the industry's de facto 64-bit "standard" architecture (as opposed to letting Xeon grow into that space). We watched Itanium stumble to market in the early 2000s — years late and with missing functionality — and shook our heads. We then watched Intel remove its 32-bit engine from the Itanium chip design — thus preventing customers from running 32-bit applications natively on Itanium — and shook our heads. We then watched AMD build a 32-/64-bit hybrid processor (Opteron) that enabled customers to run 32-/64-bit applications on the same x86-based hardware — and we saw the market gravitate toward that chip set (forcing Intel to build a hybrid of its own). And when Intel finally did build its 32-/64-bit Xeon hybrid, we smiled (because we knew that by allowing Xeon to do both 32-bit and 64-bit applications, Intel had started down a path that would ultimately make Xeon a direct competitor to Itanium). And that's exactly what has happened.

> ***Clabby Analytics is a big believer in Intel's Xeon x86 multi-cores. These new multi-cores are well-balanced (they can handle parallel, serial, and data processing tasks in a balanced fashion); plus Xeon multi-cores have good memory management facilities; and they offer several "green" (energy efficiency) features. Further, because Xeon can now scale into the server market midrange (thanks to its ability to run multiple cores) — this microprocessor is changing the competitive dynamics in the server market.***

Oracle's Purchase of Sun: Another Game Changer

When Oracle acquired Sun, *Clabby Analytics* was one of dozens of IT research and analysis firms that didn't see the match. What we saw was a software company that was acquiring a declining hardware company. And, given the persistent lateness-to-market of Sun's UltraSPARC and related chip multi-threading (CMT) architecture — we took a very dim view of Oracle's chances of recouping its investment in the timeframe it claimed it would do so. (We even doubted that Oracle could meet its accretive goals if it paid the whole $7.4 billion for Sun — and speculated that it would have to renegotiate the price to meet its goals. Oracle did not renegotiate — instead choosing to greatly reduce sales, general and administrative expenses by reducing Sun headcount from around 29,000 people at the time of the acquisition to about 15,000 after major restructuring. Headcount disruptions often affect customer sales and support — so it will be interesting to watch how Oracle handles this situation).

But Maybe Oracle's Goal Was To Acquire Sun for x86 Server Expertise…

What we didn't see, however, was that Oracle might have been buying Sun not for its Solaris/ UltraSPARC base, but rather for its x86 development capabilities and its high-end systems design expertise (this blending of expertise shows up in Oracle/Sun's Exadata server).

On September 15th, 2009, Sun (now part of Oracle) announced its Exadata Database Machine Version 2, billed as the world's fastest machine for both data warehousing and online transaction processing (OLTP). This machine is built on Sun hardware (servers and storage) — and uses advanced memory management facilities (Exadata Smart Flash Cache based on Sun FlashFire technology) to deliver extreme performance and scalability for online transaction processing (OLTP).

We believe that Exadata is only the first in a series of high-performance x86-based servers that Oracle intends to introduce. These servers will be designed to compete in the midrange and high-end server markets — where Oracle and IBM will compete for leadership in the data-intensive business intelligence and decision support market segments.

Why the Forthcoming IBM/Oracle Competition Intrigues Clabby Analytics

Over time, *Clabby Analytics* expects that x86 multi-cores will become the "de facto industry standard" for 64-bit computing. IBM will sell them — as will Oracle, HP, Dell, Fujitsu, and so forth. But, from our perspective, IBM and Oracle are uniquely positioned to capture the data-intensive upper midrange and high-end of the x86 server market, primarily because each company controls its own infrastructure stack, operating environments, management environments, database, and pricing model. (IBM can even tweak its product offerings all the way down to the core hardware level — creating the potential for major performance advantages).

By controlling these elements, each company controls its own developmental destiny. IBM and Oracle can choose what features and functions to build into their database and infrastructure products. They can also tune their environments to provide greater performance on their own respective systems designs. And they can package their hardware and software in ways their competitors can't (resellers don't necessarily have as much pricing/packaging flexibility as original equipment manufacturers). It is also worthy of note that IBM and Oracle have the ability to wrap software, services, and hardware into volume purchase agreements (VPAs). By using the VPA as a competitive weapon, both companies can significantly discount pricing across their respective hardware, software and services environments. And it should also be noted that in the midrange and high-end of the market, the VPA plays a very, very important role in buying decisions.

Comparing Oracle and IBM

One way to compare Oracle and IBM is to examine each company's product portfolio. Another way to evaluate these two companies is to look at each company's go-to-market strategy (Oracle is taking a homogeneous x86 approach versus a IBM's "workload optimized" heterogeneous server approach [x86 multi-cores, POWER, and z]).

A high-level comparison of both companies shows that Oracle is in the business application business — while IBM relies on partners for software products in that space. What this means is that Oracle is focused on selling Oracle business applications on its hardware — while IBM focuses on providing "choice" (Oracle, SAP or other business applications on its hardware).

The same kind of situation occurs at the infrastructure level where Oracle offers its stack, while IBM can sell Oracle's stack or its own infrastructure related products. This also occurs in the areas of business intelligence, asset management, product lifecycle management, database, and infrastructure products. Oracle is essentially positioned as a single stack applications/infrastructure/database vendor, where IBM is positioned to offer choice. (Note: Oracle is one of IBM's strategic partners when it comes to database and business applications — the reverse situation, however, is not true).

Given that Oracle is new to the server/storage business, it has not had much time to build an ecosystem of other alternative ISV products to sell on its hardware (and we're not sure Oracle wants to offer alternate software products on its stack). What we expect to see is that Oracle will focus on building highly-tuned Oracle solutions customized for its x86 systems and storage — whereas IBM will offer a wider variety of applications solutions including highly-tuned Oracle solutions, highly-tuned SAP solutions, alternative infrastructure and database solutions — that run on a customer's choice of industry standard x86 multi-cores, and/or on Power Systems, and/or on z mainframes.

One wild-card in this comparison is at the operating systems level. IBM's builds its z/VM and z/OS operating environments — and offers its own Unix (AIX — a Unix version that has been capturing market share from Solaris and HP/UX over the past few years). It appears to us that Oracle will focus on Oracle Enterprise Linux (OEL) over time (a distro with about 1% market share as compared with Red Hat and Novell at over 90% combined) — and that Solaris will fade away with UltraSPARC over time (although OpenSolaris will probably survive as the Unix leader on x86).

Chart 1 — Comparing Product Portfolios

Comparison Basis	Oracle Strategic Focus	IBM Strategic Focus
APPLICATIONS		
Business Applications	Oracle E-business Suite	Oracle E-business Suite; strong developmental relations with SAP; many other ISV business application solutions.
Business Intelligence	Oracle Business Intelligence Suite	IBM Cognos; Oracle equivalents; other ISV solutions
Asset Management	Asset Lifecycle Management	IBM Tivoli Maximo; Oracle equivalents; other ISV solutions
Product Lifecycle Management	Agile Product Lifecycle Management	IBM Rational (product, program, portfolio, process, performance)
DATA BASE		
Databases	Oracle Database, My SQL	IBM DB2, Oracle database; open source
INFRASTRUCTURE		
Complete Infrastructure Stacks (*These are only partial listings — the number of infrastructure software packages offered by each company is astounding*)	Oracle Fusion Middleware, Application server, Content Management Middleware for Small and Medium Businesses, Business Integration Data Integrator, Business Intelligence Developer Tools, Business Process Management EDA Suite ...	IBM WebSphere, IBM Rational Tools, IBM Express Solutions for Small and Medium Businesses, Asset Management, Business Continuity and Resiliency, Energy Efficiency, Information Infrastructure, Security, Integrated Service Management, Virtualization, ...
HARDWARE (Servers)		
x86 Multi-cores	Yes	Yes
UltraSPARC	Yes	No
POWER-based Servers	No	Yes
Mainframe (z) Servers	No	Yes

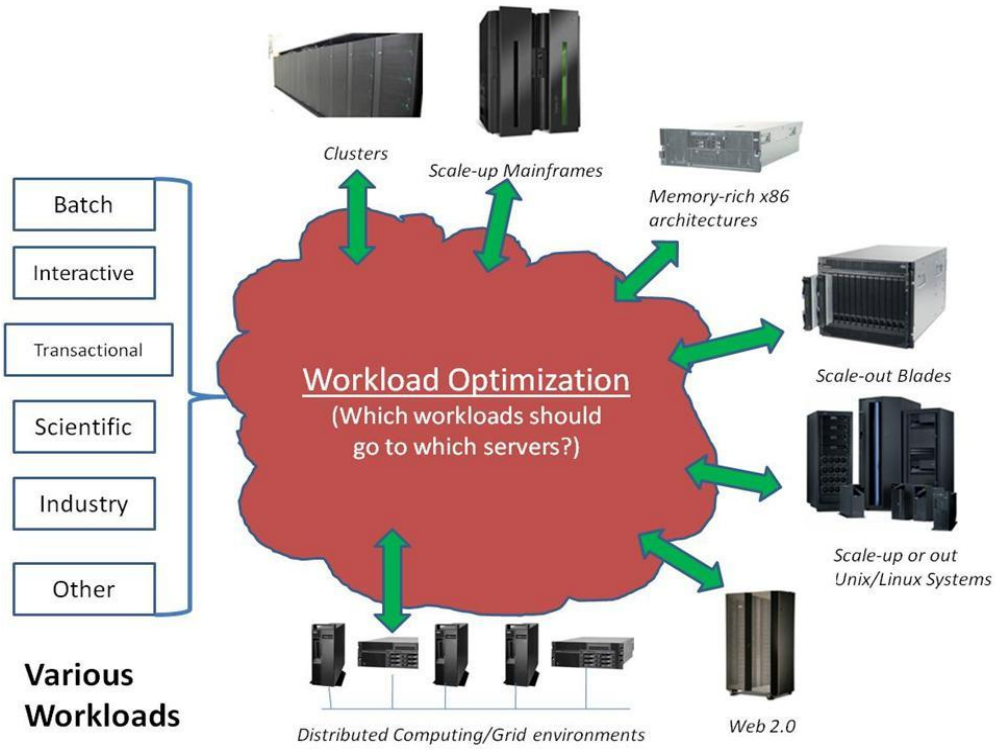
Source: Clabby Analytics, June, 2010

Hardware Choice Is Also a Huge Differentiator

At the hardware level, Oracle offers x86 and UltraSPARC solutions (at least for the time being), while IBM offers x86, POWER, and z solutions.

For some IT buyers, purchasing a single stack solution makes a lot of sense because a single server can be deployed and managed, and a single vendor can provide support for the software that runs in that environment. But the trade-off in taking this approach is that not all applications behave the same — so some applications may run well on a particular platform, while others may run better on a different platform (see Figure 1 — next page — for an illustration of running multiple workloads on a variety of servers). (Note: as illustrated above, Oracle can sell a single stack solution — but IBM can also sell a single stack Oracle solution or a single stack IBM solution).

Figure 1 — Applications Workload Optimized for Varied Platforms



Source: Clabby Analytics, June, 2010

How to Choose: Start by Evaluating Application Characteristics

From our perspective, IT buyers need to look closely at their application requirements before deciding which platform to choose because applications make use of underlying servers in different ways. For instance, an application that execute in a serial (step-after-step) fashion usually run best on scale-up hardware that offers a lot of memory. Parallel applications can execute well in a distributed computing environment and typically use less memory than monolithic applications. Figure 2 shows some application characteristics that should be considered before making a system/server choice.

Figure 2: Application Characteristics

- Applications have different characteristics
  - Execution/threading characteristics
    - Parallelism — # of independent processes that can be computed and reassembled to produce a result
    - Serial — in order execution
  - Memory usage characteristics
    - Many applications have been designed to use 4GB of memory or less
    - Enterprise class applications benefit from very large memory (VLM) — large amounts of data in memory located close to the CPU can execute very quickly
  - Design
    - Loosely-coupled; tightly-coupled
    - Message intensive (SOA)
  - Bittedness (32- or 64-bit)

Source: Clabby Analytics, June, 2010

Also Evaluate Service Level Requirements

When evaluating applications, also pay close attention to the level of service that is required by an application. For instance, certain business applications have mission-critical availability and security requirements, while e-mail, spreadsheet and word processing applications frequently do not require the same availability/security service levels. When evaluating application service-level requirements, look closely at your server's:

- Reliability/availability characteristics
- Performance characteristics
- Scalability/capacity
- Memory management and memory capacity
- Consolidation/virtualization/provisioning/workload balancing characteristics
- Power management and heat dissipation
- Security
- Energy usage characteristics

To illustrate how different systems offer different levels of service, consider the differences between x86 architecture, POWER architecture, and mainframe (z) architecture when it comes to virtualization. What Figure 3 shows is that mainframes (z/VM v 6.1) can support more than 60 virtual machines per CPU — as compared with only 20 virtual machines per CPU in the x86 world (VMware ESX 4.0). Memory handling on POWER and z architectures is also superior to the shared virtual memory pages approach used by VMware. And POWER and z offer applications access to far more memory than x86 architectures (mainframes offer access for up to 64 CPUs to 1 TB of memory; POWER offers access for up to 256 CPUs to 8 TB of memory; while x86 architecture under VMware provides access for only 8 CPUs to 256 GB of memory). Based upon this analysis, it is easy to see how applications that require access to large amounts of memory can run better in POWER and z environments as compared to x86 environments.

Figure 3 — Level of Maturity Comparison — VMware vs. POWER vs. Mainframe

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-partitiong 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 — April, 2010

Summary Observations

By virtue of owning their own infrastructure, database, server hardware products, and pricing models, both IBM and Oracle have distinct advantages over their server market competitors. Each company can package and tune its hardware and software products in ways that resellers cannot. And each company can structure enticing volume purchase agreements (their competitors don't have the same amount of pricing flexibility because they have to rely on IBM, Oracle, and other vendors for software — and are subject to their partner's margin demands).

The biggest differences between IBM and Oracle can be found in each company's go-to-market approach — and at the server hardware level. From our perspective, Oracle is positioning to sell its software solutions on its infrastructure on its hardware. IBM is positioned to sell Oracle application/database/infrastructure solutions — but IBM can also sell SAP solutions as well as business application solutions from other vendors on its hardware. Further, IBM can also offer alternative infrastructure, database, and management products.

The differences at the server hardware level also reveal how each company's approach to the server market is different. We believe that Oracle will eventually become a homogeneous x86 shop (as UltraSPARC fades away), while IBM will become the industry's only supplier of heterogeneous systems. And, from a go-to-market perspective, this homogeneous vs. heterogeneous systems difference has huge implications.

> ***Oracle's go-to-market strategy essentially encourages its customers to buy an Oracle stack on x86 architecture. And this is fine for many applications — but, it must be noted that not all applications run optimally on x86 platforms. IBM's go-to-market strategy gives IT buyers a choice between its stack and the Oracle stack — and makes IBM and Oracle solutions available on three distinct systems platforms — enabling IBM customers to choose the best system for running a particular application.***

IT buyers who are evaluating product offerings from these vendors should look very closely at the requirements of their applications. Applications can be categorized into batch, interactive, transactional, and scientific classes — and these applications execute in loosely-coupled or tightly-coupled fashion using single threads or parallel execution threads. Some applications require access to large amounts of memory — while other applications require access to modest amounts of memory. All of these factors should be taken into account when choosing a systems platform.

While evaluating application execution requirements, also consider application service level requirements. Mission-critical applications frequently require strong security and high-availability, while e-mail/word processing, and spreadsheet applications often require lesser degrees of security and availability. There are major differences in the level of service offered by various systems platforms (as illustrated in Figure 3 which shows how much more advanced POWER and z virtualization architectures are when compared to x86 architecture).

Ultimately, the final decision comes down to whether you believe x86 architecture can do all computing jobs well. If you choose to standardize on x86 architecture, then both IBM and Oracle can provide x86 solutions. If you choose a workload optimization approach (choosing the best platform to execute your applications), then only IBM can suit this need.

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