



Commoditization, Standards And the Enterprise

A White Paper

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ABSTRACT

The very nature of technology is the nature of change, and significant changes have marked the barely fifty years that represent the short, rich history of modern computing. In the parlance of computing waves, we are in the fourth wave. The original dominance of custom vertically integrated centralized computing, expanding through the need for tactically deployed departmental resources, has given way to the distributed networked world, which is currently in the throes of going mobile. In each wave of the computing world and subsequent marketplace, there have been several constants. The ones we will explore here are the effects of commoditization and standards and their subsequent impact on the enterprise.

The computing landscape is now an amalgam of technologies – servers, storage systems, software, service, and management that collectively characterize both a business platform and a market landscape. These business environments present opportunities and challenges for the IT customer and the IT vendor as enterprises seek to enhance computing capabilities, simultaneously providing effective management of existing corporate resources while maintaining or improving the return on investment. At the same time, the demand for competitive advantage and customer loyalty in the marketplace has forced a close link between business and IT. Circumstances now place a new set of demands on IT, just as IT needs to deliver in real or rapid time to market, scaleable, agile, optimized resources and leveraged existing investments in new solutions that truly meet the evolving business needs that just evolved again. Do more with less... do it faster, more flexibly, less expensively, and all together, if you please?

The cycles of change no longer encourage specialized or custom-built hardware to meet business computing needs, since the cost advantage of high volume commodity components has become so compelling. Given the high ROI that customers can achieve with standard off-the-shelf components and solutions, higher risk non-mainstream solutions become relatively less attractive. It is as if the nature of the microprocessor, off-the-shelf integrated circuits of standard ingredients and components, ever more specially integrated and arrayed to shorten the processing path and deliver its unique value-add, were now the metaphor for business itself. In today's business, as in this chip metaphor, it is not so much the ingredients as it is the recipe by which you differentiate true value-add.

Thus, systems vendors that traditionally competed on the nuts and bolts level instead need to alter their value added proposition lest they become irrelevant and financially battered to the point of ruin. For most, the challenge is to change their understanding and definition of value-add. Building upon their hardware heritage and understanding but expressing themselves through software, services, and unique function-specific hardware differentiation, vendors can promote attractive, compelling differentiation. It is in the nature of competition that customers will always seek functionality that adds value to their businesses. For HP and Compaq, this scenario offers a substantial opportunity for the combined entity to position itself as a leader in driving the economics and value proposition of industry standard computing to enterprises of every kind.

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Today's Is a Changed World

The terrorist attacks of September 11, 2001 have changed the business environment dramatically. One new reality is that most line-of-business managers are charged with the unenviable task of having marching orders to do more with less and to do it immediately. But LOB managers are not alone: their IT counterparts have also had to reduce staff and cut back on projects that were considered indispensable during the heady days of the '90s.

The dominance of the custom vertically integrated centralized computing resource or tactically deployed departmental resource has given way to a distributed networked world. The computing landscape is now populated with multitudes of servers, storage systems, software, services, and management technologies that collectively characterize the market. The Sageza Group refers to this new computing model as Service Computing: a distributed computing environment where access to information is dictated by business needs as opposed to technological limitations. Service Computing leverages the rich history of computing while bringing its value to the next generation of network applications and Web Services.

It is increasingly the case that lack of time or internal resources plays a pivotal role in IT spending habits. Looking toward the future, by the time most recent IT projects have been defined, LOB issues have moved on to something else. This indicates a need to bring the two worlds into alignment. This is not a new phenomenon; we have seen it every time there is a significant change in technology's value proposition as technology continues to become closer and more relevant to business strategy and users. Computing solutions will become integral to corporate competitive planning, hence the time to deploy any initiative will become of paramount importance.

That said, the size and importance of existing systems and their content will continue to create IT challenges. There are few green fields in enterprises and new technologies will not replace the old but rather will leverage them to create new opportunities. The organizational computing environment will increasingly dictate vendors' balancing acts in providing the best of new capabilities while protecting and enhancing existing corporate intellectual assets.

The Reality of Commoditization

The wide availability of low cost commodity components will bring an ever-increasing amount of computational, networking, and storage capability at ever-decreasing price points to most any enterprise. These hardware platforms combined with standard and emerging software standards will provide the basis on which the next generation of network applications will be built. Software standards will be key to actualizing these efforts. Who could argue that TCP/IP, HTTP, HTML and XML among others have failed to create new opportunities for faster system agnostic application development to drive the growth of distributed applications and services? In the future, standards will assure organizations that applications developed will have a life that is independent of any hardware or operating system platform, thus enabling longevity without heretofore-anticipated obsolescence or vendor lock-in.

The changes in IT that are taking place today have affected the evolution of both the marketplace and the IT industry in three key areas:

- ♦ **Commoditization of the processor:** For the mainstream computing market, the CPU is simply no longer a differentiating factor. With clock speeds in excess of 1 GHz commonplace, the reality is that mainstream computing needs can be met by Intel Architecture-based solutions. Thus competitive differentiation, or remaining value-adds of hardware solutions and their performance premium, is dictated by the rest of the

platform, e.g. specialized graphics performance, motherboards, superior backplane speeds, etc. Although the processor is a commodity, this by no means implies that all computers built around the processor will have equal performance or value-add any more than current 32-bit Intel architecture desktops and servers all perform equally. All major manufacturers work hard to engineer superior performance targeted at specific market niches by enhancing things like I/O subsystems, memory performance, graphics performance, and storage subsystems from the hardware and OS side; and system management, network management, and vertical solutions on the software side of their offerings. We expect this trend to continue as the rollout of next generation 64-bit system picks up steam.

- ◆ **The availability of off-the-shelf business solutions:** Historically, enterprise applications were homegrown and in later years, heavily customized implementations of vertically integrated software solutions. But the shift to distributed computing has changed the nature of applications where Web sites and Web services now offer functionalities that were previously the sole domain of monolithic solutions.
- ◆ **Raising the bar for value-add:** As formerly value added features become the norm for off-the-shelf components and software, value-add rises even higher in the solution set. For example, at one time the industry was focused on simply automating back office transactions, but today value added solutions focus on integrating supply chains, understanding the customer, optimizing interactions, and personalizing transactions. These functions are much higher up the value chain.

An industry standard based marketplace has few if any technical barriers to entry, so the focus of competition shifts from patents and copyrights to implementation quality, time to market, scale, efficiency, and effective marketing. This is one reason vendors have been so keen on maintaining proprietary standards for hardware and software, since it provides them a unilateral means of maintaining substantial competitive advantage. For customers, however, commoditized components translate into not only lower cost hardware, but also a choice of vendors and perhaps more importantly, a greater number of products and services with increased capability that will inevitably be brought to market.

The Role of Operating Systems in a Standards World

Some might be quick to conclude that in a commodity component and standards driven marketplace the proprietary lock in value of the operating system would be greatly diminished since there would be no secrets in how hardware components operate. Granted, more than one operating system exercises the IA-32 architecture. However, as hardware drives towards commoditization, operating systems do not automatically follow the same path. In reality, the utility of the underlying hardware is defined by the capabilities of the operating system and its support for a variety of standard development platforms. Thus the role of the operating system is increasingly to provide a variety of hardware abstraction layers that offer a foundation for myriad network focused applications and services.

Service Computing is the realization of a distributed computing infrastructure deploying solutions as standards based services sourced from many concurrent future public, commercial, and enterprise providers and delivered to virtually any type of access device. The infrastructure is complete with multiple servers, access devices, networks, middleware, networked and attached storage solutions, and security, all operating in a well defined and managed state. The operating system remains an integral part of making this distributed environment a reality. While many of the interactions that take place between these varied technologies will be driven by software standards, it is ultimately left to the operating system to provide the fundamental enabling support that makes standards a reality.

The rising bar of value added capabilities in distributed applications and services dictates that operating systems must by necessity continue to grow beyond simple functions such as computation and I/O to become the foundation upon which the next generation of distributed applications will be built. The distinction between traditional OS network services and middleware will be increasingly hard to discern. Additionally, distributed applications architectures such as .NET and ONE will have a tremendous impact on the future of software development and deployment. It will fall to the OS again to provide the framework necessary to support this next generation of applications and Web services. So for the customer, purchases will be driven less by the formerly unique attributes of a given operating system, but more by the number of software standards and application architectures that the OS enables.

Is There Any Value-Add in a Commodity Marketplace?

Commoditization when taken to its logical conclusion results in little if any differentiation between similar classes of products, and hence offers no technological or market advantage for vendors. Such a scenario would dictate that all value-add would then necessarily have to come from services or ancillary products related to the commodity. At present we do not foresee the commoditization of all aspects of computing, but rather the commoditization of Industry Standard Components, upon which the bulk of computing solutions will be based.

The real challenge facing the computer industry is not the elimination of value-add, but the shifting of where opportunities lie in such a market. Rather than focusing on generic hardware components where incremental evolution is the norm, value-added differentiation will be found in customer-focused solutions. Some examples include:

- ◆ Enterprise-wide content and applications distribution, printing, customization, and personalization including delivery to mobile workers, suppliers, and customers.
- ◆ Integrated voice and data services to take advantage of the proliferation of myriad hand-held and other small form factor access devices.
- ◆ Creation, distribution, transformation, sharing, editing, storing, etc. of rich media content.
- ◆ Providing agile, adaptive, resilient, and continuous infrastructures for running businesses that make it easy to create, deploy, monitor, and assure processes and services to shorten innovation cycles that will inevitably increase the efficiency and decrease the overall costs of computing deployments.

While leapfrog innovation may be dead or dying at the CPU level, it does not mean that innovation in commodity component solutions has ceased. Rather, the opportunity for systems vendors will be found in adding value above this level. The widespread availability and rising capabilities of hand held devices will likely have a potentially disruptive impact on IT technologies, but some of these impacts will prove difficult to foresee until the industry is in the thick of them.

Vendors: Approaches to Commodity Components

Given the market movement towards commodity component sourcing combined with growing commoditization, how are the leading systems vendors positioning themselves to deal with these challenges and take advantage of the opportunities this market shift proffers?

To our way of thinking, the market falls into two camps: those who are embracing the market reality of commodity components and those who are resisting this inevitability.

Not surprisingly, the vendors in the embracing camp are those with long, well established relationships with Intel and Microsoft. The major players in this space include Compaq, HP, IBM, and Dell — each of whom currently offer or are expanding their offerings in enterprise grade server solutions based upon commodity components. Additionally, each has a long history of offering desktop solutions based on these same components. Although the enterprise focus of IBM and HP is well established, Compaq's efforts as a major IT vendor have until the last few years been unjustly shadowed by its historical success in the PC space. Similarly, Dell is also seeking to capitalize on the enterprise server opportunity. Even though each of these companies will continue to develop and position their own separate and unique value adds through ancillary hardware, software, and services, they agree that the future of mainstream computing solutions will be based upon commodity components, including Intel's new 64-bit Itanium Processor Family.

Conversely, Sun Microsystems remains the odd company out. The company's long-standing insistence on the literal and philosophical superiority of both its UltraSPARC chipset and Solaris OS, buttressed by its recent discontinuance of support for Solaris x86, seems to obviate any need for Sun to involve itself with commodity component computing. Yet the company paid \$1.8 billion in stock for Linux server appliance maker Cobalt, insisting that the deal illuminated its contention that Linux was fine in low-end boxes, but incapable of providing the robust performance needed for backend business processes. Overall, despite protestations to the contrary, Sun remains a leopard essentially disinterested in changing its spots. In a world that continues its migration toward standardized computing technologies, Sun's species appears to be increasingly endangered or significantly separated from the mainstream.

With one exception, then, major systems vendors are driving the future of mainstream computing to commodity components. Thus, the market is moving to increasing levels of value-add capabilities at higher levels in the product marketplace. Gone may be the equivalent of custom manufactured nuts and bolts, but this by no means implies that all hardware is now a commodity. In an era of commoditized CPUs, disk drives, memory chips, etc. the value-add of each systems vendor will focus instead on motherboards, graphics chip sets, I/O, disk controllers, and other specialized components.

HP/Compaq: A Study in Standards

Two companies that have identified both commoditized components and standards-based software as the essential building blocks of mainstream computing in the future are Hewlett Packard and Compaq. While the eventuality and success of the proposed merger of HP and Compaq is an unknown, both companies have been on this course to computing's destiny for many years.

Compaq

Compaq's server, mainframe, storage, and software products match up well against those of its competitors, and the company appears to have taken advantage of the economic downturn as a time to retool and strengthen its organizational structure. The company's long-standing relationships with Intel and Microsoft leave it well positioned to act as a prime mover of those companies' standards efforts. Compaq's formal retirement of its Alpha processors in favor of Intel's 64-bit Itanium Processor Family should place it at the leading edge of the Itanium land rush.

While there will certainly be risks involved in the transition, we believe the well established alliance between Compaq and Intel is likely to help mitigate them as both parties have much

riding on the success of the new hardware platform. We also see Compaq's dedication to Linux (the company claims that it ships far more Linux-based servers than any other company) playing to its strength in Intel-based products. In addition, while Compaq's ZLE initiative is not a commodity technology, *per se*, it is capable of integrating most any business application or process with commodity products the company does deploy. Overall, we regard Compaq as being well positioned to both drive and profit from current and future industry standards initiatives.

Hewlett-Packard

In a sense, Hewlett-Packard got into the commodity market inadvertently because of the company's broad product development efforts. Although HP's server offerings span the full range, they have experienced pronounced success in the mid to upper range. The company's singular success in printer and imaging technology, its strengths in management software and middleware, and its ongoing work in developing networking solutions make it the only IT vendor that can offer fully-integrated home grown solution sets that cover most technology and business needs.

How will HP find success in the commodity component and standards-based software world we envision? To start with, HP has embodied Sageza's Service Computing market framework in their own Service Centric computing initiatives, laying the foundation for distributed and component computing at the highest level of value-add above the hardware. It is almost a foregone conclusion that, as a co-inventor with Intel of the IA-64 architecture, HP will attack the future by strengthening its alliances with component partners and making significant moves toward products based on commodity sourced components. HP has been a leading proponent of commodity components and software for quite some time. While HP has evidenced a demonstrable commitment to Linux and to developing products based on Intel's 32- and 64-bit architecture, the company has the opportunity to steadfastly drive these initiatives to market success. The company's dominance of the printer and imaging space and its consistent profitability from the UNIX server business has historically given it enormous latitude, but in a tight market made even tighter by increasing commoditization, we believe the margin of error allowed every vendor, HP included, has narrowed considerably.

Responding to the Market

Independently, both HP and Compaq have evaluated the marketplace and the value added proposition of hardware, software, services, and have come to a common conclusion. Commodity hardware will allow the merged company more research and manpower to be focused on unique value added capabilities while leveraging the economies of scale in purchasing components that are not unique unto themselves. Therefore, both companies have separately announced, as long as six years ago, that their future mainstream server strategies would no longer include proprietary CPUs (currently PA-RISC and Alpha Chips), but would standardize on future offerings from Intel's 64-bit architecture, which at that time was barely off the drawing board. Each company has carefully built a roadmap to bring their respective users to the new platform while continuing support and growth on both a system and an OS level for their existing installations and applications.

Both aspects of this transition are important as the companies do not want to damage their existing businesses while waiting for the future to arrive, nor do they want their existing customers to feel abandoned when the future inevitably does arrive. This is extremely important as the industry is not only shifting to commodity components, but is also shifting from local applications towards the Service Computing model.

The companies seem to be succeeding on both counts by building a suite of tools to provide a migration path from one operating system but perhaps more importantly providing the development environment to enable next generation network applications and Web services. This means that enterprise developers could choose to build and deploy in this new operating environment, often to middleware Web application servers or Web services, and be assured of minimal issues when either adding commodity component architecture to their environments or replacing their existing systems outright. Only the naive could believe there will not be pain or planning involved, but the transition stress should be minimized by these efforts.

Compaq + HP = Greater Value-Add and Greater Opportunity

Focusing for a moment solely on the server groups of both companies, the potential merger of HP and Compaq adds potential value to the combined company and its clients alike in three important ways:

- ◆ There are the obvious cost reductions possible from leveraging redundant engineering and marketing expenses through the additional buying power that the combined organization would have in purchasing off-the-shelf components.
- ◆ Each company has added value to their commodity CPU products by everything else they have done and are planning to do in the rest of the chipset. By combining these value-add components in new and different ways, the combined company would have the opportunity to rapidly develop best-of-breed hardware platforms that could conceivably outperform their competition from both commodity and proprietary platform players. This combination of intrinsic cost reduction and expanded value should provide the combined company with a platform that competes well against price/performance metrics.
- ◆ Each company has already recognized and begun to build on the future architecture of computing, Service Computing, or in HP's parlance, a service-centric distributed computing model.

If the value of commodity components and standards-based software has any validity (and we believe it does), then a combined HP/Compaq that leverages engineering work already done would be well positioned to deliver credible advantages to organizations ready to begin evolving to the next generation computing model. Like many new computing concepts, this will be a chicken-and-egg proposition. The more credible the vendors involved are, the more enthusiastic early adopters will be in seeking first mover advantage of their own. The more early adopters that use the technology, the more credible the whole proposition becomes, thus driving adoption curves faster than they might otherwise grow.

Of course, product quality and value are only parts of this complex puzzle. If the combined HP/Compaq makes good on its promises to its combined enterprise customer base and really provides ongoing support for existing products while delivering high value technology on commodity and standards based platform, any concerns regarding the merits of the joining of these venerable organizations and their future in server computing will soon become little more than a footnote.

Regardless of whatever other concerns the enterprise market might have about the future of an HP/Compaq venture, most will recognize the value proposition imbued in products built from this joining. HP/Compaq, for its part, will have to prove its merit to the marketplace. Fortunately, a joined HP/Compaq will be well positioned to leverage their joint market position and technology acumen to the benefit of the company and its enterprise clients alike.

Summary

The commoditization of the mainstream computing marketplace is inevitable. This is being driven in part by the availability of commodity components and the fundamental changes they portend in the value proposition of computer hardware. Many enterprises no longer require specialized or custom-built hardware to meet their computational needs since the cost advantage of high volume commodity components has become so compelling. As a result, standard off-the-shelf components and solutions have come to predominate. Given the high ROI potential for customers deploying these components and solutions, it becomes relatively less attractive to take on higher risk non-mainstream solutions.

With fewer resources being applied to commodity technology, more can be focused on higher value-add for both the customer and the vendor. Systems vendors will apply their unique skills to producing commodity component based solutions that in the end are clearly differentiated while taking advantage of the inherent cost savings afforded using commodity-sourced components. Simultaneously, more effort will be expended on software; in particular, middleware and other network-focused technologies that will allow customers to capitalize on the shift to service-centric distributed computing, or Service Computing.

As standards-based software seeks a higher level of value add or differentiation, the focus will increasingly sharpen on the specific needs of customers, as opposed to providing generic features targeted at a class of business consumers. Thus, the IT customer is in the win-win position of having access to lower cost standardized technology from a variety of suppliers while concurrently reaping the benefits of unique and personalized enterprise focused value from their IT solutions.

A combined HP/Compaq that leverages engineering work already done will be in a position to deliver credible, competitive advantages to organizations ready to invest in the next generation of computing. Of course, product quality and value are only part of the puzzle. If the combined HP/Compaq makes good on its promises to its combined enterprise customer base and provides ongoing support for existing products while delivering high value technology on commodity and standards based platforms, any concerns regarding commodity component computing architecture will soon become little more than a footnote.

Regardless of whatever other concerns the IT market might have about the future of an HP/Compaq venture, most will recognize the value proposition imbued in products built from this joining. HP/Compaq, for its part, will have to prove its merit to the marketplace. Fortunately, a joined HP/Compaq will be well positioned to leverage their joint market position and technology acumen to the benefit of the company and its enterprise clients alike.