

## Intel? AMD? Where's the Love?

***Prior to Opteron, AMD processors were relegated to the role of low-cost Intel alternative, and had little presence in the enterprise server market. Opteron changed all that and vaulted AMD into the big time – their server processor market share approached 30%. Intel responded with a furious effort to regain the performance, energy efficiency, and price/performance high ground. Our question is: Have x86 customers developed lasting loyalties to either AMD or Intel, or do they simply look for the best processor at the time? To get some answers, we asked participants in our GCG x86 Server Vendor Preference Survey to weigh in on these issues...***

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The server market is a dog-eat-dog world that revolves around four major players – IBM, HP, Dell, and Sun Microsystems. Our ongoing Server Vendor Preference surveys track their ups and downs as they scrap for deals and market share. In our latest survey, covering the x86 server market, we also ask quite a few questions on other topics of interest, including things like virtualization, power/cooling/floor space challenges, and, as outlined in this report, the highest profile component in almost any server: the processor.

When it comes to the processors that run the x86 servers, though, there are only two names that matter: Intel and AMD. For the first time, we set out to discover which of those names looms largest in the minds of x86 customers... or whether customers even care what's inside their boxes as long as the features, performance, and vendor support meet their needs.

From the end of 1Q07 through 2Q07, we surveyed 297 respondents – more than ever. (See appendix of this paper for demographics.) These are IT managers, architects, and administrators who work with the systems, know first-hand what's happening on the data center floor, and can project future IT trends. They were asked more questions on a broader range of topics in this survey, providing accurate, detailed insight.

With AMD's long-awaited quad-core Barcelona finally shipping in volume, the battlefield between Intel and AMD will certainly heat up again. AMD fired the shot heard 'round the world with their Opteron introduction in April of 2003. They trumped Intel by bringing out a 64-bit processor that was fully compatible with existing Windows/Linux operating systems and applications and offered higher performance than the existing 32-bit Intel processors. AMD also pushed the state of the art in x86 processor design by integrating the memory controller on the chip and using HyperTransport links to allow multiprocessor systems a speedier path to



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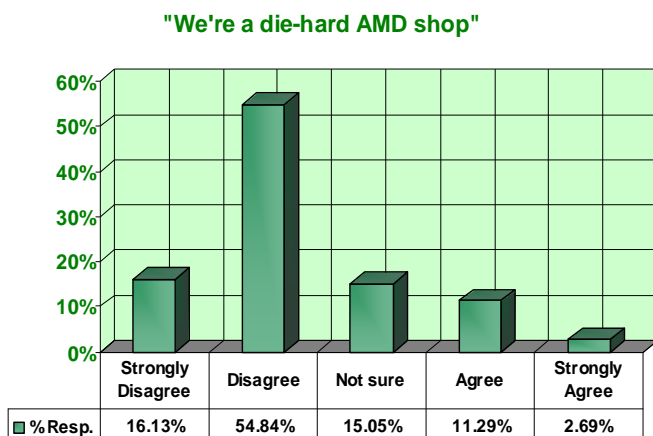
memory and other processors than the legacy bus connections. AMD again beat Intel to the punch in May of 2005, bringing out a dual-core Opteron well before Intel could bring out a competitive multi-core product.

As a result, AMD became the darling of the high-performance PC set and also managed to make significant inroads into the corporate data center and supercomputing markets. Opteron received early support from HP, who brought out a fairly wide variety of Opteron-based servers in short order. IBM provided lip service and a few systems, while Sun used AMD exclusively until their recently announced partnership with Intel. Dell was the longest holdout, finally offering Opteron-based systems in mid-2006.

In the face of the Opteron onslaught, Intel launched a furious comeback, introducing new processors at a withering rate. The turning point may have been the introduction of their Core architecture, which provided performance increases while significantly reducing power requirements and heat output. In late 2006, Intel began cranking out quad-core processors, beating AMD to the punch by nine months. AMD argues that Intel's quad-core CPUs aren't 'native' quad-core parts, due to Intel's approach of combining two dual-core processing units on a single chip sharing a single bus connection to memory. In contrast, AMD's new Barcelona processor has four distinct cores, each of which has a unique path to memory.

AMD asserts that under high demand, Intel's shared bus can become saturated, leading to performance shortfalls. Intel, of course, doesn't agree with this assessment. Our position is that while it's theoretically possible to saturate Intel's shared bus, we haven't seen any evidence that it actually happens in the real world – even on highly virtualized systems running flat out. In the majority of cases, bottlenecks in memory and system I/O hamper throughput much sooner than processor - bus contention.

Rather than explore feeds and speeds, we wanted to see if AMD's heady rise in market share over the last couple of years has engendered loyalty on the part of enterprise x86 data center purchasers. Has AMD earned enough goodwill to weather the storm of Intel processors raining down upon the market? And how much weight do purchasers place on processor brand when making their decisions? As part of our 2Q'07 x86 Vendor Preference Survey, we included a line of inquiry designed to ferret out the answers to these and other questions.

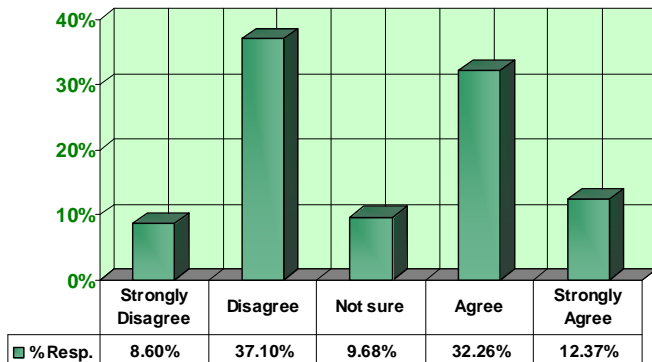


Our first question gives respondents the opportunity to firmly cast a vote in AMD's favor. Unfortunately for AMD, only 13% of our respondents describe themselves (and their data centers) as 'die-hard' AMD advocates.

The vast majority of participants, 71%, say that they are definitely not in the AMD camp. This doesn't mean that they don't have AMD-based servers in their organizations, or won't buy them in the future, but it does mean that only a small number of customers have a strong preference for or loyalty to AMD.

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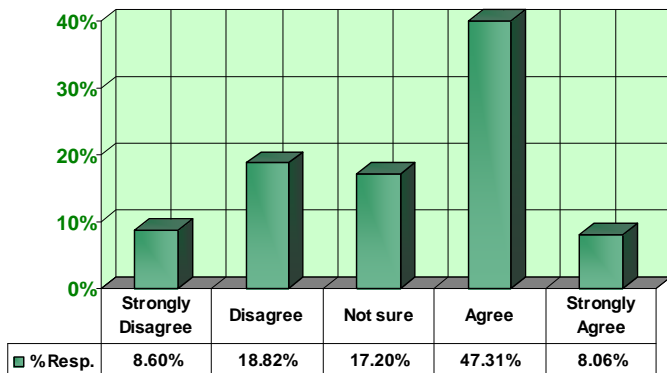
"We're a die hard Intel shop"



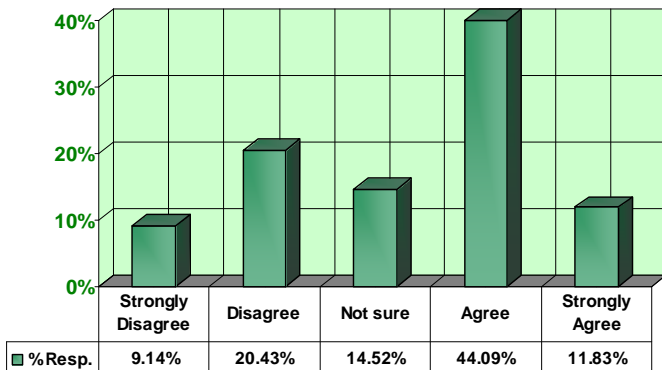
wallets of x86 server buyers. AMD just doesn't seem to have the same level of customer confidence that Intel does, despite a performance and innovation lead that began in '03 and, arguably, lasted through late '06.

However, just looking at processor brand preference doesn't tell the whole story. We asked a few more questions in order to understand the importance of processor brand in the purchase equation.

"Intel vs. AMD not as important as the server"



"We buy whatever is best at the moment"



- albeit a very important component - of the overall system. A processor that can be used to build a box that constantly fails due to weird errors and shoots out sparks if particular I/O slots are used

The same question, but with an Intel twist, elicits a considerably different response. A large number, 44.63% of our survey participants, firmly branded themselves Intel-centric. Only a slightly larger number of customers, 45.7%, denied an Intel bias, with 10% on the fence.

The number of customers who say they strongly favor Intel is more than three times the number who say they favor AMD. This obviously isn't great news for AMD.

To us, these results indicate that AMD is still facing an uphill battle for the hearts, minds, and

The chart at left shows that the majority of customers in this survey, more than 55%, believe that the server as a whole is more important than the manufacturer of the processor. The combination of factors that comprise a server purchase decision such as the vendor, memory and I/O capacity, form factor, RAS capabilities, and price take precedence over the AMD vs. Intel choice. This is wholly understandable, and certainly isn't a surprise.

What is surprising is that a little over 20% of

respondents said that the processor brand **is** the most important factor to them. We examined the data on this group a little further and found that almost 70% of them described themselves as "die-hard AMD shops", leading us to conclude that AMD has built a small but extremely loyal and hardcore following.

About the same number of enterprise customers, 55%, say that they buy the best server/processor combination at any given point in time, without regard to AMD or Intel brand processors. Like the result in the preceding question, this makes sense in that the processor is only one component

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can also be used to build a full-on enterprise box with hardware redundancy, lots of I/O, and plenty of memory slots to handle the largest workloads. Still, almost 30% of respondents seem to use the processor brand and specifications as the guiding factor in their purchasing decisions.

### **So What Have We Learned?**

In short, the results from this part of the survey tell us that brand loyalty in x86 processors is primarily tilted in Intel's direction. AMD has a small, but very committed, set of advocates who will choose the AMD solution whenever possible. A much larger number of customers will tend to buy Intel-based servers. However, the majority of enterprise customers will generally pick the right system for the job, whether it is powered by Intel or AMD processors.

For Intel, this is pretty good news. They still have strong customer loyalty, despite being at a performance and innovation disadvantage for a few years. This is the first time we've surveyed on this topic, so we can't say for sure if Intel has won customers back or if they never really lost them in the first place. Regardless, Intel is in very good shape for the future, given their strong execution on an aggressive development roadmap.

The outlook is less sunny for AMD. The survey results indicate that AMD needs to stay on the cutting edge of performance in order to capture and hold customer loyalty. This isn't limited to traditional speeds and feeds; it also extends to performance per watt and thermal characteristics. When AMD brought Opteron to the market, it immediately had an obvious performance and design advantage over existing Intel products. AMD held on to these advantages with their dual-core Opteron processor. However, the new Barcelona quad-core processor isn't head-and-shoulders above Intel's quad-core CPU – in fact, depending on how you measure performance, the two procs might be neck-and-neck.

Given Intel's roadmap and their recent track record of hitting product milestones, AMD needs to learn how to turn the development crank faster in order to stay competitive with Intel and preserve margins. If AMD can't pull this off, they will be relegated to their former role of low-priced Intel alternative. AMD woke up the Intel sleeping giant and now has to deal with the consequences.

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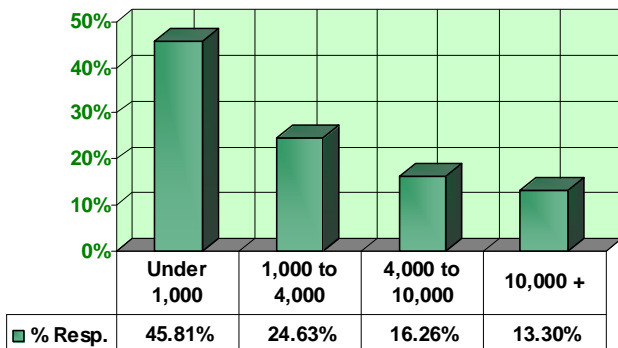
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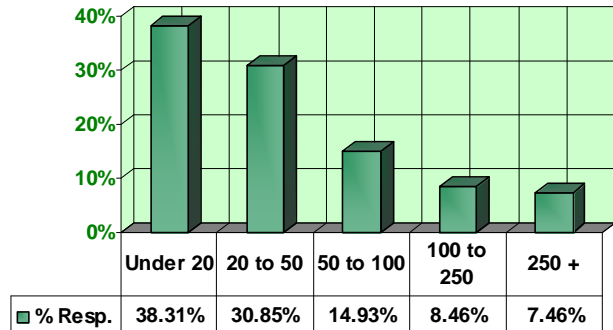
### APPENDIX

#### 2Q'07 x86 Server Vendor Preference Survey Demographics

**Organization Size (employees)**

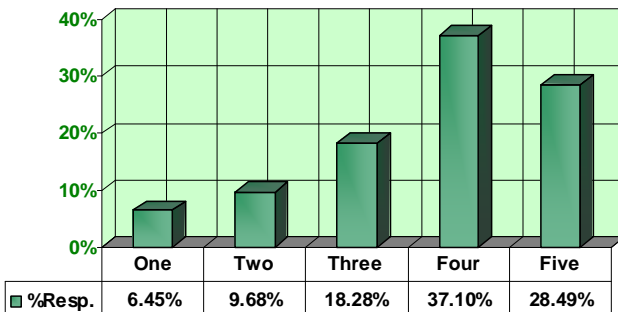


**Servers Managed by Respondent**

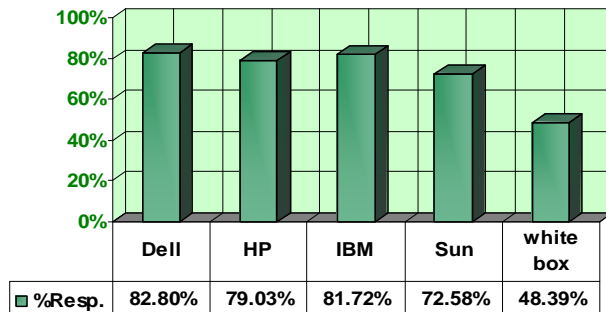


There were a total of 297 enterprise x86 respondents to this survey. SMBs (Small and Mid-sized Businesses) were well-represented in the survey, making up 46% of total participants. This survey also had a reasonable number of very large enterprise participants, at a little over 13%. The "Servers Managed by Respondent" chart refers to the number of servers that the individual participant is responsible for or has detailed knowledge about. An interesting data tidbit from this survey is that some of the SMBs with relatively few employees had fairly large server counts, in some cases a hundred or more x86 servers. Given this, it isn't hard to understand why the server vendors are rushing to produce SMB-friendly offerings.

**Number of x86 Vendors in Data Center**



**"We have at least some x86 systems from...."**



Over 83% of our respondents own x86 servers from three or more vendors. Almost a third have systems from five or more vendors, including white box or 'built it ourselves' systems. Only a very small portion – 6% - has managed to completely standardize on a single x86 vendor. Drilling down a little deeper, we find that the major vendors are present in pretty much every account. This isn't too surprising, given the fact that such a large proportion of customers have servers from three or more vendors.