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Subject: Re: OT: recommendations for high preformance workstations

Posted by [Rick Towler](#) on Fri, 11 May 2007 18:15:33 GMT

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Mirko wrote:

> On May 9, 12:25 pm, Rick Towler <[rick.tow...@nomail.noaa.gov](mailto:rick.tow...@nomail.noaa.gov)> wrote:

>>> I am buying my next linux workstation, and other than dollars, are  
>>> there other parameters that I should take into account? My main  
>>> unknown is vendor. Our company likes Dell very much, but I wonder  
>>> whether HP or IBM machines are better engineered or built for  
>>> scientific computations.

>> Two important considerations are bus topology and bus speed. My  
>> experience with IDL is that it is fairly sensitive to memory bandwidth.

>> So look for systems with a fast/wide bus.

>>

>> Intel is still using a shard bus architecture which limits the total  
>> bandwidth available to each processor socket. As socket/core numbers  
>> increase, there is a potential for greater bus contention. AMD is using  
>> a point-to-point protocol (Hyper-transport) that provides each socket  
>> with a dedicated connection to RAM. In theory this scales much better  
>> than Intel's bus architecture but it really depends on the application.  
>> If you are seriously thinking about quad procs or more, you should look  
>> at AMD's Opteron seriously.

>>

>> I haven't done any testing, but I would purchase an as fast as you can  
>> get dual core system. For Intel that would be a Xeon 3085 or Core2 Duo  
>> E6850. Both at 3Ghz with a 1333 MT/s bus (333 MHz quad rate). With all  
>> of the buzz around Intel's Core architecture I haven't been following  
>> AMD's releases but if I were buying AMD I would consider the fastest  
>> dual-core Opteron 12xx series available.

>>

>> Don't forget about a decent graphics card. I haven't been following  
>> linux 3d driver development but nVidia has historically had a better  
>> linux driver than ATI (now AMD). nVidia has two lines. The consumer  
>> "Geforce" line and the professional "Quadro". Dollar for dollar, you'll  
>> benefit much more from the higher clock rates and wider memory  
>> interfaces of the GeForce line than you will from the tweaks and driver  
>> optimizations that come with the Quadro line. (What you really pay for  
>> with the quadro line is a card that is certified with a number of  
>> professional modeling and design packages. IDL is not one of them.)  
>> Something like the nVidia 8600-GTS would be a good mid-high-end chip to  
>> go with. Even if you don't do object graphics you should consider a  
>> decent graphics card. There are some features in the upcoming 6.4 that  
>> will be able to take advantage of the hardware even if you aren't using  
>> object graphics.

>>

>>> I am looking for a 64-bit dual processor (dual or quad core) with  
>>> about 8GB. I will be running Fluent (and IDL) on it, and Fluent can

>>> take advantage of parallelized architectures. So far I have never  
>>> looked into IDL's features for running on parallel machines.  
>> The above recommendations are based solely on my experience with IDL.  
>> Maybe Fluent thrives on a slightly starved quad core system. And you  
>> can certainly buy a quad or octa processor system, you'll just have a  
>> couple of extra cores for running open office and firefox while IDL is  
>> churning away in the background.  
>>  
>> As for Dell, HP, IBM... Everyone is going to have a story. Our shop is  
>> almost exclusively Dell and our hardware failure rate is probably right  
>> in line with the industry norm. In the few cases where hardware has  
>> failed prematurely a replacement was easily and quickly obtained. I'm  
>> talking \*hardware\* support though. As of today, Dell doesn't support  
>> a desktop linux distro, and I doubt HP does. I think IBM does... But  
>> as JD mentioned there are a number of vendors that specialize in Linux  
>> systems that you may want to look into.  
>>  
>> -Rick  
>  
> Well, Rick, thanks for the really detailed response.  
>  
> I've been going "backwards" in my thinking lately. For my particular  
> application, I need two CPU's/cores with about 8-12GB of RAM.  
>  
> What I find interesting is that my current desktop has two 3.6GHz  
> single core Xeon processors. and 2GB of RAM. Intel's latest dual core  
> offering is 3GHz.

Yes, your Xeons are based on Intel's "Netburst" architecture which was developed during the MHz wars. Marketing determined that people were too ignorant/apathetic to learn the tiniest thing about their PCs and that as long as your PC had a bigger number on the box than your competitor, you sold more. The problem was that Netburst fizzled out at ~4.0GHz (it was supposed to scale to 10+ GHz). At these higher speeds it was hot and power hungry. A real disaster, especially when the market was moving heavily to mobile platforms and dense server arrays. Enter Pentium M, son of Pentium Pro, which focused on increasing the number of instructions per cycle (IPC) the processor could execute. Basically Pentium M gave you more per clock cycle than the netburst P4's did. Taking what was learned from the Pentium M development, the "Core" architecture was born continuing this focus on efficiency over brute clock speed. The end result is a architecture that executes 1.5-2.0 times as many instructions per clock cycle with very low (in relative terms) power consumption. For the most part core is the performance leader in X86 land (except for in 4+ socket arena where AMD's bus architecture rules). Things should get interesting this fall when AMD release their "Barcelona" based K10 chips. It's too early to tell if AMD will claw its way back to the top or if it will simply match Intel's

current lineup.

- > So, my current workstation with two separate CPU's is faster than a
- > dual core Xeon. (Unless the chip architecture is so radically
- > different that the 3GHz dual core outperforms two 3.6GHz single cores.
- > (I am neglecting bus speed and topology here).

Yes, the architecture is that radically different. Conservatively, the 3.0GHz Xeon 3085 is probably around 50-75% faster than your current pair of 3.6GHz P4 Xeons. I wish I had a nice Xeon 3085 based system to do some benchmarks for you but alas, I too have a 3.6 GHz Prescott based P4.

- > What I find interesting is that among several vendors, I cannot find
- > single core machines anymore (but I am a notoriously bad finder --
- > they could be there). What am I missing there?

Nothing.

How are you going to convince someone with a 3.6GHz machine to buy a shiny new single core 3.0GHz machine after pounding it into their heads that MHz matter???? You don't. You slap two cores on a chip and tell them 2 is better than 1. Better yet, sell them a bloated operating system that *\*requires\** 2 processors for a decent user experience ;). Single cores are out there but only in low end/mobile systems.

- > As for the linux distro, I will go with the Red Hat Enterprise Linux
- > (to be compatible with other linux installations within the group).

RHEL is the only approved flavor around here, although I really dislike it. Haven't tried v5 though.

Again, it is hard to make general recommendations, but if you can wait a few months, I would look for a Xeon 3085 or Core2 Duo E6850 system with the Intel P35 "Bearlake" chipset. If you need to buy now, the Xeon 5160 on an Intel 5000X chipset based motherboard would be my recommendation. Looking at aslab.com, they offer it in their "Dual-Processors" Marquis series. Closest graphics card they offer to my original recommendation is the Asus GF-8600GT. Not a bad choice. Pair that with a couple of 20" monitors for desktop bliss.

-Rick