Subject: OT: recommendations for high preformance workstations
Posted by Mirko on Tue, 08 May 2007 13:47:50 GMT
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Good morning group,

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.

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.

Thanks,

Mirko

Subject: Re: OT: recommendations for high preformance workstations
Posted by Rick Towler on Wed, 09 May 2007 16:25:41 GMT
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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.

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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

Subject: Re: OT: recommendations for high preformance workstations
Posted by Mirko on Thu, 10 May 2007 16:37:25 GMT
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Mike wrote:
> On May 8, 5:35 pm, JD Smith <jdsm...@as.arizona.edu> wrote:
>
>> I'd skip the big names and try a linux-specific workstation provider
>> like ASL labs.
>
> Do you mean ASL Labs (http://www.asllabs.net) or ASL, Inc. (http://
> www.aslab.com)?
>
> Mike

I believe it was http://www.aslab.com

Mirko

Subject: Re: OT: recommendations for high preformance workstations
Posted by JD Smith on Thu, 10 May 2007 16:48:10 GMT
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On Thu, 10 May 2007 09:37:25 -0700, Mirko wrote:

>
> Mike wrote:
>> [quoted text muted]
>
> I believe it was http://www.aslab.com

That's the one. Many people around here use them and are quite pleased.

JD

Subject: Re: OT: recommendations for high preformance workstations
Posted by Mirko on Fri, 11 May 2007 14:04:53 GMT
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On May 9, 12:25 pm, Rick Towler <rick.tow...@nomail.noaa.gov> wrote:
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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).

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

Mirko

Subject: Re: OT: recommendations for high preformance workstations
Posted by Mirko on Fri, 11 May 2007 16:56:07 GMT
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On May 11, 10:04 am, Mirko <mvuko...@nycap.rr.com> wrote:
> On May 9, 12:25 pm, Rick Towler <rick.tow...@nomail.noaa.gov> wrote:
>
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This article on wikipedia http://en.wikipedia.org/wiki/Intel_Core_microarchitecture
discusses the various intel architectures. Also, based on a reply
from asl (www.aslab.com) regarding the same question, the comparison I
was making was apples to oranges.

Mirko

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> wrote:
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> 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 Netbust 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 netbust 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.

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> 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

Subject: Re: OT: recommendations for high preformance workstations
Posted by Mirko on Fri, 11 May 2007 20:20:07 GMT
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On May 11, 2:15 pm, Rick Towler <rick.tow...@nomail.noaa.gov> wrote:
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> that as long as your PC had a bigger number on the box than your
> competitor, you sold more.

Are you referring to me there ? :-)

stuff deleted ...

Your comments about the multiple-instructions/clock cycle remind me of
the discussions in the late 80's early 90's regarding the CISC vs RISC
architectures. Are we going back to CISC?

>
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I plan to wait for at least two months. We'll see after that.

Have a good weekend (everybody)

Mirko

Subject: Re: OT: recommendations for high preformance workstations
Posted by swisswuff on Sun, 13 May 2007 08:52:47 GMT
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For the 64-bit computing, my experience covers:

* Fujitsu Siemens workstation, Celsius v830, with two AMD Opteron processors running Suse Linux; first I had one at home, and now we also got one for me at work replacing an old Powermac G5 for computing with IDL (at home: 2 x AMD Opteron 254, 8 GB RAM; at work: 2 x AMD Opteron 280, 32 GB RAM);

* IBM Intellistation 275 with Power PC processors running AIX which we bought about 3 years ago;

These machines were evaluated with considerable effort; at the time of purchase, the AMD Opteron 254 offered an extremely good performance / price relation for single core processors and it still does what I require it to do. These machines are extremely reliable work horses and I can not say anything bad about them.

Even though IDL is not supported for new releases under AIX any more, we found that new releases do not contain relevant features for our work, and so it is not really necessary for this, or the next year, to replace that machine. However, Power PC processors are somewhat slow with IDL, so I would not suggest them as prime choice. AMD processors turned out to run particular IDL routines faster than available Intel processors that we compared, maybe as floating point array operations are particularly optimized. However, it may well be that current options for Intel look as good as AMD Opteron options, best to conduct hands-on tests before buying. We evaluated for AMD Opteron and I can't say we regret it.

Apparently there had been a glitch with the manufacturing of the AMD Opteron 254 but we had not experienced any problems; anyway, Siemens technicians came to swap these processors before any problems would occur.

The BIOS of the Fujitsu-Siemens workstations appears to have issues with certain Linux distributions so not any would run; for example, we could not get Fedora or Ubuntu to run for some reason. I am reliably running Suse and no problems with this.

In terms of mobile work, I got an Asus A6T AMD Turion 64 X2 computer running a dual boot setup (Windows XP; Suse Linux 10.2); even though RAM is only extendable to 2 GB, it is a fast 64-bit computer and running IDL is nice.

Good luck with the choice!

Wolf Schweitzer.

Subject: Re: OT: recommendations for high preformance workstations
Posted by Nigel Wade on Mon, 14 May 2007 08:29:08 GMT
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Mirko wrote:

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It has a faster clock. If that is your only measure of "speed" then, yes, it's faster...

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> different that the 3GHz dual core outperforms two 3.6GHz single cores.
> (I am neglecting bus speed and topology here).
>

If you want the full picture you need to run benchmarks. Published benchmarks can give you an indication of how different systems handle various types of application. Probably the best overall is SPEC http://www.spec.org/benchmarks.html. There are results there for hundreds of systems containing various processors/cores and memory configurations. Look through the lists of systems and compare how the CPUs you are interested in compare. It is not just a case of "biggest is best" in terms of raw GHz as different CPU architectures get different throughput at the same core speed. Also, there is no benefit in having a multi-core/multi-CPU system running several parallel processes on a system with badly designed memory access, or all attempting to read data from the same disk, so that the CPUs/cores are starved of work.

The SPEC marks consist of 4 basic sets of tests. SPECint, SPECfp, SPECint_rate and SPECfp_rate. The int/fp compare the basic integer and floating point speed of a single processor/core, whilst the int_rate and fp_rate compare how well the system handles multiple processes/threads for multi-processor/core systems. Be careful when comparing rates between systems as multiple processors/cores are used in these tests, so you need to check each benchmark to find out how

many of each were used.

Within each benchmark there a many different tests run. If you look in detail at the individual tests you might find one which is similar to the type of work you intend to do. If there is then concentrating on that test, or at least giving it significant weight over other tests, might give you a good handle on how well different architectures will work for you.

But there is no better benchmark than your code.

--
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Subject: Re: OT: recommendations for high preformance workstations
Posted by Christopher Thom on Wed, 23 May 2007 00:12:59 GMT
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Quoth Andrew Cool:

> On May 10, 12:07 am, David Fanning <n...@dfanning.com> wrote:
>> Mirko writes:
>>> It is interesting that there were no mention of Sun or IBM machines
>>
>> Yeah, or VAX/VMS either. ;-)
>>
>> Cheers,
>>
>> David
>>
>> --
>> David Fanning, Ph.D.
>> Fanning Software Consulting, Inc.
>> Coyote's Guide to IDL Programming:http://www.dfanning.com/
>> Sepore ma de ni thui. ("Perhaps thou speakest truth.")
>
> David,
>
> Last I heard there are still satellites whiizing around above your head
> running VMS on board. (perhaps Wayne can confirm or deny that/)
>
> Good reason to have faith in VMS reliability... ;-)
>
> Our systems people say that when our Alpha/AXP boxes die, they won't be
> replaced. Trouble is, they're not dying - they just keep plugging away!

I have personally observed on at least 4 telescopes that are run by VAXen (and 1 that runs on a commodore 64!), and your point is spot on -- they are quite bomb-proof. The only reason they are slowly being replaced is because it's impossible to get parts for them, on the rare occasions something does break.

cheers
chris
