Subject: Re: IDL time test with a PowerMac G4
Posted by Pavel Romashkin on Tue, 05 Oct 1999 07:00:00 GMT
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It looks pretty good, although I fail to see a major improvement over G3. Both are far faster than my ability to comprehend the results of calculations they perform. I am a mac user, and in my opinion it is not the clock speed that matters, its the lack of dynamic memory allocation in the Mac OS and time between system crashes or screen freezes. Well, for one thing a faster Mac reboots faster after a crash, but that's about it...
Cheers,
Pavel

"Joseph B. Gurman" wrote:

> Running IDL 5.2 without any special Velocity Engine (AltiVec) plugins
> or other mods, a G4/450 running Mac OS 8.6 with 128 Mbyte of memory and a
> 20 Gbyte Western Digital (stock) Ultra ATA hard drive gets the following
> results on time_test2:
>
> IDL> time_test2
> |TIME_TEST2 performance for IDL 5.2:
> | OS_FAMILY=MacOS, OS=MacOS, ARCH=PowerMac
> | Mon Oct 4 15:36:29 1999
> 1 0.400000 Empty For loop, 2000000 times
> 2 0.166667 Call empty procedure (1 param) 100,000 times
> 3 0.0666667 Add 100,000 integer scalars and store
> 4 0.0833334 25,000 scalar loops each of 5 ops, 2 =, 1 if)
> 5 0.0166667 Mult 512 by 512 byte by constant and store, 10 times
> 6 0.0500000 Shift 512 by 512 byte and store, 100 times
> 7 0.0833334 Add constant to 512 x 512 byte array and store, 50 times
> 8 0.116667 Add two 512 by 512 byte images and store, 30 times
> 9 0.266667 Mult 512 by 512 floating by constant and store, 30 times
> 10 0.133333 Add constant to 512 x 512 floating and store, 40 times
> 11 0.666667 Add two 512 by 512 floating images and store, 30 times
> 12 0.0500001 Generate 225000 random numbers
> 13 0.0666666 Invert a 150 by 150 random matrix
> 14 0.0166667 LU Decomposition of a 150 by 150 random matrix
> 15 0.116667 Transpose 256 x 256 byte, FOR loops
> 16 0.116667 Transpose 256 x 256 byte, row and column ops x 10
> 17 0.0166668 Transpose 256 x 256 byte, TRANSPOSE function x 10
> 18 0.200000 Log of 100,000 numbers, FOR loop
> 19 0.0333333 Log of 100,000 numbers, vector ops
> 20 0.150000 131072 point forward plus inverse FFT
> 21 0.183333 Smooth 512 by 512 byte array, 5x5 boxcar, 10 times
> 22 0.0166667 Smooth 512 by 512 floating array, 5x5 boxcar, 2 times
> 23 1.71667 Write and read 512 by 512 byte array x 20
> 4.73333=Total Time, 0.096772401=Geometric mean, 23 tests.

>
> For comparison, a similarly equipped (6 Gbyte hard drive, 512 Mbyte
> memory) Power Mac G3/350 gets:
>
> IDL> time_test2
> |TIME_TEST2 performance for IDL 5.2:
> | OS_FAMILY=MacOS, OS=MacOS, ARCH=PowerMac
> | Mon Oct 4 15:22:46 1999
> 1 0.633333 Empty For loop, 2000000 times
> 2 0.200000 Call empty procedure (1 param) 100,000 times
> 3 0.0833334 Add 100,000 integer scalars and store
> 4 0.0833333 25,000 scalar loops each of 5 ops, 2 =, 1 if)
> 5 0.0333334 Mult 512 by 512 byte by constant and store, 10 times
> 6 0.133333 Shift 512 by 512 byte and store, 100 times
> 7 0.116667 Add constant to 512 x 512 byte array and store, 50 times
> 8 0.266667 Add two 512 by 512 byte images and store, 30 times
> 9 0.450000 Mult 512 by 512 floating by constant and store, 30 times
> 10 0.433333 Add constant to 512 x 512 floating and store, 40 times
> 11 0.950000 Add two 512 by 512 floating images and store, 30 times
> 12 0.0500001 Generate 225000 random numbers
> 13 0.133333 Invert a 150 by 150 random matrix
> 14 0.0333333 LU Decomposition of a 150 by 150 random matrix
> 15 0.133333 Transpose 256 x 256 byte, FOR loops
> 16 0.183333 Transpose 256 x 256 byte, row and column ops x 10
> 17 0.0666667 Transpose 256 x 256 byte, TRANSPOSE function x 10
> 18 0.283333 Log of 100,000 numbers, FOR loop
> 19 0.0500001 Log of 100,000 numbers, vector ops
> 20 0.300000 131072 point forward plus inverse FFT
> 21 0.233333 Smooth 512 by 512 byte array, 5x5 boxcar, 10 times
> 22 0.0500001 Smooth 512 by 512 floating array, 5x5 boxcar, 2 times
> 23 3.05000 Write and read 512 by 512 byte array x 20
> 7.95000=Total Time, 0.16647963=Geometric mean, 23 tests.
>
> To bracket the G4 performance from the other side, a Compaq XP1000 with a
> 500 MHz Alpha EV67, 768 Mbyte of memory, and running Tru64 UNIX 4.0F gets:
>
> IDL> time_test2
> |TIME_TEST2 performance for IDL 5.2:
> | OS_FAMILY=unix, OS=OSF, ARCH=alpha
> | Mon Oct 4 21:29:19 1999
> 1 0.194336 Empty For loop, 2000000 times
> 2 0.115235 Call empty procedure (1 param) 100,000 times
> 3 0.0703120 Add 100,000 integer scalars and store
> 4 0.0673831 25,000 scalar loops each of 5 ops, 2 =, 1 if)
> 5 0.0419919 Mult 512 by 512 byte by constant and store, 10 times
> 6 0.0419930 Shift 512 by 512 byte and store, 100 times
> 7 0.172851 Add constant to 512 x 512 byte array and store, 50 times
> 8 0.121094 Add two 512 by 512 byte images and store, 30 times

> 9 0.0996090 Mult 512 by 512 floating by constant and store, 30 times
> 10 0.0390630 Add constant to 512 x 512 floating and store, 40 times
> 11 0.186524 Add two 512 by 512 floating images and store, 30 times
> 12 0.0292970 Generate 225000 random numbers
> 13 0.0771489 Invert a 150 by 150 random matrix
> 14 0.0205071 LU Decomposition of a 150 by 150 random matrix
> 15 0.0898440 Transpose 256 x 256 byte, FOR loops
> 16 0.0673831 Transpose 256 x 256 byte, row and column ops x 10
> 17 0.00781202 Transpose 256 x 256 byte, TRANSPOSE function x 10
> 18 0.176758 Log of 100,000 numbers, FOR loop
> 19 0.00976598 Log of 100,000 numbers, vector ops
> 20 0.243165 131072 point forward plus inverse FFT
> 21 0.113281 Smooth 512 by 512 byte array, 5x5 boxcar, 10 times
> 22 0.0361329 Smooth 512 by 512 floating array, 5x5 boxcar, 2 times
> 23 0.0664070 Write and read 512 by 512 byte array x 20
> 2.08789=Total Time, 0.066015022=Geometric mean, 23 tests.
>
> Considering the base price of the G4 (~ $2300) is a factor of four
> less than the base price of the XP1000 (~ $10K), the performance is none
> too shabby. And you can't play Bugdom on the Alpha. ;-)
>
> Joe Gurman
>
> --
> | Joseph B. Gurman, NASA Goddard Space Flight Center, Solar Physics
> | Branch, Greenbelt MD 20771 USA / Federal employees are still
> | prohibited from holding opinions while at work. Therefore, any
> | opinions expressed herein are somebody else's.

Subject: Re: IDL time test with a PowerMac G4
Posted by mgs on Wed, 06 Oct 1999 07:00:00 GMT
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In article <37FB6F9C.FD4672C8@cmdl.noaa.gov>, promashkin@cmdl.noaa.gov wrote:

> Go for it Martin, the CPU case colors are so pretty, it looks so nice, too,
> like as a soap dish!

That's exactly why everyone invests in SGI machines - for the pretty
cases. If that's really a complaint, Apple must be doing quite well.

> Who cares it costs twice as much as a decent Pentium...
> Also, you can buy endless software updates without feeling much improvement in
> reliability. Trust me - a faster Mac reboots faster, I had older one that
> crashed as often as my new one (once per day on average; 3-5 times a day on a
> bad day, when, let's say, you try to work out in the field and adapt to a new
> network) and the new one takes 50% less time to reboot.

Pavel, if you're experiencing the above you have every right to complain. Something is very wrong with your Macs. I'd look for extension conflicts. Mine are loaded to the gills and typically run for weeks without a reboot. That's nowhere close to UNIX stability, but far better than my experience with Windows systems.

At my latest contract I work as one of few Macs in the midst of PC's, SGI's and Sun's. The IS department wont support me and in fact constantly tells me I won't be able to do what I continue to do: access every network, access every printer, exchange files with every UNIX system, exchange files with every PC. My latest round of corporate crap is described at <http://www.ivsoftware.com/IV_G3WS.html>.

That article is referring to my PowerBook 1400, a three year old laptop with RAM, CPU and HD upgrades. Earlier this year that laptop was running IDL programs in 2/3 the time it took to run on an SGI Octane 200. I was the sole user on both systems. Within a week of that happening, I met every manager in the department.

--
Mike Schienle Interactive Visuals, Inc.
mgs@ivsoftware.com Remote Sensing and Image Processing
http://www.ivsoftware.com/ Analysis and Application Development

---

Subject: Re: IDL time test with a PowerMac G4
Posted by Pavel Romashkin on Wed, 06 Oct 1999 07:00:00 GMT
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Go for it Martin, the CPU case colors are so pretty, it looks so nice, too, like as a soap dish! Who cares it costs twice as much as a decent Pentium... Also, you can buy endless software updates without feeling much improvement in reliability. Trust me - a faster Mac reboots faster, I had older one that crashed as often as my new one (once per day on average; 3-5 times a day on a bad day, when, let's say, you try to work out in the field and adapt to a new network) and the new one takes 50% less time to reboot.

Cheers,
Pavel

"Martin.Schultz@dkrz.de" wrote:

> Wow that almost convinces me of buying a Mac next time. So far my experience
> runs quite to the contrary: the faster the computer the longer it takes to
> boot!
>
> Martin

Subject: Re: IDL time test with a PowerMac G4
Posted by m218003 on Wed, 06 Oct 1999 07:00:00 GMT
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In article <37FA6A9E.D13D8730@cmdl.noaa.gov>,
Pavel Romashkin <promashkin@cmdl.noaa.gov> writes:
> ... Well, for one thing a faster Mac reboots faster
> after a crash, but that's about it...
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> Pavel
>

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Martin

--
[[[[[[[[[[
[[Martin Schultz Max-Planck-Institut fuer Meteorologie [[
[[Bundesstr. 55, 20146 Hamburg [[
[[phone: +49 40 41173-308 [[
[[fax: +49 40 441787 [[
[[martin.schultz@dkrz.de [[
[[[[[[[[[[

Subject: Re: IDL time test with a PowerMac G4
Posted by Pavel Romashkin on Thu, 07 Oct 1999 07:00:00 GMT
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>> 4.73333=Total Time, 0.096772401=Geometric mean, 23 tests.
>
> Running time_test2 on my P-II 400 laptop produces the same total time
> (4.7300 seconds, see below). I though the new G4 was a > 1 Gflops machine
> excellent for numerical stuff but, this small comparison indicates that my standard
> PC is equally fast.... Is there something I am missing here

Take a look at the disk access times, test # 10,11,23. It is evident that Joseph's G4 (1.72 s) was a slower writer than your laptop (0.16 s). That's in fact the largest contribution to the total test time for all platforms tested here. Its not the clock speed after all that limits the overall performance, its the memory and hard drive bus bottlenecks. The speed of flops by G4 is impressive, but you still need to write the results. This I think was recognized and is the tendency on all platforms now - to get the bus speed up from the ancient 33 / 66 mHz and widen the bus, too.
Cheers,
Pavel

Subject: Re: IDL time test with a PowerMac G4
Posted by roy.hansen on Thu, 07 Oct 1999 07:00:00 GMT
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In article <gurman-0410991751060001@barkochba.nascom.nasa.gov>,
gurman@gsfc.nasa.gov (Joseph B. Gurman) wrote:

> Running IDL 5.2 without any special Velocity Engine (AltiVec) plugins
> or other mods, a G4/450 running Mac OS 8.6 with 128 Mbyte of memory and a
> 20 Gbyte Western Digital (stock) Ultra ATA hard drive gets the following
> results on time_test2:
>
snip - snip

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fantastic as announced? Well, to answer my self - I fooled myself by studying the total
time from time_test2. By studying test 20 in time_test2 (forward and inverse 1D FFT)
the test looks like this:

G4/450: 20 0.150000 131072 point forward plus inverse FFT
G3/350: 20 0.300000 131072 point forward plus inverse FFT
Alpha500: 20 0.243165 131072 point forward plus inverse FFT
P-II 400: 20 0.550000 131072 point forward plus inverse FFT

So it may be that the G4 is a supercomputer after all.....

--RoyH

TIME_TEST2 performance for IDL 5.2.1:
| OS_FAMILY=Windows, OS=Win32, ARCH=x86
| Thu Oct 07 16:52:14 1999
1 0.170000 Empty For loop, 2000000 times
2 0.110000 Call empty procedure (1 param) 100,000 times
3 0.0599999 Add 100,000 integer scalars and store
4 0.110000 25,000 scalar loops each of 5 ops, 2 =, 1 if)
5 0.0500000 Mult 512 by 512 byte by constant and store, 10 times
6 0.440000 Shift 512 by 512 byte and store, 100 times
7 0.280000 Add constant to 512 x 512 byte array and store, 50 times
8 0.220000 Add two 512 by 512 byte images and store, 30 times
9 0.490000 Mult 512 by 512 floating by constant and store, 30 times
10 0.440000 Add constant to 512 x 512 floating and store, 40 times

11 0.820000 Add two 512 by 512 floating images and store, 30 times
12 0.000000 Generate 225000 random numbers
13 0.0599999 Invert a 150 by 150 random matrix
14 0.0500001 LU Decomposition of a 150 by 150 random matrix
15 0.0599999 Transpose 256 x 256 byte, FOR loops
16 0.110000 Transpose 256 x 256 byte, row and column ops x 10
17 0.000000 Transpose 256 x 256 byte, TRANSPOSE function x 10
18 0.160000 Log of 100,000 numbers, FOR loop
19 0.0600001 Log of 100,000 numbers, vector ops
20 0.550000 131072 point forward plus inverse FFT
21 0.330000 Smooth 512 by 512 byte array, 5x5 boxcar, 10 times
22 0.000000 Smooth 512 by 512 floating array, 5x5 boxcar, 2 times
23 0.160000 Write and read 512 by 512 byte array x 20
4.73000=Total Time, 2.3240033e-006=Geometric mean, 23 tests.

Subject: Re: IDL time test with a PowerMac G4
Posted by gurman on Thu, 07 Oct 1999 07:00:00 GMT
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In article <mgs-0610991001290001@teton.ivsoftware.com>, mgs@ivsoftware.com (Mike Schienle) wrote:

> In article <37FB6F9C.FD4672C8@cmdl.noaa.gov>, promashkin@cmdl.noaa.gov wrote:
>
>> Go for it Martin, the CPU case colors are so pretty, it looks so nice, too,
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>
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> cases. If that's really a complaint, Apple must be doing quite well.
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>> Also, you can buy endless software updates without feeling much improvement in
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>
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> with Windows systems.
>
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> network, access every printer, exchange files with every UNIX system,
> exchange files with every PC. My latest round of corporate crap is
> described at <http://www.ivsoftware.com/IV_G3WS.html>.
>
> That article is referring to my PowerBook 1400, a three year old laptop
> with RAM, CPU and HD upgrades. Earlier this year that laptop was running
> IDL programs in 2/3 the time it took to run on an SGI Octane 200. I was
> the sole user on both systems. Within a week of that happening, I met
> every manager in the department.

This is a fascinating thread. Why is it the Macs here hang and crash so rarely? True, they did so with great regularity before Mac OS 8.1, and before we had the current (oops, last) generation of "blue and white" G3's / G4's / PowerBook G3's /iMacs.... wonder if that has anything to do with it. And we have lots of extensions. (The first b&w G3 we got crashed a lot too, until the ATI graphics drivers were updated amonth or two after the product intro.)

Since the G4's beat Pentiums runnjing Windoze hands-down in IDL, the only reason to go with the latter is if you buy two of them.... or run Linux. The hard part for die-hard Linuxians may be that (to quote Windoze folks talking about their platform vs. Macs) there's a lot more software out there for one of the platforms.

As for SGI's, I can only assume that they have some properties (e.g. visulatization s/w) that made them so beloved by those who used them. They are in my humble eperience slow, buggy, and saddled with the version of unix that is simultaneously least standard and (after Solaris, which has a big cross-section because of its huge market share) the most likely to show up in CERT advisories.
Just because I can't explain the attraction doesn't mean it didn't happen.... just like NT vs. Mac OS. In the case of SGI's, I harbor a suspicion that movie execs wanted them because they were the most expensive solution....

My $0.02,

Joe Gurman

--
| Joseph B. Gurman, NASA Goddard Space Flight Center, Solar Physics
| Branch, Greenbelt MD 20771 USA / Federal employees are still
| prohibited from holding opinions while at work. Therefore, any
| opinions expressed herein are somebody else's.

Subject: Re: IDL time test with a PowerMac G4

Posted by gurman on Fri, 08 Oct 1999 07:00:00 GMT
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>> ...
>> Since the G4's beat Pentiums runnjing Windoze hands-down in IDL
>> ...
Sorry, that remark referred to the demo of a not-yet released version of IDL with optimization for the AltiVec ("Velocity Engine") features. I didn't mean to suggest
that the results in that file were all that spectacular; really, rather, the reverse.

(In fact, the disk write is the only real loser for the G4 --- without it, the time total is 3.0 s for the G4 vs. 3.8 s for the PIII.)

You'll note that the geometric mean for the G4/450 is about 20% less (0.096 vs 0.119) than for the PIII 400, slightly better than one would expect from the clock speed ratio, but I'm willing to bet that difference would be recovered if you were running Linux. The difference is that the Mac OS achieves essentially the same speed on the G4 as any other OS, since all the math functions are likely to be "native" now. I suspect the disk I/O is still partly 68K code, thus the pokeyness.

>
> The PC is faster overall, though some of the floating-point intensive
> operations are slower (e.g. 9, 20). Hardly "hands down".

Wait 'til January (when, of course, there will be 700 MHz PIII's, 750 MHz K-7's, and at least samples of 1.3 GHz Alphas). I suspect the AltiVec-optimized IDL will pull some numbers way down.

Joe Gurman

--
Joseph B. Gurman / NASA Goddard Space Flight Center / Solar Physics Branch / Greenbelt MD 20771 / work: gurman@gsfc.nasa.gov /other: gurman@ari.net

Government employees are still not allowed to hold opinions while at work, so any opinions expressed herein must be someone else's.

Subject: Re: IDL time test with a PowerMac G4
Posted by Patrick V. Ford on Fri, 08 Oct 1999 07:00:00 GMT
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In article <939331595.270584@clam-55>,
"Mark Hadfield" <m.hadfield@niwa.cri.nz> wrote:
> Joseph B. Gurman <gurman@gsfc.nasa.gov> wrote in message

> news:gurman-0710991007180001@barkochba.nascom.nasa.gov...
>> ...
>> Since the G4's beat Pentiums runnjing Windoze hands-down in IDL
>> ...
>

--del

> The PC is faster overall, though some of the floating-point intensive
> operations are slower (e.g. 9, 20). Hardly "hands down".
>
> ---
> Mark Hadfield
> m.hadfield@niwa.cri.nz http://katipo.niwa.cri.nz/~hadfield/
> National Institute for Water and Atmospheric Research
> PO Box 14-901, Wellington, New Zealand
>
The Gflop specs for the G4 apply only to the Altivec instructions,
which were not used! It is only a subset of floating point(FP)
operations that this will help. It won't help integer, it won't help
the hard drive, etc. If you want to do a lot of FP ops on arrays, it
should be a winner when enabled.

Regards

Patrick Ford, MD
Baylor College of Medicine
pford@bcm.tmc.edu

Subject: Re: IDL time test with a PowerMac G4
Posted by pford1955 on Fri, 08 Oct 1999 07:00:00 GMT
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In article <b13L3.5294
$cPf.197315584@news.telia.no>,
roy.hansen@triad.no (Roy E. Hansen) wrote:
> In article <gurman-
0410991751060001@barkochba.nascom.nasa.gov>,
> gurman@gsfc.nasa.gov (Joseph B. Gurman) wrote:
>
>> Running IDL 5.2 without any special
Velocity Engine (AltiVec) plugins
>> or other mods, a G4/450 running Mac OS 8.6

with 128 Mbyte of memory and a
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>>
> snip - snip
>
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>
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forward plus inverse FFT
> P-II 400: 20 0.550000 131072 point
forward plus inverse FFT
>
> So it may be that the G4 is a supercomputer
after all.....
>
> --RoyH

Yes, there is something that you are missing
here. In the introduction to the G4 test, it
states "without any special Velocity Engine
(AltiVec) plugins or other mods..." The Gflop
numbers are ONLY for AltiVec ready or enabled
applications. The G4 is only marginally faster in
floating point than the G3. It is faster than a
Pentium at the SAME CLOCK RATE, but Pentiums are
clocked faster. It is like saying MMX does not
add anything to graphics because the the program

does not use it.

Regards

Patrick Ford, MD
Baylor College of Medicine
pford@bcm.tmc.edu

Subject: Re: IDL time test with a PowerMac G4
Posted by pford1955 on Fri, 08 Oct 1999 07:00:00 GMT
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In article <b13L3.5294
$cPf.197315584@news.telia.no>,
  roy.hansen@triad.no (Roy E. Hansen) wrote:
> In article <gurman-
0410991751060001@barkochba.nascom.nasa.gov>,
> gurman@gsfc.nasa.gov (Joseph B. Gurman) wrote:
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> P-II 400: 20 0.550000 131072 point forward plus inverse FFT
>
> So it may be that the G4 is a supercomputer after all.....
>
> --RoyH
>

Roy, yes you did miss something. As stated in the introduction to the test: "without any special Velocity Engine (AltiVec) plugins or other mods..." The Gflop range applies only to AltiVec instructions. Your results are like saying MMX is no good because my application, which doesn't use them, shows no improvement in graphics. The G4 is only marginally faster than the G3 in floating point math without AltiVec. Both are faster than a Pentium series at the SAME CLOCK SPEED, but Pentium are clocked higher! While IDL is going to support AltiVec, I don't believe it is the case here. Now if you want to dump on Apple for slow disk drives and slower graphics, you might have a point. (I'm not so sure about the graphics now days, I believe it on par with Wintel machines.

Regards

Patrick Ford, MD
Baylor College of Medicine
pford@bcm.tmc.edu

Subject: Re: IDL time test with a PowerMac G4

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Joseph B. Gurman <gurman@gsfc.nasa.gov> wrote in message
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> ...
> Since the G4's beat Pentiums runnjing Windoze hands-down in IDL
> ...

That's "Windows". But I digress. Pavel's original post quoted the following
for time_test2

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> |TIME_TEST2 performance for IDL 5.2:
> | OS_FAMILY=MacOS, OS=MacOS, ARCH=PowerMac
> | Mon Oct 4 15:36:29 1999
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> 4 0.0833334 25,000 scalar loops each of 5 ops, 2 =, 1 if)
> 5 0.0166667 Mult 512 by 512 byte by constant and store, 10 times
> 6 0.0500000 Shift 512 by 512 byte and store, 100 times
> 7 0.0833334 Add constant to 512 x 512 byte array and store, 50
times
> 8 0.116667 Add two 512 by 512 byte images and store, 30 times
> 9 0.266667 Mult 512 by 512 floating by constant and store, 30
times
> 10 0.133333 Add constant to 512 x 512 floating and store, 40
times
> 11 0.666667 Add two 512 by 512 floating images and store, 30
times
> 12 0.0500001 Generate 225000 random numbers
> 13 0.0666666 Invert a 150 by 150 random matrix
> 14 0.0166667 LU Decomposition of a 150 by 150 random matrix
> 15 0.116667 Transpose 256 x 256 byte, FOR loops
> 16 0.116667 Transpose 256 x 256 byte, row and column ops x 10
> 17 0.0166668 Transpose 256 x 256 byte, TRANSPOSE function x 10
> 18 0.200000 Log of 100,000 numbers, FOR loop
> 19 0.0333333 Log of 100,000 numbers, vector ops
> 20 0.150000 131072 point forward plus inverse FFT
> 21 0.183333 Smooth 512 by 512 byte array, 5x5 boxcar, 10 times
> 22 0.0166667 Smooth 512 by 512 floating array, 5x5 boxcar, 2
times
> 23 1.71667 Write and read 512 by 512 byte array x 20
> 4.73333=Total Time, 0.096772401=Geometric mean, 23 tests.

Here's the output from my PC (Compaq Deskpro 400 MHz Pentium II, 256 MB RAM,
Windows NT 4.0)

```
|TIME_TEST2 performance for IDL 5.2:
|       OS_FAMILY=Windows, OS=Win32, ARCH=x86
| Fri Oct 08 10:17:32 1999
       1     0.140000 Empty For loop,     2000000 times
       2     0.131000 Call empty procedure (1 param) 100,000 times
       3     0.100000 Add 100,000 integer scalars and store
       4    0.0900000 25,000 scalar loops each of 5 ops, 2 =, 1 if)
       5    0.0500001 Mult 512 by 512 byte by constant and store, 10 times
       6     0.240000 Shift 512 by 512 byte and store, 100 times
       7     0.171000 Add constant to 512 x 512 byte array and store, 50
times
       8     0.180000 Add two 512 by 512 byte images and store, 30 times
       9     0.381000 Mult 512 by 512 floating by constant and store, 30
times
      10     0.300000 Add constant to 512 x 512 floating and store, 40 times
      11     0.611000 Add two 512 by 512 floating images and store, 30 times
      12    0.0300000 Generate 225000 random numbers
      13    0.0900000 Invert a 150 by 150 random matrix
      14    0.0200000 LU Decomposition of a 150 by 150 random matrix
      15     0.100000 Transpose 256 x 256 byte, FOR loops
      16     0.130000 Transpose 256 x 256 byte, row and column ops x 10
      17    0.0599999 Transpose 256 x 256 byte, TRANSPOSE function x 10
      18     0.190000 Log of 100,000 numbers, FOR loop
      19    0.0300000 Log of 100,000 numbers, vector ops
      20     0.391000       131072 point forward plus inverse FFT
      21     0.340000 Smooth 512 by 512 byte array, 5x5 boxcar, 10 times
      22    0.0400000 Smooth 512 by 512 floating array, 5x5 boxcar, 2 times
      23     0.120000 Write and read 512 by 512 byte array x 20
     3.93500=Total Time,       0.11991918=Geometric mean,      23 tests.
```

The PC is faster overall, though some of the floating-point intensive operations are slower (e.g. 9, 20). Hardly "hands down".

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