



# SPEC<sup>®</sup> CFP2006 Result

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## Fujitsu

### SPECfp<sup>®</sup>\_rate2006 = 116

## Fujitsu SPARC Enterprise M4000

### SPECfp\_rate\_base2006 = 111

CPU2006 license: 19

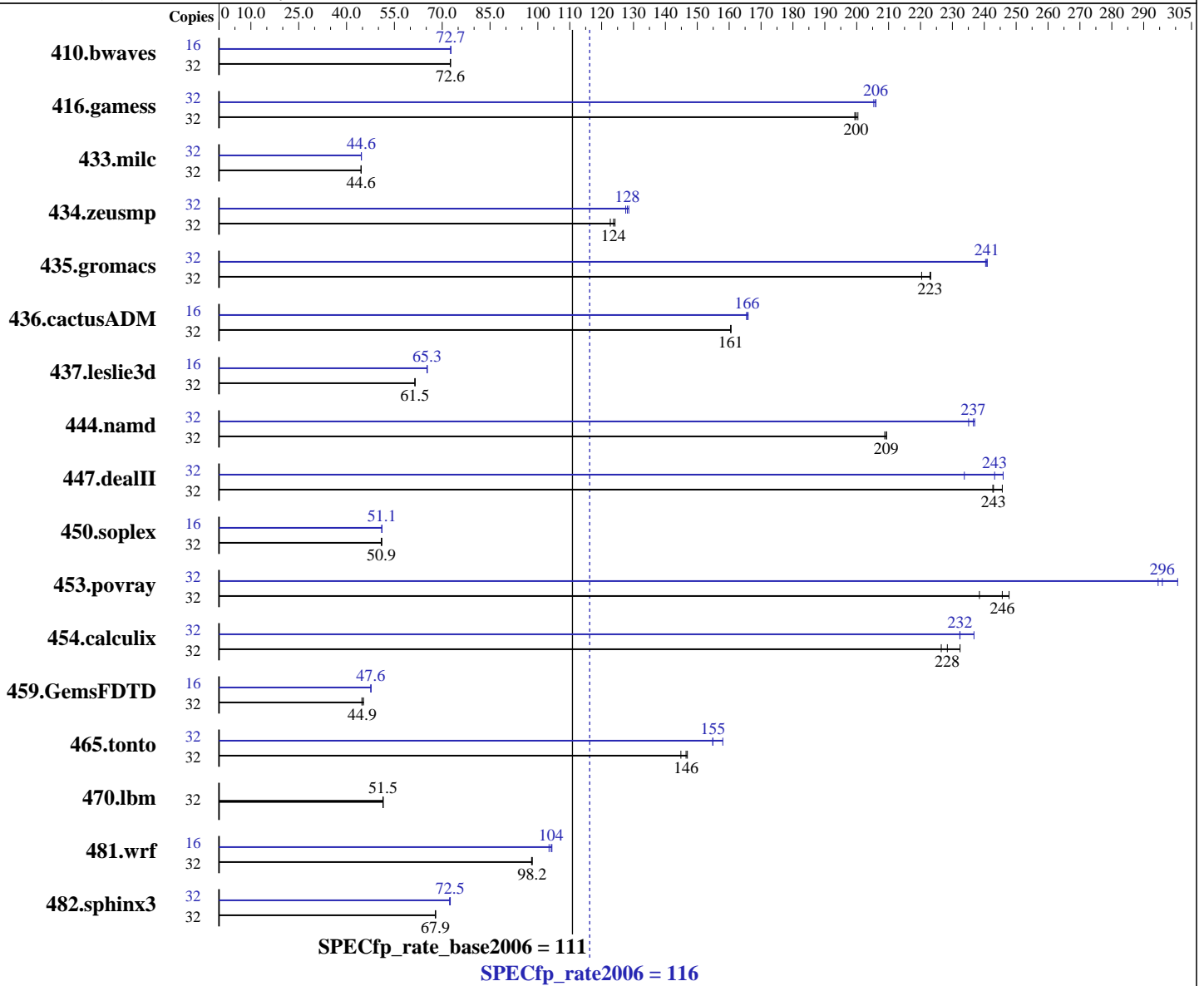
Test sponsor: Fujitsu

Tested by: Sun Microsystems

Test date: Sep-2009

Hardware Availability: Nov-2009

Software Availability: Oct-2009



### Hardware

CPU Name: SPARC64 VII  
 CPU Characteristics:  
 CPU MHz: 2530  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip, 2 threads/core  
 CPU(s) orderable: 1 to 2 CPUMs; each CPUM contains 2 CPU chips  
 Primary Cache: 64 KB I + 64 KB D on chip per core  
 Secondary Cache: 5632 KB I+D on chip per chip

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### Software

Operating System: Solaris 10 10/09 (s10s\_u8wos\_06)  
 Compiler: Sun Studio 12 Update 1 plus patches (see notes)  
 Auto Parallel: No  
 File System: zfs  
 System State: Default  
 Base Pointers: 32-bit  
 Peak Pointers: 32-bit  
 Other Software: None



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L3 Cache: None  
Other Cache: None  
Memory: 32 GB (32 x 1 GB), 8-way interleaved  
Disk Subsystem: 2x 146 GB SAS 10k rpm  
Other Hardware: None

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32	5992	72.6	5990	72.6	<u>5992</u>	<u>72.6</u>	16	2991	72.7	2991	72.7	<u>2991</u>	<u>72.7</u>
416.gamess	32	3127	200	<u>3136</u>	<u>200</u>	3142	199	32	3051	205	3041	206	<u>3043</u>	<u>206</u>
433.milc	32	<u>6592</u>	<u>44.6</u>	6593	44.6	6587	44.6	32	<u>6582</u>	<u>44.6</u>	6577	44.7	6583	44.6
434.zeusmp	32	<u>2353</u>	<u>124</u>	2345	124	2373	123	32	<u>2274</u>	<u>128</u>	2283	128	2266	129
435.gromacs	32	1024	223	<u>1025</u>	<u>223</u>	1037	220	32	948	241	950	240	<u>949</u>	<u>241</u>
436.cactusADM	32	2383	160	<u>2382</u>	<u>161</u>	2382	161	16	1152	166	<u>1154</u>	<u>166</u>	1156	165
437.leslie3d	32	4895	61.5	4892	61.5	<u>4894</u>	<u>61.5</u>	16	2305	65.3	<u>2304</u>	<u>65.3</u>	2303	65.3
444.namd	32	<u>1226</u>	<u>209</u>	1229	209	1226	209	32	1092	235	1083	237	<u>1085</u>	<u>237</u>
447.dealII	32	<u>1507</u>	<u>243</u>	1490	246	1508	243	32	<u>1505</u>	<u>243</u>	1566	234	1489	246
450.soplex	32	5227	51.1	5241	50.9	<u>5239</u>	<u>50.9</u>	16	2613	51.1	<u>2612</u>	<u>51.1</u>	2611	51.1
453.povray	32	<u>693</u>	<u>246</u>	714	238	687	248	32	566	301	578	295	<u>575</u>	<u>296</u>
454.calculix	32	1166	227	<u>1156</u>	<u>228</u>	1136	232	32	<u>1136</u>	<u>232</u>	1115	237	1136	232
459.GemsFDTD	32	7489	45.3	<u>7561</u>	<u>44.9</u>	7573	44.8	16	<u>3563</u>	<u>47.6</u>	3564	47.6	3562	47.7
465.tonto	32	2174	145	2144	147	<u>2150</u>	<u>146</u>	32	2033	155	1993	158	<u>2033</u>	<u>155</u>
470.lbm	32	8545	51.5	<u>8545</u>	<u>51.5</u>	8546	51.5	32	8545	51.5	<u>8545</u>	<u>51.5</u>	8546	51.5
481.wrf	32	3638	98.2	3646	98.0	<u>3641</u>	<u>98.2</u>	16	<u>1716</u>	<u>104</u>	1712	104	1727	104
482.sphinx3	32	<u>9190</u>	<u>67.9</u>	9191	67.9	9178	68.0	32	8597	72.5	<u>8600</u>	<u>72.5</u>	8627	72.3

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Compiler Invocation Notes

Sun Studio 12 Update 1 was used, plus patch 119963-17

Sun Studio compiler patches are available at  
[http://developers.sun.com/sunstudio/downloads/patches/ss12u1\\_patches.jsp](http://developers.sun.com/sunstudio/downloads/patches/ss12u1_patches.jsp)

## Submit Notes

Processes were assigned to specific processors using 'pbind' commands. The config file option 'submit' was used, along with a list of processors in the 'BIND' variable, to generate the pbind commands. (For details, please see the config file.)



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## Operating System Notes

ulimit -s 131072 was used to allow the stack to grow up to 131072 KB (aka 128 MB). Note that saying "131072" is preferable to "unlimited", because there is a tradeoff between space for the stack vs. space for the heap.

System Tunables (/etc/system parameters):

tune\_t\_fsflushr=10

Controls how many seconds elapse between runs of the page flush daemon, fsflush.

autoup=600

Causes pages older than the listed number of seconds to be written by fsflush.

zfs:zfs\_arc\_max = 0x10000000

Control the amount of memory used by ZFS for caching

Other System Settings:

The webconsole service was turned off using svcadm disable webconsole

The system had 32 GB of swap space

SPEC CPU2006 used 1 disk, with zfs gzip compression.

## Platform Notes

Memory is 8-way interleaved by filling all slots with the same capacity DIMMs.

This result is measured on a Sun SPARC Enterprise M4000 Server. The Sun SPARC Enterprise M4000 and the Fujitsu SPARC Enterprise M4000 are electrically equivalent.

## General Notes

Environment variables set by runspec before the start of the run:

OMP\_NUM\_THREADS = "32"

SUNW\_MP\_PROCBIND = "true"

SUNW\_MP\_THR\_IDLE = "SPIN"

(Although these variables were set prior to the run they did not affect performance, since the benchmarks were compiled in serial mode.)

447.dealII (peak): "apache\_stdctx\_4\_2\_1" src.alt was used.

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## General Notes (Continued)

447.dealIII (base): "apache\_stdccx\_4\_2\_1" src.alt was used.

## Base Compiler Invocation

C benchmarks:

cc

C++ benchmarks:

CC

Fortran benchmarks:

f90

Benchmarks using both Fortran and C:

cc f90

## Base Optimization Flags

C benchmarks:

-fast -fma=fused -xipo=2 -xpagesize=4M -xalias\_level=std  
-xprefetch\_auto\_type=indirect\_array\_access -xprefetch\_level=3

C++ benchmarks:

-xdepend -fast -fma=fused -xipo=2 -xpagesize=4M  
-xalias\_level=compatible -xprefetch=latx:0.5 -library=no%Cstd  
-I/export/home/apache/stdccx-4.2.1/include  
-I/export/home/apache/stdccx-4.2.1/build/include  
-L/export/home/apache/stdccx-4.2.1/build/lib  
-R/export/home/apache/stdccx-4.2.1/build/lib -lstd8d

Fortran benchmarks:

-fast -fma=fused -xipo=2 -xpagesize=4M -xprefetch\_level=2

Benchmarks using both Fortran and C:

-fast(cc) -fast(f90) -fma=fused -xipo=2 -xpagesize=4M  
-xalias\_level=std -xprefetch\_auto\_type=indirect\_array\_access  
-xprefetch\_level=3 -xprefetch\_level=2

## Base Other Flags

C benchmarks:

-xjobs=32 -V -#

C++ benchmarks:

-xjobs=32 -verbose=diags,version

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## Base Other Flags (Continued)

Fortran benchmarks:

-xjobs=32 -V -v

Benchmarks using both Fortran and C:

-xjobs=32 -V -# -v

## Peak Compiler Invocation

C benchmarks:

cc

C++ benchmarks:

CC

Fortran benchmarks:

f90

Benchmarks using both Fortran and C:

cc f90

## Peak Optimization Flags

C benchmarks:

433.milc: -fast -xpagesize=4M -fma=fused -xipo=2 -xprefetch\_level=2  
-fsimple=1 -xprefetch\_auto\_type=indirect\_array\_access  
-W2,-Ainline:rs=400 -xalias\_level=std

470.lbm: basepeak = yes

482.sphinx3: -xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M  
-fma=fused -xipo=2 -xinline= -xprefetch=no%auto  
-xalias\_level=strong -lfast -ll2amm

C++ benchmarks:

444.namd: -xdepend -xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M  
-xalias\_level=compatible -library=stlport4 -fma=fused  
-xipo=2 -xprefetch=no%auto -xlinkopt=2

447.dealIII: -xdepend -fast -xpagesize=4M -xalias\_level=compatible  
-library=no%Cstd -I/export/home/apache/stdcxx-4.2.1/include  
-I/export/home/apache/stdcxx-4.2.1/build/include -fma=fused  
-xipo=2 -xprefetch=latx:0.5  
-L/export/home/apache/stdcxx-4.2.1/build/lib

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## Peak Optimization Flags (Continued)

447.dealIII (continued):

-R/export/home/apache/stdcxx-4.2.1/build/lib -lstd8d

450.soplex: -xdepend -xprofile=collect:./feedback(pass 1)

-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M

-xalias\_level=compatible -library=stlport4 -xipo=1

-xprefetch=no -fsimple=0 -xrestrict

453.povray: -xdepend -xprofile=collect:./feedback(pass 1)

-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M

-xalias\_level=compatible -library=stlport4 -xipo=2

-xlinkopt=2

Fortran benchmarks:

410.bwaves: -fast -xpagesize=4M -fma=fused -xipo=2 -xprefetch\_level=2

416.gamess: -xprofile=collect:./feedback(pass 1)

-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M

-fma=fused -xipo=2 -xprefetch=no%auto

434.zeusmp: -fast -xpagesize=4M -fma=fused -xipo=2 -xprefetch\_level=1

-ll2amm

437.leslie3d: -fast -xpagesize=4M -xprefetch=no

459.GemsFDTD: -fast -xpagesize=4M -fma=fused -fsimple=1 -xprefetch=no

465.tonto: -xprofile=collect:./feedback(pass 1)

-xprofile=use:./feedback(pass 2) -fast -xpagesize=4M

-xipo=2 -xprefetch=no -lfast -ll2amm

Benchmarks using both Fortran and C:

435.gromacs: -xprofile=collect:./feedback(pass 1)

-xprofile=use:./feedback(pass 2) -fast(cc) -fast(f90)

-xpagesize=4M -fma=fused -xipo=2 -xchip=generic -xinline=

-fsimple=0

436.cactusADM: -fast(cc) -fast(f90) -xpagesize=4M -fma=fused -xipo=2

-xprefetch=latx:0.7 -fsimple=1

454.calculix: -fast(cc) -fast(f90) -xpagesize=4M -fma=fused -xipo=2

-xprefetch\_level=1 -xalias\_level=std

-xprefetch\_auto\_type=indirect\_array\_access

481.wrf: -xprofile=collect:./feedback(pass 1)

-xprofile=use:./feedback(pass 2) -fast(cc) -fast(f90)

-xpagesize=4M -xipo=2 -xprefetch\_level=2



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## Peak Other Flags

C benchmarks:

-xjobs=32 -V -#

C++ benchmarks:

-xjobs=32 -verbose=diags,version

Fortran benchmarks:

-xjobs=32 -V -v

Benchmarks using both Fortran and C:

-xjobs=32 -V -# -v

The flags file that was used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12-12u1-and-gccfss4.2.r4.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12-12u1-and-gccfss4.2.r4.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC CPU2006 v1.1.

Report generated on Wed Jul 23 04:07:48 2014 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 28 October 2009.