



# SPEC<sup>®</sup> CFP2006 Result

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## Sun Microsystems

## SPECfp<sup>®</sup>\_rate2006 = 1170

## Sun SPARC Enterprise M9000

## SPECfp\_rate\_base2006 = 1110

CPU2006 license: 6

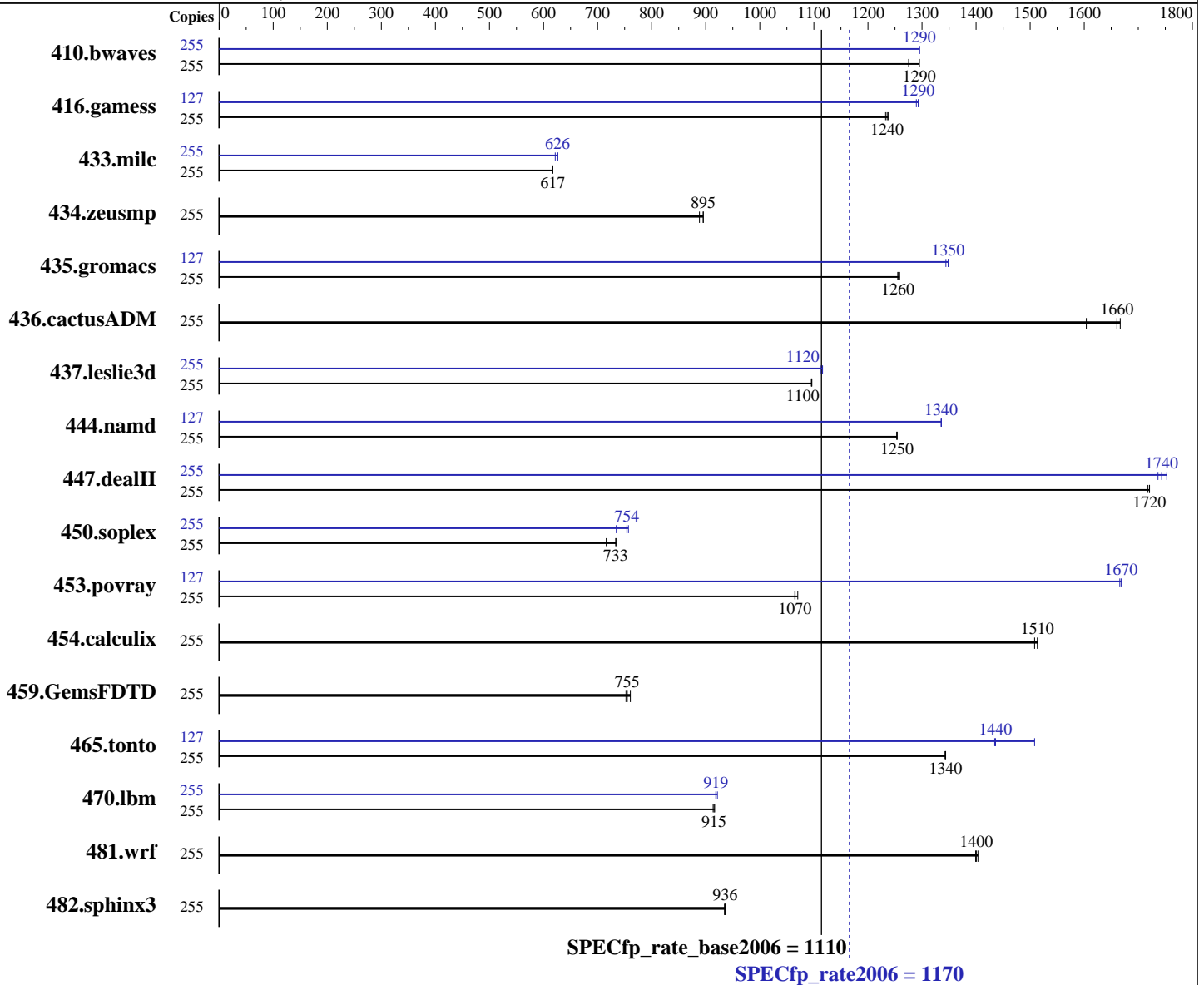
Test sponsor: Sun Microsystems

Tested by: Sun Microsystems

Test date: Mar-2007

Hardware Availability: Apr-2007

Software Availability: Jul-2007



### Hardware

CPU Name: SPARC64 VI  
 CPU Characteristics:  
 CPU MHz: 2280  
 FPU: Integrated  
 CPU(s) enabled: 128 cores, 64 chips, 2 cores/chip, 2 threads/core  
 CPU(s) orderable: 1 to 16 CMUs; each CMU contains 2 or 4 chips  
 Primary Cache: 128 KB I + 128 KB D on chip per core  
 Secondary Cache: 5 MB I+D on chip per chip

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### Software

Operating System: Solaris 10 7/07 (build s10s\_u4wos\_04)  
 Compiler: Sun Studio 12 (Build 44.0)  
 Auto Parallel: No  
 File System: ufs  
 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: 1 TB (512 x 2 GB)  
Disk Subsystem: 673 GB RAID 1+0 created by Solaris Volume Manager with 20 x 73 GB 10,000 RPM Fujitsu MAY2073RC SAS  
Other Hardware: None

### Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	255	2717	1280	<b>2676</b>	<b>1290</b>	2676	1290	255	2675	1300	<b>2676</b>	<b>1290</b>	2677	1290
416.gamess	255	<b>4041</b>	<b>1240</b>	4035	1240	4051	1230	127	1928	1290	1922	1290	<b>1923</b>	<b>1290</b>
433.milc	255	3794	617	3795	617	<b>3794</b>	<b>617</b>	255	3737	626	<b>3740</b>	<b>626</b>	3766	622
434.zeusmp	255	2612	888	<b>2592</b>	<b>895</b>	2592	895	255	2612	888	<b>2592</b>	<b>895</b>	2592	895
435.gromacs	255	1450	1260	1447	1260	<b>1450</b>	<b>1260</b>	127	<b>672</b>	<b>1350</b>	672	1350	675	1340
436.cactusADM	255	1900	1600	<b>1835</b>	<b>1660</b>	1828	1670	255	1900	1600	<b>1835</b>	<b>1660</b>	1828	1670
437.leslie3d	255	2188	1100	2186	1100	<b>2188</b>	<b>1100</b>	255	2148	1120	<b>2149</b>	<b>1120</b>	2155	1110
444.namd	255	1631	1250	<b>1631</b>	<b>1250</b>	1632	1250	127	762	1340	<b>763</b>	<b>1340</b>	763	1340
447.dealII	255	1698	1720	<b>1695</b>	<b>1720</b>	1695	1720	255	1664	1750	1680	1740	<b>1673</b>	<b>1740</b>
450.soplex	255	2970	716	<b>2899</b>	<b>733</b>	2897	734	255	2895	735	<b>2820</b>	<b>754</b>	2809	757
453.povray	255	<b>1273</b>	<b>1070</b>	1274	1060	1268	1070	127	406	1670	<b>405</b>	<b>1670</b>	405	1670
454.calculix	255	1395	1510	1389	1510	<b>1390</b>	<b>1510</b>	255	1395	1510	1389	1510	<b>1390</b>	<b>1510</b>
459.GemsFDTD	255	3596	752	3557	761	<b>3584</b>	<b>755</b>	255	3596	752	3557	761	<b>3584</b>	<b>755</b>
465.tonto	255	<b>1868</b>	<b>1340</b>	1869	1340	1867	1340	127	871	1430	829	1510	<b>870</b>	<b>1440</b>
470.lbm	255	3823	916	3835	914	<b>3828</b>	<b>915</b>	255	3802	922	<b>3813</b>	<b>919</b>	3814	919
481.wrf	255	2036	1400	<b>2034</b>	<b>1400</b>	2030	1400	255	2036	1400	<b>2034</b>	<b>1400</b>	2030	1400
482.sphinx3	255	5318	935	5309	936	<b>5309</b>	<b>936</b>	255	5318	935	5309	936	<b>5309</b>	<b>936</b>

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

### Operating System Notes

Processes were bound to cores using "submit" and "pbind".  
The SPEC toolset was bound to processor 0.

These shell commands request use of local 4MB pages:

```
export LD_PRELOAD=madv.so.1:mpss.so.1
export MPSSHEAP=4MB
export MPSSSTACK=4MB
export MADV=access_lwp
```

'access\_lwp' means that the next light weight process to touch the specified address range will access it the most heavily.

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## Operating System Notes (Continued)

ulimit -s 131072 was used to limit the space consumed by the stack (and therefore make more space available to the heap).

/etc/system parameters

autoup=300

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

bufhwm=3000

Memory byte limit for caching I/O buffers

segmap\_percent=1

Set maximum percent memory for file system cache

tune\_t\_fsflushr=3

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

The "webconsole" service was turned off using  
svcadm disable webconsole

## Platform Notes

"CMU" = CPU/Memory Unit; each holds 2 or 4 CPU chips.

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

This result was measured using a Sun SPARC Enterprise M9000 Server. Note that the Fujitsu SPARC Enterprise M9000 and Sun SPARC Enterprise M9000 are electrically equivalent.

## Base Compiler Invocation

C benchmarks:

cc

C++ benchmarks:

CC

Fortran benchmarks:

f90

Benchmarks using both Fortran and C:

cc f90



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## Base Optimization Flags

C benchmarks:

```
-fast -fma=fused -xcache=128/64/2:5120/256/10 -xipo=2 -xpagesize=4M  
-xprefetch_level=2 -xprefetch=latx:2 -xalias_level=std  
-xprefetch_level=3 -xprefetch_auto_type=indirect_array_access
```

C++ benchmarks:

```
-xdepend -library=stlport4 -fast -fma=fused  
-xcache=128/64/2:5120/256/10 -xipo=2 -xpagesize=4M -xprefetch_level=2  
-xprefetch=latx:2 -xalias_level=compatible
```

Fortran benchmarks:

```
-fast -fma=fused -xcache=128/64/2:5120/256/10 -xipo=2 -xpagesize=4M  
-xprefetch_level=2 -xprefetch=latx:2
```

Benchmarks using both Fortran and C:

```
-fast(cc) -fast(f90) -fma=fused -xcache=128/64/2:5120/256/10 -xipo=2  
-xpagesize=4M -xprefetch_level=2 -xprefetch=latx:2 -xalias_level=std  
-xprefetch_level=3 -xprefetch_auto_type=indirect_array_access
```

## Base Other Flags

C benchmarks:

```
-xjobs=24 -V -#
```

C++ benchmarks:

```
-xjobs=24 -verbose=diags,version
```

Fortran benchmarks:

```
-xjobs=24 -V -v
```

Benchmarks using both Fortran and C:

```
-xjobs=24 -V -# -v
```

## Peak Compiler Invocation

C benchmarks:

```
cc
```

C++ benchmarks:

```
CC
```

Fortran benchmarks:

```
f90
```

Benchmarks using both Fortran and C:

```
cc f90
```



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## Peak Optimization Flags

C benchmarks:

```
433.milc: -fast -xcache=128/64/2:5120/256/10 -xpagesize=4M -xipo=2
-xprefetch_level=2 -fsimple=1
-xprefetch_auto_type=indirect_array_access
-W2,-Ainline:rs=400 -xalias_level=std -fma=fused
-xprefetch=latx:3
```

```
470.lbm: -xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast
-xcache=128/64/2:5120/256/10 -xpagesize=4M
-xprefetch_level=3 -xipo=2 -xrestrict -fma=fused
-Wc,-Qlp=1 -Wc,-Qlp-av=512 -Wc,-Qlp-t=1 -Wc,-Qlp-fa=1
-Wc,-Qms_pipe-prefolim=64 -xprefetch=latx:5
```

482.sphinx3: basepeak = yes

C++ benchmarks:

```
444.namd: -xdepend -library=stlport4 -fast
-xcache=128/64/2:5120/256/10 -xpagesize=4M
-xalias_level=compatible -xprefetch_level=1 -fma=fused
-xprefetch=latx:3
```

```
447.dealIII: -xdepend -library=stlport4
-xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast
-xcache=128/64/2:5120/256/10 -xpagesize=4M
-xalias_level=compatible -xipo=2 -xrestrict -fma=fused
-xprefetch=latx:4.5
```

```
450.soplex: -xdepend -library=stlport4
-xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast
-xcache=128/64/2:5120/256/10 -xpagesize=4M
-xalias_level=compatible -xipo=2 -xprefetch_level=2
-fsimple=0 -xrestrict
-xprefetch_auto_type=indirect_array_access
-Qoption cg -Qlp-ol=1 -Qoption cg -Qlp-it=3
-Qoption cg -Qlp-imb=1 -Qoption iropt -Apf:pdl=3
```

```
453.povray: -xdepend -library=stlport4
-xprofile=collect:./feedback(pass 1)
-xprofile=use:./feedback(pass 2) -fast
-xcache=128/64/2:5120/256/10 -xpagesize=4M
-xalias_level=compatible -xipo=2 -xrestrict -fma=fused
```

Fortran benchmarks:

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## Peak Optimization Flags (Continued)

410.bwaves: -fast -xcache=128/64/2:5120/256/10 -xpagesize=4M -xipo=2  
-xprefetch\_level=2 -fma=fused -xprefetch=latx:3

416.gamess: -fast -xcache=128/64/2:5120/256/10 -xpagesize=4M -xipo=2  
-xprefetch\_level=2 -fma=fused

434.zeusmp: basepeak = yes

437.leslie3d: -fast -xcache=128/64/2:5120/256/10 -xpagesize=4M  
-xprefetch\_level=3 -qoption cg -Qlp=1 -qoption cg -Qlp-fa=0  
-qoption cg -Qlp-fl=1 -qoption cg -Qlp-av=448  
-qoption cg -Qlp-t=4 -xprefetch=latx:3.5

459.GemsFDTD: basepeak = yes

465.tonto: -fast -xcache=128/64/2:5120/256/10 -xpagesize=4M -xipo=2  
-xprefetch=latx:12 -lfast

Benchmarks using both Fortran and C:

435.gromacs: -xprofile=collect:./feedback(pass 1)  
-xprofile=use:./feedback(pass 2) -fast(cc) -fast(f90)  
-xcache=128/64/2:5120/256/10 -xpagesize=4M -xipo=2  
-xinline= -xarch=generic -xchip=generic -fsimple=0  
-fma=fused

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: basepeak = yes

## Peak Other Flags

C benchmarks:  
-xjobs=24 -V -#

C++ benchmarks:  
-xjobs=24 -verbose=diags,version

Fortran benchmarks:  
-xjobs=24 -V -v

Benchmarks using both Fortran and C:  
-xjobs=24 -V -# -v



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

<http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12.20090714.02.html>

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

<http://www.spec.org/cpu2006/flags/Sun-Solaris-Studio12.20090714.02.xml>

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

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