



# SPEC® CFP2006 Result

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## Sugon

### SPECfp®\_rate2006 = 1390

### Sugon A620-G30 (AMD EPYC 7351)

### SPECfp\_rate\_base2006 = 1270

CPU2006 license: 9046

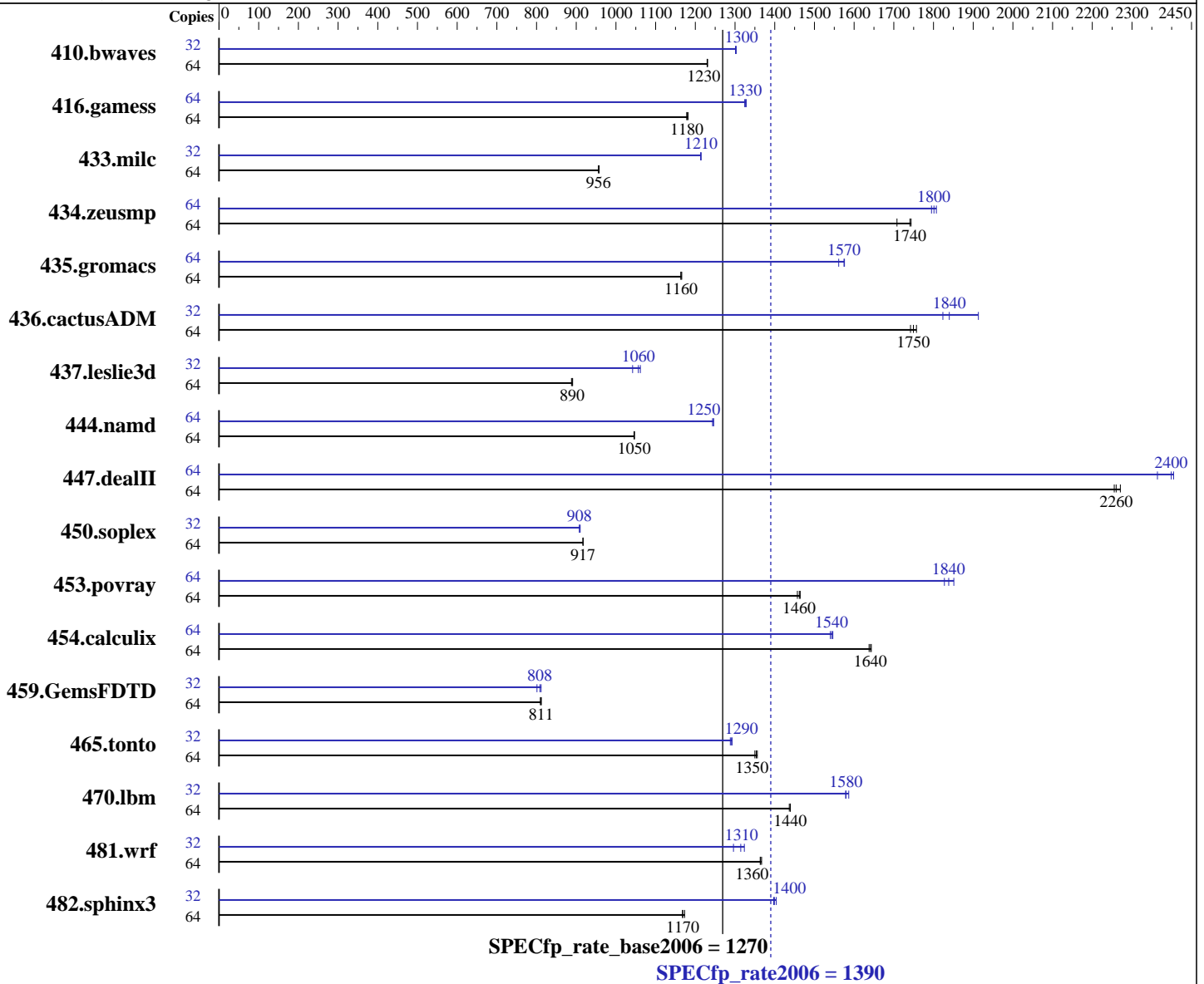
Test sponsor: Sugon

Tested by: Sugon

Test date: Dec-2017

Hardware Availability: Dec-2017

Software Availability: Oct-2017



#### Hardware

CPU Name: AMD EPYC 7351  
 CPU Characteristics: AMD Turbo CORE technology up to 2.90 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 64 KB I + 32 KB D on chip per core  
 Secondary Cache: 512 KB I+D on chip per core

Continued on next page

#### Software

Operating System: Red Hat Enterprise Linux Server 7.4  
 Kernel 3.10.0-693.2.2  
 Compiler: C/C++/Fortran: Version 4.5.2.1 of x86 Open64  
 Compiler Suite (from AMD)  
 Auto Parallel: No  
 File System: ext4  
 System State: Run level 3 (Multi User)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit

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L3 Cache: 64 MB I+D on chip per chip, 8 MB shared / 2 cores  
 Other Cache: None  
 Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2667V-R, running at 2400)  
 Disk Subsystem: 1 x 3000 GB SATA, 7200 RPM  
 Other Hardware: None

Other Software: None

## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	64	707	1230	<b>707</b>	<b>1230</b>	707	1230	32	<b>334</b>	<b>1300</b>	334	1300	334	1300		
416.gamess	64	1060	1180	<b>1063</b>	<b>1180</b>	1063	1180	64	943	1330	946	1320	<b>945</b>	<b>1330</b>		
433.milc	64	613	958	<b>614</b>	<b>956</b>	614	956	32	<b>242</b>	<b>1210</b>	242	1210	242	1210		
434.zeusmp	64	334	1740	<b>335</b>	<b>1740</b>	341	1710	64	324	1790	322	1810	<b>323</b>	<b>1800</b>		
435.gromacs	64	393	1160	392	1170	<b>393</b>	<b>1160</b>	64	290	1580	293	1560	<b>290</b>	<b>1570</b>		
436.cactusADM	64	439	1740	435	1760	<b>437</b>	<b>1750</b>	32	200	1910	<b>208</b>	<b>1840</b>	210	1820		
437.leslie3d	64	675	891	<b>676</b>	<b>890</b>	677	888	32	289	1040	283	1060	<b>285</b>	<b>1060</b>		
444.namd	64	<b>491</b>	<b>1050</b>	490	1050	491	1050	64	413	1240	412	1250	<b>412</b>	<b>1250</b>		
447.dealII	64	<b>324</b>	<b>2260</b>	325	2260	322	2270	64	<b>305</b>	<b>2400</b>	304	2400	310	2360		
450.soplex	64	<b>582</b>	<b>917</b>	582	917	582	917	32	293	910	<b>294</b>	<b>908</b>	294	908		
453.povray	64	<b>233</b>	<b>1460</b>	233	1460	234	1460	64	<b>185</b>	<b>1840</b>	184	1850	186	1830		
454.calculix	64	321	1640	322	1640	<b>322</b>	<b>1640</b>	64	343	1540	341	1550	<b>342</b>	<b>1540</b>		
459.GemsFDTD	64	836	812	839	809	<b>837</b>	<b>811</b>	32	418	812	424	801	<b>420</b>	<b>808</b>		
465.tonto	64	467	1350	<b>465</b>	<b>1350</b>	464	1360	32	244	1290	244	1290	<b>244</b>	<b>1290</b>		
470.lbm	64	<b>611</b>	<b>1440</b>	612	1440	611	1440	32	<b>278</b>	<b>1580</b>	277	1590	279	1580		
481.wrf	64	523	1370	524	1360	<b>524</b>	<b>1360</b>	32	<b>272</b>	<b>1310</b>	276	1300	270	1320		
482.sphinx3	64	1063	1170	<b>1068</b>	<b>1170</b>	1068	1170	32	444	1400	<b>446</b>	<b>1400</b>	446	1400		

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

## Submit Notes

The config file option 'submit' was used.  
 'numactl' was used to bind copies to the cores.  
 See the configuration file for details.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size  
 'ulimit -l 2097152' was used to set environment locked pages in memory limit

runspec command invoked through numactl i.e.:  
 numactl --interleave=all runspec <etc>

Set dirty\_ratio=8 to limit dirty cache to 8% of memory

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## Operating System Notes (Continued)

Set swappiness=1 to swap only if necessary  
Set zone\_reclaim\_mode=1 to free local node memory and avoid remote memory sync then drop\_caches=3 to reset caches before invoking runcpu

Transparent huge pages were enabled for this run (OS default)

Set vm/nr\_hugepages=57344 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

BIOS settings:

Determinism Slider = Power

cTDP Control = Manual

cTDP = 200

This system Sugon A620-G30 is electrically equal with Sugon A420-G30 populated with the same processors and memories.

## General Notes

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

HUGETLB\_LIMIT = "896"

LD\_LIBRARY\_PATH = "/home/cpu2006/amd1603-rate-libs-revB/32:/home/cpu2006/amd1603-rate-libs-revB/64"

The binaries were built with the AMD supported x86 Open64 Compiler Suite, which is only available from AMD at <http://developer.amd.com/tools-and-sdks/cpu-development/x86-open64-compiler-suite/> Binaries were compiled on a system with 2 x AMD Opteron 6378 chips + 128 GB Memory using RHEL 6.3

## Base Compiler Invocation

C benchmarks:  
opencc

C++ benchmarks:  
openCC

Fortran benchmarks:  
openf95

Benchmarks using both Fortran and C:  
opencc openf95

## Base Portability Flags

410.bwaves: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

```

416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
-fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

```

## Base Optimization Flags

### C benchmarks:

```

-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000
-IPA:small_pu=100 -mso -march=bdver1 -mno-fma4 -mno-xop -mno-tbm
-WB, -Wl, -z,muldefs

```

### C++ benchmarks:

```

-Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1 -INLINE:aggressive=on
-HP:bd=2m:heap=2m -D__OPEN64_FAST_SET -march=bdver2 -mno-fma4
-mno-xop -mno-tbm -WB, -Wl, -z,muldefs

```

### Fortran benchmarks:

```

-Ofast -LNO:blocking=off -LNO:simd_peel_align=on -OPT:rsqrt=2
-OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso -march=bdver1 -mno-fma4
-mno-xop -mno-tbm -WB, -Wl, -z,muldefs

```

### Benchmarks using both Fortran and C:

```

-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000
-IPA:small_pu=100 -mso -march=bdver1 -mno-fma4 -mno-xop -mno-tbm
-WB, -Wl, -z,muldefs -LNO:blocking=off -LNO:simd_peel_align=on
-OPT:rsqrt=2 -OPT:unroll_size=256

```

## Peak Compiler Invocation

### C benchmarks:

openc

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## Peak Compiler Invocation (Continued)

C++ benchmarks:  
openCC

Fortran benchmarks:  
openf95

Benchmarks using both Fortran and C:  
opencc openf95

## Peak Portability Flags

```

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
-fno-second-underscore

```

## Peak Optimization Flags

C benchmarks:

```

433.milc: -Ofast -CG:movnti=1 -CG:locs_best=on -HP:bdt=2m:heap=2m
-IPA:plimit=7000 -IPA:callee_limit=1200
-OPT:struct_array_copy=2 -OPT:alias=field_sensitive -mso
-march=bdver1 -mno-fma4

470.lbm: -Ofast -CG:cmp_peep=on -OPT:keep_ext=on -HP:bdt=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -march=bdver1 -mno-fma4
-mso

482.sphinx3: -Ofast -m32 -IPA:plimit=1000 -OPT:malloc_alg=2
-CG:cmp_peep=on -CG:p2align=0 -CG:load_exe=1 -CG:dsched=on
-INLINE:aggressive=on -LNO:prefetch=2 -LNO:prefetch_ahead=4
-mso -march=bdver2 -WB, -mno-fma4 -mno-tbm -mno-xop

```

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## Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -Ofast -IPA:plimit=3000 -LNO:ignore\_feedback=off  
-CG:local\_sched\_alg=0 -CG:load\_exe=0 -OPT:unroll\_size=256  
-fno-exceptions -HP:bdt=2m:heap=2m -LNO:if\_select\_conv=1  
-OPT:alias=disjoint -LNO:psimd\_iso\_unroll=ON -march=bdver2  
-mno-fma4 -WB, -mno-xop -mno-tbm

447.deallI: -Ofast -D\_OPEN64\_FAST\_SET -static -INLINE:aggressive=on  
-LNO:opt=1 -LNO:simd=2 -fno-emit-exceptions -m32  
-OPT:unroll\_times\_max=8 -OPT:unroll\_size=256  
-OPT:unroll\_level=2 -HP:bdt=2m:heap=2m -GRA:unspill=on  
-CG:cmp\_peep=on -CG:movext\_icmp=off -TENV:frame\_pointer=off  
-march=bdver1 -mno-fma4

450.soplex: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -O3  
-LNO:ignore\_feedback=off -INLINE:aggressive=on -OPT:RO=1  
-OPT:IEEE\_arith=3 -OPT:IEEE\_NaN\_Inf=off  
-OPT:fold\_unsigned\_relops=on -fno-exceptions -CG:p2align=0  
-m32 -mno-fma4 -HP:bdt=2m:heap=2m -WOPT:sib=on  
-march=bdver1

453.povray: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-CG:pre\_local\_sched=off -CG:p2align=0 -CG:p2align\_split=on  
-CG:dsched=on -INLINE:aggressive=on -HP:bd=2m:heap=2m  
-OPT:transform=2 -OPT:alias=disjoint -WOPT:aggcm=0  
-march=bdver2 -mno-fma4 -WB, -mno-xop -mno-tbm -Wl,  
-z,muldefs

Fortran benchmarks:

410.bwaves: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-OPT:Ofast -OPT:treeheight=on -LNO:blocking=off  
-LNO:ignore\_feedback=off -LNO:fu=4 -LNO:loop\_model\_simd=on  
-LNO:simd\_rm\_unity\_remainder=on -WOPT:aggstr=0  
-HP:bdt=2m:heap=2m -CG:cmp\_peep=on -march=bdver2 -mno-fma4

416.gamess: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-LNO:fu=6 -LNO:blocking=0 -LNO:simd=2 -OPT:ro=3  
-OPT:recip=on -CG:local\_sched\_alg=1 -HP:bdt=2m:heap=2m  
-WOPT:sib=on -march=bdver1 -mno-fma4

434.zeusmp: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-LNO:blocking=off -LNO:interchange=off -IPA:plimit=1500  
-HP:bdt=2m:heap=2m -march=bdver2 -mno-fma4

437.leslie3d: -Ofast -CG:pre\_minreg\_level=2 -LNO:simd=0 -LNO:fusion=2  
-HP:bdt=2m:heap=2m -mso -march=bdver1 -mno-fma4

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## Peak Optimization Flags (Continued)

459.GemsFDTD: -Ofast -IPA:plimit=1500 -OPT:unroll\_size=1024  
-OPT:unroll\_times\_max=16 -LNO:fission=2  
-CG:local\_sched\_alg=2 -HP -march=bdver1 -mno-fma4

465.tonto: -Ofast -OPT:alias=no\_f90\_pointer\_alias -LNO:blocking=off  
-CG:load\_exe=1 -CG:local\_sched\_alg=3 -IPA:plimit=525  
-HP:bdt=2m:heap=2m -march=bdver2 -WB, -mno-fma4 -mno-tbm  
-mno-xop

Benchmarks using both Fortran and C:

435.gromacs: -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m  
-CG:local\_sched\_alg=2 -CG:load\_exe=3 -GRA:unspill=on  
-march=bdver2 -mno-fma4 -LNO:simd=3

436.cactusADM: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-LNO:blocking=off -LNO:prefetch=2 -LNO:pf2=0  
-LNO:prefetch\_ahead=4 -HP -CG:locs\_shallow\_depth=1  
-CG:load\_exe=0 -CG:dsched=on -WOPT:sib=on -march=bdver2  
-mno-fma4

454.calculix: -Ofast -OPT:unroll\_size=256 -OPT:alias=disjoint  
-GRA:optimize\_boundary=on -CG:dsched=on -HP:bdt=2m:heap=2m  
-march=bdver1 -mno-fma4

481.wrf: -Ofast -LNO:blocking=off -LANG:copyinout=off  
-IPA:callee\_limit=5000 -GRA:prioritize\_by\_density=on -HP  
-WOPT:sib=on -march=bdver1 -mno-fma4

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.html>

<http://www.spec.org/cpu2006/flags/Sugon-Naples-Platform-Settings-revC-I.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.xml>

<http://www.spec.org/cpu2006/flags/Sugon-Naples-Platform-Settings-revC-I.xml>

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

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