SPEC® CFP2006 Result

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Sugon

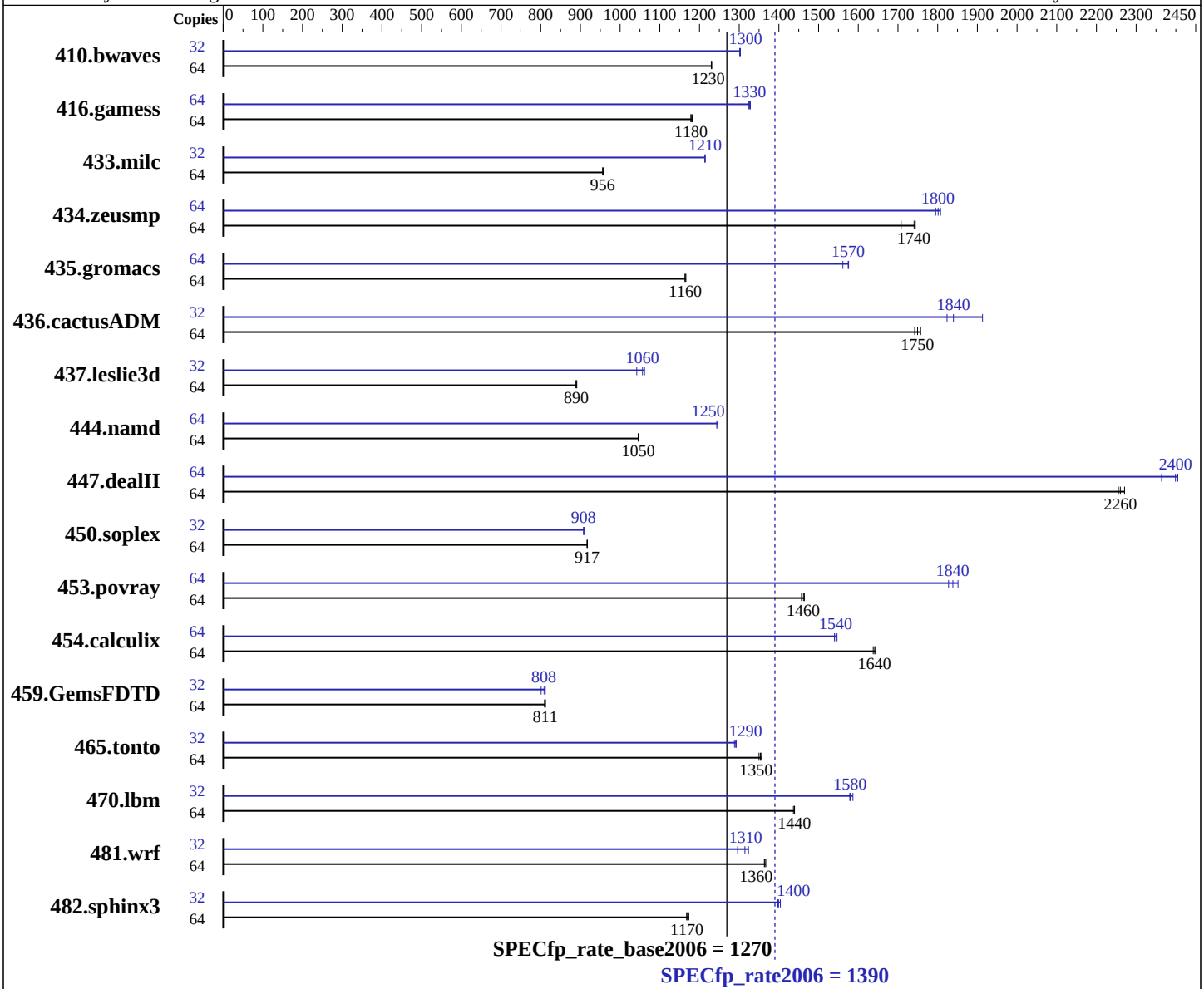
Sugon A620-G30 (AMD EPYC 7351)

SPECfp®_rate2006 = 1390

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

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

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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.dealII: -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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