SPEC® CFP2006 Result

Copyright 2006-2018 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

(Test Sponsor: Advanced Micro Devices)

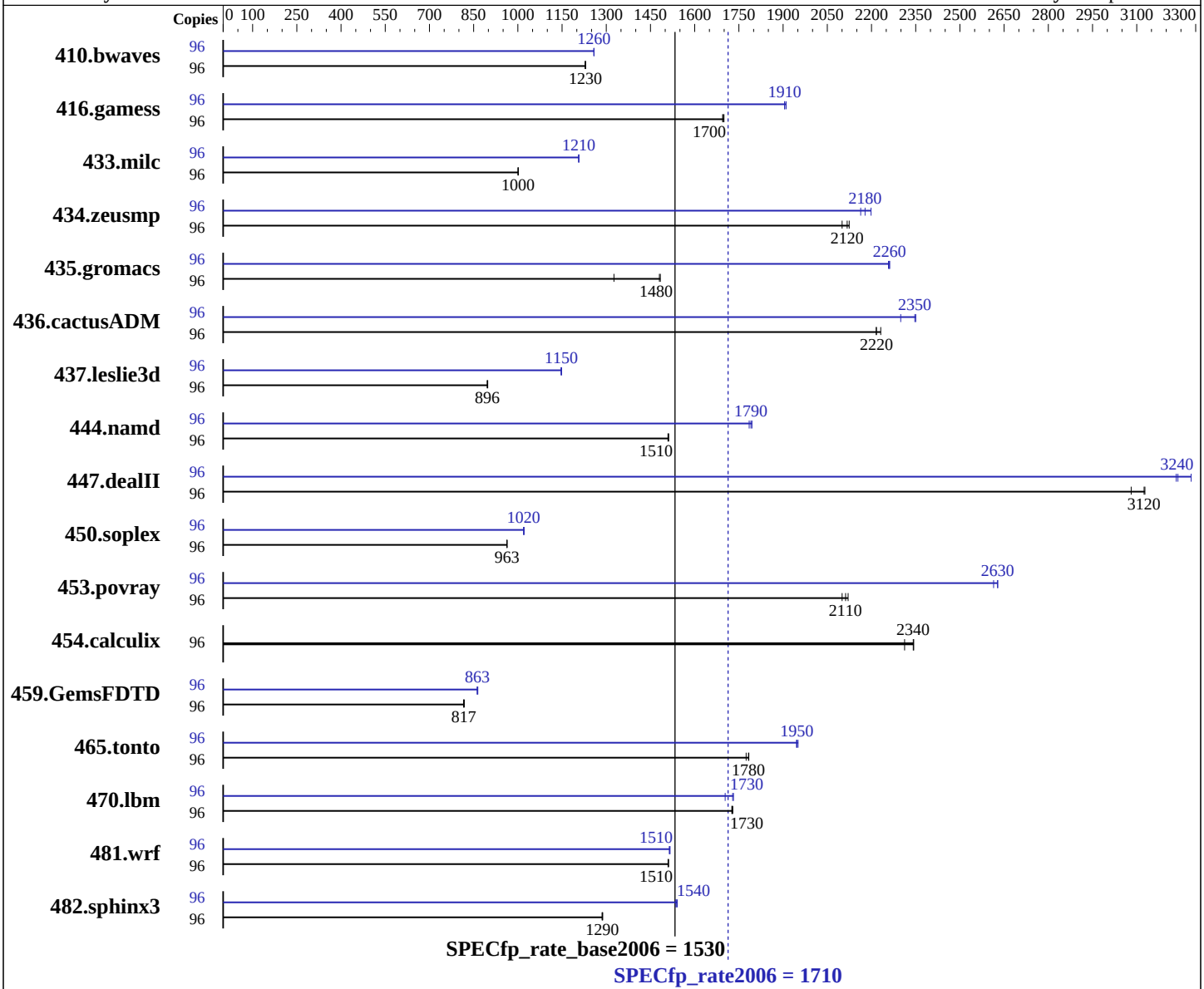
Asus RS700A-E9,
AMD EPYC 7451

SPECfp®_rate2006 = 1710

SPECfp_rate_base2006 = 1530

CPU2006 license: 49
Test sponsor: Advanced Micro Devices
Tested by: Advanced Micro Devices

Test date: Jul-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2016



Hardware

CPU Name:	AMD EPYC 7451
CPU Characteristics:	AMD Turbo CORE technology up to 3.20 GHz
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	48 cores, 2 chips, 24 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:	Ubuntu 16.04.2 LTS, Kernel 4.4.0-87-generic
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 (Full multiuser with network)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit

Continued on next page

SPEC CFP2006 Result

Copyright 2006-2018 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

(Test Sponsor: Advanced Micro Devices)

Asus RS700A-E9,
AMD EPYC 7451

SPECfp_rate2006 = 1710

SPECfp_rate_base2006 = 1530

CPU2006 license: 49
Test sponsor: Advanced Micro Devices
Tested by: Advanced Micro Devices

Test date: Jul-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2016

L3 Cache: 64 MB I+D on chip per chip, 8 MB shared / 3 cores
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2667V-R, running at 2400)
Disk Subsystem: 1 x 1 TB SSD
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	96	1061	1230	**1061**	**1230**	1062	1230	96	**1037**	**1260**	1037	1260	1037	1260
416.gamess	96	1109	1690	1106	1700	**1108**	**1700**	96	**987**	**1910**	984	1910	987	1910
433.milc	96	880	1000	881	1000	**880**	**1000**	96	**730**	**1210**	731	1210	730	1210
434.zeusmp	96	**413**	**2120**	416	2100	411	2120	96	404	2160	**401**	**2180**	397	2200
435.gromacs	96	517	1330	**463**	**1480**	462	1480	96	304	2260	303	2260	**303**	**2260**
436.cactusADM	96	514	2230	**518**	**2220**	518	2220	96	488	2350	**489**	**2350**	499	2300
437.leslie3d	96	1005	898	1007	896	**1007**	**896**	96	787	1150	**786**	**1150**	786	1150
444.namd	96	509	1510	510	1510	**510**	**1510**	96	**430**	**1790**	429	1790	431	1780
447.dealII	96	356	3080	351	3130	**351**	**3120**	96	340	3230	**339**	**3240**	334	3280
450.soplex	96	832	963	831	963	**831**	**963**	96	785	1020	784	1020	**785**	**1020**
453.povray	96	243	2100	241	2120	**242**	**2110**	96	**194**	**2630**	194	2630	195	2610
454.calculix	96	338	2340	343	2310	**338**	**2340**	96	338	2340	343	2310	**338**	**2340**
459.GemsFDTD	96	**1247**	**817**	1245	818	1249	816	96	1179	864	**1181**	**863**	1182	862
465.tonto	96	**530**	**1780**	532	1770	530	1780	96	**485**	**1950**	484	1950	486	1950
470.lbm	96	764	1730	**764**	**1730**	763	1730	96	774	1700	**763**	**1730**	762	1730
481.wrf	96	**710**	**1510**	709	1510	710	1510	96	707	1520	708	1510	**708**	**1510**
482.sphinx3	96	1455	1290	1453	1290	**1453**	**1290**	96	1218	1540	**1218**	**1540**	1214	1540

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
```

Continued on next page

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=86016 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

Platform Notes

```
The Linux run level was 3; sysinfo run-level is incorrect.
The dmidecode memory speed information is incorrect.
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "896"
LD_LIBRARY_PATH = "/root/work/cpu2006/amd1603-rate-libs-revA/32:/root/work/cpu2006/amd1603-rate-libs-revA/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 2x AMD Opteron 6378 chips + 128GB Memory using RHEL 6.3

Submitted_by: "Smith, Van" <Van.Smith@amd.com>
Submitted: Mon Aug  7 23:19:38 EDT 2017
Submission: cpu2006-20170807-48148.sub
```

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
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

Continued on next page

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

Continued on next page

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

Continued on next page

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: `basepeak = yes`

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 file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/x86-openflags-rate-revA-I.xml

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Report generated on Thu Feb 8 13:30:31 2018 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 22 August 2017.