



SPEC® CFP2006 Result

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ASUSTeK Computer Inc.

(Test Sponsor: Advanced Micro Devices)

Asus RS700A-E9,
AMD EPYC 7551

SPECfp®_rate2006 = 1820

SPECfp_rate_base2006 = 1640

CPU2006 license: 49

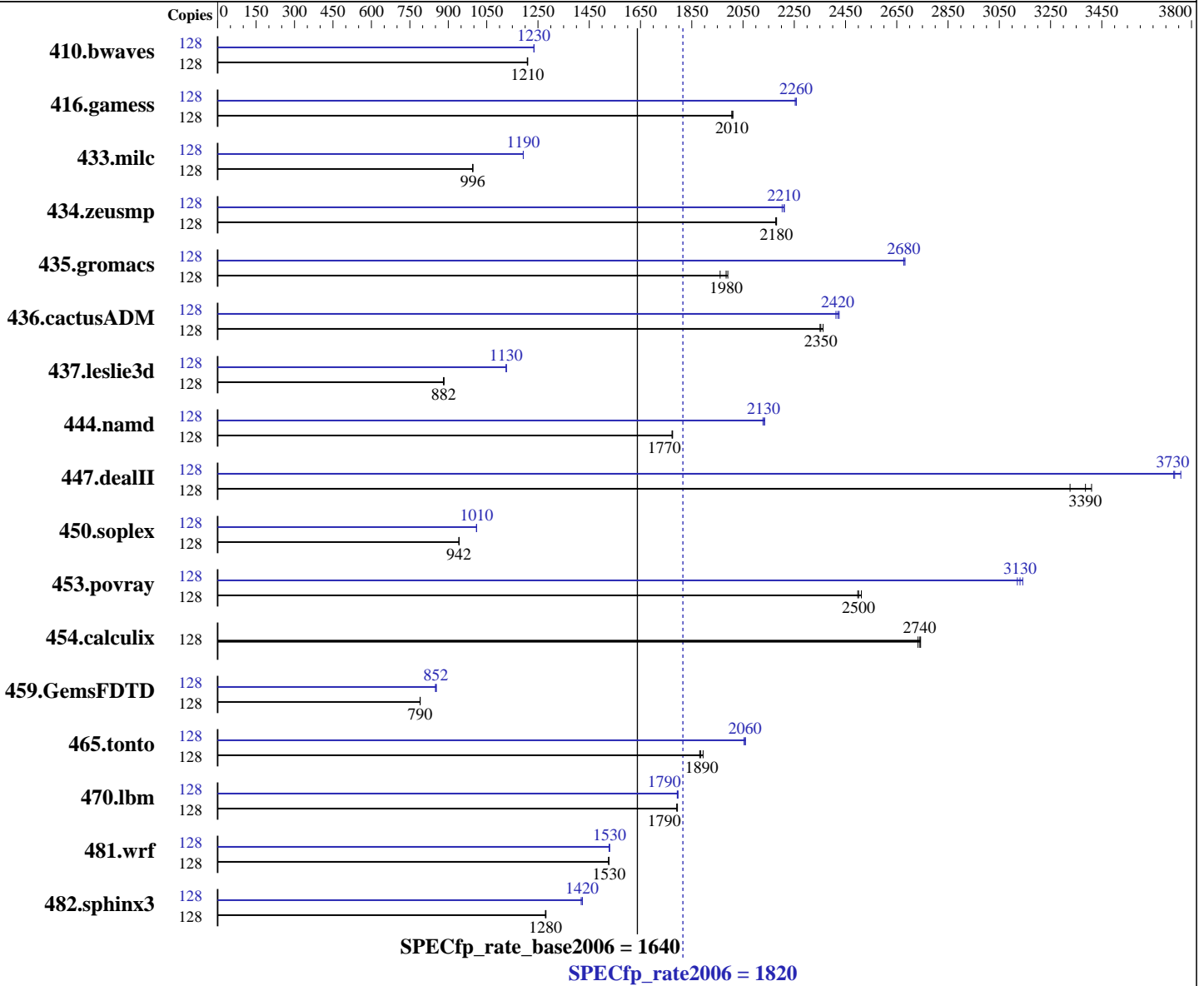
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Jul-2017

Hardware Availability: Sep-2017

Software Availability: Apr-2016



Hardware

CPU Name: AMD EPYC 7551
 CPU Characteristics: AMD Turbo CORE technology up to 3.00 GHz
 CPU MHz: 2000
 FPU: Integrated
 CPU(s) enabled: 64 cores, 2 chips, 32 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 4.4.0-83-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



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L3 Cache: 64 MB I+D on chip per chip, 8 MB shared / 4 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 | 128 | 1437 | 1210 | 1439 | 1210 | 1439 | 1210 | 128 | 1409 | 1230 | 1409 | 1230 | 1409 | 1230 |
| 416.gamess | 128 | 1249 | 2010 | 1249 | 2010 | 1246 | 2010 | 128 | 1110 | 2260 | 1112 | 2250 | 1110 | 2260 |
| 433.milc | 128 | 1180 | 996 | 1181 | 995 | 1180 | 996 | 128 | 985 | 1190 | 985 | 1190 | 985 | 1190 |
| 434.zeusmp | 128 | 534 | 2180 | 535 | 2180 | 534 | 2180 | 128 | 527 | 2210 | 529 | 2200 | 527 | 2210 |
| 435.gromacs | 128 | 459 | 1990 | 461 | 1980 | 466 | 1960 | 128 | 341 | 2680 | 341 | 2680 | 341 | 2680 |
| 436.cactusADM | 128 | 647 | 2360 | 650 | 2350 | 651 | 2350 | 128 | 631 | 2430 | 632 | 2420 | 634 | 2410 |
| 437.leslie3d | 128 | 1362 | 883 | 1365 | 881 | 1364 | 882 | 128 | 1068 | 1130 | 1069 | 1130 | 1069 | 1130 |
| 444.namd | 128 | 578 | 1780 | 579 | 1770 | 579 | 1770 | 128 | 482 | 2130 | 482 | 2130 | 481 | 2130 |
| 447.dealII | 128 | 429 | 3410 | 432 | 3390 | 440 | 3330 | 128 | 392 | 3730 | 390 | 3760 | 393 | 3730 |
| 450.soplex | 128 | 1133 | 942 | 1134 | 941 | 1134 | 942 | 128 | 1057 | 1010 | 1057 | 1010 | 1056 | 1010 |
| 453.povray | 128 | 272 | 2500 | 271 | 2510 | 273 | 2500 | 128 | 217 | 3130 | 217 | 3140 | 218 | 3120 |
| 454.calculix | 128 | 386 | 2730 | 385 | 2740 | 385 | 2740 | 128 | 386 | 2730 | 385 | 2740 | 385 | 2740 |
| 459.GemsFDTD | 128 | 1719 | 790 | 1718 | 790 | 1719 | 790 | 128 | 1598 | 850 | 1591 | 853 | 1594 | 852 |
| 465.tonto | 128 | 665 | 1890 | 670 | 1880 | 668 | 1890 | 128 | 613 | 2050 | 611 | 2060 | 612 | 2060 |
| 470.lbm | 128 | 982 | 1790 | 981 | 1790 | 980 | 1790 | 128 | 981 | 1790 | 980 | 1790 | 979 | 1800 |
| 481.wrf | 128 | 936 | 1530 | 938 | 1520 | 936 | 1530 | 128 | 935 | 1530 | 936 | 1530 | 935 | 1530 |
| 482.sphinx3 | 128 | 1950 | 1280 | 1950 | 1280 | 1947 | 1280 | 128 | 1754 | 1420 | 1753 | 1420 | 1759 | 1420 |

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



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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=114688 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 23:02:43 EDT 2017

Submission: cpu2006-20170807-48141.sub

Base Compiler Invocation

C benchmarks:
openc

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Benchmarks using both Fortran and C:
openc openf95



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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.deallI: -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:bd=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:bd=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:bd=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:bd=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:bd=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:bd=2m:heap=2m -march=bdver2 -mno-fma4

437.leslie3d: -Ofast -CG:pre_minreg_level=2 -LNO:simd=0 -LNO:fusion=2
-HP:bd=2m:heap=2m -mso -march=bdver1 -mno-fma4

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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>

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For other inquiries, please contact webmaster@spec.org.

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