# SPEC® CFP2006 Result



## Hewlett Packard Enterprise

(Test Sponsor: Advanced Micro Devices)

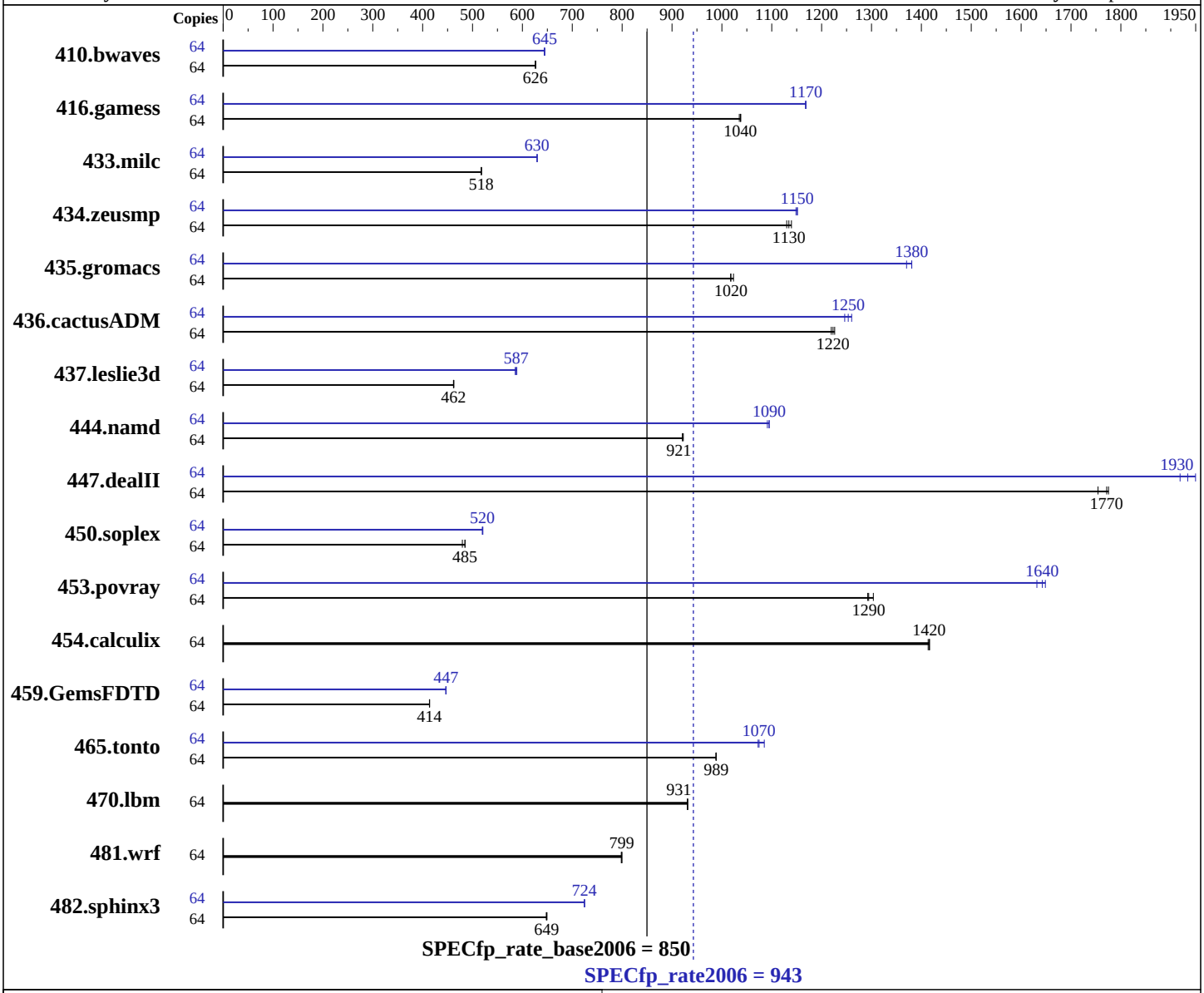
HPE Cloudline CL3150,
AMD EPYC 7601

SPECfp®_rate2006 = 943

SPECfp_rate_base2006 = 850

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

**Test date:** May-2017
**Hardware Availability:** Jul-2017
**Software Availability:** Apr-2016




## Hardware

| | |
|---|---|
| CPU Name: | AMD EPYC 7601 |
| CPU Characteristics: | AMD Turbo CORE technology up to 3.20 GHz |
| CPU MHz: | 2200 |
| FPU: | Integrated |
| CPU(s) enabled: | 32 cores, 1 chip, 32 cores/chip, 2 threads/core |
| CPU(s) orderable: | 1 chip |
| 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 LTS,<br>Kernel 4.4.0-71.generic |
| Compiler: | C/C++/Fortran: Version 4.5.2.1 of x86 Open64 Compiler Suite (from AMD) |
| Auto Parallel: | No |
| File System: | ext3 |
| 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



Hewlett Packard Enterprise
(Test Sponsor: Advanced Micro Devices)

HPE Cloudline CL3150,
AMD EPYC 7601

SPECfp_rate2006 = 943

SPECfp_rate_base2006 = 850

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

**Test date:** May-2017
**Hardware Availability:** Jul-2017
**Software Availability:** Apr-2016

L3 Cache: 64 MB I+D on chip per chip, 8 MB shared / 4 cores
Other Cache: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2667V-R)
Disk Subsystem: 1 x 500 GB 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 | 64 | 1388 | 627 | 1389 | 626 | **1389** | **626** | 64 | 1351 | 644 | 1349 | 645 | **1349** | **645** |
| 416.gamess | 64 | 1207 | 1040 | **1208** | **1040** | 1211 | 1030 | 64 | 1072 | 1170 | **1073** | **1170** | 1073 | 1170 |
| 433.milc | 64 | 1134 | 518 | **1135** | **518** | 1135 | 518 | 64 | 933 | 630 | 933 | 629 | **933** | **630** |
| 434.zeusmp | 64 | 511 | 1140 | 515 | 1130 | **513** | **1130** | 64 | 506 | 1150 | 507 | 1150 | **506** | **1150** |
| 435.gromacs | 64 | **449** | **1020** | 449 | 1020 | 447 | 1020 | 64 | 333 | 1370 | **331** | **1380** | 331 | 1380 |
| 436.cactusADM | 64 | 624 | 1230 | 627 | 1220 | **625** | **1220** | 64 | 607 | 1260 | 614 | 1250 | **610** | **1250** |
| 437.leslie3d | 64 | 1300 | 463 | **1302** | **462** | 1303 | 462 | 64 | 1027 | 586 | 1022 | 589 | **1024** | **587** |
| 444.namd | 64 | **557** | **921** | 557 | 921 | 556 | 923 | 64 | 470 | 1090 | **469** | **1090** | 469 | 1090 |
| 447.dealII | 64 | 412 | 1780 | 417 | 1750 | **413** | **1770** | 64 | 376 | 1950 | **379** | **1930** | 382 | 1920 |
| 450.soplex | 64 | **1101** | **485** | 1113 | 480 | 1101 | 485 | 64 | **1026** | **520** | 1025 | 521 | 1027 | 520 |
| 453.povray | 64 | 263 | 1290 | 261 | 1300 | **263** | **1290** | 64 | 209 | 1630 | 207 | 1650 | **207** | **1640** |
| 454.calculix | 64 | **373** | **1420** | 373 | 1420 | 374 | 1410 | 64 | **373** | **1420** | 373 | 1420 | 374 | 1410 |
| 459.GemsFDTD | 64 | 1640 | 414 | **1641** | **414** | 1642 | 414 | 64 | **1520** | **447** | 1519 | 447 | 1521 | 446 |
| 465.tonto | 64 | 637 | 988 | 637 | 989 | **637** | **989** | 64 | **586** | **1070** | 587 | 1070 | 580 | 1090 |
| 470.lbm | 64 | 945 | 931 | **944** | **931** | 944 | 932 | 64 | 945 | 931 | **944** | **931** | 944 | 932 |
| 481.wrf | 64 | **894** | **799** | 896 | 798 | 894 | 799 | 64 | **894** | **799** | 896 | 798 | 894 | 799 |
| 482.sphinx3 | 64 | 1921 | 649 | 1925 | 648 | **1923** | **649** | 64 | **1722** | **724** | 1723 | 724 | 1721 | 725 |

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
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 runspec
```

Continued on next page

## Operating System Notes (Continued)

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

## 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:
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 Jun  5 12:38:47 EDT 2017
Submission: cpu2006-20170529-47128.sub
Submitted_by: "Smith, Van" <Van.Smith@amd.com>
Submitted: Thu Jun  8 15:44:26 EDT 2017
Submission: cpu2006-20170529-47128.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

Continued on next page

## Base Portability Flags (Continued)

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

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Continued on next page

## Peak Compiler Invocation (Continued)

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: basepeak = yes

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

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

Continued on next page

## Peak Optimization Flags (Continued)

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

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

Continued on next page

## Peak Optimization Flags (Continued)

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: `basepeak = yes`

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`



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 Tue Sep 5 18:32:05 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 20 June 2017.