



SPEC[®] CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

IBM Corporation

IBM System x3755 M3
(AMD Opteron 6238)

SPECfp[®]_rate2006 = 650

SPECfp_rate_base2006 = 606

CPU2006 license: 11

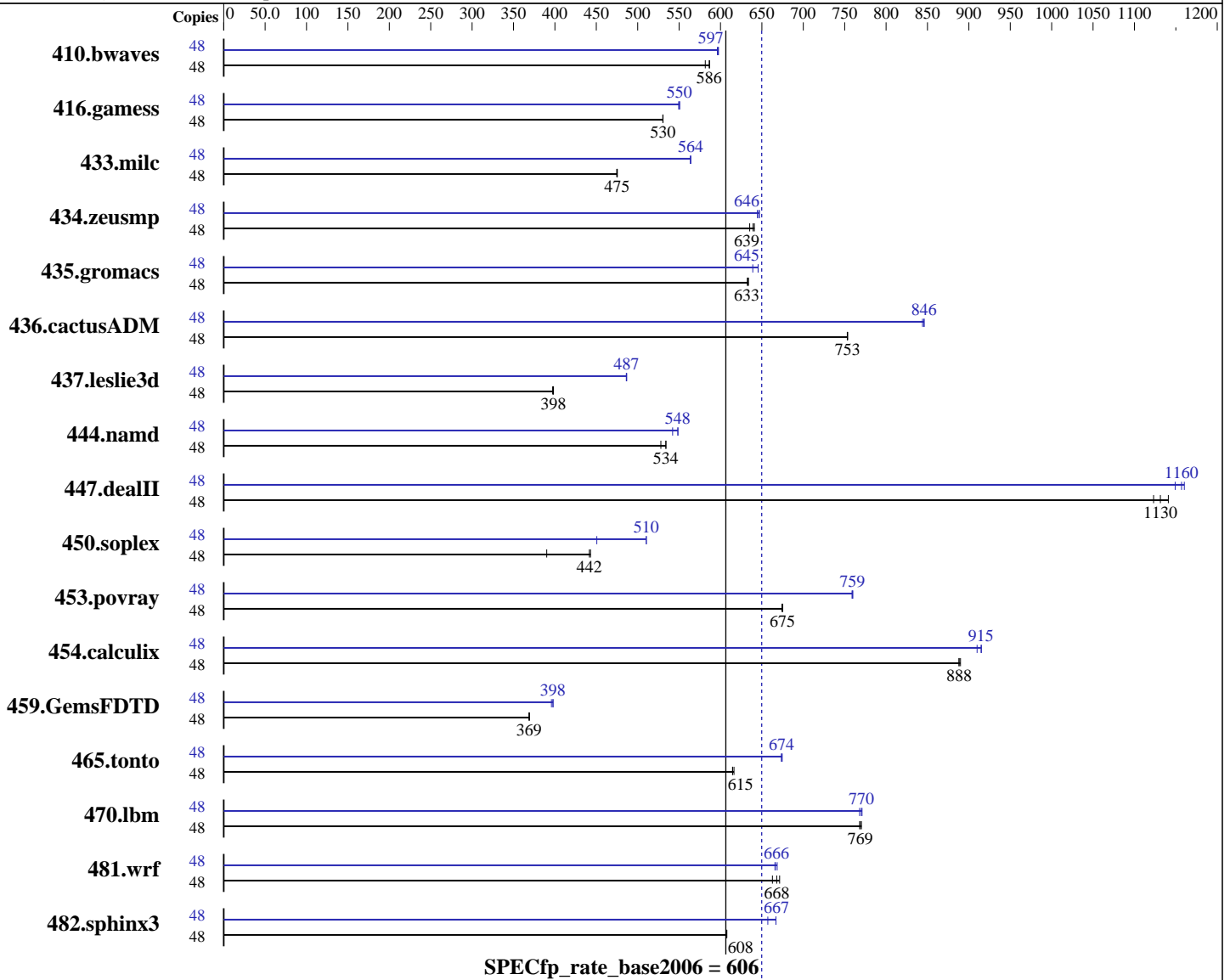
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Feb-2012

Hardware Availability: Dec-2011

Software Availability: Jul-2011



Hardware

CPU Name: AMD Opteron 6238
 CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz
 CPU MHz: 2600
 FPU: Integrated
 CPU(s) enabled: 48 cores, 4 chips, 12 cores/chip
 CPU(s) orderable: 2,4 chips

Continued on next page

Software

Operating System: Red Hat Enterprise Linux Server release 6.1, Kernel 2.6.32-131.0.15.el6.x86_64
 Compiler: C/C++/Fortran: Version 4.2.5.2 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

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Primary Cache: 384 KB I on chip per chip,
64 KB I shared / 2 cores;
16 KB D on chip per core
Secondary Cache: 12 MB I+D on chip per chip, 2 MB shared / 2 cores
L3 Cache: 16 MB I+D on chip per chip, 8 MB shared / 6 cores
Other Cache: None
Memory: 256 GB (32 x 8 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem: 1 x 600 GB SATA, 15000 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 | 48 | 1122 | 582 | <u>1113</u> | <u>586</u> | 1112 | 587 | 48 | 1092 | 598 | 1094 | 596 | <u>1092</u> | <u>597</u> | | |
| 416.gamess | 48 | <u>1772</u> | <u>530</u> | 1771 | 531 | 1772 | 530 | 48 | 1707 | 551 | <u>1708</u> | <u>550</u> | 1710 | 549 | | |
| 433.milc | 48 | <u>928</u> | <u>475</u> | 928 | 475 | 927 | 475 | 48 | 781 | 564 | 782 | 564 | <u>781</u> | <u>564</u> | | |
| 434.zeusmp | 48 | 682 | 641 | <u>683</u> | <u>639</u> | 688 | 635 | 48 | 678 | 645 | <u>676</u> | <u>646</u> | 675 | 647 | | |
| 435.gromacs | 48 | 542 | 632 | <u>541</u> | <u>633</u> | 541 | 634 | 48 | 531 | 646 | <u>531</u> | <u>645</u> | 536 | 639 | | |
| 436.cactusADM | 48 | 761 | 754 | 762 | 753 | <u>761</u> | <u>753</u> | 48 | 678 | 846 | <u>678</u> | <u>846</u> | 680 | 844 | | |
| 437.leslie3d | 48 | <u>1133</u> | <u>398</u> | 1133 | 398 | 1136 | 397 | 48 | 928 | 486 | <u>927</u> | <u>487</u> | 927 | 487 | | |
| 444.namd | 48 | 729 | 528 | 721 | 534 | <u>721</u> | <u>534</u> | 48 | 710 | 542 | <u>702</u> | <u>548</u> | 702 | 549 | | |
| 447.dealII | 48 | <u>485</u> | <u>1130</u> | 481 | 1140 | 489 | 1120 | 48 | 478 | 1150 | 473 | 1160 | <u>475</u> | <u>1160</u> | | |
| 450.soplex | 48 | 1026 | 390 | 904 | 443 | <u>906</u> | <u>442</u> | 48 | 888 | 451 | <u>785</u> | <u>510</u> | 784 | 510 | | |
| 453.povray | 48 | 379 | 674 | 378 | 675 | <u>378</u> | <u>675</u> | 48 | <u>336</u> | <u>759</u> | 336 | 759 | 336 | 760 | | |
| 454.calculix | 48 | 445 | 890 | 446 | 888 | <u>446</u> | <u>888</u> | 48 | 433 | 915 | <u>433</u> | <u>915</u> | 435 | 910 | | |
| 459.GemsFDTD | 48 | <u>1380</u> | <u>369</u> | 1379 | 369 | 1381 | 369 | 48 | 1287 | 396 | 1280 | 398 | <u>1281</u> | <u>398</u> | | |
| 465.tonto | 48 | 769 | 615 | <u>768</u> | <u>615</u> | 766 | 616 | 48 | 700 | 675 | 701 | 674 | <u>701</u> | <u>674</u> | | |
| 470.lbm | 48 | 859 | 768 | 856 | 770 | <u>858</u> | <u>769</u> | 48 | 859 | 768 | 855 | 771 | <u>856</u> | <u>770</u> | | |
| 481.wrf | 48 | 809 | 663 | 799 | 671 | <u>803</u> | <u>668</u> | 48 | 805 | 666 | 802 | 668 | <u>805</u> | <u>666</u> | | |
| 482.sphinx3 | 48 | <u>1540</u> | <u>608</u> | 1540 | 608 | 1540 | 608 | 48 | 1403 | 667 | <u>1403</u> | <u>667</u> | 1424 | 657 | | |

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

Set transparent_hugepage=never as a boot parameter in /boot/grub/menu.lst
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Operating System Notes (Continued)

Set kernel/randomize_va_space=0 in /etc/sysctl.conf

Set vm/nr_hugepages=43008 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

Platform Notes

BIOS settings:
Operating Mode set to Performance Mode

General Notes

Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "896"
LD_LIBRARY_PATH = "/root/speccpu-rate-rev1104B1/amd1104-rate-libs-revB/32:/root/speccpu-rate-rev1104B1/amd1104-rate-libs-revB/64"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at
<http://developer.amd.com/cpu/open64>

Binaries were compiled on a system with 2x AMD Opteron 6282SE chips + 64GB Memory using RHEL 6.1

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

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Base Portability Flags (Continued)

```

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:

```

-march=bdver1 -Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso

```

C++ benchmarks:

```

-march=bdver1 -Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1
-INLINE:aggressive=on -HP:bd=2m:heap=2m -D__OPEN64_FAST_SET

```

Fortran benchmarks:

```

-march=bdver1 -Ofast -LNO:blocking=off -OPT:rsqrt=2
-OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso

```

Benchmarks using both Fortran and C:

```

-march=bdver1 -Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso -LNO:blocking=off
-OPT:rsqrt=2 -OPT:unroll_size=256

```

Peak Compiler Invocation

C benchmarks:

openc

C++ benchmarks:

openCC

Fortran benchmarks:

openf95

Benchmarks using both Fortran and C:

openc openf95



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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
482.sphinx3: -DSPEC_CPU_LP64

```

Peak Optimization Flags

C benchmarks:

```

433.milc: -march=bdver1 -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

470.lbm: -march=bdver1 -Ofast -CG:cmp_peep=on
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -OPT:keep_ext=on -HP:bdt=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso

482.sphinx3: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=2
-CG:cmp_peep=on -CG:local_sched_alg=2 -INLINE:aggressive=on
-LNO:prefetch=2 -LNO:prefetch_ahead=4 -mso

```

C++ benchmarks:

```

444.namd: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:ignore_feedback=off
-CG:local_sched_alg=2 -CG:load_exe=0 -OPT:unroll_size=256
-fno-exceptions -HP:bdt=2m:heap=2m

447.dealII: -march=bdver1 -Ofast -D__OPEN64_FAST_SET -static
-INLINE:aggressive=on -LNO:opt=0 -LNO:simd=0
-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

```

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Peak Optimization Flags (Continued)

450.soplex: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -INLINE:aggressive=on -OPT:RO=1
-OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off
-OPT:fold_unsigned_relops=on -fno-exceptions -m32
-HP:bdt=2m:heap=2m -WOPT:sib=on

453.povray: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -CG:pre_local_sched=off
-INLINE:aggressive=on -HP:bd=2m:heap=2m -OPT:transform=2
-OPT:alias=disjoint -WOPT:aggcm=0

Fortran benchmarks:

410.bwaves: -march=bdver1 -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

416.gamess: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
-LNO:simd=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
-OPT:unroll_times_max=2 -CG:local_sched_alg=1
-HP:bdt=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -Ofast -LNO:blocking=off -LNO:interchange=off
-HP:bdt=2m:heap=2m

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

459.GemsFDTD: -march=bdver1 -Ofast -OPT:unroll_size=0 -LNO:fission=2
-CG:load_exe=0 -CG:local_sched_alg=2 -HP

465.tonto: -march=bdver1 -Ofast -OPT:alias=no_f90_pointer_alias
-LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525
-HP:bdt=2m:heap=2m

Benchmarks using both Fortran and C:

435.gromacs: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:rsqrt=2
-HP:bdt=2m:heap=2m

436.cactusADM: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:blocking=off
-LNO:prefetch=2 -HP -CG:locs_shallow_depth=1 -CG:load_exe=0
-WOPT:sib=on

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Peak Optimization Flags (Continued)

454.calculix: -march=bdver1 -Ofast -OPT:unroll_size=256
-GRA:optimize_boundary=on -HP:bdt=2m:heap=2m

481.wrf: -march=bdver1 -Ofast -LNO:blocking=off -LANG:copyinout=off
-IPA:callee_limit=5000 -GRA:prioritize_by_density=on
-CG:load_exe=1 -HP -WOPT:sib=on

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

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revB.html>

<http://www.spec.org/cpu2006/flags/amd-platform-rate-revB.20120103.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revB.xml>

<http://www.spec.org/cpu2006/flags/amd-platform-rate-revB.20120103.xml>

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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 Mon Sep 22 18:39:54 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 27 March 2012.