SPEC® CFP2006 Result
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IBM Corporation

IBM System x3755 M3 (AMD Opteron 6176 SE)

$SPECfp^{®}\_rate2006 = 635$

$SPECfp\_rate\_base2006 = 585$

CPU2006 license: 11
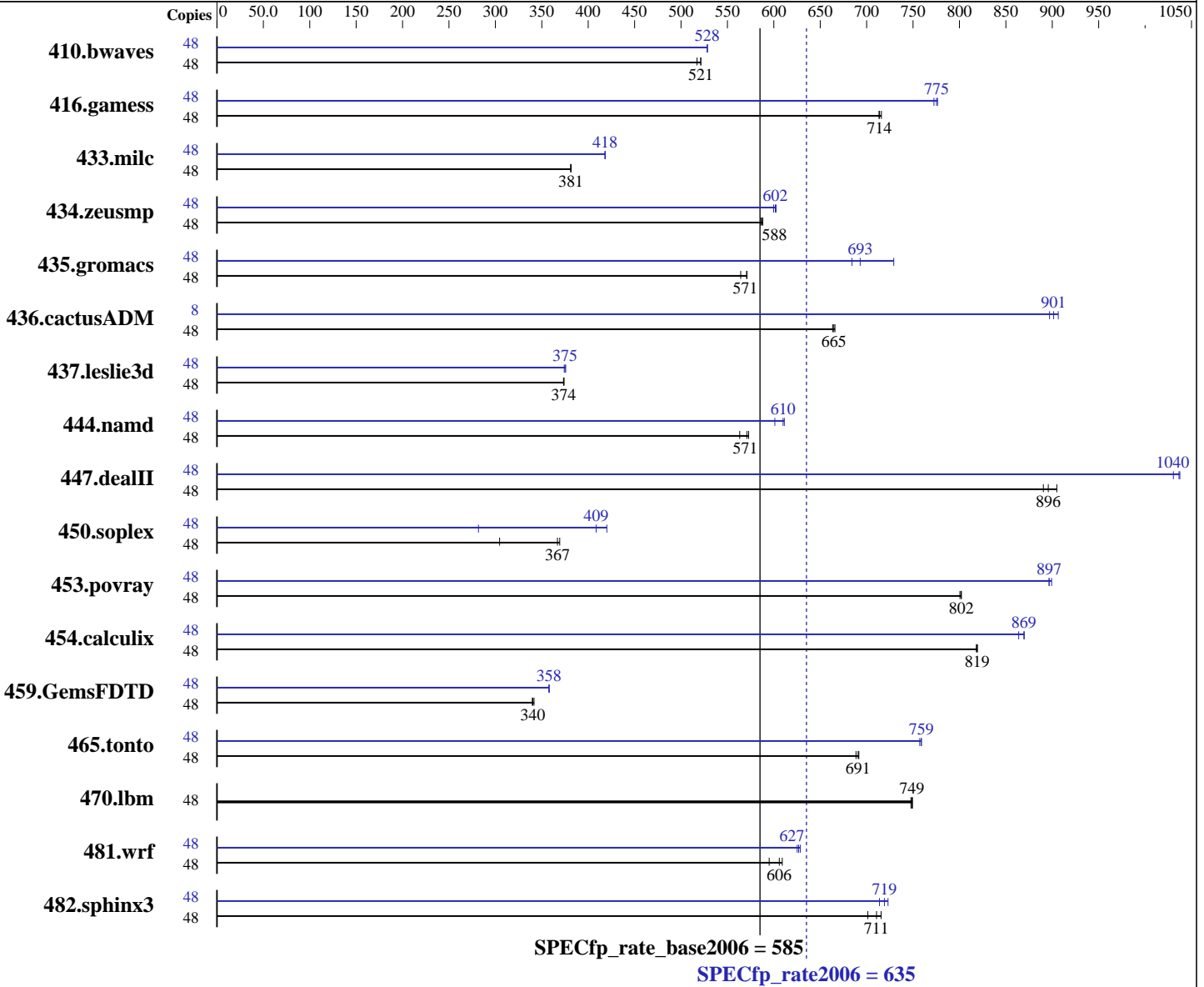**Test sponsor:** IBM Corporation
Tested by: IBM Corporation

Test date: Aug-2010
Hardware Availability: Sep-2010
Software Availability: Jul-2010

Copies

Benchmark	Copies	base	peak
410.bwaves	48 / 48	521	528
416.gamess	48 / 48	714	775
433.milc	48 / 48	381	418
434.zeusmp	48 / 48	588	602
435.gromacs	48 / 48	571	693
436.cactusADM	8 / 48	665	901
437.leslie3d	48 / 48	374	375
444.namd	48 / 48	571	610
447.dealII	48 / 48	896	1040
450.soplex	48 / 48	367	409
453.povray	48 / 48	802	897
454.calculix	48 / 48	819	869
459.GemsFDTD	48 / 48	340	358
465.tonto	48 / 48	691	759
470.lbm	48	749	
481.wrf	48 / 48	606	627
482.sphinx3	48 / 48	711	719

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Hardware

CPU Name:	AMD Opteron 6176 SE
CPU Characteristics:	
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	48 cores, 4 chips, 12 cores/chip
CPU(s) orderable:	2,4 chips
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core

Software

Operating System:	Red Hat Enterprise Linux Server release 5.5, Kernel 2.6.18-194.el5
Compiler:	x86 Open64 4.2.4 Compiler Suite (from AMD)
Auto Parallel:	Yes
File System:	ext3
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	None

Continued on next page

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L3 Cache:	12 MB I+D on chip per chip, 6 MB shared / 6 cores
Other Cache:	None
Memory:	128 GB (32 x 4 GB, PC3-10600R, CL9, Dual Rank)
Disk Subsystem:	1 x 250 GB SATA, 7200 RPM
Other Hardware:	None

Results Table

Benchmark	Base Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
410.bwaves	48	1261	517	1251	521	**1251**	**521**	48	**1235**	**528**	1235	528	1234	528
416.gamess	48	**1316**	**714**	1313	716	1318	713	48	1217	773	1210	776	**1212**	**775**
433.milc	48	1156	381	1155	382	**1155**	**381**	48	1054	418	**1054**	**418**	1053	418
434.zeusmp	48	**743**	**588**	745	586	743	588	48	728	600	725	602	**726**	**602**
435.gromacs	48	600	571	607	564	**601**	**571**	48	**494**	**693**	501	684	470	729
436.cactusADM	48	865	663	861	666	**863**	**665**	8	**106**	**901**	107	897	105	906
437.leslie3d	48	1206	374	**1208**	**374**	1208	373	48	**1203**	**375**	1201	376	1206	374
444.namd	48	**674**	**571**	683	563	672	573	48	640	601	**631**	**610**	630	611
447.dealII	48	617	890	607	905	**613**	**896**	48	529	1040	**530**	**1040**	533	1030
450.soplex	48	1314	305	**1091**	**367**	1084	369	48	1421	282	**980**	**409**	953	420
453.povray	48	319	800	**318**	**802**	318	802	48	285	897	284	899	**285**	**897**
454.calculix	48	**484**	**819**	483	819	484	818	48	455	870	**455**	**869**	458	864
459.GemsFDTD	48	1491	342	**1497**	**340**	1499	340	48	1423	358	1423	358	**1423**	**358**
465.tonto	48	**684**	**691**	686	689	683	692	48	622	759	**622**	**759**	624	757
470.lbm	48	880	749	**881**	**749**	882	748	48	880	749	**881**	**749**	882	748
481.wrf	48	901	595	**885**	**606**	880	609	48	**855**	**627**	858	625	853	628
482.sphinx3	48	1334	701	1307	716	**1316**	**711**	48	**1301**	**719**	1311	714	1294	723

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 vm/nr_hugepages=21600 in /etc/sysctl.conf
    mount -t hugetlbfs nodev /mnt/hugepages
```

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General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "450"
LD_LIBRARY_PATH = "/root/run_speccpu_amd_magnycours_revC-3/amd1002mc-rate-libs-revC/64:/root/run_speccpu_amd_magnycours_revC-3/amd1002mc-rate-libs-revC/32"
OMP_NUM_THREADS = "6"
```

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

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_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG
                  -fno-second-underscore
     482.sphinx3: -DSPEC_CPU_LP64
```

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Base Optimization Flags

C benchmarks:
```
-march=barcelona -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m
```

C++ benchmarks:
```
-march=barcelona -mso -Ofast -static -INLINE:aggressive=on
-OPT:malloc_alg=1 -HP:bdt=2m
```

Fortran benchmarks:
```
-march=barcelona -mso -Ofast -HP
```

Benchmarks using both Fortran and C:
```
-march=barcelona -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m -HP
```

Peak Compiler Invocation

C benchmarks:
```
opencc
```

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_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG
             -fno-second-underscore
   482.sphinx3: -DSPEC_CPU_LP64
```

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Peak Optimization Flags

C benchmarks:

```
     433.milc: -march=barcelona -mso -Ofast -CG:movnti=1
               -CG:local_sched_alg=1 -CG:locs_shallow_depth=1
               -HP:bdt=2m:heap=2m -LNO:prefetch=3

      470.lbm: basepeak = yes

  482.sphinx3: -march=barcelona -mso -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=2
               -CG:sse_cse_regs=0 -CG:locs_shallow_depth=1 -CG:cmp_peep=on
               -CG:local_sched_alg=1 -INLINE:aggressive=on
```

C++ benchmarks:

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

    447.dealII: -march=barcelona -mso -Ofast -static -INLINE:aggressive=on
               -LNO:opt=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 -TENV:frame_pointer=off

    450.soplex: -march=barcelona -mso -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -O3 -INLINE:aggressive=on
               -OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off
               -OPT:fold_unsigned_relops=on -OPT:malloc_alg=1
               -CG:load_exe=0 -fno-exceptions -m32 -HP:bdt=2m

    453.povray: -march=barcelona -mso -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on
```

Fortran benchmarks:

```
    410.bwaves: -march=barcelona -mso -O3 -OPT:Ofast -OPT:treeheight=on
               -LNO:blocking=off -LNO:prefetch_ahead=5
               -LNO:ignore_feedback=off -WOPT:aggstr=0 -HP:bdt=2m:heap=2m
               -CG:cmp_peep=on

    416.gamess: -march=barcelona -mso -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
               -LNO:prefetch=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
               -HP:bdt=2m:heap=2m

    434.zeusmp: -march=barcelona -mso -Ofast -LNO:blocking=off
               -LNO:interchange=off -OPT:treeheight=on -OPT:unroll_size=256
               -CG:cmp_peep=on -GRA:prioritize_by_density=on -HP
```

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Peak Optimization Flags (Continued)

```
    437.leslie3d: -march=barcelona -mso -Ofast -HP:bdt=2m:heap=2m

    459.GemsFDTD: -march=barcelona -mso -Ofast -LNO:fission=2
                  -LNO:prefetch_ahead=1 -CG:load_exe=0 -CG:local_sched_alg=1
                  -HP

       465.tonto: -march=barcelona -mso -Ofast
                  -OPT:alias=no_f90_pointer_alias -LNO:blocking=off
                  -CG:load_exe=1 -IPA:plimit=525 -HP
```

Benchmarks using both Fortran and C:

```
     435.gromacs: -march=barcelona -mso -Ofast -OPT:rsqrt=2
                  -HP:bdt=2m:heap=2m

   436.cactusADM: -march=barcelona -mso -fb_create fbdata(pass 1)
                  -fb_opt fbdata(pass 2) -Ofast -apo -LNO:prefetch_ahead=1
                  -HP:bdt=2m:heap=2m -LANG:heap_allocation_threshold=100

     454.calculix: -march=barcelona -mso -Ofast -CG:load_exe=0
                  -CG:ptr_load_use=0 -CG:local_sched_alg=2 -CG:compute_to=on
                  -LNO:prefetch_ahead=30 -WOPT:unroll=2
                  -GRA:optimize_boundary=on -HP:bdt=2m:heap=2m

         481.wrf: -march=barcelona -mso -Ofast -LNO:blocking=off
                  -LNO:prefetch_ahead=10 -LANG:copyinout=off
                  -IPA:callee_limit=5000 -GRA:prioritize_by_density=on -m3dnow
                  -HP
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20100901.html
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20100901.xml
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.xml

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

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