



SPEC® CFP2006 Result

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IBM Corporation

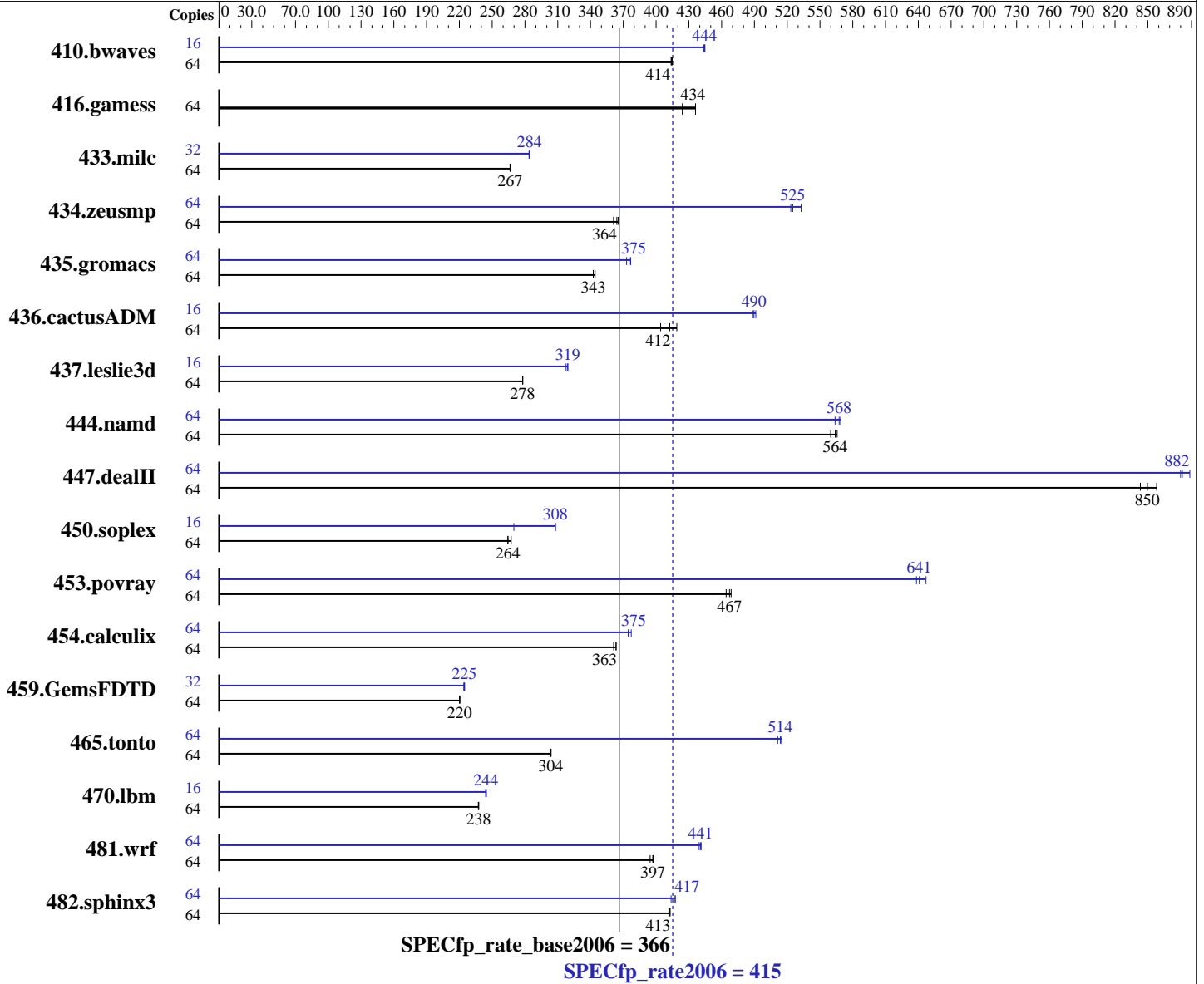
IBM BladeCenter PS702 Express (3.0 GHz, 16 core, SLES)

SPECfp®_rate2006 = 415

SPECfp_rate_base2006 = 366

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

Test date: May-2010
Hardware Availability: Jun-2010
Software Availability: Aug-2010



Hardware

CPU Name: POWER7
CPU Characteristics: Intelligent Energy Optimization enabled, up to 3.30 GHz
CPU MHz: 3000
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable: 16 cores
Primary Cache: 32 KB I + 32 KB D on chip per core

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Software

Operating System: SUSE Linux Enterprise Server 11 SP1 (ppc64), Kernel 2.6.32.12-0.3-ppc64
Compiler: IBM XL C/C++ for Linux, V10.1 Updated with the Aug2010 PTF
IBM XL Fortran for Linux, V12.1 Updated with the May2010 PTF
Auto Parallel: No
File System: ext3

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Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 4 MB I+D on chip per core
Other Cache: None
Memory: 128 GB (32x4 GB) DDR3 1066 MHz
Disk Subsystem: 1x300 GB SAS 10K RPM
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: -Post-Link Optimization for Linux on POWER, Version 5.5.0-2
-MicroQuill SmartHeap 9

Results Table

| Benchmark | Base | | | | | | | | Peak | | | | | | | |
|---------------|--------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--|--|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | | |
| 410.bwaves | 64 | 2097 | 415 | <u>2100</u> | <u>414</u> | 2102 | 414 | 16 | 490 | 444 | <u>489</u> | <u>444</u> | 489 | 445 | | |
| 416.gamess | 64 | <u>2889</u> | <u>434</u> | 2955 | 424 | 2874 | 436 | 64 | <u>2889</u> | <u>434</u> | 2955 | 424 | 2874 | 436 | | |
| 433.milc | 64 | 2200 | 267 | 2206 | 266 | <u>2204</u> | <u>267</u> | 32 | 1033 | 284 | 1035 | 284 | <u>1034</u> | <u>284</u> | | |
| 434.zeusmp | 64 | 1594 | 365 | 1613 | 361 | <u>1600</u> | <u>364</u> | 64 | <u>1109</u> | <u>525</u> | 1113 | 523 | 1093 | 533 | | |
| 435.gromacs | 64 | 1328 | 344 | 1334 | 343 | <u>1334</u> | <u>343</u> | 64 | 1213 | 377 | <u>1217</u> | <u>375</u> | 1225 | 373 | | |
| 436.cactusADM | 64 | 1825 | 419 | <u>1854</u> | <u>412</u> | 1892 | 404 | 16 | 391 | 489 | <u>391</u> | <u>490</u> | 389 | 491 | | |
| 437.leslie3d | 64 | 2165 | 278 | 2164 | 278 | <u>2164</u> | <u>278</u> | 16 | 471 | 319 | 474 | 318 | <u>471</u> | <u>319</u> | | |
| 444.namd | 64 | 907 | 566 | 917 | 560 | <u>910</u> | <u>564</u> | 64 | 910 | 564 | <u>904</u> | <u>568</u> | 902 | 569 | | |
| 447.dealII | 64 | <u>862</u> | <u>850</u> | 853 | 858 | 868 | 843 | 64 | <u>831</u> | <u>882</u> | 832 | 880 | 824 | 888 | | |
| 450.soplex | 64 | 1996 | 267 | <u>2018</u> | <u>264</u> | 2019 | 264 | 16 | 494 | 270 | <u>434</u> | <u>308</u> | 433 | 308 | | |
| 453.povray | 64 | 734 | 464 | <u>729</u> | <u>467</u> | 726 | 469 | 64 | 533 | 638 | <u>531</u> | <u>641</u> | 526 | 647 | | |
| 454.calculix | 64 | 1453 | 363 | <u>1453</u> | <u>363</u> | 1462 | 361 | 64 | 1399 | 377 | 1410 | 374 | <u>1407</u> | <u>375</u> | | |
| 459.GemsFDTD | 64 | <u>3082</u> | <u>220</u> | 3086 | 220 | 3081 | 220 | 32 | <u>1512</u> | <u>225</u> | 1516 | 224 | 1510 | 225 | | |
| 465.tonto | 64 | <u>2073</u> | <u>304</u> | 2075 | 304 | 2072 | 304 | 64 | 1232 | 511 | <u>1226</u> | <u>514</u> | 1223 | 515 | | |
| 470.lbm | 64 | 3699 | 238 | 3705 | 237 | <u>3701</u> | <u>238</u> | 16 | 898 | 245 | <u>899</u> | <u>244</u> | 901 | 244 | | |
| 481.wrf | 64 | 1812 | 395 | <u>1801</u> | <u>397</u> | 1799 | 397 | 64 | 1627 | 439 | <u>1623</u> | <u>441</u> | 1620 | 441 | | |
| 482.sphinx3 | 64 | 3030 | 412 | <u>3022</u> | <u>413</u> | 3022 | 413 | 64 | 3015 | 414 | 2988 | 418 | <u>2988</u> | <u>417</u> | | |

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.
Benchmarks bound to a processor using numactl on the submit command.

Operating System Notes

```
ulimit -s (stack) set to 1048576.
Large pages reserved as follows by root user:
echo 4224 > /proc/sys/vm/nr_hugepages
Environment variables set before executing benchmarks.
export HUGETLB_VERBOSE=0
export HUGETLB_MORECORE=yes
export HUGETLB_ELFMAP=W
export XLFRTIOPTS=intrinthds=1
```



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General Notes

IBM Post-Link optimization tool with
 options "-O4 -omullX -see 0 -m power6" used for
 433.milc 435.gromacs 436.cactusADM 482.sphinx3
 options "-O4 -omullX -see 1" used for
 436.cactusADM
 options "-O4 -omullX -see 1 -ihf -1" used for
 453.povray
 options "-O4" used for
 465.tonto
 Whenever option "-omullX" was used during the optimization phase,
 option "-imullX" was also used during the instrumentation phase.

Base Compiler Invocation

C benchmarks:

xlC -qlanglvl=extc99

C++ benchmarks:

xlC

Fortran benchmarks:

xlF95

Benchmarks using both Fortran and C:

xlC -qlanglvl=extc99 xlF95

Base Portability Flags

410.bwaves: -qfixed
 416.gamess: -qfixed
 434.zeusmp: -qfixed
 435.gromacs: -qfixed -qextname
 436.cactusADM: -qfixed -qextname
 437.leslie3d: -qfixed
 454.calculix: -qfixed -qextname
 481.wrf: -DNOUNDERSCORE
 482.sphinx3: -qchars=signed

Base Optimization Flags

C benchmarks:

-O5 -qnoenablevmx -lhugetlbfS

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Base Optimization Flags (Continued)

C++ benchmarks:

```
-O5 -qrtti -qnoenablevmx -qstaticlink  
-Wl,--whole-archive /usr/lib/libhugetlbfs.a -Wl,--no-whole-archive  
/usr/lib/libdl.a
```

Fortran benchmarks:

```
-O5 -qsmallstack=dynlenonheap -qalias=nostd -qnoenablevmx  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align
```

Benchmarks using both Fortran and C:

```
-O5 -qnoenablevmx -qsmallstack=dynlenonheap -qalias=nostd  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align
```

Base Other Flags

C benchmarks:

```
-qipa=noobject -qipa=threads
```

C++ benchmarks:

```
-qipa=noobject -qipa=threads
```

Fortran benchmarks:

```
-qipa=noobject -qipa=threads
```

Benchmarks using both Fortran and C:

```
-qipa=noobject -qipa=threads
```

Peak Compiler Invocation

C benchmarks:

```
xlc -qlanglvl=extc99
```

C++ benchmarks:

```
xlc
```

Fortran benchmarks:

```
xlf95
```

Benchmarks using both Fortran and C:

```
xlc -qlanglvl=extc99 xlf95
```



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Peak Portability Flags

410.bwaves: -qfixed
416.gamess: -qfixed
434.zeusmp: -qfixed
435.gromacs: -qfixed -qextname
436.cactusADM: -qfixed -qextname
437.leslie3d: -qfixed
454.calculix: -qfixed -qextname
481.wrf: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Peak Optimization Flags

C benchmarks:

433.milc: -Wl,-q -O5 -qnoenablevmx -lhugetlbfs
470.lbm: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align -q64
482.sphinx3: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -lhugetlbfs

C++ benchmarks:

444.namd: -qpdf1(pass 1) -qpdf2(pass 2) -O5
447.dealIII: -O5 -qrtti -qnoenablevmx -qstaticlink -Wl,-z,muldefs
-Wl,--whole-archive /usr/lib/libsmartheap.a
-Wl,--no-whole-archive
450.soplex: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qstrict -lhugetlbfs
453.povray: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -lsmartheap

Fortran benchmarks:

410.bwaves: -O5 -qsmallstack=dynlenonheap -lhugetlbfs
416.gamess: basepeak = yes
434.zeusmp: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto
-qxlf90=nosignedzero -B/usr/share/libhugetlbfs/ -tl
-Wl,--hugetlbfs-align
437.leslie3d: -O5 -qsmallstack=dynlenonheap -qnoenablevmx
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align
459.GemsFDTD: -O5 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align
-q64

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Peak Optimization Flags (Continued)

465.tonto: -Wl, -q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64
-lsmartheap64

Benchmarks using both Fortran and C:

435.gromacs: -Wl, -q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -lhugetlbfs

436.cactusADM: -Wl, -q -qpdf1(pass 1) -qpdf2(pass 2) -O2 -qarch=auto
-qtune=auto -qnostrict -lhugetlbfs

454.calculix: -O4 -B/usr/share/libhugetlbfs/ -tl -Wl, --hugetlbfs-align

481.wrf: -O5 -qnoenablevmx -q64 -lhugetlbfs

Peak Other Flags

C benchmarks:
-qipa=noobject -qipa=threads

C++ benchmarks:
-qipa=noobject -qipa=threads

Fortran benchmarks:
-qipa=noobject -qipa=threads

Benchmarks using both Fortran and C:
-qipa=noobject -qipa=threads

The flags file that was used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20100609.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20100609.xml>

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