# SPEC® CFP2006 Result

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## IBM Corporation

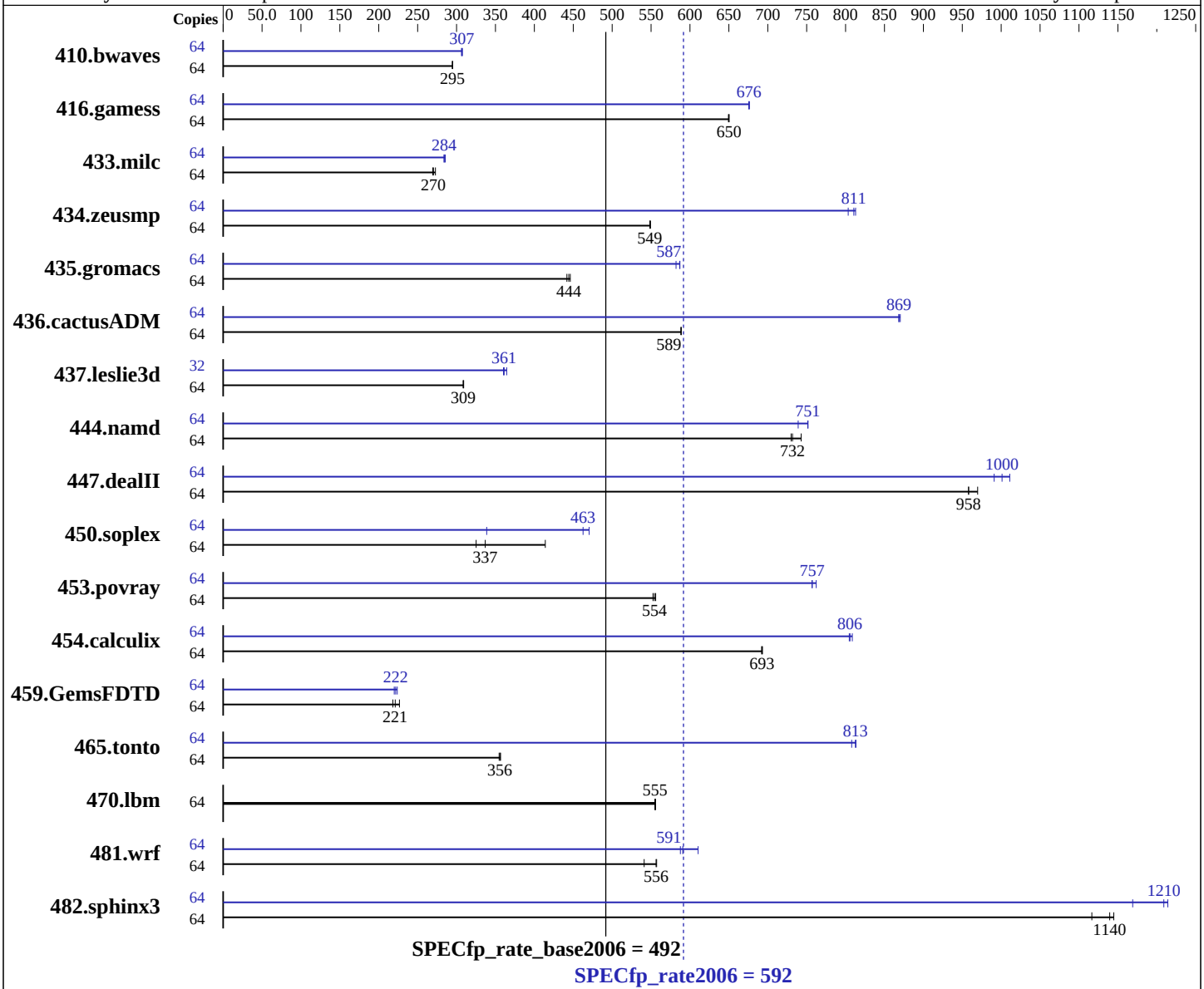
## IBM Power 570 ( 4.2 GHz, 32 core, RedHat)

**SPECfp®_rate2006 = 592**

**SPECfp_rate_base2006 = 492**

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

**Test date:** Sep-2008
**Hardware Availability:** Nov-2008
**Software Availability:** Sep-2008




### Hardware

| | |
|---|---|
| CPU Name: | POWER6+ |
| CPU Characteristics: | |
| CPU MHz: | 4200 |
| FPU: | Integrated |
| CPU(s) enabled: | 32 cores, 16 chips, 2 cores/chip, 2 threads/core |
| CPU(s) orderable: | 4,8,16,24,32 cores |
| Primary Cache: | 64 KB I + 64 KB D on chip per core |
| Secondary Cache: | 4 MB I+D on chip per core |

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### Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 5.2, Kernel 2.6.18-92.el5 |
| Compiler: | IBM XL C/C++ for Linux, V10.1<br>IBM XL Fortran for Linux, V12.1 |
| Auto Parallel: | No |
| File System: | ext3 |
| System State: | Run Level 3 (Multi-User) |
| Base Pointers: | 32-bit |
| Peak Pointers: | 32/64-bit |

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L3 Cache: 32 MB I+D off chip per chip
Other Cache: None
Memory: 128 GB (64x2 GB) DDR2 667 MHz
Disk Subsystem: 2x73 GB SAS 15K RPM
Other Hardware: None

Other Software: -IBM Post-Link Optimization for Linux on POWER, Version 5.4.0-18
-MicroQuill SmartHeap 8.1
-IBM Engineering and Scientific Subroutine Library for Linux on POWER, Version 4.3.1

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 64 | **2950** | **295** | 2950 | 295 | 2952 | 295 | 64 | 2828 | 308 | **2834** | **307** | 2839 | 306 |
| 416.gamess | 64 | 1930 | 649 | 1927 | 650 | **1928** | **650** | 64 | 1853 | 676 | **1854** | **676** | 1855 | 676 |
| 433.milc | 64 | 2153 | 273 | **2174** | **270** | 2181 | 269 | 64 | 2069 | 284 | **2068** | **284** | 2058 | 286 |
| 434.zeusmp | 64 | 1062 | 549 | 1060 | 549 | **1062** | **549** | 64 | **718** | **811** | 725 | 803 | 716 | 813 |
| 435.gromacs | 64 | 1034 | 442 | 1024 | 446 | **1029** | **444** | 64 | 785 | 582 | **779** | **587** | 778 | 587 |
| 436.cactusADM | 64 | 1300 | 588 | 1299 | 589 | **1299** | **589** | 64 | 879 | 870 | 881 | 868 | **880** | **869** |
| 437.leslie3d | 64 | 1946 | 309 | **1949** | **309** | 1950 | 309 | 32 | 825 | 364 | 835 | 360 | **833** | **361** |
| 444.namd | 64 | 703 | 730 | 691 | 743 | **701** | **732** | 64 | 694 | 739 | **683** | **751** | 683 | 752 |
| 447.dealII | 64 | 755 | 970 | 764 | 958 | **764** | **958** | 64 | **731** | **1000** | 739 | 991 | 724 | 1010 |
| 450.soplex | 64 | 1642 | 325 | 1289 | 414 | **1585** | **337** | 64 | 1576 | 339 | **1154** | **463** | 1135 | 470 |
| 453.povray | 64 | 616 | 552 | **614** | **554** | 612 | 556 | 64 | **450** | **757** | 447 | 762 | 450 | 757 |
| 454.calculix | 64 | 762 | 693 | **762** | **693** | 763 | 692 | 64 | 656 | 805 | 653 | 809 | **655** | **806** |
| 459.GemsFDTD | 64 | 3113 | 218 | 2997 | 227 | **3070** | **221** | 64 | **3062** | **222** | 3034 | 224 | 3088 | 220 |
| 465.tonto | 64 | 1766 | 357 | **1770** | **356** | 1775 | 355 | 64 | **775** | **813** | 780 | 808 | 774 | 813 |
| 470.lbm | 64 | **1584** | **555** | 1584 | 555 | 1582 | 556 | 64 | **1584** | **555** | 1584 | 555 | 1582 | 556 |
| 481.wrf | 64 | 1321 | 541 | **1285** | **556** | 1283 | 557 | 64 | 1171 | 610 | **1210** | **591** | 1216 | 588 |
| 482.sphinx3 | 64 | 1117 | 1120 | **1095** | **1140** | 1090 | 1140 | 64 | 1067 | 1170 | 1027 | 1210 | **1032** | **1210** |

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.
```

## General Notes

```
 See flags file for details on following settings.

 ulimit -s (stack) set to 1048576.


 Large pages reserved as follows by root user:
     echo 4480 > /proc/sys/vm/nr_hugepages
 System configured with libhugetlbfs library for application access to large pages
```

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## General Notes (Continued)

```
Environment variables set before executing benchmarks.
    export HUGETLB_VERBOSE=0
    export HUGETLB_MORECORE=yes
    export XLFRTEOPTS=intrinthds=1

IBM Post-Link optimization tool with options "-q -O4 -A 32 -shci 90 -sdp 9" used for
    433.milc 435.gromacs 436.cactusADM 453.povray 465.tonto 482.sphinx3
```

## 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 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx -lhugetlbfs
```

C++ benchmarks:
```
-O5 -qarch=pwr6 -qtune=pwr6 -qrtti -qnoenablevmx -qstaticlink
```

Fortran benchmarks:
```
-O5 -qarch=pwr6 -qtune=pwr6 -qsmallstack=dynlenonheap -qalias=nostd
-qnoenablevmx -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT
```

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## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
`-O5 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx -qsmallstack=dynlenonheap -qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT`

## 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`

## 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 -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx -lhugetlbfs`

470.lbm: `basepeak = yes`

482.sphinx3: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O4 -qarch=pwr6 -qtune=pwr6 -lhugetlbfs`

C++ benchmarks:

444.namd: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6`

447.dealII: `-O5 -qarch=pwr6 -qtune=pwr6 -qrtti -qnoenablevmx -qstaticlink -Wl,--whole-archive /usr/lib/libsmartheap.a -Wl,--no-whole-archive`

450.soplex: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O4 -qarch=pwr6 -qtune=pwr6 -qstrict -lhugetlbfs`

453.povray: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -lsmartheap`

Fortran benchmarks:

410.bwaves: `-O5 -qarch=pwr6 -qtune=pwr6 -qsmallstack=dynlenonheap -lhugetlbfs`

416.gamess: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -qalias=nostd -qnoenablevmx`

434.zeusmp: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O3 -qarch=pwr6 -qtune=pwr6 -qxlf90=nosignedzero -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT`

437.leslie3d: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT -q64`

459.GemsFDTD: `-O5 -qarch=pwr6 -qtune=pwr6 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT -q64`

465.tonto: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -qessl -q64 -lessl -lsmartheap -lxlf90_r`

Benchmarks using both Fortran and C:

435.gromacs: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -lhugetlbfs`

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## Peak Optimization Flags (Continued)

436.cactusADM: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O2 -qarch=pwr6 -qtune=pwr6 -qnostrict -lhugetlbfs`

454.calculix: `-O4 -qarch=pwr6 -qtune=pwr6 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT`

481.wrf: `-O5 -qarch=pwr6 -qtune=pwr6 -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.20090713.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20090713.xml`


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