# SPEC® CFP2006 Result

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## Bull SAS

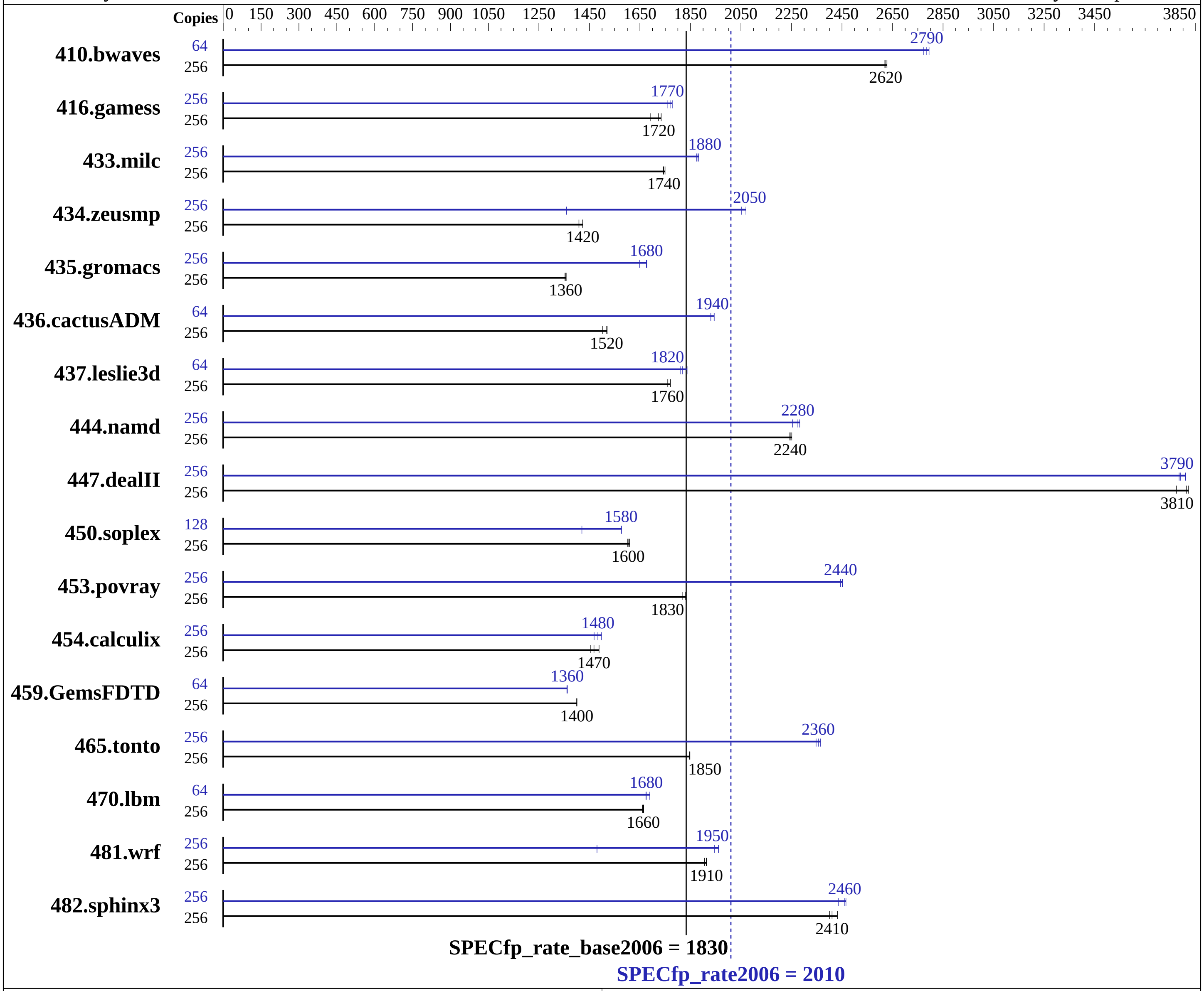
## Escala M6-700 (3.1 GHz, 64 core)

SPECfp®_rate2006 = 2010

SPECfp_rate_base2006 = 1830

**CPU2006 license:** 20
**Test sponsor:** Bull SAS
**Tested by:** Bull SAS

**Test date:** Oct-2010
**Hardware Availability:** Mar-2010
**Software Availability:** Sep-2010




### Hardware

| | |
|---|---|
| CPU Name: | POWER7 |
| CPU Characteristics: | Intelligent Energy Optimization enabled, up to 3.41 GHz |
| CPU MHz: | 3100 |
| FPU: | Integrated |
| CPU(s) enabled: | 64 cores, 8 chips, 8 cores/chip, 4 threads/core |
| CPU(s) orderable: | 12,16,24,32,36,48,64 cores |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |

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### Software

| | |
|---|---|
| Operating System: | IBM AIX V6.1 with the 6100-06 Technology Level |
| Compiler: | XL C/C++ Enterprise Edition V10.1.0.5 for AIX<br>XL Fortran Enterprise Edition V12.1.0.6 for AIX |
| Auto Parallel: | No |
| File System: | AIX/JFS2 |
| System State: | Multi-user |
| Base Pointers: | 32-bit |
| Peak Pointers: | 32/64-bit |

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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: 512 GB (64 x 8 GB 2Rx8 PC3L-8500R-7, ECC)
Disk Subsystem: 6 x 69 GB SAS SSD disks + 1 disk 15krpm 147 GB SAS
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 | 256 | 1324 | 2630 | 1328 | 2620 | **1326** | **2620** | 64 | **312** | **2790** | 311 | 2790 | 314 | 2770 |
| 416.gamess | 256 | 2891 | 1730 | **2908** | **1720** | 2965 | 1690 | 256 | 2819 | 1780 | **2833** | **1770** | 2852 | 1760 |
| 433.milc | 256 | 1343 | 1750 | 1349 | 1740 | **1347** | **1740** | 256 | 1248 | 1880 | 1254 | 1870 | **1250** | **1880** |
| 434.zeusmp | 256 | 1636 | 1420 | 1654 | 1410 | **1636** | **1420** | 256 | 1714 | 1360 | **1136** | **2050** | 1126 | 2070 |
| 435.gromacs | 256 | 1346 | 1360 | 1351 | 1350 | **1347** | **1360** | 256 | 1108 | 1650 | **1091** | **1680** | 1090 | 1680 |
| 436.cactusADM | 256 | 2036 | 1500 | 2012 | 1520 | **2015** | **1520** | 64 | 396 | 1930 | **394** | **1940** | 393 | 1940 |
| 437.leslie3d | 256 | 1369 | 1760 | **1367** | **1760** | 1359 | 1770 | 64 | **331** | **1820** | 333 | 1810 | 328 | 1840 |
| 444.namd | 256 | **915** | **2240** | 912 | 2250 | 915 | 2240 | 256 | 911 | 2250 | 899 | 2280 | **902** | **2280** |
| 447.dealII | 256 | 766 | 3820 | 776 | 3770 | **768** | **3810** | 256 | **773** | **3790** | 769 | 3810 | 774 | 3780 |
| 450.soplex | 256 | 1333 | 1600 | 1327 | 1610 | **1332** | **1600** | 128 | 752 | 1420 | **678** | **1580** | 677 | 1580 |
| 453.povray | 256 | 744 | 1830 | 748 | 1820 | **745** | **1830** | 256 | 555 | 2450 | 558 | 2440 | **557** | **2440** |
| 454.calculix | 256 | 1451 | 1460 | **1439** | **1470** | 1419 | 1490 | 256 | 1438 | 1470 | **1424** | **1480** | 1410 | 1500 |
| 459.GemsFDTD | 256 | 1943 | 1400 | 1939 | 1400 | **1940** | **1400** | 64 | **498** | **1360** | 499 | 1360 | 498 | 1360 |
| 465.tonto | 256 | **1364** | **1850** | 1363 | 1850 | 1364 | 1850 | 256 | **1069** | **2360** | 1073 | 2350 | 1065 | 2370 |
| 470.lbm | 256 | 2113 | 1660 | 2118 | 1660 | **2114** | **1660** | 64 | **525** | **1680** | 521 | 1690 | 525 | 1670 |
| 481.wrf | 256 | 1501 | 1910 | **1495** | **1910** | 1494 | 1910 | 256 | 1932 | 1480 | 1458 | 1960 | **1470** | **1950** |
| 482.sphinx3 | 256 | **2070** | **2410** | 2079 | 2400 | 2052 | 2430 | 256 | 2048 | 2440 | 2024 | 2470 | **2028** | **2460** |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Peak Tuning Notes

```
fdpr binary optimization tool used for 410.bwaves
 with options -O3 -vrox -pbsi -A 64
fdpr binary optimization tool used for 433.milc
 with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 434.zeusmp
 with options -O3 -vrox -sdp 9
fdpr binary optimization tool used for 435.gromacs
 with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 437.leslie3d
 with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 450.soplex
 with options -O3 -vrox -sdp 9
fdpr binary optimization tool used for 453.povray
```

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## Peak Tuning Notes (Continued)

```
 with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 454.calculix
 with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 459.GemsFDTD
 with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 470.lbm
 with options -O3 -vrox -sdp 9
fdpr binary optimization tool used for 481.wrf
 with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 482.sphinx3
 with options -O4 -vrox -pbsi
```

## Submit Notes

```
The config file option 'submit' was used
to assign benchmark copy to specific kernel thread using
the "bindprocessor" command (see flags file for details).
```

## Operating System Notes

```
all ulimits set to unlimited.
25600 16M large pages defined with vmo command
```

## General Notes

```
Environment variables set by runspec before the start of the run:
MALLOCOPTIONS = "pool"
MEMORY_AFFINITY = "MCM"
XLFRTEOPTS = "intrinthds=1"

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

# Base Compiler Invocation

C benchmarks:
```
/usr/vac/bin/xlc -qlanglvl=extc99
```

C++ benchmarks:
```
/usr/vacpp/bin/xlC
```

Fortran benchmarks:
```
/usr/bin/xlf95
```

Benchmarks using both Fortran and C:
```
/usr/vac/bin/xlc -qlanglvl=extc99 /usr/bin/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: -DSPEC_CPU_AIX -DNOUNDERSCORE
482.sphinx3: -qchars=signed

## Base Optimization Flags

C benchmarks:
-bmaxdata:0x40000000 -O5 -qlargepage -D_ILS_MACROS -blpdata

C++ benchmarks:
-bmaxdata:0x50000000 -O5 -qlargepage -D_ILS_MACROS -qrtti=all
-D__IBM_FAST_VECTOR -D__IBM_FAST_SET_MAP_ITERATOR -blpdata

Fortran benchmarks:
-bmaxdata:0x60000000 -O5 -qlargepage -qsmallstack=dynlenonheap
-qalias=nostd -blpdata

Benchmarks using both Fortran and C:
-bmaxdata:0x60000000 -O5 -qlargepage -D_ILS_MACROS
-qsmallstack=dynlenonheap -qalias=nostd -blpdata

## Base Other Flags

C benchmarks:
-qipa=threads -qipa=noobject -qsuppress=1500-036

C++ benchmarks:
-qipa=threads -qipa=noobject -qsuppress=1500-036

Fortran benchmarks:
-qipa=threads -qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg
-qsuppress=1500-036

Benchmarks using both Fortran and C:
-qipa=threads -qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg
-qsuppress=1500-036

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# Peak Compiler Invocation

C benchmarks:
`/usr/vac/bin/xlc -qlanglvl=extc99`

C++ benchmarks:
`/usr/vacpp/bin/xlC`

Fortran benchmarks:
`/usr/bin/xlf95`

Benchmarks using both Fortran and C:
`/usr/vac/bin/xlc -qlanglvl=extc99 /usr/bin/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: -DSPEC_CPU_AIX -DNOUNDERSCORE
482.sphinx3: -qchars=signed

# Peak Optimization Flags

C benchmarks:

433.milc: -bmaxdata:0x40000000 -O5 -qlargepage -D_ILS_MACROS -qalign=natural -qfdpr -blpdata

470.lbm: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -qlargepage -q64 -D_ILS_MACROS -qfdpr -blpdata

482.sphinx3: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qlargepage -D_ILS_MACROS -qfdpr -blpdata

C++ benchmarks:

444.namd: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qlargepage -D_ILS_MACROS -blpdata

447.dealII: -bmaxdata:0x50000000 -O5 -D_ILS_MACROS -qrtti=all -D__IBM_FAST_VECTOR -D__IBM_FAST_SET_MAP_ITERATOR -blpdata -btextpsize:64K

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# Peak Optimization Flags (Continued)

450.soplex: -O3 -qarch=auto -qtune=auto -qlargepage -q64 -D_ILS_MACROS -qfdpr -blpdata

453.povray: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -D_ILS_MACROS -qalign=natural -qfdpr -btextpsize:64K

Fortran benchmarks:

410.bwaves: -bmaxdata:0x50000000 -O5 -qlargepage -qenablevmx -qvecnvol -qfdpr -qsmallstack=dynlenonheap -blpdata

416.gamess: -bmaxdata:0x40000000 -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qlargepage -qalias=nostd -blpdata

434.zeusmp: -bmaxdata:0x40000000 -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -qlargepage -qenablevmx -qvecnvol -qxlf90=nosignedzero -qfdpr -blpdata

437.leslie3d: -O5 -qlargepage -qenablevmx -qvecnvol -qfdpr -blpdata

459.GemsFDTD: -O4 -qlargepage -q64 -qfdpr -blpdata

465.tonto: -bmaxdata:0x50000000 -qpdf1(pass 1) -qpdf2(pass 2) -O5 -blpdata -btextpsize:64K

Benchmarks using both Fortran and C:

435.gromacs: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -D_ILS_MACROS -qfdpr

436.cactusADM: -bmaxdata:0x60000000 -qpdf1(pass 1) -qpdf2(pass 2) -O2 -qarch=auto -qtune=auto -qenablevmx -qvecnvol -D_ILS_MACROS -qfdpr -qnostrict -blpdata -btextpsize:64K

454.calculix: -O4 -qlargepage -q64 -D_ILS_MACROS -qfdpr -blpdata

481.wrf: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qlargepage -q64 -D_ILS_MACROS -qfdpr -blpdata

# Peak Other Flags

C benchmarks:

-qipa=threads -qipa=noobject -qsuppress=1500-036

C++ benchmarks:

-qipa=threads -qipa=noobject -qsuppress=1500-036

Fortran benchmarks:

-qipa=threads -qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036

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# Peak Other Flags (Continued)

Benchmarks using both Fortran and C:
-qipa=threads -qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/IBM-AIX.20101027.html
http://www.spec.org/cpu2006/flags/IBM-XL.20101027.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/IBM-AIX.20101027.xml
http://www.spec.org/cpu2006/flags/IBM-XL.20101027.xml

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