



# SPEC® CFP2006 Result

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## IBM Corporation

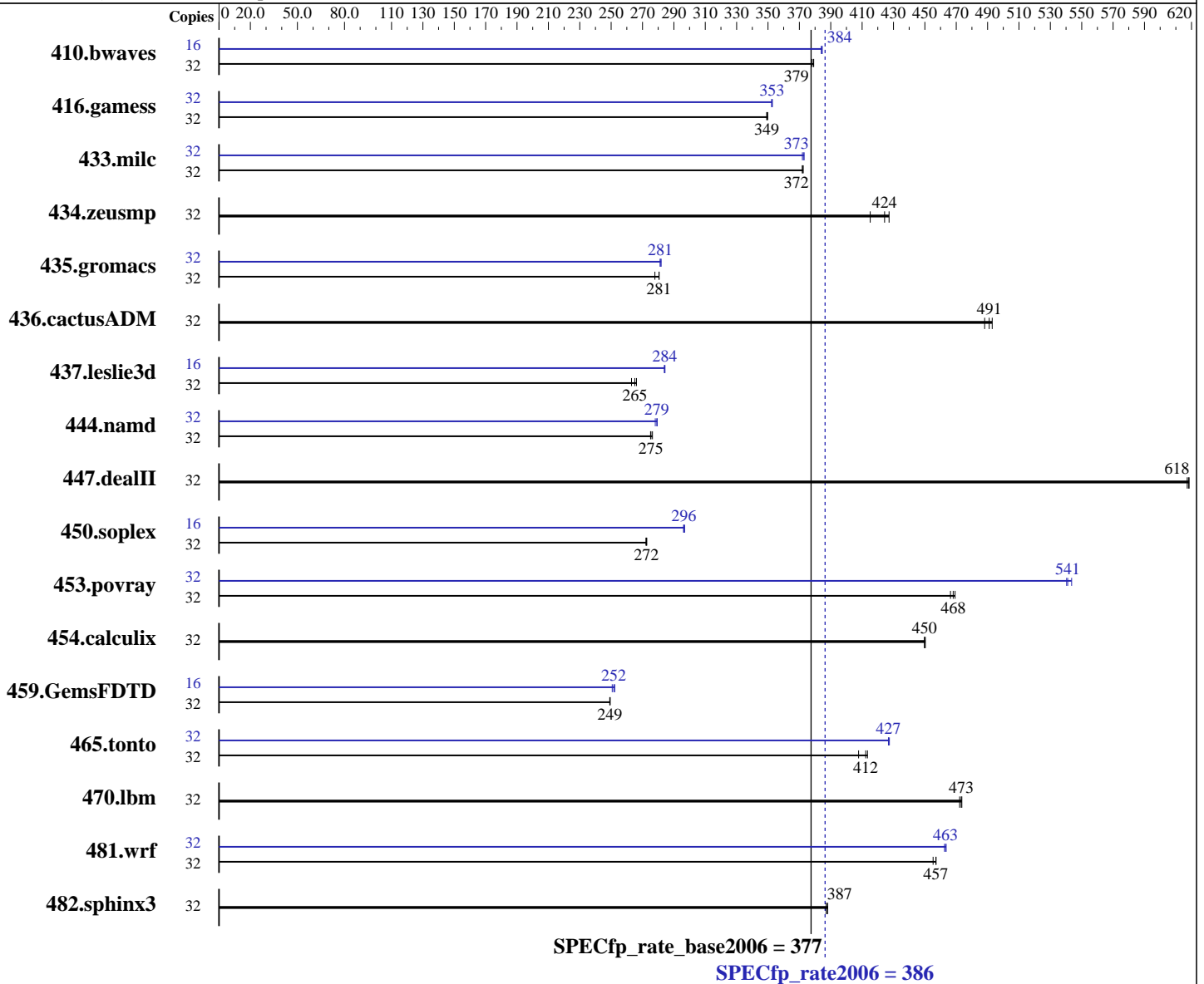
IBM Flex System x240 (Intel Xeon E5-2650L, 1.80 GHz)

SPECfp®\_rate2006 = 386

SPECfp\_rate\_base2006 = 377

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

Test date: Apr-2012  
Hardware Availability: May-2012  
Software Availability: Dec-2011



### Hardware

CPU Name: Intel Xeon E5-2650L  
CPU Characteristics: Intel Turbo Boost Technology up to 2.30 GHz  
CPU MHz: 1800  
FPU: Integrated  
CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 2 threads/core  
CPU(s) orderable: 1,2 chips  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 256 KB I+D on chip per core

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### Software

Operating System: Red Hat Enterprise Linux Server release 6.2 (Santiago)  
2.6.32-220.el6.x86\_64  
Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;  
Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux  
Auto Parallel: No  
File System: ext4

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L3 Cache: 20 MB I+D on chip per chip  
Other Cache: None  
Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
Disk Subsystem: 1 x 300 GB SAS, 10000 RPM  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32	1150	378	1147	379	<b>1147</b>	<b>379</b>	16	<b>566</b>	<b>384</b>	566	384	565	385
416.gamess	32	1791	350	<b>1794</b>	<b>349</b>	1794	349	32	1779	352	1776	353	<b>1777</b>	<b>353</b>
433.milc	32	<b>790</b>	<b>372</b>	790	372	789	372	32	<b>788</b>	<b>373</b>	787	373	790	372
434.zeusmp	32	<b>686</b>	<b>424</b>	701	415	682	427	32	<b>686</b>	<b>424</b>	701	415	682	427
435.gromacs	32	814	281	822	278	<b>815</b>	<b>281</b>	32	<b>812</b>	<b>281</b>	812	281	811	282
436.cactusADM	32	776	493	783	488	<b>779</b>	<b>491</b>	32	776	493	783	488	<b>779</b>	<b>491</b>
437.leslie3d	32	1130	266	<b>1135</b>	<b>265</b>	1144	263	16	<b>529</b>	<b>284</b>	529	284	530	284
444.namd	32	<b>932</b>	<b>275</b>	929	276	933	275	32	919	279	<b>920</b>	<b>279</b>	923	278
447.dealII	32	<b>592</b>	<b>618</b>	593	617	592	618	32	<b>592</b>	<b>618</b>	593	617	592	618
450.soplex	32	981	272	979	273	<b>979</b>	<b>272</b>	16	451	296	449	297	<b>450</b>	<b>296</b>
453.povray	32	365	466	<b>364</b>	<b>468</b>	363	469	32	315	540	313	544	<b>315</b>	<b>541</b>
454.calculix	32	<b>587</b>	<b>450</b>	586	450	587	450	32	<b>587</b>	<b>450</b>	586	450	587	450
459.GemsFDTD	32	<b>1362</b>	<b>249</b>	1363	249	1362	249	16	<b>674</b>	<b>252</b>	677	251	673	252
465.tonto	32	772	408	<b>764</b>	<b>412</b>	762	413	32	738	427	<b>738</b>	<b>427</b>	737	427
470.lbm	32	<b>929</b>	<b>473</b>	931	472	928	474	32	<b>929</b>	<b>473</b>	931	472	928	474
481.wrf	32	<b>782</b>	<b>457</b>	785	455	782	457	32	771	464	<b>772</b>	<b>463</b>	773	463
482.sphinx3	32	1611	387	1607	388	<b>1611</b>	<b>387</b>	32	1611	387	1607	388	<b>1611</b>	<b>387</b>

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

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

Operating Mode set to Maximum Performance in BIOS  
Sysinfo program /cpu2006.1.2/config/sysinfo.rev6800  
\$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3

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### Platform Notes (Continued)

running on blacktip-pete Sat Mar 31 10:00:16 2012

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see: <http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

```
From /proc/cpuinfo
model name : Genuine Intel(R) CPU @ 1.80GHz
 2 "physical id"s (chips)
 32 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
caution.)
  cpu cores : 8
  siblings  : 16
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7
cache size : 20480 KB
```

```
From /proc/meminfo
MemTotal: 132136204 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.2 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux blacktip-pete 2.6.32-220.el6.x86_64 #1 SMP Wed Nov 9 08:03:13 EST 2011
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Mar 30 17:12
```

```
SPEC is set to: /cpu2006.1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/vg_blacktippete-lv_root
ext4 265G 96G 157G 38% /
```

```
Additional information from dmidecode:
Memory:
4x Hynix HMT31GR7CFR4C-PB 8 GB 1600 MHz 2 rank
12x Samsung M393B1K70DH0-CK0 8 GB 1600 MHz 2 rank
```

(End of data from sysinfo program)



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## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5  
Transparent Huge Pages enabled with:  
echo always > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled  
Filesystem page cache cleared with:  
echo 1> /proc/sys/vm/drop\_caches  
runspec command invoked through numactl i.e.:  
numactl --interleave=all runspec <etc>

## Base Compiler Invocation

C benchmarks:  
icc -m64

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64

Benchmarks using both Fortran and C:  
icc -m64 ifort -m64

## 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 -nofor\_main  
436.cactusADM: -DSPEC\_CPU\_LP64 -nofor\_main  
437.leslie3d: -DSPEC\_CPU\_LP64  
444.namd: -DSPEC\_CPU\_LP64  
447.deallI: -DSPEC\_CPU\_LP64  
450.soplex: -DSPEC\_CPU\_LP64  
453.povray: -DSPEC\_CPU\_LP64  
454.calculix: -DSPEC\_CPU\_LP64 -nofor\_main  
459.GemsFDTD: -DSPEC\_CPU\_LP64  
465.tonto: -DSPEC\_CPU\_LP64  
470.lbm: -DSPEC\_CPU\_LP64  
481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
482.sphinx3: -DSPEC\_CPU\_LP64



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## Base Optimization Flags

C benchmarks:

`-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3`

C++ benchmarks:

`-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3`

Fortran benchmarks:

`-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch`

Benchmarks using both Fortran and C:

`-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3`

## Peak Compiler Invocation

C benchmarks:

`icc -m64`

C++ benchmarks (except as noted below):

`icpc -m64`

`450.soplex: icpc -m32`

Fortran benchmarks:

`ifort -m64`

Benchmarks using both Fortran and C:

`icc -m64 ifort -m64`

## 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 -nofor_main`  
436.cactusADM: `-DSPEC_CPU_LP64 -nofor_main`  
437.leslie3d: `-DSPEC_CPU_LP64`  
444.namd: `-DSPEC_CPU_LP64`  
447.dealII: `-DSPEC_CPU_LP64`  
453.povray: `-DSPEC_CPU_LP64`  
454.calculix: `-DSPEC_CPU_LP64 -nofor_main`  
465.tonto: `-DSPEC_CPU_LP64`

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## Peak Portability Flags (Continued)

470.lbm: -DSPEC\_CPU\_LP64  
481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
482.sphinx3: -DSPEC\_CPU\_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32  
-opt-mem-layout-trans=3

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -fno-alias  
-auto-ilp32

447.dealII: basepeak = yes

450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -static

416.gamess: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -scalar-rep- -static

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto  
-inline-calloc -opt-malloc-options=3

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## Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch  
-static -auto-ilp32 -opt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -static -auto-ilp32  
-opt-mem-layout-trans=3

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.html>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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