



# SPEC® CFP2006 Result

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## IBM Corporation

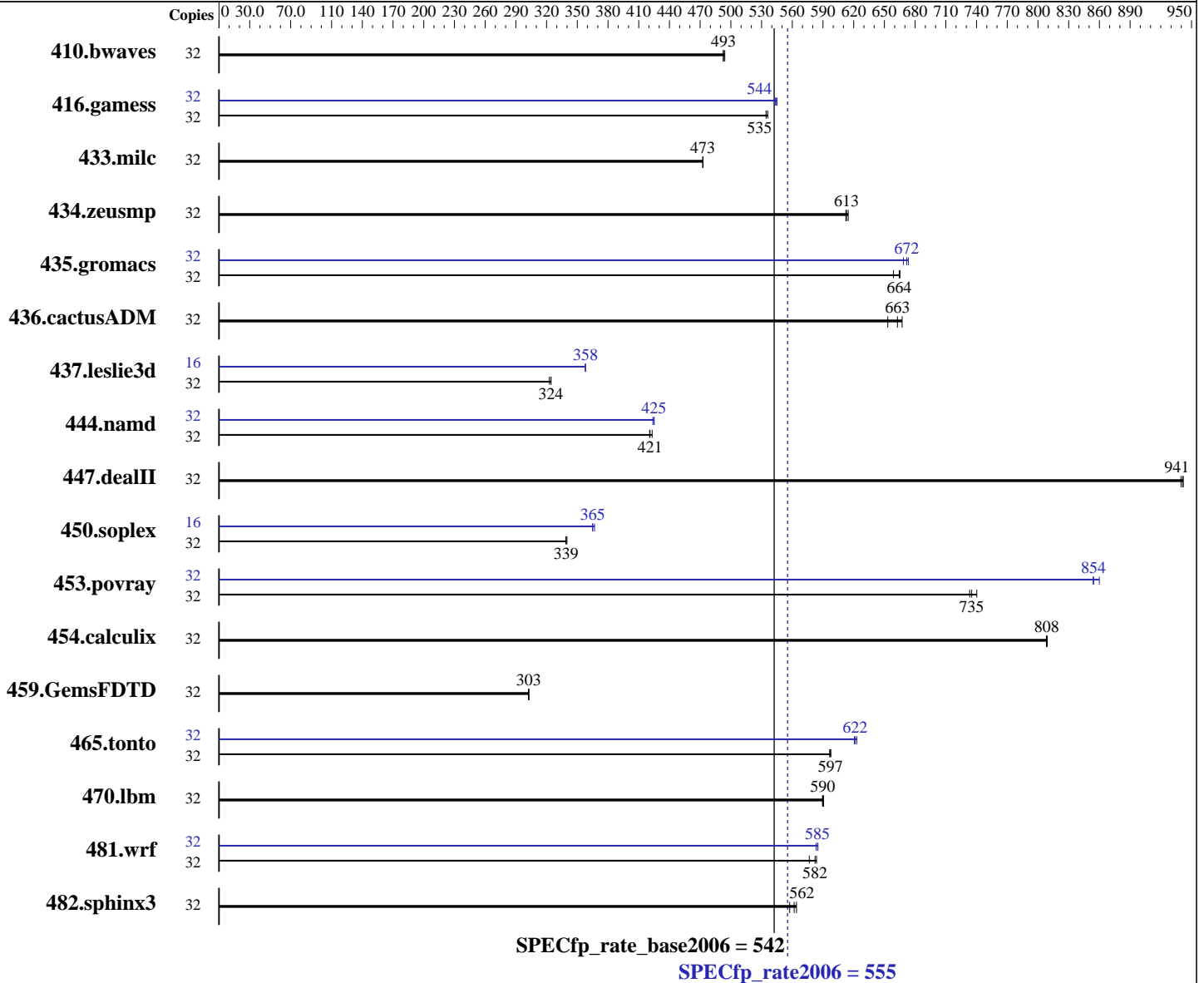
IBM Flex System x240  
(Intel Xeon E5-2650 v2, 2.60 GHz)

SPECfp®\_rate2006 = 555

SPECfp\_rate\_base2006 = 542

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

Test date: Jan-2014  
Hardware Availability: Dec-2013  
Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2650 v2  
CPU Characteristics: Intel Turbo Boost Technology up to 3.40 GHz  
CPU MHz: 2600  
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 6.4 (Santiago)  
2.6.32-358.el6.x86\_64  
Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
Fortran: Version 14.0.0.080 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 2Rx8 PC3-14900R-13, 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	883	493	880	494	<b>883</b>	<b>493</b>	32	883	493	880	494	<b>883</b>	<b>493</b>
416.gamess	32	1169	536	<b>1172</b>	<b>535</b>	1172	534	32	<b>1152</b>	<b>544</b>	1153	544	1149	545
433.milc	32	621	473	<b>622</b>	<b>473</b>	622	473	32	621	473	<b>622</b>	<b>473</b>	622	473
434.zeusmp	32	476	612	474	615	<b>475</b>	<b>613</b>	32	476	612	474	615	<b>475</b>	<b>613</b>
435.gromacs	32	343	665	347	659	<b>344</b>	<b>664</b>	32	339	673	342	669	<b>340</b>	<b>672</b>
436.cactusADM	32	573	667	<b>577</b>	<b>663</b>	585	653	32	573	667	<b>577</b>	<b>663</b>	585	653
437.leslie3d	32	932	323	927	324	<b>928</b>	<b>324</b>	16	<b>420</b>	<b>358</b>	420	358	420	358
444.namd	32	607	423	610	421	<b>610</b>	<b>421</b>	32	606	424	604	425	<b>604</b>	<b>425</b>
447.dealII	32	390	940	<b>389</b>	<b>941</b>	389	942	32	390	940	<b>389</b>	<b>941</b>	389	942
450.soplex	32	785	340	<b>787</b>	<b>339</b>	787	339	16	364	367	366	365	<b>366</b>	<b>365</b>
453.povray	32	<b>232</b>	<b>735</b>	230	740	232	733	32	<b>199</b>	<b>854</b>	199	854	198	860
454.calculix	32	326	809	<b>327</b>	<b>808</b>	327	808	32	326	809	<b>327</b>	<b>808</b>	327	808
459.GemsFDTD	32	1123	302	1122	303	<b>1122</b>	<b>303</b>	32	1123	302	1122	303	<b>1122</b>	<b>303</b>
465.tonto	32	528	596	527	598	<b>527</b>	<b>597</b>	32	505	623	<b>507</b>	<b>622</b>	507	621
470.lbm	32	746	590	<b>746</b>	<b>590</b>	744	591	32	746	590	<b>746</b>	<b>590</b>	744	591
481.wrf	32	<b>614</b>	<b>582</b>	620	577	612	584	32	<b>611</b>	<b>585</b>	613	583	611	585
482.sphinx3	32	1119	557	<b>1110</b>	<b>562</b>	1106	564	32	1119	557	<b>1110</b>	<b>562</b>	1106	564

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\_14.0\_binaries/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191

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### Platform Notes (Continued)

running on Blacktip Thu Jan 9 03:01:31 2014

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 : Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
 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: 132128812 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.4 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux Blacktip 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Jan 8 15:29
```

```
SPEC is set to: /cpu2006.1.2_14.0_binaries
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/vg_blacktip-lv_root
ext4 50G 6.8G 40G 15% /
```

```
Additional information from dmidecode:
BIOS IBM -[B2E135OUS-1.40]- 10/17/2013
Memory:
16x Hynix HMT41GR7AFR8C-RD 8 GB 1867 MHz 2 rank
8x Not Specified Not Specified
```

(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\_14.0\_binaries/libs/32:/cpu2006.1.2\_14.0\_binaries/libs/64:/cpu2006.1.2\_14.0\_binaries/sh"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4  
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 -opt-prefetch -auto-p32 -ansi-alias  
-opt-mem-layout-trans=3

### C++ benchmarks:

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

### Fortran benchmarks:

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

### Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -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  
459.GemsFDTD: -DSPEC\_CPU\_LP64

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## Peak Portability Flags (Continued)

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

## Peak Optimization Flags

### C benchmarks:

433.milc: basepeak = yes  
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) -opt-mem-layout-trans=3(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) -opt-mem-layout-trans=3(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) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -unroll4 -ansi-alias

### Fortran benchmarks:

410.bwaves: basepeak = yes  
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-  
434.zeusmp: basepeak = yes  
437.leslie3d: -xAVX -ipo -O3 -no-prec-div -opt-prefetch  
459.GemsFDTD: basepeak = yes  
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) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.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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