



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

IBM NeXtScale nx360 M4  
(Intel Xeon E5-2670 v2, 2.50 GHz)

SPECfp<sup>®</sup>2006 = **97.9**

SPECfp\_base2006 = **93.6**

CPU2006 license: 11

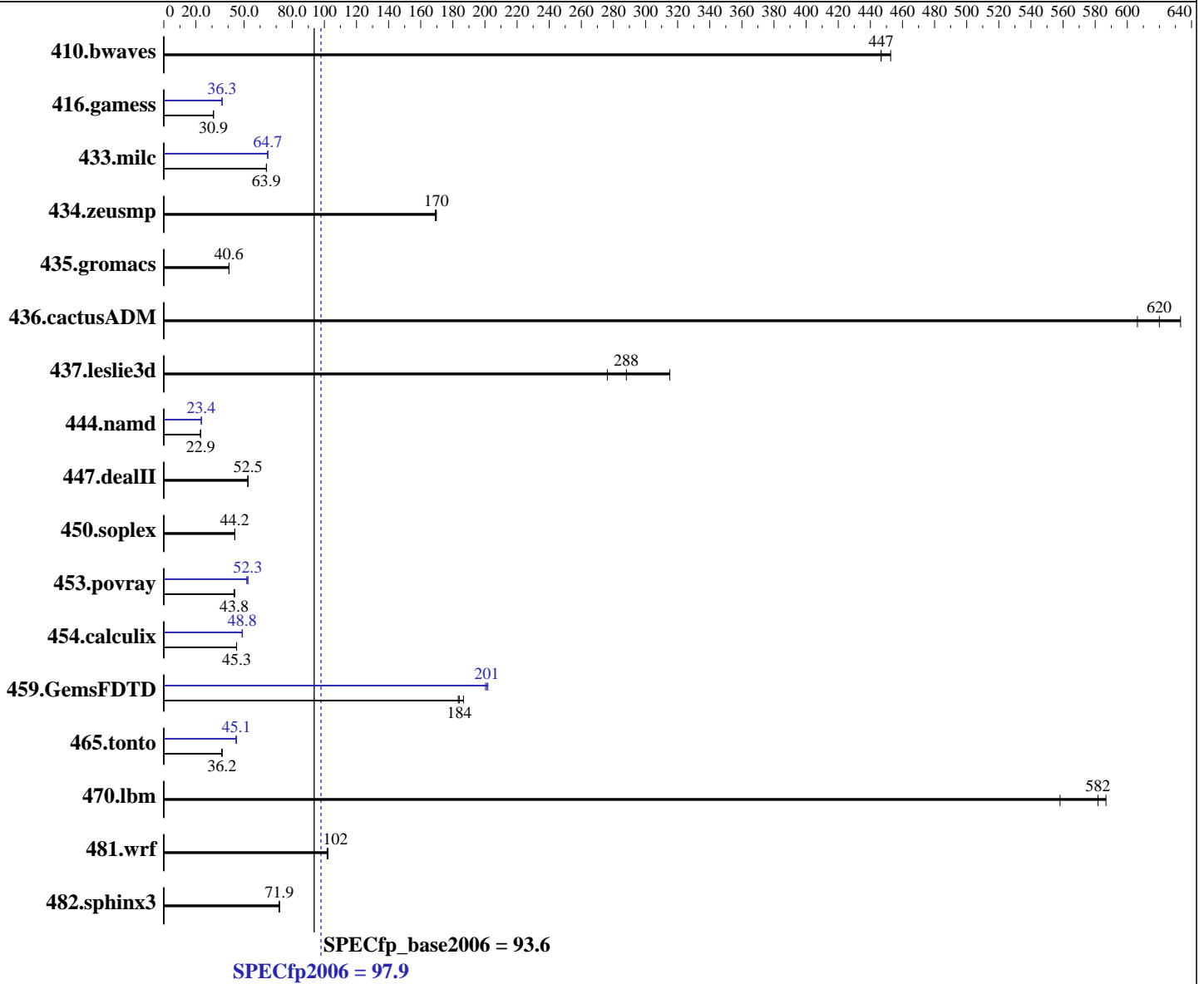
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Aug-2014

Hardware Availability: Nov-2013

Software Availability: Sep-2013



**Hardware**

CPU Name: Intel Xeon E5-2670 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2500  
 FPU: Integrated  
 CPU(s) enabled: 20 cores, 2 chips, 10 cores/chip  
 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: Yes  
 File System: ext4

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L3 Cache: 25 MB I+D on chip per chip  
Other Cache: None  
Memory: 128 GB (8 x 16 GB 2Rx4 PC3-14900R-13, ECC)  
Disk Subsystem: 2 x 250 GB SATA, 7200RPM, RAID 0  
Other Hardware: None

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

## Results Table

| Benchmark     | Base        |             |             |             |             |             | Peak        |             |             |             |             |             |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|               | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       |
| 410.bwaves    | <b>30.4</b> | <b>447</b>  | 30.4        | 447         | 30.0        | 453         | <b>30.4</b> | <b>447</b>  | 30.4        | 447         | 30.0        | 453         |
| 416.gamess    | 633         | 30.9        | 634         | 30.9        | <b>633</b>  | <b>30.9</b> | 539         | 36.3        | <b>539</b>  | <b>36.3</b> | 540         | 36.3        |
| 433.milc      | 144         | 63.9        | <b>144</b>  | <b>63.9</b> | 143         | 64.0        | <b>142</b>  | <b>64.7</b> | 142         | 64.6        | 142         | 64.8        |
| 434.zeusmp    | <b>53.6</b> | <b>170</b>  | 53.8        | 169         | 53.6        | 170         | <b>53.6</b> | <b>170</b>  | 53.8        | 169         | 53.6        | 170         |
| 435.gromacs   | <b>176</b>  | <b>40.6</b> | 176         | 40.6        | 176         | 40.6        | <b>176</b>  | <b>40.6</b> | 176         | 40.6        | 176         | 40.6        |
| 436.cactusADM | <b>19.3</b> | <b>620</b>  | 18.9        | 633         | 19.7        | 606         | <b>19.3</b> | <b>620</b>  | 18.9        | 633         | 19.7        | 606         |
| 437.leslie3d  | 29.8        | 315         | 34.0        | 276         | <b>32.6</b> | <b>288</b>  | 29.8        | 315         | 34.0        | 276         | <b>32.6</b> | <b>288</b>  |
| 444.namd      | 350         | 22.9        | <b>350</b>  | <b>22.9</b> | 350         | 22.9        | <b>343</b>  | <b>23.4</b> | 343         | 23.4        | 343         | 23.4        |
| 447.dealII    | 219         | 52.3        | 218         | 52.5        | <b>218</b>  | <b>52.5</b> | 219         | 52.3        | 218         | 52.5        | <b>218</b>  | <b>52.5</b> |
| 450.soplex    | <b>189</b>  | <b>44.2</b> | 188         | 44.3        | 189         | 44.2        | <b>189</b>  | <b>44.2</b> | 188         | 44.3        | 189         | 44.2        |
| 453.povray    | 120         | 44.2        | 122         | 43.7        | <b>121</b>  | <b>43.8</b> | 103         | 51.6        | 102         | 52.3        | <b>102</b>  | <b>52.3</b> |
| 454.calculix  | 182         | 45.4        | <b>182</b>  | <b>45.3</b> | 182         | 45.3        | 168         | 49.0        | 169         | 48.8        | <b>169</b>  | <b>48.8</b> |
| 459.GemsFDTD  | 56.9        | 187         | 57.9        | 183         | <b>57.7</b> | <b>184</b>  | <b>52.8</b> | <b>201</b>  | 52.6        | 202         | 53.0        | 200         |
| 465.tonto     | 272         | 36.2        | 271         | 36.3        | <b>272</b>  | <b>36.2</b> | 219         | 44.9        | 217         | 45.3        | <b>218</b>  | <b>45.1</b> |
| 470.lbm       | 24.6        | 558         | <b>23.6</b> | <b>582</b>  | 23.4        | 587         | 24.6        | 558         | <b>23.6</b> | <b>582</b>  | 23.4        | 587         |
| 481.wrf       | <b>109</b>  | <b>102</b>  | 110         | 102         | 109         | 102         | <b>109</b>  | <b>102</b>  | 110         | 102         | 109         | 102         |
| 482.sphinx3   | <b>271</b>  | <b>71.9</b> | 270         | 72.1        | 271         | 71.9        | <b>271</b>  | <b>71.9</b> | 270         | 72.1        | 271         | 71.9        |

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

## Operating System Notes

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

Zone reclaim mode enabled with:

```
echo 1 > /proc/sys/vm/zone_reclaim_mode
```

Intel Idle Driver disabled with the following Linux kernel parameter in /etc/grub.conf:  
intel\_idle.max\_cstate=0

## Platform Notes

BIOS setting:

Operating Mode set to Maximum Performance

Hyper-Threading set to Disable

Sysinfo program /home/SPECcpu-20140116-ic14.0/config/sysinfo.rev6818

\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191

running on nx360M4 Sun Aug 24 07:28:49 2014

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**CPU2006 license:** 11

**Test sponsor:** IBM Corporation

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**Test date:** Aug-2014

**Hardware Availability:** Nov-2013

**Software Availability:** Sep-2013

## Platform Notes (Continued)

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 E5-2670 v2 @ 2.50GHz
 2 "physical id"s (chips)
 20 "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 : 10
  siblings  : 10
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB
```

```
From /proc/meminfo
MemTotal:      132089624 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 nx360M4 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 Aug 23 14:25
```

```
SPEC is set to: /home/SPECcpu-20140116-ic14.0
Filesystem      Type      Size Used Avail Use% Mounted on
/dev/mapper/vg_nx360m4-lv_home
ext4            403G    13G  370G   4% /home
```

```
Additional information from dmidecode:
BIOS IBM -[FHE107NUS-1.20]- 06/03/2014
Memory:
8x Samsung M393B2G70QH0-CMA 16 GB 1867 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:  
KMP\_AFFINITY = "granularity=fine,compact,0,1"  
LD\_LIBRARY\_PATH = "/home/SPECcpu-20140116-ic14.0/libs/32:/home/SPECcpu-20140116-ic14.0/libs/64:/home/SPECcpu-20140116-ic14.0/sh"  
OMP\_NUM\_THREADS = "20"

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  
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 -parallel -opt-prefetch -ansi-alias`

C++ benchmarks:

`-xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias`

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

`-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias`

## Peak Compiler Invocation

C benchmarks:

`icc -m64`

C++ benchmarks:

`icpc -m64`

Fortran benchmarks:

`ifort -m64`

Benchmarks using both Fortran and C:

`icc -m64 ifort -m64`

## Peak Portability Flags

Same as Base Portability Flags

## 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) -auto-ilp32  
-ansi-alias`

470.lbm: `basepeak = yes`

482.sphinx3: `basepeak = yes`

C++ benchmarks:

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## Peak Optimization Flags (Continued)

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.dealIII: basepeak = yes

450.soplex: basepeak = yes

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: 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: basepeak = yes

459.GemsFDTD: -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 -opt-prefetch -parallel

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

### Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

481.wrf: basepeak = yes

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-B.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-B.xml>



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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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