



SPEC[®] CFP2006 Result

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Lenovo Group Limited

SPECfp[®]2006 = 104

IBM NeXtScale nx360 M4
(Intel Xeon E5-2643 v2, 3.50 GHz)

SPECfp_base2006 = 100

CPU2006 license: 9017

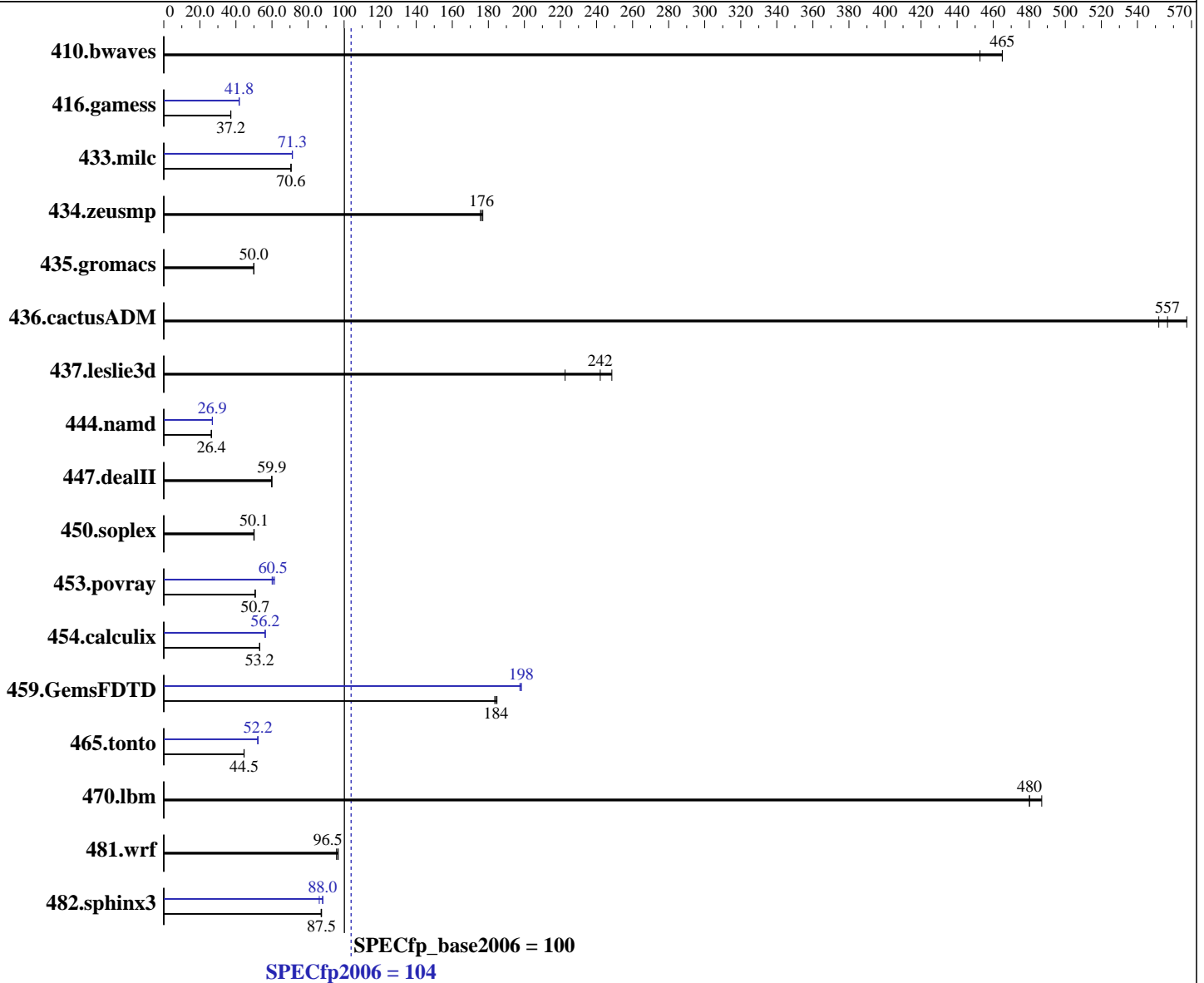
Test date: Oct-2014

Test sponsor: Lenovo Group Limited

Hardware Availability: Nov-2013

Tested by: IBM Corporation

Software Availability: Sep-2013



Hardware

CPU Name: Intel Xeon E5-2643 v2
 CPU Characteristics: Intel Turbo Boost Technology up to 3.80 GHz
 CPU MHz: 3500
 FPU: Integrated
 CPU(s) enabled: 12 cores, 2 chips, 6 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 | 30.0 | 453 | 29.2 | 465 | <u>29.2</u> | <u>465</u> | 30.0 | 453 | 29.2 | 465 | <u>29.2</u> | <u>465</u> |
| 416.gamess | 526 | 37.2 | <u>527</u> | <u>37.2</u> | 528 | 37.1 | <u>468</u> | <u>41.8</u> | 468 | 41.8 | 468 | 41.8 |
| 433.milc | 130 | 70.5 | 130 | 70.6 | <u>130</u> | <u>70.6</u> | 129 | 71.2 | <u>129</u> | <u>71.3</u> | 129 | 71.4 |
| 434.zeusmp | <u>51.6</u> | <u>176</u> | 51.4 | 177 | 51.8 | 176 | <u>51.6</u> | <u>176</u> | 51.4 | 177 | 51.8 | 176 |
| 435.gromacs | 143 | 49.8 | 143 | 50.0 | <u>143</u> | <u>50.0</u> | 143 | 49.8 | 143 | 50.0 | <u>143</u> | <u>50.0</u> |
| 436.cactusADM | <u>21.5</u> | <u>557</u> | 21.7 | 552 | 21.1 | 567 | <u>21.5</u> | <u>557</u> | 21.7 | 552 | 21.1 | 567 |
| 437.leslie3d | 42.2 | 223 | <u>38.8</u> | <u>242</u> | 37.8 | 248 | 42.2 | 223 | <u>38.8</u> | <u>242</u> | 37.8 | 248 |
| 444.namd | 304 | 26.4 | 304 | 26.4 | <u>304</u> | <u>26.4</u> | <u>298</u> | <u>26.9</u> | 298 | 26.9 | 298 | 26.9 |
| 447.dealII | <u>191</u> | <u>59.9</u> | 191 | 59.9 | 191 | 59.9 | <u>191</u> | <u>59.9</u> | 191 | 59.9 | 191 | 59.9 |
| 450.soplex | 167 | 49.9 | <u>167</u> | <u>50.1</u> | 166 | 50.1 | 167 | 49.9 | <u>167</u> | <u>50.1</u> | 166 | 50.1 |
| 453.povray | <u>105</u> | <u>50.7</u> | 105 | 50.8 | 105 | 50.6 | 86.6 | 61.4 | 88.6 | 60.1 | <u>87.9</u> | <u>60.5</u> |
| 454.calculix | 155 | 53.2 | <u>155</u> | <u>53.2</u> | 155 | 53.2 | 147 | 56.2 | 147 | 56.3 | <u>147</u> | <u>56.2</u> |
| 459.GemsFDTD | 57.8 | 184 | <u>57.6</u> | <u>184</u> | 57.4 | 185 | 53.5 | 198 | <u>53.5</u> | <u>198</u> | 53.7 | 197 |
| 465.tonto | 221 | 44.5 | <u>221</u> | <u>44.5</u> | 221 | 44.5 | <u>188</u> | <u>52.2</u> | 189 | 52.1 | 188 | 52.2 |
| 470.lbm | 28.2 | 487 | <u>28.6</u> | <u>480</u> | 28.6 | 480 | 28.2 | 487 | <u>28.6</u> | <u>480</u> | 28.6 | 480 |
| 481.wrf | 117 | 95.8 | 115 | 96.8 | <u>116</u> | <u>96.5</u> | 117 | 95.8 | 115 | 96.8 | <u>116</u> | <u>96.5</u> |
| 482.sphinx3 | <u>223</u> | <u>87.5</u> | 223 | 87.2 | 223 | 87.5 | 226 | 86.2 | 221 | 88.2 | <u>221</u> | <u>88.0</u> |

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.rev6874
\$Rev: 6874 \$ \$Date:: 2013-11-20 #\$ 654bd3fcf53b06faef0efe54ed011998
running on nx360M4 Wed Oct 15 17:01:50 2014

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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 E5-2643 v2 @ 3.50GHz
 2 "physical id"s (chips)
 12 "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      : 6
siblings       : 6
physical 0:    : cores 2 3 4 8 9 10
physical 1:    : cores 2 3 4 8 9 10
cache size     : 25600 KB
```

From /proc/meminfo

```
MemTotal:      132090624 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 Oct 15 02:01

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    14G   370G   4% /home
```

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS IBM -[FHE107NUS-1.20]- 06/03/2014

Memory:

8x Samsung M393B2G70QH0-CMA 16 GB 2 rank 1866 MHz, configured at 1867 MHz

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Platform Notes (Continued)

(End of data from sysinfo program)

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 = "12"

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.dealII: -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

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Base 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

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

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Peak Optimization Flags (Continued)

470.lbm: basepeak = yes

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias
-parallel

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.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



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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-C.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-C.xml>

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