



SPEC® CFP2006 Result

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IBM Corporation

IBM System x3650 M4 HD
(Intel Xeon E5-2690 v2, 3.00 GHz)

SPECfp®2006 = 107

SPECfp_base2006 = 103

CPU2006 license: 11

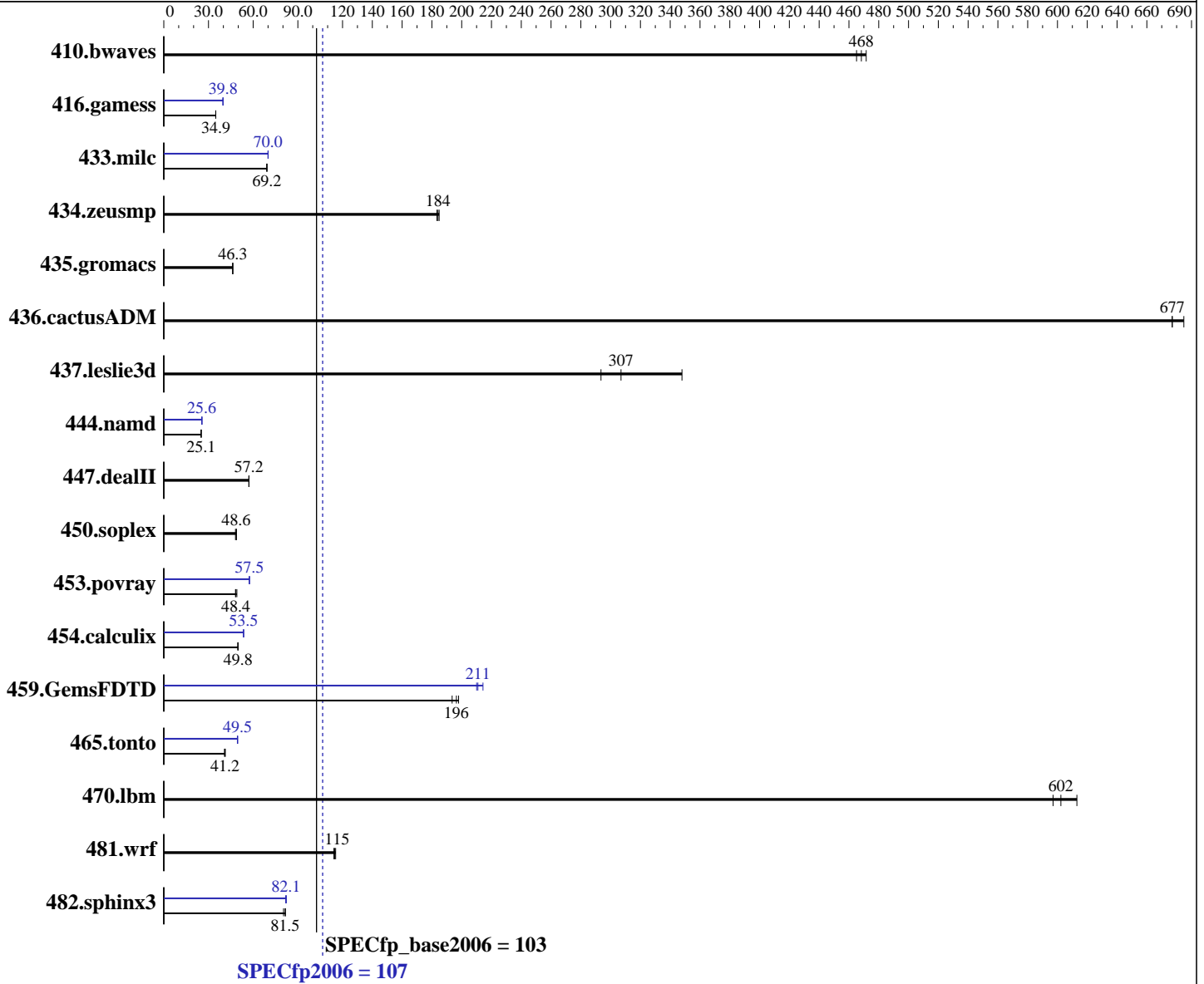
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Sep-2014

Hardware Availability: Dec-2013

Software Availability: Sep-2013



Hardware

CPU Name: Intel Xeon E5-2690 v2
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
 CPU MHz: 3000
 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: 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC)
Disk Subsystem: 1 x 400 GB SSD, 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	29.2	465	28.8	472	<u>29.0</u>	<u>468</u>	29.2	465	28.8	472	<u>29.0</u>	<u>468</u>
416.gamess	561	34.9	<u>561</u>	<u>34.9</u>	562	34.8	492	39.8	<u>493</u>	<u>39.8</u>	493	39.7
433.milc	133	69.3	<u>133</u>	<u>69.2</u>	133	69.2	<u>131</u>	<u>70.0</u>	131	70.0	131	70.1
434.zeusmp	49.2	185	49.6	183	<u>49.4</u>	<u>184</u>	49.2	185	49.6	183	<u>49.4</u>	<u>184</u>
435.gromacs	154	46.3	154	46.3	<u>154</u>	<u>46.3</u>	154	46.3	154	46.3	<u>154</u>	<u>46.3</u>
436.cactusADM	17.7	677	17.4	685	<u>17.7</u>	<u>677</u>	17.7	677	17.4	685	<u>17.7</u>	<u>677</u>
437.leslie3d	<u>30.6</u>	<u>307</u>	27.0	348	32.0	294	<u>30.6</u>	<u>307</u>	27.0	348	32.0	294
444.namd	320	25.1	320	25.1	<u>320</u>	<u>25.1</u>	313	25.6	<u>314</u>	<u>25.6</u>	314	25.6
447.dealII	200	57.2	<u>200</u>	<u>57.2</u>	200	57.1	200	57.2	<u>200</u>	<u>57.2</u>	200	57.1
450.soplex	171	48.8	173	48.1	<u>172</u>	<u>48.6</u>	171	48.8	173	48.1	<u>172</u>	<u>48.6</u>
453.povray	<u>110</u>	<u>48.4</u>	111	48.1	108	49.1	<u>92.6</u>	<u>57.5</u>	92.5	57.5	92.7	57.4
454.calculix	165	49.9	166	49.7	<u>166</u>	<u>49.8</u>	154	53.6	154	53.5	<u>154</u>	<u>53.5</u>
459.GemsFDTD	53.6	198	<u>54.0</u>	<u>196</u>	54.8	194	49.5	214	<u>50.3</u>	<u>211</u>	50.5	210
465.tonto	239	41.2	242	40.7	<u>239</u>	<u>41.2</u>	198	49.6	199	49.4	<u>199</u>	<u>49.5</u>
470.lbm	23.0	597	<u>22.8</u>	<u>602</u>	22.4	613	23.0	597	<u>22.8</u>	<u>602</u>	22.4	613
481.wrf	97.8	114	96.8	115	<u>97.4</u>	<u>115</u>	97.8	114	96.8	115	<u>97.4</u>	<u>115</u>
482.sphinx3	239	81.7	<u>239</u>	<u>81.5</u>	242	80.4	<u>237</u>	<u>82.1</u>	238	81.9	237	82.2

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 x3650M4HD Mon Sep 8 17:13:10 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 E5-2690 v2 @ 3.00GHz
 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:      264654288 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 x3650M4HD 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 Sep 8 06:17
```

```
SPEC is set to: /home/SPECcpu-20140116-ic14.0
Filesystem      Type      Size Used Avail Use% Mounted on
/dev/mapper/vg_x3650m4plus-lv_home
                ext4      309G  222G   71G   76% /home
```

```
Additional information from dmidecode:
BIOS IBM  -[VVE141DUS-1.73]- 07/31/2014
Memory:
8x Not Specified Not Specified
16x 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: -xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias
-parallel

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Peak Optimization Flags (Continued)

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

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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For other inquiries, please contact webmaster@spec.org.

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