



SPEC[®] CFP2006 Result

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HITACHI

SPECfp[®]2006 = 121

Compute Blade 520H (Intel Xeon E5-2699 v4)

SPECfp_base2006 = 113

CPU2006 license: 35

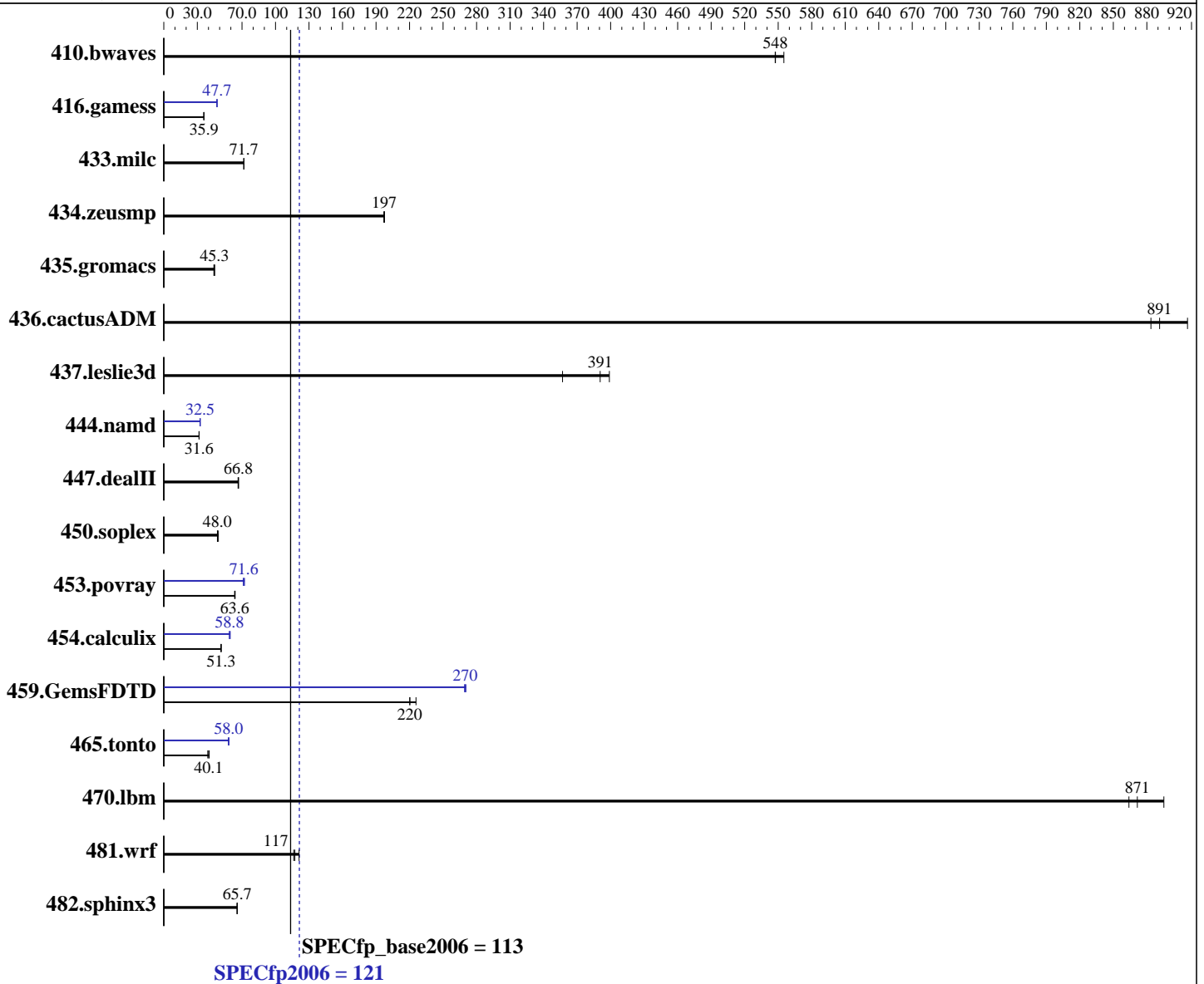
Test sponsor: HITACHI

Tested by: HITACHI

Test date: Jun-2016

Hardware Availability: Apr-2016

Software Availability: Nov-2015



Hardware

CPU Name: Intel Xeon E5-2699 v4
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
 CPU MHz: 2200
 FPU: Integrated
 CPU(s) enabled: 44 cores, 2 chips, 22 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

Continued on next page

Software

Operating System: Red Hat Enterprise Linux Server release 7.2 (Maipo)
 3.10.0-327.el7.x86_64
 Compiler: C/C++: Version 16.0.0.0 of Intel C++ Studio XE for Linux;
 Fortran: Version 16.0.0.0 of Intel Fortran Studio XE for Linux
 Auto Parallel: Yes
 File System: xfs

Continued on next page



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L3 Cache: 55 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 2 x 300 GB SAS, 15000 RPM, RAID1
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	<u>24.8</u>	<u>548</u>	24.5	555	24.8	547	<u>24.8</u>	<u>548</u>	24.5	555	24.8	547
416.gamess	544	36.0	<u>546</u>	<u>35.9</u>	546	35.8	<u>411</u>	<u>47.7</u>	411	47.7	412	47.5
433.milc	128	71.6	128	71.8	<u>128</u>	<u>71.7</u>	128	71.6	128	71.8	<u>128</u>	<u>71.7</u>
434.zeusmp	<u>46.1</u>	<u>197</u>	46.2	197	46.1	198	<u>46.1</u>	<u>197</u>	46.2	197	46.1	198
435.gromacs	<u>157</u>	<u>45.3</u>	157	45.5	159	44.8	<u>157</u>	<u>45.3</u>	157	45.5	159	44.8
436.cactusADM	<u>13.4</u>	<u>891</u>	13.0	916	13.5	884	<u>13.4</u>	<u>891</u>	13.0	916	13.5	884
437.leslie3d	23.6	399	<u>24.1</u>	<u>391</u>	26.3	357	23.6	399	<u>24.1</u>	<u>391</u>	26.3	357
444.namd	254	31.6	254	31.6	<u>254</u>	<u>31.6</u>	247	32.5	246	32.6	<u>247</u>	<u>32.5</u>
447.dealII	<u>171</u>	<u>66.8</u>	171	66.9	172	66.5	<u>171</u>	<u>66.8</u>	171	66.9	172	66.5
450.soplex	<u>174</u>	<u>48.0</u>	171	48.9	174	48.0	<u>174</u>	<u>48.0</u>	171	48.9	174	48.0
453.povray	<u>83.6</u>	<u>63.6</u>	83.3	63.9	83.9	63.4	73.6	72.2	<u>74.3</u>	<u>71.6</u>	74.8	71.1
454.calculix	161	51.3	161	51.3	<u>161</u>	<u>51.3</u>	139	59.5	<u>140</u>	<u>58.8</u>	140	58.7
459.GemsFDTD	47.0	226	<u>48.2</u>	<u>220</u>	48.2	220	<u>39.3</u>	<u>270</u>	39.4	269	39.2	270
465.tonto	<u>245</u>	<u>40.1</u>	250	39.3	242	40.7	169	58.3	<u>170</u>	<u>58.0</u>	170	57.9
470.lbm	<u>15.8</u>	<u>871</u>	15.3	895	15.9	864	<u>15.8</u>	<u>871</u>	15.3	895	15.9	864
481.wrf	96.0	116	<u>95.2</u>	<u>117</u>	92.2	121	96.0	116	<u>95.2</u>	<u>117</u>	92.2	121
482.sphinx3	<u>297</u>	<u>65.7</u>	297	65.5	296	65.9	<u>297</u>	<u>65.7</u>	297	65.5	296	65.9

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"

Platform Notes

BIOS configuration:
Patrol Scrub = Disable
Per Core P-state = Disable

Sysinfo program /home/cpu2006/config/sysinfo.rev6914
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1
running on rhel722 Sat Jun 4 02:45:27 2016

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

Continued on next page



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Platform Notes (Continued)

<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo

model name : Intel(R) Xeon(R) CPU E5-2699 v4 @ 2.20GHz

2 "physical id"s (chips)

88 "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 : 22

siblings : 44

physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

cache size : 56320 KB

From /proc/meminfo

MemTotal: 527315508 kB

HugePages_Total: 0

Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

os-release:

NAME="Red Hat Enterprise Linux Server"

VERSION="7.2 (Maipo)"

ID="rhel"

ID_LIKE="fedora"

VERSION_ID="7.2"

PRETTY_NAME="Red Hat Enterprise Linux Server 7.2 (Maipo)"

ANSI_COLOR="0;31"

CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"

redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

uname -a:

Linux rhel722 3.10.0-327.el7.x86_64 #1 SMP Thu Oct 29 17:29:29 EDT 2015

x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 3 21:47

SPEC is set to: /home/cpu2006

Filesystem Type Size Used Avail Use% Mounted on

/dev/mapper/rhel-home xfs 225G 23G 202G 11% /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.

Continued on next page

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Page 3



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Platform Notes (Continued)

BIOS HITACHI 10-00 01/29/2016

Memory:

8x NO DIMM Unknown

16x Samsung M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:

KMP_AFFINITY = "granularity=fine,compact,1,0"

LD_LIBRARY_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

OMP_NUM_THREADS = "44"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/transparent_hugepage/enabled

runspec command invoked through numactl i.e.:

numactl --interleave=all runspec <etc>

BladeSymphony BS520H, Hitachi Compute Blade 520H and BladeSymphony BS2500 are electronically equivalent.

The results have been measured on a Hitachi Compute Blade 520H.

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

Continued on next page

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Page 4



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Base Portability Flags (Continued)

```
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
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:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -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
```



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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias
-auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
-ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
-inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc

Continued on next page



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Peak Optimization Flags (Continued)

465.tonto (continued):

`-opt-malloc-options=3 -auto -unroll4`

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: `-xCORE-AVX2 -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-ic16.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/PlatformHitachi-V1.6.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/PlatformHitachi-V1.6.xml>

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Page 7