



# SPEC<sup>®</sup> CFP2006 Result

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## HITACHI

SPECfp<sup>®</sup>2006 = **121**

Compute Blade 520H (Intel Xeon E5-2697 v4)

SPECfp\_base2006 = **114**

CPU2006 license: 35

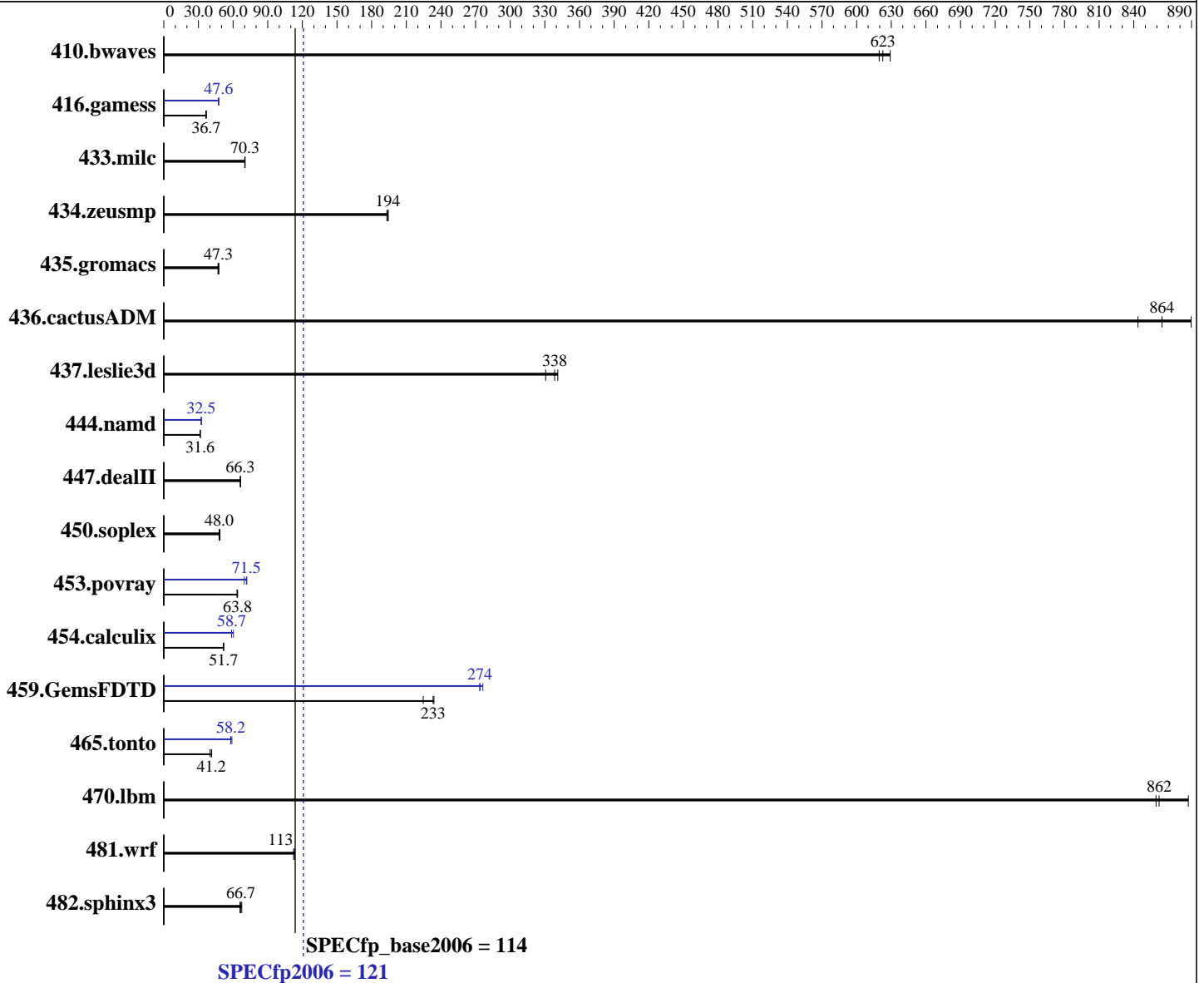
Test sponsor: HITACHI

Tested by: HITACHI

Test date: Jun-2016

Hardware Availability: Apr-2016

Software Availability: Nov-2015



**Hardware**

CPU Name: Intel Xeon E5-2697 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 36 cores, 2 chips, 18 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: 45 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	<b><u>21.8</u></b>	<b><u>623</u></b>	21.9	620	21.6	629	<b><u>21.8</u></b>	<b><u>623</u></b>	21.9	620	21.6	629
416.gamess	538	36.4	531	36.9	<b><u>534</u></b>	<b><u>36.7</u></b>	413	47.5	411	47.6	<b><u>411</u></b>	<b><u>47.6</u></b>
433.milc	130	70.4	<b><u>131</u></b>	<b><u>70.3</u></b>	131	70.1	130	70.4	<b><u>131</u></b>	<b><u>70.3</u></b>	131	70.1
434.zeusmp	<b><u>46.9</u></b>	<b><u>194</u></b>	46.8	194	47.1	193	<b><u>46.9</u></b>	<b><u>194</u></b>	46.8	194	47.1	193
435.gromacs	<b><u>151</u></b>	<b><u>47.3</u></b>	152	46.9	150	47.7	<b><u>151</u></b>	<b><u>47.3</u></b>	152	46.9	150	47.7
436.cactusADM	14.2	844	<b><u>13.8</u></b>	<b><u>864</u></b>	13.4	890	14.2	844	<b><u>13.8</u></b>	<b><u>864</u></b>	13.4	890
437.leslie3d	28.4	331	27.6	341	<b><u>27.8</u></b>	<b><u>338</u></b>	28.4	331	27.6	341	<b><u>27.8</u></b>	<b><u>338</u></b>
444.namd	254	31.6	254	31.5	<b><u>254</u></b>	<b><u>31.6</u></b>	<b><u>247</u></b>	<b><u>32.5</u></b>	247	32.5	247	32.4
447.dealII	173	66.3	172	66.4	<b><u>172</u></b>	<b><u>66.3</u></b>	173	66.3	172	66.4	<b><u>172</u></b>	<b><u>66.3</u></b>
450.soplex	174	48.0	171	48.7	<b><u>174</u></b>	<b><u>48.0</u></b>	174	48.0	171	48.7	<b><u>174</u></b>	<b><u>48.0</u></b>
453.povray	83.3	63.8	84.0	63.3	<b><u>83.4</u></b>	<b><u>63.8</u></b>	<b><u>74.4</u></b>	<b><u>71.5</u></b>	74.0	71.9	76.3	69.7
454.calculix	159	51.9	<b><u>159</u></b>	<b><u>51.7</u></b>	159	51.7	<b><u>141</u></b>	<b><u>58.7</u></b>	137	60.3	141	58.6
459.GemsFDTD	45.3	234	<b><u>45.5</u></b>	<b><u>233</u></b>	47.2	225	38.4	276	<b><u>38.8</u></b>	<b><u>274</u></b>	38.8	274
465.tonto	246	40.1	<b><u>239</u></b>	<b><u>41.2</u></b>	237	41.5	170	57.9	167	59.0	<b><u>169</u></b>	<b><u>58.2</u></b>
470.lbm	16.0	859	<b><u>15.9</u></b>	<b><u>862</u></b>	15.5	887	16.0	859	<b><u>15.9</u></b>	<b><u>862</u></b>	15.5	887
481.wrf	98.5	113	<b><u>98.6</u></b>	<b><u>113</u></b>	99.4	112	98.5	113	<b><u>98.6</u></b>	<b><u>113</u></b>	99.4	112
482.sphinx3	295	66.0	<b><u>292</u></b>	<b><u>66.7</u></b>	289	67.5	295	66.0	<b><u>292</u></b>	<b><u>66.7</u></b>	289	67.5

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 Wed Jun 8 11:38:15 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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Test date: Jun-2016

Hardware Availability: Apr-2016

Software Availability: Nov-2015

### Platform Notes (Continued)

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

From /proc/cpuinfo

model name : Intel(R) Xeon(R) CPU E5-2697 v4 @ 2.30GHz

2 "physical id"s (chips)

72 "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 : 18

siblings : 36

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

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

cache size : 46080 KB

From /proc/meminfo

MemTotal: 527317492 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 8 06:42

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.

BIOS HITACHI 10-00 01/29/2016

Memory:

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## Platform Notes (Continued)

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 = "36"

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

444.namd: -DSPEC\_CPU\_LP64

447.dealII: -DSPEC\_CPU\_LP64

Continued on next page

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Page 4



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## Base Portability Flags (Continued)

```

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

```

## Peak Portability Flags

Same as Base Portability Flags



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

Benchmarks using both Fortran and C:

Continued on next page



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## Peak Optimization Flags (Continued)

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

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