**HITACHI**
BladeSymphony BS520H (Intel Xeon E5-2699 v4)

<table>
<thead>
<tr>
<th>SPECfp®2006 = 121</th>
<th>SPECfp_base2006 = 113</th>
</tr>
</thead>
</table>

**CPU2006 license:** 35  
**Test sponsor:** HITACHI  
**Tested by:** HITACHI

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Jun-2016</th>
<th>Hardware Availability: Jun-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Availability: Nov-2015</td>
<td></td>
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</tr>
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<tr>
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</table>

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon E5-2699 v4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.60 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2200</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>44 cores, 2 chips, 22 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1, 2 chips</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>Red Hat Enterprise Linux Server release 7.2 (Maipo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>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</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
</tbody>
</table>

**Continued on next page**
**SPEC CFP2006 Result**

**HITACHI**

BladeSymphony BS520H (Intel Xeon E5-2699 v4)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds (Base)</th>
<th>Ratio (Base)</th>
<th>Seconds (Peak)</th>
<th>Ratio (Peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>24.8</td>
<td>548</td>
<td>24.8</td>
<td>548</td>
</tr>
<tr>
<td>416.gamess</td>
<td>544</td>
<td>36.0</td>
<td>546</td>
<td>35.9</td>
</tr>
<tr>
<td>433.milc</td>
<td>128</td>
<td>71.6</td>
<td>128</td>
<td>71.7</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>46.1</td>
<td>197</td>
<td>46.1</td>
<td>197</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>157</td>
<td>45.3</td>
<td>159</td>
<td>44.8</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>13.4</td>
<td>891</td>
<td>13.0</td>
<td>884</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>23.6</td>
<td>399</td>
<td>24.1</td>
<td>391</td>
</tr>
<tr>
<td>444.namd</td>
<td>254</td>
<td>31.6</td>
<td>254</td>
<td>31.6</td>
</tr>
<tr>
<td>447.dealII</td>
<td>171</td>
<td>66.8</td>
<td>171</td>
<td>66.8</td>
</tr>
<tr>
<td>450.soplex</td>
<td>174</td>
<td>48.0</td>
<td>174</td>
<td>48.0</td>
</tr>
<tr>
<td>453.povray</td>
<td>83.6</td>
<td>63.6</td>
<td>83.9</td>
<td>63.4</td>
</tr>
<tr>
<td>454.calculix</td>
<td>161</td>
<td>51.3</td>
<td>161</td>
<td>51.3</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>47.0</td>
<td>226</td>
<td>48.2</td>
<td>220</td>
</tr>
<tr>
<td>465.tonto</td>
<td>245</td>
<td>40.1</td>
<td>250</td>
<td>39.5</td>
</tr>
<tr>
<td>470.lbm</td>
<td>15.8</td>
<td>871</td>
<td>15.3</td>
<td>895</td>
</tr>
<tr>
<td>481.wrf</td>
<td>96.0</td>
<td>116</td>
<td>95.2</td>
<td>117</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>297</td>
<td>65.7</td>
<td>297</td>
<td>65.7</td>
</tr>
</tbody>
</table>

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
HITACHI

BladeSymphony BS520H (Intel Xeon E5-2699 v4)

**SPEC CFP2006 Result**

<table>
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<tr>
<th>SPECfp2006</th>
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<td>113</td>
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**CPU2006 license:** 35
**Test sponsor:** HITACHI
**Test date:** Jun-2016
**Hardware Availability:** Jun-2016
**Tested by:** HITACHI
**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 E5-2699 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*`

- 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)

```
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
HITACHI

BladeSymphony BS520H (Intel Xeon E5-2699 v4)

SPECfp2006 = 121
SPECfp_base2006 = 113

CPU2006 license: 35
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Tested by: HITACHI

Test date: Jun-2016
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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.:
umactl --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
**SPEC CFP2006 Result**

**HITACHI**

BladeSymphony BS520H (Intel Xeon E5-2699 v4)

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Test date: Jun-2016
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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
SPEC CFP2006 Result

HITACHI

BladeSymphony BS520H (Intel Xeon E5-2699 v4)

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CPU2006 license: 35
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Tested by: HITACHI
Hardware Availability: Jun-2016
Software Availability: Nov-2015

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
SPEC CFP2006 Result

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</tr>
<tr>
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</tr>
</tbody>
</table>

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

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