**HITACHI**

BladeSymphony BS520H (Intel Xeon E5-2699 v4)

**SPECint®2006 = 70.1**

**SPECint_base2006 = 68.1**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint2006</td>
<td>70.1</td>
</tr>
<tr>
<td>SPECint_base2006</td>
<td>68.1</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 35

**Test sponsor:** HITACHI

**Tested by:** HITACHI

**Test date:** Mar-2016

**Hardware Availability:** Jun-2016

**Software Availability:** Nov-2015

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**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
- **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

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**Software**

- **Operating System:** Red Hat Enterprise Linux Server release 7.2 (Maipo) 3.10.0-327.el7.x86_64
- **Compiler:** C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux
- **Auto Parallel:** Yes
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32/64-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.0
## SPEC CINT2006 Result

**HITACHI**

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**SPECint2006 = 70.1**

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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>232</td>
<td>42.1</td>
<td>234</td>
<td>41.7</td>
<td>234</td>
<td>41.8</td>
<td>206</td>
<td>47.4</td>
<td>206</td>
<td>47.4</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>391</td>
<td>24.7</td>
<td>390</td>
<td>24.7</td>
<td>390</td>
<td>24.8</td>
<td>391</td>
<td>24.7</td>
<td>390</td>
<td>24.8</td>
</tr>
<tr>
<td>403.gcc</td>
<td>224</td>
<td>35.9</td>
<td>224</td>
<td>36.0</td>
<td>224</td>
<td>36.0</td>
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<tr>
<td>429.mcf</td>
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<td>62.6</td>
<td>146</td>
<td>62.6</td>
<td>146</td>
<td>62.5</td>
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<td>62.6</td>
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<td>62.6</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>354</td>
<td>29.6</td>
<td>354</td>
<td>30.4</td>
<td>354</td>
<td>29.6</td>
<td>354</td>
<td>29.6</td>
<td>354</td>
<td>30.4</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>110</td>
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<td>109</td>
<td>85.5</td>
<td>109</td>
<td>85.3</td>
<td>110</td>
<td>84.5</td>
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<td>85.3</td>
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<td>458.sjeng</td>
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<td>35.1</td>
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<tr>
<td>462.libquantum</td>
<td>2.16</td>
<td>9580</td>
<td>2.12</td>
<td>9780</td>
<td>2.30</td>
<td>9010</td>
<td>2.16</td>
<td>9580</td>
<td>2.12</td>
<td>9780</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>499</td>
<td>44.4</td>
<td>499</td>
<td>44.3</td>
<td>501</td>
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<td>44.3</td>
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<tr>
<td>471.omnetpp</td>
<td>141</td>
<td>44.3</td>
<td>140</td>
<td>44.4</td>
<td>140</td>
<td>44.6</td>
<td>117</td>
<td>53.5</td>
<td>121</td>
<td>51.8</td>
</tr>
<tr>
<td>473.astar</td>
<td>201</td>
<td>34.9</td>
<td>202</td>
<td>34.8</td>
<td>200</td>
<td>35.1</td>
<td>201</td>
<td>34.9</td>
<td>202</td>
<td>34.8</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>95.4</td>
<td>72.3</td>
<td>95.3</td>
<td>72.4</td>
<td>95.5</td>
<td>72.2</td>
<td>95.4</td>
<td>72.3</td>
<td>95.3</td>
<td>72.4</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The config file option 'submit' was used.

### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

### Platform Notes

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

Sysinfo program /home/speccpu2006/cpu2006/config/sysinfo.rev6914

$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on rhe17.2 Fri Mar  4 10:16:38 2016

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 E5-2699 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
- Continued on next page
HITACHI
BladeSymphony BS520H (Intel Xeon E5-2699 v4)

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

Platform Notes (Continued)

cautions.)

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: 527315512 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)

uname -a:
  Linux rhel7.2 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 Mar 4 09:26

SPEC is set to: /home/speccpu2006/cpu2006

Filesystem   Type     Size  Used  Avail Use% Mounted on
/dev/disk/by-path/pci-0000:00:00.0-pci-0000:00:00.0-xfs 577G 616G 7GB 99% /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:
  8x NO DIMM Unknown
  16x Samsung M393A4K40BB1-CRC 32 GB 2 rank 2400 MHz

(End of data from sysinfo program)
**HITACHI**

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<tr>
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<td>Hardware Availability: Jun-2016</td>
</tr>
<tr>
<td>Tested by: HITACHI</td>
<td>Software Availability: Nov-2015</td>
</tr>
</tbody>
</table>

### General Notes

Environment variables set by runspec before the start of the run:
- `KMP_AFFINITY = "granularity=fine,compact,1,0"
- `LD_LIBRARY_PATH = "/home/speccpu2006/cpu2006/libs/32:/home/speccpu2006/cpu2006/libs/64:/home/speccpu2006/cpu2006/sh"
- `OMP_NUM_THREADS = "44"

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0.

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`

### Base Portability Flags

<table>
<thead>
<tr>
<th>C benchmarks</th>
<th>C++ benchmarks</th>
</tr>
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<tbody>
<tr>
<td><code>-DSPEC_CPU_LP64</code></td>
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</tr>
<tr>
<td><code>-DSPEC_CPU_LINUX_X64</code></td>
<td><code>-DSPEC_CPU_LINUX</code></td>
</tr>
<tr>
<td><code>-DSPEC_CPU_LP64</code></td>
<td><code>-DSPEC_CPU_LP64</code></td>
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</tr>
</tbody>
</table>

### Base Optimization Flags

C benchmarks:
- `-xCORE-AVX2` `-ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32`

C++ benchmarks:
- `-xCORE-AVX2` `-ipo -O3 -no-prec-div -opt-prefetch -auto-p32`
  - `-Wl,-z,muldefs -L/sh -lsmartheap64`
HITACHI

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CPU2006 license: 35
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Test date: Mar-2016
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Base Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m64

400.perlbench: icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

C++ benchmarks (except as noted below):

icpc -m64

471.omnetpp: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_IA32
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-opt-prefetch -ansi-alias

401.bzip2: basepeak = yes

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
-opt-malloc-options=3 -auto-ilp32

Continued on next page
HITACHI
BladeSymphony BS520H (Intel Xeon E5-2699 v4)

SPECint2006 = 70.1
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Peak Optimization Flags (Continued)

429.mcf: basepeak = yes
445.gobmk: basepeak = yes
456.hmmer: basepeak = yes
458.sjeng: -xCORE-AVX2(pass 2) --prof-gen(pass 1) --ipo(pass 2)
  -O3(pass 2) -no-prec-div(pass 2) --prof-use(pass 2)
  -unroll4
462.libquantum: basepeak = yes
464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) --prof-gen(pass 1) --ipo(pass 2)
  -O3(pass 2) -no-prec-div(pass 2) --prof-use(pass 2)
  --opt-ra-region-strategy=block --ansi-alias
  -Wl,-z,muldefs -L/sh -lsmartheap
473.astar: basepeak = yes
483.xalancbmk: basepeak = yes

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic15.0-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-ic15.0-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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