**Huawei**

**Huawei XH321 V3 (Intel Xeon E5-2667 v4)**

<table>
<thead>
<tr>
<th>SPECint®2006</th>
<th>72.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_base2006</td>
<td>68.9</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 3175

**Test sponsor:** Huawei

**Tested by:** Huawei

**Test date:** Nov-2016

**Hardware Availability:** Nov-2016

**Software Availability:** Dec-2015

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### SPECint2006

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>46.3</td>
</tr>
<tr>
<td>bzip2</td>
<td>26.2</td>
</tr>
<tr>
<td>gcc</td>
<td>26.5</td>
</tr>
<tr>
<td>mcf</td>
<td>39.5</td>
</tr>
<tr>
<td>gobmk</td>
<td>31.1</td>
</tr>
<tr>
<td>hammer</td>
<td>39.5</td>
</tr>
<tr>
<td>sjeng</td>
<td>35.6</td>
</tr>
<tr>
<td>libquantum</td>
<td>61.9</td>
</tr>
<tr>
<td>h264ref</td>
<td>52.0</td>
</tr>
<tr>
<td>omnetpp</td>
<td>35.3</td>
</tr>
<tr>
<td>astar</td>
<td>38.2</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>38.2</td>
</tr>
</tbody>
</table>

**SPECint_base2006 = 68.9**

---

**Hardware**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2667 v4</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.60 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>3200</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>16 cores, 2 chips, 8 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chip</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>
<tr>
<td>L3 Cache</td>
<td>25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 800 GB SATA SSD</td>
</tr>
</tbody>
</table>

**Software**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software</td>
<td>Microquill SmartHeap V10.2</td>
</tr>
</tbody>
</table>
Huawei

Huawei XH321 V3 (Intel Xeon E5-2667 v4)

SPECint2006 = 72.7
SPECint_base2006 = 68.9

CPU2006 license: 3175
Test sponsor: Huawei
Tested by: Huawei

Results Table

<table>
<thead>
<tr>
<th>Benchmark</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>230</td>
<td></td>
<td>231</td>
<td></td>
<td>212</td>
<td></td>
</tr>
<tr>
<td>401.bzip2</td>
<td>369</td>
<td>26.2</td>
<td>369</td>
<td>26.2</td>
<td>364</td>
<td>26.5</td>
</tr>
<tr>
<td>403.mcf</td>
<td>204</td>
<td>39.5</td>
<td>204</td>
<td>39.4</td>
<td>204</td>
<td>39.4</td>
</tr>
<tr>
<td>429.gcc</td>
<td>132</td>
<td>69.0</td>
<td>131</td>
<td>69.4</td>
<td>129</td>
<td>70.5</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>338</td>
<td>31.1</td>
<td>338</td>
<td>31.1</td>
<td>338</td>
<td>31.1</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>105</td>
<td>88.5</td>
<td>105</td>
<td>88.7</td>
<td>105</td>
<td>88.5</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>340</td>
<td>35.6</td>
<td>340</td>
<td>35.6</td>
<td>336</td>
<td>36.0</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>3.46</td>
<td>6000</td>
<td>3.46</td>
<td>6000</td>
<td>3.46</td>
<td>6000</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:
Set Power Efficiency Mode to Custom
Set Snoop Mode to ES mode
Set Patrol Scrub to Disable
Set Hyper-Threading to Disable
Sysinfo program /spec/spec16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1

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 E5-2667 v4@ 3.20GHz
2 "physical id"s (chips)
16 "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
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Platform Notes (Continued)

caution.)
cpu cores : 8
siblings : 8
physical 0: cores 0 2 3 4 8 10 11 12
physical 1: cores 0 2 3 4 8 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 264062240 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP1

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 1
# This file is deprecated and will be removed in a future service pack or
release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP1"
VERSION_ID="12.1"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 25 00:56

SPEC is set to: /spec/spec16
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 641G 7.6G 634G 2% /spec

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 Insyde Corp. 3.31 08/22/2016
Memory:
16x Samsung M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz

Continued on next page
Huawei XH321 V3 (Intel Xeon E5-2667 v4)

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CPU2006 license: 3175
Test sponsor: Huawei
Tested by: Huawei

Platform Notes (Continued)

(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 = "/spec/spec16/libs/32:/spec/spec16/libs/64:/spec/spec16/sh"
OMP_NUM_THREADS = "16"

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
runcspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>

Base Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks:
icpc -m64

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
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
471.omnetpp: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Base Optimization Flags

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

Continued on next page
Huawei
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Base Optimization Flags (Continued)

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -lsmartheap64

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/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

C++ benchmarks (except as noted below):
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -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
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:
Continued on next page
Huawei

Huawei XH321 V3 (Intel Xeon E5-2667 v4)

**Peak Optimization Flags (Continued)**

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<thead>
<tr>
<th>Benchmark</th>
<th>Optimization Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>-xCORE-AVX2(pass 2) -prof-gen:threadsafepass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch -ansi-alias</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>-xCORE-AVX2(pass 2) -prof-gen:threadsafepass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div -par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32 -opt-prefetch -ansi-alias</td>
</tr>
<tr>
<td>403.gcc</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>429.mcf</td>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>-xCORE-AVX2(pass 2) -prof-gen:threadsafepass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>basepeak = yes</td>
</tr>
</tbody>
</table>
| C++ benchmarks:
| 471.omnetpp | -xCORE-AVX2(pass 2) -prof-gen:threadsafepass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -opt-ra-region-strategy=block -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap |
| 473.astar | -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -Wl,-z,muldefs -L/sh -lsmartheap64 |
| 483.xalancbmk | -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap |

**Peak Other Flags**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>403.gcc</td>
<td>-Dalloca=_alloca</td>
</tr>
</tbody>
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The flags files that were used to format this result can be browsed at:

- http://www.spec.org/cpu2006/flags/Huawei-Platform-Settings-BDW-V1.0.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/Huawei-Platform-Settings-BDW-V1.0.xml

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

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