Huawei CH226 V3 (Intel Xeon E5-2609 v4)

**SPECint®2006 = 37.1**
**SPECint_base2006 = 35.8**

**CPU2006 license:** 3175  
**Test date:** Nov-2016  
**Test sponsor:** Huawei  
**Hardware Availability:** Mar-2016

**Tested by:** Huawei  
**Software Availability:** Dec-2015

---

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2609 v4</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td></td>
</tr>
<tr>
<td>CPU MHz</td>
<td>1700</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>20 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 1867 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
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</table>

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### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>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>ext4</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

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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>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>474</td>
<td>20.6</td>
<td>472</td>
<td>20.7</td>
<td>475</td>
<td>20.6</td>
<td>436</td>
<td>22.4</td>
<td>438</td>
<td>22.3</td>
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<tr>
<td>401.bzip2</td>
<td>741</td>
<td>13.0</td>
<td>740</td>
<td>13.0</td>
<td>741</td>
<td>13.0</td>
<td>728</td>
<td>13.3</td>
<td>728</td>
<td>13.3</td>
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<tr>
<td>429.mcf</td>
<td>223</td>
<td>40.9</td>
<td>223</td>
<td>40.9</td>
<td>224</td>
<td>40.8</td>
<td>223</td>
<td>40.9</td>
<td>223</td>
<td>40.9</td>
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<tr>
<td>456.hmmer</td>
<td>221</td>
<td>42.2</td>
<td>222</td>
<td>42.1</td>
<td>222</td>
<td>42.0</td>
<td>221</td>
<td>42.2</td>
<td>222</td>
<td>42.1</td>
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<tr>
<td>458.sjeng</td>
<td>691</td>
<td>17.5</td>
<td>691</td>
<td>17.5</td>
<td>691</td>
<td>17.5</td>
<td>684</td>
<td>17.7</td>
<td>684</td>
<td>17.7</td>
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<tr>
<td>462.libquantum</td>
<td>6.04</td>
<td>3430</td>
<td>5.99</td>
<td>3460</td>
<td>6.02</td>
<td>3440</td>
<td>6.04</td>
<td>3430</td>
<td>5.99</td>
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<tr>
<td>464.h264ref</td>
<td>734</td>
<td>30.1</td>
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<td>30.2</td>
<td>733</td>
<td>30.2</td>
<td>734</td>
<td>30.1</td>
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<td>30.2</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>295</td>
<td>21.2</td>
<td>296</td>
<td>21.1</td>
<td>294</td>
<td>21.3</td>
<td>224</td>
<td>27.9</td>
<td>226</td>
<td>27.7</td>
</tr>
<tr>
<td>473.astar</td>
<td>374</td>
<td>18.7</td>
<td>370</td>
<td>19.0</td>
<td>370</td>
<td>19.0</td>
<td>374</td>
<td>18.7</td>
<td>370</td>
<td>19.0</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>170</td>
<td>40.5</td>
<td>169</td>
<td>40.7</td>
<td>169</td>
<td>40.7</td>
<td>159</td>
<td>43.4</td>
<td>159</td>
<td>43.3</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 Performance
- Set Snoop Mode to ES mode
- Set Patrol Scrub to Disable

Sysinfo program /spec16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-102o Mon Nov 28 00:03:35 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 E5-2609 v4 @ 1.70GHz
- 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 caution.)

Continued on next page
Huawei

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Platform Notes (Continued)

- cpu cores: 8
- siblings: 8
- physical 0: cores 0 1 2 3 4 5 6 7
- physical 1: cores 0 1 2 3 4 5 6 7
- cache size: 20480 KB

From /proc/meminfo
   MemTotal: 528829580 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

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 26 14:53

SPEC is set to: /spec16

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 ext4 394G 14G 379G 4% /

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. 3.32 09/14/2016
Memory:
   16x Hynix HMA84GR7MFR4N-UH 32 GB 2 rank 2400 MHz, configured at 1867 MHz
   8x NO DIMM NO DIMM

(End of data from sysinfo program)
Huawei

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General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/spec16/libs/32:/spec16/libs/64:/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

C++ benchmarks:
  -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
  -Wl,-z,muldefs -L/sh -lsmartheap64
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| SPECint2006 | 37.1 |
| SPECint_base2006 | 35.8 |

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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/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_LINUX

**Peak Optimization Flags**

C benchmarks:

- 400.perlbench: -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) -opt-prefetch -ansi-alias

- 401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 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

Continued on next page
Peak Optimization Flags (Continued)

403.gcc: basepeak = yes
429.mcf: basepeak = yes
445.gobmk: basepeak = yes
456.hmmer: basepeak = yes
458.sjeng: -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
462.libquantum: basepeak = yes
464.h264ref: basepeak = yes

C++ benchmarks:
471.omnetpp: -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) -opt-ra-region-strategy=block -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap
473.astar: basepeak = yes
483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap

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-ic16.0-official-linux64.html
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 questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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