Huawei RH2288H V3 (Intel Xeon E5-2650 v4)

CPU2006 license: 3175
Test sponsor: Huawei
Tested by: Huawei
CPU Name: Intel Xeon E5-2650 v4
CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz
CPU MHz: 1800
FPU: Integrated
CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip
CPU(s) orderable: 1.2 chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core

Software
Operating System: Red Hat Enterprise Linux Server release 7.2 (Maipo) 3.10.0-327.el7.x86_64
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;
Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
Auto Parallel: Yes
File System: xfs

Hardware

SPECfp®2006 = 106
SPECfp_base2006 = 102
# SPEC CFP2006 Result

## Huawei

Huawei RH2288H V3 (Intel Xeon E5-2650 v4)

<table>
<thead>
<tr>
<th>SPECfp2006 =</th>
<th>106</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006 =</td>
<td>102</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>L3 Cache:</th>
<th>30 MB I+D on chip per chip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 1000 GB SATA, 7200rpm</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System State:</th>
<th>Run level 3 (multi-user)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>30.3</td>
<td>449</td>
<td>25.9</td>
<td>526</td>
<td>23.9</td>
<td>568</td>
<td>30.3</td>
<td>449</td>
<td>25.9</td>
<td>526</td>
<td>23.9</td>
<td>568</td>
</tr>
<tr>
<td>416.gamess</td>
<td>618</td>
<td>31.7</td>
<td>618</td>
<td>31.7</td>
<td>617</td>
<td>31.7</td>
<td>524</td>
<td>37.4</td>
<td>525</td>
<td>37.3</td>
<td>524</td>
<td>37.4</td>
</tr>
<tr>
<td>433.milc</td>
<td>144</td>
<td>63.7</td>
<td>144</td>
<td>63.7</td>
<td>143</td>
<td>64.0</td>
<td>144</td>
<td>63.7</td>
<td>144</td>
<td>63.7</td>
<td>143</td>
<td>64.0</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>45.7</td>
<td>199</td>
<td>46.2</td>
<td>197</td>
<td>45.7</td>
<td>199</td>
<td>45.7</td>
<td>199</td>
<td>46.2</td>
<td>197</td>
<td>45.7</td>
<td>199</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>163</td>
<td>43.7</td>
<td>165</td>
<td>43.3</td>
<td>167</td>
<td>42.8</td>
<td>163</td>
<td>43.7</td>
<td>165</td>
<td>43.3</td>
<td>167</td>
<td>42.8</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>15.5</td>
<td>769</td>
<td>15.5</td>
<td>773</td>
<td>16.0</td>
<td>745</td>
<td>15.5</td>
<td>769</td>
<td>15.5</td>
<td>773</td>
<td>16.0</td>
<td>745</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>25.0</td>
<td>375</td>
<td>24.6</td>
<td>382</td>
<td>25.2</td>
<td>373</td>
<td>25.0</td>
<td>375</td>
<td>24.6</td>
<td>382</td>
<td>25.2</td>
<td>373</td>
</tr>
<tr>
<td>444.namd</td>
<td>314</td>
<td>25.5</td>
<td>314</td>
<td>25.5</td>
<td>314</td>
<td>25.5</td>
<td>305</td>
<td>26.3</td>
<td>305</td>
<td>26.3</td>
<td>305</td>
<td>26.3</td>
</tr>
<tr>
<td>447.dealII</td>
<td>207</td>
<td>51.1</td>
<td>208</td>
<td>51.1</td>
<td>207</td>
<td>51.2</td>
<td>207</td>
<td>51.1</td>
<td>208</td>
<td>51.1</td>
<td>207</td>
<td>51.2</td>
</tr>
<tr>
<td>450.soplex</td>
<td>199</td>
<td>41.9</td>
<td>200</td>
<td>41.7</td>
<td>198</td>
<td>42.1</td>
<td>199</td>
<td>41.9</td>
<td>200</td>
<td>41.7</td>
<td>198</td>
<td>42.1</td>
</tr>
<tr>
<td>453.povray</td>
<td>174</td>
<td>49.8</td>
<td>174</td>
<td>49.8</td>
<td>174</td>
<td>50.7</td>
<td>159</td>
<td>51.7</td>
<td>160</td>
<td>51.7</td>
<td>161</td>
<td>51.4</td>
</tr>
<tr>
<td>454.calculix</td>
<td>47.0</td>
<td>226</td>
<td>46.1</td>
<td>230</td>
<td>46.8</td>
<td>227</td>
<td>38.0</td>
<td>279</td>
<td>39.3</td>
<td>270</td>
<td>38.6</td>
<td>275</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>253</td>
<td>38.9</td>
<td>256</td>
<td>38.4</td>
<td>252</td>
<td>39.0</td>
<td>207</td>
<td>47.6</td>
<td>205</td>
<td>47.9</td>
<td>206</td>
<td>47.9</td>
</tr>
<tr>
<td>465.tonto</td>
<td>19.6</td>
<td>700</td>
<td>19.3</td>
<td>711</td>
<td>19.4</td>
<td>709</td>
<td>19.6</td>
<td>700</td>
<td>19.3</td>
<td>711</td>
<td>19.4</td>
<td>709</td>
</tr>
<tr>
<td>481.wrf</td>
<td>137</td>
<td>81.5</td>
<td>138</td>
<td>80.9</td>
<td>143</td>
<td>78.1</td>
<td>137</td>
<td>81.5</td>
<td>138</td>
<td>80.9</td>
<td>143</td>
<td>78.1</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>281</td>
<td>69.5</td>
<td>280</td>
<td>69.5</td>
<td>278</td>
<td>70.2</td>
<td>281</td>
<td>69.5</td>
<td>280</td>
<td>69.5</td>
<td>278</td>
<td>70.2</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:
- Set Power Efficiency Mode to Custom
- Set Snoop Mode to HS mode
- Set Patrol Scrub to Disable
- Set Hyper-Threading to Disable

Sysinfo program /spec16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 $ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Mon Nov 14 07:11:40 2016

This section contains SUT (System Under Test) info as seen by
Continued on next page
Huawei RH2288H V3 (Intel Xeon E5-2650 v4)

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

Huawei

SPECfp2006 = 106
SPECfp_base2006 = 102

Platform Notes (Continued)

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 E5-2650 v4@ 2.20GHz
  2 "physical id"s (chips)
  24 "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 : 12
  siblings : 12
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
  cache size : 30720 KB

From /proc/meminfo
  MemTotal:       527793608 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 localhost.localdomain 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 Nov 14 07:09

SPEC is set to: /spec16
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda2      xfs  879G  97G  783G  11% /

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 Insysde Corp. 3.32 09/14/2016
Huawei RH2288H V3 (Intel Xeon E5-2650 v4)

SPECfp2006 = 106
SPECfp_base2006 = 102

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

Platform Notes (Continued)

Memory:
- 8x NO DIMM NO DIMM
- 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 = "/spec16/libs/32:/spec16/libs/64:/spec16/sh"
OMP_NUM_THREADS = "24"

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>

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
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64 -nofor_main
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
Huawei RH2288H V3 (Intel Xeon E5-2650 v4)

SPECfp2006 = 106
SPECfp_base2006 = 102

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

Test date: Nov-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015

Base Portability Flags (Continued)

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
Huawei RH2288H V3 (Intel Xeon E5-2650 v4)

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

Test date: Nov-2016
Hardware Availability: Mar-2016
Software Availability: Nov-2015

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
## Huawei

**Huawei RH2288H V3 (Intel Xeon E5-2650 v4)**

| SPECfp2006 = | 106 |
| SPECfp_base2006 = | 102 |

**CPU2006 license:** 3175  
**Test sponsor:** Huawei  
**Tested by:** Huawei  
**Test date:** Nov-2016  
**Hardware Availability:** Mar-2016  
**Software Availability:** Nov-2015

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

---

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester.  
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.  
Originally published on 29 November 2016.