Huawei RH2288 V3 (Intel Xeon E5-2658 v4)

SPECfp®2006 = 105
SPECfp_base2006 = 101

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

**Software**
- Operating System: SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default
- 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: ext4
- System State: Run level 3 (multi-user)

**Hardware**
- CPU Name: Intel Xeon E5-2658 v4
- CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz
- CPU MHz: 2300
- FPU: Integrated
- CPU(s) enabled: 28 cores, 2 chips, 14 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
SPEC CFP2006 Result

Huawei RH2288 V3 (Intel Xeon E5-2658 v4)

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
</tr>
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<tbody>
<tr>
<td>105</td>
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</tr>
</tbody>
</table>

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

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

L3 Cache: 35 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R)
Disk Subsystem: 1 x 2000 GB SATA, 7200 RPM
Other Hardware: None

Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

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>
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<tr>
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<td>416.gamess</td>
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<td>434.zeusmp</td>
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<td>435.gromacs</td>
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<tr>
<td>459.GemsFDTD</td>
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<td>469.tonto</td>
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<td>470.lbm</td>
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<td>279</td>
<td>69.8</td>
<td>279</td>
<td>70.0</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 linux-suse Wed Nov 23 03:23:04 2016

This section contains SUT (System Under Test) info as seen by
Continued on next page
Huawei RH2288 V3 (Intel Xeon E5-2658 v4)

**SPECfp2006 =** 105

**SPECfp_base2006 =** 101

---

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

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**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 E5-2658 v4@ 2.30GHz
- 2 "physical id"s (chips)
- 28 "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 : 14
  - siblings : 14
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
- cache size : 35840 KB

From /proc/meminfo

- MemTotal:       264271944 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:

Linux linux-suse 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015 (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 22 18:45

SPEC is set to: /spec16

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda1      ext4  1.8T  165G  1.7T  10% /

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 continued on next page
## Huawei RH2288 V3 (Intel Xeon E5-2658 v4)

### SPECfp2006 = 105

<table>
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<td>Tested by:</td>
<td>Huawei</td>
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<td>Test date:</td>
<td>Nov-2016</td>
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<td>Hardware Availability:</td>
<td>Mar-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

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### Platform Notes (Continued)

**hardware, firmware, and the "DMTF SMBIOS" standard.**

BIOS Insyde Corp. 3.31 08/22/2016  
Memory:  
16x Micron 18ASF2G72PDZ-2G3B1 16 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 = "28"

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.:  
umactl --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  -nofor_main
- 435.gromacs:  -DSPEC_CPU_LP64  -nofor_main
- 436.cactusADM:  -DSPEC_CPU_LP64  -nofor_main
- 437.leslie3d:  -DSPEC_CPU_LP64
- 444.namd:  -DSPEC_CPU_LP64

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<table>
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<th>Base Portability Flags (Continued)</th>
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<tbody>
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<td>447.dealII: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>450.soplex: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>453.povray: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>454.calculix: -DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3: -DSPEC_CPU_LP64</td>
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</tbody>
</table>

<table>
<thead>
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<th>Base Optimization Flags</th>
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</thead>
<tbody>
<tr>
<td>C benchmarks:</td>
</tr>
<tr>
<td>-xCORE-AVX2</td>
</tr>
<tr>
<td>-ipo</td>
</tr>
<tr>
<td>-O3</td>
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<tr>
<td>-no-prec-div</td>
</tr>
<tr>
<td>-parallel</td>
</tr>
<tr>
<td>-opt-prefetch</td>
</tr>
<tr>
<td>-ansi-alias</td>
</tr>
</tbody>
</table>

| 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             |

<table>
<thead>
<tr>
<th>Peak Compiler Invocation</th>
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<tbody>
<tr>
<td>C benchmarks:</td>
</tr>
<tr>
<td>icc -m64</td>
</tr>
</tbody>
</table>

| C++ benchmarks:           |
| icpc -m64                 |

| Fortran benchmarks:       |
| ifort -m64                |

| Benchmarks using both Fortran and C: |
| icc -m64 ifort -m64         |

<table>
<thead>
<tr>
<th>Peak Portability Flags</th>
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</thead>
<tbody>
<tr>
<td>Same as Base Portability Flags</td>
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</table>
Huawei RH2288 V3 (Intel Xeon E5-2658 v4)

SPECfp2006 = 105
SPECfp_base2006 = 101

CPU2006 license: 3175
Test date: Nov-2016
Test sponsor: Huawei
Hardware Availability: Mar-2016
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Software Availability: Dec-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 RH2288 V3 (Intel Xeon E5-2658 v4)

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

SPECfp2006 = 105
SPECfp_base2006 = 101

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

Peak Optimization Flags (Continued)

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -03 -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/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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