Huawei RH5885 V3 (Intel Xeon E7-8880 v4)

**SPECint**\_rate2006 = 2810  
**SPECint\_rate_base2006 = 2720**

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

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**Hardware**

- **CPU Name:** Intel Xeon E7-8880 v4  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.30 GHz  
- **CPU MHz:** 2200  
- **FPU:** Integrated  
- **CPU(s) enabled:** 88 cores, 4 chips, 22 cores/chip, 2 threads/core  
- **CPU(s) orderable:** 2,4 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:** 256 GB (16 x 16 GB 2Rx8 PC4-2400T-R, running at 1600 MHz)  
- **Disk Subsystem:** 2 x 600 GB SAS, 10K RPM  
- **Other Hardware:** None

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**Software**

- **Operating System:** SUSE Linux Enterprise Server 12 (x86_64) SP1  
  Kernel 3.12.49-11-default  
- **Compiler:** C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux  
- **Auto Parallel:** No  
- **File System:** xfs  
- **System State:** Run level 5 (multi-user)  
- **Base Pointers:** 32-bit  
- **Peak Pointers:** 32/64-bit  
- **Other Software:** Microquill SmartHeap V10.2
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>176</td>
<td>663</td>
<td>2600</td>
<td>690</td>
<td>2490</td>
<td>687</td>
<td>2500</td>
<td>176</td>
<td>567</td>
<td>3030</td>
<td>558</td>
<td>3080</td>
<td>565</td>
<td>3040</td>
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<tr>
<td>401.bzip2</td>
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<td>403.mcf</td>
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<td>429.mcf</td>
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<td>579</td>
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<td>2750</td>
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<td>2770</td>
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<td>445.gobmk</td>
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<td>2400</td>
<td>768</td>
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<td>458.sjeng</td>
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<tr>
<td>462.libquantum</td>
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<td>32300</td>
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<td>32100</td>
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<tr>
<td>464.h264ref</td>
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<td>885</td>
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<td>893</td>
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<td>897</td>
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<td>873</td>
<td>4460</td>
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<tr>
<td>471.omnetpp</td>
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<td>1030</td>
<td>1066</td>
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<td>1068</td>
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<td>473.astar</td>
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<td>906</td>
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<td>902</td>
<td>1370</td>
<td>906</td>
<td>1360</td>
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<tr>
<td>483.xalancbmk</td>
<td>176</td>
<td>556</td>
<td>2180</td>
<td>558</td>
<td>2170</td>
<td>557</td>
<td>2180</td>
<td>176</td>
<td>556</td>
<td>2180</td>
<td>558</td>
<td>2170</td>
<td>557</td>
<td>2180</td>
</tr>
</tbody>
</table>

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

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

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

Turbo mode set with:

```
cpupower -c all frequency-set -g performance
```

## Platform Notes

BIOS configuration:

- Set Power Efficiency Mode to Performance
- Set Lock_step to disabled
- Baseboard Management Controller used to adjust the fan speed to 100%
- Set C-State to C0/C1

Sysinfo program /home/speccpu/config/sysinfo.rev6914

$Rev: 6914 $ $Date:: 2014-06-25 $ e3fbb8667b5a285932ceab81e28219e1
running on linux-wa9f Mon Dec 5 19:07:25 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 E7-8880 v4 @ 2.20GHz
```

Continued on next page
Huawei RH5885 V3 (Intel Xeon E7-8880 v4)

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**Software Availability:** Dec-2015

### Platform Notes (Continued)

- 4 "physical id"s (chips)
- 176 "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 : 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
  - physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  - physical 3: 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: 264346432 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 5 Dec 5 15:45

SPEC is set to: /home/speccpu

_filesystem_    _type_    _size_    _used_    _avail_    _use%_    _mounted_on_
/dev/sda1       xfs       750G     8.0G     742G     2%   /home

Additional information from dmidecode:
Continued on next page
Huawei
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CPU2006 license: 3175
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Platform Notes (Continued)

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 American Megatrends Inc. BLISY102 11/07/2016
Memory:
32x NO DIMM NO DIMM
16x Samsung M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 1600 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/speccpu/libs/32:/home/speccpu/libs/64:/home/speccpu/sh"

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
Filesystem page cache cleared with:
echo 1 > /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
umactl --interleave=all runspec <etc>

Base Compiler Invocation

C benchmarks:
icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

Base Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -D_FILE_OFFSET_BITS=64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64
458.sjeng: -D_FILE_OFFSET_BITS=64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64

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

Base Portability Flags (Continued)

<table>
<thead>
<tr>
<th>Base Optimization Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>C benchmarks:</td>
</tr>
<tr>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch</td>
</tr>
<tr>
<td>-opt-mem-layout-trans=3</td>
</tr>
<tr>
<td>C++ benchmarks:</td>
</tr>
<tr>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch</td>
</tr>
<tr>
<td>-opt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh -lsmartheap</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Base Other Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>C benchmarks:</td>
</tr>
<tr>
<td>403.gcc: -Dalloca=_alloca</td>
</tr>
</tbody>
</table>

Peak Compiler Invocation

<table>
<thead>
<tr>
<th>C benchmarks (except as noted below):</th>
</tr>
</thead>
<tbody>
<tr>
<td>icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin</td>
</tr>
<tr>
<td>400.perlbench: icc -m64</td>
</tr>
<tr>
<td>401.bzip2: icc -m64</td>
</tr>
<tr>
<td>456.hmmer: icc -m64</td>
</tr>
<tr>
<td>458.sjeng: icc -m64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++ benchmarks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin</td>
</tr>
</tbody>
</table>

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
403.gcc: -D_FILE_OFFSET_BITS=64

Continued on next page
Huawei

Huawei RH5885 V3 (Intel Xeon E7-8880 v4)

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Test sponsor: Huawei
Tested by: Huawei

Test date: Dec-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015

Peak Portability Flags (Continued)

429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
458.sjeng: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
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) -auto-ilp32

401.bzip2: -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
            -auto-ilp32 -ansi-alias

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div

429.mcf: basepeak = yes

445.gobmk: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
            -prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias
            -opt-mem-layout-trans=3

456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32

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) -unroll14
            -auto-ilp32

462.libquantum: basepeak = yes

464.h264ref: -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) -unroll12
             -ansi-alias

C++ benchmarks:

Continued on next page
Huawei

Huawei RH5885 V3 (Intel Xeon E7-8880 v4)

SPECint_rate2006 = 2810
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CPU2006 license: 3175
Test sponsor: Huawei
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Peak Optimization Flags (Continued)

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) -ansi-alias
-opt-ra-region-strategy=block -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-ic16.0-official-linux64.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-V1.2-BDW-RevG.xml