Huawei RH2288H V3 (Intel Xeon E5-2640 v4)

Huawei

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

SPECint®2006 = 68.4
SPECint_base2006 = 65.0

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

400.perlbench 40.2
401.bzip2 25.2
403.gcc 24.8
429.mcf 37.6
445.gobmk 66.8
456.hmmer 66.2
458.sjeng 29.4
462.libquantum 3.8
464.h264ref 5.3
471.omnetpp 8
473.astar 3.8
483.xalancbmk 33.7

SPECint2006 = 68.4

Hardware

CPU Name: Intel Xeon E5-2640 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.40 GHz
CPU MHz: 2400
FPU: Integrated
CPU(s) enabled: 20 cores, 2 chips, 10 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
L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R)
Disk Subsystem: 1 x 480 GB SATA SSD
Other Hardware: None

Software

Operating System: SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default
Compiler: CIC++ Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel: Yes
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2
## SPEC CINT2006 Result

**Huawei**

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Ratio</th>
<th>Seconds Peak</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>242</td>
<td>40.4</td>
<td>223</td>
<td>43.7</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>390</td>
<td>24.7</td>
<td>383</td>
<td>25.2</td>
</tr>
<tr>
<td>403.gcc</td>
<td>214</td>
<td>37.6</td>
<td>214</td>
<td>37.6</td>
</tr>
<tr>
<td>429.mcf</td>
<td>136</td>
<td>67.2</td>
<td>135</td>
<td>67.5</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>357</td>
<td>29.4</td>
<td>357</td>
<td>29.4</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>111</td>
<td>83.8</td>
<td>111</td>
<td>83.8</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>358</td>
<td>33.8</td>
<td>353</td>
<td>34.2</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>3.81</td>
<td>5430</td>
<td>3.81</td>
<td>5430</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>398</td>
<td>55.6</td>
<td>398</td>
<td>55.6</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>179</td>
<td>34.9</td>
<td>125</td>
<td>50.0</td>
</tr>
<tr>
<td>473.astar</td>
<td>194</td>
<td>36.3</td>
<td>194</td>
<td>36.3</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>93.6</td>
<td>73.7</td>
<td>83.1</td>
<td>83.1</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 /spec16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-1jfn Thu Nov 3 06:26:43 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 E5-2640 v4 @ 2.40GHz
- 2 "physical id"s (chips)
- 20 "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
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Platform Notes (Continued)

caution.)
cpu cores : 10
siblings : 10
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 264063872 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
SuSE-release:
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.
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-1jfn 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 3 06:23

SPEC is set to: /spec16

filesystem  type  size   used  avail use% mounted on
/dev/sda1    ext4  394G   47G  347G  12% /

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 Micron 36ASF2G72PZ-2G1A2 16 GB 2 rank 2133 MHz
8x NO DIMM NO DIMM

(End of data from sysinfo program)
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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 = "20"

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.:

```
umactl --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
```
## SPEC CINT2006 Result

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### Base Other Flags

C benchmarks:

- 403.gcc: -Dalloca=_alloca

### Peak Compiler Invocation

C benchmarks (except as noted below):

- **icc** -m64

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
```

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Peak Optimization Flags (Continued)

403.gcc: basepeak = yes
429.mcf: -xCORE-AVX2 -ipo -03 -no-prec-div -parallel
        -opt-prefetch -auto-p32
445.gobmk: basepeak = yes
456.hmmer: basepeak = yes
458.sjeng: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
       -ipo(pass 2) -03(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) -03(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 -03 -no-prec-div -opt-prefetch
        -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

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
Huawei

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

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