Huawei CH242 V3 (Intel Xeon E7-8891 v4)

SPECfp®2006 = 121
SPECfp_base2006 = 116

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

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

Hardware

CPU Name: Intel Xeon E7-8891 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz
CPU MHz: 2800
FPU: Integrated
CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip
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

Software

Operating System: Red Hat Enterprise Linux Server release 7.2 (Maipo)
Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32-bit
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L3 Cache: 60 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (32 x 16 GB 2Rx8 PC4-2400T-R, running at 1600 MHz)
Disk Subsystem: 1 x 480 GB SSD
Other Hardware: None
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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<tbody>
<tr>
<td>410.bwaves</td>
<td>18.0</td>
<td>754</td>
<td>17.8</td>
<td>764</td>
<td>17.0</td>
<td>801</td>
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<td>461</td>
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<td>42.4</td>
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<td>70.9</td>
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<td>70.9</td>
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<td>70.9</td>
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<td>70.9</td>
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<tr>
<td>434.zeusmp</td>
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<td>56.0</td>
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<td>55.8</td>
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<td>55.9</td>
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<tr>
<td>459.GemsFDTD</td>
<td>48.3</td>
<td>220</td>
<td>46.7</td>
<td>227</td>
<td>47.0</td>
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<td>37.7</td>
<td>282</td>
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<tr>
<td>465.tonto</td>
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<td>42.9</td>
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<td>46.0</td>
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<td>46.0</td>
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<td>167</td>
<td>59.1</td>
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<tr>
<td>470.hm</td>
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<td>12.0</td>
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<td>11.9</td>
<td>1150</td>
<td>12.1</td>
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<td>12.0</td>
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<tr>
<td>481.wrf</td>
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<td>72.0</td>
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<td>73.6</td>
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<td>72.3</td>
<td>155</td>
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<td>73.6</td>
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<tr>
<td>482.sphinx3</td>
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<td>84.2</td>
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<td>84.6</td>
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<td>84.6</td>
<td>231</td>
<td>84.2</td>
<td>230</td>
<td>84.6</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 Hyper-Threading to Disabled
Set Lock_step to disabled
Baseboard Management Controller used to adjust the fan speed to 100
Sysinfo program /spec16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Fri Dec 9 04:30:44 2016

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Huawei

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Platform Notes (Continued)

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 E7-8891 v4 @ 2.80GHz
4 "physical id"s (chips)
40 "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: 10
siblings: 10
physical 0: cores 5 9 10 11 13 18 24 26 28 29
physical 1: cores 5 9 10 11 13 18 24 26 28 29
physical 2: cores 5 9 10 11 13 18 24 26 28 29
physical 3: cores 5 9 10 11 13 18 24 26 28 29
cache size: 61440 KB

From /proc/meminfo
MemTotal: 528083784 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
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 Dec 9 04:25

SPEC is set to: /spec16
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 ext4 407G 157G 229G 41% /

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
Huawei

Huawei CH242 V3 (Intel Xeon E7-8891 v4)

| SPECfp2006 | 121 |
| SPECfp_base2006 | 116 |

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

Platform Notes (Continued)

- hardware, firmware, and the "DMTF SMBIOS" standard.
- BIOS American Megatrends Inc. BLISV788 11/07/2016
- Memory:
  - 32x Hynix HMA82GR7AFR8N-UH 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:
- KMP_AFFINITY = "granularity=fine,compact,1,0"
- LD_LIBRARY_PATH = ":/spec16/libs/32:/spec16/libs/64:/spec16/sh"
- OMP_NUM_THREADS = "40"

- 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.:
    - numa cond --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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## Huawei CH242 V3 (Intel Xeon E7-8891 v4)

<table>
<thead>
<tr>
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<th>3175</th>
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### SPECfp2006 = 121
### SPECfp_base2006 = 116

#### Base Portability Flags (Continued)

<table>
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<tbody>
<tr>
<td>447.dealII</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>450.soplex</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>453.povray</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>454.calculix</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>459.GemsiFDTD</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-DSPEC_CPU_LP64</td>
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#### Base Optimization Flags

<table>
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<tr>
<th>C benchmarks</th>
<th><code>xcORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias</code></th>
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<td><code>xcORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias</code></td>
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#### Peak Compiler Invocation

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<th><code>icc -m64</code></th>
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<tr>
<td>Fortran benchmarks</td>
<td><code>ifort -m64</code></td>
</tr>
<tr>
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<td><code>icc -m64 ifort -m64</code></td>
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#### Base Optimization Flags

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<td><code>xcORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch</code></td>
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<td><code>xcORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias</code></td>
</tr>
</tbody>
</table>

#### Peak Portability Flags

<table>
<thead>
<tr>
<th>Peak Portability Flags</th>
<th>Same as Base Portability Flags</th>
</tr>
</thead>
</table>
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:threadsafepass 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:

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Huawei

Huawei CH242 V3 (Intel Xeon E7-8891 v4)

SPECfp2006 = 121
SPECfp_base2006 = 116

CPU2006 license: 3175
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Test date: Dec-2016
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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-llp32 -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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