Huawei CH121 V3 (Intel Xeon E5-2640 v4)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfp&lt;sup&gt;®&lt;/sup&gt;2006</th>
<th>SPECfp&lt;sub&gt;base&lt;/sub&gt;2006</th>
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</thead>
<tbody>
<tr>
<td>SPECfp&lt;sup&gt;®&lt;/sup&gt;2006</td>
<td>108</td>
<td>103</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 3175  
**Test date:** Dec-2016  
**Hardware Availability:** Mar-2016  
**Software Availability:** Dec-2015

**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

**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)
SPEC CFP2006 Result

Huawei

Huawei CH121 V3 (Intel Xeon E5-2640 v4)

SPECfp2006 = 108

SPECfp_base2006 = 103

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

Test date: Dec-2016
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L3 Cache: 25 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem: 1 x 480 GB SATA SSD
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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<td>264</td>
<td>73.8</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-102o Mon Dec 5 10:54:48 2016

Continued on next page
Huawei CH121 V3 (Intel Xeon E5-2640 v4) SPECfp2006 = 108
SPECfp_base2006 = 103

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

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 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.)
      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:       528829164 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:
      (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Dec 5 05:59

   SPEC is set to: /spec16
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda1       ext4  394G  49G  345G 13% /

   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
Huawei CH121 V3 (Intel Xeon E5-2640 v4) SPECfp2006 = 108
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Platform Notes (Continued)
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 Hynix HMA84GR7MFR4N-UH 32 GB 2 rank 2400 MHz, configured at 2133 MHz
8x NO DIMM NO DIMM

(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 = "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.:
numactl --interleave=all runspec <etc>
The Huawei CH121 V3 and Huawei CH222 V3 are electronically equivalent.
The results have been measured on a Huawei CH121 V3 model

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

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Huawei CH121 V3 (Intel Xeon E5-2640 v4)

**SPECfp2006** = 108
**SPECfp_base2006** = 103

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<th>Hardware Availability</th>
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<td>Dec-2015</td>
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### Base Portability Flags (Continued)

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<td>-DSPEC_CPU_LP64 -nofor_main</td>
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<td>459.GemsFDTD</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto</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>
</tr>
</tbody>
</table>

### 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
Huawei CH121 V3 (Intel Xeon E5-2640 v4)  

| SPECfp2006 = | 108 |
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CPU2006 license: 3175  
Test date: Dec-2016  
Test sponsor: Huawei  
Hardware Availability: Mar-2016  
Tested by: Huawei  
Software Availability: Dec-2015

Peak Portability Flags

Same as Base Portability Flags

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

Continued on next page
**Huawei**

**Huawei CH121 V3 (Intel Xeon E5-2640 v4)**

| SPECfp2006 = | 108 |
| SPECfp_base2006 = | 103 |

- **CPU2006 license:** 3175
- **Test sponsor:** Huawei
- **Tested by:** Huawei
- **Test date:** Dec-2016
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### Peak Optimization Flags (Continued)

465.tonto (continued):
- `-opt-malloc-options=3` -auto -unroll4

<table>
<thead>
<tr>
<th>Benchmarks using both Fortran and C:</th>
</tr>
</thead>
<tbody>
<tr>
<td>435.gromacs: basepeak = yes</td>
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<tr>
<td>436.cactusADM: basepeak = yes</td>
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<tr>
<td>454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias</td>
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<tr>
<td>481.wrf: basepeak = yes</td>
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</table>

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

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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