Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8170M, 2.10 GHz)

SPECfp®2006 = 149
SPECfp_base2006 = 142

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

Hardware:
- CPU Name: Intel Xeon Platinum 8170M
- CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
- CPU MHz: 2100
- FPU: Integrated
- CPU(s) enabled: 52 cores, 2 chips, 26 cores/chip
- CPU(s) orderable: 1.2 chips
- Primary Cache: 32 KB I + 32 KB D on chip per core
- Secondary Cache: 1 MB I+D on chip per core

Software:
- Operating System: SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default
- Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux;
  Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux
- Auto Parallel: Yes
- File System: xfs
- System State: Run level 3 (multi-user)
SPEC CFP2006 Result

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L3 Cache: 35.75 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R)
Disk Subsystem: 1 x 600 GB SAS HDD, 10K 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 Base</th>
<th>Ratio Base</th>
<th>Seconds Peak</th>
<th>Ratio Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>12.2</td>
<td>1120</td>
<td>12.2</td>
<td>1110</td>
</tr>
<tr>
<td>416.gamess</td>
<td>408</td>
<td>48.0</td>
<td>406</td>
<td>48.2</td>
</tr>
<tr>
<td>433.milc</td>
<td>114</td>
<td>80.5</td>
<td>117</td>
<td>78.8</td>
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<tr>
<td>434.zesmp</td>
<td>34.3</td>
<td>265</td>
<td>33.9</td>
<td>268</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>155</td>
<td>46.1</td>
<td>155</td>
<td>46.1</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>8.51</td>
<td>1400</td>
<td>8.52</td>
<td>1400</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>19.1</td>
<td>492</td>
<td>19.1</td>
<td>491</td>
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<tr>
<td>444.namd</td>
<td>225</td>
<td>35.6</td>
<td>225</td>
<td>35.6</td>
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<tr>
<td>447.dealII</td>
<td>157</td>
<td>72.7</td>
<td>157</td>
<td>73.1</td>
</tr>
<tr>
<td>450.soplex</td>
<td>158</td>
<td>52.9</td>
<td>157</td>
<td>53.1</td>
</tr>
<tr>
<td>453.povray</td>
<td>76.2</td>
<td>69.8</td>
<td>76.4</td>
<td>69.6</td>
</tr>
<tr>
<td>454.calculix</td>
<td>115</td>
<td>71.7</td>
<td>115</td>
<td>71.7</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>46.0</td>
<td>231</td>
<td>46.6</td>
<td>228</td>
</tr>
<tr>
<td>465.tonto</td>
<td>230</td>
<td>42.8</td>
<td>221</td>
<td>44.6</td>
</tr>
<tr>
<td>470.lbm</td>
<td>8.24</td>
<td>1670</td>
<td>8.27</td>
<td>1660</td>
</tr>
<tr>
<td>481.wrf</td>
<td>81.9</td>
<td>136</td>
<td>81.9</td>
<td>136</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>302</td>
<td>64.6</td>
<td>311</td>
<td>62.7</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 Settings:
Intel HyperThreading Technology set to Disabled
CPU performance set to Enterprise
Power Performance Tuning set to OS
SNC set to Disabled
IMC Interleaving set to Auto
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
runtime on linux-79ix Wed Nov 22 18:03:09 2017
Continued on next page
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) Platinum 8170M CPU @ 2.10GHz
- 2 "physical id"s (chips)
- 52 "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 : 26
  - siblings : 26
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
  - cache size : 36608 KB

From /proc/meminfo
- MemTotal: 394653784 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
- SuSE-release:
  - NAME="SLES"
  - VERSION="12-SP2"
  - VERSION_ID="12.2"
  - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  - ID="sles"
  - ANSI_COLOR="0;32"
  - CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 21 22:24

SPEC is set to: /home/cpu2006-1.2
- Filesystem     Type Size Used Avail Use% Mounted on
  /dev/sdb7      xfs 416G 119G 297G 29% /home

Additional information from dmidecode:
Continued on next page
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8170M, 2.10 GHz)

SPECfp2006 = 149
SPECfp_base2006 = 142

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

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 Cisco Systems, Inc. C220M5.3.1.1.d.0.0615170645 06/15/2017
Memory:
24x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666 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"
LD_LIBRARY_PATH = "/home/cpu2006-1.2/lib/ia32:/home/cpu2006-1.2/lib/intel64:/home/cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "52"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

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
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main

Continued on next page
Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Platinum 8170M, 2.10 GHz)

| SPECfp2006 | 149 |
| SPECfp_base2006 | 142 |

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

Test date: Nov-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

Base Portability Flags (Continued)

<table>
<thead>
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<tbody>
<tr>
<td>437.leslie3d: -DSPEC_CPU_LP64</td>
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<td>444.namd: -DSPEC_CPU_LP64</td>
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<td>447.dealII: -DSPEC_CPU_LP64</td>
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<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>
</tr>
</tbody>
</table>

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

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

Peak Portability Flags

Same as Base Portability Flags
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8170M, 2.10 GHz)

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SPECfp_base2006 = 142

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

Test date: Nov-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

Peak Optimization Flags

C benchmarks:
   433.milc: basepeak = yes
   470.lbm: basepeak = yes
   482.sphinx3: basepeak = yes

C++ benchmarks:
   444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
              -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
              -no-prec-div(pass 2) -fno-alias -auto-ilp32
   447.dealII: basepeak = yes
   450.soplex: basepeak = yes
   453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
               -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
               -no-prec-div(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:
   410.bwaves: basepeak = yes
   416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
                -no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-
   434.zeusmp: basepeak = yes
   437.leslie3d: basepeak = yes
   459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
                  -no-prec-div(pass 2) -unroll2 -inline-level=0
                  -qopt-prefetch -parallel
   465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
                -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
                -no-prec-div(pass 2) -inline-calloc -qopt-malloc-options=3
                -auto -unroll4

Benchmarks using both Fortran and C:
   435.gromacs: basepeak = yes
   436.cactusADM: basepeak = yes

Continued on next page
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8170M, 2.10 GHz)

SPECfp2006 = 149
SPECfp_base2006 = 142

Peak Optimization Flags (Continued)

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

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-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revH.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revH.xml