Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Silver 4112, 2.60GHz)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>101</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>98.7</td>
</tr>
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</table>

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems
Test date: Sep-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

<table>
<thead>
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<th>SPECfp®2006 = 101</th>
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Hardware

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Silver 4112</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz</td>
</tr>
<tr>
<td>CPU MHz: 2600</td>
</tr>
<tr>
<td>FPU: Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable: 1,2 chips</td>
</tr>
<tr>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache: 1 MB I+D on chip per core</td>
</tr>
</tbody>
</table>

Software

<table>
<thead>
<tr>
<th>Operating System: SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
</tr>
<tr>
<td>Auto Parallel: Yes</td>
</tr>
<tr>
<td>File System: xfs</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>
## SPEC CFP2006 Result

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### CPU2006 license: 9019
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- **L3 Cache:** 8.25 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R, running at 2400 MHz)
- **Disk Subsystem:** 1 x 300 GB SAS HDD, 15K 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</th>
<th>Seconds Peak</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>26.9</td>
<td>506</td>
<td>26.7</td>
<td>508</td>
</tr>
<tr>
<td>416.gamess</td>
<td>499</td>
<td>39.2</td>
<td>469</td>
<td>41.7</td>
</tr>
<tr>
<td>433.milc</td>
<td>137</td>
<td>66.9</td>
<td>137</td>
<td>66.9</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>51.8</td>
<td>176</td>
<td>51.8</td>
<td>176</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>142</td>
<td>50.1</td>
<td>142</td>
<td>50.1</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>20.0</td>
<td>597</td>
<td>20.0</td>
<td>597</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>37.9</td>
<td>248</td>
<td>37.9</td>
<td>249</td>
</tr>
<tr>
<td>444.namd</td>
<td>278</td>
<td>28.8</td>
<td>278</td>
<td>28.9</td>
</tr>
<tr>
<td>447.dealII</td>
<td>193</td>
<td>59.3</td>
<td>193</td>
<td>59.3</td>
</tr>
<tr>
<td>450.soplex</td>
<td>222</td>
<td>37.5</td>
<td>222</td>
<td>37.5</td>
</tr>
<tr>
<td>453.povray</td>
<td>94.6</td>
<td>56.3</td>
<td>94.0</td>
<td>56.6</td>
</tr>
<tr>
<td>454.calcix</td>
<td>135</td>
<td>61.0</td>
<td>133</td>
<td>61.9</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>64.2</td>
<td>165</td>
<td>64.2</td>
<td>165</td>
</tr>
<tr>
<td>465.tonto</td>
<td>214</td>
<td>46.0</td>
<td>214</td>
<td>46.0</td>
</tr>
<tr>
<td>470.lbm</td>
<td>25.6</td>
<td>538</td>
<td>25.6</td>
<td>538</td>
</tr>
<tr>
<td>481.wrf</td>
<td>139</td>
<td>80.2</td>
<td>139</td>
<td>80.2</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>311</td>
<td>62.6</td>
<td>311</td>
<td>62.6</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 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)

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**SPECfp2006** = 101
**SPECfp_base2006** = 98.7

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
<th>9019</th>
</tr>
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<tbody>
<tr>
<td>Test sponsor:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Test date:</td>
<td>Sep-2017</td>
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<td>Hardware Availability:</td>
<td>Aug-2017</td>
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**Platform Notes (Continued)**

running on linux-sca0 Sun Sep 3 23:21:02 2017

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) Silver 4112 CPU @ 2.60GHz
  2 "physical id"s (chips)
  8 "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 : 4
siblings : 4
  physical 0: cores 0 1 3 4
  physical 1: cores 1 2 4 5
cache size : 8448 KB

From /proc/meminfo
MemTotal:       394653576 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # 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-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:
Linux linux-sca0 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Sep 3 23:01

SPEC is set to: /home/cpu2006-1.2

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Continued on next page
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Platform Notes (Continued)
/dev/sdb3  xfs  237G  13G  224G  6% /home
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 Cisco Systems, Inc. C240M5.3.1.1id.0.0615170707 06/15/2017
Memory: 24x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666 MHz, configured at 2400 MHz

(End of data from syslog info 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 = "8"

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

Continued on next page
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### Base Portability Flags (Continued)

- 435.gromacs: -DSPEC_CPU_LP64 -nofor_main
- 436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
- 437.leslie3d: -DSPEC_CPU_LP64
- 444.namd: -DSPEC_CPU_LP64 -nofor_main
- 447.dealII: -DSPEC_CPU_LP64
- 450.soplex: -DSPEC_CPU_LP64
- 453.povray: -DSPEC_CPU_LP64
- 454.calculix: -DSPEC_CPU_LP64 -nofor_main
- 459.GemsFDTD: -DSPEC_CPU_LP64
- 465.tonto: -DSPEC_CPU_LP64
- 470.lbm: -DSPEC_CPU_LP64
- 481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
- 482.sphinx3: -DSPEC_CPU_LP64

### 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
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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: -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-ilk32
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 -gopt-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 -gopt-malloc-options=3 -auto -unroll4

Continued on next page
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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
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