Cisco Systems
Cisco UCS B460 M4 (Intel Xeon E7-8870 v4 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>122</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>117</td>
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CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems

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Test date: Apr-2017
Hardware Availability: Apr-2016
Software Availability: Sep-2016

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>410.bwaves</td>
<td>39.1</td>
</tr>
<tr>
<td>416.gamess</td>
<td>35.8</td>
</tr>
<tr>
<td>433.milc</td>
<td>61.3</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>179</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>44.2</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>1070</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>310</td>
</tr>
<tr>
<td>444.namd</td>
<td>27.0</td>
</tr>
<tr>
<td>447.dealII</td>
<td>55.3</td>
</tr>
<tr>
<td>450.soplex</td>
<td>42.6</td>
</tr>
<tr>
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<td>60.4</td>
</tr>
<tr>
<td>454.calculix</td>
<td>53.0</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>227</td>
</tr>
<tr>
<td>465.tonto</td>
<td>50.9</td>
</tr>
<tr>
<td>470.lbm</td>
<td>38.8</td>
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<tr>
<td>481.wrf</td>
<td>113</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>68.5</td>
</tr>
</tbody>
</table>

Software
Operating System: SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default
Compiler: C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux;
Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)

Hardware
CPU Name: Intel Xeon E7-8870 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 80 cores, 4 chips, 20 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

Continued on next page
# SPEC CFP2006 Result

## Cisco Systems

Cisco UCS B460 M4 (Intel Xeon E7-8870 v4 2.10 GHz)

### SPEC CFP2006 = 122

### SPECfp_base2006 = 117

<table>
<thead>
<tr>
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<tr>
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<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>L3 Cache:</td>
<td>50 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
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<tr>
<td>Memory:</td>
<td>1 TB (32 x 32 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)</td>
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<tr>
<td>Disk Subsystem:</td>
<td>1 x 400 GB SAS SSD</td>
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<tr>
<td>Other Hardware:</td>
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<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
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<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
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<tr>
<td>Other Software:</td>
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
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<td>51.9</td>
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<td>470.lbm</td>
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<td>285</td>
<td>68.4</td>
<td>284</td>
<td>68.7</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 Hyper-Threading Technology option set to Disabled
- CPU performance set to Enterprise
- Power Technology set to Energy Efficient
- Energy Performance BIAS setting set to Balanced Performance
- Memory RAS configuration set to Maximum Performance
- Memory Power Saving Mode set to Disabled
- QPI Snoop Mode set to Home Directory Snoop with OSB
- Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6993

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Cisco UCS B460 M4 (Intel Xeon E7-8870 v4 2.10 GHz)

SPECfp2006 = 122
SPECfp_base2006 = 117

Platform Notes (Continued)

Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1) running on linux-3y2r Sun Apr 30 11:48:54 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) CPU E7-8870 v4 @ 2.10GHz
    4 "physical id"s (chips)
    80 "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 : 20
    siblings : 20
    physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
    physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
    physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
    physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  cache size : 51200 KB

From /proc/meminfo
  MemTotal:       1058507792 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:
    Linux linux-3y2r 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 Jan 2 22:05

    SPEC is set to: /opt/cpu2006-1.2
    Filesystem   Type   Size   Used   Avail  Use% Mounted on
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CPU2006 license: 9019
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Platform Notes (Continued)
/dev/sda1      xfs   373G   21G  352G   6% /
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. EXM4.3.1.2c.0.080220161434 08/02/2016
Memory:
32x 0xCE00 M393A4K40BB0-CPB 32 GB 2 rank 2133 MHz, configured at 1600 MHz
64x NO DIMM NO DIMM 2400 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 = "/opt/cpu2006-1.2/libs/32:/opt/cpu2006-1.2/libs/64:/opt/cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "80"

Binaries compiled on a system with 1x Intel Core i7-4790K 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

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Base Portability Flags (Continued)

434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
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
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-iiip32
- 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

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## Cisco Systems

Cisco UCS B460 M4 (Intel Xeon E7-8870 v4 2.10 GHz)

| SPECfp2006 | 122 |
| SPECfp_base2006 | 117 |

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

### 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.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.xml

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

Tested with SPEC CPU2006 v1.2.
Report generated on Wed May 31 12:00:11 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 31 May 2017.