Cisco Systems
Cisco UCS B460 M4 (Intel Xeon E7-4850 v4 2.10 GHz)

| SPECfp®2006 = | 113 |
| SPECfp_base2006 = | 109 |

| SPECfp®2006 = | 113 |
| SPECfp_base2006 = | 109 |

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon E7-4850 v4</td>
<td>Operating System: SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default</td>
</tr>
<tr>
<td>CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz</td>
<td>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</td>
</tr>
<tr>
<td>CPU MHz: 2100</td>
<td>Auto Parallel: Yes</td>
</tr>
<tr>
<td>FPU: Integrated</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>CPU(s) orderable: 2,4 chips</td>
<td></td>
</tr>
<tr>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
<td></td>
</tr>
<tr>
<td>Secondary Cache: 256 KB I+D on chip per core</td>
<td></td>
</tr>
</tbody>
</table>

Tested by: Cisco Systems
Test date: May-2017
Hardware Availability: Apr-2016
Software Availability: Sep-2016

<table>
<thead>
<tr>
<th>benchmark</th>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
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<tbody>
<tr>
<td>410.bwaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>416.gamess</td>
<td></td>
<td></td>
</tr>
<tr>
<td>433.milc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>167</td>
<td></td>
</tr>
<tr>
<td>435.gromacs</td>
<td>41.9</td>
<td></td>
</tr>
<tr>
<td>436.cactusADM</td>
<td></td>
<td>903</td>
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<tr>
<td>437.leslie3d</td>
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<tr>
<td>444.namd</td>
<td>51.4</td>
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<tr>
<td>447.dealII</td>
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<td>450.soplex</td>
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<td>453.povray</td>
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<td>454.calculix</td>
<td>50.3</td>
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<tr>
<td>459.GemsFDTD</td>
<td>222</td>
<td></td>
</tr>
<tr>
<td>465.tonto</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>470.lbm</td>
<td>105</td>
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<tr>
<td>481.wrf</td>
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<tr>
<td>482.sphinx3</td>
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</table>
SPEC CFP2006 Result

Cisco Systems
Cisco UCS B460 M4 (Intel Xeon E7-4850 v4 2.10 GHz)

SPECfp2006 = 113
SPEC_fp_base2006 = 109

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems
L3 Cache: 40 MB I+D on chip per chip
Other Cache: None
Memory: 1 TB (32 x 32 GB 2Rx4 PC4-2133P-R, running at 1333 MHz)
Disk Subsystem: 1 x 400 GB SAS 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>301</td>
<td>64.9</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 Systems
Cisco UCS B460 M4 (Intel Xeon E7-4850 v4 2.10 GHz)

SPECfp2006 = 113
SPECfp_base2006 = 109

CPU2006 license: 9019
Test sponsor: Cisco Systems
Tested by: Cisco Systems
Test date: May-2017
Hardware Availability: Apr-2016
Software Availability: Sep-2016

Platform Notes (Continued)

Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
runtime on linux-3y2r Thu May 4 11:33:36 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 E7-4850 v4 @ 2.10GHz
  4 "physical id"s (chips)
  64 "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 : 16
    siblings  : 16
    physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
    cache size : 40960 KB

From /proc/meminfo
  MemTotal:       1058510096 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  SuSE-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 21:21

  SPEC is set to: /opt/cpu2006-1.2
  Filesystem   Type   Size  Used  Avail Use% Mounted on
Continued on next page
Cisco Systems
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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 1333 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 = "64"

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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Cisco UCS B460 M4 (Intel Xeon E7-4850 v4 2.10 GHz)

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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
Cisco Systems
Cisco UCS B460 M4 (Intel Xeon E7-4850 v4 2.10 GHz)

| SPECfp2006 | 113 |
| SPECfp_base2006 | 109 |

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

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

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-ipl32
- 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 E7-4850 v4 2.10 GHz)

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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.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
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revD.20170404.xml