## Cisco Systems

Cisco UCS C460 M4 (Intel Xeon E7-8870 v4 2.10 GHz)

<table>
<thead>
<tr>
<th>CPU2006 license: 9019</th>
<th>Test date: Oct-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor: Cisco Systems</td>
<td>Hardware Availability: Jul-2016</td>
</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td>Software Availability: Dec-2015</td>
</tr>
</tbody>
</table>

### SPECint2006 = 64.5

### SPECint_base2006 = 62.8

#### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E7-8870 v4</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.00 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2100</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>80 cores, 4 chips, 20 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</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>
</tr>
<tr>
<td>Memory:</td>
<td>512 GB (32 x 16 GB 2Rx4 PC4-2400T-R, running at 1600 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 400 GB SAS SSD</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System:</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software:</td>
<td>Microquill SmartHeap V10.2</td>
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</tbody>
</table>
Cisco Systems
Cisco UCS C460 M4 (Intel Xeon E7-8870 v4 2.10 GHz)

<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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<tbody>
<tr>
<td>Base</td>
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<tr>
<td>400.perlbench</td>
<td>277</td>
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<td>35.3</td>
<td>277</td>
<td>35.3</td>
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<td>401.bzip2</td>
<td>448</td>
<td>21.5</td>
<td>447</td>
<td>21.6</td>
<td>446</td>
<td>21.7</td>
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<td>45.7</td>
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<td>473.astar</td>
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<td>93.3</td>
<td>73.9</td>
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<td>74.0</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes
The config file option 'submit' was used.

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.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-69f9 Sat Oct 1 22:38:26 2016

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)

Continued on next page
Cisco Systems
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SPECint2006 = 64.5
SPECint_base2006 = 62.8

Platform Notes (Continued)

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: 529297028 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 Oct 1 22:37

  SPEC is set to: /opt/cpu2006-1.2
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda1 xfs 372G 36G 336G 10% /

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. C460M4.2.0.12b.0.062120160920 06/21/2016
  Memory:
## Platform Notes (Continued)

```
32x 0xCE00 M393A2G40EB1-CRC 16 GB 2 rank 2400 MHz, configured at 1600 MHz
64x 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"
LD_LIBRARY_PATH = "/opt/cpu2006-1.2/libs/32:/opt/cpu2006-1.2/libs/64:/opt/cpu2006-1.2/sh"
OMP_NUM_THREADS = "80"
```

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

## Base Compiler Invocation

- C benchmarks: `icc -m64`
- C++ benchmarks: `icpc -m64`

## Base Portability Flags

- **400.perlbench:** -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
- **401.bzip2:** -DSPEC_CPU_LP64
- **403.gcc:** -DSPEC_CPU_LP64
- **429.mcf:** -DSPEC_CPU_LP64
- **445.gobmk:** -DSPEC_CPU_LP64
- **456.hmmer:** -DSPEC_CPU_LP64
- **458.sjeng:** -DSPEC_CPU_LP64
- **462.libquantum:** -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
- **464.h264ref:** -DSPEC_CPU_LP64
- **471.omnetpp:** -DSPEC_CPU_LP64
- **473.astar:** -DSPEC_CPU_LP64
- **483.xalancbmk:** -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

## Base Optimization Flags

- **C benchmarks:** `-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32`
- **C++ benchmarks:** `-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -lsmartheap64`
Cisco Systems
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**SPECint2006 =**  64.5  
**SPECint_base2006 =**  62.8

**CPU2006 license:** 9019  
**Test sponsor:** Cisco Systems  
**Tested by:** Cisco Systems  
**Test date:** Oct-2016  
**Hardware Availability:** Jul-2016  
**Software Availability:** Dec-2015

### Base Other Flags
- **C benchmarks:**
  - 403.gcc: -Dalloca=_alloca

### Peak Compiler Invocation
- **C benchmarks (except as noted below):**
  - **icc** -m64
  - 400.perlbench: **icc** -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
- **C++ benchmarks (except as noted below):**
  - **icpc** -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
  - 473.astar: **icpc** -m64

### Peak Portability Flags
- **C benchmarks:**
  - 400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
  - 401.bzip2: -DSPEC_CPU_LP64
  - 403.gcc: -DSPEC_CPU_LP64
  - 429.mcf: -DSPEC_CPU_LP64
  - 445.gobmk: -D_FILE_OFFSET_BITS=64
  - 456.hmmer: -DSPEC_CPU_LP64
  - 458.sjeng: -DSPEC_CPU_LP64
  - 462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
  - 464.h264ref: -DSPEC_CPU_LP64
  - 471.omnetpp: -D_FILE_OFFSET_BITS=64
  - 473.astar: -DSPEC_CPU_LP64
  - 483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

### Peak Optimization Flags
- **C benchmarks:**
  - 400.perlbench: -xCORE-AVX2(pass 2) -prof-gen:threadsafepass 1
  - -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
  - -par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch
  - -ansi-alias
  - 401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafepass 1
  - -ipo(pass 2) -O3(pass 2) -no-prec-div
  - -par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32

Continued on next page
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CPU2006 license: 9019
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Peak Optimization Flags (Continued)

401.bzip2 (continued):
   -opt-prefetch -ansi-alias

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
   -opt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
   -opt-prefetch -auto-p32

445.gobmk: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
   -prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias

456.hmmer: basepeak = yes

458.sjeng: -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

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -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)
   -opt-ra-region-strategy=block -ansi-alias
   -Wl,-z,muldefs -L/sh -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
   -auto-p32 -Wl,-z,muldefs -L/sh -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
   -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revE.html
## SPEC CINT2006 Result

**Cisco Systems**  
Cisco UCS C460 M4 (Intel Xeon E7-8870 v4  2.10 GHz)  

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<tr>
<th>SPECint2006</th>
<th>64.5</th>
<th>SPECint_base2006</th>
<th>62.8</th>
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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/Cisco-Platform-Settings-V1.2-revE.xml

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For questions about this result, please contact the tester.  
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.  
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