Cisco Systems

Cisco UCS C220 M4 (Intel Xeon E5-2620 v4, 2.10 GHz)

SPECint\textsuperscript{2006} = 59.5
SPECint\textsubscript{base2006} = 56.9

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

Test date: Aug-2016
Hardware Availability: Apr-2016
Software Availability: Dec-2015

Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon E5-2620 v4</th>
</tr>
</thead>
<tbody>
<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>16 cores, 2 chips, 8 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>20 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 300 GB SAS HDD, 15K RPM</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
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</tbody>
</table>

Software

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default</th>
</tr>
</thead>
<tbody>
<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>
</tr>
</tbody>
</table>
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2620 v4, 2.10 GHz)

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CPU2006 license: 9019
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Test date: Aug-2016
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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>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>274</td>
<td>35.6</td>
<td>274</td>
<td>35.7</td>
<td>274</td>
<td>35.7</td>
<td>274</td>
<td>35.7</td>
<td>251</td>
<td>38.9</td>
<td>252</td>
<td>38.8</td>
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<tr>
<td>401.bzip2</td>
<td>436</td>
<td>22.1</td>
<td>437</td>
<td>22.1</td>
<td>439</td>
<td>22.0</td>
<td>429</td>
<td>22.5</td>
<td>429</td>
<td>22.5</td>
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<tr>
<td>403.gcc</td>
<td>241</td>
<td>33.4</td>
<td>241</td>
<td>33.4</td>
<td>241</td>
<td>33.4</td>
<td>243</td>
<td>33.2</td>
<td>242</td>
<td>33.2</td>
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<tr>
<td>429.mcf</td>
<td>152</td>
<td>60.2</td>
<td>150</td>
<td>60.6</td>
<td>152</td>
<td>60.0</td>
<td>152</td>
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<td>150</td>
<td>60.9</td>
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<tr>
<td>445.gobmk</td>
<td>407</td>
<td>25.8</td>
<td>406</td>
<td>25.8</td>
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<td>25.9</td>
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<td>25.7</td>
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<td>456.hmmer</td>
<td>126</td>
<td>74.0</td>
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<tr>
<td>458.sjeng</td>
<td>407</td>
<td>29.7</td>
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<td>29.8</td>
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<td>29.7</td>
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<td>30.1</td>
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<tr>
<td>462.libquantum</td>
<td>4.78</td>
<td>4330</td>
<td>4.81</td>
<td>4310</td>
<td>4.78</td>
<td>4340</td>
<td>4.78</td>
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<td>4.81</td>
<td>4310</td>
<td>4.78</td>
<td>4340</td>
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<tr>
<td>464.h264ref</td>
<td>443</td>
<td>50.0</td>
<td>443</td>
<td>49.9</td>
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<td>49.9</td>
<td>443</td>
<td>49.9</td>
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</tr>
<tr>
<td>471.omnetpp</td>
<td>226</td>
<td>27.7</td>
<td>225</td>
<td>27.8</td>
<td>224</td>
<td>27.8</td>
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<td>38.8</td>
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<td>39.0</td>
<td>160</td>
<td>39.0</td>
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<tr>
<td>473.astar</td>
<td>220</td>
<td>31.9</td>
<td>219</td>
<td>32.0</td>
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<td>32.1</td>
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<td>31.9</td>
<td>221</td>
<td>31.7</td>
<td>220</td>
<td>31.9</td>
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<tr>
<td>483.xalancbmk</td>
<td>105</td>
<td>65.5</td>
<td>104</td>
<td>66.1</td>
<td>104</td>
<td>66.1</td>
<td>95.1</td>
<td>72.6</td>
<td>95.0</td>
<td>72.6</td>
<td>95.0</td>
<td>72.6</td>
</tr>
</tbody>
</table>

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

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 E5-2620 v4 @ 2.10GHz
2 "physical id"s (chips)
Continued on next page
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2620 v4, 2.10 GHz)

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Platform Notes (Continued)

16 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
cache size : 20480 KB

From /proc/meminfo
MemTotal: 264569532 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 Aug 21 19:52

SPEC is set to: /opt/cpu2006-1.2

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 xfs 279G 13G 267G 5% /

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. C220M4.2.0.10c.0.032320160810 03/23/2016
Memory:
16x 0xCE00 M393A2G40EB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133 MHz
8x NO DIMM NO DIMM

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Cisco Systems
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Platform Notes (Continued)

(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 = "16"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

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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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
445.gobmk: 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

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:threadsafe(pass 1)
-ipoo(pass 2) -03(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:threadsafe(pass 1)
-ipoo(pass 2) -03(pass 2) -no-prec-div
-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32

Continued on next page
 Cisco UCS C220 M4 (Intel Xeon E5-2620 v4, 2.10 GHz)  

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**CPU2006 license:** 9019  
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**Hardware Availability:** Apr-2016  
**Tested by:** Cisco Systems  
**Software Availability:** Dec-2015

### 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

- **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 C220 M4 (Intel Xeon E5-2620 v4, 2.10 GHz)

| SPECint2006 = | 59.5 |
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You can also download the XML flags sources by saving the following links:

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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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