**Cisco Systems**

 Cisco UCS C220 M4 (Intel Xeon E5-2660 v4, 2.00 GHz)

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
<th>9019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2660 v4</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.20 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2000</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>28 cores, 2 chips, 14 cores/chip</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>35 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory:</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 960 GB SAS HDD</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>

| Operating System: | SUSE Linux Enterprise Server 12 SP1 (x86_64) 3.12.49-11-default |
| Compiler:         | C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux |
| Auto Parallel:    | Yes |
| File System:      | xfs |
| System State:     | Run level 3 (multi-user) |
| Base Pointers:    | 32/64-bit |
| Peak Pointers:    | 32/64-bit |
| Other Software:   | Microquill SmartHeap V10.2 |

**SPECint®2006 = 66.2**

**SPECint_base2006 = 63.6**

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Jul-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2016</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
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</table>

**SPEC® CINT2006 Result**

---

**Standard Performance Evaluation Corporation**

info@spec.org

http://www.spec.org/
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2660 v4, 2.00 GHz)

SPECint2006 = 66.2
SPECint_base2006 = 63.6

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>258</td>
<td>37.8</td>
<td>259</td>
<td>37.8</td>
<td>259</td>
<td>37.7</td>
<td>237</td>
<td>41.2</td>
<td>238</td>
<td>41.1</td>
<td>238</td>
<td>41.1</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>421</td>
<td>22.9</td>
<td>420</td>
<td>23.0</td>
<td>421</td>
<td>22.9</td>
<td>413</td>
<td>23.4</td>
<td>413</td>
<td>23.3</td>
<td>413</td>
<td>23.3</td>
</tr>
<tr>
<td>403.gcc</td>
<td>225</td>
<td>35.8</td>
<td>225</td>
<td>35.8</td>
<td>225</td>
<td>35.7</td>
<td>244</td>
<td>36.0</td>
<td>226</td>
<td>35.6</td>
<td>225</td>
<td>35.8</td>
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<tr>
<td>429.mcf</td>
<td>148</td>
<td>61.5</td>
<td>150</td>
<td>60.9</td>
<td>151</td>
<td>60.5</td>
<td>148</td>
<td>61.8</td>
<td>148</td>
<td>61.6</td>
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<tr>
<td>445.gobmk</td>
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<td>27.6</td>
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<td>27.6</td>
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<td>27.3</td>
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<td>456.hmmer</td>
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<td>78.5</td>
<td>118</td>
<td>78.9</td>
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<td>78.8</td>
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<td>78.5</td>
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<td>458.sjeng</td>
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<td>32.0</td>
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<tr>
<td>462.libquantum</td>
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<td>6420</td>
<td>3.22</td>
<td>6430</td>
<td>3.21</td>
<td>6460</td>
<td>3.23</td>
<td>6420</td>
<td>3.22</td>
<td>6430</td>
<td>3.21</td>
<td>6460</td>
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<tr>
<td>464.h264ref</td>
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<td>52.3</td>
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<td>52.7</td>
<td>421</td>
<td>52.6</td>
<td>423</td>
<td>52.3</td>
<td>420</td>
<td>52.7</td>
<td>421</td>
<td>52.6</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>152</td>
<td>41.2</td>
<td>151</td>
<td>41.3</td>
<td>152</td>
<td>41.2</td>
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<td>53.3</td>
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<td>53.0</td>
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<tr>
<td>473.astar</td>
<td>208</td>
<td>33.7</td>
<td>208</td>
<td>33.7</td>
<td>208</td>
<td>33.7</td>
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<td>33.9</td>
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<td>33.8</td>
<td>207</td>
<td>33.9</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>97.8</td>
<td>70.6</td>
<td>98.4</td>
<td>70.1</td>
<td>97.9</td>
<td>70.5</td>
<td>87.4</td>
<td>79.0</td>
<td>87.5</td>
<td>78.8</td>
<td>87.3</td>
<td>79.0</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-40jf Tue Jul 12 09:05:46 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 E5-2660 v4@ 2.00GHz
  2 "physical id" (chips)

Continued on next page
Cisco UCS C220 M4 (Intel Xeon E5-2660 v4, 2.00 GHz)

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

CPU2006 license: 9019
Test date: Jul-2016
Hardware Availability: Apr-2016
Software Availability: Dec-2015

Platform Notes (Continued)

28 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)

   cpu cores : 14
   siblings : 14
   physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
   physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
   cache size : 35840 KB

From /proc/meminfo
MemTotal:  264568500 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 Jul 12 08:17

SPEC is set to: /opt/cpu2006-1.2

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda1      xfs   893G   14G  880G   2% /

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
   8x NO DIMM NO DIMM

Continued on next page
## SPEC CINT2006 Result

### Cisco Systems

Cisco UCS C220 M4 (Intel Xeon E5-2660 v4, 2.00 GHz)

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

### 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 = "28"`

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 -03 -no-prec-div -parallel -opt-prefetch -auto-p32

- **C++ benchmarks:**
  - -xCORE-AVX2 -ipo -03 -no-prec-div -opt-prefetch -auto-p32
  - -Wl,-z,muldefs -L/sh -lsmartheap64
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2660 v4, 2.00 GHz)

| SPECint2006 = | 66.2 |
| SPECint_base2006 = | 63.6 |

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

| Test date: | Jul-2016 |
| Hardware Availability: | Apr-2016 |
| Software Availability: | Dec-2015 |

Base Other Flags

C benchmarks:

403.gcc -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):

```bash
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):

```bash
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
473.astar: icpc -m64
```

Peak Portability Flags

```bash
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:

```bash
400.perlbench: -xCORE-AVX2(pass 2) -prof-gen:threadsafepass 1
ipro(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
ipro(pass 2) -O3(pass 2) -no-prec-div
-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32
```

Continued on next page
Cisco Systems
Cisco UCS C220 M4 (Intel Xeon E5-2660 v4, 2.00 GHz)

SPECint2006 = 66.2
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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
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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.

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