Cisco Systems
Cisco UCS C480 M5 (Intel Xeon Gold 6150 2.70GHz)

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Aug-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Aug-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2017</td>
</tr>
</tbody>
</table>

| SPECint®2006 = | 79.5 |
| SPECint_base2006 = | 76.0 |

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

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System: Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.el7.x86_64</td>
<td>CPU Name: Intel Xeon Gold 6150</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux</td>
<td>CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz</td>
</tr>
<tr>
<td>Auto Parallel: Yes</td>
<td>CPU MHz: 2700</td>
</tr>
<tr>
<td>File System: xfs</td>
<td>FPU: Integrated</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>CPU(s) enabled: 72 cores, 4 chips, 18 cores/chip</td>
</tr>
<tr>
<td>Base Pointers: 32/64-bit</td>
<td>CPU(s) orderable: 2,4 chips</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Other Software: Microquill SmartHeap V10.2</td>
<td>Secondary Cache: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td></td>
<td>L3 Cache: 24.75 MB I+D on chip per core</td>
</tr>
<tr>
<td></td>
<td>Other Cache: None</td>
</tr>
<tr>
<td></td>
<td>Memory: 768 GB (48 x 16 GB 2Rx4 PC4-2666V-R)</td>
</tr>
<tr>
<td></td>
<td>Disk Subsystem: 1 x 600 GB SAS HDD, 10K RPM</td>
</tr>
<tr>
<td></td>
<td>Other Hardware: None</td>
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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>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>209</td>
<td>46.8</td>
<td>210</td>
<td>46.6</td>
<td>209</td>
<td>46.7</td>
<td>184</td>
<td>53.0</td>
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<tr>
<td>401.bzip2</td>
<td>340</td>
<td>28.4</td>
<td>340</td>
<td>28.4</td>
<td>340</td>
<td>28.4</td>
<td>340</td>
<td>28.4</td>
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<tr>
<td>403.gcc</td>
<td>186</td>
<td>43.2</td>
<td>187</td>
<td>43.2</td>
<td>187</td>
<td>43.1</td>
<td>181</td>
<td>44.6</td>
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<td>429.mcf</td>
<td>116</td>
<td>78.6</td>
<td>117</td>
<td>78.0</td>
<td>114</td>
<td>79.7</td>
<td>118</td>
<td>77.3</td>
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<tr>
<td>445.gobmk</td>
<td>312</td>
<td>33.6</td>
<td>313</td>
<td>33.6</td>
<td>312</td>
<td>33.7</td>
<td>311</td>
<td>33.8</td>
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<tr>
<td>456.hmmer</td>
<td>96.5</td>
<td>96.7</td>
<td>96.4</td>
<td>96.8</td>
<td>96.5</td>
<td>96.7</td>
<td>96.5</td>
<td>96.7</td>
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<tr>
<td>458.sjeng</td>
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<td>37.2</td>
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<td>37.2</td>
<td>326</td>
<td>37.2</td>
<td>319</td>
<td>37.9</td>
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<tr>
<td>462.libquantum</td>
<td>2.44</td>
<td>8500</td>
<td>2.44</td>
<td>8490</td>
<td>2.50</td>
<td>8300</td>
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<td>464.h264ref</td>
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<td>70.5</td>
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<td>70.2</td>
</tr>
<tr>
<td>471.omnetpp</td>
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<td>36.5</td>
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<td>473.astar</td>
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<td>39.0</td>
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<td>39.1</td>
<td>181</td>
<td>38.9</td>
<td>181</td>
<td>38.8</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>86.5</td>
<td>79.8</td>
<td>86.9</td>
<td>79.4</td>
<td>86.5</td>
<td>79.8</td>
<td>77.5</td>
<td>89.0</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 HyperThreading Technology set to Disabled
CPU performance set to Enterprise
Power Performance Tuning set to OS
SNC set to Disabled
IMC Interleaving set to Auto
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on rhe173-spec Fri 25 16:31:30 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) Gold 6150 CPU @ 2.70GHz
4 "physical id"s (chips)
72 "processors"
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Software Availability: Apr-2017

Platform Notes (Continued)

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 : 18
- siblings : 18
- physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
- physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
- physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
- physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
- cache size : 25344 KB

From /proc/meminfo

- MemTotal: 790981160 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

- os-release:
  - NAME="Red Hat Enterprise Linux Server"
  - VERSION="7.3 (Maipo)"
  - ID="rhel"
  - ID_LIKE="fedora"
  - VERSION_ID="7.3"
  - PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
  - ANSI_COLOR="0;31"
  - CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"

- redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
- system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

unname -a:

Linux rhel73-spec 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Aug 25 15:35

SPEC is set to: /home/cpu2006-1.2

- Filesystem Type Size Used Avail Use% Mounted on
  /dev/sdb5 xfs 503G 30G 474G 6% /home

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. C480M5.3.1.0.272.0613172154 06/13/2017Cisco Systems, Inc. C480M5.3.1.0.272.0613172154 06/13/2017
- Memory:
  - 96x 0xCE000 M393A2G40EB2-CTD 16 GB 2 rank 2666 MHz

(End of data from sysinfo program)
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Platform Notes (Continued)

The correct amount of Memory installed is 768 GB (48 x 16 GB) and the dmidecode is reporting invalid number of DIMMs installed

Installed Memory:
48x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2006-1.2/lib/ia32:/home/cpu2006-1.2/lib/intel64:/home/cpu2006-1.2/sh10.2"
OMP_NUM_THREADS = "72"

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

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 -qopt-prefetch
-auto-p32

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Base Optimization Flags (Continued)

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh10.2 -lsmarheap64

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_2017/linux/lib/ia32
445.gobmk: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks (except as noted below):
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
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
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

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
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Peak Optimization Flags

C benchmarks:

400.perlbench: -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) -qopt-prefetch

401.bzip2: -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 -auto-ilp32 -qopt-prefetch

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

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

445.gobmk: -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)

456.hmmer: basepeak = yes

458.sjeng: -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

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -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) -qopt-ra-region-strategy=block
   -Wl,-z,muldefs -L/sh10.2 -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
   -auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
   -Wl,-z,muldefs -L/sh10.2 -lsmartheap

Peak Other Flags

C benchmarks:
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Peak Other Flags (Continued)

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-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revH.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-revF.xml
http://www.spec.org/cpu2006/flags/Cisco-Platform-Settings-V1.2-revH.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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