Cisco Systems
Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECint®2006 = 73.1
SPECint_base2006 = 71.0

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

Hardware
CPU Name: Intel Xeon E5-2698 v4
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz
CPU MHz: 2200
FPU: Integrated
CPU(s) enabled: 40 cores, 2 chips, 20 cores/chip
CPU(s) orderable: 1.2 chips
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 50 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 400 GB SSD SAS
Other Hardware: None

Software
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
Cisco Systems

Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 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>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>233</td>
<td>41.9</td>
<td>234</td>
<td>41.8</td>
<td>233</td>
<td>41.9</td>
<td>214</td>
<td>45.7</td>
<td>215</td>
<td>45.5</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>384</td>
<td>25.1</td>
<td>387</td>
<td>24.9</td>
<td>383</td>
<td>25.2</td>
<td>383</td>
<td>25.2</td>
<td>383</td>
<td>25.2</td>
</tr>
<tr>
<td>403.gcc</td>
<td>210</td>
<td>38.3</td>
<td>210</td>
<td>38.3</td>
<td>211</td>
<td>38.2</td>
<td>207</td>
<td>39.0</td>
<td>207</td>
<td>38.8</td>
</tr>
<tr>
<td>429.mcf</td>
<td>145</td>
<td>63.0</td>
<td>144</td>
<td>63.4</td>
<td>142</td>
<td>64.2</td>
<td>142</td>
<td>64.1</td>
<td>143</td>
<td>63.6</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>342</td>
<td>30.7</td>
<td>342</td>
<td>30.7</td>
<td>341</td>
<td>30.7</td>
<td>346</td>
<td>30.4</td>
<td>346</td>
<td>30.3</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>106</td>
<td>88.3</td>
<td>106</td>
<td>88.2</td>
<td>106</td>
<td>88.2</td>
<td>106</td>
<td>88.3</td>
<td>106</td>
<td>88.2</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>337</td>
<td>35.9</td>
<td>337</td>
<td>36.0</td>
<td>336</td>
<td>36.0</td>
<td>332</td>
<td>36.4</td>
<td>332</td>
<td>36.4</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>2.29</td>
<td>90.30</td>
<td>2.29</td>
<td>90.70</td>
<td>2.30</td>
<td>90.20</td>
<td>2.29</td>
<td>90.30</td>
<td>2.29</td>
<td>90.70</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>382</td>
<td>57.9</td>
<td>384</td>
<td>57.7</td>
<td>383</td>
<td>57.8</td>
<td>382</td>
<td>57.9</td>
<td>384</td>
<td>57.7</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>134</td>
<td>46.5</td>
<td>134</td>
<td>46.7</td>
<td>133</td>
<td>47.0</td>
<td>116</td>
<td>53.8</td>
<td>116</td>
<td>53.7</td>
</tr>
<tr>
<td>473.astar</td>
<td>193</td>
<td>36.4</td>
<td>190</td>
<td>36.9</td>
<td>194</td>
<td>36.3</td>
<td>194</td>
<td>36.2</td>
<td>194</td>
<td>36.2</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>91.7</td>
<td>75.2</td>
<td>92.9</td>
<td>74.3</td>
<td>92.2</td>
<td>74.8</td>
<td>84.2</td>
<td>81.9</td>
<td>84.3</td>
<td>81.9</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 Saving Mode set to Disabled
- QPI Snoop Mode set to Home Directory Snoop with OSB
- Sysinfo program /opt/CISCO_Benchmarks/cpu2006/config/sysinfo.rev6914
  $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-nsg9 Mon Apr 4 02:10:51 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 E5-2698 v4 @ 2.20GHz
  2 "physical id"s (chips)
Cisco Systems
Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECint2006 = 73.1
SPECint_base2006 = 71.0

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

Platform Notes (Continued)

40 "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 : 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
  cache size : 51200 KB

From /proc/meminfo
  MemTotal:         264366604 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP1

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 Apr 4 02:05

SPEC is set to: /opt/CISCO_Benchmarks/cpu2006
  Filesystem  Type  Size  Used  Avail  Use% Mounted on
  /dev/sda1   xfs   325G   13G  313G   4% /

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. B200M4.3.1.1.11.110420151758 11/04/2015
Continued on next page
Cisco Systems
Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECint2006 = 73.1
SPECint_base2006 = 71.0

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

Platform Notes (Continued)

Memory:
16x 0xCE00 M393A2G40EB1-CRC 16 GB 2 rank 2400 MHz
8x 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/CISCO_Benchmarks/cpu2006/libs/32:/opt/CISCO_Benchmarks/cpu2006/libs/64:/opt/CISCO_Benchmarks/cpu2006/sh"
OMP_NUM_THREADS = "40"

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

Continued on next page
Cisco Systems
Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECint2006 = 73.1
SPECint_base2006 = 71.0

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

Base Optimization Flags (Continued)

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -lsmartheap64

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 -DSPEC_CPU_LINUX
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
Cisco Systems
Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECint2006 = 73.1
SPECint_base2006 = 71.0

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

### Peak Optimization Flags

#### C benchmarks:

- **400.perlbench**: -xCORE-AVX2(2) -prof-gen:threadsafe(2) -ipo(2) -O3(2) -no-prec-div(2) -par-num-threads=1(2) -prof-use(2) -opt-prefetch -ansi-alias
- **401.bzip2**: -xCORE-AVX2(2) -prof-gen:threadsafe(2) -ipo(2) -O3(2) -no-prec-div -par-num-threads=1(2) -prof-use(2) -auto-1lp32 -opt-prefetch -ansi-alias
- **403.gcc**: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc -opt-malloc-options=3 -auto-1lp32
- **429.mcf**: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32
- **445.gobmk**: -xCORE-AVX2(2) -prof-gen:threadsafe(2) -prof-use(2) -par-num-threads=1(2) -ansi-alias
- **456.hmmer**: basepeak = yes
- **458.sjeng**: -xCORE-AVX2(2) -prof-gen:threadsafe(2) -ipo(2) -O3(2) -no-prec-div(2) -par-num-threads=1(2) -prof-use(2) -unroll4
- **462.libquantum**: basepeak = yes
- **464.h264ref**: basepeak = yes

#### C++ benchmarks:

- **471.omnetpp**: -xCORE-AVX2(2) -prof-gen:threadsafe(2) -ipo(2) -O3(2) -no-prec-div(2) -par-num-threads=1(2) -prof-use(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
Cisco Systems
Cisco UCS B200 M4 (Intel Xeon E5-2698 v4, 2.20 GHz)

SPECint2006 = 73.1
SPECint_base2006 = 71.0

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

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

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-revD.html

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-revD.xml

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue May 3 18:01:35 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 3 May 2016.