## SPECint® CINT2006 Result

### Cisco Systems

Cisco UCS B480 M5 (Intel Xeon Gold 6144, 3.50 GHz)

| SPECint_rate2006 | 2440 |
| SPECint_rate_base2006 | 2310 |

#### CPU2006 license: 9019

- **Test date:** Dec-2017
- **Hardware Availability:** Aug-2017
- **Software Availability:** Sep-2017

**Test sponsor:** Cisco Systems

**Tested by:** Cisco Systems

### Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon Gold 6144</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 4.20 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>3500</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>32 cores, 4 chips, 8 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>2,4 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>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache:</td>
<td>24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>768 GB (48 x 16 GB 2Rx4 PC4-2666V-R)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 600 GB SAS HDD, 10K RPM</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System:</td>
<td>SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran</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-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 B480 M5 (Intel Xeon Gold 6144, 3.50 GHz)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</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>64</td>
<td>392</td>
<td>1590</td>
<td>389</td>
<td>1610</td>
<td>392</td>
<td>1590</td>
<td>64</td>
<td>324</td>
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<tr>
<td>401.bzip2</td>
<td>64</td>
<td>599</td>
<td>1030</td>
<td>599</td>
<td>1030</td>
<td>601</td>
<td>1030</td>
<td>64</td>
<td>570</td>
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<tr>
<td>403.mcf</td>
<td>64</td>
<td>320</td>
<td>1610</td>
<td>321</td>
<td>1600</td>
<td>319</td>
<td>1610</td>
<td>64</td>
<td>313</td>
</tr>
<tr>
<td>429.mcf</td>
<td>64</td>
<td>185</td>
<td>3150</td>
<td>186</td>
<td>3150</td>
<td>186</td>
<td>3140</td>
<td>64</td>
<td>185</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>64</td>
<td>482</td>
<td>1390</td>
<td>481</td>
<td>1400</td>
<td>481</td>
<td>1400</td>
<td>64</td>
<td>483</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>64</td>
<td>182</td>
<td>3280</td>
<td>183</td>
<td>3270</td>
<td>181</td>
<td>3300</td>
<td>64</td>
<td>147</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>64</td>
<td>526</td>
<td>1470</td>
<td>526</td>
<td>1470</td>
<td>526</td>
<td>1470</td>
<td>64</td>
<td>497</td>
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<tr>
<td>462.libquantum</td>
<td>64</td>
<td>32.0</td>
<td>41500</td>
<td>32.1</td>
<td>41300</td>
<td>32.0</td>
<td>41500</td>
<td>64</td>
<td>32.0</td>
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<td>464.h264ref</td>
<td>64</td>
<td>554</td>
<td>2560</td>
<td>548</td>
<td>2580</td>
<td>552</td>
<td>2570</td>
<td>64</td>
<td>528</td>
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<tr>
<td>471.omnetpp</td>
<td>64</td>
<td>386</td>
<td>1040</td>
<td>387</td>
<td>1030</td>
<td>386</td>
<td>1040</td>
<td>64</td>
<td>353</td>
</tr>
<tr>
<td>473.astar</td>
<td>64</td>
<td>348</td>
<td>1290</td>
<td>347</td>
<td>1290</td>
<td>347</td>
<td>1290</td>
<td>64</td>
<td>348</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>64</td>
<td>155</td>
<td>2840</td>
<td>155</td>
<td>2850</td>
<td>156</td>
<td>2830</td>
<td>64</td>
<td>155</td>
</tr>
</tbody>
</table>

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS Settings:
Intel HyperThreading Technology set to Enabled
CPU performance set to Enterprise
Power Performance Tuning set to OS Controls
SNC set to Enabled
IMC Interleaving set to 1-way Interleave
Patrol Scrub set to Disabled
Sysinfo program /opt/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-qiw Fri Dec 15 19:32:25 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 6144 CPU @ 3.50GHz
Continued on next page

SPEC CINT2006 Result
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spec
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SPEC CINT2006 Result
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spec
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Cisco Systems
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SPECint_rate2006 = 2440
SPECint_rate_base2006 = 2310

CPU2006 license: 9019
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Platform Notes (Continued)

4 "physical id"s (chips)
64 "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 : 16
physical 0: cores 0 2 3 9 16 19 26 27
physical 1: cores 0 2 3 9 16 19 26 27
physical 2: cores 0 2 3 9 16 19 26 27
physical 3: cores 0 2 3 9 16 19 26 27
cache size : 25344 KB

From /proc/meminfo
MemTotal: 791027744 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
(9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 15 19:27

SPEC is set to: /opt/cpu2006-1.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 xfs 280G 29G 251G 11% /

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. B480M5.3.2.2a.0.0919171641 09/19/2017
SPEC CINT2006 Result

Cisco Systems
Cisco UCS B480 M5 (Intel Xeon Gold 6144, 3.50 GHz)

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CPU2006 license: 9019
Test sponsor: Cisco Systems
Test date: Dec-2017
Hardware Availability: Aug-2017
Tested by: Cisco Systems
Software Availability: Sep-2017

Platform Notes (Continued)

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

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/opt/intel/lib/ia32:/opt/intel/lib/intel64:/opt/cpu2006-1.2/sh10.2"

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
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
No: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
No: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.

This benchmark result is intended to provide perspective on
past performance using the historical hardware and/or
software described on this result page.

The system as described on this result page was formerly
generally available. At the time of this publication, it may
not be shipping, and/or may not be supported, and/or may fail
to meet other tests of General Availability described in the

This measured result may not be representative of the result
that would be measured were this benchmark run with hardware
and software available as of the publication date.

Base Compiler Invocation

C benchmarks:
icc -m32 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
Cisco Systems
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**SPECint_rate2006 = 2440**
**SPECint_rate_base2006 = 2310**

CPU2006 license: 9019
Test sponsor: Cisco Systems
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**Base Portability Flags**

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

**Base Optimization Flags**

C benchmarks:
-xHOST -ipo -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3

C++ benchmarks:
-xHOST -ipo -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3
-Wl,-z,muldefs -L/opt/cpu2006-1.2/sh10.2 -lsmartheap

**Base Other Flags**

C benchmarks:
403.gcc: -Dalloca=_alloca

**Peak Compiler Invocation**

C benchmarks (except as noted below):
icc -m32 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32

400.perlbench: icc -m64
401.bzip2: icc -m64
456.hmmer: icc -m64
458.sjeng: icc -m64

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
Cisco Systems
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<table>
<thead>
<tr>
<th>SPECint_rate2006</th>
<th>2440</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_rate_base2006</td>
<td>2310</td>
</tr>
</tbody>
</table>

CPU2006 license: 9019
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Peak Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>-DSPEC_CPU_LP64  -DSPEC_CPU_LINUX_X64</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>403.gcc</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>429.mcf</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>-D_FILE_OFFSET_BITS=64  -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>473.astar</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>-D_FILE_OFFSET_BITS=64  -DSPEC_CPU_LINUX</td>
</tr>
</tbody>
</table>

Peak Optimization Flags

C benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>-prof-gen(pass 1)  -prof-use(pass 2)  -xHOST(pass 2)  -par-num-threads=1(pass 1)  -ipo(pass 2)  -O3(pass 2)  -no-prec-div(pass 2)  -auto-ilp32  -qopt-mem-layout-trans=3</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>-prof-gen(pass 1)  -prof-use(pass 2)  -xHOST(pass 2)  -par-num-threads=1(pass 1)  -ipo(pass 2)  -O3(pass 2)  -no-prec-div(pass 2)  -qopt-prefetch  -auto-ilp32  -qopt-mem-layout-trans=3</td>
</tr>
<tr>
<td>403.gcc</td>
<td>-xHOST  -ipo  -O3  -no-prec-div  -qopt-mem-layout-trans=3</td>
</tr>
<tr>
<td>429.mcf</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>-prof-gen(pass 1)  -prof-use(pass 2)  -xHOST(pass 2)  -par-num-threads=1(pass 1)  -ipo(pass 2)  -O3(pass 2)  -no-prec-div(pass 2)  -qopt-mem-layout-trans=3</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>-xHOST  -ipo  -O3  -no-prec-div  -unroll2  -auto-ilp32  -qopt-mem-layout-trans=3</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>-prof-gen(pass 1)  -prof-use(pass 2)  -xHOST(pass 2)  -par-num-threads=1(pass 1)  -ipo(pass 2)  -O3(pass 2)  -no-prec-div(pass 2)  -unroll4  -auto-ilp32  -qopt-mem-layout-trans=3</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>basepeak = yes</td>
</tr>
</tbody>
</table>
Cisco Systems
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SPECint_rate2006 = 2440
SPECint_rate_base2006 = 2310

Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xHOST(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2)
-qopt-ra-region-strategy=block
-qopt-mem-layout-trans=3 -Wl,-z,muldefs
-L/opt/cpu2006-1.2/sh10.2 -lsmartheap

473.astar: basepeak = yes

483.xalancbmk: basepeak = yes

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-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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