Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Silver 4116, 2.10GHz)

SPEClnt\_rate2006 = 1100
SPEClnt\_rate\_base2006 = 1050

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

Hardware
CPU Name: Intel Xeon Silver 4116
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip, 2 threads/core
CPU(s) orderable: 1,2 chips
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 1 MB I+D on chip per core
L3 Cache: 16.5 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R, running at 2400 MHz)
Disk Subsystem: 1 x 240 GB SSD SAS
Other Hardware: None

Software
Operating System: SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default
Compiler: C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2
Cisco Systems
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SPECint_rate2006 = 1100
SPECint_rate_base2006 = 1050

Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

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>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>48</td>
<td>618</td>
<td>759</td>
<td>617</td>
<td>760</td>
<td>621</td>
<td>756</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>48</td>
<td>1004</td>
<td>461</td>
<td>999</td>
<td>463</td>
<td>1006</td>
<td>461</td>
</tr>
<tr>
<td>403.mcf</td>
<td>48</td>
<td>502</td>
<td>770</td>
<td>500</td>
<td>774</td>
<td>502</td>
<td>770</td>
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<tr>
<td>429.mcf</td>
<td>48</td>
<td>283</td>
<td>1550</td>
<td>281</td>
<td>1560</td>
<td><strong>282</strong></td>
<td><strong>1550</strong></td>
</tr>
<tr>
<td>445.gobmk</td>
<td>48</td>
<td>775</td>
<td>650</td>
<td>774</td>
<td>651</td>
<td>775</td>
<td>650</td>
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<tr>
<td>456.hmmer</td>
<td>48</td>
<td>290</td>
<td>1550</td>
<td>289</td>
<td>1550</td>
<td><strong>291</strong></td>
<td><strong>1540</strong></td>
</tr>
<tr>
<td>458.sjeng</td>
<td>48</td>
<td>833</td>
<td>697</td>
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<td>697</td>
<td><strong>833</strong></td>
<td>697</td>
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<tr>
<td>462.libquantum</td>
<td>48</td>
<td>94.2</td>
<td>10600</td>
<td>94.2</td>
<td>10500</td>
<td><strong>94.3</strong></td>
<td><strong>10500</strong></td>
</tr>
<tr>
<td>464.h264ref</td>
<td>48</td>
<td>888</td>
<td><strong>1200</strong></td>
<td>891</td>
<td>1190</td>
<td>884</td>
<td>1200</td>
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<tr>
<td>471.omnetpp</td>
<td>48</td>
<td>524</td>
<td>572</td>
<td>523</td>
<td>574</td>
<td><strong>523</strong></td>
<td><strong>574</strong></td>
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<tr>
<td>473.astar</td>
<td>48</td>
<td>554</td>
<td>608</td>
<td>551</td>
<td>611</td>
<td>555</td>
<td>607</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>48</td>
<td>250</td>
<td>1320</td>
<td>253</td>
<td>1310</td>
<td><strong>252</strong></td>
<td><strong>1310</strong></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
SNC set to Enabled
IMC Interleaving set to 1-way Interleave
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2006-1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-kt20 Sun Aug 27 04:06:10 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) Silver 4116 CPU @ 2.10GHz

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Platform Notes (Continued)

2 "physical id"s (chips)
48 "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 : 12
siblings : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 16896 KB

From /proc/meminfo
MemTotal: 394653260 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

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:
   Linux linux-kt2o 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
   (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Aug 27 04:02

SPEC is set to: /home/cpu2006-1.2
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda3 xfs 182G 20G 162G 11% /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.
Cisco UCS C240 M5 (Intel Xeon Silver 4116, 2.10GHz)

CPU2006 license: 9019
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Test date: Aug-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

Platform Notes (Continued)

BIOS Cisco Systems, Inc. C240M5.3.1.1d.0.0615170707 06/15/2017
Memory:
24x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666 MHz, configured at 2400 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "*/home/cpu2006-1.2/lib/ia32:/home/cpu2006-1.2/lib/intel64:/home/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>

Base Compiler Invocation

C benchmarks:
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Base Portability Flags

400.perlbmk: -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
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### Base Optimization Flags

C benchmarks:
- xCORE-AVX2
- ipo
- -O3
- -no-prec-div
- -qopt-prefetch
- -qopt-mem-layout-trans=3

C++ benchmarks:
- xCORE-AVX2
- ipo
- -O3
- -no-prec-div
- -qopt-prefetch
- -qopt-mem-layout-trans=3
- -Wl,-z,muldefs
- -L/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_2017/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_2017/linux/lib/ia32

### Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
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
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Peak Portability Flags (Continued)
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:
400.perlb benchmark: -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) -auto-ilp32 -qopt-mem-layout-trans=3

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(pass 2) -qopt-prefetch -auto-ilp32
-qopt-mem-layout-trans=3

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3

429.mcfc: basepeak = yes

456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
-qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -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) -unroll2 -qopt-mem-layout-trans=3

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
-qopt-mem-layout-trans=3 -Wl,-z,muldefs
-L/sh10.2 -lsmartheap

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Peak Optimization Flags (Continued)

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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For other inquiries, please contact webmaster@spec.org.

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