Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 5122 3.60 GHz)

SPECspeed2017_int_base = 8.33
SPECspeed2017_int_peak = 8.61

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Jan-2019
Hardware Availability: Aug-2017
Software Availability: Nov-2018

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench</td>
<td>8</td>
</tr>
<tr>
<td>602.gcc</td>
<td>8</td>
</tr>
<tr>
<td>605.mcf</td>
<td>8</td>
</tr>
<tr>
<td>620.omnetpp</td>
<td>8</td>
</tr>
<tr>
<td>623.xalancbmk</td>
<td>8</td>
</tr>
<tr>
<td>625.x264</td>
<td>8</td>
</tr>
<tr>
<td>631.deepsjeng</td>
<td>8</td>
</tr>
<tr>
<td>641.leela</td>
<td>8</td>
</tr>
<tr>
<td>648.exchange2</td>
<td>8</td>
</tr>
<tr>
<td>657.xz</td>
<td>8</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Gold 5122
Max MHz.: 3700
Nominal: 3600
Enabled: 8 cores, 2 chips
Orderable: 1.2 Chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 16.5 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 240 GB M.2 SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
Compiler for Linux:
Fortran: Version 19.0.1.144 of Intel Fortran
Parallel: Yes
Firmware: Version 4.0.1 released Oct-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator V5.0.1
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</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>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>8</td>
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<td>6.24</td>
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<td>6.23</td>
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<td>242</td>
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<td>240</td>
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<tr>
<td>605.mcf_s</td>
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<td>430</td>
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<td>428</td>
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<td>297</td>
<td>5.49</td>
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<td>150</td>
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<td>139</td>
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<tr>
<td>625.x264_s</td>
<td>8</td>
<td>137</td>
<td>12.9</td>
<td>137</td>
<td>12.9</td>
<td>137</td>
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<td>5.17</td>
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<td>280</td>
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<td>641.leela_s</td>
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<td>377</td>
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<td>4.53</td>
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<td>378</td>
<td>4.51</td>
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<tr>
<td>648.exchange2_s</td>
<td>8</td>
<td>219</td>
<td>13.4</td>
<td>219</td>
<td>13.4</td>
<td>219</td>
<td>13.4</td>
<td>8</td>
<td>219</td>
<td>13.4</td>
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<tr>
<td>657.xz_s</td>
<td>8</td>
<td>466</td>
<td>13.3</td>
<td>459</td>
<td>13.5</td>
<td>459</td>
<td>13.5</td>
<td>8</td>
<td>453</td>
<td>13.6</td>
<td>453</td>
</tr>
</tbody>
</table>

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

## Operating System Notes

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

## General Notes

Environment variables set by runcpu before the start of the run:
- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Filesystem page cache synced and cleared with:
```
sync; echo 3>/proc/sys/vm/drop_caches
```

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: 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.

Yes: 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.

Cisco Systems
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SPEC CPU2017 Integer Speed Result

Cisco Systems

SPECspeed2017_int_base = 8.33
SPECspeed2017_int_peak = 8.61

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Platform Notes

BIOS Settings:
Intel HyperThreading Technology set to Disabled
CPU performance set to Enterprise
Power Performance Tuning set to OS Controls
SNC set to Disabled
IMC Interleaving set to Auto
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd08f2999c33d61f64985e45859ea9
running on linux-vaxe Thu Jan 24 10:59:49 2019

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name: Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz
 2 "physical id"s (chips)
 8 "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: 4
  siblings: 4
  physical 0: cores 1 2 5 11
  physical 1: cores 1 2 5 11

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz
Stepping: 4
CPU MHz: 1215.204
CPU max MHz: 3700.0000
CPU min MHz: 1200.0000
BogoMIPS: 7183.14
Virtualization: VT-x
L1d cache: 32K

(Continued on next page)
### Platform Notes (Continued)

<table>
<thead>
<tr>
<th></th>
<th>CPU</th>
<th>L1i cache:</th>
<th>L2 cache:</th>
<th>L3 cache:</th>
<th>NUMA node0 CPU(s):</th>
<th>NUMA node1 CPU(s):</th>
<th>Flags:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>32K</td>
<td>1024K</td>
<td>16896K</td>
<td>0-3</td>
<td>4-7</td>
<td>fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov l1 constant_tsc art arch_perfmon pebs bts rep_good nop1 xtopology nonstop_tsc aperfmperf eagerfpf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdc md cda sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts dtherm hwp act_window hwp epp hwp_pkg resp intel_pt rsb_ctxsw spec_ctrl stibp retpoline kaiser tpr_shadow vmm flexpriority ept vpid fsgrbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaving xsaveopt xsave xgetbv1 cqm 11c cqm 11c pkg ospke</td>
</tr>
</tbody>
</table>

From `/proc/cpuinfo`
- cache data
  - cache size: 16896 KB

From `numactl --hardware`
- WARNING: a numactl 'node' might or might not correspond to a physical chip.
  - available: 2 nodes (0-1)
  - node 0 cpus: 0 1 2 3
  - node 0 size: 385633 MB
  - node 0 free: 385267 MB
  - node 1 cpus: 4 5 6 7
  - node 1 size: 387062 MB
  - node 1 free: 386582 MB
  - node distances:
    - node 0 1
    - 0: 10 21
    - 1: 21 10

From `/proc/meminfo`
- MemTotal: 791240864 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release` /`/etc/*version`
- os-release:
  - SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 3
  - # 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.

(Continued on next page)
Platform Notes (Continued)

NAME="SLES"
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
Linux linux-vaxe 4.4.120-94.17-default #1 SMP Wed Mar 14 17:23:00 UTC 2018 (cf3a7bb)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Jan 24 10:58

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb1 xfs 224G 37G 188G 17% /

Additional information from dmidecode follows. 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. C220M5.4.0.1.139.1003182107 10/03/2018

Memory:
  11x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666
  13x 0xCE00 M393A4K40CB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)
SPEC CPU2017 Integer Speed Result

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Cisco UCS C220 M5 (Intel Xeon Gold 5122 3.60 GHz)  

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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:  
icc -m64 -std=c11

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64

(Continued on next page)
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 5122 3.60 GHz)

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**Test Date:** Jan-2019  
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### Base Portability Flags (Continued)

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<td>-DSPEC_LP64</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>-DSPEC_LP64 -DSPEC_LINUX</td>
</tr>
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<td>625.x264_s</td>
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<tr>
<td>648.exchange2_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

### Base Optimization Flags

**C benchmarks:**

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/home/cpu2017/je5.0.1-64/ -ljemalloc
```

**C++ benchmarks:**

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/home/cpu2017/je5.0.1-64/ -ljemalloc
```

**Fortran benchmarks:**

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/home/cpu2017/je5.0.1-64/ -ljemalloc
```

### Peak Compiler Invocation

**C benchmarks:**

```
icc -m64 -std=c11
```

**C++ benchmarks (except as noted below):**

```
icpc -m64
```

```
623.xalancbmk_s: icpc -m32 -L/opt/intel/lib/ia32
```

**Fortran benchmarks:**

```
ifort -m64
```
Cisco Systems  
Cisco UCS C220 M5 (Intel Xeon Gold 5122 3.60 GHz)  

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CPU2017 License: 9019  
Test Sponsor: Cisco Systems  
Tested by: Cisco Systems  

Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmk_s: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -fno-strict-overflow  
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -L/home/cpu2017/je5.0.1-64/ -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP  
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP  
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

(Continued on next page)
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 5122 3.60 GHz)

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Peak Optimization Flags (Continued)

623.xalancbmk_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/home/cpu2017/je5.0.1-32/ -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

The flags files that were used to format this result can be browsed at

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.xml

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