# SPEC® CPU2017 Integer Speed Result

**Cisco Systems**

Cisco UCS B480 M5 (Intel Xeon Gold 6140M, 2.30 GHz)

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Nov-2018</th>
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</thead>
<tbody>
<tr>
<td>Hardware Availability</td>
<td>Aug-2017</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

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

**SPECspeed2017_int_base = 8.85**  
**SPECspeed2017_int_peak = 9.09**

### Hardware
- **CPU Name:** Intel Xeon Gold 6140M  
- **Max MHz.:** 3700  
- **Nominal:** 2300  
- **Enabled:** 72 cores, 4 chips  
- **Orderable:** 2,4 Chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 24.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)  
- **Storage:** 1 x 400 GB SSD SAS  
- **Other:** None

### Software
- **OS:** SUSE Linux Enterprise Server 12 SP2 (x86_64)  
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++  
- **Compiler for Linux:** Fortran: Version 18.0.2.199 of Intel Fortran  
- **Compiler for Linux:**  
- **Parallel:** Yes  
- **Firmware:** Version 3.2.3c released Mar-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>
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<tr>
<th>Test</th>
<th>Threads</th>
<th>SPECspeed2017_int_base (8.85)</th>
<th>SPECspeed2017_int_peak (9.09)</th>
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</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>72</td>
<td>6.20</td>
<td>7.27</td>
</tr>
<tr>
<td>gcc</td>
<td>72</td>
<td>7.35</td>
<td>8.90</td>
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<tr>
<td>mcf</td>
<td>72</td>
<td>8.85</td>
<td>10.80</td>
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<tr>
<td>omnetpp</td>
<td>72</td>
<td>9.47</td>
<td>11.50</td>
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<tr>
<td>xalancbmk</td>
<td>72</td>
<td>10.10</td>
<td>11.50</td>
</tr>
<tr>
<td>x264</td>
<td>72</td>
<td>11.50</td>
<td>23.70</td>
</tr>
<tr>
<td>deepsjeng</td>
<td>72</td>
<td>13.30</td>
<td>13.50</td>
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<tr>
<td>leela</td>
<td>72</td>
<td>13.30</td>
<td>13.50</td>
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<tr>
<td>exchange2</td>
<td>72</td>
<td>13.30</td>
<td>13.50</td>
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<tr>
<td>xz</td>
<td>72</td>
<td>23.50</td>
<td>23.70</td>
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</table>

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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
## 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>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>72</td>
<td>283</td>
<td>6.27</td>
<td>289</td>
<td>6.13</td>
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<td>6.20</td>
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<td>602.gcc_s</td>
<td>72</td>
<td>433</td>
<td>9.20</td>
<td>442</td>
<td>9.02</td>
<td>429</td>
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<td>605.mcf_s</td>
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<td>10.8</td>
<td>435</td>
<td>10.7</td>
<td>432</td>
<td>10.9</td>
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<td>620.omnetpp_s</td>
<td>72</td>
<td>258</td>
<td>6.31</td>
<td>249</td>
<td>6.54</td>
<td>262</td>
<td>6.23</td>
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<td>625.x264_s</td>
<td>72</td>
<td>153</td>
<td>11.5</td>
<td>153</td>
<td>11.5</td>
<td>155</td>
<td>11.4</td>
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<td>631.deepsjeng_s</td>
<td>72</td>
<td>282</td>
<td>5.09</td>
<td>282</td>
<td>5.08</td>
<td>282</td>
<td>5.08</td>
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<tr>
<td>641.leela_s</td>
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<td>390</td>
<td>4.37</td>
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<td>4.37</td>
<td>390</td>
<td>4.38</td>
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<tr>
<td>648.exchange2_s</td>
<td>72</td>
<td>221</td>
<td>13.3</td>
<td>222</td>
<td>13.2</td>
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<td>13.3</td>
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<tr>
<td>657.xz_s</td>
<td>72</td>
<td>264</td>
<td>23.4</td>
<td>260</td>
<td>23.8</td>
<td>264</td>
<td>23.5</td>
</tr>
</tbody>
</table>

### 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"
  - OMP_STACKSIZE = "192M"

- Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
- 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.

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SPEC CPU2017 Integer Speed Result

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SPECspeed2017_int_base = 8.85
SPECspeed2017_int_peak = 9.09

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Nov-2018
Tested by: Cisco Systems
Hardware Availability: Aug-2017
Software Availability: Mar-2018

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
Patrol Scrub set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd61b9cc091c0f
running on linux-xy4f Sat Nov 17 21:11:06 2018

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 6140M CPU @ 2.30GHz
4 "physical id"s (chips)
72 "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 : 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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 1
Core(s) per socket: 18
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6140M CPU @ 2.30GHz
Stepping: 4
CPU MHz: 1479.163
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4599.99
Virtualization: VT-x

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---

### Platform Notes (Continued)

```
L1d cache:               32K  
L1i cache:               32K  
L2 cache:                1024K  
L3 cache:               25344K  
NUMA node0 CPU(s):      0-17  
NUMA node1 CPU(s):      18-35  
NUMA node2 CPU(s):      36-53  
NUMA node3 CPU(s):      54-71  

Flags:                   fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov  
                        pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp  
                        lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc  
                        aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg  
                        fma cx16 xtpre pdcm pcid dca sse4_1 lsse4_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 hwp_act_window hwp_epp hwp_pkg_req intel_pt rsb_ctxsav spec_ctrl stibp  
                        retpoline kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle  
                        avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt  
                        clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbxv1 cqm_llc cqm_occup_llc
```

/proc/cpuinfo cache data  
```
cache size : 25344 KB
```

From numactl --hardware  
```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
```
```
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
node 0 size: 385624 MB
node 0 free: 385368 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
node 1 size: 387057 MB
node 1 free: 386659 MB
node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
node 2 size: 387057 MB
node 2 free: 386789 MB
node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 3 size: 387054 MB
node 3 free: 386856 MB
node distances:
node 0 1 2 3
0: 10 21 21 21
1: 21 10 21 21
2: 21 21 10 21
3: 21 21 21 10
```

From /proc/meminfo  
```
MemTotal:        1583916164 kB
HugePages_Total:          0
```

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Platform Notes (Continued)

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:
   Linux linux-xy4f 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Jan 3 00:13

SPEC is set to: /home/cpu2017
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda1 xfs 224G 70G 154G 32% /

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. B480M5.3.2.3c.0.0307181316 03/07/2018
   Memory:
      48x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| CC | 600.perlbench_s(base) | 602.gcc_s(base) | 605.mcf_s(base) | 625.x264_s(base, peak) | 657.xz_s(base) |
==============================================================================

icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
## Cisco Systems
Cisco UCS B480 M5 (Intel Xeon Gold 6140M, 2.30 GHz)

<table>
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<tr>
<th>CPU2017 License:</th>
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### SPEC Speed Results

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**Compiler Version Notes (Continued)**

```
== CC 600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak) ==
---
iccc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---

== CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base) ==
---
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---

== CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak) 641.leela_s(peak) ==
---
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---

== FC 648.exchange2_s(base, peak) ==
---
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
```

## Base Compiler Invocation

**C benchmarks:**
iccc -m64 -std=c11

**C++ benchmarks:**
icpc -m64

**Fortran benchmarks:**
ifort -m64
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Cisco UCS B480 M5 (Intel Xeon Gold 6140M, 2.30 GHz)

SPEC CPU2017 Integer Speed Result
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SPECspeed2017_int_base = 8.85
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CPU2017 License: 9019
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Tested by: Cisco Systems

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Base 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: -DSPEC_LP64 -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

Base Optimization Flags

C benchmarks:
-Wl, -z, muldefs -mCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl, -z, muldefs -mCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl, -z, muldefs -mCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64

623.xalancbmk_s: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64
Cisco Systems
Cisco UCS B480 M5 (Intel Xeon Gold 6140M, 2.30 GHz)

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Software Availability: Mar-2018

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-prefetch -ipo -O3 -qopt-mem-layout-trans=3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc
602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -qopt-mem-layout-trans=3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -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-prefetch -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp

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Peak Optimization Flags (Continued)

620.omnetpp_s (continued):
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

623.xalancbmk_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-prefetch
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-32/lib -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-prefetch
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -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-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/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 info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2018-11-17 21:11:06-0500.
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