## SPEC CPU®2017 Integer Speed Result

**Cisco Systems**

**Cisco UCS C220 M5 (Intel Xeon Gold 6238, 2.10GHz)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base = 9.86</th>
<th>SPECspeed®2017_int_peak = 10.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>44</td>
<td>6.51</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>44</td>
<td>7.63</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>44</td>
<td>9.50</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>44</td>
<td>9.80</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>44</td>
<td>12.1</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>44</td>
<td>5.26</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>44</td>
<td>4.54</td>
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<tr>
<td>641.leela_s</td>
<td>44</td>
<td>4.53</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>44</td>
<td>15.9</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>44</td>
<td>22.5</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6238
- **Max MHz:** 3700
- **Nominal:** 2100
- **Enabled:** 44 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:** 30.25 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R)
- **Storage:** 1 x 240 GB M.2 SATA SSD
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux;
  Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 4.0.4g released Jul-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** default
## SPEC CPU®2017 Integer Speed Result

### Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 6238, 2.10GHz)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Oct-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_base = 9.86

### SPECspeed®2017_int_peak = 10.1

### 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>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>605.mcf_s</td>
<td>44</td>
<td>389</td>
<td>12.1</td>
<td>388</td>
<td>12.2</td>
<td>389</td>
<td>12.1</td>
<td>389</td>
<td>12.1</td>
<td>388</td>
<td>12.2</td>
<td>389</td>
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<tr>
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<td>8.24</td>
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<td>119</td>
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<td>120</td>
<td>11.8</td>
<td>119</td>
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<tr>
<td>625.x264_s</td>
<td>44</td>
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<td>13.8</td>
<td>127</td>
<td>13.9</td>
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<td>641.leela_s</td>
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<td>376</td>
<td>4.54</td>
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</tr>
<tr>
<td>648.exchange2_s</td>
<td>44</td>
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<td>15.9</td>
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<td>15.9</td>
<td>186</td>
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<td>15.8</td>
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<td>15.9</td>
<td>186</td>
<td>15.8</td>
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<td>22.6</td>
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<td>22.5</td>
<td>275</td>
<td>22.5</td>
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<td>22.5</td>
<td>274</td>
<td>22.6</td>
<td>275</td>
<td>22.6</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"

### Environment Variables Notes

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

### General Notes

- Binaries compiled on a system with 1x Intel Core i9-799X 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`
- NA: 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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Cisco UCS C220 M5 (Intel Xeon Gold 6238, 2.10GHz)

| SPECspeed®2017_int_base = 9.86 |
| SPECspeed®2017_int_peak = 10.1 |

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

Test Date: Oct-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

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: r6365 of 2019-08-21 295195f888a3d7ed81e6e46a485a0011
running on linux-jm4k Mon Oct 28 00:49:37 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 6238 CPU @ 2.10GHz
  2 "physical id"s (chips)
  44 "processors"
core, siblings (Caution: counting these is hw and system dependent. The following
  excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  cpu cores : 22
  siblings : 22
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 44
On-line CPU(s) list: 0-43
Thread(s) per core: 1
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K

(Continued on next page)
SPEC CPU®2017 Integer Speed Result
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SPECspeed®2017_int_base = 9.86
SPECspeed®2017_int_peak = 10.1

Platform Notes (Continued)

L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K
NUMA node0 CPU(s): 0-21
NUMA node1 CPU(s): 22-43

Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpre pdcm pcid dca sse4_1 l rm x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebpx cat_* cd pcpid single intel_pni mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 8ms invpcid rtm cqm mx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves cmqm llc cmq_occup_llc cmq_mbm_total cmq_mbm_local ibpb ibrs stibp dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pkg
ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
cache size : 30976 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 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
node 0 size: 385608 MB
node 0 free: 384876 MB
node 1 cpus: 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
node 1 size: 387059 MB
node 1 free: 386666 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 791212408 kB
 HugePages_Total: 0
 Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"

(Continued on next page)
**Cisco Systems**

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

**Test Date:** Oct-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

---

**Platform Notes (Continued)**

```plaintext
ID_LIKE="suse"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:15"
```

uname -a:
```
Linux linux-jm4k 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)  
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- **CVE-2018-3620** (L1 Terminal Fault): No status reported
- **Microarchitectural Data Sampling:** No status reported
- **CVE-2017-5754** (Meltdown): Not affected
- **CVE-2018-3639** (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753** (Spectre variant 1): Mitigation: __user pointer sanitization
- **CVE-2017-5715** (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

---

**run-level 3 Oct 28 00:46**

SPEC is set to: /home/cpu2017

From /sys/devices/virtual/dmi/id
```
BIOS:    Cisco Systems, Inc. C220M5.4.0.4g.0.0712190011 07/12/2019  
Vendor:  Cisco Systems Inc  
Product: UCSC-C220-M5SX  
Serial:  WZP21500B9E
```

---

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 accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

**Memory:**
```
24x 0xCE00 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934
```

(End of data from sysinfo program)

---

**Compiler Version Notes**

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

(Continued on next page)
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Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 6238, 2.10GHz)

Compiler Version Notes (Continued)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
==============================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
        | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

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
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

(Continued on next page)
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Test Date: Oct-2019
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Base Portability Flags (Continued)

648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11
C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Peak Portability Flags

Same as Base Portability Flags
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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=4 -ipo -O3
-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-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_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-mem-layout-trans=4
-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-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

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=4
-DSPEC_SUPPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4

(Continued on next page)
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CPU2017 License: 9019
Test Sponsor: Cisco Systems
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Peak Optimization Flags (Continued)

Fortran benchmarks (continued):
-nostandard-realloc-lhs

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/Cisco-Platform-Settings-V1.2-revJ.xml

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