## SPEC CPU®2017 Integer Speed Result

**Cisco Systems**

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

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.86</td>
<td>10.0</td>
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</tbody>
</table>

**CPU2017 License:** 9019  
**Test Sponsor:** Cisco Systems  
**Test Date:** Oct-2019  
**Tested by:** Cisco Systems  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>44</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>44</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>44</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>44</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>44</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>44</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>44</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>44</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>44</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>44</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_base (9.86)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>6.55</td>
</tr>
<tr>
<td>gcc_s</td>
<td>9.52</td>
</tr>
<tr>
<td>mcf_s</td>
<td>9.77</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>8.21</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>11.8</td>
</tr>
<tr>
<td>x264_s</td>
<td>11.8</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>5.26</td>
</tr>
<tr>
<td>leela_s</td>
<td>4.53</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>15.8</td>
</tr>
<tr>
<td>xz_s</td>
<td>22.7</td>
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</table>

### SPECspeed®2017_int_peak (10.0)

<table>
<thead>
<tr>
<th>Benchmark</th>
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</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>7.63</td>
</tr>
<tr>
<td>gcc_s</td>
<td>9.52</td>
</tr>
<tr>
<td>mcf_s</td>
<td>9.77</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>12.1</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>8.21</td>
</tr>
<tr>
<td>x264_s</td>
<td>12.2</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>5.26</td>
</tr>
<tr>
<td>leela_s</td>
<td>4.53</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>15.8</td>
</tr>
<tr>
<td>xz_s</td>
<td>22.8</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6238M</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled</td>
<td>44 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 Chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>30.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
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<tr>
<td>Memory</td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2933V-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 1.9 TB SSD SAS</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Max MHz</td>
<td>4,12,14,23-default</td>
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<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
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<tr>
<td>Firmware</td>
<td>Version 4.0.4g released Jul-2019</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>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>--</td>
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</table>
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 6238M, 2.10GHz)

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

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>
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<tr>
<td>600.perlbench_s</td>
<td>44</td>
<td>271</td>
<td>6.55</td>
<td>272</td>
<td>6.52</td>
<td>270</td>
<td>6.57</td>
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<td>602.gcc_s</td>
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<td>419</td>
<td>9.49</td>
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<td>9.57</td>
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<td>605.mcf_s</td>
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<td>12.1</td>
<td>389</td>
<td>12.1</td>
<td>388</td>
<td>12.2</td>
<td>370</td>
<td>12.2</td>
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<td>620.omnetpp_s</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>44</td>
<td>272</td>
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<td>648.exchange2_s</td>
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<td>22.7</td>
<td>272</td>
<td>22.7</td>
<td>271</td>
<td>22.8</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/intel64:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 6238M, 2.10GHz)

SPECspeed®2017_int_base = 9.86
SPECspeed®2017_int_peak = 10.0

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Oct-2019
Tested by: Cisco Systems
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: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-jm4k Thu Oct 3 08:57:53 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 6238M CPU @ 2.10GHz
  2 "physical id"s (chips)
  44 "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 : 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 6238M 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
L1i cache: 32K

(Continued on next page)
Cisco Systems
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| SPECspeed®2017_int_base | 9.86 |
| SPECspeed®2017_int_peak | 10.0 |

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

**Platform Notes (Continued)**

- **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 rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperf
- **L2 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: 385637 MB
  - node 0 free: 384891 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: 387030 MB
  - node 1 free: 386621 MB
  - node distances:
    - node 0 1
    - 0: 10 21
    - 1: 21 10

- **From /proc/meminfo**
  - MemTotal: 791212404 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"
  - ID_LIKE="suse"

(Continued on next page)
Platform Notes (Continued)

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-2017-5754 (Meltdown): Not affected
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 3 08:53

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sdb1 xfs 224G 20G 204G 9% /

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. C220M5.4.0.4g.0.0712190011 07/12/2019
    Memory:
    24x 0xCE00 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
|   | 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) |
==============================================================================

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.

==============================================================================
|   | 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,
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 6238M, 2.10GHz)

SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

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Compiler Version Notes (Continued)

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

Base Optimization Flags

C benchmarks:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

(Continued on next page)
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Base Optimization Flags (Continued)

C benchmarks (continued):
-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

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

(Continued on next page)
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SPECspeed®2017_int_base = 9.86
SPECspeed®2017_int_peak = 10.0

Peak Optimization Flags (Continued)

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