Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8260L, 2.40GHz)

### SPEC CPU®2017 Integer Speed Result

<table>
<thead>
<tr>
<th>Software Availability</th>
<th>Test Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr-2019</td>
<td>Nov-2019</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Sponsor</th>
<th>Tested by</th>
</tr>
</thead>
<tbody>
<tr>
<td>9019</td>
<td>Cisco Systems</td>
<td>Cisco Systems</td>
</tr>
</tbody>
</table>

**CPU Name:** Intel Xeon Platinum 8260L

**Max MHz:** 3900

**Nominal:** 2400

**Enabled:** 48 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:** 35.75 MB I+D on chip per chip

**Other:** None

**Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R)

**Storage:** 1 x 1.9 TB SSD SAS

**Other:** None

---

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
</tr>
<tr>
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<td>625.x264_s</td>
<td>48</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>48</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>48</td>
</tr>
</tbody>
</table>

---

**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

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CPU2017 License: 9019
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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,compact"
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 i9-7900X 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

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>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>262</td>
<td>6.77</td>
<td>260</td>
<td>6.83</td>
<td>259</td>
<td>6.86</td>
<td>48</td>
<td>222</td>
<td>8.00</td>
<td>225</td>
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<td>8.01</td>
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<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>399</td>
<td>9.97</td>
<td>399</td>
<td>9.98</td>
<td>397</td>
<td>10.0</td>
<td>48</td>
<td>387</td>
<td>10.3</td>
<td>386</td>
<td>10.3</td>
<td>389</td>
<td>10.2</td>
<td></td>
<td></td>
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<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>373</td>
<td>12.7</td>
<td>373</td>
<td>12.6</td>
<td>375</td>
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<td>48</td>
<td>372</td>
<td>12.7</td>
<td>371</td>
<td>12.7</td>
<td>371</td>
<td>12.7</td>
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<td></td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>48</td>
<td>114</td>
<td>12.5</td>
<td>114</td>
<td>12.4</td>
<td>115</td>
<td>12.3</td>
<td>48</td>
<td>114</td>
<td>12.4</td>
<td>114</td>
<td>12.4</td>
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<td>12.4</td>
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<tr>
<td>625.x264_s</td>
<td>48</td>
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<td>14.4</td>
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<td>123</td>
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<td>48</td>
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<td>14.4</td>
<td>123</td>
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<td>123</td>
<td>14.3</td>
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</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
<td>261</td>
<td>5.50</td>
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<td>5.49</td>
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<td>5.51</td>
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<td>261</td>
<td>5.49</td>
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<td></td>
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<tr>
<td>641.leela_s</td>
<td>48</td>
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<td>4.77</td>
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<td>4.78</td>
<td>357</td>
<td>4.78</td>
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<td>357</td>
<td>4.77</td>
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<td>4.78</td>
<td>357</td>
<td>4.78</td>
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<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>176</td>
<td>16.7</td>
<td>177</td>
<td>16.6</td>
<td>176</td>
<td>16.7</td>
<td>48</td>
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<td>16.7</td>
<td>176</td>
<td>16.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
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<td>265</td>
<td>23.4</td>
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<td>23.5</td>
<td>262</td>
<td>23.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
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**Cisco Systems**
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<table>
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<th>SPECspeed®2017_int_peak = 10.6</th>
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<td>CPU2017 License: 9019</td>
<td>Test Date: Nov-2019</td>
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<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td>Software Availability: May-2019</td>
</tr>
</tbody>
</table>

### 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 295195f888a3d7ed16e46a485a0011
running on linux-ylla Fri Nov 1 10:08:32 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) Platinum 8260L CPU @ 2.40GHz
- 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: 24
  - siblings: 24
  - physical 0: cores 0 1 2 3 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 25 26 27 28 29
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 25 26 27 28 29

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 48
- On-line CPU(s) list: 0-47
- Thread(s) per core: 1
- Core(s) per socket: 24
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8260L CPU @ 2.40GHz
- Stepping: 6
- CPU MHz: 2400.000
- CPU max MHz: 3900.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4800.00
- Virtualization: VT-x
- L1d cache: 32K

(Continued on next page)
Cisco Systems
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SPECspeed®2017_int_base = 10.4
SPECspeed®2017_int_peak = 10.6

Platform Notes (Continued)

L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
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 aperfmperf tsc_known_freq pni pclmulqdq dtsc64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpre pdcm pcid dca ssse4_1 ssse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_ppin mba tpr_shadow vnlmi fpext priority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsaveopt xsavec cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local ibpb ibrs ibs tibp dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pkup ospe avx512_vni arch_capabilities ssbd

/proc/cpuinfo cache data
cache size : 36608 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 22 23
node 0 size: 385604 MB
node 0 free: 384791 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387055 MB
node 1 free: 386769 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 791203552 kB
HugePages_Total: 0
Hugepagesize: 4096 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15"
VERSION_ID=15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID=sles"
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8260L, 2.40GHz)

**Platform Notes (Continued)**

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

uname -a:
Linux linux-ylla 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 31 14:15

SPEC is set to: /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sdb2</td>
<td>xfs</td>
<td>559G</td>
<td>70G</td>
<td>490G</td>
<td>13%</td>
<td>/</td>
</tr>
</tbody>
</table>

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:** WZP22380ZAS

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.

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

(End of data from sysinfo program)

---

**Compiler Version Notes**

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

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)
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

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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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Cisco Systems

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Tested by: Cisco Systems

Test Date: Nov-2019
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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 -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp
-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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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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2019-11-01 13:08:31-0400.
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