## SPEC CPU®2017 Integer Speed Result

### Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Platinum 8276, 2.20GHz)

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<thead>
<tr>
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### Threads

<table>
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<tr>
<th>Benchmark</th>
<th>Value</th>
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<tr>
<td>600.perlbench_s</td>
<td>56</td>
<td>8.21</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>56</td>
<td>10.2</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>56</td>
<td>10.5</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>56</td>
<td>12.9</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>56</td>
<td>13.0</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>56</td>
<td>9.31</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>56</td>
<td>12.7</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>56</td>
<td>14.8</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>56</td>
<td>17.1</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_peak = 10.9

### SPECspeed®2017_int_base = 10.7

### Hardware

- **CPU Name:** Intel Xeon Platinum 8276
- **Max MHz:** 4000
- **Nominal:** 2200
- **Enabled:** 56 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:** 38.5 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

### 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
- **Compiler:** 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:** --
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8276, 2.20GHz)

RESULTS TABLE

Benchmark | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio
600.perlbench_s | 56 | 254 | 6.98 | 252 | 7.06 | 250 | 7.09 | 56 | 216 | 8.21 | 216 | 8.21 | 217 | 8.17
602.gcc_s | 56 | 389 | 10.2 | 389 | 10.2 | 391 | 10.2 | 56 | 377 | 10.6 | 379 | 10.5 | 378 | 10.5
605.mcf_s | 56 | 389 | 10.2 | 389 | 10.2 | 391 | 10.2 | 56 | 364 | 13.0 | 364 | 13.0 | 365 | 12.9
623.xalanchmk_s | 56 | 111 | 12.7 | 112 | 12.7 | 111 | 12.7 | 56 | 112 | 12.7 | 112 | 12.7 | 112 | 12.7
625.x264_s | 56 | 119 | 14.8 | 119 | 14.8 | 120 | 14.8 | 56 | 119 | 14.8 | 120 | 14.8 | 119 | 14.8
631.deepsjeng_s | 56 | 256 | 5.61 | 256 | 5.60 | 256 | 5.60 | 56 | 256 | 5.61 | 255 | 5.61 | 255 | 5.61
641.leela_s | 56 | 348 | 4.90 | 348 | 4.90 | 348 | 4.90 | 56 | 348 | 4.90 | 348 | 4.90 | 349 | 4.89
648.exchange2_s | 56 | 173 | 17.0 | 172 | 17.1 | 172 | 17.1 | 56 | 171 | 17.1 | 173 | 17.0 | 173 | 17.0
657.xz_s | 56 | 251 | 24.6 | 251 | 24.6 | 251 | 24.6 | 56 | 250 | 24.7 | 250 | 24.7 | 250 | 24.8

SPECspeed\textsuperscript{2017\textunderscore int\textunderscore base} = 10.7
SPECspeed\textsuperscript{2017\textunderscore int\textunderscore peak} = 10.9

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.
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**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-3yo3 Sun Oct 6 07:08:57 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 8276 CPU @ 2.20GHz
- 2 "physical id"s (chips)
- 56 "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 : 28
- siblings : 28
- physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
- physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 56
- On-line CPU(s) list: 0-55
- Thread(s) per core: 1
- Core(s) per socket: 28
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8276 CPU @ 2.20GHz
- Stepping: 7
- CPU MHz: 2200.000
- CPU max MHz: 4000.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4400.00
- Virtualization: VT-x

(Continued on next page)
Platform Notes (Continued)

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27
NUMA node1 CPU(s): 28-55
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 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
sdmb fma cx16 xtpr pdcm pcid dca sse4_1 sse4_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_pppin mba tpr_shadow vmmi flexpriority ept
vpid fsgsbase tsc_adjust bmis hle avx2 smep bmi2 erms invpcid rtm cmp mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp
dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku
ospe avx512_vnni arch_capabilities ssbd

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 24 25 26 27
node 0 size: 385632 MB
node 0 free: 384848 MB
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55
node 1 size: 387025 MB
node 1 free: 386584 MB
node distances:
  node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal: 791201956 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15"
    VERSION_ID="15"

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Platform Notes (Continued)

PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
    Linux linux-3yo3 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 6 07:03

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda1 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

==============================================================================
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)
==============================================================================
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)
(Continued on next page)
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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.xalancmk_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
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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

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

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**Peak Optimization Flags (Continued)**

```
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 -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

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You can also download the XML flags sources by saving the following links:


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