## SPEC CPU®2017 Integer Speed Result

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

### Software
- OS: SUSE Linux Enterprise Server 15
  - 4.12.14-23-default
- 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 4.0.4d released May-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: --

### Hardware
- CPU Name: Intel Xeon Platinum 8280L
  - Max MHz: 4000
  - Nominal: 2700
  - 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

### Benchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
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<td>13.0</td>
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<td>56</td>
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<tr>
<td>623.xalancbmk_s</td>
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<td>12.7</td>
<td>14.8</td>
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<td>56</td>
<td>4.90</td>
<td>24.5</td>
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<tr>
<td>641.leela_s</td>
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<td>14.8</td>
<td>24.6</td>
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<tr>
<td>648.exchange2_s</td>
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<td>17.1</td>
<td></td>
</tr>
<tr>
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Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Platinum 8280L, 2.70GHz)
## SPEC CPU®2017 Integer Speed Result

### Cisco Systems

Cisco UCS C240 M5 (Intel Xeon Platinum 8280L, 2.70GHz)

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**SPECspeed®2017_int_base = 10.7**

**SPECspeed®2017_int_peak = 10.9**

**Test Date:** Aug-2019  
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### Results Table

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<th>Ratio</th>
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**SPECspeed®2017_int_base = 10.7**

**SPECspeed®2017_int_peak = 10.9**

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"

### 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:
  ```sh
csync; echo 3 > /proc/sys/vm/drop_caches
```

**Operating System Notes**

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 C240 M5 (Intel Xeon Platinum 8280L, 2.70GHz)

SPECspeed®2017_int_base = 10.7
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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-3c6s Mon Aug 12 10:05:58 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 8280L CPU @ 2.70GHz
- 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 8280L CPU @ 2.70GHz
- Stepping: 7
- CPU MHz: 2700.000
- CPU max MHz: 4000.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 5400.00
- Virtualization: VT-x

(Continued on next page)
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SPECcpu®2017 Integer Speed Result
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Cisco Systems

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

Test Date: Aug-2019
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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
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtrr 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 cd_p_l3 invpcid_single intel_pmin usper_shad owm flexpriority ept
vpid fsgsbase tsc_adjust biml hle avx2 smep bni2 ems invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsave xsetbv1 xsaves cqm_l1c cqm_occum_l1c cqm_mbms tlem cqm_mbms_local
ibpb ibs tibp btherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pkup
ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
  cache size: 39424 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 24 25 26 27
  node 0 size: 385631 MB
  node 0 free: 385128 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: 386348 MB
  node distances:
    node 0 1
      0: 10 21
      1: 21 10

From /proc/meminfo
  MemTotal: 791200792 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

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

(Continued on next page)
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SPEC CPU®2017 Integer Speed Result

**SPEC**

**SPECspeed®2017_int_base = 10.7**

**SPECspeed®2017_int_peak = 10.9**

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**Platform Notes (Continued)**

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

```plaintext
uname -a:
    Linux linux-3c6s 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

```plaintext
run-level 3 Aug 12 10:04
```

SPEC is set to: `/home/cpu2017`

```plaintext
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. C240M5.4.0.4d.0.0506190827 05/06/2019
- Memory: 24x 0xCE00 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934

(End of data from sysinfo program)

**Compiler Version Notes**

```plaintext
==============================================================================
| 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) |
==============================================================================
```

```plaintext
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.
```

```plaintext
==============================================================================
| C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) |
==============================================================================
```

(Continued on next page)
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| SPECspeed®2017_int_base = 10.7 |
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CPU2017 License: 9019
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Tested by: Cisco Systems

| Copyright 2017-2020 Standard Performance Evaluation Corporation |

Compiler Version Notes (Continued)

| 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
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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**Test Date:** Aug-2019  
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**Software Availability:** May-2019

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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 -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


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| SPECspeed®2017_int_base | 10.7 |
| SPECspeed®2017_int_peak | 10.9 |

CPU2017 License: 9019
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Software Availability: May-2019

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

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