## SPEC® CPU2017 Integer Speed Result

### Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8156 3.60 GHz)

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Platinum 8156</td>
<td>OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)</td>
</tr>
<tr>
<td>Max MHz.: 3700</td>
<td>4.4.120-94.17-default</td>
</tr>
<tr>
<td>Nominal: 3600</td>
<td>Compiler: C/C++: Version 19.0.1.144 of Intel C/C++</td>
</tr>
<tr>
<td>Enabled: 8 cores, 2 chips</td>
<td>Compiler for Linux: Fortran: Version 19.0.1.144 of Intel Fortran</td>
</tr>
<tr>
<td>Orderable: 1.2 Chips</td>
<td>Compiler for Linux</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Firmware: Version 4.0.1 released Oct-2018</td>
</tr>
<tr>
<td>L3: 16.5 MB I+D on chip per chip</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x 240 GB M.2 SATA SSD</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
</tbody>
</table>

### SPECspeed2017_int_base = 8.34
### SPECspeed2017_int_peak = 8.59

<table>
<thead>
<tr>
<th>Test Date: Jan-2019</th>
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<tr>
<td>Test Sponsor: Cisco Systems</td>
<td>Software Availability: Nov-2018</td>
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### Threads

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed2017_int_base (8.34)</th>
<th>SPECspeed2017_int_peak (8.59)</th>
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<tbody>
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<tr>
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<tr>
<td>11.0</td>
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<td>12.0</td>
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<td>13.0</td>
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<td></td>
</tr>
<tr>
<td>14.0</td>
<td></td>
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</tr>
</tbody>
</table>

### Benchmarks

- **600.perlbench_s**: 8 threads, SPECspeed2017_int_base = 6.15
- **602.gcc_s**: 8 threads, SPECspeed2017_int_base = 7.38
- **605.mcf_s**: 8 threads, SPECspeed2017_int_base = 9.14
- **620.omnetpp_s**: 8 threads, SPECspeed2017_int_base = 11.0
- **623.xalancbmk_s**: 8 threads, SPECspeed2017_int_base = 9.42
- **625.x264_s**: 8 threads, SPECspeed2017_int_base = 10.2
- **631.deepsjeng_s**: 8 threads, SPECspeed2017_int_base = 12.9
- **641.leela_s**: 8 threads, SPECspeed2017_int_base = 13.4
- **648.exchange2_s**: 8 threads, SPECspeed2017_int_base = 13.4
- **657.xz_s**: 8 threads, SPECspeed2017_int_base = 13.6

---

---
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8156 3.60 GHz)

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

SPEC CPU2017 Integer Speed Result

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Ratio</th>
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<th>Ratio</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>6.15</td>
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<td>6.16</td>
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<td>8</td>
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<td>602.gcc_s</td>
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<tr>
<td>605.mcf_s</td>
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<td>620.omnetpp_s</td>
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<td>657.xz_s</td>
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<td>13.6</td>
<td>460</td>
<td>13.4</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.34
SPECspeed2017_int_peak = 8.59

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/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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
Yes: 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 Date:** Jan-2019  
**Test Sponsor:** Cisco Systems  
**Hardware Availability:** Aug-2017  
**Tested by:** Cisco Systems  
**Software Availability:** Nov-2018

### 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 9bced8f2999c33d61f64985e45859ea9
running on linux-vuxe Thu Jan 17 22:09:40 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 8156 CPU @ 3.60GHz
- 2 "physical id"s (chips)
- 8 "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 : 4
  - siblings : 4
  - physical 0: cores 1 5 9 13
  - physical 1: cores 1 5 9 13

From lscpu:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 8
- On-line CPU(s) list: 0-7
- Thread(s) per core: 1
- Core(s) per socket: 4
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz
- Stepping: 4
- CPU MHz: 1319.540
- CPU max MHz: 3700.0000
- CPU min MHz: 1200.0000
- BogoMIPS: 7183.09
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K

(Continued on next page)
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</tbody>
</table>

**SPECspeed2017_int_base** = 8.34

**SPECspeed2017_int_peak** = 8.59

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## Platform Notes (Continued)

- **L2 cache:** 1024K
- **L3 cache:** 1096K
- **NUMA node0 CPU(s):** 0–3
- **NUMA node1 CPU(s):** 4–7
- **Flags:** fpu vme de pse 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 aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg 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 ida arat epb invpcid_single pln pts dtherm hwlp act_window hwlp_pkg_req intel_pt rsb_ctxsw spec_ctrl stibp rettopline kaiser tpr_shadow vmvi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 urs invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

From `numactl --hardware`:

- **Available:** 2 nodes (0-1)
- **Node 0 cpus:** 0 1 2 3
- **Node 0 size:** 385633 MB
- **Node 0 free:** 385261 MB
- **Node 1 cpus:** 4 5 6 7
- **Node 1 size:** 387062 MB
- **Node 1 free:** 386649 MB
- **Node distances:**
  - **Node 0:** 1 10 21
  - **Node 1:** 21 10

From `/proc/meminfo`

- **MemTotal:** 791240864 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

From `/etc/*release* /etc/*version*`

- **SuSE-release:**
  - SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 3

  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.

- **os-release:**
  - NAME="SLES"

(Continued on next page)
## Platform Notes (Continued)

```
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

```
uname -a:
    Linux linux-vaxe 4.4.120-94.17-default #1 SMP Wed Mar 14 17:23:00 UTC 2018 (cf3a7bb)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- **CVE-2017-5754** (Meltdown): Mitigation: PTI
- **CVE-2017-5753** (Spectre variant 1): Mitigation: __user pointer sanitization
- **CVE-2017-5715** (Spectre variant 2): Mitigation: IBRS+IBPB

```
run-level 3 Jan 17 22:07
```

```
SPEC is set to: /home/cpu2017
```

```
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sdb1      xfs   224G   37G  188G  17%  /
```

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. C220M5.4.0.1.139.1003182107 10/03/2018
Memory:
    11x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666
    13x 0xCE00 M393A4K40CB2-CTD 32 GB 2 rank 2666
```

(End of data from sysinfo program)

## Compiler Version Notes

```
==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base,
    peak) 657.xz_s(base)
------------------------------------------------------------------------------
icc (ICC) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
```

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Compiler Version Notes (Continued)

icc (ICC) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
641.leela_s(base)

icpc (ICC) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak)
641.leela_s(peak)

icpc (ICC) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

FC 648.exchange2_s(base, peak)

ifort (IFORT) 19.0.1.144 20181018
Copyright (C) 1985-2018 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

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Base Portability Flags (Continued)

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<th>Flags</th>
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<td>605.mcf_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>623.xalancbmk_s</td>
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<tr>
<td>625.x264_s</td>
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<tr>
<td>641.leela_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

Base Optimization Flags

C benchmarks:
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- L/home/cpu2017/je5.0.1-64/ -ljemalloc

C++ benchmarks:
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -L/home/cpu2017/je5.0.1-64/ -ljemalloc

Fortran benchmarks:
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
- L/home/cpu2017/je5.0.1-64/ -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64

623.xalancbmk_s: icpc -m32 -L/opt/intel/lib/ia32

Fortran benchmarks:
ifort -m64
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Peak 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: -D_FILE_OFFSET_BITS=64 -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

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=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/home/cpu2017/je5.0.1-64/ -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=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

657.xz_s: Same as 602.gcc_s

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=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

(Continued on next page)
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Platinum 8156 3.60 GHz)

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**Peak Optimization Flags (Continued)**

623.xalancbmk_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/home/cpu2017/je5.0.1-32/ -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

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/Intel-ic19.0-official-linux64.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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