## SPEC CPU®2017 Integer Speed Result

### Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6252N, 2.30GHz)

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

### 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
- **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

### Hardware

- **CPU Name:** Intel Xeon Gold 6252N
- **Max MHz:** 3600
- **Nominal:** 2300
- **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
- **Orderable:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R)
- **Storage:** 1 x 600 GB 15K RPM SAS HDD
- **Other:** None

### SPEC Speed Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>6.33</td>
<td>9.92</td>
</tr>
<tr>
<td>gcc_s</td>
<td>6.33</td>
<td>9.92</td>
</tr>
<tr>
<td>mcf_s</td>
<td>8.59</td>
<td>11.9</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>8.81</td>
<td>12.0</td>
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<tr>
<td>xalancbmk_s</td>
<td>11.5</td>
<td>13.6</td>
</tr>
<tr>
<td>x264_s</td>
<td>13.5</td>
<td>15.4</td>
</tr>
<tr>
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<td>4.41</td>
<td>5.14</td>
</tr>
<tr>
<td>leela_s</td>
<td>4.41</td>
<td>5.14</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>22.2</td>
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</tr>
<tr>
<td>xz_s</td>
<td>22.4</td>
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### SPECspeed®2017 Results

- **SPECspeed®2017_int_base:** 9.70
- **SPECspeed®2017_int_peak:** 9.92
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<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>22.3</td>
<td><strong>276</strong></td>
<td><strong>22.4</strong></td>
<td>276</td>
</tr>
</tbody>
</table>

### 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 i9-799X 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.  
Cisco Systems
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SPECspeed®2017_int_base = 9.70
SPECspeed®2017_int_peak = 9.92

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 295195f888a3d7ed1e6e46a485a0011
running on linux-ylla Tue Oct 22 20:31:20 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 6252N CPU @ 2.30GHz
  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 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 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 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) Gold 6252N CPU @ 2.30GHz
Stepping: 7
CPU MHz: 2300.000
CPU max MHz: 3600.0000
CPU min MHz: 1000.0000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 32K

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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 mce 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 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 cpuid_fault ebda cat13 invpcid_single intel_pinn mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnowprefetch cpuid_fault

/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: 385633 MB
  node 0 free: 385136 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: 387026 MB
  node 1 free: 386452 MB
  node distances:
  node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 791203560 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"

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Platform Notes (Continued)

ID_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 22 20:24

SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   559G   70G  490G  13% /

From /sys/devices/virtual/dmi/id
    BIOS:    Cisco Systems, Inc. C220M5.4.0.4g.0.0.712190011 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

==============================================================================
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)
==============================================================================

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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)
------------------------------------------------------------------------------
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

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Base Portability Flags (Continued)

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
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1,-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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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 -gopenmp`
-`-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 -gopenmp -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 -gopenmp -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 -gopenmp`
-`-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.xalancbkms_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.xalancbkms_s

641.leela_s: Same as 623.xalancbkms_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.

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