



# SPEC® CPU2017 Integer Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

## Cisco Systems

Cisco UCS C240 M5 (Intel Xeon Gold 5120  
2.20 GHz)

SPECspeed2017\_int\_base = 7.79

SPECspeed2017\_int\_peak = 8.06

CPU2017 License: 9019

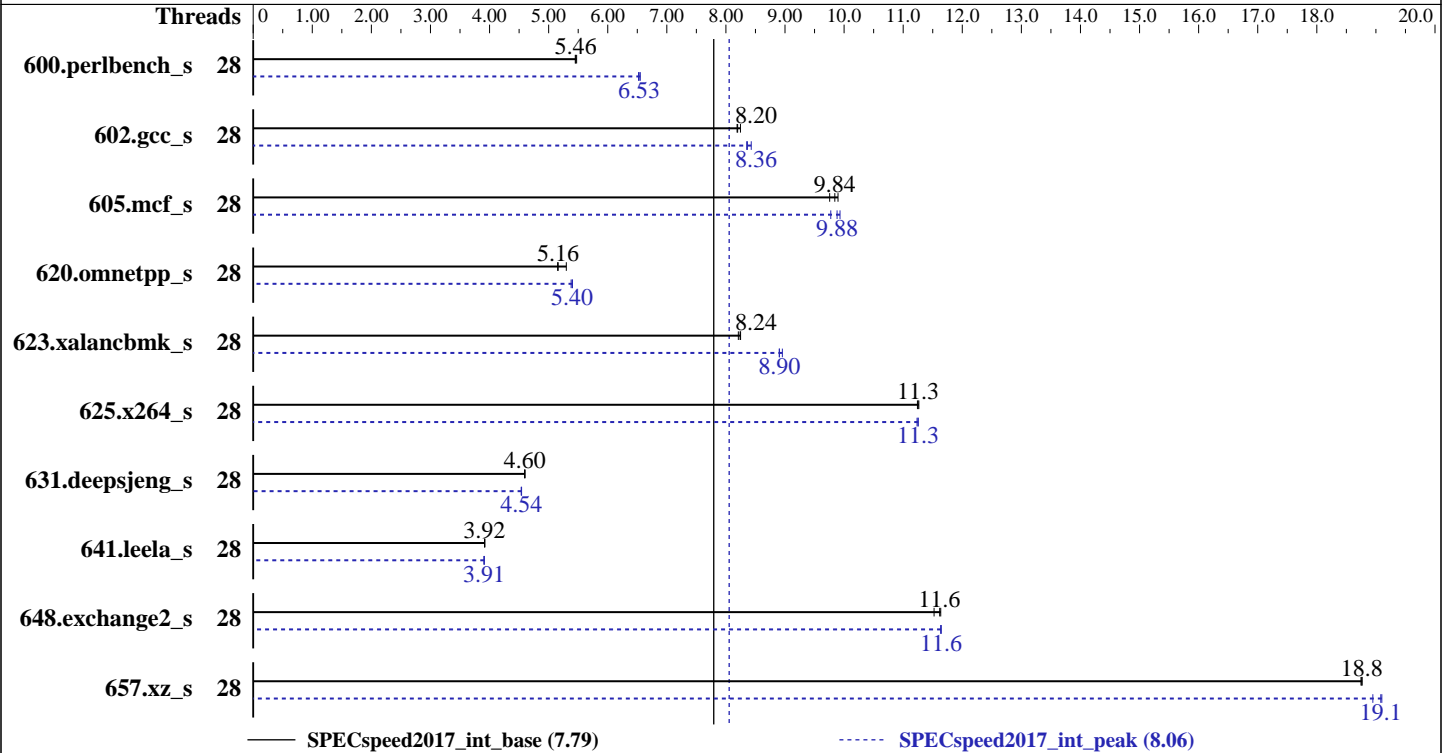
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Nov-2018

Hardware Availability: Aug-2017

Software Availability: Oct-2018



### Hardware

CPU Name: Intel Xeon Gold 5120  
 Max MHz.: 3200  
 Nominal: 2200  
 Enabled: 28 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: 19.25 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)  
 Storage: 1 x 600 GB SAS HDD,15K RPM  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86\_64) 4.4.120-92.70-default  
 Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 19.0.1.144 of Intel Fortran Compiler for Linux  
 Parallel: Yes  
 Firmware: Version 4.0.1 released Oct-2018  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: jemalloc memory allocator V5.0.1



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	28	326	5.45	324	5.47	<b>325</b>	<b>5.46</b>	28	272	6.52	<b>272</b>	<b>6.53</b>	271	6.55
602.gcc_s	28	483	8.25	486	8.19	<b>486</b>	<b>8.20</b>	28	472	8.43	477	8.35	<b>476</b>	<b>8.36</b>
605.mcf_s	28	477	9.90	<b>480</b>	<b>9.84</b>	484	9.76	28	475	9.93	483	9.77	<b>478</b>	<b>9.88</b>
620.omnetpp_s	28	308	5.30	317	5.15	<b>316</b>	<b>5.16</b>	28	<b>302</b>	<b>5.40</b>	302	5.40	303	5.38
623.xalancbmk_s	28	172	8.25	173	8.21	<b>172</b>	<b>8.24</b>	28	<b>159</b>	<b>8.90</b>	159	8.90	158	8.96
625.x264_s	28	<b>157</b>	<b>11.3</b>	157	11.3	157	11.2	28	157	11.3	157	11.2	<b>157</b>	<b>11.3</b>
631.deepsjeng_s	28	312	4.60	<b>312</b>	<b>4.60</b>	312	4.59	28	315	4.54	<b>316</b>	<b>4.54</b>	316	4.54
641.leela_s	28	436	3.92	<b>436</b>	<b>3.92</b>	435	3.92	28	<b>437</b>	<b>3.91</b>	436	3.91	437	3.91
648.exchange2_s	28	255	11.5	253	11.6	<b>253</b>	<b>11.6</b>	28	253	11.6	253	11.6	<b>253</b>	<b>11.6</b>
657.xz_s	28	329	18.8	<b>330</b>	<b>18.8</b>	330	18.7	28	326	18.9	324	19.1	<b>324</b>	<b>19.1</b>

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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"  
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.

jemalloc, a general purpose malloc implementation  
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>



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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: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on linux-fdny Wed Dec 5 22:36:23 2018

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 5120 CPU @ 2.20GHz
 2 "physical id"s (chips)
 28 "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 : 14
siblings  : 14
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
```

#### From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                28
On-line CPU(s) list:  0-27
Thread(s) per core:    1
Core(s) per socket:    14
Socket(s):              2
NUMA node(s):         2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
Stepping:              4
CPU MHz:               1938.956
CPU max MHz:           3200.0000
CPU min MHz:           1000.0000
BogoMIPS:              4389.68
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
```

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### Platform Notes (Continued)

```

L2 cache:                1024K
L3 cache:                19712K
NUMA node0 CPU(s):      0-13
NUMA node1 CPU(s):      14-27
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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpperf 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 fl16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm hwp hwp_act_window hwp_epp hwp_pkg_req intel_pt rsb_ctxsw spec_ctrl stibp
retpoline kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle
avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt
clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

```

```

/proc/cpuinfo cache data
cache size : 19712 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
node 0 size: 385626 MB
node 0 free: 385084 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
node 1 size: 387054 MB
node 1 free: 386664 MB
node distances:
node  0  1
  0:  10  21
  1:  21  10

```

```

From /proc/meminfo
MemTotal:      791225644 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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"
VERSION="12-SP2"

```

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### Platform Notes (Continued)

```
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="/o:suse:sles:12:sp2"
```

```
uname -a:
Linux linux-fdny 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Dec 5 22:26
```

```
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        xfs   500G  162G  339G  33% /
```

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. C240M5.4.0.1.139.1003182220 10/03/2018

Memory:  
24x 0xCE00 M393A4K40CB2-CTD 32 GB 2 rank 2666, configured at 2400

(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.  
-----
```

```
=====  
CC 600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)  
-----
```

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

```
=====  
CXXC 620.omnetpp_s(base) 623.xalanbmk_s(base) 631.deepsjeng_s(base)  
641.leela_s(base)  
-----
```

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## Compiler Version Notes (Continued)

-----  
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

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=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
```

## 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
```



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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=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
```

```
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
```





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The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.html>

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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