



# SPEC® CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

## Cisco Systems

Cisco UCS C240 M5 (Intel Xeon Gold 6154  
3.00 GHz)

SPECrate2017\_int\_base = 221

SPECrate2017\_int\_peak = 232

CPU2017 License: 9019

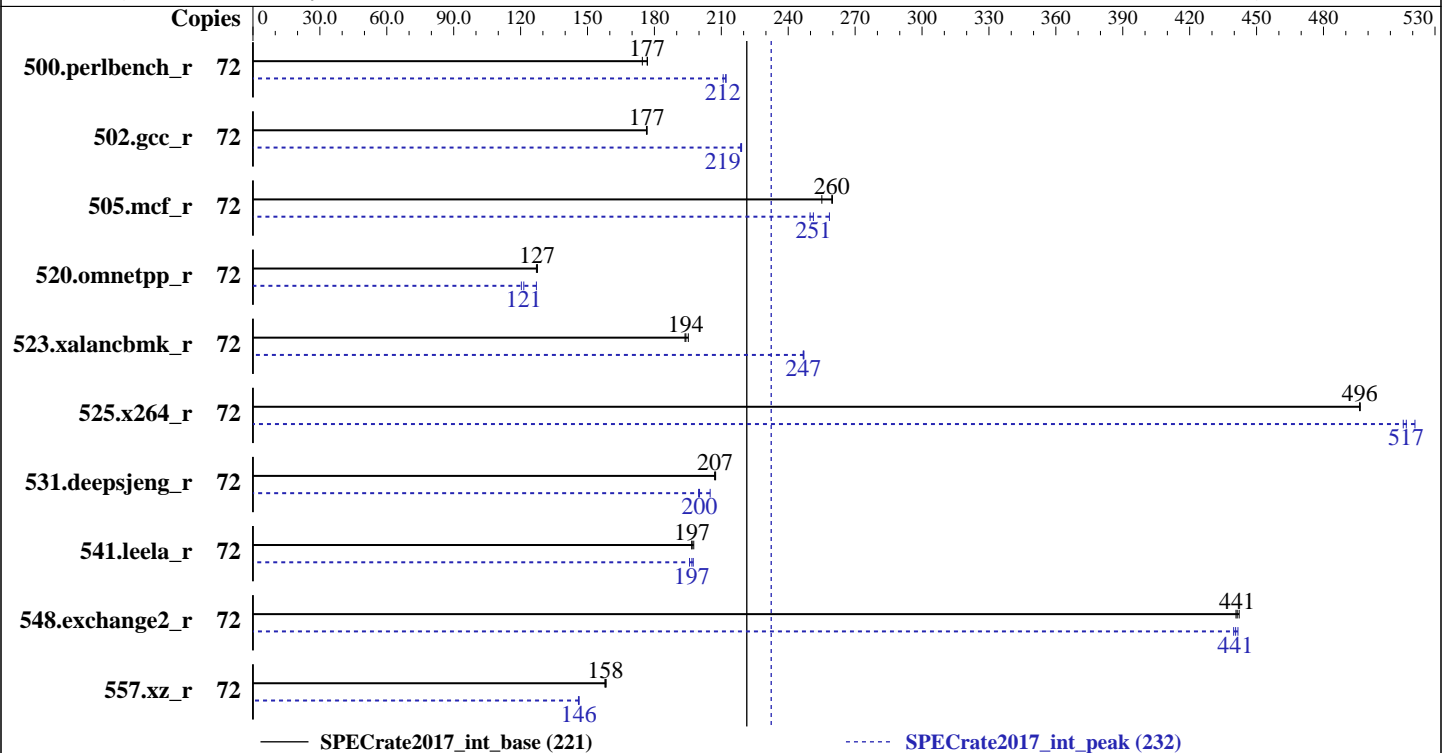
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Nov-2018

Hardware Availability: Aug-2017

Software Availability: Oct-2018



### Hardware

CPU Name: Intel Xeon Gold 6154  
 Max MHz.: 3700  
 Nominal: 3000  
 Enabled: 36 cores, 2 chips, 2 threads/core  
 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: 24.75 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)  
 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: No  
 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	72	<b><u>649</u></b>	<b><u>177</u></b>	657	175	648	177	72	<b><u>541</u></b>	<b><u>212</u></b>	540	212	544	211
502.gcc_r	72	<b><u>577</u></b>	<b><u>177</u></b>	577	177	578	176	72	<b><u>465</u></b>	<b><u>219</u></b>	466	219	465	219
505.mcf_r	72	448	260	<b><u>448</u></b>	<b><u>260</u></b>	456	255	72	450	258	466	250	<b><u>463</u></b>	<b><u>251</u></b>
520.omnetpp_r	72	<b><u>741</u></b>	<b><u>127</u></b>	741	128	743	127	72	743	127	<b><u>778</u></b>	<b><u>121</u></b>	785	120
523.xalancbmk_r	72	<b><u>392</u></b>	<b><u>194</u></b>	390	195	392	194	72	<b><u>308</u></b>	<b><u>247</u></b>	308	247	308	247
525.x264_r	72	254	496	<b><u>254</u></b>	<b><u>496</u></b>	254	496	72	242	521	244	516	<b><u>244</u></b>	<b><u>517</u></b>
531.deepsjeng_r	72	<b><u>398</u></b>	<b><u>207</u></b>	399	207	398	207	72	403	205	413	200	<b><u>412</u></b>	<b><u>200</u></b>
541.leela_r	72	606	197	603	198	<b><u>605</u></b>	<b><u>197</u></b>	72	<b><u>606</u></b>	<b><u>197</u></b>	604	197	609	196
548.exchange2_r	72	<b><u>427</u></b>	<b><u>441</u></b>	427	442	428	441	72	427	442	429	440	<b><u>428</u></b>	<b><u>441</u></b>
557.xz_r	72	491	158	<b><u>492</u></b>	<b><u>158</u></b>	493	158	72	532	146	533	146	<b><u>532</u></b>	<b><u>146</u></b>

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## 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:  
LD\_LIBRARY\_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"

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
```

runcpu command invoked through numactl i.e.:

```
numactl --interleave=all runcpu <etc>
```

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)

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## General Notes (Continued)

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>

## Platform Notes

BIOS Settings:

Intel HyperThreading Technology set to Enabled

CPU performance set to Enterprise

Power Performance Tuning set to OS Controls

SNC set to Enabled

IMC Interleaving set to 1-way Interleave

Patrol Scrub set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f

running on linux-dkz7 Tue Dec 4 09:37:35 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 6154 CPU @ 3.00GHz
```

```
2 "physical id"s (chips)
```

```
72 "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 : 18
```

```
siblings : 36
```

```
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

```
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:

Architecture: x86\_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 72

On-line CPU(s) list: 0-71

Thread(s) per core: 2

Core(s) per socket: 18

Socket(s): 2

NUMA node(s): 4

Vendor ID: GenuineIntel

CPU family: 6

Model: 85

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### Platform Notes (Continued)

```

Model name: Intel(R) Xeon(R) Gold 6154 CPU @ 3.00GHz
Stepping: 4
CPU MHz: 1200.130
CPU max MHz: 3700.0000
CPU min MHz: 1200.0000
BogoMIPS: 5985.91
Virtualization: VT-x
Lld cache: 32K
Lli cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-2,5,6,9,10,14,15,36-38,41,42,45,46,50,51
NUMA node1 CPU(s): 3,4,7,8,11-13,16,17,39,40,43,44,47-49,52,53
NUMA node2 CPU(s): 18-20,23,24,27,28,32,33,54-56,59,60,63,64,68,69
NUMA node3 CPU(s): 21,22,25,26,29-31,34,35,57,58,61,62,65-67,70,71
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 f16c 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 vmni 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 : 25344 KB

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```

available: 4 nodes (0-3)
node 0 cpus: 0 1 2 5 6 9 10 14 15 36 37 38 41 42 45 46 50 51
node 0 size: 192097 MB
node 0 free: 189797 MB
node 1 cpus: 3 4 7 8 11 12 13 16 17 39 40 43 44 47 48 49 52 53
node 1 size: 193528 MB
node 1 free: 191359 MB
node 2 cpus: 18 19 20 23 24 27 28 32 33 54 55 56 59 60 63 64 68 69
node 2 size: 193528 MB
node 2 free: 191277 MB
node 3 cpus: 21 22 25 26 29 30 31 34 35 57 58 61 62 65 66 67 70 71
node 3 size: 193525 MB
node 3 free: 191306 MB
node distances:
node  0  1  2  3
0:  10  11  21  21

```

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### Platform Notes (Continued)

```
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10
```

From /proc/meminfo

```
MemTotal: 791224868 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"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

uname -a:

```
Linux linux-dkz7 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 3 22:55

SPEC is set to: /home/cpu2017

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 500G 124G 376G 25% /
```

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:

```
12x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666
12x 0xCE00 M393A4K40CB2-CTD 32 GB 2 rank 2666
```

(End of data from sysinfo program)



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## Compiler Version Notes

```
=====
CC 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
    525.x264_r(base, peak) 557.xz_r(base, peak)
-----
```

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

```
=====
CC 500.perlbench_r(peak) 502.gcc_r(peak)
-----
```

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

```
=====
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
    541.leela_r(base)
-----
```

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

```
=====
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
    541.leela_r(peak)
-----
```

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

```
=====
FC 548.exchange2_r(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
```

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## Base Compiler Invocation (Continued)

Fortran benchmarks:

```
ifort -m64
```

## Base Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```

## Base Optimization Flags

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
```

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 (except as noted below):

```
icc -m64 -std=c11
```

```
502.gcc_r: icc -m32 -std=c11 -L/opt/intel/lib/ia32
```

C++ benchmarks (except as noted below):

```
icpc -m64
```

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## Peak Compiler Invocation (Continued)

523.xalancbmk\_r: icpc -m32 -L/opt/intel/lib/ia32

Fortran benchmarks:

ifort -m64

## Peak Portability Flags

500.perlbench\_r: -DSPEC\_LP64 -DSPEC\_LINUX\_X64  
502.gcc\_r: -D\_FILE\_OFFSET\_BITS=64  
505.mcf\_r: -DSPEC\_LP64  
520.omnetpp\_r: -DSPEC\_LP64  
523.xalancbmk\_r: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_LINUX  
525.x264\_r: -DSPEC\_LP64  
531.deepsjeng\_r: -DSPEC\_LP64  
541.leela\_r: -DSPEC\_LP64  
548.exchange2\_r: -DSPEC\_LP64  
557.xz\_r: -DSPEC\_LP64

## Peak Optimization Flags

C benchmarks:

500.perlbench\_r: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-fno-strict-overflow -L/home/cpu2017/je5.0.1-64/  
-ljemalloc

502.gcc\_r: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/home/cpu2017/je5.0.1-32/ -ljemalloc

505.mcf\_r: -w1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -L/home/cpu2017/je5.0.1-64/  
-ljemalloc

525.x264\_r: -w1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -fno-alias  
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

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## Peak Optimization Flags (Continued)

557.xz\_r: Same as 505.mcf\_r

C++ benchmarks:

```
520.omnetpp_r: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/home/cpu2017/je5.0.1-64/ -ljemalloc
```

```
523.xalancbmk_r: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/home/cpu2017/je5.0.1-32/ -ljemalloc
```

531.deepsjeng\_r: Same as 520.omnetpp\_r

541.leela\_r: Same as 520.omnetpp\_r

Fortran benchmarks:

```
-w1,-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

<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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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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