



# SPEC CPU®2017 Integer Rate Result

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## Cisco Systems

Cisco UCS C480 M5 (Intel Xeon Gold 6154,  
3.00 GHz)

**SPECrate®2017\_int\_base = 428**

**SPECrate®2017\_int\_peak = 450**

CPU2017 License: 9019

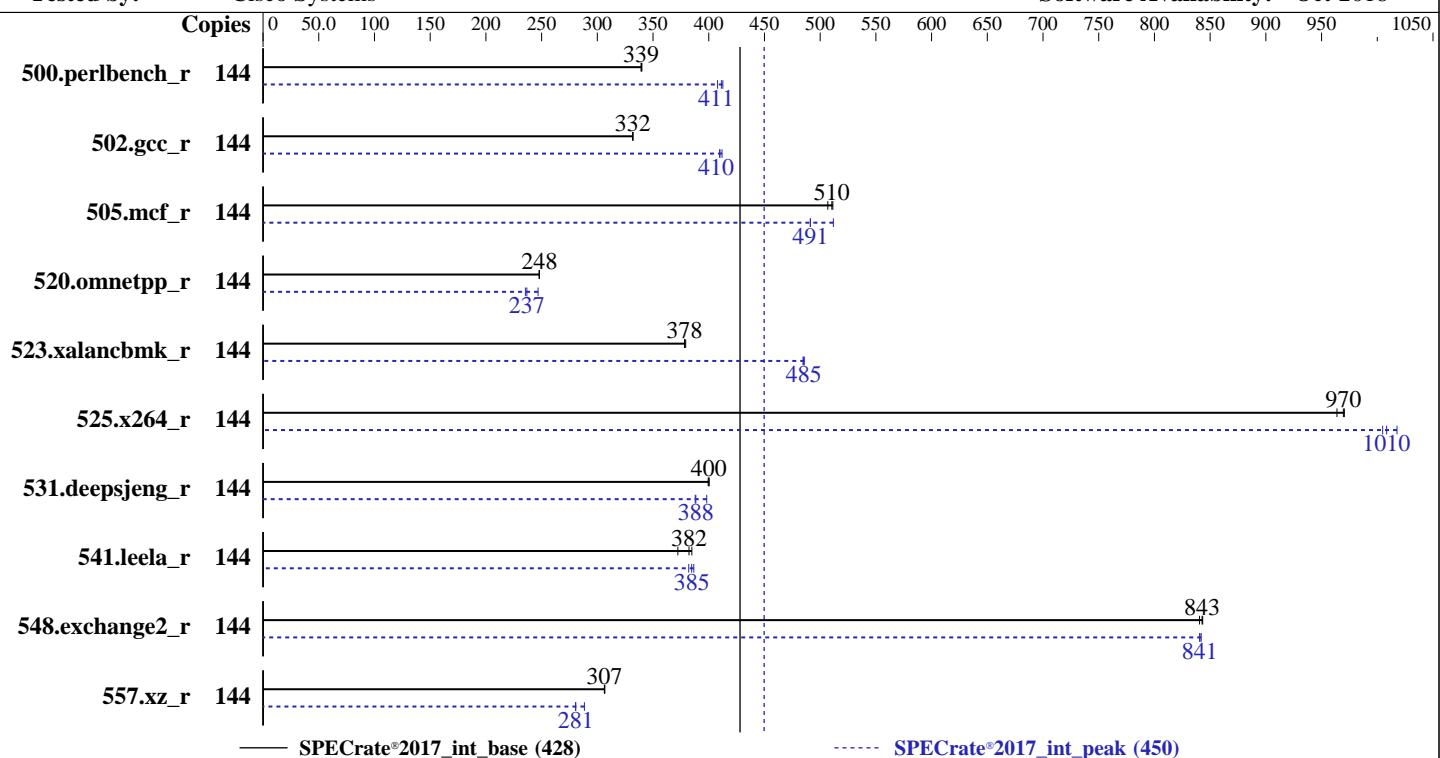
Test Date: Dec-2018

Test Sponsor: Cisco Systems

Hardware Availability: Aug-2017

Tested by: Cisco Systems

Software Availability: Oct-2018



### Hardware

CPU Name: Intel Xeon Gold 6154  
 Max MHz: 3700  
 Nominal: 3000  
 Enabled: 72 cores, 4 chips, 2 threads/core  
 Orderable: 2,4 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: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)  
 Storage: 1 x 1 TB HDD, 7.2K RPM  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86\_64)  
 4.4.120-92.70-default  
 Compiler: C/C++: Version 19.0.0.117 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 19.0.0.117 of Intel Fortran  
 Compiler for Linux  
 Parallel: No  
 Firmware: Version 3.1.3e released Jun-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  
 Power Management: --



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## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	144	674	340	676	339	<b>675</b>	<b>339</b>	144	556	413	<b>557</b>	<b>411</b>	562	408		
502.gcc_r	144	615	332	614	332	<b>614</b>	<b>332</b>	144	495	412	<b>497</b>	<b>410</b>	498	410		
505.mcf_r	144	<b>456</b>	<b>510</b>	455	511	459	507	144	455	512	<b>474</b>	<b>491</b>	474	491		
520.omnetpp_r	144	762	248	763	248	<b>762</b>	<b>248</b>	144	765	247	<b>798</b>	<b>237</b>	802	235		
523.xalancbmk_r	144	401	379	402	378	<b>402</b>	<b>378</b>	144	313	486	314	485	<b>313</b>	<b>485</b>		
525.x264_r	144	262	964	<b>260</b>	<b>970</b>	260	970	144	<b>250</b>	<b>1010</b>	248	1020	251	1000		
531.deepsjeng_r	144	<b>412</b>	<b>400</b>	412	400	413	399	144	414	398	426	388	<b>425</b>	<b>388</b>		
541.leela_r	144	641	372	<b>624</b>	<b>382</b>	620	385	144	624	382	617	387	<b>620</b>	<b>385</b>		
548.exchange2_r	144	<b>448</b>	<b>843</b>	449	840	447	843	144	448	842	449	841	<b>449</b>	<b>841</b>		
557.xz_r	144	<b>507</b>	<b>307</b>	507	307	508	306	144	<b>539</b>	288	554	280	<b>554</b>	<b>281</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 taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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 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:

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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## General Notes (Continued)

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](http://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: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on linux-9r4j Thu Dec 20 18:32:28 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
        4 "physical id"s (chips)
        144 "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
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: 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):                144
On-line CPU(s) list:  0-143
Thread(s) per core:   2
Core(s) per socket:   18
Socket(s):             4
NUMA node(s):          8
Vendor ID:             GenuineIntel
CPU family:            6
```

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## Platform Notes (Continued)

Model: 85  
Model name: Intel(R) Xeon(R) Gold 6154 CPU @ 3.00GHz  
Stepping: 4  
CPU MHz: 3700.000  
CPU max MHz: 3700.0000  
CPU min MHz: 1200.0000  
BogoMIPS: 5993.53  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 25344K  
NUMA node0 CPU(s): 0-2,5,6,9,10,14,15,72-74,77,78,81,82,86,87  
NUMA node1 CPU(s): 3,4,7,8,11-13,16,17,75,76,79,80,83-85,88,89  
NUMA node2 CPU(s): 18-20,23,24,27,28,32,33,90-92,95,96,99,100,104,105  
NUMA node3 CPU(s): 21,22,25,26,29-31,34,35,93,94,97,98,101-103,106,107  
NUMA node4 CPU(s): 36-38,41,42,45,46,50,51,108-110,113,114,117,118,122,123  
NUMA node5 CPU(s): 39,40,43,44,47-49,52,53,111,112,115,116,119-121,124,125  
NUMA node6 CPU(s): 54-56,59,60,63,64,68,69,126-128,131,132,135,136,140,141  
NUMA node7 CPU(s): 57,58,61,62,65-67,70,71,129,130,133,134,137-139,142,143  
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 aperfmpfperf 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 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 : 25344 KB

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

available: 8 nodes (0-7)  
node 0 cpus: 0 1 2 5 6 9 10 14 15 72 73 74 77 78 81 82 86 87  
node 0 size: 192093 MB  
node 0 free: 191911 MB  
node 1 cpus: 3 4 7 8 11 12 13 16 17 75 76 79 80 83 84 85 88 89  
node 1 size: 193528 MB  
node 1 free: 193303 MB  
node 2 cpus: 18 19 20 23 24 27 28 32 33 90 91 92 95 96 99 100 104 105  
node 2 size: 193528 MB  
node 2 free: 193299 MB  
node 3 cpus: 21 22 25 26 29 30 31 34 35 93 94 97 98 101 102 103 106 107

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## Platform Notes (Continued)

```
node 3 size: 193528 MB
node 3 free: 193209 MB
node 4 cpus: 36 37 38 41 42 45 46 50 51 108 109 110 113 114 117 118 122 123
node 4 size: 193528 MB
node 4 free: 193394 MB
node 5 cpus: 39 40 43 44 47 48 49 52 53 111 112 115 116 119 120 121 124 125
node 5 size: 193528 MB
node 5 free: 193376 MB
node 6 cpus: 54 55 56 59 60 63 64 68 69 126 127 128 131 132 135 136 140 141
node 6 size: 193528 MB
node 6 free: 193393 MB
node 7 cpus: 57 58 61 62 65 66 67 70 71 129 130 133 134 137 138 139 142 143
node 7 size: 193525 MB
node 7 free: 193330 MB
node distances:
node   0   1   2   3   4   5   6   7
  0: 10  11  21  21  21  21  21  21
  1: 11  10  21  21  21  21  21  21
  2: 21  21  10  11  21  21  21  21
  3: 21  21  11  10  21  21  21  21
  4: 21  21  21  21  10  11  21  21
  5: 21  21  21  21  11  10  21  21
  6: 21  21  21  21  21  21  10  11
  7: 21  21  21  21  21  21  11  10
```

From /proc/meminfo

```
MemTotal:      1583913112 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:

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## Platform Notes (Continued)

```
Linux linux-9r4j 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
```

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 Nov 11 08:25

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sdal	xfs	930G	35G	896G	4%	/

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. C480M5.3.1.3e.0.0613181101 06/13/2018

Memory:

48x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

## Compiler Version Notes

=====

C | 502.gcc\_r(peak)

=====

Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version  
19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

=====

C | 500.perlbench\_r(base, peak) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
| 525.x264\_r(base, peak) 557.xz\_r(base, peak)

=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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=====

=====

C | 502.gcc\_r(peak)

=====

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=====

C | 500.perlbench\_r(base, peak) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
| 525.x264\_r(base, peak) 557.xz\_r(base, peak)

=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

C++ | 523.xalancbmk\_r(peak)

=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version  
19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

C++ | 520.omnetpp\_r(base, peak) 523.xalancbmk\_r(base)  
| 531.deepsjeng\_r(base, peak) 541.leela\_r(base, peak)

=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

C++ | 523.xalancbmk\_r(peak)

=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version  
19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

C++ | 520.omnetpp\_r(base, peak) 523.xalancbmk\_r(base)  
| 531.deepsjeng\_r(base, peak) 541.leela\_r(base, peak)

=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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## Compiler Version Notes (Continued)

```
=====
Fortran | 548.exchange2_r(base, peak)
=====
```

```
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
 64, Version 19.0.0.117 Build 20180804
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

```
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-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/jet5.0.1-64/lib -ljemalloc
```

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## Base Optimization Flags (Continued)

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

## Peak Compiler Invocation

C benchmarks (except as noted below):

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

502.gcc\_r: icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers\_and\_libraries\_2019.0.117/linux/compiler/lib/ia32\_lin

C++ benchmarks (except as noted below):

```
icpc -m64
```

523.xalancbmk\_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers\_and\_libraries\_2019.0.117/linux/compiler/lib/ia32\_lin

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



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**Hardware Availability:** Aug-2017

**Software Availability:** Oct-2018

## Peak Optimization Flags

C benchmarks:

```
500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib  
-ljemalloc
```

```
502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

```
505.mcf_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib  
-ljemalloc
```

```
525.x264_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -fno-alias  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

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

C++ benchmarks:

```
520.omnetpp_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

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

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

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/je5.0.1-64/lib -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-linux64.2019-01-15.html>  
<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.html>



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## Cisco Systems

Cisco UCS C480 M5 (Intel Xeon Gold 6154,  
3.00 GHz)

SPECrate®2017\_int\_base = 428

SPECrate®2017\_int\_peak = 450

**CPU2017 License:** 9019

**Test Date:** Dec-2018

**Test Sponsor:** Cisco Systems

**Hardware Availability:** Aug-2017

**Tested by:** Cisco Systems

**Software Availability:** Oct-2018

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.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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