



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Cisco Systems

Cisco UCS B480 M5 (Intel Xeon Platinum 8260, 2.40GHz)

SPECrate®2017\_int\_base = 549

SPECrate®2017\_int\_peak = 572

CPU2017 License: 9019

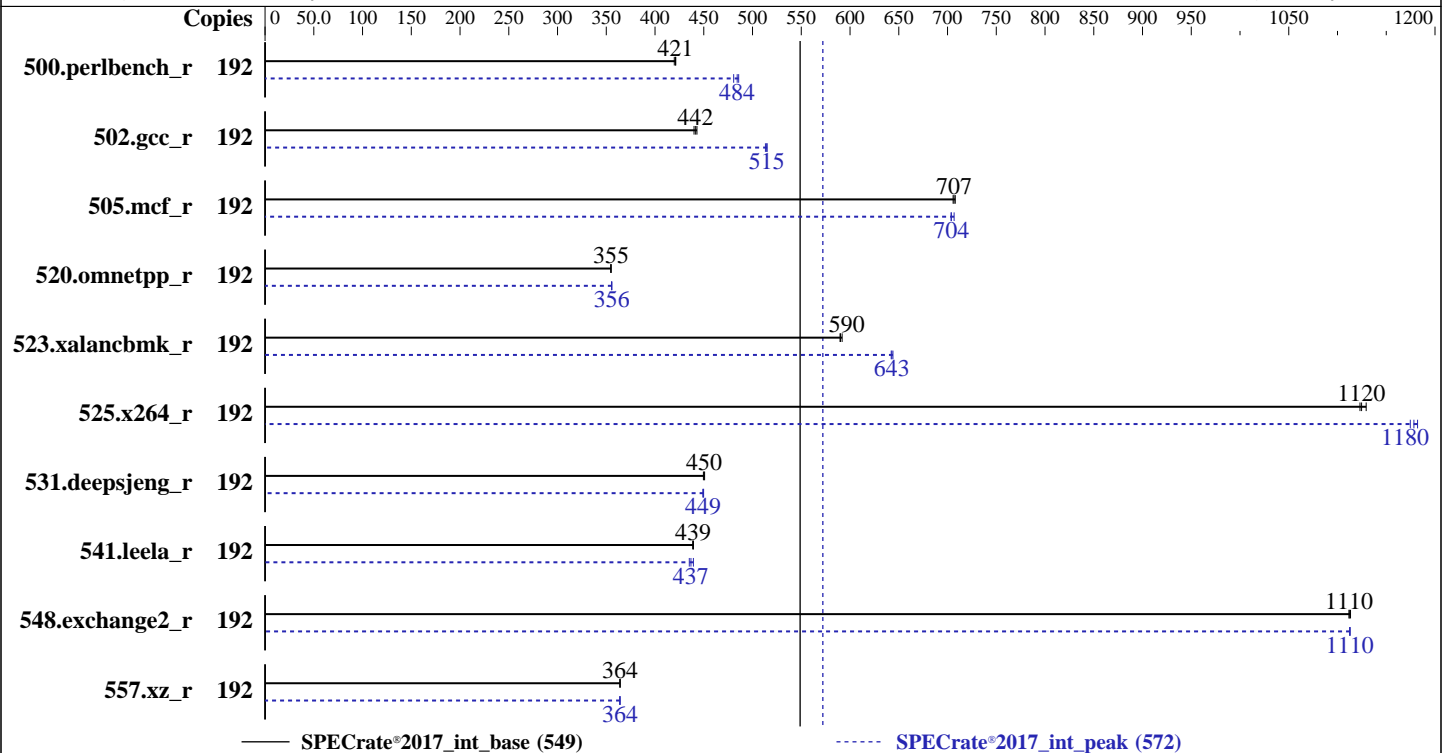
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Oct-2019

Hardware Availability: Apr-2019

Software Availability: May-2019



### Hardware

CPU Name: Intel Xeon Platinum 8260  
 Max MHz: 3900  
 Nominal: 2400  
 Enabled: 96 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: 35.75 MB I+D on chip per chip  
 Other: None  
 Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933V-R)  
 Storage: 1 x 1.9 TB SSD SAS  
 Other: None

### Software

OS: SUSE Linux Enterprise Desktop 15 (x86\_64) 4.12.14-23-default  
 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: No  
 Firmware: Version 4.0.4b released Apr-2019  
 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: default



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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	192	726	421	<b><u>726</u></b>	<b><u>421</u></b>	728	420	192	636	481	629	486	<b><u>631</u></b>	<b><u>484</u></b>
502.gcc_r	192	614	443	<b><u>616</u></b>	<b><u>442</u></b>	618	440	192	<b><u>528</u></b>	<b><u>515</u></b>	530	513	528	515
505.mcf_r	192	438	708	<b><u>439</u></b>	<b><u>707</u></b>	440	706	192	439	707	<b><u>441</u></b>	<b><u>704</u></b>	441	704
520.omnetpp_r	192	710	355	710	355	<b><u>710</u></b>	<b><u>355</u></b>	192	708	356	709	355	<b><u>709</u></b>	<b><u>356</u></b>
523.xalancbmk_r	192	<b><u>344</u></b>	<b><u>590</u></b>	344	590	343	592	192	<b><u>315</u></b>	<b><u>643</u></b>	315	644	316	642
525.x264_r	192	298	1130	299	1120	<b><u>299</u></b>	<b><u>1120</u></b>	192	<b><u>285</u></b>	<b><u>1180</u></b>	284	1180	286	1170
531.deepsjeng_r	192	489	450	488	451	<b><u>489</u></b>	<b><u>450</u></b>	192	490	449	<b><u>490</u></b>	<b><u>449</u></b>	489	450
541.leela_r	192	<b><u>724</u></b>	<b><u>439</u></b>	724	439	725	439	192	724	439	731	435	<b><u>728</u></b>	<b><u>437</u></b>
548.exchange2_r	192	<b><u>452</u></b>	<b><u>1110</u></b>	452	1110	452	1110	192	452	1110	<b><u>452</u></b>	<b><u>1110</u></b>	452	1110
557.xz_r	192	570	364	<b><u>569</u></b>	<b><u>364</u></b>	569	364	192	570	364	<b><u>570</u></b>	<b><u>364</u></b>	569	364

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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"

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH =
"/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
```

## General Notes

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  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

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## General Notes (Continued)

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.

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

SNC set to Enabled

IMC Interleaving set to 1-way Interleave

Patrol Scrub set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo  
 Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011  
 running on linux-0enh Thu Oct 24 01:12:17 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 8260 CPU @ 2.40GHz
 4 "physical id"s (chips)
 192 "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  : 48
physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 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
physical 2: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 3: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

```

From lscpu:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
CPU(s):                 192
On-line CPU(s) list:   0-191
Thread(s) per core:    2

```

(Continued on next page)



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### Platform Notes (Continued)

```

Core(s) per socket: 24
Socket(s): 4
NUMA node(s): 8
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8260 CPU @ 2.40GHz
Stepping: 6
CPU MHz: 2400.000
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3,7,8,12-14,18-20,96-99,103,104,108-110,114-116
NUMA node1 CPU(s): 4-6,9-11,15-17,21-23,100-102,105-107,111-113,117-119
NUMA node2 CPU(s): 24-27,31-33,37-39,43,44,120-123,127-129,133-135,139,140
NUMA node3 CPU(s): 28-30,34-36,40-42,45-47,124-126,130-132,136-138,141-143
NUMA node4 CPU(s): 48-51,55,56,60-62,66-68,144-147,151,152,156-158,162-164
NUMA node5 CPU(s): 52-54,57-59,63-65,69-71,148-150,153-155,159-161,165-167
NUMA node6 CPU(s): 72-75,79,80,84-86,90-92,168-171,175,176,180-182,186-188
NUMA node7 CPU(s): 76-78,81-83,87-89,93-95,172-174,177-179,183-185,189-191
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 cpuid
aperfmpperf 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
epb cat_l3 cdp_l3 invpcid_single intel_ppin mba tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bml hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
ibpb ibrs stibp dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku
ospke avx512_vnni arch_capabilities ssbd

```

```
/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: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 7 8 12 13 14 18 19 20 96 97 98 99 103 104 108 109 110 114 115 116
node 0 size: 191935 MB
node 0 free: 191631 MB

```

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### Platform Notes (Continued)

```

node 1 cpus: 4 5 6 9 10 11 15 16 17 21 22 23 100 101 102 105 106 107 111 112 113 117
118 119
node 1 size: 193526 MB
node 1 free: 193350 MB
node 2 cpus: 24 25 26 27 31 32 33 37 38 39 43 44 120 121 122 123 127 128 129 133 134
135 139 140
node 2 size: 193526 MB
node 2 free: 193368 MB
node 3 cpus: 28 29 30 34 35 36 40 41 42 45 46 47 124 125 126 130 131 132 136 137 138
141 142 143
node 3 size: 193526 MB
node 3 free: 193361 MB
node 4 cpus: 48 49 50 51 55 56 60 61 62 66 67 68 144 145 146 147 151 152 156 157 158
162 163 164
node 4 size: 193526 MB
node 4 free: 193368 MB
node 5 cpus: 52 53 54 57 58 59 63 64 65 69 70 71 148 149 150 153 154 155 159 160 161
165 166 167
node 5 size: 193526 MB
node 5 free: 193376 MB
node 6 cpus: 72 73 74 75 79 80 84 85 86 90 91 92 168 169 170 171 175 176 180 181 182
186 187 188
node 6 size: 193497 MB
node 6 free: 193314 MB
node 7 cpus: 76 77 78 81 82 83 87 88 89 93 94 95 172 173 174 177 178 179 183 184 185
189 190 191
node 7 size: 193523 MB
node 7 free: 193357 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: 1583705096 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLED"

```

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## Platform Notes (Continued)

```

VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Desktop 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"

```

uname -a:

```

Linux linux-0enh 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 23 10:56

SPEC is set to: /home/cpu2017

```

Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda1       xfs   224G   26G  198G  12% /

```

From /sys/devices/virtual/dmi/id

```

BIOS:          Cisco Systems, Inc. B480M5.4.0.4b.0.0407190454 04/07/2019
Vendor:        Cisco Systems Inc
Product:       UCSB-B480-M5
Serial:        FLM2230020U

```

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:

```

48x 0xCE00 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934

```

(End of data from sysinfo program)



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## Compiler Version Notes

=====  
C | 502.gcc\_r(peak)  
-----

Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version  
19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 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 | 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 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
-----

=====  
C++ | 523.xalanbmk\_r(peak)  
-----

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version  
19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
-----

=====  
C++ | 520.omnetpp\_r(base, peak) 523.xalanbmk\_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)

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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

-----  
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 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 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====  
Fortran | 548.exchange2\_r(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

500.perlbench\_r: -DSPEC\_LP64 -DSPEC\_LINUX\_X64

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## Base Portability Flags (Continued)

```
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=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

C++ benchmarks:

```
-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
```

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

## 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_2019.4.227/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_2019.4.227/linux/compiler/lib/ia32_lin
```

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## Peak Compiler Invocation (Continued)

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: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: -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

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

557.xz_r: Same as 505.mcf_r
```

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# SPEC CPU®2017 Integer Rate Result

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## Cisco Systems

Cisco UCS B480 M5 (Intel Xeon Platinum 8260, 2.40GHz)

SPECrate®2017\_int\_base = 549

SPECrate®2017\_int\_peak = 572

**CPU2017 License:** 9019

**Test Sponsor:** Cisco Systems

**Tested by:** Cisco Systems

**Test Date:** Oct-2019

**Hardware Availability:** Apr-2019

**Software Availability:** May-2019

## Peak Optimization Flags (Continued)

C++ benchmarks:

520.omnetpp\_r: -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

523.xalancbmk\_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo

-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4

-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-AVX512 -ipo -O3 -no-prec-div

-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte

-L/usr/local/IntelCompiler19/compilers\_and\_libraries\_2019.4.227/linux/compiler/lib/intel64

-lqkmalloc

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html>

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml>

<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](mailto:info@spec.org).

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