Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6144, 3.50 GHz)

SPECrater®2017_int_base = 117
SPECrater®2017_int_peak = 122

Test Date: May-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

500.perlbench_r 32
502.gcc_r 32
505.mcf_r 32
520.omnetpp_r 32
523.xalancbmk_r 32
525.x264_r 32
531.deepsjeng_r 32
541.leela_r 32
548.exchange2_r 32
557.xz_r 32

Hardware
CPU Name: Intel Xeon Gold 6144
Max MHz: 4200
Nominal: 3500
Enabled: 16 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: 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 240 GB M.2 SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.103-92.56-default
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
Parallel: No
Firmware: Version 3.2.3c released Mar-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library V5.0.1;
Power Management: --
## Results Table

| Benchmark        | Base |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|           |
|                  |      | Copies    | Seconds   | Ratio     | Seconds   | Ratio     | Seconds   | Ratio     | Seconds   | Ratio     | Seconds   | Ratio     | Seconds   | Ratio     | Seconds   | Ratio     |           |
|                  |      |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| 500.perlbench_r  | 32   | 553       | 92.2      | 557       | 91.4      | 557       | 91.4      | 32        | 463       | 110       | 463       | 110       | 468       | 109       |           |           |           |
| 502.gcc_r        | 32   | **456**   | **99.4**  | 455       | 99.6      | 456       | 99.4      | 32        | 378       | 120       | 378       | 120       | 379       | 120       |           |           |           |
| 505.mcf_r        | 32   | 363       | 143       | 352       | 147       | 358       | 145       | 32        | 359       | 144       | **369**   | **140**   | 371       | 139       |           |           |           |
| 520.omnetpp_r    | 32   | 620       | 67.7      | 622       | 67.5      | 621       | **67.6**  | 32        | 628       | 66.9      | **652**   | **64.4**  | 655       | 64.1      |           |           |           |
| 523.xalancbmk_r  | 32   | 271       | 125       | 272       | **124**   | 273       | 124       | 32        | 229       | 148       | 229       | 147       | **229**   | **147**   |           |           |           |
| 525.x264_r       | 32   | 248       | 226       | 247       | **227**   | 245       | 229       | 32        | 237       | 236       | 236       | 238       | **236**   | **237**   |           |           |           |
| 531.deepsjeng_r  | 32   | 354       | 104       | 354       | 104       | 354       | **104**   | 32        | 353       | 104       | 362       | 101       | **357**   | **103**   |           |           |           |
| 541.leela_r      | 32   | **545**   | **97.3**  | 542       | 97.8      | 552       | 95.9      | 32        | 533       | 99.5      | 537       | 98.6      | **535**   | **99.0**  |           |           |           |
| 548.exchange2_r  | 32   | 367       | 230       | 370       | 226       | **370**   | **227**   | 32        | 370       | 227       | **370**   | **226**   | 371       | 226       |           |           |           |
| 557.xz_r         | 32   | **422**   | **81.8**  | 422       | 81.9      | 423       | 81.8      | 32        | 449       | 77.0      | 460       | 75.1      | **458**   | **75.4**  |           |           |           |

**SPECrate®2017_int_base = 117**

**SPECrate®2017_int_peak = 122**

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:/home/cpu2017/jemalloc5.0.1-32:/home/cpu2017/jemalloc5.0.1-64"

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: configured and built at default for

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General Notes (Continued)

32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4,
and the system compiler gcc 4.8.5;
jemalloc: sources available from jemalloc.net or

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-mys2 Wed May 23 12:43:36 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 6144 CPU @ 3.50GHz
  2 "physical id"s (chips)
  32 "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 : 8
siblings : 16
physical 0: cores 0 2 3 9 16 19 26 27
physical 1: cores 0 2 3 9 16 19 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6

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SPEC CPU®2017 Integer Rate Result
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Cisco Systems
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SPECrate®2017_int_peak = 122

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: May-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Gold 6144 CPU @ 3.50GHz
Stepping: 4
CPU MHz: 1439.574
CPU max MHz: 4200.0000
CPU min MHz: 1200.0000
BogoMIPS: 7000.05
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpre 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_pkg_req intel_pt spec_ctrl kaiser tpr_shadow
vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3msrs invpcid
rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw
avx512vl xsaveopt xsaveopt xgetbv1 cqm_llc cqm_occup_llc

From /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: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
  node 0 size: 192074 MB
  node 0 free: 187435 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
  node 1 size: 193504 MB
  node 1 free: 188447 MB
  node distances:
  node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
  MemTotal: 394832496 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

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Platform Notes (Continued)

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

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-mys2 4.4.103-92.56-default #1 SMP Wed Dec 27 16:24:31 UTC 2017 (2fd2155)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 2 04:08

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 182G 54G 129G 30% /home

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. B200M5.3.2.3c.0.0307181316 03/07/2018
Memory:
24x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

=================================================================================
C | 500.perlbench_r(base, peak) 502.gcc_r(base, peak) 505.mcf_r(base, peak)
  | 525.x264_r(base, peak) 557.xz_r(base, peak)
=================================================================================
icc (ICC) 18.0.2 20180210

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SPEC CPU®2017 Integer Rate Result

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SPECrate®2017_int_base = 117
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Compiler Version Notes (Continued)

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------------------------------------------------------------------------------
| C++                      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) |
|                          | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)   |
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
| Fortran                  | 548.exchange2_r(base, peak) |
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
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
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</table>

### 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/compilers_and_libraries_2018/linux/lib/ia32
```

**C++ benchmarks (except as noted below):**

```
icpc -m64
523.xalancbmk_r: icpc -m32 -L/opt/intel/compilers_and_libraries_2018/linux/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
```
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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=3
-fno-strict-overflow -L/home/cpu2017/je5.0.1-64/
-ljemalloc

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=3
-L/home/cpu2017/je5.0.1-32/ -ljemalloc

505.mcf_r: -Wl,-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: -Wl,-z,muldefs -xCORE-AVX512 -ipo -o3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/home/cpu2017/je5.0.1-64/ -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-AVX512 -o3 -no-prec-div -qopt-mem-layout-trans=3
-L/home/cpu2017/je5.0.1-64/ -ljemalloc

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=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:
-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

The flags files that were used to format this result can be browsed at
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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.xml