Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 110</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>36</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>36</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>36</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>36</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>36</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>36</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>36</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>36</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>36</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>36</td>
</tr>
</tbody>
</table>

**Hardware**
- **CPU Name:** Intel Xeon Gold 6140
- **Max MHz:** 3700
- **Nominal:** 2300
- **Enabled:** 36 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:** 24.75 MB I+D on chip per chip
- **Memory:** 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R)
- **Storage:** 1 x 1 TB SAS HDD, 10K RPM
- **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:** Yes
- **Firmware:** Version 3.2.3c released Mar-2018
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** --
Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>36</td>
<td>121</td>
<td>489</td>
<td>121</td>
<td>487</td>
<td>121</td>
<td>486</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>36</td>
<td>111</td>
<td>150</td>
<td>112</td>
<td>149</td>
<td>112</td>
<td>149</td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>36</td>
<td>121</td>
<td>43.2</td>
<td>121</td>
<td>43.3</td>
<td>121</td>
<td>43.2</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>36</td>
<td>153</td>
<td>86.3</td>
<td>154</td>
<td>86.1</td>
<td>154</td>
<td>86.1</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>36</td>
<td>112</td>
<td>79.0</td>
<td>112</td>
<td>79.2</td>
<td>112</td>
<td>79.1</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>36</td>
<td>186</td>
<td>63.9</td>
<td>188</td>
<td>63.2</td>
<td>182</td>
<td>63.1</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>36</td>
<td>134</td>
<td>108</td>
<td>135</td>
<td>107</td>
<td>136</td>
<td>106</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>36</td>
<td>86.2</td>
<td>203</td>
<td>86.3</td>
<td>202</td>
<td>86.3</td>
<td>203</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>36</td>
<td>112</td>
<td>81.1</td>
<td>113</td>
<td>80.4</td>
<td>114</td>
<td>80.2</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>36</td>
<td>140</td>
<td>112</td>
<td>139</td>
<td>113</td>
<td>139</td>
<td>114</td>
</tr>
</tbody>
</table>

Results Table

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,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
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.

Platform Notes
BIOS Settings:
Intel HyperThreading Technology set to Disabled
Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 110
SPECspeed®2017_fp_peak = 111

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)

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-uezu Thu May 24 15:33:20 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 6140 CPU @ 2.30GHz
2 "physical id"s (chips)
36 "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 : 18
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): 36
On-line CPU(s) list: 0-35
Thread(s) per core: 1
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
Stepping: 4
CPU MHz: 3403.645
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4599.99
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K

(Continued on next page)
Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

<table>
<thead>
<tr>
<th>CPU2017 License: 9019</th>
<th>Test Date: May-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Cisco Systems</td>
<td>Hardware Availability: Aug-2017</td>
</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td>Software Availability: Mar-2018</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

NUMA node0 CPU(s): 0-17
NUMA node1 CPU(s): 18-35
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 ntopology nonstop_tsc
aperfmonperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbog
fma cx16 xtrr pdcm pcd 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 spec_ctrl kaiser tpr_shadow
vmni fен priority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 ertx 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: 2 nodes (0-1)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
    node 0 size: 192074 MB
    node 0 free: 188011 MB
    node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
    node 1 size: 193504 MB
    node 1 free: 189847 MB
    node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
    MemTotal: 394832472 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"

(Continued on next page)
Platform Notes (Continued)

`uname -a:
    Linux linux-uezu 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 15:24`

`SPEC is set to: /home/cpu2017`

`Filesystem     Type  Size  Used Avail Use% Mounted on`
`/dev/sda1      xfs   894G  111G  784G  13% /`

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
  619.lbm_s(base, peak) 638.imagick_s(base, peak)
  644.nab_s(base, peak)
```

```
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
C++, C, Fortran
  607.cactuBSSN_s(base, peak)
```

```
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

(Continued on next page)
Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

SPECspeed®2017_fp_base = 110
SPECspeed®2017_fp_peak = 111

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: May-2018
Hardware Availability: Aug-2017
Tested by: Cisco Systems
Software Availability: Mar-2018

Compiler Version Notes (Continued)

Fortran
603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
654.roms_s(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

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64

(Continued on next page)
Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

SPECspeak®2017_fp_base = 110
SPECspeak®2017_fp_peak = 111

Base Portability Flags (Continued)
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

SPECspeed®2017_fp_base = 110
SPECspeed®2017_fp_peak = 111

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

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

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP

638.imagick_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

644.nab_s: Same as 638.imagick_s

Fortran benchmarks:
-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
Cisco Systems
Cisco UCS B200 M5 (Intel Xeon Gold 6140, 2.30 GHz)

<table>
<thead>
<tr>
<th>SPECspeed(^{2017}) fp_peak</th>
<th>SPECspeed(^{2017}) fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>110</td>
</tr>
</tbody>
</table>

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

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

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

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

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.