Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Bronze 3204, 1.90GHz)

<table>
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<th>CPU2017 License:</th>
<th>9019</th>
</tr>
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<tr>
<td>Test Sponsor:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Sep-2019</td>
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**SPECrate®2017_fp_base** = 55.0
**SPECrate®2017_fp_peak** = Not Run

| Copies | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 | 210 | 220 |
|--------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 503.bwaves_r | 12 | | | | | 37.7 | | | | | | | | | | | | | | | | |
| 507.cactuBSSN_r | 12 | | | | | 32.2 | | | | | | | | | | | | | | | | |
| 508.namd_r | 12 | | | | | 36.3 | | | | | | | | | | | | | | | | |
| 510.parest_r | 12 | | | | | 48.1 | | | | | | | | | | | | | | | | |
| 511.povray_r | 12 | | | | | 52.7 | | | | | | | | | | | | | | | | |
| 519.lbm_r | 12 | | | | | 59.1 | | | | | | | | | | | | | | | | |
| 521.wrf_r | 12 | | | | | 42.0 | | | | | | | | | | | | | | | | |
| 526.blender_r | 12 | | | | | 39.3 | | | | | | | | | | | | | | | | |
| 527.cam4_r | 12 | | | | | 47.0 | | | | | | | | | | | | | | | | |
| 538.imagick_r | 12 | | | | | 58.7 | | | | | | | | | | | | | | | | |
| 544.nab_r | 12 | | | | | 78.2 | | | | | | | | | | | | | | | | |
| 549.fotonik3d_r | 12 | | | | | 38.5 | | | | | | | | | | | | | | | | |
| 554.roms_r | 12 | | | | | 96.9 | | | | | | | | | | | | | | | | |

---

**Hardware**

- **CPU Name:** Intel Xeon Bronze 3204
- **Max MHz:** 1900
- **Nominal:** 1900
- **Enabled:** 12 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:** 8.25 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R, running at 2133)
- **Storage:** 1 x 1.9 TB SSD SAS
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 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 4.0.4d released May-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
- **Power Management:** --
Cisco Systems
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CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems
Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Results Table

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</tr>
</tbody>
</table>

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/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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
## Cisco Systems

Cisco UCS C240 M5 (Intel Xeon Bronze 3204, 1.90GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>55.0</th>
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</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### General Notes (Continued)

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:**
  - 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-4vt5 Sun Sep 1 06:52:59 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- **From /proc/cpuinfo**

  ```
  model name : Intel(R) Xeon(R) Bronze 3204 CPU @ 1.90GHz
  2 "physical id"s (chips)
  12 "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 : 6
  siblings : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5
  ```

- **From lscpu:**

  ```
  Architecture:           x86_64
  CPU op-mode(s):         32-bit, 64-bit
  Byte Order:             Little Endian
  CPU(s):                 12
  On-line CPU(s) list:    0-11
  Thread(s) per core:     1
  Core(s) per socket:     6
  Socket(s):              2
  NUMA node(s):           2
  Vendor ID:              GenuineIntel
  CPU family:             6
  Model:                  85
  Model name:             Intel(R) Xeon(R) Bronze 3204 CPU @ 1.90GHz
  Stepping:               6
  ```

(Continued on next page)
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Bronze 3204, 1.90GHz)

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</tbody>
</table>

**SPEC CPU®2017 Floating Point Rate Result**

**SPECRate®2017_fp_base = 55.0**

**SPECRate®2017_fp_peak = Not Run**

### Platform Notes (Continued)

```
CPU MHz: 1900.000
CPU max MHz: 1900.0000
CPU min MHz: 800.0000
BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 8448K
NUMA node0 CPU(s): 0-5
NUMA node1 CPU(s): 6-11
Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf 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 ebpx cat _13 cdp _l3 invpcid_single intel_pinn mba tpr_shadow vnumi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rd_t_a avx512f avx512dq rdseed adx clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaveas cqm_l1c cqm_occup_llc cqm_mbb_total cqm_mbb_local ibpb ibrs stibp dtherm 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: 8448 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
  node 0 size: 385635 MB
  node 0 free: 381389 MB
  node 1 cpus: 6 7 8 9 10 11
  node 1 size: 387029 MB
  node 1 free: 384454 MB
  node distances:
    node 0 1
      0: 10 21
      1: 21 10

From /proc/meminfo
  MemTotal: 791209188 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*
```

(Continued on next page)
Cisco Systems
Cisco UCS C240 M5 (Intel Xeon Bronze 3204, 1.90GHz)

SPECrater®2017_fp_base = 55.0
SPECrater®2017_fp_peak = Not Run

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Sep-2019
CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Sep-2019
Tested by: Cisco Systems
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

```bash
os-release:
 NAME="SLES"
 VERSION="15"
 VERSION_ID="15"
 PRETTY_NAME="SUSE Linux Enterprise Server 15"
 ID="sles"
 ID_LIKE="suse"
 ANSI_COLOR="0;32"
 CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
 Linux linux-4vt5 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-2017-5754 (Meltdown): Not affected
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 Sep 1 02:56

SPEC is set to: /home/cpu2017
   Filesystem  Type   Size  Used  Avail Use% Mounted on
   /dev/sda1   xfs  224G   25G  199G  11% /

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. C240M5.4.0.4d.0.0506190827 05/06/2019
   Memory:
            24x 0xCE00 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2133

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
| C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base) |
==============================================================================
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.
```

(Continued on next page)
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SPECrate®2017_fp_base = 55.0
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CPU2017 License: 9019
Test Sponsor: Cisco Systems
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Compiler Version Notes (Continued)

==============================================================================
C++ | 508.namd_r(base) 510.parest_r(base)
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++, C | 511.povray_r(base) 526.blender_r(base)
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.
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++, C, Fortran | 507.cactuBSSN_r(base)
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.
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.
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.
------------------------------------------------------------------------

==============================================================================
Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
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.
------------------------------------------------------------------------

==============================================================================
Fortran, C | 521.wrf_r(base) 527.cam4_r(base)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416

(Continued on next page)
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SPECrate®2017_fp_peak = Not Run

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Cisco Systems
1.90GHz

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Compiler Version Notes (Continued)

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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.
------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
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| SPECrate®2017_fp_base = 55.0 |
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**Software Availability:** May-2019

### Base Optimization Flags

**C benchmarks:**
- `-xCORE-AVX512`  
- `-ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=4`

**C++ benchmarks:**
- `-xCORE-AVX512`  
- `-ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=4`

**Fortran benchmarks:**
- `-xCORE-AVX512`  
- `-ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=4 -auto`  
- `-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=4 -auto`  
- `-nostandard-realloc-lhs -align array32byte`

**Benchmarks using both C and C++:**
- `-xCORE-AVX512`  
- `-ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=4`

**Benchmarks using Fortran, C, and C++:**
- `-xCORE-AVX512`  
- `-ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=4 -auto`  
- `-nostandard-realloc-lhs -align array32byte`

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:


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