Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Gold 6140 2.30 GHz)

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

TEST DATE: Jan-2019
Hardware Availability: Aug-2017
Software Availability: Nov-2018

**SPECspeed2017_fp_base = 122**
**SPECspeed2017_fp_peak = Not Run**

**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
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 24.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
- **Storage:** 1 x 240 GB M.2 SATA SSD
- **Other:** None

**Software**
- **OS:** SUSE Linux Enterprise Server 12 SP3 (x86_64) 4.4.120-94.17-default
- **Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++ Compiler for Linux;
  Fortran: Version 19.0.1.144 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 4.0.1 released Oct-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
SPECCPU2017 Floating Point Speed Result

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SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = Not Run

Results Table

| Benchmark | Threads | Seconds | Ratio | Seconds | Ratio | Base | 36 | 122 | 482 | 122 | 482 | 123 | 480 | Base | 36 | 122 | 482 | 122 | 482 | 123 | 480 |
| 603裙waves_s | 36 | 122 | 482 | 122 | 482 | 123 | 480 | 122 | 482 | 123 | 480 |
| 607.cactuBSSN_s | 36 | 120 | 139 | 120 | 139 | 120 | 139 | 120 | 139 | 120 | 139 |
| 619.lbm_s | 36 | 56.8 | 92.3 | 56.8 | 92.3 | 57.7 | 90.7 | 56.8 | 92.3 | 57.7 | 90.7 |
| 621.wrf_s | 36 | 114 | 116 | 115 | 115 | 115 | 115 | 114 | 116 | 114 | 116 |
| 627.cam4_s | 36 | 104 | 85.4 | 104 | 85.2 | 104 | 85.3 | 104 | 85.3 | 104 | 85.3 |
| 628.pop2_s | 36 | 186 | 63.9 | 185 | 64.3 | 188 | 63.1 | 186 | 63.9 | 185 | 64.3 |
| 638.imagick_s | 36 | 139 | 103 | 137 | 105 | 140 | 103 | 139 | 103 | 137 | 105 |
| 644.nab_s | 36 | 86.7 | 202 | 86.7 | 201 | 86.7 | 201 | 86.7 | 202 | 86.7 | 201 |
| 649.fotonik3d_s | 36 | 113 | 80.3 | 113 | 80.7 | 114 | 80.0 | 113 | 80.3 | 113 | 80.7 |
| 654.roms_s | 36 | 140 | 112 | 139 | 113 | 141 | 112 | 140 | 112 | 139 | 113 |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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
CPU performance set to Enterprise

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Platform Notes (Continued)

Power Performance Tuning set to OS Controls
SNC set to Disabled
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-vaxe Mon Jan 21 05:01:54 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) 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: 2691.685
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4589.21
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17

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**SPEC CPU2017 Floating Point Speed Result**

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**Platform Notes (Continued)**

NUMA node1 CPU(s): 18–35  
Flags:  
- fpu  
- vme  
- de  
- pse  
- tsc  
- 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  
- arch_perfmon  
- pebs  
- bts  
- rep_good  
- nop1  
- xtopology  
- nonstop_tsc  
- aperfmperf  
- eagerfp  
- pni  
- pclmulqdq  
- dtes64  
- monitor  
- ds_cpl  
- vmx  
- smx  
- est  
- tm2  
- ssse3  
- sdbg  
- fma  
- cx16  
- xtr  
- pdc  
- pcid  
- dca  
- sse4_1  
- sse4_2  
- x2apic  
- movbe  
- popcnt  
- tsc_deadline_timer  
- aes  
- xsave  
- avx  
- f16c  
- rcrand  
- lahf_1m  
- abm  
- 3dnowprefetch  
- ida  
- arat  
- epb  
- invpcid_single  
- pln  
- pts  
- dtherm  
- hwdep_act_window  
- hwp_logreg  
- hwp_pkg_req  
- intel_pt  
- rsb_ctxsw  
- spec_ctrl  
- stibp  
- retpoline  
- kaiser  
- tpr_shadow  
- vmni  
- flexpriority  
- ept  
- fsvgsbase  
- tsc_adjust  
- bmi1  
- hle  
- avx2  
- smep  
- bmi2  
- emms  
- invpcid  
- rtm  
- cqm  
- mpkx  
- avx512f  
- avx512dq  
- rdseed  
- adx  
- smap  
- clflushopt  
- clwb  
- avx512cd  
- avx512bw  
- avx512vl  
- xsaveopt  
- xsavec  
- xgetbv1  
- cqm_llc  
- cqm_occuppy  
- pk  
- ospke

```
/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: 385631 MB
  node 0 free: 381042 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: 387060 MB
  node 1 free: 383700 MB
  node distances:
    node   0   1
    0:  10  21
    1:  21  10
```

From /proc/meminfo  
```
MemTotal:       791237056 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From /etc/*release* /etc/*version*  
```
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 3
  # 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-SP3"
    VERSION_ID="12.3"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
```

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Platform Notes (Continued)

ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
   Linux linux-vaxe 4.4.120-94.17-default #1 SMP Wed Mar 14 17:23:00 UTC 2018 (cf3a7bb)
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 Jan 20 23:59

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdc1 xfs 224G 43G 182G 19% /

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. C220M5.4.0.1.139.1003182107 10/03/2018
Memory:
11x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666
13x 0xCE00 M393A4K40CB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
==============================================================================
icc (ICC) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  607.cactuBSSN_s(base)
==============================================================================
icpc (ICC) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 19.0.1.144 20181018

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Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)

---

ifort (IFORT) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

CC  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

---

ifort (IFORT) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

icc (ICC) 19.0.1.144 20181018
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++:
icc -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

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### Base Portability Flags (Continued)

- 638.imagick_s: -DSPEC_LP64
- 644.nab_s: -DSPEC_LP64
- 649.fotonik3d_s: -DSPEC_LP64
- 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

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/Intel-ic19.0-official-linux64.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.

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