### Cisco Systems

**Cisco UCS C220 M6 (Intel Xeon Gold 6330, 2.00GHz)**

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>179</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>180</td>
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</tbody>
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- **CPU2017 License:** 9019
- **Test Sponsor:** Cisco Systems
- **Test Date:** Nov-2021
- **Hardware Availability:** Apr-2021
- **Tested by:** Cisco Systems
- **Software Availability:** Dec-2020

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (179)</th>
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<tr>
<td>56</td>
<td>603.bwaves_s</td>
<td>607.cactussn_s</td>
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<td>238</td>
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<tr>
<td></td>
<td>619.lbm_s</td>
<td>621.wrf_s</td>
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<td>628.pop2_s</td>
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<tr>
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<td>649.fotonik3d_s</td>
<td>654.roms_s</td>
</tr>
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<td></td>
<td>101</td>
<td>209</td>
</tr>
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</table>

#### Hardware

- **CPU Name:** Intel Xeon Gold 6330
- **Max MHz:** 3100
- **Nominal:** 2000
- **Enabled:** 56 cores, 2 chips
- **Orderable:** 1.2 Chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 42 MB I+D on chip per chip
- **Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
- **Storage:** 1 x 960 GB M.2 SSD SATA
- **Other:** None

#### Software

- **OS:** SUSE Linux Enterprise Server 15 SP2 (x86_64) 5.3.18-22-default
- **Compiler:**
  - C/C++: Version 2021.1 of Intel oneAPI DPC++/C++  Compiler Build 20201113 for Linux;
  - Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
- **C/C++:** Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Parallel:** Yes
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
## SPEC CPU®2017 Floating Point Speed Result

**Cisco Systems**  
Cisco UCS C220 M6 (Intel Xeon Gold 6330, 2.00GHz)

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### Results Table

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<th>Ratio</th>
<th>Seconds</th>
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<td>75.4</td>
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<td>74.8</td>
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**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"  
cputopower frequency-set -g performance run as root to set the scaling governor to performance.

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:  
KMP_AFFINITY = "granularity=fine,compact"  
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"  
MALLOC_CONF = "retain:true"  
OMP_STACKSIZE = "192M"

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Redhat Enterprise Linux 8.0  
Transparent Huge Pages enabled by default  
Prior to runcpu invocation  
Filesysten page cache synced and cleared with:  
sync; echo 3 > /proc/sys/vm/drop_caches  
runcpu command invoked through numaclt 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.  
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.
Cisco Systems  
Cisco UCS C220 M6 (Intel Xeon Gold 6330, 2.00GHz)

SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 179
SPECspeed®2017_fp_peak = 180

Cisco Systems  
Cisco UCS C220 M6 (Intel Xeon Gold 6330, 2.00GHz)

<table>
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<tr>
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<th>Value</th>
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<td>Software Availability</td>
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General Notes (Continued)
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

Platform Notes

BIOS Settings:
Intel Hyper-Threading Technology set to Disabled
DCU Streamer Prefetch set to Disabled
LLC Dead Line set to Disabled
Memory Refresh Rate set to 1x Refresh
ADDDC Sparing set to Disabled
Patrol Scrub set to Disabled
Processor C6 Report set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on localhost Fri Nov 26 21:16:16 2021

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 6330 CPU @ 2.00GHz
2 "physical id"s (chips)
56 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

From lscpu from util-linux 2.33.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 57 bits virtual
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 6330, 2.00GHz)

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Nov-2021
Tested by: Cisco Systems
Test Hardware Availability: Apr-2021
Software Availability: Dec-2020

CPU MHz: 2485.561
CPU max MHz: 3100.000
CPU min MHz: 800.000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 43008K
NUMA node0 CPU(s): 0-27
NUMA node1 CPU(s): 28-55

Platform Notes (Continued)

Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6330 CPU @ 2.00GHz
Stepping: 6

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpicacl mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb dts
large ds cpl flushtlb pagecolor kptitl debug monitor pse36 clflush dts mce cx8
x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm
3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd
mb ibp shmtib ibrs_enhanced tpr_shadow vni flexpriority ept vpd ept_ad
fsgbase tsc_adjust bmi1 hle avx2 smep bm12 erms invpcid rtm cmq rdt_a avx512f
avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_ptu avx512cd sha_ni
avx512bw avx512vl xsaveopt xsaveprec xtstate xsavec xsavecap cmqm mb local
wbnoiwvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp
hwp_pkg_req avx512vbm umip pku ospke avx512_vbmi2 gfn vaes vpclmulqdq avx512_vnni
avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities

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 18 19 20 21 22 23 24 25 26 27
node 0 size: 515682 MB
node 0 free: 514985 MB
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55
node 1 size: 516052 MB
node 1 free: 515515 MB

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Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 6330, 2.00GHz)

SPECspeed\textsuperscript{\textregistered}2017\textsuperscript{*}_fp_base = 179
SPECspeed\textsuperscript{\textregistered}2017\textsuperscript{*}_fp_peak = 180

CPU2017 License: 9019
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Tested by: Cisco Systems

Platform Notes (Continued)

node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 1056496208 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP2"
VERSION_ID="15.2"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp2"

uname -a:
Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5754 (Spectre variant 1): Mitigation: userscopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Nov 26 11:29

(Continued on next page)
Cisco Systems
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SPECspeed®2017_fp_base = 179
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CPU2017 License: 9019
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Platform Notes (Continued)

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 btrfs 222G 33G 188G 15% /home

From /sys/devices/virtual/dmi/id
Vendor: Cisco Systems Inc
Product: UCSC-C220-M6S
Serial: WZP244104TF

Additional information from dmidecode 3.2 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:
32x 0xCE00 M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: Cisco Systems, Inc.
BIOS Version: C220M6.4.2.1d.0.0730210924
BIOS Date: 07/30/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base)
==============================================================================
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
C               | 644.nab_s(peak)
==============================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,  
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base)

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Compiler Version Notes (Continued)

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Base Compiler Invocation

- C benchmarks: icc
- Fortran benchmarks: ifort
- Benchmarks using both Fortran and C: ifort icc
- Benchmarks using Fortran, C, and C++: icpc icc ifort

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
- 654.roms_s: -DSPEC_LP64

Base Optimization Flags

- C benchmarks: 
  -m64 -std=c11 -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
  -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
  -mbranches-within-32B-boundaries
- Fortran benchmarks: 
  -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
  -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
  -nostandard-realloc-lhs -mbranches-within-32B-boundaries

(Continued on next page)
Cisco Systems
Cisco UCS C220 M6 (Intel Xeon Gold 6330, 2.00GHz)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
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<td>SPECspeed®2017_fp_peak</td>
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CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Nov-2021  
Hardware Availability: Apr-2021  
Software Availability: Dec-2020

### Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using both Fortran and C:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

### Peak Compiler Invocation

C benchmarks (except as noted below):

```
icc

644.nab_s: icx
```

Fortran benchmarks:

```
ifort
```

Benchmarks using both Fortran and C:

```
ifort icc
```

Benchmarks using Fortran, C, and C++:

```
icpc icc ifort
```

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

C benchmarks:

(Continued on next page)
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Peak Optimization Flags (Continued)

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes


Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -openmp -nostandard-realloc-lhs -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -openmp -DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
SPEC CPU®2017 Floating Point Speed Result

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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