# SPEC CPU 2017 Floating Point Speed Result

## Cisco Systems

Cisco UCS C240 M6 (Intel Xeon Gold 6330N, 2.20GHz)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed(^{2017\text{-fp_base}}) = 174</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>56</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>56</td>
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<tr>
<td>619.lbm_s</td>
<td>56</td>
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<tr>
<td>621.wrf_s</td>
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<tr>
<td>627.cam4_s</td>
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<td>628.pop2_s</td>
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</tr>
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<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
<td>56</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>56</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>56</td>
</tr>
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</table>

### Hardware

- CPU Name: Intel Xeon Gold 6330N
- Max MHz: 3400
- Nominal: 2200
- 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
- Other: None
- Memory: 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
- Storage: 1 x 240 GB SATA SSD
- Other: None

### Software

- OS: SUSE Linux Enterprise Server 15 SP2 5.3.18-22-default
- Compiler: 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
- Firmware: Version 4.2.1d released Jul-2021
- File System: btrfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: Not Applicable
- Other: jemalloc memory allocator V5.0.1
- Power Management: BIOS and OS set to prefer performance at the cost of additional power usage
Cisco Systems
Cisco UCS C240 M6 (Intel Xeon Gold 6330N, 2.20GHz)

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

Test Date: Sep-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>193</td>
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</table>

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

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"

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 i9-7940X CPU + 64GB RAM memory using openSUSE Leap 15.2
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.:

(Continued on next page)
spec

SPEC CPU®2017 Floating Point Speed Result

Cisco Systems
Cisco UCS C240 M6 (Intel Xeon Gold 6330N, 2.20GHz)

SPECspeed®2017_fp_base = 174
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9019
Test Sponsor: Cisco Systems
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Test Date: Sep-2021
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General Notes (Continued)

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.
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 Hyper-Threading Technology set to Disabled
DCU Streamer Prefetch set to Disabled
Memory Refresh Rate set to 1x Refresh
ADDDC Sparing set to Disabled
Patrol Scrub set to Disabled
Enhanced CPU performance set to Auto
Processor C6 Report set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b5589ef0e16acaf64d
running on install Sun Sep 5 18:38:29 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 6330N CPU @ 2.20GHz
  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

(Continued on next page)
## Platform Notes (Continued)

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  
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 6330N CPU @ 2.20GHz  
Stepping: 6  
CPU MHz: 3254.417  
CPU max MHz: 3400.0000  
CPU min MHz: 800.0000  
BogoMIPS: 4400.00  
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  
Flags: fpu vme de pse tsc msr pae mce cs 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 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 ebcd cat_13 invpcid_single ssbd mba ibrs ibpb ibrs TimeUnit tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xsaveic xsavec cmq llc cmq_occmap llc cmq_mbb total cmq_mbb_local wbinvd dtmrdt ida arat pht hwcact_win hwp epp hwp_pkg_req avx512vfmib gfnva vaes fpcmulqdq avx512_vnni avx512_bitalg tmve axv512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

```
/proc/cpuinfo cache data
  cache size : 43008 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 18 19 20 21 22 23 24 25 26 27  
node 0 size: 1031777 MB

(Continued on next page)
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Platform Notes (Continued)

node 0 free: 1022387 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: 1032147 MB  
node 1 free: 1024512 MB  
node distances:  
node 0 1  
0: 10 20  
1: 20 10  
From /proc/meminfo  
MemTotal: 2113459592 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 install 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): Not affected  
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp  
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitization  
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

(Continued on next page)
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Platform Notes (Continued)

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Sep 5 08:56

SPEC is set to: /home/cpu2017

Filesystem     Type     Size  Used  Avail Use% Mounted on
/dev/sda2      btrfs  222G   50G  172G  23%  /home

From /sys/devices/virtual/dmi/id
Vendor:         Cisco Systems Inc
Product:        UCSC-C240-M6S
Serial:         WZP24460JDZ

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 M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666

BIOS:
  BIOS Vendor: Cisco Systems Inc
  BIOS Version: C240M6.4.2.1d.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) 638.imagick_s(base) 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++, C, Fortran | 607.cactuBSSN_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.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)

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Compiler Version Notes (Continued)

64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
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---------------------------------------------------------------------
Fortran         | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
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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

(Continued on next page)
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Base Portability Flags (Continued)

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
   -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

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-ic2021-official-linux64_revA.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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