SPEC CPU®2017 Floating Point Speed Result

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Cisco Systems

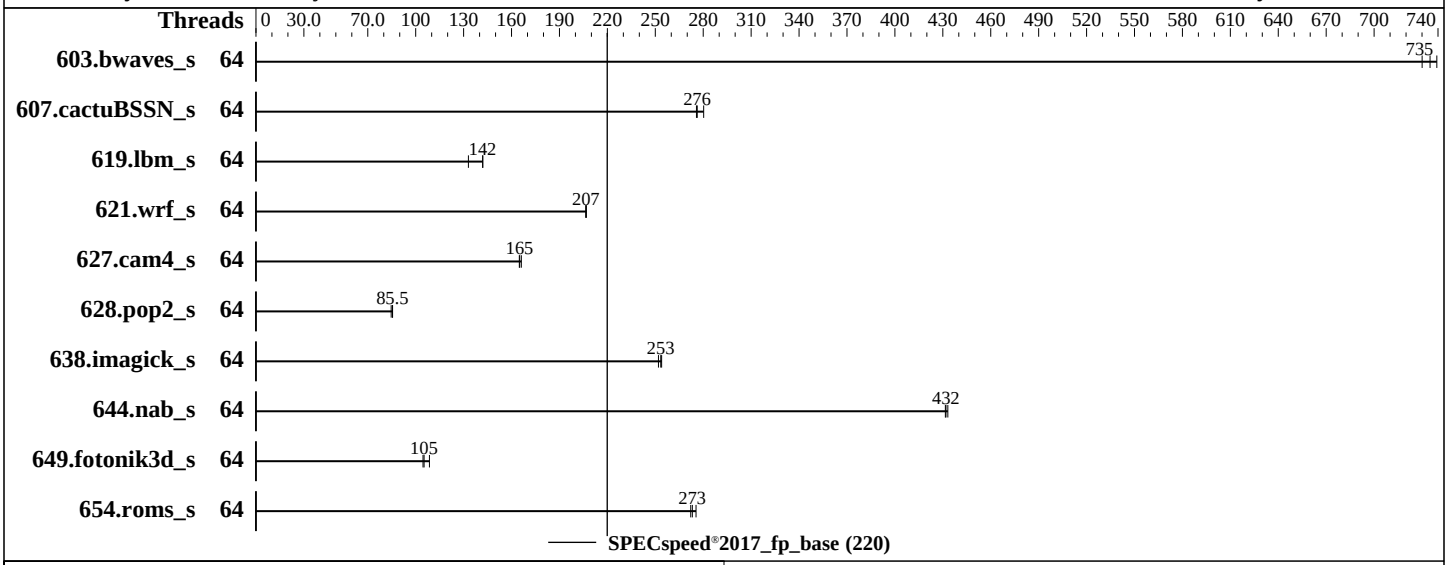
Cisco UCS C220 M6 (Intel Xeon Platinum 8358P, 2.60GHz)

SPECspeed®2017_fp_base = 220

SPECspeed®2017_fp_peak = Not Run

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

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



Hardware

CPU Name:	Intel Xeon Platinum 8358P
Max MHz:	3400
Nominal:	2600
Enabled:	64 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:	48 MB I+D on chip per chip
Other:	None
Memory:	2 TB (32 x 64 GB 2Rx4 PC4-3200V-R)
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 4.2.1c 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

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	64	80.8	730	79.8	739	**80.3**	**735**							
607.cactuBSSN_s	64	60.4	276	59.5	280	**60.3**	**276**							
619.lbm_s	64	36.9	142	39.4	133	**36.9**	**142**							
621.wrf_s	64	**64.0**	**207**	64.0	207	63.9	207							
627.cam4_s	64	53.8	165	**53.7**	**165**	53.3	166							
628.pop2_s	64	139	85.5	**139**	**85.5**	140	84.6							
638.imagick_s	64	56.8	254	**56.9**	**253**	57.3	252							
644.nab_s	64	40.3	433	40.5	432	**40.4**	**432**							
649.fotonik3d_s	64	**86.6**	**105**	83.9	109	87.2	105							
654.roms_s	64	57.8	272	**57.6**	**273**	57.2	276							

SPECspeed®2017_fp_base = 220

SPECspeed®2017_fp_peak = Not Run

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 optio
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)

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.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/rele
```

Platform Notes

```
BIOS Settings:
Adjacent Cache Line Prefetcher set to Disabled
DCU Streamer Prefetch set to Disabled
UPI Link Enablement set to 1
UPI Power Management set to Enabled
Sub NUMA Clustering 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
Enhanced CPU performance set to Auto
Energy Efficient Turbo set to Enabled
Processor C6 Report set to Enabled
Processor C1E set to Enabled
Intel HyperThreading Technology set to Disabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on install Thu Aug 12 23:06:56 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) Platinum 8358P CPU @ 2.60GHz
       2  "physical id"s (chips)
       64 "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 : 32
       siblings  : 32
       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
```

(Continued on next page)

Platform Notes (Continued)

```
       25 26 27 28 29 30 31
      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 28 29 30 31

 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):              64
      On-line CPU(s) list: 0-63
      Thread(s) per core:  1
      Core(s) per socket:  32
      Socket(s):           2
      NUMA node(s):        2
      Vendor ID:           GenuineIntel
      CPU family:          6
      Model:               106
      Model name:          Intel(R) Xeon(R) Platinum 8358P CPU @ 2.60GHz
      Stepping:            6
      CPU MHz:             800.000
      CPU max MHz:         3400.0000
      CPU min MHz:         800.0000
      BogoMIPS:            5200.00
      Virtualization:      VT-x
      L1d cache:           48K
      L1i cache:           32K
      L2 cache:            1280K
      L3 cache:            49152K
      NUMA node0 CPU(s):   0-31
      NUMA node1 CPU(s):   32-63
      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 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 epb cat_l3 invpcid_single ssbd
      mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad
      fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f
      avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni
      avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
      cqm_mbm_local wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp
      hwp_pkg_req avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni
      avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
      arch_capabilities

 /proc/cpuinfo cache data
```

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Platform Notes (Continued)

```
    cache size : 49152 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
   28 29 30 31
   node 0 size: 1031776 MB
   node 0 free: 1030681 MB
   node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
   57 58 59 60 61 62 63
   node 1 size: 1032147 MB
   node 1 free: 1023256 MB
   node distances:
   node   0   1
     0:  10  20
     1:  20  10

 From /proc/meminfo
    MemTotal:       2113458600 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
```

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Platform Notes (Continued)

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

 run-level 3 Aug 12 18:11

 SPEC is set to: /home/cpu2017
    Filesystem     Type   Size  Used Avail Use% Mounted on
    /dev/sda2      btrfs  222G   43G  178G  20% /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

 BIOS:
    BIOS Vendor:       Cisco Systems, Inc.
    BIOS Version:      C240M6.4.2.1c.10.0723211453
    BIOS Date:         07/23/2021
    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.
------------------------------------------------------------------------------
```

(Continued on next page)

Compiler Version Notes (Continued)

```
==============================================================================
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)
  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
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran         | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran 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.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran 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)
  64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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Base Compiler Invocation (Continued)

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
-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

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-ICX-revG.html

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
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-ICX-revG.xml

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