SPEC CPU®2017 Floating Point Speed Result

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xFusion
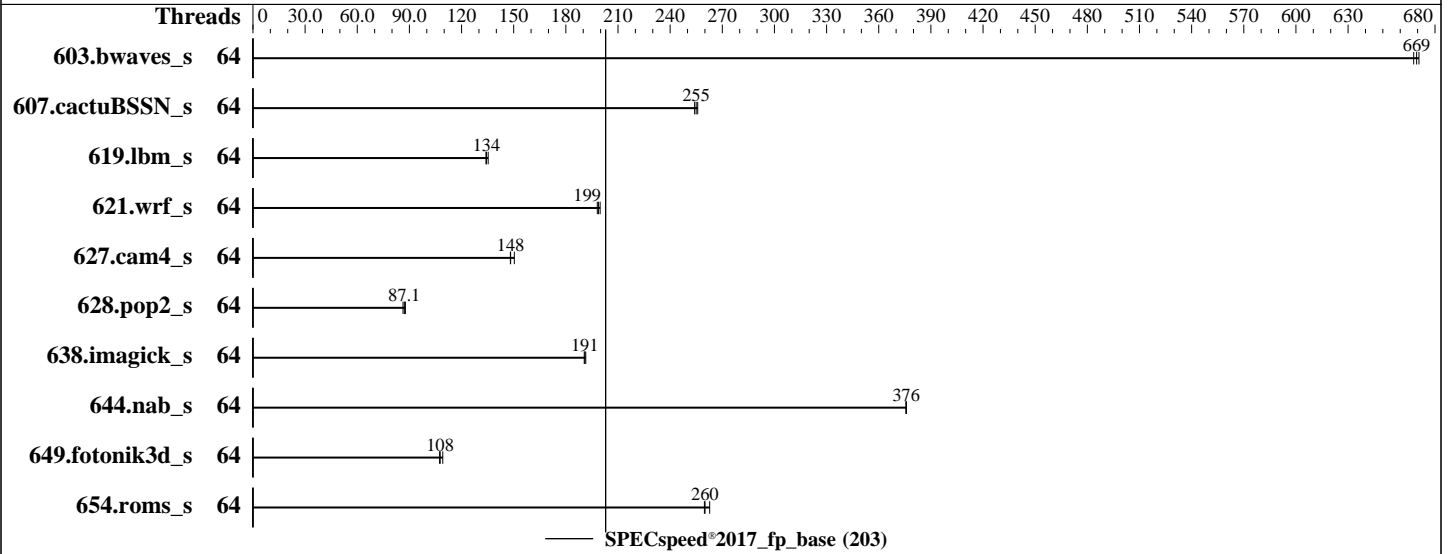
xFusion 2288H V6 (Intel Xeon Gold 6338N)

$SPECspeed®2017\_fp\_base =$ 203

$SPECspeed®2017\_fp\_peak =$ Not Run

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Apr-2022
Hardware Availability: Apr-2021
Software Availability: May-2021

Threads | 0 30.0 60.0 90.0 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600 630 680

- 603.bwaves_s **64** — 669
- 607.cactuBSSN_s **64** — 255
- 619.lbm_s **64** — 134
- 621.wrf_s **64** — 199
- 627.cam4_s **64** — 148
- 628.pop2_s **64** — 87.1
- 638.imagick_s **64** — 191
- 644.nab_s **64** — 376
- 649.fotonik3d_s **64** — 108
- 654.roms_s **64** — 260

—— **SPECspeed®2017_fp_base (203)**

Hardware

CPU Name: Intel Xeon Gold 6338N
  Max MHz: 3500
  Nominal: 2200
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: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 8.4 (Ootpa)
    4.18.0-305.el8.x86_64
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 0.95 Released Dec-2021
File System: xfs
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	**88.1**	**669**	88.4	668	88.0	671							
607.cactuBSSN_s	64	65.2	256	65.6	254	**65.4**	**255**							
619.lbm_s	64	39.1	134	38.7	135	**39.0**	**134**							
621.wrf_s	64	66.2	200	**66.5**	**199**	66.8	198							
627.cam4_s	64	**59.8**	**148**	58.9	150	59.8	148							
628.pop2_s	64	138	86.3	**136**	**87.1**	135	87.7							
638.imagick_s	64	75.4	191	**75.6**	**191**	75.7	191							
644.nab_s	64	**46.5**	**376**	46.5	376	46.5	376							
649.fotonik3d_s	64	**84.6**	**108**	83.5	109	84.9	107							
654.roms_s	64	59.9	263	60.6	260	**60.5**	**260**							
SPECspeed®2017_fp_base =	**203**													
SPECspeed®2017_fp_peak =	**Not Run**													

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"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/spec2017/lib/intel64:/spec2017/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 Red Hat Enterprise Linux 8.1
 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
 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
```

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General Notes (Continued)

sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

Platform Notes

```
BIOS configuration:
Performance Profile Set to Load Balance
Hyper-Threading Set to Disabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Sun Apr 10 04:12:40 2022

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 6338N CPU @ 2.20GHz
      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
      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 2.32.1:
     Architecture:        x86_64
     CPU op-mode(s):      32-bit, 64-bit
     Byte Order:          Little Endian
     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
     BIOS Vendor ID:      Intel(R) Corporation
     CPU family:          6
     Model:               106
     Model name:          Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz
     BIOS Model name:     Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz
     Stepping:            6
```

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Platform Notes (Continued)

```
        CPU MHz:                2236.509
        CPU max MHz:            2201.0000
        CPU min MHz:            800.0000
        BogoMIPS:               4400.00
        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 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 split_lock_detect wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku
     ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
     avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d arch_capabilities

 /proc/cpuinfo cache data
    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: 257138 MB
   node 0 free: 255039 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: 258038 MB
   node 1 free: 254675 MB
   node distances:
   node   0    1
     0:  10   20
     1:  20   10

 From /proc/meminfo
    MemTotal:       527541268 kB
    HugePages_Total:        0
```

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Platform Notes (Continued)

```
     Hugepagesize:          2048 kB

 /sbin/tuned-adm active
     Current active profile: throughput-performance

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

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="8.4 (Ootpa)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="8.4"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

 uname -a:
    Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021
    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
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):           Not affected

 run-level 3 Apr 10 02:14

 SPEC is set to: /spec2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
```

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Platform Notes (Continued)

```
    /dev/sda3        xfs    420G   22G   399G   6% /

 From /sys/devices/virtual/dmi/id
     Vendor:          XFUSION
     Product:         2288H V6
     Product Family:  Whitley
     Serial:          123456


 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:
     16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2666


 BIOS:
    BIOS Vendor:        INSYDE Corp.
    BIOS Version:       0.95
    BIOS Date:          12/22/2021
    BIOS Revision:      0.95

 (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)
  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.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
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
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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`

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`

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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:

```
-m64 -std=c11 -xCORE-AVX512 -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-AVX512 -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-AVX512 -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-AVX512 -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/xFusion-Platform-Settings-ICX-V1.1.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/xFusion-Platform-Settings-ICX-V1.1.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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