## SPEC CPU®2017 Floating Point Rate Result

### Huawei
(Test Sponsor: China Academy of Information and Communications Technology)

#### Huawei 2288H V6 (Intel Xeon Platinum 8380)

| SPECrate®2017_fp_base = | SPECrate®2017_fp_peak = Not Run |

**CPU2017 License:** 6177  
**Test Sponsor:** China Academy of Information and Communications Technology  
**Tested by:** China Academy of Information and Communications Technology  
**Test Date:** Apr-2021  
**Hardware Availability:** Apr-2021  
**Software Availability:** Mar-2021

### Hardware

- **CPU Name:** Intel Xeon Platinum 8380  
- **Max MHz:** 3400  
- **Nominal:** 2300  
- **Enabled:** 80 cores, 2 chips, 2 threads/core  
- **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:** 60 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)  
- **Storage:** 1 x 960 GB SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP2(x86_64)  
- **Kernel:** 5.3.18-22-default  
- **Compiler:** C/C++: Version 2021.2.0 of Intel oneAPI  
- **DPC++/C++ Compiler Build:** 20210317 for Linux;  
- **Fortran:** Version 2021.2.0 of Intel Fortran  
- **Compiler Classic Build:** 20210228 for Linux;  
- **C/C++:** Version 2021.2.0 of Intel C/C++ Compiler Classic Build 20210228 for Linux;  
- **Parallel:** No  
- **Firmware:** Version 0.66 released Apr-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 set to prefer performance at the cost of additional power usage.

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_fp_base</th>
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<td>544.nab_r</td>
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<td>554.roms_r</td>
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**SPECCrate®2017_fp_base (476)**
Huawei
(Test Sponsor: China Academy of Information and Communications Technology)
Huawei 2288H V6 (Intel Xeon Platinum 8380)

CPU2017 License: 6177
Test Sponsor: China Academy of Information and Communications Technology
Tested by: China Academy of Information and Communications Technology
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Results Table

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<th>Ratio</th>
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</tbody>
</table>

SPECrate®2017_fp_base = 476
SPECrate®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 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"
SCALING_GOVERNOR set to ondemand

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/opt/intel/oneapi/compiler/2021.2.0/linux/compiler/lib/intel64:/usr/local/jemalloc64-5.0.1"
MALLOC_CONF = "retain:true"

General Notes
Transparent Huge Pages enabled by default
Prior to runcpu invocation
SPEC CPU®2017 Floating Point Rate Result

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CPU2017 License: 6177
Test Sponsor: China Academy of Information and Communications Technology
Tested by: China Academy of Information and Communications Technology

Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

General Notes (Continued)

Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl 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.
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 configuration:
Power Policy Set to Performance
SNC Set to Enabled
XPT Prefetch Set to Enabled

Sysinfo program /home/spec2017115/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost Sun Apr 25 21:19:31 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 8380 CPU @ 2.30GHz
2 "physical id"s (chips)
160 "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 : 40
siblings : 80
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 32 33 34 35 36 37 38 39
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 32 33 34 35 36 37 38 39

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian

(Continued on next page)
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SPECrate®2017_fp_base = 476
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CPU2017 License: 6177
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Platform Notes (Continued)

Address sizes: 46 bits physical, 57 bits virtual
CPU(s): 160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 40
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8380 CPU @ 2.30GHz
Stepping: 6
CPU MHz: 963.860
CPU max MHz: 2301.0000
CPU min MHz: 800.0000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 61440K
NUMA node0 CPU(s): 0-19,80-99
NUMA node1 CPU(s): 20-39,100-119
NUMA node2 CPU(s): 40-59,120-139
NUMA node3 CPU(s): 60-79,140-159
Flags: fpu vme de pse tsc msr pae mce 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 aperf perfctr pni pclmulqdq dtss64 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 avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrsenhanced 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 xsaves xsavec xgetbv xlavar cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local wbinvd dtherm ida arat pln pts avx512vbm umip pku ospke avx512_vbmi1 gfn i vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld arch_capabilities

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99

(Continued on next page)
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(Test Sponsor: China Academy of Information and Communications Technology)
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Test Date: Apr-2021
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Platform Notes (Continued)

node 0 size: 257392 MB
node 0 free: 256707 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119
node 1 size: 258004 MB
node 1 free: 257290 MB
node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
node 2 size: 258038 MB
node 2 free: 257696 MB
node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
node 3 size: 257757 MB
node 3 free: 257407 MB
node distances:
node 0  1  2  3
  0: 10 11 20 20
  1: 11 10 20 20
  2: 20 20 10 11
  3: 20 20 11 10

From /proc/meminfo
MemTotal: 1055942032 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

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

(Continued on next page)
Huawei
(Test Sponsor: China Academy of Information and Communications Technology)

Huawei 2288H V6 (Intel Xeon Platinum 8380)

SPECCPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 476
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 6177
Test Sponsor: China Academy of Information and Communications Technology
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Platform Notes (Continued)

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass):
Mitigation: Speculative Store Bypass disabled via prct1 and seccomp
CVE-2017-5753 (Spectre variant 1):
Mitigation: usercopy/swaps 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 25 21:18 last=5

SPEC is set to: /home/spec2017115
From /sys/devices/virtual/dmi/id
Vendor: Huawei
Product: 2288H V6
Product Family: Whitley
Serial: Huawei

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.
Memory:
  32x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

BIOS:
  BIOS Vendor: INSYDE Corp.
  BIOS Version: 0.66
  BIOS Date: 04/09/2021
  BIOS Revision: 0.66

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base) |
-------------------------------------------------------------------------------
(Continued on next page)
## Huawei

### SPEC CPU®2017 Floating Point Rate Result

#### Huawei 2288H V6 (Intel Xeon Platinum 8380)

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### Compiler Version Notes (Continued)

Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.2.0 Build 20210317
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

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C++  | 508.namd_r(base) 510.parest_r(base)
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Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.2.0 Build 20210317
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

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C++, C | 511.povray_r(base) 526.blender_r(base)
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Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.2.0 Build 20210317
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

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C++, C, Fortran | 507.cactuBSSN_r(base)
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Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.2.0 Build 20210317
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Intel (R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.2.0 Build 20210317
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

Intel (R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.2.0 Build 20210228_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

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Fortran  | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
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Intel (R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.2.0 Build 20210228_000000
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(Continued on next page)
## Compiler Version Notes (Continued)

For Fortran, C | 521.wrf_r(base) 527.cam4_r(base)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.2.0 Build 20210228_000000
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.2.0 Build 20210317
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## Base Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

Benchmarks using both Fortran and C:
- ifort icx

Benchmarks using both C and C++:
- icpx icx

Benchmarks using Fortran, C, and C++:
- icpx icx ifort

## Base Portability Flags

- 503.bwaves_r: -DSPEC_LP64
- 507.cactuBSSN_r: -DSPEC_LP64
- 508.namd_r: -DSPEC_LP64
- 510.parest_r: -DSPEC_LP64
- 511.povray_r: -DSPEC_LP64
- 519.ibm_r: -DSPEC_LP64
- 521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
- 527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 538.imagick_r: -DSPEC_LP64
- 544.nab_r: -DSPEC_LP64

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

549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

## Base Optimization Flags

### C benchmarks:
- `w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/`

### C++ benchmarks:
- `w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto`
- `mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/`

### Fortran benchmarks:
- `w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`
- `qopt-prefetch -ffinite-math-only`
- `qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4`
- `nostandard-realloc-lhs -align array32byte -auto`
- `mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/`

### Benchmarks using both Fortran and C:
- `w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo`
- `no-prec-div -qopt-prefetch -ffinite-math-only`
- `qopt-multiple-gather-scatter-by-shuffles`
- `mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/`

### Benchmarks using both C and C++:
- `w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/`

### Benchmarks using Fortran, C, and C++:
- `w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3`
- `no-prec-div -qopt-prefetch -ffinite-math-only`
- `qopt-multiple-gather-scatter-by-shuffles`
### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `mbranches-within-32B-boundaries`
- `nostandard-realloc-lhs`
- `align array32byte`
- `auto`
- `ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/`

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/CAICT-Platform-Settings-V1.3.xml](http://www.spec.org/cpu2017/flags/CAICT-Platform-Settings-V1.3.xml)