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

Huawei 2288H V5 (Intel Xeon Gold 6238R)

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

**Hardware**

- CPU Name: Intel Xeon Gold 6238R
- Max MHz: 4000
- Nominal: 2200
- Enabled: 56 cores, 2 chips
- Orderable: 1.2 chips
- Cache L1: 32 KB I+D on chip per core
- L2: 1 MB I+D on chip per core
- L3: 38.5 MB I+D on chip per chip
- Other: None
- Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- Storage: 1 x 960 GB SAS SSD
- Other: None

**Software**

- OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
  - Kernel 4.12.14-94.41-default
- Compiler:
  - C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux
  - Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux
- Parallel: Yes
- 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.

**SPEC CPU®2017 Floating Point Speed Result**

**SPECspeed®2017_fp_base = 148**

**SPECspeed®2017_fp_peak = Not Run**
SPEC CPU®2017 Floating Point Speed 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
Hardware Availability: Feb-2020
Software Availability: Apr-2020
Test Date: Jan-2021

Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
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</table>

SPECspeed®2017_fp_base = 148
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 = "/opt/intel/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64:/usr/local/jemalloc64-5.0.1"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

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.
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.

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result
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Huawei 2288H V5 (Intel Xeon Gold 6238R)

| SPECspeed®2017_fp_base = | 148 |
| SPECspeed®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

General Notes (Continued)
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 configuration:
Power Policy Set to Load Balance
Hyper-Threading Set to Disabled
XPT Prefetch Set to Enabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-j3dr Thu Jan 7 17:07:42 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 6238R 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 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

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

(Continued on next page)
## SPEC CPU®2017 Floating Point Speed Result

**Huawei**

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

**Huawei 2288H V5 (Intel Xeon Gold 6238R)**

<table>
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**CPU2017 License:** 6177  
**Test Date:** Jan-2021  
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**Hardware Availability:** Feb-2020  
**Tested by:** China Academy of Information and Communications Technology  
**Software Availability:** Apr-2020  

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### Platform Notes (Continued)

- **Vendor ID:** GenuineIntel
- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Gold 6238R CPU @ 2.20GHz
- **Stepping:** 7
- **CPU MHz:** 2200.000
- **CPU max MHz:** 4000.0000
- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 4400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K  
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K
- **NUMA node0 CPU(s):** 0-27  
- **NUMA node1 CPU(s):** 28-55

**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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrpr 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 cdp_l3
invpcid_single ssbd mba ibrs ibpb tpr_shadow vnmi flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsavesopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
dtherm ida arat pni pts pku ospke avx512_vnni flush_lld 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:** 385551 MB  
**node 0 free:** 384790 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:** 387065 MB  
**node 1 free:** 386003 MB  
**node distances:**  
**node 0:** 10 21  
**node 1:** 21 10

From `/proc/meminfo`

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(Continued on next page)
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Specspeed®2017_fp_base = 148
Specspeed®2017_fp_peak = Not Run

Platform Notes (Continued)

MemTotal: 791159924 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 4
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.

os-release:
  NAME="SLES"
  VERSION="12-SP4"
  VERSION_ID="12.4"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: No status reported
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted
  Speculation, IBPB, IBRS_FW

run-level 3 Jan 7 15:02

SPEC is set to: /spec2017

From /sys/devices/virtual/dmi/id
  BIOS: INSYDE Corp. 6.83 06/29/2019
  Vendor: Huawei
  Product: 2288H V5
  Product Family: Purley
  Serial: Serial Number

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result
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Platform Notes (Continued)

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:
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(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 for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306
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 for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306
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 for applications running on Intel(R)
(Continued on next page)
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### Compiler Version Notes (Continued)

64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985–2020 Intel Corporation. All rights reserved.  
Intel (R) C Intel (R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.1.1.217 Build 20200306  
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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.caesar_BSSN_s: -DSPEC_LP64  
- 619.ibm_s: -DSPEC_LP64  
- 621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -DSPEC_CASE_FLAG -convert big_endian -assume byterecl

- 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

*(Continued on next page)*
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Base Optimization Flags (Continued)

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/ -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/ -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/ -ljemalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/CAICT-Platform-Settings-V1.3.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revB.xml
http://www.spec.org/cpu2017/flags/CAICT-Platform-Settings-V1.3.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2021-01-07 04:07:42-0500.
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