### Huawei

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

**Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)**

| SPECspeed®2017_int_base = 11.4 | SPECspeed®2017_int_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: | Nov-2020 |
| Hardware Availability: | Feb-2020 |
| Software Availability: | Apr-2020 |

#### Hardware

- **CPU Name:** Intel Xeon Gold 5220R
- **Max MHz:** 4000
- **Nominal:** 2200
- **Enabled:** 48 cores, 2 chips
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 35.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
- **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
- **Firmware:** Version 6.83 released Jun-2019
- **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.

---

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**SPECspeed®2017_int_base** (11.4)
SPEC CPU®2017 Integer Speed Result

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

Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)

SPECspeed®2017_int_base = 11.4

SPECspeed®2017_int_peak = Not Run

CPU2017 License: 6177
Test Sponsor: China Academy of Information and Communications Technology
Test Date: Nov-2020
Tested by: China Academy of Information and Communications Technology
Software Availability: Apr-2020

Results Table

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</table>

SPECSpeed®2017_int_base = 11.4

SPECSpeed®2017_int_peak = Not Run

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

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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,1,0"
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)

(Continued on next page)
**SPEC CPU®2017 Integer Speed Result**

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**Huawei**

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

Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)

| SPECspeed®2017_int_base = 11.4 |
| SPECspeed®2017_int_peak = Not Run |

---

**CPU2017 License:** 6177  
**Test Date:** Nov-2020  
**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

---

**General Notes (Continued)**

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:  
\texttt{sync; echo 3> /proc/sys/vm/drop_caches}  
\texttt{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 Load Balance  
Hyper-Threading Set to Disabled  
XPT Prefetch Set to Enabled

Sysinfo program /spec2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e46a485a0011  
running on linux-j3dr Sat Nov 7 14:51:41 2020

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  
\begin{verbatim}
model name : Intel(R) Xeon(R) Gold 5220R CPU @ 2.20GHz  
  2 "physical id"s (chips)  
  48 "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 : 24  
  siblings : 24  
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29  
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
\end{verbatim}

From lscpu:  
\begin{verbatim}
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 48  
On-line CPU(s) list: 0-47  
Thread(s) per core: 1  
Core(s) per socket: 24  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel
\end{verbatim}

(Continued on next page)
### Huawei

**SPEC CPU®2017 Integer Speed Result**

**Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)**

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>11.4</th>
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<tr>
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**CPU2017 License:** 6177  
**Test Sponsor:** China Academy of Information and Communications Technology

**Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz) Platform Notes (Continued)**

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<td>85</td>
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<tr>
<td>Model name:</td>
<td>Intel(R) Xeon(R) Gold 5220R CPU @ 2.20GHz</td>
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<tr>
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<td>CPU MHz:</td>
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</table>

/proc/cpuinfo cache data

```
cache size : 36608 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
node 0 size: 385551 MB
node 0 free: 385005 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387065 MB
node 1 free: 386516 MB
node distances:
  node  0  1
  0:  10  21
  1:  21  10
```

From /proc/meminfo

```
MemTotal:    791159916 kB
HugePages_Total:       0
```

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

- **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 (Meltdown):** No status reported
- **CVE-2017-5754 (Spectre variant 1):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5739 (Spectre variant 2):** Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

```
run-level 3 Nov 7 14:48
```

**SPEC is set to:** /spec2017

```
Filesystem   Type Size Used Avail Use% Mounted on
/dev/sda3    xfs  734G  46G  689G   7% /
```

From `/sys/devices/virtual/dmi/id`

- **BIOS:** INSYDE Corp. 6.83 06/29/2019
- **Vendor:** Huawei
- **Product:** 2288H V5
- **Product Family:** Purley
- **Serial:** 210200351910KC000123

Additional information from dmidecode follows. **WARNING:** Use caution when you interpret (Continued on next page)
SPEC CPU®2017 Integer Speed Result
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Huawei
(Test Sponsor: China Academy of Information and Communications Technology)

Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)

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

Platform Notes (Continued)

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, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base) 
==============================================================================
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base) 
==============================================================================
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran | 648.exchange2_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.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

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

Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)

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Test Date: Nov-2020
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Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Basic Optimization Flags

C benchmarks:
-m64 -qnextgen -std=c11
-W1,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/ -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/opt/intel/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -W1,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries
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<tr>
<th>Huawei 2288H V5 (Intel Xeon Gold 5220R, 2.20 GHz)</th>
<th>SPECspeed®2017_int_base = 11.4</th>
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<td>SPECspeed®2017_int_peak = Not Run</td>
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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:** Nov-2020  
**Hardware Availability:** Feb-2020  
**Software Availability:** Apr-2020

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)

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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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