Huawei 2288H V5 (Intel Xeon Gold 5215L)

**CPU2017 License:** 3175  
**Test Date:** Apr-2019  
**Test Sponsor:** Huawei  
**Hardware Availability:** Apr-2019  
**Tested by:** Huawei  
**Software Availability:** Dec-2018

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
</table>
| OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)  
4.12.14-94.41-default  
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++  
Compiler Build 20181018 for Linux;  
Fortran: Version 19.0.1.144 of Intel Fortran  
Compiler Build 20181018 for Linux  
Parallel: Yes  
Firmware: Version 6.52 Released Mar-2019  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: 64-bit  
Other: jemalloc memory allocator V5.0.1 | CPU Name: Intel Xeon Gold 5215L  
Max MHz.: 3400  
Nominal: 2500  
Enabled: 20 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: 13.75 MB I+D on chip per chip  
Other: None  
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)  
Storage: 1 x 1200 GB SAS, 10000 RPM  
Other: None |

---

**SPEC**

**CPU2017 Integer Speed Result**

Huawei  
**SPECspeed2017_int_base = 8.47**  
**SPECspeed2017_int_peak = 8.67**

**Threads**

<table>
<thead>
<tr>
<th>Test</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>5.79</td>
<td>6.85</td>
</tr>
<tr>
<td>gcc_s</td>
<td>8.43</td>
<td>8.70</td>
</tr>
<tr>
<td>mcf_s</td>
<td>5.56</td>
<td>5.64</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>10.9</td>
<td>11.3</td>
</tr>
<tr>
<td>xalancbk_s</td>
<td>4.87</td>
<td>4.88</td>
</tr>
<tr>
<td>x264_s</td>
<td>4.16</td>
<td>4.16</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>12.3</td>
<td>19.1</td>
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<tr>
<td>leela_s</td>
<td></td>
<td>19.4</td>
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<tr>
<td>exchange2_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz_s</td>
<td></td>
<td></td>
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spec

SPEC CPU2017 Integer Speed Result

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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>20</td>
<td>307</td>
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<td>303</td>
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<tr>
<td>602.gcc_s</td>
<td>20</td>
<td>473</td>
<td>8.41</td>
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<td>8.61</td>
<td>472</td>
<td>8.43</td>
<td>20</td>
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<tr>
<td>605.mcf_s</td>
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<td>292</td>
<td>5.58</td>
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<td>5.45</td>
<td>293</td>
<td>5.56</td>
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<td>291</td>
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<td>620.omnetpp_s</td>
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<td>625.x264_s</td>
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<tr>
<td>641.leela_s</td>
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<td>410</td>
<td>4.16</td>
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<td>4.15</td>
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<td>4.16</td>
<td>20</td>
<td>410</td>
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<td>648.exchange2_s</td>
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<td>240</td>
<td>12.3</td>
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<td>12.3</td>
<td>240</td>
<td>12.3</td>
<td>20</td>
<td>240</td>
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<tr>
<td>657.xz_s</td>
<td>20</td>
<td>324</td>
<td>19.1</td>
<td>324</td>
<td>19.1</td>
<td>324</td>
<td>19.1</td>
<td>20</td>
<td>319</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.47
SPECspeed2017_int_peak = 8.67

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/spec/lib/ia32:/spec/lib/intel64:/spec/je5.0.1-32:/spec/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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
Yes: 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.
Huawei

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CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Apr-2019
Tested by: Huawei
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Platform Notes

BIOS configuration:
Power Policy Set to Load Balance
Hyper-Threading Set to Disable
XPT Prefetch Set to Enabled
Sysinfo program /spec/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sles12sp4 Sun Apr 21 21:59:50 2019

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 5215L CPU @ 2.50GHz
  2 "physical id"s (chips)
  20 "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 : 10
siblings : 10
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 20
On-line CPU(s) list: 0-19
Thread(s) per core: 1
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5215L CPU @ 2.50GHz
Stepping: 6
CPU MHz: 2500.000
CPU max MHz: 3400.0000
CPU min MHz: 1000.0000
BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K

(Continued on next page)
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| SPECspeed2017_int_base | 8.47 |
| SPECspeed2017_int_peak | 8.67 |

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Tested by: Huawei

Platform Notes (Continued)

NUMA node0 CPU(s): 0-9
NUMA node1 CPU(s): 10-19
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
aperfmpref perf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr 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_13
invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
fs_dbgbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_p稳定 avx512cd avx512bw avx512vl
xsaves xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occ_vllc cqm_mbms_total cqm_mbms_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size: 14080 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
  node 0 size: 191934 MB
  node 0 free: 185564 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19
  node 1 size: 193251 MB
  node 1 free: 192700 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 394430504 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"

(Continued on next page)
SPEC CPU2017 Integer Speed Result

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Platform Notes (Continued)

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-2017-5754 (Meltdown): Not affected
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 Apr 21 21:55

SPEC is set to: /spec
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda3 xfs 849G 94G 756G 12% /

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.
   BIOS INSYDE Corp. 6.52 03/16/2019
   Memory:
   24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
==============================================================================

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
==============================================================================

(Continued on next page)
## Huawei 2288H V5 (Intel Xeon Gold 5215L)

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### Compiler Version Notes (Continued)

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
```

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
CXXC 620.omnetpp_s(peak)
```

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC 648.exchange2_s(base, peak)
```

```
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

## Base Compiler Invocation

**C benchmarks:**

```
icc -m64 -std=c11
```

**C++ benchmarks:**

```
icpc -m64
```

**Fortran benchmarks:**

```
ifort -m64
```
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CPU2017 License: 3175  
Test Sponsor: Huawei  
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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

Base Optimization Flags

C benchmarks:
- -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
- -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
- -lqkmalloc

Fortran benchmarks:
- -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
- icc -m64 -std=c11

C++ benchmarks:
- icpc -m64

Fortran benchmarks:
- ifort -m64
SPEC CPU2017 Integer Speed Result

Huawei

Huawei 2288H V5 (Intel Xeon Gold 5215L)

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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

620.omnetpp_s -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:

623.xalancbmk_s -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

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SPECspeed2017_int_base = 8.47
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Peak Optimization Flags (Continued)

631.deepsjeng_s: Same as 623.xalancbmk_s
641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:
648.exchange2_s: basepeak = yes

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/Huawei-Platform-Settings-SKL-V1.9-revC.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 CPU2017 v1.0.5 on 2019-04-21 21:59:49-0400.