Huawei

Huawei 2288H V5 (Intel Xeon Gold 6146)

**CPU2017 License:** 3175
**Test Sponsor:** Huawei
**Tested by:** Huawei

**Test Date:** Aug-2018
**Hardware Availability:** Jul-2017
**Software Availability:** Mar-2018

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base = 10.0</th>
<th>SPECspeed2017_int_peak = Not Run</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>60.08</td>
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<tr>
<td>602.gcc_s</td>
<td>10.9</td>
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<tr>
<td>605.mcf_s</td>
<td>12.8</td>
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<tr>
<td>620.omnetpp_s</td>
<td>7.35</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>10.7</td>
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</tr>
<tr>
<td>625.x264_s</td>
<td>12.1</td>
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<tr>
<td>631.deepsjeng_s</td>
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<tr>
<td>641.leela_s</td>
<td>4.96</td>
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<tr>
<td>648.exchange2_s</td>
<td>15.1</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24.0</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6146
- **Max MHz.:** 4200
- **Nominal:** 3200
- **Enabled:** 24 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:** 24.75 MB I+D on chip per chip
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
- **Storage:** 1 x 1200 GB SAS, 10000 RPM
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo) 3.10.0-693.11.6.el7.x86_64
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
  Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 0.81 Released Jul-2018
- **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
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SPECspeed2017_int_base = 10.0
SPECspeed2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<tr>
<td></td>
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<td>Peak</td>
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<tr>
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<td>Threads</td>
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<td>24.0</td>
<td>257</td>
<td>24.0</td>
<td>257</td>
<td>24.0</td>
</tr>
</tbody>
</table>

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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-6700K 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
## SPEC CPU2017 Integer Speed Result

**Huawei**

**Huawei 2288H V5 (Intel Xeon Gold 6146)**

<table>
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**CPU2017 License:** 3175  
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**Platform Notes**

BIOS configuration:  
Power Policy Set to Load Balance  
Hyper-Threading Set to Disable  
XPT Prefetch Set to Enabled  

Sysinfo program /spec2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b091c0f  
running on localhost.localdomain Sun Jan 5 16:27:22 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  
```
model name : Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
  2 "physical id"s (chips)
  24 "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 : 12
siblings : 12
  physical 0: cores 0 2 3 4 9 10 11 16 17 18 24 26
  physical 1: cores 0 3 4 5 6 7 16 18 19 20 21 22
```

From lscpu:  
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
Stepping: 4
CPU MHz: 3201.000
CPU max MHz: 3201.0000
CPU min MHz: 1200.0000
BogoMIPS: 6400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
```

(Continued on next page)
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<table>
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#### Platform Notes (Continued)

```
NUMA node0 CPU(s):     0-11  
NUMA node1 CPU(s):     12-23  
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 nonstop_tsc  
                        aperfmperf eagerfpu pni pclmulqdq dtes64 monitoring ds cpl vmx smx est tm2 ssse3 fma  
                        cx16 xsmtp pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes  
                        xsave avx f16c rdrand lahf_lm abm 3nowprefetch ept cat_13 cpd_13 invpcid_single  
                        intel_pt spec_ctrl ibpb_support tpr_shadow vmi flexpriority ept vpid fsgsbase  
                        tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdr_a avx512f avx512dq  
                        rsseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1  
                        cqmm_llc cqmm_occup_llc cqmm_mbm_total cqmm_mbm_local dtherm ida arat pln pts  
```

```
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  
node 0 size: 194741 MB  
node 0 free: 189739 MB  
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23  
node 1 size: 196608 MB  
node 1 free: 192046 MB  
node distances:  
  node   0   1  
  0:  10  21  
  1:  21  10  
```

```
From /proc/meminfo  
MemTotal:       394174888 kB  
HugePages_Total:       0  
Hugepagesize:       2048 kB  
```

```
From /etc/*release* /etc/*version*  
os-release:  
  NAME="Red Hat Enterprise Linux Server"  
  VERSION="7.4 (Maipo)"  
  ID="rhel"  
  ID_LIKE="fedora"  
  VARIANT="Server"  
  VARIANT_ID="server"  
  VERSION_ID="7.4"  
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"  
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)  
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)  
```

(Continued on next page)
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SPEC CPU2017 Integer Speed Result

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Spec CPU2017 Integer Speed Result

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SPECspeed2017_int_base = 10.0

SPECspeed2017_int_peak = Not Run

CPU2017 License: 3175
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Platform Notes (Continued)

system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
Linux localhost.localdomain 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST 2017 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jan 5 16:25

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs 883G 17G 867G 2% /

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. 0.81 07/02/2018
Memory:
24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 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) 657.xz_s(base)
657.xz_s(base)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)
641.leela_s(base)
==============================================================================
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC 648.exchange2_s(base)
==============================================================================
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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---

### Base Compiler Invocation

- **C benchmarks:**
  - icc -m64 -std=c11

- **C++ benchmarks:**
  - icpc -m64

- **Fortran benchmarks:**
  - ifort -m64

---

### Base Portability Flags

- **C benchmarks:**
  - 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:**
  - -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
  - -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
  - -L/usr/local/je5.0.1-64/lib -ljemalloc

- **C++ benchmarks:**
  - -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
  - -qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

- **Fortran benchmarks:**
  - -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
  - -qopt-mem-layout-trans=3 -nostandard-realloc-lhs
  - -L/usr/local/je5.0.1-64/lib -ljemalloc
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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/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.xml

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Tested with SPEC CPU2017 v1.0.2 on 2020-01-05 16:27:21-0500.
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