**Huawei**

Huawei 1288H V5 (Intel Xeon Gold 6150)

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Cpu2017 License: 3175  Test Date: Jul-2018
Test Sponsor: Huawei  Hardware Availability: Jan-2018
Tested by: Huawei  Software Availability: Jan-2018

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**Hardware**

CPU Name: Intel Xeon Gold 6150
Max MHz.: 3700
Nominal: 2700
Enabled: 36 cores, 2 chips, 2 threads/core
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
Other: None
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)
 Compiler: C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;
 Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
 Parallel: No
 Firmware: Version 0.62 Released Mar-2018
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: None
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</tbody>
</table>

**SPECrate2017_fp_base = 193**

**SPECrate2017_fp_peak = 197**

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"

### General Notes

Environment variables set by runcpu before the start of the run:

```
```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM

memory using Redhat Enterprise Linux 7.4

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
```

runcpu command invoked through numactl i.e.:

```
numactl --interleave=all runcpu <etc>
```

Yes: 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)
Huawei
Huawei 1288H V5 (Intel Xeon Gold 6150)

SPECrate2017_fp_base = 193
SPECrate2017_fp_peak = 197

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

Test Date: Jul-2018
Hardware Availability: Jul-2017
Software Availability: Jan-2018

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 Performance
SNC Set to Enabled
IMC Interleaving Set to 1-way Interleave
XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Wed Jul 18 20:44:23 2018

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 6150 CPU @ 2.70GHz
  2 "physical id"s (chips)
  72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6150 CPU @ 2.70GHz
Stepping: 4

(Continued on next page)
**Huawei**

**Huawei 1288H V5 (Intel Xeon Gold 6150)**

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**Platform Notes (Continued)**

- CPU MHz: 2700.000
- BogoMIPS: 5400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 25344K
- NUMA node0 CPU(s): 0-2, 5, 6, 9, 10, 14, 15, 36-38, 41, 42, 45, 46, 50, 51
- NUMA node1 CPU(s): 3, 4, 7, 8, 11-13, 16, 17, 39, 40, 43, 44, 47-49, 52, 53
- NUMA node2 CPU(s): 18-20, 23, 24, 27, 28, 32, 33, 54-56, 59, 60, 63, 64, 68, 69
- NUMA node3 CPU(s): 21, 22, 25, 26, 29-31, 34, 35, 37, 57, 58, 61, 62, 65-67, 70, 71

**Flags:**

- fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
- pat pse36 clf flush dtst 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
- aperfmpref perf eagerfpu pni pclmulqdq dtst64 ds_cpl vmx smx est tm2 ssse3 fma cx16 xtp
- pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx
- f16c rdrand lahf_lm abm 3nowprefetch epb cat_i3 cdp_l3 invpd_single intel_pt
- spec_ctrl ibpb_support tpr_shadow vnmi flexpriority ept vpid fsdbase tsc_adjust
- bm1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx
- smap cflushopt cwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cqm_llc
- cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts

/proc/cpuinfo cache data

cache size : 25344 KB

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 5 6 9 10 14 15 36 37 38 41 42 45 46 50 51
- node 0 size: 96437 MB
- node 0 free: 92402 MB
- node 1 cpus: 3 4 7 8 11 12 13 16 17 39 40 43 44 47 48 49 52 53
- node 1 size: 98304 MB
- node 1 free: 94985 MB
- node 2 cpus: 18 19 20 23 24 27 28 32 33 54 55 56 59 60 63 64 68 69
- node 2 size: 98304 MB
- node 2 free: 95143 MB
- node 3 cpus: 21 22 25 26 29 30 31 34 35 57 58 61 62 65 66 67 70 71
- node 3 size: 98304 MB
- node 3 free: 95105 MB

node distances:

- node 0 1 2 3
  0: 10 11 21 22
  1: 11 10 21 22
  2: 21 21 10 11
  3: 21 21 11 10

(Continued on next page)
Huawei

Huawei 1288H V5 (Intel Xeon Gold 6150)

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**Test Date:** Jul-2018

**Hardware Availability:** Jul-2017

**Software Availability:** Jan-2018

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### Platform Notes (Continued)

From `/proc/meminfo`

- MemTotal: 394174484 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)

- 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 Jul 16 11:43

- SPEC is set to: /spec2017
  - Filesystem Type Size Used Avail Use% Mounted on
  - /dev/mapper/rhel-root xfs 1.8T 35G 1.8T 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. 0.62 03/26/2018
- Memory:
  - 24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

---

### Compiler Version Notes

```
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
```

```
icc (ICC) 18.0.0 20170811
```

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SPEC CPU2017 Floating Point Rate Result

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Compiler Version Notes (Continued)

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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FC 507.cactuBSSN_r(peak)
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ifort (IFORT) 18.0.0 20170811
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## SPEC CPU2017 Floating Point Rate Result

**Huawei**

**Huawei 1288H V5 (Intel Xeon Gold 6150)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  
**Test Date:** Jul-2018  
**Hardware Availability:** Jul-2017  
**Software Availability:** Jan-2018

### Base Compiler Invocation

C benchmarks:
- `icc`

C++ benchmarks:
- `icpc`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `ifort icc`

Benchmarks using both C and C++:
- `icpc icc`

Benchmarks using Fortran, C, and C++:
- `icpc icc 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.lbm_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`
- `549.fotonik3d_r: -DSPEC_LP64`
- `554.roms_r: -DSPEC_LP64`

### Base Optimization Flags

C benchmarks:
- `-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only`
- `-qopt-mem-layout-trans=3`

C++ benchmarks:
- `-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only`

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### Base Optimization Flags (Continued)

C++ benchmarks (continued):
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

### Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using both C and C++:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11
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Peak Compiler Invocation

C benchmarks:
  \texttt{icc}

C++ benchmarks:
  \texttt{icpc}

Fortran benchmarks:
  \texttt{ifort}

Benchmarks using both Fortran and C:
  \texttt{ifort icc}

Benchmarks using both C and C++:
  \texttt{icpc icc}

Benchmarks using Fortran, C, and C++:
  \texttt{icpc icc ifort}

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: \texttt{-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3}
-\texttt{no-prec-div -qopt-prefetch -ffinite-math-only}
-\texttt{qopt-mem-layout-trans=3}

538.imagick_r: \texttt{-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch}
-\texttt{ffinite-math-only -qopt-mem-layout-trans=3}

544.nab_r: Same as 519.lbm_r

C++ benchmarks:

-\texttt{prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3}
-\texttt{no-prec-div -qopt-prefetch -ffinite-math-only}
-\texttt{qopt-mem-layout-trans=3}

Fortran benchmarks:

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**Peak Optimization Flags (Continued)**

503.bwaves_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`

Benchmarks using both Fortran and C:
`-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`

Benchmarks using both C and C++:
`-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3`

Benchmarks using Fortran, C, and C++:
`507.cactuBSSN_r: basepeak = yes`

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**Peak Other Flags**

C benchmarks:
`-m64 -std=c11`

C++ benchmarks:
`-m64`

Fortran benchmarks:
`-m64`

Benchmarks using both Fortran and C:
`-m64 -std=c11`

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The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml
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.

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