Huawei 5288 V5 (Intel Xeon Gold 6134)

**SPECrate2017_fp_peak = 139**

**SPECrate2017_fp_base = 136**

- **CPU2017 License:** 3175
- **Test Date:** Aug-2018
- **Hardware Availability:** Jul-2017
- **Software Availability:** Mar-2018

**Hardware**

- **CPU Name:** Intel Xeon Gold 6134
- **Max MHz.:** 3700
- **Nominal:** 3200
- **Enabled:** 16 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
- **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 18.0.2.199 of Intel C/C++ Compiler for Linux;
  Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
- **Parallel:** No
- **Firmware:** Version 0.81 Released Jul-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
### Results Table

<table>
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<th>Ratio Base</th>
<th>Seconds Peak</th>
<th>Ratio Peak</th>
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<td>567</td>
<td>89.7</td>
</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 136**  
**SPECrate2017_fp_peak = 139**

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 i7-6700K 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
```

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 5288 V5 (Intel Xeon Gold 6134)

SPECrate2017_fp_base = 136
SPECrate2017_fp_peak = 139

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

Test Date: Aug-2018
Hardware Availability: Jul-2017
Software Availability: Mar-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 Aug 22 13:43:06 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 6134 CPU @ 3.20GHz
  2 "physical id"s (chips)
  32 "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: 8
  siblings: 16
  physical 0: cores 0 2 3 9 16 19 26 27
  physical 1: cores 1 3 4 6 7 18 20 22

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6134 CPU @ 3.20GHz
Stepping: 4

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Gold 6134)

SPEC CPU2017 Floating Point Rate Result

<table>
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<tr>
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**CPU2017 License:** 3175

**Test Sponsor:** Huawei

**Test Date:** Aug-2018

**Hardware Availability:** Jul-2017

**Tested by:** Huawei

**Software Availability:** Mar-2018

**Platform Notes (Continued)**

```
CPU MHz:               3200.000
BogoMIPS:              6400.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              25344K
NUMA node0 CPU(s):     0,1,3,4,16,17,19,20
NUMA node1 CPU(s):     2,5-7,18,21-23
NUMA node2 CPU(s):     8-10,13,24-26,29
NUMA node3 CPU(s):     11,12,14,15,27,28,30,31
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
                       pat pse36 clf flush dtls acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
                       lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
                       aperfmperf eagerfpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 fma cx16 xtpr
                       pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx
                       f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt
                       spec_ctrl ibpb_support tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
                       bmi1 hle avx2 smep bmi2 ets invpcid rtm cmp mpx rdt_a avx512f avx512dq rdseed adx
                       smap clfushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xcven xgetbv1 cqm_llc
                       cqm_occyp_llc cqm_mbm_total cqm_mbm_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 3 4 16 17 19 20
node 0 size: 96437 MB
node 0 free: 93488 MB
node 1 cpus: 2 5 6 7 18 21 22 23
node 1 size: 98304 MB
node 1 free: 95546 MB
node 2 cpus: 8 9 10 13 24 25 26 29
node 2 size: 98304 MB
node 2 free: 95654 MB
node 3 cpus: 11 12 14 15 27 28 30 31
node 3 size: 98304 MB
node 3 free: 95721 MB
node distances:
    node 0 1 2 3
  0: 10 11 21 21
  1: 11 10 21 21
  2: 21 21 10 11
  3: 21 21 11 10
```

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

Huawei

Huawei 5288 V5 (Intel Xeon Gold 6134)

| SPECrate2017_fp_base = 136 |
|SPECrate2017_fp_peak = 139 |

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

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)
    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 Aug 22 06:05

SPEC is set to: /spec2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/mapper/rhel-root xfs 1.8T 53G 1.7T 3% /

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  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base, peak) |
==============================================================================

icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
Huawei
Huawei 5288 V5 (Intel Xeon Gold 6134)

<table>
<thead>
<tr>
<th>SPEC CPU2017 Floating Point Rate Result</th>
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<td>Tested by: Huawei</td>
<td>Software Availability: Mar-2018</td>
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Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------
CC  519.lbm_r(peak)  
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CXXC 508.namd_r(base) 510.parest_r(base, peak)  
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CXXC 508.namd_r(peak)  
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CC  511.povray_r(base) 526.blender_r(base, peak)  
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
CC  511.povray_r(peak)  
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
FC  507.cactuBSSN_r(base, peak)  
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210

(Continued on next page)```
Huawei

Huawei 5288 V5 (Intel Xeon Gold 6134)  

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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Test Date:** Aug-2018  
**Hardware Availability:** Jul-2017  
**Tested by:** Huawei  
**Software Availability:** Mar-2018

---

### Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

---

```
FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
```

---

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

---

```plaintext
FC 554.roms_r(peak)
```

---

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

---

```plaintext
CC 521.wrf_r(base) 527.cam4_r(base)
```

---

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

---

```plaintext
CC 521.wrf_r(peak) 527.cam4_r(peak)
```

---

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

---

### Base Compiler Invocation

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

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

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Gold 6134)

| SPECrate2017_fp_base = 136 |
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Huawei

CPU2017 License: 3175
Test Sponsor: Huawei
Hardware Availability: Jul-2017
Tested by: Huawei
Software Availability: Mar-2018
Test Date: Aug-2018

**Base Compiler Invocation (Continued)**

Fortran benchmarks:
ifort -m64

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

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

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

**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.ibm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigend-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 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

(Continued on next page)
Huawei

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| SPECrate2017_fp_base = 136 |
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CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Aug-2018
Tested by: Huawei
Hardware Availability: Jul-2017
Software Availability: Mar-2018

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

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

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result  
Copyright 2017-2018 Standard Performance Evaluation Corporation

Huawei  
Huawei 5288 V5 (Intel Xeon Gold 6134)  

SPECrate2017_fp_base = 136  
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CPU2017 License: 3175  
Test Date: Aug-2018  
Hardware Availability: Jul-2017  

Test Sponsor: Huawei  
Software Availability: Mar-2018  
Tested by: Huawei

Peak Optimization Flags (Continued)

519.lbm_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

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

544.nab_r: Same as 538.imagick_r

C++ benchmarks:

508.namd_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

510.parest_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

Fortran benchmarks:

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

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 -auto -nostandard-realloc lhs

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 -auto -nostandard-realloc lhs

Benchmarks using both C and C++:

511.povray_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

526.blender_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only

(Continued on next page)
Huawei
Huawei 5288 V5 (Intel Xeon Gold 6134)

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

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

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

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 2018-08-22 13:43:05-0400.
Originally published on 2018-09-18.