Huawei CH225 V5 (Intel Xeon Gold 6146)

SPECrate2017_fp_base = 180
SPECrate2017_fp_peak = 183

CPUT2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Hardware

CPU Name: Intel Xeon Gold 6146
Max MHz.: 4200
Nominal: 3200
Enabled: 24 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 7.3 (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 0.80 Released Jun-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None

503.bwaves_r 48
507.cactuBSSN_r 48
508.namd_r 48
510.parest_r 48
511.povray_r 48
519.lbm_r 48
521.wrf_r 48
526.blender_r 48
527.cam4_r 48
538.imagick_r 48
544.nab_r 48
549.fotonik3d_r 48
554.roms_r 48

48

139
225
101
107
181
187
398
288
147
147
98.2

SPECrate2017_fp_base (180)
SPECrate2017_fp_peak (183)
### SPEC CPU2017 Floating Point Rate Result

**Huawei**

Huawei CH225 V5 (Intel Xeon Gold 6146)

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<td>Jul-2017</td>
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<td>Mar-2018</td>
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#### Results Table

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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
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<td>503.bwaves_r</td>
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<td>526.blender_r</td>
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<td>527.cam4_r</td>
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<td></td>
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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.
Huawei

Huawei CH225 V5 (Intel Xeon Gold 6146)

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Tested by: Huawei
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 Thu Oct 18 13:23:33 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 6146 CPU @ 3.20GHz
  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 : 12
siblings : 24
physical 0: cores 0 3 4 5 6 7 16 18 19 20 21 22
physical 1: cores 0 2 3 4 9 10 11 16 17 18 24 26

From lscpu:
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: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
Stepping: 4

(Continued on next page)
Huawei

Huawei CH225 V5 (Intel Xeon Gold 6146)

SPECrate2017_fp_base = 180
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CPU MHz: 3200.000
BogoMIPS: 6405.50
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-2, 6-8, 24-26, 30-32
NUMA node1 CPU(s): 3-5, 9-11, 27-29, 33-35
NUMA node2 CPU(s): 12, 13, 16, 19, 20, 22, 36, 37, 40, 43, 44, 46
NUMA node3 CPU(s): 14, 15, 17, 18, 21, 23, 38, 39, 41, 42, 45, 47

/platform/cpuintifo 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 6 7 8 24 25 26 30 31 32
  node 0 size: 96433 MB
  node 0 free: 93494 MB
  node 1 cpus: 3 4 5 9 10 11 27 28 29 33 34 35
  node 1 size: 98304 MB
  node 1 free: 95554 MB
  node 2 cpus: 12 13 16 19 20 22 36 37 40 43 44 46
  node 2 size: 98304 MB
  node 2 free: 95366 MB
  node 3 cpus: 14 15 17 18 21 23 38 39 41 42 45 47
  node 3 size: 98304 MB
  node 3 free: 95609 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

From /proc/meminfo
  MemTotal: 394168644 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.3 (Maipo)"
    ID="rhel"

(Continued on next page)
Huawei

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Platform Notes (Continued)

ID_LIKE="fedora"
VERSION_ID="7.3"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.3 (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 Oct 18 05:23

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 400G 9.6G 391G 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. 0.80 06/27/2018
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 CH225 V5 (Intel Xeon Gold 6146)

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**CPU2017 License:** 3175

**Test Sponsor:** Huawei

**Test Date:** Oct-2018

**Hardware Availability:** Jul-2017

**Tested by:** Huawei

**Software Availability:** Mar-2018

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### Compiler Version Notes (Continued)

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

(Continued on next page)
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Compiler Version Notes (Continued)

Base 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
## Huawei CH225 V5 (Intel Xeon Gold 6146)

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### Test Date: Oct-2018

| Hardware Availability: Jul-2017 |
| Software Availability: Mar-2018 |

## 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:

- `CORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

### C++ benchmarks:

- `CORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

### Fortran benchmarks:

- `CORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

### Benchmarks using both Fortran and C:

- `CORE-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++:

- `CORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

### Benchmarks using Fortran, C, and C++:

- `CORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`
Huawei

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Hardware Availability: Jul-2017
Software Availability: Mar-2018

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:

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: basepeak = yes

544.nab_r: basepeak = yes

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

(Continued on next page)
Peak Optimization Flags (Continued)

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:

521.wrf_r: basepeak = yes

527.cam4_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 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
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

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
Huawei

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.