**Huawei**

**Huawei XH321 V5 (Intel Xeon Silver 4108)**

**SPECrate2017_fp_base = 77.5**  
**SPECrate2017_fp_peak = 79.7**

<table>
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<th>Test Date:</th>
<th>Jun-2018</th>
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<tbody>
<tr>
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<td>Jul-2017</td>
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<td>Software Availability:</td>
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<th><strong>Test Date:</strong> June-2018</th>
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<tr>
<td><strong>Test Sponsor:</strong> Huawei</td>
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</tr>
<tr>
<td><strong>Tested by:</strong> Huawei</td>
<td><strong>Software Availability:</strong> Jan-2018</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Silver 4108  
**Max MHz.:** 3000  
**Nominal:** 1800  
**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:** 11 MB I+D on chip per chip  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)  
**Storage:** 1 x 1200 GB SAS, 10000 RPM  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux Server release 7.3  
(Maipo)  
3.10.0-693.11.6.el7.x86_64  
**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 0.59 Released Feb-2018  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None
spec

Huawei
Huawei XH321 V5 (Intel Xeon Silver 4108)

SPECrate2017_fp_base = 77.5
SPECrate2017_fp_peak = 79.5

Results Table

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</tr>
</tbody>
</table>

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:
LD_LIBRARY_PATH = "/spec/lib/ia32:/spec/lib/intel64:/spec/je5.0.1-32:/spec/je5.0.1-64"

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 XH321 V5 (Intel Xeon Silver 4108)  SPECrate2017_fp_base =  77.5
SPECrate2017_fp_peak =  79.7

| CPU2017 License: | 3175 |
| Test Sponsor: | Huawei |
| Tested by: | Huawei |
| Test Date: | Jun-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  
ADDDC Sparing Set to Disabled  
Sysinfo program /spec/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on localhost.localdomain Sun Jun 10 15:16:49 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) Silver 4108 CPU @ 1.80GHz
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 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

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): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4108 CPU @ 1.80GHz

(Continued on next page)
Huawei
Huawei XH321 V5 (Intel Xeon Silver 4108)

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CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Jun-2018
CPU2017 License: 3175
Test Sponsor: Huawei

### Platform Notes (Continued)

- Stepping: 4
- CPU MHz: 1800.000
- BogoMIPS: 3604.53
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 11264K
- NUMA node0 CPU(s): 0-7,16-23
- NUMA node1 CPU(s): 8-15,24-31

```
/platform/cpuinfo/cache data
  cache size : 11264 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 16 17 18 19 20 21 22 23
  node 0 size: 195701 MB
  node 0 free: 189995 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
  node 1 size: 196608 MB
  node 1 free: 191467 MB
  node distances:
    node 0   1
    0:  10  21
    1:  21  10
```

```
From /proc/meminfo
  MemTotal:       395141652 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"
    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)
```

(Continued on next page)
Huawei

Huawei XH321 V5 (Intel Xeon Silver 4108)

SPEC rate2017_fp_base = 77.5
SPEC rate2017_fp_peak = 79.7

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

<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
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</thead>
<tbody>
<tr>
<td><strong>uname -a:</strong></td>
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<tr>
<td>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</td>
</tr>
<tr>
<td>run-level 3 Jun 10 02:55</td>
</tr>
<tr>
<td>SPEC is set to: /spec</td>
</tr>
<tr>
<td>Filesystem    Type  Size  Used Avail Use% Mounted on</td>
</tr>
<tr>
<td>/dev/sda8      xfs   325G   30G  296G  10% /</td>
</tr>
</tbody>
</table>

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. 0.59 02/24/2018
Memory:
4x NO DIMM NO DIMM
12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>CC   519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)</th>
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<tbody>
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<td>icc (ICC) 18.0.0 20170811</td>
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<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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(Continued on next page)
SPEC CPU2017 Floating Point Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

Huawei
Huawei XH321 V5 (Intel Xeon Silver 4108)

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CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Jun-2018
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Hardware Availability: Jul-2017
Software Availability: Jan-2018

Compiler Version Notes (Continued)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
CC 511.povray_r(base) 526.blender_r(base)
==============================================================================
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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
iccc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
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==============================================================================
FC 507.cactuBSSN_r(base)
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iccc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC 507.cactuBSSN_r(peak)
==============================================================================
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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
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==============================================================================
FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
(Continued on next page)
Huawei

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**SPECrerate2017_fp_base = 77.5**

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**CPU2017 License:** 3175

**Test Sponsor:** Huawei

**Test Date:** Jun-2018

**Hardware Availability:** Jul-2017

**Tested by:** Huawei

**Software Availability:** Jan-2018

---

**Compiler Version Notes (Continued)**

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

---

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

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

---

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

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

---

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

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

---

**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

(Continued on next page)
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<td>Huawei</td>
<td>Software Availability:</td>
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</table>

**Base Compiler Invocation (Continued)**

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 -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 -nostandard-realloc-1hs -align array32byte

Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-1hs -align array32byte

Benchmarks using both C and C++:

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

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

### Huawei

**Huawei XH321 V5 (Intel Xeon Silver 4108)**

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### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
- `-xCORE-AVX2`  `-ipo`  `-o3`  `-no-prec-div`  `-qopt-prefetch`  `-ffinite-math-only`  `-qopt-mem-layout-trans=3`  `-nostandard-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`

### Peak 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`
Huawei

Huawei XH321 V5 (Intel Xeon Silver 4108)

SPECRate2017_fp_base = 77.5
SPECRate2017_fp_peak = 79.7

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

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

Peak Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:
- icpc
- icc
- ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

- 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

- 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

C++ benchmarks:

- 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

Fortran benchmarks:

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

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

Benchmarks using both Fortran and C:
- prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3

(Continued on next page)
### Huawei

**Huawei XH321 V5 (Intel Xeon Silver 4108)**

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**CPU2017 License:** 3175

**Test Sponsor:** Huawei

**Test Date:** Jun-2018

**Tested by:** Huawei

**Hardware Availability:** Jul-2017

**Software Availability:** Jan-2018

### Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
- `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`
- `-no-prec-div`
- `-qopt-prefetch`
- `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`

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

### Peak 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`

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
### Huawei

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