Huawei

Huawei XH321 V5 (Intel Xeon Silver 4110)

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

SPECrate2017_fp_peak = 82.1
SPECrate2017_fp_base = 80.1

Hardware

CPU Name: Intel Xeon Silver 4110
Max MHz.: 3000
Nominal: 2100
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)
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 CPU2017 Floating Point Rate Result

Huawei

Huawei XH321 V5 (Intel Xeon Silver 4110)

SPECrate2017_fp_base = 80.1
SPECrate2017_fp_peak = 82.1

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>32</td>
<td>1237</td>
<td>259</td>
<td>1235</td>
<td>260</td>
<td>1231</td>
<td>261</td>
<td>32</td>
<td>1229</td>
<td>261</td>
<td>1230</td>
<td>261</td>
<td>1226</td>
<td>262</td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>32</td>
<td>583</td>
<td>69.4</td>
<td>582</td>
<td>69.6</td>
<td>582</td>
<td>69.6</td>
<td>32</td>
<td>583</td>
<td>69.4</td>
<td>582</td>
<td>69.6</td>
<td>582</td>
<td>69.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>32</td>
<td>549</td>
<td>55.4</td>
<td>549</td>
<td>55.4</td>
<td>548</td>
<td>55.4</td>
<td>32</td>
<td>545</td>
<td>55.8</td>
<td>548</td>
<td>55.5</td>
<td>547</td>
<td>55.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>32</td>
<td>1432</td>
<td>58.5</td>
<td>1435</td>
<td>58.3</td>
<td>1434</td>
<td>58.4</td>
<td>32</td>
<td>1430</td>
<td>58.5</td>
<td>1430</td>
<td>58.5</td>
<td>1430</td>
<td>58.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>32</td>
<td>833</td>
<td>89.7</td>
<td>832</td>
<td>89.9</td>
<td>833</td>
<td>89.7</td>
<td>32</td>
<td>736</td>
<td>102</td>
<td>730</td>
<td>102</td>
<td>733</td>
<td>102</td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>32</td>
<td>604</td>
<td>55.8</td>
<td>607</td>
<td>55.6</td>
<td>602</td>
<td>56.0</td>
<td>32</td>
<td>558</td>
<td>60.4</td>
<td>556</td>
<td>60.7</td>
<td>552</td>
<td>61.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>32</td>
<td>768</td>
<td>93.4</td>
<td>770</td>
<td>93.1</td>
<td>766</td>
<td>93.5</td>
<td>32</td>
<td>749</td>
<td>95.7</td>
<td>745</td>
<td>96.2</td>
<td>747</td>
<td>96.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>32</td>
<td>637</td>
<td>76.5</td>
<td>639</td>
<td>76.2</td>
<td>637</td>
<td>76.6</td>
<td>32</td>
<td>634</td>
<td>76.9</td>
<td>633</td>
<td>77.0</td>
<td>635</td>
<td>76.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>32</td>
<td>806</td>
<td>69.5</td>
<td>807</td>
<td>69.4</td>
<td>808</td>
<td>69.3</td>
<td>32</td>
<td>791</td>
<td>70.8</td>
<td>790</td>
<td>70.8</td>
<td>791</td>
<td>70.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>32</td>
<td>725</td>
<td>110</td>
<td>724</td>
<td>110</td>
<td>724</td>
<td>110</td>
<td>32</td>
<td>724</td>
<td>110</td>
<td>724</td>
<td>110</td>
<td>724</td>
<td>110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>32</td>
<td>560</td>
<td>96.1</td>
<td>560</td>
<td>96.2</td>
<td>565</td>
<td>95.3</td>
<td>32</td>
<td>553</td>
<td>97.4</td>
<td>552</td>
<td>97.5</td>
<td>553</td>
<td>97.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>32</td>
<td>1678</td>
<td>74.3</td>
<td>1678</td>
<td>74.3</td>
<td>1689</td>
<td>73.9</td>
<td>32</td>
<td>1677</td>
<td>74.3</td>
<td>1667</td>
<td>74.4</td>
<td>1671</td>
<td>74.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>32</td>
<td>1032</td>
<td>49.3</td>
<td>1044</td>
<td>48.7</td>
<td>1048</td>
<td>48.5</td>
<td>32</td>
<td>1006</td>
<td>50.6</td>
<td>1011</td>
<td>50.3</td>
<td>1011</td>
<td>50.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- SPECrate2017_fp_base = 80.1
- SPECrate2017_fp_peak = 82.1

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)
SPEC CPU2017 Floating Point Rate Result

Huawei

Huawei XH321 V5 (Intel Xeon Silver 4110)

SPECrate2017_fp_base = 80.1
SPECrate2017_fp_peak = 82.1

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 Thu Jun 21 21:33:08 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 4110 CPU @ 2.10GHz
  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 4110 CPU @ 2.10GHz

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

Huawei
Huawei XH321 V5 (Intel Xeon Silver 4110)

SPECrate2017_fp_base = 80.1
SPECrate2017_fp_peak = 82.1

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

Platform Notes (Continued)

Stepping: 4
CPU MHz: 2100.000
BogoMIPS: 4204.95
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

From /proc/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: 180072 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: 182840 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 4110)

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Huawei
Huawei XH321 V5 (Intel Xeon Silver 4110)

SPECrate2017_fp_base = 80.1
SPECrate2017_fp_peak = 82.1

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

Platform Notes (Continued)

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 Jun 21 10:27

SPEC is set to: /spec

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda8 xfs 325G 151G 175G 47% /

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

==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------

==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
==============================================================================
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------

(Continued on next page)
Huawei

Huawei XH321 V5 (Intel Xeon Silver 4110)

| SPECrate2017_fp_base = 80.1 |
| SPECrate2017_fp_peak = 82.1 |

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

Test Date: Jun-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)

icpc (ICC) 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.

icpc (ICC) 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.

---

FC 507.cactuBSSN_r(base)

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

---

FC 507.cactuBSSN_r(peak)

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

---

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

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

Huawei
Huawei XH321 V5 (Intel Xeon Silver 4110)

SPECrate2017_fp_base = 80.1
SPECrate2017_fp_peak = 82.1

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

Compiler Version Notes (Continued)

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

FC 554.roms_r(peak)

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

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

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.

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

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)
## SPEC CPU2017 Floating Point Rate Result

<table>
<thead>
<tr>
<th>Huawei XH321 V5 (Intel Xeon Silver 4110)</th>
<th>SPECrate2017_fp_base = 80.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak = 82.1</td>
<td></td>
</tr>
</tbody>
</table>

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

### Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:

```
icpc icc ifort```

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

### 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-lhs`  
- `-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-lhs`  
- `-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)
Huawei
Huawei XH321 V5 (Intel Xeon Silver 4110)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base = 80.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak = 82.1</td>
</tr>
</tbody>
</table>

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

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

(Continued on next page)
Huawei
Huawei XH321 V5 (Intel Xeon Silver 4110)

SPECrate2017_fp_base = 80.1
SPECrate2017_fp_peak = 82.1

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:
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 519.lbm_r

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:
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

(Continued on next page)
### Huawei

**Huawei XH321 V5 (Intel Xeon Silver 4110)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.1</td>
<td>82.1</td>
</tr>
</tbody>
</table>

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

**Test Date:** Jun-2018  
**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`  
- `-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`

### 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](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/Intel-ic18.0-official-linux64.xml)
<table>
<thead>
<tr>
<th>Huawei XH321 V5 (Intel Xeon Silver 4110)</th>
<th>SPECrate2017_fp_base = 80.1</th>
<th>SPECrate2017_fp_peak = 82.1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU2017 License:</strong> 3175</td>
<td><strong>Test Date:</strong> Jun-2018</td>
<td></td>
</tr>
<tr>
<td><strong>Test Sponsor:</strong> Huawei</td>
<td><strong>Hardware Availability:</strong> Jul-2017</td>
<td></td>
</tr>
<tr>
<td><strong>Tested by:</strong> Huawei</td>
<td><strong>Software Availability:</strong> Jan-2018</td>
<td></td>
</tr>
</tbody>
</table>

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.2 on 2018-06-21 21:33:06-0400.
Originally published on 2018-07-10.