## Huawei

### Huawei CH121 V5 (Intel Xeon Silver 4109T)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (59.3)</th>
<th>SPECspeed2017_fp_peak (60.6)</th>
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<tbody>
<tr>
<td>603.bwaves_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s 16</td>
<td></td>
<td></td>
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<tr>
<td>619.libm_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>621.wrf_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s 16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4109T
- **Max MHz.:** 3000
- **Nominal:** 2000
- **Enabled:** 16 cores, 2 chips
- **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
- **Memory:** 768 GB (24 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 7.4 (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:** Yes
- **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
SPEC CPU2017 Floating Point Speed Result

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Huawei
Huawei CH121 V5 (Intel Xeon Silver 4109T)

SPECspeed2017_fp_base = 59.3
SPECspeed2017_fp_peak = 60.6

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>307</td>
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<td>33.0</td>
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<td>33.1</td>
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<td>44.5</td>
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<tr>
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<td>361</td>
<td>40.0</td>
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<td>39.7</td>
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<td>64.0</td>
<td>247</td>
<td>63.9</td>
<td>246</td>
<td>64.0</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 59.3
SPECspeed2017_fp_peak = 60.6

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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:
KMP_AFFINITY = "granularity= fine, compact"
OMP_STACKSIZE = "192M"

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

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
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 Load Balance
Hyper-Threading Set to Disable

(Continued on next page)
Huawei

Huawei CH121 V5 (Intel Xeon Silver 4109T)

SPECspeed2017_fp_peak = 60.6
SPECspeed2017_fp_base = 59.3

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

Platform Notes (Continued)

XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd61bbcc091c0f
running on localhost.localdomain Fri Aug 31 04:58:04 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 4109T CPU @ 2.00GHz
  2 "physical id"s (chips)
  16 "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 : 8
  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): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
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 4109T CPU @ 2.00GHz
Stepping: 4
CPU MHz: 2001.000
CPU max MHz: 2001.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

(Continued on next page)
Platform Notes (Continued)

pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtex64 ds_cpl vmx smx est tm2 ssse3 fma cx16 xtp
rdm cachex sse4_1 sse4_2 x2apic movbe popcnt perf 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
bm1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdtd_a avx512f avx512dq rdseed adx
smcp cflushtpr clwb avx512cd avx512bw avx512vl xsaveopt xsaveopt xsaveopt xsaveopt
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
  node 0 size: 391349 MB
  node 0 free: 375246 MB
  node 1 cpus: 8 9 10 11 12 13 14 15
  node 1 size: 393216 MB
  node 1 free: 377147 MB
  node distances:
    node 0: 10 21
    node 1: 21 10

From /proc/meminfo
  MemTotal: 790512260 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 release 7.4 (Maipo)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:

(Continued on next page)
Huawei
Huawei CH121 V5 (Intel Xeon Silver 4109T)

SPECspeed2017_fp_base = 59.3
SPECspeed2017_fp_peak = 60.6

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

TEST DATE: Aug-2018
Hardware Availability: Jul-2017
Software Availability: Jan-2018

Platform Notes (Continued)

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 29 18:57

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 781G 130G 652G 17% /

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 M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC   619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  607.cactuBSSN_s(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.
------------------------------------------------------------------------------

(Continued on next page)
**Huawei**

Huawei CH121 V5 (Intel Xeon Silver 4109T)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>SPECspeed2017_fp_base</td>
<td>59.3</td>
</tr>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>60.6</td>
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**CPU2017 License**: 3175

**Test Sponsor**: Huawei

**Test Date**: Aug-2018

**Hardware Availability**: Jul-2017

**Tested by**: Huawei

**Software Availability**: Jan-2018

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**Compiler Version Notes (Continued)**

```
FC  607.cactuBSSN_s(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  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

---

```
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

---

```
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(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  621.wrf_s(peak) 628.pop2_s(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.
```
SPEC CPU2017 Floating Point Speed Result

Huawei
Huawei CH121 V5 (Intel Xeon Silver 4109T)

| SPECspeed2017_fp_base = 59.3 |
| SPECspeed2017_fp_peak = 60.6 |

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

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

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
   -assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

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

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

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>60.6</td>
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</tbody>
</table>

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

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

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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 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

---

**Base Other Flags**

C benchmarks:
-m64 -std=c11

Fortran benchmarks:
-m64

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

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

---

**Peak Compiler Invocation**

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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

---

**Peak Portability Flags**

Same as Base Portability Flags
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Huawei CH121 V5 (Intel Xeon Silver 4109T)

SPEC CPU2017 Floating Point Speed Result

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Huawei
Huawei CH121 V5 (Intel Xeon Silver 4109T)

SPECspeed2017_fp_base = 59.3
SPECspeed2017_fp_peak = 60.6

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

Peak Optimization Flags

C benchmarks:

619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP

638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP

644.nab_s: Same as 638.imagick_s

Fortran benchmarks:

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes

654.roms_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch
-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
-align array32byte
Huawei CH121 V5 (Intel Xeon Silver 4109T)

<table>
<thead>
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<th>SPECspeed2017_fp_peak</th>
<th>60.6</th>
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<tbody>
<tr>
<td>SPECspeed2017_fp_base</td>
<td>59.3</td>
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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Test Date:** Aug-2018  
**Hardware Availability:** Jul-2017  
**Tested by:** Huawei  
**Software Availability:** Jan-2018

**Peak Other Flags**

- C benchmarks:  
  -m64 -std=c11

- Fortran benchmarks:  
  -m64

- Benchmarks using both Fortran 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:


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

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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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