Huawei
Huawei CH121 V5 (Intel Xeon Silver 4116)

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

CPU Name: Intel Xeon Silver 4116
Max MHz.: 3000
Nominal: 2100
Enabled: 24 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: 16.5 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
Storage: 1 x 1200 GB SAS, 10000 RPM
Other: None

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: Yes
Firmware: Version 0.31 Released Sep-2017
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None

SPECspeed2017_fp_base = 77.7
SPECspeed2017_fp_peak = 79.3

Hardware
Software
Huawei
Huawei CH121 V5 (Intel Xeon Silver 4116)

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base: Seconds</th>
<th>Ratio</th>
<th>Peak: Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>603.bwaves_s</td>
<td></td>
<td>603.bwaves_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>151</td>
<td>390</td>
<td>152</td>
<td>389</td>
<td>152</td>
<td>388</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>607.cactuBSSN_s</td>
<td></td>
<td>607.cactuBSSN_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>165</td>
<td>101</td>
<td>165</td>
<td>101</td>
<td>165</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>619.ibm_s</td>
<td></td>
<td>619.ibm_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>243</td>
<td>56.3</td>
<td>141</td>
<td>37.3</td>
<td>141</td>
<td>37.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>621.wrf_s</td>
<td></td>
<td>621.wrf_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>235</td>
<td>56.3</td>
<td>233</td>
<td>56.7</td>
<td>233</td>
<td>56.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>627.cam4_s</td>
<td></td>
<td>627.cam4_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>239</td>
<td>60.3</td>
<td>181</td>
<td>49.1</td>
<td>181</td>
<td>48.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>628.pop2_s</td>
<td></td>
<td>628.pop2_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>228</td>
<td>52.0</td>
<td>227</td>
<td>52.4</td>
<td>227</td>
<td>52.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>638.imagick_s</td>
<td></td>
<td>638.imagick_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>239</td>
<td>60.3</td>
<td>239</td>
<td>60.4</td>
<td>239</td>
<td>60.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>644.nab_s</td>
<td></td>
<td>644.nab_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>164</td>
<td>107</td>
<td>164</td>
<td>107</td>
<td>164</td>
<td>107</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>649.fotonik3d_s</td>
<td></td>
<td>649.fotonik3d_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>128</td>
<td>71.2</td>
<td>128</td>
<td>71.1</td>
<td>128</td>
<td>71.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>654.roms_s</td>
<td></td>
<td>654.roms_s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>191</td>
<td>82.3</td>
<td>191</td>
<td>82.5</td>
<td>191</td>
<td>82.6</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 77.7
SPECspeed2017_fp_peak = 79.3

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

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.
Huawei

Huawei CH121 V5 (Intel Xeon Silver 4116)  

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>77.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>79.3</td>
</tr>
</tbody>
</table>

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

Test Date: Dec-2017  
Hardware Availability: Jul-2017  
Software Availability: Sep-2017

General Notes (Continued)

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS configuration:
Power Efficiency Mode Set to Custom  
Hyper-Threading Set to Disable  
Sysinfo program /spec2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on localhost.localdomain Tue Dec 26 15:15:48 2017

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 4116 CPU @ 2.10GHz  
    2 "physical id"s (chips)  
    24 "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 : 12  
    physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13  
    physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:
  Architecture: x86_64  
  CPU op-mode(s): 32-bit, 64-bit  
  Byte Order: Little Endian  
  CPU(s): 24  
  On-line CPU(s) list: 0-23  
  Thread(s) per core: 1  
  Core(s) per socket: 12  
  Socket(s): 2  
  NUMA node(s): 2  
  Vendor ID: GenuineIntel  
  CPU family: 6

(Continued on next page)
Huawei CH121 V5 (Intel Xeon Silver 4116)  

SPEC Speed2017_fp_peak = 79.3  
SPEC Speed2017_fp_base = 77.7

Platform Notes (Continued)

Model: 85  
Model name: Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz  
Stepping: 4  
CPU MHz: 2101.000  
BogoMIPS: 4205.25  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 16896K  
NUMA node0 CPU(s): 0-11  
NUMA node1 CPU(s): 12-23

From /proc/cpuinfo cache data
  cache size: 16896 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 8 9 10 11
  node 0 size: 194709 MB
  node 0 free: 188594 MB
  node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
  node 1 size: 196608 MB
  node 1 free: 190974 MB
  node distances:
    node 0   1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 394145208 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)
Huawei CH121 V5 (Intel Xeon Silver 4116)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>77.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>79.3</td>
</tr>
</tbody>
</table>

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

Test Date: Dec-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2017

Platform Notes (Continued)


uname -a:
Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 25 17:38

SPEC is set to: /spec2017

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      xfs   781G  228G  554G  30% /
```

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. 0.31 09/29/2017
- Memory:
  - 24x Samsung M393A2K43BB1-CTD 16 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
```

(Continued on next page)
Huawei CH121 V5 (Intel Xeon Silver 4116)

**SPECspeed2017_fp_base** = 77.7
**SPECspeed2017_fp_peak** = 79.3

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Huawei</th>
<th>Test Date</th>
<th>Dec-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor</td>
<td>Huawei</td>
<td>Hardware Availability</td>
<td>Jul-2017</td>
</tr>
<tr>
<td>Tested by</td>
<td>Huawei</td>
<td>Software Availability</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

**Compiler Version Notes (Continued)**

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

```
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.
Huawei

Huawei CH121 V5 (Intel Xeon Silver 4116)

| SPECspeed2017_fp_base = 77.7 |
| SPECspeed2017_fp_peak = 79.3 |

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

Test Date: Dec-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2017

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 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

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

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

Huawei

Huawei CH121 V5 (Intel Xeon Silver 4116)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>77.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>79.3</td>
</tr>
</tbody>
</table>

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Dec-2017
Hardware Availability: Jul-2017
Tested by: Huawei
Software Availability: Sep-2017

Base Optimization Flags (Continued)

-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
Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

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

Fortran benchmarks:

-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

Peak Other Flags

C benchmarks:

-m64 -std=c11

Fortran benchmarks:

-m64
Huawei

Huawei CH121 V5 (Intel Xeon Silver 4116)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_peak = 79.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_base = 77.7</td>
</tr>
</tbody>
</table>

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

Test Date: Dec-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2017

Peak Other Flags (Continued)

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
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-V1.8.xml

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 2017-12-26 15:15:48-0500.
Originally published on 2018-02-27.