## SPEC® CPU2017 Floating Point Speed Result

### Huawei

**Huawei CH225 V5 (Intel Xeon Platinum 8160)**

<table>
<thead>
<tr>
<th>Applications</th>
<th>SPECspeed2017_fp_base</th>
<th>Threads</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>48</td>
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<tr>
<td>619.lbm_s</td>
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<td>621.wrf_s</td>
<td>122</td>
<td>48</td>
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<td>627.cam4_s</td>
<td>122</td>
<td>48</td>
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<tr>
<td>628.pop2_s</td>
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<td>638.imagick_s</td>
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<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>48</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>122</td>
<td>48</td>
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</tbody>
</table>

**SPECspeed2017_fp_peak = 124**

### Hardware

- **CPU Name:** Intel Xeon Platinum 8160
- **Max MHz.:** 3700
- **Nominal:** 2100
- **Enabled:** 48 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:** 33 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) 3.10.0-693.11.6.el7.x86_64
- **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:** Yes
- **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:** jemalloc memory allocator V5.0.1
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<td>148</td>
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</tbody>
</table>

SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = 124

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 i7-6700K 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
```
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
Huawei CH225 V5 (Intel Xeon Platinum 8160)

---

**Platform Notes**

BIOS configuration:
- Power Policy Set to Load Balance
- Hyper-Threading Set to Disable
- XPT Prefetch Set to Enabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Mon Oct 15 17:05:58 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

---

```plaintext
model name : Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
  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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
```

From lscpu:

```plaintext
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:    1
Core(s) per socket:    24
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
Stepping:              4
CPU MHz:               2101.000
BogoMIPS:              4205.38
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              33792K
NUMA node0 CPU(s):     0-23
NUMA node1 CPU(s):     24-47
```

(Continued on next page)
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Platform Notes (Continued)

/proc/cpuinfo cache data
  cache size : 33792 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 12 13 14 15 16 17 18 19 20 21 22 23
  node 0 size: 194737 MB
  node 0 free: 188847 MB
  node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
  node 1 size: 196608 MB
  node 1 free: 191952 MB
  node distances:
    node   0   1
    0:  10  21
    1:  21  10

From /proc/meminfo
  MemTotal:       394169164 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)

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 15 12:07

SPEC is set to: /spec2017
  Filesystem    Type  Size  Used Avail Use% Mounted on
  /dev/sda4      xfs  400G  9.6G  391G  3% /

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SPEC CPU2017 Floating Point Speed Result

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<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
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<tbody>
<tr>
<td>122</td>
<td>124</td>
</tr>
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</table>

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

Platform Notes (Continued)

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  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak) |
| cc (ICC) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

=========================================
| cc  619.lbm_s(peak) |
| cc (ICC) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

=========================================
| fc  607.cactuBSSN_s(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  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak) |
| ifort (IFORT) 18.0.2 20180210 |
| Copyright (C) 1985-2018 Intel Corporation. All rights reserved. |

=========================================
| fc  603.bwaves_s(peak) 649.fotonik3d_s(peak) |

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**Specspeed2017_fp_base = 122**

**Specspeed2017_fp_peak = 124**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3175</th>
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<tbody>
<tr>
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<td>Huawei</td>
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<td>Tested by:</td>
<td>Huawei</td>
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</table>

**Compiler Version Notes (Continued)**

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

---------------------------------------------
CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
---------------------------------------------
ifort (IFORT) 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 621.wrf_s(peak) 628.pop2_s(peak)
---------------------------------------------
ifort (IFORT) 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.

**Base Compiler Invocation**

C benchmarks:
```bash
icc -m64 -std=c11
```

Fortran benchmarks:
```bash
ifort -m64
```

Benchmarks using both Fortran and C:
```bash
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```bash
icpc -m64 icc -m64 -std=c11 ifort -m64
```

**Base Portability Flags**

`603.bwaves_s: -DSPEC_LP64`

`607.cactuBSSN_s: -DSPEC_LP64`

`619.hm_s: -DSPEC_LP64`

`621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`

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SPECspeed2017_fp_base = 122
SPECspeed2017_fp_peak = 124

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Oct-2018
Hardware Availability: Jul-2017
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Software Availability: Mar-2018

Base Portability Flags (Continued)

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:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using both Fortran and C:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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Specspeed2017_fp_base = 122
Specspeed2017_fp_peak = 124

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

Peak Compiler Invocation (Continued)

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:
619.lbm_s: basepeak = yes
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: basepeak = yes

Fortran benchmarks:
603.bwaves_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

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

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

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

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| SPECspeed2017_fp_peak = 124 |
| SPECspeed2017_fp_base = 122 |

| SPEC CPU2017 Floating Point Speed Result |
| Huawei CH225 V5 | Huawei CH225 V5 |

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

Test Date: Oct-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018

Peak Optimization Flags (Continued)

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

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-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.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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