Huawei 2288H V5 (Intel Xeon Bronze 3104)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>37.0</td>
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CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Jan-2018
Hardware Availability: Jul-2017
Software Availability: Sep-2017

**Threads**

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<td>46.2</td>
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<td>27.7</td>
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<tr>
<td>621.wrf_s</td>
<td>12</td>
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<td>27.7</td>
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<td>627.cam4_s</td>
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<td>20.0</td>
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<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>12</td>
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</table>

**Hardware**

CPU Name: Intel Xeon Bronze 3104
Max MHz.: 1700
Nominal: 1700
Enabled: 12 cores, 2 chips
Orderable: 2 chips
Cache L1: 32 KB I+ 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 8.25 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)
Storage: 1 x 1200 GB SAS, 10000 RPM
Other: None

**Software**

OS: Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.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 0.31 Released Sep-2017
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

**Huawei**

**Huawei 2288H V5 (Intel Xeon Bronze 3104)**

**Copyright 2017-2018 Standard Performance Evaluation Corporation**

#### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</table>

**SPECspeed2017_fp_base = 37.0**  
**SPECspeed2017_fp_peak = 37.8**

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.

(Continued on next page)
Huawei

Huawei 2288H V5 (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base = 37.0
SPECspeed2017_fp_peak = 37.8

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

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

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
XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568d54c135fd618b00c09c0f
running on localhost.localdomain Tue Jan 16 20:38:36 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) Bronze 3104 CPU @ 1.70GHz
  2 "physical id"s (chips)
  12 "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 : 6
  siblings : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 12
  On-line CPU(s) list: 0-11
  Thread(s) per core: 1
  Core(s) per socket: 6
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6

(Continued on next page)
Huawei

Huawei 2288H V5 (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base = 37.0
SPECspeed2017_fp_peak = 37.8

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

Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1700.000
BogoMIPS: 3405.05
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 8448K
NUMA node0 CPU(s): 0-5
NUMA node1 CPU(s): 6-11

/proc/cpuinfo cache data
  cache size : 8448 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
  node 0 size: 194709 MB
  node 0 free: 188160 MB
  node 1 cpus: 6 7 8 9 10 11
  node 1 size: 196608 MB
  node 1 free: 191632 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)

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Huawei

Huawei 2288H V5 (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base = 37.0
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CPU2017 License: 3175  
Test Sponsor: Huawei  
Test Date: Jan-2018  
Hardware Availability: Jul-2017  
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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 Jan 15 05:21

SPEC is set to: /spec2017
```

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 859G 50G 810G 6% /

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 2133

(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)
## SPEC CPU2017 Floating Point Speed Result

### Huawei

**Huawei 2288H V5 (Intel Xeon Bronze 3104)**

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

### 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 2288H V5 (Intel Xeon Bronze 3104)

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| CPU2017 License: | 3175 |
| Test Sponsor:   | Huawei |
| Tested by:      | Huawei |
| Test Date:      | Jan-2018 |
| 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

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SPEC CPU2017 Floating Point Speed Result

Huawei

Huawei 2288H V5 (Intel Xeon Bronze 3104)

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

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

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
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: 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:

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: basepeak = yes

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

**Huawei 2288H V5 (Intel Xeon Bronze 3104)**

<table>
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<th>SPECspeed2017_fp_peak</th>
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| CPU2017 License: | 3175               |
| Test Sponsor:    | Huawei              |
| Tested by:       | Huawei              |
| Test Date:       | Jan-2018            |
| Hardware Availability: | Jul-2017 |
| Software Availability: | Sep-2017 |

### 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:

- [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)
- [http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.7.xml](http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.7.xml)

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