Huawei

Huawei 5288 V5 (Intel Xeon Platinum 8160)

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

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

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

OS: Red Hat Enterprise Linux Server release 7.4 (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 0.62 Released Apr-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

**Huawei**  
Huawei 5288 V5 (Intel Xeon Platinum 8160)  

**SPECspeed2017_fp_base = 122**  
**SPECspeed2017_fp_peak = 124**

| CPU2017 License: | 3175 |
| Test Sponsor: | Huawei |
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| Test Date: | Jun-2018 |
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>119</td>
<td>496</td>
<td>118</td>
<td>499</td>
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<td>500</td>
<td>48</td>
<td>118</td>
<td>499</td>
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<td>607.cactubssn_s</td>
<td>48</td>
<td>99.0</td>
<td>168</td>
<td>98.8</td>
<td>169</td>
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<td>48</td>
<td>97.4</td>
<td>171</td>
<td>97.3</td>
<td>171</td>
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<td>117</td>
<td>44.9</td>
<td>117</td>
<td>44.9</td>
<td>117</td>
<td>44.9</td>
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<td>621.wrf_s</td>
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<td>161</td>
<td>81.9</td>
<td>162</td>
<td>81.6</td>
<td>162</td>
<td>81.6</td>
<td>48</td>
<td>150</td>
<td>88.2</td>
<td>149</td>
<td>88.8</td>
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<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>88.0</td>
<td>101</td>
<td>88.3</td>
<td>100</td>
<td>88.0</td>
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<td>88.3</td>
<td>101</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>187</td>
<td>63.5</td>
<td>188</td>
<td>63.3</td>
<td>187</td>
<td>63.5</td>
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<td>182</td>
<td>65.3</td>
<td>182</td>
<td>65.1</td>
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<td>638.imagick_s</td>
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<td>113</td>
<td>127</td>
<td>112</td>
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<td>111</td>
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<td>644.nab_s</td>
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<td>78.1</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>86.0</td>
<td>107</td>
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<td>48</td>
<td>101</td>
<td>155</td>
<td>99.8</td>
<td>158</td>
</tr>
</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 i7-4790 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 5288 V5 (Intel Xeon Platinum 8160)

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

SPEC CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Platform Notes (Continued)

XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Mon Jun 4 09:15:59 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) 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:
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
CPU max MHz: 2101.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
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
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

(Continued on next page)
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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
aperf perf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma
cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt 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 fsnsbase
tsc_adjust bmi1 hle avx2 smep bmi2 64bit cmc mpn mxmmul mfx mmxx vapprox_popcnt
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
cqm_llc cqm_occult llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

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: 194741 MB
node 0 free: 188851 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: 191902 MB
node distances:
node   0   1
0: 10 21
1: 21 10

From /proc/meminfo

MemTotal: 394175324 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 Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:

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

## Huawei

### Huawei 5288 V5 (Intel Xeon Platinum 8160)

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

### CPU2017 License
- **CPU2017 License**: 3175
- **Test Date**: Jun-2018
- **Test Sponsor**: Huawei
- **Hardware Availability**: Jul-2017
- **Tested by**: Huawei
- **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 Jun 4 04:22

SPEC is set to: /spec2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda2</td>
<td>xfs</td>
<td>781G</td>
<td>34G</td>
<td>748G</td>
<td>5%</td>
<td>/</td>
</tr>
</tbody>
</table>

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 SMI BIOS" standard.

BIOS INSIDE Corp. 0.62 04/03/2018

Memory:
- 24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

### Compiler Version Notes

```
==============================================================================
<p>| CC   619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak) |
|------------------------|------------------------|
| icc (ICC) 18.0.0 20170811 |</p>
<table>
<thead>
<tr>
<th>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</th>
<th></th>
</tr>
</thead>
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```

```
==============================================================================
<table>
<thead>
<tr>
<th>CC   619.lbm_s(peak)</th>
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<tr>
<td>icc (ICC) 18.0.0 20170811</td>
</tr>
<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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<tr>
<td>---------------------</td>
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</table>
```

```
==============================================================================
<table>
<thead>
<tr>
<th>FC  607.cactuBSSN_s(base)</th>
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<tbody>
<tr>
<td>icpc (ICC) 18.0.0 20170811</td>
</tr>
<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
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```
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SPECspeed2017_fp_peak = 124

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Test Date: Jun-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)
 lParam (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)
 lParam (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
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**SPECspeed2017_fp_base = 122**

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<tr>
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<td>Jan-2018</td>
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</tbody>
</table>

**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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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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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: Same as 638.imagick_s

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: 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

Peak Other Flags

C benchmarks:

-m64 -std=c11

Fortran benchmarks:

-m64

Benchmarks using both Fortran and C:

-m64 -std=c11

(Continued on next page)
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---

**Peak Other Flags (Continued)**

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.

Tested with SPEC CPU2017 v1.0.2 on 2018-06-04 09:15:59-0400.