Huawei

Huawei 5288 V5 (Intel Xeon Platinum 8158)

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

CPU Name: Intel Xeon Platinum 8158
Max MHz.: 3700
Nominal: 3000
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: 24.75 MB I+D on chip per core
Other: None
Memory: 384 GB (2 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: Feb-2018

SPECspeed2017_fp_base = 104
SPECspeed2017_fp_peak = 106

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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</thead>
<tbody>
<tr>
<td>bwaves</td>
<td>24</td>
<td>128</td>
<td>131</td>
</tr>
<tr>
<td>cactuBSSN</td>
<td>24</td>
<td>44.5</td>
<td>131</td>
</tr>
<tr>
<td>lbm</td>
<td>24</td>
<td>82.8</td>
<td>85.7</td>
</tr>
<tr>
<td>wrf</td>
<td>24</td>
<td>73.6</td>
<td>85.7</td>
</tr>
<tr>
<td>cam4</td>
<td>24</td>
<td>66.4</td>
<td>68.5</td>
</tr>
<tr>
<td>pop2</td>
<td>24</td>
<td>87.4</td>
<td>159</td>
</tr>
<tr>
<td>imagick</td>
<td>24</td>
<td>83.0</td>
<td>159</td>
</tr>
<tr>
<td>nab</td>
<td>24</td>
<td>83.0</td>
<td>159</td>
</tr>
<tr>
<td>fotoni3d</td>
<td>24</td>
<td>115</td>
<td>120</td>
</tr>
</tbody>
</table>

HOST

OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
4.4.114-92.64-default
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 Mar-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

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<table>
<thead>
<tr>
<th><strong>CPU2017 License:</strong></th>
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<tr>
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<td>Huawei</td>
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**SPECspeed2017_fp_base = 104**

**SPECspeed2017_fp_peak = 106**

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>123</td>
<td>480</td>
<td><strong>123</strong></td>
<td>479</td>
<td>123</td>
<td>478</td>
<td><strong>123</strong></td>
<td>480</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>131</td>
<td>127</td>
<td>130</td>
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<td><strong>128</strong></td>
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<td>619.lbm_s</td>
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<td>44.6</td>
<td><strong>118</strong></td>
<td>44.5</td>
<td><strong>118</strong></td>
<td>44.6</td>
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<td>159</td>
<td>83.2</td>
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<td>82.8</td>
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<td>82.7</td>
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<td>627.cam4_s</td>
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<td>121</td>
<td>73.1</td>
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<td><strong>73.6</strong></td>
<td>120</td>
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<td><strong>120</strong></td>
<td><strong>73.6</strong></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>177</td>
<td>67.1</td>
<td><strong>179</strong></td>
<td><strong>66.4</strong></td>
<td>179</td>
<td>66.3</td>
<td><strong>179</strong></td>
<td><strong>67.0</strong></td>
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<tr>
<td>638.imagick_s</td>
<td>24</td>
<td><strong>165</strong></td>
<td>87.4</td>
<td>165</td>
<td>87.3</td>
<td>165</td>
<td>87.5</td>
<td>165</td>
<td>87.3</td>
</tr>
<tr>
<td>644.nab_s</td>
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<td>110</td>
<td>159</td>
<td>110</td>
<td><strong>159</strong></td>
<td>110</td>
<td><strong>159</strong></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>109</td>
<td>83.4</td>
<td>110</td>
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<td><strong>110</strong></td>
<td><strong>83.0</strong></td>
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<td><strong>83.0</strong></td>
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<tr>
<td>654.roms_s</td>
<td>24</td>
<td>138</td>
<td>114</td>
<td><strong>137</strong></td>
<td><strong>115</strong></td>
<td>137</td>
<td>115</td>
<td>137</td>
<td>115</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base = 104**

**SPECspeed2017_fp_peak = 106**

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:

```bash
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)
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Platform Notes (Continued)

XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b011c0f
running on linux-2gz1 Wed Jun 13 13:13:11 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 8158 CPU @ 3.00GHz
  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 9 10 16 18 19 25 26
physical 1: cores 0 3 4 5 6 7 16 18 19 20 21 22

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
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8158 CPU @ 3.00GHz
Stepping: 4
CPU MHz: 1300.000
CPU max MHz: 3001.0000
CPU min MHz: 1200.000
BogoMIPS: 6000.01
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-11
NUMA node1 CPU(s): 12-23
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

(Continued on next page)
Huawei

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SPECspeed2017_fp_base = 104
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Platform Notes (Continued)

pat pse36 clflush dts acpi mmx fxsr sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperf perf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vmi flexpriority
empt vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqmx
mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavecl xgetbv1 cqm_l1c cqm_occup_l1c

From /proc/cpuinfo cache data
  cache size : 25344 KB
  available: 2 nodes (0-1)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
    node 0 size: 191528 MB
    node 0 free: 186525 MB
    node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
    node 1 size: 193382 MB
    node 1 free: 188480 MB
    node distances:
      node 0: 10 21
      node 1: 21 10

From /proc/meminfo
  MemTotal: 394149468 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 2
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP2"
    VERSION_ID="12.2"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp2"

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Platinum 8158)

SPECspeed2017_fp_base = 104
SPECspeed2017_fp_peak = 106

Platform Notes (Continued)

uname -a:
Linux linux-2gz1 4.4.114-92.64-default #1 SMP Thu Feb 1 19:18:19 UTC 2018 (c6ce5db)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 12 12:37

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 269G 30G 240G 11% /

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. 0.62 03/26/2018
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)
------------------------------------------------------------------------------
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

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<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>104</td>
<td>106</td>
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</table>

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Date</th>
<th>Hardware Availability</th>
<th>Test Sponsor</th>
<th>Software Availability</th>
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<tbody>
<tr>
<td>3175</td>
<td>Jun-2018</td>
<td>Jul-2017</td>
<td>Huawei</td>
<td>Feb-2018</td>
</tr>
</tbody>
</table>

#### Compiler Version Notes (Continued)

```plaintext
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 5288 V5 (Intel Xeon Platinum 8158)

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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
Huawei 5288 V5 (Intel Xeon Platinum 8158)

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**CPU2017 License:** 3175

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**Test Date:** Jun-2018

**Hardware Availability:** Jul-2017

**Software Availability:** Feb-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: `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: `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`
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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-V1.9-revC.xml