Huawei

Huawei 1288H V5 (Intel Xeon Platinum 8164)

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei
Test Date: Nov-2016
Hardware Availability: Jul-2017
Software Availability: Feb-2018

threads 603.bwaves_s 52
607.cactuBSSN_s 52
619.lbm_s 52
621.wrf_s 52
627.cam4_s 52
628.pop2_s 52
638.imagick_s 52
644.nab_s 52
649.fotonik3d_s 52
654.roms_s 52

Hardware
CPU Name: Intel Xeon Platinum 8164
Max MHz.: 3700
Nominal: 2000
Enabled: 52 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: 35.75 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: 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

SPECspeed2017_fp_base = 119
SPECspeed2017_fp_peak = 121

Intel Xeon Platinum 8164

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## SPEC CPU2017 Floating Point Speed Result

**Huawei**

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### SPECspeed2017_fp_base = 119

### SPECspeed2017_fp_peak = 121

### 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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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>52</td>
<td>115</td>
<td>511</td>
<td>116</td>
<td>510</td>
<td>115</td>
<td>511</td>
<td>116</td>
<td>510</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>52</td>
<td>96.1</td>
<td>174</td>
<td>95.5</td>
<td>175</td>
<td>96.6</td>
<td>173</td>
<td>95.5</td>
<td>175</td>
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<tr>
<td>619.lbm_s</td>
<td>52</td>
<td>116</td>
<td>45.0</td>
<td>116</td>
<td>45.1</td>
<td>116</td>
<td>45.1</td>
<td>116</td>
<td>45.1</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>52</td>
<td>166</td>
<td>79.8</td>
<td>166</td>
<td>79.6</td>
<td>168</td>
<td>78.9</td>
<td>168</td>
<td>78.9</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>52</td>
<td>88.0</td>
<td>101</td>
<td>87.9</td>
<td>101</td>
<td>87.8</td>
<td>101</td>
<td>87.8</td>
<td>101</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>52</td>
<td>219</td>
<td>54.2</td>
<td>222</td>
<td>53.5</td>
<td>219</td>
<td>54.2</td>
<td>219</td>
<td>54.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>52</td>
<td>122</td>
<td>118</td>
<td>120</td>
<td>120</td>
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<td>120</td>
<td>118</td>
<td>120</td>
</tr>
<tr>
<td>644.nab_s</td>
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<td>74.7</td>
<td>234</td>
<td>74.8</td>
<td>234</td>
<td>74.8</td>
<td>234</td>
<td>74.8</td>
<td>234</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>52</td>
<td>107</td>
<td>85.5</td>
<td>108</td>
<td>84.2</td>
<td>107</td>
<td>85.1</td>
<td>108</td>
<td>84.2</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>52</td>
<td>115</td>
<td>137</td>
<td>114</td>
<td>138</td>
<td>114</td>
<td>138</td>
<td>114</td>
<td>138</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base = 119**

**SPECspeed2017_fp_peak = 121**

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 Efficiency Mode 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 96c45e4568ad54c35fd618b5091c0f
running on linux-2gz1 Mon Nov 7 03:12:24 2016

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 8164 CPU @ 2.00GHz
- 2 "physical id"s (chips)
- 52 "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 : 26
  - siblings : 26
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 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): 52
- On-line CPU(s) list: 0-51
- Thread(s) per core: 1
- Core(s) per socket: 26
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8164 CPU @ 2.00GHz
- Stepping: 4
- CPU MHz: 1000.000
- CPU max MHz: 2001.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4000.01
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 36608K
- NUMA node0 CPU(s): 0-25

(Continued on next page)
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Platform Notes (Continued)

NUMA node1 CPU(s): 26-51
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xpmr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtss intel_pt rsb.ctxsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority
epi vpid fsgsbase ts_c_adjust bmi1 hle avx2 smep bmi2 ertpm cmpxcmpx etpm avx512f
avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavexc xgetbv1 cqm_llc cqm_occup_llc

/proc/cpuinfo cache data
    cache size: 36608 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 24 25
    node 0 size: 191528 MB
    node 0 free: 186630 MB
    node 1 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
    node 1 size: 193382 MB
    node 1 free: 188183 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"

(Continued on next page)
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### Platform Notes (Continued)

```plaintext
ID="sles"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```plaintext
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
```

```plaintext
run-level 3 Nov 6 03:19
SPEC is set to: /spec2017
```

**Filesystem**  
<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>xfs</td>
<td>269G</td>
<td>30G</td>
<td>239G</td>
<td>12%</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 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

```plaintext
==============================================================================
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.
```

```plaintext
==============================================================================
CC  619.lbm_s(peak)
==============================================================================
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
==============================================================================
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
```

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

Huawei
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Compiler Version Notes (Continued)

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  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)
==============================================================================
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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

(Continued on next page)
Huawei 1288H V5 (Intel Xeon Platinum 8164)

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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:

603.bwaves_s: basepeak = yes

649.fotoni3d_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: -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

(Continued on next page)
Peak Other Flags (Continued)

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

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