Huawei

Huawei XH628 V5 (Intel Xeon Platinum 8253)

SPECspeed2017_fp_base = 110

SPECspeed2017_fp_peak = 111

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Mar-2019

Hardware
CPU Name: Intel Xeon Platinum 8253
Max MHz.: 3000
Nominal: 2200
Enabled: 32 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: 22 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)
Storage: 1 x 3840 GB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build 20181018 for Linux
Parallel: Yes
Firmware: Version 6.36 Released Feb-2019
File System: btrfs
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 XH628 V5 (Intel Xeon Platinum 8253)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>123</td>
<td>478</td>
<td>123</td>
<td>480</td>
<td>123</td>
<td>481</td>
<td></td>
</tr>
<tr>
<td>607.cactubssn_s</td>
<td>32</td>
<td>136</td>
<td>122</td>
<td>137</td>
<td>122</td>
<td>137</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>58.9</td>
<td>88.9</td>
<td>59.2</td>
<td>88.5</td>
<td>60.4</td>
<td>86.7</td>
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<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>136</td>
<td>97.0</td>
<td>136</td>
<td>97.4</td>
<td>135</td>
<td>97.9</td>
<td></td>
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<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>137</td>
<td>64.8</td>
<td>137</td>
<td>64.7</td>
<td>137</td>
<td>64.7</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>208</td>
<td>57.2</td>
<td>205</td>
<td>58.0</td>
<td>208</td>
<td>57.1</td>
<td></td>
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<tr>
<td>638.imagick_s</td>
<td>32</td>
<td>176</td>
<td>82.2</td>
<td>170</td>
<td>84.9</td>
<td>176</td>
<td>81.8</td>
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<tr>
<td>644.nab_s</td>
<td>32</td>
<td>115</td>
<td>151</td>
<td>115</td>
<td>152</td>
<td>115</td>
<td>152</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>118</td>
<td>77.3</td>
<td>118</td>
<td>77.3</td>
<td>117</td>
<td>77.7</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>110</td>
<td>143</td>
<td>110</td>
<td>143</td>
<td>110</td>
<td>144</td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base = 110**

**SPECspeed2017_fp_peak = 111**

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"
- LD_LIBRARY_PATH = "/spec2017/lib/ia32:/spec2017/lib/intel64"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X 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.

### Platform Notes

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

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

Huawei

Huawei XH628 V5 (Intel Xeon Platinum 8253)

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

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<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Dec-2018</td>
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</tbody>
</table>

Platform Notes (Continued)

XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-alrn Tue Mar 12 02:58:56 2019

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 8253 CPU @ 2.20GHz
 2 "physical id"s (chips)
 32 "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 : 16
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8253 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 1000.000
CPU max MHz: 2201.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-15
NUMA node1 CPU(s): 16-31
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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CPU2017 License: 3175
Test Date: Mar-2019
Test Sponsor: Huawei
Hardware Availability: Apr-2019
Tested by: Huawei
Software Availability: Dec-2018

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 cpuid
aperfmpref 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 cpuid_fault epb cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vmm mmx fxsr sse sse2 ss ht tm
pbe syscall nx pdpe1gb rdtscp tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vmm
flexpriority ept vpid
fsyscalls tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

/platform/cpuinto cache data
  cache size : 22528 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
  node 0 size: 95165 MB
  node 0 free: 94557 MB
  node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
  node 1 size: 96504 MB
  node 1 free: 95047 MB
  node distances:
    node 0 1
       0: 10 21
       1: 21 10

From /proc/meminfo
  MemTotal:       196270012 kB
  HugePages_Total:       0
  Hugepagesize:         2048 kB

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 4
    # 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-SP4"
    VERSION_ID="12.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    ID="sles"
    ANSI_COLOR="0;32"

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Platinum 8253)

SPECspeed2017_fp_base = 110
SPECspeed2017_fp_peak = 111

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Mar-2019
Hardware Availability: Apr-2019
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Software Availability: Dec-2018

Platform Notes (Continued)

uname -a:
      x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Mar 11 20:11

SPEC is set to: /spec2017
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda4 btrfs 2.5T 12G 2.4T 1% /

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. 6.36 02/15/2019
   Memory:
      1x Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933
      11x Micron 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
      4x NO DIMM NO DIMM

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
   Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
FC  607.cactuBSSN_s(base, peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
   Version 19.0.1.144 Build 20181018

(Continued on next page)
**Huawei XH628 V5 (Intel Xeon Platinum 8253)**

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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Tested by:** Huawei  
**Software Availability:** Dec-2018

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## Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

### FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)

Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

### FC 603.bwaves_s(peak) 649.fotonik3d_s(peak)

Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

### CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)

Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

### CC 621.wrf_s(peak) 628.pop2_s(peak)

Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,  
Version 19.0.1.144 Build 20181018  
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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Tested by:** Huawei

**Base Compiler Invocation**

C benchmarks:

```
icc -m64 -std=c11
```

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

**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 bigEndian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert bigEndian
   -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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:

```
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

(Continued on next page)
## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-gopt-prefetch`  
- `-ffinite-math-only`  
- `-gopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`

## 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`

### 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-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch`  
- `-ffinite-math-only`  
- `-gopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`
- `644.nab_s: Same as 638.imagick_s`

### Fortran benchmarks:
- `603.bwaves_s: basepeak = yes`
Huawei

Huawei XH628 V5 (Intel Xeon Platinum 8253)

| SPECspeed2017_fp_base = 110 |
| SPECspeed2017_fp_peak = 111 |

CPU2017 License: 3175
Test Sponsor: Huawei
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Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Peak Optimization Flags (Continued)

649.fotonik3d_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -02 -xCORE-AVX512 -qopt-prefetch -ipo -03
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -03 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -02 -xCORE-AVX512
-qopt-prefetch -ipo -03 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

-xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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/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.

Tested with SPEC CPU2017 v1.0.5 on 2019-03-11 14:58:55-0400.