SPEC® CPU2017 Floating Point Speed Result

Huawei
Huawei XH628 V5 (Intel Xeon Gold 6252)

SPECspeed2017_fp_base = 133
SPECspeed2017_fp_peak = 134

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

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018

Threads

<table>
<thead>
<tr>
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<tr>
<td>603.bwaves_s 48</td>
<td>160</td>
</tr>
<tr>
<td>607.cactuBSSN_s 48</td>
<td>160</td>
</tr>
<tr>
<td>619.lbm_s 48</td>
<td>97.4</td>
</tr>
<tr>
<td>621.wrf_s 48</td>
<td>115</td>
</tr>
<tr>
<td>627.cam4_s 48</td>
<td>101</td>
</tr>
<tr>
<td>628.pop2_s 48</td>
<td>101</td>
</tr>
<tr>
<td>638.imagick_s 48</td>
<td>55.9</td>
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<tr>
<td>644.nab_s 48</td>
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<tr>
<td>649.fotonik3d_s 48</td>
<td>239</td>
</tr>
<tr>
<td>654.roms_s 48</td>
<td>84.6</td>
</tr>
<tr>
<td></td>
<td>162</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Gold 6252
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: 35.75 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

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### Results Table

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<tr>
<th>Benchmark</th>
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<td>48</td>
<td>87.8</td>
<td>101</td>
<td>88.0</td>
<td>101</td>
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<td>56.1</td>
<td>214</td>
<td>55.5</td>
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<td>57.1</td>
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**SPECspeed2017_fp_base = 133**

**SPECspeed2017_fp_peak = 134**

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

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Hardware Availability: Apr-2019
Software Availability: Dec-2018

Platform Notes (Continued)

XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-19he Wed Mar 6 01:20:04 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) Gold 6252 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 6 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 6 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) Gold 6252 CPU @ 2.10GHz
Stepping:              6
CPU MHz:               2100.000
CPU max MHz:           3700.0000
CPU min MHz:           1000.0000
BogoMIPS:              4200.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              36608K
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
```

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**Platform Notes (Continued)**

```plaintext
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 cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xptr 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 vnumi flexpriority ept vpid
fsgsbase 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 xsavevc xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities
```

/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
node 0 size: 95135 MB
node 0 free: 94384 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: 96499 MB
node 1 free: 90187 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10
```

From /proc/meminfo
```
MemTotal: 196234236 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

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SPECspeed2017_fp_peak = 134

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Platform Notes (Continued)

CPE_NAME="cpe:o:suse:sles:12:sp4"

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 5 19:26

SPEC is set to: /spec2017
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda4 btrfs 2.5T 9.0G 2.5T 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:
      12x 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
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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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 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-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

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### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
- `x-CORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `ffinite-math-only -qopt-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:**
```
xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

**Fortran benchmarks:**
```
603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes
```

**Benchmarks using both Fortran and C:**

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</thead>
</table>

| SPECspeed2017_fp_base = 133 |

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

**Peak Optimization Flags (Continued)**

621.wrf_s: `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -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 -O3 -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 -O3 -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 2019-03-05 12:20:04-0500.