## SPEC® CPU2017 Floating Point Speed Result

### Huawei

**Huawei XH628 V5 (Intel Xeon Gold 6144)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
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<tr>
<td>SPECspeed2017_fp_peak</td>
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</tbody>
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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Test Date:** Aug-2018  
**Hardware Availability:** Aug-2018  
**Software Availability:** Mar-2018

### Threads

<table>
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<tr>
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<th>SPECspeed2017_fp_peak (91.1)</th>
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<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 6144  
**Max MHz.:** 4200  
**Nominal:** 3500  
**Enabled:** 16 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 chip  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)  
**Storage:** 1 x 1800 GB SAS, 10000 RPM  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
3.10.0-693.11.6.el7.x86_64  
**Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux  
**Parallel:** Yes  
**Firmware:** Version 0.86 Released Aug-2018  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc memory allocator V5.0.1
SPEC CPU2017 Floating Point Speed Result

Huawei XH628 V5 (Intel Xeon Gold 6144)

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Huawei XH628 V5 (Intel Xeon Gold 6144)

SPECspeed2017_fp_base = 89.5

SPECspeed2017_fp_peak = 91.1

Results Table

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<td>106</td>
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SPECspeed2017_fp_base = 89.5

SPECspeed2017_fp_peak = 91.1

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 i7-6700K 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
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SPECspeed2017_fp_base = 89.5
SPECspeed2017_fp_peak = 91.1

PLATFORM NOTES

BIOS configuration:
Power Policy Set to Load Balance
Hyper-Threading Set to Disable
XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Mon Aug 20 13:09:05 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) Gold 6144 CPU @ 3.50GHz
  2 "physical id"s (chips)
  16 "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 : 8
siblings : 8
  physical 0: cores 0 2 3 9 16 19 26 27
  physical 1: cores 0 2 3 9 16 19 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6144 CPU @ 3.50GHz
Stepping: 4
CPU MHz: 3501.000
CPU max MHz: 3501.0000
CPU min MHz: 1200.0000
BogoMIPS: 7000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K

(Continued on next page)
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Software Availability: Mar-2018

**Platform Notes (Continued)**

NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15

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 mca nonstop_tsc
aperf perf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma

```
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
node 0 size: 194741 MB
node 0 free: 189455 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 196608 MB
node 1 free: 191661 MB
node distances:
node   0   1
0:  10  21
1:  21  10
```

```
From /proc/meminfo
MemTotal: 394174956 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
From /etc/*release* /etc/*version*
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)
```

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

system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

```
uname -a:
    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 Aug 19 19:52
```

SPEC is set to: /spec2017

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. 0.86 08/06/2018

### Memory:
- 4x NO DIMM NO DIMM
- 12x Samsung M393A4K40BB2-CTD 32 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)
```

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

```
icc (ICC) 18.0.2 20180210
```

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

```
FC  607.cactuBSSN_s(base, peak)
```

icpc (ICC) 18.0.2 20180210

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

iccc (ICC) 18.0.2 20180210

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SPECspeed2017_fp_base = 89.5
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CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Compiler Version Notes (Continued)

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
==============================================================================
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)
==============================================================================
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
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==============================================================================
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC  621.wrf_s(peak) 628.pop2_s(peak)
==============================================================================
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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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
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**Huawei XH628 V5 (Intel Xeon Gold 6144)**

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**Base Compiler Invocation (Continued)**

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:**

```
-Wl,-z,muldefs  -xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch
-ffinite-math-only  -qopt-mem-layout-trans=3  -qopenmp  -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib  -ljemalloc
```

**Fortran benchmarks:**

```
-Wl,-z,muldefs  -DSPEC_OPENMP  -xCORE-AVX2  -ipo  -O3  -no-prec-div
-qopt-prefetch  -ffinite-math-only  -qopt-mem-layout-trans=3  -qopenmp
-nostandard-realloc-lhs  -L/usr/local/je5.0.1-64/lib  -ljemalloc
```

**Benchmarks using both Fortran and C:**

```
-Wl,-z,muldefs  -xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch
-ffinite-math-only  -qopt-mem-layout-trans=3  -qopenmp  -DSPEC_OPENMP
-nostandard-realloc-lhs  -L/usr/local/je5.0.1-64/lib  -ljemalloc
```

**Benchmarks using Fortran, C, and C++:**

```
-Wl,-z,muldefs  -xCORE-AVX2  -ipo  -O3  -no-prec-div  -qopt-prefetch
-ffinite-math-only  -qopt-mem-layout-trans=3  -qopenmp  -DSPEC_OPENMP
-nostandard-realloc-lhs  -L/usr/local/je5.0.1-64/lib  -ljemalloc
```
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**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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- 644.nab_s: basepeak = yes

Fortran benchmarks:

- 603.bwaves_s: basepeak = yes
- 649.fotonik3d_s: basepeak = yes
- 654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs

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

(Continued on next page)
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**Peak Optimization Flags (Continued)**

621.wrf_s (continued):
- -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp  
- -DSPEC_OPENMP -nostandard-realloc-lhs  

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  

628.pop2_s: Same as 621.wrf_s  

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  

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:


---

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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 2018-08-20 09:09:05-0400.  