Huawei

Huawei XH628 V5 (Intel Xeon Gold 6142)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
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</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Gold 6142</td>
<td>OS: Red Hat Enterprise Linux Server release 7.4 (Maipo) 3.10.0-693.11.6.el7.x86_64</td>
</tr>
<tr>
<td>Max MHz.: 3700</td>
<td>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</td>
</tr>
<tr>
<td>Nominal: 2600</td>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>Enabled: 32 cores, 2 chips</td>
<td>Firmware: Version 0.86 Released Aug-2018</td>
</tr>
<tr>
<td>Orderable: 1,2 chips</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>L3: 22 MB I+D on chip per chip</td>
<td>Peak Pointers: 64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)</td>
<td></td>
</tr>
<tr>
<td>Storage: 1 x 1800 GB SAS, 10000 RPM</td>
<td></td>
</tr>
<tr>
<td>Other: None</td>
<td></td>
</tr>
</tbody>
</table>

| Software Availability: Mar-2018 |
| Test Date: Aug-2018 |
| Hardware Availability: Aug-2018 |
| Software Availability: Mar-2018 |

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>607.cactuBSSN_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>619.lbm_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>621.wrf_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>627.cam4_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>628.pop2_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>638.imagick_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>644.nab_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>649.fotonik3d_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
<tr>
<td>654.roms_s 32</td>
<td>0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480</td>
<td>482</td>
</tr>
</tbody>
</table>
**SPEC CPU2017 Floating Point Speed Result**

**Huawei**

Huawei XH628 V5 (Intel Xeon Gold 6142)

**SPECspeed2017_fp_base** = 115

**SPECspeed2017_fp_peak** = 115

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<td>Software Availability: Mar-2018</td>
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### 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>
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<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>122</td>
<td>484</td>
<td><strong>122</strong></td>
<td><strong>482</strong></td>
<td>123</td>
<td>481</td>
<td><strong>122</strong></td>
<td><strong>482</strong></td>
<td>123</td>
<td>481</td>
</tr>
<tr>
<td>607.cactubssn_s</td>
<td>32</td>
<td>111</td>
<td>151</td>
<td>117</td>
<td>142</td>
<td><strong>112</strong></td>
<td><strong>149</strong></td>
<td>32</td>
<td>111</td>
<td>151</td>
<td>117</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>116</td>
<td>45.0</td>
<td><strong>117</strong></td>
<td><strong>44.9</strong></td>
<td>117</td>
<td>44.9</td>
<td>32</td>
<td>116</td>
<td>45.0</td>
<td><strong>117</strong></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>148</td>
<td>89.5</td>
<td><strong>148</strong></td>
<td><strong>89.5</strong></td>
<td>147</td>
<td>90.0</td>
<td>32</td>
<td>139</td>
<td>95.2</td>
<td>140</td>
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<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>108</td>
<td>82.4</td>
<td>107</td>
<td>82.9</td>
<td><strong>107</strong></td>
<td><strong>82.6</strong></td>
<td>32</td>
<td>108</td>
<td>82.4</td>
<td>107</td>
</tr>
<tr>
<td>628.pop2_s</td>
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<td><strong>172</strong></td>
<td><strong>69.2</strong></td>
<td>171</td>
<td>69.6</td>
<td>172</td>
<td>69.1</td>
<td>32</td>
<td>168</td>
<td>70.5</td>
<td>170</td>
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<tr>
<td>638.imagick_s</td>
<td>32</td>
<td>140</td>
<td>103</td>
<td>146</td>
<td>98.9</td>
<td><strong>145</strong></td>
<td><strong>99.6</strong></td>
<td>32</td>
<td>140</td>
<td>103</td>
<td>146</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>32</td>
<td><strong>85.1</strong></td>
<td><strong>205</strong></td>
<td>85.1</td>
<td>205</td>
<td>85.2</td>
<td>205</td>
<td>32</td>
<td><strong>85.1</strong></td>
<td><strong>205</strong></td>
<td>85.1</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>110</td>
<td>82.8</td>
<td><strong>109</strong></td>
<td><strong>83.3</strong></td>
<td>109</td>
<td>83.7</td>
<td>32</td>
<td>110</td>
<td>82.8</td>
<td><strong>109</strong></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td><strong>115</strong></td>
<td><strong>137</strong></td>
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<td>138</td>
<td>116</td>
<td>136</td>
<td>32</td>
<td>115</td>
<td>137</td>
<td>114</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base** = 115

**SPECspeed2017_fp_peak** = 115

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

Sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
Huawei

Huawei XH628 V5 (Intel Xeon Gold 6142)

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SPECspeed2017_fp_peak = 115

CPU2017 License: 3175
Test Sponsor: Huawei
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Hardware Availability: Aug-2018
Software Availability: Mar-2018

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 Wed Aug 15 16:19:59 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 6142 CPU @ 2.60GHz
  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) Gold 6142 CPU @ 2.60GHz
Stepping: 4
CPU MHz: 2601.000
CPU max MHz: 2601.0000
CPU min MHz: 1000.0000
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K

(Continued on next page)
Platform Notes (Continued)

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
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 ntopology nonstop_tsc
aperfmpref perf eagerfpu pni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 fma
cx16 xtpr pdcm pccid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_13 cd_p_13 invpcid_single
intel_pt spec_ctrl ibpb_support tpr_shadow vmx flexpriority ept vpid fsgsbase
tsc_adjust bml1 hle avx2 smep bmi2 erms invpcid rtm cmq mpx rdt_a avx512f avx512dq
rdsnop adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaves opt xsave cxetbvl
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

From /proc/cpuinfo 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: 194741 MB
    node 0 free: 189655 MB
    node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
    node 1 size: 196608 MB
    node 1 free: 191294 MB
    node distances:
      node 0: 10 21
      node 1: 21 10

From /proc/meminfo
    MemTotal: 3941748888 KB
    MemFree: 189655 MB
    HugePages_Total: 0
    Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*
    os-release:
      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)
Huawei
Huawei XH628 V5 (Intel Xeon Gold 6142)

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

SPECspeed2017_fp_base = 115
SPECspeed2017_fp_peak = 115

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 15 11:18

SPEC is set to: /spec2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   553G  8.0G  545G   2% /

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.lbms(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
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.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Gold 6142)

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**CPU2017 License:** 3175

**Test Sponsor:** Huawei

**Test Date:** Aug-2018

**Hardware Availability:** Aug-2018

**Tested by:** Huawei

**Software Availability:** Mar-2018

---

**Compiler Version Notes (Continued)**

```markdown
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.

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

---

**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
```

(Continued on next page)
Huawei

Huawei XH628 V5 (Intel Xeon Gold 6142)

| SPECspeed2017_fp_base | 115 |
| SPECspeed2017_fp_peak  | 115 |

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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 -gopenmp -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 -gopenmp
-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 -gopenmp -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 -gopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
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: basepeak = yes
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 -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs

(Continued on next page)
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CPU2017 License: 3175
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Peak Optimization Flags (Continued)

627.cam4_s: basepeak = yes
628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

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/Intel-ic18.0-official-linux64.2017-12-21.xml
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 v1.0.2 on 2018-08-15 12:19:59-0400.