Huawei XH321 V5 (Intel Xeon Gold 5120T)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>87.3</td>
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CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

**Threads**

<table>
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<tr>
<th>Test Case</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
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<tr>
<td>603.bwaves_s</td>
<td>114</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>115</td>
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<tr>
<td>619.lbm_s</td>
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<td>627.cam4_s</td>
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<tr>
<td>628.pop2_s</td>
<td>60.4</td>
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<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<td>132</td>
<td></td>
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<tr>
<td>649.fotonik3d_s</td>
<td>72.6</td>
<td>72.6</td>
<td></td>
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<tr>
<td>654.roms_s</td>
<td>94.0</td>
<td>94.0</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

CPU Name: Intel Xeon Gold 5120T
Max MHz.: 3200
Nominal: 2200
Enabled: 28 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: 19.25 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage: 1 x 1200 GB SAS, 10000 RPM
Other: None

**Software**

OS: Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-693.11.6.el7.x86_64
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 0.59 Released Feb-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Huawei

Huawei XH321 V5 (Intel Xeon Gold 5120T)

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<th>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
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</table>

SPECspeed2017_fp_base = 87.3
SPECspeed2017_fp_peak = 88.9

Results Table

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 = "/spec/lib/ia32:/spec/lib/intel64:/spec/je5.0.1-32:/spec/je5.0.1-64"
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 Policy Set to Custom
Hyper-Threading Set to Disable

(Continued on next page)
Huawei

Huawei XH321 V5 (Intel Xeon Gold 5120T)

SPECspeed2017_fp_peak = 88.9
SPECspeed2017_fp_base = 87.3

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Jun-2018
Tested by: Huawei
Hardware Availability: Jul-2017
Software Availability: Jan-2018

Platform Notes (Continued)

ADDDC Sparing Set to Disabled
Sysinfo program /spec/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc091c0f
running on localhost.localdomain Tue Jun 19 16:12:32 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 5120T CPU @ 2.20GHz
2 "physical id"s (chips)
28 "processors"
cores, siblings (counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 14
siblings : 14
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 28
On-line CPU(s) list: 0–27
Thread(s) per core: 1
Core(s) per socket: 14
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5120T CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2201.000
BogoMIPS: 4405.47
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0–13
NUMA node1 CPU(s): 14–27

/proc/cpuinfo cache data
cache size : 19712 KB

(Continued on next page)
Huawei

Huawei XH321 V5 (Intel Xeon Gold 5120T)

SPECspeed2017_fp_base = 87.3
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CPU2017 License: 3175
Test Sponsor: Huawei
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Test Date: Jun-2018
Hardware Availability: Jul-2017
Software Availability: Jan-2018

Platform Notes (Continued)

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
   node 0 size: 194741 MB
   node 0 free: 189404 MB
   node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
   node 1 size: 196608 MB
   node 1 free: 191600 MB
   node distances:
      node   0   1
      0: 10  21
      1: 21  10

From /proc/meminfo
   MemTotal:       394174996 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*

   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.3 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.3"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
      redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
      system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

   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 Jun 19 10:23

   SPEC is set to: /spec
      Filesystem     Type  Size  Used Avail Use% Mounted on
      /dev/sda8      xfs   325G  114G  212G  36% /

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

(Continued on next page)
**Huawei**

**Huawei XH321 V5 (Intel Xeon Gold 5120T)**

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**CPU2017 License:** 3175  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  
**Test Date:** Jun-2018  
**Hardware Availability:** Jul-2017  
**Software Availability:** Jan-2018

**Platform Notes (Continued)**

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.  
BIOS INSYDE Corp. 0.59 02/24/2018  
Memory:  
4x NO DIMM NO DIMM  
12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

**Compiler Version Notes**

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

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

Huawei

Huawei XH321 V5 (Intel Xeon Gold 5120T)

SPECspeed2017_fp_base = 87.3
SPECspeed2017_fp_peak = 88.9

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Jun-2018
Tested by: Huawei
Hardware Availability: Jul-2017
Software Availability: Jan-2018

Compiler Version Notes (Continued)

==============================================================================
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)
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.

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
<table>
<thead>
<tr>
<th>Base Portability Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>607.cactuBSSN_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>619.lbm_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
</tr>
<tr>
<td>627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG</td>
</tr>
<tr>
<td>628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
</tr>
<tr>
<td>-assume byterecl</td>
</tr>
<tr>
<td>638.imagick_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>644.nab_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>649.fotonik3d_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>654.roms_s: -DSPEC_LP64</td>
</tr>
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</table>

<table>
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<tr>
<th>Base Optimization Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>C benchmarks:</td>
</tr>
<tr>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only</td>
</tr>
<tr>
<td>-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP</td>
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<tr>
<td>Fortran benchmarks:</td>
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<td>-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch</td>
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<td>-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp</td>
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<tr>
<td>-nostandard-realloc-lhs -align array32byte</td>
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<tr>
<td>Benchmarks using both Fortran and C:</td>
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<tr>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only</td>
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<td>-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP</td>
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<tr>
<th>Base Other Flags</th>
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<tbody>
<tr>
<td>C benchmarks:</td>
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<td>-m64 -std=c11</td>
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<td>Fortran benchmarks:</td>
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<td>-m64</td>
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**Huawei**

Huawei XH321 V5 (Intel Xeon Gold 5120T)

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- **CPU2017 License:** 3175
- **Test Sponsor:** Huawei
- **Test Date:** Jun-2018
- **Tested by:** Huawei
- **Hardware Availability:** Jul-2017
- **Software Availability:** Jan-2018

### Base Other Flags (Continued)

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

### Peak Optimization Flags

- **C benchmarks:**
  - `619.lbm_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`

- `638.imagick_s: basepeak = yes`

- `644.nab_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`
Huawei
Huawei XH321 V5 (Intel Xeon Gold 5120T)

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CPU2017 License: 3175
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Test Date: Jun-2018
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Software Availability: Jan-2018

Peak Optimization Flags (Continued)

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_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

654.roms_s: Same as 649.fotonik3d_s

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

Fortran benchmarks:

-m64

Benchmarks using both Fortran and C:

-m64 -std=c11

Benchmarks using Fortran, C, and C++:

-m64 -std=c11
Huawei

**Huawei XH321 V5 (Intel Xeon Gold 5120T)**

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<td>Jul-2017</td>
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</table>

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

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