## SPEC® CPU2017 Floating Point Speed Result

**New H3C Technologies Co., Ltd.**

**H3C UniServer R6900 G3 (Intel Xeon Platinum 8160)**

### SPECspeed2017_fp_base = 170

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>New H3C Technologies Co., Ltd.</th>
<th>Test Date:</th>
<th>Jul-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by:</td>
<td>New H3C Technologies Co., Ltd.</td>
<td>Hardware Availability:</td>
<td>Sep-2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software Availability:</td>
<td>May-2018</td>
</tr>
</tbody>
</table>

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base (170)</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>96</td>
<td>217</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>96</td>
<td>78.6</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>96</td>
<td>75.7</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>96</td>
<td>141</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>96</td>
<td>59.0</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>96</td>
<td>219</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>96</td>
<td>361</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>96</td>
<td>109</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>96</td>
<td>250</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>96</td>
<td>144</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8160
- **Max MHz.:** 3700
- **Nominal:** 2100
- **Enabled:** 96 cores, 4 chips
- **Orderable:** 1, 2, 3, 4 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 33 MB I+D on chip per chip
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
- **Storage:** 1 x 800 GB SATA SSD
- **Other:** None

### Software

- **OS:** CentOS Linux release 7.5.1804 (Core) 3.10.0-862.3.2.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:** INSYDE Corp. BIOS Version 1.00.16 released May-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None
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H3C UniServer R6900 G3 (Intel Xeon Platinum 8160)

| SPECspeed2017_fp_base = 170 |
| SPECspeed2017_fp_peak = Not Run |

CPU2017 License: 9066  
Test Sponsor: New H3C Technologies Co., Ltd.  
Tested by: New H3C Technologies Co., Ltd.  
Test Date: Jul-2018  
Hardware Availability: Sep-2017  
Software Availability: May-2018

### 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>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>96</td>
<td>72.5</td>
<td>814</td>
<td>71.4</td>
<td>826</td>
<td>72.5</td>
<td>813</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>96</td>
<td>76.8</td>
<td>217</td>
<td>76.8</td>
<td>217</td>
<td>77.0</td>
<td>217</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>96</td>
<td>66.7</td>
<td>78.6</td>
<td>66.3</td>
<td>79.0</td>
<td>66.9</td>
<td>78.2</td>
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<tr>
<td>621.wrf_s</td>
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<td>75.7</td>
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<tr>
<td>627.cam4_s</td>
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<td>63.0</td>
<td>141</td>
<td>62.7</td>
<td>141</td>
<td>62.7</td>
<td>141</td>
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<tr>
<td>628.pop2_s</td>
<td>96</td>
<td>201</td>
<td>59.0</td>
<td>203</td>
<td>58.4</td>
<td>200</td>
<td>59.3</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>96</td>
<td>66.0</td>
<td>218</td>
<td>65.5</td>
<td>220</td>
<td>65.8</td>
<td>219</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>96</td>
<td>46.0</td>
<td>379</td>
<td>45.9</td>
<td>381</td>
<td>45.8</td>
<td>381</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>96</td>
<td>83.8</td>
<td>109</td>
<td>84.2</td>
<td>108</td>
<td>84.0</td>
<td>109</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>96</td>
<td>64.8</td>
<td>243</td>
<td>61.7</td>
<td>255</td>
<td>62.9</td>
<td>250</td>
</tr>
</tbody>
</table>

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### 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 = "/home/speccpu/lib/ia32:/home/speccpu/lib/intel64:/home/speccpu/je5.0.1-32:/home/speccpu/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:
- Set Sub NUMA Cluster to Disabled
- Set IMC Interleaving to Auto

(Continued on next page)
Platform Notes (Continued)

Set Power Supply Mode to Performance
Set Workload Configuration to NUMA
Set Hyper Threading to Disabled
Set C1E to Disabled
Set Patrol Scrub to Disabled
Sysinfo program /home/speccpu/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Tue Jul 10 00:46:46 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) Platinum 8160 CPU @ 2.10GHz
  4 "physical id"s (chips)
  96 "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 8 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 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
  physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
  physical 3: cores 0 1 2 3 4 5 8 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):                96
On-line CPU(s) list:   0-95
Thread(s) per core:    1
Core(s) per socket:    24
Socket(s):             4
NUMA node(s):          4
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz
Stepping:              4
CPU MHz:               1718.939
CPU max MHz:           3700.0000
CPU min MHz:           1000.0000
BogoMIPS:              4200.00
Virtualization:        VT-x
L1d cache:             32K

(Continued on next page)
New H3C Technologies Co., Ltd.

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| SPECspeed2017_fp_base | 170 |
| SPECspeed2017_fp_peak | Not Run |

**CPU2017 License:** 9066  
**Test Sponsor:** New H3C Technologies Co., Ltd.  
**Tested by:** New H3C Technologies Co., Ltd.

**Test Date:** Jul-2018  
**Hardware Availability:** Sep-2017  
**Software Availability:** May-2018

**Platform Notes (Continued)**

```
L1i cache:            32K
L2 cache:             1024K
L3 cache:             33792K
NUMA node0 CPU(s):    0-23
NUMA node1 CPU(s):    24-47
NUMA node2 CPU(s):    48-71
NUMA node3 CPU(s):    72-95
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 xtopology nonstop_tsc
                       aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
                       fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
                       xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 intel_ppin
                       intel_pt mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2
                       smep bmi2  ert msrm invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt
                       clwb avx512cd avx512bw avx512vl xsaveopt xsavevc xsavecf xsaveopt xsavevc xgetbv1 cqm_llc
                       cqm_occu_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pln pts hwp
                       hwp_act_window hwp_epp hwp_pkg_req pku ospke spec_ctrl intel_stibp

/proc/cpuinfo cache data
  cache size : 33792 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 4 nodes (0-3)
  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: 194957 MB
  node 0 free: 189226 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: 196608 MB
  node 1 free: 189772 MB
  node 2 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
  node 2 size: 196608 MB
  node 2 free: 190908 MB
  node 3 cpus: 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
  node 3 size: 196608 MB
  node 3 free: 191372 MB
  node distances:
    node 0 1 2 3
    0: 10 21 21 21
    1: 21 10 21 21
    2: 21 21 10 21
    3: 21 21 21 10

From /proc/meminfo
  MemTotal:       790695820 kB
  HugePages_Total:  0
```

(Continued on next page)
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SPECspeed2017_fp_peak = Not Run

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Software Availability: May-2018

Platform Notes (Continued)

Hugepagesize: 2048 kB
/usr/bin/lsb_release -d
CentOS Linux release 7.5.1804 (Core)

From /etc/*release* /etc/*version*:
centos-release: CentOS Linux release 7.5.1804 (Core)
centos-release-upstream: Derived from Red Hat Enterprise Linux 7.5 (Source)
os-release:
  NAME="CentOS Linux"
  VERSION="7 (Core)"
  ID="centos"
  ID_LIKE="rhel fedora"
  VERSION_ID="7"
  PRETTY_NAME="CentOS Linux 7 (Core)"
  ANSI_COLOR="0;31"
  CPE_NAME=cpe:/o:centos:centos:7
redhat-release: CentOS Linux release 7.5.1804 (Core)
system-release: CentOS Linux release 7.5.1804 (Core)
system-release-cpe: cpe:/o:centos:centos:7

uname -a:
  Linux localhost.localdomain 3.10.0-862.3.2.el7.x86_64 #1 SMP Mon May 21 23:36:36 UTC 2018 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 9 18:55

SPEC is set to: /home/speccpu
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/mapper/centos-home xfs 690G 13G 677G 2% /home

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. 1.00.16P00 05/30/2018
Memory:
  24x Micron 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666
  24x NO DIMM NO DIMM

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)

(Continued on next page)
New H3C Technologies Co., Ltd.
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| SPECspeed2017_fp_base = | 170 |
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CPU2017 License: 9066
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Tested by: New H3C Technologies Co., Ltd.
Test Date: Jul-2018
Hardware Availability: Sep-2017
Software Availability: May-2018

Compiler Version Notes (Continued)

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

FC 607.cactuBSSN_s(base)

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.
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)

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

CC 621.wrf_s(base) 627.cam4_s(base) 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.

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
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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=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -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:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
   -nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
   -nostandard-realloc-lhs

Base Other Flags

C benchmarks:
-m64 -std=c11

Fortran benchmarks:
-m64

(Continued on next page)
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Base Other Flags (Continued)

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11

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
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevC.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/New_H3C-Platform-Settings-V1.3-SKL-RevC.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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