



# SPEC® CPU2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

New H3C Technologies Co., Ltd.

SPECspeed2017\_fp\_base = 170

H3C UniServer R8900 G3 (Intel Xeon Platinum 8180)

SPECspeed2017\_fp\_peak = 159

CPU2017 License: 9066

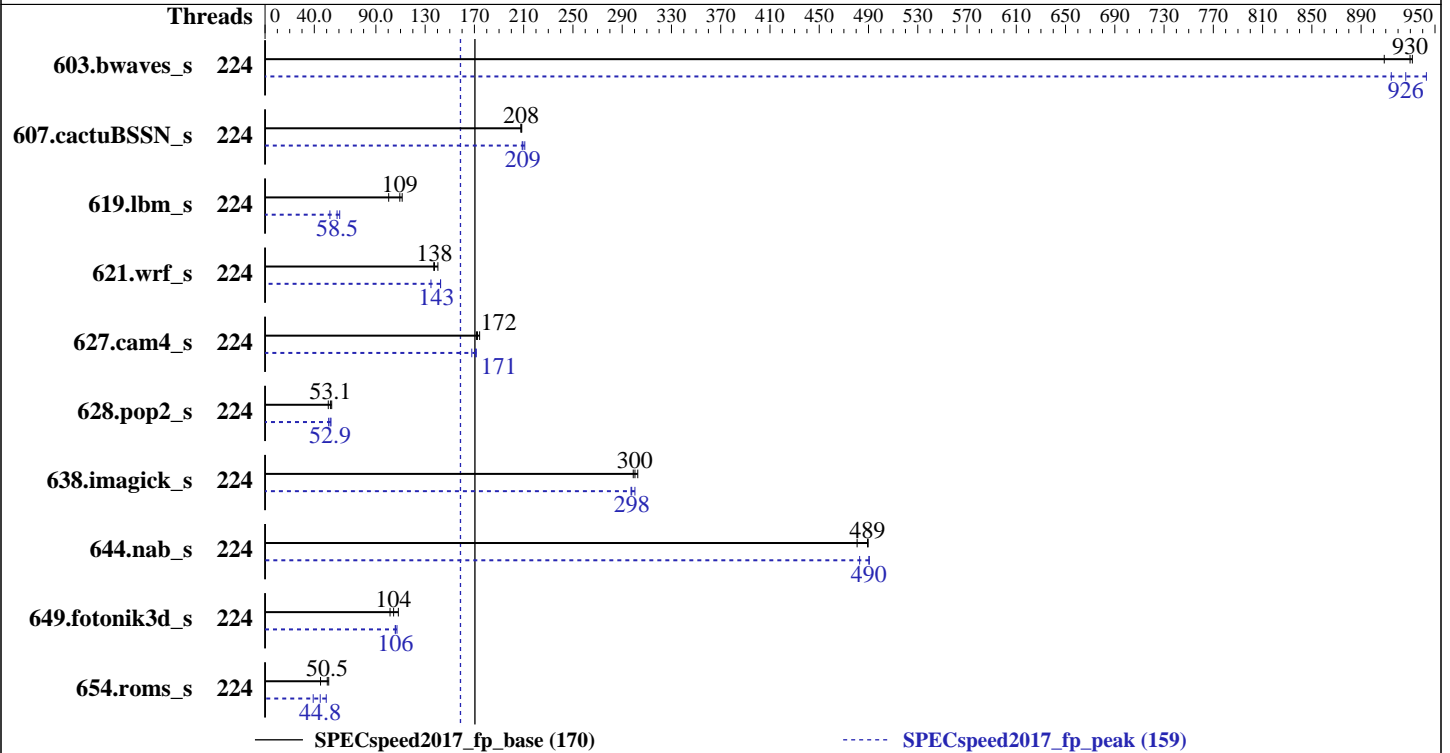
Test Date: Mar-2019

Test Sponsor: New H3C Technologies Co., Ltd.

Hardware Availability: Feb-2019

Tested by: New H3C Technologies Co., Ltd.

Software Availability: Feb-2019



### Hardware

CPU Name: Intel Xeon Platinum 8180  
 Max MHz.: 3800  
 Nominal: 2500  
 Enabled: 224 cores, 8 chips  
 Orderable: 1,2,3,4,5,6,7,8 Chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 38.5 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
 Storage: 1 x 480GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux Server release 7.4  
 3.10.0-957.el7.x86\_64  
 Compiler: C/C++: Version 19.0.0.117 of Intel  
 C/C++  
 Compiler for Linux;  
 Fortran: Version 19.0.0.117 of  
 Intel Fortran  
 Compiler for Linux  
 Parallel: Yes  
 Firmware: Version 2.00.23 released Feb-2019BIOS  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: None



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	224	63.3	932	64.9	909	<b><u>63.5</u></b>	<b><u>930</u></b>	224	64.5	914	<b><u>63.7</u></b>	<b><u>926</u></b>	62.6	943
607.cactuBSSN_s	224	<b><u>80.1</u></b>	<b><u>208</u></b>	80.0	208	80.3	208	224	79.8	209	<b><u>79.6</u></b>	<b><u>209</u></b>	79.0	211
619.lbm_s	224	47.0	111	52.2	100	<b><u>47.9</u></b>	<b><u>109</u></b>	224	99.5	52.6	86.4	60.6	<b><u>89.6</u></b>	<b><u>58.5</u></b>
621.wrf_s	224	94.2	140	96.5	137	<b><u>96.1</u></b>	<b><u>138</u></b>	224	<b><u>92.8</u></b>	<b><u>143</u></b>	98.2	135	92.8	143
627.cam4_s	224	50.9	174	51.6	172	<b><u>51.4</u></b>	<b><u>172</u></b>	224	<b><u>51.9</u></b>	<b><u>171</u></b>	52.8	168	51.7	172
628.pop2_s	224	<b><u>224</u></b>	<b><u>53.1</u></b>	219	54.1	231	51.3	224	<b><u>225</u></b>	<b><u>52.9</u></b>	230	51.6	222	53.5
638.imagick_s	224	48.3	299	<b><u>48.0</u></b>	<b><u>300</u></b>	47.7	303	224	48.5	297	48.0	300	<b><u>48.5</u></b>	<b><u>298</u></b>
644.nab_s	224	35.7	490	36.3	481	<b><u>35.7</u></b>	<b><u>489</u></b>	224	35.6	491	<b><u>35.6</u></b>	<b><u>490</u></b>	36.2	483
649.fotonik3d_s	224	84.2	108	<b><u>87.3</u></b>	<b><u>104</u></b>	89.8	101	224	86.3	106	85.1	107	<b><u>86.0</u></b>	<b><u>106</u></b>
654.roms_s	224	<b><u>312</u></b>	<b><u>50.5</u></b>	305	51.7	350	45.0	224	403	39.1	317	49.7	<b><u>351</u></b>	<b><u>44.8</u></b>

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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 = "/home/speccpu/lib/ia32:/home/speccpu/lib/intel64"

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.

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3620 (Foreshadow-NG) is mitigated in the system as tested and documented.



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## Platform Notes

### BIOS Settings:

```

Set SNC to disabled
Set Hyper-Threading to disabled
Set Power Supply Mode to Performance
Set EIST PSD Function to SW Any
Set Autonomous Core C-State to enabled
Set Hardware Prefetch to disabled
Set Adjacent Cache Prefetch to disabled
Sysinfo program /home/speccpu/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Tue Mar 26 02:37:17 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) Platinum 8180 CPU @ 2.50GHz
 8 "physical id"s (chips)
224 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 4: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 5: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 6: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 7: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30

```

### From lscpu:

```

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 224
On-line CPU(s) list: 0-223

```

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## Platform Notes (Continued)

```

Thread(s) per core:      1
Core(s) per socket:     28
Socket(s):               8
NUMA node(s):           8
Vendor ID:               GenuineIntel
CPU family:              6
Model:                   85
Model name:              Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
Stepping:                4
CPU MHz:                 1000.061
CPU max MHz:             3800.0000
CPU min MHz:             1000.0000
BogoMIPS:                5000.00
Virtualization:          VT-x
L1d cache:               32K
L1i cache:               32K
L2 cache:                1024K
L3 cache:                39424K
NUMA node0 CPU(s):      0-27
NUMA node1 CPU(s):      28-55
NUMA node2 CPU(s):      56-83
NUMA node3 CPU(s):      84-111
NUMA node4 CPU(s):      112-139
NUMA node5 CPU(s):      140-167
NUMA node6 CPU(s):      168-195
NUMA node7 CPU(s):      196-223
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
aperfmpperf 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_pt ssbd mba
ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bml hle
avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap
clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc
cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp hwp_act_window
hwp_epp hwp_pkg_req pku ospke spec_ctrl intel_stibp flush_lld

```

```

/proc/cpuinfo cache data
cache size : 39424 KB

```

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 8 nodes (0-7)
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 24 25 26 27
node 0 size: 96909 MB
node 0 free: 94476 MB

```

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## Platform Notes (Continued)

```

node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55
node 1 size: 98304 MB
node 1 free: 95794 MB
node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
81 82 83
node 2 size: 98304 MB
node 2 free: 96066 MB
node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105
106 107 108 109 110 111
node 3 size: 98304 MB
node 3 free: 91087 MB
node 4 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129
130 131 132 133 134 135 136 137 138 139
node 4 size: 98304 MB
node 4 free: 95730 MB
node 5 cpus: 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157
158 159 160 161 162 163 164 165 166 167
node 5 size: 98304 MB
node 5 free: 95794 MB
node 6 cpus: 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185
186 187 188 189 190 191 192 193 194 195
node 6 size: 98304 MB
node 6 free: 96014 MB
node 7 cpus: 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213
214 215 216 217 218 219 220 221 222 223
node 7 size: 98304 MB
node 7 free: 94273 MB
node distances:
node  0  1  2  3  4  5  6  7
 0: 10 21 21 31 21 31 31 31
 1: 21 10 31 21 31 21 31 31
 2: 21 31 10 21 31 31 21 31
 3: 31 21 21 10 31 31 31 21
 4: 21 31 31 31 10 21 31 21
 5: 31 21 31 31 21 10 21 31
 6: 31 31 21 31 31 21 10 21
 7: 31 31 31 21 21 31 21 10

```

```

From /proc/meminfo
MemTotal:      791094188 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"

```

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## Platform Notes (Continued)

VERSION="7.4 (Maipo)"

ID="rhel"

ID\_LIKE="fedora"

VARIANT="Server"

VARIANT\_ID="server"

VERSION\_ID="7.4"

PRETTY\_NAME="OpenShift Enterprise"

redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)

system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)

system-release-cpe: cpe:/o:redhat:enterprise\_linux:7.4:ga:server

uname -a:

Linux localhost.localdomain 3.10.0-957.el7.x86\_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018  
x86\_64 x86\_64 x86\_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI

CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, \_\_user pointer sanitization

CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Mar 25 20:44

SPEC is set to: /home/speccpu

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/nvme0n1p3	xfs	500G	54G	447G	11%	/

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 American Megatrends Inc. 2.00.23 02/22/2019

Memory:

48x Hynix HMA82GR7AFR8N-VK 16 GB 2 rank 2666

48x NO DIMM NO DIMM

(End of data from sysinfo program)

## Compiler Version Notes

=====  
CC 619.lbm\_s(base) 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 19.0.0.117 Build 20180804

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

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## Compiler Version Notes (Continued)

=====  
CC 619.lbm\_s(peak)  
-----

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.0.117 Build 20180804  
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 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
FC 603.bwaves\_s(base) 649.fotonik3d\_s(base) 654.roms\_s(base, peak)  
-----

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
FC 603.bwaves\_s(peak) 649.fotonik3d\_s(peak)  
-----

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
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-----

=====  
CC 621.wrf\_s(base) 627.cam4\_s(base, peak) 628.pop2\_s(base)  
-----

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
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=====  
CC 621.wrf\_s(peak) 628.pop2\_s(peak)

-----  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.0.117 Build 20180804  
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

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





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## 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 -align array32byte
```

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 -align array32byte
```

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 -align array32byte
```

## 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



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## Peak Optimization Flags

C benchmarks:

```
619.lbm_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=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP
```

```
638.imagick_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP
```

644.nab\_s: Same as 638.imagick\_s

Fortran benchmarks:

```
603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs -align array32byte
```

649.fotonik3d\_s: Same as 603.bwaves\_s

```
654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:

```
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=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
```

```
627.cam4_s: -xCORE-AVX512 -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++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte
```



# SPEC CPU2017 Floating Point Speed Result

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New H3C Technologies Co., Ltd.

SPECspeed2017\_fp\_base = 170

H3C UniServer R8900 G3 (Intel Xeon Platinum 8180)

SPECspeed2017\_fp\_peak = 159

**CPU2017 License:** 9066

**Test Date:** Mar-2019

**Test Sponsor:** New H3C Technologies Co., Ltd.

**Hardware Availability:** Feb-2019

**Tested by:** New H3C Technologies Co., Ltd.

**Software Availability:** Feb-2019

The flags files that were used to format this result can be browsed at

[http://www.spec.org/cpu2017/flags/New\\_H3C-Platform-Settings-V1.3-SKL-RevD.html](http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevD.html)

<http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.html>

You can also download the XML flags sources by saving the following links:

[http://www.spec.org/cpu2017/flags/New\\_H3C-Platform-Settings-V1.3-SKL-RevD.xml](http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevD.xml)

<http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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