SPEC CPU®2017 Floating Point Speed Result

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New H3C Technologies Co., Ltd.

$SPECspeed®2017\_fp\_base = 167$

H3C UniServer R6700 G3 (Intel Xeon Gold 6130)

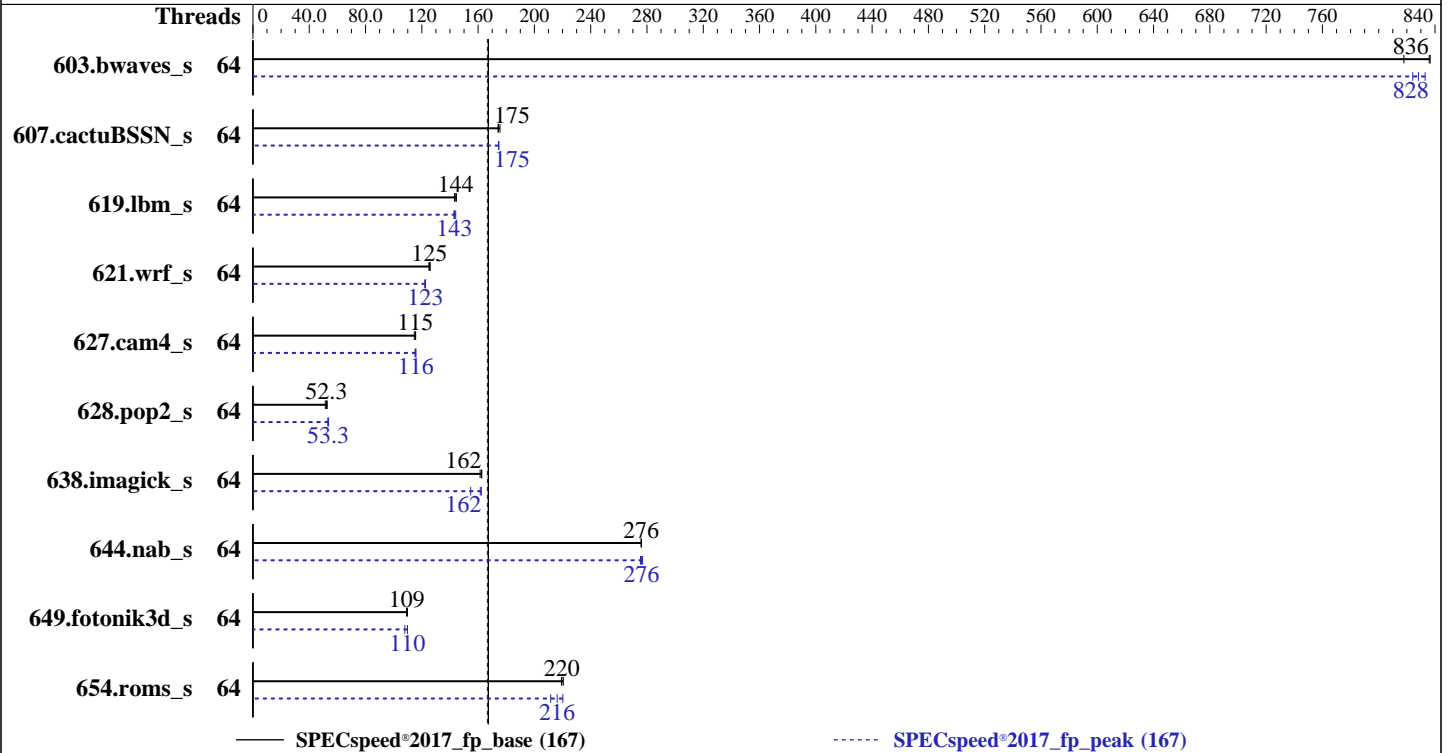$SPECspeed®2017\_fp\_peak = 167$

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

Test Date: Jun-2020
Hardware Availability: Mar-2019
Software Availability: May-2019

Threads		base	peak
603.bwaves_s	64	836	828
607.cactuBSSN_s	64	175	175
619.lbm_s	64	144	143
621.wrf_s	64	125	123
627.cam4_s	64	115	116
628.pop2_s	64	52.3	53.3
638.imagick_s	64	162	162
644.nab_s	64	276	276
649.fotonik3d_s	64	109	110
654.roms_s	64	220	216

Scale: 0 40.0 80.0 120 160 200 240 280 320 360 400 440 480 520 560 600 640 680 720 760 840

—— SPECspeed®2017_fp_base (167)   ----- SPECspeed®2017_fp_peak (167)

Hardware

CPU Name: Intel Xeon Gold 6130
 Max MHz: 3700
 Nominal: 2100
Enabled: 64 cores, 4 chips
Orderable: 1,2,3,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 22 MB I+D on chip per chip
 Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933V-R, running at 2666)
Storage: 1 x 800 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.6 (Maipo)
3.10.0-957.el7.x86_64
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
Parallel: Yes
Firmware: Version 2.00.39 released Mar-2020 BIOS
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage

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New H3C Technologies Co., Ltd.	SPECspeed®2017_fp_base = 167
H3C UniServer R6700 G3 (Intel Xeon Gold 6130)	SPECspeed®2017_fp_peak = 167

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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	64	70.5	837	72.1	818	**70.6**	**836**	64	**71.2**	**828**	70.8	833	71.6	824
607.cactuBSSN_s	64	94.9	176	**95.5**	**175**	95.7	174	64	95.4	175	95.5	175	**95.5**	**175**
619.lbm_s	64	36.6	143	36.2	145	**36.3**	**144**	64	36.7	143	**36.6**	**143**	36.4	144
621.wrf_s	64	106	125	105	126	**106**	**125**	64	108	123	108	122	**108**	**123**
627.cam4_s	64	76.7	116	77.3	115	**76.8**	**115**	64	**76.6**	**116**	76.5	116	77.0	115
628.pop2_s	64	231	51.4	225	52.8	**227**	**52.3**	64	221	53.7	**223**	**53.3**	223	53.3
638.imagick_s	64	89.4	161	88.7	163	**88.8**	**162**	64	88.9	162	**89.3**	**162**	93.2	155
644.nab_s	64	**63.3**	**276**	63.3	276	63.3	276	64	63.5	275	63.1	277	**63.3**	**276**
649.fotonik3d_s	64	83.0	110	83.5	109	**83.3**	**109**	64	84.5	108	**83.1**	**110**	83.0	110
654.roms_s	64	**71.7**	**220**	71.4	221	71.8	219	64	71.5	220	74.4	212	**72.8**	**216**
SPECspeed®2017_fp_base =		**167**												
SPECspeed®2017_fp_peak =		**167**												

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/speccpu/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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.
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

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

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CPU2017 License: 9066

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Test Date: Jun-2020

Hardware Availability: Mar-2019

Software Availability: May-2019

Platform Notes

```
BIOS settings:
Set Hyper Threading to Disabled
Set IMC Interleaving to 2-way Interleave

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on localhost.localdomain Wed Jun 10 10:02:38 2020

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 6130 CPU @ 2.10GHz
      4  "physical id"s (chips)
      64 "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
      physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 3: 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):              64
      On-line CPU(s) list: 0-63
      Thread(s) per core:  1
      Core(s) per socket:  16
      Socket(s):           4
      NUMA node(s):        4
      Vendor ID:           GenuineIntel
      CPU family:          6
      Model:               85
      Model name:          Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz
      Stepping:            4
      CPU MHz:             1478.356
      CPU max MHz:         3700.0000
      CPU min MHz:         1000.0000
      BogoMIPS:            4200.00
      Virtualization:      VT-x
      L1d cache:           32K
      L1i cache:           32K
```

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Hardware Availability: Mar-2019

Software Availability: May-2019

Platform Notes (Continued)

```
     L2 cache:              1024K
     L3 cache:              22528K
     NUMA node0 CPU(s):     0-15
     NUMA node1 CPU(s):     16-31
     NUMA node2 CPU(s):     32-47
     NUMA node3 CPU(s):     48-63
     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
     aperfmperf 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 ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase
     tsc_adjust bmi1 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_l1d

 /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: 4 nodes (0-3)
   node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
   node 0 size: 96928 MB
   node 0 free: 93753 MB
   node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
   node 1 size: 98304 MB
   node 1 free: 93441 MB
   node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
   node 2 size: 98304 MB
   node 2 free: 94459 MB
   node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
   node 3 size: 98304 MB
   node 3 free: 92885 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:       394633424 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB
```

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H3C UniServer R6700 G3 (Intel Xeon Gold 6130)

SPECspeed®2017_fp_base = 167

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CPU2017 License: 9066
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Test Date: Jun-2020
Hardware Availability: Mar-2019
Software Availability: May-2019

Platform Notes (Continued)

```
From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.6 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VARIANT="Server"
      VARIANT_ID="server"
      VERSION_ID="7.6"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
   redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.6: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-2018-3620 (L1 Terminal Fault):        Mitigation: PTE Inversion; VMX: SMT disabled,
                                          L1D conditional cache flushes
Microarchitectural Data Sampling:         No status reported
CVE-2017-5754 (Meltdown):                 Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
                                          via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):        Mitigation: Load fences, __user pointer
                                          sanitization
CVE-2017-5715 (Spectre variant 2):        Mitigation: IBRS (kernel)

run-level 3 Jun 10 05:04 last=5

SPEC is set to: /home/speccpu
   Filesystem              Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   690G  131G  559G  19% /home

From /sys/devices/virtual/dmi/id
    BIOS:    American Megatrends Inc. 2.00.39 03/24/2020
    Vendor:  New H3C Technologies Co., Ltd.
    Product: UniServer R6700 G3
    Serial:  210200A01SH18B000020

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.
```

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$SPECspeed^{®}2017\_fp\_base = 167$

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$SPECspeed^{®}2017\_fp\_peak = 167$

CPU2017 License: 9066   **Test Date:**   Jun-2020
Test Sponsor: New H3C Technologies Co., Ltd.   **Hardware Availability:** Mar-2019
Tested by: New H3C Technologies Co., Ltd.   **Software Availability:** May-2019

Platform Notes (Continued)

```
      Memory:
        24x Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2666
        24x NO DIMM NO DIMM

   (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C                     | 619.lbm_s(base, peak) 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran               | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                      | 654.roms_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran, C            | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                      | 628.pop2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
```

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Compiler Version Notes (Continued)

```
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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
```

Base Optimization Flags

C benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

(Continued on next page)

New H3C Technologies Co., Ltd.

SPECspeed®2017_fp_base = 167

H3C UniServer R6700 G3 (Intel Xeon Gold 6130)

SPECspeed®2017_fp_peak = 167

Base Optimization Flags (Continued)

Fortran benchmarks:
```
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -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=4 -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=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

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:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

(Continued on next page)

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Peak Optimization Flags (Continued)

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=4
-qopenmp -nostandard-realloc-lhs

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=4
-qopenmp -nostandard-realloc-lhs

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=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

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=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.3-SKL-RevE.xml

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

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