### SPEC CPU®2017 Floating Point Rate Result

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

H3C UniServer R4900 G3 (Intel Xeon Gold 6248)

| Test Date: | Jul-2021 |
| Test Sponsor: | New H3C Technologies Co., Ltd. |
| Tested by: | New H3C Technologies Co., Ltd. |
| CPU2017 License: | 9066 |
| Test Date: | Jul-2021 |
| CPU Name: | Intel Xeon Gold 6248 |
| Max MHz: | 3900 |
| Nominal: | 2500 |
| Enabled: | 40 cores, 2 chips, 2 threads/core |
| 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: | 27.5 MB I+D on chip per chip |
| Memory: | 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R) |
| Storage: | 1 x 480GB SATA SSD |
| OS: | Red Hat Enterprise Linux release 8.2 (Ootpa) |
| Compiler: | C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux |
| Firmware: | No |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Power Management: | BIOS set to prefer performance at the cost of additional power usage |

### Hardware

| SpecRate®2017_fp_base = 245 |
| SpecRate®2017_fp_peak = 257 |

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</table>

### Software

- **CPU Name:** Intel Xeon Gold 6248
- **Max MHz:** 3900
- **Nominal:** 2500
- **Enabled:** 40 cores, 2 chips, 2 threads/core
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
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- **Compiler:** C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Firmware:** No
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
## Results Table

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</table>

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### 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:
LD_LIBRARY_PATH = "/home/speccpu/lib/intel64:/home/speccpu/je5.0.1-64"
MALLOC_CONF = "retain:true"

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1
NA: 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)
New H3C Technologies Co., Ltd.
H3C UniServer R4900 G3 (Intel Xeon Gold 6248)

SPECrate®2017_fp_base = 245
SPECrate®2017_fp_peak = 257

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Jul-2021
Hardware Availability: Jun-2019
Software Availability: Dec-2020

General Notes (Continued)

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS settings:
Set SNC to Enabled
Set IMC Interleaving to 1-way Interleave
Set Patrol Scrub to Disabled
Set XPT Prefetcher to Enabled

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acfc64d
running on localhost.localdomain Sat Jul 31 11:52:29 2021

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 6248 CPU @ 2.50GHz
  2 "physical id"s (chips)
  80 "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 : 20
  siblings : 40
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79

(Continued on next page)
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Software Availability: Dec-2020

Platform Notes (Continued)

Thread(s) per core: 2  
Core(s) per socket: 20  
Socket(s): 2  
NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 6248 CPU @ 2.50GHz  
Stepping: 5  
CPU MHz: 3199.997  
CPU max MHz: 3900.0000  
CPU min MHz: 1000.0000  
BogoMIPS: 5000.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 28160K  
NUMA node0 CPU(s): 0-2,5,6,10-12,15,16,40-42,45,46,50-52,55,56  
NUMA node1 CPU(s): 3,4,7-9,13,14,17-19,43,44,47-49,53,54,57-59  
NUMA node2 CPU(s): 20-22,25,26,30-32,35,36,60-62,65,66,70-72,75,76  
NUMA node3 CPU(s): 23,24,27-29,33,34,37-39,63,64,67-69,73,74,77-79  
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 nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 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 abml a3nowprefetch cpuid_fault epb cat_1 cdp_1 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cmqm mxp rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves 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 md_clear flush_lld arch_capabilities

From numactl --hardware

cache size : 28160 KB

WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 4 nodes (0-3)
node 0 cpus: 0 1 2 5 6 10 11 12 15 16 40 41 42 45 46 50 51 52 55 56
node 0 size: 95084 MB
node 0 free: 83687 MB
node 1 cpus: 3 4 7 8 9 13 14 17 18 19 43 44 47 48 49 53 54 57 58 59
node 1 size: 96735 MB
node 1 free: 87869 MB

(Continued on next page)
## SPEC CPU®2017 Floating Point Rate Result

### New H3C Technologies Co., Ltd.

**H3C UniServer R4900 G3 (Intel Xeon Gold 6248)**

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</table>

### Platform Notes (Continued)

- node 2 cpus: 20 21 22 25 26 30 31 32 35 60 61 62 65 66 70 71 72 75 76
- node 2 size: 96763 MB
- node 2 free: 87390 MB
- node 3 cpus: 23 24 27 28 29 33 34 37 38 39 63 64 67 68 69 73 74 77 78 79
- node 3 size: 96762 MB
- node 3 free: 87317 MB
- node distances:
  - node 0: 10 11 21 21
  - node 1: 11 10 21 21
  - node 2: 21 21 10 11
  - node 3: 21 21 11 10

From `/proc/meminfo`

- MemTotal: 394594836 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/sbin/tuned-adm active

- Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has

- performance

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

- os-release:
  - NAME="Red Hat Enterprise Linux"
  - VERSION="8.2 (Ootpa)"
  - ID="rhel"
  - ID_LIKE="fedora"
  - VERSION_ID="8.2"
  - PLATFORM_ID="platform:el8"
  - PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
  - ANSI_COLOR="0;31"
- redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
- system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
- system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:

```
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2018-12207 (iTLB Multihit): KVM: Mitigation: Split huge pages
- Not affected
- Microarchitectural Data Sampling: Mitigation: Clear CPU buffers; SMT

(Continued on next page)
New H3C Technologies Co., Ltd. | SPECrate®2017_fp_base = 245
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Platform Notes (Continued)

CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitation
CVE-2017-5715 (Spectre variant 2): Mitigation: Full generic retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Mitigation: Clear CPU buffers; SMT vulnerable

SPEC is set to: /home/speccpu
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   392G   93G  300G  24% /home

From /sys/devices/virtual/dmi/id
Vendor:         New H3C Technologies Co., Ltd.
Product:        UniServer R4900 G3
Product Family: Rack
Serial:         210235A3TKH19B000002

Additional information from dmidecode 3.2 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.
Memory:
  12x Hynix HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  12x NO DIMM NO DIMM

BIOS:
  BIOS Vendor:       American Megatrends Inc.
  BIOS Version:      2.00.49
  BIOS Date:         04/16/2021
  BIOS Revision:     5.14

(End of data from sysinfo program)
New H3C Technologies Co., Ltd.
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Hardware Availability: Jun-2019
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Compiler Version Notes

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<tr>
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<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
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<th>C++, C</th>
<th>511.povray_r(peak)</th>
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<td>Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
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<td>Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
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(Continued on next page)
Compiler Version Notes (Continued)

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C++, C          | 511.povray_r(base) 526.blender_r(base, peak)

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C++, C, Fortran | 507.cactuBSSN_r(base, peak)

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Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)

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Fortran, C      | 521.wrf_r(peak)

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(Continued on next page)
New H3C Technologies Co., Ltd.  H3C UniServer R4900 G3 (Intel Xeon Gold 6248)

SPECrater®2017_fp_base = 245
SPECrater®2017_fp_peak = 257

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

Test Date: Jul-2021
Hardware Availability: Jun-2019
Software Availability: Dec-2020

Compiler Version Notes (Continued)

==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
Fortran, C      | 521.wrf_r(peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R4900 G3 (Intel Xeon Gold 6248)

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**SPECrate®2017_fp_base = 245**

**SPECrate®2017_fp_peak = 257**

**Base Compiler Invocation (Continued)**

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

**Base Portability Flags**

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-gopt-prefetch -ffinite-math-only

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

H3C UniServer R4900 G3 (Intel Xeon Gold 6248)

SPECrate®2017_fp_base = 245
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Test Date: Jul-2021
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Software Availability: Dec-2020

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
521.wrf_r: ifort icc

(Continued on next page)
Peak Compiler Invocation (Continued)

527.cam4_r: ifort icx

Benchmarks using both C and C++:

511.povray_r: icpc icc

526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes


C++ benchmarks:

508.namd_r: basepeak = yes


Fortran benchmarks:

503.bwaves_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-prefetch -ffinite-math-only

(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R4900 G3 (Intel Xeon Gold 6248)

SPECrate®2017_fp_base = 245
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Test Date: Jul-2021
Tested by: New H3C Technologies Co., Ltd.
Hardware Availability: Jun-2019
Software Availability: Dec-2020

Peak Optimization Flags (Continued)

503.bwaves_r (continued):
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.4-CLX-RevB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.4-CLX-RevB.xml
## SPEC CPU®2017 Floating Point Rate Result

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

Tested with SPEC CPU<sup>®</sup>2017 v1.1.8 on 2021-07-31 11:52:28-0400.
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