New H3C Technologies Co., Ltd.  

H3C UniServer R4900 G5 (Intel Xeon Platinum 8352Y)  

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SPECrate®2017_fp_base = 402  
SPECrate®2017_fp_peak = 423  

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

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
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<tbody>
<tr>
<td>OS: Red Hat Enterprise Linux release 8.2 (Ootpa) 4.18.0-193.el8.x86_64</td>
<td>CPU Name: Intel Xeon Platinum 8352Y</td>
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<tr>
<td>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</td>
<td>Max MHz: 3400</td>
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<tr>
<td>Firmware: Version 5.39 released Nov-2021 BIOS</td>
<td>Nominal: 2200</td>
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<tr>
<td>File System: xfs</td>
<td>Enabled: 64 cores, 2 chips, 2 threads/core</td>
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<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Orderable: 1,2 chips</td>
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<tr>
<td>Base Pointers: 64-bit</td>
<td>Cache L1: 32 KB I+ 48 KB D on chip per core</td>
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<tr>
<td>Peak Pointers: 64-bit</td>
<td>L2: 1.25 MB I+D on chip per core</td>
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<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
<td>L3: 48 MB I+D on chip per core</td>
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<td>Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.</td>
<td>Other: None</td>
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<th>519.lbm_r</th>
<th>521.wrf_r</th>
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CPU Name: Intel Xeon Platinum 8352Y  
Max MHz: 3400  
Nominal: 2200  
Enabled: 64 cores, 2 chips, 2 threads/core  
Orderable: 1,2 chips  
Cache L1: 32 KB I+ 48 KB D on chip per core  
L2: 1.25 MB I+D on chip per core  
L3: 48 MB I+D on chip per core  
Other: None  
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)  
Storage: 1 x 480GB SATA SSD  
Other: None
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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)

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

H3C UniServer R4900 G5 (Intel Xeon Platinum 8352Y)

SPEC CPU®2017 Floating Point Rate Result

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SPECrates®2017_fp_base = 402
SPECrates®2017_fp_peak = 423

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

Test Date: Dec-2021
Hardware Availability: Jun-2021
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 (Sub NUMA) to Enabled
Set Power Performance Tuning to BIOS Controls EPB
Set Energy Performance BIAS to Performance
Set XPT Prefetch to Enabled

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc6d4
running on localhost.localdomain Mon Dec  6 18:43:35 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) Platinum 8352Y CPU @ 2.20GHz
2 "physical id"s (chips)
128 "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 : 32
siblings : 64
physical 0: cores 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 28 29 30 31
physical 1: cores 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 28 29 30 31

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

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

H3C UniServer R4900 G5 (Intel Xeon Platinum 8352Y)

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<td>New H3C Technologies Co., Ltd.</td>
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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 24 25 26 27 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 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79

(Continued on next page)
## Platform Notes (Continued)

```plaintext
node 0 size: 128351 MB
node 0 free: 112918 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 1 size: 128989 MB
node 1 free: 116122 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128
node 2 size: 129016 MB
node 2 free: 115420 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
node 3 size: 129014 MB
node 3 free: 116240 MB
node distances:
  node 0 1 2 3
  0: 10 11 20 10
  1: 11 10 20 10
  2: 20 10 11 11
  3: 20 10 11 10
```

From `/proc/meminfo`
```
MemTotal:       527741584 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*
```
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`

(Continued on next page)
### Platform Notes (Continued)

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:

<table>
<thead>
<tr>
<th>Vulnerability</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-12207 (iTLB Multihit):</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3620 (L1 Terminal Fault):</td>
<td>Not affected</td>
</tr>
<tr>
<td>Microarchitectural Data Sampling:</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754 (Meltdown):</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2018-3639 (Speculative Store Bypass):</td>
<td>Mitigation: usercopy/swaps barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>CVE-2017-5753 (Spectre variant 1):</td>
<td>Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling</td>
</tr>
<tr>
<td>CVE-2017-5715 (Spectre variant 2):</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2020-0543 (Special Register Buffer Data Sampling):</td>
<td>No status reported</td>
</tr>
<tr>
<td>CVE-2019-11135 (TSX Asynchronous Abort):</td>
<td>Not affected</td>
</tr>
</tbody>
</table>

run-level 3 Dec 6 10:40

SPEC is set to: /home/speccpu

Filesystem            Type  Size  Used Avail Use% Mounted on  
/dev/mapper/rhel-home xfs   392G  116G  276G  30% /home

From /sys/devices/virtual/dmi/id

Vendor:         H3C
Product:        RS33M2C9S
Product Family: Rack

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:

16x Micron 36ASF4G72PZ-3G2E7 32 GB 2 rank 3200
16x NO DIMM NO DIMM

BIOS:

BIOS Vendor: American Megatrends International, LLC.
BIOS Version:  5.39
BIOS Date:     11/17/2021
BIOS Revision: 5.22

(End of data from sysinfo program)
New H3C Technologies Co., Ltd.

H3C UniServer R4900 G5 (Intel Xeon Platinum 8352Y)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2022 Standard Performance Evaluation Corporation

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

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

SPECrated®2017_fp_base = 402
SPECrated®2017_fp_peak = 423

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
</tr>
</thead>
<tbody>
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<tr>
<td>Version 2021.1 Build 20201113</td>
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<table>
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(Continued on next page)
# SPEC CPU®2017 Floating Point Rate Result

## New H3C Technologies Co., Ltd.

### H3C UniServer R4900 G5 (Intel Xeon Platinum 8352Y)

<table>
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<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<tr>
<td>= 402</td>
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<td>New H3C Technologies Co., Ltd.</td>
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### Compiler Version Notes (Continued)

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<th>Fortran, C</th>
<th>521.wrf_r(peak)</th>
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(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R4900 G5 (Intel Xeon Platinum 8352Y)

SPECrater®2017_fp_base = 402
SPECrater®2017_fp_peak = 423

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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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==============================================================================
Fortran, C | 521.wrf_r(peak)
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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
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Fortran, C | 521.wrf_r(base) 527.cam4_r(base, peak)
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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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 G5 (Intel Xeon Platinum 8352Y)

SPECrate®2017_fp_base = 402  
SPECrate®2017_fp_peak = 423

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

### Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

```bash
ifort icx
```

Benchmarks using both C and C++:

```bash
icpx icx
```

Benchmarks using Fortran, C, and C++:

```bash
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:

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

#### C++ benchmarks:

```bash
-w -m64 -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
```

#### Fortran benchmarks:

```bash
-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 G5 (Intel Xeon Platinum 8352Y)

SPECrate®2017_fp_base = 402
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Tested by: New H3C Technologies Co., Ltd.
Software Availability: Dec-2020
Test Date: Dec-2021

### 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 icx

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

H3C UniServer R4900 G5 (Intel Xeon Platinum 8352Y)

526.blender_r: icpx icx

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

Peak Compiler Invocation (Continued)

527.cam4_r: ifort icx

Benchmarks using both C and C++:
511.povray_r: icpc icc

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:

(Continued on next page)
## Peak Optimization Flags (Continued)

503.bwaves_r (continued):
- opt -multiple-gather-scatter-by-shuffles
- opt -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 -opt-prefetch -ffinite-math-only
-opt -multiple-gather-scatter-by-shuffles
-opt -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 -opt-prefetch -ffinite-math-only
-opt -multiple-gather-scatter-by-shuffles
-opt -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

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-V1.0-CPX-RevD.xml
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- **Test Date:** Dec-2021
- **Hardware Availability:** Jun-2021
- **Software Availability:** Dec-2020

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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®2017 v1.1.8 on 2021-12-06 05:43:34-0500.
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