## SPEC CPU®2017 Floating Point Rate Result

**New H3C Technologies Co., Ltd.**  
H3C UniServer R4900 G3 (Intel Xeon Silver 4210)

**SPECrate®2017_fp_base** = 118  
**SPECrate®2017_fp_peak** = 121

| Copys | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 |
|-------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 503.bwaves_r | 40 |    |    |    |    |    |    |  87.4 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 507.cactuBSSN_r | 40 |    |    |    |    |    |    |  81.8 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 508.namd_r | 40 |    |    |    |    |    |    |  82.1 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 510.parest_r | 40 |    |    |    |    |    |    |  68.3 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 511.povray_r | 40 |    |    |    |    |    |    |  74.0 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 519.lbm_r | 40 |    |    |    |    |    |    |  83.1 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 521.wrf_r | 40 |    |    |    |    |    |    |  83.2 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 526.blender_r | 40 |    |    |    |    |    |    |  104 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 527.cam4_r | 40 |    |    |    |    |    |    |  107 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 538.imagick_r | 40 |    |    |    |    |    |    |  127 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 544.nab_r | 40 |    |    |    |    |    |    |  143 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 549.fotonik3d_r | 40 |    |    |    |    |    |    |  114 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |
| 554.roms_r | 20 |    |    |    |    |    |    |  62.2 | 73.1 | 60.9 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |  87.4 |

---

### Hardware

**CPU Name:** Intel Xeon Silver 4210  
**Max MHz:** 3200  
**Nominal:** 2200  
**Enabled:** 20 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:** 13.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
**Storage:** 1 x 480 GB SATA SSD  
**Other:** None

### Software

**OS:** SUSE Linux Enterprise Server 12 SP4  
**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:** No  
**Firmware:** Version 2.00.32 released Jul-2019 BIOS  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None  
**Power Management:** --
### SPEC CPU®2017 Floating Point Rate Result

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

H3C UniServer R4900 G3 (Intel Xeon Silver 4210)

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

**SPECrate®2017_fp_base = 118**  
**SPECrate®2017_fp_peak = 121**

**Test Date:** Sep-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

---

#### Results Table

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<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Seconds</th>
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<td>73.4</td>
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</tbody>
</table>

SPECrates®2017_fp_base = 118  
SPECrates®2017_fp_peak = 121

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

---

#### 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"

---

#### General Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = "/home/speccpu/lib/intel64"
```

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.5  
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>
```

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
New H3C Technologies Co., Ltd. | SPEC CPU®2017 Floating Point Rate Result
H3C UniServer R4900 G3 (Intel Xeon Silver 4210) | SPECrate®2017_fp_base = 118
| SPECrate®2017_fp_peak = 121

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

General Notes (Continued)
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 Settings:
Set LLC Prefetch to Disabled
Set XPT Prefetch to Auto
Sysinfo program /home/speccpu/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-lwue Fri Sep 13 02:41:55 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) Silver 4210 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2200.000
CPU max MHz: 3200.000

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

- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 4400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 14080K
- **NUMA node0 CPU(s):** 0-9,20-29
- **NUMA node1 CPU(s):** 10-19,30-39
- **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 pst ceb art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf 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 cpuid_fault ebx cat_l3 cdp_l3 invpcid_single intel_p6 mce lmsrc mbseq ibs ibti ibti osf1 osf2 istqm cmp_legacy see arccmp xsaveopt xSAVE xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtm dts iommu ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni flush_l1d arch_capabilities

```
/cache data
  cache size: 14080 KB
```

From `numactl --hardware`

<table>
<thead>
<tr>
<th>Node</th>
<th>CPUs</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0-29</td>
<td>192005 MB</td>
</tr>
<tr>
<td>1</td>
<td>10-29</td>
<td>193294 MB</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

- **MemTotal:** 394547244 KB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 KB

```
/SUSE Linux Enterprise Server 12 SP4
```

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

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

```plaintext
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 4
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.

os-release:
  NAME="SLES"
  VERSION="12-SP4"
  VERSION_ID="12.4"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Not affected
- CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Sep 11 11:00 last=5

SPEC is set to: `/home/speccpu`

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   405G   27G  379G   7% /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 American Megatrends Inc. 2.00.32 07/19/2019
- Memory: 24x Hynix HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
New H3C Technologies Co., Ltd.
H3C UniServer R4900 G3 (Intel Xeon Silver 4210)

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Compiler Version Notes

---

C
519.lbm_r(base, peak) 538.imagick_r(base, peak)
544.nab_r(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.

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C++
508.namd_r(base, peak) 510.parest_r(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.

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

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C++, C, Fortran
507.cactuBSSN_r(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.

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Fortran
503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
554.roms_r(base, peak)

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

(Continued on next page)
New H3C Technologies Co., Ltd. | SPECrate®2017_fp_base = 118
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Compiler Version Notes (Continued)

64, Version 19.0.4.227 Build 20190416
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==============================================================================
Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(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.
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

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactusBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64

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Base Portability Flags (Continued)

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

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

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-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=4 -auto
-nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R4900 G3 (Intel Xeon Silver 4210)

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

SPECrater®2017_fp_base = 118
SPECrater®2017_fp_peak = 121

Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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

Benchmarks using both C and C++:
icpc -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:
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

538.imagick_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

544.nab_r: Same as 538.imagick_r

C++ benchmarks:
508.namd_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

510.parest_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

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

New H3C Technologies Co., Ltd.  
H3C UniServer R4900 G3 (Intel Xeon Silver 4210)  

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

### Peak Optimization Flags (Continued)

**Fortran benchmarks:**

```
503.bwaves_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte
```

```
549.fotonik3d_r: Same as 503.bwaves_r
```

```
554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512  
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

**Benchmarks using both Fortran and C:**

```
503.bwaves_r: -ipt -prof-use(pass 2) -ipo -xCORE-AVX512 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

**Benchmarks using both C and C++:**

```
511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4
```

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

**Benchmarks using Fortran, C, and C++:**

```
xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte
```

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.2019-09-03.00.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.2019-09-03.00.xml
## SPEC CPU®2017 Floating Point Rate Result

**New H3C Technologies Co., Ltd.**  
H3C UniServer R4900 G3 (Intel Xeon Silver 4210)

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### Test Details

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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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