New H3C Technologies Co., Ltd.

H3C UniServer R4300 G3 (Intel Xeon Silver 4114)

<table>
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<tr>
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<th>Hardware</th>
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<tr>
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<td>Nominal: 2200</td>
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<td>File System: xfs</td>
<td>Enabled: 20 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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## SPEC CPU2017 Floating Point Rate Result

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

**H3C UniServer R4300 G3 (Intel Xeon Silver 4114)**

**SPECRate2017_fp_base = 111**

**SPECRate2017_fp_peak = 114**

**CPU2017 License:** 9066  
**Test Date:** Aug-2019  
**Test Sponsor:** New H3C Technologies Co., Ltd.  
**Tested by:** New H3C Technologies Co., Ltd.  
**Hardware Availability:** Dec-2018  
**Software Availability:** May-2019

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**SPECRate2017_fp_base = 111**  
**SPECRate2017_fp_peak = 114**

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>
```
Yes: 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)
SPEC CPU2017 Floating Point Rate Result

New H3C Technologies Co., Ltd.
H3C UniServer R4300 G3 (Intel Xeon Silver 4114)

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SPECrate2017_fp_peak = 114

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Test Date: Aug-2019
Tested by: New H3C Technologies Co., Ltd.
Hardware Availability: Dec-2018
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 9bcd8f2999c33d61f64985e45859ea9
running on localhost.localdomain Thu Aug 1 12:48:40 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 4114 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 4114 CPU @ 2.20GHz
Stepping:              4
CPU MHz:               2934.765
CPU max MHz:           3000.0000

(Continued on next page)
NEW H3C TECHNOLOGIES CO., LTD.

H3C UNI SERVER R4300 G3 (INTEL XEON SILVER 4114)

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Tested by: New H3C Technologies Co., Ltd.

Test Date: Aug-2019
Hardware Availability: Dec-2018
Software Availability: May-2019

Platform Notes (Continued)

CPU min MHz: 800.0000
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 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 xtpre 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 cdq_l3 intel_ppow
intel_pt sbbd mba ibrs ibpb stibp cpr_shadow vmni 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 xsaveopt xgetbv1
cqm_llc cq_m_occu_l1l ccq_mbb_total ccq_mmb_local dtherm ida arat pin pts hwp
hwp_act_window hwp_epp hwp_pkg_req pku ospke spec_ctrl intel_stibp flush_l1d

/proc/cpuinfo cache data

    cache size : 14080 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
    available: 2 nodes (0-1)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
    node 0 size: 96919 MB
    node 0 free: 80762 MB
    node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
    node 1 size: 98304 MB
    node 1 free: 86616 MB
    node distances:
        node 0 1
        0: 10 21
        1: 21 10

From /proc/meminfo

    MemTotal: 196453432 kB
    HugePages_Total: 0
    Hugepagesize: 4096 kB

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

    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.5 (Maipo)"

(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R4300 G3 (Intel Xeon Silver 4114)

SPECrate2017_fp_base = 111
SPECrate2017_fp_peak = 114

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Test Date: Aug-2019
Tested by: New H3C Technologies Co., Ltd.
Hardware Availability: Dec-2018
Software Availability: May-2019

Platform Notes (Continued)

```
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.5"
PRETTY_NAME="OpenShift Enterprise"
redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5: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 Aug 1 02:37 last=5

SPEC is set to: /home/speccpu
    /dev/mapper/rhel-home xfs 370G 31G 339G 9% /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:
    12x Hynix HMA82GR7AFR8N-VK 16 GB 2 rank 2400
    12x NO DIMM NO DIMM
```

Compiler Version Notes

```
==============================================================================
CC  519.lbm_r(base) 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.
```
New H3C Technologies Co., Ltd.
H3C UniServer R4300 G3 (Intel Xeon Silver 4114)

SPECrate2017_fp_base = 111
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Test Date: Aug-2019
Hardware Availability: Dec-2018
Software Availability: May-2019

Compiler Version Notes (Continued)

==============================================================================
CC   519.lbm_r(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.
==============================================================================

CXXC 508.namd_r(base) 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.
==============================================================================

CXXC 508.namd_r(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.
==============================================================================

CC  511.povray_r(base) 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.
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.

CC  511.povray_r(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.

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

New H3C Technologies Co., Ltd.

H3C UniServer R4300 G3 (Intel Xeon Silver 4114)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>111</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>114</td>
</tr>
</tbody>
</table>

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

Test Date: Aug-2019
Hardware Availability: Dec-2018
Software Availability: May-2019

Compiler Version Notes (Continued)

==============================================================================
FC 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.
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.
==============================================================================

FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
------------------------------------------------------------------------------
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.
==============================================================================

FC 554.roms_r(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.
==============================================================================

CC 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
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.
==============================================================================

CC 521.wrf_r(peak) 527.cam4_r(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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(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R4300 G3 (Intel Xeon Silver 4114)

SPECrate2017_fp_base = 111
SPECrate2017_fp_peak = 114

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Test Date: Aug-2019
Tested by: New H3C Technologies Co., Ltd.
Hardware Availability: Dec-2018
Software Availability: May-2019

Compiler Version Notes (Continued)
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.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
New H3C Technologies Co., Ltd. | SPECrate2017_fp_base = 111
H3C UniServer R4300 G3 (Intel Xeon Silver 4114) | SPECrate2017_fp_peak = 114

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

Test Date: Aug-2019  
Hardware Availability: Dec-2018  
Software Availability: May-2019

### Base Optimization Flags

**C benchmarks:**
- `xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch`
- `ffinite-math-only -qopt-mem-layout-trans=4`

**C++ benchmarks:**
- `xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch`
- `ffinite-math-only -qopt-mem-layout-trans=4`

**Fortran benchmarks:**
- `xCORE-AVX512 -ipo -03 -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 -03 -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 -03 -no-prec-div -qopt-prefetch`
- `ffinite-math-only -qopt-mem-layout-trans=4`

**Benchmarks using Fortran, C, and C++:**
- `xCORE-AVX512 -ipo -03 -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`

**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`

(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R4300 G3 (Intel Xeon Silver 4114)

<table>
<thead>
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Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Aug-2019
Hardware Availability: Dec-2018
Software Availability: May-2019

Peak Compiler Invocation (Continued)

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

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

(Continued on next page)
New H3C Technologies Co., Ltd. | SPECrate2017_fp_base = 111
H3C UniServer R4300 G3 (Intel Xeon Silver 4114) | SPECrate2017_fp_peak = 114

| CPU2017 License: | 9066 |
| Test Sponsor: | New H3C Technologies Co., Ltd. |
| Tested by: | New H3C Technologies Co., Ltd. |
| Test Date: | Aug-2019 |
| Hardware Availability: | Dec-2018 |
| Software Availability: | May-2019 |

Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:
- 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 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

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

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