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

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

Test Date: Aug-2020  
Hardware Availability: Feb-2020  
Software Availability: May-2019

### Hardware

**CPU Name:** Intel Xeon Silver 4210R  
**Max MHz:** 3200  
**Nominal:** 2400  
**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:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
**Storage:** 1 x 960 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:** No  
**Firmware:** Version 2.00.33 released Aug-2019 BIOS  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>75.0</td>
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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/lib/ia32:/home/speccpu/je5.0.1-32"

General Notes

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

(Continued on next page)
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SPECRate®2017_int_base = 115  
SPECRate®2017_int_peak = Not Run  

General Notes (Continued)  

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  

Platform Notes  

BIOS Settings:  
Set SNC to Enabled  
Set IMC Interleaving to 1-way Interleave  
Set XPT Prefetcher to Enabled  

Sysinfo program /home/spec/cpu/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7e0b1e6e46a485a0011  
running on localhost.localdomain Tue Aug  4 22:51:28 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) Silver 4210R CPU @ 2.40GHz  
  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 4210R CPU @ 2.40GHz  
Stepping: 7  

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

New H3C Technologies Co., Ltd.  SPECrate®2017_int_base = 115
H3C UniServer R4900 G3 (Intel Xeon Silver 4210R)  SPECrate®2017_int_peak = Not Run

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
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Platform Notes (Continued)

CPU MHz: 2877.246
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_13 cpd_13 intel_ppn
intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept
vpid fs.gsbase tsc_adjust bml1 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_occupa_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln
pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni spec_ctrl
intel_stibp flush_lld arch_capabilities

/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: 97878 MB
  node 0 free: 88752 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: 95685 MB
  node distances:
    node 0: 10 21
    node 1: 21 10

From /proc/meminfo
  MemTotal: 197420128 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

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

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

```plaintext
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)
```

```
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): Not affected
- Microarchitectural Data Sampling: No status reported
- 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: Load fences, __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

```
rpm -qa
```

```
run-level 3 Aug 4 22:49
```

SPEC is set to: /home/speccpu
`
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 839G 25G 814G 3% /home
```

From /sys/devices/virtual/dmi/id
```plaintext
BIOS: American Megatrends Inc. 2.00.33 08/22/2019
Vendor: New H3C Technologies Co., Ltd.
Product: UniServer R4900 G3
Serial: 210200A00QH18C001552
```

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.
```plaintext
Memory:
12x Hynix HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
12x NO DIMM NO DIMM
```

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

(End of data from sysinfo program)

**Compiler Version Notes**

<table>
<thead>
<tr>
<th>Compiler</th>
<th>Benchmark(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Fortran</td>
<td>548.exchange2_r(base)</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tbody>
</table>

**Base Compiler Invocation**

C benchmarks:
```
icc -m64 -std=c11
```

C++ benchmarks:
```
ccpc -m64
```

Fortran benchmarks:
```
ifort -m64
```
**SPEC CPU®2017 Integer Rate Result**

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H3C UniServer R4900 G3 (Intel Xeon Silver 4210R) | SPECrate®2017_int_peak = Not Run

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**Base Portability Flags**

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

**Base Optimization Flags**

**C benchmarks:**
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4
- /usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- lqkmalloc

**C++ benchmarks:**
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4
- /usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- lqkmalloc

**Fortran benchmarks:**
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
- /usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- lqkmalloc

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/New_H3C-Platform-Settings-V1.4-CLX-RevB.xml
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