New H3C Technologies Co., Ltd.

H3C UniServer R4900 G3 (Intel Xeon Gold 5117)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>85.6</td>
<td>85.1</td>
</tr>
</tbody>
</table>

CPU2017 License: 9066  
Test Sponsor: New H3C Technologies Co., Ltd.  
Test Date: Apr-2019  
Hardware Availability: Jul-2017  
Tested by: New H3C Technologies Co., Ltd.  
Software Availability: Mar-2019

### Threads

<table>
<thead>
<tr>
<th>Thread</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>28</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>28</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>28</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>28</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>28</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>28</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>28</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>28</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>28</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>28</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5117  
- **Max MHz.:** 2800  
- **Nominal:** 2000  
- **Enabled:** 28 cores, 2 chips  
- **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:** 19.25 MB I+D on chip per core  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)  
- **Storage:** 1 x 1 TB 7200RPM SATA HDD  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.5 (Maipo)  
  Version 3.10.0-957.el7.x86_64  
- **Compiler:** C/C++: Version 19.0.1.144 of Intel C/C++  
  Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran  
  Compiler Build 20181018 for Linux  
- **Parallel:** Yes  
- **Firmware:** Version 2.00.24 released Mar-2019 BIOS  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
New H3C Technologies Co., Ltd.  
H3C UniServer R4900 G3 (Intel Xeon Gold 5117)

SPECspeed2017_fp_base = 85.6
SPECspeed2017_fp_peak = 85.1

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>28</td>
<td>146</td>
<td>404</td>
<td>147</td>
<td>402</td>
<td>147</td>
<td>401</td>
<td>28</td>
<td>147</td>
<td>400</td>
<td>146</td>
<td>404</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>28</td>
<td>164</td>
<td>102</td>
<td>161</td>
<td>104</td>
<td>162</td>
<td>103</td>
<td>28</td>
<td>166</td>
<td>100</td>
<td>162</td>
<td>103</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>28</td>
<td>71.9</td>
<td>72.8</td>
<td>72.1</td>
<td>72.6</td>
<td>71.7</td>
<td>73.0</td>
<td>28</td>
<td>72.0</td>
<td>72.8</td>
<td>71.9</td>
<td>72.9</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>28</td>
<td>192</td>
<td>69.1</td>
<td>191</td>
<td>69.2</td>
<td>191</td>
<td>69.2</td>
<td>28</td>
<td>179</td>
<td>73.8</td>
<td>179</td>
<td>73.7</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>28</td>
<td>185</td>
<td>47.9</td>
<td>184</td>
<td>48.1</td>
<td>184</td>
<td>48.1</td>
<td>28</td>
<td>184</td>
<td>48.1</td>
<td>185</td>
<td>48.0</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>28</td>
<td>272</td>
<td>43.6</td>
<td>272</td>
<td>43.7</td>
<td>274</td>
<td>43.4</td>
<td>28</td>
<td>269</td>
<td>44.2</td>
<td>269</td>
<td>44.1</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>28</td>
<td>219</td>
<td>65.8</td>
<td>218</td>
<td>66.1</td>
<td>218</td>
<td>66.1</td>
<td>28</td>
<td>250</td>
<td>57.7</td>
<td>219</td>
<td>65.9</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>28</td>
<td>142</td>
<td>123</td>
<td>141</td>
<td>124</td>
<td>141</td>
<td>124</td>
<td>28</td>
<td>142</td>
<td>123</td>
<td>141</td>
<td>124</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>28</td>
<td>137</td>
<td>66.8</td>
<td>138</td>
<td>66.1</td>
<td>137</td>
<td>66.7</td>
<td>28</td>
<td>137</td>
<td>66.5</td>
<td>138</td>
<td>66.2</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>28</td>
<td>176</td>
<td>89.7</td>
<td>177</td>
<td>89.0</td>
<td>176</td>
<td>89.3</td>
<td>28</td>
<td>177</td>
<td>88.8</td>
<td>176</td>
<td>89.5</td>
</tr>
</tbody>
</table>

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

**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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/speccpu/lib/ia32:/home/speccpu/lib/intel64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X 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
Yes: 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.

**Platform Notes**

BIOS Settings:
Set SNC to Disabled
Set Hyper-Threading to Disabled

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

New H3C Technologies Co., Ltd.
H3C UniServer R4900 G3 (Intel Xeon Gold 5117)

SPECspeed2017_fp_base = 85.6
SPECspeed2017_fp_peak = 85.1

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Apr-2019
Hardware Availability: Jul-2017
Software Availability: Mar-2019

Platform Notes (Continued)

Set Autonomous Core C-State to Enabled
Set Stale Atos to Enabled
Set Intel VT for Directed I/O (VT-d) to Disabled
Sysinfo program /home/speccpu/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Sat Apr 13 00:53:44 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) Gold 5117 CPU @ 2.00GHz
  2 "physical id"s (chips)
  28 "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 : 14
siblings : 14
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 28
On-line CPU(s) list: 0-27
Thread(s) per core: 1
Core(s) per socket: 14
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5117 CPU @ 2.00GHz
Stepping: 4
CPU MHz: 799.926
CPU max MHz: 2800.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K

(Continued on next page)
Platform Notes (Continued)

NUMA node0 CPU(s): 0-13  
NUMA node1 CPU(s): 14-27  
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 ntopology nonstop_tsc 
aperfmonperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg 
fma cx16 xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes 
xsaves avx f16c rdrAND lahf_lm abml 3nowprefetch ept cat _1 cdp _1 intel _pt ssbd mba 
ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle 
avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap 
ciflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cqm_llc 
cgm _occup _llc cgm _mbm _total cgm _mbm _local dtherm ida arat pln pts hwp hwp _act _window 
hwp _epp hwp _pkg _req pk u ospke spec _ctrl intel _stibp flush _l1d

/cache data

/cache size: 19712 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 10 11 12 13
  node 0 size: 195224 MB
  node 0 free: 180699 MB
  node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  node 1 size: 196608 MB
  node 1 free: 188818 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 394623760 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.5 (Maipo)"
    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)

(Continued on next page)
New H3C Technologies Co., Ltd. H3C UniServer R4900 G3 (Intel Xeon Gold 5117)

| SPECspeed2017_fp_base = 85.6 |
| SPECspeed2017_fp_peak = 85.1 |

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Apr-2019
Hardware Availability: Jul-2017
Software Availability: Mar-2019

Platform Notes (Continued)

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)

time run-level 3 Apr 12 18:27
SPECSpec  is set to:  /home/speccpu
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   293G   20G  274G   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. 2.00.24 03/08/2019
  Memory:
    12x Micron 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666, configured at 2400
    12x NO DIMM NO DIMM

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
FC  607.cactuBSSN_s(base, peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

H3C UniServer R4900 G3 (Intel Xeon Gold 5117)

SPECspeed2017_fp_base = 85.6
SPECspeed2017_fp_peak = 85.1

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Test Date: Apr-2019
Tested by: New H3C Technologies Co., Ltd.
Hardware Availability: Jul-2017
Software Availability: Mar-2019

Compiler Version Notes (Continued)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
New H3C Technologies Co., Ltd. | SPECsopen2017_fp_base = 85.6
H3C UniServer R4900 G3 (Intel Xeon Gold 5117) | SPECsopen2017_fp_peak = 85.1

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

Test Date: Apr-2019
Hardware Availability: Jul-2017
Software Availability: Mar-2019

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian 
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

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

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

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch 
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP 
-nostandard-realloc-lhs

(Continued on next page)
## SPEC CPU2017 Floating Point Speed Result

New H3C Technologies Co., Ltd.

H3C UniServer R4900 G3 (Intel Xeon Gold 5117)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 85.6</th>
<th>SPECspeed2017_fp_peak = 85.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 9066</td>
<td>Test Date: Apr-2019</td>
</tr>
<tr>
<td>Test Sponsor: New H3C Technologies Co., Ltd.</td>
<td>Hardware Availability: Jul-2017</td>
</tr>
<tr>
<td>Tested by: New H3C Technologies Co., Ltd.</td>
<td>Software Availability: Mar-2019</td>
</tr>
</tbody>
</table>

### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

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

### Peak Compiler Invocation

**C benchmarks:**

`icc -m64 -std=c11`

**Fortran benchmarks:**

`ifort -m64`

**Benchmarks using both Fortran and C:**

`ifort -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:**

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

**Fortran benchmarks:**

603.bwaves_s: `-prof-gen(pass 1)` -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 `xCORE-AVX512` -qopt-prefetch -ipo -O3
- `-ffinite-math-only` -no-prec-div -qopt-mem-layout-trans=4
- `-qopenmp` `-nostandard-realloc-lhs`

649.fotonik3d_s: Same as 603.bwaves_s

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

(Continued on next page)
New H3C Technologies Co., Ltd.  
H3C UniServer R4900 G3 (Intel Xeon Gold 5117)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>85.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>85.1</td>
</tr>
</tbody>
</table>

CPU2017 License: 9066  
Test Sponsor: New H3C Technologies Co., Ltd.  
Tested by: New H3C Technologies Co., Ltd.  
Test Date: Apr-2019  
Hardware Availability: Jul-2017  
Software Availability: Mar-2019

Peak Optimization Flags (Continued)

654.roms_s (continued):  
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512  
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div  
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs

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.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.xml  

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.5 on 2019-04-12 12:53:43-0400.  