# SPEC CPU®2017 Integer Speed Result

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

H3C UniServer R6900 G3 (Intel Xeon Gold 6230)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>10.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>10.7</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9066  
**Test Date:** Oct-2020  
**Test Sponsor:** New H3C Technologies Co., Ltd.  
**Hardware Availability:** Jun-2019  
**Tested by:** New H3C Technologies Co., Ltd.  
**Software Availability:** Apr-2020

## Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>80</td>
<td>6.39</td>
<td>7.31</td>
</tr>
<tr>
<td>gcc_s</td>
<td>80</td>
<td>9.56</td>
<td>9.98</td>
</tr>
<tr>
<td>mcf_s</td>
<td>80</td>
<td>8.42</td>
<td>17.4</td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>80</td>
<td>12.6</td>
<td>15.7</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>80</td>
<td>5.51</td>
<td>15.1</td>
</tr>
<tr>
<td>x264_s</td>
<td>80</td>
<td>4.57</td>
<td>15.8</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>80</td>
<td></td>
<td>23.9</td>
</tr>
<tr>
<td>leela_s</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exchange2_s</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz_s</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon Gold 6230  
- **Max MHz:** 3900  
- **Nominal:** 2100  
- **Enabled:** 80 cores, 4 chips  
- **Orderable:** 1,2,3,4 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 27.5 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933V-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

## Software

- **OS:** Red Hat Enterprise Linux release 8.2 (Ootpa)  
  4.18.0-193.el8.x86_64  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux; Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux
- **Parallel:** Yes  
- **Firmware:** Version 2.00.33 released Aug-2019 BIOS  
  xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
New H3C Technologies Co., Ltd. | SPECspeed®2017_int_base = 10.5
H3C UniServer R6900 G3 (Intel Xeon Gold 6230) | SPECspeed®2017_int_peak = 10.7

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>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>80</td>
<td>274</td>
<td>6.48</td>
<td>278</td>
<td>6.39</td>
<td>279</td>
<td>6.36</td>
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<tr>
<td>602.gcc_s</td>
<td>80</td>
<td>415</td>
<td>9.58</td>
<td>418</td>
<td>9.53</td>
<td>417</td>
<td>9.56</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>80</td>
<td>272</td>
<td>17.4</td>
<td>271</td>
<td>17.4</td>
<td>269</td>
<td>17.5</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>80</td>
<td>198</td>
<td>8.23</td>
<td>193</td>
<td>8.43</td>
<td>194</td>
<td>8.42</td>
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<tr>
<td>623.xalanchmk_s</td>
<td>80</td>
<td>113</td>
<td>12.6</td>
<td>112</td>
<td>12.6</td>
<td>112</td>
<td>12.6</td>
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<tr>
<td>625.x264_s</td>
<td>80</td>
<td>117</td>
<td>15.1</td>
<td>117</td>
<td>15.1</td>
<td>116</td>
<td>15.2</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>80</td>
<td>261</td>
<td>5.48</td>
<td>260</td>
<td>5.51</td>
<td>260</td>
<td>5.51</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>80</td>
<td>374</td>
<td>4.57</td>
<td>375</td>
<td>4.55</td>
<td>373</td>
<td>4.57</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>80</td>
<td>186</td>
<td>15.8</td>
<td>183</td>
<td>16.0</td>
<td>188</td>
<td>15.7</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>80</td>
<td>258</td>
<td>23.9</td>
<td>262</td>
<td>23.6</td>
<td>258</td>
<td>23.9</td>
</tr>
</tbody>
</table>

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

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/speccpu/lib/intel64:/home/speccpu/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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)
### General Notes (Continued)

- 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:
  ```bash
  sync; echo 3> /proc/sys/vm/drop_caches
  ```
- 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 Hyper Threading to Disabled
- Set Patrol Scrub to Disabled
- Set IMC Interleaving to 2-way Interleave

**Sysinfo program /home/speccpu/bin/sysinfo**
```
Rev: r6365 of 2019-08-21 295195f888a3d7edbb16e46a485a0011
running on localhost.localdomain Mon Oct 26 11:24:33 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

**From /proc/cpuinfo**
```
model name : Intel(R) Xeon(R) Gold 6230 CPU @ 2.10GHz
 4 "physical id"s (chips)
 80 "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 : 20
  siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
```

**From lscpu:**
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 1
Core(s) per socket: 20
Socket(s): 4
```
SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

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CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Test Date: Oct-2020
Hardware Availability: Jun-2019
Tested by: New H3C Technologies Co., Ltd.
Software Availability: Apr-2020

Platform Notes (Continued)

NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2982.559
CPU max MHz: 3900.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-19
NUMA node1 CPU(s): 20-39
NUMA node2 CPU(s): 40-59
NUMA node3 CPU(s): 60-79
Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64monitor 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 cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pplln ssbd mba ibrs ibpb ibrs_enhanced 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 clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaves xsaveopt xsavec xsavec qcm_llc qcm_occup_llc qcm_mmb_total qcm_mmb_local dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size: 28160 KB

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
node 0 size: 95069 MB
node 0 free: 94532 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
node 1 size: 96763 MB
node 1 free: 96575 MB
node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
node 2 size: 96763 MB
node 2 free: 95538 MB

(Continued on next page)
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---

**Platform Notes (Continued)**

```plaintext
node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 3 size: 96735 MB
node 3 free: 96465 MB
node distances:
  node 0 1 2 3
  0: 10 21 21 21
  1: 21 10 21 21
  2: 21 21 10 21
  3: 21 21 21 10

From /proc/meminfo
  MemTotal: 394580036 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

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:
  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:

- **itlb_multihit:** KVM: Mitigation: Split huge pages
- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **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: usercopy/swapgs barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **tsx_async_abort:** Mitigation: Clear CPU buffers; SMT disabled
```

(Continued on next page)
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---

**Platform Notes (Continued)**

```plaintext
run-level 3 Oct 26 11:23

SPEC is set to: /home/speccpu

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 839G 98G 741G 12% /home
```

From /sys/devices/virtual/dmi/id

- **BIOS:** American Megatrends Inc. 2.00.33 08/22/2019
- **Vendor:** New H3C Technologies Co., Ltd.
- **Product:** H3C UniServer R6900 G3
- **Product Family:** Rack
- **Serial:** 210235A3T0H204000004

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.

**Memory:**

- 24x Micron 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933
- 24x NO DIMM NO DIMM

(End of data from sysinfo program)

---

**Compiler Version Notes**

```plaintext
==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
| 625.x264_s(base, peak) 657.xz_s(base, peak)
```

---

**Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1**

NextGen Build 20200304

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

```plaintext
C       | 600.perlbench_s(peak)
```

---

**Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306**

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

```plaintext
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
| 625.x264_s(base, peak) 657.xz_s(base, peak)
```

(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R6900 G3 (Intel Xeon Gold 6230)

SPECspeed®2017_int_base = 10.5
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Compiler Version Notes (Continued)

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
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==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(peak)</th>
</tr>
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<tr>
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
<table>
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<tr>
<th>C++</th>
<th>620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</th>
</tr>
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Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
<table>
<thead>
<tr>
<th>Fortran</th>
<th>648.exchange2_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>---------</td>
<td>-----------------------------</td>
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</table>

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
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Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
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</tr>
</tbody>
</table>

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-nbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

(Continued on next page)
Peak Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64(*) -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

(*) Indicates a portability flag that was found in a non-portability variable.

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -qnextgen -std=c11 -fuse-ld=gold
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

H3C UniServer R6900 G3 (Intel Xeon Gold 6230)

**CPU2017 License:** 9066
**Test Date:** Oct-2020
**Test Sponsor:** New H3C Technologies Co., Ltd.
**Hardware Availability:** Jun-2019
**Tested by:** New H3C Technologies Co., Ltd.
**Software Availability:** Apr-2020

**SPEC CPU®2017 Integer Speed Result**

### Peak Optimization Flags (Continued)

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes
623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes
641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

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](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](http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.4-CLX-RevB.xml)

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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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