New H3C Technologies Co., Ltd.  
H3C UniServer R4900 G3 (Intel Xeon Gold 6256)  

**SPEC CPU®2017 Integer Speed Result**  
Copyright 2017-2020 Standard Performance Evaluation Corporation

**New H3C Technologies Co., Ltd.**  
H3C UniServer R4900 G3 (Intel Xeon Gold 6256)  

---

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>8.50</td>
<td>12.2</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>11.2</td>
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</tr>
<tr>
<td>620.omnetpp_s</td>
<td>9.85</td>
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</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>14.8</td>
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<tr>
<td>625.x264_s</td>
<td>17.2</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>6.41</td>
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<tr>
<td>641.leela_s</td>
<td>5.38</td>
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</tr>
<tr>
<td>648.exchange2_s</td>
<td>18.5</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24.0</td>
<td></td>
</tr>
</tbody>
</table>

---

**Hardware**  

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6256</td>
</tr>
<tr>
<td>Max MHz</td>
<td>4500</td>
</tr>
<tr>
<td>Nominal</td>
<td>3600</td>
</tr>
<tr>
<td>Enabled</td>
<td>24 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
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<tr>
<td>L3</td>
<td>33 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2933V-R)</td>
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<tr>
<td>Storage</td>
<td>2 x 600 GB SAS HDD,10k RPM,RAID 1</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

**Software**  

<table>
<thead>
<tr>
<th>Component</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Red Hat Enterprise Linux release 8.2 (Ootpa) 4.18.0-193.el8.x86_64</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 2.00.33 released Aug-2019 BIOS</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>64-bit</td>
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<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
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<tr>
<td>Power Management</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>
New H3C Technologies Co., Ltd. | SPECspeed®2017_int_base = 12.0  
H3C UniServer R4900 G3 (Intel Xeon Gold 6256) | SPECspeed®2017_int_peak = 12.2

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

<table>
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<tr>
<th>Benchmark</th>
<th>Base Threads</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Threads</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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<tr>
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<td>24</td>
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<td>317</td>
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<td>5.36</td>
<td>316</td>
<td>5.39</td>
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<td>317</td>
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<tr>
<td>648.exchange2_s</td>
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<td>18.5</td>
<td>158</td>
<td>18.6</td>
<td>159</td>
<td>18.5</td>
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<td>657.xz_s</td>
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<td>258</td>
<td>24.0</td>
<td>24</td>
<td>257</td>
<td>24.0</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:
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 XPT Prefetch to Auto
Set Patrol Scrub to Disabled
Set IMC Interleaving to 2-way Interleave

Sysinfo program /home/spec/cpu/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e6e46a485a0011
running on localhost.localdomain Wed Sep 9 11:22:58 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) Gold 6256 CPU @ 3.60GHz
 2 "physical id"s (chips)
 24 "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 : 12
siblings : 12
physical 0: cores 0 1 3 8 9 12 18 21 25 27 28 29
physical 1: cores 0 1 5 9 10 11 13 16 20 21 25 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2

(Continued on next page)
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<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>12.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>12.2</td>
</tr>
</tbody>
</table>

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

Platform Notes (Continued)

- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6256 CPU @ 3.60GHz
- Stepping: 7
- CPU MHz: 2739.874
- CPU max MHz: 4500.0000
- CPU min MHz: 1200.0000
- BogoMIPS: 7200.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 33792K
- NUMA node0 CPU(s): 0-11
- NUMA node1 CPU(s): 12-23
- 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aes xsave avx f16c rdrand lahf_lm abml3 size32 node_attribute_group node_attr_tune

/proc/cpuinfo cache data
- cache size: 33792 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

From /proc/meminfo

(Continued on next page)
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**Test Sponsor:** New H3C Technologies Co., Ltd.  
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**SPECspeed®2017_int_base = 12.0**  
**SPECspeed®2017_int_peak = 12.2**

**Test Date:** Sep-2020  
**Hardware Availability:** Mar-2019  
**Software Availability:** Apr-2020

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**Platform Notes (Continued)**

MemTotal: 394599132 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*  
```
os-release:
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
```

```
run-level 3 Sep 9 11:21 last=5  
SPEC is set to: /home/speccpu  
```

```
Filesystem Type Size Used Avail Use% Mounted on  
/dev/mapper/rhel-home xfs 504G 12G 492G 3% /home
```

From /sys/devices/virtual/dmi/id  
```
BIOS: American Megatrends Inc. 2.00.33 08/22/2019
Vendor: H3C  
Product: RS33M2C9S  
Product Family: Rack
```

(Continued on next page)
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SPECspeed®2017_int_base = 12.0
SPECspeed®2017_int_peak = 12.2

Platform Notes (Continued)

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:
- 12x NO DIMM NO DIMM
- 1x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933
- 11x Samsung M393A4K40DB2-CVF 32 GB 2 rank 2933

Compiler Version Notes

==============================================================================
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.
-----------------------------------------------------------------------------

==============================================================================
C       | 600.perlbench_s(peak)
-----------------------------------------------------------------------------
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.
-----------------------------------------------------------------------------

==============================================================================
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.
-----------------------------------------------------------------------------

==============================================================================
C       | 600.perlbench_s(peak)
-----------------------------------------------------------------------------
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.
(Continued on next page)
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H3C UniServer R4900 G3 (Intel Xeon Gold 6256)

SPECspeed®2017_int_base = 12.0
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CPU2017 License: 9066
Test Date: Sep-2020
Test Sponsor: New H3C Technologies Co., Ltd.
Hardware Availability: Mar-2019
Tested by: New H3C Technologies Co., Ltd.
Software Availability: Apr-2020

Compiler Version Notes (Continued)

--------------------------------------------------------------------------------
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
       | 631.deepsjeng_s(base, peak) 641.leela_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.

--------------------------------------------------------------------------------
Fortran | 648.exchange2_s(base, peak)
--------------------------------------------------------------------------------
Intel(R) Fortran 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.

--------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
  icc

C++ benchmarks:
  icpc

Fortran benchmarks:
  ifort

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`
- `-mbranches-within-32B-boundaries`

## Peak Compiler Invocation

### C benchmarks:
- `icc`

### C++ benchmarks:
- `icpc`

### 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`

(Continued on next page)
Peak Portability Flags (Continued)

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

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:

(Continued on next page)
Peak Optimization Flags (Continued)

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

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