# SPEC CPU®2017 Integer Speed Result

## New H3C Technologies Co., Ltd.

**H3C UniServer R4300 G5 (Intel Xeon Gold 5320)**

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 11.6</th>
<th>SPECspeed®2017_int_peak = 11.8</th>
</tr>
</thead>
</table>

**CPU2017 License:** 9066  
**Test Sponsor:** New H3C Technologies Co., Ltd.  
**Tested by:** New H3C Technologies Co., Ltd.  
**Test Date:** Nov-2021  
**Hardware Availability:** Sep-2020  
**Software Availability:** Jan-2021

<table>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>52</td>
<td>602.gcc_s</td>
<td>52</td>
<td>605.mcf_s</td>
<td>52</td>
<td>620.omnetpp_s</td>
<td>52</td>
<td>623.xalancbmk_s</td>
<td>52</td>
<td>625.x264_s</td>
<td>52</td>
<td>631.deepsjeng_s</td>
<td>52</td>
<td>641.leela_s</td>
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<td>8.09</td>
<td>10.6</td>
<td>11.1</td>
<td></td>
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<td>19.4</td>
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---

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux release 8.2 (Ootpa) 4.18.0-193.el8.x86_64</th>
</tr>
</thead>
</table>
| Compiler: | C/C++: Version 2021.1 of Intel oneAPI DPC++/C++  
Compiler Build 20201113 for Linux;  
Fortran: Version 2021.1 of Intel Fortran Compiler  
Classic Build 20201112 for Linux;  
C/C++: Version 2021.1 of Intel C/C++ Compiler  
Classic Build 20201112 for Linux |
| Parallel: | Yes |
| Firmware: | Version 5.34 released Sep-2021 BIOS |
| File System: | 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 and OS set to prefer performance at the cost of additional power usage. |

### Hardware

| CPU Name: | Intel Xeon Gold 5320 |
| Max MHz: | 3400 |
| Nominal: | 2200 |
| Enabled: | 52 cores, 2 chips |
| Orderable: | 1.2 chips |
| Cache L1: | 32 KB I + 48 KB D on chip per core |
| L2: | 1.25 MB I+D on chip per core |
| L3: | 39 MB I+D on chip per chip |
| Other: | None |
| Memory: | 1 TB (16 x 64 GB 2Rx4 PC4-3200V-R, running at 2933) |
| Storage: | 1 x 600GB 10000RPM SAS HDD |
| Other: | None |
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>269</td>
<td>23.0</td>
<td>269</td>
<td>23.0</td>
<td>269</td>
</tr>
</tbody>
</table>

**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) 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

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

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CPU2017 License: 9066
Test Date: Nov-2021
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

SPECspeed®2017_int_base = 11.6
SPECspeed®2017_int_peak = 11.8

General Notes (Continued)


Platform Notes

BIOS Settings:
Set Hyper-Threading to Disabled
Set Power Performance Tuning to BIOS Controls EPB
Set Energy Performance BIAS to Performance
Set Patrol Scrub to Disabled

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf664d
running on localhost.localdomain Wed Nov 10 16:37:52 2021

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 5320 CPU @ 2.20GHz
 2 "physical id"s (chips)
 52 "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 : 26
siblings : 26
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

From lscpu from util-linux 2.32.1:
Architecture:     x86_64
CPU op-mode(s) :  32-bit, 64-bit
Byte Order:       Little Endian
CPU(s) :          52
On-line CPU(s) list: 0-51
Thread(s) per core: 1
Core(s) per socket: 26
Socket(s):        2
NUMA node(s):     2
Vendor ID:        GenuineIntel
CPU family:       6
Model:            106
Model name:       Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
Stepping:         6

(Continued on next page)
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H3C UniServer R4300 G5 (Intel Xeon Gold 5320)  

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**Copyright 2017-2021 Standard Performance Evaluation Corporation**  

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**Hardware Availability:** Sep-2020  
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**SPECspeed®2017_int_base = 11.6**  
**SPECspeed®2017_int_peak = 11.8**  

Platform Notes (Continued)  

- CPU MHz: 1030.123  
- CPU max MHz: 3400.0000  
- CPU min MHz: 800.0000  
- BogoMIPS: 4400.00  
- Virtualization: VT-x  
- L1d cache: 48K  
- L1i cache: 32K  
- L2 cache: 1280K  
- L3 cache: 39936K  
- NUMA node0 CPU(s): 0-25  
- NUMA node1 CPU(s): 26-51  
- 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 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 abb 3nowprefetch cpuid_fault epb cat_13 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmx flexpriority ept vpid fsgsbase tsc_adjust bmi bmi1 hle avx2 smep bmi2 erm invpcid rtm qdrt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsavevm cqm cqm_llc qm_occup_llc cqm_mbm_total cqm_mbm_local wboinfo dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vmbi umip pku ospke avx512_vbmi2 gfn vaes vpcmldqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfiq flush_l1d arch_capabilities

/proc/cpuinfo cache data  
  cache size : 39936 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 14 15 16 17 18 19 20 21 22 23 24 25  
node 0 size: 515266 MB  
node 0 free: 513961 MB  
node 1 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51  
node 1 size: 516059 MB  
node 1 free: 515373 MB  
node distances:  
node 0 1  
  0: 10 20  
  1: 20 10  

From /proc/meminfo  
  MemTotal: 1056077912 KB  
  HugePages_Total: 0

(Continued on next page)
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SPECspeed®2017_int_base = 11.6
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Platform Notes (Continued)

Hugepagesize: 2048 kB
/sbin/tuned-adm active
  Current active profile: throughput-performance
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
  performance

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:

CVE-2018-12207 (iTLB Multihit):
CVE-2018-3620 (L1 Terminal Fault):
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown):
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):

run-level 3 Nov 10 16:36
SPEC is set to: /home/speccpu

Filesystem Type      Size  Used Avail Use% Mounted on

(Continued on next page)
Platform Notes (Continued)

/dev/mapper/rhel-home xfs 504G 49G 455G 10% /home

From /sys/devices/virtual/dmi/id
Product Family: Rack

Additional information from dmidecode 3.2 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:
16x Hynix HMAA8GR7JR4N-XN 64 GB 2 rank 3200, configured at 2933
16x NO DIMM NO DIMM

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 5.34
BIOS Date: 09/11/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

Compiler Version Notes

C       | 600.perlbench_s(peak)

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C       | 600.perlbench_s(peak)

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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Compiler Version Notes (Continued)

------------------------------------------------------------------------------
| 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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

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

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

---

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64

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

- 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:
- -DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
- -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
- -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
- -DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
- -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- -mbranches-within-32B-boundaries
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
  -lqkmalloc

Fortran benchmarks:
- -m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs -align array32byte -auto
- -mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks (except as noted below):
- icx
  - 600.perlbench_s: icc

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort
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---

**Peak Portability Flags**

Same as Base Portability Flags

---

**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 -std=c11 -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  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs  
-xCORE-AVX512 -flto -O3 -ffast-math  
-qopt-mem-layout-trans=4 -fno-alias  
-mbranches-within-32B-boundaries  
-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:

648.exchange2_s: basepeak = yes
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**Test Sponsor:** New H3C Technologies Co., Ltd.  
**Tested by:** New H3C Technologies Co., Ltd.  
**Test Date:** Nov-2021  
**Hardware Availability:** Sep-2020  
**Software Availability:** Jan-2021

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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