# SPEC CPU®2017 Integer Speed Result

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

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

| SPECspeed®2017_int_base = 11.7 | SPECspeed®2017_int_peak = 11.9 |

| 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 |

## Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>40</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>40</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>40</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>40</td>
</tr>
<tr>
<td>623.xalanchbk_s</td>
<td>40</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>40</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>40</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>40</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>40</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>40</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_base (11.7) - - SPECspeed®2017_int_peak (11.9)

### Hardware

**CPU Name:** Intel Xeon Gold 5320T  
**Max MHz:** 3500  
**Nominal:** 2300  
**Enabled:** 40 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:** 30 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

### Software

**OS:** Red Hat Enterprise Linux release 8.2 (Ootpa)  
4.18.0-193.el8.x86_64  
**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.
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Results Table

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<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.perbench_s</td>
<td>40</td>
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<td>7.20</td>
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<td>7.20</td>
<td>245</td>
<td>7.23</td>
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<tr>
<td>602.gcc_s</td>
<td>40</td>
<td>373</td>
<td>10.7</td>
<td>369</td>
<td>10.8</td>
<td>370</td>
<td>10.8</td>
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<tr>
<td>605.mcf_s</td>
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<td>19.8</td>
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<td>19.9</td>
<td>238</td>
<td>19.8</td>
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<tr>
<td>620.omnetpp_s</td>
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<td>152</td>
<td>10.7</td>
<td>153</td>
<td>10.7</td>
<td>151</td>
<td>10.8</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
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<td>13.5</td>
<td>105</td>
<td>13.5</td>
<td>104</td>
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<td>625.x264_s</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>5.92</td>
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<td>5.91</td>
<td>242</td>
<td>5.92</td>
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<tr>
<td>641.leela_s</td>
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<tr>
<td>648.exchange2_s</td>
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<td>152</td>
<td>19.4</td>
<td>153</td>
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<td>274</td>
<td>22.6</td>
<td>274</td>
<td>22.5</td>
<td>274</td>
<td>22.5</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"

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)
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CPU2017 License: 9066  Test Date: Nov-2021
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SPECspeed®2017_int_base = 11.7
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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 982a61ec0915b55891ef0e16aca6c64d
running on localhost.localdomain Wed Nov 17 11:20:49 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 5320T CPU @ 2.30GHz
  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 : 20
siblings : 20
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

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): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 1
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5320T CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2023.342
CPU max MHz: 3500.0000

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Platform Notes (Continued)

CPU min MHz: 800.0000  
BogoMIPS: 4600.00

Virtualization: VT-x

L1d cache: 48K  
L1i cache: 32K  
L2 cache: 1280K  
L3 cache: 30720K

NUMA node0 CPU(s): 0-19  
NUMA node1 CPU(s): 20-39

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

/proc/cpuinfo cache data

cache size : 30720 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
	node 0 size: 515267 MB  
	node 0 free: 514648 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: 516061 MB  
	node 1 free: 514735 MB
	node distances:

node distances:

node 0 1

0: 10 20

1: 20 10

From /proc/meminfo

MemTotal: 1056080456 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/sbin/tuned-adm active

(Continued on next page)
Platform Notes (Continued)

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): Not affected
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/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Nov 17 11:20

SPEC is set to: /home/speccpu
    Filesystem          Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   504G  49G  455G  10% /home

From /sys/devices/virtual/dmi/id

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Platform Notes (Continued)

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 HMAA8GR7AJR4N-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)

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<th>C</th>
<th>600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)</th>
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<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
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<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>
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<th>Fortran</th>
<th>648.exchange2_s(base, peak)</th>
</tr>
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<td>Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
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</table>

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
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX

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### Base Portability Flags (Continued)

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

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