# SPEC CPU®2017 Integer Speed Result

## New H3C Technologies Co., Ltd.

### H3C UniServer R4900 G5 (Intel Xeon Gold 6330N)

**SPECspeed®2017_int_base = 11.5**  
**SPECspeed®2017_int_peak = 11.8**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tbody>
<tr>
<td>perlbench_s</td>
<td>56</td>
<td>8.04</td>
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<tr>
<td>gcc_s</td>
<td>56</td>
<td>8.04</td>
<td>10.5</td>
</tr>
<tr>
<td>mcf_s</td>
<td>56</td>
<td>10.9</td>
<td>12.2</td>
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<tr>
<td>omnetpp_s</td>
<td>56</td>
<td>5.63</td>
<td>7.01</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>56</td>
<td>5.63</td>
<td>7.01</td>
</tr>
<tr>
<td>x264_s</td>
<td>56</td>
<td>5.63</td>
<td>7.01</td>
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<tr>
<td>deepsjeng_s</td>
<td>56</td>
<td>5.63</td>
<td>7.01</td>
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<tr>
<td>leela_s</td>
<td>56</td>
<td>5.63</td>
<td>7.01</td>
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<tr>
<td>exchange2_s</td>
<td>56</td>
<td>5.63</td>
<td>7.01</td>
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<tr>
<td>xz_s</td>
<td>56</td>
<td>5.63</td>
<td>7.01</td>
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</tbody>
</table>

## Hardware

**CPU Name:** Intel Xeon Gold 6330N  
**Max MHz:** 3400  
**Nominal:** 2200  
**Enabled:** 56 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:**  42 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200V-R, running at 2666)  
**Storage:** 1 x 480GB 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 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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SPECspeed®2017_int_base = 11.5

SPECspeed®2017_int_peak = 11.8

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>
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<td>140</td>
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<td>146</td>
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<tr>
<td>623.xalanchmk_s</td>
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<td>108</td>
<td>13.1</td>
<td>107</td>
<td>13.2</td>
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<tr>
<td>625.x264_s</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>641.leela_s</td>
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<td>4.71</td>
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<tr>
<td>648.exchange2_s</td>
<td>56</td>
<td>156</td>
<td>18.8</td>
<td>157</td>
<td>18.7</td>
<td>156</td>
<td>18.8</td>
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<tr>
<td>657.xz_s</td>
<td>56</td>
<td>274</td>
<td>22.6</td>
<td>274</td>
<td>22.5</td>
<td>275</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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<th>9066</th>
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<td>Sep-2020</td>
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</tr>
</tbody>
</table>

**General Notes (Continued)**


**Platform Notes**

BIOS Settings:
Set Hyper-Thread to Disabled
Set Energy Performance BIAS to Performance
Set Patrol Scrub to Disabled

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aaca64d
running on localhost.localdomain Mon Nov 15 01:22:50 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 6330N CPU @ 2.20GHz
2 "physical id"s (chips)
56 "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 : 28
siblings : 28
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 26 27
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 26 27

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): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6330N CPU @ 2.20GHz
Stepping: 6
CPU MHz: 3206.496

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Platform Notes (Continued)

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: 43008K
NUMA node0 CPU(s): 0-27
NUMA node1 CPU(s): 28-55

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 cpuid
aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx16
xtpre pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebpx cat_13 invpcid_single ssbd
mba ibrs ibpb stibp ibrsenhanced tpr_shadow vmni flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cqm rdta avx512f avx512dq
rseseadx smap avx512lifm ciflushopt clwb intel_pt avx512cd sha ni avx512bw
avx512vl xsaveopt xsavec xgetbv1 xsaves cmq llc cmq_occupa llc cmq_mbb total
sqm_mbb_local wbindnv dtherm ida arat pln pts hwp hwp_act_window hwp_epp
hwp_pkg_req avx512vbmi umip pku ospke avx512_vbmi2 gfn i vaes vpclmulqdq avx512_vnni
avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities

/platform/cpuinfo cache data

cache size : 43008 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 26 27
node 0 size: 257376 MB
node 0 free: 256453 MB
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55
node 1 size: 258011 MB
node 1 free: 257615 MB
node distances:
	node 0 1
	only

From /proc/meminfo

MemTotal: 527757244 KB
HugePages_Total: 0
Hugepagesize: 2048 KB

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Platform Notes (Continued)

/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
unname -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

SPEC is set to: /home/speccpu
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs 392G 32G 360G 9% /home

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Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
Vendor: H3C
Product: RS3M2C9S
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 HMA84GR7DJR4N-XN 32 GB 2 rank 3200, configured at 2666
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)
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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.
---

---
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

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### 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.leea_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
- -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 -fopenmp -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.xalancbnk_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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