**SPEC CPU®2017 Integer Speed Result**

New H3C Technologies Co., Ltd.  
H3C UniServer R4300 G5 (Intel Xeon Gold 6338N)

<table>
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<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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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

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**Hardware**

CPU Name: Intel Xeon Gold 6338N  
Max MHz: 3500  
Nominal: 2200  
Enabled: 64 cores, 2 chips, 2 threads/core  
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: 48 MB I+D on chip per core  
Other: None  
Memory: 1 TB (16 x 64 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.
New H3C Technologies Co., Ltd.
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Results Table

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<tr>
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<th>Seconds</th>
<th>Ratio</th>
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<td>600.perlbench_s</td>
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<td>602.gcc_s</td>
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<td>11.2</td>
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<tr>
<td>605.mcf_s</td>
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<td>11.6</td>
<td>139</td>
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<td>139</td>
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<td>11.8</td>
<td>139</td>
<td>11.8</td>
</tr>
<tr>
<td>626.x264_s</td>
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<td>243</td>
<td>5.91</td>
<td>243</td>
<td>5.90</td>
<td>128</td>
<td>243</td>
<td>5.90</td>
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<td>5.91</td>
<td>243</td>
<td>5.90</td>
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<tr>
<td>641.leela_s</td>
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<td>153</td>
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<td>657.zx_s</td>
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<td>257</td>
<td>24.1</td>
<td>128</td>
<td>257</td>
<td>24.0</td>
<td>257</td>
<td>24.1</td>
<td>257</td>
<td>24.1</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"
MALLOCONF = "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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**New H3C Technologies Co., Ltd.**

H3C UniServer R4300 G5 (Intel Xeon Gold 6338N)

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**Hardware Availability:** Sep-2020  
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**Test Sponsor:** New H3C Technologies Co., Ltd.  
**Tested by:** New H3C Technologies Co., Ltd.

---

## General Notes (Continued)


## Platform Notes

**BIOS Settings:**
- 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 982a61ec0915b55891ef0e16aca64d  
running on localhost.localdomain Wed Nov 10 11:05:06 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 6338N CPU @ 2.20GHz
- 2 "physical id":s (chips)
- 128 "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: 32
  - siblings: 64
- 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 28 29 30 31
- 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 28 29 30 31

**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): 128
- On-line CPU(s) list: 0-127
- Thread(s) per core: 2
- Core(s) per socket: 32
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz
- Stepping: 6
- CPU MHz: 1165.930

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

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Platform Notes (Continued)

CPU max MHz: 3500.0000
CPU min MHz: 800.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-31,64-95
NUMA node1 CPU(s): 32-63,96-127
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds cpl vmxon smx est tm2 ssse3 sse2 ss xtpr pdcm dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrsenhanced tpr_shadow vnumi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xfgotb v1 xsaves cqm_llc cqm_occup_llc cqm_mem_total cqm_mbm_local wboinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbm1 umip pku ospke avx512_vmvl2 gfni vaes vpcmldq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

From /proc/cpuinfo cache data
    cache size: 49152 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 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 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
    node 0 size: 515416 MB
    node 0 free: 514744 MB
    node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
    node 1 size: 516052 MB
    node 1 free: 514786 MB
    node distances:
    node 0 1
    0: 10 20
    1: 20 10

From /proc/meminfo

(Continued on next page)
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### Platform Notes (Continued)

MemTotal: 1056223704 kB  
HugePages_Total: 0  
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*

```text
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"
```

cve

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:

```text
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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp  
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization  
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling  
CVE-2017-5715 (Spectre variant 2):  
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported  
CVE-2019-11135 (TSX Asynchronous Abort): Not affected  

run-level 3 Nov 10 11:04
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SPECspeed\textsuperscript{\textregistered}2017\textunderscore int\textunderscore peak = 12.1

SPECspeed\textsuperscript{\textregistered}2017\textunderscore int\textunderscore base = 11.9

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Platform Notes (Continued)

SPEC is set to: /home/speccpu

Filesystem | Type  | Size  | Used | Avail | Use\% | Mounted on
/dev/mapper/rhel-home | xfs   | 392G  | 31G  | 361G  | 8\%   | /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 HMAA8GR7AJR4N-XN 64 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

==============================================================================
<table>
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<tr>
<th>C</th>
<th>600.perlbench_s(peak)</th>
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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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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**Compiler Version Notes (Continued)**

64, Version 2021.1 Build 20201112_000000
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<table>
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<th>C++</th>
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<tr>
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<td>631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</td>
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<thead>
<tr>
<th>Fortran</th>
<th>648.exchange2_s(base, peak)</th>
</tr>
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</table>

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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**Base Compiler Invocation**

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

---

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**Base Portability Flags**

- `600.perlbench_s`: `-DSPEC_LP64`  
- `602.gcc_s`: `-DSPEC_LP64`  
- `605.mcf_s`: `-DSPEC_LP64`  
- `620.omnetpp_s`: `-DSPEC_LP64`  
- `623.xalancbmk_s`: `-DSPEC_LP64`  
- `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`  
- `-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`  
- `-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`

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

Fortran benchmarks:
ifort

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.profdatalpass 2) -xCORE-AVX512 -flto
-Oofast(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

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

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<th>SPECspeed®2017_int_base = 11.9</th>
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<tr>
<th>Peak Optimization Flags (Continued)</th>
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</table>

- 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:

You can also download the XML flags sources by saving the following links:

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