## SPEC CPU®2017 Integer Rate Result

### New H3C Technologies Co., Ltd.

H3C UniServer R5500 G5 (Intel Xeon Gold 6330)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>367</td>
<td>378</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9066

Test Sponsor: New H3C Technologies Co., Ltd.

Tested by: New H3C Technologies Co., Ltd.

Test Date: Dec-2021

Hardware Availability: Apr-2021

Software Availability: Dec-2020

### Hardware

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Gold 6330</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz: 3100</td>
</tr>
<tr>
<td>Nominal: 2000</td>
</tr>
<tr>
<td>Enabled: 56 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable: 1.2 Chips</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 42 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)</td>
</tr>
<tr>
<td>Storage: 2.0 TB SSD NVME</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS: Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86_64</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
</tr>
<tr>
<td>Parallel: No</td>
</tr>
<tr>
<td>Firmware: Version 5.20 released Apr-2021 BIOS</td>
</tr>
<tr>
<td>File System: xfs</td>
</tr>
<tr>
<td>System State: Run level 5 (multi-user with GUI)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>112</td>
<td>260</td>
<td>-</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>112</td>
<td>260</td>
<td>-</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>112</td>
<td>237</td>
<td>-</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>112</td>
<td>602</td>
<td>-</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>112</td>
<td>472</td>
<td>-</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>112</td>
<td>741</td>
<td>-</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>112</td>
<td>273</td>
<td>-</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>112</td>
<td>269</td>
<td>-</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>112</td>
<td>754</td>
<td>-</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>112</td>
<td>208</td>
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</tr>
</tbody>
</table>
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**New H3C Technologies Co., Ltd.**

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**Test Sponsor:** New H3C Technologies Co., Ltd.

**Tested by:** New H3C Technologies Co., Ltd.

**Test Date:** Dec-2021

**Hardware Availability:** Apr-2021

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
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</table>

**SPECrate®2017_int_base =** 367  
**SPECrate®2017_int_peak =** 378

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### 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:

```
LD_LIBRARY_PATH = 
"/home/speccpu/lib/intel64:/home/speccpu/lib/ia32:/home/speccpu/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM

memory using Red Hat Enterprise Linux 8.1

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
```

(Continued on next page)
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SPECrater®2017_int_peak = 378
SPECrater®2017_int_base = 367

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.
Test Date: Dec-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

General Notes (Continued)

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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.

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 SNC to enabled
Set Patrol Scrub to disabled

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca61c6d
running on localhost.localdomain Thu Dec  2 17:55:53 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 6330 CPU @ 2.00GHz
  2 "physical id"s (chips)
  112 "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 : 56
  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): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2

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

H3C UniServer R5500 G5 (Intel Xeon Gold 6330)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2022 Standard Performance Evaluation Corporation

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Platform Notes (Continued)

Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6330 CPU @ 2.00GHz
Stepping: 6
CPU MHz: 1219.470
CPU max MHz: 3100.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 43008K
NUMA node0 CPU(s): 0-13, 56-69
NUMA node1 CPU(s): 14-27, 70-83
NUMA node2 CPU(s): 28-41, 84-97
NUMA node3 CPU(s): 42-55, 98-111
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 rdtsscp
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
xtr pdcm cdci 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
intel_pippin ssbd sse4.1 p6cpu ibpb stibp ibrs_enhanced tpr_shadow vmm vmpreempt
vpid et_ad fsgrbase tsc_adjust bml1 hle avx2 smep bmi2 erms invvpid cmq rdt_a
avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha
ni
avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsaves cmqm lgc cmq_occnum lgc
cmqm lgc local split_lock_detect wbinvd dtherm ida arat pln pts hwp hwp_act_window
hwp epp hwp_pgt_req avx512bvmi umip pku ospke avx512_vbmi2 gfnl vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdrpid md_clear pconfig flush_l1d
arch_capabilities

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 56 57 58 59 60 61 62 63 64 65 66 67 68 69
node 0 size: 125541 MB
node 0 free: 127981 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80
81 82 83
/

(Continued on next page)
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Platform Notes (Continued)

node 1 size: 125927 MB
dnode 1 free: 128459 MB
node 2 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 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 96 97
node 2 size: 125949 MB
node 2 free: 127910 MB
node 3 cpus: 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 96 97
node 3 size: 125937 MB
node 3 free: 128008 MB
node distances:
node 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 527995108 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*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
uname -a:
Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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

<table>
<thead>
<tr>
<th>CVE</th>
<th>Description</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-12207</td>
<td>(iTLB Multihit)</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3620</td>
<td>(L1 Terminal Fault)</td>
<td>Not affected</td>
</tr>
<tr>
<td>Microarchitectural Data Sampling:</td>
<td></td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754</td>
<td>(Meltdown)</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3639</td>
<td>(Speculative Store Bypass)</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2017-5753</td>
<td>(Spectre variant 1)</td>
<td>Mitigation: usercopy/swaps barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>CVE-2017-5715</td>
<td>(Spectre variant 2)</td>
<td>Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling</td>
</tr>
<tr>
<td>CVE-2020-0543</td>
<td>(Special Register Buffer Data Sampling)</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2019-11135</td>
<td>(TSX Asynchronous Abort)</td>
<td>Not affected</td>
</tr>
</tbody>
</table>

**SPEC is set to:** /home/speccpu

**Filesystem**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>xfs</td>
<td>1.8T</td>
<td>509G</td>
<td>1.3T</td>
<td>29%</td>
<td>/home</td>
</tr>
</tbody>
</table>

**From /sys/devices/virtual/dmi/id**

<table>
<thead>
<tr>
<th>Vendor:</th>
<th>New H3C Technologies Co., Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product:</td>
<td>H3C UniServer R5500 G5</td>
</tr>
<tr>
<td>Product Family:</td>
<td>Rack</td>
</tr>
<tr>
<td>Serial:</td>
<td>0235A3VWH21C000001</td>
</tr>
</tbody>
</table>

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 2933
- 16x NO DIMM NO DIMM

**BIOS:**

<table>
<thead>
<tr>
<th>BIOS Vendor:</th>
<th>American Megatrends International, LLC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Version:</td>
<td>5.20</td>
</tr>
<tr>
<td>BIOS Date:</td>
<td>04/09/2021</td>
</tr>
<tr>
<td>BIOS Revision:</td>
<td>5.21</td>
</tr>
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</table>

(End of data from sysinfo program)
### Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>500.perlbench_r(peak) 557.xz_r(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
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<tr>
<th>C</th>
<th>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base)</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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New H3C Technologies Co., Ltd.
H3C UniServer R5500 G5 (Intel Xeon Gold 6330)

SPEC CPU®2017 Integer Rate Result

SPECrate®2017_int_base = 367
SPECrate®2017_int_peak = 378

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Test Date: Dec-2021
Tested by: New H3C Technologies Co., Ltd.
Hardware Availability: Apr-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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.

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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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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# SPEC CPU®2017 Integer Rate Result

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

H3C UniServer R5500 G5 (Intel Xeon Gold 6330)

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**Hardware Availability:** Apr-2021

**Software Availability:** Dec-2020

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## Base Compiler Invocation

**C benchmarks:**

icx

**C++ benchmarks:**

icpx

**Fortran benchmarks:**

ifort

---

## Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64

502.gcc_r: -DSPEC_LP64

505.mcf_r: -DSPEC_LP64

520.omnetpp_r: -DSPEC_LP64

523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX

525.x264_r: -DSPEC_LP64

531.deepsjeng_r: -DSPEC_LP64

541.leela_r: -DSPEC_LP64

548.exchange2_r: -DSPEC_LP64

557.xz_r: -DSPEC_LP64

---

## Base Optimization Flags

**C benchmarks:**

-w -std=c11 -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

**C++ benchmarks:**

-w -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/onapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin

-lqkmalloc

**Fortran benchmarks:**

-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div

-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte

-auto -mbranches-within-32B-boundaries

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New H3C Technologies Co., Ltd.
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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icx
500.perlbench_r: icc
557.xz_r: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:
500.perlbench_r: -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

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## New H3C Technologies Co., Ltd.

### H3C UniServer R5500 G5 (Intel Xeon Gold 6330)

**SPEC CPU®2017 Integer Rate Result**

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</tbody>
</table>

**Hardware Availability:** Apr-2021

**Tested by:** New H3C Technologies Co., Ltd.

### Peak Optimization Flags (Continued)

```
500.perlbench_r (continued):
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 --flto
-Ofast(pass 1) -03 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes
523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: 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:

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-V1.0-CPX-RevD.xml
New H3C Technologies Co., Ltd. | SPECrate®2017_int_base = 367
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