### SPEC CPU®2017 Floating Point Rate Result

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

H3C UniServer R5300 G5 (Intel Xeon Gold 6330)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9066</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>New H3C Technologies Co., Ltd.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>New H3C Technologies Co., Ltd.</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

#### Hardware

<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon Gold 6330</td>
</tr>
<tr>
<td>Max MHz:</td>
<td>3100</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2000</td>
</tr>
<tr>
<td>Enabled:</td>
<td>56 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1,2 Chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>42 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-3200V-R, running at 2933)</td>
</tr>
<tr>
<td>Storage:</td>
<td>960 GB SSD NVME</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Software

<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS:</td>
<td>Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86_64</td>
</tr>
<tr>
<td>Compiler:</td>
<td>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;</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 5.23 released Apr-2021BIOS</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>Jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management:</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

#### SPECrate®2017 fp_base = 356

<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = 372</td>
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</table>

<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>112</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>112</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>112</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>112</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>112</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>112</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>112</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>112</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>112</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>112</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>112</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>112</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>112</td>
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<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_base (356)</td>
<td></td>
</tr>
<tr>
<td>SPECrate®2017_fp_peak (372)</td>
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</tr>
</tbody>
</table>
New H3C Technologies Co., Ltd. |
H3C UniServer R5300 G5 (Intel Xeon Gold 6330) |

SPECrate®2017_fp_base = 356 |
SPECrate®2017_fp_peak = 372

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
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<td>1683</td>
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<td>507.cactuBSSN_r</td>
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<td>288</td>
<td>492</td>
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<td>488</td>
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<td>288</td>
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<tr>
<td>508.namd_r</td>
<td>112</td>
<td>372</td>
<td>286</td>
<td>372</td>
<td>286</td>
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<td>510.parest_r</td>
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<td>1562</td>
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<td>1563</td>
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<td>521.wrf_r</td>
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<td>527.cam4_r</td>
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<td>112</td>
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<td>204</td>
<td>2138</td>
<td>204</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>112</td>
<td>1269</td>
<td>140</td>
<td>1264</td>
<td>141</td>
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<td>141</td>
<td>56</td>
<td>513</td>
<td>174</td>
<td>513</td>
<td>173</td>
</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 356 |
SPECrate®2017_fp_peak = 372

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/je5.0.1-64"
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:

(Continued on next page)
General Notes (Continued)

sync; echo 3 > /proc/sys/vm/drop_caches
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.

Platform Notes

BIOS Settings:
Set SNC to enabled
Set Patrol Scrub to disabled
Set XPT Prefetch to enabled
Set Energy Performance BIAS to Performance

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca61c6d
running on localhost.localdomain Sat Jul 3 23:47:51 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

(Continued on next page)
ISSI Technology, Inc.

ISSI UniServer R5300 G5 (Intel Xeon Gold 6140)

SPEC®2017 fp_base = 356
SPEC®2017 fp_peak = 372

CPU2017 License: 9066
Test Sponsor: ISSI Technology, Inc.
Test Date: Jul-2021
Hardware Availability: Apr-2021
Tested by: ISSI Technology, Inc.
Software Availability: Dec-2020

Platform Notes (Continued)

CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
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 6140 CPU @ 2.00GHz
Stepping: 6
CPU MHz: 2600.000
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 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 abm 3dnowprefetch cpuid_fault ebx cat _l3 invpcid_single intel_pdpin ssbd mba ibrs ibpb stibp ibrs _enhanced tpr_shadow vanni flexpriority ept vpid ept_ad fsysbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rd t-a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaveav xsaes cmqm_llc cmqm_occupa_llc cmqm_mbml tota l cmqm _mbml _local split _lock _detect wbnoinvd dtherm ida arat pln pts hwp hwp _act _window hwp _epp hwp _pkg _req avx512vmbi umip kpu ospke avx512_vmbi2 gfn i vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d

/proc/cpuinfo cache data
 cache size: 43008 KB

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: 125508 MB

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

New H3C Technologies Co., Ltd.
H3C UniServer R5300 G5 (Intel Xeon Gold 6330)

SPECrerate®2017_fp_base = 356
SPECrerate®2017_fp_peak = 372

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

Platform Notes (Continued)

node 0 free: 114631 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
node 1 size: 126210 MB
node 1 free: 117291 MB
node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 84 85 86 87 88 89 90 91 92 93 94 95 96 97
node 2 size: 125943 MB
node 2 free: 116846 MB
node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 98 99 100 101 102 103 104 105 106 107 108 109 110 111
node 3 size: 125800 MB
node 3 free: 117079 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: 527994168 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 release 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

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

SPEC CPU®2017 Floating Point Rate Result

CPU2017 License: 9066
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Tested by: New H3C Technologies Co., Ltd.
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SPECrate®2017_fp_peak = 372
SPECrate®2017_fp_base = 356

Platform Notes (Continued)

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-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitation
CVE-2017-5753 (Spectre variant 1): Not affected
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):
run-level 3 Jul 3 15:31

SPEC is set to: /home/speccpu
From /sys/devices/virtual/dmi/id
Vendor: New H3C Technologies Co., Ltd.
Product: UniServer R5300 G5
Product Family: Rack
Serial: 210235A3WGH213000015

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:
7x Hynix HMA84GR7DJR4N-XN 32 GB 2 rank 3200, configured at 2933
5x Micron 36ASF4G72PZ-3G2E7 32 GB 2 rank 3200, configured at 2933
16x NO DIMM NO DIMM
4x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 5.23
BIOS Date: 04/23/2021
BIOS Revision: 5.21

(Continued on next page)
New H3C Technologies Co., Ltd.
H3C UniServer R5300 G5 (Intel Xeon Gold 6330)

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CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

Test Date: Jul-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

Platform Notes (Continued)
(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
C
| 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_r(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++
| 508.namd_r(base, peak) 510.parest_r(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++, C
| 511.povray_r(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.
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++, C
| 511.povray_r(base) 526.blender_r(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.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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==============================================================================
C++, C
| 511.povray_r(peak)
---
(Continued on next page)
New H3C Technologies Co., Ltd.  
H3C UniServer R5300 G5 (Intel Xeon Gold 6330)  

**Compiler Version Notes (Continued)**

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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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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C++, C, Fortran | 507.cactuBSSN_r(base, peak)  
503.bwaves_r(base, peak)  
549.fotonik3d_r(base, peak)  
554.roms_r(base, peak)

---

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
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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, C, Fortran | 521.wrf_r(peak)  
511.povray_r(base)  
526.blender_r(base, peak)

---

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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---

Fortran  
503.bwaves_r(base, peak)  
549.fotonik3d_r(base, peak)  
554.roms_r(base, peak)

---

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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New H3C Technologies Co., Ltd. | SPEC CPU®2017 Floating Point Rate Result
H3C UniServer R5300 G5 (Intel Xeon Gold 6330)

| SPECrate®2017_fp_base = 356 | SPECrate®2017_fp_peak = 372 |

<table>
<thead>
<tr>
<th>CPU2017 License: 9066</th>
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<tbody>
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Compiler Version Notes (Continued)

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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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<th>Fortran, C</th>
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

(Continued on next page)
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**Base Compiler Invocation (Continued)**

Fortran benchmarks:  
*ifort*

Benchmarks using both Fortran and C:  
*ifort icx*

Benchmarks using both C and C++:  
*icpx icx*

Benchmarks using Fortran, C, and C++:  
*icpx icx ifort*

**Base Portability Flags**

- 503.bwaves_r: -DSPEC_LP64  
- 507.cactuBSSN_r: -DSPEC_LP64  
- 508.namd_r: -DSPEC_LP64  
- 510.parest_r: -DSPEC_LP64  
- 511.povray_r: -DSPEC_LP64  
- 519.ibm_r: -DSPEC_LP64  
- 521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
- 526.blender_r: -DSPEC_LP64 -DSPEC_LP64 -DSPEC_LINUX -funsigned-char  
- 527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG  
- 538.imagick_r: -DSPEC_LP64  
- 544.nab_r: -DSPEC_LP64  
- 549.fotonik3d_r: -DSPEC_LP64  
- 554.roms_r: -DSPEC_LP64

**Base Optimization Flags**

**C benchmarks:**  
- `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
- `-flto -mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4  
- `-mbranches-within-32B-boundaries -ljemalloc  
- `-L/usr/local/jemalloc64-5.0.1/lib`

**C++ benchmarks:**  
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto  
- `-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4  
- `-mbranches-within-32B-boundaries -ljemalloc`

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

C++ benchmarks (continued):
- L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
- w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
- qopt-prefetch -ffinite-math-only
- qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
- nostandard-realloc-lhs -align array32byte -auto
- mbranches-within-32B-boundaries -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
- w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
- no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-multiple-gather-scatter-by-shuffles
- mbranches-within-32B-boundaries -nostandard-realloc-lhs
- align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
- w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- mbranches-within-32B-boundaries -ljemalloc
- L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
- w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
- no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-multiple-gather-scatter-by-shuffles
- mbranches-within-32B-boundaries -nostandard-realloc-lhs
- align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort
Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

521.wrf_r: ifort icc
527.cam4_r: ifort icx

Benchmarks using both C and C++:

511.povray_r: icpc icc
526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes
### Peak Optimization Flags (Continued)

**Fortran benchmarks:**

- `549.fotonik3d_r`: `basepeak = yes`
- `554.roms_r`: Same as `503.bwaves_r`

**Benchmarks using both Fortran and C:**

- `527.cam4_r`: `basepeak = yes`

**Benchmarks using both C and C++:**

- `526.blender_r`: `basepeak = yes`

**Benchmarks using Fortran, C, and C++:**

- `507.cactuBSSN_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:

## SPEC CPU®2017 Floating Point Rate Result

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