Dell Inc. PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>104</td>
<td>465</td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>104</td>
<td>263</td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>104</td>
<td>183</td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>52</td>
<td>244</td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>104</td>
<td>375</td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>104</td>
<td>245</td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>104</td>
<td>311</td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>104</td>
<td>361</td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>104</td>
<td>361</td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>104</td>
<td>902</td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>104</td>
<td>596</td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>104</td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>52</td>
<td>143</td>
<td></td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Gold 5320
Max MHz: 3400
Nominal: 2200
Enabled: 52 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
Cache L2: 1.25 MB I+D on chip per core
Cache L3: 39 MB I+D on chip per core
Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
Storage: 225 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.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: No
Firmware: Version 1.2.1 released May-2021
File System: tmpfs
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.
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>104</td>
<td>1542</td>
<td>676</td>
<td>1544</td>
<td>675</td>
<td>104</td>
<td>1542</td>
<td>676</td>
<td>1544</td>
<td>675</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>104</td>
<td>283</td>
<td>465</td>
<td>282</td>
<td>466</td>
<td>104</td>
<td>283</td>
<td>465</td>
<td>282</td>
<td>466</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>104</td>
<td>375</td>
<td>263</td>
<td>374</td>
<td>264</td>
<td>104</td>
<td>375</td>
<td>263</td>
<td>374</td>
<td>264</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.prest_r</td>
<td>104</td>
<td>1478</td>
<td>184</td>
<td>1484</td>
<td>183</td>
<td>104</td>
<td>1478</td>
<td>184</td>
<td>1484</td>
<td>183</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>104</td>
<td>634</td>
<td>383</td>
<td>647</td>
<td>375</td>
<td>104</td>
<td>634</td>
<td>383</td>
<td>647</td>
<td>375</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>104</td>
<td>448</td>
<td>245</td>
<td>447</td>
<td>245</td>
<td>104</td>
<td>448</td>
<td>245</td>
<td>447</td>
<td>245</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>104</td>
<td>750</td>
<td>311</td>
<td>749</td>
<td>311</td>
<td>104</td>
<td>750</td>
<td>311</td>
<td>749</td>
<td>311</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>104</td>
<td>438</td>
<td>361</td>
<td>439</td>
<td>361</td>
<td>104</td>
<td>438</td>
<td>361</td>
<td>439</td>
<td>361</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>104</td>
<td>504</td>
<td>361</td>
<td>504</td>
<td>361</td>
<td>104</td>
<td>504</td>
<td>361</td>
<td>504</td>
<td>361</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>104</td>
<td>287</td>
<td>902</td>
<td>284</td>
<td>910</td>
<td>104</td>
<td>287</td>
<td>902</td>
<td>284</td>
<td>910</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>104</td>
<td>938</td>
<td>596</td>
<td>910</td>
<td>602</td>
<td>104</td>
<td>938</td>
<td>596</td>
<td>910</td>
<td>602</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>104</td>
<td>1933</td>
<td>210</td>
<td>1933</td>
<td>210</td>
<td>104</td>
<td>1933</td>
<td>210</td>
<td>1933</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>104</td>
<td>1155</td>
<td>143</td>
<td>1154</td>
<td>143</td>
<td>52</td>
<td>478</td>
<td>173</td>
<td>479</td>
<td>172</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 343
SPECrate®2017_fp_peak = 359

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 = 
"/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/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

(Continued on next page)
Dell Inc. PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz) SPECrate®2017_fp_base = 343
SPECrate®2017_fp_peak = 359

CPU2017 License: 55
Test Date: Aug-2021
Test Sponsor: Dell Inc.
Hardware Availability: Jul-2021
Tested by: Dell Inc.
Software Availability: Dec-2020

General Notes (Continued)

Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numaclt i.e.:
numactl --interleave=all runcpu <etc>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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.

Benchmark run from a 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
  Sub NUMA Cluster : 2-Way Clustering
  Virtualization Technology : Disabled

  System Profile : Custom
  CPU Power Management : Maximum Performance
    C1E : Disabled
    C States : Autonomous
  Memory Patrol Scrub : Disabled
  Energy Efficiency Policy : Performance
  CPU Interconnect Bus Link
    Power Management : Disabled
  PCI ASPM L1 Link
    Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2021.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaafc64d
running on r650xs.9yn9cd3.inside.dell.com Sun Aug 29 19:26:34 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 5320 CPU @ 2.20GHz

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

Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

SPECrate®2017_fp_base = 343
SPECrate®2017_fp_peak = 359

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

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

Platform Notes (Continued)

2 "physical id"s (chips)
104 "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 : 26
siblings : 52
physical 0: cores 0 1 2 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
physical 1: cores 0 1 2 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

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): 104
On-line CPU(s) list: 0-103
Thread(s) per core: 2
Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5320 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2608.795
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 39936K
NUMA node0 CPU(s):
0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100
NUMA node1 CPU(s):
2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102
NUMA node2 CPU(s):
1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101
NUMA node3 CPU(s):
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cplflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfperf perf 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 epb cat_l3 invpcid_single
intel_pni ssbd mba ibrs ibpb stibp ibrs_enabled fsxsave tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma

(Continued on next page)
Dell Inc.  

PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.

SPECrate®2017_fp_base = 343  
SPECrate®2017_fp_peak = 359

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

Platform Notes (Continued)

cfluschopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xssaves cqm_llc cqm_occalfc llc cqm_mbb_total cqm_mbb_local split_lock_detect wbnoinvd dtherm ida arat pln pts avx512vbmui umip pku ospke avx512_vbmi2 gfnl vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data  
cache size : 39936 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 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96 100
node 0 size: 125210 MB
node 0 free: 113465 MB
node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78 82 86 90 94 98 102
node 1 size: 126094 MB
node 1 free: 118979 MB
node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93 97 101
node 2 size: 126237 MB
node 2 free: 109872 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79 83 87 91 95 99 103
node 3 size: 126537 MB
node 3 free: 118935 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: 527534992 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release* /etc/*version*
o-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.3 (Ootpa)"

(Continued on next page)
Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

SPECRate®2017_fp_base = 343
SPECRate®2017_fp_peak = 359

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

Platform Notes (Continued)

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 r650xs.9yn9cd3.inside.dell.com 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:

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/swapsgs 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):
CVE-2019-11135 (TSX Asynchronous Abort):
run-level 3 Aug 29 14:00

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 47G 179G 21% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R650xs
Product Family: PowerEdge
Serial: 9YN9CD3

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.

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

## Dell Inc.

### PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>343</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>359</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

Memory:
- 16x 00AD063200AD HMA84GR7DJR4N-XN 32 GB 2 rank 3200, configured at 2933

BIOS:
- BIOS Vendor: Dell Inc.
- BIOS Version: 1.2.1
- BIOS Date: 05/28/2021
- BIOS Revision: 1.2

(End of data from sysinfo program)

### Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,</td>
<td></td>
</tr>
<tr>
<td>Version 2021.1 Build 20201113 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++</th>
<th>508.namd_r(base, peak) 510.parest_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,</td>
<td></td>
</tr>
<tr>
<td>Version 2021.1 Build 20201113 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++, C</th>
<th>511.povray_r(peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,</td>
<td></td>
</tr>
<tr>
<td>Version 2021.1 Build 20201112_000000 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++, C</th>
<th>511.povray_r(base) 526.blender_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,</td>
<td></td>
</tr>
<tr>
<td>Version 2021.1 Build 20201113</td>
<td></td>
</tr>
</tbody>
</table>

(Continued on next page)
Compiled Version Notes (Continued)

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

==============================================================================
C++, C, Fortran | 507.cactuBSSN_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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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.

==============================================================================
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

(Continued on next page)
Dell Inc.
PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

SPECrated®2017_fp_base = 343
SPECrated®2017_fp_peak = 359

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran, C    | 521.wrf_r(base, peak) 527.cam4_r(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.
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.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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.lbm_r: -DSPEC_LP64

(Continued on next page)
Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

SPECRate\textsuperscript{\textregistered}2017\textsubscript{fp\_peak} = 359

SPECRate\textsuperscript{\textregistered}2017\textsubscript{fp\_base} = 343

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Aug-2021
Tested by: Dell Inc.

Hardware Availability: Jul-2021
Software Availability: Dec-2020

Base Portability Flags (Continued)

521.wrf\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big_endian
526.blender\_r: -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:
-\texttt{-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math}
-\texttt{-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4}
-\texttt{-mbranches-within-32B-boundaries -ljemalloc}
-\texttt{-L/usr/local/jemalloc64-5.0.1/lib}

C++ benchmarks:
-\texttt{-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto}
-\texttt{-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4}
-\texttt{-mbranches-within-32B-boundaries -ljemalloc}
-\texttt{-L/usr/local/jemalloc64-5.0.1/lib}

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

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

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

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

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`

Benchmarks using both Fortran and C:
- `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:

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

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes


C++ benchmarks:

508.namd_r: basepeak = yes


Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes


Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511 povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

(Continued on next page)
Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 5320, 2.20 GHz)

SPECrate®2017_fp_base = 343
SPECrate®2017_fp_peak = 359

CPU2017 License:  55
Test Sponsor:     Dell Inc.
Tested by:       Dell Inc.
Test Date:       Aug-2021
Hardware Availability:  Jul-2021
Software Availability:  Dec-2020

Peak Optimization Flags (Continued)

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:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.4.xml

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.8 on 2021-08-29 20:26:33-0400.
Report generated on 2021-11-10 10:11:08 by CPU2017 PDF formatter v6442.
Originally published on 2021-11-09.