## Dell Inc.

**PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
</tbody>
</table>

### Test Results

**SPECrate®2017_fp_base = 281**

**SPECrate®2017_fp_peak = 287**

<table>
<thead>
<tr>
<th>Test</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>32</td>
<td>56</td>
<td>64</td>
</tr>
<tr>
<td>507.caactuBSSN_r</td>
<td>64</td>
<td>359</td>
<td>644</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>64</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>32</td>
<td>155</td>
<td>174</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>64</td>
<td>292</td>
<td>344</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>64</td>
<td>218</td>
<td>334</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>32</td>
<td>264</td>
<td>258</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>64</td>
<td>267</td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>64</td>
<td>264</td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>64</td>
<td></td>
<td>694</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>64</td>
<td></td>
<td>444</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>64</td>
<td>205</td>
<td>453</td>
</tr>
<tr>
<td>554.rome_r</td>
<td>32</td>
<td>126</td>
<td>144</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6326
- **Max MHz:** 3500
- **Nominal:** 2900
- **Enabled:** 32 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:** 24 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
- **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;
- **Firmware:** Version 1.1.3 released Apr-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.
# SPEC CPU® 2017 Floating Point Rate Result

## Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)

**SPECrater®2017_fp_base = 281**

**SPECrater®2017_fp_peak = 287**

<table>
<thead>
<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: Aug-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Dell Inc.</td>
<td>Hardware Availability: Jul-2021</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Dec-2020</td>
</tr>
</tbody>
</table>

## 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>Peak</th>
<th>Copies</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>64</td>
<td>977</td>
<td>657</td>
<td>978</td>
<td>656</td>
<td></td>
<td></td>
<td></td>
<td>32</td>
<td>498</td>
<td>645</td>
<td>498</td>
<td>644</td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>64</td>
<td>225</td>
<td>360</td>
<td>225</td>
<td>359</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>225</td>
<td>360</td>
<td>225</td>
<td>359</td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>64</td>
<td>312</td>
<td>195</td>
<td>312</td>
<td>195</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>312</td>
<td>195</td>
<td>312</td>
<td>195</td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>64</td>
<td>1078</td>
<td>155</td>
<td>1071</td>
<td>156</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>470</td>
<td>178</td>
<td>469</td>
<td>178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>64</td>
<td>511</td>
<td>292</td>
<td>510</td>
<td>293</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>447</td>
<td>334</td>
<td>445</td>
<td>336</td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>64</td>
<td>310</td>
<td>218</td>
<td>310</td>
<td>218</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>310</td>
<td>218</td>
<td>310</td>
<td>218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>64</td>
<td>543</td>
<td>264</td>
<td>543</td>
<td>264</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>300</td>
<td>239</td>
<td>301</td>
<td>238</td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>64</td>
<td>363</td>
<td>268</td>
<td>365</td>
<td>267</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>363</td>
<td>268</td>
<td>365</td>
<td>267</td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>64</td>
<td>424</td>
<td>264</td>
<td>422</td>
<td>265</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>424</td>
<td>264</td>
<td>422</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>64</td>
<td>229</td>
<td>694</td>
<td>228</td>
<td>698</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>229</td>
<td>694</td>
<td>228</td>
<td>698</td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>64</td>
<td>241</td>
<td>447</td>
<td>243</td>
<td>444</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>238</td>
<td>453</td>
<td>237</td>
<td>454</td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>64</td>
<td>1219</td>
<td>205</td>
<td>1218</td>
<td>205</td>
<td></td>
<td></td>
<td></td>
<td>64</td>
<td>1219</td>
<td>205</td>
<td>1218</td>
<td>205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>64</td>
<td>808</td>
<td>126</td>
<td>810</td>
<td>126</td>
<td></td>
<td></td>
<td></td>
<td>32</td>
<td>351</td>
<td>145</td>
<td>353</td>
<td>144</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 = 
  "/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)
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 numacl 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 982a61ec0915b55891ef0e16acafc64d
running on r650xs.1b86kd3.inside.dell.com Tue Aug 24 14:38:57 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 6326 CPU @ 2.90GHz

(Continued on next page)
Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)

SPECrater®2017_fp_base = 281
SPECrater®2017_fp_peak = 287

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

Platform Notes (Continued)

2 "physical id"s (chips)
64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6326 CPU @ 2.90GHz
Stepping: 6
CPU MHz: 1961.370
BogoMIPS: 5800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 24576K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60
NUMA node1 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62
NUMA node2 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63
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 art arch_perfmon pebs bts rep_good nopl 0f8p good nolp xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr pdcid 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_ppn ssbd mba ibrs ibpb stibp ibrs_handed fsgsbase tsx_adjust bmi1 hle avx2
smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clfushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsaves xgetbv1
xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbinvd
dtherm ida arat pln pts avx512vmbi umip pkp ospke avx512_vmbi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lid

(Continued on next page)
Dell Inc.  
PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)  

**SPEC CPU®2017 Floating Point Rate Result**  
Copyright 2017-2021 Standard Performance Evaluation Corporation  

<table>
<thead>
<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: Aug-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Dell Inc.</td>
<td>Hardware Availability: Jul-2021</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Dec-2020</td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 281**  
**SPECrate®2017_fp_peak = 287**

---

**Platform Notes (Continued)**

```
arch_capabilities

/proc/cpuinfo cache data  
cache size : 24576 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  
node 0 size: 125918 MB  
node 0 free: 108261 MB  
node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62  
node 1 size: 126906 MB  
node 1 free: 122469 MB  
node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61  
node 2 size: 126958 MB  
node 2 free: 122626 MB  
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63  
node 3 size: 126749 MB  
node 3 free: 122490 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: 527543480 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

/sbin/tuned-adm active  
Current active profile: throughput-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)
```

(Continued on next page)
Dell Inc.  
PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)  

**SPEC CPU®2017 Floating Point Rate Result**  
Copyright 2017-2021 Standard Performance Evaluation Corporation  

**SPECrates**  
SPECrates®2017_fp_base = 281  
SPECrates®2017_fp_peak = 287  

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
<th>Test Date:</th>
<th>Aug-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
    Linux r650xs.1b86kd3.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): 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/swapgs 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): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Aug 24 09:49

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1
```

From /sys/devices/virtual/dmi/id
```
    Vendor: Dell Inc.
    Product: PowerEdge R650 xs
    Product Family: PowerEdge
    Serial: 1B86KD3
```

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 00AD063200AD HMA84GR7DJR4N-XN 32 GB 2 rank 3200

BIOS:
    BIOS Vendor: Dell Inc.
    BIOS Version: 1.1.3
    BIOS Date: 04/27/2021
    BIOS Revision: 1.1
```

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

Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)

SPECrates®2017_fp_base = 281
SPECrates®2017_fp_peak = 287

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)

(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(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          | 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          | 511.povray_r(peak)
(Continued on next page)
Dell Inc.
PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)

SPECraten®2017_fp_base = 281
SPECraten®2017_fp_peak = 287

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

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

Fortran, C | 521.wrf_r(peak)

(Continued on next page)
Dell Inc. PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)

| SPECrate®2017_fp_base = 281 |
| SPECrate®2017_fp_peak = 287 |

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

Compiler Version Notes (Continued)

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.

Fortran, C  | 521.wrf_r(base) 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) 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.

Fortran, C  | 521.wrf_r(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) 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.

Fortran, C  | 521.wrf_r(base) 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) 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.

Base Compiler Invocation

C benchmarks:
icx

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

Dell Inc.
PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)

SPECrater®2017_fp_base = 281
SPECrater®2017_fp_peak = 287

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

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

Base Compiler Invocation (Continued)

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
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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-fflto -mfpmath=sse -funroll-loops -qopt-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 -qopt-mem-layout-trans=4

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

Dell Inc.

PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)

SPECrate®2017_fp_base = 281
SPECrate®2017_fp_peak = 287

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

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-mbranches-within-32B-boundaries -ljemalloc
-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

(Continued on next page)
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 icc

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
544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
   -Ofast -qopt-mem-layout-trans=4
   -fimf-accuracy-bits=14:sqrt
   -mbranches-within-32B-boundaries -ljemalloc
   -L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

508.namd_r: basepeak = yes
510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
   -flto -mfpmath=sse -funroll-loops
   -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries

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

510.parest_r (continued):
-1jemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:

503.bwaves_r: -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
-1jemalloc -L/usr/local/jemalloc64-5.0.1/lib

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

521.wrf_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
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -1jemalloc

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 -1jemalloc

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
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dell Inc.</strong></td>
<td></td>
</tr>
<tr>
<td>PowerEdge R650xs (Intel Xeon Gold 6326, 2.90 GHz)</td>
<td></td>
</tr>
<tr>
<td><strong>SPECrate®2017_fp_base</strong> = 281</td>
<td></td>
</tr>
<tr>
<td><strong>SPECrate®2017_fp_peak</strong> = 287</td>
<td></td>
</tr>
<tr>
<td>CPU2017 License:</td>
<td>55</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Aug-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

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 2021-08-24 15:38:56-0400.
Originally published on 2021-09-17.