Dell Inc.

PowerEdge R660 (Intel Xeon Gold 6454S)

### CPU2017 License
- 6573

### Test Sponsor
- Dell Inc.

### Tested by
- Dell Inc.

### Test Date
- Dec-2022

### Hardware
- **CPU Name:** Intel Xeon Gold 6454S
- **Max MHz:** 3400
- **Nominal:** 2200
- **Enabled:** 64 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 2 MB I+D on chip per core
- **L3:** 60 MB I+D on chip per chip
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
- **Storage:** 125 GB on tmpfs
- **Other:** None
- **OS:** SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.22-default
- **Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
- **Parallel:** No
- **Firmware:** Version 0.3.2 released Nov-2022
- **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.

### Software

### SPEC CPU 2017 Floating Point Rate Result

<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>128</td>
<td>861</td>
<td>3360</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>64</td>
<td>675</td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>128</td>
<td>456</td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>64</td>
<td>625</td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>128</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td>519.ibm_r</td>
<td>128</td>
<td>532</td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>128</td>
<td>626</td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>128</td>
<td>687</td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>128</td>
<td>1710</td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>128</td>
<td>1050</td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>128</td>
<td>501</td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>64</td>
<td>1280</td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>64</td>
<td>270</td>
<td></td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 662**

**SPECrate®2017_fp_peak = 695**
### Dell Inc. PowerEdge R660 (Intel Xeon Gold 6454S)

**SPECrate®2017_fp_base = 662**

**SPECrate®2017_fp_peak = 695**

<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>128</td>
<td>382</td>
<td>382</td>
<td>3360</td>
<td>3360</td>
<td>128</td>
<td>382</td>
<td>3360</td>
<td>3360</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>128</td>
<td>212</td>
<td>212</td>
<td>765</td>
<td>765</td>
<td>64</td>
<td>94.2</td>
<td>861</td>
<td>861</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>128</td>
<td>294</td>
<td>294</td>
<td>414</td>
<td>414</td>
<td>128</td>
<td>294</td>
<td>414</td>
<td>414</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>128</td>
<td>990</td>
<td>992</td>
<td>338</td>
<td>338</td>
<td>64</td>
<td>392</td>
<td>427</td>
<td>427</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>128</td>
<td>443</td>
<td>440</td>
<td>675</td>
<td>675</td>
<td>128</td>
<td>443</td>
<td>440</td>
<td>679</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>128</td>
<td>391</td>
<td>391</td>
<td>345</td>
<td>345</td>
<td>128</td>
<td>391</td>
<td>345</td>
<td>345</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>128</td>
<td>539</td>
<td>539</td>
<td>532</td>
<td>532</td>
<td>128</td>
<td>539</td>
<td>532</td>
<td>532</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>128</td>
<td>311</td>
<td>311</td>
<td>626</td>
<td>626</td>
<td>128</td>
<td>311</td>
<td>626</td>
<td>626</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>128</td>
<td>326</td>
<td>326</td>
<td>687</td>
<td>687</td>
<td>128</td>
<td>326</td>
<td>687</td>
<td>696</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>128</td>
<td>186</td>
<td>186</td>
<td>1710</td>
<td>1710</td>
<td>128</td>
<td>186</td>
<td>1710</td>
<td>1710</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>128</td>
<td>204</td>
<td>204</td>
<td>1050</td>
<td>1050</td>
<td>128</td>
<td>169</td>
<td>1280</td>
<td>1280</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>128</td>
<td>986</td>
<td>995</td>
<td>506</td>
<td>501</td>
<td>128</td>
<td>986</td>
<td>506</td>
<td>995</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>128</td>
<td>755</td>
<td>755</td>
<td>270</td>
<td>270</td>
<td>64</td>
<td>344</td>
<td>296</td>
<td>296</td>
<td></td>
<td></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:

```bash
LD_LIBRARY_PATH = 
"/mnt/ramdisk/cpu2017-1.1.8-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2022.1/je5.0.1-64"
MALLOCONF = "retain:true"
```

**General Notes**

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4

Transparent Huge Pages enabled by default.

(Continued on next page)
Dell Inc. PowerEdge R660 (Intel Xeon Gold 6454S)

CPU2017 License: 6573  Test Date:  Dec-2022
Test Sponsor: Dell Inc. Hardware Availability:  Feb-2023
Tested by: Dell Inc.  Software Availability:  Jun-2022

<table>
<thead>
<tr>
<th>SPEC CPU®2017 Floating Point Rate Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_base = 662</td>
</tr>
<tr>
<td>SPECrate®2017_fp_peak = 695</td>
</tr>
</tbody>
</table>

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 numactl 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 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
- ADDDC Setting: Disabled
- DIMM Self Healing on
- Uncorrectable Memory Error: Disabled
- Virtualization Technology: Disabled
- Sub NUMA Cluster: 4-way Clustering
- DCU Streamer Prefetcher: Disabled
- LLC Prefetch: Disabled
- Dead Line LLC Alloc: Disabled
- Optimizer Mode: Enabled

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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2022.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on localhost Mon Dec 5 00:34:08 2022

SUT (System Under Test) info as seen by some common utilities.

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

**Dell Inc.**

**PowerEdge R660 (Intel Xeon Gold 6454S)**

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>662</td>
<td>695</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 6573  
**Test Sponsor:** Dell Inc.  
**Test Date:** Dec-2022  
**Tested by:** Dell Inc.  
**Hardware Availability:** Feb-2023  
**Software Availability:** Jun-2022

---

**Platform Notes (Continued)**

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 6454S
- `cpu cores`: 32
- `siblings`: 64
- `physical 0`: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
- `physical 1`: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

From `lscpu` from `util-linux 2.37.2`:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Address sizes: 46 bits physical, 57 bits virtual
- Byte Order: Little Endian
- CPU(s): 128
- On-line CPU(s) list: 0-127
- Vendor ID: GenuineIntel
- Model name: Intel(R) Xeon(R) Gold 6454S
- CPU family: 6
- Model: 143
- Thread(s) per core: 2
- Core(s) per socket: 32
- Socket(s): 2
- Stepping: 8
- BogoMIPS: 4400.00
- 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 xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 ds_cpl 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 ebp cat_l3 cat_l2 cdp_l3 invpcid_single cdp_l2 ssb md mce ibrs ibpd stibp ibrs_enhanced fsqbase tsc_adjust bmi1 hle avx2 smep bmi2 ibrms invpcid vtm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsaves cqm _llc cqm_occup llc cqm_mbb_total cqm_mbb_local split_lock_detect avx_vnni avx512 lf16 wbinvd dtherm ida arat pni pts avx512v bmi umip pkg ospke waitpkg avx512v bmi2 gfn i vaes vpclmulqdq avx512_vnni avx512_s bitalg tme avx512_vpopcntdq la57 rdpids lock_detect cldemote movdiri movdir64b encode md_clear serialize tsxldtrk pconfig arch_ibr avx512_fp16 amx_tile flush_lld arch_capabilities

(Continued on next page)
Dell Inc.

PowerEdge R660 (Intel Xeon Gold 6454S)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

SPECRate®2017_fp_base = 662
SPECRate®2017_fp_peak = 695

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Dec-2022
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Platform Notes (Continued)

L1d cache: 3 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 128 MiB (64 instances)
L3 cache: 120 MiB (2 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-7,64-71
NUMA node1 CPU(s): 8-15,72-79
NUMA node2 CPU(s): 16-23,80-87
NUMA node3 CPU(s): 24-31,88-95
NUMA node4 CPU(s): 32-39,96-103
NUMA node5 CPU(s): 40-47,104-111
NUMA node6 CPU(s): 48-55,112-119
NUMA node7 CPU(s): 56-63,120-127
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d 48K 3M 12 Data 1 64 1 64
L1i 32K 2M 8 Instruction 1 64 1 64
L2 2M 128M 16 Unified 2 2048 1 64
L3 60M 120M 15 Unified 3 65536 1 64

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 4 5 6 7 64 65 66 67 68 69 70 71
node 0 size: 128472 MB
node 0 free: 116255 MB
node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
node 1 size: 129019 MB
node 1 free: 122496 MB
node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
node 2 size: 129019 MB

(Continued on next page)
Dell Inc.
PowerEdge R660 (Intel Xeon Gold 6454S)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

SPECrade®2017_fp_base = 662
SPECrade®2017_fp_peak = 695

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Test Date: Dec-2022
Tested by: Dell Inc.
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Platform Notes (Continued)

node 2 free: 122485 MB
node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
node 3 size: 129019 MB
node 3 free: 115124 MB
node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103
node 4 size: 129019 MB
node 4 free: 122502 MB
node 5 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111
node 5 size: 129019 MB
node 5 free: 122511 MB
node 6 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119
node 6 size: 128985 MB
node 6 free: 122479 MB
node 7 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127
node 7 size: 128972 MB
node 7 free: 122438 MB
node distances:

From /proc/meminfo
MemTotal:       1056286516 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*

   os-release:
       NAME="SLES"
       VERSION="15-SP4"
       VERSION_ID="15.4"
       PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
       ID="sles"
       ID_LIKE="suse"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:15:sp4"

   uname -a:
       Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux

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

Dell Inc.
PowerEdge R660 (Intel Xeon Gold 6454S)

| SPECrate®2017_fp_base = 662 |
| SPECrate®2017_fp_peak = 695 |

| CPU2017 License: 6573 | Test Date: Dec-2022 |
| Test Sponsor: Dell Inc. | Hardware Availability: Feb-2023 |
| Tested by: Dell Inc. | Software Availability: Jun-2022 |

**Platform Notes (Continued)**

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 Dec 4 19:56

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2022.1

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>tmpfs</td>
<td>tmpfs</td>
<td>125G</td>
<td>54G</td>
<td>72G</td>
<td>44%</td>
<td>/mnt/ramdisk</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

- Vendor: Dell Inc.
- Product: PowerEdge R660
- Product Family: PowerEdge
- Serial: SLR6604

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 002C00B3002C MTC40F2046S1RC48BA1 64 GB 2 rank 4800

BIOS:

- BIOS Vendor: Dell Inc.
- BIOS Version: 0.3.2
- BIOS Date: 11/30/2022
- BIOS Revision: 0.3

(End of data from sysinfo program)
## SPEC CPU®2017 Floating Point Rate Result

**Dell Inc.**

**PowerEdge R660 (Intel Xeon Gold 6454S)**

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Sponsor</th>
<th>Tested by</th>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>6573</td>
<td>Dell Inc.</td>
<td>Dell Inc.</td>
<td>662</td>
<td>695</td>
</tr>
</tbody>
</table>

**Compiler Version Notes**

```plaintext
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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C++, C          | 511.povray_r(base, peak) 526.blender_r(base, peak)
-----------------|------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
-----------------|------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
```

(Continued on next page)
Dell Inc.

PowerEdge R660 (Intel Xeon Gold 6454S)

SPECratenum

SPECratenum

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Dec-2022
Hardware Availability: Feb-2023
Software Availability: Jun-2022

Compiler Version Notes (Continued)

Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

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 R660 (Intel Xeon Gold 6454S)  

**SPEC CPU®2017 Floating Point Rate Result**

**Test Date:** Dec-2022  
**Software Availability:** Jun-2022  
**Hardware Availability:** Feb-2023  
**CPU2017 License:** 6573  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

**SPECrate®2017_fp_base = 662**  
**SPECrate®2017_fp_peak = 695**

---

### 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:**
- `-w` `-std=c11` `-m64` `-Wl,-z,muldefs` `-xCORE-AVX512` `-Ofast` `-ffast-math`  
- `-flto` `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4` `-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` `-ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

**Fortran benchmarks:**
- `-w` `-m64` `-Wl,-z,muldefs` `-xCORE-AVX512` `-Ofast` `-ffast-math` `-flto`  
- `-mfpmath=sse` `-funroll-loops` `-qopt-mem-layout-trans=4` `-nostandard-realloc-lhs` `-align array32byte` `-auto` `-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` `-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` `-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` `-nostandard-realloc-lhs` `-align array32byte` `-auto` `-ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`
Dell Inc. PowerEdge R660 (Intel Xeon Gold 6454S)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>662</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>695</td>
</tr>
</tbody>
</table>

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

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 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -qopt-zmm-usage=high -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 -ljemalloc

(Continued on next page)
Dell Inc.

PowerEdge R660 (Intel Xeon Gold 6454S)

<table>
<thead>
<tr>
<th>SPEC CPU®2017 Floating Point Rate Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell Inc.</td>
</tr>
<tr>
<td>SPECrate®2017_fp_base = 662</td>
</tr>
<tr>
<td>SPECrate®2017_fp_peak = 695</td>
</tr>
</tbody>
</table>

CPU2017 License: 6573  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test Date: Dec-2022  
Hardware Availability: Feb-2023  
Software Availability: Jun-2022

Peak Optimization Flags (Continued)

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

Fortran benchmarks:

503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes

554.roms_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-ftlo -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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: basepeak = yes
526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-ftlo -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.xml
Dell Inc.  
PowerEdge R660 (Intel Xeon Gold 6454S)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_peak</th>
<th>695</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_base</td>
<td>662</td>
</tr>
</tbody>
</table>

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Dec-2022
Hardware Availability: Feb-2023
Software Availability: Jun-2022