### Dell Inc.

**PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)**

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base = 271</th>
<th>SPECrate®2017_int_peak = 281</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>502.gcc_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>505.mcf_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>520.omnetpp_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>523.xalancbmk_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>525.x264_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>531.deepsjeng_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>541.leela_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>548.exchange2_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
<tr>
<td>557.xz_r 80</td>
<td><img src="image" alt="Graph of SPECrate®2017_int_base (271)" /></td>
<td><img src="image" alt="Graph of SPECrate®2017_int_peak (281)" /></td>
</tr>
</tbody>
</table>

#### Hardware
- **CPU Name:** Intel Xeon Silver 4316
- **Max MHz:** 3400
- **Nominal:** 2300
- **Enabled:** 40 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 30 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2666)
- **Storage:** 225 GB on tmpfs
- **Other:** None

#### Software
- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.15.1.el8_3.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 5 (graphical multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
Dell Inc. PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)  

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>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>80</td>
<td>685</td>
<td>186</td>
<td>686</td>
<td>186</td>
<td>80</td>
<td>587</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>80</td>
<td>510</td>
<td>222</td>
<td>511</td>
<td>222</td>
<td>80</td>
<td>438</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>80</td>
<td>287</td>
<td>450</td>
<td>288</td>
<td>448</td>
<td>80</td>
<td>287</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>80</td>
<td>604</td>
<td>174</td>
<td>603</td>
<td>174</td>
<td>80</td>
<td>604</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>80</td>
<td>251</td>
<td>337</td>
<td>251</td>
<td>336</td>
<td>80</td>
<td>251</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>80</td>
<td>254</td>
<td>551</td>
<td>256</td>
<td>548</td>
<td>80</td>
<td>242</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>80</td>
<td>441</td>
<td>208</td>
<td>443</td>
<td>207</td>
<td>80</td>
<td>441</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>80</td>
<td>645</td>
<td>206</td>
<td>644</td>
<td>206</td>
<td>80</td>
<td>645</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>80</td>
<td>377</td>
<td>555</td>
<td>380</td>
<td>552</td>
<td>80</td>
<td>377</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>80</td>
<td>563</td>
<td>153</td>
<td>562</td>
<td>154</td>
<td>80</td>
<td>563</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECrate®2017_int_base = 271  

SPECrate®2017_int_peak = 281

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/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/lib/ia32:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
```
sync; echo 3> /proc/sys/vm/drop_caches
```

(Continued on next page)
Dell Inc.

PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)

General Notes (Continued)

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 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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Fri May 14 16:47:54 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) Silver 4316 CPU @ 2.30GHz
  2 "physical id"s (chips)
  80 "processors"
core, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 20

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

Copyright 2017-2021 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)

SPECrate®2017_int_base = 271
SPECrate®2017_int_peak = 281

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

Platform Notes (Continued)

siblings : 40
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 80
  On-line CPU(s) list: 0-79
  Thread(s) per core: 2
  Core(s) per socket: 20
  Socket(s): 2
  NUMA node(s): 4
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 106
  Model name: Intel(R) Xeon(R) Silver 4316 CPU @ 2.30GHz
  Stepping: 6
  CPU MHz: 2797.503
  BogoMIPS: 4600.00
  Virtualization: VT-x
  L1d cache: 48K
  L1i cache: 32K
  L2 cache: 1280K
  L3 cache: 30720K
  NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76
  NUMA node1 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78
  NUMA node2 CPU(s): 5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77
  NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79
  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 pdemsg 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 rdmsk rdtscp cpuid_fault epb cat_l3 invpcid_single
        intel_pni ssbd mba ibrs ibpb stibp ibrs_enhanced fsogbase tsc_adjust bmi1 hle
        avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
        clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsaves xsavec
        xstate avx2sm mcm avx512_l4c avx512_occsp l4c avx512_mbtotal avx512_mblocal
        split_lock_detect wbinvd
dtimerr ia arat pni pts avx512vmmi umip pku ospke avx512_vbmi2 gfni vaes vpcm1qdq
        avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
        arch_capabilities

/proc/cpuinfo cache data
  cache size : 30720 KB

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

Dell Inc.
PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)

SPECrate®2017_int_base = 271
SPECrate®2017_int_peak = 281

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

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Platform Notes (Continued)

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
node 0 size: 125982 MB
node 0 free: 113048 MB
node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78
node 1 size: 127017 MB
node 1 free: 127966 MB
node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77
node 2 size: 126379 MB
node 2 free: 128570 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79
node 3 size: 126602 MB
node 3 free: 128387 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: 527804512 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sbin/tuned-adm active
Current active profile: throughput-performance

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

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 4.18.0-240.15.1.el8_3.x86_64 #1 SMP Wed Feb 3 03:12:15 EST 2021 x86_64 x86_64 x86_64 GNU/Linux

(Continued on next page)
Dell Inc. PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)  

SPEC CPU®2017 Integer Rate Result

SPECrate®2017_int_base = 271
SPECrate®2017_int_peak = 281

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Test Date: May-2021

Tested by: Dell Inc.  
Hardware Availability: May-2021

Software Availability: Feb-2021

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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 May 14 16:46

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5-ic2021.1

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R650
Product Family: PowerEdge
Serial: 1234567
Memory:
7x 00AD00B300AD HMAA4GR7A9R8N-XN 32 GB 2 rank 3200, configured at 2666
9x 00AD063200AD HMAA4GR7A9R8N-XN 32 GB 2 rank 3200, configured at 2666
16x Not Specified Not Specified

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.2.1
BIOS Date: 05/06/2021
BIOS Revision: 1.2

(End of data from sysinfo program)
# Dell Inc.

PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 271</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak = 281</td>
</tr>
</tbody>
</table>

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

## Compiler Version Notes

```
C       | 500.perlbench_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.
-------------------------------------------------------------------

C       | 502.gcc_r(peak)
-------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-------------------------------------------------------------------

C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
  | 525.x264_r(base, peak) 557.xz_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       | 500.perlbench_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.
-------------------------------------------------------------------

C       | 502.gcc_r(peak)
-------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-------------------------------------------------------------------

C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
  | 525.x264_r(base, peak) 557.xz_r(base, peak)
-------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
```

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

**Dell Inc.**

PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 271</th>
<th>SPECrate®2017_int_peak = 281</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: <strong>55</strong></td>
<td>Test Date: <strong>May-2021</strong></td>
</tr>
<tr>
<td>Test Sponsor: <strong>Dell Inc.</strong></td>
<td>Hardware Availability: <strong>May-2021</strong></td>
</tr>
<tr>
<td>Tested by: <strong>Dell Inc.</strong></td>
<td>Software Availability: <strong>Feb-2021</strong></td>
</tr>
</tbody>
</table>

---

## Compiler Version Notes (Continued)

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

---

<table>
<thead>
<tr>
<th>C</th>
<th>500.perlbench_r(peak)</th>
</tr>
</thead>
</table>

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.

---

<table>
<thead>
<tr>
<th>C</th>
<th>502.gcc_r(peak)</th>
</tr>
</thead>
</table>

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113

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

---

<table>
<thead>
<tr>
<th>C</th>
<th>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>525.x264_r(base, peak) 557.xz_r(base, peak)</td>
</tr>
</tbody>
</table>

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.

---

<table>
<thead>
<tr>
<th>C++</th>
<th>520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>531.deepsjeng_r(base, peak) 541.leela_r(base, peak)</td>
</tr>
</tbody>
</table>

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.

---

<table>
<thead>
<tr>
<th>Fortran</th>
<th>548.exchange2_r(base, peak)</th>
</tr>
</thead>
</table>

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.
### Base Compiler Invocation

C benchmarks:  
```
icx
```

C++ benchmarks:  
```
icpx
```

Fortran benchmarks:  
```
ifort
```

### Base Portability Flags

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

### Base Optimization Flags

C benchmarks:
```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
```

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

### Dell Inc.

**PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)**

### SPECrate®2017 int_base = 271
### SPECrate®2017 int_peak = 281

<table>
<thead>
<tr>
<th>Spec</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<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>May-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>May-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2021</td>
</tr>
</tbody>
</table>

### Base Optimization Flags (Continued)

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

### Peak Compiler Invocation

- **C benchmarks (except as noted below):**
  - `icx`
  - 500.perlbench_r: `icc`

- **C++ benchmarks:**
  - `icpx`

- **Fortran benchmarks:**
  - `ifort`

### Peak Portability Flags

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

### Peak Optimization Flags

- **C benchmarks:**
  - 500.perlbench_r: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)`
  - `-xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `-qopt-mem-layout-trans=4 -fno-strict-overflow`
  - `-mbranches-within-32B-boundaries`
  - `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
  - `-lqkmalloc`

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

Dell Inc.  

PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)

SPECrate®2017_int_base = 271  
SPECrate®2017_int_peak = 281

CPU2017 License: 55  
Test Date: May-2021

Test Sponsor: Dell Inc.  
Hardware Availability: May-2021

Tested by: Dell Inc.  
Software Availability: Feb-2021

Peak Optimization Flags (Continued)

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-submit(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

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

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

The flags files that were used to format this result can be browsed at

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
Dell Inc.

PowerEdge R650 (Intel Xeon Silver 4316, 2.30 GHz)

SPECrate®2017_int_base = 271
SPECrate®2017_int_peak = 281

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

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

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 v1.1.5 on 2021-05-14 17:47:53-0400.
Report generated on 2021-07-08 13:29:03 by CPU2017 PDF formatter v6442.
Originally published on 2021-07-06.