## SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge R650xs (Intel Xeon Platinum 8352Y, 2.20 GHz)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Aug-2021</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
<tr>
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<td>Dec-2020</td>
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### CPU2017 License: 55

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<th>Tested by:</th>
<th>Dell Inc.</th>
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| Test Sponsor: | Dell Inc. |

### Software

**OS:** Red Hat Enterprise Linux 8.3 (Ootpa)

**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:** Yes

**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.

### Hardware

**CPU Name:** Intel Xeon Platinum 8352Y

**Max MHz:** 3400

**Nominal:** 2200

**Enabled:** 64 cores, 2 chips

**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:** 48 MB I+D on chip per chip

**Other:** None

**Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)

**Storage:** 125 GB on tmpfs

**Other:** None

<table>
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<tr>
<th>Threads</th>
<th>600.perlbench_s 64</th>
<th>602.gcc_s 64</th>
<th>605.mcf_s 64</th>
<th>620.omnetpp_s 64</th>
<th>623.xalancbmk_s 64</th>
<th>625.x264_s 64</th>
<th>631.deepsjeng_s 64</th>
<th>641.leela_s 64</th>
<th>648.exchange2_s 64</th>
<th>657.xz_s 64</th>
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<tr>
<td></td>
<td>24.0</td>
<td>1.00</td>
<td>3.00</td>
<td>5.00</td>
<td>7.00</td>
<td>9.00</td>
<td>11.0</td>
<td>13.0</td>
<td>15.0</td>
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<td>SPECspeed®2017_int_peak (11.8)</td>
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<td>11.8</td>
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</table>

**640.perlbench_s**: 8.00

**602.gcc_s**: 10.5

**605.mcf_s**: 11.0

**620.omnetpp_s**: 11.5

**623.xalancbmk_s**: 13.2

**625.x264_s**: 16.7

**631.deepsjeng_s**: 5.76

**641.leela_s**: 4.71

**648.exchange2_s**: 18.8

**657.xz_s**: 23.5

**Notes:**

- SPEC benchmark suite results include both SPECspeed®2017_int_base and SPECspeed®2017_int_peak values.
- The results are horizontally aligned for ease of comparison.
- All tests are run with a thread count of 64 unless specified otherwise.
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**SPECspeed®2017_int_base = 11.6**

**SPECspeed®2017_int_peak = 11.8**

CPU2017 License: 55
Test Date: Aug-2021
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### Results Table

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<tr>
<td>648.exchange2_s</td>
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<td>18.8</td>
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<tr>
<td>657.xz_s</td>
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**SPECspeed®2017_int_base = 11.6**

**SPECspeed®2017_int_peak = 11.8**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

---

### 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:
- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/jemalloc5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

---

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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
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.

(Continued on next page)
### General Notes (Continued)

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:**

- Logical Processor : Disabled
- 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 982a61ec0915b55891ef0e16aca664d

running on r650xs.0yn9cd3.inside.dell.com Mon Aug 2 16:37:01 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) Platinum 8352Y CPU @ 2.20GHz
- 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 : 32
- siblings : 32
- physical 0: cores 0 1 2 3 4 5 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 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

(Continued on next page)
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CPU2017 License: 55
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Tested by: Dell Inc.

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

Platform Notes (Continued)

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: 1
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8352Y CPU @ 2.20GHz
Stepping: 6
CPU MHz: 1722.476
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s):
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58
Socket(s): 2
NUMA node1 CPU(s):
1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59
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 pdelgb 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
  xtopr 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 fsalgsbase tsc_adjust bmi1 hle avx2
  smep bmi2 erms invpcid cqm qm rdler a2v512f avx512dq rdseed adx smap avx512ifma
  clflushopt clwb intel_pt avx512cd sha_{ni avx512bw avx512vl rsaveopt xsave xgetbv1
  xsaveas cmq llc cmq_occ沪 llc cmq_mbm_total cmq_mbm_local split_lock_detect wbinvd
  dtherm idar pln pts avx512vbmi umpi pku ospke avx512_vBMI gfini vae vpcmldq
  avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld
  arch_capabilities

/proc/cpuinfo cache data
  cache size : 49152 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.

(Continued on next page)
### Dell Inc.

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#### Platform Notes (Continued)

available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62
node 0 size: 243059 MB
node 0 free: 256571 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63
node 1 size: 245662 MB
node 1 free: 248364 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 527544320 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)
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): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store

(Continued on next page)
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Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1):
Bypass disabled via prctl and seccomp
Mitigation: usercopy/swaps 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 2 16:35
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1

Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 125G 4.4G 121G 4% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R650 xs
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.
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

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(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.
(Continued on next page)
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### Compiler Version Notes (Continued)

```
C          | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(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          | 600.perlbench_s(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          | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(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++        | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(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.
```

```
Fortran    | 648.exchange2_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
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### Base Compiler Invocation

- **C benchmarks:** icx
- **C++ benchmarks:** icpx
- **Fortran benchmarks:** ifort

### Base Portability Flags

- 600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
- 602.gcc_s: -DSPEC_LP64
- 605.mcf_s: -DSPEC_LP64
- 620.omnetpp_s: -DSPEC_LP64
- 623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
- 625.x264_s: -DSPEC_LP64
- 631.deepsjeng_s: -DSPEC_LP64
- 641.leela_s: -DSPEC_LP64
- 648.exchange2_s: -DSPEC_LP64
- 657.xz_s: -DSPEC_LP64

### Base Optimization Flags

- **C benchmarks:**
  - -DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

- **C++ benchmarks:**

- **Fortran benchmarks:**
  - -m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte -auto -mbranches-within-32B-boundaries
### Peak Compiler Invocation

C benchmarks (except as noted below):
- icx
- 600.perlbench_s: icc

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

C benchmarks:
- 600.perlbench_s: -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/usr/local/jemalloc64-5.0.1/lib -ljemalloc  
- 602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2)  
  -xCORE-AVX512 -flto -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
  -mbranches-within-32B-boundaries
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc  
- 605.mcf_s: basepeak = yes
- 625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs  
  -xCORE-AVX512 -flto -O3 -ffast-math
  -qopt-mem-layout-trans=4 -fno-alias
  -mbranches-within-32B-boundaries
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc  
- 657.xz_s: basepeak = yes

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<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>11.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>11.8</td>
</tr>
</tbody>
</table>

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**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)

**C++ benchmarks:**

- 620.omnetpp_s: `basepeak = yes`
- 623.xalancbmk_s: `basepeak = yes`
- 631.deepsjeng_s: `basepeak = yes`
- 641.leela_s: `basepeak = yes`

**Fortran benchmarks:**

- 648.exchange2_s: `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:


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

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