**SPEC CPU®2017 Integer Speed Result**

**Dell Inc.**

PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed®2017_int_base = 10.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 55</td>
<td>SPECspeed®2017_int_peak = 10.5</td>
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<tr>
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<tr>
<td>623.xalancbmk_s 12</td>
<td>5.60</td>
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<td>625.x264_s 12</td>
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<td>18.2</td>
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<td>13.4</td>
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<tr>
<td>641.leela_s 12</td>
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<td></td>
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<tr>
<td>648.exchange2_s 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s 12</td>
<td></td>
<td></td>
</tr>
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</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4310
- **Max MHz:** 3300
- **Nominal:** 2100
- **Enabled:** 12 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 18 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (8 x 64 GB 2Rx4 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:** Yes
- **Firmware:** Version 0.9.0 released May-2021
- **File System:** tmpfs
- **System State:** Run level 5 (graphical 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 Integer Speed Result

Dell Inc.
PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

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

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<td>461</td>
<td>13.4</td>
<td>461</td>
<td>13.4</td>
</tr>
</tbody>
</table>

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/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
MALLOCONF = "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)
Dell Inc. PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

**SPEC CPU®2017 Integer Speed Result**

**SPECspeed®2017_int_base = 10.3**

**SPECspeed®2017_int_peak = 10.5**

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Test Date:** May-2021

**Tested by:** Dell Inc.

**Hardware Availability:** Jul-2021

**Software Availability:** Feb-2021

**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 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G 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

**Sysinfo program** /mnt/ramdisk/cpu2017-1.1.5-ic2021.1/bin/sysinfo
**Rev:** r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Wed May 19 21:24:59 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 4310 CPU @ 2.10GHz
- 1 "physical id"s (chips)
  - 12 "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: 12
  - siblings: 12
  - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11

**From lscpu**
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 12
# SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

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## SPECspeed®2017_int_base = 10.3

## SPECspeed®2017_int_peak = 10.5

### Platform Notes (Continued)

- On-line CPU(s) list: 0-11
- Thread(s) per core: 1
- Core(s) per socket: 12
- Socket(s): 1
- NUMA node(s): 1
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Silver 4310 CPU @ 2.10GHz
- Stepping: 6
- CPU MHz: 2701.368
- BogoMIPS: 4200.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 18432K
- NUMA node0 CPU(s): 0-11
- Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdtpe0gb rdosp
- 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 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 invbpcid_single intel_pppin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmov rdt_a avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsave xsetbv xsaves cmq_llc cmq_ocap_llc cmq_mmnb_total cmq_mmnb_local split_lock_detect wbnoinvd dtherm ida arat pln pts avx512vmbi umip pku ospke avx512_vbmi2 gfni vaes vpmullqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq 1a57 rdpid md_clear pconfig flush_lid arch_capabilities

```
/proc/cpuinfo cache data
  cache size : 18432 KB
```

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

```
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
  node 0 size: 505635 MB
  node 0 free: 498634 MB
```

From /proc/meminfo
```
MemTotal: 527819844 KB
```
Dell Inc.

PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

SPEC CPU®2017 Integer Speed Result

Specspeed®2017_int_base = 10.3
Specspeed®2017_int_peak = 10.5

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: May-2021
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Dell Inc.
PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

SPECspeed®2017_int_base = 10.3
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: May-2021
CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: May-2021

Platform Notes (Continued)

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 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

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 19 21:17

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5-ic2021.1
Filesystem     Type   Size  Used Avail Use% Mounted on
tmpfs          tmpfs  225G  7.0G  219G   4% /mnt/ramdisk

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

Dell Inc.

PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

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

Specspeed

**Platform Notes (Continued)**

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge XR11
Product Family: PowerEdge
Serial: 09900TO

Additional information from dmidecode 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:
1x 002C069D002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666
7x 00AD069D00AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200, configured at 2666

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 0.9.0
BIOS Date: 05/10/2021
BIOS Revision: 0.9

(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.

-------------------------------
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)
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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### Compiler Version Notes (Continued)

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

### Base Compiler Invocation

**C benchmarks:**

- `icx`

**C++ benchmarks:**

- `icpx`

**Fortran benchmarks:**

- `ifort`

### Base Portability Flags

```
600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
```

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

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PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

**SPECspeed®2017_int_base = 10.3**

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**SPECspeed®2017_int_peak = 10.5**

#### Base Portability Flags (Continued)

- 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 -fopenmp -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:**
- -DSPEC_OPENMP 
  -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:**
- -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
SPEC CPU®2017 Integer Speed Result

Dell Inc.

PowerEdge XR11 (Intel Xeon Silver 4310, 2.10 GHz)

| SPECspeed®2017_int_peak = 10.5 |
| SPECspeed®2017_int_base = 10.3 |

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

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

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

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
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<table>
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<tr>
<th>SPECspeed®2017_int_base</th>
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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