Dell Inc.
PowerEdge R750 (Intel Xeon Gold 6346, 3.10 GHz)

**SPEC CPU®2017 Integer Speed Result**

**SPECspeed®2017_int_base = 12.1**

**SPECspeed®2017_int_peak = 12.3**

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Apr-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>May-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2021</td>
</tr>
</tbody>
</table>

**Threads**

- 600.perlbench_s: 32 threads, SPECspeed®2017_int_base = 8.48
- 602.gcc_s: 32 threads, SPECspeed®2017_int_base = 11.1
- 605.mcf_s: 32 threads, SPECspeed®2017_int_base = 11.5
- 620.omnetpp_s: 32 threads, SPECspeed®2017_int_base = 20.3
- 623.xalancbmk_s: 32 threads, SPECspeed®2017_int_base = 13.6
- 625.x264_s: 32 threads, SPECspeed®2017_int_base = 17.5
- 631.deepsjeng_s: 32 threads, SPECspeed®2017_int_base = 6.04
- 641.leela_s: 32 threads, SPECspeed®2017_int_base = 19.9
- 648.exchange2_s: 32 threads, SPECspeed®2017_int_base = 23.2
- 657.xz_s: 32 threads, SPECspeed®2017_int_base = 23.2

**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;
- **Parallel:** Yes
- **Firmware:** Version 1.1.2 released Apr-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.
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>620.omnetpp_s</td>
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<td>137</td>
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<td>141</td>
<td>11.6</td>
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<td>625.x264_s</td>
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<td>648.exchange2_s</td>
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<td>657.xz_s</td>
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<td>266</td>
<td>23.2</td>
<td>266</td>
<td>23.2</td>
<td>264</td>
<td>23.4</td>
</tr>
</tbody>
</table>

### 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/ramdisk2/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk2/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
- 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

Sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

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 R750 (Intel Xeon Gold 6346, 3.10 GHz)

SPECspeed®2017_int_base = 12.1
SPECspeed®2017_int_peak = 12.3

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/ramdisk2/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afea89d4b38e2f1c
running on localhost.localdomain Thu Apr 22 17:37:44 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 6346 CPU @ 3.10GHz
  2 "physical id"s (chips)
  32 "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 : 16
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:
Architecture: x86_64

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

Dell Inc.  
PowerEdge R750 (Intel Xeon Gold 6346, 3.10 GHz)  

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Apr-2021  
**Hardware Availability:** May-2021  
**Software Availability:** Feb-2021  

**SPECspeed®2017_int_base = 12.1**  
**SPECspeed®2017_int_peak = 12.3**

---

**Platform Notes (Continued)**

- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 32
- On-line CPU(s) list: 0-31
- Thread(s) per core: 1
- Core(s) per socket: 16
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 6346 CPU @ 3.10GHz
- Stepping: 6
- CPU MHz: 2539.846
- BogoMIPS: 6200.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 36864K
- NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
- NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31
- 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 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 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced fs.gsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma cf ilshOPT clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsave xsetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect wbinvd dtherm ida arat pln pts avx512vbmi umip pkp ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size : 36864 KB

---

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
  node 0 size: 250062 MB
  node 0 free: 242075 MB
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
  node 1 size: 250317 MB

---

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

SPECspeed®2017_int_base = 12.1
SPECspeed®2017_int_peak = 12.3

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

Platform Notes (Continued)

node 1 free: 256193 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 527815572 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 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):
CVE-2020-0543 (Special Register Buffer Data Sampling):
Not affected

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

Dell Inc.
PowerEdge R750 (Intel Xeon Gold 6346, 3.10 GHz)

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<td>Hardware Availability: May-2021</td>
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</tbody>
</table>

**SPECspeed®2017_int_peak = 12.3**

---

**Platform Notes (Continued)**

CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Apr 22 17:34

SPEC is set to: /mnt/ramdisk2/cpu2017-1.1.5-ic2021.1

Filesystem Type Size Used Avail Use% Mounted on

tmpfs tmpfs 225G 6.9G 219G 4% /mnt/ramdisk2

From /sys/devices/virtual/dmi/id

Vendor: Dell Inc.

Product: PowerEdge R750

Product Family: PowerEdge

Serial: 1234567

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:

12x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200
4x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200
16x Not Specified Not Specified

BIOS:

BIOS Vendor: Dell Inc.

BIOS Version: 1.1.2

BIOS Date: 04/09/2021

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.

```
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,
Dell Inc.

PowerEdge R750 (Intel Xeon Gold 6346, 3.10 GHz)

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**SPECspeed®2017_int_base = 12.1**

**SPECspeed®2017_int_peak = 12.3**

**Compiler Version Notes (Continued)**

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

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

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CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Apr-2021
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Hardware Availability: May-2021
Software Availability: Feb-2021

Base Compiler Invocation (Continued)

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
-03 -ffast-math -fflags-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 -03 -ffast-math
-fflags-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 -03 -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

(Continued on next page)
Peak Compiler Invocation (Continued)

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: -W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-CORE-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 -W1,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdta(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 -W1,-z,muldefs
-CORE-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:

(Continued on next page)
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**SPECspeed®2017_int_peak = 12.3**

---

**Peak Optimization Flags (Continued)**

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:

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml


---

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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 2021-04-22 18:37:44-0400.


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