### Dell Inc.

**PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)**

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Dell Inc.</th>
<th>Test Date</th>
<th>May-2021</th>
</tr>
</thead>
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<tr>
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<td>Hardware Availability</td>
<td>Apr-2021</td>
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<tr>
<td>CPU2017 License</td>
<td>55</td>
<td>Software Availability</td>
<td>Dec-2020</td>
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#### SPECspeed®2017_fp_base = 173

#### SPECspeed®2017_fp_peak = 176

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### Hardware

**CPU Name:** Intel Xeon Gold 6338T  
**Max MHz:** 3400  
**Nominal:** 2100  
**Enabled:** 48 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:** 36 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)  
**Storage:** 125 GB on tmpfs  
**Other:** None

### 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.
Dell Inc. PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tr>
<td>627.cam4_s</td>
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<td>74.3</td>
<td>119</td>
<td>72.6</td>
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<td>649.fotonik3d_s</td>
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<tr>
<td>654.roms_s</td>
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<td>220</td>
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<td>219</td>
<td>71.9</td>
<td>219</td>
<td>71.9</td>
<td>219</td>
</tr>
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</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,compact"
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.7-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

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.

Transparent Huge Pages enabled by default
Prior to runcpu invocation

(Continued on next page)
Dell Inc. PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

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<thead>
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### General Notes (Continued)

Filesystem page cache synced and cleared with:

```bash
sync; echo 3>/proc/sys/vm/drop_caches
```

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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.7-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c running on localhost.localdomain Tue May 11 15:47:12 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

```plaintext
model name : Intel(R) Xeon(R) Gold 6338T CPU @ 2.10GHz
  2 "physical id"s (chips)
  48 "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 : 24
  siblings : 24
physical 0: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23
physical 1: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23
```

From lscpu:

```plaintext
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
```

(Continued on next page)
Dell Inc. PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

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

**Platform Notes (Continued)**

- **Byte Order:** Little Endian  
- **CPU(s):** 48  
- **On-line CPU(s) list:** 0-47  
- **Thread(s) per core:** 1  
- **Core(s) per socket:** 24  
- **Socket(s):** 2  
- **NUMA node(s):** 2  
- **Vendor ID:** GenuineIntel  
- **CPU family:** 6  
- **Model:** 106  
- **Model name:** Intel(R) Xeon(R) Gold 6338T CPU @ 2.10GHz  
- **Stepping:** 6  
- **CPU MHz:** 1741.920  
- **BogoMIPS:** 4200.00  
- **Virtualization:** VT-x  
- **L1d cache:** 48K  
- **L1i cache:** 32K  
- **L2 cache:** 1280K  
- **L3 cache:** 36864K  
- **NUMA node0 CPU(s):** 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46  
- **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  
- **Flags:**  
  - fpu  
  - vme  
  - de  
  - pse  
  - msr  
  - pae  
  - mca  
  - cmov  
  - pat  
  - pse36  
  - clflush  
  - dts  
  - acpi  
  - mmx  
  - fxsr  
  - sse  
  - sse2  
  - ss  
  - ht  
  - tm  
  - pbe  
  - syscall  
  - nx  
  - pdpe1gb  
  - rdtscp  
  - lm  
  - constant_tsc  
  - arch_perfmon  
  - pebs  
  - bts  
  - rep_good  
  - nop1  
  - xtopology  
  - nonstop_tsc  
  - tsc  
  - deadline_timer  
  - aes  
  - xsave  
  - avx  
  - f16c  
  - rdrand  
  - lahf_lm  
  - abm  
  - 3dnowprefetch  
  - cpuid  
  - singleıntel_pinn  
  - ssbd  
  - mba  
  - ibrs  
  - ibpb  
  - stibp  
  - ibrs_enhanced  
  - fsqsgbase  
  - tsc_adjust  
  - bm1  
  - hle  
  - avx2  
  - smep  
  - bmi2  
  - erms  
  - invpcid  
  - cmq  
  - rdt_a  
  - avx512f  
  - avx512dq  
  - rdseed  
  - adx  
  - smap  
  - avx512ifma  
  - clflushopt  
  - clwb  
  - intel_pt  
  - avx512cd  
  - sha  
  - ni  
  - avx512bw  
  - avx512vl  
  - xsaveopt  
  - xsavec  
  - xgetbv1  
  - xsaves  
  - cmq_llic  
  - cmq_occup_llic  
  - cmq_mmb_total  
  - cmq_mmb_local  
  - split_lock_detect  
  - wboinvd  
  - dtherm  
  - ida  
  - arat  
  - pln  
  - pts  
  - avx512vbmi  
  - umip  
  - pku  
  - ospke  
  - avx512_vbmi2  
  - gfn  
  - vaes  
  - vpclmulqdq  
  - avx512_vnni  
  - avx512_bitalg  
  - tme  
  - avx512_vpopcntdq  
  - la57  
  - rdpid  
  - md_clear  
  - pconfig  
  - flush_l1d  
  - 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 32 34 36 38 40 42 44 46  
  - node 0 size: 247277 MB  
  - node 0 free: 253315 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

(Continued on next page)
Dell Inc. PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

SPECspeed®2017_fp_base = 173
SPECspeed®2017_fp_peak = 176

CPU2017 License: 55  Test Date: May-2021
Test Sponsor: Dell Inc.  Hardware Availability: Apr-2021
Tested by: Dell Inc.  Software Availability: Dec-2020

Platform Notes (Continued)

node 1 size: 247637 MB
node 1 free: 245830 MB
node distances:
node 0 1
  0: 10 20
  1: 20 10

From /proc/meminfo
   MemTotal: 527809648 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.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 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

(Continued on next page)
Dell Inc. PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

| SPECspeed®2017_fp_base = 173 |
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CPU2017 License: 55  Test Date: May-2021
Test Sponsor: Dell Inc.  Hardware Availability: Apr-2021
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Platform Notes (Continued)

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected
	run-level 3 May 11 13:01

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-ic2021.1
Filesystem     Type   Size  Used Avail Use% Mounted on
tmpfs           tmpfs  125G   11G  115G   9% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor:         Dell Inc.
Product:        PowerEdge C6520
Product Family: PowerEdge

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:
  6x 002C00B3002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200
  10x 00AD063200AD HMAA4GR7AJR8N-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                  | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
                   | 644.nab_s(base)
==============================================================================

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                  | 644.nab_s(peak)
==============================================================================

Intel(R) oneAPI DPC+/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113

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

PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

**Compiler Version Notes (Continued)**

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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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<table>
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<tr>
<th>C</th>
<th>644.nab_s(peak)</th>
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113

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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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SPEC CPU®2017 Floating Point Speed Result

Dell Inc.
PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

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Compiler Version Notes (Continued)

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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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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Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
  -assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-tran=4 -qopenmp -DSPEC_OPENMP

(Continued on next page)
Dell Inc.
PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

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Base Optimization Flags (Continued)

C benchmarks (continued):
-mbranches-within-32B-boundaries

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
-mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc

644.nab_s: icx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags

Same as Base Portability Flags
Dell Inc.
PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)

SPECspeed®2017_fp_base = 173
SPECspeed®2017_fp_peak = 176

CPU2017 License: 55
Test Date: May-2021
Test Sponsor: Dell Inc.
Hardware Availability: Apr-2021
Tested by: Dell Inc.
Software Availability: Dec-2020

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
         -flto -mfpmath=sse -funroll-loops -fopenmp
         -DSPEC_OPENMP -qopt-mem-layout-trans=4
         -fimf-accuracy-bits=14:sqrt
         -mbranches-within-32B-boundaries
         -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:

603.bwaves_s: basepeak = yes
649.fotonik3d_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
                -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512
                -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
                -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
                -mbranches-within-32B-boundaries
                -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
           -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div
           -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
           -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
           -mbranches-within-32B-boundaries -nostandard-realloc-lhs
           -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes
### SPEC CPU®2017 Floating Point Speed Result

**Dell Inc.**

**PowerEdge C6520 (Intel Xeon Gold 6338T, 2.10 GHz)**

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<th>SPECspeed®2017_fp_base</th>
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- **CPU2017 License:** 55
- **Test Sponsor:** Dell Inc.
- **Tested by:** Dell Inc.
- **Test Date:** May-2021
- **Hardware Availability:** Apr-2021
- **Software Availability:** Dec-2020

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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