# SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge C6520 (Intel Xeon Platinum 8368, 2.40 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tr>
<td>11.7</td>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Apr-2021  
**Hardware Availability:** Apr-2021  
**Software Availability:** Feb-2021

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
</table>
| OS: Red Hat Enterprise Linux 8.2 (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 1.1.2 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. | CPU Name: Intel Xeon Platinum 8368  
Max MHz: 3400  
Nominal: 2400  
Enabled: 76 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: 57 MB I+D on chip per chip  
Other: None  
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)  
Storage: 125 GB on tmpfs  
Other: None |
### 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>
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<th>Ratio</th>
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<tr>
<td>600.perlbench_s</td>
<td>76</td>
<td>253</td>
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<td>252</td>
<td>7.04</td>
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<td>220</td>
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<td>12.1</td>
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<td>12.3</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>76</td>
<td>107</td>
<td>13.2</td>
<td>107</td>
<td>13.2</td>
<td></td>
<td></td>
<td>76</td>
<td>107</td>
<td>13.2</td>
<td>107</td>
<td>13.2</td>
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<tr>
<td>625.x264_s</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>641.leea_s</td>
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<td>4.72</td>
<td>364</td>
<td>4.69</td>
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<td>4.69</td>
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<td>648.exchange2_s</td>
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<td>157</td>
<td>18.8</td>
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<td>18.8</td>
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<td>76</td>
<td>157</td>
<td>18.8</td>
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<td>18.8</td>
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<tr>
<td>657.xz_s</td>
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<td>255</td>
<td>24.2</td>
<td></td>
<td></td>
<td>76</td>
<td>255</td>
<td>24.2</td>
<td>255</td>
<td>24.2</td>
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</table>

**SPECspeed®2017_int_base = 11.7**
**SPECspeed®2017_int_peak = 12.0**

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/cpu2017-1.1.7-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/jre5.0.1-64"
- 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)
### General Notes (Continued)

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

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 Wed Apr 21 20:10:18 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 8368 CPU @ 2.40GHz
- 2 "physical id"s (chips)
- 76 "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 : 38
- siblings : 38
- physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
- physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

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Platform Notes (Continued)

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 76
- On-line CPU(s) list: 0-75
- Thread(s) per core: 1
- Core(s) per socket: 38
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Platinum 8368 CPU @ 2.40GHz
- Stepping: 6
- CPU MHz: 1709.180
- BogoMIPS: 4800.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 58368K
- NUMA node0 CPU(s): 0-37
- NUMA node1 CPU(s): 38-75
- 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 pdpe1gb 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 xtrunc pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lmlahf_lm abm 3dnowprefetch cpuid rt msr aarch64fsr aarch64 exceptions arch_capabilities

/proc/cpuinfo cache data
- cache size : 58368 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 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
  - node 0 size: 386178 MB

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Platform Notes (Continued)

node 0 free: 376157 MB
node 1 cpus: 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62
63 64 65 66 67 68 69 70 71 72 73 74 75
node 1 size: 516084 MB
node 1 free: 515751 MB
node distances:
node 0 1
  0: 10 20
  1: 20 10

From /proc/meminfo
  MemTotal: 923917688 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="8.2 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.2"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
  Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):
CVE-2018-3620 (L1 Terminal Fault):
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown):
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1):

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

- **CVE-2017-5715 (Spectre variant 2):** Sanitization  
  Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** No status reported
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

run-level 3 Apr 21 20:07

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-ic2021.1

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>tmpfs</td>
<td>tmpfs</td>
<td>125G</td>
<td>4.4G</td>
<td>121G</td>
<td>4%</td>
<td>/mnt/ramdisk</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

- **Vendor:** Dell Inc.
- **Product:** PowerEdge C6520
- **Product Family:** PowerEdge
- **Serial:** SDPT078

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:

```
16x 00AD063200AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200
```

**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)  
```

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

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PowerEdge C6520 (Intel Xeon Platinum 8368, 2.40 GHz)

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**Compiler Version Notes (Continued)**

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.

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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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---

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

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**Base Compiler Invocation (Continued)**

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

**Base Portability Flags**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
</tr>
<tr>
<td>gcc</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>mcf</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>omnetpp</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>-DSPEC_LP64 -DSPEC_LINUX</td>
</tr>
<tr>
<td>x264</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>deepsjeng</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>leela</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>exchange2</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>xz</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

**Base Optimization Flags**

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fopenmp -Wl,-z,muldefs -xCORE-AVX512
-03 -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 -03 -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 -03 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

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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.profdatalate(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

(Continued on next page)
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### 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.

Tested with SPEC CPU²017 v1.1.7 on 2021-04-21 20:10:16-0400.
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