# SPEC® CPU2017 Integer Speed Result

**Dell Inc.**  
PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)  

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>10.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>10.6</td>
</tr>
</tbody>
</table>

- **CPU2017 License**: 55
- **Test Sponsor**: Dell Inc.
- **Tested by**: Dell Inc.
- **Test Date**: Mar-2019
- **Hardware Availability**: Apr-2019
- **Software Availability**: May-2019

## Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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<td>9.95</td>
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<tr>
<td>605.mcf_s</td>
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<td>52</td>
<td>9.21</td>
<td>9.74</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>52</td>
<td>12.7</td>
<td>13.2</td>
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<tr>
<td>625.x264_s</td>
<td>52</td>
<td>12.7</td>
<td>14.5</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>52</td>
<td>5.57</td>
<td>8.56</td>
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<tr>
<td>641.leela_s</td>
<td>52</td>
<td>4.84</td>
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<tr>
<td>648.exchange2_s</td>
<td>52</td>
<td>17.6</td>
<td>17.6</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>52</td>
<td>22.2</td>
<td>22.4</td>
</tr>
</tbody>
</table>

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## Hardware

- **CPU Name**: Intel Xeon Platinum 8270  
- **Max MHz.**: 4000  
- **Nominal**: 2700  
- **Enabled**: 52 cores, 2 chips  
- **Orderable**: 1,2 chips  
- **Cache L1**: 32 KB I + 32 KB D on chip per core  
- **L2**: 1 MB I+D on chip per core  
- **L3**: 35.75 MB I+D on chip per chip  
- **Other**: None  
- **Memory**: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage**: 1 x 480 GB SATA SSD  
- **Other**: None

## Software

- **OS**: Ubuntu 18.04.2 LTS  
- **kernel**: 4.15.0-45-generic  
- **Compiler**: C/C++: Version 19.0.4.227 of Intel C/C++  
  Compiler Build 20190416 for Linux;  
- **Fortran**: Version 19.0.4.227 of Intel Fortran  
  Compiler Build 20190416 for Linux  
- **Parallel**: Yes  
- **Firmware**: Version 2.3.1 released May-2019  
- **File System**: ext4  
- **System State**: Run level 3 (multi-user)  
- **Base Pointers**: 64-bit  
- **Peak Pointers**: 64-bit  
- **Other**: jemalloc memory allocator V5.0.1
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>278</td>
<td>52</td>
<td>276</td>
<td>22.4</td>
<td>271</td>
</tr>
</tbody>
</table>

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
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
Filsystem page cache synced and cleared with:
sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

(Continued on next page)
General Notes (Continued)
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS settings:
- ADDDC setting disabled
- Sub NUMA Cluster enabled
- Virtualization Technology disabled
- DCU Streamer Prefetcher enabled
- System Profile set to Custom
- CPU Performance set to Maximum Performance
- C States set to Autonomous
- C1E disabled
- Uncore Frequency set to Dynamic
- Energy Efficiency Policy set to Performance
- Memory Patrol Scrub disabled
- Logical Processor disabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program /home/cpu2017/bin/sysinfo
- Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
- running on intel-sut Thu Jun 27 15:07:15 2019

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 8270 CPU @ 2.70GHz
  2 "physical id"s (chips)
  52 "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: 26
  siblings: 26
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Dell Inc.

PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)

SPECspeed2017_int_base = 10.4
SPECspeed2017_int_peak = 10.6

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

CPU(s): 52
On-line CPU(s) list: 0-51
Thread(s) per core: 1
Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8270 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2262.678
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
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
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
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acp1 mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpec1b rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmrperf pni pclmulqdq dtc64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xptr pdcm dca sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_13 cdp_13 invpcid_single intel_pinn ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vnni flexpriority ept vpid fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsavec l1c cqm_occup LLC cqm_mbb_total cqm_mbb_local dtherm ida arat pti pdt oskpe avx512_vnni flush_lld arch_capabilities

Warning: a numacl 'node' might or might not correspond to a physical chip.

/proc/cpuinfo cache data
  cache size : 36608 KB

From numactl --hardware 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
  node 0 size: 191911 MB
  node 0 free: 189742 MB
  node 0 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
  node 0 size: 193509 MB
  node 0 free: 192359 MB
**Dell Inc.**

**PowerEdge M640 (Intel Xeon Platinum 8270, 2.70GHz)**

**SPEC speed2017_int_base = 10.4**

**SPEC speed2017_int_peak = 10.6**

---

**Platform Notes (Continued)**

```
node   0   1
  0: 10 21
  1: 21 10
```

From `/proc/meminfo`
- MemTotal: 394670932 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

```
/usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS
```

From `/etc/*release*/etc/*version*`
- debian_version: buster/sid
- os-release:
  - NAME="Ubuntu"
  - VERSION="18.04.2 LTS (Bionic Beaver)"
  - ID=ubuntu
  - ID_LIKE=debian
  - PRETTY_NAME="Ubuntu 18.04.2 LTS"
  - VERSION_ID="18.04"
  - HOME_URL="https://www.ubuntu.com/"
  - SUPPORT_URL="https://help.ubuntu.com/"

```
uname -a:
  Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
  x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Not affected
- CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB

run-level 3 Jun 25 19:35

SPEC is set to: /home/cpu2017
```
Filesystem   Type  Size  Used Avail Use% Mounted on
/dev/sda2      ext4  439G  31G  386G   8% /
```

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.

- BIOS Dell Inc. 2.3.1 05/02/2019
- Memory:
  - 6x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
SPEC CPU2017 Integer Speed Result

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Test Date: Mar-2019
Hardware Availability: Apr-2019
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Platform Notes (Continued)

6x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

=============================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
=============================================
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=============================================
CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=============================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
=============================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
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=============================================
CXXC 620.omnetpp_s(peak)
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Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=============================================
FC  648.exchange2_s(base, peak)
=============================================
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416

(Continued on next page)
### Base Compiler Invocation

**C benchmarks:**

```plaintext
icc -m64 -std=c11
```

**C++ benchmarks:**

```plaintext
icpc -m64
```

**Fortran benchmarks:**

```plaintext
ifort -m64
```

### Base Portability Flags

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<tr>
<th>Benchmark</th>
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### Base Optimization Flags

**C benchmarks:**

```plaintext
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

**C++ benchmarks:**

```plaintext
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc
```

(Continued on next page)
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**Base Optimization Flags (Continued)**

Fortran benchmarks:
- xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
- nostandard-realloc-lhs

**Peak Compiler Invocation**

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

**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) -O2
- xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3
- no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
- DSPEC_OPENMP -fno-strict-overflow
- L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
- xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3
- no-prec-div -DSPEC_SUPPRESS_OPENMP
- L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
- xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
- DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
- L/usr/local/je5.0.1-64/lib -ljemalloc

(Continued on next page)
## Peak Optimization Flags (Continued)

### C++ benchmarks:

- `625.x264_s`: `-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -gopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

- `657.xz_s`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

### Fortran benchmarks:


- `641.leela_s`: Same as 623.xalancbmk_s

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: