## SPEC CPU®2017 Integer Speed Result

### Dell Inc.

**PowerEdge FC640 (Intel Xeon Gold 6234, 3.30GHz)**

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<tr>
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### Threads

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<td>16</td>
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<tr>
<td>657.xz_s</td>
<td>16</td>
</tr>
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### Hardware

**CPU Name:** Intel Xeon Gold 6234  
**Max MHz:** 4000  
**Nominal:** 3300  
**Enabled:** 16 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:** 24.75 MB I+D on chip per chip  
**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  
**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  
**File System:** ext4  
**System State:** Run level 5 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** --
SPEC CPU®2017 Integer Speed Result

Dell Inc.

PowerEdge FC640 (Intel Xeon Gold 6234, 3.30GHz)

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

SPECspeed®2017_int_base = 10.1
SPECspeed®2017_int_peak = 10.3

Results Table

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<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>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>16</td>
<td>257</td>
<td>6.90</td>
<td>258</td>
<td>6.88</td>
<td>258</td>
<td>6.89</td>
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<tr>
<td>602.gcc_s</td>
<td>16</td>
<td>417</td>
<td>9.54</td>
<td>413</td>
<td>9.65</td>
<td>413</td>
<td>9.65</td>
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<tr>
<td>605.mcf_s</td>
<td>16</td>
<td>381</td>
<td>12.4</td>
<td>386</td>
<td>12.2</td>
<td>386</td>
<td>12.3</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>16</td>
<td>210</td>
<td>7.77</td>
<td>209</td>
<td>7.80</td>
<td>208</td>
<td>7.82</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>16</td>
<td>112</td>
<td>12.7</td>
<td>112</td>
<td>12.6</td>
<td>112</td>
<td>12.7</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>16</td>
<td>120</td>
<td>14.7</td>
<td>120</td>
<td>14.7</td>
<td>120</td>
<td>14.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>16</td>
<td>255</td>
<td>5.62</td>
<td>256</td>
<td>5.61</td>
<td>255</td>
<td>5.62</td>
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<tr>
<td>641.leela_s</td>
<td>16</td>
<td>348</td>
<td>4.91</td>
<td>348</td>
<td>4.90</td>
<td>349</td>
<td>4.89</td>
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<td>16</td>
<td>171</td>
<td>17.2</td>
<td>172</td>
<td>17.1</td>
<td>171</td>
<td>17.1</td>
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<tr>
<td>657.xz_s</td>
<td>16</td>
<td>318</td>
<td>19.4</td>
<td>318</td>
<td>19.4</td>
<td>317</td>
<td>19.5</td>
</tr>
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</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
Filesystem 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)
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CPU2017 License: 55  
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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:
ADDCC 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 9bcd0f2999c33d61f64985e45839ea9  
running on intel-sut Mon Sep 9 21:24:56 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) Gold 6234 CPU @ 3.30GHz  
2 "physical id"s (chips)  
16 "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 : 8  
siblings : 8  
physical 0: cores 2 4 9 11 17 25 26 27  
physical 1: cores 2 3 4 9 11 24 25 27

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 16  
On-line CPU(s) list: 0-15

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

| Thread(s) per core: | 1 |
| Core(s) per socket: | 8 |
| Socket(s): | 2 |
| NUMA node(s): | 2 |
| Vendor ID: | GenuineIntel |
| CPU family: | 6 |
| Model: | 85 |
| Model name: | Intel(R) Xeon(R) Gold 6234 CPU @ 3.30GHz |
| Stepping: | 7 |
| CPU MHz: | 3696.634 |
| BogoMIPS: | 6600.00 |
| Virtualization: | VT-x |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 1024K |
| L3 cache: | 25344K |
| NUMA node0 CPU(s): | 0,2,4,6,8,10,12,14 |
| NUMA node1 CPU(s): | 1,3,5,7,9,11,13,15 |
| Flags: | fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdscop 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 cdp_l3 invpcid_single intel_pplin ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdte_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsavec xsavec cs救人 cqm_occup_l1c cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld arch_capabilities |

/proc/cpuinfo cache data

```plaintext
cache size : 25344 KB
```

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

```plaintext
available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14
node 0 size: 191894 MB
node 0 free: 191359 MB
node 1 cpus: 1 3 5 7 9 11 13 15
node 1 size: 193533 MB
node 1 free: 193165 MB
node distances:
  node 0 1
    0: 10 21
    1: 21 10
```

(Continued on next page)
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Platform Notes (Continued)

From /proc/meminfo
MemTotal: 394678208 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 4.15.0-60-generic #67-Ubuntu SMP Thu Aug 22 16:55:30 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: usercopy/swapgs barriers and __user
pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB
filling

run-level 5 Sep 9 21:22

SPEC is set to: /home/cpu2017

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. 2.2.11 06/14/2019
Memory:
3x 00AD003B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
6x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933

(Continued on next page)
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**SPECspeed®2017_int_base = 10.1**

**SPECspeed®2017_int_peak = 10.3**

### Platform Notes (Continued)

3x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
4x Not Specified Not Specified

(End of data from sysinfo program)

### Compiler Version Notes

```
==============================================================================
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
==============================================================================
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.
```

```
==============================================================================
C++     | 620.omnetpp_s(base, peak) 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
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```
==============================================================================
Fortran | 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
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

**C benchmarks:**

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

**C++ benchmarks:**

```
icpc -m64
```

**Fortran benchmarks:**

```
ifort -m64
```
Dell Inc. PowerEdge FC640 (Intel Xeon Gold 6234, 3.30GHz)  

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**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:**
- -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- -L/usr/local/je5.0.1-64/lib -ljemalloc

**C++ benchmarks:**
- -Wl,-z,muldefs -xCORE-AVX512 -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

**Fortran benchmarks:**
- -xCORE-AVX512 -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
Dell Inc. 
PowerEdge FC640 (Intel Xeon Gold 6234, 3.30GHz) 

SPECspeed® 2017 Int Base = 10.1
SPECspeed® 2017 Int Peak = 10.3

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

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-AVX512 -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-AVX512 -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-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
- -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
- -L/usr/local/je5.0.1-64/lib -ljemalloc

- 625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4 -qopenmp -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-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
- -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
- -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

- 620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
- -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
- -DSPEC_SUPPRESS_OPENMP
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- -lqkmalloc

- 623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX512 -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

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### Peak Optimization Flags (Continued)

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:

- `-xCORE-AVX512` -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
- `nostandard-realloc-lhs`

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.

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