Dell Inc. PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017_int_base = 211
SPECrate®2017_int_peak = 220

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

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Copies

| Program        | Copies | 0   | 20  | 40  | 60  | 80  | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 445 |
|----------------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 500.perlbench_r | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 502.gcc_r       | 64     | 163 | 163 | 158 | 158 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 505.mcf_r       | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 520.omnetpp_r   | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 523.xalancbmk_r | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 525.x264_r      | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 531.deepsjeng_r | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 541.leela_r     | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 548.exchange2_r | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 557.zx_r        | 64     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

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SPECrater®2017_int_base (211)
SPECrater®2017_int_peak (220)

Software

OS: Ubuntu 18.04.2 LTS
Compiler: C++: Version 19.0.4227 of Intel C/C++ Compiler Build 20190416 for Linux;
Fortran: Version 19.0.4227 of Intel Fortran Compiler Build 20190416 for Linux

Parallel: No
Firmware: Version 2.2.9 released May-2019
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: --

Hardware

CPU Name: Intel Xeon Gold 5217
Max MHz: 3700
Nominal: 3000
Enabled: 32 cores, 4 chips, 2 threads/core
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: 11 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
Storage: 1 x 480 GB SATA SSD
Other: None
Dell Inc.

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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
<td>629</td>
<td>162</td>
<td>621</td>
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<td>286</td>
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</tr>
</tbody>
</table>

SERCrate®2017_int_base = 211
SERCrate®2017_int_peak = 220

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.:
### General Notes (Continued)

numactl --interleave=all runcpu <etc>
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 enabled
  - 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 Mon Nov 18 21:37:11 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 5217 CPU @ 3.00GHz
  - 4 "physical id"s (chips)
  - 64 "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 : 16
    - physical 0: cores 0 1 2 3 4 5 6 7
    - physical 1: cores 0 1 2 3 4 5 6 7
    - physical 2: cores 0 1 2 3 4 5 6 7
    - physical 3: cores 0 1 2 3 4 5 6 7

  From lscpu:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
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**Test Date:** Mar-2019  
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**Software Availability:** May-2019

---

**SPECrate®2017_int_base = 211**

**SPECrate®2017_int_peak = 220**

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**Platform Notes (Continued)**

- **Byte Order:** Little Endian
- **CPU(s):** 64
- **On-line CPU(s) list:** 0-63
- **Thread(s) per core:** 2
- **Core(s) per socket:** 8
- **Socket(s):** 4
- **NUMA node(s):** 4
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 5217 CPU @ 3.00GHz
- **Stepping:** 6
- **CPU MHz:** 2698.735
- **BogoMIPS:** 6000.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 11264K
- **NUMA node0 CPU(s):** 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60
- **NUMA node1 CPU(s):** 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61
- **NUMA node2 CPU(s):** 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62
- **NUMA node3 CPU(s):** 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63
- **Flags:** fpu vme de pse tsc msr pae mce cmov cmov 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 pclid cdca sse4_1 mce sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vmm_mon flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  

From `numactl --hardware` cache data  
`cache size : 11264 KB`

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

(Continued on next page)
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Platform Notes (Continued)

node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62
node 2 size: 193511 MB
node 2 free: 193221 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63
node 3 size: 193531 MB
node 3 free: 193148 MB
node distances:
node 0 1 2 3
0: 10 21 31 21
1: 21 10 21 31
2: 31 21 10 21
3: 21 31 21 10

From /proc/meminfo
MemTotal: 791998640 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 Nov 18 21:35

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on

(Continued on next page)
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Platform Notes (Continued)

/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. 2.2.9 05/08/2019
Memory:
16x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2666
8x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2666
24x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 502.gcc_r(peak)
==============================================================================
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,

(Continued on next page)
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**Compiler Version Notes (Continued)**

Version 19.0.4.227 Build 20190416
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==============================================================================
C++     | 523.xalancbmk_r(peak)
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Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416
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==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
        | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
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        | 531.deepsjeng_r(base, peak) 541.leela_r(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 | 548.exchange2_r(base, peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
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### Base Compiler Invocation

C benchmarks:

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

C++ benchmarks:

```plaintext
icpc -m64
```

Fortran benchmarks:

```plaintext
ifort -m64
```

### Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

### Base Optimization Flags

C benchmarks:

```plaintext
-W1, -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
```

C++ benchmarks:

```plaintext
-W1, -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:

```plaintext
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```
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#### CPU2017 License: 55

**Test Sponsor:** Dell Inc.

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**Software Availability:** May-2019

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### Peak Compiler Invocation

C benchmarks (except as noted below):

```bash
c -m64 -std=c11
```


C++ benchmarks (except as noted below):

```bash
icpc -m64
```

523.xalancbmk_r:icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

Fortran benchmarks:

```bash
ifort -m64
```

---

### Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64

502.gcc_r: -D_FILE_OFFSET_BITS=64

505.mcf_r: -DSPEC_LP64

520.omnetpp_r: -DSPEC_LP64

523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX

525.x264_r: -DSPEC_LP64

531.deepsjeng_r: -DSPEC_LP64

541.leela_r: -DSPEC_LP64

548.exchange2_r: -DSPEC_LP64

557.xz_r: -DSPEC_LP64

---

### Peak Optimization Flags

C benchmarks:

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

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4

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

Dell Inc.  
PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)  

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 211</th>
<th>SPECrate®2017_int_peak = 220</th>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

---

**Peak Optimization Flags (Continued)**

### 505.mcf_r (continued):

- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`  
- `-lqkmalloc`

### 525.x264_r

- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-fno-alias`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`  
- `-lqkmalloc`

### 557.xz_r

Same as 505.mcf_r

---

### C++ benchmarks:

#### 520.omnetpp_r

- `-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`

#### 523.xalancbmk_r

- `-Wl,-z,muldefs`  
- `-prof-gen(pass 1)`  
- `-prof-use(pass 2)`  
- `-ipo`  
- `-xCORE-AVX512`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-L/usr/local/je5.0.1-32/lib`  
- `-ljemalloc`

#### 531.deepsjeng_r

Same as 520.omnetpp_r

#### 541.leela_r

Same as 520.omnetpp_r

---

### Fortran benchmarks:

- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`  
- `-lqkmalloc`

---

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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Tested with SPEC CPU®2017 v1.0.5 on 2019-11-18 16:37:10-0500.  
Report generated on 2019-12-11 10:49:00 by CPU2017 PDF formatter v6255.  
Originally published on 2019-12-10.