Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
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<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
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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: Feb-2019

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</tr>
</tbody>
</table>

Hardware

- CPU Name: Intel Xeon Silver 4208
- Max MHz.: 3200
- Nominal: 2100
- Enabled: 16 cores, 2 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: 384 GB (12 x 32 GB 2Rx8 PC4-2933Y-R, running at 2400)
- Storage: 1 x 480 GB SATA SSD
- Other: None

Software

- OS: Ubuntu 18.04.2 LTS
- Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;

- Firmware: Version 2.2.2 released Mar-2019
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: 32/64-bit
- Other: jemalloc memory allocator V5.0.1

---

Homepage: [https://www.spec.org/](https://www.spec.org/)
## Dell Inc.

### PowerEdge M640 (Intel Xeon Silver 4208, 2.10GHz)

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

### SPECrate2017_int_base = 81.3

### SPECrate2017_int_peak = 84.0

### Results Table

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</table>

**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/jre5.0.1-32:/home/cpu2017/jre5.0.1-64"
```

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)
Dell Inc.
PowerEdge M640 (Intel Xeon Silver 4208, 2.10GHz)

**SPECrate2017_int_base = 81.3**
**SPECrate2017_int_peak = 84.0**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tr>
<td>CPU2017 License</td>
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<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Feb-2019</td>
</tr>
</tbody>
</table>

---

**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 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 Fri Mar 29 22:10:41 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) Silver 4208 CPU @ 2.10GHz
  2 "physical id"s (chips)
  32 "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
```

From lscpu:

```
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              32
On-line CPU(s) list: 0-31
```

(Continued on next page)
SPEC CPU2017 Integer Rate Result

Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10GHz)

| SPECrate2017_int_base | 81.3 |
| SPECrate2017_int_peak | 84.0 |

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

Platform Notes (Continued)

- Thread(s) per core: 2
- 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) Silver 4208 CPU @ 2.10GHz
- Stepping: 6
- CPU MHz: 2441.330
- BogoMIPS: 4200.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 11264K
- NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
- NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31
- Flags: fpu vme de pse tsc msr pae mce cx8 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 pcid dca sed fsgsbase tsc_adjust mmx cd mxvaxes cmx llc cmx_occup_llc cmx_mbm_total cmx_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

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

<table>
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<tr>
<th>Available nodes</th>
<th>Available CPUs</th>
<th>Node size</th>
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<tbody>
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<td>2</td>
<td>8</td>
<td>192856 MB</td>
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<tr>
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<td>2</td>
<td>192325 MB</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>193191 MB</td>
</tr>
<tr>
<td>0 free</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>1 free</td>
<td>1</td>
<td>21</td>
</tr>
</tbody>
</table>

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

From /proc/meminfo

```plaintext
MemTotal: 395662248 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/"
```

```plaintext
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 Mar 29 22:03

SPEC is set to: /home/cpu2017
```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 19G 398G 5% /
```

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. 2.2.2 03/05/2019
Memory:
```
6x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2400
6x 00AD069D00AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2400
4x Not Specified Not Specified
```

(End of data from sysinfo program)
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10GHz)

SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 81.3
SPECrate2017_int_peak = 84.0

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

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

Compiler Version Notes

==============================================================================
CC 502.gcc_r(peak)

Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
525.x264_r(base, peak) 557.xz_r(base, peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC 500.perlbench_r(peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 523.xalancbmk_r(peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak)
541.leea_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018

(Continued on next page)
Dell Inc.  
PowerEdge M640 (Intel Xeon Silver 4208, 2.10GHz)  

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SPECrate2017_int_peak = 84.0

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

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

Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
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:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

C++ benchmarks:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Base Optimization Flags (Continued)

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_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64
523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/ia32_lin

Fortran benchmarks:
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:
500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4

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

500.perlbench_r (continued):
-\fno-\strict-\overflow
-\L/usr/local/IntelCompiler19/compilers_and Libraries_2019.1.144/linux/compiler/lib/intel64
-\lqkmallocl

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
-\L/usr/local/IntelCompiler19/compilers_and Libraries_2019.1.144/linux/compiler/lib/intel64
-\lqkmallocl

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_2019.1.144/linux/compiler/lib/intel64
-\lqkmallocl

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_2019.1.144/linux/compiler/lib/intel64
-\lqkmallocl

523.xalancbmkr: -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_2019.1.144/linux/compiler/lib/intel64
-\lqkmallocl

The flags files that were used to format this result can be browsed at
## SPEC CPU2017 Integer Rate Result

**Dell Inc.**

PowerEdge M640 (Intel Xeon Silver 4208, 2.10GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 81.3</th>
<th>SPECrate2017_int_peak = 84.0</th>
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</thead>
</table>

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

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 v1.0.5 on 2019-03-29 18:10:40-0400.

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