## Dell Inc. 

**PowerEdge MX740C (Intel Xeon Silver 4208, 2.10GHz)**

### SPEC® CPU2017 Integer Rate Result

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
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<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Silver 4208</td>
<td>OS: Ubuntu 18.04.2 LTS</td>
</tr>
<tr>
<td>Max MHz.: 3200</td>
<td>kernel 4.15.0-45-generic</td>
</tr>
<tr>
<td>Nominal: 2100</td>
<td>Compiler: C/C++: Version 19.0.1.144 of Intel C/C++</td>
</tr>
<tr>
<td>Enabled: 16 cores, 2 chips, 2 threads/core</td>
<td>Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran</td>
</tr>
<tr>
<td>Orderable: 1,2 chips</td>
<td>Compiler Build 20181018 for Linux</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Firmware: Version 2.2.1 released Feb-2019</td>
</tr>
<tr>
<td>L3: 11 MB I+D on chip per chip</td>
<td>File System: ext4</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Memory: 768 GB (24 x 32 GB 2Rx8 PC4-2933Y-R, running at 2400)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x 480 GB SATA SSD</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
</tbody>
</table>

### SPECrate2017_int_base = 81.3

| SPECrate2017_int_peak = 84.0 |

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

### Specbench Results (integer)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
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<td>84.0</td>
<td>81.3</td>
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### Hardware

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>63.0</td>
<td>72.0</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>69.0</td>
<td>77.0</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>56.6</td>
<td>113</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>56.6</td>
<td>113</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>96.2</td>
<td>101</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>146</td>
<td>146</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>67.7</td>
<td>67.8</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>61.7</td>
<td>61.0</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>143</td>
<td>143</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>54.6</td>
<td>54.7</td>
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## Copyright

Copyright 2017-2019 Standard Performance Evaluation Corporation
Dell Inc. PowerEdge MX740C (Intel Xeon Silver 4208, 2.10GHz)

SPECrates2017_int_base = 81.3
SPECrates2017_int_peak = 84.0

Results Table

Benchmark | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
500.perlbench_r | 32 | 809 | **63.0** | 810 | 62.9 | 809 | 63.0 | 32 | 708 | **72.0** | 705 | 72.3 | 710 | 71.8
502.gcc_r | 32 | 653 | 69.4 | **657** | **69.0** | 658 | 68.9 | 32 | 588 | 77.0 | 587 | 77.2 | **588** | **77.0**
505.mcf_r | 32 | **459** | **113** | 459 | 113 | 458 | 113 | 32 | 457 | 113 | 459 | 113 | **459** | **113**
520.omnetpp_r | 32 | 738 | 56.9 | 744 | 56.5 | **742** | **56.6** | 32 | **741** | **56.6** | 738 | 56.9 | 743 | 56.5
523.xalancbmk_r | 32 | 352 | 96.1 | **351** | **96.2** | 350 | 96.6 | 32 | 335 | 101 | **336** | **101** | 337 | 100
525.x264_r | 32 | **383** | **146** | 387 | 145 | 381 | 147 | 32 | 367 | 153 | 368 | 152 | **368** | **152**
531.deepsjeng_r | 32 | 541 | 67.8 | **542** | **67.7** | 542 | 67.6 | 32 | 542 | 67.7 | **541** | **67.8** | 541 | 67.8
541.leela_r | 32 | **859** | **61.7** | 858 | 61.7 | 867 | 61.1 | 32 | 832 | 63.7 | 869 | 61.0 | **868** | **61.0**
548.exchange2_r | 32 | 588 | 143 | **588** | **143** | 590 | 142 | 32 | 588 | 143 | **589** | **142** | 589 | 142
557.xz_r | 32 | 633 | 54.6 | **633** | **54.6** | 632 | 54.7 | 32 | 632 | 54.7 | 632 | 54.6 | **632** | **54.7**

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)
Dell Inc.

PowerEdge MX740C (Intel Xeon Silver 4208, 2.10GHz)

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**SPECrate2017_int_peak = 84.0**

CPU2017 License: 55
Test Sponsor: Dell Inc.
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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:
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 Tue Apr 23 21:46:41 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)
## 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: 2032.061
- 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 pdelgb rdtsscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrpr pdcm pcid dca dcm ia32e flag

```
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 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
node 0 size: 386394 MB
node 0 free: 385822 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
node 1 size: 387068 MB
node 1 free: 386633 MB
node distances:
node   0   1
0:  10  21
1:  21  10
```

(Continued on next page)
SPECCPU2017 Integer Rate Result

Dell Inc.

PowerEdge MX740C (Intel Xeon Silver 4208, 2.10GHz)

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SPECrate2017_int_peak = 84.0

CPU2017 License: 55
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Test Date: Mar-2019
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Platform Notes (Continued)

From /proc/meminfo
MemTotal: 792025848 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 4.15.0-46-generic #49-Ubuntu SMP Wed Feb 6 09:33:07 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 Apr 23 21:45

SPEC is set to: /home/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 ext4 439G 20G 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. 2.2.1 02/19/2019
  Memory:
    5x 002C00B3002C 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666, configured at 2400
    8x 002C0632002C 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666, configured at 2400
    11x 00AD063200AD HMA84GR7A4R4N-VK 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
Dell Inc.

PowerEdge MX740C (Intel Xeon Silver 4208, 2.10GHz)

**SPEC CPU2017 Integer Rate Result**

---

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---

### Dell Inc.

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Test Date:** Mar-2019

**Hardware Availability:** Apr-2019

**Tested by:** Dell Inc.

**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

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---

**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

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---

**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

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---

**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

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---

**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

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(Continued on next page)
Dell Inc.
PowerEdge MX740C (Intel Xeon Silver 4208, 2.10GHz)

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

Compiler Version Notes (Continued)
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------------------------------------------------------------------------------

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)
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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)
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### Peak Optimization Flags (Continued)

500.perlbench_r (continued):
-\texttt{-fno-strict-overflow}\n-\texttt{-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64}
-\texttt{-lqkmalloc}\n
502.gcc_r:\texttt{-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}\n
505.mcf_r:\texttt{-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}
-\texttt{-lqkmalloc}\n
525.x264_r:\texttt{-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}
-\texttt{-lqkmalloc}\n
557.xz_r: Same as 505.mcf_r

### C++ benchmarks:

520.omnetpp_r:\texttt{-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}
-\texttt{-lqkmalloc}\n
523.xalancbmk_r:\texttt{-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}\n
531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

### Fortran benchmarks:

-\texttt{-lqkmalloc}\n
The flags files that were used to format this result can be browsed at


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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 2019-04-23 17:46:40-0400.
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