**Dell Inc.**

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

**SPEC CPU®2017 Integer Speed Result**

**SPECspeed®2017_int_base = 8.55**

**SPECspeed®2017_int_peak = 8.80**

---

**Hardware**

- **CPU Name:** Intel Xeon Silver 4208
- **Max MHz:** 3200
- **Nominal:** 2100
- **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:** 11 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
- **Storage:** 125 GB on tmpfs
- **Other:** None

---

**Software**

- **OS:** Red Hat Enterprise Linux 8.4 (Ootpa)
- **Compiler:** C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
  Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
  C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Parallel:** Yes
- **Firmware:** Version 2.12.2 released Jul-2021
- **File System:** tmpfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10 GHz)

Results Table

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<tr>
<th>Benchmark</th>
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<th>Seconds</th>
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<td>16.1</td>
<td>382</td>
<td>16.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Operating System Notes

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

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/mnt/ramdisk/kavya/lib/intel64:/mnt/ramdisk/kavya/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
  /proc/sys/vm/drop_caches
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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)

(Continued on next page)
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10 GHz)

**SPEC CPU®2017 Integer Speed Result**

<table>
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<td>8.80</td>
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</tbody>
</table>

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

**General Notes (Continued)**

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.

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

**Platform Notes**

BIOS Settings:
- Logical Processor : Disabled
- Virtualization Technology : Disabled

- System Profile : Custom
- CPU Power Management : Maximum Performance
- C1E : Disabled
- C States : Autonomous
- Memory Patrol Scrub : Disabled
- Energy Efficiency Policy : Performance
- CPU Interconnect Bus Link
  - Power Management : Disabled
- PCI ASPM L1 Link
  - Power Management : Disabled

Sysinfo program /mnt/ramdisk/kavya/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6c64d
running on localhost.localdomain Wed Oct 27 13:05:25 2021

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)
  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 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7

From lscpu from util-linux 2.32.1:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit

(Continued on next page)
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10 GHz)

| SPECspeed®2017_int_base = 8.55 |
| SPECspeed®2017_int_peak = 8.80 |

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

| Test Date: Oct-2021 |
| Hardware Availability: Apr-2019 |
| Software Availability: May-2021 |

**Platform Notes (Continued)**

| Byte Order: | Little Endian |
| CPU(s): | 16 |
| On-line CPU(s) list: | 0-15 |
| Thread(s) per core: | 1 |
| Core(s) per socket: | 8 |
| Socket(s): | 2 |
| NUMA node(s): | 2 |
| Vendor ID: | GenuineIntel |
| BIOS Vendor ID: | Intel |
| CPU family: | 6 |
| Model: | 85 |
| Model name: | Intel(R) Xeon(R) Silver 4208 CPU @ 2.10GHz |
| BIOS Model name: | Intel(R) Xeon(R) Silver 4208 CPU @ 2.10GHz |
| Stepping: | 6 |
| CPU MHz: | 2494.158 |
| CPU max MHz: | 3200.0000 |
| CPU min MHz: | 800.0000 |
| 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 |
| NUMA node1 CPU(s): | 1,3,5,7,9,11,13,15 |
| 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 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 xтур pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 dcp_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced fsbgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaves xsaveopt xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d arch_capabilities |

/cache data

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
node 0 size: 192075 MB
node 0 free: 191576 MB
node 1 cpus: 1 3 5 7 9 11 13 15

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

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

SPECspeed®2017_int_base = 8.55
SPECspeed®2017_int_peak = 8.80

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

Test Date: Oct-2021
Hardware Availability: Apr-2019
Software Availability: May-2021

Platform Notes (Continued)

node 1 size: 193496 MB
node 1 free: 183799 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
  MemTotal:       394825592 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

/sbin/tuned-adm active
  Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.4 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.4"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:
  Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):
  KVM: Mitigation: Split huge pages
CVE-2018-3620 (L1 Terminal Fault):
  Not affected
Microarchitectural Data Sampling:
  Not affected
CVE-2017-5754 (Meltdown):
  Mitigation: Speculative Store Bypass disabled via prct1 and seccomp
CVE-2018-3639 (Speculative Store Bypass):
  Mitigation: usercopy/swapps barriers and __user pointer
CVE-2017-5753 (Spectre variant 1):

(Continued on next page)
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10 GHz)

SPEC CPU®2017 Integer Speed Result

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Dell Inc.

SPECspeed®2017_int_base = 8.55

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CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Oct-2021
Hardware Availability: Apr-2019
Tested by: Dell Inc.
Software Availability: May-2021

Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2): sanitation
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected

run-level 3 Oct 27 13:00

SPEC is set to: /mnt/ramdisk/kavya

Filesystem       Type      Size  Used  Avail Use% Mounted on
    tmpfs          tmpfs   125G   4.4G  121G   4% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge M640
    Product Family: PowerEdge

Additional information from dmidecode 3.2 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.

Memory:
    6x 002C069D002C 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933, configured at 2400
    4x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2400
    2x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2400

BIOS:
    BIOS Vendor:       Dell Inc.
    BIOS Version:      2.12.2
    BIOS Date:         07/12/2021
    BIOS Revision:     2.12

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(peak)
==============================================================================

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)

(Continued on next page)
SPECCPU®2017 Integer Speed Result

Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10 GHz)

SPECspeed®2017_int_base = 8.55
SPECspeed®2017_int_peak = 8.80

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Oct-2021
Hardware Availability: Apr-2019
Software Availability: May-2021

Compiler Version Notes (Continued)

<table>
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<tr>
<th>625.x264_s(base, peak) 657.xz_s(base, peak)</th>
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</table>

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------------------------------------------
C       | 600.perlbench_s(peak)
------------------------------------------------------------------------------------------------------------------

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------------------------------------------
Fortran | 648.exchange2_s(base, peak) |
------------------------------------------------------------------------------------------------------------------

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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Base Compiler Invocation

C benchmarks:
icx

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

<table>
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</tbody>
</table>

**Base Compiler Invocation (Continued)**

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

**Base Portability Flags**

```diff
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:
- -DSPEC_OPENMP -std=c11 -m64 -fopenmp -Wl,-z,muldefs -xCORE-AVX2
- -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
- -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
- -DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
- -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- -mbranches-within-32B-boundaries
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
  -lgkmalloc

Fortran benchmarks:
- -m64 -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs -align array32byte -auto
- -mbranches-within-32B-boundaries
**SPEC CPU®2017 Integer Speed Result**

**Dell Inc.**

PowerEdge M640 (Intel Xeon Silver 4208, 2.10 GHz)  

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CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test Date: Oct-2021  
Hardware Availability: Apr-2019  
Software Availability: May-2021

**Peak Compiler Invocation**

C benchmarks (except as noted below):

- icx
  - 600.perlbench_s: icc

C++ benchmarks:

- icpx

Fortran benchmarks:

- ifort

**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) -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -fno-strict-overflow -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

- 602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2) -xCORE-AVX2 -flto -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

- 605.mcf_s: basepeak = yes

- 625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -flto -O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

- 657.xz_s: basepeak = yes

(Continued on next page)
Dell Inc.

PowerEdge M640 (Intel Xeon Silver 4208, 2.10 GHz)

SPECs\textsuperscript{\textregistered}2017\textsubscript{int}_\textsuperscript{peak} = 8.80

SPECs\textsuperscript{\textregistered}2017\textsubscript{int}_\textsuperscript{base} = 8.55

Table:

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<tr>
<td>Software Availability</td>
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</tbody>
</table>

**Peak Optimization Flags (Continued)**

C++ benchmarks:

620.omnetpp\_s: basepeak = yes

623.xalancbmk\_s: basepeak = yes

631.deepsjeng\_s: basepeak = yes

641.leela\_s: basepeak = yes

Fortran benchmarks:

648.exchange2\_s: basepeak = yes

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:

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64\_revA.xml

http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX\_rev1.4.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU\textsuperscript{\textregistered}2017 v1.1.8 on 2021-10-27 13:05:25-0400.


Originally published on 2021-11-23.