# Dell Inc.  
## PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)  

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>59.0</td>
<td>60.3</td>
</tr>
<tr>
<td>603.bwaves_s</td>
<td></td>
<td>76.1</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td></td>
<td>78.8</td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>31.0</td>
<td>33.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>53.4</td>
<td>56.4</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>42.2</td>
<td>43.5</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>40.3</td>
<td>45.5</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td></td>
<td>40.3</td>
</tr>
<tr>
<td>644.nab_s</td>
<td></td>
<td>86.9</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td></td>
<td>86.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td></td>
<td>61.1</td>
</tr>
</tbody>
</table>

---

### Hardware

- **CPU Name:** Intel Xeon Silver 4110
- **Max MHz.:** 3000
- **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
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage:** 1 TB SATA SSD
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP3 4.4.114-94.11-default
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 0.3.15 released Mar-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
## Dell Inc.

PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>188</td>
<td>314</td>
<td>32</td>
<td>188</td>
<td>314</td>
<td>32</td>
<td>188</td>
<td>314</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>219</td>
<td>76.2</td>
<td>32</td>
<td>219</td>
<td>76.1</td>
<td>32</td>
<td>219</td>
<td>76.1</td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>32</td>
<td>168</td>
<td>31.1</td>
<td>32</td>
<td>169</td>
<td>31.0</td>
<td>32</td>
<td>169</td>
<td>31.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>246</td>
<td>53.7</td>
<td>32</td>
<td>248</td>
<td>53.4</td>
<td>32</td>
<td>248</td>
<td>53.3</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>210</td>
<td>42.2</td>
<td>32</td>
<td>209</td>
<td>42.4</td>
<td>32</td>
<td>210</td>
<td>42.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>272</td>
<td>43.7</td>
<td>32</td>
<td>272</td>
<td>43.6</td>
<td>32</td>
<td>273</td>
<td>43.5</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>32</td>
<td>358</td>
<td>40.3</td>
<td>32</td>
<td>358</td>
<td>40.3</td>
<td>32</td>
<td>358</td>
<td>40.3</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>32</td>
<td>201</td>
<td>86.9</td>
<td>32</td>
<td>201</td>
<td>86.9</td>
<td>32</td>
<td>201</td>
<td>86.9</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>155</td>
<td>58.8</td>
<td>32</td>
<td>155</td>
<td>59.0</td>
<td>32</td>
<td>150</td>
<td>60.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>258</td>
<td>61.1</td>
<td>32</td>
<td>258</td>
<td>61.0</td>
<td>32</td>
<td>257</td>
<td>61.2</td>
</tr>
</tbody>
</table>

### 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:

- KMP_AFFINITY = "granularity=fine,compact"
- OMP_STACKSIZE = "192M"

- Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
- Yes: 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:
  ```bash
  sync; echo 3> /proc/sys/vm/drop_caches
  ```

### Platform Notes

- BIOS settings:
  - Sub NUMA Cluster Disabled
  - Virtualization Technology Disabled

(Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

**Dell Inc.**

PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)

---

### SPECspeed2017_fp_base = 62.6

### SPECspeed2017_fp_peak = 63.9

---

*CPU2017 License:* 55  
*Test Sponsor:* Dell Inc.  
*Test Date:* Apr-2018  
*Hardware Availability:* Sep-2017  
*Tested by:* Dell Inc.  
*Software Availability:* Sep-2017

---

### Platform Notes (Continued)

- 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 /root/cpu2017/bin/sysinfo
- Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcco91c0f
- running on linux-9px5 Tue Apr 10 13:53:43 2018

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 4110 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
- 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 4110 CPU @ 2.10GHz
- Stepping: 4
- CPU MHz: 2095.086
- BogoMIPS: 4190.17
- Virtualization: VT-x

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

Dell Inc.
PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)

SPECspeed2017_fp_base = 62.6
SPECspeed2017_fp_peak = 63.9

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

Test Date: Apr-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu 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 ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vnumi flexpriority
ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm cqm mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm_llc cqm_occup_llc pln pts

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: 192118 MB
node 0 free: 187432 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
node 1 size: 193516 MB
node 1 free: 189621 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 394890860 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:

(Continued on next page)
Dell Inc.
PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)

SPECspeed2017_fp_base = 62.6
SPECspeed2017_fp_peak = 63.9

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

Platform Notes (Continued)

NAME="SLES"
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
    Linux linux-9px5 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Apr 7 00:48

SPEC is set to: /root/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 565G 20G 545G 4% /

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. 0.3.15 03/12/2018
    Memory:
        19x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666, configured at 2400
        1x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
        4x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
CC  619.lbm_s(peak)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
Dell Inc.
PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)

SPECspeed2017_fp_base = 62.6
SPECspeed2017_fp_peak = 63.9

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

Test Date: Apr-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Compiler Version Notes (Continued)

==============================================================================
FC  607.cactuBSSN_s(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC   607.cactuBSSN_s(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  621.wrf_s(peak) 628.pop2_s(peak)
(Continued on next page)
Dell Inc.
PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)

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

Test Date: Apr-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2017

Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
                     -assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

Dell Inc.
PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)  

| SPECspeed2017_fp_base = 62.6 |
| SPECspeed2017_fp_peak = 63.9 |

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

Test Date: Apr-2018  
Hardware Availability: Sep-2017  
Software Availability: Sep-2017

Base Optimization Flags (Continued)

Fortran benchmarks:  
-DSPEC_OPENMP -xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp  
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:  
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs -align array32byte

Base Other Flags

C benchmarks:  
-m64 -std=c11

Fortran benchmarks:  
-m64

Benchmarks using both Fortran and C:  
-m64 -std=c11

Benchmarks using Fortran, C, and C++:  
-m64 -std=c11

Peak Compiler Invocation

C benchmarks:  
icc

Fortran benchmarks:  
ifort

Benchmarks using both Fortran and C:  
ifort icc

Benchmarks using Fortran, C, and C++:  
icpc icc ifort
SPEC CPU2017 Floating Point Speed Result

Dell Inc.  
PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)  

SPECspeed2017_fp_base = 62.6  
SPECspeed2017_fp_peak = 63.9

CPU2017 License: 55  
Test Date: Apr-2018  
Test Sponsor: Dell Inc.  
Hardware Availability: Sep-2017  
Tested by: Dell Inc.  
Software Availability: Sep-2017

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP

638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

644.nab_s: Same as 638.imagick_s

Fortran benchmarks:
-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
### SPEC CPU2017 Floating Point Speed Result

**Dell Inc.**

PowerEdge MX740c (Intel Xeon Silver 4110 CPU, 2.10GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>62.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>63.9</td>
</tr>
</tbody>
</table>

**CPUs**

- Test Date: Apr-2018
- Hardware Availability: Sep-2017
- Software Availability: Sep-2017

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

---

#### Peak Other Flags

C benchmarks:

- `-m64 -std=c11`

Fortran benchmarks:

- `-m64`

Benchmarks using both Fortran and C:

- `-m64 -std=c11`

Benchmarks using Fortran, C, and C++:

- `-m64 -std=c11`

---

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:

- [Dell-Platform-Flags-PowerEdge14G-revC.xml](http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revC.xml)

---

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.2 on 2018-04-10 14:53:42-0400.  
Originally published on 2018-09-04.