Dell Inc.

PowerEdge MX840c (Intel Xeon Gold 6144, 3.50GHz)

<table>
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<tr>
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**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test Date:** Sep-2018  
**Hardware Availability:** Sep-2018  
**Software Availability:** Jun-2018

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

**Hardware**

**CPU Name:** Intel Xeon Gold 6144  
**Max MHz.:** 4200  
**Nominal:** 3500  
**Enabled:** 32 cores, 4 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:** 24.75 MB I+D on chip per core  
**Other:** None  
**Memory:** 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
**Storage:** 960 GB SATA SSD  
**Other:** None

**Software**

**OS:** SUSE Linux Enterprise Server 12 SP3  
**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 1.6.0 released Jul-2018  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None
Dell Inc.
PowerEdge MX840c (Intel Xeon Gold 6144, 3.50GHz)

SPECspeed2017_fp_base = 136
SPECspeed2017_fp_peak = 138

Results Table

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<td>76.1</td>
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</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:
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 MX840c (Intel Xeon Gold 6144, 3.50GHz)

SPECspeed2017_fp_base = 136
SPECspeed2017_fp_peak = 138

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

Platform Notes (Continued)

System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1EE Disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub Disabled
Logical Processor Disabled
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 96c45e45f5d4c135fd618b0a01c0f
running on linux-0x7z Wed Sep 26 20:56:56 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) Gold 6144 CPU @ 3.50GHz
  4 "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 : 8
physical 0: cores 0 2 3 9 16 19 26 27
physical 1: cores 0 2 3 9 16 19 26 27
physical 2: cores 0 2 3 9 16 19 26 27
physical 3: cores 0 2 3 9 16 19 26 27

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: 1
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 6144 CPU @ 3.50GHz
Stepping: 4
CPU MHz: 3491.785

(Continued on next page)
Dell Inc.
PowerEdge MX840c (Intel Xeon Gold 6144, 3.50GHz)

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Platform Notes (Continued)

BogoMIPS: 6983.57
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28
NUMA node1 CPU(s): 1,5,9,13,17,21,25,29
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31
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 ntopology nonstop_tsc
aperfmperf 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 ssbd ibpb stibp retpoline kaiser tpr_shadow vnni
flexpriority ept vpid fsgsbase tsc_adjust bmi1 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 pku ospke

From /proc/cpuinfo cache data
  cache size : 25344 KB
  From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
  physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0 4 8 12 16 20 24 28
    node 0 size: 192125 MB
    node 0 free: 187877 MB
    node 1 cpus: 1 5 9 13 17 21 25 29
    node 1 size: 193526 MB
    node 1 free: 192461 MB
    node 2 cpus: 2 6 10 14 18 22 26 30
    node 2 size: 193526 MB
    node 2 free: 192475 MB
    node 3 cpus: 3 7 11 15 19 23 27 31
    node 3 size: 193524 MB
    node 3 free: 191840 MB
    node distances:
      node 0 1 2 3
      0: 10 21 21 21
      1: 21 10 21 21
      2: 21 21 10 21
      3: 21 21 21 10

From /proc/meminfo

(Continued on next page)
<table>
<thead>
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<th>Dell Inc.</th>
<th>SPEC CPU2017 Floating Point Speed Result</th>
</tr>
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<tr>
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| CPU2017 License: 55 | Test Date: Sep-2018 |
| Test Sponsor: Dell Inc. | Hardware Availability: Sep-2018 |
| Tested by: Dell Inc. | Software Availability: Jun-2018 |

**Platform Notes (Continued)**

```
MemTotal: 791246976 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:
    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-0x7z 4.4.138-8.g8686768-default #1 SMP Mon Jun 25 17:25:25 UTC 2018
  (8686768) x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Sep 26 16:19
```

```
SPEC is set to: /root/cpu2017
```

```
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs    927G  32G  896G   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. 1.6.0 07/19/2018
Memory:
  26x 002C00B3002C 18ASF2G72FD2-2G6D1 16 GB 2 rank 2666
  2x 00AD00B300AD HMA82GGR7AFR8N-VK 16 GB 2 rank 2666
  1x 00AD063200AD HMA82GGR7AFR8N-VK 16 GB 2 rank 2666
  19x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666
```

(End of data from sysinfo program)
## SPEC CPU2017 Floating Point Speed Result

### Dell Inc.

**PowerEdge MX840c (Intel Xeon Gold 6144, 3.50GHz)**

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- **Test Sponsor:** Dell Inc.
- **Tested by:** Dell Inc.
- **Test Date:** Sep-2018
- **Hardware Availability:** Sep-2018
- **Software Availability:** Jun-2018

### Compiler Version Notes

```plaintext
==============================================================================
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.
==============================================================================
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

(Continued on next page)
Dell Inc.
PowerEdge MX840c (Intel Xeon Gold 6144, 3.50GHz)

SPECspeed2017_fp_base = 136
SPECspeed2017_fp_peak = 138

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

Compiler Version Notes (Continued)

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.bm_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

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

**Dell Inc.**

PowerEdge MX840c (Intel Xeon Gold 6144, 3.50GHz)

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**Base Portability Flags (Continued)**

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-AVX512  -ipo  -O3  -no-prec-div  -qopt-prefetch  
-ffinite-math-only  -qopt-mem-layout-trans=3  -qopenmp  -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP  -xCORE-AVX512  -ipo  -O3  -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-AVX512  -ipo  -O3  -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-AVX512  -ipo  -O3  -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
SPEC CPU2017 Floating Point Speed Result

Dell Inc.
PowerEdge MX840c (Intel Xeon Gold 6144, 3.50GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 136</th>
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</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak = 138</td>
</tr>
</tbody>
</table>

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

Test Date: Sep-2018
Hardware Availability: Sep-2018
Software Availability: Jun-2018

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

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-AVX512
-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-AVX512 -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-AVX512 -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-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp

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

621.wrf_s (continued):
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -openmp
-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-AVX512 -qopt-prefetch
-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -openmp -DSPEC_OPENMP -nostandard-realloc-lhs
-align array32byte

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:

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