Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6146, 3.20GHz)  

| SPECspeed2017_fp_base = 98.5 |
| SPECspeed2017_fp_peak = 99.7 |

| Threads | 0  | 20  | 40  | 60  | 80  | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 |
|---------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

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

### Hardware
- **CPU Name:** Intel Xeon Gold 6146  
- **Max MHz.:** 4200  
- **Nominal:** 3200  
- **Enabled:** 24 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:** 24.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)  
- **Storage:** 960 GB SAS 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 0.4.4 released May-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 Gold 6146, 3.20GHz)

SPECspeed2017_fp_base = 98.5
SPECspeed2017_fp_peak = 99.7

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td></td>
<td></td>
<td>Base</td>
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<td>Peak</td>
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<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>132</td>
<td>446</td>
<td>135</td>
<td>436</td>
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<td>432</td>
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<td>607.cactuBSSN_s</td>
<td>24</td>
<td>142</td>
<td>118</td>
<td>144</td>
<td>116</td>
<td>143</td>
<td>117</td>
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<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>125</td>
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<td>40.8</td>
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<td>621.wrf_s</td>
<td>24</td>
<td>158</td>
<td>83.7</td>
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<td>84.2</td>
<td>158</td>
<td>83.6</td>
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<td>627.cam4_s</td>
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<td>628.pop2_s</td>
<td>24</td>
<td>185</td>
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<td>63.7</td>
<td>187</td>
<td>63.6</td>
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<td>638.imagick_s</td>
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<td>165</td>
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<tr>
<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
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<td>107</td>
<td>145</td>
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<td>144</td>
<td>109</td>
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</tbody>
</table>

SPECspeed2017_fp_base = 98.5
SPECspeed2017_fp_peak = 99.7

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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 MX740c (Intel Xeon Gold 6146, 3.20GHz)

SPECspeed2017_fp_base = 98.5
SPECspeed2017_fp_peak = 99.7

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 96c45e4568ad54c135fd618bccc091c0f
running on linux-5y3r Fri Jun 1 22:14:43 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) Gold 6146 CPU @ 3.20GHz
  2 "physical id"s (chips)
  24 "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 : 12
siblings : 12
  physical 0: cores 0 1 2 3 4 9 10 16 18 19 25 26
  physical 1: cores 0 1 2 3 4 9 10 16 18 19 25 26

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                24
On-line CPU(s) list:   0-23
Thread(s) per core:    1
Core(s) per socket:    12
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
Stepping:              4
CPU MHz:               3192.481
BogoMIPS:              6384.96
Virtualization:        VT-x

(Continued on next page)
Dell Inc.  
PowerEdge MX740c (Intel Xeon Gold 6146, 3.20GHz)  

**SPECs**

---

<table>
<thead>
<tr>
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<tbody>
<tr>
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---

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

---

**Platform Notes (Continued)**

- L1d cache: 32K  
- L1i cache: 32K  
- L2 cache: 1024K  
- L3 cache: 25344K  
- NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22  
- NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23  
- 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 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 epb invlpg dtlbtlbi mcm cpb mfcpu
- /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: 2 nodes (0-1)  
- node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22  
- node 0 size: 192122 MB  
- node 0 free: 188322 MB  
- node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23  
- node 1 size: 193517 MB  
- node 1 free: 189488 MB  
- node distances:  
  - node 0 1  
    - 0: 10 21  
    - 1: 21 10

---

**From /proc/meminfo**  
MemTotal: 394895024 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

---

**From /usr/bin/lsb_release -d**  
SUSE Linux Enterprise Server 12 SP3

---

**From /etc/*release*/ etc/*version**  
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)  
VERSION = 12  
PATCHLEVEL = 3

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

Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6146, 3.20GHz)

SPECspeed2017_fp_base = 98.5
SPECspeed2017_fp_peak = 99.7

<table>
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<td>Sep-2018</td>
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<td>Dell Inc.</td>
<td>Dell Inc.</td>
<td></td>
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Specspeed2017_fp_base = 98.5
Specspeed2017_fp_peak = 99.7

**Compiler Version Notes**

```
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
```

**Platform Notes (Continued)**

```
# 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-5y3r 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 Jun 1 17:33

SPEC is set to: /root/cpu2017
  Filesystem  Type  Size  Used  Avail  Use%  Mounted on
  /dev/sda3    xfs   882G   24G  859G    3%  /
```

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. 0.4.4 05/22/2018

Memory:
  6x 00AD00B300AD HMA84GR7AFR4N-VK 32 GB 2 rank 2666
  6x 00AD063200AD HMA84GR7AFR4N-VK 32 GB 2 rank 2666
  12x Not Specified Not Specified

(End of data from sysinfo program)

(Continued on next page)
Dell Inc.  
PowerEdge MX740c (Intel Xeon Gold 6146, 3.20GHz)  

SPECspeed2017_fp_base = 98.5  
SPECspeed2017_fp_peak = 99.7  

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

Compiler Version Notes (Continued)

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  
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.

(Continued on next page)
**Dell Inc.**  
PowerEdge MX740c (Intel Xeon Gold 6146, 3.20GHz)

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

**Compiler Version Notes (Continued)**

```
==============================================================================
CC   621.wrf_s(peak) 628.pop2_s(peak)                                      
------------------------------------------------------------------------------
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                                             
```
Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6146, 3.20GHz)

SPECspeed2017_fp_base = 98.5
SPECspeed2017_fp_peak = 99.7

CPU2017 License: 55
Test Sponsor: Dell Inc.
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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

Peak Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

(Continued on next page)
Dell Inc.
PowerEdge MX740c (Intel Xeon Gold 6146, 3.20GHz)

SPECspeed2017_fp_base = 98.5
SPECspeed2017_fp_peak = 99.7

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

Peak Compiler Invocation (Continued)

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
-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 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

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

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 -qopenmp -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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