**SPEC® CPU2017 Floating Point Rate Result**

**Dell Inc.**
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

<table>
<thead>
<tr>
<th>Code</th>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tr>
<td>503.bwaves_r</td>
<td>16</td>
<td>59.8</td>
<td>60.1</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>16</td>
<td>46.3</td>
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<td>508.namd_r</td>
<td>16</td>
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<td>35.4</td>
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<td>510.parest_r</td>
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<td>538.imagick_r</td>
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<td>544.nab_r</td>
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<td>549.fotonik3d_r</td>
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<td>76.2</td>
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<tr>
<td>554.roms_r</td>
<td>16</td>
<td>45.7</td>
<td>48.3</td>
</tr>
</tbody>
</table>

**Hardware**
- **CPU Name:** Intel Xeon Bronze 3106
- **Max MHz.:** 1700
- **Nominal:** 1700
- **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 core
- **Other:** None
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)
- **Storage:** 960 GB SAS 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:** No
- **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
SPEC CPU2017 Floating Point Rate Result

Dell Inc.
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

SPECrate2017_fp_base = 59.8
SPECrate2017_fp_peak = 60.1

Results Table

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

SPECrate2017_fp_base = 59.8
SPECrate2017_fp_peak = 60.1

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:

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
Dell Inc.
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

SPECrate2017_fp_base = 59.8
SPECrate2017_fp_peak = 60.1

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

General Notes (Continued)

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>

Platform Notes

BIOS settings:
Sub NUMA Cluster Disabled
Virtualization Technology Disabled
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
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-kuth Tue Jun 5 00:49:28 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) Bronze 3106 CPU @ 1.70GHz
        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:
    Architecture:       x86_64
    CPU op-mode(s):     32-bit, 64-bit
    Byte Order:         Little Endian
    CPU(s):             16
    On-line CPU(s) list: 0-15
    Thread(s) per core: 1
    Core(s) per socket: 8

(Continued on next page)
Dell Inc.

PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

SPECrate2017_fp_base = 59.8
SPECrate2017_fp_peak = 60.1

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

Hardware Availability: Sep-2017
Software Availability: Sep-2017

Platform Notes (Continued)

Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1696.003
BogoMIPS: 3392.00
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 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
aperfmprefp eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpre pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb invpcid_single pln pts
d Humph intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vmx 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 xgetbvl cqmm_llc cqmm_occup_llc pku ospke

From /proc/cpuinfo cache data
  cache size : 11264 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
  node 0 size: 95354 MB
  node 0 free: 94988 MB
  node 1 cpus: 1 3 5 7 9 11 13 15
  node 1 size: 96749 MB
  node 1 free: 96413 MB
  node distances:
    node  0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 196715324 kB
  HugePages_Total: 0

(Continued on next page)
Dell Inc.
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

SPECrate2017_fp_base = 59.8
SPECrate2017_fp_peak = 60.1

Platform Notes (Continued)

Hugepagesize: 2048 kB

/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
    # 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"
        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-kuth 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 4 15:25

SPEC is set to: /root/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda2 xfs 890G 18G 873G 2% /

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:
        12x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2133
        12x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
==============================================================================

(Continued on next page)
## Dell Inc.

**PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)**

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<thead>
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<th>Test Date: Jun-2018</th>
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<tbody>
<tr>
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<td>Hardware Availability: Sep-2017</td>
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<td>Software Availability: Sep-2017</td>
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### SPEC CPU2017 Floating Point Rate Result

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tr>
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### Compiler Version Notes (Continued)

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

 CC  519.lbm_r(peak) 544.nab_r(peak)

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

 CC  519.lbm_r(peak) 544.nab_r(peak)

CXXC 508.namd_r(base) 510.parest_r(base)

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

CXXC 508.namd_r(peak) 510.parest_r(peak)

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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

 CC  511.povray_r(base) 526.blender_r(base)

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icc (ICC) 18.0.0 20170811
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 CC  511.povray_r(peak) 526.blender_r(peak)

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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
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 FC  507.cactuBSSN_r(base)

(Continued on next page)```
Dell Inc.
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

1.70GHz)
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

SPECrate2017_fp_peak = 60.1
SPECrate2017_fp_base = 59.8

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

Compiler Version Notes (Continued)

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 507.cactuBSSN_r(peak)
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icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
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FC 554.roms_r(peak)
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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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Compiler Version Notes (Continued)

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

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### Base Compiler Invocation

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<td>Fortran benchmarks:</td>
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<td>icpc icc</td>
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### Base Portability Flags

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503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
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**SPEC CPU2017 Floating Point Rate Result**

**Dell Inc.**

PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

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**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Jun-2018

**Hardware Availability:** Sep-2017

**Software Availability:** Sep-2017

---

**Base Optimization Flags**

**C benchmarks:**

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3

**C++ benchmarks:**

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3

**Fortran benchmarks:**

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C:**

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

**Benchmarks using both C and C++:**

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3

**Benchmarks using Fortran, C, and C++:**

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

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**Base Other Flags**

**C benchmarks:**

-m64 -std=c11

**C++ benchmarks:**

-m64

**Fortran benchmarks:**

-m64

**Benchmarks using both Fortran and C:**

-m64 -std=c11

**Benchmarks using both C and C++:**

-m64 -std=c11

**Benchmarks using Fortran, C, and C++:**

-m64 -std=c11
Dell Inc.
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz) | SPECrate2017_fp_base = 59.8
SPECrate2017_fp_peak = 60.1

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

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

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

544.nab_r: Same as 519.lbm_r

C++ benchmarks:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:

(Continued on next page)
Dell Inc.
PowerEdge MX740c (Intel Xeon Bronze 3106 CPU, 1.70GHz)

SPEC CPU2017 Floating Point Rate Result

SPECrate2017_fp_base = 59.8
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

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

Peak Optimization Flags (Continued)

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

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-align array32byte

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

Benchmarks using both C and C++:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Peak Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

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

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

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

Dell Inc.
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Peak Other Flags (Continued)

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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