Dell Inc.  

PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)  

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Mar-2018  
**Hardware Availability:** Sep-2017  
**Software Availability:** Feb-2018

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<th>Threads</th>
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<tr>
<td>607.cactuBSSN_s 40</td>
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<td>619.ibm_s 40</td>
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<tr>
<td>621.wrf_s 40</td>
<td>43.6</td>
<td></td>
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<td>627.cam4_s 40</td>
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<td>628.pop2_s 40</td>
<td>64.1</td>
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<td>638.imagick_s 40</td>
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<td>644.nab_s 40</td>
<td>82.6</td>
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<tr>
<td>649.fotonik3d_s 40</td>
<td>82.4</td>
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<tr>
<td>654.roms_s 40</td>
<td>124</td>
<td></td>
</tr>
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</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6138  
- **Max MHz.:** 3700  
- **Nominal:** 2000  
- **Enabled:** 40 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:** 27.5 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 480 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 SP2  
  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 1.3.7 released Feb-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)

SPECspeed2017_fp_base = 108
SPECspeed2017_fp_peak = 109

Results Table

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<th>Ratio</th>
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<td>127</td>
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</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 108
SPECspeed2017_fp_peak = 109

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
## Dell Inc. PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)

<table>
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**CPU2017 License:** 55  
**Test Date:** Mar-2018  
**Hardware Availability:** Sep-2017  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Software Availability:** Feb-2018

### 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 disabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program /home/cpu2017rev5/cpu2017/bin/sysinfo
- Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c091c0f
- running on linux-bfgp Tue Mar 6 22:18:53 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 6138 CPU @ 2.00GHz
- 2 "physical id"s (chips)
- 40 "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 : 20
- siblings : 20
- physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
- physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

**From lscpu:**

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 40
- On-line CPU(s) list: 0-39
- Thread(s) per core: 1
- Core(s) per socket: 20
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz
- Stepping: 4
- CPU MHz: 1995.317
- BogoMIPS: 3990.63
- Virtualization: VT-x

(Continued on next page)
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)

SPECspeed2017_fp_base = 108
SPECspeed2017_fp_peak = 109

Platform Notes (Continued)

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39
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 nop1 xtopology nonstop_tsc
aperfimperf 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_cxsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority
epi vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  bdsm rdtscp jnp kmic mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm _llc cqm_occup_llc pku ospke

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 32 34 36 38
node 0 size: 191988 MB
node 0 free: 186599 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39
node 1 size: 193516 MB
node 1 free: 190676 MB
node distances:
node 0 1
 0:  10 21
 1:  21 10

From /proc/meminfo
MemTotal: 394756860 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
SUSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result
Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)

SPECspeed2017_fp_base = 108
SPECspeed2017_fp_peak = 109

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-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  Linux linux-bgfp 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 Mar 6 17:17

SPEC is set to: /home/cpu2017rev5/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   405G   59G  347G  15% /home

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. 1.3.7 02/08/2018
  Memory:
    22x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
    2x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666

(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.

(Continued on next page)
Dell Inc.  

PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)  

| SPECspeed2017_fp_base = 108 | SPECspeed2017_fp_peak = 109 |

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**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Mar-2018  
**Hardware Availability:** Sep-2017  
**Software Availability:** Feb-2018

### 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.
```

(Continued on next page)
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

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)  

**SPEC CPU2017 Floating Point Speed Result**  
Copyright 2017-2018 Standard Performance Evaluation Corporation

<table>
<thead>
<tr>
<th>SPECspeed2017 FP Peak</th>
<th>SPECspeed2017 FP Base</th>
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<tbody>
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**CPU2017 License:** 55  
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### Base Optimization Flags (Continued)

C benchmarks (continued):
- -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

Benchmarks using both Fortran and C:
- ifort icc

(Continued on next page)
Dell Inc.  
PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)  

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Hardware Availability: Sep-2017  
Software Availability: Feb-2018

Peak Compiler Invocation (Continued)

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)
Dell Inc. PowerEdge R740xd (Intel Xeon Gold 6138, 2.00GHz)

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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