<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Ubuntu 18.04.2 LTS</td>
<td>CPU Name: Intel Xeon Gold 6238</td>
</tr>
<tr>
<td>kernel 4.15.0-45-generic</td>
<td>Max MHz.: 3700</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 19.0.1.144 of Intel C/C++</td>
<td>Compiler Build 20181018 for Linux;</td>
</tr>
<tr>
<td>Compiler Build 20181018 for Linux</td>
<td>Fortran: Version 19.0.1.144 of Intel Fortran</td>
</tr>
<tr>
<td>Firmware: Version 2.2.11 released Jun-2019</td>
<td>Compiler Build 20181018 for Linux</td>
</tr>
<tr>
<td>File System: ext4</td>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>System State: Run level 5 (multi-user)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>Peak Pointers: 64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

**SPEC** CPU2017 Floating Point Speed Result

Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz)

| SPECspeed2017_fp_base = 130 |
| SPECspeed2017_fp_peak = 131 |

Test Date: Jul-2019

Hardware Availability: Jun-2019

Software Availability: Feb-2019

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base (130)</th>
<th>SPECspeed2017_fp_peak (131)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads</td>
<td>603.bwaves_s</td>
</tr>
<tr>
<td></td>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td></td>
<td>619.lbm_s</td>
</tr>
<tr>
<td></td>
<td>621.wrf_s</td>
</tr>
<tr>
<td></td>
<td>627.cam4_s</td>
</tr>
<tr>
<td></td>
<td>628.pop2_s</td>
</tr>
<tr>
<td></td>
<td>638.imagick_s</td>
</tr>
<tr>
<td></td>
<td>644.nab_s</td>
</tr>
<tr>
<td></td>
<td>649.fotonik3d_s</td>
</tr>
<tr>
<td></td>
<td>654.roms_s</td>
</tr>
</tbody>
</table>

**Hardware**

CPU Name: Intel Xeon Gold 6238

Max MHz.: 3700

Nominal: 2100

Enabled: 44 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: 30.25 MB I+D on chip per chip

Other: None

Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)

Storage: 1 x 960 GB SATA SSD

Other: None
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz)

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>44</td>
<td>121</td>
<td>487</td>
<td>123</td>
<td>479</td>
<td>124</td>
<td>474</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>44</td>
<td>116</td>
<td>144</td>
<td>116</td>
<td>144</td>
<td>116</td>
<td>144</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>44</td>
<td>55.4</td>
<td>94.6</td>
<td>56.1</td>
<td>93.3</td>
<td>56.4</td>
<td>92.8</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>44</td>
<td>110</td>
<td>120</td>
<td>110</td>
<td>121</td>
<td>105</td>
<td>126</td>
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<tr>
<td>627.cam4_s</td>
<td>44</td>
<td>92.1</td>
<td>96.2</td>
<td>92.1</td>
<td>96.2</td>
<td>92.0</td>
<td>96.3</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>44</td>
<td>185</td>
<td>64.3</td>
<td>185</td>
<td>64.0</td>
<td>183</td>
<td>64.8</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>44</td>
<td>117</td>
<td>123</td>
<td>118</td>
<td>123</td>
<td>118</td>
<td>123</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>44</td>
<td>76.6</td>
<td>228</td>
<td>76.7</td>
<td>228</td>
<td>76.7</td>
<td>228</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>44</td>
<td>112</td>
<td>81.3</td>
<td>113</td>
<td>80.8</td>
<td>112</td>
<td>81.6</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>44</td>
<td>118</td>
<td>134</td>
<td>118</td>
<td>133</td>
<td>120</td>
<td>132</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 130
SPECspeed2017_fp_peak = 131

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"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
NA: 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:
ADDDC setting disabled
Virtualization Technology disabled
## SPEC CPU2017 Floating Point Speed Result

### Dell Inc.

**PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>131</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Test Date:** Jul-2019  
**Tested by:** Dell Inc.  
**Hardware Availability:** Jun-2019  
**Software Availability:** Feb-2019

### Platform Notes (Continued)

- DCU Streamer Prefetcher 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
- Logical Processor disabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program /home/cpu2017/bin/sysinfo
- Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
- running on intel-sut Mon Jul 8 12:57:57 2019

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 6238 CPU @ 2.10GHz
  2 "physical id"s (chips)
  44 "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 : 22
siblings : 22
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 44
On-line CPU(s) list: 0-43
Thread(s) per core: 1
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 1509.635
BogoMIPS: 4200.00
```

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

Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz)

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

**SPECspeed2017_fp_base** = 130

**SPECspeed2017_fp_peak** = 131

**Test Date:** Jul-2019  
**Hardware Availability:** Jun-2019  
**Software Availability:** Feb-2019

---

**Platform Notes (Continued)**

Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 30976K

NUMA node0 CPU(s):  
2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42

NUMA node1 CPU(s): 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43

Flags:  
-fpu -vme -de -pse -tsc -msr -pae -mce -cx8 -apic -sep -mtrr -pge -mca -cmov
  -pat -pse36 -clflush -dts -acpi -fxsr -sse -sse2 -ss -ht -tm -pbe -syscall -nx -pdpe1gb -rdtscp
  -lm -constant_tsc -art -arch_perfmon -pebs -bts -rep_good -nop1 -xtopology -nonstop_tsc -cpuid
  -aperfmpref -pci -mulqdq -dtes64 -monitor -ds_cpl -vmx -smx -est -tm2 -ssse3 -sdbg -fma -cx16
  -xtrp -pdc -pcid -dca -sse4_1 -sse4_2 -x2apic -movbe -popcnt -aes -fxsr -sse -sse2 -ss -ht
  -tm -pbe -syscall -nx -pdpe1gb -rdtscp -lm -constant_tsc -art -arch_perfmon -pebs -bts -rep_good
  -nop1 -xtopology -nonstop_tsc -cpuid -aperfmpref -pci -mulqdq -dtes64 -monitor -ds_cpl -vmx -smx
  -est -tm2 -ssse3 -sdbg -fma -cx16 -xtrp -pdc -pcid -dca -sse4_1 -sse4_2 -x2apic -movbe -popcnt
  -aes -fxsr -sse -sse2 -ss -ht -tm -pbe -syscall -nx -pdpe1gb -rdtscp -lm -constant_tsc -art

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 40 42
  node 0 size: 191893 MB
  node 0 free: 186218 MB
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43
  node 1 size: 193530 MB
  node 1 free: 191177 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From `/proc/meminfo`

MemTotal: 394674452 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

From `/usr/bin/lsb_release -d`  
Ubuntu 18.04.2 LTS

From `/etc/*release* /etc/*version*`

debian_version: buster/sid  
os-release:

(Continued on next page)
### Platform Notes (Continued)

```bash
NAME="Ubuntu"
VERSION="18.04.2 LTS (Bionic Beaver)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 18.04.2 LTS"
VERSION_ID="18.04"
HOME_URL="https://www.ubuntu.com/
SUPPORT_URL="https://help.ubuntu.com/"
```

```bash
uname -a:
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

- **CVE-2017-5754 (Meltdown):** Not affected
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB

**run-level 5 Jul 8 09:34**

**SPEC is set to:** /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda2</td>
<td>ext4</td>
<td>439G</td>
<td>30G</td>
<td>387G</td>
<td>8%</td>
<td>/</td>
</tr>
</tbody>
</table>

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. 2.2.11 06/13/2019**
- **Memory:**
  - 12x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  - 12x Not Specified Not Specified

(End of data from sysinfo program)

### Compiler Version Notes

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

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

(Continued on next page)
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz)

SPECspeed2017_fp_base = 130
SPECspeed2017_fp_peak = 131

Compiler Version Notes (Continued)

==============================================================================
FC 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC 603.bwaves_s(peak) 649.fotonik3d_s(peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
CC 621.wrf_s(peak) 628.pop2_s(peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
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(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz)

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<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Dell Inc.</td>
</tr>
</tbody>
</table>

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

Test Date: Jul-2019
Hardware Availability: Jun-2019
Software Availability: Feb-2019

Compiler Version Notes (Continued)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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

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
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

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

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

Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz)

SPECspeed2017_fp_base = 130
SPECspeed2017_fp_peak = 131

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

Test Date: Jul-2019
Hardware Availability: Jun-2019
Software Availability: Feb-2019

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Gold 6238, 2.10GHz) SPECspeed2017_fp_base = 130
SPECspeed2017_fp_peak = 131

CPU2017 License: 55 Test Date: Jul-2019
Test Sponsor: Dell Inc. Hardware Availability: Jun-2019
Tested by: Dell Inc. Software Availability: Feb-2019

Peak Optimization Flags (Continued)

603.bwaves_s: -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=4
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

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=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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

Tested with SPEC CPU2017 v1.0.5 on 2019-07-08 08:57:56-0400.
Report generated on 2019-08-21 12:04:33 by CPU2017 PDF formatter v6067.
Originally published on 2019-08-20.