Dell Inc. PowerEdge R740xd (Intel Xeon Gold 5215, 2.50GHz) SPECspeed2017_fp_base = 89.6
SPECspeed2017_fp_peak = 90.1

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

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>20</td>
<td>94.0</td>
<td>90.1</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>20</td>
<td>74.2</td>
<td>74.1</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>20</td>
<td>86.4</td>
<td>89.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>20</td>
<td>52.1</td>
<td>52.2</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>20</td>
<td>61.8</td>
<td>62.1</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>20</td>
<td>63.1</td>
<td>63.1</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>20</td>
<td>64.1</td>
<td>64.1</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>20</td>
<td>70.3</td>
<td>70.4</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>20</td>
<td>84.5</td>
<td>84.7</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>20</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Gold 5215
Max MHz.: 3400
Nominal: 2500
Enabled: 20 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: 13.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: Ubuntu 18.04.2 LTS
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux
Parallel: Yes
Firmware: Version 2.1.8 released Apr-2019
File System: ext4
System State: Run level 5 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 5215, 2.50GHz)

SPECspeed2017_fp_base = 89.6
SPECspeed2017_fp_peak = 90.1

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>20</td>
<td>159</td>
<td>370</td>
<td>158</td>
<td>372</td>
<td>20</td>
<td>159</td>
<td>372</td>
<td>158</td>
<td>372</td>
<td>158</td>
<td>372</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>20</td>
<td>177</td>
<td>94.4</td>
<td>177</td>
<td>94.0</td>
<td>20</td>
<td>176</td>
<td>94.5</td>
<td>177</td>
<td>94.3</td>
<td>20</td>
<td>176</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>20</td>
<td>70.6</td>
<td>74.2</td>
<td>70.4</td>
<td>74.4</td>
<td>20</td>
<td>70.7</td>
<td>74.1</td>
<td>70.3</td>
<td>74.5</td>
<td>20</td>
<td>70.6</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>20</td>
<td>152</td>
<td>87.1</td>
<td>153</td>
<td>86.4</td>
<td>20</td>
<td>149</td>
<td>89.0</td>
<td>145</td>
<td>91.1</td>
<td>20</td>
<td>149</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>20</td>
<td>170</td>
<td>52.1</td>
<td>170</td>
<td>52.2</td>
<td>20</td>
<td>170</td>
<td>52.2</td>
<td>170</td>
<td>52.2</td>
<td>20</td>
<td>170</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>20</td>
<td>191</td>
<td>62.1</td>
<td>192</td>
<td>61.8</td>
<td>20</td>
<td>188</td>
<td>63.1</td>
<td>187</td>
<td>63.4</td>
<td>20</td>
<td>188</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>20</td>
<td>226</td>
<td>63.8</td>
<td>225</td>
<td>64.2</td>
<td>20</td>
<td>225</td>
<td>64.1</td>
<td>225</td>
<td>64.2</td>
<td>20</td>
<td>225</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>20</td>
<td>143</td>
<td>122</td>
<td>143</td>
<td>122</td>
<td>20</td>
<td>144</td>
<td>122</td>
<td>143</td>
<td>122</td>
<td>20</td>
<td>143</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>20</td>
<td>130</td>
<td>70.3</td>
<td>129</td>
<td>70.6</td>
<td>20</td>
<td>129</td>
<td>70.5</td>
<td>129</td>
<td>70.4</td>
<td>20</td>
<td>129</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>20</td>
<td>186</td>
<td>84.5</td>
<td>186</td>
<td>84.5</td>
<td>20</td>
<td>186</td>
<td>84.7</td>
<td>186</td>
<td>84.7</td>
<td>20</td>
<td>186</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 89.6
SPECspeed2017_fp_peak = 90.1

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:
ADDC setting disabled
Sub NUMA Cluster disabled

(Continued on next page)
Dell Inc. PowerEdge R740xd (Intel Xeon Gold 5215, 2.50GHz)

SPECspeed2017_fp_base = 89.6
SPECspeed2017_fp_peak = 90.1

<table>
<thead>
<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: May-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Dell Inc.</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

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
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 Fri May 31 08:06:47 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 5215 CPU @ 2.50GHz
  2 "physical id"s (chips)
  20 "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 : 10
siblings : 10
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 20
On-line CPU(s) list: 0-19
Thread(s) per core: 1
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5215 CPU @ 2.50GHz
Stepping: 6
CPU MHz: 2808.834
BogoMIPS: 5000.00

(Continued on next page)
## Dell Inc.

**PowerEdge R740xd (Intel Xeon Gold 5215, 2.50GHz)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>89.6</td>
<td>90.1</td>
</tr>
</tbody>
</table>

### CPU2017 License: 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** May-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Feb-2019

### Platform Notes (Continued)

- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 14080K
- **NUMA node0 CPU(s):** 0,2,4,6,8,10,12,14,16,18
- **NUMA node1 CPU(s):** 1,3,5,7,9,11,13,15,17,19
- **Flags:** fpu vme de pse tsc msr pae mce 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 cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc tur dtc acpi pht tca pgt转 pmx pclmulqdq dtes64_64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc tur dtc acpi pht tca pgt
- **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
- **Node 0 size:** 191937 MB
- **Node 0 free:** 187695 MB
- **Node 1 cpus:** 1 3 5 7 9 11 13 15 17 19
- **Node 1 size:** 193512 MB
- **Node 1 free:** 188366 MB
- **Node distances:**
  - 0: 10 21
  - 1: 21 10

### From /proc/meminfo

- **MemTotal:** 394700780 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)
SPEC CPU2017 Floating Point Speed Result

Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 5215, 2.50GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>89.6</td>
<td>90.1</td>
</tr>
</tbody>
</table>

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

Platform Notes (Continued)

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/"

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 May 30 19:40

SPEC is set to: /home/cpu2017

Filesystem    Type    Size    Used    Avail Use% Mounted on
/dev/sda2    ext4    439G   25G    392G   6% /

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. 2.1.8 04/30/2019
Memory:
24x 00AD00B300AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2666

(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 5215, 2.50GHz)  

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>89.6</td>
<td>90.1</td>
</tr>
</tbody>
</table>

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

Test Date: May-2019  
Hardware Availability: Apr-2019  
Software Availability: Feb-2019

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.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,

(Continued on next page)
Dell Inc.

PowerEdge R740xd (Intel Xeon Gold 5215, 2.50GHz)

SPECspeed2017_fp_base = 89.6
SPECspeed2017_fp_peak = 90.1

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

Compiler Version Notes (Continued)

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

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

Dell Inc.  

PowerEdge R740xd (Intel Xeon Gold 5215, 2.50GHz)  

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 89.6</th>
<th>SPECspeed2017_fp_peak = 90.1</th>
</tr>
</thead>
</table>

| CPU2017 License: 55 | Test Date: May-2019 |
| Test Sponsor: Dell Inc. | Hardware Availability: Apr-2019 |
| Tested by: Dell Inc. | Software Availability: Feb-2019 |

**Base Optimization Flags (Continued)**

Fortran benchmarks (continued):
- 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 5215, 2.50GHz)  

SPECspeed2017_fp_base = 89.6  
SPECspeed2017_fp_peak = 90.1

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:

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2019-05-31 04:06:46-0400.  
Originally published on 2019-06-25.