### Dell Inc.

PowerEdge R740xd (Intel Xeon Platinum 8253, 2.20GHz)

<table>
<thead>
<tr>
<th>threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>114</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>89.1</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>87.7</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>107</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>64.5</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>64.5</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>32</td>
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<tr>
<td>644.nab_s</td>
<td>32</td>
<td>75.0</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>75.6</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>145</td>
</tr>
</tbody>
</table>

#### Hardware

- **CPU Name:** Intel Xeon Platinum 8253
- **Max MHz.:** 3000
- **Nominal:** 2200
- **Enabled:** 32 cores, 2 chips
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 22 MB I+D on chip per chip
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

#### Software

- **OS:** Ubuntu 18.04.2 LTS
- **Kernel:** 4.15.0-45-generic
- **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 2.1.7 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 Platinum 8253, 2.20GHz)

SPEC CPU2017 Floating Point Speed Result

SPECspeed2017_fp_base = 109
SPECspeed2017_fp_peak = 111

Results Table

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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>462</td>
<td>125</td>
<td>473</td>
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<td>125</td>
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<td>607.cactuBSSN_s</td>
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<td>147</td>
<td>114</td>
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<td>117</td>
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<td>75.7</td>
<td>122</td>
<td>75.0</td>
<td>32</td>
<td>120</td>
</tr>
</tbody>
</table>

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"
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
Sub NUMA Cluster disabled

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

Dell Inc.
PowerEdge R740xd (Intel Xeon Platinum 8253, 2.20GHz)

**SPECspeed2017_fp_base = 109**

**SPECspeed2017_fp_peak = 111**

<table>
<thead>
<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: Apr-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
- 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 Tue Apr 30 14:05:07 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) Platinum 8253 CPU @ 2.20GHz
  - 2 "physical id"s (chips)
  - 32 "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: 16
  - siblings: 16
  - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  - physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 32
- On-line CPU(s) list: 0-31
- Thread(s) per core: 1
- Core(s) per socket: 16
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8253 CPU @ 2.20GHz
- Stepping: 6
- CPU MHz: 2503.429

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

Dell Inc.
PowerEdge R740xd (Intel Xeon Platinum 8253, 2.20GHz)

SPECspeed2017_fp_base = 109
SPECspeed2017_fp_peak = 111

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

Platform Notes (Continued)

BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmonperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr_pdm_pcid dca sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs
ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
bmi1 hle avx2 smep bmi2 erms invpcid rtm cmpxchg16b rdt_a avx512f avx512dq rdseed adx
smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsaveprec xtpr
pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibrs
ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
bmi1 hle avx2 smep bmi2 erms invpcid rtm cmpxchg16b rdt_a avx512f avx512dq rdseed adx
smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
xsaves cmpm_mlb cmpm_occuall cmpm_mbb_total cmpm_mbb_local dtherm ida arat pln pts pku
ospke avx512_vnni flush_lid arch_capabilities

/cache/data

cache size : 22528 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 24 26 28 30
node 0 size: 191936 MB
node 0 free: 187878 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31
node 1 size: 193511 MB
node 1 free: 189648 MB
node distances:
node 0: 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 394698564 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /proc/meminfo
MemTotal: 394698564 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

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Platinum 8253, 2.20GHz)

SPECspeed2017_fp_base = 109
SPECspeed2017_fp_peak = 111

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

Platform Notes (Continued)

os-release:
    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 Apr 30 09:34

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. 2.1.7 04/03/2019
    Memory:
    12x 00AD069D00AD 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 Platinum 8253, 2.20GHz)  

SPECspeed2017_fp_base = 109  
SPECspeed2017_fp_peak = 111

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

Test Date: Apr-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.

==============================================================================
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

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Platinum 8253, 2.20GHz)

SPEC CPU2017 Floating Point Speed Result

SPECspeed2017_fp_base = 109
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Compiler Version Notes (Continued)

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.

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

(Continued on next page)
Dell Inc.  
PowerEdge R740xd (Intel Xeon Platinum 8253, 2.20GHz)  

SPECspeed2017_fp_base = 109  
SPECspeed2017_fp_peak = 111

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

Base Optimization Flags (Continued)

Fortran benchmarks:
-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:
-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

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Platinum 8253, 2.20GHz)

SPECspeed2017_fp_base = 109
SPECspeed2017_fp_peak = 111

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

Peak Optimization Flags (Continued)

Fortran benchmarks:

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

Benchmarks using Fortran, C, and C++:

628.pop2_s: Same as 621.wrf_s

654.roms_s: -DSPEC_OPENMP -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 2019-04-30 10:05:06-0400.
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