SPEC CPU®2017 Floating Point Speed Result

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Dell Inc.

$SPECspeed^{®}2017\_fp\_base = 185$

PowerEdge R6525 (AMD EPYC 7662, 2.00 GHz)

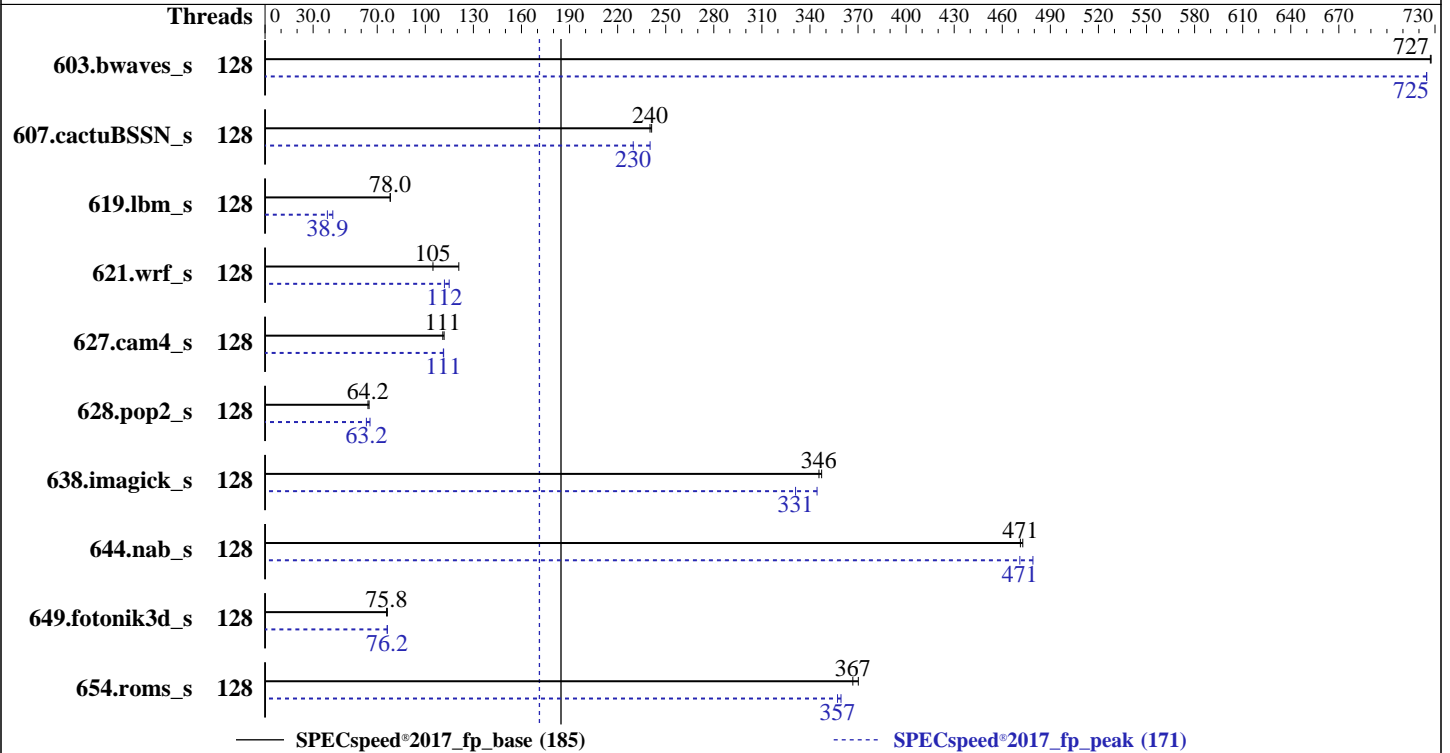$SPECspeed^{®}2017\_fp\_peak = 171$

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

Test Date: Dec-2019
Hardware Availability: Feb-2019
Software Availability: Aug-2019

Threads

Benchmark	Threads	base	peak
603.bwaves_s	128	727	725
607.cactuBSSN_s	128	240	230
619.lbm_s	128	78.0	38.9
621.wrf_s	128	105	112
627.cam4_s	128	111	111
628.pop2_s	128	64.2	63.2
638.imagick_s	128	346	331
644.nab_s	128	471	471
649.fotonik3d_s	128	75.8	76.2
654.roms_s	128	367	357

SPECspeed®2017_fp_base (185)   SPECspeed®2017_fp_peak (171)

Hardware

CPU Name: AMD EPYC 7662
 Max MHz: 3300
 Nominal: 2000
Enabled: 128 cores, 2 chips
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 256 MB I+D on chip per chip, 16 MB shared / 4 cores
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1
 kernel 4.12.14-195-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.2.4 released Nov-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc: jemalloc memory allocator library v5.1.0
Power Management: BIOS set to prefer performance at the cost of additional power usage.

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	128	81.1	728	**81.1**	**727**			128	**81.4**	**725**	81.4	725		
607.cactuBSSN_s	128	**69.4**	**240**	69.1	241			128	**72.6**	**230**	69.4	240		
619.lbm_s	128	**67.1**	**78.0**	67.0	78.2			128	**135**	**38.9**	124	42.3		
621.wrf_s	128	109	121	**126**	**105**			128	**118**	**112**	115	115		
627.cam4_s	128	79.3	112	**79.9**	**111**			128	**79.7**	**111**	79.5	111		
628.pop2_s	128	183	64.9	**185**	**64.2**			128	181	65.5	**188**	**63.2**		
638.imagick_s	128	**41.7**	**346**	41.5	347			128	**43.6**	**331**	41.9	344		
644.nab_s	128	37.0	473	**37.1**	**471**			128	36.5	479	**37.1**	**471**		
649.fotonik3d_s	128	119	76.3	**120**	**75.8**			128	**120**	**76.2**	119	76.3		
654.roms_s	128	42.5	370	**42.9**	**367**			128	**44.1**	**357**	43.8	359		
SPECspeed®2017_fp_base =		**185**												
SPECspeed®2017_fp_peak =		**171**												

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/
```

Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.
```

Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory
sync then drop_caches=3 to reset caches before invoking runcpu

dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were
all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

Transparent huge pages set to 'always' for this run (OS default)
```

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-127"
LD_LIBRARY_PATH =
      "/root/cpu2017-1.1.0/amd_speed_aocc200_rome_C_lib/64;/root/cpu2017-1.1.0
      /amd_speed_aocc200_rome_C_lib/32:"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "128"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74
      11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86
      23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98
      35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45
      109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55
      119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74
      11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86
      23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98
      35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45
      109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55
      119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-127"
```

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Environment Variables Notes (Continued)

```
Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-127"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

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.

jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
```

Platform Notes

```
 BIOS settings:
  NUMA Nodes Per Socket set to 4
  CCX as NUMA Domain set to Enabled
  System Profile set to Custom
  CPU Power Management set to Maximum Performance
  Memory Frequency set to Maximum Performance
  Turbo Boost Enabled
  Cstates set to Enabled
  Memory Patrol Scrub Disabled
  Memory Refresh Rate set to 1x
  PCI ASPM L1 Link Power Management Disabled
  Determinism Slider set to Power Determinism
  Efficiency Optimized Mode Disabled
  Memory Interleaving set to Disabled
  Logical Processor disabled

 Sysinfo program /root/cpu2017-1.1.0/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on linux-g3ob Fri Dec  6 18:21:52 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
```

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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : AMD EPYC 7662 64-Core Processor
      2  "physical id"s (chips)
      128 "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 : 64
      siblings  : 64
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
      25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
      53 54 55 56 57 58 59 60 61 62 63
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
      25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
      53 54 55 56 57 58 59 60 61 62 63

From lscpu:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      Address sizes:       43 bits physical, 48 bits virtual
      CPU(s):              128
      On-line CPU(s) list: 0-127
      Thread(s) per core:  1
      Core(s) per socket:  64
      Socket(s):           2
      NUMA node(s):        32
      Vendor ID:           AuthenticAMD
      CPU family:          23
      Model:               49
      Model name:          AMD EPYC 7662 64-Core Processor
      Stepping:            0
      CPU MHz:             1996.307
      BogoMIPS:            3992.61
      Virtualization:      AMD-V
      L1d cache:           32K
      L1i cache:           32K
      L2 cache:            512K
      L3 cache:            16384K
      NUMA node0 CPU(s):   0-3
      NUMA node1 CPU(s):   4-7
      NUMA node2 CPU(s):   8-11
      NUMA node3 CPU(s):   12-15
      NUMA node4 CPU(s):   16-19
      NUMA node5 CPU(s):   20-23
      NUMA node6 CPU(s):   24-27
      NUMA node7 CPU(s):   28-31
```

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Platform Notes (Continued)

```
      NUMA node8 CPU(s):     32-35
      NUMA node9 CPU(s):     36-39
      NUMA node10 CPU(s):    40-43
      NUMA node11 CPU(s):    44-47
      NUMA node12 CPU(s):    48-51
      NUMA node13 CPU(s):    52-55
      NUMA node14 CPU(s):    56-59
      NUMA node15 CPU(s):    60-63
      NUMA node16 CPU(s):    64-67
      NUMA node17 CPU(s):    68-71
      NUMA node18 CPU(s):    72-75
      NUMA node19 CPU(s):    76-79
      NUMA node20 CPU(s):    80-83
      NUMA node21 CPU(s):    84-87
      NUMA node22 CPU(s):    88-91
      NUMA node23 CPU(s):    92-95
      NUMA node24 CPU(s):    96-99
      NUMA node25 CPU(s):    100-103
      NUMA node26 CPU(s):    104-107
      NUMA node27 CPU(s):    108-111
      NUMA node28 CPU(s):    112-115
      NUMA node29 CPU(s):    116-119
      NUMA node30 CPU(s):    120-123
      NUMA node31 CPU(s):    124-127
      Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
   pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
   constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
   pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx
   f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse
   3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
   perfctr_l2 mwaitx cpb cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall
   fsgsbase bmi1 avx2 smep bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha_ni
   xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
   clzero irperf xsaveerptr arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean
   flushbyasid decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif umip
   rdpid overflow_recov succor smca

 /proc/cpuinfo cache data
    cache size : 512 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
   available: 32 nodes (0-31)
   node 0 cpus: 0 1 2 3
   node 0 size: 15548 MB
   node 0 free: 15406 MB
   node 1 cpus: 4 5 6 7
```

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Platform Notes (Continued)

```
    node 1 size: 16127 MB
    node 1 free: 16075 MB
    node 2 cpus: 8 9 10 11
    node 2 size: 16097 MB
    node 2 free: 16061 MB
    node 3 cpus: 12 13 14 15
    node 3 size: 16126 MB
    node 3 free: 16033 MB
    node 4 cpus: 16 17 18 19
    node 4 size: 16127 MB
    node 4 free: 16108 MB
    node 5 cpus: 20 21 22 23
    node 5 size: 16127 MB
    node 5 free: 16106 MB
    node 6 cpus: 24 25 26 27
    node 6 size: 16127 MB
    node 6 free: 16112 MB
    node 7 cpus: 28 29 30 31
    node 7 size: 16126 MB
    node 7 free: 16058 MB
    node 8 cpus: 32 33 34 35
    node 8 size: 16127 MB
    node 8 free: 16093 MB
    node 9 cpus: 36 37 38 39
    node 9 size: 16127 MB
    node 9 free: 16104 MB
    node 10 cpus: 40 41 42 43
    node 10 size: 16127 MB
    node 10 free: 16112 MB
    node 11 cpus: 44 45 46 47
    node 11 size: 16126 MB
    node 11 free: 16111 MB
    node 12 cpus: 48 49 50 51
    node 12 size: 16127 MB
    node 12 free: 16093 MB
    node 13 cpus: 52 53 54 55
    node 13 size: 16127 MB
    node 13 free: 16113 MB
    node 14 cpus: 56 57 58 59
    node 14 size: 16127 MB
    node 14 free: 16113 MB
    node 15 cpus: 60 61 62 63
    node 15 size: 16114 MB
    node 15 free: 16100 MB
    node 16 cpus: 64 65 66 67
    node 16 size: 16127 MB
    node 16 free: 16091 MB
```

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Platform Notes (Continued)

```
      node 17 cpus: 68 69 70 71
      node 17 size: 16127 MB
      node 17 free: 16107 MB
      node 18 cpus: 72 73 74 75
      node 18 size: 16127 MB
      node 18 free: 16106 MB
      node 19 cpus: 76 77 78 79
      node 19 size: 16126 MB
      node 19 free: 16111 MB
      node 20 cpus: 80 81 82 83
      node 20 size: 16127 MB
      node 20 free: 16111 MB
      node 21 cpus: 84 85 86 87
      node 21 size: 16127 MB
      node 21 free: 16112 MB
      node 22 cpus: 88 89 90 91
      node 22 size: 16127 MB
      node 22 free: 16113 MB
      node 23 cpus: 92 93 94 95
      node 23 size: 16126 MB
      node 23 free: 16008 MB
      node 24 cpus: 96 97 98 99
      node 24 size: 16127 MB
      node 24 free: 16113 MB
      node 25 cpus: 100 101 102 103
      node 25 size: 16127 MB
      node 25 free: 16113 MB
      node 26 cpus: 104 105 106 107
      node 26 size: 16127 MB
      node 26 free: 16113 MB
      node 27 cpus: 108 109 110 111
      node 27 size: 16126 MB
      node 27 free: 16112 MB
      node 28 cpus: 112 113 114 115
      node 28 size: 16127 MB
      node 28 free: 16112 MB
      node 29 cpus: 116 117 118 119
      node 29 size: 16127 MB
      node 29 free: 16112 MB
      node 30 cpus: 120 121 122 123
      node 30 size: 16127 MB
      node 30 free: 16110 MB
      node 31 cpus: 124 125 126 127
      node 31 size: 16124 MB
      node 31 free: 16110 MB
      node distances:
      node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19
```

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Platform Notes (Continued)

```
      20   21   22   23   24   25   26   27   28   29   30   31
   0:  10   11   11   11   12   12   12   12   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   1:  11   10   11   11   12   12   12   12   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   2:  11   11   10   11   12   12   12   12   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   3:  11   11   11   10   12   12   12   12   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   4:  12   12   12   12   10   11   11   11   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   5:  12   12   12   12   11   10   11   11   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   6:  12   12   12   12   11   11   10   11   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   7:  12   12   12   12   11   11   11   10   12   12   12   12   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   8:  12   12   12   12   12   12   12   12   10   11   11   11   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
   9:  12   12   12   12   12   12   12   12   11   10   11   11   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
  10:  12   12   12   12   12   12   12   12   11   11   10   11   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
  11:  12   12   12   12   12   12   12   12   11   11   11   10   12   12   12   12   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
  12:  12   12   12   12   12   12   12   12   12   12   12   12   10   11   11   11   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
  13:  12   12   12   12   12   12   12   12   12   12   12   12   11   10   11   11   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
  14:  12   12   12   12   12   12   12   12   12   12   12   12   11   11   10   11   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
  15:  12   12   12   12   12   12   12   12   12   12   12   12   11   11   11   10   32   32   32   32
      32   32   32   32   32   32   32   32   32   32   32   32
  16:  32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   10   11   11   11
      12   12   12   12   12   12   12   12   12   12   12   12
  17:  32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   11   10   11   11
      12   12   12   12   12   12   12   12   12   12   12   12
  18:  32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   11   11   10   11
      12   12   12   12   12   12   12   12   12   12   12   12
  19:  32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   11   11   11   10
      12   12   12   12   12   12   12   12   12   12   12   12
  20:  32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   12   12   12   12
      10   11   11   11   12   12   12   12   12   12   12   12
  21:  32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   12   12   12   12
      11   10   11   11   12   12   12   12   12   12   12   12
  22:  32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   32   12   12   12   12
      11   11   10   11   12   12   12   12   12   12   12   12
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

Dell Inc.

PowerEdge R6525 (AMD EPYC 7662, 2.00 GHz)

$SPECspeed^{®}2017\_fp\_base = 185$

$SPECspeed^{®}2017\_fp\_peak = 171$

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

Test Date: Dec-2019
Hardware Availability: Feb-2019
Software Availability: Aug-2019

Platform Notes (Continued)

```
   23:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   11  11  11  10  12  12  12  12  12  12  12  12
   24:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  10  11  11  11  12  12  12  12
   25:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  11  10  11  11  12  12  12  12
   26:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  11  11  10  11  12  12  12  12
   27:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  11  11  11  10  12  12  12  12
   28:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  12  12  12  12  10  11  11  11
   29:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  12  12  12  12  11  10  11  11
   30:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  12  12  12  12  11  11  10  11
   31:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12
   12  12  12  12  12  12  12  12  11  11  11  10


 From /proc/meminfo
    MemTotal:       527808276 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="SLES"
       VERSION="15-SP1"
       VERSION_ID="15.1"
       PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
       ID="sles"
       ID_LIKE="suse"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:15:sp1"

 uname -a:
    Linux linux-g3ob 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-3620 (L1 Terminal Fault):       Not affected
 Microarchitectural Data Sampling:        Not affected
 CVE-2017-5754 (Meltdown):                Not affected
 CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
                                          via prctl and seccomp
 CVE-2017-5753 (Spectre variant 1):       Mitigation: __user pointer sanitization
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

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Platform Notes (Continued)

```
 CVE-2017-5715 (Spectre variant 2):              Mitigation: Full AMD retpoline, IBPB:
                                                 conditional, IBRS_FW, STIBP: disabled, RSB
                                                 filling


 run-level 3 Dec 6 14:41

 SPEC is set to: /root/cpu2017-1.1.0
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   440G   41G  400G  10% /

 From /sys/devices/virtual/dmi/id
    BIOS:    Dell Inc. 1.2.4 11/05/2019
    Vendor:  Dell Inc.
    Product: PowerEdge R6525
    Product Family: PowerEdge
    Serial:  1234567


 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.
    Memory:
      5x 802C80B3802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
      2x 802C8632802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
      1x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
      8x 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
      16x Not Specified Not Specified

 (End of data from sysinfo program)
```

Compiler Version Notes

```
================================================================================
C                 | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
                  | 644.nab_s(base, peak)
--------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------------


================================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
--------------------------------------------------------------------------------
```

(Continued on next page)

Dell Inc.

PowerEdge R6525 (AMD EPYC 7662, 2.00 GHz)

SPECspeed®2017_fp_base = 185

SPECspeed®2017_fp_peak = 171

Compiler Version Notes (Continued)

```
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------


==========================================================================
Fortran          | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                 | 654.roms_s(base, peak)
--------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------


==========================================================================
Fortran, C       | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                 | 628.pop2_s(base, peak)
--------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------
```

SPEC CPU®2017 Floating Point Speed Result

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$SPECspeed^{®}2017\_fp\_base = 185$

$SPECspeed^{®}2017\_fp\_peak = 171$

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Dec-2019

Hardware Availability: Feb-2019

Software Availability: Aug-2019

Base Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

Benchmarks using both Fortran and C:
```
flang clang
```

Benchmarks using Fortran, C, and C++:
```
clang++ clang flang
```

Base Portability Flags

603.bwaves_s: `-DSPEC_LP64`
607.cactuBSSN_s: `-DSPEC_LP64`
619.lbm_s: `-DSPEC_LP64`
621.wrf_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
627.cam4_s: `-DSPEC_CASE_FLAG -DSPEC_LP64`
628.pop2_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
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:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang
```

Fortran benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
```

(Continued on next page)

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$SPECspeed®2017\_fp\_base = 185$

$SPECspeed®2017\_fp\_peak = 171$

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

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
-lflang
```

Benchmarks using both Fortran and C:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -funroll-loops -Mrecursive -z muldefs
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
-lflang
```

Benchmarks using Fortran, C, and C++:
```
-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only
-DSPEC_OPENMP -fopenmp -DUSE_OPENMP -fopenmp=libomp -lomp -lpthread
-ldl -lmvec -lamdlibm -ljemalloc -lflang
```

Base Other Flags

C benchmarks:
```
-Wno-return-type
```

Fortran benchmarks:
```
-Wno-return-type
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_peak = 171

CPU2017 License: 55
Test Sponsor: Dell Inc.
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Test Date: Dec-2019
Hardware Availability: Feb-2019
Software Availability: Aug-2019

Base Other Flags (Continued)

Benchmarks using both Fortran and C:
```
-Wno-return-type
```

Benchmarks using Fortran, C, and C++:
```
-Wno-return-type
```

Peak Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

Benchmarks using both Fortran and C:
```
flang clang
```

Benchmarks using Fortran, C, and C++:
```
clang++ clang flang
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver2
-mno-sse4a -fstruct-layout=5 -mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -DSPEC_OPENMP -fopenmp -DUSE_OPENMP
-lmvec -lamdlibm -fopenmp=libomp -lomp -lpthread -ldl -ljemalloc
-lflang
```

(Continued on next page)

Dell Inc.

PowerEdge R6525 (AMD EPYC 7662, 2.00 GHz)

SPECspeed®2017_fp_base = 185

SPECspeed®2017_fp_peak = 171

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

Test Date: Dec-2019
Hardware Availability: Feb-2019
Software Availability: Aug-2019

Peak Optimization Flags (Continued)

Fortran benchmarks:

603.bwaves_s: `-flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3`
`-march=znver2 -funroll-loops -Mrecursive`
`-mllvm -vector-library=LIBMVEC -Kieee`
`-fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP`
`-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm`
`-ljemalloc -lflang`

649.fotonik3d_s: `Same as 603.bwaves_s`

654.roms_s: `-flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver2`
`-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC`
`-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp`
`-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl`
`-lmvec -lamdlibm -ljemalloc -lflang`

Benchmarks using both Fortran and C:
`-flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver2`
`-mno-sse4a -fstruct-layout=5 -mllvm -vectorize-memory-aggressively`
`-mllvm -function-specialize -mllvm -enable-gvn-hoist`
`-mllvm -unroll-threshold=50 -fremap-arrays`
`-mllvm -vector-library=LIBMVEC -mllvm -reduce-array-computations=3`
`-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000`
`-flv-function-specialization -O3 -funroll-loops -Mrecursive -Kieee`
`-fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP`
`-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc`
`-lflang`

Benchmarks using Fortran, C, and C++:
`-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver2`
`-mno-sse4a -fstruct-layout=5 -mllvm -vectorize-memory-aggressively`
`-mllvm -function-specialize -mllvm -enable-gvn-hoist`
`-mllvm -unroll-threshold=50 -fremap-arrays`
`-mllvm -vector-library=LIBMVEC -mllvm -reduce-array-computations=3`

(Continued on next page)

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Software Availability: Aug-2019

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch -mllvm -loop-unswitch-threshold=200000
-O3 -funroll-loops -Mrecursive -Kieee -fno-finite-math-only
-DSPEC_OPENMP -fopenmp -DUSE_OPENMP -fopenmp=libomp -lomp -lpthread
-ldl -lmvec -lamdlibm -ljemalloc -lflang
```

Peak Other Flags

C benchmarks:
```
-Wno-return-type
```

Fortran benchmarks:
```
-Wno-return-type
```

Benchmarks using both Fortran and C:
```
-Wno-return-type
```

Benchmarks using Fortran, C, and C++:
```
-Wno-return-type
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/aocc200-flags-B1-speed-Dell.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE7.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/aocc200-flags-B1-speed-Dell.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE7.xml

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

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