SPEC CPU®2017 Floating Point Speed Result

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Dell Inc.

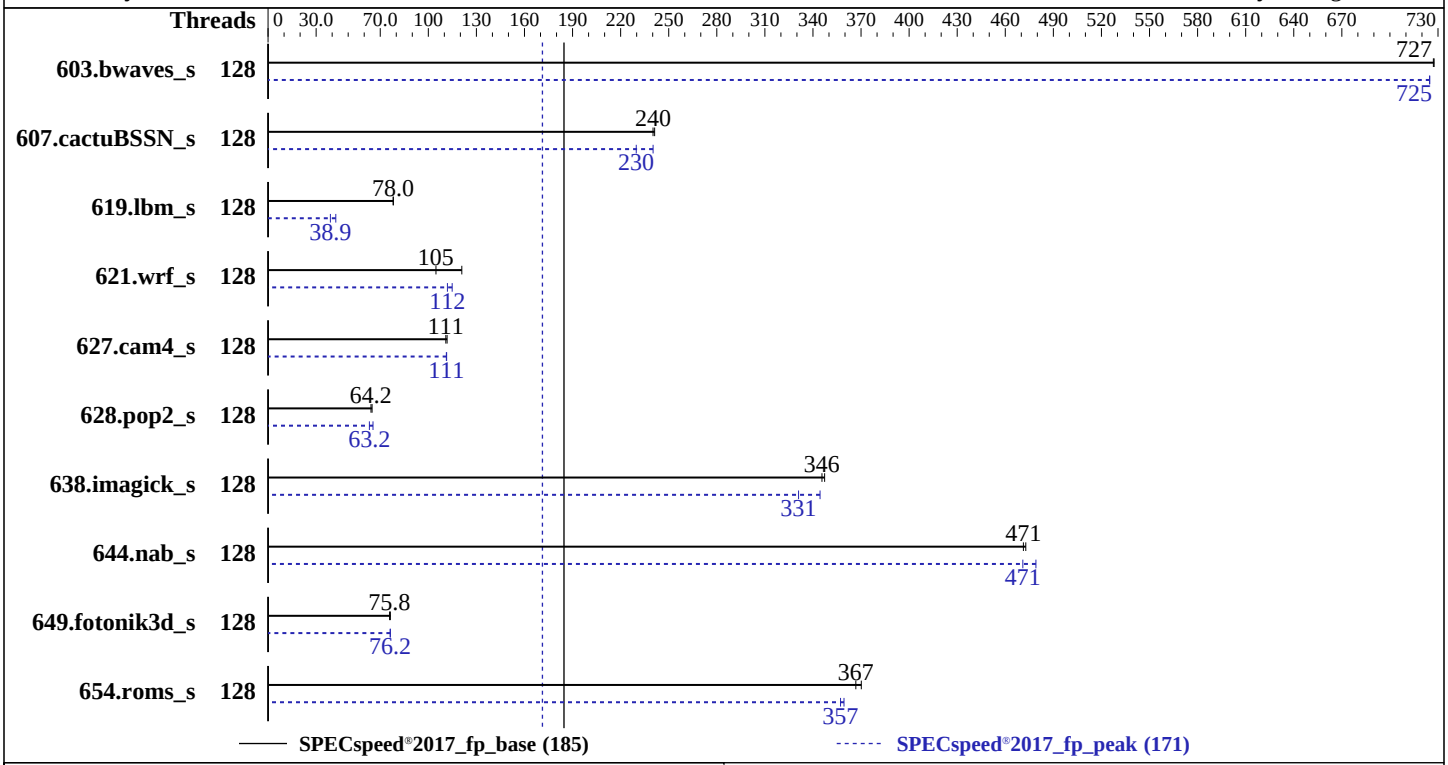
PowerEdge R6525 (AMD EPYC 7662, 2.00 GHz)

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



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.

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)
```

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
```


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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
```

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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)

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
------------------------------------------------------------------------------
```

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)

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

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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`

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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`

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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

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