SPEC CPU®2017 Floating Point Speed Result

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Dell Inc.

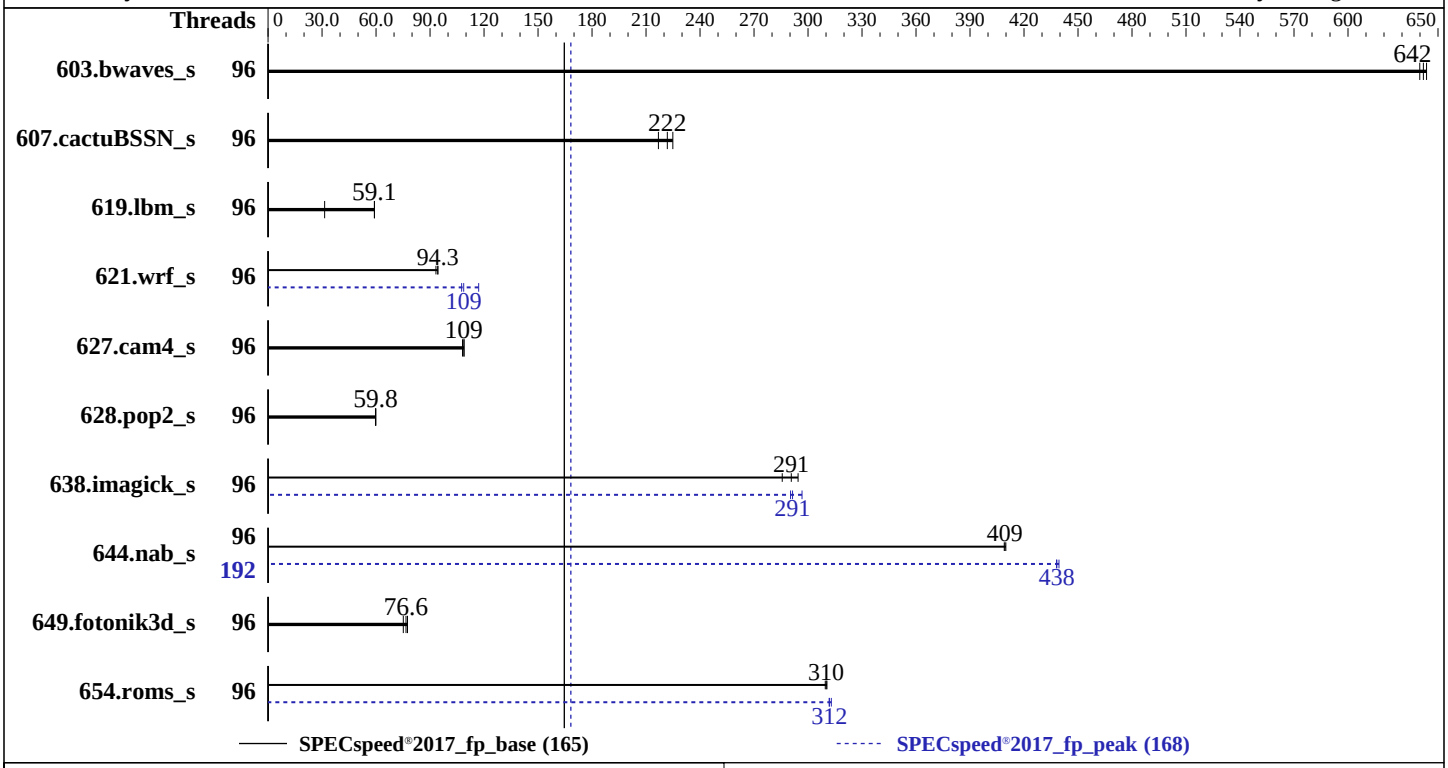
PowerEdge R7525 (AMD EPYC 7642, 2.30 GHz)

SPECspeed®2017_fp_base = 165

SPECspeed®2017_fp_peak = 168

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

Test Date: Nov-2019
Hardware Availability: Feb-2020
Software Availability: Aug-2019



Hardware

CPU Name:	AMD EPYC 7642
Max MHz:	3300
Nominal:	2300
Enabled:	96 cores, 2 chips, 2 threads/core
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 / 3 cores
Other:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
Storage:	2 x 960 GB SAS 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 1.2.5 released Nov-2019
File System:	xfs
System State:	Run level 5 (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	96	**91.9**	**642**	91.7	644	92.2	640	96	**91.9**	**642**	91.7	644	92.2	640
607.cactuBSSN_s	96	**75.1**	**222**	76.9	217	74.1	225	96	**75.1**	**222**	76.9	217	74.1	225
619.lbm_s	96	88.6	59.1	167	31.4	**88.7**	**59.1**	96	88.6	59.1	167	31.4	**88.7**	**59.1**
621.wrf_s	96	140	94.4	142	93.3	**140**	**94.3**	96	**122**	**109**	113	117	123	108
627.cam4_s	96	**81.5**	**109**	81.4	109	82.0	108	96	**81.5**	**109**	81.4	109	82.0	108
628.pop2_s	96	199	59.7	**199**	**59.8**	198	59.9	96	199	59.7	**199**	**59.8**	198	59.9
638.imagick_s	96	49.0	294	50.5	286	**49.6**	**291**	96	**49.5**	**291**	48.6	297	49.7	290
644.nab_s	96	**42.7**	**409**	42.6	410	42.7	409	192	39.8	439	39.9	438	**39.9**	**438**
649.fotonik3d_s	96	121	75.1	118	77.5	**119**	**76.6**	96	121	75.1	118	77.5	**119**	**76.6**
654.roms_s	96	50.7	311	50.9	310	**50.8**	**310**	96	**50.5**	**312**	50.3	313	50.5	312

SPECspeed®2017_fp_base = **165**

SPECspeed®2017_fp_peak = **168**

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 = "0-191"
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 = "192"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 96 1 97 2 98 3 99 4 100 5 101 6 102 7 103 8 104 9 105
     10 106 11 107 12 108 13 109 14 110 15 111 16 112 17 113 18 114 19 115 20
     116 21 117 22 118 23 119 24 120 25 121 26 122 27 123 28 124 29 125 30
     126 31 127 32 128 33 129 34 130 35 131 36 132 37 133 38 134 39 135 40
     136 41 137 42 138 43 139 44 140 45 141 46 142 47 143 48 144 49 145 50
     146 51 147 52 148 53 149 54 150 55 151 56 152 57 153 58 154 59 155 60
     156 61 157 62 158 63 159 64 160 65 161 66 162 67 163 68 164 69 165 70
     166 71 167 72 168 73 169 74 170 75 171 76 172 77 173 78 174 79 175 80
     176 81 177 82 178 83 179 84 180 85 181 86 182 87 183 88 184 89 185 90
     186 91 187 92 188 93 189 94 190 95 191"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-95"
```

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:
```

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General Notes (Continued)

```
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

 Sysinfo program /root/cpu2017-1.1.0/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on linux-g3ob Wed Nov 20 05:17:08 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 : AMD EPYC 7642 48-Core Processor
       2  "physical id"s (chips)
       192 "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 : 48
       siblings  : 96
       physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
       32 33 34 36 37 38 40 41 42 44 45 46 48 49 50 52 53 54 56 57 58 60 61 62
       physical 1: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
       32 33 34 36 37 38 40 41 42 44 45 46 48 49 50 52 53 54 56 57 58 60 61 62

 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
```

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Platform Notes (Continued)

```
CPU(s):              192
On-line CPU(s) list: 0-191
Thread(s) per core:  2
Core(s) per socket:  48
Socket(s):           2
NUMA node(s):        32
Vendor ID:           AuthenticAMD
CPU family:          23
Model:               49
Model name:          AMD EPYC 7642 48-Core Processor
Stepping:            0
CPU MHz:             2295.709
BogoMIPS:            4591.41
Virtualization:      AMD-V
L1d cache:           32K
L1i cache:           32K
L2 cache:            512K
L3 cache:            16384K
NUMA node0 CPU(s):   0-2,96-98
NUMA node1 CPU(s):   3-5,99-101
NUMA node2 CPU(s):   6-8,102-104
NUMA node3 CPU(s):   9-11,105-107
NUMA node4 CPU(s):   12-14,108-110
NUMA node5 CPU(s):   15-17,111-113
NUMA node6 CPU(s):   18-20,114-116
NUMA node7 CPU(s):   21-23,117-119
NUMA node8 CPU(s):   24-26,120-122
NUMA node9 CPU(s):   27-29,123-125
NUMA node10 CPU(s):  30-32,126-128
NUMA node11 CPU(s):  33-35,129-131
NUMA node12 CPU(s):  36-38,132-134
NUMA node13 CPU(s):  39-41,135-137
NUMA node14 CPU(s):  42-44,138-140
NUMA node15 CPU(s):  45-47,141-143
NUMA node16 CPU(s):  48-50,144-146
NUMA node17 CPU(s):  51-53,147-149
NUMA node18 CPU(s):  54-56,150-152
NUMA node19 CPU(s):  57-59,153-155
NUMA node20 CPU(s):  60-62,156-158
NUMA node21 CPU(s):  63-65,159-161
NUMA node22 CPU(s):  66-68,162-164
NUMA node23 CPU(s):  69-71,165-167
NUMA node24 CPU(s):  72-74,168-170
NUMA node25 CPU(s):  75-77,171-173
NUMA node26 CPU(s):  78-80,174-176
NUMA node27 CPU(s):  81-83,177-179
NUMA node28 CPU(s):  84-86,180-182
```

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Platform Notes (Continued)

```
      NUMA node29 CPU(s):  87-89,183-185
      NUMA node30 CPU(s):  90-92,186-188
      NUMA node31 CPU(s):  93-95,189-191
      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 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 96 97 98
    node 0 size: 15548 MB
    node 0 free: 15494 MB
    node 1 cpus: 3 4 5 99 100 101
    node 1 size: 16126 MB
    node 1 free: 16104 MB
    node 2 cpus: 6 7 8 102 103 104
    node 2 size: 16126 MB
    node 2 free: 16095 MB
    node 3 cpus: 9 10 11 105 106 107
    node 3 size: 16125 MB
    node 3 free: 16087 MB
    node 4 cpus: 12 13 14 108 109 110
    node 4 size: 16126 MB
    node 4 free: 16107 MB
    node 5 cpus: 15 16 17 111 112 113
    node 5 size: 16097 MB
    node 5 free: 16081 MB
    node 6 cpus: 18 19 20 114 115 116
    node 6 size: 16126 MB
    node 6 free: 16110 MB
    node 7 cpus: 21 22 23 117 118 119
    node 7 size: 16125 MB
    node 7 free: 16101 MB
    node 8 cpus: 24 25 26 120 121 122
    node 8 size: 16126 MB
```

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Platform Notes (Continued)

```
node 8 free: 16109 MB
node 9 cpus: 27 28 29 123 124 125
node 9 size: 16126 MB
node 9 free: 16104 MB
node 10 cpus: 30 31 32 126 127 128
node 10 size: 16126 MB
node 10 free: 16105 MB
node 11 cpus: 33 34 35 129 130 131
node 11 size: 16125 MB
node 11 free: 16109 MB
node 12 cpus: 36 37 38 132 133 134
node 12 size: 16126 MB
node 12 free: 16086 MB
node 13 cpus: 39 40 41 135 136 137
node 13 size: 16126 MB
node 13 free: 16111 MB
node 14 cpus: 42 43 44 138 139 140
node 14 size: 16126 MB
node 14 free: 16110 MB
node 15 cpus: 45 46 47 141 142 143
node 15 size: 16113 MB
node 15 free: 16095 MB
node 16 cpus: 48 49 50 144 145 146
node 16 size: 16126 MB
node 16 free: 16083 MB
node 17 cpus: 51 52 53 147 148 149
node 17 size: 16126 MB
node 17 free: 16088 MB
node 18 cpus: 54 55 56 150 151 152
node 18 size: 16126 MB
node 18 free: 16093 MB
node 19 cpus: 57 58 59 153 154 155
node 19 size: 16125 MB
node 19 free: 16093 MB
node 20 cpus: 60 61 62 156 157 158
node 20 size: 16126 MB
node 20 free: 16041 MB
node 21 cpus: 63 64 65 159 160 161
node 21 size: 16126 MB
node 21 free: 15861 MB
node 22 cpus: 66 67 68 162 163 164
node 22 size: 16126 MB
node 22 free: 15918 MB
node 23 cpus: 69 70 71 165 166 167
node 23 size: 16125 MB
node 23 free: 16065 MB
node 24 cpus: 72 73 74 168 169 170
```

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Platform Notes (Continued)

```
node 24 size: 16126 MB
node 24 free: 16107 MB
node 25 cpus: 75 76 77 171 172 173
node 25 size: 16126 MB
node 25 free: 16101 MB
node 26 cpus: 78 79 80 174 175 176
node 26 size: 16126 MB
node 26 free: 16107 MB
node 27 cpus: 81 82 83 177 178 179
node 27 size: 16125 MB
node 27 free: 16105 MB
node 28 cpus: 84 85 86 180 181 182
node 28 size: 16126 MB
node 28 free: 16101 MB
node 29 cpus: 87 88 89 183 184 185
node 29 size: 16126 MB
node 29 free: 16033 MB
node 30 cpus: 90 91 92 186 187 188
node 30 size: 16126 MB
node 30 free: 16089 MB
node 31 cpus: 93 94 95 189 190 191
node 31 size: 16124 MB
node 31 free: 16074 MB
node distances:
node   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
  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
```

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Platform Notes (Continued)

```
     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
     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:       527796228 kB
     HugePages_Total:       0
```


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Platform Notes (Continued)

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

  run-level 5 Nov 19 10:55

  SPEC is set to: /root/cpu2017-1.1.0
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   440G   36G  405G   8% /

  From /sys/devices/virtual/dmi/id
      BIOS:    Dell Inc. 1.2.5 11/14/2019
      Vendor:  Dell Inc.
      Product: PowerEdge R7525
      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:
```

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Platform Notes (Continued)

```
     7x 802C80B3802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
     8x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
     1x 80AD80B380AD 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)
------------------------------------------------------------------------------
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)
```

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Compiler Version Notes (Continued)

```
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

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Base Portability Flags (Continued)

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
-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

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Base Optimization Flags (Continued)

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

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:

619.lbm_s: basepeak = yes

638.imagick_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 -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

644.nab_s: Same as 638.imagick_s

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

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:

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Peak Optimization Flags (Continued)

621.wrf_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 -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`

627.cam4_s: `basepeak = yes`

628.pop2_s: `basepeak = yes`

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

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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