



SPEC CPU®2017 Floating Point Speed Result

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Dell Inc.

SPECspeed®2017_fp_base = 175

PowerEdge R7525 (AMD EPYC 7702, 2.00 GHz)

SPECspeed®2017_fp_peak = 175

CPU2017 License: 55

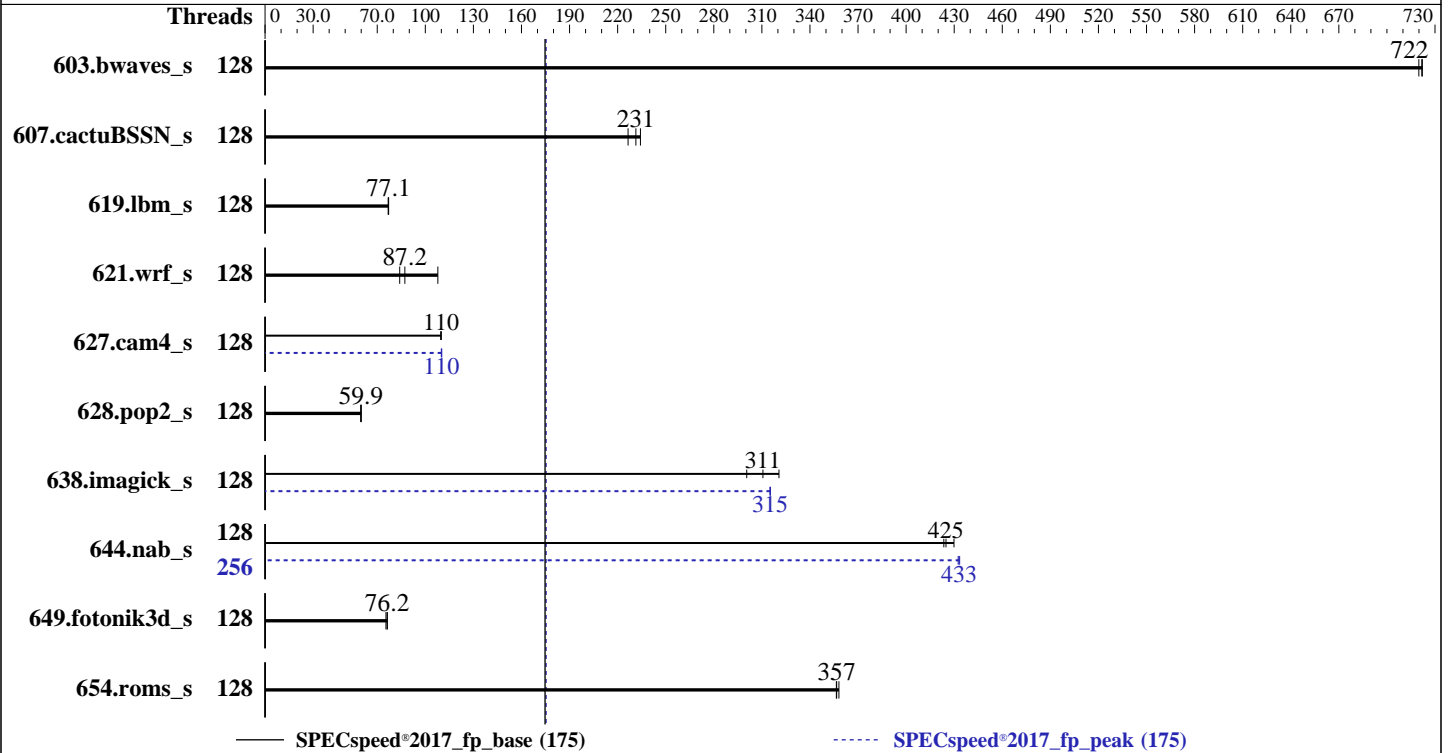
Test Date: Nov-2019

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2020

Tested by: Dell Inc.

Software Availability: Aug-2019



Hardware

CPU Name: AMD EPYC 7702
 Max MHz: 3350
 Nominal: 2000
 Enabled: 128 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 / 4 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 1.2.4 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	81.7	722	81.7	722	82.0	720	128	81.7	722	81.7	722	82.0	720
607.cactuBSSN_s	128	73.6	227	71.2	234	72.0	231	128	73.6	227	71.2	234	72.0	231
619.lbm_s	128	68.2	76.8	67.9	77.1	68.0	77.1	128	68.2	76.8	67.9	77.1	68.0	77.1
621.wrf_s	128	157	84.0	152	87.2	123	108	128	157	84.0	152	87.2	123	108
627.cam4_s	128	80.7	110	80.7	110	80.8	110	128	80.6	110	80.4	110	80.5	110
628.pop2_s	128	198	59.9	199	59.7	198	60.0	128	198	59.9	199	59.7	198	60.0
638.imagick_s	128	45.0	321	48.0	301	46.4	311	128	45.8	315	45.8	315	45.7	315
644.nab_s	128	41.3	424	41.1	425	40.6	430	256	40.3	433	40.4	432	40.4	433
649.fotonik3d_s	128	120	76.3	121	75.4	120	76.2	128	120	76.3	121	75.4	120	76.2
654.roms_s	128	44.1	357	44.2	356	44.0	358	128	44.1	357	44.2	356	44.0	358

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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 = "0-255"

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 = "256"

Environment variables set by runcpu during the 627.cam4_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 = "0 128 1 129 2 130 3 131 4 132 5 133 6 134 7 135 8 136 9

137 10 138 11 139 12 140 13 141 14 142 15 143 16 144 17 145 18 146 19

147 20 148 21 149 22 150 23 151 24 152 25 153 26 154 27 155 28 156 29

157 30 158 31 159 32 160 33 161 34 162 35 163 36 164 37 165 38 166 39

167 40 168 41 169 42 170 43 171 44 172 45 173 46 174 47 175 48 176 49

177 50 178 51 179 52 180 53 181 54 182 55 183 56 184 57 185 58 186 59

187 60 188 61 189 62 190 63 191 64 192 65 193 66 194 67 195 68 196 69

197 70 198 71 199 72 200 73 201 74 202 75 203 76 204 77 205 78 206 79

207 80 208 81 209 82 210 83 211 84 212 85 213 86 214 87 215 88 216 89

217 90 218 91 219 92 220 93 221 94 222 95 223 96 224 97 225 98 226 99

227 100 228 101 229 102 230 103 231 104 232 105 233 106 234 107 235 108

236 109 237 110 238 111 239 112 240 113 241 114 242 115 243 116 244 117

245 118 246 119 247 120 248 121 249 122 250 123 251 124 252 125 253 126

254 127 255"

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

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General Notes (Continued)

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

Sysinfo program /root/cpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-g3ob Sat Nov 16 20:29:41 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 7702 64-Core Processor
 2 "physical id"s (chips)
256 "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  : 128
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

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Platform Notes (Continued)

```

CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
Address sizes:       43 bits physical, 48 bits virtual
CPU(s):              256
On-line CPU(s) list: 0-255
Thread(s) per core: 2
Core(s) per socket: 64
Socket(s):           2
NUMA node(s):       32
Vendor ID:           AuthenticAMD
CPU family:          23
Model:               49
Model name:          AMD EPYC 7702 64-Core Processor
Stepping:            0
CPU MHz:             1996.409
BogoMIPS:            3992.81
Virtualization:      AMD-V
L1d cache:           32K
L1i cache:           32K
L2 cache:            512K
L3 cache:            16384K
NUMA node0 CPU(s):  0-3,128-131
NUMA node1 CPU(s):  4-7,132-135
NUMA node2 CPU(s):  8-11,136-139
NUMA node3 CPU(s):  12-15,140-143
NUMA node4 CPU(s):  16-19,144-147
NUMA node5 CPU(s):  20-23,148-151
NUMA node6 CPU(s):  24-27,152-155
NUMA node7 CPU(s):  28-31,156-159
NUMA node8 CPU(s):  32-35,160-163
NUMA node9 CPU(s):  36-39,164-167
NUMA node10 CPU(s): 40-43,168-171
NUMA node11 CPU(s): 44-47,172-175
NUMA node12 CPU(s): 48-51,176-179
NUMA node13 CPU(s): 52-55,180-183
NUMA node14 CPU(s): 56-59,184-187
NUMA node15 CPU(s): 60-63,188-191
NUMA node16 CPU(s): 64-67,192-195
NUMA node17 CPU(s): 68-71,196-199
NUMA node18 CPU(s): 72-75,200-203
NUMA node19 CPU(s): 76-79,204-207
NUMA node20 CPU(s): 80-83,208-211
NUMA node21 CPU(s): 84-87,212-215
NUMA node22 CPU(s): 88-91,216-219
NUMA node23 CPU(s): 92-95,220-223
NUMA node24 CPU(s): 96-99,224-227
NUMA node25 CPU(s): 100-103,228-231

```

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Platform Notes (Continued)

NUMA node26 CPU(s): 104-107,232-235
 NUMA node27 CPU(s): 108-111,236-239
 NUMA node28 CPU(s): 112-115,240-243
 NUMA node29 CPU(s): 116-119,244-247
 NUMA node30 CPU(s): 120-123,248-251
 NUMA node31 CPU(s): 124-127,252-255

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
 fl6c 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 bml 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 3 128 129 130 131
node 0 size: 15676 MB
node 0 free: 15620 MB
node 1 cpus: 4 5 6 7 132 133 134 135
node 1 size: 16126 MB
node 1 free: 16103 MB
node 2 cpus: 8 9 10 11 136 137 138 139
node 2 size: 16126 MB
node 2 free: 16060 MB
node 3 cpus: 12 13 14 15 140 141 142 143
node 3 size: 16125 MB
node 3 free: 16099 MB
node 4 cpus: 16 17 18 19 144 145 146 147
node 4 size: 16096 MB
node 4 free: 16042 MB
node 5 cpus: 20 21 22 23 148 149 150 151
node 5 size: 16126 MB
node 5 free: 16103 MB
node 6 cpus: 24 25 26 27 152 153 154 155
node 6 size: 16126 MB
node 6 free: 16019 MB
node 7 cpus: 28 29 30 31 156 157 158 159
```

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Platform Notes (Continued)

```

node 7 size: 16125 MB
node 7 free: 16073 MB
node 8 cpus: 32 33 34 35 160 161 162 163
node 8 size: 16126 MB
node 8 free: 16079 MB
node 9 cpus: 36 37 38 39 164 165 166 167
node 9 size: 16126 MB
node 9 free: 16076 MB
node 10 cpus: 40 41 42 43 168 169 170 171
node 10 size: 16126 MB
node 10 free: 16104 MB
node 11 cpus: 44 45 46 47 172 173 174 175
node 11 size: 16125 MB
node 11 free: 16106 MB
node 12 cpus: 48 49 50 51 176 177 178 179
node 12 size: 16126 MB
node 12 free: 16072 MB
node 13 cpus: 52 53 54 55 180 181 182 183
node 13 size: 16126 MB
node 13 free: 15975 MB
node 14 cpus: 56 57 58 59 184 185 186 187
node 14 size: 16126 MB
node 14 free: 16098 MB
node 15 cpus: 60 61 62 63 188 189 190 191
node 15 size: 16113 MB
node 15 free: 16092 MB
node 16 cpus: 64 65 66 67 192 193 194 195
node 16 size: 16126 MB
node 16 free: 16100 MB
node 17 cpus: 68 69 70 71 196 197 198 199
node 17 size: 16126 MB
node 17 free: 16104 MB
node 18 cpus: 72 73 74 75 200 201 202 203
node 18 size: 16126 MB
node 18 free: 16107 MB
node 19 cpus: 76 77 78 79 204 205 206 207
node 19 size: 16125 MB
node 19 free: 16107 MB
node 20 cpus: 80 81 82 83 208 209 210 211
node 20 size: 16126 MB
node 20 free: 16107 MB
node 21 cpus: 84 85 86 87 212 213 214 215
node 21 size: 16126 MB
node 21 free: 16108 MB
node 22 cpus: 88 89 90 91 216 217 218 219
node 22 size: 16126 MB
node 22 free: 16108 MB

```

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Platform Notes (Continued)

```

node 23 cpus: 92 93 94 95 220 221 222 223
node 23 size: 16125 MB
node 23 free: 16105 MB
node 24 cpus: 96 97 98 99 224 225 226 227
node 24 size: 16126 MB
node 24 free: 16092 MB
node 25 cpus: 100 101 102 103 228 229 230 231
node 25 size: 16126 MB
node 25 free: 16102 MB
node 26 cpus: 104 105 106 107 232 233 234 235
node 26 size: 16126 MB
node 26 free: 16108 MB
node 27 cpus: 108 109 110 111 236 237 238 239
node 27 size: 16125 MB
node 27 free: 16107 MB
node 28 cpus: 112 113 114 115 240 241 242 243
node 28 size: 16126 MB
node 28 free: 16103 MB
node 29 cpus: 116 117 118 119 244 245 246 247
node 29 size: 16126 MB
node 29 free: 16107 MB
node 30 cpus: 120 121 122 123 248 249 250 251
node 30 size: 16126 MB
node 30 free: 16107 MB
node 31 cpus: 124 125 126 127 252 253 254 255
node 31 size: 16122 MB
node 31 free: 16104 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 11 11 11 11 11 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32
1: 11 10 11 11 11 11 11 11 11 12 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32
2: 11 11 10 11 11 11 11 11 11 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32
3: 11 11 11 10 11 11 11 11 11 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32
4: 11 11 11 11 10 11 11 11 11 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32
5: 11 11 11 11 11 10 11 11 11 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32
6: 11 11 11 11 11 11 10 11 11 12 12 12 12 12 12 32 32 32 32
32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32
7: 11 11 11 11 11 11 11 10 11 12 12 12 12 12 12 32 32 32 32
32 32 32 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 12 10 11 11 11 11 11 32 32 32 32

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32	32	32	32	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	12	11	10	11	11	11	11	11	32	32	32	32	
32	32	32	32	32	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	12	11	11	10	11	11	11	11	32	32	32	32	
32	32	32	32	32	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	12	11	11	11	10	11	11	11	32	32	32	32	
32	32	32	32	32	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	11	11	11	11	10	11	11	32	32	32	32	
32	32	32	32	32	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	11	11	11	11	11	10	11	11	32	32	32	32
32	32	32	32	32	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	11	11	11	11	11	10	11	32	32	32	32	
32	32	32	32	32	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	11	11	11	11	11	10	32	32	32	32	32	
32	32	32	32	32	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	
11	11	11	11	12	12	12	12	12	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	
11	11	11	11	12	12	12	12	12	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	
11	11	11	11	12	12	12	12	12	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	
11	11	11	11	12	12	12	12	12	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	11	11	11	11	
10	11	11	11	12	12	12	12	12	12	12	12	12	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	11	11	11	11	
11	10	11	11	12	12	12	12	12	12	12	12	12	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	11	11	11	11	
11	11	10	11	12	12	12	12	12	12	12	12	12	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	11	11	11	11	
11	11	11	10	12	12	12	12	12	12	12	12	12	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	11	11	11	11	11	11	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	11	11	11	11	11	11	11	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	11	11	11	11	11	11	11	11	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	11	11	11	11	11	11	11	11	11	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	11	11	11	11	10	11	11	11	11	11	11	11	11	12	12	12	12	
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	11	11	11	11	11	10	11	11	11	11	11	11	11	12	12	12	12	
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	11	11	11	11	11	11	10	11	11	11	11	11	11	12	12	12	12	
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	11	11	11	11	11	11	11	11	11	11	11	11	11	12	12	12	12	

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Platform Notes (Continued)

From /proc/meminfo

```
MemTotal:      527914260 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
CVE-2017-5715 (Spectre variant 2):      Mitigation: Full AMD retpoline, IBPB:
conditional, IBRS_FW, STIBP: conditional, RSB
filling
```

run-level 3 Nov 15 22:34 last=5

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 R7525
Product Family: PowerEdge
```

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow

(Continued on next page)



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Platform Notes (Continued)

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:

16x 802C869D802C 36ASF4G72PZ-3G2E2 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
```

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Compiler Version Notes (Continued)

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

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Base Portability Flags (Continued)

```
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
-freemap-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
-freemap-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
```

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Base Optimization Flags (Continued)

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

```

-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

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



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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: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

```
627.cam4_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
```

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Peak Optimization Flags (Continued)

627.cam4_s (continued):

```
-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
```

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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