



# SPEC CPU®2017 Floating Point Speed Result

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## Dell Inc.

SPECspeed®2017\_fp\_base = 194

PowerEdge C6525 (AMD EPYC 7662, 2.00 GHz)

SPECspeed®2017\_fp\_peak = 200

CPU2017 License: 55

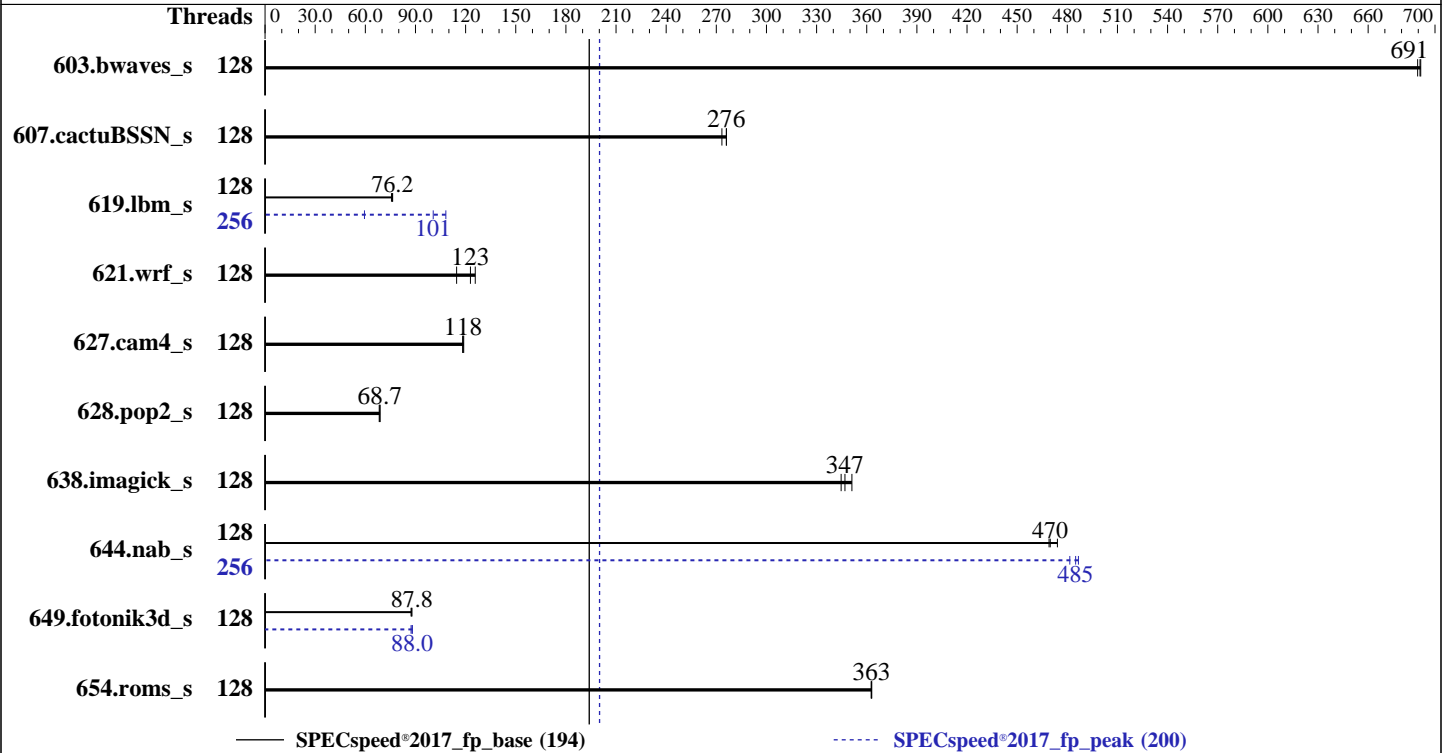
Test Date: Dec-2019

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2020

Tested by: Dell Inc.

Software Availability: Aug-2019



### Hardware

CPU Name: AMD EPYC 7662  
 Max MHz: 3300  
 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: 1 x 480 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 1.2.2 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 v5.2.0  
 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	85.3	691	<b>85.4</b>	<b>691</b>	85.6	690	128	85.3	691	<b>85.4</b>	<b>691</b>	85.6	690
607.cactuBSSN_s	128	60.4	276	<b>60.4</b>	<b>276</b>	61.0	273	128	60.4	276	<b>60.4</b>	<b>276</b>	61.0	273
619.lbm_s	128	68.6	76.3	<b>68.8</b>	<b>76.2</b>	69.3	75.6	256	<b>52.1</b>	<b>101</b>	48.4	108	88.1	59.5
621.wrf_s	128	<b>108</b>	<b>123</b>	105	126	115	115	128	<b>108</b>	<b>123</b>	105	126	115	115
627.cam4_s	128	74.6	119	75.0	118	<b>74.8</b>	<b>118</b>	128	74.6	119	75.0	118	<b>74.8</b>	<b>118</b>
628.pop2_s	128	174	68.3	<b>173</b>	<b>68.7</b>	173	68.8	128	174	68.3	<b>173</b>	<b>68.7</b>	173	68.8
638.imagick_s	128	41.1	351	41.9	345	<b>41.6</b>	<b>347</b>	128	41.1	351	41.9	345	<b>41.6</b>	<b>347</b>
644.nab_s	128	36.9	474	<b>37.2</b>	<b>470</b>	37.2	469	256	35.9	487	36.3	481	<b>36.0</b>	<b>485</b>
649.fotonik3d_s	128	104	87.4	104	87.8	<b>104</b>	<b>87.8</b>	128	<b>104</b>	<b>88.0</b>	103	88.1	104	87.4
654.roms_s	128	43.4	363	43.4	363	<b>43.4</b>	<b>363</b>	128	43.4	363	43.4	363	<b>43.4</b>	<b>363</b>

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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 619.lbm\_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"

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"

Environment variables set by runcpu during the 649.fotonik3d\_s peak run:

GOMP\_CPU\_AFFINITY = "0-127"



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## 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 5.2.0 is available here:

<https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.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 3200  
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 Wed Dec 18 17:18:00 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 7662 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
```

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## Platform Notes (Continued)

```

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
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 7662 64-Core Processor
Stepping:               0
CPU MHz:                1996.379
BogoMIPS:               3992.75
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

```

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## Platform Notes (Continued)

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  
 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  
 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 3 128 129 130 131
node 0 size: 15676 MB
node 0 free: 15628 MB
node 1 cpus: 4 5 6 7 132 133 134 135
node 1 size: 16126 MB
node 1 free: 15993 MB
node 2 cpus: 8 9 10 11 136 137 138 139
node 2 size: 16126 MB
node 2 free: 16098 MB
node 3 cpus: 12 13 14 15 140 141 142 143
node 3 size: 16125 MB
node 3 free: 16067 MB
```

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## Platform Notes (Continued)

```

node 4 cpus: 16 17 18 19 144 145 146 147
node 4 size: 16126 MB
node 4 free: 16084 MB
node 5 cpus: 20 21 22 23 148 149 150 151
node 5 size: 16126 MB
node 5 free: 16104 MB
node 6 cpus: 24 25 26 27 152 153 154 155
node 6 size: 16126 MB
node 6 free: 16104 MB
node 7 cpus: 28 29 30 31 156 157 158 159
node 7 size: 16125 MB
node 7 free: 16105 MB
node 8 cpus: 32 33 34 35 160 161 162 163
node 8 size: 16096 MB
node 8 free: 16060 MB
node 9 cpus: 36 37 38 39 164 165 166 167
node 9 size: 16126 MB
node 9 free: 16106 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: 16105 MB
node 12 cpus: 48 49 50 51 176 177 178 179
node 12 size: 16126 MB
node 12 free: 16101 MB
node 13 cpus: 52 53 54 55 180 181 182 183
node 13 size: 16126 MB
node 13 free: 15970 MB
node 14 cpus: 56 57 58 59 184 185 186 187
node 14 size: 16126 MB
node 14 free: 16103 MB
node 15 cpus: 60 61 62 63 188 189 190 191
node 15 size: 16113 MB
node 15 free: 16012 MB
node 16 cpus: 64 65 66 67 192 193 194 195
node 16 size: 16126 MB
node 16 free: 16107 MB
node 17 cpus: 68 69 70 71 196 197 198 199
node 17 size: 16126 MB
node 17 free: 16108 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

```

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```

node 19 free: 16105 MB
node 20 cpus: 80 81 82 83 208 209 210 211
node 20 size: 16126 MB
node 20 free: 16108 MB
node 21 cpus: 84 85 86 87 212 213 214 215
node 21 size: 16126 MB
node 21 free: 16104 MB
node 22 cpus: 88 89 90 91 216 217 218 219
node 22 size: 16126 MB
node 22 free: 16108 MB
node 23 cpus: 92 93 94 95 220 221 222 223
node 23 size: 16125 MB
node 23 free: 16106 MB
node 24 cpus: 96 97 98 99 224 225 226 227
node 24 size: 16126 MB
node 24 free: 16107 MB
node 25 cpus: 100 101 102 103 228 229 230 231
node 25 size: 16126 MB
node 25 free: 16108 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: 16108 MB
node 29 cpus: 116 117 118 119 244 245 246 247
node 29 size: 16126 MB
node 29 free: 16108 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 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 32
  1: 11 10 11 11 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 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 32 32 32 32

```

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## Platform Notes (Continued)

32	32	32	32	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	32	32	32	32
32	32	32	32	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	32	32	32	32
32	32	32	32	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	32	32	32	32
32	32	32	32	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	32	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	10	11	11	11	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	32
9:	12	12	12	12	12	12	12	12	11	10	11	11	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	32
10:	12	12	12	12	12	12	12	12	11	11	10	11	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	32
11:	12	12	12	12	12	12	12	12	11	11	11	10	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	32
12:	12	12	12	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	32	32	32	32	32	32	32	32
13:	12	12	12	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	32	32	32	32	32	32	32	32
14:	12	12	12	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	32	32	32	32	32	32	32	32
15:	12	12	12	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	32	32	32	32	32	32	32	32
16:	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	12	12	12	12	12	12	12	12
17:	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	12	12	12	12	12	12	12	12
18:	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	12	12	12	12	12	12	12	12
19:	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	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	32	32	32
10	11	11	11	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	32	32	32
11	10	11	11	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	32	32	32
11	11	10	11	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	32	32	32
11	11	11	10	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	32	32	32
12	12	12	12	10	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12
25:	32	32	32	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	12	12	12	12
26:	32	32	32	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	12	12	12	12

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SPECSpeed®2017\_fp\_peak = 200

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Dec-2019

Hardware Availability: Feb-2020

Software Availability: Aug-2019

## Platform Notes (Continued)

```

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:      527914768 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 Dec 17 07:32

SPEC is set to: /root/cpu2017-1.1.0

```

Filesystem      Type  Size  Used Avail Use% Mounted on

```

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## Platform Notes (Continued)

/dev/sdb2        xfs     440G    34G   407G    8% /

From /sys/devices/virtual/dmi/id  
BIOS:     Dell Inc. 1.2.2 11/13/2019  
Vendor:   Dell Inc.  
Product:  PowerEdge C6525  
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 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 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200

(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

(Continued on next page)



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Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Dec-2019

Hardware Availability: Feb-2020

Software Availability: Aug-2019

## Compiler Version Notes (Continued)

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



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CPU2017 License: 55

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Tested by: Dell Inc.

Test Date: Dec-2019

Hardware Availability: Feb-2020

Software Availability: Aug-2019

## 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
-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

```

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CPU2017 License: 55

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Tested by: Dell Inc.

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Hardware Availability: Feb-2020

Software Availability: Aug-2019

## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-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
```

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
```

(Continued on next page)



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Software Availability: Aug-2019

## Peak Compiler Invocation (Continued)

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: -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
```

638.imagick\_s: basepeak = yes

644.nab\_s: Same as 619.lbm\_s

Fortran benchmarks:

603.bwaves\_s: basepeak = yes

```
649.fotonik3d_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
```

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## Peak Optimization Flags (Continued)

649.fotonik3d\_s (continued):

```
-mllvm -vector-library=LIBMVEC -Kieee
-fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang
```

654.roms\_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf\_s: basepeak = yes

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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