



SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

SPECrate®2017_fp_base = 498

PowerEdge C6525 (AMD EPYC 7742, 2.25 GHz)

SPECrate®2017_fp_peak = 549

CPU2017 License: 55

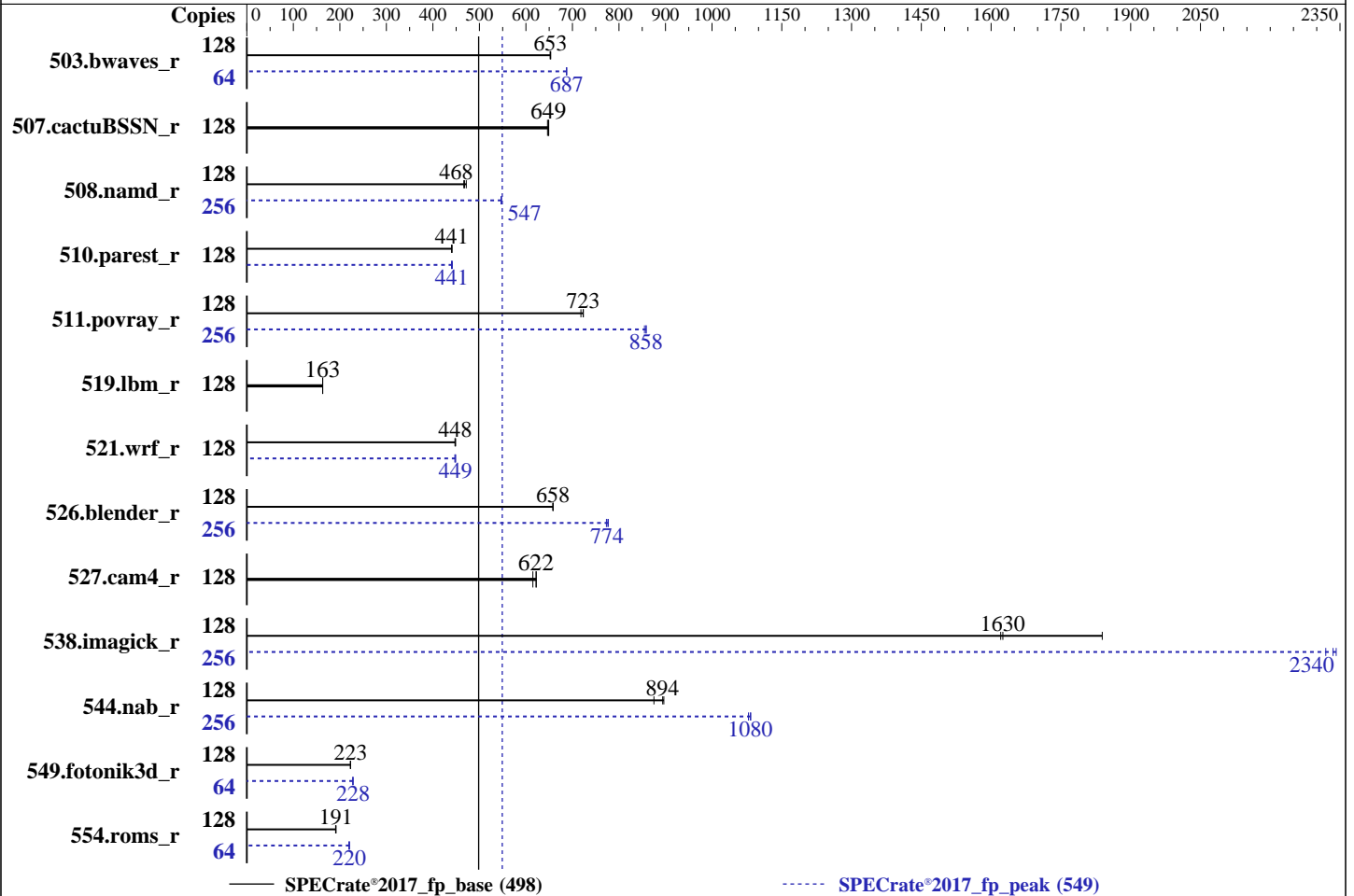
Test Date: Nov-2019

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2020

Tested by: Dell Inc.

Software Availability: Aug-2019



Hardware

CPU Name: AMD EPYC 7742
 Max MHz: 3400
 Nominal: 2250
 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: No
 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	<u>1966</u>	<u>653</u>	1965	653	1969	652	64	<u>934</u>	<u>687</u>	934	687	933	688
507.cactuBSSN_r	128	<u>250</u>	<u>649</u>	250	649	251	646	128	<u>250</u>	<u>649</u>	250	649	251	646
508.namd_r	128	<u>260</u>	<u>468</u>	261	466	258	472	256	<u>445</u>	<u>547</u>	445	546	444	547
510.parest_r	128	759	441	760	440	<u>760</u>	<u>441</u>	128	<u>760</u>	<u>441</u>	758	442	761	440
511.povray_r	128	416	718	<u>413</u>	<u>723</u>	413	723	256	696	859	<u>697</u>	<u>858</u>	699	855
519.lbm_r	128	828	163	827	163	<u>827</u>	<u>163</u>	128	828	163	827	163	<u>827</u>	<u>163</u>
521.wrf_r	128	639	449	640	448	<u>640</u>	<u>448</u>	128	<u>639</u>	<u>449</u>	639	449	641	447
526.blender_r	128	296	658	296	659	<u>296</u>	<u>658</u>	256	<u>504</u>	<u>774</u>	504	773	502	777
527.cam4_r	128	360	622	<u>360</u>	<u>622</u>	364	615	128	360	622	<u>360</u>	<u>622</u>	364	615
538.imagick_r	128	<u>196</u>	<u>1630</u>	196	1620	173	1840	256	272	2340	<u>273</u>	<u>2340</u>	274	2320
544.nab_r	128	240	896	<u>241</u>	<u>894</u>	246	875	256	398	1080	400	1080	<u>398</u>	<u>1080</u>
549.fotonik3d_r	128	<u>2238</u>	<u>223</u>	2237	223	2238	223	64	1095	228	1092	228	<u>1092</u>	<u>228</u>
554.roms_r	128	1066	191	<u>1063</u>	<u>191</u>	1061	192	64	464	219	<u>462</u>	<u>220</u>	461	221

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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

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Operating System Notes (Continued)

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:

LD_LIBRARY_PATH =

"/root/cpu2017-1.0.5/cpu2017-1.1.0/amd_rate_aocc200_rome_C_lib/64:/root/cpu2017-1.0.5/cpu2017-1.1.0/amd_rate_aocc200_rome_C_lib/32:"

MALLOC_CONF = "retain:true"

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 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

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Platform Notes (Continued)

Memory Interleaving set to Disabled

sysinfo program /root/cpu2017-1.0.5/cpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on linux-g3ob Thu Nov 21 20:19:31 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 7742 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
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 7742 64-Core Processor
Stepping: 0
CPU MHz: 2245.845
BogoMIPS: 4491.69
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
```

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Platform Notes (Continued)

```

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
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

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Platform Notes (Continued)

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: 15675 MB
node 0 free: 15359 MB
node 1 cpus: 4 5 6 7 132 133 134 135
node 1 size: 16126 MB
node 1 free: 15811 MB
node 2 cpus: 8 9 10 11 136 137 138 139
node 2 size: 16126 MB
node 2 free: 15824 MB
node 3 cpus: 12 13 14 15 140 141 142 143
node 3 size: 16125 MB
node 3 free: 15824 MB
node 4 cpus: 16 17 18 19 144 145 146 147
node 4 size: 16126 MB
node 4 free: 15835 MB
node 5 cpus: 20 21 22 23 148 149 150 151
node 5 size: 16126 MB
node 5 free: 15828 MB
node 6 cpus: 24 25 26 27 152 153 154 155
node 6 size: 16126 MB
node 6 free: 15830 MB
node 7 cpus: 28 29 30 31 156 157 158 159
node 7 size: 16125 MB
node 7 free: 15831 MB
node 8 cpus: 32 33 34 35 160 161 162 163
node 8 size: 16126 MB
node 8 free: 15748 MB
node 9 cpus: 36 37 38 39 164 165 166 167
node 9 size: 16126 MB
node 9 free: 15836 MB
node 10 cpus: 40 41 42 43 168 169 170 171
node 10 size: 16126 MB
node 10 free: 15833 MB
node 11 cpus: 44 45 46 47 172 173 174 175
node 11 size: 16125 MB
node 11 free: 15832 MB
node 12 cpus: 48 49 50 51 176 177 178 179
node 12 size: 16126 MB
node 12 free: 15825 MB
node 13 cpus: 52 53 54 55 180 181 182 183
node 13 size: 16126 MB
node 13 free: 15827 MB

```

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Platform Notes (Continued)

```

node 14 cpus: 56 57 58 59 184 185 186 187
node 14 size: 16126 MB
node 14 free: 15838 MB
node 15 cpus: 60 61 62 63 188 189 190 191
node 15 size: 16113 MB
node 15 free: 15540 MB
node 16 cpus: 64 65 66 67 192 193 194 195
node 16 size: 16126 MB
node 16 free: 15838 MB
node 17 cpus: 68 69 70 71 196 197 198 199
node 17 size: 16126 MB
node 17 free: 15836 MB
node 18 cpus: 72 73 74 75 200 201 202 203
node 18 size: 16096 MB
node 18 free: 15804 MB
node 19 cpus: 76 77 78 79 204 205 206 207
node 19 size: 16125 MB
node 19 free: 15831 MB
node 20 cpus: 80 81 82 83 208 209 210 211
node 20 size: 16126 MB
node 20 free: 15829 MB
node 21 cpus: 84 85 86 87 212 213 214 215
node 21 size: 16126 MB
node 21 free: 15832 MB
node 22 cpus: 88 89 90 91 216 217 218 219
node 22 size: 16126 MB
node 22 free: 15837 MB
node 23 cpus: 92 93 94 95 220 221 222 223
node 23 size: 16125 MB
node 23 free: 15833 MB
node 24 cpus: 96 97 98 99 224 225 226 227
node 24 size: 16126 MB
node 24 free: 15832 MB
node 25 cpus: 100 101 102 103 228 229 230 231
node 25 size: 16126 MB
node 25 free: 15835 MB
node 26 cpus: 104 105 106 107 232 233 234 235
node 26 size: 16126 MB
node 26 free: 15839 MB
node 27 cpus: 108 109 110 111 236 237 238 239
node 27 size: 16125 MB
node 27 free: 15834 MB
node 28 cpus: 112 113 114 115 240 241 242 243
node 28 size: 16126 MB
node 28 free: 15833 MB
node 29 cpus: 116 117 118 119 244 245 246 247
node 29 size: 16126 MB

```

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Platform Notes (Continued)

```

node 29 free: 15836 MB
node 30 cpus: 120 121 122 123 248 249 250 251
node 30 size: 16126 MB
node 30 free: 15834 MB
node 31 cpus: 124 125 126 127 252 253 254 255
node 31 size: 16122 MB
node 31 free: 15837 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  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  32
3:  11  11  11  10  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
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
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
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
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
8:  12  12  12  12  12  12  12  12  10  11  11  11  11  12  12  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  12  12  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  12  12  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  11  12  12  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  10  11  11  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  11  10  11  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  11  11  10  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  11  11  11  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
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
18: 32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  11

```

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Platform Notes (Continued)

```

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: 527913928 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

```

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SPECrate®2017_fp_peak = 549

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Nov-2019

Hardware Availability: Feb-2020

Software Availability: Aug-2019

Platform Notes (Continued)

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 21 09:58

```
SPEC is set to: /root/cpu2017-1.0.5/cpu2017-1.1.0
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   440G   23G  418G   6% /
```

```
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:
5x 802C80B3802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
1x 802C8632802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
5x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
5x 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
```

(End of data from sysinfo program)

Compiler Version Notes

```
=====
C          | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
          | 544.nab_r(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
```

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Hardware Availability: Feb-2020

Tested by: Dell Inc.

Software Availability: Aug-2019

Compiler Version Notes (Continued)

Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

=====
C++ | 508.namd_r(base, peak) 510.parest_r(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 | 511.povray_r(base, peak) 526.blender_r(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

=====
C++, C, Fortran | 507.cactuBSSN_r(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

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Compiler Version Notes (Continued)

```

=====
Fortran          | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                  | 554.roms_r(base, peak)
=====

```

```

-----
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.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       | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
=====

```

```

-----
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.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
AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCCLLVM.2.0.0.B191.2019_07_19) (based on LLVM AOCCLLVM.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

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

(Continued on next page)



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Software Availability: Aug-2019

Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:

clang++ clang flang

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
 507.cactuBSSN_r: -DSPEC_LP64
 508.namd_r: -DSPEC_LP64
 510.parest_r: -DSPEC_LP64
 511.povray_r: -DSPEC_LP64
 519.lbm_r: -DSPEC_LP64
 521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
 526.blender_r: -funsigned-char -D__BOOL_DEFINED -DSPEC_LP64
 527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
 538.imagick_r: -DSPEC_LP64
 544.nab_r: -DSPEC_LP64
 549.fotonik3d_r: -DSPEC_LP64
 554.roms_r: -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 -lmvec -lamdlibm -ljemalloc
 -lflang

C++ benchmarks:

-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
 -mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
 -mllvm -unroll-threshold=100 -flv-function-specialization
 -mllvm -enable-partial-unswitch -z muldefs -lmvec -lamdlibm
 -ljemalloc -lflang

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Base Optimization Flags (Continued)

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
-Kieeee -fno-finite-math-only -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
-Kieeee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using both 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 -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 -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch -z muldefs
-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 -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 -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieeee -fno-finite-math-only
-lmvec -lamdlibm -ljemalloc -lflang
```



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Software Availability: Aug-2019

Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

```
538.imagick_r: -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 -lmvec -lamdlibm -ljemalloc
-lflang
```

(Continued on next page)



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Software Availability: Aug-2019

Peak Optimization Flags (Continued)

544.nab_r: Same as 538.imagick_r

C++ benchmarks:

```
508.namd_r: -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 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -lmvec -lamdlibm -ljemalloc
-lflang
```

```
510.parest_r: -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 -Ofast -march=znver2
-flv-function-specialization -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -lmvec -lamdlibm -ljemalloc
-lflang
```

Fortran benchmarks:

```
503.bwaves_r: -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 -lmvec -lamdlibm -ljemalloc
-lflang
```

549.fotonik3d_r: Same as 503.bwaves_r

```
554.roms_r: -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
```

(Continued on next page)



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Peak Optimization Flags (Continued)

554.roms_r (continued):

```
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc
-lflang
```

Benchmarks using both Fortran and C:

```
521.wrf_r: -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 -lmvec
-lamdlibm -ljemalloc -lflang
```

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

```
511.povray_r: -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,-x86-use-vzeroupper=false -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 -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000 -lmvec -lamdlibm
-ljemalloc -lflang
```

```
526.blender_r: -std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
```

(Continued on next page)



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Peak Optimization Flags (Continued)

526.blender_r (continued):

```
-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 -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000 -lmvec -lamdlibm
-ljemalloc -lflang
```

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

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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