SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

$SPECrate^®2017\_fp\_base = 428$

$SPECrate^®2017\_fp\_peak = 426$

CPU2017 License: 55	**Test Date:** Dec-2019
Test Sponsor: Dell Inc.	**Hardware Availability:** Feb-2020
Tested by: Dell Inc.	**Software Availability:** Aug-2019

Copies

- 503.bwaves_r: 128 = 700; 32 = 725
- 507.cactuBSSN_r: 128 = 575; 64 = 536
- 508.namd_r: 128 = 339; 128 = 325
- 510.parest_r: 128 = 379; 64 = 404
- 511.povray_r: 128 = 506; 128 = 514
- 519.lbm_r: 128 = 167; 32 = 150
- 521.wrf_r: 128 = 434; 64 = 409
- 526.blender_r: 128 = 505; 128 = 499
- 527.cam4_r: 128 = 454; 128 = 460
- 538.imagick_r: 128 = 1370; 128 = 1380
- 544.nab_r: 128 = 631; 128 = 632
- 549.fotonik3d_r: 128 = 231; 64 = 234
- 554.roms_r: 128 = 189; 32 = 201

—— SPECrate®2017_fp_base (428)
----- SPECrate®2017_fp_peak (426)

Hardware

CPU Name: AMD EPYC 7532
Max MHz: 3300
Nominal: 2400
Enabled: 64 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 / 2 cores
Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 1.6TB SAS SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1
kernel 4.12.14-195-default
4.12.14-195-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: No
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 v5.2.0
Power Management: BIOS set to prefer performance at the cost of additional power usage.

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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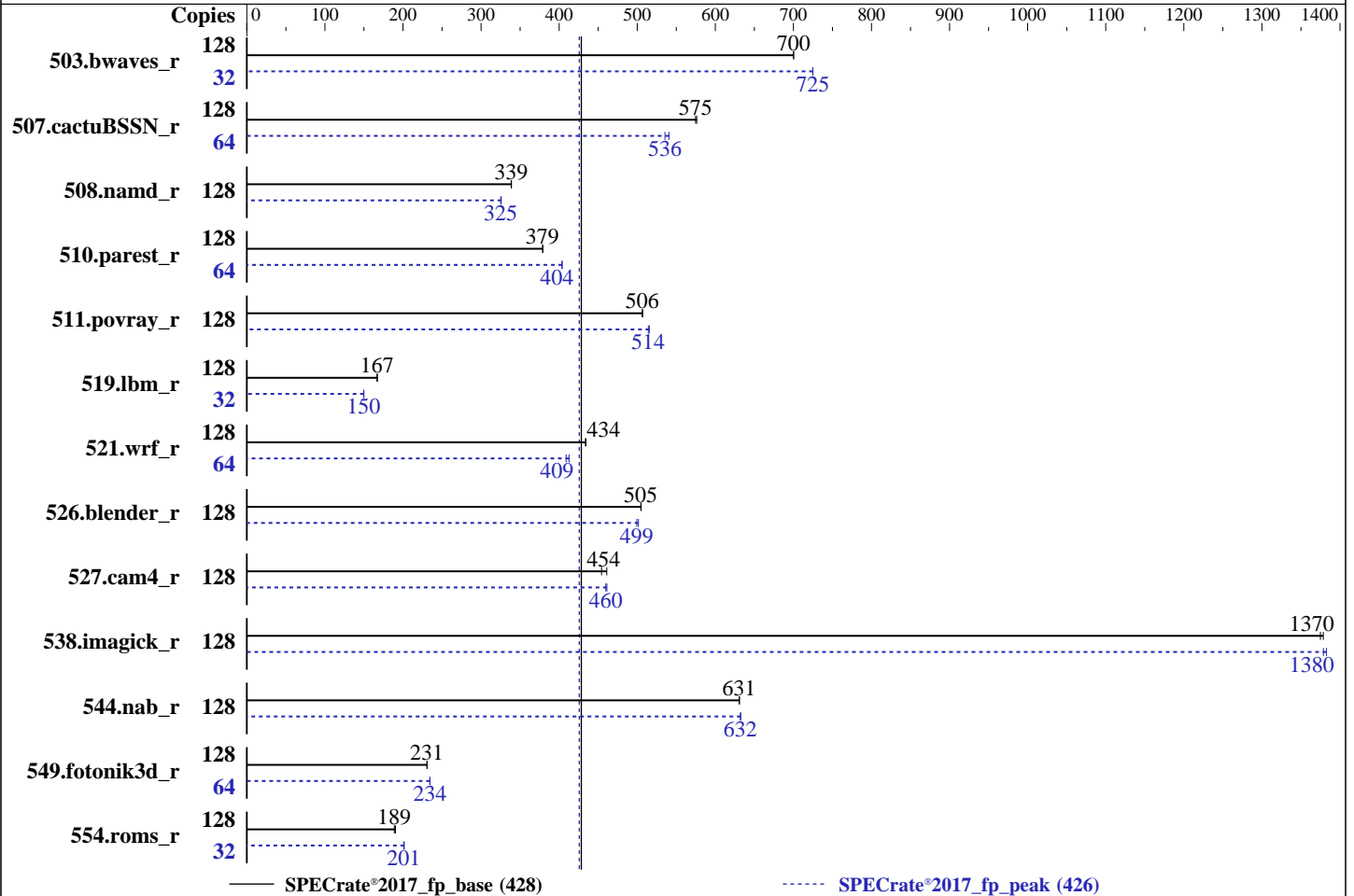
CPU2017 License: 55

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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	**1833**	**700**	1833	700			32	443	725	**443**	**725**		
507.cactuBSSN_r	128	281	576	**282**	**575**			64	150	541	**151**	**536**		
508.namd_r	128	**359**	**339**	359	339			128	373	326	**374**	**325**		
510.parest_r	128	**884**	**379**	883	379			64	415	404	**415**	**404**		
511.povray_r	128	590	507	**590**	**506**			128	**581**	**514**	580	515		
519.lbm_r	128	807	167	**809**	**167**			32	225	150	**225**	**150**		
521.wrf_r	128	660	434	**661**	**434**			64	**351**	**409**	347	413		
526.blender_r	128	**386**	**505**	386	505			128	**390**	**499**	389	502		
527.cam4_r	128	486	461	**493**	**454**			128	**487**	**460**	485	461		
538.imagick_r	128	**232**	**1370**	231	1380			128	230	1380	**231**	**1380**		
544.nab_r	128	**342**	**631**	341	631			128	341	633	**341**	**632**		
549.fotonik3d_r	128	**2161**	**231**	2161	231			64	**1064**	**234**	1063	235		
554.roms_r	128	1068	190	**1077**	**189**			32	**253**	**201**	252	202		
SPECrate®2017_fp_base =		**428**												
SPECrate®2017_fp_peak =		**426**												

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
```

(Continued on next page)

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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/cpu2017-1.1.0/amd_rate_aocc200_rome_C_lib/64;/root/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/cpu2017-1.1.0/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on linux-g3ob Wed Dec  4 15:21:57 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 7532 32-Core Processor
       2  "physical id"s (chips)
       128 "processors"
    cores, siblings (Caution: counting these is hw and system dependent. The following
    excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
       cpu cores : 32
       siblings  : 64
       physical 0: cores 0 1 4 5 8 9 12 13 16 17 20 21 24 25 28 29 32 33 36 37 40 41 44 45
       48 49 52 53 56 57 60 61
       physical 1: cores 0 1 4 5 8 9 12 13 16 17 20 21 24 25 28 29 32 33 36 37 40 41 44 45
       48 49 52 53 56 57 60 61

 From lscpu:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      Address sizes:       43 bits physical, 48 bits virtual
      CPU(s):              128
      On-line CPU(s) list: 0-127
      Thread(s) per core:  2
      Core(s) per socket:  32
      Socket(s):           2
      NUMA node(s):        32
      Vendor ID:           AuthenticAMD
      CPU family:          23
      Model:               49
      Model name:          AMD EPYC 7532 32-Core Processor
      Stepping:            0
      CPU MHz:             2395.513
      BogoMIPS:            4791.02
      Virtualization:      AMD-V
      L1d cache:           32K
      L1i cache:           32K
      L2 cache:            512K
      L3 cache:            16384K
      NUMA node0 CPU(s):   0,1,64,65
```

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Platform Notes (Continued)

```
     NUMA node1 CPU(s):     2,3,66,67
     NUMA node2 CPU(s):     4,5,68,69
     NUMA node3 CPU(s):     6,7,70,71
     NUMA node4 CPU(s):     8,9,72,73
     NUMA node5 CPU(s):     10,11,74,75
     NUMA node6 CPU(s):     12,13,76,77
     NUMA node7 CPU(s):     14,15,78,79
     NUMA node8 CPU(s):     16,17,80,81
     NUMA node9 CPU(s):     18,19,82,83
     NUMA node10 CPU(s):    20,21,84,85
     NUMA node11 CPU(s):    22,23,86,87
     NUMA node12 CPU(s):    24,25,88,89
     NUMA node13 CPU(s):    26,27,90,91
     NUMA node14 CPU(s):    28,29,92,93
     NUMA node15 CPU(s):    30,31,94,95
     NUMA node16 CPU(s):    32,33,96,97
     NUMA node17 CPU(s):    34,35,98,99
     NUMA node18 CPU(s):    36,37,100,101
     NUMA node19 CPU(s):    38,39,102,103
     NUMA node20 CPU(s):    40,41,104,105
     NUMA node21 CPU(s):    42,43,106,107
     NUMA node22 CPU(s):    44,45,108,109
     NUMA node23 CPU(s):    46,47,110,111
     NUMA node24 CPU(s):    48,49,112,113
     NUMA node25 CPU(s):    50,51,114,115
     NUMA node26 CPU(s):    52,53,116,117
     NUMA node27 CPU(s):    54,55,118,119
     NUMA node28 CPU(s):    56,57,120,121
     NUMA node29 CPU(s):    58,59,122,123
     NUMA node30 CPU(s):    60,61,124,125
     NUMA node31 CPU(s):    62,63,126,127
     Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
     pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
     constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
     pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx
     f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse
     3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
     perfctr_l2 mwaitx cpb cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall
     fsgsbase bmi1 avx2 smep bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha_ni
     xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
     clzero irperf xsaveerptr arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean
     flushbyasid decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif umip
     rdpid overflow_recov succor smca

  /proc/cpuinfo cache data
     cache size : 512 KB
```

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Platform Notes (Continued)

```
  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 64 65
    node 0 size: 15548 MB
    node 0 free: 15343 MB
    node 1 cpus: 2 3 66 67
    node 1 size: 16127 MB
    node 1 free: 15967 MB
    node 2 cpus: 4 5 68 69
    node 2 size: 16127 MB
    node 2 free: 15964 MB
    node 3 cpus: 6 7 70 71
    node 3 size: 16126 MB
    node 3 free: 15969 MB
    node 4 cpus: 8 9 72 73
    node 4 size: 16127 MB
    node 4 free: 15969 MB
    node 5 cpus: 10 11 74 75
    node 5 size: 16127 MB
    node 5 free: 15968 MB
    node 6 cpus: 12 13 76 77
    node 6 size: 16127 MB
    node 6 free: 15970 MB
    node 7 cpus: 14 15 78 79
    node 7 size: 16126 MB
    node 7 free: 15961 MB
    node 8 cpus: 16 17 80 81
    node 8 size: 16127 MB
    node 8 free: 15966 MB
    node 9 cpus: 18 19 82 83
    node 9 size: 16127 MB
    node 9 free: 15969 MB
    node 10 cpus: 20 21 84 85
    node 10 size: 16127 MB
    node 10 free: 15965 MB
    node 11 cpus: 22 23 86 87
    node 11 size: 16126 MB
    node 11 free: 15965 MB
    node 12 cpus: 24 25 88 89
    node 12 size: 16127 MB
    node 12 free: 15948 MB
    node 13 cpus: 26 27 90 91
    node 13 size: 16127 MB
    node 13 free: 15966 MB
    node 14 cpus: 28 29 92 93
    node 14 size: 16127 MB
```

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Platform Notes (Continued)

```
     node 14 free: 15968 MB
     node 15 cpus: 30 31 94 95
     node 15 size: 16084 MB
     node 15 free: 15926 MB
     node 16 cpus: 32 33 96 97
     node 16 size: 16127 MB
     node 16 free: 15960 MB
     node 17 cpus: 34 35 98 99
     node 17 size: 16127 MB
     node 17 free: 15966 MB
     node 18 cpus: 36 37 100 101
     node 18 size: 16127 MB
     node 18 free: 15963 MB
     node 19 cpus: 38 39 102 103
     node 19 size: 16126 MB
     node 19 free: 15961 MB
     node 20 cpus: 40 41 104 105
     node 20 size: 16127 MB
     node 20 free: 15965 MB
     node 21 cpus: 42 43 106 107
     node 21 size: 16127 MB
     node 21 free: 15968 MB
     node 22 cpus: 44 45 108 109
     node 22 size: 16127 MB
     node 22 free: 15969 MB
     node 23 cpus: 46 47 110 111
     node 23 size: 16126 MB
     node 23 free: 15967 MB
     node 24 cpus: 48 49 112 113
     node 24 size: 16127 MB
     node 24 free: 15858 MB
     node 25 cpus: 50 51 114 115
     node 25 size: 16127 MB
     node 25 free: 15966 MB
     node 26 cpus: 52 53 116 117
     node 26 size: 16127 MB
     node 26 free: 15924 MB
     node 27 cpus: 54 55 118 119
     node 27 size: 16126 MB
     node 27 free: 15930 MB
     node 28 cpus: 56 57 120 121
     node 28 size: 16127 MB
     node 28 free: 15968 MB
     node 29 cpus: 58 59 122 123
     node 29 size: 16127 MB
     node 29 free: 15967 MB
     node 30 cpus: 60 61 124 125
```

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Platform Notes (Continued)

```
node 30 size: 16127 MB
node 30 free: 15970 MB
node 31 cpus: 62 63 126 127
node 31 size: 16124 MB
node 31 free: 15964 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
  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
```

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Platform Notes (Continued)

```
   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:       527808280 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:
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

SPECrate®2017_fp_base = 428

SPECrate®2017_fp_peak = 426

CPU2017 License: 55		**Test Date:**	Dec-2019
Test Sponsor: Dell Inc.		**Hardware Availability:**	Feb-2020
Tested by: Dell Inc.		**Software Availability:**	Aug-2019

Platform Notes (Continued)

```
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 4 10:08

SPEC is set to: /root/cpu2017-1.1.0
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       xfs   440G   41G  400G  10% /


From /sys/devices/virtual/dmi/id
    BIOS:    Dell Inc. 1.2.4 11/05/2019
    Vendor:  Dell Inc.
    Product: PowerEdge R6525
    Product Family: PowerEdge
    Serial:  1234567


Additional information from dmidecode follows.  WARNING: Use caution when you interpret
this section. The 'dmidecode' program reads system data which is "intended to allow
hardware to be accurately determined", but the intent may not be met, as there are
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
   Memory:
     5x 802C80B3802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
     2x 802C8632802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
     1x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
     8x 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
     16x Not Specified Not Specified

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C                 | 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
```

(Continued on next page)

           https://www.spec.org/

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

SPECrate®2017_fp_base = 428

SPECrate®2017_fp_peak = 426

CPU2017 License: 55
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
------------------------------------------------------------------------


==============================================================================
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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SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

SPECrate®2017_fp_base = 428

SPECrate®2017_fp_peak = 426

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

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

Compiler Version Notes (Continued)

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

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

==========================================================================
Fortran, C       | 521.wrf_r(base, peak) 527.cam4_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
--------------------------------------------------------------------------
```

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)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

SPECrate®2017_fp_base = 428

SPECrate®2017_fp_peak = 426

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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SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

SPECrate®2017_fp_base = 428

SPECrate®2017_fp_peak = 426

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

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

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
-Kieee -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
-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 -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 -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 -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 -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
-lmvec -lamdlibm -ljemalloc -lflang
```

SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

$SPECrate^{®}2017\_fp\_base = 428$

$SPECrate^{®}2017\_fp\_peak = 426$

CPU2017 License: 55		**Test Date:**	Dec-2019
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Feb-2020
Tested by:	Dell Inc.	**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:
```
-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
```

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
```

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     https://www.spec.org/

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

SPECrate®2017_fp_base = 428

SPECrate®2017_fp_peak = 426

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

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

Peak Optimization Flags (Continued)

508.namd_r (continued):
```
-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
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC
-Kieee -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 -Ofast -march=znver2
```

(Continued on next page)

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

SPECrate®2017_fp_base = 428

SPECrate®2017_fp_peak = 426

CPU2017 License: 55	**Test Date:** Dec-2019
Test Sponsor: Dell Inc.	**Hardware Availability:** Feb-2020
Tested by: Dell Inc.	**Software Availability:** Aug-2019

Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
```
-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
```

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
-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++:
```
-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R6525 (AMD EPYC 7532, 2.40 GHz)

$SPECrate^{®}2017\_fp\_base = 428$

$SPECrate^{®}2017\_fp\_peak = 426$

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

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

Peak 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 -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
-O3 -funroll-loops -Mrecursive -Kieee -fno-finite-math-only -lmvec
-lamdlibm -ljemalloc -lflang
```

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

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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