



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate®2017\_fp\_base = 402

PowerEdge R7525 (AMD EPYC 7552, 2.20 GHz)

SPECrate®2017\_fp\_peak = 445

CPU2017 License: 55

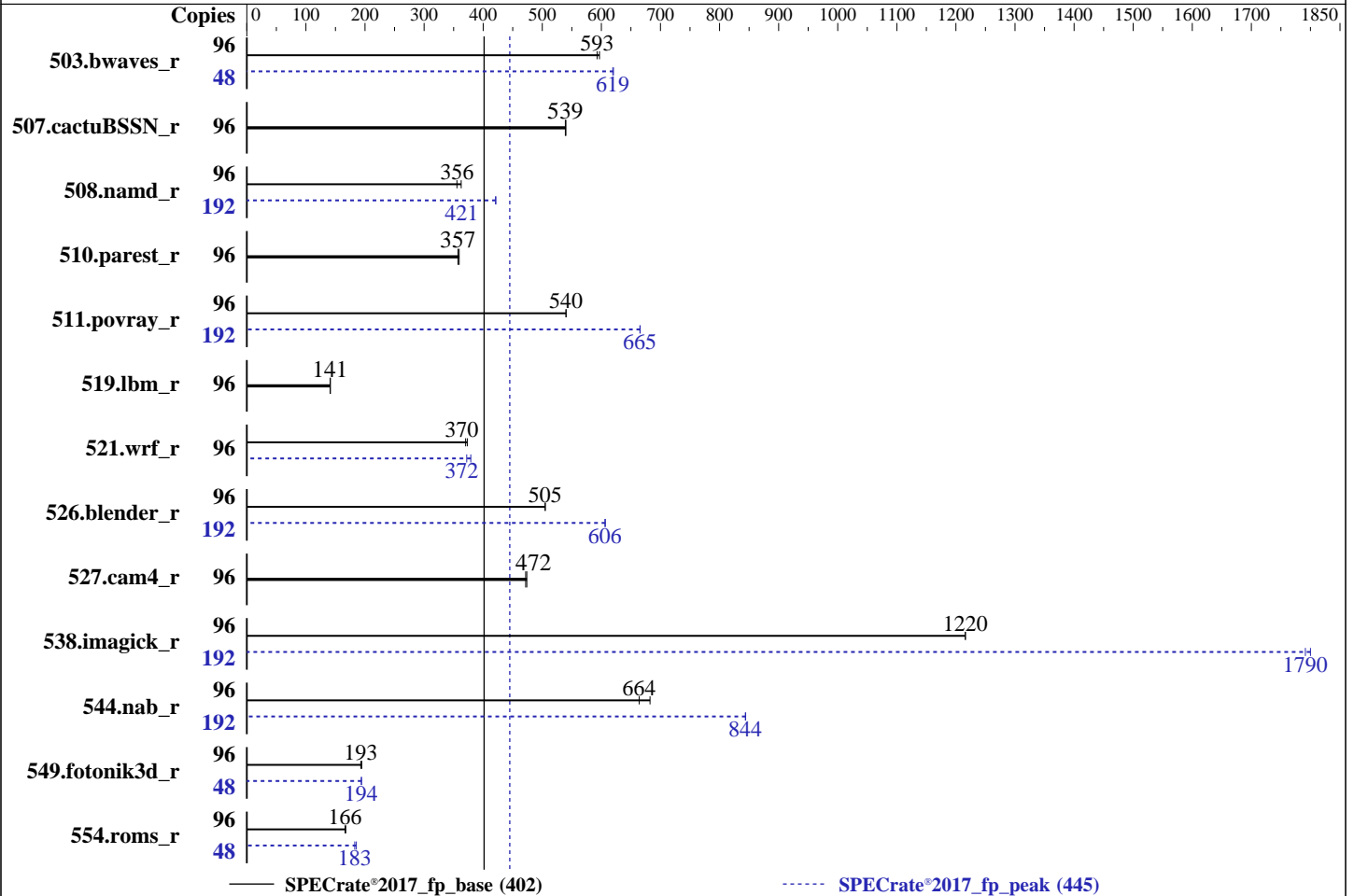
Test Date: Nov-2019

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2020

Tested by: Dell Inc.

Software Availability: Aug-2019



### Hardware

CPU Name: AMD EPYC 7552  
 Max MHz: 3300  
 Nominal: 2200  
 Enabled: 96 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 512 KB I+D on chip per core  
 L3: 192 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 960 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 1.2.4 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.



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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	96	<b><u>1624</u></b>	<b><u>593</u></b>	1613	597			48	<b><u>777</u></b>	<b><u>619</u></b>	776	620		
507.cactuBSSN_r	96	<b><u>225</u></b>	<b><u>539</u></b>	225	540			96	<b><u>225</u></b>	<b><u>539</u></b>	225	540		
508.namd_r	96	<b><u>256</u></b>	<b><u>356</u></b>	251	363			192	433	421	<b><u>433</u></b>	<b><u>421</u></b>		
510.parest_r	96	699	359	<b><u>703</u></b>	<b><u>357</u></b>			96	699	359	<b><u>703</u></b>	<b><u>357</u></b>		
511.povray_r	96	<b><u>415</u></b>	<b><u>540</u></b>	415	540			192	<b><u>674</u></b>	<b><u>665</u></b>	673	666		
519.lbm_r	96	716	141	<b><u>717</u></b>	<b><u>141</u></b>			96	716	141	<b><u>717</u></b>	<b><u>141</u></b>		
521.wrf_r	96	<b><u>581</u></b>	<b><u>370</u></b>	576	373			96	<b><u>578</u></b>	<b><u>372</u></b>	567	379		
526.blender_r	96	<b><u>290</u></b>	<b><u>505</u></b>	289	505			192	482	607	<b><u>482</u></b>	<b><u>606</u></b>		
527.cam4_r	96	<b><u>356</u></b>	<b><u>472</u></b>	354	474			96	<b><u>356</u></b>	<b><u>472</u></b>	354	474		
538.imagick_r	96	196	1220	<b><u>196</u></b>	<b><u>1220</u></b>			192	<b><u>267</u></b>	<b><u>1790</u></b>	265	1800		
544.nab_r	96	<b><u>243</u></b>	<b><u>664</u></b>	237	682			192	383	844	<b><u>383</u></b>	<b><u>844</u></b>		
549.fotonik3d_r	96	1923	195	<b><u>1940</u></b>	<b><u>193</u></b>			48	<b><u>966</u></b>	<b><u>194</u></b>	964	194		
554.roms_r	96	<b><u>917</u></b>	<b><u>166</u></b>	911	167			48	411	185	<b><u>418</u></b>	<b><u>183</u></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

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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 2

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 295195f888a3d7edble6e46a485a0011  
running on linux-g3ob Tue Nov 19 10:27:12 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 7552 48-Core Processor
 2 "physical id"s (chips)
192 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 48
siblings  : 96
physical 0: cores 0 1 2 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
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
```

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): 192
On-line CPU(s) list: 0-191
Thread(s) per core: 2
Core(s) per socket: 48
Socket(s): 2
NUMA node(s): 24
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7552 48-Core Processor
Stepping: 0
CPU MHz: 2195.836
BogoMIPS: 4391.67
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-3,96-99
```

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## Platform Notes (Continued)

```

NUMA node1 CPU(s): 4-7,100-103
NUMA node2 CPU(s): 8-11,104-107
NUMA node3 CPU(s): 12-15,108-111
NUMA node4 CPU(s): 16-19,112-115
NUMA node5 CPU(s): 20-23,116-119
NUMA node6 CPU(s): 24-27,120-123
NUMA node7 CPU(s): 28-31,124-127
NUMA node8 CPU(s): 32-35,128-131
NUMA node9 CPU(s): 36-39,132-135
NUMA node10 CPU(s): 40-43,136-139
NUMA node11 CPU(s): 44-47,140-143
NUMA node12 CPU(s): 48-51,144-147
NUMA node13 CPU(s): 52-55,148-151
NUMA node14 CPU(s): 56-59,152-155
NUMA node15 CPU(s): 60-63,156-159
NUMA node16 CPU(s): 64-67,160-163
NUMA node17 CPU(s): 68-71,164-167
NUMA node18 CPU(s): 72-75,168-171
NUMA node19 CPU(s): 76-79,172-175
NUMA node20 CPU(s): 80-83,176-179
NUMA node21 CPU(s): 84-87,180-183
NUMA node22 CPU(s): 88-91,184-187
NUMA node23 CPU(s): 92-95,188-191

```

```

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
constant_tsc rep_good nopl xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c
rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx cpb
cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep
bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsavec xgetbv1 xsaves
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr arat npt
lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca

```

```

/proc/cpuinfo cache data
cache size : 512 KB

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```

available: 24 nodes (0-23)
node 0 cpus: 0 1 2 3 96 97 98 99
node 0 size: 21051 MB
node 0 free: 20723 MB
node 1 cpus: 4 5 6 7 100 101 102 103
node 1 size: 21501 MB
node 1 free: 21177 MB

```

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## Platform Notes (Continued)

```

node 2 cpus: 8 9 10 11 104 105 106 107
node 2 size: 21502 MB
node 2 free: 21201 MB
node 3 cpus: 12 13 14 15 108 109 110 111
node 3 size: 21501 MB
node 3 free: 21209 MB
node 4 cpus: 16 17 18 19 112 113 114 115
node 4 size: 21501 MB
node 4 free: 21198 MB
node 5 cpus: 20 21 22 23 116 117 118 119
node 5 size: 21503 MB
node 5 free: 21216 MB
node 6 cpus: 24 25 26 27 120 121 122 123
node 6 size: 21501 MB
node 6 free: 21231 MB
node 7 cpus: 28 29 30 31 124 125 126 127
node 7 size: 21501 MB
node 7 free: 21232 MB
node 8 cpus: 32 33 34 35 128 129 130 131
node 8 size: 21503 MB
node 8 free: 21232 MB
node 9 cpus: 36 37 38 39 132 133 134 135
node 9 size: 21501 MB
node 9 free: 21171 MB
node 10 cpus: 40 41 42 43 136 137 138 139
node 10 size: 21501 MB
node 10 free: 21230 MB
node 11 cpus: 44 45 46 47 140 141 142 143
node 11 size: 21490 MB
node 11 free: 21216 MB
node 12 cpus: 48 49 50 51 144 145 146 147
node 12 size: 21501 MB
node 12 free: 21222 MB
node 13 cpus: 52 53 54 55 148 149 150 151
node 13 size: 21501 MB
node 13 free: 21230 MB
node 14 cpus: 56 57 58 59 152 153 154 155
node 14 size: 21502 MB
node 14 free: 21230 MB
node 15 cpus: 60 61 62 63 156 157 158 159
node 15 size: 21501 MB
node 15 free: 21232 MB
node 16 cpus: 64 65 66 67 160 161 162 163
node 16 size: 21501 MB
node 16 free: 21231 MB
node 17 cpus: 68 69 70 71 164 165 166 167
node 17 size: 21503 MB

```

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## Platform Notes (Continued)

```

node 17 free: 21234 MB
node 18 cpus: 72 73 74 75 168 169 170 171
node 18 size: 21501 MB
node 18 free: 21232 MB
node 19 cpus: 76 77 78 79 172 173 174 175
node 19 size: 21501 MB
node 19 free: 21231 MB
node 20 cpus: 80 81 82 83 176 177 178 179
node 20 size: 21503 MB
node 20 free: 21234 MB
node 21 cpus: 84 85 86 87 180 181 182 183
node 21 size: 21472 MB
node 21 free: 21201 MB
node 22 cpus: 88 89 90 91 184 185 186 187
node 22 size: 21501 MB
node 22 free: 21234 MB
node 23 cpus: 92 93 94 95 188 189 190 191
node 23 size: 21501 MB
node 23 free: 21229 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
0: 10 11 11 11 11 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32
32 32 32 32
1: 11 10 11 11 11 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32
32 32 32 32
2: 11 11 10 11 11 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32
32 32 32 32
3: 11 11 11 10 11 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32
32 32 32 32
4: 11 11 11 11 10 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32
32 32 32 32
5: 11 11 11 11 11 10 12 12 12 12 12 12 32 32 32 32 32 32 32 32
32 32 32 32
6: 12 12 12 12 12 12 12 10 11 11 11 11 32 32 32 32 32 32 32 32
32 32 32 32
7: 12 12 12 12 12 12 12 11 10 11 11 11 32 32 32 32 32 32 32 32
32 32 32 32
8: 12 12 12 12 12 12 12 11 11 10 11 11 32 32 32 32 32 32 32 32
32 32 32 32
9: 12 12 12 12 12 12 12 11 11 11 10 11 32 32 32 32 32 32 32 32
32 32 32 32
10: 12 12 12 12 12 12 12 11 11 11 11 10 32 32 32 32 32 32 32 32
32 32 32 32
11: 12 12 12 12 12 12 12 11 11 11 11 11 32 32 32 32 32 32 32 32
32 32 32 32
12: 32 32 32 32 32 32 32 32 32 32 32 32 32 10 11 11 11 11 11 12 12

```

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## Platform Notes (Continued)

```

12 12 12 12
13: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 10 11 11 11 11 12 12
12 12 12 12
14: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 10 11 11 11 12 12
12 12 12 12
15: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 10 11 11 12 12
12 12 12 12
16: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 10 11 12 12
12 12 12 12
17: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 10 12 12
12 12 12 12
18: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 10 11
11 11 11 11
19: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 11 10
11 11 11 11
20: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 11 11
10 11 11 11
21: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 11 11
11 10 11 11
22: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 11 11
11 11 10 11
23: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 11 11
11 11 11 10

```

```

From /proc/meminfo
MemTotal:      527930668 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

```

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## Platform Notes (Continued)

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 19 03:57 last=5

SPEC is set to: /root/cpu2017-1.1.0

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	xfs	440G	41G	400G	10%	/

```
From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 1.2.4 11/05/2019
Vendor: Dell Inc.
Product: PowerEdge R7525
Product Family: PowerEdge
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:

```
3x 802C80B3802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
1x 802C80B3802C 36ASF4G72PZ-3G2E7 32 GB 2 rank 3200
2x 802C8632802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
1x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200
9x 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
Thread model: posix
```

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## Compiler Version Notes (Continued)

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)  
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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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SPECrate®2017\_fp\_base = 402

PowerEdge R7525 (AMD EPYC 7552, 2.20 GHz)

SPECrate®2017\_fp\_peak = 445

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Nov-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)
=====

```

```

=====
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

Benchmarks using Fortran, C, and C++:

clang++ clang flang



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## 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
-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 -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

```

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

```

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Hardware Availability: Feb-2020

Software Availability: Aug-2019

## Base Optimization Flags (Continued)

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
```

## Peak Compiler Invocation

C benchmarks:  
clang

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Tested by: Dell Inc.

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Hardware Availability: Feb-2020

Software Availability: Aug-2019

## Peak Compiler Invocation (Continued)

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
```

544.nab\_r: Same as 538.imagick\_r

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Tested by: Dell Inc.

Test Date: Nov-2019

Hardware Availability: Feb-2020

Software Availability: Aug-2019

## Peak Optimization Flags (Continued)

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: basepeak = yes

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:

```
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
```

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## Peak Optimization Flags (Continued)

521.wrf\_r (continued):

```
-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
-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
```

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## Peak Optimization Flags (Continued)

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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