Dell Inc.

PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)

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

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

SPECspeed®2017_fp_base = 135
SPECspeed®2017_fp_peak = 138

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 135</th>
</tr>
</thead>
</table>

```
603.bwaves_s  48
607.cactuBSSN_s  48
619.lbm_s  48
621.wrf_s  96
627.cam4_s  48
628.pop2_s  48
638.imagick_s  48
644.nab_s  96
649.fotonik3d_s  48
654.roms_s  48
```

603.bwaves_s  48
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619.lbm_s  48
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638.imagick_s  48
644.nab_s  96
649.fotonik3d_s  48
654.roms_s  48

Hardware

CPU Name: AMD EPYC 7402
Max MHz: 3350
Nominal: 2800
Enabled: 48 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: 128 MB I+D on chip per chip, 16 MB shared / 3 cores
Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 2 x 960 GB SAS SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.2.6 released Nov-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc: jemalloc memory allocator library v5.1.0
Power Management: BIOS set to prefer performance at the cost of additional power usage.
Dell Inc.  
PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)  

**SPECspeed®2017_fp_base = 135**  
**SPECspeed®2017_fp_peak = 138**

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Base</th>
<th>Seconds</th>
<th>Base</th>
<th>Seconds</th>
<th>Base</th>
</tr>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td></td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>88.2</td>
<td>189</td>
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<td>53.8</td>
<td>98.3</td>
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<td>98.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>125</td>
<td>106</td>
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<td><strong>125</strong></td>
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<tr>
<td>627.cam4_s</td>
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<td>83.8</td>
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<td><strong>83.6</strong></td>
<td>48</td>
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<td>83.6</td>
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<td>83.8</td>
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<tr>
<td>628.pop2_s</td>
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<td><strong>52.2</strong></td>
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<td><strong>52.8</strong></td>
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<tr>
<td>638.imagick_s</td>
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<td><strong>192</strong></td>
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<td><strong>192</strong></td>
<td>75.6</td>
<td>191</td>
<td>73.7</td>
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<td></td>
</tr>
<tr>
<td>644.nab_s</td>
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<td><strong>63.9</strong></td>
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<td>273</td>
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<td><strong>54.2</strong></td>
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<td>54.3</td>
<td>322</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td><strong>116</strong></td>
<td><strong>78.8</strong></td>
<td>114</td>
<td>80.0</td>
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<td><strong>78.8</strong></td>
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<td>80.0</td>
<td>118</td>
<td>77.2</td>
<td></td>
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<tr>
<td>654.roms_s</td>
<td>48</td>
<td>80.4</td>
<td>196</td>
<td><strong>80.6</strong></td>
<td><strong>195</strong></td>
<td>80.8</td>
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<td>48</td>
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<td>201</td>
<td>78.6</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

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 -1 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory sync then drop_caches=3 to reset caches before invoking runcpu

dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

Transparent huge pages set to 'always' for this run (OS default)
Dell Inc. 

PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz) 

SPECspeed®2017_fp_base = 135 
SPECspeed®2017_fp_peak = 138

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-95"
LD_LIBRARY_PATH = 
/root/cpu2017-1.1.0/amd_speed_aocc200_rome_C_lib/64:/root/cpu2017-1.1.0 
/amd_speed_aocc200_rome_C_lib/32:
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "96"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0 48 1 49 2 50 3 51 4 52 5 53 6 54 7 55 8 56 9 57 10 58 
11 59 12 60 13 61 14 62 15 63 16 64 17 65 18 66 19 67 20 68 21 69 22 70 
23 71 24 72 25 73 26 74 27 75 28 76 29 77 30 78 31 79 32 80 33 81 34 82 
35 83 36 84 37 85 38 86 39 87 40 88 41 89 42 90 43 91 44 92 45 93 46 94 
47 95"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 48 1 49 2 50 3 51 4 52 5 53 6 54 7 55 8 56 9 57 10 58 
11 59 12 60 13 61 14 62 15 63 16 64 17 65 18 66 19 67 20 68 21 69 22 70 
23 71 24 72 25 73 26 74 27 75 28 76 29 77 30 78 31 79 32 80 33 81 34 82 
35 83 36 84 37 85 38 86 39 87 40 88 41 89 42 90 43 91 44 92 45 93 46 94 
47 95"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-47"

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.

(Continued on next page)
Spec CPU®2017 Floating Point Speed Result

Dell Inc.

PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)

SPECspeed®2017_fp_base = 135
SPECspeed®2017_fp_peak = 138

General Notes (Continued)
jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS settings:
NUMA Nodes Per Socket set to 4
CCX as NUMA Domain set to Enabled
System Profile set to Custom
CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost Enabled
Cstates set to Enabled
Memory Patrol Scrub Disabled
Memory Refresh Rate set to 1x
PCI ASPM L1 Link Power Management Disabled
Determinism Slider set to Power Determinism
Efficiency Optimized Mode Disabled
Memory Interleaving set to Disabled

Sysinfo program /root/cpu2017-1.1.0/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e46a485a0011
running on linux-g3ob Sat Nov 23 06:33:33 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 7402 24-Core Processor
  2 "physical id"s (chips)
  96 "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 : 24
siblings : 48
physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
physical 1: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30

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

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_base = 135
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CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 16
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7402 24-Core Processor
Stepping: 0
CPU MHz: 2794.922
BogoMIPS: 5589.84
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K

NUMA node0 CPU(s): 0-2,48-50
NUMA node1 CPU(s): 3-5,51-53
NUMA node2 CPU(s): 6-8,54-56
NUMA node3 CPU(s): 9-11,57-59
NUMA node4 CPU(s): 12-14,60-62
NUMA node5 CPU(s): 15-17,63-65
NUMA node6 CPU(s): 18-20,66-68
NUMA node7 CPU(s): 21-23,69-71
NUMA node8 CPU(s): 24-26,72-74
NUMA node9 CPU(s): 27-29,75-77
NUMA node10 CPU(s): 30-32,78-80
NUMA node11 CPU(s): 33-35,81-83
NUMA node12 CPU(s): 36-38,84-86
NUMA node13 CPU(s): 39-41,87-89
NUMA node14 CPU(s): 42-44,90-92
NUMA node15 CPU(s): 45-47,93-95

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 aperf merf
pni pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c
rdseed lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dmnowprefetch
osvw ibr skip tsc skinit wdt toe topoext perfctr_core perfctr_nb bpxe perfctr_l2 mwaitx cpb
cat_l3 cdp_l3 hw_pstate smm sse44 misalignsse 3dmnowprefetch

/platform/cpuinfo/cache data

(Continued on next page)
### Platform Notes (Continued)

```plaintext
cache size : 512 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 16 nodes (0-15)
node 0 cpus: 0 1 2 48 49 50
node 0 size: 31676 MB
node 0 free: 31626 MB
node 1 cpus: 3 4 5 51 52 53
node 1 size: 32224 MB
node 1 free: 32183 MB
node 2 cpus: 6 7 8 54 55 56
node 2 size: 32254 MB
node 2 free: 32219 MB
node 3 cpus: 9 10 11 57 58 59
node 3 size: 32254 MB
node 3 free: 32218 MB
node 4 cpus: 12 13 14 60 61 62
node 4 size: 32254 MB
node 4 free: 32197 MB
node 5 cpus: 15 16 17 63 64 65
node 5 size: 32254 MB
node 5 free: 32224 MB
node 6 cpus: 18 19 20 66 67 68
node 6 size: 32254 MB
node 6 free: 32184 MB
node 7 cpus: 21 22 23 69 70 71
node 7 size: 32242 MB
node 7 free: 32192 MB
node 8 cpus: 24 25 26 72 73 74
node 8 size: 32254 MB
node 8 free: 32220 MB
node 9 cpus: 27 28 29 75 76 77
node 9 size: 32254 MB
node 9 free: 32210 MB
node 10 cpus: 30 31 32 78 79 80
node 10 size: 32254 MB
node 10 free: 32085 MB
node 11 cpus: 33 34 35 81 82 83
node 11 size: 32254 MB
node 11 free: 32136 MB
node 12 cpus: 36 37 38 84 85 86
node 12 size: 32254 MB
node 12 free: 32219 MB
node 13 cpus: 39 40 41 87 88 89
node 13 size: 32254 MB
node 13 free: 32210 MB
```

(Continued on next page)
PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)

Dell Inc.

SPEC CPU®2017 Floating Point Speed Result

SPECspeed®2017_fp_base = 135
SPECspeed®2017_fp_peak = 138

Copyright 2017-2019 Standard Performance Evaluation Corporation

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)

node 14 cpus: 42 43 44 90 91 92
node 14 size: 32254 MB
node 14 free: 32196 MB
node 15 cpus: 45 46 47 93 94 95
node 15 size: 32252 MB
node 15 free: 32207 MB

node distances:
node distances:
node 0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
0:   10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
1:   11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
2:   12  12  10  11  12  12  12  12  32  32  32  32  32  32  32  32
3:   12  12  11  10  12  12  12  12  32  32  32  32  32  32  32  32
4:   12  12  12  12  10  11  12  12  32  32  32  32  32  32  32  32
5:   12  12  12  12  11  10  12  12  32  32  32  32  32  32  32  32
6:   12  12  12  12  12  12  10  11  32  32  32  32  32  32  32  32
7:   12  12  12  12  12  12  11  10  32  32  32  32  32  32  32  32
8:   32  32  32  32  32  32  32  32  10  11  12  12  12  12  12  12
9:   32  32  32  32  32  32  32  32  11  10  12  12  12  12  12  12
10:  32  32  32  32  32  32  32  32  12  12  10  11  12  12  12  12
11:  32  32  32  32  32  32  32  32  12  12  11  10  12  12  12  12
12:  32  32  32  32  32  32  32  32  12  12  12  12  10  11  12  12
13:  32  32  32  32  32  32  32  32  12  12  12  12  11  10  12  12
14:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
15:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10

From /proc/meminfo
MemTotal: 527821092 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 Speed Result**

**Dell Inc.**

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**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Nov-2019

**Hardware Availability:** Feb-2020

**Software Availability:** Aug-2019

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**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 Nov 22 10:46 last=5**

**SPEC is set to:** /root/cpu2017-1.1.0

**Filesystem**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>xfs</td>
<td>440G</td>
<td>36G</td>
<td>405G</td>
<td>8%</td>
<td>/</td>
</tr>
</tbody>
</table>

**From /sys/devices/virtual/dmi/id**

- **BIOS:** Dell Inc. 1.2.6 11/21/2019
- **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:**

- 7x 802C80B3802C 36ASF4G72FZ-3G2E2 32 GB 2 rank 3200
- 8x 802C869D802C 36ASF4G72FZ-3G2E2 32 GB 2 rank 3200
- 1x 80AD80B380AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
- 16x Not Specified Not Specified

(End of data from sysinfo program)

---

**Compiler Version Notes**

---

**C**

- 619.lbm_s(base, peak)
- 638.imagick_s(base, peak)
- 644.nab_s(base, peak)

---


**Target:** x86_64-unknown-linux-gnu

**Thread model:** posix

**InstalledDir:** /sppo/dev/compilers/aocccompiler-2.0.0/bin

(Continued on next page)
**Compiler Version Notes (Continued)**

C++, C, Fortran | 607.cactuBSSN_s(base, peak)  

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
    AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
    AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  

Fortran                             | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)  
                          | 654.roms_s(base, peak)  

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
    AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  

Fortran, C                           | 621.wrf_s(base, peak) 627.cam4_s(base, peak)  
                                      | 628.pop2_s(base, peak)  

AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
    AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins  
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Target: x86_64-unknown-linux-gnu  
Thread model: posix  
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(Continued on next page)
Dell Inc.

PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)

SPECspeed®2017_fp_base = 135
SPECspeed®2017_fp_peak = 138

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)

Base Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.ibm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-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
-fly-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm

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Dell Inc.  
PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)  

SPEC CPU®2017 Floating Point Speed Result  
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SPECspeed®2017_fp_base = 135  
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CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  

Test Date: Nov-2019  
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Base Optimization Flags (Continued)

C benchmarks (continued):  
-ljemalloc -lflang

Fortran benchmarks:  
-fflto -Wl,-mlllvm -Wl,-function-specialize  
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC  
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -march=znver2  
-funroll-loops -Mrecursive -mlllvm -vector-library=LIBMVEC -z muldefs  
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP  
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc  
-lflang

Benchmarks using both Fortran and C:  
-fflto -Wl,-mlllvm -Wl,-function-specialize  
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC  
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math  
-march=znver2 -fstruct-layout=3 -mlllvm -unroll-threshold=50  
-fremap-arrays -mlllvm -function-specialize -mlllvm -enable-gvn-hoist  
-mlllvm -reduce-array-computations=3 -mlllvm -global-vectorize-slp  
-mlllvm -vector-library=LIBMVEC -mlllvm -inline-threshold=1000  
-flv-function-specialization -funroll-loops -Mrecursive -z muldefs  
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP  
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc  
-lflang

Benchmarks using Fortran, C, and C++:  
-std=c++98 -fflto -Wl,-mlllvm -Wl,-function-specialize  
-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC  
-Wl,-mlllvm -Wl,-reduce-array-computations=3  
-Wl,-mlllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2  
-fstruct-layout=3 -mlllvm -unroll-threshold=50 -fremap-arrays  
-mlllvm -function-specialize -mlllvm -enable-gvn-hoist  
-mlllvm -reduce-array-computations=3 -mlllvm -global-vectorize-slp  
-mlllvm -vector-library=LIBMVEC -mlllvm -inline-threshold=1000  
-flv-function-specialization -mlllvm -loop-unswitch-threshold=200000  
-mlllvm -unroll-threshold=100 -mlllvm -enable-partial-unswitch  
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only  
-DSPEC_OPENMP -fopenmp -DUSE_OPENMP -fopenmp=libomp -lomp -lpthread  
-ldl -lmvec -lamdlibm -ljemalloc -lflang

Base Other Flags

C benchmarks:  
-Wno-return-type

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Dell Inc.

PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)

SPECspeed\textsuperscript{\textregistered}2017\_fp\_base = 135

SPECspeed\textsuperscript{\textregistered}2017\_fp\_peak = 138

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<th>Test Date: Nov-2019</th>
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</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Aug-2019</td>
</tr>
</tbody>
</table>

**Base Other Flags (Continued)**

Fortran benchmarks:
-Wno-return-type

Benchmarks using both Fortran and C:
-Wno-return-type

Benchmarks using Fortran, C, and C++:
-Wno-return-type

**Peak Compiler Invocation**

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

C benchmarks:

619.lbm\_s: basepeak = yes

638.imagick\_s: basepeak = yes

644.nab\_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC

(Continued on next page)
Peak Optimization Flags (Continued)

644.nab_s (continued):
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mlir -vectorize-memory-aggressively
-mlir -function-specialize -mlir -enable-gvn-hoist
-mlir -unroll-threshold=50 -fremap-arrays
-mlir -vector-library=LIBMVEC
-mlir -reduce-array-computations=3
-mlir -global-vectorize-slp -mlir -inline-threshold=1000
-fly-function-specialization -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -lmvec -lamdlibm -fopenmp=libomp -lomp
-1pthread -ldl -ljemalloc -lflang

Fortran benchmarks:

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes

654.roms_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver2
-funroll-loops -Mrecursive -mlir -vector-library=LIBMVEC
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl
-lmvec -lamdlibm -ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mlir -vectorize-memory-aggressively
-mlir -function-specialize -mlir -enable-gvn-hoist
-mlir -unroll-threshold=50 -fremap-arrays
-mlir -vector-library=LIBMVEC
-mlir -reduce-array-computations=3
-mlir -global-vectorize-slp -mlir -inline-threshold=1000
-fly-function-specialization -O3 -funroll-loops
-Mrecursive -Kieee -fno-finite-math-only -DSPEC_OPENMP
-fopenmp -DUSE_OPENMP -fopenmp=libomp -lomp -lpthread
-ldl -lmvec -lamdlibm -ljemalloc -lflang

(Continued on next page)
Dell Inc.
PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz)

**Peak Optimization Flags (Continued)**

627.cam4_s: basepeak = yes
628.pop2_s: Same as 621.wrf_s

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 -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
- DSPEC_OPENMP -fopenmp -DUSE_OPENMP -fopenmp=libomp -lomp -lpthread
- ld1 -lmvec -lamdlibm -ljemalloc -lflang

**Peak Other Flags**

C benchmarks:
- Wno-return-type

Fortran benchmarks:
- Wno-return-type

Benchmarks using both Fortran and C:
- Wno-return-type

Benchmarks using Fortran, C, and C++:
- Wno-return-type

The flags files that were used to format this result can be browsed at


You can also download the XML flags sources by saving the following links:

| Dell Inc. | SPECspeed®2017_fp_base = 135 |
| PowerEdge R7525 (AMD EPYC 7402, 2.80 GHz) | SPECspeed®2017_fp_peak = 138 |
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