Dell Inc.

PowerEdge R6515 (AMD EPYC 7662, 2.00 GHz)

**SPECspeed®2017_fp_base = 124**

**SPECspeed®2017_fp_peak = 130**

<table>
<thead>
<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: Nov-2019</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Hardware Availability: Feb-2020</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Aug-2019</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 7662
- **Max MHz:** 3300
- **Nominal:** 2000
- **Enabled:** 64 cores, 1 chip, 2 threads/core
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 512 KB I+D on chip per core
- **L3:** 256 MB I+D on chip per chip, 16 MB shared / 4 cores
- **Other:** None
- **Memory:** 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R, running at 3200)
- **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:** Yes
- **Firmware:** Version 1.2.7 released Oct-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.
SPEC CPU®2017 Floating Point Speed Result

Dell Inc.
PowerEdge R6515 (AMD EPYC 7662, 2.00 GHz)

CPU2017 License: 55
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SPECspeed®2017_fp_base = 124
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>167</td>
<td>352</td>
<td>168</td>
<td>350</td>
<td>161</td>
<td>366</td>
<td>64</td>
<td>167</td>
<td>352</td>
<td>168</td>
<td>350</td>
<td>161</td>
<td>366</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td>94.8</td>
<td>176</td>
<td>96.6</td>
<td>173</td>
<td>94.6</td>
<td>176</td>
<td>64</td>
<td>94.8</td>
<td>176</td>
<td>96.6</td>
<td>173</td>
<td>94.6</td>
<td>176</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>64</td>
<td>168</td>
<td>31.2</td>
<td>166</td>
<td>31.5</td>
<td>166</td>
<td>31.6</td>
<td>128</td>
<td>124</td>
<td>42.1</td>
<td>128</td>
<td>42.1</td>
<td>124</td>
<td>42.1</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>64</td>
<td>97.7</td>
<td>135</td>
<td>98.3</td>
<td>134</td>
<td>98.5</td>
<td>134</td>
<td>64</td>
<td>97.7</td>
<td>135</td>
<td>98.3</td>
<td>134</td>
<td>98.5</td>
<td>134</td>
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<tr>
<td>627.cam4_s</td>
<td>64</td>
<td>106</td>
<td>83.3</td>
<td>107</td>
<td>82.7</td>
<td>107</td>
<td>82.6</td>
<td>64</td>
<td>106</td>
<td>83.3</td>
<td>107</td>
<td>82.7</td>
<td>107</td>
<td>82.6</td>
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<tr>
<td>628.pop2_s</td>
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<td>182</td>
<td>65.4</td>
<td>184</td>
<td>64.6</td>
<td><strong>182</strong></td>
<td><strong>65.2</strong></td>
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<td>184</td>
<td>64.6</td>
<td><strong>182</strong></td>
<td><strong>65.2</strong></td>
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<td>638.imagick_s</td>
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<td>219</td>
<td>64.9</td>
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<td>67.5</td>
<td>214</td>
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<td>219</td>
<td>64.9</td>
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<td>67.5</td>
<td>214</td>
</tr>
<tr>
<td>644.nab_s</td>
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<td>54.6</td>
<td>320</td>
<td>54.7</td>
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<td><strong>48.9</strong></td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>162</td>
<td>56.1</td>
<td><strong>162</strong></td>
<td><strong>56.3</strong></td>
<td>161</td>
<td>56.5</td>
<td>64</td>
<td>162</td>
<td>56.1</td>
<td><strong>162</strong></td>
<td><strong>56.3</strong></td>
<td>161</td>
<td>56.5</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td>99.3</td>
<td>159</td>
<td><strong>98.7</strong></td>
<td><strong>160</strong></td>
<td>98.6</td>
<td>160</td>
<td>64</td>
<td>98.5</td>
<td>160</td>
<td><strong>98.6</strong></td>
<td><strong>160</strong></td>
<td>98.6</td>
<td>160</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 -l 2097152' was used to set environment locked pages in memory limit
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

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

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

Transparent huge pages set to 'always' for this run (OS default)
Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-127"
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 = "128"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74 11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86 23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98 35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45 109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55 119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74 11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86 23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98 35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45 109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55 119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-63"

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 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
**SPEC CPU®2017 Floating Point Speed Result**

**Dell Inc.**

PowerEdge R6515 (AMD EPYC 7662, 2.00 GHz)

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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

---

**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 Wed Nov 6 12:31:52 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- From /proc/cpuinfo
  - model name: AMD EPYC 7662 64-Core Processor
  - 1 "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: 64
    - siblings: 128
      - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

- 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: 64
  - Socket(s): 1
  - NUMA node(s): 16
  - Vendor ID: AuthenticAMD

(Continued on next page)
Dell Inc.  

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---  

**Platform Notes (Continued)**

- **CPU family:** 23  
- **Model:** 49  
- **Model name:** AMD EPYC 7662 64-Core Processor  
- **Stepping:** 0  
- **CPU MHz:** 1996.348  
- **BogoMIPS:** 3992.69  
- **Virtualization:** AMD-V  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 512K  
- **L3 cache:** 16384K  

**NUMA node 0 CPU(s):** 0-3, 64-67  
**NUMA node 1 CPU(s):** 4-7, 68-71  
**NUMA node 2 CPU(s):** 8-11, 72-75  
**NUMA node 3 CPU(s):** 12-15, 76-79  
**NUMA node 4 CPU(s):** 16-19, 80-83  
**NUMA node 5 CPU(s):** 20-23, 84-87  
**NUMA node 6 CPU(s):** 24-27, 88-91  
**NUMA node 7 CPU(s):** 28-31, 92-95  
**NUMA node 8 CPU(s):** 32-35, 96-99  
**NUMA node 9 CPU(s):** 36-39, 100-103  
**NUMA node 10 CPU(s):** 40-43, 104-107  
**NUMA node 11 CPU(s):** 44-47, 108-111  
**NUMA node 12 CPU(s):** 48-51, 112-115  
**NUMA node 13 CPU(s):** 52-55, 116-119  
**NUMA node 14 CPU(s):** 56-59, 120-123  
**NUMA node 15 CPU(s):** 60-63, 124-127  

**Flags:** fpu vme de pse tsc msr pae mca 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 sinit wdt tce topoext perfctr_core perfctr_nb bext perfctr_l2 mwaitx cpb cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibm vmmcall fsgsbase bm1 avx2 smep bmi2 cmqm rdt_a rdseed adx smap clflushopt clwb sha ni xsaveopt xsavec xgetbv1 xsaves cmqm_llc cmqm_occup_llc cmqm_mbm_total cmqm_mbm_local clzero irperf xsaveerpr arat npt lbrv svm_lock np_save tsc_scale vmbc_clean flushbyasid decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca

```
 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 3 64 65 66 67
```

(Continued on next page)
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Platform Notes (Continued)

node 0 size: 15548 MB
node 0 free: 15477 MB
node 1 cpus: 4 5 6 7 68 69 70 71
node 1 size: 16096 MB
node 1 free: 16042 MB
node 2 cpus: 8 9 10 11 72 73 74 75
node 2 size: 16126 MB
node 2 free: 16096 MB
node 3 cpus: 12 13 14 15 76 77 78 79
node 3 size: 16125 MB
node 3 free: 16097 MB
node 4 cpus: 16 17 18 19 80 81 82 83
node 4 size: 16126 MB
node 4 free: 16073 MB
node 5 cpus: 20 21 22 23 84 85 86 87
node 5 size: 16126 MB
node 5 free: 16097 MB
node 6 cpus: 24 25 26 27 88 89 90 91
node 6 size: 16126 MB
node 6 free: 16101 MB
node 7 cpus: 28 29 30 31 92 93 94 95
node 7 size: 16125 MB
node 7 free: 16100 MB
node 8 cpus: 32 33 34 35 96 97 98 99
node 8 size: 16126 MB
node 8 free: 15921 MB
node 9 cpus: 36 37 38 39 100 101 102 103
node 9 size: 16126 MB
node 9 free: 16069 MB
node 10 cpus: 40 41 42 43 104 105 106 107
node 10 size: 16126 MB
node 10 free: 16085 MB
node 11 cpus: 44 45 46 47 108 109 110 111
node 11 size: 16125 MB
node 11 free: 16060 MB
node 12 cpus: 48 49 50 51 112 113 114 115
node 12 size: 16126 MB
node 12 free: 16087 MB
node 13 cpus: 52 53 54 55 116 117 118 119
node 13 size: 16126 MB
node 13 free: 16098 MB
node 14 cpus: 56 57 58 59 120 121 122 123
node 14 size: 16126 MB
node 14 free: 16094 MB
node 15 cpus: 60 61 62 63 124 125 126 127
node 15 size: 16111 MB
node 15 free: 16002 MB

(Continued on next page)
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Platform Notes (Continued)

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

From /proc/meminfo
MemTotal:       263574096 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release*/etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-g3ob 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization

(Continued on next page)
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Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2):
Mitigation: Full AMD retopline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Nov 5 09:25 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. 1.2.7 10/31/2019
Vendor: Dell Inc.
Product: PowerEdge R6515
Product Family: PowerEdge

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
8x 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
8x 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) |
| AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins) |
| AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19) |
| Target: x86_64-unknown-linux-gnu |
| Thread model: posix |
| InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin |

==============================================================================

| C++, C, Fortran | 607.cactuBSSN_s(base, peak) |
| AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins) |
| AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19) |
| Target: x86_64-unknown-linux-gnu |
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Compiler Version Notes (Continued)

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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
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

Base Compiler Invocation

C benchmarks:
clang

(Continued on next page)
## Dell Inc. PowerEdge R6515 (AMD EPYC 7662, 2.00 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>= 124</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>= 130</td>
</tr>
</tbody>
</table>

### Base Compiler Invocation (Continued)

<table>
<thead>
<tr>
<th>Fortran benchmarks:</th>
<th>flang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmarks using both Fortran and C:</td>
<td>flang clang</td>
</tr>
<tr>
<td>Benchmarks using Fortran, C, and C++:</td>
<td>clang++ clang flang</td>
</tr>
</tbody>
</table>

### Base Portability Flags

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

### Base Optimization Flags

**C benchmarks:**
- flto -Wl,-mllvm -Wl,-function-specialize  
- Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC  
- Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math  
- -march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50  
- -freemap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist  
- mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp  
- mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000  
- -fvl-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp  
- -DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm  
- -ljemalloc -lflang

**Fortran benchmarks:**
- flto -Wl,-mllvm -Wl,-function-specialize  
- Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC  
- Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver2  
- -funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs  
- -Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP

(Continued on next page)
Dell Inc.

PowerEdge R6515 (AMD EPYC 7662, 2.00 GHz)

SPECspeed®2017_fp_base = 124

SPECspeed®2017_fp_peak = 130

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

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

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-lopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
-lflang

Benchmarks using both Fortran and C:
-flt0 -Wl,-mllvm -Wl,-function-specialize
-flt0 -Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-flt0 -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 -DSPEC_OPENMP -lopenmp -DUSE_OPENMP
-lopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
-lflang

Benchmarks using Fortran, C, and C++:
-std=c++98 -flt0 -Wl,-mllvm -Wl,-function-specialize
-flt0 -Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-flt0 -Wl,-mllvm -Wl,-reduce-array-computations=3
-flt0 -Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only
-DSPEC_OPENMP -lopenmp -DUSE_OPENMP -lopenmp=libomp -lomp -lpthread
-ldl -lmvec -lamdlibm -ljemalloc -lflang

Base Other Flags

C benchmarks:
-Wno-return-type

Fortran benchmarks:
-Wno-return-type

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

(Continued on next page)
### Base Other Flags (Continued)

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:**

Dell Inc.
PowerEdge R6515 (AMD EPYC 7662, 2.00 GHz)

SPECspeed®2017_fp_base = 124
SPECspeed®2017_fp_peak = 130

Dell Inc.

Peak Optimization Flags (Continued)

638.imagick_s: basepeak = yes
644.nab_s: Same as 619.lbm_s

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

Benchmarks using both Fortran and C:
621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

Peak Other Flags

C benchmarks:
-Wno-return-type

Fortran benchmarks:
-Wno-return-type

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

(Continued on next page)
Dell Inc. PowerEdge R6515 (AMD EPYC 7662, 2.00 GHz)

SPECspeed\textsuperscript{®}2017\_fp\_peak = 130
SPECspeed\textsuperscript{®}2017\_fp\_base = 124

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

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

Peak Other Flags (Continued)

Benchmarks using Fortran, C, and C++:
-\texttt{-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:

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