Dell Inc.

PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)

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

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

**Hardware**

- **CPU Name:** AMD EPYC 7542
- **Max MHz:** 3400
- **Nominal:** 2900
- **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:** 128 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:** 2 x 960 GB SAS 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 1.2.6 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.

**SPECspeed©2017_fp_base = 152**

**SPECspeed©2017_fp_peak = 155**
Dell Inc.

PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
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<td>64</td>
<td>98.8</td>
<td>597</td>
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<tr>
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<tr>
<td>654.roms_s</td>
<td>64</td>
<td>69.9</td>
<td>225</td>
<td>69.7</td>
<td>226</td>
<td>69.9</td>
<td>225</td>
<td>64</td>
<td>68.5</td>
<td>230</td>
<td>68.8</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)
Dell Inc.

PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)

SPECspeed®2017_fp_base = 152
SPECspeed®2017_fp_peak = 155

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_SCHEDULER = "static"
OMP_STACKSIZE = "128M"
OMP_THREADLIMIT = "128"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-63"

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 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-63"

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
Dell Inc.  
PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)  

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| CPU2017 License: 55 | Test Date: Nov-2019 |
| Test Sponsor: Dell Inc. | Hardware Availability: Feb-2020 |
| Tested by: Dell Inc. | 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 27 15:06:41 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 7542 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 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  
- 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

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): 16

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

Dell Inc.

PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)

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

spec

SPECspeed®2017_fp_base = 152
SPECspeed®2017_fp_peak = 155

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

Platform Notes (Continued)

Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7542 32-Core Processor
Stepping: 0
CPU MHz: 2894.664
BogoMIPS: 5789.32
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-3,64-67
NUMA node1 CPU(s): 4-7,68-71
NUMA node2 CPU(s): 8-11,72-75
NUMA node3 CPU(s): 12-15,76-79
NUMA node4 CPU(s): 16-19,80-83
NUMA node5 CPU(s): 20-23,84-87
NUMA node6 CPU(s): 24-27,88-91
NUMA node7 CPU(s): 28-31,92-95
NUMA node8 CPU(s): 32-35,96-99
NUMA node9 CPU(s): 36-39,100-103
NUMA node10 CPU(s): 40-43,104-107
NUMA node11 CPU(s): 44-47,108-111
NUMA node12 CPU(s): 48-51,112-115
NUMA node13 CPU(s): 52-55,116-119
NUMA node14 CPU(s): 56-59,120-123
NUMA node15 CPU(s): 60-63,124-127
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 aperfmpcrf pni
pni pclmulqdq monitor sse4_1 sse4_2 movbe popcnt aes xsave avx f16c
rdseed rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
osvw ibs kinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx cpb
cat_l3 cdp_l3 hw_pstate sme ssbd sev ibs ibpb stibp vmxcall fsxgsbase bmi1 avx2 smep
bmi2 cmp rdt_a rtsdseed adx smap clflushopt clwb sha ni xsaveopt xsaves xsave ecx
xsaveopt xsavec xgetbv1 xsaves crq_l1c crq_occup_l1c crq_mmb_total crq_mmb_local clzero irperf
xsaver appropriate arat npt lpv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
pausefilter pfthreshold avic v_vmsave_vmload vgfl umip rdpid overflow_recover 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: 16 nodes (0-15)
  node 0 cpus: 0 1 2 3 64 65 66 67

(Continued on next page)
Dell Inc.  

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SPECspeed®2017_fp_base = 152  
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Tested by: Dell Inc.  
Hardware Availability: Feb-2020  
Software Availability: Aug-2019

Platform Notes (Continued)

node 0 size: 31804 MB
node 0 free: 31718 MB
node 1 cpus: 4 5 6 7 68 69 70 71
node 1 size: 32253 MB
node 1 free: 32211 MB
node 2 cpus: 8 9 10 11 72 73 74 75
node 2 size: 32254 MB
node 2 free: 32207 MB
node 3 cpus: 12 13 14 15 76 77 78 79
node 3 size: 32253 MB
node 3 free: 32219 MB
node 4 cpus: 16 17 18 19 80 81 82 83
node 4 size: 32254 MB
node 4 free: 32203 MB
node 5 cpus: 20 21 22 23 84 85 86 87
node 5 size: 32253 MB
node 5 free: 32202 MB
node 6 cpus: 24 25 26 27 88 89 90 91
node 6 size: 32254 MB
node 6 free: 32184 MB
node 7 cpus: 28 29 30 31 92 93 94 95
node 7 size: 32212 MB
node 7 free: 32177 MB
node 8 cpus: 32 33 34 35 96 97 98 99
node 8 size: 32254 MB
node 8 free: 32196 MB
node 9 cpus: 36 37 38 39 100 101 102 103
node 9 size: 32253 MB
node 9 free: 32218 MB
node 10 cpus: 40 41 42 43 104 105 106 107
node 10 size: 32254 MB
node 10 free: 32221 MB
node 11 cpus: 44 45 46 47 108 109 110 111
node 11 size: 32253 MB
node 11 free: 32223 MB
node 12 cpus: 48 49 50 51 112 113 114 115
node 12 size: 32254 MB
node 12 free: 31995 MB
node 13 cpus: 52 53 54 55 116 117 118 119
node 13 size: 32253 MB
node 13 free: 32202 MB
node 14 cpus: 56 57 58 59 120 121 122 123
node 14 size: 32254 MB
node 14 free: 32212 MB
node 15 cpus: 60 61 62 63 124 125 126 127
node 15 size: 32252 MB
node 15 free: 32212 MB

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

**Dell Inc.**

**PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)**

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>SPECspeed®2017_fp_base</td>
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- **CPU2017 License:** 55
- **Test Date:** Nov-2019
- **Hardware Availability:** Feb-2020
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**Platform Notes (Continued)**

```plaintext
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 32 32 32 32 32 32 32 32
1: 11 10 11 11 12 12 12 12 32 32 32 32 32 32 32 32
2: 11 11 10 11 12 12 12 12 32 32 32 32 32 32 32 32
3: 12 12 12 12 10 11 11 11 32 32 32 32 32 32 32 32
4: 12 12 12 12 11 10 11 11 32 32 32 32 32 32 32 32
5: 12 12 12 12 11 10 11 11 32 32 32 32 32 32 32 32
6: 12 12 12 12 11 10 11 11 32 32 32 32 32 32 32 32
7: 12 12 12 12 11 10 11 11 32 32 32 32 32 32 32 32
8: 32 32 32 32 32 32 32 32 10 11 11 11 11 11 12 12
12: 32 32 32 32 32 32 32 32 12 12 12 12 12 12 12 12
13: 32 32 32 32 32 32 32 32 12 12 12 12 12 12 12 12
14: 32 32 32 32 32 32 32 32 12 12 12 12 12 12 12 12
15: 32 32 32 32 32 32 32 32 12 12 12 12 12 12 12 12
```

From /proc/meminfo
- MemTotal: 527946176 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)
SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_base = 152
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CPU2017 License: 55
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Test Date: Nov-2019
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Software Availability: Aug-2019

Platform Notes (Continued)

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

run-level 3 Nov 27 09:57 last=5

SPEC is set to: /root/cpu2017-1.1.0

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 440G 46G 395G 11% /

From /sys/devices/virtual/dmi/id
BIOS: Dell Inc. 1.2.6 11/21/2019
Vendor: Dell Inc.
Product: PowerEdge R7525
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:
16x 802C869D802C 36ASF4G72PZ-3G2E2 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)
==============================================================================
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)
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(Continued on next page)
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**Compiler Version Notes (Continued)**

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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---

**Fortran, C**

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<th>603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)</th>
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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)
### Base Compiler Invocation (Continued)

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

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

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
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<tr>
<td>603.bwaves_s</td>
<td>-DSPEC_LP64</td>
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<td>607.cactuBSSN_s</td>
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<tr>
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<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>-DSPEC_CASE_FLAG -DSPEC_LP64</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64</td>
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<tr>
<td>638.imagick_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

### Base Optimization Flags

C benchmarks:
- `f1to` -Wl,-mllvvm -Wl,-function-specialize
- `-Wl,-mllvvm -Wl,-region-vectorize -Wl,-mllvvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mllvvm -Wl,-reduce-array-computations=3 -O3 -ffast-math`
- `-march=znver2 -fstruct-layout=3 -mllvvm -unroll-threshold=50`
- `-fremap-arrays -mllvvm -function-specialize -mllvvm -enable-gvn-hoist`
- `-mllvvm -reduce-array-computations=3 -mllvvm -global-vectorize-slp`
- `-mllvvm -vector-library=LIBMVEC -mllvvm -inline-threshold=1000`
- `-fly-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp`
- `-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm`
- `-ljemalloc -lflang`

Fortran benchmarks:
- `f1to` -Wl,-mllvvm -Wl,-function-specialize
- `-Wl,-mllvvm -Wl,-region-vectorize -Wl,-mllvvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mllvvm -Wl,-reduce-array-computations=3 -O3 -march=znver2`
- `-funroll-loops -Mrecursive -mllvvm -vector-library=LIBMVEC -z muldefs`
- `-Xlee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -DUSE_OPENMP`
Dell Inc.

PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)

SPECspeed®2017_fp_base = 152
SPECspeed®2017_fp_peak = 155

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):
- fopenmp=libomp -lomp -lpthread -ldl -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
- -fllvm-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 -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
- -fllvm-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 -fopenmp -DUSE_OPENMP -fopenmp=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

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### Dell Inc.

**PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)**

| SPECspeed\textsuperscript{2017\_fp\_base} | = 152 |
| SPECspeed\textsuperscript{2017\_fp\_peak} | = 155 |

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### 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:**

  - `619.lbm_s`: `basepeak = yes`
  
  - `638.imagick_s`: `basepeak = yes`
  

(Continued on next page)
Dell Inc.

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Peak Optimization Flags (Continued)

644.nab_s (continued):
- flv-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: -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 -DSPEC_OPENMP -fopenmp -DUSE_OPENMP
- fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
- ljemalloc -lflang

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 -mllvm -vector-library=LIBMVEC
- -Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lpthread -ldl
- -lmvec -lamdlibm -ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_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
- 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 -DSPEC_OPENMP

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

**Dell Inc.**

PowerEdge R7525 (AMD EPYC 7542, 2.90 GHz)

<table>
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**Peak Optimization Flags (Continued)**

627.cam4_s (continued):
-`fopenmp -DUSE_OPENMP -fopenmp=libomp -lomp -lpthread`
-`-ldl -lmvec -lamdlibm -ljemalloc -lflang`

628.pop2_s: `basepeak = yes`

**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`
- `-ldl -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:


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