### Dell Inc.

PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>168</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>169</td>
</tr>
</tbody>
</table>

#### SPEC CPU®2017 Floating Point Speed Result

**CPU2017 License:** 55  
**Test Date:** Mar-2021  
**Test Sponsor:** Dell Inc.  
**Hardware Availability:** Mar-2021  
**Tested by:** Dell Inc.  
**Software Availability:** Mar-2021

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>276</td>
<td>276</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>277</td>
<td>277</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>205</td>
<td>205</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>280</td>
<td>280</td>
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<tr>
<td>627.cam4_s</td>
<td>389</td>
<td>389</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>72.1</td>
<td>72.1</td>
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<tr>
<td>638.imagick_s</td>
<td>159</td>
<td>159</td>
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<tr>
<td>644.nab_s</td>
<td>168</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>64</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td>64</td>
</tr>
</tbody>
</table>

#### Hardware

- **CPU Name:** AMD EPYC 7763  
- **Max MHz:** 3500  
- **Nominal:** 2450  
- **Enabled:** 64 cores, 1 chip  
- **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, 32 MB shared / 8 cores  
- **Other:** None  
- **Memory:** 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R)  
- **Storage:** 125 GB on tmpfs  
- **Other:** None

#### Software

- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa)  
- **Compiler:** C/C++/Fortran: Version 3.0.0 of AOCC  
- **Parallel:** Yes  
- **Firmware:** Version 2.1.4 released Feb-2021  
- **File System:** tmpfs  
- **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 and OS set to prefer performance at the cost of additional power usage.
Dell Inc.

PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)  

**SPEC** CPU®2017 Floating Point Speed Result

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**Test Date:** Mar-2021  
**Hardware Availability:** Mar-2021  
**Software Availability:** Mar-2021

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

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Peak</th>
<th>Ratio Peak</th>
<th>Seconds Peak</th>
<th>Ratio Peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
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<td>376</td>
<td>157</td>
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<td>60.2</td>
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</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 168**  
**SPECspeed®2017_fp_peak = 169**

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>

'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.  
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.  
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.  
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.  
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout randomization (ASLR) to reduce run-to-run variability.

(Continued on next page)
Dell Inc.
PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)

SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = 169

Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root to enable
Transparent Hugepages (THP) for this run.
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for peak
runs of 628.pop2_s and 638.imagick_s to enable THP only on request.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-63"
LD_LIBRARY_PATH =
    "/mnt/ramdisk/cpu2017-1.1.5/amd_speed_aocc300_milan_B_lib/64;/mnt/ramdisk/cpu2017-1.1.5/amd_speed_aocc300_milan_B_lib/32;"
MALLOCONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "64"

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

Environment variables set by runcpu during the 619.lbm_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 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-63"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using openSUSE 15.2

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 v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
Dell Inc. PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)

SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = 169

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

Test Date: Mar-2021
Hardware Availability: Mar-2021
Software Availability: Mar-2021

General Notes (Continued)

https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS settings:
Logical processor: Disabled
L3 Cache as NUMA Domain: Enabled
Virtualization Technology: Disabled
DRAM Refresh Delay: Performance
System Profile: Custom
CPU Power Management: Maximum Performance
Memory Patrol Scrub: Disabled
PCI ASPM L1 Link
Power Management: Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.5/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on rhel-8-3-amd Mon Mar 1 04:26:32 2021

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 7763 64-Core Processor
1 "physical id"s (chips)
64 "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: 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 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
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 1
Core(s) per socket: 64
Socket(s): 1
NUMA node(s): 8

(Continued on next page)
Dell Inc. PowerEdge R7515 (AMD EPYC 7763 64-Core Processor) Dell Inc.

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

**SPECspeed®2017_fp_base = 168**  
**SPECspeed®2017_fp_peak = 169**

**Platform Notes (Continued)**

- **Vendor ID:** AuthenticAMD
- **CPU family:** 25
- **Model:** 1
- **Model name:** AMD EPYC 7763 64-Core Processor
- **Stepping:** 1
- **CPU MHz:** 2835.739
- **CPU max MHz:** 2450.0000
- **CPU min MHz:** 1500.0000
- **BogoMIPS:** 4891.30
- **Virtualization:** AMD-V
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 512K
- **L3 cache:** 32768K
- **NUMA node0 CPU(s):** 0-7
- **NUMA node1 CPU(s):** 8-15
- **NUMA node2 CPU(s):** 16-23
- **NUMA node3 CPU(s):** 24-31
- **NUMA node4 CPU(s):** 32-39
- **NUMA node5 CPU(s):** 40-47
- **NUMA node6 CPU(s):** 48-55
- **NUMA node7 CPU(s):** 56-63
- **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 nop1 nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pclid sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw  
  ibs  
  skinit  
  wdt  
  tce  
  topoext  
  perfctr_core  
  perfctr_nb  
  bpext  
  perfctr_l1c  
  mwaitx  
  cpb  
  cat_l3  
  cdp_l3  
  invpcid_single  
  hw_pstate  
  sme  
  ssbd  
  mba  
  sev  
  ibrs  
  ibpb  
  stibp  
  vmmcall  
  fs_dbgbase  
  bml1  
  avx2  
  smep  
  bmi2  
  invpcid  
  cqm  
  rdt_a  
  rdseed  
  adx  
  smap  
  clflushopt  
  clwb  
  sha_ni  
  xsaveopt  
  xsavec  
  xgetbv  
  xsaves  
  cqm_l1c  
  cqm_occupa_l1c  
  cqm_mbb_total  
  cqm_mbb_local  
  clzero  
  irperf  
  xsaveerrptr  
  wbnoinvd  
  amd_ppin  
  arat  
  npt  
  lbv  
  svm_lock  
  nrip_save  
  tsc_scale  
  vmcb_clean  
  flushbyasid  
  decodeassists  
  pauselimit  
  pfthreshold  
  v_vmsave_vmload  
  vgif  
  umip  
  ospke  
  vaes  
  vpclmulqdq  
  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: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 31819 MB
node 0 free: 31702 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 32249 MB
node 1 free: 32165 MB
```
SPEC CPU®2017 Floating Point Speed Result
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SPECspeed®2017_fp_peak = 169
SPECspeed®2017_fp_base = 168

CPU2017 License: 55
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Platform Notes (Continued)

node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 32251 MB
node 2 free: 27100 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 32253 MB
node 3 free: 32174 MB
node 4 cpus: 32 33 34 35 36 37 38 39
node 4 size: 32253 MB
node 4 free: 32075 MB
node 5 cpus: 40 41 42 43 44 45 46 47
node 5 size: 32214 MB
node 5 free: 32039 MB
node 6 cpus: 48 49 50 51 52 53 54 55
node 6 size: 32253 MB
node 6 free: 31936 MB
node 7 cpus: 56 57 58 59 60 61 62 63
node 7 size: 32333 MB
node 7 free: 32083 MB
node distances:
0: 10 11 11 11 11 11 11 11
1: 11 10 11 11 11 11 11 11
2: 11 11 10 11 11 11 11 11
3: 11 11 11 10 11 11 11 11
4: 11 11 11 11 10 11 11 11
5: 11 11 11 11 11 10 11 11
6: 11 11 11 11 11 11 10 11
7: 11 11 11 11 11 11 11 10

From /proc/meminfo
MemTotal: 263721560 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"

(Continued on next page)
Dell Inc.

PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)

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Platform Notes (Continued)

PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
   Linux rhel-8-3-amd 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64
   x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitation
CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Mar 1 01:44
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 125G 4.9G 121G 4% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R7515
Product Family: PowerEdge
Serial: 5MHPH13

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

(Continued on next page)
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Platform Notes (Continued)

8x Not Specified Not Specified

BIOS:
  BIOS Vendor: Dell Inc.
  BIOS Version: 2.1.4
  BIOS Date: 02/17/2021
  BIOS Revision: 2.1

(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)
AMD clang version 12.0.0 (CLANG: A0CC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
AMD clang version 12.0.0 (CLANG: A0CC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
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LLVM Mirror.Version.12.0.0)
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Thread model: posix
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LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

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

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

---
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on 
LLVM Mirror.Version.12.0.0)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

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.lbm_s: -DSPEC_LP64

(Continued on next page)
Base Portability Flags (Continued)

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:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=xnver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-lcm-vrp -mllvm -reduce-array-computations=3 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llflang -llflangrti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-lcm-vrp -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Hz,1,0x1 -O3
-march=xnver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop
-mllvm -enable-lcm-vrp -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -llflang -llflangrti

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-lcm-vrp -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=xnver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000

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

Dell Inc.  
PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)

SPECspeed®2017_fp_base = 168  
SPECspeed®2017_fp_peak = 169

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-ffremap-arrays -mllvm -function-specialize -flv-function-specialization
-mlirvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mlirvm -enable-licm-vrp -mlirvm -reduce-array-computations=3 -Hz,1,0x1
-Mrecursive -mlirvm -fuse-tile-inner-loop -funroll-loops
-mlirvm -extra-vectorizer-passes -mlirvm -lsr-in-nested-loop -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-lflang -lflangrti

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98
-Wl,-mlirvm -Wl,-x86-use-vzeroupper=false
-Wl,-mlirvm -Wl,-region-vectorize -Wl,-mlirvm -Wl,-function-specialize
-Wl,-mlirvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlirvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -fllto -fstruct-layout=5
-mlirvm -unroll-threshold=50 -mlirvm -inline-threshold=1000
-ffremap-arrays -mlirvm -function-specialize -flv-function-specialization
-mlirvm -enable-gvn-hoist -mlirvm -global-vectorize-slp=true
-mlirvm -enable-licm-vrp -mlirvm -reduce-array-computations=3
-mlirvm -enable-partial-unswitch -mlirvm -unroll-threshold=100
-finline-aggressive -mlirvm -loop-unswitch-threshold=200000
-mlirvm -reroll-loops -mlirvm -aggressive-loop-unswitch
-mlirvm -extra-vectorizer-passes -mlirvm -convert-pow-exp-to-int=false
-Hz,1,0x1 -Mrecursive -mlirvm -fuse-tile-inner-loop -funroll-loops
-mlirvm -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Base Other Flags

C benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Benchmarks using both Fortran and C:
-Wno-unused-command-line-argument -Wno-return-type

Benchmarks using Fortran, C, and C++:
-Wno-unused-command-line-argument -Wno-return-type
Dell Inc.

PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)

SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = 169

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Mar-2021

Tested by: Dell Inc.
Hardware Availability: Mar-2021

Software Availability: Mar-2021

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: -m64 -mno-adx -mno-sse4a
-W1,-mlllvm -W1,-function-specialize
-W1,-mlllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mlllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -fito
-fstruct-layout=5 -mlllvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mlllvm -inline-threshold=1000 -mlllvm -enable-gvn-hoist
-mlllvm -global-vectorize-slp=true
-mlllvm -function-specialize -mlllvm -enable-lcim-vrp
-mlllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: basepeak = yes

(Continued on next page)
/**
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  */

Dell Inc.
PowerEdge R7515 (AMD EPYC 7763 64-Core Processor)

<table>
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<th>SPECspeed\textsuperscript{\textregistered}2017_fp_base</th>
<th>Dell Inc.</th>
<th>Test Date: Mar-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed\textsuperscript{\textregistered}2017_fp_peak</td>
<td>Dell Inc.</td>
<td>Hardware Availability: Mar-2021</td>
</tr>
</tbody>
</table>

**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

**Peak Optimization Flags (Continued)**

649.fotonik3d\textunderscore s: basepeak = yes

654.roms\textunderscore s: -m64 -mno-adx -mno-sse4a
-W1,-ml1vm -W1,-enable-X86-prefetching
-W1,-ml1vm -W1,-enable-licm-vrp
-W1,-ml1vm -W1,-function-specialize
-W1,-ml1vm -W1,-align-all-nofallback-blocks=6
-W1,-ml1vm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-ml1vm -reduce-array-computations=3
-ml1vm -global-vectorize-slp=true -ml1vm -enable-licm-vrp
-DSPEC\textunderscore OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf\textunderscore s: basepeak = yes

627.cam4\textunderscore s: -m64 -mno-adx -mno-sse4a
-W1,-ml1vm -W1,-enable-X86-prefetching
-W1,-ml1vm -W1,-enable-licm-vrp
-W1,-ml1vm -W1,-function-specialize
-W1,-ml1vm -W1,-align-all-nofallback-blocks=6
-W1,-ml1vm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -ml1vm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-ml1vm -inline-threshold=1000 -ml1vm -enable-gvn-hoist
-ml1vm -global-vectorize-slp=true
-ml1vm -function-specialize -ml1vm -enable-licm-vrp
-ml1vm -reduce-array-computations=3 -Mrecursive
-DSPEC\textunderscore OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

628.pop2\textunderscore s: basepeak = yes

Benchmarks using Fortran, C, and C++:

-m64 -mno-adx -mno-sse4a -std=c++98
-W1,-ml1vm -W1,-x86-use-vzeroupper=false -W1,-ml1vm -W1,-enable-licm-vrp
-W1,-ml1vm -W1,-function-specialize
-W1,-ml1vm -W1,-align-all-nofallback-blocks=6
-W1,-ml1vm -W1,-reduce-array-computations=3 -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-ml1vm -unroll-threshold=50 -fremap-arrays -flv-function-specialization
-ml1vm -inline-threshold=1000 -ml1vm -enable-gvn-hoist
-ml1vm -global-vectorize-slp=true -ml1vm -function-specialize

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

Benchmarks using Fortran, C, and C++ (continued):
- `mllvm -enable-llicm-vrp`
- `mllvm -reduce-array-computations=3`
- `finline-aggressive`
- `mllvm -unroll-threshold=100`
- `mllvm -reroll-loops`
- `mllvm -aggressive-loop-unswitch`
- `-Mrecursive`
- `-DSPEC_OPENMP`
- `-fopenmp`
- `-fopenmp=libomp`
- `-lomp`
- `-lamdlibm`
- `-ljemalloc`
- `-lflang`

### Peak Other Flags

C benchmarks:
- `-Wno-unused-command-line-argument`
- `-Wno-return-type`

Fortran benchmarks:
- `-Wno-unused-command-line-argument`
- `-Wno-return-type`

Benchmarks using both Fortran and C:
- `-Wno-unused-command-line-argument`
- `-Wno-return-type`

Benchmarks using Fortran, C, and C++:
- `-Wno-unused-command-line-argument`
- `-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: