# SPEC CPU®2017 Floating Point Speed Result

Dell Inc.  
PowerEdge C6525 (AMD EPYC 7513 32-Core Processor)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 205</th>
<th>SPECspeed®2017_fp_peak = 209</th>
</tr>
</thead>
</table>

## Hardware
- **CPU Name:** AMD EPYC 7513  
- **Max MHz:** 3650  
- **Nominal:** 2600  
- **Enabled:** 64 cores, 2 chips  
- **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, 32 MB shared / 8 cores  
- **Other:** None  
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)  
- **Storage:** 252 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.

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**Threads**

<table>
<thead>
<tr>
<th>Test</th>
<th>SPECspeed®2017_fp_base</th>
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<tbody>
<tr>
<td>603.bwaves_s 64</td>
<td>342</td>
<td>342</td>
</tr>
<tr>
<td>607.cactuBSSN_s 64</td>
<td>113</td>
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</tr>
<tr>
<td>619.lbm_s 64</td>
<td>178</td>
<td>178</td>
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<tr>
<td>621.wrf_s 64</td>
<td>153</td>
<td>153</td>
</tr>
<tr>
<td>627.cam4_s 64</td>
<td>67.1</td>
<td>67.1</td>
</tr>
<tr>
<td>628.pop2_s 64</td>
<td>299</td>
<td>299</td>
</tr>
<tr>
<td>638.imagick_s 64</td>
<td>103</td>
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<tr>
<td>644.nab_s 64</td>
<td>223</td>
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<tr>
<td>649.fotonik3d_s 64</td>
<td>267</td>
<td>267</td>
</tr>
<tr>
<td>654.roms_s 64</td>
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**Test Details**

- **CPU2017 License:** 55  
- **Test Sponsor:** Dell Inc.  
- **Test Date:** Mar-2021  
- **Hardware Availability:** Mar-2021  
- **Tested by:** Dell Inc.  
- **Software Availability:** Mar-2021
Dell Inc. PowerEdge C6525 (AMD EPYC 7513 32-Core Processor)

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

Results Table

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<tr>
<th>Benchmark</th>
<th>Baseline Threads</th>
<th>Baseline Seconds</th>
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<tr>
<td>603.bwaves_s</td>
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<td>607.cactuBSSN_s</td>
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

Submit Notes

The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit
'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 0 > /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.
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## Dell Inc.

**PowerEdge C6525 (AMD EPYC 7513 32-Core Processor)**

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

### Operating System Notes (Continued)

To enable Transparent Hugepages (THP) for all allocations, 'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and 'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root. To enable THP only on request for peak runs of 628.pop2_s, and 638.imagick_s, 'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root. To disable THP for peak runs of 627.cam4_s, 644.nab_s, 649.fotonik3d_s, and 654.roms_s, 'echo never > /sys/kernel/mm/transparent_hugepage/enabled' run as root.

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

- GOMP_CPU_AFFINITY = "0-63"
- LD_LIBRARY_PATH = 
  "/dev/shm/cpu2017-1.1.5/amd_speed_aocc300_milan_B_lib/64;/dev/shm/cpu201 7-1.1.5/amd_speed_aocc300_milan_B_lib/32;"
- MALLOC_CONF = "retain:true"
- OMP_DYNAMIC = "false"
- OMP_SCHEDULER = "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 621.wrf_s peak run:

- GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 627.cam4_s peak run:

- GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42 11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54 23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 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

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:

(Continued on next page)
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General Notes (Continued)

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

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.

Benchmark run from a 252 GB ramdisk created with the cmd: "mount -t tmpfs -o size=252G tmpfs /mnt/ramdisk"

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 /dev/shm/cpu2017-1.1.5/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on rhel-8-3-amd Thu Mar 11 18:11:07 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 7513 32-Core Processor
  2 "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 : 32
siblings : 32
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

(Continued on next page)
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Platform Notes (Continued)

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: 32
Socket(s): 2
NUMA node(s): 8
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7513 32-Core Processor
Stepping: 1
CPU MHz: 1972.702
BogoMIPS: 5190.12
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 mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapicid abm smx ssse4 misalignsse 3dnowprefetch osvw ibs k筅it tce topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate sme ssbd mba sev ibrs ibpb stibp vmxcall fsgsbase bmi1 avx2 smep bmi2 invpcid cqm rdt_a rseed adx smap clflushopt clwb sha_ni xsaveopt xsave xgetbv1 xsaveas cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr wbnoinvd amd_pini arat np tbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif umip pkpu ospke vaes vpclmulqdq rdpid overflow_recov succor smca

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

(Continued on next page)
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#### CPU2017 License
- Rating: 55

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**Tested by:** Dell Inc.
**Software Availability:** Mar-2021

<table>
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<th>Platform Notes (Continued)</th>
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physical chip.

available: 8 nodes (0-7)

node 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 64074 MB
node 0 free: 63984 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 64507 MB
node 1 free: 64406 MB
node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 64503 MB
node 2 free: 64392 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 64491 MB
node 3 free: 64262 MB
node 4 cpus: 32 33 34 35 36 37 38 39
node 4 size: 64501 MB
node 4 free: 58490 MB
node 5 cpus: 40 41 42 43 44 45 46 47
node 5 size: 64507 MB
node 5 free: 64394 MB
node 6 cpus: 48 49 50 51 52 53 54 55
node 6 size: 64509 MB
node 6 free: 64300 MB
node 7 cpus: 56 57 58 59 60 61 62 63
node 7 size: 64463 MB
node 7 free: 64352 MB

node distances:

node   0   1   2   3   4   5   6   7
0:  10  11  11  11  32  32  32  32
1:  11  10  11  11  32  32  32  32
2:  11  11  10  11  32  32  32  32
3:  11  11  11  10  32  32  32  32
4:  32  32  32  32  10  11  11  11
5:  32  32  32  32  11  10  11  11
6:  32  32  32  32  11  11  10  11
7:  32  32  32  32  11  11  11  10

From /proc/meminfo

MemTotal:       527961868 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/sbin/tuned-adm active

Current active profile: throughput-performance

From /etc/*release* /etc/*version*

os-release:
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**Platform Notes (Continued)**

```
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
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/swaps barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
CVE-2017-5715 (Spectre variant 2): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected
```

run-level 3 Nov 26 07:58

SPEC is set to: /dev/shm/cpu2017-1.1.5

```
Filesystem      Type       Size  Used Avail Use% Mounted on
tmpfs           tmpfs      252G  5.7G  247G   3%   /dev/shm
```

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge C6525
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
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**Platform Notes (Continued)**

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 80AD863280AD HMA44GR7AJR8N-XN 32 GB 2 rank 3200

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)

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**Compiler Version Notes**

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<tr>
<td>AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)</td>
<td></td>
</tr>
<tr>
<td>Target: x86_64-unknown-linux-gnu</td>
<td></td>
</tr>
<tr>
<td>Thread model: posix</td>
<td></td>
</tr>
<tr>
<td>InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin</td>
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(Continued on next page)
### Dell Inc. PowerEdge C6525 (AMD EPYC 7513 32-Core Processor)

**SPECspeed®2017 fp_base = 205**

**SPECspeed®2017 fp_peak = 209**

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### Compiler Version Notes (Continued)

<table>
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<tr>
<th>Fortran</th>
<th>603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)</th>
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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

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<th>Fortran, C</th>
<th>621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)</th>
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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
## SPEC CPU®2017 Floating Point Speed Result

### Dell Inc.

**PowerEdge C6525 (AMD EPYC 7513 32-Core Processor)**  

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### SPECspeed®2017_fp_base = 205

### SPECspeed®2017_fp_peak = 209

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### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>619.libm_s</td>
<td>-DSPEC_LP64</td>
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<tr>
<td>621.wrf_s</td>
<td>-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64</td>
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<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>
</tr>
<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:

- `m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize`
- `Wl,-mllvm -Wl,-function-specialize`
- `Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-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-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs`
- `-DSPEC_OPENMP -fopenmpmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc`
- `-lflang -lflangrti`

#### Fortran benchmarks:

- `m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching`
- `Wl,-mllvm -Wl,-enable-licm-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=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive`
- `-mllvm -use-tiling -mllvm -funroll-loops`
- `-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop`
- `-mllvm -enable-licm-vc -mllvm -reduce-array-computations=3`
- `-mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp`
- `-fopenmpmp -lomp -ljemalloc -lflang -lflangrti`

#### Benchmarks using both Fortran and C:

- `m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching`
- `Wl,-mllvm -Wl,-enable-licm-vrp -Wl,-mllvm -Wl,-region-vectorize`
- `Wl,-mllvm -Wl,-function-specialize`
- `Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`

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Dell Inc.
PowerEdge C6525 (AMD EPYC 7513 32-Core Processor)

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CPU2017 License: 55
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Test Date: Mar-2021
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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-W1,-mllvm -W1,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flio -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-licm-vrp -mllvm -reduce-array-computations=3 -Hz,1,0x1
-Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -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
-W1,-mllvm -W1,-x86-use-xzverupper=false
-W1,-mllvm -W1,-region-vectorize -W1,-mllvm -W1,-function-specialize
-W1,-mllvm -W1,-align-all-nofallthrough-blocks=6
-W1,-mllvm -W1,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flio -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-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -enable-partial-unswitch -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -convert-pow-exp-to-int=false
-Hz,1,0x1 -Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -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.  
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**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: basepeak = yes

Fortran benchmarks:
603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: -m64 -mno-adx -mno-sse4a
-Wl,-mlllvm -Wl,-enable-X86-prefetching
-Wl,-mlllvm -Wl,-enable-licm-vrp
-Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlllvm -reduce-array-computations=3
-mlllvm -global-vectorize-slp=true -mlllvm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamlldlibm

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Peak Optimization Flags (Continued)

654.roms_s (continued):
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -mno-adx -mno-sse4a
-mlvm -Wl, -aligned-up
-mlvm -Wl, -enable-X86-prefetching
-mlvm -Wl, -enable-llicm-vrp
-mlvm -Wl, -function-specialize
-mlvm -Wl, -align-all-nofallbackblocks=6
-mlvm -Wl, -reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mlvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mlvm -enable-llicm-vrp
-mllvm -reduce-array-computations=3 -Hz,1,0x1 -O3
-Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mlvm -lsr-in-nested-loop
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-mlvm = basepeak

627.cam4_s: -m64 -mno-adx -mno-sse4a
-mlvm -Wl, -enable-X86-prefetching
-mlvm -Wl, -enable-llicm-vrp
-mlvm -Wl, -function-specialize
-mlvm -Wl, -align-all-nofallbackblocks=6
-mlvm -Wl, -reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mlvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mlvm -enable-llicm-vrp
-mllvm -reduce-array-computations=3 -Mrecursive
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-mlvm = basepeak

628.pop2_s: -m64 -mno-adx -mno-sse4a -std=c++98
-mlvm -Wl, -x86-use-vzeroupper=false -Wl, -mlvm -Wl, -enable-llicm-vrp
-mlvm -Wl, -function-specialize
-mlvm -Wl, -align-all-nofallbackblocks=6

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Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -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-licm-vrp -mlllvm -reduce-array-computations=3
-finline-aggressive -mlllvm -unroll-threshold=100 -mlllvm -reroll-loops
-mlllvm -aggressive-loop-unswitch -Mrecursive -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

Peak Other Flags

C benchmarks:
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Fortran benchmarks:
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Benchmarks using both Fortran and C:
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Tested with SPEC CPU®2017 v1.1.5 on 2021-03-11 19:11:07-0500.
Originally published on 2021-05-25.