## SPEC CPU®2017 Floating Point Speed Result

**Cisco Systems**

Cisco UCS C225 M6 (AMD EPYC 7763 64-Core, Processor)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>253</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>264</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9019  
**Test Sponsor:** Cisco Systems  
**Tested by:** Cisco Systems  
**Test Date:** Aug-2021  
**Hardware Availability:** Jun-2021  
**Software Availability:** Jun-2021

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (253)</th>
<th>SPECspeed®2017_fp_peak (264)</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>128</td>
<td>429</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>128</td>
<td>431</td>
</tr>
<tr>
<td>619.libm_s</td>
<td>128</td>
<td>127</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>128</td>
<td>134</td>
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<tr>
<td>627.cam4_s</td>
<td>128</td>
<td>174</td>
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<td>628.pop2_s</td>
<td>128</td>
<td>184</td>
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<tr>
<td>638.imagick_s</td>
<td>128</td>
<td>75.5</td>
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<td>644.nab_s</td>
<td>128</td>
<td>80.9</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>128</td>
<td>461</td>
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<tr>
<td>654.roms_s</td>
<td>128</td>
<td>610</td>
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<tr>
<td><strong>SPECspeed®2017_fp_base (253)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SPECspeed®2017_fp_peak (264)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 7763  
- **Max MHz:** 3500  
- **Nominal:** 2450  
- **Enabled:** 128 cores, 2 chips  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 512 KB I+D on chip per core  
- **Cache L3:** 256 MB I+D on chip per chip, 32 MB shared / 8 cores  
- **Other:** None  
- **Memory:** 2 TB (16 x 128 GB 4Rx4 PC4-3200V-L)  
- **Storage:** 1 x 960 GB M.2 SSD SATA  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP3 (x86_64) kernel version 5.3.18-57-default  
- **Compiler:** C/C++/Fortran: Version 3.0.0 of AOCC  
- **Parallel:** Yes  
- **Firmware:** Version 4.2.0.287 released Jul-2021  
- **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
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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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</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>75.1</td>
<td>786</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<tr>
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<tr>
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<td>75.5</td>
<td>146</td>
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<tr>
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<tr>
<td>654.roms_s</td>
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<td>128</td>
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<td>431</td>
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</tr>
</tbody>
</table>

SPEC®2017_fp_base = 253
SPEC®2017_fp_peak = 264

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>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage, 'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space randomization (ASLR) to reduce run-to-run variability, 'sysctl -w kernel.randomize_va_space=0' run as root.
To enable Transparent Hugepages (THP) for all allocations,
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SPECspeed®2017_fp_base = 253
SPECspeed®2017_fp_peak = 264

CPU2017 License: 9019
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Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-127"
LD_LIBRARY_PATH =
"/home/cpu2017/amd_speed_aocc300_milan_B_lib/lib;/home/cpu2017/amd_speed _aocc300_milan_B_lib/lib32:" MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "128"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-127"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-127"

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:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
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</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>264</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

| Socket(s): | 2 |
| NUMA node(s): | 16 |
| Vendor ID: | AuthenticAMD |
| CPU family: | 25 |
| Model: | 1 |
| Model name: | AMD EPYC 7763 64-Core Processor |
| Stepping: | 1 |
| Frequency boost: | enabled |
| CPU MHz: | 1794.422 |
| CPU max MHz: | 2450.0000 |
| CPU min MHz: | 1500.0000 |
| BogoMIPS: | 4890.77 |
| Virtualization: | AMD-V |
| L1d cache: | 4 MiB |
| L1i cache: | 4 MiB |
| L2 cache: | 64 MiB |
| L3 cache: | 512 MiB |
| 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 |
| NUMA node8 CPU(s): | 64-71 |
| NUMA node9 CPU(s): | 72-79 |
| NUMA node10 CPU(s): | 80-87 |
| NUMA node11 CPU(s): | 88-95 |
| NUMA node12 CPU(s): | 96-103 |
| NUMA node13 CPU(s): | 104-111 |
| NUMA node14 CPU(s): | 112-119 |
| NUMA node15 CPU(s): | 120-127 |
| Vulnerability Itlb multihit: | Not affected |
| Vulnerability L1tf: | Not affected |
| Vulnerability Mds: | Not affected |
| Vulnerability Meltdown: | Not affected |
| Vulnerability Spec store bypass: | Mitigation; Speculative Store Bypass disabled via prctl and seccomp |
| Vulnerability Spectre v1: | Mitigation; usercopy/swapgs barriers and __user pointer sanitization |
| Vulnerability Spectre v2: | Mitigation; Full AMD retpoline, IBFB conditional, IBRS_FW, STIBP disabled, RSB filling |
| Vulnerability Srbd: | Not affected |
| Vulnerability Tsx async abort: | Not affected |
| 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 |

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| SPECspeed®2017_fp_base | = 253 |
| SPECspeed®2017_fp_peak | = 264 |

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Test Date: Aug-2021
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Platform Notes (Continued)

pdpe1gb rdtscp lm constant_tsc rep_good nonstop_tsc cpuid extd_apicid
aperefmpref pni pclmulqdq monitor ssse3 fma cx16 pclid sse4_1 sse4_2 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 ssbd mba ibrs
ibpb stibp vmmcall fsqsbse base bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a rdseed adx
smap clflushopt clwb sha_xn xsaveopt xsaves xgetbv xsavec cqm_llc cqm_occup_llc
cqm_mbb_total cqm_mbb_local clzero irperf xsaveerptr wbnoinvd amd_ppn arat npt lbrv
svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
pfthreshold v_vmsave_vmload vgif umip pku ospke vaes vpclmulqdq rdpid overflow_recover
succor smca fsrm

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>32K</td>
<td>4M</td>
<td>8</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>4M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>512K</td>
<td>64M</td>
<td>8</td>
<td>Unified</td>
<td>2</td>
<td>1024</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>32M</td>
<td>512M</td>
<td>16</td>
<td>Unified</td>
<td>3</td>
<td>32768</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

/platforminfo 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 4 5 6 7
node 0 size: 128834 MB
node 0 free: 128637 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 129021 MB
node 1 free: 128892 MB
node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 129021 MB
node 2 free: 128921 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 129021 MB
node 3 free: 128924 MB
node 4 cpus: 32 33 34 35 36 37 38 39
node 4 size: 129021 MB
node 4 free: 128869 MB
node 5 cpus: 40 41 42 43 44 45 46 47
node 5 size: 129021 MB
node 5 free: 128929 MB
node 6 cpus: 48 49 50 51 52 53 54 55
node 6 size: 129021 MB
node 6 free: 128907 MB
node 7 cpus: 56 57 58 59 60 61 62 63

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**SPECspeed®2017_fp_base** = 253  
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Platform Notes (Continued)

```
node 7 size: 116909 MB
node 7 free: 116811 MB
node 8 cpus: 64 65 66 67 68 69 70 71
node 8 size: 129021 MB
node 8 free: 128915 MB
node 9 cpus: 72 73 74 75 76 77 78 79
node 9 size: 129021 MB
node 9 free: 128908 MB
node 10 cpus: 80 81 82 83 84 85 86 87
node 10 size: 129021 MB
node 10 free: 128496 MB
node 11 cpus: 88 89 90 91 92 93 94 95
node 11 size: 129021 MB
node 11 free: 128889 MB
node 12 cpus: 96 97 98 99 100 101 102 103
node 12 size: 129021 MB
node 12 free: 128890 MB
node 13 cpus: 104 105 106 107 108 109 110 111
node 13 size: 129021 MB
node 13 free: 128856 MB
node 14 cpus: 112 113 114 115 116 117 118 119
node 14 size: 129021 MB
node 14 free: 128905 MB
node 15 cpus: 120 121 122 123 124 125 126 127
node 15 size: 128982 MB
node 15 free: 128850 MB
node distances:

From /proc/meminfo

MemTotal: 2101256792 kB
```

(Continued on next page)
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Platform Notes (Continued)

HugePages_Total:       0
Hugepagesize:       2048 kB

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

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

os-release:
NAME="SLES"
VERSION="15-SP3"
VERSION_ID="15.3"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP3"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp3"

uname -a:
Linux localhost 5.3.18-57-default #1 SMP Wed Apr 28 10:54:41 UTC 2021 (ba3c2e9) 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:
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: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Aug 15 17:25

SPEC is set to: /home/cpu2017

Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sda3   xfs   557G   10G  547G  2% /

From /sys/devices/virtual/dmi/id
Vendor: Cisco Systems Inc

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

**Product:** UCSC-C225-M6S  
**Serial:** WZP252309U3  

Additional information from dmidecode 3.2 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 0xCE00 M386AAG40AM3-CWE 128 GB 4 rank 3200  

**BIOS:**  
BIOS Vendor: Cisco Systems, Inc.  
BIOS Version: C225M6.4.2.0.287.0730211213  
BIOS Date: 07/30/2021  
BIOS Revision: 5.22  

(End of data from sysinfo program)

## Compiler Version Notes

```
<table>
<thead>
<tr>
<th>Language</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)</td>
</tr>
</tbody>
</table>

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
```

```
<table>
<thead>
<tr>
<th>Language</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C++, C, Fortran</td>
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Compiler Version Notes (Continued)
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)

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

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

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
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7763 64-Core, Processor)

SPECspeed®2017_fp_base = 253
SPECspeed®2017_fp_peak = 264

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Aug-2021
Hardware Availability: Jun-2021
Tested by: Cisco Systems
Software Availability: Jun-2021

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:
-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=znver3
-fvecclib=AMDLIBM -ffast-math -fflt -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-vcpr -mllvm -reduce-array-computations=3 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llang -llangirti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrpr -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 -fvecclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lser-in-nested-loop
-mllvm -enable-licm-vrpr -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -llang -llangirti

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrpr -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

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Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7763 64-Core, Processor)

SPECspeed®2017_fp_base = 253
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CPU2017 License: 9019
Test Sponsor: Cisco Systems
Test Date: Aug-2021
Tested by: Cisco Systems
Hardware Availability: Jun-2021
Software Availability: Jun-2021

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-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 -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
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false
-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=znver3
-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
-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
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7763 64-Core, Processor)  

SPECspeed®2017_fp_base = 253  
SPECspeed®2017_fp_peak = 264

CPU2017 License: 9019  
Test Date: Aug-2021

Test Sponsor: Cisco Systems  
Hardware Availability: Jun-2021

Tested by: Cisco Systems  
Software Availability: Jun-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  
-Wl,-mllvm -Wl,-function-specialize  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto  
-fstruct-layout=5 -mllvm -unroll-threshold=50  
-fremap-arrays -flv-function-specialization  
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist  
-mllvm -global-vectorize-slp=true  
-mllvm -function-specialize -mllvm -enable-licm-vrp  
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp  
-fopenmp=libomp -lomp -landlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: basepeak = yes

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Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7763 64-Core, Processor)

SPECSpeed®2017_fp_base = 253
SPECSpeed®2017_fp_peak = 264

Peak Optimization Flags (Continued)

649.fotonik3d_s: basepeak = yes

654.roms_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-marcesznver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamlb
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: basepeak = yes

628.pop2_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-marcesznver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mllvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -Mrecursive
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamlb
-ljemalloc -lflang

Benchmarks using Fortran, C, and C++:

-m64 -mno-adx -mno-sse4a -std=c++98
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -marcesznver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true -mllvm -function-specialize

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Peak Optimization Flags (Continued)
Benchmarks using Fortran, C, and C++ (continued):

-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:
-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: