# SPEC CPU®2017 Floating Point Speed Result

## Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed®2017_fp_base = 246</th>
<th>SPECspeed®2017_fp_peak = 253</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License:</td>
<td>9019</td>
<td>Test Date:</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>Cisco Systems</td>
<td>Hardware Availability:</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Cisco Systems</td>
<td>Software Availability:</td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** AMD EPYC 7663
- **Max MHz:** 3500
- **Nominal:** 2000
- **Enabled:** 112 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:** 256 MB I+D on chip per chip, 32 MB shared / 7 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 C225M6.4.2.1c released Sep-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 and OS set to prefer performance at the cost of additional power usage

### Test Results
<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>112</td>
<td>112</td>
<td>112</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>135</td>
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<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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<td>638.imagick_s</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>654.roms_s</td>
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<td>339</td>
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</tr>
</tbody>
</table>

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**Threads:**

- 0 30.0 60.0 90.0 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600 630 660 690

**Score:**

- SPECspeed®2017_fp_base = 246
- SPECspeed®2017_fp_peak = 253
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Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

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

### Results Table

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</tbody>
</table>

**SPECspeed®2017_fp_base = 246**  
**SPECspeed®2017_fp_peak = 253**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Compiler Notes


### 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 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.  
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root for peak  

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SPEC®2017_fp_base = 246
SPEC®2017_fp_peak = 253

Operating System Notes (Continued)
integer runs and all FP runs to enable Transparent Hugepages (THP).
"cpupower --frequency-set -g performance" run as root to set the scaling governor to
performance.

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-111"
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 = "16G"
OMP_THREAD_LIMIT = "112"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-111"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-111"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-111"

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
Platform Notes

BIOS Configuration
SMT Mode set to Disabled
NUMA nodes per socket set to NPS1
ACPI SRAT L3 Cache As NUMA Domain set to Enabled
DRAM Scrub Time set to Disabled
Determinism Slider set to Power
L1 Stream HW Prefetcher set to Enabled
APBDIS set to 1

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on localhost Sat Sep 25 22:16:30 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 7663 56-Core Processor
 2 "physical id"s (chips)
 112 "processors"
core, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 56
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  28 29 30 32 33 34 35 36 37 38 40 41 42 43 44 45 46 48 49 50 51 52 53 54 56 57 58 59
  60 61 62
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  28 29 30 32 33 34 35 36 37 38 40 41 42 43 44 45 46 48 49 50 51 52 53 54 56 57 58 59
  60 61 62

From lscpu from util-linux 2.36.2:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 48 bits physical, 48 bits virtual
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 1
Core(s) per socket: 56
Socket(s): 2
NUMA node(s): 16
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7663 56-Core Processor

(Continued on next page)
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**SPECspeed\textsuperscript{\textregistered}2017\_fp\_base = 246**  
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**Platform Notes (Continued)**

- Stepping: 1
- Frequency boost: enabled
- CPU MHz: 1807.896
- CPU max MHz: 2000.0000
- CPU min MHz: 1500.0000
- BogoMIPS: 3992.59
- Virtualization: AMD-V
- L1d cache: 3.5 MiB
- L1i cache: 3.5 MiB
- L2 cache: 56 MiB
- L3 cache: 512 MiB
- NUMA node0 CPU(s): 0-6
- NUMA node1 CPU(s): 7-13
- NUMA node2 CPU(s): 14-20
- NUMA node3 CPU(s): 21-27
- NUMA node4 CPU(s): 28-34
- NUMA node5 CPU(s): 35-41
- NUMA node6 CPU(s): 42-48
- NUMA node7 CPU(s): 49-55
- NUMA node8 CPU(s): 56-62
- NUMA node9 CPU(s): 63-69
- NUMA node10 CPU(s): 70-76
- NUMA node11 CPU(s): 77-83
- NUMA node12 CPU(s): 84-90
- NUMA node13 CPU(s): 91-97
- NUMA node14 CPU(s): 98-104
- NUMA node15 CPU(s): 105-111
- 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, IBPB conditional, IBRS\_FW, STIBP disabled, RSB filling
- Vulnerability Srbds: 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 pdp64\_lg rdtsscp lm constant\_tsc rep\_good nopl nonstop\_tsc cpuid extd\_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pcid 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 bptext perfctr\_llc mwaitx cpb cat\_l3 cdp\_l3 invpcid\_single hw\_pstate ssbd mba ibrs ibpb stibp vmmcall fsgrbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt\_a rdseed adx

(Continued on next page)


<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>
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<td>3.5M</td>
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</table>

/proc/cpuinfo cache data

cache size : 512 KB

From lscpu --cache:

WARNING: a numactl 'node' might or might not correspond to a physical chip.

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
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<tr>
<td>node 0</td>
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<tr>
<td>node 0</td>
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<tr>
<td>node 1</td>
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<tr>
<td>node 1</td>
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<tr>
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<tr>
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<tr>
<td>node 5</td>
<td>free: 128838 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 6</td>
<td>cpus: 42 43 44 45 46 47 48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 6</td>
<td>size: 129021 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 6</td>
<td>free: 128902 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 7</td>
<td>cpus: 49 50 51 52 53 54 55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 7</td>
<td>size: 116909 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 7</td>
<td>free: 116821 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 8</td>
<td>cpus: 56 57 58 59 60 61 62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 8</td>
<td>size: 129021 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 8</td>
<td>free: 128927 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>node 9</td>
<td>cpus: 63 64 65 66 67 68 69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Cisco Systems

Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

SPECspeed®2017_fp_base = 246
SPECspeed®2017_fp_peak = 253

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

Platform Notes (Continued)

node 9 size: 129021 MB
node 9 free: 128907 MB
node 10 cpus: 70 71 72 73 74 75 76
node 10 size: 129021 MB
node 10 free: 128927 MB
node 11 cpus: 77 78 79 80 81 82 83
node 11 size: 129021 MB
node 11 free: 128925 MB
node 12 cpus: 84 85 86 87 88 89 90
node 12 size: 129021 MB
node 12 free: 128928 MB
node 13 cpus: 91 92 93 94 95 96 97
node 13 size: 129021 MB
node 13 free: 128927 MB
node 14 cpus: 98 99 100 101 102 103 104
node 14 size: 129021 MB
node 14 free: 128916 MB
node 15 cpus: 105 106 107 108 109 110 111
node 15 size: 129016 MB
node 15 free: 128905 MB
node distances:

From /proc/meminfo
MemTotal: 2101262076 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

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CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems
CPE_NAME=cpe:/o:suse:sles:15:sp3

Platform Notes (Continued)

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: 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: usercopy/swapsps barriers and __user pointer sanitation
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 Sep 25 12:24

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 557G 11G 546G 2% /

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

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

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Tested by: Cisco Systems
Hardware Availability: Jun-2021  
Software Availability: Jun-2021

Platform Notes (Continued)
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: C225M6.4.2.1c.0.0806211349
BIOS Date: 08/06/2021
BIOS Revision: 5.22

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

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

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Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

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

Compiler Version Notes (Continued)

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

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Base Portability Flags (Continued)

607.cactuBSSN_s: -DSPEC_LP64
619.ibm_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 -W1, -mllvm -W1, -region-vectorize
-W1, -mllvm -W1, -function-specialize
-W1, -mllvm -W1, -align-all-nofallthru-blocks=6
-W1, -mllvm -W1, -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 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-lflang -lflangrti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -W1, -mllvm -W1, -enable-X86-prefetching
-W1, -mllvm -W1, -enable-licm-vrp -W1, -mllvm -W1, -region-vectorize
-W1, -mllvm -W1, -function-specialize
-W1, -mllvm -W1, -align-all-nofallthru-blocks=6
-W1, -mllvm -W1, -reduce-array-computations=3 -Hz,1,0x1 -O3
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -W1, -mllvm -W1, -enable-X86-prefetching
-W1, -mllvm -W1, -enable-licm-vrp -W1, -mllvm -W1, -region-vectorize
-W1, -mllvm -W1, -function-specialize
-W1, -mllvm -W1, -align-all-nofallthru-blocks=6
-W1, -mllvm -W1, -reduce-array-computations=3 -O3 -march=znver3

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

Benchmarks using both Fortran and C (continued):
- fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
- mlvm -unroll-threshold=50 -mlllvm -inline-threshold=1000
- fremap-arrays -mlllvm -function-specialize -flv-function-specialization
- mlllvm -enable-gvn-hoist -mlllvm -global-vectorize-slp=true
- mlllvm -enable-lcm-vrp -mlllvm -reduce-array-computations=3 -Hz,1,0x1
- Mrecursive -mlllvm -fuse-tile-inner-loop -funroll-loops
- mlllvm -extra-vectorizer-passes -mlllvm -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,-mlllvm -W1,-x86-use-vzeroupper=false
- W1,-mlllvm -W1,-region-vectorize -W1,-mlllvm -W1,-function-specialize
- W1,-mlllvm -W1,-align-all-nofallthru-blocks=6
- W1,-mlllvm -W1,-reduce-array-computations=3 -O3 -march=znver3
- fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
- mlllvm -unroll-threshold=50 -mlllvm -inline-threshold=1000
- fremap-arrays -mlllvm -function-specialize -flv-function-specialization
- mlllvm -enable-gvn-hoist -mlllvm -global-vectorize-slp=true
- mlllvm -enable-lcm-vrp -mlllvm -reduce-array-computations=3
- mlllvm -enable-partial-unswitch -mlllvm -unroll-threshold=100
- finline-aggressive -mlllvm -loop-unswitch-threshold=200000
- mlllvm -reroll-loops -mlllvm -aggressive-loop-unswitch
- mlllvm -extra-vectorizer-passes -mlllvm -convert-pow-exp-to-int=false
- Hz,1,0x1 -Mrecursive -mlllvm -fuse-tile-inner-loop -funroll-loops
- mlllvm -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lamdlibm -ljemmalloc -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 7663 56-Core Processor)

<table>
<thead>
<tr>
<th>CPU2017 License: 9019</th>
<th>Test Date: Sep-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Cisco Systems</td>
<td>Hardware Availability: Jun-2021</td>
</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td>Software Availability: Jun-2021</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_fp_base = 246
### SPECspeed®2017_fp_peak = 253

---

**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,-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
    -march=znver3 -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 -lamdlibm

(Continued on next page)
Cisco Systems
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Peak Optimization Flags (Continued)

654.roms_s (continued):
  -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
  -W1,-mlllvm -W1,-enable-X86-prefetching
  -W1,-mlllvm -W1,-enable-lcim-vrp
  -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 -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-lcim-vrp
  -mlllvm -reduce-array-computations=3 -Mrecursive
  -DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
  -ljemalloc -lflang

Benchmarks using Fortran, C, and C++:
  -m64 -mno-adx -mno-sse4a -std=c++98
  -W1,-mlllvm -W1,-x86-use-vzeroupper=false -W1,-mlllvm -W1,-enable-lcim-vrp
  -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 -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-lcim-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

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7663 56-Core Processor)

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Test Date: Sep-2021
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Peak Other Flags (Continued)

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:

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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