Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: AMD EPYC 7413</td>
<td>OS: SUSE Linux Enterprise Server 15 SP3 (x86_64)</td>
</tr>
<tr>
<td>Max MHz: 3600</td>
<td>kernel version 5.3.18-57-default</td>
</tr>
<tr>
<td>Nominal: 2650</td>
<td>Compiler: C/C++/Fortran: Version 3.0.0 of AOCC</td>
</tr>
<tr>
<td>Enabled: 48 cores, 2 chips, 2 threads/core</td>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>Orderable: 1.2 chips</td>
<td>Firmware: Version 4.2.0.271 released Jul-2021</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>L2: 512 KB I+D on chip per core</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>L3: 128 MB I+D on chip per chip, 32 MB shared / 6 cores</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Peak Pointers: 64-bit</td>
</tr>
<tr>
<td>Memory: 2 TB (16 x 128 GB 4Rx4 PC4-3200V-L)</td>
<td>Other: jemalloc: jemalloc memory allocator library v5.2.0</td>
</tr>
<tr>
<td>Storage: 1 x 1.6 TB M.2 SSD SATA</td>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Date: Jun-2021</td>
<td>SPECspeed®2017_fp_base = 196</td>
</tr>
<tr>
<td>Hardware Availability: Jun-2021</td>
<td>SPECspeed®2017_fp_peak = 203</td>
</tr>
<tr>
<td>Tested by: Cisco Systems</td>
<td>Tested by: Cisco Systems</td>
</tr>
<tr>
<td>Software Availability: Jun-2021</td>
<td>Software Availability: Jun-2021</td>
</tr>
<tr>
<td>Test Sponsor: Cisco Systems</td>
<td>Test Sponsor: Cisco Systems</td>
</tr>
</tbody>
</table>

603.bwaves_s 48
607.cactuBSSN_s 48
619.lbm_s 48
621.wrf_s 48
627.cam4_s 48
628.pop2_s 48
638.imagick_s 48
644.nab_s 48
649.fotonik3d_s 48
654.roms_s 48

Threads 0 30.0 60.0 90.0 120 150 180 210 240 270 300 330 360 390 420 450 480 510 540 570 600 630 660 690 720 750 780 810 840 870 900 930 960 990 1020 1050 1080 1110 1140 1170 1200 1230 1260 1290 1320 1350 1380 1410 1440 1470 1500 1530 1560 1590 1620 1650 1680 1710 1740 1770 1800 1830 1860 1890 1920 1950 1980 2010 2040 2070 2100 2130 2160 2190 2220 2250 2280 2310 2340 2370 2400 2430 2460 2490 2520 2550 2580 2610 2640 2670 2700 2730 2760 2790 2820 2850 2880 2910 2940 2970 3000 3030 3060 3090 3120 3150 3180 3210 3240 3270 3300 3330 3360 3390 3420 3450 3480 3510 3540 3570 3600 3630 3660 3690 3720 3750 3780 3810 3840 3870 3900 3930 3960 3990 4020 4050 4080 4110 4140 4170 4200 4230 4260 4290 4320 4350 4380 4410 4440 4470 4500 4530 4560 4590 4620 4650 4680 4710 4740 4770 4800 4830 4860 4890 4920 4950 4980 5010 5040 5070 5100 5130 5160 5190 5220 5250 5280 5310 5340 5370 5400 5430 5460 5490 5520 5550 5580 5610 5640 5670 5700 5730 5760 5790 5820 5850 5880 5910 5940 5970 6000 6030 6060 6090 6120

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>196</td>
<td>203</td>
</tr>
</tbody>
</table>
SPEC CPU®2017 Floating Point Speed Result

Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>95.2</td>
<td></td>
<td>620</td>
<td></td>
<td>95.3</td>
<td></td>
<td>619</td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>54.4</td>
<td></td>
<td>303</td>
<td></td>
<td>54.4</td>
<td></td>
<td>306</td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>43.2</td>
<td></td>
<td>121</td>
<td></td>
<td>44.2</td>
<td></td>
<td>119</td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>78.5</td>
<td></td>
<td>169</td>
<td></td>
<td>79.5</td>
<td></td>
<td>166</td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>60.0</td>
<td></td>
<td>149</td>
<td></td>
<td>59.7</td>
<td></td>
<td>148</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>167</td>
<td></td>
<td>71.0</td>
<td></td>
<td>166</td>
<td></td>
<td>71.5</td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>58.3</td>
<td></td>
<td>248</td>
<td></td>
<td>58.1</td>
<td></td>
<td>248</td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>49.0</td>
<td></td>
<td>356</td>
<td></td>
<td>49.0</td>
<td></td>
<td>357</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>82.5</td>
<td></td>
<td>112</td>
<td></td>
<td>82.0</td>
<td></td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>73.6</td>
<td></td>
<td>214</td>
<td></td>
<td>75.5</td>
<td></td>
<td>209</td>
<td></td>
</tr>
</tbody>
</table>

Specspeed®2017_fp_base = 196
Specspeed®2017_fp_peak = 203

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 layout 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,
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

SPECspeed®2017_fp_base = 196
SPECspeed®2017_fp_peak = 203

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 = "0-95"
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 = "96"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 48 1 49 2 50 3 51 4 52 5 53 6 54 7 55 8 56 9 57 10 58
11 59 12 60 13 61 14 62 15 63 16 64 17 65 18 66 19 67 20 68 21 69 22 70
23 71 24 72 25 73 26 74 27 75 28 76 29 77 30 78 31 79 32 80 33 81 34 82
35 83 36 84 37 85 38 86 39 87 40 88 41 89 42 90 43 91 44 92 45 93 46 94
47 95"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-47"

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 v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.2.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2
### SPEC CPU®2017 Floating Point Speed Result

**Cisco Systems**

Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>196</td>
<td>203</td>
</tr>
</tbody>
</table>

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

---

#### Platform Notes

**BIOS Configuration**
- SMT Mode set to Auto
- NUMA nodes per socket set to NPS4
- ACPI SRAT L3 Cache As NUMA Domain set to Enabled
- DRAM Scrub Time set to Disabled
- Determinism Slider set to Power
- cTDP Control set to Manual
- cTDP set to 280
- EDC Control set to Manual
- EDC set to 300
- L2 Stream HW Prefetcher set to Disabled
- Memory Interleaving set to Disabled
- APBDIS set to 1
- xGMI Link config set to 4

**Sysinfo program** /home/cpu2017/bin/sysinfo  
**Rev:** r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca264d  
**running on localhost Sun May 2 19:40:00 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

**From /proc/cpuinfo**

- **model name:** AMD EPYC 7413 24-Core Processor
- **2 "physical id”s (chips)**
- **96 "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:** 24
  - **siblings:** 48
  - **physical 0:** cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
  - **physical 1:** cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

**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):** 96
- **On-line CPU(s) list:** 0-95
- **Thread(s) per core:** 2
- **Core(s) per socket:** 24
- **Socket(s):** 2
- **NUMA node(s):** 8
- **Vendor ID:** AuthenticAMD
- **CPU family:** 25

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Model: 1
Model name: AMD EPYC 7413 24-Core Processor
Stepping: 1
Frequency boost: enabled
CPU MHz: 1832.680
CPU max MHz: 2650.0000
CPU min MHz: 1500.0000
BogoMIPS: 5289.94
Virtualization: AMD-V
L1d cache: 1.5 MiB
L1i cache: 1.5 MiB
L2 cache: 24 MiB
L3 cache: 256 MiB
NUMA node0 CPU(s): 0-5,48-53
NUMA node1 CPU(s): 6-11,54-59
NUMA node2 CPU(s): 12-17,60-65
NUMA node3 CPU(s): 18-23,66-71
NUMA node4 CPU(s): 24-29,72-77
NUMA node5 CPU(s): 30-35,78-83
NUMA node6 CPU(s): 36-41,84-89
NUMA node7 CPU(s): 42-47,90-95
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 always-on, RSB filling
Vulnerability Srbd: Not affected
Vulnerability Txs 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 pdelbg 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 ax64 f16c rdrandr lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3nowprefetch osuw ibs skinit wd tce topoext perfctr_core perfctr_nb perfctr_l1d perfctr_l2 perfctr_l3 perfctr_llc mwaitx cpub time cpb_cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsqbase bml1 avx2 smep bmi2 erms invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha2ni xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occuop_llc cqm_mbb_total cqm_mbb_local clzero rperf xsavereptr wbinvd amd_ppin arat npt lbv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif umip pkp ospke vaes vpclmulqdq rdpid overflow_recover succor smca fsrm

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

SPECspeed®2017_fp_base = 196
SPECspeed®2017_fp_peak = 203

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

Platform Notes (Continued)

From lsccpu --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>1.5M</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>1.5M</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>24M</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>256M</td>
<td>16</td>
<td>Unified</td>
<td>3</td>
<td>32768</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

/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 48 49 50 51 52 53
node 0 size: 257857 MB
node 0 free: 257637 MB

node 1 cpus: 6 7 8 9 10 11 54 55 56 57 58 59
node 1 size: 258044 MB
node 1 free: 257583 MB

node 2 cpus: 12 13 14 15 16 17 60 61 62 63 64 65
node 2 size: 258044 MB
node 2 free: 257849 MB

node 3 cpus: 18 19 20 21 22 23 66 67 68 69 70 71
node 3 size: 245900 MB
node 3 free: 245591 MB

node 4 cpus: 24 25 26 27 28 29 72 73 74 75 76 77
node 4 size: 258044 MB
node 4 free: 257830 MB

node 5 cpus: 30 31 32 33 34 35 78 79 80 81 82 83
node 5 size: 258044 MB
node 5 free: 257878 MB

node 6 cpus: 36 37 38 39 40 41 84 85 86 87 88 89
node 6 size: 258044 MB
node 6 free: 257855 MB

node 7 cpus: 42 43 44 45 46 47 90 91 92 93 94 95
node 7 size: 258041 MB
node 7 free: 257844 MB

node distances:

(Continued on next page)
Platform Notes (Continued)

From /proc/meminfo
MemTotal: 2101271028 kB
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: 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, IBFB: conditional, IBRS_FW, STIBP: always-on, RSB filling
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 29 05:00

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p3 xfs 1.5T 12G 1.5T 1% /

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

SPECspeed®2017_fp_base = 196
SPECspeed®2017_fp_peak = 203

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
Vendor: Cisco Systems Inc
Product: UCSC-C225-M6N
Serial: WZP25230TMY

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: C225M6.4.2.0.271.0716210621
BIOS Date: 07/16/2021
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-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: 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

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

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

SPEC speed®2017_fp_base = 196
SPEC speed®2017_fp_peak = 203

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

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

Compiler Version Notes (Continued)

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-unknown-linux-gnu
Thread model: posix

--------------------------------------------------------------------------------
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

Base Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

SPECspeed®2017_fp_base = 196
SPECspeed®2017_fp_peak = 203

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

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

Base Compiler Invocation (Continued)
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
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
-fvccib=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 -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 -fvccib=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

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

SPECspeed®2017_fp_base = 196
SPECspeed®2017_fp_peak = 203

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

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-ffopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -W1,-mlllvm -W1,-enable-X86-prefetching
-W1,-mlllvm -W1,-enable-llicm-vrp -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
-fveclib=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-liicm-vrp -mlllvm -reduce-array-computations=3 -Hz,1,0x1
-ML recursive -mlllvm -fuse-tile-inner-loop -funroll-loops
-mlllvm -extra-vectorizer-passes -mlllvm -lsr-in-nested-loop -z muldefs
-DSPEC_OPENMP -fopenmp -ffopenmp=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
-fveclib=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-liicm-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
-ffopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Base Other Flags

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

(Continued on next page)
Cisco Systems
Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor)

SPECspeed®2017_fp_base = 196
SPECspeed®2017_fp_peak = 203

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

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

Base 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

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.ibm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: -m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000

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

644.nab_s (continued):
-`-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 -lamdlibm -ljemalloc -lflang`

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`
-`-ljemalloc -lflang`

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`
627.cam4_s: `basepeak = yes`
628.pop2_s: `basepeak = yes`

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 -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`
-`-finline-aggressive -mllvm -unroll-threshold=100 -mllvm -reroll-loops`
-`-mllvm -aggressive-loop-unswitch -Mrecursive -DSPEC_OPENMP -fopenmp`
-`-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang`
Cisco Systems (Cisco UCS C225 M6 (AMD EPYC 7413 64-Core Processor))

SPECspeed®2017_fp_base = 196
SPECspeed®2017_fp_peak = 203

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

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:

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.8 on 2021-05-02 22:39:59-0400.
Report generated on 2021-09-29 12:21:01 by CPU2017 PDF formatter v6442.
Originally published on 2021-09-28.