



SPEC CPU®2017 Floating Point Speed Result

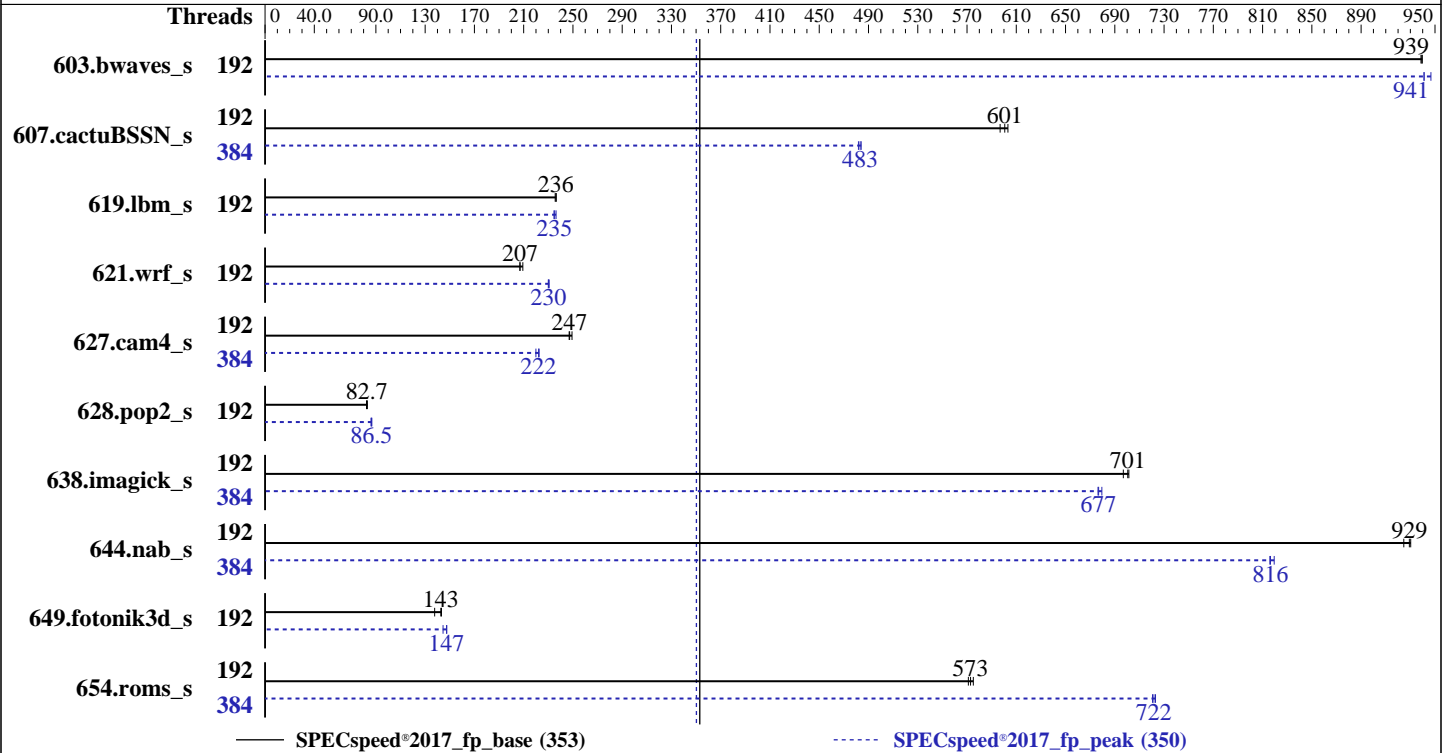
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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
(Tyrone Camarero SDA200A2N-212)
(2.4 GHz, AMD EPYC 9654)

SPECspeed®2017_fp_base = 353
SPECspeed®2017_fp_peak = 350

CPU2017 License: 6042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Sep-2023



Hardware

CPU Name: AMD EPYC 9654
Max MHz: 3700
Nominal: 2400
Enabled: 192 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB NVMe
Other: None

Software

OS: Ubuntu 20.04.4 LTS
kernel version 5.15.0-83-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.4 released Apr-2023
File System: ext4
System State: Run level 5 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage.



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Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio		
603.bwaves_s	192	62.9	939	62.8	940	62.8	939	192	62.3	947	62.7	941	62.7	941
607.cactuBSSN_s	192	27.9	597	27.8	601	27.6	603	384	34.6	482	34.5	483	34.4	484
619.lbm_s	192	22.2	236	22.2	236	22.2	236	192	22.3	235	22.3	235	22.2	236
621.wrf_s	192	63.2	209	63.9	207	63.9	207	192	57.5	230	57.3	231	57.5	230
627.cam4_s	192	35.6	249	35.9	247	35.8	247	384	39.9	222	40.3	220	39.8	223
628.pop2_s	192	144	82.7	144	82.4	143	83.1	192	138	86.0	137	86.7	137	86.5
638.imagick_s	192	20.6	701	20.7	697	20.6	701	384	21.3	677	21.2	679	21.3	676
644.nab_s	192	18.8	929	18.9	925	18.8	930	384	21.3	819	21.4	816	21.4	816
649.fotonik3d_s	192	63.9	143	66.2	138	63.6	143	192	61.8	148	63.1	145	61.8	147
654.roms_s	192	27.6	571	27.4	575	27.5	573	384	21.8	722	21.8	723	21.8	721

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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>

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) only on request for base runs,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To enable THP for all allocations for peak runs,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.



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Environment Variables Notes

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

```
GOMP_CPU_AFFINITY = "0-383"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc400_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "384"
```

Environment variables set by runcpu during the 603.bwaves_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:

```
GOMP_CPU_AFFINITY = "0-383"
```

Environment variables set by runcpu during the 619.lbm_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 621.wrf_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

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

```
GOMP_CPU_AFFINITY = "0-383"
```

Environment variables set by runcpu during the 628.pop2_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 638.imagick_s peak run:

```
GOMP_CPU_AFFINITY = "0-383"
```

Environment variables set by runcpu during the 644.nab_s peak run:

```
GOMP_CPU_AFFINITY = "0-383"
```

Environment variables set by runcpu during the 649.fotonik3d_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
PGHPF_ZMEM = "yes"
```

Environment variables set by runcpu during the 654.roms_s peak run:

```
GOMP_CPU_AFFINITY = "0 192 1 193 2 194 3 195 4 196 5 197 6 198 7 199 8 200 9 201 10 202 11 203 12 204 13
205 14 206 15 207 16 208 17 209 18 210 19 211 20 212 21 213 22 214 23 215 24 216 25 217 26 218 27 219
28 220 29 221 30 222 31 223 32 224 33 225 34 226 35 227 36 228 37 229 38 230 39 231 40 232 41 233 42
234 43 235 44 236 45 237 46 238 47 239 48 240 49 241 50 242 51 243 52 244 53 245 54 246 55 247 56 248
57 249 58 250 59 251 60 252 61 253 62 254 63 255 64 256 65 257 66 258 67 259 68 260 69 261 70 262 71
263 72 264 73 265 74 266 75 267 76 268 77 269 78 270 79 271 80 272 81 273 82 274 83 275 84 276 85 277
86 278 87 279 88 280 89 281 90 282 91 283 92 284 93 285 94 286 95 287 96 288 97 289 98 290 99 291 100
292 101 293 102 294 103 295 104 296 105 297 106 298 107 299 108 300 109 301 110 302 111 303 112 304
113 305 114 306 115 307 116 308 117 309 118 310 119 311 120 312 121 313 122 314 123 315 124 316 125
317 126 318 127 319 128 320 129 321 130 322 131 323 132 324 133 325 134 326 135 327 136 328 137 329
138 330 139 331 140 332 141 333 142 334 143 335 144 336 145 337 146 338 147 339 148 340 149 341 150
342 151 343 152 344 153 345 154 346 155 347 156 348 157 349 158 350 159 351 160 352 161 353 162 354
163 355 164 356 165 357 166 358 167 359 168 360 169 361 170 362 171 363 172 364 173 365 174 366 175
367 176 368 177 369 178 370 179 371 180 372 181 373 182 374 183 375 184 376 185 377 186 378 187 379
188 380 189 381 190 382 191 383"
```



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General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

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.

Platform Notes

BIOS Settings:
 cTDP: 360
 Determinism Slider set to Power
 Package Power: 360
 EDC: 400
 ACPI SRAT L3 Cache as NUMA Domain: enabled
 Memory interleaving: Disabled
 4-link xGMI max speed: 16Gbps
 Fan Speed: Maximum

Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on amd2-Super-Server Mon Sep 25 14:42:48 2023

SUT (System Under Test) info as seen by some common utilities.

Table of contents

1. uname -a
 2. w
 3. Username
 4. ulimit -a
 5. sysinfo process ancestry
 6. /proc/cpuinfo
 7. lscpu
 8. numactl --hardware
 9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 245 (245.4-4ubuntu3.20)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
-
1. uname -a
 Linux amd2-Super-Server 5.15.0-83-generic #92~20.04.1-Ubuntu SMP Mon Aug 21 14:00:49 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux

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Platform Notes (Continued)

2. w
14:42:48 up 6 days, 3:28, 1 user, load average: 6.35, 7.29, 4.35
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
amd2 tty2 - 19Sep23 3:23m 2.12s 0.03s -bash

3. Username
From environment variable \$USER: root
From the command 'logname': amd2

4. ulimit -a
time(seconds) unlimited
file(blocks) unlimited
data(kbytes) unlimited
stack(kbytes) unlimited
coredump(blocks) 0
memory(kbytes) unlimited
locked memory(kbytes) 2097152
process 4126356
nofiles 1024
vmemory(kbytes) unlimited
locks unlimited
rtprio 0

5. sysinfo process ancestry
/sbin/init splash
/bin/login -p --
-bash
sudo su
su
bash
python3 ./run_amd_speed_aocc400_znver4_A1.py
/bin/bash ./amd_speed_aocc400_znver4_A1.sh
runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fpspeed
runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
\$SPEC/tmp/CPU2017.002/templogs/preenv.fpspeed.002.0.log --lognum 002.0 --from_runcpu 2
specperl \$SPEC/bin/sysinfo
\$SPEC = /home/cpu2017

6. /proc/cpuinfo
model name : AMD EPYC 9654 96-Core Processor
vendor_id : AuthenticAMD
cpu family : 25
model : 17
stepping : 1
microcode : 0xa10113e
bugs : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size : 3584 4K pages
cpu cores : 96
siblings : 192
2 physical ids (chips)
384 processors (hardware threads)
physical id 0: core ids 0-95
physical id 1: core ids 0-95

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Platform Notes (Continued)

physical id 0: apicids 0-191
physical id 1: apicids 256-447

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

7. lscpu

From lscpu from util-linux 2.34:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
Address sizes:         52 bits physical, 57 bits virtual
CPU(s):                384
On-line CPU(s) list:   0-383
Thread(s) per core:    2
Core(s) per socket:    96
Socket(s):             2
NUMA node(s):         2
Vendor ID:             AuthenticAMD
CPU family:            25
Model:                 17
Model name:            AMD EPYC 9654 96-Core Processor
Stepping:              1
Frequency boost:       enabled
CPU MHz:               1500.000
CPU max MHz:           3707.8120
CPU min MHz:           1500.0000
BogoMIPS:              4799.75
Virtualization:       AMD-V
L1d cache:            6 MiB
L1i cache:            6 MiB
L2 cache:              192 MiB
L3 cache:              768 MiB
NUMA node0 CPU(s):    0-95,192-287
NUMA node1 CPU(s):    96-191,288-383
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit:      Not affected
Vulnerability L1tf:               Not affected
Vulnerability Mds:                Not affected
Vulnerability Meltdown:           Not affected
Vulnerability Mmio stale data:    Not affected
Vulnerability Retbleed:           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; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                                  filling, PBRSE-eIBRS Not affected
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 pdpe1gb rdtscp
                                  lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf
                                  rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
                                  movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic
                                  cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce
                                  topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3
                                  cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall
                                  fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
                                  rdseed adx smap avx512ifma clflushopt clwb avx512cd sha_ni avx512bw
                                  avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc

```

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Platform Notes (Continued)

cqm_mbm_total cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru
wbnoinvd amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale
vmcb_clean flushbyasid decodeassists pausefilter pftreshold avic
v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke avx512_vbmi2
gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq la57
rdpid overflow_recov succor smca fsrm flush_l1d

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL
L1d	32K	6M	8	Data	1
L1i	32K	6M	8	Instruction	1
L2	1M	192M	8	Unified	2
L3	32M	768M	16	Unified	3

8. numactl --hardware

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

```
available: 2 nodes (0-1)
node 0 cpus: 0-95,192-287
node 0 size: 515747 MB
node 0 free: 511806 MB
node 1 cpus: 96-191,288-383
node 1 size: 515916 MB
node 1 free: 512352 MB
node distances:
node  0  1
  0:  10  32
  1:  32  10
```

9. /proc/meminfo

MemTotal: 1056424336 kB

10. who -r

run-level 5 Sep 19 11:14

11. Systemd service manager version: systemd 245 (245.4-4ubuntu3.20)

Default Target	Status
graphical	degraded

12. Failed units, from systemctl list-units --state=failed

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
* fwupd-refresh.service	loaded	failed	failed	Refresh fwupd metadata and update motd

13. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon anacron apparmor autovt@ avahi-daemon bluetooth console-setup cron cups cups-browsed dmesg e2scrub_reap getty@ gpu-manager grub-common grub-initrd-fallback irqbalance kerneloops keyboard-setup network-manager networkd-dispatcher ondemand openvpn pppd-dns rsync rsyslog secureboot-db setvtrgb snapd ssh sshd switcheroo-control syslog systemd-pstore systemd-resolved systemd-timesyncd thermald ua-reboot-cmds udisks2 ufw unattended-upgrades whoopsie wpa_supplicant
enabled-runtime	netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
disabled	acpid brltty console-getty debug-shell openvpn-client@ openvpn-server@ openvpn@ rtkit-daemon serial-getty@ speech-dispatcher speech-dispatcherd

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Platform Notes (Continued)

```
systemd-boot-check-no-failures systemd-network-generator systemd-networkd
systemd-networkd-wait-online systemd-time-wait-sync upower wpa_supplicant-nl80211@
wpa_supplicant-wired@ wpa_supplicant@
```

generated

indirect

masked

apport

display-manager lightdm saned@ spice-vdagent spice-vdagentd uidd

alsa-utils cryptdisks cryptdisks-early hwclock pulseaudio-enable-autospawn rc rcS saned

sudo x11-common

14. Linux kernel boot-time arguments, from /proc/cmdline

```
BOOT_IMAGE=/boot/vmlinuz-5.15.0-83-generic
root=UUID=1ae71a13-cac0-48f6-b6e6-e15e5e687f57
ro
quiet
splash
vt.handoff=7
```

15. sysctl

```
kernel.numa_balancing 1
kernel.randomize_va_space 0
vm.compaction_proactiveness 20
vm.dirty_background_bytes 0
vm.dirty_background_ratio 10
vm.dirty_bytes 0
vm.dirty_expire_centisecs 3000
vm.dirty_ratio 8
vm.dirty_writeback_centisecs 500
vm.dirtytime_expire_seconds 43200
vm.extfrag_threshold 500
vm.min_unmapped_ratio 1
vm.nr_hugepages 0
vm.nr_hugepages_mempolicy 0
vm.nr_overcommit_hugepages 0
vm.swappiness 1
vm.watermark_boost_factor 15000
vm.watermark_scale_factor 10
vm.zone_reclaim_mode 1
```

16. /sys/kernel/mm/transparent_hugepage

```
defrag [always] defer defer+madvise madvise never
enabled [always] madvise never
hpage_pmd_size 2097152
shmem_enabled always within_size advise [never] deny force
```

17. /sys/kernel/mm/transparent_hugepage/khugepaged

```
alloc_sleep_millisecs 60000
defrag 1
max_ptes_none 511
max_ptes_shared 256
max_ptes_swap 64
pages_to_scan 4096
scan_sleep_millisecs 10000
```

18. OS release

```
From /etc/*-release /etc/*-version
os-release Ubuntu 20.04.4 LTS
```

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Platform Notes (Continued)

19. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p2 ext4 938G 19G 872G 3% /

20. /sys/devices/virtual/dmi/id
Vendor: Tyrone Systems
Product: Tyrone Camarero SDA200A2N-212
Product Family: SMC H13
Serial: A509935X3311011

21. dmidecode
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.

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 1.4
BIOS Date: 04/19/2023
BIOS Revision: 5.27

Compiler Version Notes

=====
C | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

=====
C++, C, Fortran | 607.cactuBSSN_s(base, peak)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

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SPEC CPU®2017 Floating Point Speed Result

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Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-212)

(2.4 GHz, AMD EPYC 9654)

SPECspeed®2017_fp_base = 353

SPECspeed®2017_fp_peak = 350

CPU2017 License: 6042

Test Sponsor: Netweb Pte Ltd

Tested by: Tyrone Systems

Test Date: Sep-2023

Hardware Availability: Jun-2023

Software Availability: Sep-2023

Compiler Version Notes (Continued)

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

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

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

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

Base Compiler Invocation

C benchmarks:

clang

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

Base Portability Flags

603.bwaves_s: -DSPEC_LP64

607.cactuBSSN_s: -DSPEC_LP64

619.lbm_s: -DSPEC_LP64

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



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Test Sponsor: Netweb Pte Ltd
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Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Sep-2023

Base Optimization Flags

C benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

Benchmarks using both Fortran and C:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Benchmarks using Fortran, C, and C++:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```



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SPECspeed®2017_fp_base = 353
 SPECspeed®2017_fp_peak = 350

CPU2017 License: 6042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Sep-2023

Base Other Flags

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

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

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

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

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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
```

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Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Sep-2023

Peak Optimization Flags (Continued)

619.lbm_s (continued):

```
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt  
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

638.imagick_s: Same as 619.lbm_s

```
644.nab_s: -m64 -Wl,-mllvm -Wl,-region-vectorize -Ofast  
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp  
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt  
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Fortran benchmarks:

```
603.bwaves_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP  
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math  
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3  
-fvector-transform -fscalar-transform -fopenmp=libomp  
-lomp -lamdlibm -lamdalloc -lflang
```

```
649.fotonik3d_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP  
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math  
-fopenmp -flto -Mrecursive  
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp  
-lomp -lamdlibm -lamdalloc -lflang
```

654.roms_s: Same as 603.bwaves_s

Benchmarks using both Fortran and C:

```
621.wrf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast  
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp  
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt  
-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop  
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

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CPU2017 License: 6042
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Test Date: Sep-2023
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Software Availability: Sep-2023

Peak Optimization Flags (Continued)

```
627.cam4_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

```
628.pop2_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=9
-mllvm -unroll-threshold=50 -freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -finline-aggressive -mllvm -unroll-threshold=100
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Peak Other Flags

C benchmarks:

```
-Wno-return-type -Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```

Benchmarks using both Fortran and C:

```
-Wno-return-type -Wno-unused-command-line-argument
```

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SPECspeed®2017_fp_base = 353

SPECspeed®2017_fp_peak = 350

CPU2017 License: 6042

Test Sponsor: Netweb Pte Ltd

Tested by: Tyrone Systems

Test Date: Sep-2023

Hardware Availability: Jun-2023

Software Availability: Sep-2023

Peak Other Flags (Continued)

Benchmarks using Fortran, C, and C++:

-Wno-return-type -Wno-unused-command-line-argument

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/aocc400-flags.html>

<http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-Genoa-revC.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/aocc400-flags.xml>

<http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-Genoa-revC.xml>

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Tested with SPEC CPU®2017 v1.1.9 on 2023-09-25 05:12:47-0400.

Report generated on 2023-11-07 18:40:23 by CPU2017 PDF formatter v6716.

Originally published on 2023-11-07.