SPEC CPU®2017 Floating Point Rate Result

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Supermicro

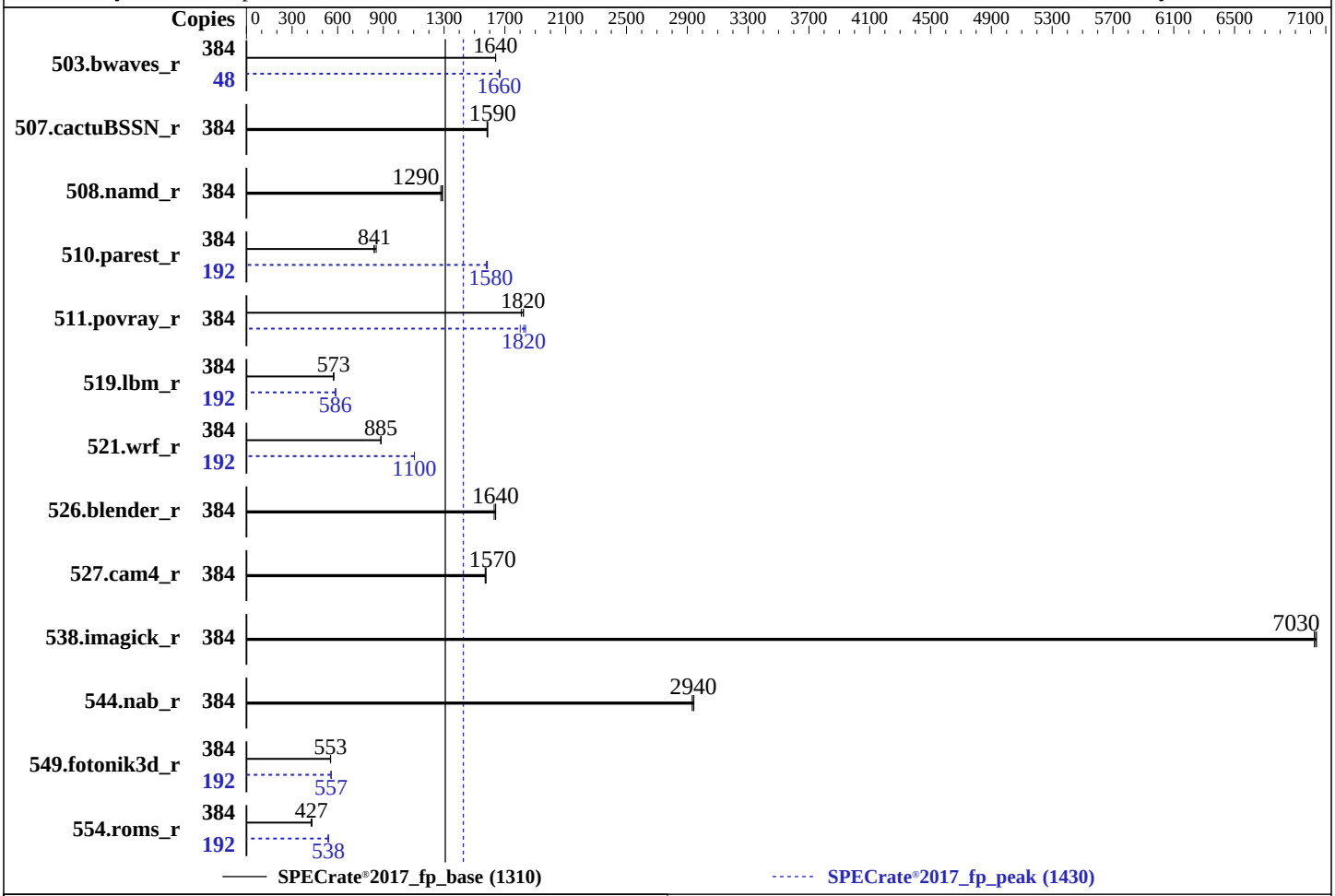
A+ Server 2025HS-TNR
(H13DSH , AMD EPYC 9654)

SPECrate®2017_fp_base = 1310

SPECrate®2017_fp_peak = 1430

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Oct-2022
Hardware Availability: Nov-2022
Software Availability: Nov-2022



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:	3 TB (24 x 128 GB 2Rx4 PC5-4800B-R)
Storage:	1.5 TB on tmpfs
Other:	None

Software

OS:	Ubuntu 22.04.1 LTS Kernel 5.15.0-52-generic
Compiler:	C/C++/Fortran: Version 4.0.0 of AOCC
Parallel:	No
Firmware:	Version 0.10 released Oct-2022
File System:	tmpfs
System State:	Run level 5 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other:	None
Power Management:	BIOS and OS set to prefer performance at the cost of additional power usage.

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	384	2350	1640	2349	1640	**2349**	**1640**	48	**289**	**1660**	289	1670	290	1660
507.cactuBSSN_r	384	**307**	**1590**	306	1590	307	1580	384	**307**	**1590**	306	1590	307	1580
508.namd_r	384	283	1290	285	1280	**283**	**1290**	384	283	1290	285	1280	**283**	**1290**
510.parest_r	384	**1194**	**841**	1177	854	1196	840	192	318	1580	**318**	**1580**	317	1580
511.povray_r	384	**492**	**1820**	496	1810	492	1820	384	488	1840	**491**	**1820**	498	1800
519.lbm_r	384	706	573	705	574	**706**	**573**	192	345	586	**345**	**586**	346	585
521.wrf_r	384	**972**	**885**	973	884	971	886	192	389	1110	389	1100	**389**	**1100**
526.blender_r	384	359	1630	**357**	**1640**	357	1640	384	359	1630	**357**	**1640**	357	1640
527.cam4_r	384	426	1580	**427**	**1570**	428	1570	384	426	1580	**427**	**1570**	428	1570
538.imagick_r	384	136	7040	**136**	**7030**	136	7020	384	136	7040	**136**	**7030**	136	7020
544.nab_r	384	**220**	**2940**	220	2930	220	2940	384	**220**	**2940**	220	2930	220	2940
549.fotonik3d_r	384	**2706**	**553**	2709	552	2702	554	192	1343	557	**1343**	**557**	1344	557
554.roms_r	384	1432	426	1416	431	**1428**	**427**	192	568	537	565	540	**567**	**538**

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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.
```

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Operating System Notes (Continued)

```
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,
'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:
LD_LIBRARY_PATH =
     "/dev/shm/amd_rate_aocc400_genoa_B_lib/lib:/dev/shm/amd_rate_aocc400_gen
     oa_B_lib/lib32:"
MALLOC_CONF = "retain:true"
```

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:
Determinism Control = Manual
Determinism Enable = Disable Performance Determinism
cTDP Control = Manual
cTDP = 400
Package Power Limit Control = Manual
Package Power Limit = 400
ACPI SRAT L3 cache As NUMA Domain = Enabled

 Sysinfo program /dev/shm/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on sysv Mon Oct 24 00:25:25 2022
```

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Platform Notes (Continued)

```
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 9654 96-Core Processor
      2  "physical id"s (chips)
      384 "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 : 96
      siblings  : 192
      physical 0: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
      26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
      54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81
      82 83 84 85 86 87 88 89 90 91 92 93 94 95
      physical 1: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
      26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
      54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81
      82 83 84 85 86 87 88 89 90 91 92 93 94 95

From lscpu from util-linux 2.37.2:
     Architecture:                    x86_64
     CPU op-mode(s):                  32-bit, 64-bit
     Address sizes:                   52 bits physical, 57 bits virtual
     Byte Order:                      Little Endian
     CPU(s):                          384
     On-line CPU(s) list:             0-383
     Vendor ID:                       AuthenticAMD
     Model name:                      AMD EPYC 9654 96-Core Processor
     CPU family:                      25
     Model:                           17
     Thread(s) per core:              2
     Core(s) per socket:              96
     Socket(s):                       2
     Stepping:                        1
     Frequency boost:                 enabled
     CPU max MHz:                     3709.0000
     CPU min MHz:                     400.0000
     BogoMIPS:                        4799.88
     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
```

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Platform Notes (Continued)

```
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 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 pfthreshold 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
Virtualization:                  AMD-V
L1d cache:                       6 MiB (192 instances)
L1i cache:                       6 MiB (192 instances)
L2 cache:                        192 MiB (192 instances)
L3 cache:                        768 MiB (24 instances)
NUMA node(s):                    24
NUMA node0 CPU(s):               0-7,192-199
NUMA node1 CPU(s):               8-15,200-207
NUMA node2 CPU(s):               16-23,208-215
NUMA node3 CPU(s):               24-31,216-223
NUMA node4 CPU(s):               32-39,224-231
NUMA node5 CPU(s):               40-47,232-239
NUMA node6 CPU(s):               48-55,240-247
NUMA node7 CPU(s):               56-63,248-255
NUMA node8 CPU(s):               64-71,256-263
NUMA node9 CPU(s):               72-79,264-271
NUMA node10 CPU(s):              80-87,272-279
NUMA node11 CPU(s):              88-95,280-287
NUMA node12 CPU(s):              96-103,288-295
NUMA node13 CPU(s):              104-111,296-303
NUMA node14 CPU(s):              112-119,304-311
NUMA node15 CPU(s):              120-127,312-319
NUMA node16 CPU(s):              128-135,320-327
NUMA node17 CPU(s):              136-143,328-335
NUMA node18 CPU(s):              144-151,336-343
NUMA node19 CPU(s):              152-159,344-351
NUMA node20 CPU(s):              160-167,352-359
NUMA node21 CPU(s):              168-175,360-367
NUMA node22 CPU(s):              176-183,368-375
NUMA node23 CPU(s):              184-191,376-383
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
```

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Platform Notes (Continued)

```
      pointer sanitization
     Vulnerability Spectre v2:        Mitigation; Retpolines, IBPB conditional, IBRS_FW,
     STIBP always-on, RSB filling, PBRSB-eIBRS Not affected
     Vulnerability Srbds:             Not affected
     Vulnerability Tsx async abort:   Not affected

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       32K       6M    8 Data            1    64        1             64
     L1i       32K       6M    8 Instruction     1    64        1             64
     L2         1M     192M    8 Unified         2  2048        1             64
     L3        32M     768M   16 Unified         3 32768        1             64

/proc/cpuinfo cache data
   cache size : 1024 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 24 nodes (0-23)
  node 0 cpus: 0 1 2 3 4 5 6 7 192 193 194 195 196 197 198 199
  node 0 size: 128752 MB
  node 0 free: 127645 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 200 201 202 203 204 205 206 207
  node 1 size: 129018 MB
  node 1 free: 128034 MB
  node 2 cpus: 16 17 18 19 20 21 22 23 208 209 210 211 212 213 214 215
  node 2 size: 129018 MB
  node 2 free: 128071 MB
  node 3 cpus: 24 25 26 27 28 29 30 31 216 217 218 219 220 221 222 223
  node 3 size: 128983 MB
  node 3 free: 128056 MB
  node 4 cpus: 32 33 34 35 36 37 38 39 224 225 226 227 228 229 230 231
  node 4 size: 129018 MB
  node 4 free: 128082 MB
  node 5 cpus: 40 41 42 43 44 45 46 47 232 233 234 235 236 237 238 239
  node 5 size: 129018 MB
  node 5 free: 128072 MB
  node 6 cpus: 48 49 50 51 52 53 54 55 240 241 242 243 244 245 246 247
  node 6 size: 129018 MB
  node 6 free: 128064 MB
  node 7 cpus: 56 57 58 59 60 61 62 63 248 249 250 251 252 253 254 255
  node 7 size: 129018 MB
  node 7 free: 128075 MB
  node 8 cpus: 64 65 66 67 68 69 70 71 256 257 258 259 260 261 262 263
  node 8 size: 129018 MB
  node 8 free: 128016 MB
  node 9 cpus: 72 73 74 75 76 77 78 79 264 265 266 267 268 269 270 271
```

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Platform Notes (Continued)

```
node 9 size: 129018 MB
node 9 free: 123202 MB
node 10 cpus: 80 81 82 83 84 85 86 87 272 273 274 275 276 277 278 279
node 10 size: 129018 MB
node 10 free: 128061 MB
node 11 cpus: 88 89 90 91 92 93 94 95 280 281 282 283 284 285 286 287
node 11 size: 129018 MB
node 11 free: 128116 MB
node 12 cpus: 96 97 98 99 100 101 102 103 288 289 290 291 292 293 294 295
node 12 size: 129018 MB
node 12 free: 127943 MB
node 13 cpus: 104 105 106 107 108 109 110 111 296 297 298 299 300 301 302 303
node 13 size: 129018 MB
node 13 free: 128113 MB
node 14 cpus: 112 113 114 115 116 117 118 119 304 305 306 307 308 309 310 311
node 14 size: 129018 MB
node 14 free: 128097 MB
node 15 cpus: 120 121 122 123 124 125 126 127 312 313 314 315 316 317 318 319
node 15 size: 129018 MB
node 15 free: 128102 MB
node 16 cpus: 128 129 130 131 132 133 134 135 320 321 322 323 324 325 326 327
node 16 size: 129018 MB
node 16 free: 128096 MB
node 17 cpus: 136 137 138 139 140 141 142 143 328 329 330 331 332 333 334 335
node 17 size: 129018 MB
node 17 free: 128104 MB
node 18 cpus: 144 145 146 147 148 149 150 151 336 337 338 339 340 341 342 343
node 18 size: 129018 MB
node 18 free: 127724 MB
node 19 cpus: 152 153 154 155 156 157 158 159 344 345 346 347 348 349 350 351
node 19 size: 129018 MB
node 19 free: 128084 MB
node 20 cpus: 160 161 162 163 164 165 166 167 352 353 354 355 356 357 358 359
node 20 size: 128951 MB
node 20 free: 128031 MB
node 21 cpus: 168 169 170 171 172 173 174 175 360 361 362 363 364 365 366 367
node 21 size: 129018 MB
node 21 free: 128076 MB
node 22 cpus: 176 177 178 179 180 181 182 183 368 369 370 371 372 373 374 375
node 22 size: 129018 MB
node 22 free: 128101 MB
node 23 cpus: 184 185 186 187 188 189 190 191 376 377 378 379 380 381 382 383
node 23 size: 129018 MB
node 23 free: 128098 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19
20  21  22  23
```

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Platform Notes (Continued)

```
  0:  10  11  11  11  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  1:  11  10  11  11  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  2:  11  11  10  11  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  3:  11  11  11  10  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  4:  11  11  11  11  10  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  5:  11  11  11  11  11  10  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  6:  11  11  11  11  11  11  10  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  7:  11  11  11  11  11  11  11  10  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  8:  11  11  11  11  11  11  11  11  10  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  9:  11  11  11  11  11  11  11  11  11  10  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
 10:  11  11  11  11  11  11  11  11  11  11  10  11  32  32  32  32  32  32  32  32
 32  32  32  32
 11:  11  11  11  11  11  11  11  11  11  11  11  10  32  32  32  32  32  32  32  32
 32  32  32  32
 12:  32  32  32  32  32  32  32  32  32  32  32  32  10  11  11  11  11  11  11  11
 11  11  11  11
 13:  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  11  11  11  11  11
 11  11  11  11
 14:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  11  11  11  11  11
 11  11  11  11
 15:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  10  11  11  11  11
 11  11  11  11
 16:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  10  11  11  11
 11  11  11  11
 17:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  10  11  11
 11  11  11  11
 18:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  10  11
 11  11  11  11
 19:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  10
 11  11  11  11
 20:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
 10  11  11  11
 21:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
 11  10  11  11
 22:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
 11  11  10  11
 23:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
```


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Platform Notes (Continued)

```
    11  11  11  10

 From /proc/meminfo
    MemTotal:       3170387988 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

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

 /usr/bin/lsb_release -d
    Ubuntu 22.04.1 LTS

 From /etc/*release* /etc/*version*
    debian_version: bookworm/sid
    os-release:
       PRETTY_NAME="Ubuntu 22.04.1 LTS"
       NAME="Ubuntu"
       VERSION_ID="22.04"
       VERSION="22.04.1 LTS (Jammy Jellyfish)"
       VERSION_CODENAME=jammy
       ID=ubuntu
       ID_LIKE=debian
       HOME_URL="https://www.ubuntu.com/"

 uname -a:
    Linux sysv 5.15.0-52-generic #58-Ubuntu SMP Thu Oct 13 08:03:55 UTC 2022 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
 mmio_stale_data:                                Not affected
 retbleed:                                       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: Retpolines, IBPB:
                                                 conditional, IBRS_FW, STIBP:
                                                 always-on, RSB filling,
                                                 PBRSB-eIBRS: Not affected
```

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Platform Notes (Continued)

```
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):               Not affected

 run-level 5 Oct 23 17:54

 SPEC is set to: /dev/shm
    Filesystem     Type   Size  Used Avail Use% Mounted on
    tmpfs          tmpfs  1.5T  4.8G  1.5T   1% /dev/shm

 From /sys/devices/virtual/dmi/id
     Vendor:         Supermicro
     Product:        Super Server
     Product Family: SMC H13
     Serial:         123456789

 Additional information from dmidecode 3.3 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:
     24x SK Hynix HMCT04MEERA135N 128 GB 2 rank 4800

 BIOS:
    BIOS Vendor:       American Megatrends International, LLC.
    BIOS Version:      0.10
    BIOS Date:         10/18/2022
    BIOS Revision:     5.27

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                | 544.nab_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
C++, C          | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                | 554.roms_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
```

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Compiler Version Notes (Continued)

```
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

Benchmarks using both C and C++:
`clang++ clang`

Benchmarks using Fortran, C, and C++:
`clang++ clang flang`

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -lflang

C++ benchmarks:
-m64 -flto -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 -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang

Fortran benchmarks:
-m64 -flto -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 -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang

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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang

Benchmarks using both C and C++:
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang

Benchmarks using Fortran, C, and C++:
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang

Base Other Flags

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

C++ benchmarks:
-Wno-unused-command-line-argument

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

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Base Other Flags (Continued)

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

Benchmarks using both C and C++:
`-Wno-unused-command-line-argument`

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

Peak Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

Benchmarks using both C and C++:
`clang++ clang`

Benchmarks using Fortran, C, and C++:
`clang++ clang flang`

Peak Portability Flags

`Same as Base Portability Flags`

Peak Optimization Flags

C benchmarks:

519.lbm_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6 -Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math`

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Peak Optimization Flags (Continued)

519.lbm_r (continued):
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -m64 -flto -Wl,-mllvm -Wl,-suppress-fmas
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc

Fortran benchmarks:

503.bwaves_r: -m64 -flto -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 -Mrecursive
-mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -lflang

549.fotonik3d_r: -m64 -flto -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 -Kieee
-Mrecursive -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlibm -lamdalloc -lflang

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

521.wrf_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3

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Peak Optimization Flags (Continued)

521.wrf_r (continued):
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-lflang

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm
-lamdalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

Peak Other Flags

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

C++ benchmarks:
-Wno-unused-command-line-argument

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

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

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Peak Other Flags (Continued)

Benchmarks using both C and C++:
`-Wno-unused-command-line-argument`

Benchmarks using Fortran, C, and C++:
`-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/Supermicro-Platform-Settings-V1.2-Genoa-revB.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/Supermicro-Platform-Settings-V1.2-Genoa-revB.xml`

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