SPEC CPU®2017 Integer Rate Result

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GIGA-BYTE TECHNOLOGY CO., LTD.

R283-Z90-AAD1-000
(AMD EPYC 9654, 2.4GHz)

$SPECrate®2017\_int\_base = 1690$

$SPECrate®2017\_int\_peak = 1820$
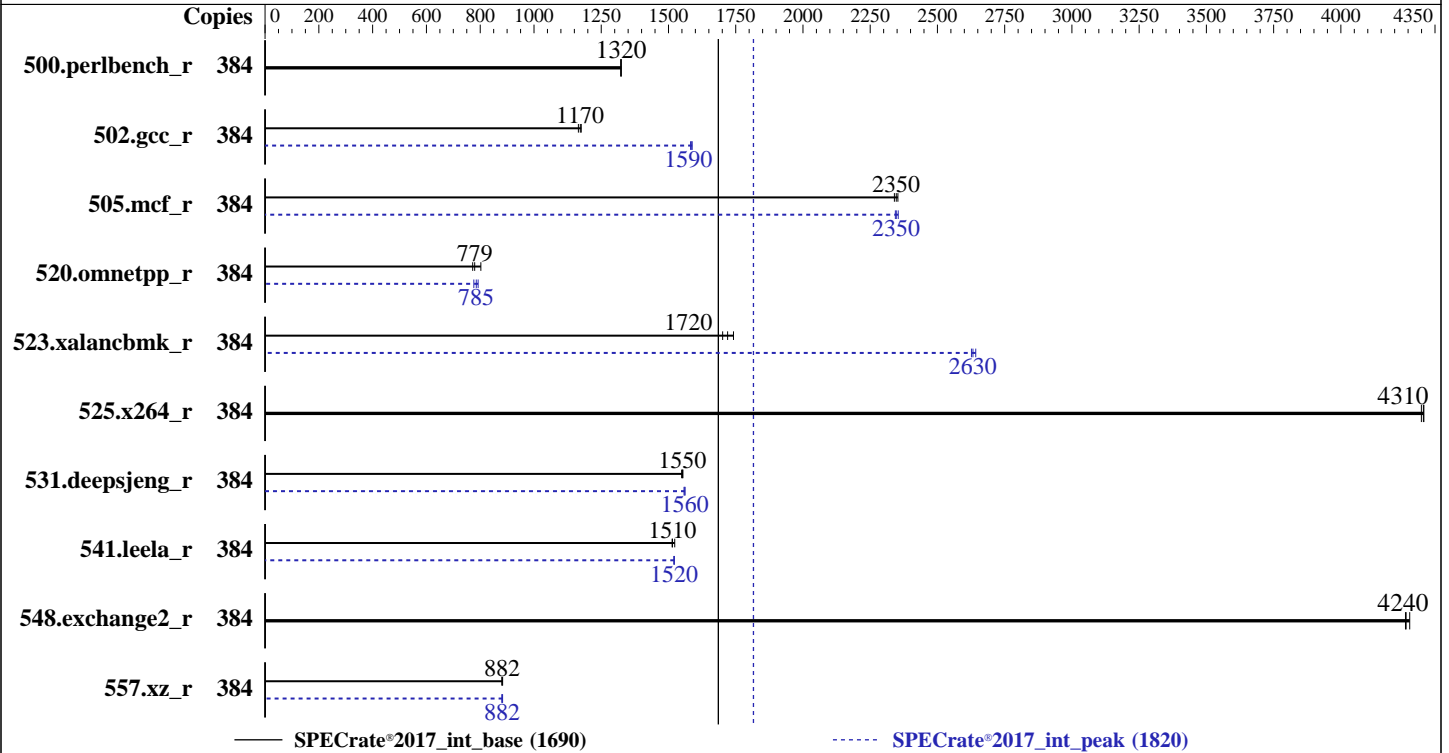
CPU2017 License: 9082
Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.
Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

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

Benchmark	Copies	Base	Peak
500.perlbench_r	384	1320	
502.gcc_r	384	1170	1590
505.mcf_r	384	2350	2350
520.omnetpp_r	384	779	785
523.xalancbmk_r	384	1720	2630
525.x264_r	384	4310	
531.deepsjeng_r	384	1550	1560
541.leela_r	384	1510	1520
548.exchange2_r	384	4240	
557.xz_r	384	882	882

—— SPECrate®2017_int_base (1690)   ----- SPECrate®2017_int_peak (1820)

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: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 3.2 TB PCIE NVME SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64) 5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Version F04 released Dec-2022
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: None
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

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GIGA-BYTE TECHNOLOGY CO., LTD.	SPECrate®2017_int_base = 1690
R283-Z90-AAD1-000 (AMD EPYC 9654, 2.4GHz)	SPECrate®2017_int_peak = 1820

CPU2017 License: 9082 **Test Date:** Dec-2022
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	384	**462**	**1320**	462	1320	462	1320	384	**462**	**1320**	462	1320	462	1320
502.gcc_r	384	463	1180	**464**	**1170**	467	1170	384	342	1590	344	1580	**343**	**1590**
505.mcf_r	384	**264**	**2350**	264	2350	265	2340	384	264	2350	265	2340	**264**	**2350**
520.omnetpp_r	384	**646**	**779**	628	802	653	772	384	**641**	**785**	636	792	649	776
523.xalancbmk_r	384	238	1700	**236**	**1720**	233	1740	384	**154**	**2630**	154	2630	153	2640
525.x264_r	384	156	4300	156	4310	**156**	**4310**	384	156	4300	156	4310	**156**	**4310**
531.deepsjeng_r	384	284	1550	283	1550	**284**	**1550**	384	282	1560	**282**	**1560**	282	1560
541.leela_r	384	**420**	**1510**	417	1520	420	1510	384	418	1520	418	1520	**418**	**1520**
548.exchange2_r	384	**237**	**4240**	237	4240	236	4260	384	**237**	**4240**	237	4240	236	4260
557.xz_r	384	469	883	471	880	**470**	**882**	384	471	881	470	883	**470**	**882**
SPECrate®2017_int_base =		**1690**												
SPECrate®2017_int_peak =		**1820**												

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.
```

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Operating System Notes (Continued)

```
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.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
      "/home/cpu2017_rB1/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017_rB1/am
      d_rate_aocc400_genoa_B_lib/lib32:"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:never"
```

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:
SEV Control = Disable
TSME = Disabled
Determinism Control = Manual
Determinism Enable = Power
TDP Control = Manual
TDP = 400
PPT Control = Manual
PPT = 400
```

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Platform Notes (Continued)

```
Sysinfo program /home/cpu2017_rB1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Tue Dec 13 17:32:40 2022

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:             3707.8120
   CPU min MHz:             1500.0000
   BogoMIPS:                4800.07
   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
```

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Platform Notes (Continued)

```
     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 cqm_mbm_total
     cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin 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 Spec store bypass: Mitigation; Speculative Store Bypass disabled via
```

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Platform Notes (Continued)

```
     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
     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: 64176 MB
     node 0 free: 61907 MB
     node 1 cpus: 8 9 10 11 12 13 14 15 200 201 202 203 204 205 206 207
     node 1 size: 64506 MB
     node 1 free: 64319 MB
     node 2 cpus: 16 17 18 19 20 21 22 23 208 209 210 211 212 213 214 215
     node 2 size: 64506 MB
     node 2 free: 64329 MB
     node 3 cpus: 24 25 26 27 28 29 30 31 216 217 218 219 220 221 222 223
     node 3 size: 64506 MB
     node 3 free: 64317 MB
     node 4 cpus: 32 33 34 35 36 37 38 39 224 225 226 227 228 229 230 231
     node 4 size: 64506 MB
     node 4 free: 64356 MB
     node 5 cpus: 40 41 42 43 44 45 46 47 232 233 234 235 236 237 238 239
     node 5 size: 64506 MB
     node 5 free: 64353 MB
     node 6 cpus: 48 49 50 51 52 53 54 55 240 241 242 243 244 245 246 247
     node 6 size: 64506 MB
     node 6 free: 64074 MB
     node 7 cpus: 56 57 58 59 60 61 62 63 248 249 250 251 252 253 254 255
     node 7 size: 64506 MB
     node 7 free: 64070 MB
     node 8 cpus: 64 65 66 67 68 69 70 71 256 257 258 259 260 261 262 263
     node 8 size: 64506 MB
```

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Platform Notes (Continued)

```
       node 8 free: 62901 MB
       node 9 cpus: 72 73 74 75 76 77 78 79 264 265 266 267 268 269 270 271
       node 9 size: 64506 MB
       node 9 free: 64388 MB
       node 10 cpus: 80 81 82 83 84 85 86 87 272 273 274 275 276 277 278 279
       node 10 size: 64506 MB
       node 10 free: 64320 MB
       node 11 cpus: 88 89 90 91 92 93 94 95 280 281 282 283 284 285 286 287
       node 11 size: 64506 MB
       node 11 free: 64306 MB
       node 12 cpus: 96 97 98 99 100 101 102 103 288 289 290 291 292 293 294 295
       node 12 size: 64506 MB
       node 12 free: 64322 MB
       node 13 cpus: 104 105 106 107 108 109 110 111 296 297 298 299 300 301 302 303
       node 13 size: 64506 MB
       node 13 free: 64372 MB
       node 14 cpus: 112 113 114 115 116 117 118 119 304 305 306 307 308 309 310 311
       node 14 size: 64472 MB
       node 14 free: 64314 MB
       node 15 cpus: 120 121 122 123 124 125 126 127 312 313 314 315 316 317 318 319
       node 15 size: 64506 MB
       node 15 free: 64357 MB
       node 16 cpus: 128 129 130 131 132 133 134 135 320 321 322 323 324 325 326 327
       node 16 size: 64506 MB
       node 16 free: 64366 MB
       node 17 cpus: 136 137 138 139 140 141 142 143 328 329 330 331 332 333 334 335
       node 17 size: 64506 MB
       node 17 free: 64370 MB
       node 18 cpus: 144 145 146 147 148 149 150 151 336 337 338 339 340 341 342 343
       node 18 size: 64506 MB
       node 18 free: 64362 MB
       node 19 cpus: 152 153 154 155 156 157 158 159 344 345 346 347 348 349 350 351
       node 19 size: 64506 MB
       node 19 free: 64355 MB
       node 20 cpus: 160 161 162 163 164 165 166 167 352 353 354 355 356 357 358 359
       node 20 size: 64506 MB
       node 20 free: 64308 MB
       node 21 cpus: 168 169 170 171 172 173 174 175 360 361 362 363 364 365 366 367
       node 21 size: 64506 MB
       node 21 free: 64349 MB
       node 22 cpus: 176 177 178 179 180 181 182 183 368 369 370 371 372 373 374 375
       node 22 size: 64506 MB
       node 22 free: 64338 MB
       node 23 cpus: 184 185 186 187 188 189 190 191 376 377 378 379 380 381 382 383
       node 23 size: 64018 MB
       node 23 free: 63837 MB
       node distances:
```

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Platform Notes (Continued)

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

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Platform Notes (Continued)

```
     12  11  10  11
   23:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12
     12  11  11  10

 From /proc/meminfo
    MemTotal:       1584439916 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

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

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 15 SP4

 From /etc/*release* /etc/*version*
    os-release:
       NAME="SLES"
       VERSION="15-SP4"
       VERSION_ID="15.4"
       PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
       ID="sles"
       ID_LIKE="suse"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:15:sp4"

 uname -a:
    Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
    UTC 2022 (49db222) 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/swapgs
                                                    barriers and __user pointer
                                                    sanitization
 CVE-2017-5715 (Spectre variant 2):                 Mitigation: Retpolines, IBPB:
                                                    conditional, IBRS_FW, STIBP:
                                                    always-on, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):           Not affected
```

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SPEC CPU®2017 Integer Rate Result

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GIGA-BYTE TECHNOLOGY CO., LTD.

R283-Z90-AAD1-000
(AMD EPYC 9654, 2.4GHz)

SPECrate®2017_int_base = 1690

SPECrate®2017_int_peak = 1820

CPU2017 License: 9082
Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.
Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

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

Platform Notes (Continued)

```
  run-level 3 Dec 13 16:55

  SPEC is set to: /home/cpu2017_rB1
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/nvme0n1p3 xfs   237G   61G  176G  26% /home

  From /sys/devices/virtual/dmi/id
     Vendor:          GIGABYTE
     Product:         R283-Z90-AAD1-000
     Product Family: Server
     Serial:          GMG6D1212A0002

  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:
      24x Micron Technology MTC40F2046S1RC48BA1 64 GB 2 rank 4800

  BIOS:
     BIOS Vendor:        GIGABYTE
     BIOS Version:       F04
     BIOS Date:          12/01/2022
     BIOS Revision:      5.27

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C        | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
         | 525.x264_r(base, peak) 557.xz_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)
```

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GIGA-BYTE TECHNOLOGY CO., LTD.

R283-Z90-AAD1-000
(AMD EPYC 9654, 2.4GHz)

SPECrate®2017_int_base = 1690

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Compiler Version Notes (Continued)

```
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------


==============================================================================
C          | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------


==============================================================================
C          | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
           | 525.x264_r(base, peak) 557.xz_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++        | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------


==============================================================================
C++        | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
           | 531.deepsjeng_r(base, peak) 541.leela_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
------------------------------------------------------------------------
```

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SPEC CPU®2017 Integer Rate Result

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

Compiler Version Notes (Continued)

```
==============================================================================
C++      | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_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
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_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
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

SPEC CPU®2017 Integer Rate Result

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R283-Z90-AAD1-000
(AMD EPYC 9654, 2.4GHz)

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

Base Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-DSPEC_LP64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_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
-z muldefs -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 -lflang
-lamdalloc
```

C++ benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -lflang
-lamdalloc-ext
```

Fortran benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc
```

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

SPEC CPU®2017 Integer Rate Result

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GIGA-BYTE TECHNOLOGY CO., LTD.

R283-Z90-AAD1-000
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SPECrate®2017_int_base = 1690

SPECrate®2017_int_peak = 1820

CPU2017 License: 9082
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Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

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

Base Other Flags

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

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

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

Peak Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

Peak Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Peak Optimization Flags

C benchmarks:

500.perlbench_r: `basepeak = yes`

(Continued on next page)

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CPU2017 License: 9082		**Test Date:**	Dec-2022
Test Sponsor:	GIGA-BYTE TECHNOLOGY CO., LTD.	**Hardware Availability:**	Nov-2022
Tested by:	GIGA-BYTE TECHNOLOGY CO., LTD.	**Software Availability:**	Dec-2022

Peak Optimization Flags (Continued)

```
502.gcc_r: -m32 -flto -z muldefs -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 -fgnu89-inline
-lamdalloc

505.mcf_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
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc

525.x264_r: basepeak = yes

557.xz_r: Same as 505.mcf_r
```

C++ benchmarks:

```
520.omnetpp_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
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext

523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext

531.deepsjeng_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
```

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Hardware Availability: Nov-2022
Software Availability: Dec-2022

Peak Optimization Flags (Continued)

531.deepsjeng_r (continued):
```
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext
```

541.leela_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
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lflang -lamdalloc-ext
```

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

Peak Other Flags

C benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

502.gcc_r: `-L/usr/lib32 -Wno-unused-command-line-argument`
```
-L/home/work/cpu2017/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32
```

C++ benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

523.xalancbmk_r: `-L/usr/lib32 -Wno-unused-command-line-argument`
```
-L/home/work/cpu2017/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32
```

Fortran benchmarks:
```
-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/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.1-Genoa.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/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.1-Genoa.xml

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