SPEC CPU®2017 Floating Point Rate Result

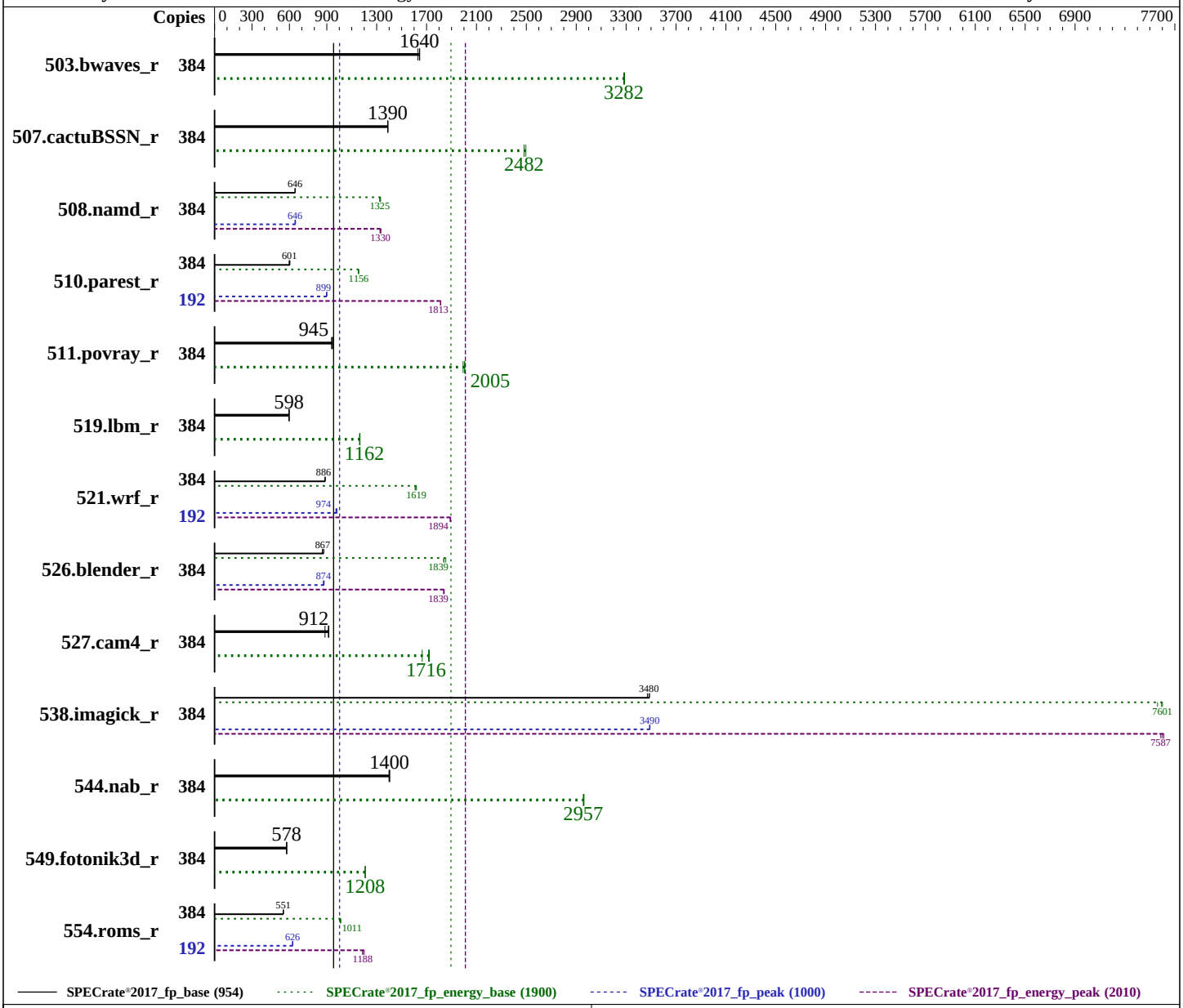
Lenovo Global Technology

ThinkSystem SR665 V3
2.40 GHz, AMD EPYC 9654

SPECrate®2017_fp_base =	954
SPECrate®2017_fp_energy_base =	1900
SPECrate®2017_fp_peak =	1000
SPECrate®2017_fp_energy_peak =	2010

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Oct-2022
Hardware Availability: Dec-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

(Continued on next page)

Software

OS: Red Hat Enterprise Linux 8.6 (Ootpa)
Kernel 4.18.0-372.9.1.el8.x86_64
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Lenovo BIOS Version KAE103A 1.10 released Sep-2022

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Lenovo Global Technology

ThinkSystem SR665 V3
2.40 GHz, AMD EPYC 9654

SPECrate®2017_fp_base =	954
SPECrate®2017_fp_energy_base =	1900
SPECrate®2017_fp_peak =	1000
SPECrate®2017_fp_energy_peak =	2010

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

Hardware (Continued)

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: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software (Continued)

File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS and OS set to balance power and performance

Power

Max. Power (W): 652.2
Idle Power (W): 136.15
Min. Temperature (C): 24.44
Elevation (m): 43
Line Standard: 220 V / 50 Hz / 1 phase / 3 wires
Provisioning: Line-powered

Power Settings

Management FW: Version 1.00 of KAX303I
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 1 x 1800 W (non-redundant)
Details: ThinkSystem 1800W Platinum Power Supply 4P57A26294
Backplane: 8 x 2.5-inch HDD back plane
Other Storage: None
Storage Model #s: 4XB7A82259
NICs Installed: 1 x ThinkSystem Ethernet 4-port Adaptor @ 1 Gb
NICs Enabled (FW/OS): 4 / 1
NICs Connected/Speed: 1 @ 1 Gb
Other HW Model #s: 6 x Standard fans

Power Analyzer

Power Analyzer: WIN:9888
Hardware Vendor: YOKOGAWA, Inc.
Model: YokogawaWT310E
Serial Number: C3UG05014E
Input Connection: Default
Metrology Institute: CNAS
Calibration By: GRG METROLOGY & TEST (BEIJING) CO., LTD.
Calibration Label: J202210116758A-0005
Calibration Date: 19-Oct-2022
PTDaemon® Version: 1.9.2 (3976349f; 2020-12-08)
Setup Description: Connected to PSU1
Current Ranges Used: 5A
Voltage Range Used: 300V

Temperature Meter

Temperature Meter: WIN:9889
Hardware Vendor: Digi International, Inc.
Model: DigiWATCHPORT_H
Serial Number: W62330940
Input Connection: USB
PTDaemon Version: 1.9.2 (3976349f; 2020-12-08)
Setup Description: 50 mm in front of SUT main intake

Base Results Table

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Base Results Table (Continued)

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
503.bwaves_r	384	2341	1650	1280	3290	545	558	**2344**	**1640**	**1280**	**3280**	**546**	**558**	2361	1630	1280	3280	541	559
507.cactuBSSN_r	384	350	1390	215	2480	615	622	**350**	**1390**	**215**	**2480**	**615**	**623**	350	1390	214	2500	612	619
508.namd_r	384	565	645	300	1320	531	550	**565**	**646**	**300**	**1330**	**531**	**549**	564	647	299	1330	529	545
510.parest_r	384	1680	598	946	1150	563	616	**1672**	**601**	**945**	**1160**	**565**	**617**	1662	605	948	1150	570	618
511.povray_r	384	948	946	485	2010	512	517	**949**	**945**	**485**	**2010**	**511**	**518**	956	938	488	1990	511	519
519.lbm_r	384	678	597	394	1170	581	592	**677**	**598**	**396**	**1160**	**584**	**594**	677	598	395	1170	583	593
521.wrf_r	384	969	888	582	1610	601	631	972	885	584	1610	601	631	**970**	**886**	**580**	**1620**	**598**	**634**
526.blender_r	384	668	876	342	1850	512	573	**675**	**867**	**344**	**1840**	**510**	**569**	676	865	345	1840	510	575
527.cam4_r	384	733	917	425	1720	580	643	**736**	**912**	**426**	**1720**	**579**	**643**	758	886	439	1660	579	639
538.imagick_r	384	**274**	**3480**	**136**	**7600**	**496**	**585**	275	3470	137	7560	497	581	274	3490	136	7590	497	581
544.nab_r	384	**461**	**1400**	**237**	**2960**	**514**	**548**	460	1400	237	2960	514	549	462	1400	236	2960	512	546
549.fotonik3d_r	384	2593	577	1380	1210	532	542	2586	579	1380	1210	534	542	**2589**	**578**	**1380**	**1210**	**533**	**541**
554.roms_r	384	1104	553	666	1010	603	618	**1108**	**551**	**666**	**1010**	**601**	**620**	1110	550	667	1010	602	621

SPECrate®2017_fp_base = 954

SPECrate®2017_fp_energy_base = 1900

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

Peak Results Table

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
503.bwaves_r	384	2341	1650	1280	3290	545	558	**2344**	**1640**	**1280**	**3280**	**546**	**558**	2361	1630	1280	3280	541	559
507.cactuBSSN_r	384	350	1390	215	2480	615	622	**350**	**1390**	**215**	**2480**	**615**	**623**	350	1390	214	2500	612	619
508.namd_r	384	565	645	300	1330	530	548	**565**	**646**	**299**	**1330**	**529**	**548**	562	649	298	1330	531	547
510.parest_r	192	559	898	301	1810	538	607	558	900	302	1810	541	608	**559**	**899**	**301**	**1810**	**540**	**608**
511.povray_r	384	948	946	485	2010	512	517	**949**	**945**	**485**	**2010**	**511**	**518**	956	938	488	1990	511	519
519.lbm_r	384	678	597	394	1170	581	592	**677**	**598**	**396**	**1160**	**584**	**594**	677	598	395	1170	583	593
521.wrf_r	192	438	983	249	1890	568	579	**441**	**974**	**248**	**1890**	**562**	**575**	442	974	248	1890	562	576
526.blender_r	384	666	879	345	1840	518	583	670	873	344	1840	513	573	**669**	**874**	**344**	**1840**	**515**	**577**
527.cam4_r	384	733	917	425	1720	580	643	**736**	**912**	**426**	**1720**	**579**	**643**	758	886	439	1660	579	639
538.imagick_r	384	274	3490	136	7600	498	585	274	3490	136	7610	496	583	**274**	**3490**	**136**	**7590**	**498**	**583**
544.nab_r	384	**461**	**1400**	**237**	**2960**	**514**	**548**	460	1400	237	2960	514	549	462	1400	236	2960	512	546
549.fotonik3d_r	384	2593	577	1380	1210	532	542	2586	579	1380	1210	534	542	**2589**	**578**	**1380**	**1210**	**533**	**541**
554.roms_r	192	**487**	**626**	**283**	**1190**	**582**	**589**	489	624	283	1190	580	591	486	628	280	1200	576	584

SPECrate®2017_fp_peak = 1000

SPECrate®2017_fp_energy_peak = 2010

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

Compiler Notes

```
The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/
```

Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.
```

Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,
'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/cpu2017-1.1.8-amd-aocc400-genoa-B1b/amd_rate_aocc400_genoa_B_lib/
     lib:/home/cpu2017-1.1.8-amd-aocc400-genoa-B1b/amd_rate_aocc400_genoa_B_l
     ib/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 configuration:
Operating Mode set to Custom Mode
Core Performance Boost set to Disabled
SOC P-states set to P3
NUMA Nodes per Socket set to NPS4
ACPI SRAT L3 Cache as NUMA Domain set to Enabled
L2 Stream HW Prefetcher set to Disabled

 Sysinfo program /home/cpu2017-1.1.8-amd-aocc400-genoa-B1b/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on localhost.localdomain Sun Oct 23 22:58:03 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 2.32.1:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      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):        24
      Vendor ID:           AuthenticAMD
      BIOS Vendor ID:      Advanced Micro Devices, Inc.
```

(Continued on next page)

Platform Notes (Continued)

```
CPU family:          25
Model:               17
Model name:          AMD EPYC 9654 96-Core Processor
BIOS Model name:     AMD EPYC 9654 96-Core Processor
Stepping:            1
CPU MHz:             1500.000
CPU max MHz:         3707.8120
CPU min MHz:         1500.0000
BogoMIPS:            4792.48
Virtualization:      AMD-V
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            32768K
NUMA node0 CPU(s):   0-7,192-199
NUMA node1 CPU(s):   24-31,216-223
NUMA node2 CPU(s):   48-55,240-247
NUMA node3 CPU(s):   72-79,264-271
NUMA node4 CPU(s):   8-15,200-207
NUMA node5 CPU(s):   32-39,224-231
NUMA node6 CPU(s):   56-63,248-255
NUMA node7 CPU(s):   80-87,272-279
NUMA node8 CPU(s):   16-23,208-215
NUMA node9 CPU(s):   40-47,232-239
NUMA node10 CPU(s):  64-71,256-263
NUMA node11 CPU(s):  88-95,280-287
NUMA node12 CPU(s):  96-103,288-295
NUMA node13 CPU(s):  120-127,312-319
NUMA node14 CPU(s):  144-151,336-343
NUMA node15 CPU(s):  168-175,360-367
NUMA node16 CPU(s):  104-111,296-303
NUMA node17 CPU(s):  128-135,320-327
NUMA node18 CPU(s):  152-159,344-351
NUMA node19 CPU(s):  176-183,368-375
NUMA node20 CPU(s):  112-119,304-311
NUMA node21 CPU(s):  136-143,328-335
NUMA node22 CPU(s):  160-167,352-359
NUMA node23 CPU(s):  184-191,376-383
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 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
cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase
```

(Continued on next page)

Platform Notes (Continued)

```
      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 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

 /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: 31875 MB
   node 0 free: 31525 MB
   node 1 cpus: 24 25 26 27 28 29 30 31 216 217 218 219 220 221 222 223
   node 1 size: 32251 MB
   node 1 free: 32046 MB
   node 2 cpus: 48 49 50 51 52 53 54 55 240 241 242 243 244 245 246 247
   node 2 size: 32251 MB
   node 2 free: 31993 MB
   node 3 cpus: 72 73 74 75 76 77 78 79 264 265 266 267 268 269 270 271
   node 3 size: 32251 MB
   node 3 free: 32046 MB
   node 4 cpus: 8 9 10 11 12 13 14 15 200 201 202 203 204 205 206 207
   node 4 size: 32251 MB
   node 4 free: 32036 MB
   node 5 cpus: 32 33 34 35 36 37 38 39 224 225 226 227 228 229 230 231
   node 5 size: 32251 MB
   node 5 free: 32061 MB
   node 6 cpus: 56 57 58 59 60 61 62 63 248 249 250 251 252 253 254 255
   node 6 size: 32251 MB
   node 6 free: 32060 MB
   node 7 cpus: 80 81 82 83 84 85 86 87 272 273 274 275 276 277 278 279
   node 7 size: 32251 MB
   node 7 free: 32062 MB
   node 8 cpus: 16 17 18 19 20 21 22 23 208 209 210 211 212 213 214 215
   node 8 size: 32251 MB
   node 8 free: 32058 MB
   node 9 cpus: 40 41 42 43 44 45 46 47 232 233 234 235 236 237 238 239
   node 9 size: 32251 MB
   node 9 free: 32060 MB
   node 10 cpus: 64 65 66 67 68 69 70 71 256 257 258 259 260 261 262 263
```

(Continued on next page)

Platform Notes (Continued)

```
node 10 size: 32209 MB
node 10 free: 32020 MB
node 11 cpus: 88 89 90 91 92 93 94 95 280 281 282 283 284 285 286 287
node 11 size: 32251 MB
node 11 free: 32063 MB
node 12 cpus: 96 97 98 99 100 101 102 103 288 289 290 291 292 293 294 295
node 12 size: 32251 MB
node 12 free: 32064 MB
node 13 cpus: 120 121 122 123 124 125 126 127 312 313 314 315 316 317 318 319
node 13 size: 32251 MB
node 13 free: 32060 MB
node 14 cpus: 144 145 146 147 148 149 150 151 336 337 338 339 340 341 342 343
node 14 size: 32251 MB
node 14 free: 31818 MB
node 15 cpus: 168 169 170 171 172 173 174 175 360 361 362 363 364 365 366 367
node 15 size: 32251 MB
node 15 free: 32058 MB
node 16 cpus: 104 105 106 107 108 109 110 111 296 297 298 299 300 301 302 303
node 16 size: 32251 MB
node 16 free: 32064 MB
node 17 cpus: 128 129 130 131 132 133 134 135 320 321 322 323 324 325 326 327
node 17 size: 32251 MB
node 17 free: 32064 MB
node 18 cpus: 152 153 154 155 156 157 158 159 344 345 346 347 348 349 350 351
node 18 size: 32251 MB
node 18 free: 32065 MB
node 19 cpus: 176 177 178 179 180 181 182 183 368 369 370 371 372 373 374 375
node 19 size: 32251 MB
node 19 free: 32058 MB
node 20 cpus: 112 113 114 115 116 117 118 119 304 305 306 307 308 309 310 311
node 20 size: 32251 MB
node 20 free: 32061 MB
node 21 cpus: 136 137 138 139 140 141 142 143 328 329 330 331 332 333 334 335
node 21 size: 32183 MB
node 21 free: 31995 MB
node 22 cpus: 160 161 162 163 164 165 166 167 352 353 354 355 356 357 358 359
node 22 size: 32251 MB
node 22 free: 32054 MB
node 23 cpus: 184 185 186 187 188 189 190 191 376 377 378 379 380 381 382 383
node 23 size: 32251 MB
node 23 free: 32064 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
  0:  10  12  12  12  11  12  12  12  11  12  12  12  32  32  32  32  32  32  32  32
```

(Continued on next page)

Platform Notes (Continued)

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

(Continued on next page)

Platform Notes (Continued)

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

 From /proc/meminfo
    MemTotal:       792108520 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

 /sbin/tuned-adm active
     Current active profile: throughput-performance

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

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="8.6 (Ootpa)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="8.6"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="Red Hat Enterprise Linux 8.6 (Ootpa)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos

 uname -a:
    Linux localhost.localdomain 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19 EDT
    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
 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:
```

(Continued on next page)

Platform Notes (Continued)

```
                                                      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

 run-level 3 Oct 23 22:57

 SPEC is set to: /home/cpu2017-1.1.8-amd-aocc400-genoa-B1b
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   373G   21G  352G   6% /home

 From /sys/devices/virtual/dmi/id
     Vendor:          Lenovo
     Product:         ThinkSystem SR665 V3 MB,Genoa,Kauai,DDR5,Kauai,2U
     Product Family: ThinkSystem
     Serial:          1234567890

 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 HMCG88AEBRA168N 32 GB 2 rank 4800

 BIOS:
    BIOS Vendor:       Lenovo
    BIOS Version:      KAE103A-1.10
    BIOS Date:         09/26/2022
    BIOS Revision:     1.10
    Firmware Revision: 1.0

 (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
```

(Continued on next page)

Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------

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

(Continued on next page)

Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------

==============================================================================
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
  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`

(Continued on next page)

Base Compiler Invocation (Continued)

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

(Continued on next page)

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-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

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`

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: basepeak = yes

538.imagick_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
-lamdalloc

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_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 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc

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: basepeak = yes

549.fotonik3d_r: basepeak = yes

(Continued on next page)

Peak Optimization Flags (Continued)

554.roms_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`

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 -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: `basepeak = yes`

526.blender_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 -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 -finline-aggressive -mllvm -unroll-threshold=100 -lamdlibm -lamdalloc`

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`

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-N.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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-N.xml`

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

Tested with SPEC CPU®2017 v1.1.8 on 2022-10-23 10:58:02-0400.
Report generated on 2022-11-10 14:45:08 by CPU2017 PDF formatter v6442.
Originally published on 2022-11-10.