



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL365 Gen11

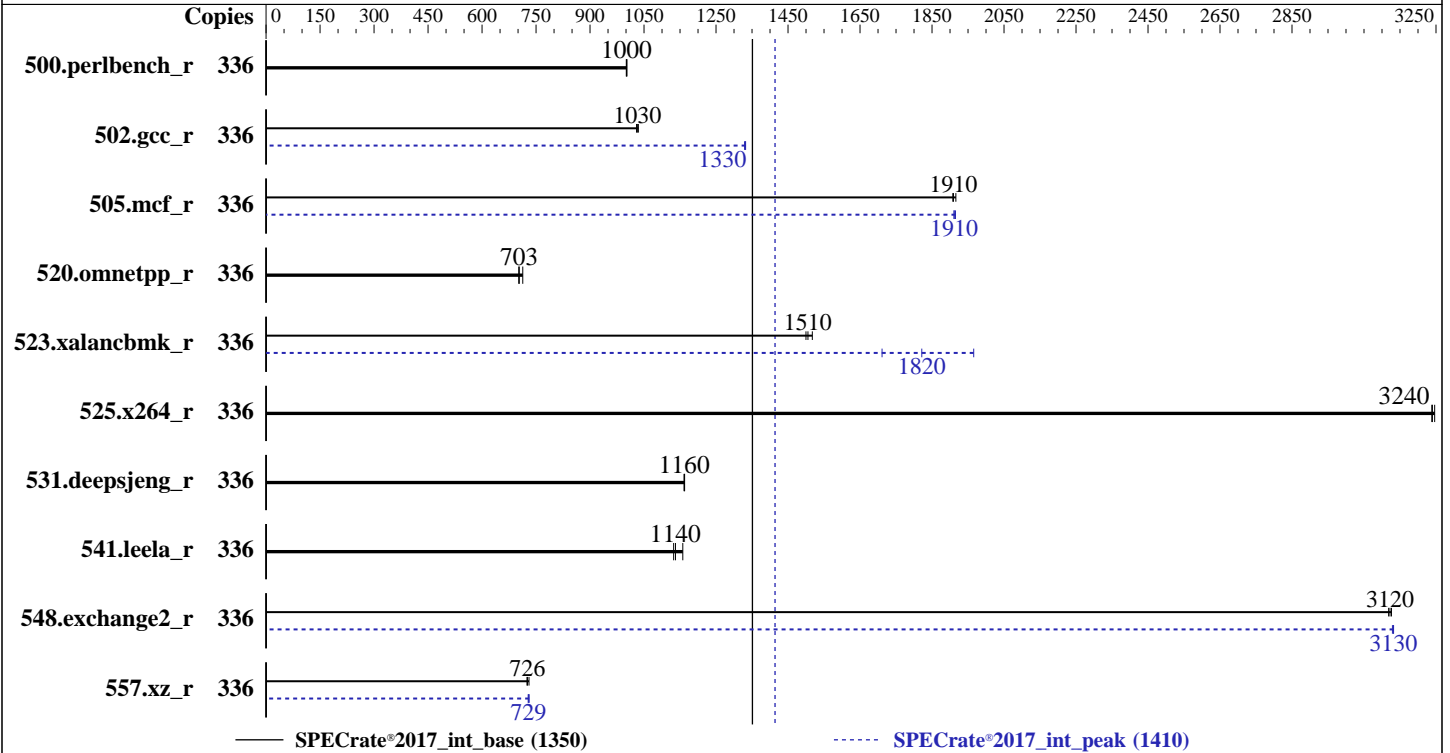
(2.25 GHz, AMD EPYC 9634)

SPECrate®2017_int_base = 1350

SPECrate®2017_int_peak = 1410

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jan-2023
Hardware Availability: Dec-2022
Software Availability: Nov-2022



Hardware

CPU Name: AMD EPYC 9634
 Max MHz: 3700
 Nominal: 2250
 Enabled: 168 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 / 7 cores
 Other: None
 Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
 Storage: 1 x 480 GB SATA SSD
 Other: None

Software

OS: Ubuntu 22.04.1 LTS
 Kernel 5.15.0-56-generic
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
 Parallel: No
 Firmware: HPE BIOS Version v1.12 11/24/2022 released
 Nov-2022
 File System: ext4
 System State: Run level 5 (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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	336	534	1000	535	1000	534	1000	336	534	1000	535	1000	534	1000
502.gcc_r	336	462	1030	460	1030	461	1030	336	357	1330	358	1330	357	1330
505.mcf_r	336	284	1910	283	1920	285	1910	336	284	1920	284	1910	284	1910
520.omnetpp_r	336	618	713	628	702	627	703	336	618	713	628	702	627	703
523.xalancbmk_r	336	234	1520	237	1500	236	1510	336	180	1970	195	1820	207	1710
525.x264_r	336	181	3250	182	3240	182	3240	336	181	3250	182	3240	182	3240
531.deepsjeng_r	336	331	1160	332	1160	331	1160	336	331	1160	332	1160	331	1160
541.leela_r	336	481	1160	491	1130	489	1140	336	481	1160	491	1130	489	1140
548.exchange2_r	336	282	3130	282	3120	282	3120	336	281	3130	281	3130	281	3130
557.xz_r	336	501	725	500	726	497	730	336	497	731	498	729	498	728

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

Compiler Notes

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

Submit Notes

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

Operating System Notes

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

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

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

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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/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017/amd_rate_a  
    occ400_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 Configuration

Workload Profile set to General Throughput Compute

Determinism Control set to Manual

Performance Determinism set to Power Deterministic

Last-Level Cache (LLC) as NUMA Node set to Enabled

NUMA memory domains per socket set to Four memory domains per socket

ACPI CST C2 Latency set to 18 microseconds

Thermal Configuration set to Maximum Cooling

Workload Profile set to Custom

Power Regulator set to OS Control Mode

(Continued on next page)



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Platform Notes (Continued)

The system ROM used for this result contains microcode version 0xa10110e for the AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this ROM is version GenoaPI 1.0.0.1-L6

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on admin1 Tue Jun 28 07:45:14 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 9634 84-Core Processor
 2 "physical id"s (chips)
336 "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 : 84
siblings  : 168
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30 32 33 34 35 36 37 38 40 41 42 43 44 45 46 48 49 50 51 52 53 54 56 57 58 59
60 61 62 64 65 66 67 68 69 70 72 73 74 75 76 77 78 80 81 82 83 84 85 86 88 89 90 91
92 93 94
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30 32 33 34 35 36 37 38 40 41 42 43 44 45 46 48 49 50 51 52 53 54 56 57 58 59
60 61 62 64 65 66 67 68 69 70 72 73 74 75 76 77 78 80 81 82 83 84 85 86 88 89 90 91
92 93 94
```

```
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):                 336
On-line CPU(s) list:   0-335
Vendor ID:              AuthenticAMD
Model name:             AMD EPYC 9634 84-Core Processor
CPU family:             25
Model:                  17
Thread(s) per core:    2
Core(s) per socket:    84
Socket(s):              2
Stepping:               1
Frequency boost:        enabled
CPU max MHz:            3701.0000
CPU min MHz:           400.0000
```

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Platform Notes (Continued)

```

BogoMIPS:                4493.48
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
aperfmpperf 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 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_lld
Virtualization:          AMD-V
L1d cache:               5.3 MiB (168 instances)
L1i cache:               5.3 MiB (168 instances)
L2 cache:                 168 MiB (168 instances)
L3 cache:                 768 MiB (24 instances)
NUMA node(s):            24
NUMA node0 CPU(s):       0-6,168-174
NUMA node1 CPU(s):       28-34,196-202
NUMA node2 CPU(s):       56-62,224-230
NUMA node3 CPU(s):       14-20,182-188
NUMA node4 CPU(s):       42-48,210-216
NUMA node5 CPU(s):       70-76,238-244
NUMA node6 CPU(s):       21-27,189-195
NUMA node7 CPU(s):       49-55,217-223
NUMA node8 CPU(s):       77-83,245-251
NUMA node9 CPU(s):       7-13,175-181
NUMA node10 CPU(s):      35-41,203-209
NUMA node11 CPU(s):      63-69,231-237
NUMA node12 CPU(s):      84-90,252-258
NUMA node13 CPU(s):      112-118,280-286
NUMA node14 CPU(s):      140-146,308-314
NUMA node15 CPU(s):      98-104,266-272
NUMA node16 CPU(s):      126-132,294-300
NUMA node17 CPU(s):      154-160,322-328
NUMA node18 CPU(s):      105-111,273-279
NUMA node19 CPU(s):      133-139,301-307
NUMA node20 CPU(s):      161-167,329-335
NUMA node21 CPU(s):      91-97,259-265
NUMA node22 CPU(s):      119-125,287-293
NUMA node23 CPU(s):      147-153,315-321
Vulnerability Itlb multihit:  Not affected

```

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Platform Notes (Continued)

Vulnerability L1tf: Not affected
 Vulnerability Mds: Not affected
 Vulnerability Meltdown: Not affected
 Vulnerability Mmio stale data: Not affected
 Vulnerability Retbleed: Not affected
 Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
 Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
 Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling, PBRSE-eIBRS Not affected
 Vulnerability Srbds: Not affected
 Vulnerability Tsx async abort: Not affected

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	32K	5.3M	8	Data	1	64	1	64
L1i	32K	5.3M	8	Instruction	1	64	1	64
L2	1M	168M	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 6 168 169 170 171 172 173 174
 node 0 size: 64198 MB
 node 0 free: 63878 MB
 node 1 cpus: 28 29 30 31 32 33 34 196 197 198 199 200 201 202
 node 1 size: 64508 MB
 node 1 free: 64292 MB
 node 2 cpus: 56 57 58 59 60 61 62 224 225 226 227 228 229 230
 node 2 size: 64508 MB
 node 2 free: 64267 MB
 node 3 cpus: 14 15 16 17 18 19 20 182 183 184 185 186 187 188
 node 3 size: 64508 MB
 node 3 free: 64175 MB
 node 4 cpus: 42 43 44 45 46 47 48 210 211 212 213 214 215 216
 node 4 size: 64473 MB
 node 4 free: 64167 MB
 node 5 cpus: 70 71 72 73 74 75 76 238 239 240 241 242 243 244
 node 5 size: 64508 MB
 node 5 free: 64217 MB
 node 6 cpus: 21 22 23 24 25 26 27 189 190 191 192 193 194 195
 node 6 size: 64508 MB

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Platform Notes (Continued)

```

node 6 free: 64182 MB
node 7 cpus: 49 50 51 52 53 54 55 217 218 219 220 221 222 223
node 7 size: 64508 MB
node 7 free: 64215 MB
node 8 cpus: 77 78 79 80 81 82 83 245 246 247 248 249 250 251
node 8 size: 64508 MB
node 8 free: 64236 MB
node 9 cpus: 7 8 9 10 11 12 13 175 176 177 178 179 180 181
node 9 size: 64508 MB
node 9 free: 64245 MB
node 10 cpus: 35 36 37 38 39 40 41 203 204 205 206 207 208 209
node 10 size: 64508 MB
node 10 free: 64293 MB
node 11 cpus: 63 64 65 66 67 68 69 231 232 233 234 235 236 237
node 11 size: 64508 MB
node 11 free: 64275 MB
node 12 cpus: 84 85 86 87 88 89 90 252 253 254 255 256 257 258
node 12 size: 64508 MB
node 12 free: 64293 MB
node 13 cpus: 112 113 114 115 116 117 118 280 281 282 283 284 285 286
node 13 size: 64508 MB
node 13 free: 64311 MB
node 14 cpus: 140 141 142 143 144 145 146 308 309 310 311 312 313 314
node 14 size: 64508 MB
node 14 free: 64322 MB
node 15 cpus: 98 99 100 101 102 103 104 266 267 268 269 270 271 272
node 15 size: 64508 MB
node 15 free: 64315 MB
node 16 cpus: 126 127 128 129 130 131 132 294 295 296 297 298 299 300
node 16 size: 64508 MB
node 16 free: 64330 MB
node 17 cpus: 154 155 156 157 158 159 160 322 323 324 325 326 327 328
node 17 size: 64508 MB
node 17 free: 64334 MB
node 18 cpus: 105 106 107 108 109 110 111 273 274 275 276 277 278 279
node 18 size: 64508 MB
node 18 free: 64295 MB
node 19 cpus: 133 134 135 136 137 138 139 301 302 303 304 305 306 307
node 19 size: 64508 MB
node 19 free: 64226 MB
node 20 cpus: 161 162 163 164 165 166 167 329 330 331 332 333 334 335
node 20 size: 64508 MB
node 20 free: 64269 MB
node 21 cpus: 91 92 93 94 95 96 97 259 260 261 262 263 264 265
node 21 size: 64508 MB
node 21 free: 64263 MB
node 22 cpus: 119 120 121 122 123 124 125 287 288 289 290 291 292 293

```

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```

node 22 size: 64508 MB
node 22 free: 64332 MB
node 23 cpus: 147 148 149 150 151 152 153 315 316 317 318 319 320 321
node 23 size: 64450 MB
node 23 free: 64270 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 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 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 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 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 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 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 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 32 12 12 12 12 12 12 11 10

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Platform Notes (Continued)

```

11 12 12 12
20: 32 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 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 32 12 12 12 12 12 12 12 12
12 11 10 11
23: 32 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:      1584947636 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 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 admin1 5.15.0-56-generic #62-Ubuntu SMP Tue Nov 22 19:54:14 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

```

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Platform Notes (Continued)

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

run-level 5 Jun 28 00:01

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv	ext4	437G	20G	399G	5%	/

```
From /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL365 Gen11
Product Family: ProLiant
Serial: DL365G11-003
```

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 Hynix HMCG94AEBRA103N 64 GB 2 rank 4800
```

```
BIOS:
BIOS Vendor: HPE
BIOS Version: 1.12
BIOS Date: 11/24/2022
BIOS Revision: 1.12
Firmware Revision: 1.10
```

(End of data from sysinfo program)

Compiler Version Notes

C | 502.gcc_r(peak)

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Test Date: Jan-2023
Hardware Availability: Dec-2022
Software Availability: Nov-2022

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: 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 | 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

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SPEC CPU®2017 Integer Rate Result

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ProLiant DL365 Gen11

(2.25 GHz, AMD EPYC 9634)

SPECrate®2017_int_base = 1350

SPECrate®2017_int_peak = 1410

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jan-2023
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Compiler Version Notes (Continued)

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

=====
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



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Test Date: Jan-2023

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Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

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
-lamdaloc
```

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
```

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Base Optimization Flags (Continued)

C++ benchmarks (continued):

-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

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

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Peak Portability Flags (Continued)

```
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
```

```
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: basepeak = yes
```

```
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
```

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Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):

```
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamalloc-ext
```

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

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 -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 -lamalloc
```

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/HPE-Platform-Flags-AMD-Genoa-rev2.1.html>

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



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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-rev2.1.xml>

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

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