SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

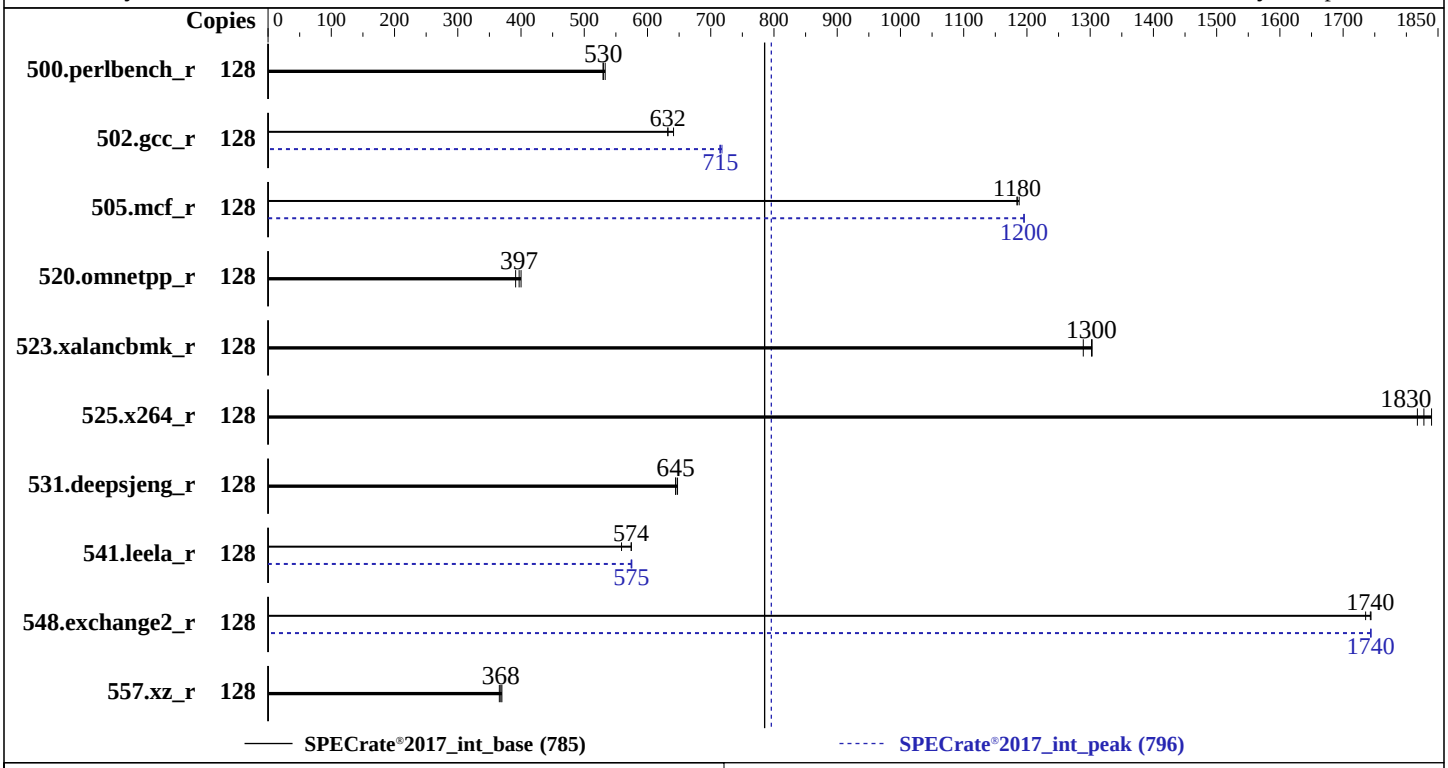
ProLiant DL385 Gen11
(3.25 GHz, AMD EPYC 9354)

SPECrate®2017_int_base = 785

SPECrate®2017_int_peak = 796

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

Test Date: Sep-2024
Hardware Availability: Nov-2022
Software Availability: Sep-2024



Hardware

CPU Name:	AMD EPYC 9354
Max MHz:	3800
Nominal:	3250
Enabled:	64 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:	256 MB I+D on chip per chip, 32 MB shared / 4 cores
Other:	None
Memory:	768 GB (24 x 32 GB 2Rx4 PC5-4800B-R)
Storage:	2 x 480GB NVMe M.2, RAID 1
Other:	CPU Cooling: Air

Software

OS:	Ubuntu 22.04.4 LTS Kernel 5.15.0-121-generic
Compiler:	C/C++/Fortran: Version 5.0.0 of AOCC
Parallel:	No
Firmware:	HPE BIOS Version v1.58 01/04/2024 released Jan-2024
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	128	382	533	**384**	**530**	385	530	128	382	533	**384**	**530**	385	530
502.gcc_r	128	283	641	287	632	**287**	**632**	128	254	714	**253**	**715**	253	718
505.mcf_r	128	175	1180	**175**	**1180**	174	1190	128	173	1200	173	1200	**173**	**1200**
520.omnetpp_r	128	420	400	**423**	**397**	429	391	128	420	400	**423**	**397**	429	391
523.xalancbmk_r	128	104	1300	105	1290	**104**	**1300**	128	104	1300	105	1290	**104**	**1300**
525.x264_r	128	**123**	**1830**	123	1820	122	1840	128	**123**	**1830**	123	1820	122	1840
531.deepsjeng_r	128	227	648	228	645	**228**	**645**	128	227	648	228	645	**228**	**645**
541.leela_r	128	379	559	**369**	**574**	369	574	128	369	574	368	575	**369**	**575**
548.exchange2_r	128	**192**	**1740**	193	1740	192	1740	128	192	1740	192	1740	**192**	**1740**
557.xz_r	128	**376**	**368**	378	366	374	370	128	**376**	**368**	378	366	374	370

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SPECrate®2017_int_peak = 796

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

Compiler Notes

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

Submit Notes

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

Operating System Notes

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

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

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

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

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/cpu2017/amd_rate_aocc500_znver5_A_lib/lib:/cpu2017/amd_rate_aocc500_znver5_A_lib/lib32:"
MALLOC_CONF = "retain:true"
```

General Notes

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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
```

Platform Notes

```
BIOS 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
Data Fabric C-State Enable set to Force Enabled
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
The reference code/AGESA version used in this
ROM is version GenoaPI 1.0.0.B

 Sysinfo program /cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on dl95 Tue Sep 17 08:33:12 2024

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

 ----------------------------------------------------------
 Table of contents
 ----------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. sysctl
```

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Platform Notes (Continued)

```
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux dl95 5.15.0-121-generic #131-Ubuntu SMP Fri Aug 9 08:29:53 UTC 2024 x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   08:33:12 up 1 day,  1:49,  1 user,  load average: 0.07, 4.80, 43.48
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     pts/0    10.11.6.7        08:28   16.00s  1.29s  0.25s /bin/bash ./amd_rate_aocc500_znver5_A1.sh

------------------------------------------------------------
3. Username
  From environment variable $USER:  root

------------------------------------------------------------
4. ulimit -a
  time(seconds)        unlimited
  file(blocks)         unlimited
  data(kbytes)         unlimited
  stack(kbytes)        unlimited
  coredump(blocks)     0
  memory(kbytes)       unlimited
  locked memory(kbytes) 2097152
  process              3094340
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0

------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
 sshd: root@pts/0
 -bash
 python3 ./run_amd_rate_aocc500_znver5_A1.py
 /bin/bash ./amd_rate_aocc500_znver5_A1.sh
 runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intrate
 runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.006/templogs/preenv.intrate.006.0.log --lognum 006.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9354 32-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 1
```

(Continued on next page)

Platform Notes (Continued)

```
     microcode       : 0xa101144
     bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
     TLB size        : 3584 4K pages
     cpu cores       : 32
     siblings        : 64
     2 physical ids (chips)
     128 processors (hardware threads)
     physical id 0: core ids 0-31
     physical id 1: core ids 0-31
     physical id 0: apicids 0-63
     physical id 1: apicids 64-127
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems.  Use the above data carefully.

 ------------------------------------------------------------
 7. lscpu

 From lscpu from util-linux 2.37.2:
   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):                               128
   On-line CPU(s) list:                  0-127
   Vendor ID:                            AuthenticAMD
   Model name:                           AMD EPYC 9354 32-Core Processor
   CPU family:                           25
   Model:                                17
   Thread(s) per core:                   2
   Core(s) per socket:                   32
   Socket(s):                            2
   Stepping:                             1
   Frequency boost:                      enabled
   CPU max MHz:                          3250.0000
   CPU min MHz:                          1500.0000
   BogoMIPS:                             6490.10
   Flags:                                fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                                         pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                                         rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
                                         aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1
                                         sse4_2 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 ibrs_enhanced vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid
                                         cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
                                         avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves
                                         cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local avx512_bf16 clzero
                                         irperf xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
                                         nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                                         pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku
                                         ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                                         avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
   Virtualization:                       AMD-V
   L1d cache:                            2 MiB (64 instances)
   L1i cache:                            2 MiB (64 instances)
   L2 cache:                             64 MiB (64 instances)
   L3 cache:                             512 MiB (16 instances)
   NUMA node(s):                         16
   NUMA node0 CPU(s):                    0-3,64-67
```

(Continued on next page)

Platform Notes (Continued)

```
   NUMA node1 CPU(s):                   4-7,68-71
   NUMA node2 CPU(s):                   8-11,72-75
   NUMA node3 CPU(s):                   12-15,76-79
   NUMA node4 CPU(s):                   16-19,80-83
   NUMA node5 CPU(s):                   20-23,84-87
   NUMA node6 CPU(s):                   24-27,88-91
   NUMA node7 CPU(s):                   28-31,92-95
   NUMA node8 CPU(s):                   32-35,96-99
   NUMA node9 CPU(s):                   36-39,100-103
   NUMA node10 CPU(s):                  40-43,104-107
   NUMA node11 CPU(s):                  44-47,108-111
   NUMA node12 CPU(s):                  48-51,112-115
   NUMA node13 CPU(s):                  52-55,116-119
   NUMA node14 CPU(s):                  56-59,120-123
   NUMA node15 CPU(s):                  60-63,124-127
   Vulnerability Gather data sampling:  Not affected
   Vulnerability Itlb multihit:         Not affected
   Vulnerability L1tf:                  Not affected
   Vulnerability Mds:                   Not affected
   Vulnerability Meltdown:              Not affected
   Vulnerability Mmio stale data:       Not affected
   Vulnerability Reg file data sampling: Not affected
   Vulnerability Retbleed:              Not affected
   Vulnerability Spec rstack overflow:  Mitigation; safe RET
   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; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                        always-on; RSB filling; PBRSB-eIBRS Not affected; BHI 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       2M    8 Data            1    64        1             64
      L1i       32K       2M    8 Instruction     1    64        1             64
      L2         1M      64M    8 Unified         2  2048        1             64
      L3        32M     512M   16 Unified         3 32768        1             64

 ------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 16 nodes (0-15)
   node 0 cpus: 0-3,64-67
   node 0 size: 48069 MB
   node 0 free: 47000 MB
   node 1 cpus: 4-7,68-71
   node 1 size: 48381 MB
   node 1 free: 47876 MB
   node 2 cpus: 8-11,72-75
   node 2 size: 48381 MB
   node 2 free: 47879 MB
   node 3 cpus: 12-15,76-79
   node 3 size: 48381 MB
   node 3 free: 47942 MB
   node 4 cpus: 16-19,80-83
   node 4 size: 48381 MB
   node 4 free: 47836 MB
   node 5 cpus: 20-23,84-87
   node 5 size: 48381 MB
   node 5 free: 47886 MB
```

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Platform Notes (Continued)

```
   node 6 cpus: 24-27,88-91
   node 6 size: 48381 MB
   node 6 free: 47889 MB
   node 7 cpus: 28-31,92-95
   node 7 size: 48381 MB
   node 7 free: 47924 MB
   node 8 cpus: 32-35,96-99
   node 8 size: 48381 MB
   node 8 free: 47805 MB
   node 9 cpus: 36-39,100-103
   node 9 size: 48381 MB
   node 9 free: 47935 MB
   node 10 cpus: 40-43,104-107
   node 10 size: 48381 MB
   node 10 free: 47918 MB
   node 11 cpus: 44-47,108-111
   node 11 size: 48334 MB
   node 11 free: 47907 MB
   node 12 cpus: 48-51,112-115
   node 12 size: 48381 MB
   node 12 free: 47942 MB
   node 13 cpus: 52-55,116-119
   node 13 size: 48381 MB
   node 13 free: 47953 MB
   node 14 cpus: 56-59,120-123
   node 14 size: 48381 MB
   node 14 free: 47927 MB
   node 15 cpus: 60-63,124-127
   node 15 size: 48331 MB
   node 15 free: 47903 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
     0:  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
     1:  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
     2:  12  12  10  11  12  12  12  12  32  32  32  32  32  32  32  32
     3:  12  12  11  10  12  12  12  12  32  32  32  32  32  32  32  32
     4:  12  12  12  12  10  11  12  12  32  32  32  32  32  32  32  32
     5:  12  12  12  12  11  10  12  12  32  32  32  32  32  32  32  32
     6:  12  12  12  12  12  12  10  11  32  32  32  32  32  32  32  32
     7:  12  12  12  12  12  12  11  10  32  32  32  32  32  32  32  32
     8:  32  32  32  32  32  32  32  32  10  11  12  12  12  12  12  12
     9:  32  32  32  32  32  32  32  32  11  10  12  12  12  12  12  12
    10:  32  32  32  32  32  32  32  32  12  12  10  11  12  12  12  12
    11:  32  32  32  32  32  32  32  32  12  12  11  10  12  12  12  12
    12:  32  32  32  32  32  32  32  32  12  12  12  12  10  11  12  12
    13:  32  32  32  32  32  32  32  32  12  12  12  12  11  10  12  12
    14:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
    15:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       792268192 kB

------------------------------------------------------------
10. who -r
  run-level 5 Sep 16 06:47

------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
  Default Target  Status
```

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Platform Notes (Continued)

```
  graphical       degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                                LOAD   ACTIVE SUB    DESCRIPTION
  * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured

------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          ModemManager apparmor blk-availability cloud-config cloud-final cloud-init
                   cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                   grub-common grub-initrd-fallback hv-fcopy-daemon hv-kvp-daemon hv-vss-daemon irqbalance
                   keyboard-setup lvm2-monitor lxd-agent multipathd networkd-dispatcher open-iscsi
                   open-vm-tools pollinate rsyslog secureboot-db setvtrgb snapd ssh systemd-networkd
                   systemd-networkd-wait-online systemd-pstore systemd-resolved systemd-timesyncd thermald
                   ua-reboot-cmds ubuntu-advantage udisks2 ufw unattended-upgrades vgauth
  enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
  disabled         console-getty debug-shell intel-sgx-load-module iscsid nftables rsync serial-getty@
                   systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                   systemd-time-wait-sync upower
  generated        apport
  indirect         uuidd
  masked           cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
                   x11-common

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/vmlinuz-5.15.0-121-generic
  root=/dev/mapper/ubuntu--vg-ubuntu--lv
  ro

------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 1.50 GHz and 3.25 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes
      Boost States: 0
      Total States: 3
      Pstate-P0:  3250MHz

------------------------------------------------------------
16. sysctl
  kernel.numa_balancing               1
  kernel.randomize_va_space           0
  vm.compaction_proactiveness        20
  vm.dirty_background_bytes           0
  vm.dirty_background_ratio          10
  vm.dirty_bytes                      0
  vm.dirty_expire_centisecs        3000
  vm.dirty_ratio                      8
  vm.dirty_writeback_centisecs      500
  vm.dirtytime_expire_seconds     43200
  vm.extfrag_threshold              500
  vm.min_unmapped_ratio               1
  vm.nr_hugepages                     0
```

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Platform Notes (Continued)

```
  vm.nr_hugepages_mempolicy           0
  vm.nr_overcommit_hugepages          0
  vm.swappiness                       1
  vm.watermark_boost_factor       15000
  vm.watermark_scale_factor          10
  vm.zone_reclaim_mode                1

------------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage
  defrag          [always] defer defer+madvise madvise never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
  shmem_enabled   always within_size advise [never] deny force

------------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_shared           256
  max_ptes_swap              64
  pages_to_scan            4096
  scan_sleep_millisecs    10000

------------------------------------------------------------
19. OS release
  From /etc/*-release /etc/*-version
  os-release Ubuntu 22.04.4 LTS

------------------------------------------------------------
20. Disk information
SPEC is set to: /cpu2017
  Filesystem                     Type  Size  Used Avail Use% Mounted on
  /dev/mapper/ubuntu--vg-ubuntu--lv ext4  433G   18G  393G   5% /

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        ProLiant DL385 Gen11
    Product Family: ProLiant
    Serial:         CZ233700BH

------------------------------------------------------------
22. dmidecode
  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 Samsung M321R4GA3BB6-CQKDS 32 GB 2 rank 4800


------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       HPE
   BIOS Version:      1.58
   BIOS Date:         01/04/2024
   BIOS Revision:     1.58
   Firmware Revision: 1.58
```

Compiler Version Notes

```
==============================================================================================================
C       | 502.gcc_r(peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C       | 502.gcc_r(peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
        | 541.leela_r(base, peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran | 548.exchange2_r(base, peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------
```

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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-Wl,-mllvm -Wl,-extra-inliner -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-lamdalloc-ext -ldl

C++ benchmarks:
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -fno-PIE -no-pie

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lflang -lamdalloc-ext
-ldl

Fortran benchmarks:
-m64 -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=znver5
-fveclib=AMDLIBM -ffast-math -flto
-fepilog-vectorization-of-inductions -mllvm -optimize-strided-mem-cost
-floop-transform -mllvm -unroll-aggressive -mllvm -unroll-threshold=500
-lamdlibm -lflang -lamdalloc -ldl

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`

502.gcc_r: `-m32 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand
-fenable-aggressive-gather -Wl,-mllvm -Wl,-extra-inliner
-z muldefs -Ofast -march=znver5 -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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc-ext -ldl`

525.x264_r: `basepeak = yes`

557.xz_r: `basepeak = yes`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

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Peak Optimization Flags (Continued)

523.xalancbmk_r: `basepeak = yes`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `-m64 -std=c++14`
`-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast`
`-march=znver5 -fveclib=AMDLIBM -ffast-math -flto`
`-mllvm -unroll-threshold=100`
`-mllvm -reduce-array-computations=3 -zopt -fno-PIE`
`-no-pie -fvirtual-function-elimination -fvisibility=hidden`
`-mllvm -do-block-reorder=advanced -lamdlibm -lflang`
`-lamdalloc-ext -ldl`

Fortran benchmarks:
`-m64 -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=znver5 -fveclib=AMDLIBM`
`-ffast-math -flto -fepilog-vectorization-of-inductions`
`-mllvm -optimize-strided-mem-cost -floop-transform`
`-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm`
`-lflang -lamdalloc -ldl`

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/v119/aocc5/1316/amd_rate_aocc500_znver5_A_lib/lib32`

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

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-rev2.3.html`
`http://www.spec.org/cpu2017/flags/aocc500-flags.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-rev2.3.xml`
`http://www.spec.org/cpu2017/flags/aocc500-flags.xml`

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