SPEC CPU®2017 Integer Rate Result

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Supermicro
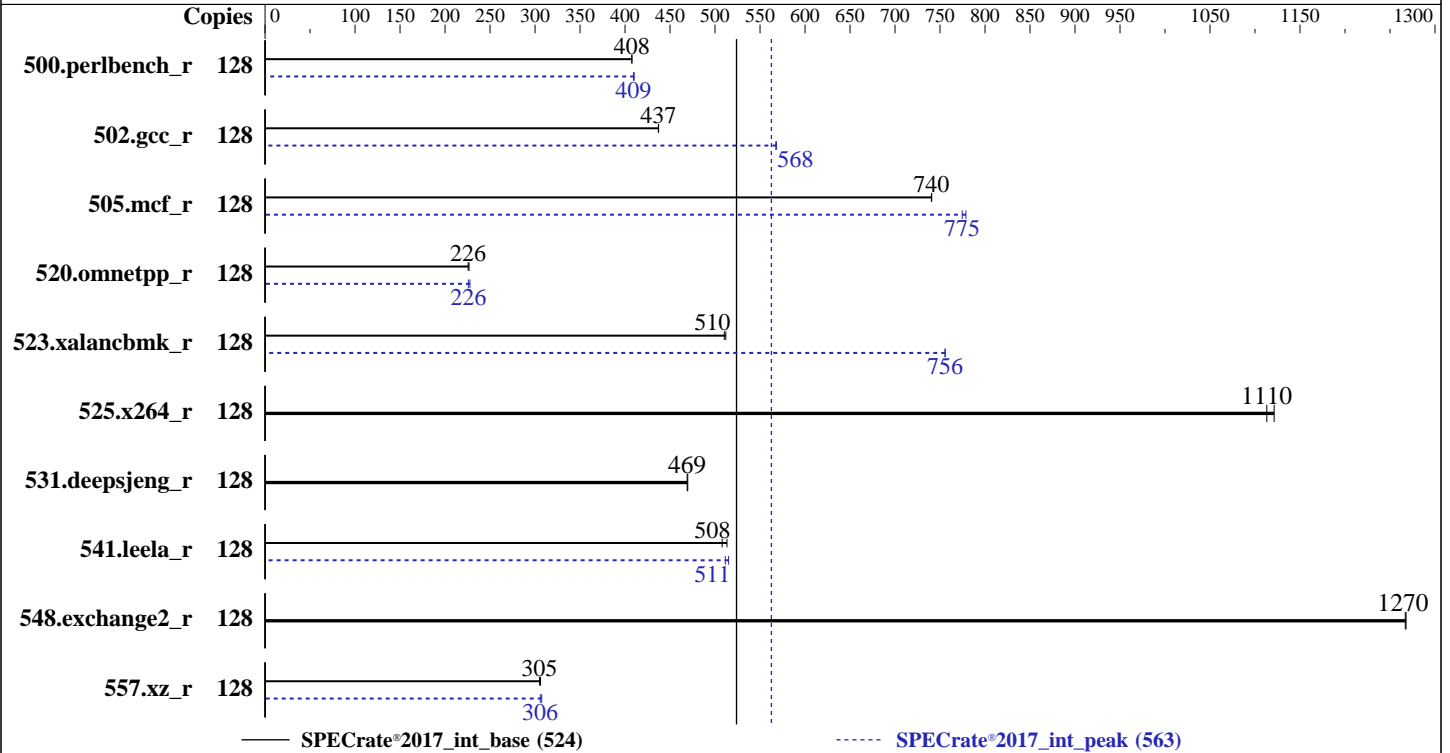
A+ Server 2124US-TNRP
(H12DSU-iN , AMD EPYC 7543)

$SPECrate^{®}2017\_int\_base = 524$

$SPECrate^{®}2017\_int\_peak = 563$

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Mar-2023

Hardware Availability: Mar-2021

Software Availability: Feb-2023

Copies	
500.perlbench_r	128
	408
	409
502.gcc_r	128
	437
	568
505.mcf_r	128
	740
	775
520.omnetpp_r	128
	226
	226
523.xalancbmk_r	128
	510
	756
525.x264_r	128
	1110
531.deepsjeng_r	128
	469
541.leela_r	128
	508
	511
548.exchange2_r	128
	1270
557.xz_r	128
	305
	306

—— SPECrate®2017_int_base (524)   - - - - SPECrate®2017_int_peak (563)

Hardware

CPU Name: AMD EPYC 7543
  Max MHz: 3700
  Nominal: 2800
Enabled: 64 cores, 2 chips, 2 threads/core
Orderable: 2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
  L2: 512 KB I+D on chip per core
  L3: 256 MB I+D on chip per chip, 32 MB shared / 4 cores
  Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 800 GB NVMe SSD
Other: None

Software

OS: Ubuntu 22.04.2 LTS
  Kernel 5.15.0-67-generic
Compiler: C/C++/Fortran: Version 3.2.0 of AOCC
Parallel: No
Firmware: Version 2.5 released Sep-2022
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library v5.1.0
Power Management: BIOS and OS set to max 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	500	408	**500**	**408**			128	497	410	**498**	**409**		
502.gcc_r	128	414	437	**415**	**437**			128	319	568	**319**	**568**		
505.mcf_r	128	279	741	**279**	**740**			128	**267**	**775**	266	779		
520.omnetpp_r	128	741	227	**744**	**226**			128	**743**	**226**	738	228		
523.xalancbmk_r	128	**265**	**510**	264	512			128	**179**	**756**	179	756		
525.x264_r	128	200	1120	**201**	**1110**			128	200	1120	**201**	**1110**		
531.deepsjeng_r	128	312	470	**313**	**469**			128	312	470	**313**	**469**		
541.leela_r	128	413	513	**417**	**508**			128	412	515	**414**	**511**		
548.exchange2_r	128	**265**	**1270**	265	1270			128	265	1270	265	1270		
557.xz_r	128	452	306	**453**	**305**			128	**452**	**306**	450	307		
SPECrate®2017_int_base =			**524**											
SPECrate®2017_int_peak =			**563**											

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.

(Continued on next page)

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

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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_aocc320_milanx_A_lib/lib;/home/cpu2017/amd_rate_
     aocc320_milanx_A_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 7742 CPU + 1TiB Memory using OpenSUSE 15.2

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.

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
```

Platform Notes

```
BIOS Settings:
Determinism Control = Manual
Determinism Slider = Power
cTDP Control = Manual
cTDP = 240
Package Power Limit Control = Manual
Package Power Limit = 240
```

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Platform Notes (Continued)

```
APBDIS = 1
NUMA Nodes Per Socket = NPS4
ACPI SRAT L3 cache As NUMA Domain = Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on as-2124us-tnrp-7543 Fri Mar 17 10:06:32 2023

 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 (249.11-0ubuntu3.7)
 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
 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 as-2124us-tnrp-7543 5.15.0-67-generic #74-Ubuntu SMP Wed Feb 22 14:14:39 UTC 2023 x86_64 x86_64
   x86_64 GNU/Linux


 ------------------------------------------------------------
 2. w
    10:06:32 up 11 min,  2 users,  load average: 0.17, 0.09, 0.09
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

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Platform Notes (Continued)

```
 lab       tty1      -                      10:00    5:52   0.19s  0.01s -bash
 lab       pts/0     -                      10:00   16.00s  1.24s  0.16s sudo su -


 ------------------------------------------------------------
 3. Username
   From environment variable $USER:  root
   From the command 'logname':       lab


 ------------------------------------------------------------
 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                4127157
   nofiles                1024
   vmemory(kbytes)        unlimited
   locks                  unlimited
   rtprio                 0


 ------------------------------------------------------------
 5. sysinfo process ancestry
 /sbin/init
 /bin/login -p --
 -bash
 sudo su -
 sudo su -
 su -
 -bash
 python3 ./run_amd_rate_aocc320_milanx_A1.py
  /bin/bash ./amd_rate_aocc320_milanx_A1.sh
 runcpu --config amd_rate_aocc320_milanx_A1.cfg --tune all --reportable --iterations 2 intrate
 runcpu --configfile amd_rate_aocc320_milanx_A1.cfg --tune all --reportable --iterations 2 --nopower
   --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


 ------------------------------------------------------------
 6. /proc/cpuinfo
    model name     : AMD EPYC 7543 32-Core Processor
    vendor_id      : AuthenticAMD
    cpu family     : 25
    model          : 1
```

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Platform Notes (Continued)

```
     stepping        : 1
     microcode       : 0xa001173
     bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size        : 2560 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:            48 bits physical, 48 bits virtual
   Byte Order:               Little Endian
   CPU(s):                   128
   On-line CPU(s) list:      0-127
   Vendor ID:                AuthenticAMD
   Model name:               AMD EPYC 7543 32-Core Processor
   CPU family:               25
   Model:                    1
   Thread(s) per core:       2
   Core(s) per socket:       32
   Socket(s):                2
   Stepping:                 1
   Frequency boost:          enabled
   CPU max MHz:              3737.8899
   CPU min MHz:              1500.0000
   BogoMIPS:                 5599.86
  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 vmmcall fsgsbase bmi1 avx2 smep bmi2
                              erms invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt
                              xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
```

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Platform Notes (Continued)

```
                        clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv svm_lock
                        nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                        pfthreshold v_vmsave_vmload vgif v_spec_ctrl umip pku ospke vaes
                            vpclmulqdq rdpid overflow_recov succor smca fsrm
    Virtualization:             AMD-V
    L1d cache:                  2 MiB (64 instances)
    L1i cache:                  2 MiB (64 instances)
    L2 cache:                   32 MiB (64 instances)
    L3 cache:                   512 MiB (16 instances)
    NUMA node(s):               16
    NUMA node0 CPU(s):          0-3,64-67
    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 Itlb multihit:    Not affected
    Vulnerability L1tf:             Not affected
    Vulnerability Mds:              Not affected
    Vulnerability Meltdown:         Not affected
    Vulnerability Mmio stale data:  Not affected
    Vulnerability Retbleed:         Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:        Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                                 filling, PBRSB-eIBRS Not affected
    Vulnerability Srbds:            Not affected
    Vulnerability Tsx async abort:  Not affected


  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL   SETS PHY-LINE COHERENCY-SIZE
      L1d       32K       2M   8 Data            1     64        1             64
      L1i       32K       2M   8 Instruction     1     64        1             64
      L2       512K      32M   8 Unified         2   1024        1             64
      L3        32M     512M  16 Unified         3  32768        1             64


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

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Platform Notes (Continued)

```
   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: 64316 MB
   node 0 free: 63021 MB
   node 1 cpus: 4-7,68-71
   node 1 size: 64507 MB
   node 1 free: 64250 MB
   node 2 cpus: 8-11,72-75
   node 2 size: 64509 MB
   node 2 free: 64235 MB
   node 3 cpus: 12-15,76-79
   node 3 size: 64508 MB
   node 3 free: 64269 MB
   node 4 cpus: 16-19,80-83
   node 4 size: 64509 MB
   node 4 free: 64265 MB
   node 5 cpus: 20-23,84-87
   node 5 size: 64508 MB
   node 5 free: 64276 MB
   node 6 cpus: 24-27,88-91
   node 6 size: 64509 MB
   node 6 free: 64243 MB
   node 7 cpus: 28-31,92-95
   node 7 size: 64496 MB
   node 7 free: 64209 MB
   node 8 cpus: 32-35,96-99
   node 8 size: 64509 MB
   node 8 free: 64314 MB
   node 9 cpus: 36-39,100-103
   node 9 size: 64473 MB
   node 9 free: 64274 MB
   node 10 cpus: 40-43,104-107
   node 10 size: 64509 MB
   node 10 free: 64305 MB
   node 11 cpus: 44-47,108-111
   node 11 size: 64508 MB
   node 11 free: 64324 MB
   node 12 cpus: 48-51,112-115
   node 12 size: 64509 MB
   node 12 free: 64311 MB
   node 13 cpus: 52-55,116-119
   node 13 size: 64508 MB
   node 13 free: 64317 MB
   node 14 cpus: 56-59,120-123
   node 14 size: 64509 MB
```

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Platform Notes (Continued)

```
  node 14 free: 64328 MB
  node 15 cpus: 60-63,124-127
  node 15 size: 64503 MB
  node 15 free: 64311 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:       1056669088 kB


  ------------------------------------------------------------
  10. who -r
    run-level 3 Mar 17 09:57


  ------------------------------------------------------------
  11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.7)
   Default Target  Status
   multi-user      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 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 irqbalance keyboard-setup lm-sensors lvm2-monitor lxd-agent
```

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Platform Notes (Continued)

```
                  multipathd networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db
                  setvtrgb ssh systemd-networkd systemd-networkd-wait-online systemd-pstore systemd-resolved
                  systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw vgauth
 enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
 disabled         apparmor console-getty debug-shell 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=/boot/vmlinuz-5.15.0-67-generic
    root=UUID=63a5bd49-1a2b-4fc5-945b-bc07b22b6218
    ro
```

```
  ----------------------------------------------------------
  15. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 1.50 GHz and 2.80 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:  2800MHz
```

```
  ----------------------------------------------------------
  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
    vm.nr_hugepages_mempolicy        0
```

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Supermicro

A+ Server 2124US-TNRP
(H12DSU-iN , AMD EPYC 7543)

SPECrate®2017_int_base = 524

SPECrate®2017_int_peak = 563

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

Test Date: Mar-2023
Hardware Availability: Mar-2021
Software Availability: Feb-2023

Platform Notes (Continued)

```
  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 22.04.2 LTS


  -------------------------------------------------------------
20. Disk information
SPEC is set to: /home/cpu2017
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p2 ext4  732G   17G  678G   3% /


  -------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:        Supermicro
    Product:       Super Server
    Serial:        0123456789


  -------------------------------------------------------------
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:
```

(Continued on next page)

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Platform Notes (Continued)

```
      16x NO DIMM Unknown
      16x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200


    ----------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:        American Megatrends Inc.
    BIOS Version:       2.5
    BIOS Date:          09/14/2022
    BIOS Revision:      5.22
```

Compiler Version Notes

```
==============================================================================
C        | 502.gcc_r(peak)
------------------------------------------------------------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/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 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
------------------------------------------------------------------------------


==============================================================================
C        | 502.gcc_r(peak)
------------------------------------------------------------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
------------------------------------------------------------------------------


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

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(H12DSU-iN , AMD EPYC 7543)

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CPU2017 License: 001176	**Test Date:** Mar-2023
Test Sponsor: Supermicro	**Hardware Availability:** Mar-2021
Tested by: Supermicro	**Software Availability:** Feb-2023

Compiler Version Notes (Continued)

```
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 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
------------------------------------------------------------------------------


==============================================================================
C++        | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
------------------------------------------------------------------------------


==============================================================================
C++        | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
           | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
------------------------------------------------------------------------------


==============================================================================
C++        | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
------------------------------------------------------------------------------


==============================================================================
C++        | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
           | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
```

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CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Mar-2023

Hardware Availability: Mar-2021

Software Availability: Feb-2023

Compiler Version Notes (Continued)

```
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin
------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on
  LLVM Mirror.Version.13.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/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`

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(H12DSU-iN , AMD EPYC 7543)

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CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Mar-2023

Hardware Availability: Mar-2021

Software Availability: Feb-2023

Base Optimization Flags

C benchmarks:

```
-m64 -Wl,-allow-multiple-definition -Wl,-mllvm -Wl,-enable-licm-vrp
-flto -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-loop-fusion -O3 -march=znver3 -fveclib=AMDLIBM
-ffast-math -fstruct-layout=5 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays
-mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -enable-loop-fusion -z muldefs -lamdlibm -ljemalloc -lflang
```

C++ benchmarks:

```
-m64 -std=c++98 -flto -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-loop-fusion -O3 -march=znver3 -fveclib=AMDLIBM
-ffast-math -mllvm -enable-partial-unswitch
-mllvm -unroll-threshold=100 -finline-aggressive
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -convert-pow-exp-to-int=false
-mllvm -enable-loop-fusion -z muldefs -fvirtual-function-elimination
-fvisibility=hidden -lamdlibm -ljemalloc -lflang
```

Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-flto -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-loop-fusion -O3 -march=znver3 -fveclib=AMDLIBM
-ffast-math -z muldefs -mllvm -unroll-aggressive
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang
```

Base Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument
```

Supermicro

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Software Availability: Feb-2023

Base Other Flags (Continued)

C++ 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: `-m64 -Wl,-allow-multiple-definition`
`-Wl,-mllvm -Wl,-enable-licm-vrp -flto`
`-Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-fprofile-instr-generate`(pass 1)
`-fprofile-instr-use`(pass 2) `-Ofast -march=znver3`

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Peak Optimization Flags (Continued)

500.perlbench_r (continued):
```
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=false
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc
```

502.gcc_r: `-m32 -Wl,-allow-multiple-definition`
```
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -fgnu89-inline
-ljemalloc
```

505.mcf_r: `-m64 -Wl,-allow-multiple-definition`
```
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc
```

525.x264_r: `basepeak = yes`

557.xz_r: `Same as 505.mcf_r`

C++ benchmarks:

520.omnetpp_r: `-m64 -std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize`
```
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-flv-function-specialization -mllvm -enable-licm-vrp
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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Supermicro

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(H12DSU-iN , AMD EPYC 7543)

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Peak Optimization Flags (Continued)

520.omnetpp_r (continued):
```
-mllvm -global-vectorize-slp=true
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -ljemalloc
```

523.xalancbmk_r: `-m32 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto`
```
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-flv-function-specialization -mllvm -enable-licm-vrp
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-ljemalloc
```

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `Same as 520.omnetpp_r`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

Peak Other Flags

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

502.gcc_r: `-L/usr/lib -Wno-unused-command-line-argument`
`-L/sppo/bin/cpu2017v118-aocc3-milanX/amd_rate_aocc320_milanx_A_lib/lib32`

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

523.xalancbmk_r: `-L/usr/lib -Wno-unused-command-line-argument`
`-L/sppo/bin/cpu2017v118-aocc3-milanX/amd_rate_aocc320_milanx_A_lib/lib32`

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The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/aocc320-flags-A1.html
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Milan-revH.html

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

http://www.spec.org/cpu2017/flags/aocc320-flags-A1.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Milan-revH.xml

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

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