SPEC CPU®2017 Integer Rate Result

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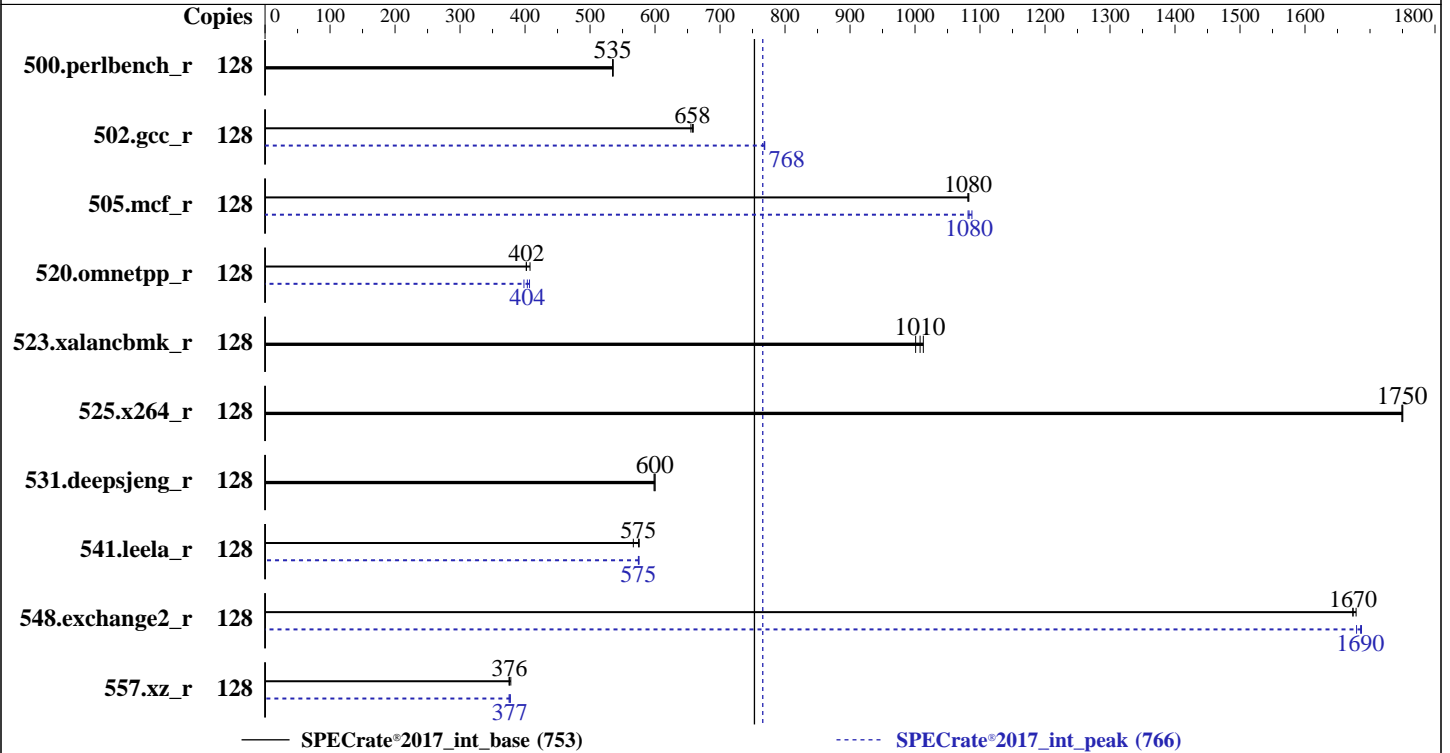## xFusion

FusionServer 1258H V7
(AMD EPYC 9354)

$SPECrate®2017\_int\_base = 753$

$SPECrate®2017\_int\_peak = 766$

CPU2017 License: 6488

Test Sponsor: xFusion

Tested by: xFusion

Test Date: Sep-2024

Hardware Availability: Nov-2023

Software Availability: Dec-2023

Benchmark	Copies	Base	Peak
500.perlbench_r	128	535	
502.gcc_r	128	658	768
505.mcf_r	128	1080	1080
520.omnetpp_r	128	402	404
523.xalancbmk_r	128	1010	
525.x264_r	128	1750	
531.deepsjeng_r	128	600	
541.leela_r	128	575	575
548.exchange2_r	128	1670	1690
557.xz_r	128	376	377

SPECrate®2017_int_base (753)　　SPECrate®2017_int_peak (766)

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 2Rx8 PC5-4800B-R)

Storage: 1 x 480 GB SATA SSD

Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux release 9.0 (Plow) 5.14.0-70.13.1.el9_0.x86_64

Compiler: C/C++/Fortran: Version 4.0.0 of AOCC

Parallel: No

Firmware: Version 2.09.26 released Aug-2024

File System: xfs

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	381	535	381	536	**381**	**535**	128	381	535	381	536	**381**	**535**
502.gcc_r	128	277	655	**276**	**658**	275	659	128	**236**	**768**	236	768	236	769
505.mcf_r	128	191	1080	**191**	**1080**	191	1080	128	191	1080	**191**	**1080**	190	1090
520.omnetpp_r	128	418	402	412	408	**418**	**402**	128	422	398	**416**	**404**	413	407
523.xalancbmk_r	128	135	1000	133	1010	**134**	**1010**	128	135	1000	133	1010	**134**	**1010**
525.x264_r	128	**128**	**1750**	128	1750	128	1750	128	**128**	**1750**	128	1750	128	1750
531.deepsjeng_r	128	245	598	245	600	**245**	**600**	128	245	598	245	600	**245**	**600**
541.leela_r	128	368	576	**369**	**575**	374	567	128	**369**	**575**	368	575	369	574
548.exchange2_r	128	200	1680	**200**	**1670**	200	1670	128	200	1680	**199**	**1690**	199	1690
557.xz_r	128	366	378	**368**	**376**	368	375	128	368	375	**367**	**377**	366	377
SPECrate®2017_int_base =		**753**												
SPECrate®2017_int_peak =		**766**												

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

Compiler Notes

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

Submit Notes

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

Operating System Notes

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

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

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

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

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

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/cpu2017/amd_rate_aocc400_znver4_A_lib/lib:/cpu2017/amd_rate_aocc400_znver4_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 settings:
 Determinism Control = Manual
 Determinism Enable = Power
 TDP Control = Manual
 TDP = 400
 PPT Control = Manual
 PPT = 400
 NUMA Nodes Per Socket = NPS4

 Sysinfo program /cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Mon Sep 23 19:01:25 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 250 (250-6.el9_0)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. tuned-adm active
 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
```

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Platform Notes (Continued)

```
 22. dmidecode
 23. BIOS
   ------------------------------------------------------------

   ------------------------------------------------------------
 1. uname -a
   Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
   x86_64 x86_64 GNU/Linux

   ------------------------------------------------------------
 2. w
    19:01:25 up 1 min,  2 users,  load average: 1.10, 0.65, 0.25
   USER     TTY          LOGIN@   IDLE   JCPU   PCPU WHAT
   root     pts/0    19:00    1:13   0.00s  0.00s -bash
   root     pts/1    19:01   11.00s  1.05s  0.00s -bash

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

   ------------------------------------------------------------
 4. ulimit -a
   real-time non-blocking time  (microseconds, -R) unlimited
   core file size              (blocks, -c) unlimited
   data seg size               (kbytes, -d) unlimited
   scheduling priority                 (-e) 0
   file size                   (blocks, -f) unlimited
   pending signals                     (-i) 6191057
   max locked memory           (kbytes, -l) 2097152
   max memory size             (kbytes, -m) unlimited
   open files                          (-n) 1024
   pipe size                (512 bytes, -p) 8
   POSIX message queues         (bytes, -q) 819200
   real-time priority                  (-r) 0
   stack size                  (kbytes, -s) unlimited
   cpu time                   (seconds, -t) unlimited
   max user processes                  (-u) 6191057
   virtual memory              (kbytes, -v) unlimited
   file locks                          (-x) unlimited

   ------------------------------------------------------------
 5. sysinfo process ancestry
  /usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
  sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
  sshd: root [priv]
  sshd: root@pts/1
  -bash
  -bash
  python3 ./run_amd_rate_aocc400_znver4_A1.py
  /bin/bash ./amd_rate_aocc400_znver4_A1.sh
  runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 intrate
  runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
    --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
    $SPEC/tmp/CPU2017.021/templogs/preenv.intrate.021.0.log --lognum 021.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /cpu2017

   ------------------------------------------------------------
 6. /proc/cpuinfo
     model name      : AMD EPYC 9354 32-Core Processor
```

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Platform Notes (Continued)

```
      vendor_id       : AuthenticAMD
      cpu family      : 25
      model           : 17
      stepping        : 1
      microcode       : 0xa101148
      bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
      TLB size        : 3584 4K pages
      cpu cores       : 32
      siblings        : 64
      2 physical ids (chips)
      128 processors (hardware threads)
      physical id 0: core ids 0-3,8-11,16-19,24-27,32-35,40-43,48-51,56-59
      physical id 1: core ids 0-3,8-11,16-19,24-27,32-35,40-43,48-51,56-59
      physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
      physical id 1: apicids 128-135,144-151,160-167,176-183,192-199,208-215,224-231,240-247
  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 2.37.4:
    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
    BIOS Vendor ID:          Advanced Micro Devices, Inc.
    Model name:              AMD EPYC 9354 32-Core Processor
    BIOS 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:             3799.0720
    CPU min MHz:             1500.0000
    BogoMIPS:                6489.95
    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 x2apic movbe
                             popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy
                             abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext
                             perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3
                             invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1
                             avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                             avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
                             xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                             avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
                             svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
                             pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
                             umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                             avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
    Virtualization:          AMD-V
    L1d cache:               2 MiB (64 instances)
```

(Continued on next page)

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Platform Notes (Continued)

```
  L1i cache:                     2 MiB (64 instances)
  L2 cache:                      64 MiB (64 instances)
  L3 cache:                      512 MiB (16 instances)
  NUMA node(s):                  8
  NUMA node0 CPU(s):             0-7,64-71
  NUMA node1 CPU(s):             8-15,72-79
  NUMA node2 CPU(s):             16-23,80-87
  NUMA node3 CPU(s):             24-31,88-95
  NUMA node4 CPU(s):             32-39,96-103
  NUMA node5 CPU(s):             40-47,104-111
  NUMA node6 CPU(s):             48-55,112-119
  NUMA node7 CPU(s):             56-63,120-127
  Vulnerability Itlb multihit:   Not affected
  Vulnerability L1tf:            Not affected
  Vulnerability Mds:             Not affected
  Vulnerability Meltdown:        Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:      Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:      Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                                 filling
  Vulnerability Srbds:           Not affected
  Vulnerability Tsx async abort: Not affected

 From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d       32K      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: 8 nodes (0-7)
   node 0 cpus: 0-7,64-71
   node 0 size: 95928 MB
   node 0 free: 94883 MB
   node 1 cpus: 8-15,72-79
   node 1 size: 96764 MB
   node 1 free: 96368 MB
   node 2 cpus: 16-23,80-87
   node 2 size: 96764 MB
   node 2 free: 96374 MB
   node 3 cpus: 24-31,88-95
   node 3 size: 96764 MB
   node 3 free: 96364 MB
   node 4 cpus: 32-39,96-103
   node 4 size: 96728 MB
   node 4 free: 96299 MB
   node 5 cpus: 40-47,104-111
   node 5 size: 96764 MB
   node 5 free: 96385 MB
   node 6 cpus: 48-55,112-119
   node 6 size: 96764 MB
   node 6 free: 96383 MB
   node 7 cpus: 56-63,120-127
   node 7 size: 96711 MB
   node 7 free: 96310 MB
   node distances:
   node   0   1   2   3   4   5   6   7
```

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Platform Notes (Continued)

```
   0:  10  12  12  12  32  32  32  32
   1:  12  10  12  12  32  32  32  32
   2:  12  12  10  12  32  32  32  32
   3:  12  12  12  10  32  32  32  32
   4:  32  32  32  32  10  12  12  12
   5:  32  32  32  32  12  10  12  12
   6:  32  32  32  32  12  12  10  12
   7:  32  32  32  32  12  12  12  10


  -------------------------------------------------------------
  9. /proc/meminfo
    MemTotal:       791747028 kB


  -------------------------------------------------------------
  10. who -r
    run-level 5 Sep 23 19:00


  -------------------------------------------------------------
  11. Systemd service manager version: systemd 250 (250-6.el9_0)
    Default Target  Status
    graphical       running


  -------------------------------------------------------------
  12. Services, from systemctl list-unit-files
    STATE             UNIT FILES
    enabled           ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                      accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker firewalld
                      gdm getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt
                      low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
                      nvmefc-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rhsmcertd
                      rsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd switcheroo-control
                      systemd-network-generator tuned udisks2 upower vgauthd vmtoolsd
    enabled-runtime   systemd-remount-fs
    disabled          arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown
                      canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
                      dbus-daemon debug-shell dnsmasq hwloc-dump-hwdata iprdump iprinit iprupdate iscsid
                      iscsiuio kpatch kvm_stat ledmon man-db-restart-cache-update nftables nvmf-autoconnect
                      podman podman-auto-update podman-restart psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm
                      rhsm-facts rpmdb-rebuild serial-getty@ speech-dispatcherd sshd-keygen@
                      systemd-boot-check-no-failures systemd-pstore systemd-sysext wpa_supplicant
    indirect          spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
  -------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
    root=/dev/mapper/rhel-root
    ro
    crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
    resume=/dev/mapper/rhel-swap
    rd.lvm.lv=rhel/root
    rd.lvm.lv=rhel/swap
    rhgb
    quiet
    nohz_full=1-127


  -------------------------------------------------------------
  14. 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
```

(Continued on next page)

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Platform Notes (Continued)

```
                     within this range.
      boost state support:
        Supported: yes
        Active: yes
        Boost States: 0
        Total States: 3
        Pstate-P0:  3250MHz


    ---------------------------------------------------------------
 15. tuned-adm active
    It seems that tuned daemon is not running, preset profile is not activated.
    Preset profile: throughput-performance


    ---------------------------------------------------------------
 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
    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     Red Hat Enterprise Linux 9.0 (Plow)
    redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
    system-release Red Hat Enterprise Linux release 9.0 (Plow)

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

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Platform Notes (Continued)

```
  20. Disk information
  SPEC is set to: /cpu2017
    Filesystem          Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-root xfs   70G   11G   60G  15% /

  ------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Product:        1258H V7
      Product Family: Genoa

  ------------------------------------------------------------
  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-CQKDG 32 GB 2 rank 4800

  ------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:     INSYDE Corp.
    BIOS Version:    2.09.26
    BIOS Date:       08/15/2024
    BIOS Revision:   2.9
```

Compiler Version Notes

```
==============================================================================================
C        | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/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 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C        | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


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

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xFusion

FusionServer 1258H V7
(AMD EPYC 9354)

SPECrate®2017_int_base = 753

SPECrate®2017_int_peak = 766

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Sep-2024
Hardware Availability: Nov-2023
Software Availability: Dec-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 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/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 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------


=================================================================================================
Fortran | 548.exchange2_r(base, peak)
-------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/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`

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xFusion

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Test Date: Sep-2024
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Base Portability Flags (Continued)

541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-lamdalloc
```

C++ benchmarks:

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

Fortran benchmarks:

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

Base Other Flags

C benchmarks:

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

SPEC CPU®2017 Integer Rate Result

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xFusion

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Base Other Flags (Continued)

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 -z muldefs -Ofast -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`

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

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Hardware Availability: Nov-2023
Software Availability: Dec-2023

Peak Optimization Flags (Continued)

502.gcc_r (continued):
```
-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline
-lamdalloc
```

505.mcf_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc
```

525.x264_r: `basepeak = yes`

557.xz_r: `Same as 505.mcf_r`

C++ benchmarks:

520.omnetpp_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext
```

523.xalancbmk_r: `basepeak = yes`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lflang -lamdalloc-ext
```

Fortran benchmarks:
```
-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
```

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Peak Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc
```

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/aocc4/znver4/rate/amd_rate_aocc400_znver4_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/aocc400-flags.html
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-AMD-V1.1.html
```

You can also download the XML flags sources by saving the following links:
```
http://www.spec.org/cpu2017/flags/aocc400-flags.xml
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-AMD-V1.1.xml
```

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

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