SPEC CPU®2017 Integer Rate Result

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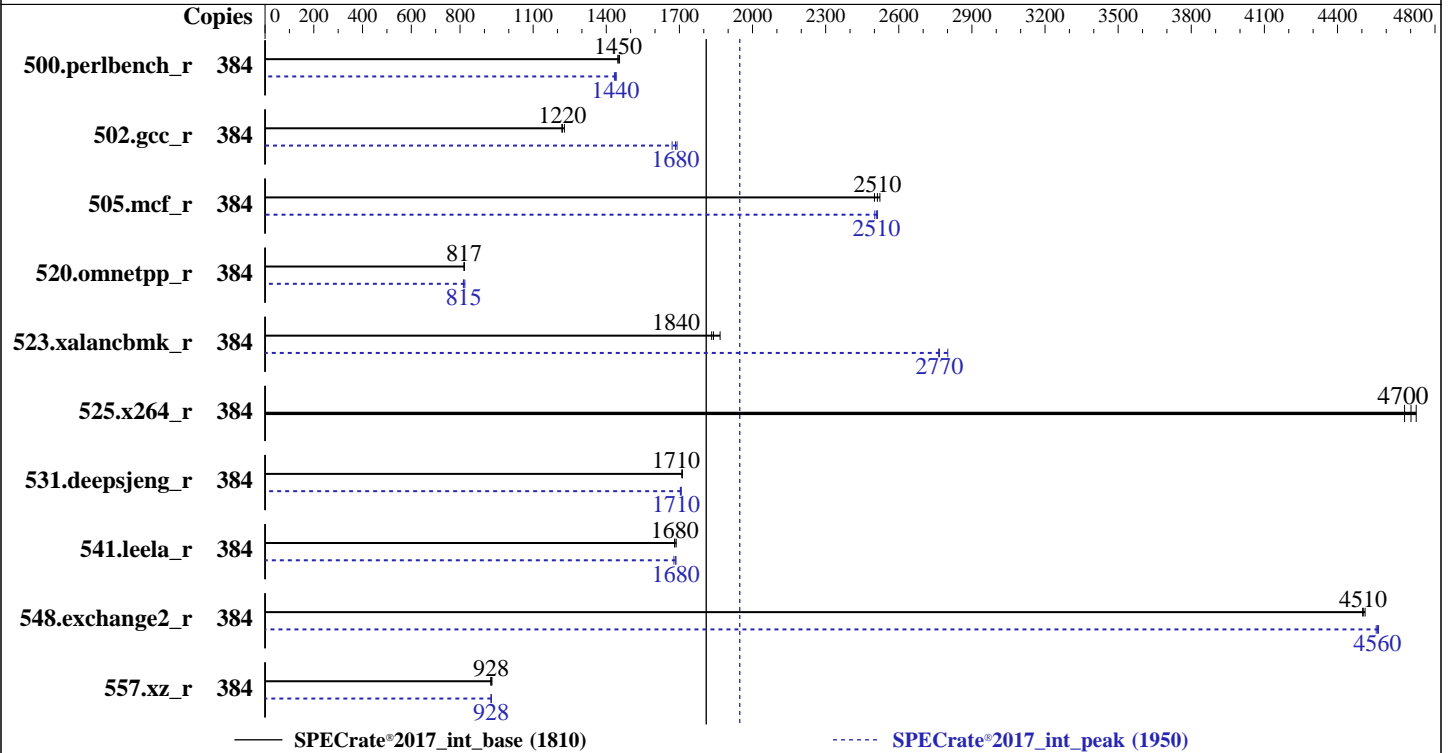## xFusion

FusionServer 1258H V7
AMD EPYC 9654

$SPECrate^{®}2017\_int\_base = 1810$

$SPECrate^{®}2017\_int\_peak = 1950$

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

Test Date: Jan-2024
Hardware Availability: Nov-2023
Software Availability: Oct-2023

Benchmark	Copies	base	peak
500.perlbench_r	384	1450	1440
502.gcc_r	384	1220	1680
505.mcf_r	384	2510	2510
520.omnetpp_r	384	817	815
523.xalancbmk_r	384	1840	2770
525.x264_r	384	4700	
531.deepsjeng_r	384	1710	1710
541.leela_r	384	1680	1680
548.exchange2_r	384	4510	4560
557.xz_r	384	928	928

SPECrate®2017_int_base (1810)   SPECrate®2017_int_peak (1950)

Hardware

CPU Name: AMD EPYC 9654
 Max MHz: 3700
 Nominal: 2400
Enabled: 192 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores
 Other: None
Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 960 GB SATA SSD
Other: None

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 1.06.29 released Nov-2023
File System: xfs
System State: Run level 3 (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	384	**422**	**1450**	420	1450	422	1450	384	426	1430	**425**	**1440**	424	1440
502.gcc_r	384	**446**	**1220**	446	1220	443	1230	384	326	1670	**323**	**1680**	322	1690
505.mcf_r	384	248	2500	246	2520	**247**	**2510**	384	247	2510	**247**	**2510**	248	2500
520.omnetpp_r	384	616	818	**617**	**817**	617	817	384	619	814	615	820	**618**	**815**
523.xalancbmk_r	384	217	1870	**220**	**1840**	221	1830	384	145	2800	**147**	**2770**	147	2760
525.x264_r	384	142	4720	144	4680	**143**	**4700**	384	142	4720	144	4680	**143**	**4700**
531.deepsjeng_r	384	257	1710	**257**	**1710**	257	1710	384	258	1710	258	1700	**258**	**1710**
541.leela_r	384	378	1680	377	1690	**378**	**1680**	384	379	1680	377	1690	**377**	**1680**
548.exchange2_r	384	223	4510	**223**	**4510**	223	4500	384	220	4570	**220**	**4560**	221	4560
557.xz_r	384	**447**	**928**	448	926	446	931	384	447	928	447	928	**447**	**928**
SPECrate®2017_int_base =		**1810**												
SPECrate®2017_int_peak =		**1950**												

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.

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 =
     "/home/cpu2017/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017/amd_rate_aocc400_znver4_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 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:
 TDP: 400
 Determinism Enable set to Power
 PPT: 400
 NPS: 4

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Tue Jan 30 00:41:04 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
```

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Platform Notes (Continued)

```
  21. /sys/devices/virtual/dmi/id
  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
     00:41:04 up 5 min,  2 users,  load average: 0.28, 1.51, 0.95
    USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
    root     pts/0      00:37    2:24   0.00s  0.00s -bash
    root     pts/1      00:38    1:12   1.25s  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) 0
    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 --switched-root --system --deserialize 30
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: root [priv]
   sshd: root@pts/1
   -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/CPU2017.022/templogs/preenv.intrate.022.0.log --lognum 022.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017


  -----------------------------------------------------------
  6. /proc/cpuinfo
      model name       : AMD EPYC 9654 96-Core Processor
```

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Platform Notes (Continued)

```
      vendor_id       : AuthenticAMD
      cpu family      : 25
      model           : 17
      stepping        : 1
      microcode       : 0xa101121
      bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
      TLB size        : 3584 4K pages
      cpu cores       : 96
      siblings        : 192
      2 physical ids (chips)
      384 processors (hardware threads)
      physical id 0: core ids 0-95
      physical id 1: core ids 0-95
      physical id 0: apicids 0-191
      physical id 1: apicids 256-447
   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):                  384
     On-line CPU(s) list:     0-383
     Vendor ID:               AuthenticAMD
     BIOS Vendor ID:          Advanced Micro Devices, Inc.
     Model name:              AMD EPYC 9654 96-Core Processor
     BIOS Model name:         AMD EPYC 9654 96-Core Processor
     CPU family:              25
     Model:                   17
     Thread(s) per core:      2
     Core(s) per socket:      96
     Socket(s):               2
     Stepping:                1
     Frequency boost:         enabled
     CPU max MHz:             3707.8120
     CPU min MHz:             1500.0000
     BogoMIPS:                4799.63
     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:               6 MiB (192 instances)
```

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Platform Notes (Continued)

```
  L1i cache:                         6 MiB (192 instances)
  L2 cache:                          192 MiB (192 instances)
  L3 cache:                          768 MiB (24 instances)
  NUMA node(s):                      24
  NUMA node0 CPU(s):                 0-7,192-199
  NUMA node1 CPU(s):                 8-15,200-207
  NUMA node2 CPU(s):                 16-23,208-215
  NUMA node3 CPU(s):                 24-31,216-223
  NUMA node4 CPU(s):                 32-39,224-231
  NUMA node5 CPU(s):                 40-47,232-239
  NUMA node6 CPU(s):                 48-55,240-247
  NUMA node7 CPU(s):                 56-63,248-255
  NUMA node8 CPU(s):                 64-71,256-263
  NUMA node9 CPU(s):                 72-79,264-271
  NUMA node10 CPU(s):                80-87,272-279
  NUMA node11 CPU(s):                88-95,280-287
  NUMA node12 CPU(s):                96-103,288-295
  NUMA node13 CPU(s):                104-111,296-303
  NUMA node14 CPU(s):                112-119,304-311
  NUMA node15 CPU(s):                120-127,312-319
  NUMA node16 CPU(s):                128-135,320-327
  NUMA node17 CPU(s):                136-143,328-335
  NUMA node18 CPU(s):                144-151,336-343
  NUMA node19 CPU(s):                152-159,344-351
  NUMA node20 CPU(s):                160-167,352-359
  NUMA node21 CPU(s):                168-175,360-367
  NUMA node22 CPU(s):                176-183,368-375
  NUMA node23 CPU(s):                184-191,376-383
  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       6M    8 Data            1    64        1             64
    L1i       32K       6M    8 Instruction     1    64        1             64
    L2         1M     192M    8 Unified         2  2048        1             64
    L3        32M     768M   16 Unified         3 32768        1             64

    ---------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 24 nodes (0-23)
  node 0 cpus: 0-7,192-199
  node 0 size: 31414 MB
  node 0 free: 30874 MB
  node 1 cpus: 8-15,200-207
  node 1 size: 32252 MB
  node 1 free: 32019 MB
  node 2 cpus: 16-23,208-215
  node 2 size: 32252 MB
  node 2 free: 31774 MB
  node 3 cpus: 24-31,216-223
```

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Platform Notes (Continued)

```
       node 3 size: 32252 MB
       node 3 free: 32044 MB
       node 4 cpus: 32-39,224-231
       node 4 size: 32252 MB
       node 4 free: 32056 MB
       node 5 cpus: 40-47,232-239
       node 5 size: 32252 MB
       node 5 free: 31917 MB
       node 6 cpus: 48-55,240-247
       node 6 size: 32252 MB
       node 6 free: 31668 MB
       node 7 cpus: 56-63,248-255
       node 7 size: 32252 MB
       node 7 free: 31710 MB
       node 8 cpus: 64-71,256-263
       node 8 size: 32252 MB
       node 8 free: 31829 MB
       node 9 cpus: 72-79,264-271
       node 9 size: 32252 MB
       node 9 free: 32053 MB
       node 10 cpus: 80-87,272-279
       node 10 size: 32252 MB
       node 10 free: 32050 MB
       node 11 cpus: 88-95,280-287
       node 11 size: 32216 MB
       node 11 free: 31929 MB
       node 12 cpus: 96-103,288-295
       node 12 size: 32252 MB
       node 12 free: 32062 MB
       node 13 cpus: 104-111,296-303
       node 13 size: 32252 MB
       node 13 free: 32047 MB
       node 14 cpus: 112-119,304-311
       node 14 size: 32252 MB
       node 14 free: 32048 MB
       node 15 cpus: 120-127,312-319
       node 15 size: 32252 MB
       node 15 free: 32027 MB
       node 16 cpus: 128-135,320-327
       node 16 size: 32252 MB
       node 16 free: 32031 MB
       node 17 cpus: 136-143,328-335
       node 17 size: 32252 MB
       node 17 free: 32055 MB
       node 18 cpus: 144-151,336-343
       node 18 size: 32252 MB
       node 18 free: 32048 MB
       node 19 cpus: 152-159,344-351
       node 19 size: 32252 MB
       node 19 free: 32054 MB
       node 20 cpus: 160-167,352-359
       node 20 size: 32252 MB
       node 20 free: 31948 MB
       node 21 cpus: 168-175,360-367
       node 21 size: 32252 MB
       node 21 free: 31938 MB
       node 22 cpus: 176-183,368-375
       node 22 size: 32252 MB
       node 22 free: 31929 MB
       node 23 cpus: 184-191,376-383
```

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Platform Notes (Continued)

```
    node 23 size: 32177 MB
    node 23 free: 31858 MB
    node distances:
    node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23
      0:  10  11  11  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      1:  11  10  11  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      2:  11  11  10  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      3:  12  12  12  10  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      4:  12  12  12  11  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      5:  12  12  12  11  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      6:  12  12  12  12  12  12  10  11  11  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      7:  12  12  12  12  12  12  11  10  11  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      8:  12  12  12  12  12  12  11  11  10  12  12  12  32  32  32  32  32  32  32  32  32  32  32  32
      9:  12  12  12  12  12  12  12  12  12  10  11  11  32  32  32  32  32  32  32  32  32  32  32  32
     10:  12  12  12  12  12  12  12  12  12  11  10  11  32  32  32  32  32  32  32  32  32  32  32  32
     11:  12  12  12  12  12  12  12  12  12  11  11  10  32  32  32  32  32  32  32  32  32  32  32  32
     12:  32  32  32  32  32  32  32  32  32  32  32  32  10  11  11  12  12  12  12  12  12  12  12  12
     13:  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  12  12  12  12  12  12  12  12  12
     14:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  12  12  12  12  12  12  12  12  12
     15:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  10  11  11  12  12  12  12  12  12
     16:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  10  11  12  12  12  12  12  12
     17:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  11  10  12  12  12  12  12  12
     18:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11  11  12  12  12
     19:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10  11  12  12  12
     20:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11  10  12  12  12
     21:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  10  11  11
     22:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  11  10  11
     23:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12  11  11  10


    --------------------------------------------------------------
 9. /proc/meminfo
    MemTotal:       791664324 kB


    --------------------------------------------------------------
10. who -r
   run-level 3 Jan 30 00:35


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


    --------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond
                    dbus-broker firewalld getty@ irqbalance kdump mdmonitor microcode nis-domainname rhsmcertd
                    rsyslog selinux-autorelabel-mark sshd sssd systemd-network-generator tuned udisks2
   enabled-runtime  systemd-remount-fs
   disabled         console-getty cpupower debug-shell hwloc-dump-hwdata kvm_stat man-db-restart-cache-update
                    nftables rdisc rhsm rhsm-facts rpmdb-rebuild serial-getty@ sshd-keygen@
                    systemd-boot-check-no-failures systemd-pstore systemd-sysext
   indirect         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=UUID=da6bcd86-e169-49dc-be09-79aca5bc5a8d
   ro
   crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
```

(Continued on next page)

xFusion

FusionServer 1258H V7
AMD EPYC 9654

SPECrate®2017_int_base = 1810

SPECrate®2017_int_peak = 1950

CPU2017 License: 6488
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Tested by: xFusion

Test Date: Jan-2024
Hardware Availability: Nov-2023
Software Availability: Oct-2023

Platform Notes (Continued)

```
  resume=UUID=73e1e4c9-f998-43cc-8ff7-916ce4b89f9b
  nohz_full=1-383


  --------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 1.50 GHz and 2.40 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:  2400MHz


  --------------------------------------------------------------
15. tuned-adm active
  Current active 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


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

SPEC CPU®2017 Integer Rate Result

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Platform Notes (Continued)

```
  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)

    ----------------------------------------------------------------
  20. Disk information
  SPEC is set to: /home/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda3       xfs   719G   27G  692G   4% /home

    ----------------------------------------------------------------
  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:      1.06.29
    BIOS Date:         11/23/2023
    BIOS Revision:     1.6
```

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)
--------------------------------------------------------------------------------------------------------------
```

(Continued on next page)

xFusion

FusionServer 1258H V7
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Compiler Version Notes (Continued)

```
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++     | 523.xalancbmk_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++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base,
        | peak)
-----------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#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++     | 523.xalancbmk_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++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base,
        | peak)
-----------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#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
```

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xFusion

FusionServer 1258H V7
AMD EPYC 9654

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

Test Date: Jan-2024
Hardware Availability: Nov-2023
Software Availability: Oct-2023

Compiler Version Notes (Continued)

```
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`
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
```

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-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
```

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
```

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CPU2017 License: 6488
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Tested by: xFusion

Test Date: Jan-2024
Hardware Availability: Nov-2023
Software Availability: Oct-2023

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 -flto -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=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-faggressive-loop-transform -fvector-transform
-fscalar-transform -lamdlibm -lflang -lamdalloc

502.gcc_r: -m32 -flto -z muldefs -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline
-lamdalloc

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

525.x264_r: basepeak = yes

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Standard Performance Evaluation Corporation (info@spec.org)
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SPEC CPU®2017 Integer Rate Result

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Peak Optimization Flags (Continued)

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: -m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext

531.deepsjeng_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -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 -lamdalloc-ext

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
```

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xFusion

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Peak Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-mllvm -optimize-strided-mem-cost -floop-transform
-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 (except as noted below):
```
-Wno-unused-command-line-argument
```

```
 523.xalancbmk_r: -L/usr/lib32 -Wno-unused-command-line-argument
-L/home/work/cpu2017/v119/aocc4/znver4/rate/amd_rate_aocc400_znver4_A_lib/lib32
```

Fortran benchmarks:
```
-Wno-unused-command-line-argument
```

The flags files that were used to format this result can be browsed at
```
 http://www.spec.org/cpu2017/flags/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
```

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

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