SPEC CPU®2017 Integer Rate Result

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Fujitsu

PRIMERGY RX2450 M2,
AMD EPYC 9384X, 3.10 GHz

$SPECrate^{®}2017\_int\_base =$ 804

$SPECrate^{®}2017\_int\_peak =$ Not Run

CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Feb-2024

Hardware Availability: Feb-2024

Software Availability: Nov-2022

Benchmark	Copies	Result
500.perlbench_r	128	584
502.gcc_r	128	739
505.mcf_r	128	1120
520.omnetpp_r	128	457
523.xalancbmk_r	128	1150
525.x264_r	128	1780
531.deepsjeng_r	128	603
541.leela_r	128	581
548.exchange2_r	128	1670
557.xz_r	128	426

SPECrate®2017_int_base (804)

Hardware

CPU Name: AMD EPYC 9384X
  Max MHz: 3900
  Nominal: 3100
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: 768 MB I+D on chip per chip,
  96 MB shared / 4 cores
  Other: None
Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x PCIE NVME SSD, 2 TB
Other: Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP4
  5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Fujitsu BIOS Version Version V5.0.0.27 R1.5.0 for
  D4129-A1x. Released May-2024
  tested as V5.0.0.27 R1.4.0 for D4129-A1x Jan-2024
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance
  at the cost of additional power usage

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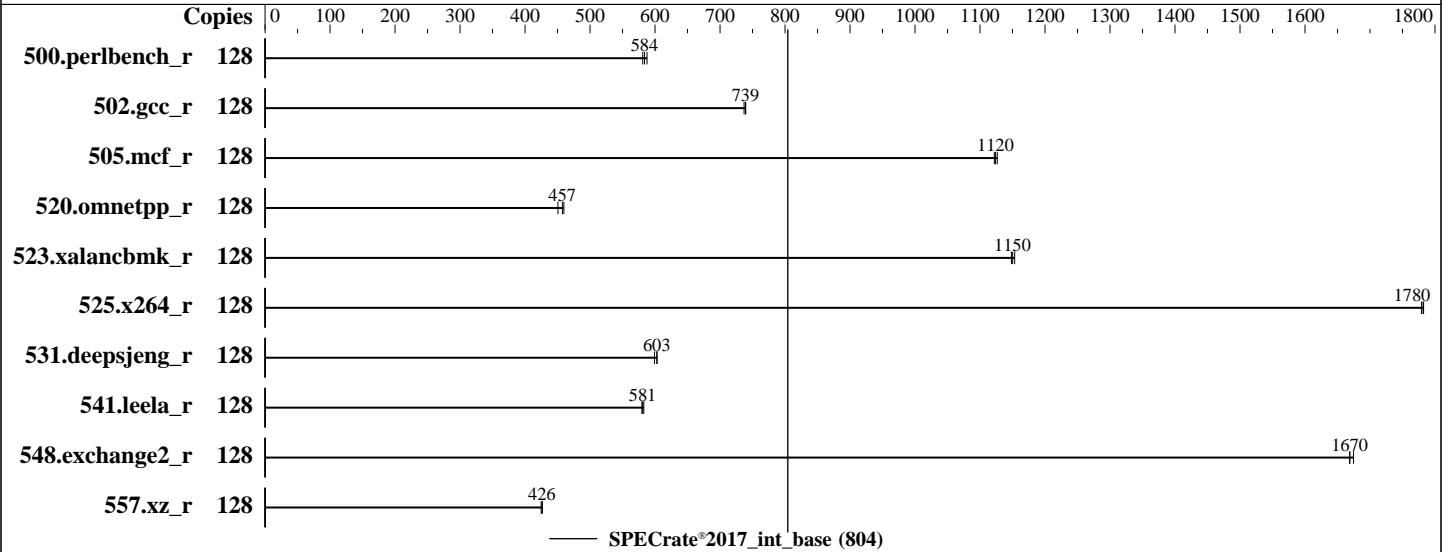
SPECrate®2017_int_peak = Not Run

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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	347	588	**349**	**584**	351	581							
502.gcc_r	128	245	740	**245**	**739**	246	737							
505.mcf_r	128	**184**	**1120**	184	1120	184	1130							
520.omnetpp_r	128	**367**	**457**	373	451	365	460							
523.xalancbmk_r	128	118	1150	117	1150	**118**	**1150**							
525.x264_r	128	**126**	**1780**	126	1780	126	1780							
531.deepsjeng_r	128	245	599	**243**	**603**	243	603							
541.leela_r	128	**365**	**581**	366	580	364	583							
548.exchange2_r	128	200	1670	201	1670	**201**	**1670**							
557.xz_r	128	324	427	**324**	**426**	325	425							

SPECrate®2017_int_base =   804

SPECrate®2017_int_peak =   Not Run

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.
```

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/home/Benchmark/speccpu2017r/amd_rate_aocc400_znver4_A_lib/lib:/home/Benchmark/speccpu2017r/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 configuration:
Determinism Slider = Power
TDP Control = Manual
TDP Limit = 400
Package Power Limit Control = Manual
Package Power Limit = 400
DF PState Frequency Optimizer = Enabled
Power Profile Selection = High Performance
NUMA nodes per socket = NPS4
Chipselect Interleaving = Enabled
Probe Filter Organization = Shared
Periodic Directory Rinse (PDR) Tuning = Cache-Bound
Fan Control = Full


 Sysinfo program /home/Benchmark/speccpu2017r/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Feb 29 22:17:57 2024

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

 -----------------------------------------------------------
 Table of contents
 -----------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
```

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Platform Notes (Continued)

```
    14. cpupower frequency-info
    15. sysctl
    16. /sys/kernel/mm/transparent_hugepage
    17. /sys/kernel/mm/transparent_hugepage/khugepaged
    18. OS release
    19. Disk information
    20. /sys/devices/virtual/dmi/id
    21. dmidecode
    22. BIOS
    ------------------------------------------------------------

    ------------------------------------------------------------
    1. uname -a
      Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
      x86_64 x86_64 x86_64 GNU/Linux

    ------------------------------------------------------------
    2. w
       22:17:57 up 11 min,  1 user,  load average: 0.07, 0.08, 0.08
      USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
      root     tty1      -                22:15   13.00s  1.29s  0.12s /bin/bash ./amd_rate_aocc400_znver4_A1.sh

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

    ------------------------------------------------------------
    4. ulimit -a
      core file size          (blocks, -c) unlimited
      data seg size           (kbytes, -d) unlimited
      scheduling priority             (-e) 0
      file size               (blocks, -f) unlimited
      pending signals                 (-i) 3092222
      max locked memory       (kbytes, -l) 2097152
      max memory size         (kbytes, -m) unlimited
      open files                      (-n) 65536
      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) 3092222
      virtual memory          (kbytes, -v) unlimited
      file locks                      (-x) unlimited

    ------------------------------------------------------------
    5. sysinfo process ancestry
     /usr/lib/systemd/systemd --switched-root --system --deserialize 30
     login -- root
     -bash
     -bash
     python3 ./run_amd_intrate_aocc400_znver4_A1.py
     /bin/bash ./amd_rate_aocc400_znver4_A1.sh
     runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 intrate
     runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 --nopower
       --runmode rate --tune base --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/Benchmark/speccpu2017r
```

(Continued on next page)

Fujitsu

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Platform Notes (Continued)

```
   ----------------------------------------------------------
   6. /proc/cpuinfo
      model name        : AMD EPYC 9384X 32-Core Processor
      vendor_id         : AuthenticAMD
      cpu family        : 25
      model             : 17
      stepping          : 2
      microcode         : 0xa101244
      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 2.37.2:
     Architecture:              x86_64
     CPU op-mode(s):            32-bit, 64-bit
     Address sizes:             52 bits physical, 57 bits virtual
     Byte Order:                Little Endian
     CPU(s):                    128
     On-line CPU(s) list:       0-127
     Vendor ID:                 AuthenticAMD
     Model name:                AMD EPYC 9384X 32-Core Processor
     CPU family:                25
     Model:                     17
     Thread(s) per core:        2
     Core(s) per socket:        32
     Socket(s):                 2
     Stepping:                  2
     Frequency boost:           enabled
     CPU max MHz:               3911.3279
     CPU min MHz:               1500.0000
     BogoMIPS:                  6190.24
     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
```

(Continued on next page)

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Platform Notes (Continued)

```
  L1d cache:                 2 MiB (64 instances)
  L1i cache:                 2 MiB (64 instances)
  L2 cache:                  64 MiB (64 instances)
  L3 cache:                  1.5 GiB (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 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
  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        96M    1.5G   16 Unified        3  98304       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: 96185 MB
  node 0 free: 94958 MB
  node 1 cpus: 8-15,72-79
  node 1 size: 96763 MB
  node 1 free: 96504 MB
  node 2 cpus: 16-23,80-87
  node 2 size: 96763 MB
  node 2 free: 96499 MB
  node 3 cpus: 24-31,88-95
  node 3 size: 96763 MB
  node 3 free: 96522 MB
  node 4 cpus: 32-39,96-103
  node 4 size: 96763 MB
  node 4 free: 96542 MB
  node 5 cpus: 40-47,104-111
  node 5 size: 96763 MB
  node 5 free: 96527 MB
  node 6 cpus: 48-55,112-119
  node 6 size: 96729 MB
  node 6 free: 96477 MB
  node 7 cpus: 56-63,120-127
  node 7 size: 96345 MB
  node 7 free: 96130 MB
  node distances:
```

(Continued on next page)

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Platform Notes (Continued)

```
   node   0   1   2   3   4   5   6   7
    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:       791633976 kB


   --------------------------------------------------------------
   10. who -r
     run-level 3 Feb 29 22:09


   --------------------------------------------------------------
   11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
      Default Target  Status
      multi-user      running


   --------------------------------------------------------------
   12. Services, from systemctl list-unit-files
      STATE             UNIT FILES
      enabled           YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron display-manager getty@
                        haveged irqbalance iscsi issue-generator kbdsettings kdump kdump-early klog lvm2-monitor
                        nscd nvmefc-boot-connections postfix purge-kernels rollback rsyslog smartd sshd wicked
                        wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
      enabled-runtime   systemd-remount-fs
      disabled          accounts-daemon appstream-sync-cache autofs autoyast-initscripts blk-availability
                        bluetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
                        cups-browsed debug-shell ebtables exchange-bmc-os-info firewalld gpm grub2-once
                        haveged-switch-root hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid iscsiuio
                        issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nmb
                        nvmf-autoconnect ostree-remount rdisc rpcbind rpmconfigcheck rsyncd rtkit-daemon
                        serial-getty@ smartd_generate_opts smb snmpd snmptrapd speech-dispatcherd
                        systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                        systemd-time-wait-sync systemd-timesyncd udisks2 upower
      indirect          wickedd


   --------------------------------------------------------------
   13. Linux kernel boot-time arguments, from /proc/cmdline
      BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
      root=UUID=fc0a5636-eee2-42c1-a98a-4213e704cc89
      splash=silent
      mitigations=auto
      quiet
      security=apparmor
      crashkernel=328M,high
      crashkernel=72M,low


   --------------------------------------------------------------
   14. cpupower frequency-info
      analyzing CPU 0:
        current policy: frequency should be within 1.50 GHz and 3.10 GHz.
                        The governor "ondemand" may decide which speed to use
                        within this range.
        boost state support:
```

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Platform Notes (Continued)

```
        Supported: yes
        Active: yes


      ------------------------------------------------------------
15. 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


      ------------------------------------------------------------
16. /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


      ------------------------------------------------------------
17. /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


      ------------------------------------------------------------
18. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP4


      ------------------------------------------------------------
19. Disk information
SPEC is set to: /home/Benchmark/speccpu2017r
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p2 xfs   1.9T  100G  1.8T   6% /


      ------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:          FUJITSU
    Product:         PRIMERGY RX2450 M2
    Product Family:  SERVER
    Serial:          xxxxxxxxxx
```

(Continued on next page)

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Platform Notes (Continued)

```
   ---------------------------------------------------------------
   21. dmidecode
     Additional information from dmidecode 3.2 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-CQKEG 32 GB 2 rank 4800


   ---------------------------------------------------------------
   22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:        FUJITSU // American Megatrends Inc.
     BIOS Version:       V5.0.0.27 R1.4.0 for D4129-A1x
     BIOS Date:          01/30/2024
     BIOS Revision:      1.4
     Firmware Revision: 2.42
```

Compiler Version Notes

```
==============================================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
----------------------------------------------------------------------------------------------
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) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
----------------------------------------------------------------------------------------------
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)
----------------------------------------------------------------------------------------------
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++

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

Fujitsu

PRIMERGY RX2450 M2,
AMD EPYC 9384X, 3.10 GHz

SPECrate®2017_int_base =   804

SPECrate®2017_int_peak = Not Run

CPU2017 License: 19		**Test Date:**	Feb-2024
Test Sponsor: Fujitsu		**Hardware Availability:**	Feb-2024
Tested by: Fujitsu		**Software Availability:**	Nov-2022

Base Compiler Invocation (Continued)

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
-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
```

(Continued on next page)

Fujitsu

PRIMERGY RX2450 M2,
AMD EPYC 9384X, 3.10 GHz

SPECrate®2017_int_base =   804

SPECrate®2017_int_peak = Not Run

CPU2017 License: 19	**Test Date:** Feb-2024
Test Sponsor: Fujitsu	**Hardware Availability:** Feb-2024
Tested by: Fujitsu	**Software Availability:** Nov-2022

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-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
```

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/Fujitsu-Platform-Settings-V1.0-Genoa-RevD.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/Fujitsu-Platform-Settings-V1.0-Genoa-RevD.xml
```

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

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