SPEC CPU®2017 Integer Rate Result

Inspur Electronic Information Industry Co., Ltd. (IEI)

NF5180A7 (AMD EPYC 9474F)

$SPECrate®2017\_int\_base = 1110$

$SPECrate®2017\_int\_peak = 1170$

CPU2017 License: 3358

Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)

Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

Test Date: May-2023

Hardware Availability: Feb-2023

Software Availability: Nov-2022

Benchmark	Copies	base	peak
500.perlbench_r	192	816	
502.gcc_r	192	898	1130
505.mcf_r	192	1620	1620
520.omnetpp_r	192	527	534
523.xalancbmk_r	192	1290	1630
525.x264_r	192	2820	
531.deepsjeng_r	192	954	
541.leela_r	192	925	
548.exchange2_r	192	2670	2670
557.xz_r	192	552	

SPECrate®2017_int_base (1110)   SPECrate®2017_int_peak (1170)

Hardware

CPU Name: AMD EPYC 9474F
 Max MHz: 4100
 Nominal: 3600
Enabled: 96 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 / 6 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1 TB NVME SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 9 (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 04.02.14 released Dec-2022
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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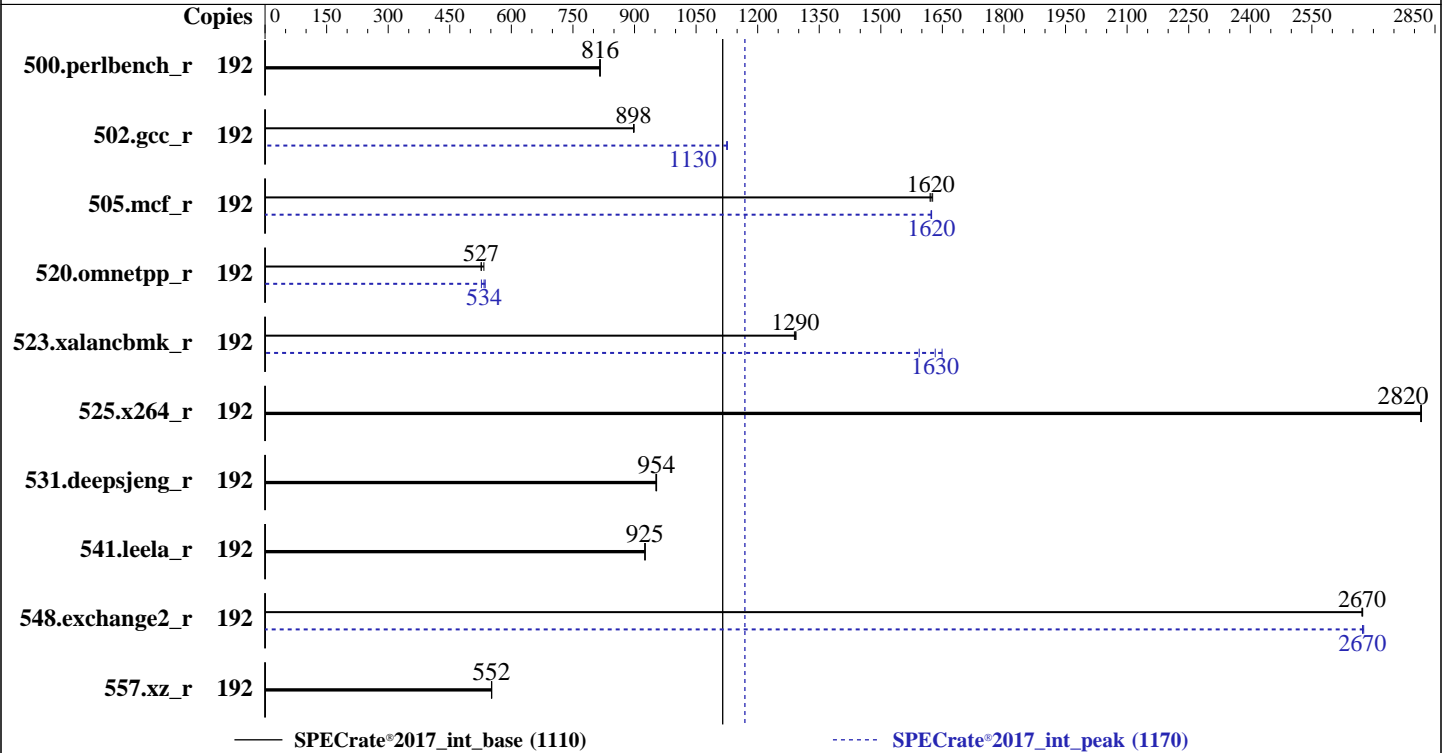
CPU2017 License: 3358　　　　　　　　　　　　　　　　　　**Test Date:** May-2023
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	192	**374**	**816**	374	817	375	815	192	**374**	**816**	374	817	375	815
502.gcc_r	192	302	899	303	898	**303**	**898**	192	242	1120	241	1130	**242**	**1130**
505.mcf_r	192	191	1630	**191**	**1620**	192	1620	192	191	1620	**191**	**1620**	191	1620
520.omnetpp_r	192	**478**	**527**	473	533	478	527	192	470	536	478	527	**472**	**534**
523.xalancbmk_r	192	157	1290	**157**	**1290**	157	1290	192	**124**	**1630**	123	1650	127	1590
525.x264_r	192	**119**	**2820**	119	2820	119	2820	192	**119**	**2820**	119	2820	119	2820
531.deepsjeng_r	192	231	954	**231**	**954**	231	952	192	231	954	**231**	**954**	231	952
541.leela_r	192	344	925	343	926	**344**	**925**	192	344	925	343	926	**344**	**925**
548.exchange2_r	192	188	2670	188	2670	**188**	**2670**	192	188	2680	188	2670	**188**	**2670**
557.xz_r	192	**376**	**552**	376	552	376	552	192	**376**	**552**	376	552	376	552
SPECrate®2017_int_base =	**1110**													
SPECrate®2017_int_peak =	**1170**													

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.

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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_genoa_B_lib/lib:/home/CPU2017/amd_rate_aocc400_genoa_B_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 configuration:
 SVM Mode = disable
 DRAM Scrub time = disable
 NUMA nodes per socket = NPS4
 Determinism Slider = Power
 cTDP = 400
 Package Power Limit = 400

 Sysinfo program /home/CPU2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Wed May 10 09:45:35 2023

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

 --------------------------------------------------------
 Table of contents
 --------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 250 (250-6.el9_0)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. tuned-adm active
 17. sysctl
 18. /sys/kernel/mm/transparent_hugepage
```

(Continued on next page)

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Platform Notes (Continued)

```
  19. /sys/kernel/mm/transparent_hugepage/khugepaged
  20. OS release
  21. Disk information
  22. /sys/devices/virtual/dmi/id
  23. dmidecode
  24. 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
     09:45:35 up 3 min,  1 user,  load average: 0.26, 0.38, 0.18
    USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1       09:43   13.00s  1.25s  0.15s /bin/bash ./amd_rate_aocc400_genoa_B1.sh


  --------------------------------------------------------------
  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) 6191126
    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) 6191126
    virtual memory              (kbytes, -v) unlimited
    file locks                        (-x) unlimited


  --------------------------------------------------------------
  5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 18
   login -- root
   -bash
   python3 ./run_amd_rate_aocc400_genoa_B1.py
   /bin/bash ./amd_rate_aocc400_genoa_B1.sh
   runcpu --config amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 intrate
   runcpu --configfile amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower --runmode
     rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
     $SPEC/tmp/CPU2017.003/templogs/preenv.intrate.003.0.log --lognum 003.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/CPU2017


  --------------------------------------------------------------
  6. /proc/cpuinfo
      model name       : AMD EPYC 9474F 48-Core Processor
```

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Platform Notes (Continued)

```
        vendor_id       : AuthenticAMD
        cpu family      : 25
        model           : 17
        stepping        : 1
        microcode       : 0xa101111
        bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
        TLB size        : 3584 4K pages
        cpu cores       : 48
        siblings        : 96
        2 physical ids (chips)
        192 processors (hardware threads)
        physical id 0: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
        physical id 1: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
        physical id 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
        physical id 1: apicids 128-139,144-155,160-171,176-187,192-203,208-219,224-235,240-251
    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):                  192
      On-line CPU(s) list:     0-191
      Vendor ID:               AuthenticAMD
      BIOS Vendor ID:          Advanced Micro Devices, Inc.
      Model name:              AMD EPYC 9474F 48-Core Processor
      BIOS Model name:         AMD EPYC 9474F 48-Core Processor
      CPU family:              25
      Model:                   17
      Thread(s) per core:      2
      Core(s) per socket:      48
      Socket(s):               2
      Stepping:                1
      Frequency boost:         enabled
      CPU max MHz:             4113.2808
      CPU min MHz:             1500.0000
      BogoMIPS:                7200.00
      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:               3 MiB (96 instances)
```

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Platform Notes (Continued)

```
  L1i cache:                       3 MiB (96 instances)
  L2 cache:                        96 MiB (96 instances)
  L3 cache:                        512 MiB (16 instances)
  NUMA node(s):                    16
  NUMA node0 CPU(s):               0-5,96-101
  NUMA node1 CPU(s):               6-11,102-107
  NUMA node2 CPU(s):               12-17,108-113
  NUMA node3 CPU(s):               18-23,114-119
  NUMA node4 CPU(s):               24-29,120-125
  NUMA node5 CPU(s):               30-35,126-131
  NUMA node6 CPU(s):               36-41,132-137
  NUMA node7 CPU(s):               42-47,138-143
  NUMA node8 CPU(s):               48-53,144-149
  NUMA node9 CPU(s):               54-59,150-155
  NUMA node10 CPU(s):              60-65,156-161
  NUMA node11 CPU(s):              66-71,162-167
  NUMA node12 CPU(s):              72-77,168-173
  NUMA node13 CPU(s):              78-83,174-179
  NUMA node14 CPU(s):              84-89,180-185
  NUMA node15 CPU(s):              90-95,186-191
  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       3M    8 Data             1     64        1             64
      L1i       32K       3M    8 Instruction      1     64        1             64
      L2         1M      96M    8 Unified          2   2048        1             64
      L3        32M     512M   16 Unified          3  32768        1             64

      --------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 16 nodes (0-15)
    node 0 cpus: 0-5,96-101
    node 0 size: 96576 MB
    node 0 free: 95903 MB
    node 1 cpus: 6-11,102-107
    node 1 size: 96761 MB
    node 1 free: 96277 MB
    node 2 cpus: 12-17,108-113
    node 2 size: 96761 MB
    node 2 free: 96336 MB
    node 3 cpus: 18-23,114-119
    node 3 size: 96761 MB
    node 3 free: 96434 MB
    node 4 cpus: 24-29,120-125
    node 4 size: 96761 MB
    node 4 free: 96399 MB
    node 5 cpus: 30-35,126-131
    node 5 size: 96761 MB
    node 5 free: 96374 MB
```

(Continued on next page)

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Platform Notes (Continued)

```
     node 6 cpus: 36-41,132-137
     node 6 size: 96761 MB
     node 6 free: 96392 MB
     node 7 cpus: 42-47,138-143
     node 7 size: 96761 MB
     node 7 free: 96411 MB
     node 8 cpus: 48-53,144-149
     node 8 size: 96761 MB
     node 8 free: 96407 MB
     node 9 cpus: 54-59,150-155
     node 9 size: 96724 MB
     node 9 free: 96396 MB
     node 10 cpus: 60-65,156-161
     node 10 size: 96761 MB
     node 10 free: 96331 MB
     node 11 cpus: 66-71,162-167
     node 11 size: 96761 MB
     node 11 free: 96406 MB
     node 12 cpus: 72-77,168-173
     node 12 size: 96761 MB
     node 12 free: 96374 MB
     node 13 cpus: 78-83,174-179
     node 13 size: 96761 MB
     node 13 free: 96424 MB
     node 14 cpus: 84-89,180-185
     node 14 size: 96761 MB
     node 14 free: 96292 MB
     node 15 cpus: 90-95,186-191
     node 15 size: 96689 MB
     node 15 free: 96266 MB
     node distances:
     node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
       0:  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
       1:  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
       2:  12  12  10  11  12  12  12  12  32  32  32  32  32  32  32  32
       3:  12  12  11  10  12  12  12  12  32  32  32  32  32  32  32  32
       4:  12  12  12  12  10  11  12  12  32  32  32  32  32  32  32  32
       5:  12  12  12  12  11  10  12  12  32  32  32  32  32  32  32  32
       6:  12  12  12  12  12  12  10  11  32  32  32  32  32  32  32  32
       7:  12  12  12  12  12  12  11  10  32  32  32  32  32  32  32  32
       8:  32  32  32  32  32  32  32  32  10  11  12  12  12  12  12  12
       9:  32  32  32  32  32  32  32  32  11  10  12  12  12  12  12  12
      10:  32  32  32  32  32  32  32  32  12  12  10  11  12  12  12  12
      11:  32  32  32  32  32  32  32  32  12  12  11  10  12  12  12  12
      12:  32  32  32  32  32  32  32  32  12  12  12  12  10  11  12  12
      13:  32  32  32  32  32  32  32  32  12  12  12  12  11  10  12  12
      14:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
      15:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10


   ----------------------------------------------------------
   9. /proc/meminfo
      MemTotal:       1585035092 kB


   ----------------------------------------------------------
   10. who -r
      run-level 3 May 10 09:42


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

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Platform Notes (Continued)

```
   multi-user       degraded


   --------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT                           LOAD   ACTIVE SUB    DESCRIPTION
   * NetworkManager-wait-online.service loaded failed failed Network Manager Wait Online


   --------------------------------------------------------
13. Services, from systemctl list-unit-files
     STATE            UNIT FILES
     enabled          NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
                      dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
                      nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
                      systemd-network-generator tuned udisks2 upower
     enabled-runtime  systemd-remount-fs
     disabled         blk-availability canberra-system-bootup canberra-system-shutdown
                      canberra-system-shutdown-reboot chrony-wait 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


   --------------------------------------------------------
14. 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
     resume=/dev/mapper/rhel-swap
     rd.lvm.lv=rhel/root
     rd.lvm.lv=rhel/swap


   --------------------------------------------------------
15. cpupower frequency-info
     analyzing CPU 0:
       current policy: frequency should be within 1.50 GHz and 3.60 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:  3600MHz


   --------------------------------------------------------
16. tuned-adm active
     Current active profile: throughput-performance


   --------------------------------------------------------
17. 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
```

(Continued on next page)

Inspur Electronic Information Industry Co., Ltd. (IEI)

NF5180A7 (AMD EPYC 9474F)

SPECrate®2017_int_base = 1110

SPECrate®2017_int_peak = 1170

CPU2017 License: 3358
Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)
Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

Test Date: May-2023
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Software Availability: Nov-2022

Platform Notes (Continued)

```
    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


  ----------------------------------------------------------
  18. /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


  ----------------------------------------------------------
  19. /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


  ----------------------------------------------------------
  20. 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)


  ----------------------------------------------------------
  21. Disk information
  SPEC is set to: /home/CPU2017
    Filesystem             Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   819G   14G  805G   2% /home


  ----------------------------------------------------------
  22. /sys/devices/virtual/dmi/id
      Vendor:        IEI
      Product:       NF5180A7
      Product Family: Not specified
      Serial:        000000000


  ----------------------------------------------------------
  23. 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:
      1x Samsung M321R8GA0BB0-CQKDS 64 GB 2 rank 4800
      23x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800



  ----------------------------------------------------------
  24. BIOS
```

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Platform Notes (Continued)

```
   (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:        American Megatrends International, LLC.
     BIOS Version:       04.02.14
     BIOS Date:          12/29/2022
```

Compiler Version Notes

```
==============================================================================================
C      | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C      | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C++    | 523.xalancbmk_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
```

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Inspur Electronic Information Industry Co., Ltd. (IEI)

NF5180A7 (AMD EPYC 9474F)

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Test Date: May-2023
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Software Availability: Nov-2022

Compiler Version Notes (Continued)

```
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
C++     | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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`

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SPEC CPU®2017 Integer Rate Result

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NF5180A7 (AMD EPYC 9474F)

SPECrate®2017_int_base = 1110

SPECrate®2017_int_peak = 1170

Base Portability Flags (Continued)

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
-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
```

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SPEC CPU®2017 Integer Rate Result

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SPECrate®2017_int_peak = 1170

CPU2017 License: 3358
Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)
Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

Test Date: May-2023
Hardware Availability: Feb-2023
Software Availability: Nov-2022

Base Other Flags

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

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

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

Peak Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Peak Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Peak Optimization Flags

C benchmarks:

500.perlbench_r: `basepeak = yes`

(Continued on next page)

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CPU2017 License: 3358

Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)

Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

Test Date: May-2023

Hardware Availability: Feb-2023

Software Availability: Nov-2022

Peak Optimization Flags (Continued)

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

557.xz_r: basepeak = yes

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: basepeak = yes

541.leela_r: basepeak = yes

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CPU2017 License: 3358		**Test Date:**	May-2023
Test Sponsor:	Inspur Electronic Information Industry Co., Ltd. (IEI)	**Hardware Availability:**	Feb-2023
Tested by:	Inspur Electronic Information Industry Co., Ltd. (IEI)	**Software Availability:**	Nov-2022

Peak Optimization Flags (Continued)

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
-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/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_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/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_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/Inspur-Platform-Settings-amd-V3.0.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/Inspur-Platform-Settings-amd-V3.0.xml
```

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