SPEC CPU®2017 Integer Rate Result

New H3C Technologies Co., Ltd.

$SPECrate^{®}2017\_int\_base = 1260$

H3C UniServer R4950 G6 (AMD EPYC 9534)

$SPECrate^{®}2017\_int\_peak = 1330$

CPU2017 License: 9066

Test Sponsor: New H3C Technologies Co., Ltd.

Tested by: New H3C Technologies Co., Ltd.

Test Date: Oct-2024

Hardware Availability: Feb-2024

Software Availability: Nov-2023

Benchmark	Copies	base	peak
500.perlbench_r	256	945	
502.gcc_r	256	967	1240
505.mcf_r	256	1820	1820
520.omnetpp_r	256	600	
523.xalancbmk_r	256	1330	1730
525.x264_r	256	3130	
531.deepsjeng_r	256	1120	
541.leela_r	256	1090	1090
548.exchange2_r	256	3040	3070
557.xz_r	256	646	647

SPECrate®2017_int_base (1260) ----- SPECrate®2017_int_peak (1330)

Hardware

CPU Name: AMD EPYC 9534

Max MHz: 3700

Nominal: 2450

Enabled: 128 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 / 8 cores

Other: None

Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-5600B-R, running at 4800)

Storage: 1 x 256GB NVME

Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux release 9.3 (Plow) kernel version 5.14.0-362.8.1.el9_3.x86_64

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

Parallel: No

Firmware: Version 6.30.28 released Feb-2024

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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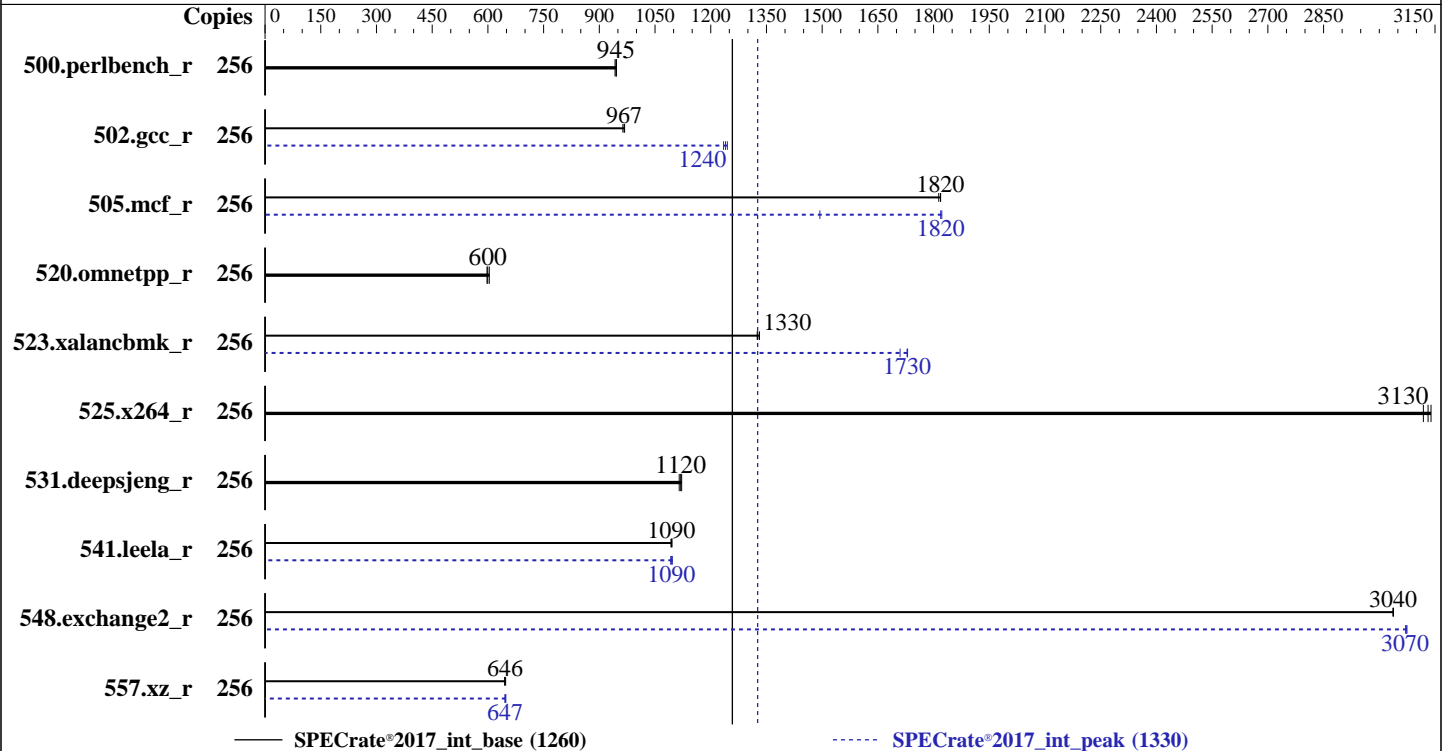| **CPU2017 License:** 9066	**Test Date:** Oct-2024
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	256	**431**	**945**	432	942	431	946	256	**431**	**945**	432	942	431	946
502.gcc_r	256	**375**	**967**	374	968	376	963	256	**292**	**1240**	291	1240	294	1230
505.mcf_r	256	228	1810	**227**	**1820**	227	1820	256	277	1490	**227**	**1820**	227	1820
520.omnetpp_r	256	562	598	556	604	**560**	**600**	256	562	598	556	604	**560**	**600**
523.xalancbmk_r	256	**204**	**1330**	203	1330	204	1330	256	156	1730	158	1710	**156**	**1730**
525.x264_r	256	144	3120	**143**	**3130**	143	3140	256	144	3120	**143**	**3130**	143	3140
531.deepsjeng_r	256	262	1120	**262**	**1120**	263	1120	256	262	1120	**262**	**1120**	263	1120
541.leela_r	256	388	1090	387	1100	**387**	**1090**	256	388	1090	387	1100	**387**	**1090**
548.exchange2_r	256	**221**	**3040**	221	3040	221	3040	256	**218**	**3070**	218	3070	218	3070
557.xz_r	256	**428**	**646**	427	648	429	645	256	426	648	**427**	**647**	428	646
SPECrate®2017_int_base =	**1260**													
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

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

Submit Notes

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

Operating System Notes

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

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

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

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

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/cpu119/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu119/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:
cTDP Control: Manual
cTDP: 300
PPT Control: Manual
PPT: 300
Determinism Slider set to Power
NUMA nodes per socket: NPS4
IOMMU: Auto
SVM Mode: Disabled
ACPI SRAT L3 Cache As NUMA Domain: Enabled

 Sysinfo program /home/cpu119/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Mon Aug 21 20:01:27 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 252 (252-18.el9)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. tuned-adm active
```

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Platform Notes (Continued)

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


   ----------------------------------------------------------
   1. uname -a
     Linux localhost.localdomain 5.14.0-362.8.1.el9_3.x86_64 #1 SMP PREEMPT_DYNAMIC Tue Oct 3 11:12:36 EDT 2023
     x86_64 x86_64 x86_64 GNU/Linux


   ----------------------------------------------------------
   2. w
      20:01:27 up 1 min,  2 users,  load average: 11.22, 5.50, 2.06
     USER      TTY         LOGIN@   IDLE   JCPU   PCPU WHAT
     root     tty1       20:00   51.00s  0.00s  0.00s -bash
     root     pts/0      20:00   15.00s  1.15s  0.03s /bin/bash ./amd_rate_aocc400_znver4_A1.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) 6188720
     max locked memory           (kbytes, -l) 2097152
     max memory size             (kbytes, -m) unlimited
     open files                      (-n) 32768
     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) unlimited
     virtual memory              (kbytes, -v) unlimited
     file locks                      (-x) unlimited


   ----------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 31
    sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
    sshd: root [priv]
    sshd: root@pts/0
    -bash
    -bash
    python3 ./run_amd_rate_aocc400_znver4_A1.py
    /bin/bash ./amd_rate_aocc400_znver4_A1.sh
    runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 intrate
    runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
      --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.003/templogs/preenv.intrate.003.0.log --lognum 003.0 --from_runcpu 2
```

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Platform Notes (Continued)

```
  specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu119


  ------------------------------------------------------------
 6. /proc/cpuinfo
    model name       : AMD EPYC 9534 64-Core Processor
    vendor_id        : AuthenticAMD
    cpu family       : 25
    model            : 17
    stepping         : 1
    microcode        : 0xa101144
    bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size         : 3584 4K pages
    cpu cores        : 64
    siblings         : 128
    2 physical ids (chips)
    256 processors (hardware threads)
    physical id 0: core ids 0-63
    physical id 1: core ids 0-63
    physical id 0: apicids 0-127
    physical id 1: apicids 128-255
  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):                    256
  On-line CPU(s) list:       0-255
  Vendor ID:                 AuthenticAMD
  BIOS Vendor ID:            Advanced Micro Devices, Inc.
  Model name:                AMD EPYC 9534 64-Core Processor
  BIOS Model name:           AMD EPYC 9534 64-Core Processor
  CPU family:                25
  Model:                     17
  Thread(s) per core:        2
  Core(s) per socket:        64
  Socket(s):                 2
  Stepping:                  1
  Frequency boost:           enabled
  CPU max MHz:               3718.0659
  CPU min MHz:               1500.0000
  BogoMIPS:                  4888.68
  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 amd_lbr_v2 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 perfmon_v2 ibrs ibpb
                             stibp ibrs_enhanced 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
```

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Platform Notes (Continued)

```
                        irperf xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
                        nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                        pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi
                        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:            4 MiB (128 instances)
  L1i cache:            4 MiB (128 instances)
  L2 cache:             128 MiB (128 instances)
  L3 cache:             512 MiB (16 instances)
  NUMA node(s):         16
  NUMA node0 CPU(s):    0-7,128-135
  NUMA node1 CPU(s):    8-15,136-143
  NUMA node2 CPU(s):    16-23,144-151
  NUMA node3 CPU(s):    24-31,152-159
  NUMA node4 CPU(s):    32-39,160-167
  NUMA node5 CPU(s):    40-47,168-175
  NUMA node6 CPU(s):    48-55,176-183
  NUMA node7 CPU(s):    56-63,184-191
  NUMA node8 CPU(s):    64-71,192-199
  NUMA node9 CPU(s):    72-79,200-207
  NUMA node10 CPU(s):   80-87,208-215
  NUMA node11 CPU(s):   88-95,216-223
  NUMA node12 CPU(s):   96-103,224-231
  NUMA node13 CPU(s):   104-111,232-239
  NUMA node14 CPU(s):   112-119,240-247
  NUMA node15 CPU(s):   120-127,248-255
  Vulnerability Gather data sampling: Not affected
  Vulnerability Itlb multihit:   Not affected
  Vulnerability L1tf:            Not affected
  Vulnerability Mds:             Not affected
  Vulnerability Meltdown:        Not affected
  Vulnerability Mmio stale data: Not affected
  Vulnerability Retbleed:        Not affected
  Vulnerability Spec store bypass:  Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:      Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:      Mitigation; Enhanced / Automatic IBRS, IBPB conditional, STIBP
                                 always-on, RSB filling, PBRSB-eIBRS Not affected
  Vulnerability Srbds:           Not affected
  Vulnerability Tsx async abort: Not affected


  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d        32K       4M    8 Data           1    64        1             64
      L1i        32K       4M    8 Instruction    1    64        1             64
      L2          1M     128M    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: 0-7,128-135
    node 0 size: 95876 MB
    node 0 free: 94956 MB
    node 1 cpus: 8-15,136-143
    node 1 size: 96763 MB
    node 1 free: 96153 MB
    node 2 cpus: 16-23,144-151
```

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Platform Notes (Continued)

```
    node 2 size: 96763 MB
    node 2 free: 96381 MB
    node 3 cpus: 24-31,152-159
    node 3 size: 96763 MB
    node 3 free: 96341 MB
    node 4 cpus: 32-39,160-167
    node 4 size: 96763 MB
    node 4 free: 95823 MB
    node 5 cpus: 40-47,168-175
    node 5 size: 96763 MB
    node 5 free: 96342 MB
    node 6 cpus: 48-55,176-183
    node 6 size: 96763 MB
    node 6 free: 96451 MB
    node 7 cpus: 56-63,184-191
    node 7 size: 96763 MB
    node 7 free: 96418 MB
    node 8 cpus: 64-71,192-199
    node 8 size: 96763 MB
    node 8 free: 95984 MB
    node 9 cpus: 72-79,200-207
    node 9 size: 96763 MB
    node 9 free: 96381 MB
    node 10 cpus: 80-87,208-215
    node 10 size: 96763 MB
    node 10 free: 96376 MB
    node 11 cpus: 88-95,216-223
    node 11 size: 96763 MB
    node 11 free: 96373 MB
    node 12 cpus: 96-103,224-231
    node 12 size: 96710 MB
    node 12 free: 96301 MB
    node 13 cpus: 104-111,232-239
    node 13 size: 96763 MB
    node 13 free: 96404 MB
    node 14 cpus: 112-119,240-247
    node 14 size: 96763 MB
    node 14 free: 96415 MB
    node 15 cpus: 120-127,248-255
    node 15 size: 96705 MB
    node 15 free: 96367 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  22  22  22  22  22  22  22  22
      1:  11  10  12  12  12  12  12  12  22  22  22  22  22  22  22  22
      2:  12  12  10  11  12  12  12  12  22  22  22  22  22  22  22  22
      3:  12  12  11  10  12  12  12  12  22  22  22  22  22  22  22  22
      4:  12  12  12  12  10  11  12  12  22  22  22  22  22  22  22  22
      5:  12  12  12  12  11  10  12  12  22  22  22  22  22  22  22  22
      6:  12  12  12  12  12  12  10  11  22  22  22  22  22  22  22  22
      7:  12  12  12  12  12  12  11  10  22  22  22  22  22  22  22  22
      8:  22  22  22  22  22  22  22  22  10  11  12  12  12  12  12  12
      9:  22  22  22  22  22  22  22  22  11  10  12  12  12  12  12  12
     10:  22  22  22  22  22  22  22  22  12  12  10  11  12  12  12  12
     11:  22  22  22  22  22  22  22  22  12  12  11  10  12  12  12  12
     12:  22  22  22  22  22  22  22  22  12  12  12  12  10  11  12  12
     13:  22  22  22  22  22  22  22  22  12  12  12  12  11  10  12  12
     14:  22  22  22  22  22  22  22  22  12  12  12  12  12  12  10  11
     15:  22  22  22  22  22  22  22  22  12  12  12  12  12  12  11  10
```

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Platform Notes (Continued)

```
----------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584356208 kB


----------------------------------------------------------
10. who -r
   run-level 3 Aug 21 20:00


----------------------------------------------------------
11. Systemd service manager version: systemd 252 (252-18.el9)
   Default Target  Status
   multi-user      running


----------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
                    dbus-broker getty@ insights-client-boot irqbalance kdump lvm2-monitor mdmonitor microcode
                    nis-domainname nvmefc-boot-connections rhsmcertd rsyslog selinux-autorelabel-mark sshd
                    sssd systemd-boot-update systemd-network-generator tuned udisks2
   enabled-runtime  systemd-remount-fs
   disabled         blk-availability chrony-wait console-getty cpupower debug-shell dnf-system-upgrade
                    firewalld hwloc-dump-hwdata kvm_stat man-db-restart-cache-update nftables nvmf-autoconnect
                    rdisc rhcd rhsm rhsm-facts rpmdb-rebuild selinux-check-proper-disable 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 systemd-sysupdate
                    systemd-sysupdate-reboot


----------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-362.8.1.el9_3.x86_64
   root=/dev/mapper/rhel-root
   ro
   crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
   resume=/dev/mapper/rhel-swap
   rd.lvm.lv=rhel/root
   rd.lvm.lv=rhel/swap


----------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 1.50 GHz and 2.45 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:  2450MHz


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


----------------------------------------------------------
16. sysctl
   kernel.numa_balancing             0
   kernel.randomize_va_space         0
   vm.compaction_proactiveness       20
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

H3C UniServer R4950 G6 (AMD EPYC 9534)

SPECrate®2017_int_base = 1260

SPECrate®2017_int_peak = 1330

CPU2017 License: 9066

Test Sponsor: New H3C Technologies Co., Ltd.

Tested by: New H3C Technologies Co., Ltd.

Test Date: Oct-2024

Hardware Availability: Feb-2024

Software Availability: Nov-2023

Platform Notes (Continued)

```
      vm.dirty_background_bytes             0
      vm.dirty_background_ratio            40
      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    50000


   ----------------------------------------------------------
   19. OS release
     From /etc/*-release /etc/*-version
     os-release     Red Hat Enterprise Linux 9.3 (Plow)
     redhat-release Red Hat Enterprise Linux release 9.3 (Plow)
     system-release Red Hat Enterprise Linux release 9.3 (Plow)


   ----------------------------------------------------------
   20. Disk information
   SPEC is set to: /home/cpu119
     Filesystem              Type  Size  Used Avail Use% Mounted on
     /dev/mapper/rhel-home xfs   163G  5.5G  158G   4% /home


   ----------------------------------------------------------
   21. /sys/devices/virtual/dmi/id
      Vendor:         H3C
      Product:        RS33M2C9S
      Product Family: Rack
      Serial:         N/A


   ----------------------------------------------------------
   22. dmidecode
     Additional information from dmidecode 3.5 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.
```

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Tested by: New H3C Technologies Co., Ltd.		**Software Availability:** Nov-2023

Platform Notes (Continued)

```
    Memory:
      24x Samsung M321R8GA0PB0-CWMJJ 64 GB 2 rank 5600, configured at 4800


    -------------------------------------------------------------
    23. BIOS
    (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        American Megatrends International, LLC.
      BIOS Version:       6.30.28
      BIOS Date:          02/27/2024
      BIOS Revision:      5.27
```

Compiler Version Notes

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


==============================================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
         | 557.xz_r(base, peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


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


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

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H3C UniServer R4950 G6 (AMD EPYC 9534)

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Tested by: New H3C Technologies Co., Ltd.

Test Date: Oct-2024

Hardware Availability: Feb-2024

Software Availability: Nov-2023

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------------------------
===========================================================================================
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
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

SPEC CPU®2017 Integer Rate Result

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New H3C Technologies Co., Ltd.

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

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
-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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New H3C Technologies Co., Ltd.

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CPU2017 License: 9066
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Tested by: New H3C Technologies Co., Ltd.

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

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`

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H3C UniServer R4950 G6 (AMD EPYC 9534)

SPECrate®2017_int_base = 1260

SPECrate®2017_int_peak = 1330

CPU2017 License: 9066		**Test Date:**	Oct-2024
Test Sponsor:	New H3C Technologies Co., Ltd.	**Hardware Availability:**	Feb-2024
Tested by:	New H3C Technologies Co., Ltd.	**Software Availability:**	Nov-2023

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: `Same as 505.mcf_r`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

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: `-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`

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SPECrate®2017_int_base = 1260

H3C UniServer R4950 G6 (AMD EPYC 9534)

SPECrate®2017_int_peak = 1330

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Test Sponsor:	New H3C Technologies Co., Ltd.	**Hardware Availability:**	Feb-2024
Tested by:	New H3C Technologies Co., Ltd.	**Software Availability:**	Nov-2023

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/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/New_H3C-Platform-AMD-Settings-V1.4-Genoa.html
  http://www.spec.org/cpu2017/flags/aocc400-flags.html

You can also download the XML flags sources by saving the following links:
  http://www.spec.org/cpu2017/flags/New_H3C-Platform-AMD-Settings-V1.4-Genoa.xml
  http://www.spec.org/cpu2017/flags/aocc400-flags.xml

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

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