SPEC CPU®2017 Integer Speed Result

New H3C Technologies Co., Ltd.

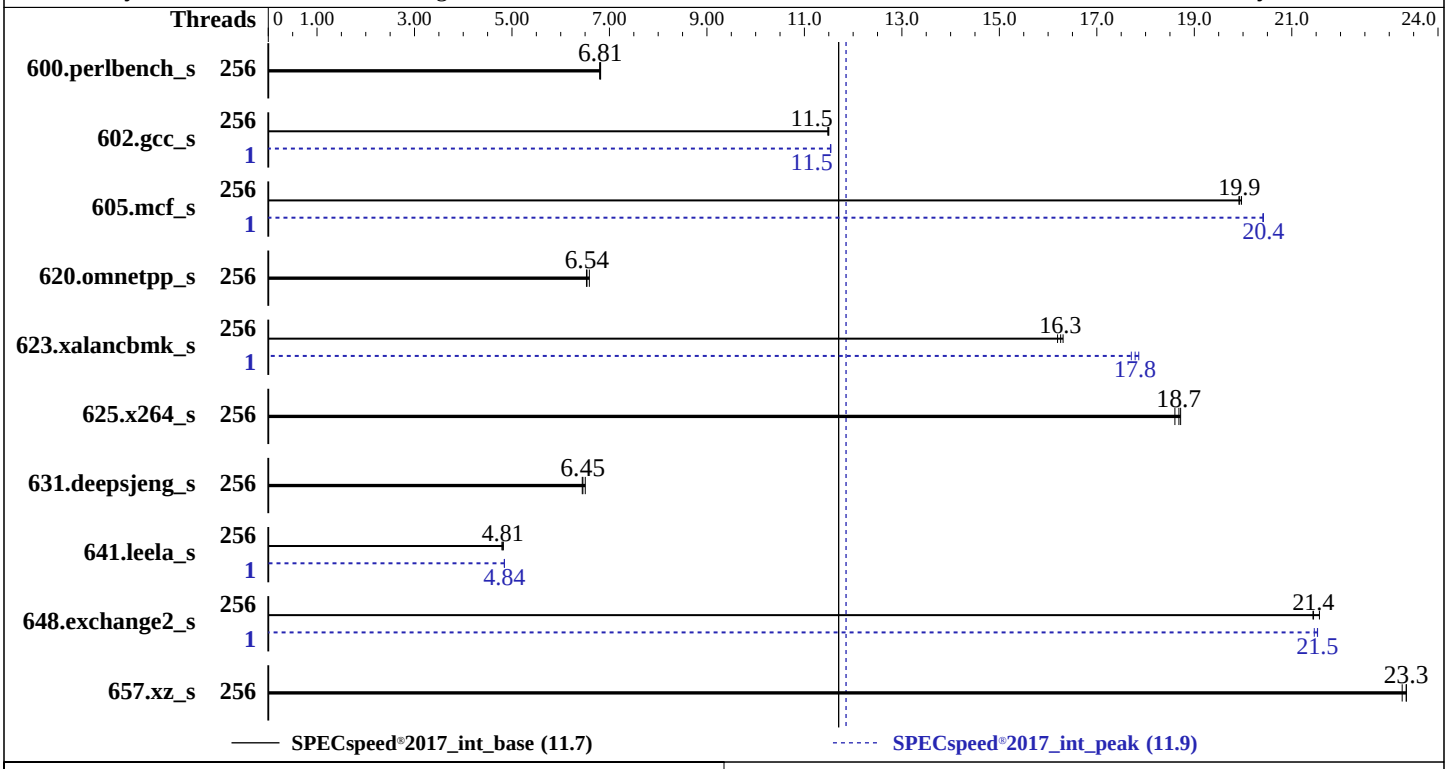
H3C UniServer R4950 G7
AMD EPYC 9754

SPECspeed®2017_int_base = 11.7

SPECspeed®2017_int_peak = 11.9

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

Test Date: Mar-2025
Hardware Availability: Oct-2024
Software Availability: Oct-2024



Hardware

CPU Name:	AMD EPYC 9754
Max MHz:	3100
Nominal:	2250
Enabled:	256 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, 16 MB shared / 8 cores
Other:	None
Memory:	1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage:	1 x 3.84TB SSD
Other:	CPU Cooling: Air

Software

OS:	Red Hat Enterprise Linux 9.4 (Plow) kernel version 5.14.0-427.13.1.el9_4.x86_64
Compiler:	C/C++/Fortran: Version 5.0.0 of AOCC
Parallel:	Yes
Firmware:	Version 6.30.37P01 released Mar-2025
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other:	None
Power Management:	BIOS and OS set to prefer performance at the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	256	261	6.80	**260**	**6.81**	260	6.82	256	261	6.80	**260**	**6.81**	260	6.82
602.gcc_s	256	**346**	**11.5**	346	11.5	347	11.5	1	345	11.5	**345**	**11.5**	345	11.5
605.mcf_s	256	237	19.9	236	20.0	**237**	**19.9**	1	231	20.4	231	20.4	**231**	**20.4**
620.omnetpp_s	256	248	6.59	**249**	**6.54**	250	6.53	256	248	6.59	**249**	**6.54**	250	6.53
623.xalancbmk_s	256	**87.2**	**16.3**	86.9	16.3	87.5	16.2	1	**79.7**	**17.8**	79.3	17.9	80.0	17.7
625.x264_s	256	**94.4**	**18.7**	94.2	18.7	94.8	18.6	256	**94.4**	**18.7**	94.2	18.7	94.8	18.6
631.deepsjeng_s	256	220	6.50	222	6.44	**222**	**6.45**	256	220	6.50	222	6.44	**222**	**6.45**
641.leela_s	256	356	4.79	**355**	**4.81**	354	4.82	1	352	4.84	352	4.85	**352**	**4.84**
648.exchange2_s	256	137	21.4	136	21.6	**137**	**21.4**	1	137	21.5	**137**	**21.5**	137	21.5
657.xz_s	256	266	23.3	265	23.4	**265**	**23.3**	256	266	23.3	265	23.4	**265**	**23.3**

SPECspeed®2017_int_base = 11.7

SPECspeed®2017_int_peak = 11.9

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.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-511"
LD_LIBRARY_PATH =
     "/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib:/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib32:/
     usr/local/mpc-131/lib:/usr/local/gmp-630/lib:/usr/local/mpfr-421/lib:/usr/local/isl-027/lib:/usr/local
     /gcc-1420/lib64:/usr/local/lib:/usr/lib"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "512"

Environment variables set by runcpu during the 602.gcc_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 641.leela_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 648.exchange2_s peak run:
GOMP_CPU_AFFINITY = "0"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9D64 CPU + 500GiB Memory using Ubuntu 22.04

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:
SMT Control set to Enabled
SVM Mode set to Disabled
Power Profile Selection set to High Performance Mode
Determinism Slider set to Power
cTDP set to 400
PPT set to 400
NUMA nodes per socket set to NPS 4
ACPI SRAT L3 cache as NUMA domain set to Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Fri Mar 21 12:46:44 2025

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

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Platform Notes (Continued)

```
------------------------------------------------------------
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 (252-32.el9_4)
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
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 5.14.0-427.13.1.el9_4.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 10 10:29:16 EDT
  2024 x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   12:46:44 up  9:45,  2 users,  load average: 0.49, 0.14, 0.05
  USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1      03:02    9:44m  0.00s  0.00s -bash
  root     pts/0     03:03   52.00s  1.55s  0.28s /bin/bash ./amd_speed_aocc500_znver5_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) 6188189
  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
```

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Platform Notes (Continued)

```
  cpu time                   (seconds, -t) unlimited
  max user processes                 (-u) 6188189
  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
 python3 ./run_amd_speed_aocc500_znver5_A1.py
 /bin/bash ./amd_speed_aocc500_znver5_A1.sh
 runcpu --config amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intspeed
 runcpu --configfile amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.004/templogs/preenv.intspeed.004.0.log --lognum 004.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9754 128-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 160
    stepping        : 1
    microcode       : 0xaa00116
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
    TLB size        : 3584 4K pages
    cpu cores       : 128
    siblings        : 256
    2 physical ids (chips)
    512 processors (hardware threads)
    physical id 0: core ids 0-127
    physical id 1: core ids 0-127
    physical id 0: apicids 0-255
    physical id 1: apicids 256-511
  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):                              512
  On-line CPU(s) list:                 0-511
  Vendor ID:                           AuthenticAMD
  BIOS Vendor ID:                      Advanced Micro Devices, Inc.
  Model name:                          AMD EPYC 9754 128-Core Processor
  BIOS Model name:                     AMD EPYC 9754 128-Core Processor
  CPU family:                          25
  Model:                               160
  Thread(s) per core:                  2
  Core(s) per socket:                  128
```

(Continued on next page)

Platform Notes (Continued)

```
  Socket(s):                       2
  Stepping:                        1
  Frequency boost:                 enabled
  CPU(s) scaling MHz:              73%
  CPU max MHz:                     3100.3411
  CPU min MHz:                     1500.0000
  BogoMIPS:                        4489.58
  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
                                   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 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
                                   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 debug_swap
  L1d cache:                       8 MiB (256 instances)
  L1i cache:                       8 MiB (256 instances)
  L2 cache:                        256 MiB (256 instances)
  L3 cache:                        512 MiB (32 instances)
  NUMA node(s):                    32
  NUMA node0 CPU(s):               0-7,256-263
  NUMA node1 CPU(s):               8-15,264-271
  NUMA node2 CPU(s):               16-23,272-279
  NUMA node3 CPU(s):               24-31,280-287
  NUMA node4 CPU(s):               32-39,288-295
  NUMA node5 CPU(s):               40-47,296-303
  NUMA node6 CPU(s):               48-55,304-311
  NUMA node7 CPU(s):               56-63,312-319
  NUMA node8 CPU(s):               64-71,320-327
  NUMA node9 CPU(s):               72-79,328-335
  NUMA node10 CPU(s):              80-87,336-343
  NUMA node11 CPU(s):              88-95,344-351
  NUMA node12 CPU(s):              96-103,352-359
  NUMA node13 CPU(s):              104-111,360-367
  NUMA node14 CPU(s):              112-119,368-375
  NUMA node15 CPU(s):              120-127,376-383
  NUMA node16 CPU(s):              128-135,384-391
  NUMA node17 CPU(s):              136-143,392-399
  NUMA node18 CPU(s):              144-151,400-407
  NUMA node19 CPU(s):              152-159,408-415
  NUMA node20 CPU(s):              160-167,416-423
  NUMA node21 CPU(s):              168-175,424-431
  NUMA node22 CPU(s):              176-183,432-439
  NUMA node23 CPU(s):              184-191,440-447
  NUMA node24 CPU(s):              192-199,448-455
  NUMA node25 CPU(s):              200-207,456-463
  NUMA node26 CPU(s):              208-215,464-471
  NUMA node27 CPU(s):              216-223,472-479
  NUMA node28 CPU(s):              224-231,480-487
  NUMA node29 CPU(s):              232-239,488-495
```

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Platform Notes (Continued)

```
  NUMA node30 CPU(s):                  240-247,496-503
  NUMA node31 CPU(s):                  248-255,504-511
  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 rstack overflow: Mitigation; Safe RET
  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       8M    8 Data            1    64        1             64
     L1i       32K       8M    8 Instruction     1    64        1             64
     L2         1M     256M    8 Unified         2  2048        1             64
     L3        16M     512M   16 Unified         3 16384        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 32 nodes (0-31)
  node 0 cpus: 0-7,256-263
  node 0 size: 47436 MB
  node 0 free: 46761 MB
  node 1 cpus: 8-15,264-271
  node 1 size: 48379 MB
  node 1 free: 47757 MB
  node 2 cpus: 16-23,272-279
  node 2 size: 48379 MB
  node 2 free: 47740 MB
  node 3 cpus: 24-31,280-287
  node 3 size: 48379 MB
  node 3 free: 47740 MB
  node 4 cpus: 32-39,288-295
  node 4 size: 48379 MB
  node 4 free: 47694 MB
  node 5 cpus: 40-47,296-303
  node 5 size: 48379 MB
  node 5 free: 47293 MB
  node 6 cpus: 48-55,304-311
  node 6 size: 48379 MB
  node 6 free: 47763 MB
  node 7 cpus: 56-63,312-319
  node 7 size: 48379 MB
  node 7 free: 47765 MB
  node 8 cpus: 64-71,320-327
  node 8 size: 48379 MB
  node 8 free: 47624 MB
  node 9 cpus: 72-79,328-335
  node 9 size: 48379 MB
  node 9 free: 47750 MB
  node 10 cpus: 80-87,336-343
  node 10 size: 48338 MB
```

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Platform Notes (Continued)

```
  node 10 free: 47720 MB
  node 11 cpus: 88-95,344-351
  node 11 size: 48379 MB
  node 11 free: 47758 MB
  node 12 cpus: 96-103,352-359
  node 12 size: 48379 MB
  node 12 free: 47727 MB
  node 13 cpus: 104-111,360-367
  node 13 size: 48379 MB
  node 13 free: 47768 MB
  node 14 cpus: 112-119,368-375
  node 14 size: 48379 MB
  node 14 free: 47750 MB
  node 15 cpus: 120-127,376-383
  node 15 size: 48379 MB
  node 15 free: 47757 MB
  node 16 cpus: 128-135,384-391
  node 16 size: 48379 MB
  node 16 free: 47742 MB
  node 17 cpus: 136-143,392-399
  node 17 size: 48379 MB
  node 17 free: 47775 MB
  node 18 cpus: 144-151,400-407
  node 18 size: 48379 MB
  node 18 free: 47760 MB
  node 19 cpus: 152-159,408-415
  node 19 size: 48379 MB
  node 19 free: 47751 MB
  node 20 cpus: 160-167,416-423
  node 20 size: 48377 MB
  node 20 free: 47725 MB
  node 21 cpus: 168-175,424-431
  node 21 size: 48381 MB
  node 21 free: 47740 MB
  node 22 cpus: 176-183,432-439
  node 22 size: 48377 MB
  node 22 free: 47723 MB
  node 23 cpus: 184-191,440-447
  node 23 size: 48381 MB
  node 23 free: 47755 MB
  node 24 cpus: 192-199,448-455
  node 24 size: 48379 MB
  node 24 free: 47743 MB
  node 25 cpus: 200-207,456-463
  node 25 size: 48379 MB
  node 25 free: 47486 MB
  node 26 cpus: 208-215,464-471
  node 26 size: 48379 MB
  node 26 free: 47744 MB
  node 27 cpus: 216-223,472-479
  node 27 size: 48379 MB
  node 27 free: 47755 MB
  node 28 cpus: 224-231,480-487
  node 28 size: 48379 MB
  node 28 free: 47730 MB
  node 29 cpus: 232-239,488-495
  node 29 size: 48379 MB
  node 29 free: 47752 MB
  node 30 cpus: 240-247,496-503
  node 30 size: 48379 MB
```

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Platform Notes (Continued)

```
node 30 free: 47723 MB
node 31 cpus: 248-255,504-511
node 31 size: 48299 MB
node 31 free: 47682 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24
25  26  27  28  29  30  31
  0:  10  11  11  11  12  12  12  12  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  1:  11  10  11  11  12  12  12  12  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  2:  11  11  10  11  12  12  12  12  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  3:  11  11  11  10  12  12  12  12  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  4:  12  12  12  12  10  11  11  11  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  5:  12  12  12  12  11  10  11  11  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  6:  12  12  12  12  11  11  10  11  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  7:  12  12  12  12  11  11  11  10  12  12  12  12  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  8:  12  12  12  12  12  12  12  12  10  11  11  11  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
  9:  12  12  12  12  12  12  12  12  11  10  11  11  12  12  12  12  22  22  22  22  22  22  22  22  22
  22  22  22  22  22  22  22
 10:  12  12  12  12  12  12  12  12  11  11  10  11  12  12  12  12  22  22  22  22  22  22  22  22  22
 22  22  22  22  22  22  22
 11:  12  12  12  12  12  12  12  12  11  11  11  10  12  12  12  12  22  22  22  22  22  22  22  22  22
 22  22  22  22  22  22  22
 12:  12  12  12  12  12  12  12  12  12  12  12  12  10  11  11  11  22  22  22  22  22  22  22  22  22
 22  22  22  22  22  22  22
 13:  12  12  12  12  12  12  12  12  12  12  12  12  11  10  11  11  22  22  22  22  22  22  22  22  22
 22  22  22  22  22  22  22
 14:  12  12  12  12  12  12  12  12  12  12  12  12  11  11  10  11  22  22  22  22  22  22  22  22  22
 22  22  22  22  22  22  22
 15:  12  12  12  12  12  12  12  12  12  12  12  12  11  11  11  10  22  22  22  22  22  22  22  22  22
 22  22  22  22  22  22  22
 16:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  10  11  11  11  12  12  12  12  12
 12  12  12  12  12  12  12
 17:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  11  10  11  11  12  12  12  12  12
 12  12  12  12  12  12  12
 18:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  11  11  10  11  12  12  12  12  12
 12  12  12  12  12  12  12
 19:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  11  11  11  10  12  12  12  12  12
 12  12  12  12  12  12  12
 20:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  10  11  11  11  12
 12  12  12  12  12  12  12
 21:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  11  10  11  11  12
 12  12  12  12  12  12  12
 22:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  11  11  10  11  12
 12  12  12  12  12  12  12
 23:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  11  11  11  10  12
 12  12  12  12  12  12  12
 24:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  10
 11  11  11  12  12  12  12
 25:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  11
 10  11  11  12  12  12  12
 26:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  11
```

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Platform Notes (Continued)

```
   11  10  11  12  12  12  12
   27:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  11
   11  11  10  12  12  12  12
   28:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  12
   12  12  12  10  11  11  11
   29:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  12
   12  12  12  11  10  11  11
   30:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  12
   12  12  12  11  11  10  11
   31:  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  22  12  12  12  12  12  12  12  12  12
   12  12  12  11  11  11  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584220392 kB

------------------------------------------------------------
10. who -r
  run-level 3 Mar 21 03:02

------------------------------------------------------------
11. Systemd service manager version: systemd 252 (252-32.el9_4)
  Default Target  Status
  multi-user      degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                   LOAD   ACTIVE SUB    DESCRIPTION
  * dnf-makecache.service loaded failed failed dnf makecache

------------------------------------------------------------
13. 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 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 chronyd-restricted console-getty cpupower debug-shell
                   dnf-system-upgrade firewalld hwloc-dump-hwdata kvm_stat man-db-restart-cache-update
                   nftables 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

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-427.13.1.el9_4.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

------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 301:
    current policy: frequency should be within 1.50 GHz and 2.25 GHz.
                    The governor "performance" may decide which speed to use
```

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Platform Notes (Continued)

```
                    within this range.
     boost state support:
       Supported: yes
       Active: yes
       Boost States: 0
       Total States: 3
       Pstate-P0:  2250MHz

------------------------------------------------------------
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
  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 9.4 (Plow)
  redhat-release Red Hat Enterprise Linux release 9.4 (Plow)
  system-release Red Hat Enterprise Linux release 9.4 (Plow)

------------------------------------------------------------
21. Disk information
```

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Platform Notes (Continued)

```
SPEC is set to: /home/cpu2017
  Filesystem            Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs   3.5T   44G  3.4T   2% /home

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

------------------------------------------------------------
23. 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.
  Memory:
    1x SK Hynix HMCG94AEBRA102N 64 GB 2 rank 4800
    17x SK Hynix HMCG94AEBRA109N 64 GB 2 rank 4800
    4x SK Hynix HMCG94AEBRA123N 64 GB 2 rank 4800
    2x SK Hynix HMCG94MEBRA109N 64 GB 2 rank 4800


------------------------------------------------------------
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      6.30.37P01
   BIOS Date:         03/20/2025
   BIOS Revision:     5.27
```

Compiler Version Notes

```
==============================================================================================================
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
        | 657.xz_s(base, peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
        | 641.leela_s(base, peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran | 648.exchange2_s(base, peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
```

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Compiler Version Notes (Continued)

```
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Base Portability Flags

600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -Wl,-mllvm -Wl,-extra-inliner -O3
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP
-flto -fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp -lamdlibm
-lflang -lamdalloc

C++ benchmarks:
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc-ext

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -O3 -march=znver5 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc

Base Other Flags

C benchmarks:
-Wno-return-type -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

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s: basepeak = yes

602.gcc_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

605.mcf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

625.x264_s: basepeak = yes

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt

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Peak Optimization Flags (Continued)

623.xalancbmk_s (continued):
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -fopenmp=libomp -lomp
-lamdlibm -lamdalloc-ext -lflang

631.deepsjeng_s: basepeak = yes

641.leela_s: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -O3 -march=znver5 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang

Peak Other Flags

C benchmarks:
-Wno-return-type -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/aocc500-flags.2024-10-10.html
http://www.spec.org/cpu2017/flags/New_H3C-Platform-AMD-Settings-V1.7-Turin.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml
http://www.spec.org/cpu2017/flags/New_H3C-Platform-AMD-Settings-V1.7-Turin.xml

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

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