



SPEC CPU®2017 Integer Rate Result

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

SPECrate®2017_int_base = 1770

NF5180A7 (AMD EPYC 9654)

SPECrate®2017_int_peak = 1920

CPU2017 License: 3358

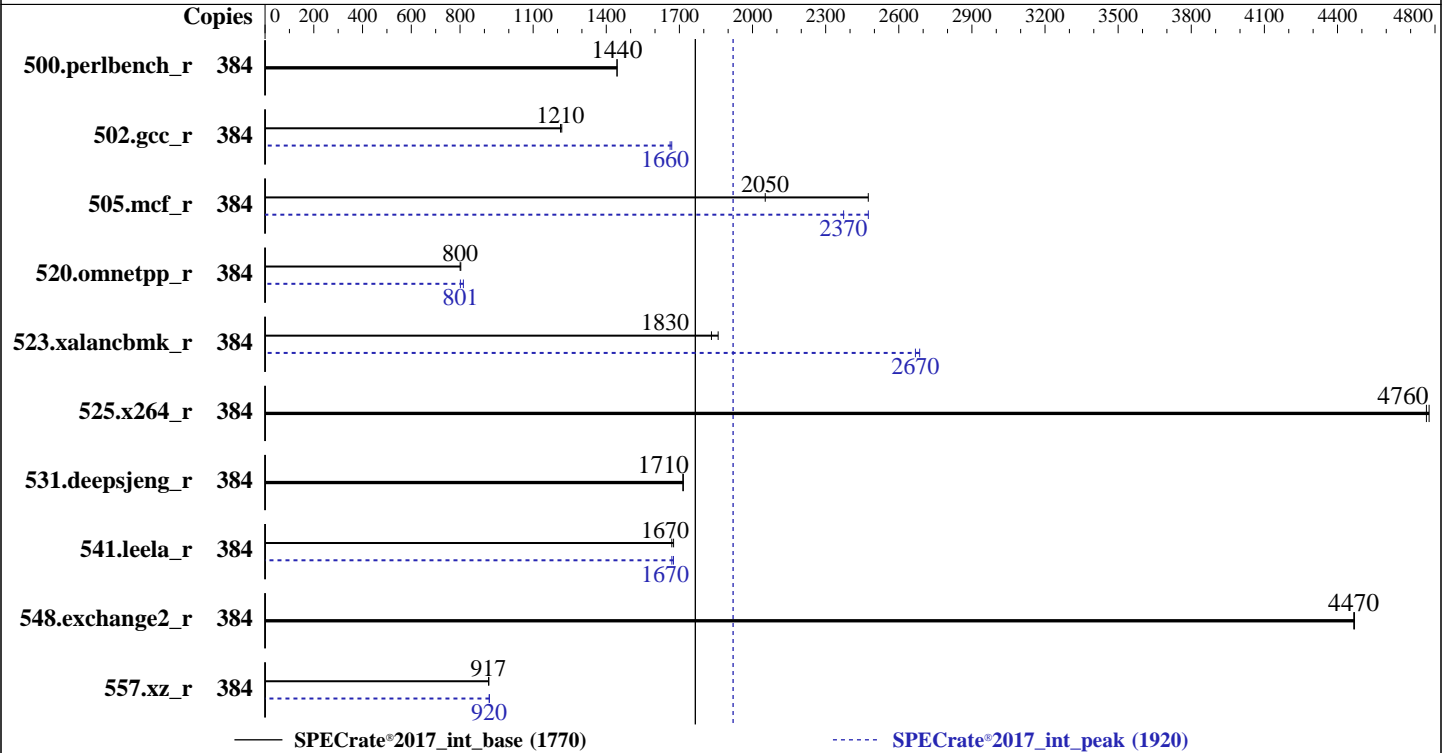
Test Date: Apr-2023

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



Hardware

CPU Name: AMD EPYC 9654
 Max MHz: 3700
 Nominal: 2400
 Enabled: 192 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores
 Other: None
 Memory: 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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	384	423	1440	423	1440			384	423	1440	423	1440		
502.gcc_r	384	449	1210	447	1220			384	326	1670	327	1660		
505.mcf_r	384	302	2050	251	2470			384	251	2480	261	2370		
520.omnetpp_r	384	627	803	630	800			384	619	814	629	801		
523.xalancbmk_r	384	221	1830	218	1860			384	152	2670	151	2690		
525.x264_r	384	141	4760	141	4780			384	141	4760	141	4780		
531.deepsjeng_r	384	257	1710	256	1720			384	257	1710	256	1720		
541.leela_r	384	379	1680	381	1670			384	379	1680	381	1670		
548.exchange2_r	384	225	4470	225	4470			384	225	4470	225	4470		
557.xz_r	384	452	918	452	917			384	450	921	451	920		

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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) 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:"
MALLOCONF = "retain:true"
```

Environment variables set by runcpu during the 523.xalancbmk_r peak run:

```
MALLOCONF = "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 Mon Apr 17 15:42:23 2023

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

Table of contents

1. uname -a
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4. ulimit -a
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6. /proc/cpuinfo
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10. who -r
11. Systemd service manager version: systemd 250 (250-6.el9_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
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17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged

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Platform Notes (Continued)

- 19. OS release
- 20. Disk information
- 21. /sys/devices/virtual/dmi/id
- 22. dmidecode
- 23. BIOS

```
1. uname -a
Linux localhost.localdomain 5.14.0-70.13.1.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
15:42:24 up 27 min, 1 user, load average: 0.00, 0.02, 0.37
USER      TTY      LOGIN@   IDLE   JCPU   PCPU WHAT
root      tty1    15:33   16.00s  1.57s  0.29s /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) 6191057
max locked memory            (kbytes, -l) 2097152
max memory size              (kbytes, -m) unlimited
open files                   (-n) 1024
pipe size                    (512 bytes, -p) 8
POSIX message queues         (bytes, -q) 819200
real-time priority           (-r) 0
stack size                   (kbytes, -s) unlimited
cpu time                     (seconds, -t) unlimited
max user processes           (-u) 6191057
virtual memory                (kbytes, -v) unlimited
file locks                   (-x) unlimited
```

```
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 28
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 2 intrate
runcpu --configfile amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 2 --nopower --runmode
rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/CPU2017
```

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

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Platform Notes (Continued)

```

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       : 96
siblings        : 192
2 physical ids (chips)
384 processors (hardware threads)
physical id 0: core ids 0-95
physical id 1: core ids 0-95
physical id 0: apicids 0-191
physical id 1: apicids 256-447

```

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

7. lscpu

From lscpu from util-linux 2.37.4:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          52 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 384
On-line CPU(s) list:   0-383
Vendor ID:              AuthenticAMD
BIOS Vendor ID:        Advanced Micro Devices, Inc.
Model name:             AMD EPYC 9654 96-Core Processor
BIOS Model name:       AMD EPYC 9654 96-Core Processor
CPU family:            25
Model:                  17
Thread(s) per core:    2
Core(s) per socket:    96
Socket(s):              2
Stepping:               1
Frequency boost:       enabled
CPU max MHz:            3707.8120
CPU min MHz:            1500.0000
BogoMIPS:               4799.91
Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                        clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
                        constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf rapl
                        pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
                        popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy
                        abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext
                        perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3
                        invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1
                        avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                        avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
                        xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                        avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
                        svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
                        pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
                        umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                        avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
Virtualization:        AMD-V
L1d cache:             6 MiB (192 instances)
L1i cache:             6 MiB (192 instances)

```

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Platform Notes (Continued)

```

L2 cache:                192 MiB (192 instances)
L3 cache:                768 MiB (24 instances)
NUMA node(s):            24
NUMA node0 CPU(s):      0-7,192-199
NUMA node1 CPU(s):      8-15,200-207
NUMA node2 CPU(s):      16-23,208-215
NUMA node3 CPU(s):      24-31,216-223
NUMA node4 CPU(s):      32-39,224-231
NUMA node5 CPU(s):      40-47,232-239
NUMA node6 CPU(s):      48-55,240-247
NUMA node7 CPU(s):      56-63,248-255
NUMA node8 CPU(s):      64-71,256-263
NUMA node9 CPU(s):      72-79,264-271
NUMA node10 CPU(s):     80-87,272-279
NUMA node11 CPU(s):     88-95,280-287
NUMA node12 CPU(s):     96-103,288-295
NUMA node13 CPU(s):    104-111,296-303
NUMA node14 CPU(s):    112-119,304-311
NUMA node15 CPU(s):    120-127,312-319
NUMA node16 CPU(s):    128-135,320-327
NUMA node17 CPU(s):    136-143,328-335
NUMA node18 CPU(s):    144-151,336-343
NUMA node19 CPU(s):    152-159,344-351
NUMA node20 CPU(s):    160-167,352-359
NUMA node21 CPU(s):    168-175,360-367
NUMA node22 CPU(s):    176-183,368-375
NUMA node23 CPU(s):    184-191,376-383
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:       Not affected
Vulnerability Mds:        Not affected
Vulnerability Meltdown:  Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                          filling
Vulnerability Srbds:      Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	32K	6M	8	Data	1	64	1	64
L1i	32K	6M	8	Instruction	1	64	1	64
L2	1M	192M	8	Unified	2	2048	1	64
L3	32M	768M	16	Unified	3	32768	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```

available: 24 nodes (0-23)
node 0 cpus: 0-7,192-199
node 0 size: 64310 MB
node 0 free: 63950 MB
node 1 cpus: 8-15,200-207
node 1 size: 64507 MB
node 1 free: 64254 MB
node 2 cpus: 16-23,208-215
node 2 size: 64507 MB
node 2 free: 64178 MB
node 3 cpus: 24-31,216-223
node 3 size: 64507 MB

```

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Platform Notes (Continued)

```

node 3 free: 64207 MB
node 4 cpus: 32-39,224-231
node 4 size: 64507 MB
node 4 free: 64252 MB
node 5 cpus: 40-47,232-239
node 5 size: 64507 MB
node 5 free: 64252 MB
node 6 cpus: 48-55,240-247
node 6 size: 64507 MB
node 6 free: 64253 MB
node 7 cpus: 56-63,248-255
node 7 size: 64507 MB
node 7 free: 64242 MB
node 8 cpus: 64-71,256-263
node 8 size: 64507 MB
node 8 free: 64238 MB
node 9 cpus: 72-79,264-271
node 9 size: 64507 MB
node 9 free: 64219 MB
node 10 cpus: 80-87,272-279
node 10 size: 64507 MB
node 10 free: 64126 MB
node 11 cpus: 88-95,280-287
node 11 size: 64507 MB
node 11 free: 64171 MB
node 12 cpus: 96-103,288-295
node 12 size: 64507 MB
node 12 free: 63952 MB
node 13 cpus: 104-111,296-303
node 13 size: 64507 MB
node 13 free: 63954 MB
node 14 cpus: 112-119,304-311
node 14 size: 64507 MB
node 14 free: 64106 MB
node 15 cpus: 120-127,312-319
node 15 size: 64507 MB
node 15 free: 63904 MB
node 16 cpus: 128-135,320-327
node 16 size: 64507 MB
node 16 free: 64048 MB
node 17 cpus: 136-143,328-335
node 17 size: 64507 MB
node 17 free: 64133 MB
node 18 cpus: 144-151,336-343
node 18 size: 64507 MB
node 18 free: 64217 MB
node 19 cpus: 152-159,344-351
node 19 size: 64471 MB
node 19 free: 64221 MB
node 20 cpus: 160-167,352-359
node 20 size: 64507 MB
node 20 free: 64215 MB
node 21 cpus: 168-175,360-367
node 21 size: 64507 MB
node 21 free: 64229 MB
node 22 cpus: 176-183,368-375
node 22 size: 64507 MB
node 22 free: 64232 MB
node 23 cpus: 184-191,376-383
node 23 size: 64431 MB

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Platform Notes (Continued)

node 23 free: 64121 MB

node distances:

node	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0:	10	11	11	12	12	12	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
1:	11	10	11	12	12	12	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
2:	11	11	10	12	12	12	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
3:	12	12	12	10	11	11	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
4:	12	12	12	11	10	11	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
5:	12	12	12	11	11	10	12	12	12	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
6:	12	12	12	12	12	12	10	11	11	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
7:	12	12	12	12	12	12	11	10	11	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
8:	12	12	12	12	12	12	11	11	10	12	12	12	12	32	32	32	32	32	32	32	32	32	32	32
9:	12	12	12	12	12	12	12	12	12	10	11	11	12	32	32	32	32	32	32	32	32	32	32	32
10:	12	12	12	12	12	12	12	12	12	11	10	11	12	32	32	32	32	32	32	32	32	32	32	32
11:	12	12	12	12	12	12	12	12	12	11	11	10	12	32	32	32	32	32	32	32	32	32	32	32
12:	32	32	32	32	32	32	32	32	32	32	32	32	10	11	11	12	12	12	12	12	12	12	12	12
13:	32	32	32	32	32	32	32	32	32	32	32	32	11	10	11	12	12	12	12	12	12	12	12	12
14:	32	32	32	32	32	32	32	32	32	32	32	32	11	11	10	12	12	12	12	12	12	12	12	12
15:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	10	11	11	12	12	12	12	12	12
16:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	11	10	11	12	12	12	12	12	12
17:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	11	11	10	12	12	12	12	12	12
18:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	10	11	11	12	12	12
19:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	11	10	11	12	12	12
20:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	11	11	10	12	12	12
21:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	12	12	12	10	11	11
22:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	12	12	12	11	10	11
23:	32	32	32	32	32	32	32	32	32	32	32	32	12	12	12	12	12	12	12	12	12	11	11	10

9. /proc/meminfo
MemTotal: 1585017540 kB

10. who -r
run-level 3 Apr 17 15:15

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

12. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd 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

13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
root=/dev/mapper/rhel-root

(Continued on next page)



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Platform Notes (Continued)

```
ro
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 2.40 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

  boost state support:
    Supported: yes
    Active: yes
    Boost States: 0
    Total States: 3
    Pstate-P0: 2400MHz
```

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

```
-----
16. sysctl
kernel.numa_balancing          1
kernel.randomize_va_space     0
vm.compaction_proactiveness    20
vm.dirty_background_bytes     0
vm.dirty_background_ratio     10
vm.dirty_bytes                 0
vm.dirty_expire_centisecs     3000
vm.dirty_ratio                 8
vm.dirty_writeback_centisecs  500
vm.dirtytime_expire_seconds   43200
vm.extfrag_threshold          500
vm.min_unmapped_ratio         1
vm.nr_hugepages                0
vm.nr_hugepages_mempolicy     0
vm.nr_overcommit_hugepages    0
vm.swappiness                  1
vm.watermark_boost_factor     15000
vm.watermark_scale_factor     10
vm.zone_reclaim_mode          1
```

```
-----
17. /sys/kernel/mm/transparent_hugepage
defrag      [always] defer defer+madvise madvise never
enabled     [always] madvise never
hpage_pmd_size 2097152
shmem_enabled always within_size advise [never] deny force
```

```
-----
18. /sys/kernel/mm/transparent_hugepage/khugepaged
alloc_sleep_millisecs 60000
defrag                 1
max_ptes_none         511
max_ptes_shared       256
max_ptes_swap         64
pages_to_scan         4096
scan_sleep_millisecs 10000
```

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Platform Notes (Continued)

19. OS release

```
From /etc/*-release /etc/*-version
os-release      Red Hat Enterprise Linux 9.0 (Plow)
redhat-release  Red Hat Enterprise Linux release 9.0 (Plow)
system-release  Red Hat Enterprise Linux release 9.0 (Plow)
```

20. Disk information

```
SPEC is set to: /home/CPU2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   819G   14G  806G   2% /home
```

21. /sys/devices/virtual/dmi/id

```
Vendor:      IEI
Product:     NF5180A7
Product Family: Not specified
Serial:      000000000
```

22. dmidecode

Additional information from dmidecode 3.3 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

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

23. BIOS

(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
```

(Continued on next page)



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Compiler Version Notes (Continued)

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)
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)

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Compiler Version Notes (Continued)

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
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

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Software Availability: Nov-2022

Base Optimization Flags (Continued)

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
```

Base Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument
```

C++ benchmarks:

```
-Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```

Peak Compiler Invocation

C benchmarks:

```
clang
```

C++ benchmarks:

```
clang++
```

Fortran benchmarks:

```
flang
```



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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

```
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: -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
```

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Peak Optimization Flags (Continued)

520.omnetpp_r (continued):

-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: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lflang -lamdalloc-ext

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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

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Peak Other Flags (Continued)

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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