



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

## Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

SPECrate®2017\_int\_base = 355

SPECrate®2017\_int\_peak = 362

CPU2017 License: 9019

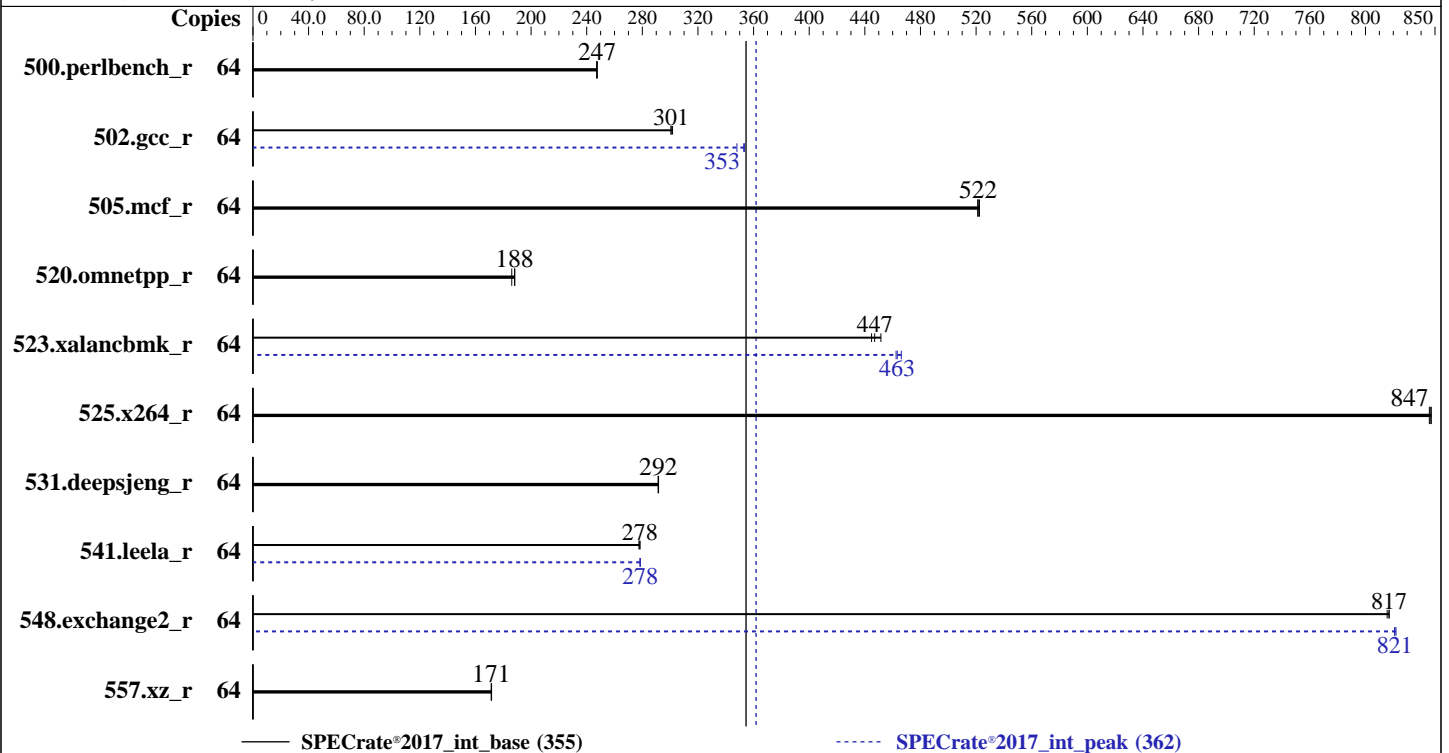
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Jul-2024

Hardware Availability: Jun-2024

Software Availability: Jun-2023



### Hardware

CPU Name: AMD EPYC 9124  
 Max MHz: 3700  
 Nominal: 3000  
 Enabled: 32 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: 64 MB I+D on chip per chip, 16 MB shared / 4 cores  
 Other: None  
 Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-5600B-R, running at 4800)  
 Storage: 1 x 1.6 TB NVME SSD  
 Other: CPU Cooling: Air

### Software

OS: SUSE Linux Enterprise Server 15 SP5  
 kernel version 5.14.21-150500.53-default  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: No  
 Firmware: Version 4.3.4a released May-2024  
 File System: btrfs  
 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	64	412	247	<b><u>412</u></b>	<b><u>247</u></b>	412	247	64	412	247	<b><u>412</u></b>	<b><u>247</u></b>	412	247
502.gcc_r	64	301	301	<b><u>301</u></b>	<b><u>301</u></b>	300	302	64	260	348	256	353	<b><u>257</u></b>	<b><u>353</u></b>
505.mcf_r	64	198	521	<b><u>198</u></b>	<b><u>522</u></b>	198	522	64	198	521	<b><u>198</u></b>	<b><u>522</u></b>	198	522
520.omnetpp_r	64	446	188	<b><u>446</u></b>	<b><u>188</u></b>	451	186	64	446	188	<b><u>446</u></b>	<b><u>188</u></b>	451	186
523.xalancbmk_r	64	152	445	150	452	<b><u>151</u></b>	<b><u>447</u></b>	64	146	462	<b><u>146</u></b>	<b><u>463</u></b>	145	466
525.x264_r	64	132	846	132	847	<b><u>132</u></b>	<b><u>847</u></b>	64	132	846	132	847	<b><u>132</u></b>	<b><u>847</u></b>
531.deepsjeng_r	64	251	292	252	291	<b><u>252</u></b>	<b><u>292</u></b>	64	251	292	252	291	<b><u>252</u></b>	<b><u>292</u></b>
541.leela_r	64	<b><u>381</u></b>	<b><u>278</u></b>	381	278	382	278	64	381	278	381	278	<b><u>381</u></b>	<b><u>278</u></b>
548.exchange2_r	64	<b><u>205</u></b>	<b><u>817</u></b>	205	817	206	816	64	204	821	204	822	<b><u>204</u></b>	<b><u>821</u></b>
557.xz_r	64	<b><u>403</u></b>	<b><u>171</u></b>	403	171	403	172	64	<b><u>403</u></b>	<b><u>171</u></b>	403	171	403	172

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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_znver4_A_lib/lib:/home/cpu2017/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:

NUMA nodes per socket set to NPS4

Determinism Slider set to Power

DF C-States set to Disabled

TDP set to 400

PPT set to 400

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Jul 31 08:39:41 2024
```

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

-----  
Table of contents  
-----

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent\_hugepage
17. /sys/kernel/mm/transparent\_hugepage/khugepaged

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### Platform Notes (Continued)

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

```
1. uname -a
Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
08:39:41 up 2 min, 1 user, load average: 0.16, 0.05, 0.01
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU   WHAT
root      tty1    -              08:38   21.00s 1.31s  0.12s /bin/bash ./amd_rate_aocc400_znver4_A1.sh
```

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

```
4. ulimit -a
core file size          (blocks, -c) unlimited
data seg size           (kbytes, -d) unlimited
scheduling priority     (-e) 0
file size                (blocks, -f) unlimited
pending signals         (-i) 6191377
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) 6191377
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited
```

```
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
python3 ./run_amd_rate_aocc400_znver4_A1.py -b intrate
/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/CPU2017.001/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 9124 16-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
```

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### Platform Notes (Continued)

```

model          : 17
stepping       : 1
microcode      : 0xa101148
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 3584 4K pages
cpu cores     : 16
siblings      : 32
2 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-3,8-11,16-19,24-27
physical id 1: core ids 0-3,8-11,16-19,24-27
physical id 0: apicids 0-7,16-23,32-39,48-55
physical id 1: apicids 64-71,80-87,96-103,112-119

```

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):                64
On-line CPU(s) list:   0-63
Vendor ID:             AuthenticAMD
Model name:            AMD EPYC 9124 16-Core Processor
CPU family:            25
Model:                 17
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):             2
Stepping:              1
Frequency boost:       enabled
CPU max MHz:           3711.9141
CPU min MHz:           1500.0000
BogoMIPS:              5991.16
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 sse3 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
                      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 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_lld
Virtualization:        AMD-V
L1d cache:             1 MiB (32 instances)
L1i cache:             1 MiB (32 instances)
L2 cache:              32 MiB (32 instances)
L3 cache:              128 MiB (8 instances)

```

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### Platform Notes (Continued)

```

NUMA node(s): 8
NUMA node0 CPU(s): 0-3,32-35
NUMA node1 CPU(s): 4-7,36-39
NUMA node2 CPU(s): 8-11,40-43
NUMA node3 CPU(s): 12-15,44-47
NUMA node4 CPU(s): 16-19,48-51
NUMA node5 CPU(s): 20-23,52-55
NUMA node6 CPU(s): 24-27,56-59
NUMA node7 CPU(s): 28-31,60-63
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 and seccomp
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, PBRSE-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	1M	8	Data	1	64	1	64
L1i	32K	1M	8	Instruction	1	64	1	64
L2	1M	32M	8	Unified	2	2048	1	64
L3	16M	128M	16	Unified	3	16384	1	64

8. numactl --hardware

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

```

available: 8 nodes (0-7)
node 0 cpus: 0-3,32-35
node 0 size: 193232 MB
node 0 free: 192777 MB
node 1 cpus: 4-7,36-39
node 1 size: 193533 MB
node 1 free: 193175 MB
node 2 cpus: 8-11,40-43
node 2 size: 193499 MB
node 2 free: 193199 MB
node 3 cpus: 12-15,44-47
node 3 size: 193533 MB
node 3 free: 193236 MB
node 4 cpus: 16-19,48-51
node 4 size: 193533 MB
node 4 free: 193237 MB
node 5 cpus: 20-23,52-55
node 5 size: 193533 MB
node 5 free: 193248 MB
node 6 cpus: 24-27,56-59
node 6 size: 193533 MB
node 6 free: 193254 MB
node 7 cpus: 28-31,60-63
node 7 size: 193473 MB
node 7 free: 193188 MB
node distances:
node  0  1  2  3  4  5  6  7
0:  10 12 12 12 32 32 32 32

```

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### Platform Notes (Continued)

1:	12	10	12	12	32	32	32	32
2:	12	12	10	12	32	32	32	32
3:	12	12	12	10	32	32	32	32
4:	32	32	32	32	10	12	12	12
5:	32	32	32	32	12	10	12	12
6:	32	32	32	32	12	12	10	12
7:	32	32	32	32	12	12	12	10

```
-----
9. /proc/meminfo
   MemTotal:      1585023152 kB
-----
```

```
-----
10. who -r
    run-level 3 Jul 31 08:37
-----
```

```
-----
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
    Default Target  Status
    multi-user      running
-----
```

```
-----
12. Services, from systemctl list-unit-files
    STATE          UNIT FILES
    enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ irqbalance iscsi
                    issue-generator kbdsettings klog libvirt lvm2-monitor nscd postfix purge-kernels rollback
                    rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
                    wickedd-nanny
    enabled-runtime systemd-remount-fs
    disabled        autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                    chronyd console-getty cups cups-browsed debug-shell dnsmasq ebttables exchange-bmc-os-info
                    firewallld gpm grub2-once haveged haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                    iscsi-init iscsid issue-add-ssh-keys kdump kdump-early kexec-load ksm kvm_stat
                    libvirt-guests lunmask man-db-create multipathd nfs nfs-blkmap nfs-server nfsserver
                    rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd
                    strongswan strongswan-starter svnserv systemd-boot-check-no-failures
                    systemd-network-generator systemd-nspawn@ systemd-sysextd systemd-time-wait-sync
                    systemd-timesyncd tcso udisks2 virtinterfaced virtnetworkd virtnodevdev virtnwfilterd
                    virtproxyd virtqemud virtsecret virtstoraged
    indirect        pcsd virtlockd virtlogd wickedd
-----
```

```
-----
13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
    root=UUID=5eac0278-b5d7-4d70-9f22-3587a0d03dd8
    splash=silent
    mitigations=auto
    quiet
    security=apparmor
-----
```

```
-----
14. cpupower frequency-info
    analyzing CPU 0:
        current policy: frequency should be within 1.50 GHz and 3.00 GHz.
                        The governor "performance" may decide which speed to use
                        within this range.

    boost state support:
        Supported: yes
        Active: yes
-----
```

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### Platform Notes (Continued)

-----  
15. sysctl

```

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

```

-----  
16. /sys/kernel/mm/transparent\_hugepage

```

defrag          [always] defer defer+madvise madvise never
enabled         [always] madvise never
hpage_pmd_size 2097152
shmem_enabled   always within_size advise [never] deny force

```

-----  
17. /sys/kernel/mm/transparent\_hugepage/khugepaged

```

alloc_sleep_millisecs 60000
defrag                 1
max_ptes_none          511
max_ptes_shared        256
max_ptes_swap           64
pages_to_scan          4096
scan_sleep_millisecs   10000

```

-----  
18. OS release

```

From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP5

```

-----  
19. Disk information

```

SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       btrfs 222G  11G  210G   5% /home

```

-----  
20. /sys/devices/virtual/dmi/id

```

Vendor:      Cisco Systems Inc
Product:     UCSC-C245-M8SX
Serial:      WZP27360C65

```

-----  
21. dmidecode

```

Additional information from dmidecode 3.4 follows.  WARNING: Use caution when you interpret this section.
The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately

```

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### Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:

4x 0xCE00 M321R8GA0PB0-CWMJH 64 GB 2 rank 5600, configured at 4800

20x 0xCE00 M321R8GA0PB0-CWMKJ 64 GB 2 rank 5600, configured at 4800

#### 22. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: Cisco Systems, Inc.

BIOS Version: C245M8.4.3.4a.0.0520240849

BIOS Date: 05/20/2024

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)

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# SPEC CPU®2017 Integer Rate Result

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## Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

SPECrate®2017\_int\_base = 355

SPECrate®2017\_int\_peak = 362

**CPU2017 License:** 9019

**Test Sponsor:** Cisco Systems

**Tested by:** Cisco Systems

**Test Date:** Jul-2024

**Hardware Availability:** Jun-2024

**Software Availability:** Jun-2023

## Compiler Version Notes (Continued)

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

=====  
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



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**Test Date:** Jul-2024

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**Software Availability:** Jun-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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**Tested by:** Cisco Systems

**Test Date:** Jul-2024

**Hardware Availability:** Jun-2024

**Software Availability:** Jun-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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**Tested by:** Cisco Systems

**Test Date:** Jul-2024

**Hardware Availability:** Jun-2024

**Software Availability:** Jun-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
-lamalloc
```

505.mcf\_r: basepeak = yes

525.x264\_r: basepeak = yes

557.xz\_r: basepeak = yes

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
-lamalloc-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
-lamdlbm -lflang -lamalloc-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 -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 -lamdlbm
```

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Hardware Availability: Jun-2024

Software Availability: Jun-2023

## Peak Optimization Flags (Continued)

Fortran benchmarks (continued):

-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/aocc400-flags.html>

<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-AMD-v3-revA.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/Cisco-Platform-Settings-AMD-v3-revA.xml>

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Tested with SPEC CPU®2017 v1.1.9 on 2024-07-31 08:39:41-0400.

Report generated on 2024-08-29 10:53:21 by CPU2017 PDF formatter v6716.

Originally published on 2024-08-27.