SPEC CPU®2017 Integer Speed Result

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Cisco Systems

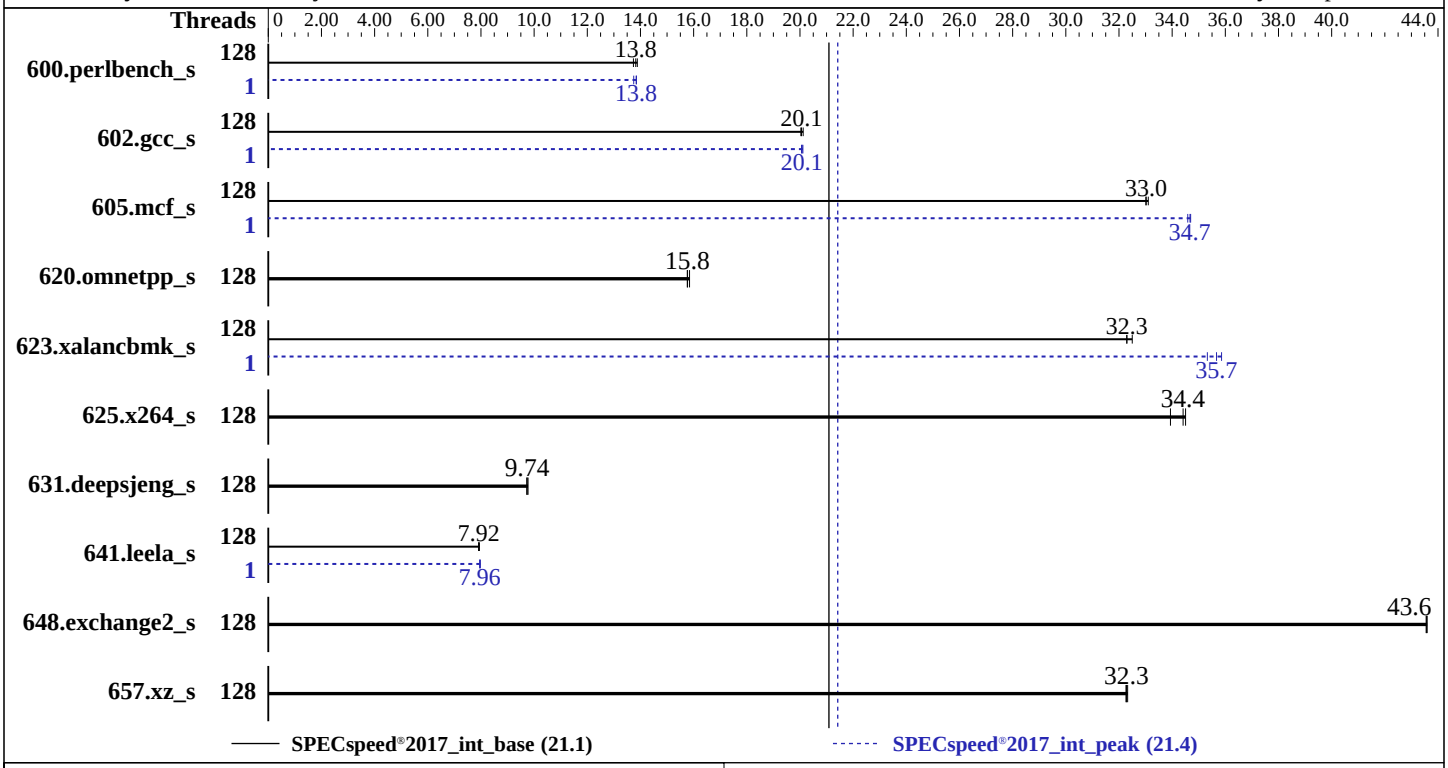
Cisco UCS X215 M8 (AMD EPYC 9575F 3.30 GHz Processor)

SPECspeed®2017_int_base = 21.1

SPECspeed®2017_int_peak = 21.4

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Jan-2025
Hardware Availability: Oct-2024
Software Availability: Sep-2024



Hardware

CPU Name:	AMD EPYC 9575F
Max MHz:	5000
Nominal:	3300
Enabled:	128 cores, 2 chips
Orderable:	1,2 chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	256 MB I+D on chip per chip, 32 MB shared / 8 cores
Other:	None
Memory:	1536 GB (24 x 64 GB 2Rx4 PC5-6400B-R, running at 6000)
Storage:	1 x 6.4 TB NVMe SSD
Other:	CPU Cooling: Air

Software

OS:	SUSE Linux Enterprise Server 15 SP6 kernel version 6.4.0-150600.21-default
Compiler:	C/C++/Fortran: Version 5.0.0 of AOCC
Parallel:	Yes
Firmware:	Version 4.3.5f released Feb-2025
File System:	btrfs
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	128	129	13.7	128	13.9	**128**	**13.8**	1	**128**	**13.8**	129	13.7	128	13.9
602.gcc_s	128	199	20.0	198	20.1	**199**	**20.1**	1	198	20.1	**198**	**20.1**	199	20.1
605.mcf_s	128	143	33.1	143	33.0	**143**	**33.0**	1	136	34.7	136	34.6	**136**	**34.7**
620.omnetpp_s	128	**103**	**15.8**	103	15.8	103	15.8	128	**103**	**15.8**	103	15.8	103	15.8
623.xalancbmk_s	128	43.6	32.5	43.9	32.3	**43.9**	**32.3**	1	**39.7**	**35.7**	40.1	35.3	39.5	35.9
625.x264_s	128	**51.3**	**34.4**	52.0	33.9	51.1	34.5	128	**51.3**	**34.4**	52.0	33.9	51.1	34.5
631.deepsjeng_s	128	147	9.77	147	9.72	**147**	**9.74**	128	147	9.77	147	9.72	**147**	**9.74**
641.leela_s	128	**216**	**7.92**	215	7.94	216	7.91	1	**214**	**7.96**	215	7.95	214	7.98
648.exchange2_s	128	67.4	43.6	67.5	43.6	**67.5**	**43.6**	128	67.4	43.6	67.5	43.6	**67.5**	**43.6**
657.xz_s	128	**191**	**32.3**	191	32.3	192	32.3	128	**191**	**32.3**	191	32.3	192	32.3

SPECspeed®2017_int_base = **21.1**

SPECspeed®2017_int_peak = **21.4**

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.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-127"
LD_LIBRARY_PATH =
     "/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib:/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib32:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "128"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "0"

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"
```

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 Mode set to Disabled
NUMA nodes per socket set to NPS1
Determinism Slider set to Power
DF C-States set to Disabled
Enhanced CPU performance set to Auto

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Wed May 14 05:47:36 2025

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

 ------------------------------------------------------------
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 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 254 (254.10+suse.84.ge8d77af424)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
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15. sysctl
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18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux localhost 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
  x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   05:47:36 up 2 min,  3 users,  load average: 0.09, 0.05, 0.01
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                05:46   24.00s  0.75s  0.07s /bin/bash ./amd_speed_aocc500_znver5_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) 6190697
  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) 6190697
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
```

(Continued on next page)

Platform Notes (Continued)

```
 /usr/lib/systemd/systemd --switched-root --system --deserialize=42
 login -- root
 -bash
 python3 ./run_amd_speed_aocc500_znver5_A1.py -b intspeed
 /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/CPU2017.002/templogs/preenv.intspeed.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9575F 64-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 26
    model           : 2
    stepping        : 1
    microcode       : 0xb00211e
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 192 4K pages
    cpu cores       : 64
    siblings        : 64
    2 physical ids (chips)
    128 processors (hardware threads)
    physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
    physical id 1: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
    physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
    physical id 1: apicids 128-135,144-151,160-167,176-183,192-199,208-215,224-231,240-247
  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 2.39.3:
  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):                               128
  On-line CPU(s) list:                  0-127
  Vendor ID:                            AuthenticAMD
  BIOS Vendor ID:                       Advanced Micro Devices, Inc.
  Model name:                           AMD EPYC 9575F 64-Core Processor
  BIOS Model name:                      AMD EPYC 9575F 64-Core Processor                Unknown CPU @ 3.3GHz
  BIOS CPU family:                      107
  CPU family:                           26
  Model:                                2
  Thread(s) per core:                   1
  Core(s) per socket:                   64
  Socket(s):                            2
  Stepping:                             1
  Frequency boost:                      enabled
  CPU(s) scaling MHz:                   102%
  CPU max MHz:                          3300.0000
  CPU min MHz:                          1500.0000
  BogoMIPS:                             6589.52
  Flags:                                fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
```

(Continued on next page)

Platform Notes (Continued)

```
                                  pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                                  rdtscp lm constant_tsc rep_good amd_lbr_v2 nopl nonstop_tsc cpuid
                                  extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid
                                  sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
                                  cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
                                  osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
                                  perfctr_llc mwaitx cpb cat_l3 cdp_l3 hw_pstate ssbd mba perfmon_v2
                                  ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust 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 user_shstk avx_vnni 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 bus_lock_detect
                                  movdiri movdir64b overflow_recov succor smca fsrm avx512_vp2intersect
                                  flush_l1d debug_swap
  Virtualization:                 AMD-V
  L1d cache:                      6 MiB (128 instances)
  L1i cache:                      4 MiB (128 instances)
  L2 cache:                       128 MiB (128 instances)
  L3 cache:                       512 MiB (16 instances)
  NUMA node(s):                   2
  NUMA node0 CPU(s):              0-63
  NUMA node1 CPU(s):              64-127
  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 Reg file data sampling: Not affected
  Vulnerability Retbleed:               Not affected
  Vulnerability Spec rstack overflow:   Not affected
  Vulnerability Spec store bypass:      Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:             Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:             Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                  disabled; RSB filling; PBRSB-eIBRS Not affected; BHI 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       48K       6M   12 Data            1    64        1             64
     L1i       32K       4M    8 Instruction     1    64        1             64
     L2         1M     128M   16 Unified         2  1024        1             64
     L3        32M     512M   16 Unified         3 32768        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-63
  node 0 size: 773711 MB
  node 0 free: 772292 MB
  node 1 cpus: 64-127
  node 1 size: 773989 MB
  node 1 free: 772673 MB
```

(Continued on next page)

Platform Notes (Continued)

```
  node distances:
  node   0   1
    0:  10  32
    1:  32  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584845712 kB

------------------------------------------------------------
10. who -r
  run-level 3 May 14 05:45

------------------------------------------------------------
11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
  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 lvm2-monitor nscd nvmefc-boot-connections
                   nvmf-autoconnect postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore
                   virtqemud 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 ebtables exchange-bmc-os-info
                   firewalld fsidd gpm grub2-once haveged hv_fcopy_daemon hv_kvp_daemon hv_vss_daemon
                   hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid issue-add-ssh-keys kexec-load ksm
                   kvm_stat libvirt-guests lunmask man-db-create multipathd nfs nfs-blkmap nfs-server
                   nfsserver rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd_generate_opts
                   snmpd snmptrapd strongswan strongswan-starter svnserve systemd-boot-check-no-failures
                   systemd-confext systemd-network-generator systemd-nspawn@ systemd-sysext
                   systemd-time-wait-sync systemd-timesyncd tcsd udisks2 virtinterfaced virtlockd virtlogd
                   virtnetworkd virtnodedevd virtnwfilterd virtsecretd virtstoraged
  indirect         pcscd systemd-userdbd tftp wickedd

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
  root=UUID=657ee49c-2d95-4700-b85a-ada6d25f50ed
  splash=silent
  mitigations=auto
  quiet
  security=apparmor

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 75:
    current policy: frequency should be within 1.50 GHz and 3.30 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

------------------------------------------------------------
15. sysctl
  kernel.numa_balancing               1
```

(Continued on next page)

Platform Notes (Continued)

```
  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 SP6

------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017
  Filesystem     Type   Size  Used Avail Use% Mounted on
  /dev/sdc3      btrfs  5.9T   11G  5.9T   1% /home

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Cisco Systems Inc
    Product:        UCSX-215C-M8
    Product Family: Cisco UCS Rack Server
    Serial:         FCH282172A1

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

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Platform Notes (Continued)

```
  Memory:
    20x 0xCE00 M321R8GA0PB2-CCPKC 64 GB 2 rank 6400, configured at 6000
    4x 0xCE00 M321R8GA0PB2-CCPPC 64 GB 2 rank 6400, configured at 6000


 ------------------------------------------------------------
 22. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Cisco Systems, Inc.
    BIOS Version:      X215M8.4.3.5f.0.0218251523
    BIOS Date:         02/18/2025
    BIOS Revision:     5.35
```

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
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
-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: `-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`

(Continued on next page)

Peak Optimization Flags (Continued)

602.gcc_s: `Same as 600.perlbench_s`

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 -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:

648.exchange2_s: `basepeak = yes`

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.html`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-AMD-Turin-v1.1-revG.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc500-flags.xml`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-AMD-Turin-v1.1-revG.xml`

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