SPEC CPU®2017 Integer Rate Result

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Supermicro

MegaDC ARS-211M-NR
(R13SPD , Ampere AmpereOne A192-32X)

$SPECrate^{®}2017\_int\_base = 702$

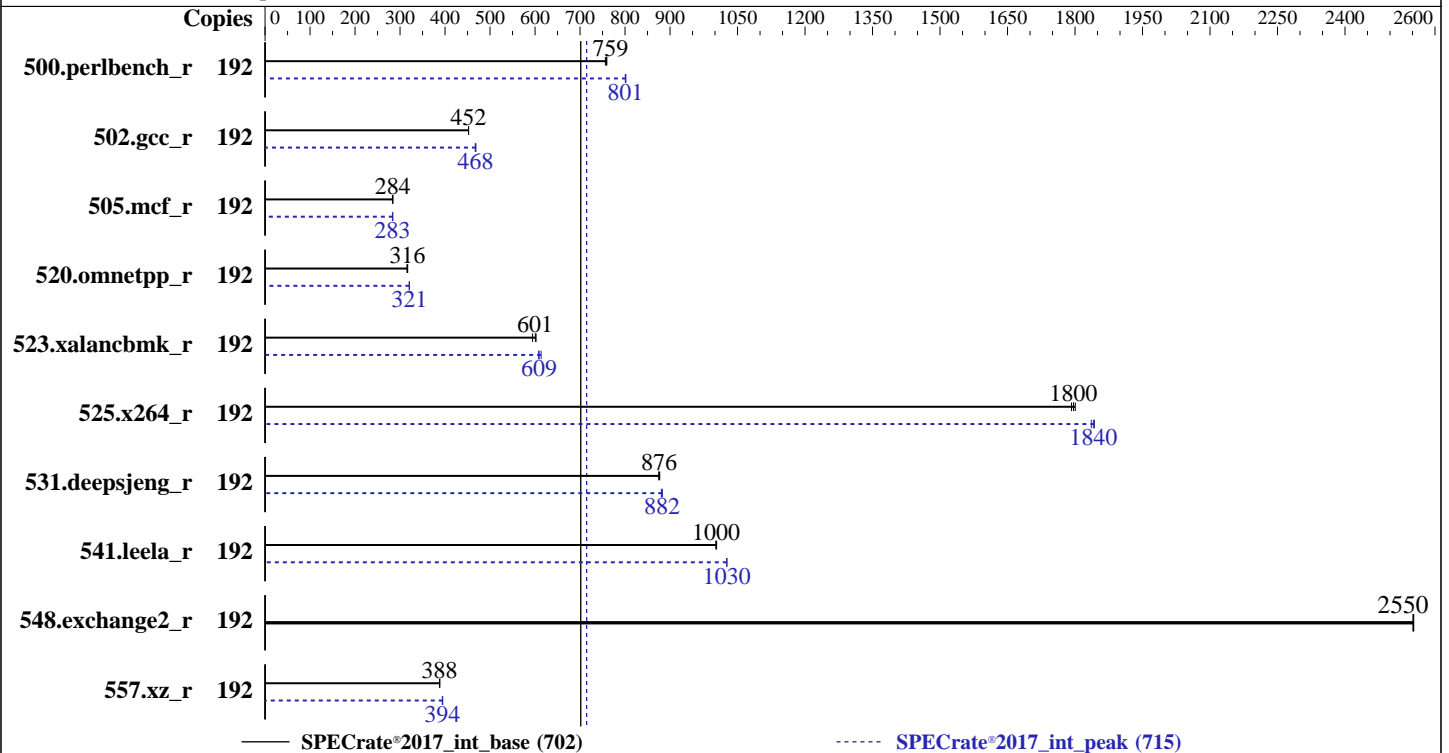$SPECrate^{®}2017\_int\_peak = 715$

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Copies			
500.perlbench_r	192	base	759
		peak	801
502.gcc_r	192	base	452
		peak	468
505.mcf_r	192	base	284
		peak	283
520.omnetpp_r	192	base	316
		peak	321
523.xalancbmk_r	192	base	601
		peak	609
525.x264_r	192	base	1800
		peak	1840
531.deepsjeng_r	192	base	876
		peak	882
541.leela_r	192	base	1000
		peak	1030
548.exchange2_r	192	base	2550
557.xz_r	192	base	388
		peak	394

SPECrate®2017_int_base (702)   SPECrate®2017_int_peak (715)

Hardware

CPU Name: AmpereOne A192-32X
Max MHz: 3200
Nominal: 3200
Enabled: 192 cores, 1 chip
Orderable: 1 chip
Cache L1: 16 KB I + 64 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 64 MB I+D on chip per chip
Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC5-5600B-R, running at 5200)
Storage: 1 x 900 GB NVMe SSD
Other: CPU Cooling: Air

Software

OS: Fedora Linux 37 (Server Edition)
Kernel 6.1.14-200.fc37.aarch64
Compiler: C/C++/Fortran: Version 13.2.0 of GCC, the GNU Compiler Collection
Parallel: No
Firmware: Version 1.0 released Jul-2024
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: Jemalloc memory allocator library v5.3.0
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

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Test Date: Jul-2024
Hardware Availability: Aug-2024
Software Availability: Jul-2023

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	192	**403**	**759**	404	756	402	760	192	381	802	**382**	**801**	382	801
502.gcc_r	192	601	452	601	452	**601**	**452**	192	580	469	**581**	**468**	582	467
505.mcf_r	192	**1093**	**284**	1096	283	1092	284	192	1093	284	1096	283	**1095**	**283**
520.omnetpp_r	192	**796**	**316**	795	317	799	315	192	**785**	**321**	786	320	785	321
523.xalancbmk_r	192	**338**	**601**	337	602	341	595	192	333	608	**333**	**609**	330	614
525.x264_r	192	188	1790	**187**	**1800**	187	1800	192	183	1840	182	1840	**183**	**1840**
531.deepsjeng_r	192	251	875	251	877	**251**	**876**	192	**249**	**882**	250	881	249	883
541.leela_r	192	317	1000	317	1000	**317**	**1000**	192	310	1030	310	1030	**310**	**1030**
548.exchange2_r	192	197	2550	**197**	**2550**	197	2550	192	197	2550	**197**	**2550**	197	2550
557.xz_r	192	**534**	**388**	534	388	534	388	192	525	395	526	394	**526**	**394**
SPECrate®2017_int_base =		**702**												
SPECrate®2017_int_peak =		**715**												

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
Binaries were compiled on a system with 1x AmpereOne CPU
chip + 512 GB Memory using Fedora Linux 37
```

Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
```

Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size
Set dirty_ratio=8 to limit dirty cache to 8% of memory
     echo 8 | sudo tee /proc/sys/vm/dirty_ratio
Set swappiness=1 to swap only if necessary
     echo 1 | sudo tee /proc/sys/vm/swappiness
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory
     echo 1 | sudo tee /proc/sys/vm/zone_reclaim_mode
Set drop_caches=3 to reset caches before invoking runcpu
     echo 3 | sudo tee /proc/sys/vm/drop_caches
Set numa_balancing=0 to disable automatic numa balancing
     echo 0 | sudo tee /proc/sys/kernel/numa_balancing
Switch off all ktune and tuned settings
     sudo tuned-adm off
Transparent huge pages set to 'never'
     sudo bash -c "echo never > /sys/kernel/mm/transparent_hugepage/enabled"

runcpu command invoked through numactl i.e.
1P: numactl --interleave=0-3 runcpu <etc>
2P: numactl --interleave=all runcpu <etc>
```

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/root/cpu2017/ampere_spec2017/spec2017/jemalloc/install/lib:/root/cpu2017/ampere_spec2017/spec2017/gc
     c/install/lib64:/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib:/home/amptest/ampere_spec2
     017/spec2017/gcc/install/lib64:/root/cpu2017/ampere_spec2017/spec2017/gcc/install/lib64:"
MALLOC_CONF =
     "thp:always,metadata_thp:always,dirty_decay_ms:-1,muzzy_decay_ms:-1,retain:true,percpu_arena:percpu"
```

General Notes

```
Jemalloc v5.3.0 is available via
https://github.com/jemalloc/jemalloc/releases/download/5.3.0/jemalloc-5.3.0.tar.bz2
It was built on Fedora Linux 37 using Version 13.2.0 of GCC
The configure options are
"--with-lg-page=16" for building libjemalloc.so, and
"--with-lg-quantum=3 --with-lg-page=18" for building libjemalloc_ext.so
Tuned MALLOC_CONF in terms of https://jemalloc.net/jemalloc.3.html

 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

```
Note: lscpu is not able to detect the SLC.
SLC is defined at https://developer.arm.com/documentation/100180/0103/bry1436285730281
BIOS Settings:
Sub-NUMA Mode = Quadrant

Sysinfo program /root/cpu2017/ampere_spec2017/spec2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Mon Jul 29 14:56:12 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 251 (251.19-1.fc37)
 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
```

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Platform Notes (Continued)

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

   -------------------------------------------------------------
   1. uname -a
     Linux localhost.localdomain 6.1.14-200.fc37.aarch64 #1 SMP PREEMPT_DYNAMIC Sun Feb 26 00:22:40 UTC 2023
     aarch64 aarch64 aarch64 GNU/Linux

   -------------------------------------------------------------
   2. w
     14:56:12 up 1 min,  2 users,  load average: 2.07, 1.22, 0.47
     USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
     root     ttyAMA0    14:55    1:14   0.02s  0.02s -bash
     root     pts/0      14:55    35.00s 1.28s  0.00s /bin/bash ./run_spec2017.sh --iterations 3 --copies 192
     --nobuild --action run --reportable --tune base:peak intrate

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

   -------------------------------------------------------------
   4. ulimit -a
     real-time non-blocking time  (microseconds, -R) unlimited
     core file size              (blocks, -c) unlimited
     data seg size               (kbytes, -d) unlimited
     scheduling priority                 (-e) 0
     file size                   (blocks, -f) unlimited
     pending signals                     (-i) 2057751
     max locked memory           (kbytes, -l) 8192
     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) 8192
     cpu time                   (seconds, -t) unlimited
     max user processes                  (-u) 2057751
     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
    /bin/bash ./test4k.sh
    /bin/bash ./run_spec2017.sh --iterations 3 --copies 192 --nobuild --action run --reportable --tune base:peak
      intrate
    runcpu --config=ampere_aarch64 --define numasize=48 --define
      gcc_dir=/home/amptest/ampere_spec2017/spec2017/gcc/install --define
      llvm_dir=/home/amptest/ampere_spec2017/spec2017/llvm/install --define
      jemalloc_dir=/home/amptest/ampere_spec2017/spec2017/jemalloc/install --define glibc_dir=/ --iterations 3
      --copies 192 --nobuild --action run --reportable --tune base:peak intrate
```

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Platform Notes (Continued)

```
 runcpu --configfile ampere_aarch64 --define numasize=48 --define
   gcc_dir=/home/amptest/ampere_spec2017/spec2017/gcc/install --define
   llvm_dir=/home/amptest/ampere_spec2017/spec2017/llvm/install --define
   jemalloc_dir=/home/amptest/ampere_spec2017/spec2017/jemalloc/install --define glibc_dir=/ --iterations 3
   --copies 192 --nobuild --action run --reportable --tune base:peak --nopower --runmode rate --tune
   base:peak --size refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.004/templogs/preenv.intrate.004.0.log --lognum 004.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /root/cpu2017/ampere_spec2017/spec2017


-----------------------------------------------------------
6. /proc/cpuinfo
    CPU implementer : 0xc0
    CPU architecture: 8
    CPU variant     : 0x0
    CPU part        : 0xac4
    CPU revision    : 0
    Features        : fp asimd evtstrm aes pmull sha1 sha2 crc32 atomics fphp asimdhp cpuid asimdrdm jscvt
                      fcma lrcpc dcpop sha3 sm3 sm4 asimddp sha512 asimdfhm dit uscat ilrcpc flagm ssbs sb
                      paca pacg dcpodp flagm2 frint i8mm bf16 rng bti ecv


-----------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.38.1:
  Architecture:                aarch64
  CPU op-mode(s):              64-bit
  Byte Order:                  Little Endian
  CPU(s):                      192
  On-line CPU(s) list:         0-191
  Vendor ID:                   Ampere
  BIOS Vendor ID:              Ampere(R)
  Model name:                  -
  BIOS Model name:             AmpereOne(R) A192-32X CPU @ 3.2GHz
  BIOS CPU family:             257
  Model:                       0
  Thread(s) per core:          1
  Core(s) per socket:          192
  Socket(s):                   1
  Stepping:                    0x0
  Frequency boost:             disabled
  CPU(s) scaling MHz:          100%
  CPU max MHz:                 3200.0000
  CPU min MHz:                 1000.0000
  BogoMIPS:                    2000.00
  Flags:                       fp asimd evtstrm aes pmull sha1 sha2 crc32 atomics fphp asimdhp cpuid
                               asimdrdm jscvt fcma lrcpc dcpop sha3 sm3 sm4 asimddp sha512 asimdfhm dit
                               uscat ilrcpc flagm ssbs sb paca pacg dcpodp flagm2 frint i8mm bf16 rng bti
                               ecv
  L1d cache:                   12 MiB (192 instances)
  L1i cache:                   3 MiB (192 instances)
  L2 cache:                    384 MiB (192 instances)
  NUMA node(s):                4
  NUMA node0 CPU(s):           0-47
  NUMA node1 CPU(s):           48-95
  NUMA node2 CPU(s):           96-143
  NUMA node3 CPU(s):           144-191
  Vulnerability Itlb multihit: Not affected
  Vulnerability L1tf:          Not affected
  Vulnerability Mds:           Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
   Vulnerability Meltdown:          Not affected
   Vulnerability Mmio stale data:   Not affected
   Vulnerability Retbleed:          Not affected
   Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
   Vulnerability Spectre v1:        Mitigation; __user pointer sanitization
   Vulnerability Spectre v2:        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       64K      12M    4 Data          1  256                        64
      L1i       16K       3M    4 Instruction   1   64                        64
      L2         2M     384M    8 Unified       2 4096                        64


 ------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0-47
   node 0 size: 128565 MB
   node 0 free: 127995 MB
   node 1 cpus: 48-95
   node 1 size: 128972 MB
   node 1 free: 127023 MB
   node 2 cpus: 96-143
   node 2 size: 129018 MB
   node 2 free: 128514 MB
   node 3 cpus: 144-191
   node 3 size: 127985 MB
   node 3 free: 127540 MB
   node distances:
   node   0   1   2   3
     0:  10  11  11  12
     1:  11  10  12  11
     2:  11  12  10  11
     3:  12  11  11  10


 ------------------------------------------------------------
 9. /proc/meminfo
   MemTotal:       526890088 kB


 ------------------------------------------------------------
 10. who -r
   run-level 3 Jul 29 14:54


 ------------------------------------------------------------
 11. Systemd service manager version: systemd 251 (251.19-1.fc37)
   Default Target  Status
   multi-user      running


 ------------------------------------------------------------
 12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                   abrt-journal-core abrt-oops abrt-vmcore abrt-xorg abrtd atd auditd avahi-daemon bluetooth
                   chronyd crond dbus-broker getty@ irqbalance iscsi iscsi-onboot lm_sensors lvm2-monitor
                   lxdm mdmonitor multipathd ostree-remount qemu-guest-agent rpmdb-migrate rpmdb-rebuild
                   rsyslog rtkit-daemon selinux-autorelabel-mark smartd sshd sssd systemd-boot-update
                   systemd-network-generator systemd-oomd systemd-resolved udisks2 upower vgauthd vmtoolsd
```

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Platform Notes (Continued)

```
  enabled-runtime  systemd-remount-fs
  disabled         abrt-pstoreoops arp-ethers autofs blk-availability canberra-system-bootup
                   canberra-system-shutdown canberra-system-shutdown-reboot certmonger chrony-wait
                   console-getty cpupower cups cups-browsed dbus-daemon debug-shell dmraid-activation
                   dnf-system-upgrade dnsmasq fancontrol firewalld fsidd gssproxy initial-setup
                   initial-setup-reconfiguration iscsid iscsiuio kadmin kdump kprop krb5kdc
                   low-memory-monitor man-db-restart-cache-update ndctl-monitor netavark-dhcp-proxy
                   nfs-blkmap nfs-server nftables nis-domainname nmb oddjobd openhpid podman
                   podman-auto-update podman-clean-transient podman-kube@ podman-restart psacct rpcbind samba
                   selinux-check-proper-disable smb sshd-keygen@ systemd-boot-check-no-failures systemd-homed
                   systemd-homed-activate systemd-sysext systemd-time-wait-sync
                   systemd-timesyncd winbind wpa_supplicant
  indirect         pcscd serial-getty@ spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam
                   sssd-ssh sssd-sudo systemd-sysupdate systemd-sysupdate-reboot systemd-userdbd


  ------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt2)/vmlinuz-6.1.14-200.fc37.aarch64
    root=UUID=a54ebc41-1111-4472-a096-715a07a6762d
    ro


  ------------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 154:
      current policy: frequency should be within 1000 MHz and 3.20 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.


  ------------------------------------------------------------
  15. sysctl
    kernel.numa_balancing          0
    kernel.randomize_va_space      2
    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
```

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Platform Notes (Continued)

```
   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      Fedora Linux 37 (Server Edition)
    fedora-release Fedora release 37 (Thirty Seven)
    redhat-release Fedora release 37 (Thirty Seven)
    system-release Fedora release 37 (Thirty Seven)


   ----------------------------------------------------------
 19. Disk information
 SPEC is set to: /root/cpu2017/ampere_spec2017/spec2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p3 xfs   893G  105G  788G  12% /


   ----------------------------------------------------------
 20. /sys/devices/virtual/dmi/id
      Vendor:         Supermicro
      Product:        Super Server
      Product Family: Family
      Serial:         0123456789


   ----------------------------------------------------------
 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.
    Memory:
      8x SK Hynix HMCG94AGBRA181N 64 GB 2 rank 5600, configured at 5200



   ----------------------------------------------------------
 22. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       American Megatrends International, LLC.
    BIOS Version:      1.0
    BIOS Date:         07/26/2024
    BIOS Revision:     5.34
```

Compiler Version Notes

```
==========================================================================================================
 C      | 500.perlbench_r(base, peak) 502.gcc_r(base, peak) 505.mcf_r(base, peak) 525.x264_r(base, peak)
        | 557.xz_r(base, peak)
----------------------------------------------------------------------------------------------------------
 gcc (GCC) 13.2.0
 Copyright (C) 2023 Free Software Foundation, Inc.
 This is free software; see the source for copying conditions.  There is NO
 warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
----------------------------------------------------------------------------------------------------------


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

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Compiler Version Notes (Continued)

```
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
         | 541.leela_r(base, peak)
------------------------------------------------------------------------------------------------
g++ (GCC) 13.2.0
Copyright (C) 2023 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
------------------------------------------------------------------------------------------------


================================================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------------------------
GNU Fortran (GCC) 13.2.0
Copyright (C) 2023 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
------------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
gcc

C++ benchmarks:
g++

Fortran benchmarks:
gfortran

Base Portability Flags

500.perlbench_r: -DSPEC_LINUX_AARCH64 -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

SPEC CPU®2017 Integer Rate Result

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Supermicro

MegaDC ARS-211M-NR
(R13SPD , Ampere AmpereOne A192-32X)

SPECrate®2017_int_base = 702

SPECrate®2017_int_peak = 715

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Jul-2024
Hardware Availability: Aug-2024
Software Availability: Jul-2023

Base Optimization Flags

C benchmarks:
```
-std=c99 -static -fwhole-program
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib -g -O3
-mcpu=ampere1a -flto=32 -funroll-loops
-freorder-blocks-algorithm=simple --param early-inlining-insns=96
--param max-inline-insns-auto=64 --param inline-unit-growth=96
-fno-strict-aliasing -fgnu89-inline -u malloc -ljemalloc
```

C++ benchmarks:
```
-std=c++03 -static -fwhole-program
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib -g -O3
-mcpu=ampere1a -flto=32 -funroll-loops
-freorder-blocks-algorithm=simple --param early-inlining-insns=256
--param max-inline-insns-auto=128 --param inline-unit-growth=256
-ffinite-loops -u malloc -ljemalloc_ext
```

Fortran benchmarks:
```
-static -fwhole-program
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib -g -O3
-mcpu=ampere1a -flto=32 -funroll-loops
-freorder-blocks-algorithm=simple --param ipa-cp-eval-threshold=1
--param ipa-cp-unit-growth=80 --param ipa-cp-max-recursive-depth=8
-fstack-arrays -fno-tree-vectorize -u malloc -ljemalloc
```

Base Other Flags

C benchmarks:
```
-fcommon -Wl,-Map,mapfile
```

C++ benchmarks:
```
-Wl,-Map,mapfile
```

Fortran benchmarks:
```
-Wl,-Map,mapfile
```

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

Supermicro

MegaDC ARS-211M-NR
(R13SPD , Ampere AmpereOne A192-32X)

$SPECrate®2017\_int\_base = 702$

$SPECrate®2017\_int\_peak = 715$

Peak Compiler Invocation

C benchmarks:
```
gcc
```

C++ benchmarks:
```
g++
```

Fortran benchmarks:
```
gfortran
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
500.perlbench_r: -std=c99 -static -fwhole-program
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib
-fprofile-generate -fprofile-use
-fprofile-partial-training -g -Ofast -mcpu=ampere1a
-flto=32 -funroll-loops --param early-inlining-insns=96
--param max-inline-insns-auto=64
--param inline-unit-growth=96 -fno-strict-aliasing
-fno-unsafe-math-optimizations -fno-finite-math-only
-u malloc -ljemalloc
```

```
502.gcc_r: -std=c99 -static -fwhole-program
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib
-fprofile-generate -fprofile-use
-fprofile-partial-training -g -Ofast -mcpu=ampere1a
-flto=32 -funroll-loops --param early-inlining-insns=96
--param max-inline-insns-auto=64
--param inline-unit-growth=96 -fno-strict-aliasing
-fgnu89-inline -u malloc -ljemalloc
```

```
505.mcf_r: -std=c99 -static -fwhole-program
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
```

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Supermicro

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(R13SPD , Ampere AmpereOne A192-32X)

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CPU2017 License: 001176	**Test Date:** Jul-2024
Test Sponsor: Supermicro	**Hardware Availability:** Aug-2024
Tested by: Supermicro	**Software Availability:** Jul-2023

Peak Optimization Flags (Continued)

505.mcf_r (continued):
```
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib
-g -Ofast -mcpu=ampere1a -flto=32 -funroll-loops
--param early-inlining-insns=96
--param max-inline-insns-auto=64
--param inline-unit-growth=96 -fno-strict-aliasing
-u malloc -ljemalloc
```

525.x264_r: `-std=c99 -static -fwhole-program`
```
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib
-g -Ofast -mcpu=ampere1a -flto=32 -funroll-loops
--param early-inlining-insns=96
--param max-inline-insns-auto=64
--param inline-unit-growth=96 -u malloc -ljemalloc
```

557.xz_r: `-std=c99 -static -fwhole-program`
```
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib
-fprofile-generate -fprofile-use
-fprofile-partial-training -g -Ofast -mcpu=ampere1a
-flto=32 -funroll-loops --param early-inlining-insns=96
--param max-inline-insns-auto=64
--param inline-unit-growth=96 -u malloc -ljemalloc
```

C++ benchmarks:

520.omnetpp_r: `-std=c++03 -static -fwhole-program`
```
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib
-fprofile-generate -fprofile-use
-fprofile-partial-training -g -Ofast -mcpu=ampere1a
-flto=32 -funroll-loops --param early-inlining-insns=256
--param max-inline-insns-auto=128
--param inline-unit-growth=256 -ffinite-loops -u malloc
-ljemalloc_ext
```

523.xalancbmk_r: `Same as 520.omnetpp_r`

531.deepsjeng_r: `-std=c++03 -static -fwhole-program`
```
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64
-L/home/amptest/ampere_spec2017/spec2017/gcc/install/lib
```

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Supermicro

MegaDC ARS-211M-NR
(R13SPD , Ampere AmpereOne A192-32X)

SPECrate®2017_int_base = 702

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Peak Optimization Flags (Continued)

531.deepsjeng_r (continued):
```
-L/home/amptest/ampere_spec2017/spec2017/jemalloc/install/lib
-g -Ofast -mcpu=ampere1a -flto=32 -funroll-loops
--param early-inlining-insns=256
--param max-inline-insns-auto=128
--param inline-unit-growth=256 -ffinite-loops -u malloc
-ljemalloc_ext
```

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:

548.exchange2_r: basepeak = yes

Peak Other Flags

C benchmarks (except as noted below):
```
-Wl,-Map,mapfile
```

525.x264_r: `-fcommon -Wl,-Map,mapfile`

C++ benchmarks:
```
-Wl,-Map,mapfile
```

Fortran benchmarks:
```
-Wl,-Map,mapfile
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/gcc.2024-08-14.html
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Ampere-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/gcc.2024-08-14.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Ampere-revE.xml

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

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