SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology
(Test Sponsor: Ampere Computing)

ThinkSystem SR635 V3
(2.40 GHz,AMD EPYC 9654P)

$SPECrate®2017\_int\_base =$ 673

$SPECrate®2017\_int\_peak =$ Not Run

CPU2017 License: 6412

Test Sponsor: Ampere Computing

Tested by: Ampere Computing

Test Date: Aug-2024

Hardware Availability: Apr-2023

Software Availability: Jun-2024

Copies

Benchmark	Copies	Result
500.perlbench_r	192	634
502.gcc_r	192	603
505.mcf_r	192	385
520.omnetpp_r	192	395
523.xalancbmk_r	192	742
525.x264_r	192	1170
531.deepsjeng_r	192	739
541.leela_r	192	677
548.exchange2_r	192	1920
557.xz_r	192	396

SPECrate®2017_int_base (673)

Hardware

CPU Name: AMD EPYC 9654P
  Max MHz: 3700
  Nominal: 2400
Enabled: 96 cores, 1 chip, 2 threads/core
Orderable: 1 chip
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: 384 GB (12 x 32 GB 2Rx8 PC5-5600B-R
  , running at 4800)
Storage: 1 x 480 GB SATA SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
  Kernel 6.4.0-150600.21-default
  6.4.0-150600.21-default
Compiler: C/C++/Fortran: Version 13.2.0 of GCC, the
  GNU Compiler Collection
Parallel: No
Firmware: Lenovo BIOS Version KAE118M 4.11 released Feb-2024
File System: xfs
System State: Run level 5 (multi-user and boots up in X window)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: Jemalloc memory allocator library v5.3.0
Power Management: BIOS sets to prefer performance at the cost
  of additional power usage

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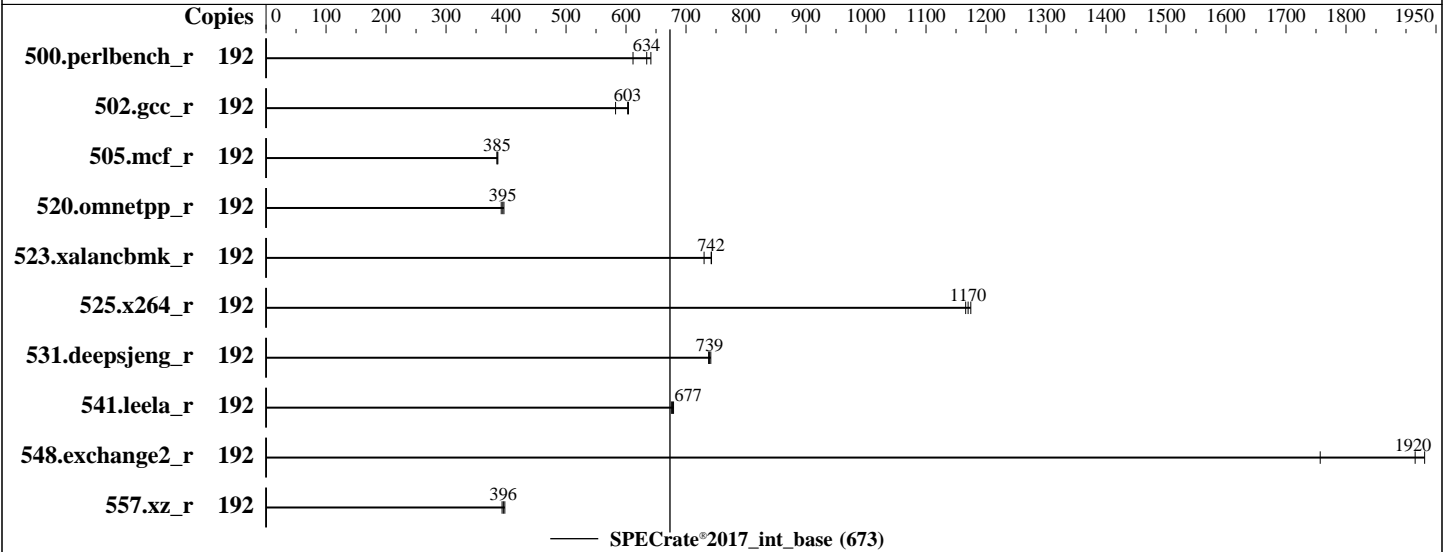
SPECrate®2017_int_peak = Not Run

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Results Table

Benchmark	Base Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
500.perlbench_r	192	500	612	**482**	**634**	477	641							
502.gcc_r	192	**451**	**603**	467	583	450	604							
505.mcf_r	192	803	386	806	385	**806**	**385**							
520.omnetpp_r	192	643	392	**639**	**395**	635	396							
523.xalancbmk_r	192	273	742	**273**	**742**	278	730							
525.x264_r	192	**287**	**1170**	288	1170	286	1170							
531.deepsjeng_r	192	298	738	297	741	**298**	**739**							
541.leela_r	192	**469**	**677**	468	679	471	676							
548.exchange2_r	192	**263**	**1920**	260	1930	286	1760							
557.xz_r	192	**524**	**396**	521	398	527	393							

SPECrate®2017_int_base = 673

SPECrate®2017_int_peak = Not Run

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

Compiler Notes

```
The GCC Compiler 13.2.0 is available at
https://gcc.gnu.org/
```

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.
```

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/amptest/workspace/sir2017_pkg_verify/ampere_spec2017/spec2017/jemalloc/install/lib:/home/amptes
     t/workspace/sir2017_pkg_verify/ampere_spec2017/spec2017/gcc/install/lib64:/home/amptest/ampere_spec201
     7/spec2017/jemalloc/install/lib:/home/amptest/ampere_spec2017/spec2017/gcc/install/lib64:/home/amptest
     /workspace/sir2017_pkg_verify/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

```
Binaries were compiled on a system with 1x AMD EPYC 9654 CPU + 384GiB Memory
using SUSE Linux Enterprise Server 15 SP6

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.

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 SUSE Linux Enterprise Server 15 SP6 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#tuning
```

Platform Notes

```
BIOS configuration:
Operating Mode set to Maximum Performance and then set it to Custom Mode
NUMA Nodes per Socket set to NPS4

 Sysinfo program /home/amptest/workspace/sir2017_pkg_verify/ampere_spec2017/spec2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on scc1-sut02sys-r165 Thu Aug  8 22:08:19 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 254 (254.10+suse.84.ge8d77af424)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
```

(Continued on next page)

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Platform Notes (Continued)

```
   14. cpupower frequency-info
   15. tuned-adm active
   16. sysctl
   17. /sys/kernel/mm/transparent_hugepage
   18. /sys/kernel/mm/transparent_hugepage/khugepaged
   19. OS release
   20. Disk information
   21. /sys/devices/virtual/dmi/id
   22. dmidecode
   23. BIOS
   ----------------------------------------------------------


   ----------------------------------------------------------
   1. uname -a
     Linux scc1-sut02sys-r165 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
      22:08:19 up  8:04,  2 users,  load average: 120.20, 131.73, 164.68
     USER      TTY         FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
     amptest   :                           14:04   ?xdm?  5:08m  0.03s gdm-session-worker [pam/gdm-password]
     amptest   seat0    login-             14:04    0.00s  0.00s  0.00s /usr/lib/gdm/gdm-x-session
     --register-session --run-script gnome
     amptest          :1                   14:04   ?xdm?  5:08m  0.00s /usr/lib/gdm/gdm-x-session
     --register-session --run-script gnome


   ----------------------------------------------------------
   3. Username
     From environment variable $USER:   root
     From the command 'logname':        amptest


   ----------------------------------------------------------
   4. ulimit -a
     core file size          (blocks, -c) 0
     data seg size           (kbytes, -d) unlimited
     scheduling priority             (-e) 0
     file size               (blocks, -f) unlimited
     pending signals                 (-i) 1544523
     max locked memory       (kbytes, -l) 8192
     max memory size         (kbytes, -m) unlimited
     open files                      (-n) 1048576
     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) 1048576
     virtual memory          (kbytes, -v) unlimited
     file locks                      (-x) 1048576


   ----------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize=42 ITMZ INTP
    sshd: amptest [priv]
    sshd: amptest@notty
    java -jar remoting.jar -workDir /home/amptest -jar-cache /home/amptest/remoting/jarCache
    /bin/bash /tmp/jenkins11094392986948535180.sh
    sudo -S -E UPDATE_UTIL=false /home/amptest/util/jenkins/speccpu_pkg_verify.sh
      http://eng21sys-r143.scc-lab.amperecomputing.com/fromsc/GreenSIR2017/without_report/spec2017_intrate_gcc13
```

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Platform Notes (Continued)

```
    _genoa_thinksystem_sr635_v3_with_noinline_384.tgz
  /bin/bash /home/amptest/util/jenkins/speccpu_pkg_verify.sh
    http://eng21sys-r143.scc-lab.amperecomputing.com/fromsc/GreenSIR2017/without_report/spec2017_intrate_gcc13
    _genoa_thinksystem_sr635_v3_with_noinline_384.tgz
  /bin/bash /home/amptest/workspace/sir2017_pkg_verify/ampere_spec2017/run_spec2017.sh --iterations 3
    --nobuild --action run --copies 192 --reportable --tune=base 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
    --nobuild --action run --copies 192 --reportable --tune=base intrate
  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
    --nobuild --action run --copies 192 --reportable --tune base --nopower --runmode rate --tune base --size
    refrate intrate --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.003/templogs/preenv.intrate.003.0.log
    --lognum 003.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/amptest/workspace/sir2017_pkg_verify/ampere_spec2017/spec2017


  ------------------------------------------------------------
  6. /proc/cpuinfo
      model name       : AMD EPYC 9654P 96-Core Processor
      vendor_id        : AuthenticAMD
      cpu family       : 25
      model            : 17
      stepping         : 1
      microcode        : 0xa101144
      bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
      TLB size         : 3584 4K pages
      cpu cores        : 96
      siblings         : 192
      1 physical ids (chips)
      192 processors (hardware threads)
      physical id 0: core ids 0-95
      physical id 0: apicids 0-191
    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):                 192
    On-line CPU(s) list:    0-191
    Vendor ID:              AuthenticAMD
    BIOS Vendor ID:         Advanced Micro Devices, Inc.
    Model name:             AMD EPYC 9654P 96-Core Processor
    BIOS Model name:        AMD EPYC 9654P 96-Core Processor                Unknown CPU @ 2.4GHz
    BIOS CPU family:        107
    CPU family:             25
    Model:                  17
    Thread(s) per core:     2
    Core(s) per socket:     96
    Socket(s):              1
```

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Platform Notes (Continued)

```
    Stepping:                            1
    Frequency boost:                     enabled
    CPU(s) scaling MHz:                  52%
    CPU max MHz:                         3707.8120
    CPU min MHz:                         1500.0000
    BogoMIPS:                            4792.60
    Flags:                               fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                                         pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                                         rdtscp lm constant_tsc rep_good amd_lbr_v2 nopl nonstop_tsc cpuid
                                         extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid
                                         sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
                                         cmp_legacy 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 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 avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd
                                         amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean
                                         flushbyasid decodeassists pausefilter pfthreshold avic
                                         v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi avx512vbmi umip pku
                                         ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                                         avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
                                         debug_swap
    Virtualization:                      AMD-V
    L1d cache:                           3 MiB (96 instances)
    L1i cache:                           3 MiB (96 instances)
    L2 cache:                            96 MiB (96 instances)
    L3 cache:                            384 MiB (12 instances)
    NUMA node(s):                        4
    NUMA node0 CPU(s):                   0-23,96-119
    NUMA node1 CPU(s):                   24-47,120-143
    NUMA node2 CPU(s):                   48-71,144-167
    NUMA node3 CPU(s):                   72-95,168-191
    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:  Mitigation; Safe RET
    Vulnerability Spec store bypass:     Mitigation; Speculative Store Bypass disabled via prctl
    Vulnerability Spectre v1:            Mitigation; usercopy/swapgs barriers and __user pointer sanitization
    Vulnerability Spectre v2:            Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                         always-on; RSB filling; PBRSB-eIBRS Not affected; 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       32K       3M    8 Data             1    64        1             64
      L1i       32K       3M    8 Instruction      1    64        1             64
      L2         1M      96M    8 Unified          2  2048        1             64
      L3        32M     384M   16 Unified          3 32768        1             64

    -------------------------------------------------------------
  8. numactl --hardware
```

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Platform Notes (Continued)

```
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0-23,96-119
   node 0 size: 96381 MB
   node 0 free: 94530 MB
   node 1 cpus: 24-47,120-143
   node 1 size: 96716 MB
   node 1 free: 95360 MB
   node 2 cpus: 48-71,144-167
   node 2 size: 96755 MB
   node 2 free: 94441 MB
   node 3 cpus: 72-95,168-191
   node 3 size: 96305 MB
   node 3 free: 94162 MB
   node distances:
   node   0   1   2   3
     0:  10  20  20  20
     1:  20  10  20  20
     2:  20  20  10  20
     3:  20  20  20  10


 ----------------------------------------------------------
 9. /proc/meminfo
   MemTotal:       395427672 kB


 ----------------------------------------------------------
 10. who -r
   run-level 5 Aug 8 14:04


 ----------------------------------------------------------
 11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
   Default Target  Status
   graphical       running


 ----------------------------------------------------------
 12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth cron
                   display-manager firewalld getty@ irqbalance issue-generator kbdsettings kdump kdump-early
                   kdump-notify klog 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        accounts-daemon autofs autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl
                   ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebtables
                   exchange-bmc-os-info fancontrol fsidd gpm grub2-once haveged ipmi ipmievd
                   issue-add-ssh-keys kexec-load lm_sensors lunmask man-db-create multipathd nfs nfs-blkmap
                   nmb ostree-remount rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@
                   smartd_generate_opts smb snmpd snmptrapd speech-dispatcherd svnserve
                   systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysext
                   systemd-time-wait-sync systemd-timesyncd tuned udisks2 update-system-flatpaks upower
                   vncserver@
   indirect        pcscd systemd-userdbd wickedd


 ----------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
   root=UUID=fc8dda5b-cc39-41f3-8182-76f5b78f93be
   splash=silent
   ipv6.disable=1
   IRPO=/os/suse/SLE-15-SP6-GA/Server/x86_64/os
```

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Platform Notes (Continued)

```
  IFST=xfs
  IURL=http://isorepo.SCC-LAB.amperecomputing.com
  ITMZ
  INTP
  ITO=10
  mitigations=auto
  quiet
  security=apparmor
  crashkernel=369M,high
  crashkernel=72M,low

  -------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 149:
    current policy: frequency should be within 1.50 GHz and 2.40 GHz.
                    The governor "ondemand" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

  -------------------------------------------------------------
15. tuned-adm active
  No current active profile.

  -------------------------------------------------------------
16. 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

  -------------------------------------------------------------
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
```

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Lenovo Global Technology
(Test Sponsor: Ampere Computing)

ThinkSystem SR635 V3
(2.40 GHz,AMD EPYC 9654P)

SPECrate®2017_int_base =   673

SPECrate®2017_int_peak = Not Run

CPU2017 License: 6412
Test Sponsor: Ampere Computing
Tested by: Ampere Computing

Test Date: Aug-2024
Hardware Availability: Apr-2023
Software Availability: Jun-2024

Platform Notes (Continued)

```
    max_ptes_swap             64
    pages_to_scan           4096
    scan_sleep_millisecs   10000


  ------------------------------------------------------------
  19. OS release
    From /etc/*-release /etc/*-version
    os-release SUSE Linux Enterprise Server 15 SP6


  ------------------------------------------------------------
  20. Disk information
  SPEC is set to: /home/amptest/workspace/sir2017_pkg_verify/ampere_spec2017/spec2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda6       xfs   378G  295G   83G  79% /home


  ------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Vendor:         Lenovo
      Product:        ThinkSystem SR635 V3
      Product Family: ThinkSystem
      Serial:         JZ0045EC


  ------------------------------------------------------------
  22. 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:
      12x Samsung M321R4GA3PB0-CWMXJ 32 GB 2 rank 5600, configured at 4800



  ------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:      Lenovo
      BIOS Version:     KAE118M-4.11
      BIOS Date:        02/29/2024
      BIOS Revision:    4.11
      Firmware Revision: 2.81
```

Compiler Version Notes

```
==============================================================================
C     | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------


==============================================================================
C++   | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
------------------------------------------------------------------------------
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.
```

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SPEC CPU®2017 Integer Rate Result

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Hardware Availability: Apr-2023

Software Availability: Jun-2024

Compiler Version Notes (Continued)

```
-------------------------------------------------------------------------------------

=====================================================================================
Fortran | 548.exchange2_r(base)
-------------------------------------------------------------------------------------
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_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:
`-std=c99 -z muldefs -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`
`-march=znver4 -flto=32 -funroll-loops`
`-freorder-blocks-algorithm=simple --param early-inlining-insns=96`

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

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Base Optimization Flags (Continued)

C benchmarks (continued):
```
--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
-march=znver4 -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
-march=znver4 -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
-fno-inline-functions-called-once -fstack-arrays
```

Base Other Flags

C benchmarks:
```
-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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-R.html
http://www.spec.org/cpu2017/flags/gcc.2024-08-14.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-R.xml
http://www.spec.org/cpu2017/flags/gcc.2024-08-14.xml

SPEC CPU®2017 Integer Rate Result

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

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