SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology

$SPECrate^{®}2017\_fp\_base = 1450$

ThinkSystem SR860 V3
(2.40 GHz, Intel Xeon Gold 6448H)

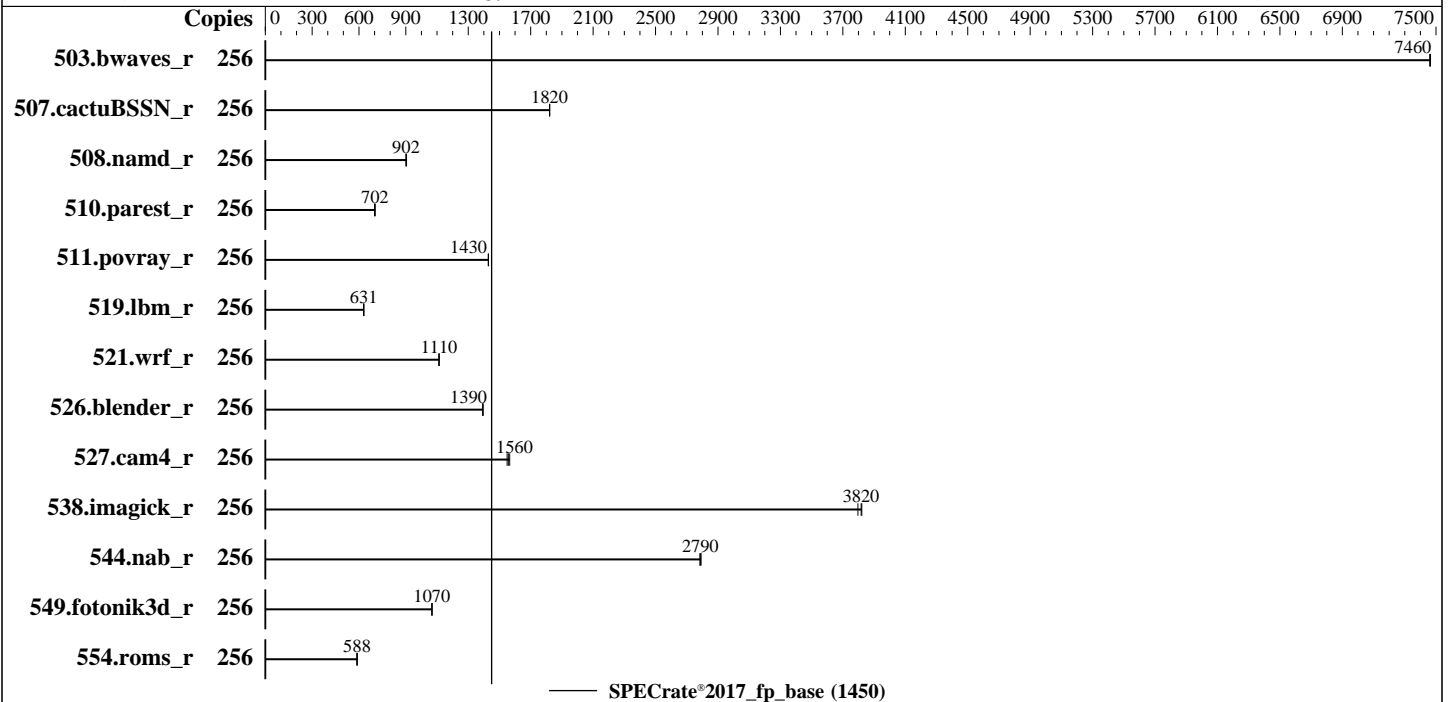$SPECrate^{®}2017_fp_peak = $ Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022

Benchmark	Copies	Result
503.bwaves_r	256	7460
507.cactuBSSN_r	256	1820
508.namd_r	256	902
510.parest_r	256	702
511.povray_r	256	1430
519.lbm_r	256	631
521.wrf_r	256	1110
526.blender_r	256	1390
527.cam4_r	256	1560
538.imagick_r	256	3820
544.nab_r	256	2790
549.fotonik3d_r	256	1070
554.roms_r	256	588

SPECrate®2017_fp_base (1450)

Hardware

CPU Name: Intel Xeon Gold 6448H
 Max MHz: 4100
 Nominal: 2400
Enabled: 128 cores, 4 chips, 2 threads/core
Orderable: 2,4 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 60 MB I+D on chip per chip
 Other: None
Memory: 1 TB (32 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64)
 Kernel 5.14.21-150400.22-default
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2023.0 of Intel Fortran Compiler
 for Linux;
Parallel: No
Firmware: Lenovo BIOS Version RSE105I 1.11 released Jul-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance at the cost
 of additional power usage

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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
503.bwaves_r	256	344	7460	344	7460	**344**	**7460**							
507.cactuBSSN_r	256	178	1820	178	1820	**178**	**1820**							
508.namd_r	256	269	905	270	901	**270**	**902**							
510.parest_r	256	957	700	**954**	**702**	952	703							
511.povray_r	256	418	1430	**418**	**1430**	418	1430							
519.lbm_r	256	**428**	**631**	428	631	428	630							
521.wrf_r	256	**515**	**1110**	516	1110	515	1110							
526.blender_r	256	280	1390	280	1390	**280**	**1390**							
527.cam4_r	256	289	1550	**288**	**1560**	286	1570							
538.imagick_r	256	**167**	**3820**	167	3820	168	3800							
544.nab_r	256	155	2780	**155**	**2790**	154	2790							
549.fotonik3d_r	256	934	1070	**935**	**1070**	935	1070							
554.roms_r	256	691	589	**692**	**588**	693	587							

SPECrate®2017_fp_base = 1450

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate numactl commands to bind each copy to a specific processor.
For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-ic2023.0-2/lib/intel64:/home/cpu2017-1.1.9-ic2023.0-2/je5.0.1-64"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>   /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.

(Continued on next page)

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General Notes (Continued)

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, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

Platform Notes

```
BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
DCU Streamer  Prefetcher set to Disabled
LLC Prefetch set to Disabled
SNC set to SNC2
C-State set to Legacy
AMP Prefetch set to Enable

 Sysinfo program /home/cpu2017-1.1.9-ic2023.0-2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Sep 21 02:59:09 2023

 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 (249.11+suse.124.g2bc0b2c447)
 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
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
 ------------------------------------------------------------


 ------------------------------------------------------------
 1. uname -a
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux


 ------------------------------------------------------------
 2. w
    02:59:09 up 11:17,  1 user,  load average: 60.76, 190.80, 230.95
```

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Platform Notes (Continued)

```
    USER     TTY     FROM              LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1    -                 15:42    9:38m  0.84s  0.01s /bin/bash ./run_SR860V3.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) 4126597
     max locked memory       (kbytes, -l) 64
     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) 4126597
     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
    /bin/bash ./run_SR860V3.sh
    /bin/bash ./run_SR860V3.sh
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 -c
      ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=128 --define physicalfirst
      --define invoke_with_interleave --define drop_caches --tune base -o all fprate
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 --configfile
      ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=128 --define physicalfirst
      --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
      rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.033/templogs/preenv.fprate.033.0.log --lognum 033.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017-1.1.9-ic2023.0-2


   -------------------------------------------------------------
   6. /proc/cpuinfo
      model name      : Intel(R) Xeon(R) Gold 6448H
      vendor_id       : GenuineIntel
      cpu family      : 6
      model           : 143
      stepping        : 8
      microcode       : 0x2b0001b0
      bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
      cpu cores       : 32
      siblings        : 64
      4 physical ids (chips)
      256 processors (hardware threads)
      physical id 0: core ids 0-31
      physical id 1: core ids 0-31
      physical id 2: core ids 0-31
```

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Platform Notes (Continued)

```
      physical id 3: core ids 0-31
      physical id 0: apicids 0-63
      physical id 1: apicids 128-191
      physical id 2: apicids 256-319
      physical id 3: apicids 384-447
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems.  Use the above data carefully.


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

   From lscpu from util-linux 2.37.2:
     Architecture:                x86_64
     CPU op-mode(s):              32-bit, 64-bit
     Address sizes:               46 bits physical, 57 bits virtual
     Byte Order:                  Little Endian
     CPU(s):                      256
     On-line CPU(s) list:         0-255
     Vendor ID:                   GenuineIntel
     Model name:                  Intel(R) Xeon(R) Gold 6448H
     CPU family:                  6
     Model:                       143
     Thread(s) per core:          2
     Core(s) per socket:          32
     Socket(s):                   4
     Stepping:                    8
     BogoMIPS:                    4800.00
     Flags:                       fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                                  clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                                  lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                                  nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                                  ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                                  sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                                  lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                                  invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                                  tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle
                                  avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
                                  avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
                                  xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                                  cqm_mbm_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
                                  arat pln pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
                                  vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid
                                  bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear serialize
                                  tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities
     Virtualization:              VT-x
     L1d cache:                   6 MiB (128 instances)
     L1i cache:                   4 MiB (128 instances)
     L2 cache:                    256 MiB (128 instances)
     L3 cache:                    240 MiB (4 instances)
     NUMA node(s):                8
     NUMA node0 CPU(s):           0-15,128-143
     NUMA node1 CPU(s):           16-31,144-159
     NUMA node2 CPU(s):           32-47,160-175
     NUMA node3 CPU(s):           48-63,176-191
     NUMA node4 CPU(s):           64-79,192-207
     NUMA node5 CPU(s):           80-95,208-223
     NUMA node6 CPU(s):           96-111,224-239
     NUMA node7 CPU(s):           112-127,240-255
     Vulnerability Itlb multihit: Not affected
     Vulnerability L1tf:          Not affected
```

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Platform Notes (Continued)

```
   Vulnerability Mds:                 Not affected
   Vulnerability Meltdown:            Not affected
   Vulnerability Spec store bypass:   Mitigation; Speculative Store Bypass disabled via prctl and seccomp
   Vulnerability Spectre v1:          Mitigation; usercopy/swapgs barriers and __user pointer sanitization
   Vulnerability Spectre v2:          Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
   Vulnerability Srbds:               Not affected
   Vulnerability Tsx async abort:     Not affected

   From lscpu --cache:
       NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL   SETS PHY-LINE COHERENCY-SIZE
       L1d       48K       6M   12 Data              1     64        1             64
       L1i       32K       4M    8 Instruction       1     64        1             64
       L2         2M     256M   16 Unified           2   2048        1             64
       L3        60M     240M   15 Unified           3  65536        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: 0-15,128-143
     node 0 size: 128679 MB
     node 0 free: 126960 MB
     node 1 cpus: 16-31,144-159
     node 1 size: 129015 MB
     node 1 free: 127690 MB
     node 2 cpus: 32-47,160-175
     node 2 size: 128981 MB
     node 2 free: 127851 MB
     node 3 cpus: 48-63,176-191
     node 3 size: 129015 MB
     node 3 free: 127905 MB
     node 4 cpus: 64-79,192-207
     node 4 size: 129015 MB
     node 4 free: 127886 MB
     node 5 cpus: 80-95,208-223
     node 5 size: 129015 MB
     node 5 free: 127893 MB
     node 6 cpus: 96-111,224-239
     node 6 size: 129015 MB
     node 6 free: 127820 MB
     node 7 cpus: 112-127,240-255
     node 7 size: 128932 MB
     node 7 free: 127828 MB
     node distances:
     node   0   1   2   3   4   5   6   7
       0:  10  12  21  21  21  21  21  21
       1:  12  10  21  21  21  21  21  21
       2:  21  21  10  12  21  21  21  21
       3:  21  21  12  10  21  21  21  21
       4:  21  21  21  21  10  12  21  21
       5:  21  21  21  21  12  10  21  21
       6:  21  21  21  21  21  21  10  12
       7:  21  21  21  21  21  21  12  10


   ------------------------------------------------------------
   9. /proc/meminfo
     MemTotal:       1056433364 kB


   ------------------------------------------------------------
   10. who -r
```

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Platform Notes (Continued)

```
  run-level 3 Sep 20 15:42

  ----------------------------------------------------------
  11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
   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@ haveged irqbalance
                     issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
                     smartd sshd 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 ebtables exchange-bmc-os-info
                     firewalld gpm grub2-once haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load
                     lunmask man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd
                     serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
                     systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd
    generated        ntp_sync
    indirect         wickedd

  ----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=07b494b8-a782-4eba-84f2-ef5cae789da8
    splash=silent
    mitigations=auto
    quiet
    security=apparmor

  ----------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 0:
      Unable to determine current policy
      boost state support:
        Supported: yes
        Active: yes

  ----------------------------------------------------------
  15. sysctl
    kernel.numa_balancing            1
    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                   20
    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                    60
    vm.watermark_boost_factor        15000
    vm.watermark_scale_factor        10
```

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Platform Notes (Continued)

```
   vm.zone_reclaim_mode              0


  ----------------------------------------------------------
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 SP4


  ----------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2023.0-2
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda3      xfs   445G   44G  401G  10% /


  ----------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Lenovo
    Product:        ThinkSystem SR860 V3
    Product Family: ThinkSystem
    Serial:         None


  ----------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.2 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:
    19x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
    6x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
    4x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
    3x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800


  ----------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
  BIOS Vendor:       Lenovo
  BIOS Version:      RSE105I-1.11
  BIOS Date:         07/12/2023
  BIOS Revision:     1.11
  Firmware Revision: 1.11
```

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Compiler Version Notes

```
==============================================================================
C                | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++              | 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C           | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
Fortran          | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
Fortran, C       | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
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------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR860 V3
(2.40 GHz, Intel Xeon Gold 6448H)

SPECrate®2017_fp_base =   1450

SPECrate®2017_fp_peak = Not Run

Base Compiler Invocation (Continued)

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

Benchmarks using both C and C++:
`icpx icx`

Benchmarks using Fortran, C, and C++:
`icpx icx ifx`

Base Portability Flags

    503.bwaves_r: -DSPEC_LP64
    507.cactuBSSN_r: -DSPEC_LP64
    508.namd_r: -DSPEC_LP64
    510.parest_r: -DSPEC_LP64
    511.povray_r: -DSPEC_LP64
    519.lbm_r: -DSPEC_LP64
    521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
    526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
    527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
    538.imagick_r: -DSPEC_LP64
    544.nab_r: -DSPEC_LP64
    549.fotonik3d_r: -DSPEC_LP64
    554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
```
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:
```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR860 V3
(2.40 GHz, Intel Xeon Gold 6448H)

SPECrate®2017_fp_base = 1450

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017	**Test Date:** Sep-2023
Test Sponsor: Lenovo Global Technology	**Hardware Availability:** Jun-2023
Tested by: Lenovo Global Technology	**Software Availability:** Dec-2022

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both Fortran and C:
```
-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:
```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:
```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

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-Eaglestream-Z.html
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64_revB.2023-10-11.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-Eaglestream-Z.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64_revB.2023-10-11.xml

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

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Report generated on 2023-10-11 12:34:54 by CPU2017 PDF formatter v6716.
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