SPEC CPU®2017 Floating Point Rate Result

Lenovo Global Technology

SPECrate®2017_fp_base =   453

ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Gold 6416H)

SPECrate®2017_fp_peak = Not Run

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

Test Date: Mar-2023
Hardware Availability: Feb-2023
Software Availability: Dec-2022

Benchmark	Copies	Result
503.bwaves_r	72	2110
507.cactuBSSN_r	72	532
508.namd_r	72	233
510.parest_r	72	256
511.povray_r	72	375
519.lbm_r	72	302
521.wrf_r	72	409
526.blender_r	72	363
527.cam4_r	72	431
538.imagick_r	72	1010
544.nab_r	72	717
549.fotonik3d_r	72	434
554.roms_r	72	222

SPECrate®2017_fp_base (453)

Hardware

CPU Name: Intel Xeon Gold 6416H
 Max MHz: 4200
 Nominal: 2200
Enabled: 36 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 45 MB I+D on chip per chip
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 960 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 ESE109L 1.10 released Jan-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

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

SPEC CPU®2017 Floating Point Rate Result
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Lenovo Global Technology

ThinkSystem SR650 V3
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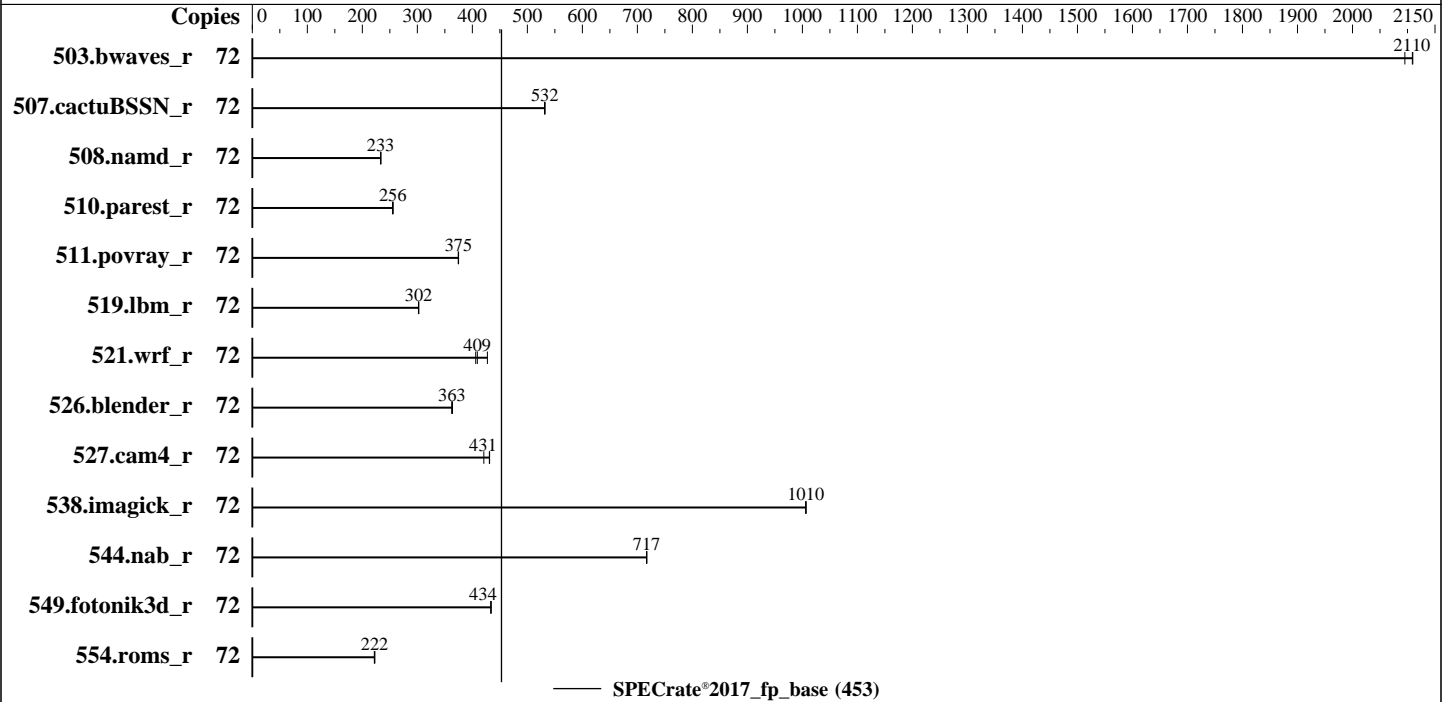SPECrate®2017_fp_base = 453

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CPU2017 License: 9017	**Test Date:** Mar-2023
Test Sponsor: Lenovo Global Technology	**Hardware Availability:** Feb-2023
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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	72	345	2100	**342**	**2110**	342	2110							
507.cactuBSSN_r	72	171	532	172	531	**171**	**532**							
508.namd_r	72	293	233	**293**	**233**	293	234							
510.parest_r	72	736	256	**737**	**256**	739	255							
511.povray_r	72	449	374	**449**	**375**	448	375							
519.lbm_r	72	251	302	251	302	**251**	**302**							
521.wrf_r	72	**394**	**409**	397	406	377	427							
526.blender_r	72	**302**	**363**	301	364	302	363							
527.cam4_r	72	292	431	**292**	**431**	299	421							
538.imagick_r	72	**178**	**1010**	178	1010	178	1010							
544.nab_r	72	169	717	**169**	**717**	169	717							
549.fotonik3d_r	72	647	434	646	434	**647**	**434**							
554.roms_r	72	514	223	**514**	**222**	516	222							

SPECrate®2017_fp_base = 453

SPECrate®2017_fp_peak = Not Run

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/lib/intel64:/home/cpu2017-1.1.9-ic2023.0/j
    e5.0.1-64"
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

(Continued on next page)

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General Notes (Continued)

```
 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.
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:
Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enabled
SNC set to SNC2
LLC Prefetch set to Disabled
XPT Prefetcher set to Disabled

 Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Mar  7 18:37:08 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
```

(Continued on next page)

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Test Sponsor: Lenovo Global Technology   **Hardware Availability:** Feb-2023
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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 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
      18:37:08 up 17 min,  1 user,  load average: 0.08, 0.02, 0.01
      USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
      root     tty1     -                18:21   12.00s  1.13s  0.01s -bash


   ------------------------------------------------------------
   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) 2062613
     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) 2062613
     virtual memory          (kbytes, -v) unlimited
     file locks                      (-x) unlimited


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

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Platform Notes (Continued)

```
 5. sysinfo process ancestry
  /usr/lib/systemd/systemd --switched-root --system --deserialize 30
  login -- root
  -bash
  -bash
  -bash
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=72 -c
    ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=36 --define physicalfirst
    --define invoke_with_interleave --define drop_caches --tune base -o all fprate
  runcpu --nobuild --action validate --define default-platform-flags --define numcopies=72 --configfile
    ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=36 --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/CPU2017.013/templogs/preenv.fprate.013.0.log --lognum 013.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017-1.1.9-ic2023.0


 ------------------------------------------------------------
 6. /proc/cpuinfo
    model name        : Intel(R) Xeon(R) Gold 6416H
    vendor_id         : GenuineIntel
    cpu family        : 6
    model             : 143
    stepping          : 8
    microcode         : 0x2b000161
    bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores         : 18
    siblings          : 36
    2 physical ids (chips)
    72 processors (hardware threads)
    physical id 0: core ids 0-17
    physical id 1: core ids 0-17
    physical id 0: apicids 0-35
    physical id 1: apicids 128-163
  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):                      72
   On-line CPU(s) list:         0-71
```

(Continued on next page)

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Platform Notes (Continued)

```
   Vendor ID:                    GenuineIntel
   Model name:                   Intel(R) Xeon(R) Gold 6416H
   CPU family:                   6
   Model:                        143
   Thread(s) per core:           2
   Core(s) per socket:           18
   Socket(s):                    2
   Stepping:                     8
   BogoMIPS:                     4400.00
  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:                    1.7 MiB (36 instances)
   L1i cache:                    1.1 MiB (36 instances)
   L2 cache:                     72 MiB (36 instances)
   L3 cache:                     90 MiB (2 instances)
   NUMA node(s):                 4
   NUMA node0 CPU(s):            0-8,36-44
   NUMA node1 CPU(s):            9-17,45-53
   NUMA node2 CPU(s):            18-26,54-62
   NUMA node3 CPU(s):            27-35,63-71
   Vulnerability Itlb multihit:  Not affected
   Vulnerability L1tf:           Not affected
   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:
```

(Continued on next page)

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Platform Notes (Continued)

```
        NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL   SETS PHY-LINE COHERENCY-SIZE
        L1d       48K     1.7M  12 Data            1     64     1              64
        L1i       32K     1.1M   8 Instruction     1     64     1              64
        L2         2M      72M  16 Unified         2   2048     1              64
        L3        45M      90M  15 Unified         3  49152     1              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: 0-8,36-44
       node 0 size: 128682 MB
       node 0 free: 127888 MB
       node 1 cpus: 9-17,45-53
       node 1 size: 128984 MB
       node 1 free: 128497 MB
       node 2 cpus: 18-26,54-62
       node 2 size: 129019 MB
       node 2 free: 128610 MB
       node 3 cpus: 27-35,63-71
       node 3 size: 128990 MB
       node 3 free: 128632 MB
       node distances:
       node   0   1   2   3
         0:  10  12  21  21
         1:  12  10  21  21
         2:  21  21  10  12
         3:  21  21  12  10


     ----------------------------------------------------------
     9. /proc/meminfo
        MemTotal:       528053428 kB


     ----------------------------------------------------------
     10. who -r
        run-level 3 Mar 7 18:19


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

(Continued on next page)

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Platform Notes (Continued)

```
                      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
                      sapconf serial-getty@ smartd_generate_opts snmpd snmptrapd sysstat
                     systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                     systemd-time-wait-sync systemd-timesyncd tuned
  indirect          uuidd wickedd


  ----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=461ffbd6-8da0-4c20-adb7-d9d3143b6aa5
    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. tuned-adm active
    It seems that tuned daemon is not running, preset profile is not activated.
    Preset profile: virtual-guest


  ----------------------------------------------------------
  16. 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
```

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Platform Notes (Continued)

```
  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
  vm.zone_reclaim_mode                 0


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


  ----------------------------------------------------------------
20. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2023.0
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/sda3       xfs   889G  112G  777G  13% /


  ----------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         Lenovo
    Product:        ThinkSystem SR650 V3 MB,EGS,DDR5,SH,2U
    Product Family: ThinkSystem
    Serial:         1234567890


  ----------------------------------------------------------------
22. 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
```

(Continued on next page)

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Platform Notes (Continued)

```
   determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
    "DMTF SMBIOS" standard.
    Memory:
      16x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800


  ----------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:        Lenovo
    BIOS Version:       ESE109L-1.10
    BIOS Date:          01/07/2023
    BIOS Revision:      1.10
    Firmware Revision: 1.0
```

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)
```

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Software Availability: Dec-2022

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------
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.
Intel(R) Fortran 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)
--------------------------------------------------------------------------
Intel(R) Fortran 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
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--------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Gold 6416H)

SPECrate®2017_fp_base =   453

SPECrate®2017_fp_peak = Not Run

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

Base Compiler Invocation (Continued)

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`
`-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`

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ThinkSystem SR650 V3
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SPECrate®2017_fp_base = 453

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Base Optimization Flags (Continued)

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-O.html
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.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-O.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

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

Tested with SPEC CPU®2017 v1.1.9 on 2023-03-07 05:37:07-0500.
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