SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology

ThinkSystem SD530 V3
(2.20 GHz, Intel Xeon Gold 5520+)

$SPECrate^{®}2017\_fp\_base = 664$

$SPECrate^{®}2017_fp_peak = $ Not Run

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jan-2024

Hardware Availability: Mar-2024

Software Availability: Dec-2023

Copies	Value
503.bwaves_r 112	3160
507.cactuBSSN_r 112	852
508.namd_r 112	392
510.parest_r 112	319
511.povray_r 112	620
519.lbm_r 112	347
521.wrf_r 112	527
526.blender_r 112	586
527.cam4_r 112	679
538.imagick_r 112	1740
544.nab_r 112	1200
549.fotonik3d_r 112	520
554.roms_r 112	297

SPECrate®2017_fp_base (664)

Hardware

CPU Name: Intel Xeon Gold 5520+
 Max MHz: 4000
 Nominal: 2200
Enabled: 56 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: 52.5 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R, running at 4800)
Storage: 1 x 480 GB M.2 SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux 9.3 (Plow)
 Kernel 5.14.0-362.8.1.el9_3.x86_64
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Lenovo BIOS Version FNE113F 2.20 released Jan-2024
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/

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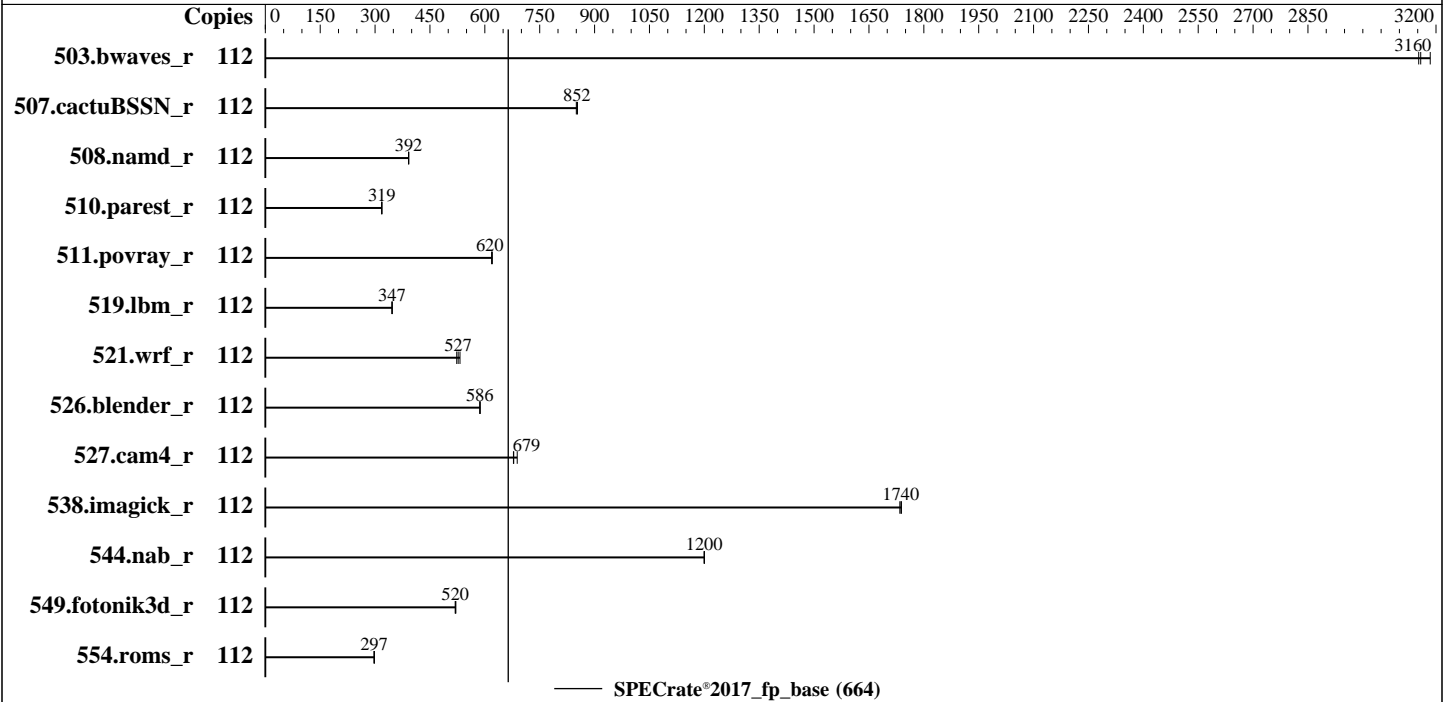|	
CPU2017 License: 9017	**Test Date:** Jan-2024
Test Sponsor: Lenovo Global Technology	**Hardware Availability:** Mar-2024
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	112	353	3180	**356**	**3160**	356	3150							
507.cactuBSSN_r	112	166	853	**166**	**852**	167	850							
508.namd_r	112	272	392	**272**	**392**	272	392							
510.parest_r	112	**920**	**319**	920	319	921	318							
511.povray_r	112	423	619	422	620	**422**	**620**							
519.lbm_r	112	341	347	341	346	**341**	**347**							
521.wrf_r	112	480	523	471	532	**476**	**527**							
526.blender_r	112	291	586	290	587	**291**	**586**							
527.cam4_r	112	284	689	**289**	**679**	289	678							
538.imagick_r	112	161	1730	**160**	**1740**	160	1740							
544.nab_r	112	157	1200	157	1200	**157**	**1200**							
549.fotonik3d_r	112	**840**	**520**	841	519	838	521							
554.roms_r	112	**598**	**297**	597	298	599	297							

SPECrate®2017_fp_base = 664

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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-ic2023.2.3/lib/intel64:/home/cpu2017-1.1.9-ic2023.2.3/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
C-States set to Legacy
SNC set to SNC2
LLC Prefetch set to Disabled
AMP Prefetch set to Enable

 Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Mon Jan 29 01:01:28 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 252 (252-18.el9)
 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.localdomain 5.14.0-362.8.1.el9_3.x86_64 #1 SMP PREEMPT_DYNAMIC Tue Oct 3 11:12:36 EDT 2023
   x86_64 x86_64 x86_64 GNU/Linux


 -----------------------------------------------------------
 2. w
   01:01:28 up 0 min,  1 user,  load average: 0.14, 0.04, 0.01
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
```

(Continued on next page)

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Platform Notes (Continued)

```
   root     tty1       01:01    8.00s  0.83s  0.01s -bash


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


   -----------------------------------------------------------
   4. ulimit -a
     real-time non-blocking time  (microseconds, -R) unlimited
     core file size              (blocks, -c) 0
     data seg size               (kbytes, -d) unlimited
     scheduling priority              (-e) 0
     file size                   (blocks, -f) unlimited
     pending signals                  (-i) 4126921
     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) 4126921
     virtual memory              (kbytes, -v) unlimited
     file locks                       (-x) unlimited


   -----------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 31
    login -- root
    -bash
    -bash
    -bash
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=112 -c
      ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=56 --define physicalfirst
      --define invoke_with_interleave --define drop_caches --tune base -o all fprate
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=112 --configfile
      ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=56 --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/CPU2017.252/templogs/preenv.fprate.252.0.log --lognum 252.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017-1.1.9-ic2023.2.3


   -----------------------------------------------------------
   6. /proc/cpuinfo
       model name       : INTEL(R) XEON(R) GOLD 5520+
       vendor_id        : GenuineIntel
       cpu family       : 6
       model            : 207
       stepping         : 2
       microcode        : 0x21000200
       bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
       cpu cores        : 28
       siblings         : 56
       2 physical ids (chips)
       112 processors (hardware threads)
       physical id 0: core ids 0-27
       physical id 1: core ids 0-27
       physical id 0: apicids 0-55
```

(Continued on next page)

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Platform Notes (Continued)

```
    physical id 1: apicids 128-183
  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 2.37.4:
  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):                          112
  On-line CPU(s) list:             0-111
  Vendor ID:                       GenuineIntel
  BIOS Vendor ID:                  Intel(R) Corporation
  Model name:                      INTEL(R) XEON(R) GOLD 5520+
  BIOS Model name:                 INTEL(R) XEON(R) GOLD 5520+
  CPU family:                      6
  Model:                           207
  Thread(s) per core:              2
  Core(s) per socket:              28
  Socket(s):                       2
  Stepping:                        2
  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 flexpriority ept vpid ept_ad fsgsbase
                                   tsc_adjust bmi1 avx2 smep bmi2 erms invpcid 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 vnmi 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 ibt amx_bf16
                                   avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities
  Virtualization:                  VT-x
  L1d cache:                       2.6 MiB (56 instances)
  L1i cache:                       1.8 MiB (56 instances)
  L2 cache:                        112 MiB (56 instances)
  L3 cache:                        105 MiB (2 instances)
  NUMA node(s):                    4
  NUMA node0 CPU(s):               0-13,56-69
  NUMA node1 CPU(s):               14-27,70-83
  NUMA node2 CPU(s):               28-41,84-97
  NUMA node3 CPU(s):               42-55,98-111
  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 Retbleed:          Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
  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, RSB filling,
                                       PBRSB-eIBRS SW sequence
  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     2.6M   12 Data            1    64       1              64
      L1i      32K     1.8M    8 Instruction     1    64       1              64
      L2        2M     112M   16 Unified         2  2048       1              64
      L3     52.5M     105M   15 Unified         3 57344       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: 0-13,56-69
  node 0 size: 257706 MB
  node 0 free: 256984 MB
  node 1 cpus: 14-27,70-83
  node 1 size: 257987 MB
  node 1 free: 257248 MB
  node 2 cpus: 28-41,84-97
  node 2 size: 258040 MB
  node 2 free: 257183 MB
  node 3 cpus: 42-55,98-111
  node 3 size: 258035 MB
  node 3 free: 257248 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:       1056532088 kB


  ------------------------------------------------------------
10. who -r
   run-level 3 Jan 29 01:00


  ------------------------------------------------------------
11. Systemd service manager version: systemd 252 (252-18.el9)
   Default Target  Status
   multi-user      running


  ------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond
                    dbus-broker firewalld getty@ insights-client-boot irqbalance kdump low-memory-monitor
                    mdmonitor microcode nis-domainname rhsmcertd rsyslog rtkit-daemon selinux-autorelabel-mark
                    sshd sssd systemd-boot-update systemd-network-generator udisks2 upower
   enabled-runtime  systemd-remount-fs
   disabled         canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot
                    console-getty cpupower debug-shell dnf-system-upgrade kvm_stat man-db-restart-cache-update
```

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Platform Notes (Continued)

```
                    nftables pesign rdisc rhcd rhsm rhsm-facts rpmdb-rebuild selinux-check-proper-disable
                    serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysext
    indirect        sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate
                    systemd-sysupdate-reboot

    ----------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt3)/boot/vmlinuz-5.14.0-362.8.1.el9_3.x86_64
    root=UUID=be3ee7bd-6dba-4efc-8d0a-4f4f123b4865
    ro
    resume=UUID=8de8c2d1-84ee-4c60-9038-a9e1ae2929c4

    ----------------------------------------------------------------
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
    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

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

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Platform Notes (Continued)

```
   18. OS release
     From /etc/*-release /etc/*-version
     os-release      Red Hat Enterprise Linux 9.3 (Plow)
     redhat-release Red Hat Enterprise Linux release 9.3 (Plow)
     system-release Red Hat Enterprise Linux release 9.3 (Plow)

   ----------------------------------------------------------------
   19. Disk information
   SPEC is set to: /home/cpu2017-1.1.9-ic2023.2.3
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda4       xfs   372G   25G  348G   7% /home

   ----------------------------------------------------------------
   20. /sys/devices/virtual/dmi/id
       Vendor:         Lenovo
       Product:        ThinkSystem SD530 V3
       Product Family: ThinkSystem
       Serial:         PASDVMK006

   ----------------------------------------------------------------
   21. dmidecode
     Additional information from dmidecode 3.5 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:
       15x Samsung M321R8GA0PB0-CWMKH 64 GB 2 rank 5600, configured at 4800
       1x Samsung M321R8GA0PB0-CWMXH 64 GB 2 rank 5600, configured at 4800


   ----------------------------------------------------------------
   22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
       BIOS Vendor:    Lenovo
       BIOS Version:   FNE113F-2.20
       BIOS Date:      01/02/2024
       BIOS Revision:  2.20
       Firmware Revision: 1.10
```

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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
```

(Continued on next page)

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```
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------


==================================================================================================
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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------


==================================================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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------------------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icx
```

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
```

SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology

ThinkSystem SD530 V3
(2.20 GHz, Intel Xeon Gold 5520+)

SPECrate®2017_fp_base = 664

SPECrate®2017_fp_peak = Not Run

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

Test Date: Jan-2024
Hardware Availability: Mar-2024
Software Availability: Dec-2023

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

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

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-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-AA.html
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-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-AA.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml
```

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

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