SPEC CPU®2017 Floating Point Rate Result

2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Gold 6554S)

SPECrate®2017_fp_base = 811

SPECrate®2017_fp_peak = Not Run

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

Test Date: Mar-2024
Hardware Availability: Feb-2024
Software Availability: Mar-2024

Benchmark	Copies	Result
503.bwaves_r	144	3500
507.cactuBSSN_r	144	919
508.namd_r	144	492
510.parest_r	144	475
511.povray_r	144	763
519.lbm_r	144	362
521.wrf_r	144	635
526.blender_r	144	733
527.cam4_r	144	783
538.imagick_r	144	2780
544.nab_r	144	1520
549.fotonik3d_r	144	546
554.roms_r	144	374

SPECrate®2017_fp_base (811)

Hardware

CPU Name: Intel Xeon Gold 6554S
 Max MHz: 4000
 Nominal: 2200
Enabled: 72 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: 180 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R, running at 5200)
Storage: 1 x 960 GB SATA SSD
Other: Cooling: DLC

Software

OS: Red Hat Enterprise Linux 9.2 (Plow)
 Kernel 5.14.0-284.11.1.el9_2.x86_64
Compiler: C/C++: Version 2024.0.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.0.2 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Lenovo BIOS Version ESE123B 3.11 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

Page 1   Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

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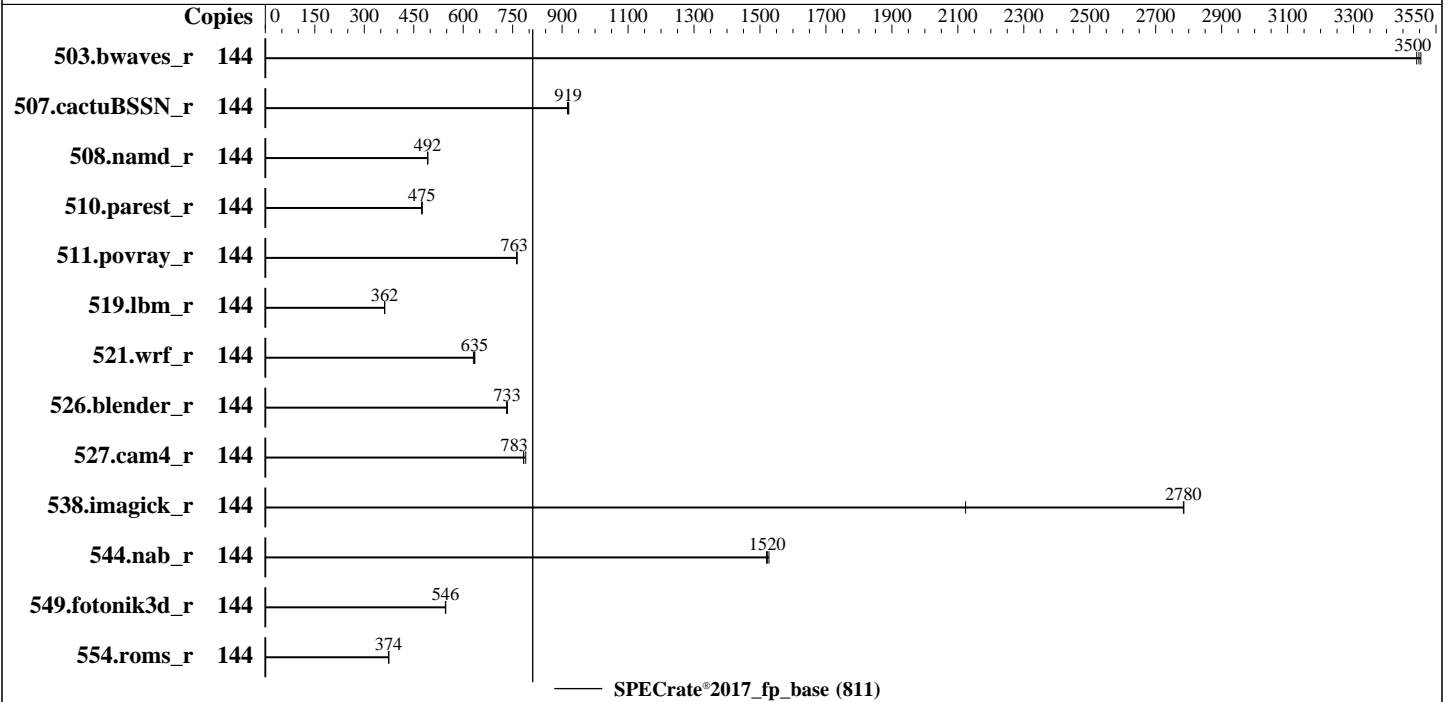SPECrate®2017_fp_peak = Not Run

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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	144	412	3500	**413**	**3500**	414	3490							
507.cactuBSSN_r	144	199	916	**198**	**919**	198	920							
508.namd_r	144	**278**	**492**	278	492	278	493							
510.parest_r	144	792	476	**793**	**475**	794	474							
511.povray_r	144	441	762	441	763	**441**	**763**							
519.lbm_r	144	419	362	420	362	**420**	**362**							
521.wrf_r	144	511	631	**508**	**635**	508	635							
526.blender_r	144	299	734	**299**	**733**	300	732							
527.cam4_r	144	322	783	**321**	**783**	319	790							
538.imagick_r	144	**129**	**2780**	129	2790	169	2120							
544.nab_r	144	159	1520	**159**	**1520**	159	1530							
549.fotonik3d_r	144	1026	547	**1027**	**546**	1028	546							
554.roms_r	144	611	374	612	374	**611**	**374**							

SPECrate®2017_fp_base = 811

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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-ic2024.0.2/lib/intel64:/home/cpu2017-1.1.9-ic2024.0.2/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
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-ic2024.0.2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Sun Mar 17 03:44:33 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 (252-13.el9_2)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. tuned-adm active
 17. sysctl
 18. /sys/kernel/mm/transparent_hugepage
 19. /sys/kernel/mm/transparent_hugepage/khugepaged
 20. OS release
 21. Disk information
 22. /sys/devices/virtual/dmi/id
 23. dmidecode
 24. BIOS
 -----------------------------------------------------------


 -----------------------------------------------------------
 1. uname -a
   Linux localhost.localdomain 5.14.0-284.11.1.el9_2.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 12 10:45:03 EDT
   2023 x86_64 x86_64 x86_64 GNU/Linux


 -----------------------------------------------------------
 2. w
```

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Platform Notes (Continued)

```
   03:44:33 up  1:39,  1 user,  load average: 1.32, 53.34, 102.44
   USER     TTY         LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1        02:05    9.00s  0.91s  0.02s -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) 4126913
   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) 4126913
   virtual memory              (kbytes, -v) unlimited
   file locks                       (-x) unlimited


   ----------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
 login -- root
 -bash
 -bash
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=144 -c
   ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=72 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=144 --configfile
   ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --define smt-on --define cores=72 --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-ic2024.0.2


   ----------------------------------------------------------
6. /proc/cpuinfo
   model name       : INTEL(R) XEON(R) GOLD 6554S
   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        : 36
   siblings         : 72
   2 physical ids (chips)
   144 processors (hardware threads)
   physical id 0: core ids 0-35
   physical id 1: core ids 0-35
```

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Platform Notes (Continued)

```
    physical id 0: apicids 0-71
    physical id 1: apicids 128-199
  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):                     144
  On-line CPU(s) list:        0-143
  Vendor ID:                  GenuineIntel
  BIOS Vendor ID:             Intel(R) Corporation
  Model name:                 INTEL(R) XEON(R) GOLD 6554S
  BIOS Model name:            INTEL(R) XEON(R) GOLD 6554S
  CPU family:                 6
  Model:                      207
  Thread(s) per core:         2
  Core(s) per socket:         36
  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 cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
                              vnmi 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 avx_vnni
                              avx512_bf16 wbnoinvd dtherm ida arat pln pts hfi 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:                  3.4 MiB (72 instances)
  L1i cache:                  2.3 MiB (72 instances)
  L2 cache:                   144 MiB (72 instances)
  L3 cache:                   360 MiB (2 instances)
  NUMA node(s):               4
  NUMA node0 CPU(s):          0-17,72-89
  NUMA node1 CPU(s):          18-35,90-107
  NUMA node2 CPU(s):          36-53,108-125
  NUMA node3 CPU(s):          54-71,126-143
  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
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
```

(Continued on next page)

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Platform Notes (Continued)

```
   Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
   Vulnerability Spectre v2:        Mitigation; Enhanced 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     3.4M   12 Data            1      64        1             64
     L1i       32K     2.3M    8 Instruction     1      64        1             64
     L2         2M     144M   16 Unified         2    2048        1             64
     L3       180M     360M   20 Unified         3  147456        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: 0-17,72-89
  node 0 size: 257703 MB
  node 0 free: 256258 MB
  node 1 cpus: 18-35,90-107
  node 1 size: 258039 MB
  node 1 free: 256791 MB
  node 2 cpus: 36-53,108-125
  node 2 size: 258039 MB
  node 2 free: 256747 MB
  node 3 cpus: 54-71,126-143
  node 3 size: 257986 MB
  node 3 free: 256635 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:       1056533004 kB


------------------------------------------------------------
10. who -r
  run-level 3 Mar 17 02:05


------------------------------------------------------------
11. Systemd service manager version: systemd 252 (252-13.el9_2)
  Default Target  Status
  multi-user      degraded


------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                   LOAD   ACTIVE SUB    DESCRIPTION
  * dnf-makecache.service loaded failed failed dnf makecache


------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE             UNIT FILES
  enabled           NetworkManager NetworkManager-dispatcher NetworkManager-wait-online atd auditd bluetooth
                    chronyd crond dbus-broker firewalld getty@ insights-client-boot irqbalance iscsi
                    iscsi-onboot kdump libstoragemgmt low-memory-monitor lvm2-monitor mcelog mdmonitor
```

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Platform Notes (Continued)

```
                   microcode multipathd nis-domainname nvmefc-boot-connections rhsmcertd rsyslog rtkit-daemon
                   selinux-autorelabel-mark smartd sshd sssd systemd-boot-update systemd-network-generator
                   tuned udisks2 upower
  enabled-runtime  systemd-remount-fs
  disabled         arp-ethers blk-availability canberra-system-bootup canberra-system-shutdown
                   canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell
                   dnf-system-upgrade iprdump iprinit iprupdate iscsid iscsiuio kpatch kvm_stat ledmon
                   man-db-restart-cache-update nftables nvmf-autoconnect pesign psacct 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

  ----------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd3,gpt2)/vmlinuz-5.14.0-284.11.1.el9_2.x86_64
  root=/dev/mapper/rhel-root
  ro
  resume=/dev/mapper/rhel-swap
  rd.lvm.lv=rhel/root
  rd.lvm.lv=rhel/swap
  rhgb
  quiet

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

  ----------------------------------------------------------
16. tuned-adm active
  Current active profile: throughput-performance

  ----------------------------------------------------------
17. 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                   40
  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                    10
  vm.watermark_boost_factor        15000
  vm.watermark_scale_factor        10
  vm.zone_reclaim_mode             0

  ----------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage
```

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Platform Notes (Continued)

```
  defrag           always defer defer+madvise [madvise] never
  enabled          [always] madvise never
  hpage_pmd_size   2097152
  shmem_enabled    always within_size advise [never] deny force


  -------------------------------------------------------------
19. /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


  -------------------------------------------------------------
20. OS release
  From /etc/*-release /etc/*-version
  os-release     Red Hat Enterprise Linux 9.2 (Plow)
  redhat-release Red Hat Enterprise Linux release 9.2 (Plow)
  system-release Red Hat Enterprise Linux release 9.2 (Plow)


  -------------------------------------------------------------
21. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2024.0.2
  Filesystem            Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs   819G   69G  750G   9% /home


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


  -------------------------------------------------------------
23. dmidecode
  Additional information from dmidecode 3.3 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:
    5x Samsung M321R8GA0PB0-CWMKH 64 GB 2 rank 5600, configured at 5200
    11x Samsung M321R8GA0PB0-CWMXH 64 GB 2 rank 5600, configured at 5200


  -------------------------------------------------------------
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:      Lenovo
    BIOS Version:     ESE123B-3.11
    BIOS Date:        01/25/2024
    BIOS Revision:    3.11
    Firmware Revision: 3.90
```

Compiler Version Notes

```
==============================================================================================
C              | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
```

(Continued on next page)

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Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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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 2024.0.2 Build 20231213
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--------------------------------------------------------------------------------------------


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

Base Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

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SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology

ThinkSystem SR650 V3
(2.20 GHz, Intel Xeon Gold 6554S)

SPECrate®2017_fp_base =   811

SPECrate®2017_fp_peak = Not Run

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

Test Date: Mar-2024
Hardware Availability: Feb-2024
Software Availability: Mar-2024

Base Compiler Invocation (Continued)

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`
`-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

Lenovo Global Technology

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SPECrate®2017_fp_base =   811

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Hardware Availability: Feb-2024
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Base Optimization Flags (Continued)

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-AA.html
http://www.spec.org/cpu2017/flags/Intel-ic2024-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-ic2024-official-linux64.xml

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

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