Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

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

SPECRate®2017_fp_base = 1160
SPECRate®2017_fp_peak = Not Run

Test Date: Nov-2023
Hardware Availability: Feb-2024
Software Availability: Dec-2023

<table>
<thead>
<tr>
<th>Copies</th>
<th>0</th>
<th>200</th>
<th>400</th>
<th>600</th>
<th>800</th>
<th>1100</th>
<th>1400</th>
<th>1700</th>
<th>2000</th>
<th>2300</th>
<th>2600</th>
<th>2900</th>
<th>3200</th>
<th>3500</th>
<th>3800</th>
<th>4100</th>
<th>4400</th>
<th>4800</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1240</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>845</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>742</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1270</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>449</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>759</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1210</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1320</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3720</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2590</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>624</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>256</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>473</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Platinum 8593Q
Max MHz: 3900
Nominal: 2200
Enabled: 128 cores, 2 chips, 2 threads/core
Orderable: 2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 320 MB I+D on chip per chip
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R)
Storage: 1 x 1.92 TB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 15 SP5
Kernel 5.14.21-150500.53-default
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 USE125B 4.10 released Nov-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
# Lenovo Global Technology

ThinkSystem SD650 V3

(2.20 GHz, Intel Xeon Platinum 8593Q)

---

## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>256</td>
<td>543</td>
<td>4730</td>
<td>541</td>
<td>4750</td>
<td>541</td>
<td>4750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>256</td>
<td>262</td>
<td>1240</td>
<td>262</td>
<td>1240</td>
<td>262</td>
<td>1240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>508.namd_r</td>
<td>256</td>
<td>288</td>
<td>846</td>
<td>288</td>
<td>845</td>
<td>288</td>
<td>844</td>
<td></td>
<td></td>
</tr>
<tr>
<td>510.parest_r</td>
<td>256</td>
<td>900</td>
<td>744</td>
<td>902</td>
<td>742</td>
<td>902</td>
<td>742</td>
<td></td>
<td></td>
</tr>
<tr>
<td>511.povray_r</td>
<td>256</td>
<td>471</td>
<td>1270</td>
<td>469</td>
<td>1270</td>
<td>473</td>
<td>1260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>256</td>
<td>602</td>
<td>448</td>
<td>602</td>
<td>449</td>
<td>602</td>
<td>449</td>
<td></td>
<td></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>256</td>
<td>756</td>
<td>758</td>
<td>755</td>
<td>760</td>
<td>755</td>
<td>759</td>
<td></td>
<td></td>
</tr>
<tr>
<td>526.blender_r</td>
<td>256</td>
<td>321</td>
<td>1210</td>
<td>321</td>
<td>1210</td>
<td>321</td>
<td>1210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>256</td>
<td>340</td>
<td>1320</td>
<td>339</td>
<td>1320</td>
<td>340</td>
<td>1320</td>
<td></td>
<td></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>256</td>
<td>212</td>
<td>3010</td>
<td>171</td>
<td>3720</td>
<td>171</td>
<td>3720</td>
<td></td>
<td></td>
</tr>
<tr>
<td>544.nab_r</td>
<td>256</td>
<td>166</td>
<td>2590</td>
<td>168</td>
<td>2560</td>
<td>167</td>
<td>2590</td>
<td></td>
<td></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>256</td>
<td>1599</td>
<td>624</td>
<td>1598</td>
<td>624</td>
<td>1597</td>
<td>625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>554.roms_r</td>
<td>256</td>
<td>859</td>
<td>473</td>
<td>861</td>
<td>472</td>
<td>860</td>
<td>473</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### 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)
Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

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

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


Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
SNC set to SNC2
AMP Prefetch set to Enable

Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c6ae2c92cc097bec197
running on localhost Mon Nov 27 01:30:05 2023

SUT (System Under Test) info as seen by some common utilities.

1. **uname -a**
2. **w**
3. **username**
4. **ulimit -a**
5. **sysinfo process ancestry**
6. **/proc/cpulinfo**
7. **lsmp**
8. **numactl --hardware**
9. **/proc/meminfo**
10. **who -r**
11. **Systemd service manager version; systemd 249 (249.16+suse.171.gdad0071f15)**
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 5.14.21-150500.53-default 
   #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
   x86_64 x86_64 x86_64 GNU/Linux

2. **w**
   01:30:05 up 2 min, 1 user, load average: 3.37, 2.49, 1.00
   USER  TTY    FROM  LOGIN@  IDLE  JCPU  PCPU WHAT
   root  tty1    -      01:29 25.00s 1.10s 0.01s 0.00s -bash

(Continued on next page)
Lenovo Global Technology

ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

SPECrat®2017_fp_base = 1160
SPECrat®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Nov-2023
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Platform Notes (Continued)

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) 4126607
   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) 4126607
   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
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 -c
   ic2023.2.3-lin-sapphirerapids-rate-20231121.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/CPU2017.010/templogs/preenv.fprate.010.0.log --lognum 010.0 --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) PLATINUM 8593Q
   vendor_id : GenuineIntel
   cpu family : 6
   model : 207
   stepping : 2
   microcode : 0x21000190
   bugs : spectre_v1 spectre_v2 spec_store_bypass swaps eibrs_pbrsb
   cpu cores : 64
   siblings : 128
   2 physical ids (chips)
   256 processors (hardware threads)
   physical id 0: core ids 0-63
   physical id 1: core ids 0-63
   physical id 0: apicids 0-127
   physical id 1: apicids 128-255

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.
Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Nov-2023
Tested by: Lenovo Global Technology
Hardware Availability: Feb-2024
Software Availability: Dec-2023

---

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): 256
On-line CPU(s) list: 0-255
Vendor ID: GenuineIntel
Model name: INTEL(R) XEON(R) PLATINUM 8593Q
CPU family: 6
Model: 207
Thread(s) per core: 2
Core(s) per socket: 64
Socket(s): 2
Stepping: 2
BogoMIPS: 4400.00

Flags:
    fpu vme de pse tsc msr pae mce cmov pat pse36
    clflush dtc npx mxr save unm xtopology
    nonstop_tsc xsave cld xsaveopt xsavec xgetbv1
    xsaveopt xsavec xgetbv1 xsave
    cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
    avx_vnni avx512_bf16

Virtualization: VT-x
L1d cache: 6 MiB (128 instances)
L1i cache: 4 MiB (128 instances)
L2 cache: 256 MiB (128 instances)
L3 cache: 640 MiB (2 instances)
NUMA node(s):
    NUMA node0 CPU(s): 0-31,128-159
    NUMA node1 CPU(s): 32-63,160-191
    NUMA node2 CPU(s): 64-95,192-223
    NUMA node3 CPU(s): 96-127,224-255

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 and seccomp
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 Tlx async abort: Not affected

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>6M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>4M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>256M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td>320M</td>
<td>640M</td>
<td>20</td>
<td>Unified</td>
<td>3</td>
<td>262144</td>
<td>1</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>

---

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.
node 0 cpus: 0-31,128-159
node 0 size: 257661 MB
node 0 free: 256800 MB
node 1 cpus: 32-63,160-191
node 1 size: 258031 MB
node 1 free: 257263 MB
node 2 cpus: 64-95,192-223
node 2 size: 258031 MB
node 2 free: 256918 MB
node 3 cpus: 96-127,224-255
node 3 size: 257957 MB
node 3 free: 257294 MB
node distances:
0:  10  12  21  21
1:  12  10  21  21
2:  21  21  10  12
3:  21  21  12  10

---

9. /proc/meminfo

MemTotal: 1056442388 kB

---

10. who -r
run-level 3 Nov 27 01:28

---

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
Default Target Status
multi-user running

---

12. Services, from systemctl list-unit-files

<table>
<thead>
<tr>
<th>STATE</th>
<th>PROJECT</th>
<th>UNIT FILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>enabled</td>
<td>YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ irqbalance issue-generator kbdsettings klog lvms-monitor mdadm postfix purge-kernels rollback raylog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny</td>
<td></td>
</tr>
<tr>
<td>enabled-runtime</td>
<td>systemctl-remount-fs</td>
<td></td>
</tr>
</tbody>
</table>

---

13. Linux kernel boot-time arguments, from /proc/cmdline

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

SPECrate®2017_fp_base = 1160
SPECrate®2017_fp_peak = Not Run

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

Test Date: Nov-2023
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Platform Notes (Continued)

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
root=UUID=d7791671-9fd7-462e-99cf-2cc433d1f618
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
   vm.zone_reclaim_mode 0

16. /sys/kernel/mm/transparent_hugepage
   defrag always defer defer+madvice [madvice] never
   enabled [always] madvice 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 SP5

(Continued on next page)
Lenovo Global Technology  
ThinkSystem SD650 V3  
(2.20 GHz, Intel Xeon Platinum 8593Q)  

| SPECrate®2017_fp_base = 1160 |
| SPECrate®2017_fp_peak = Not Run |

Platform Notes (Continued)

19. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2023.2.3
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 1.8T 57G 1.7T 4% /

20. /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SD650 V3
Product Family: ThinkSystem
Serial: 123456789

21. dmidecode
Additional information from dmidecode 3.4 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
15x Samsung M321R8GA0PB0-CWMKH 64 GB 2 rank 5600
1x Samsung M321R8GA0PB0-CWMXH 64 GB 2 rank 5600

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: Lenovo
BIOS Version: USE125B-4.10
BIOS Date: 11/02/2023
BIOS Revision: 4.10
Firmware Revision: 0.30

Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2023 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++</th>
<th>508.namd_r(base) 510.parest_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2023 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++, C</th>
<th>511.povray_r(base) 526.blender_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2023 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2023 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C++, C, Fortran</th>
<th>507.cactuBSSN_r(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Continued on next page)</td>
<td></td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

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

Test Date: Nov-2023
Hardware Availability: Feb-2024
Software Availability: Dec-2023

SPECrated®2017_fp_base = 1160
SPECrated®2017_fp_peak = Not Run

Compiler Version Notes (Continued)

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, C |
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
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

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

Base Portability Flags (Continued)

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
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V3
(2.20 GHz, Intel Xeon Platinum 8593Q)

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

SPECrates®2017_fp_base = 1160
SPECrates®2017_fp_peak = Not Run

Test Date: Nov-2023
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Base Optimization Flags (Continued)

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

SPEC CPU and SPECrates are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2023-11-26 12:30:05-0500.
Originally published on 2023-12-14.