



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SD550 V3  
(2.00 GHz, Intel Xeon Platinum 8592V)

SPECrate®2017\_int\_base = 979

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 9017

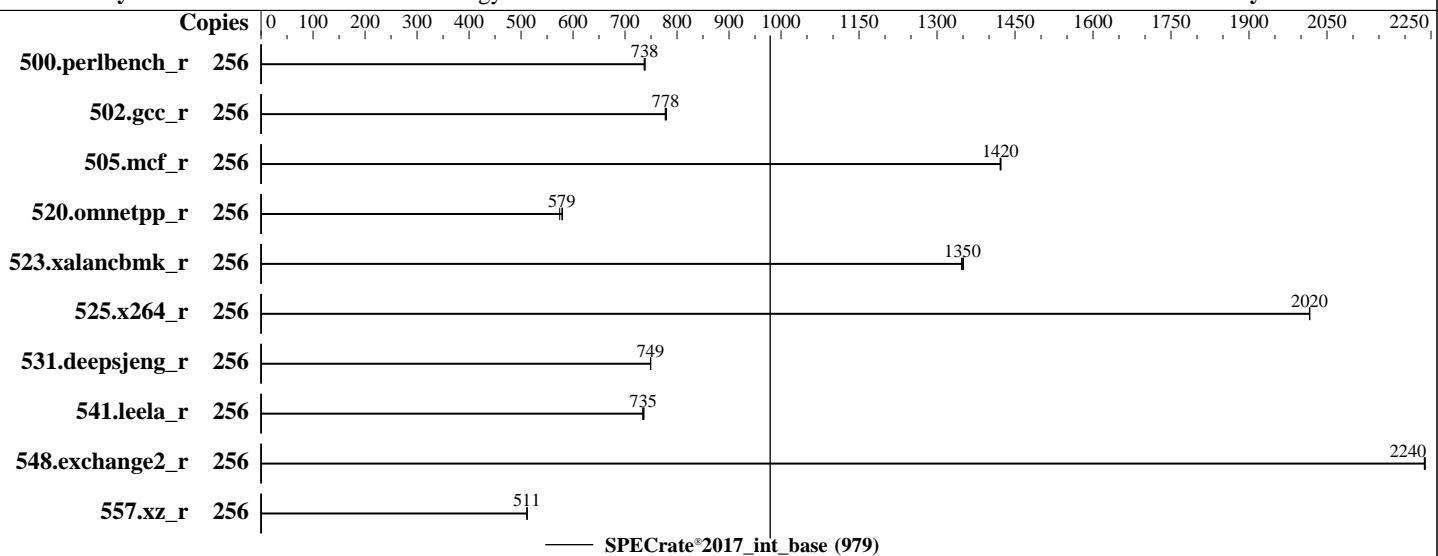
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Feb-2024

Hardware Availability: Mar-2024

Software Availability: Dec-2023



### Hardware

CPU Name: Intel Xeon Platinum 8592V  
Max MHz: 3900  
Nominal: 2000  
Enabled: 128 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: 320 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 SATA SSD  
Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP5  
Compiler: Kernel 5.14.21-150500.53-default  
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: None  
Power Management: BIOS set to prefer performance at the cost of additional power usage



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## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	256	552	739	553	737	<b>552</b>	<b>738</b>							
502.gcc_r	256	465	780	466	777	<b>466</b>	<b>778</b>							
505.mcf_r	256	<b>291</b>	<b>1420</b>	291	1420	291	1420							
520.omnetpp_r	256	<b>581</b>	<b>579</b>	585	574	579	580							
523.xalancbmk_r	256	201	1350	<b>200</b>	<b>1350</b>	200	1350							
525.x264_r	256	222	2020	222	2020	<b>222</b>	<b>2020</b>							
531.deepsjeng_r	256	<b>392</b>	<b>749</b>	391	750	392	749							
541.leela_r	256	<b>577</b>	<b>735</b>	578	734	576	736							
548.exchange2_r	256	300	2240	<b>300</b>	<b>2240</b>	300	2240							
557.xz_r	256	540	512	<b>541</b>	<b>511</b>	541	511							

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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/lib/ia32:/home/cpu2017-1.1.9-ic2023.2.3/je5.0.1-32"
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.

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.

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## General Notes (Continued)

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.

## Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance and then set it to Custom Mode

SNC set to SNC2

LLC Prefetch set to Disabled

UPI Link Disable set to Minimum Number of Links Enabled

```
Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Sun Feb 4 14:56:05 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 249 (249.16+suse.171.gdad0071f15)  
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. 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 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
x86_64 x86_64 x86_64 GNU/Linux
```

-----

```
2. w
14:56:05 up 2 min, 1 user, load average: 0.10, 0.07, 0.02
USER   TTY      FROM          LOGIN@    IDLE    JCPU    PCPU WHAT
root   ttys1     -           14:54    41.00s  1.14s  0.01s sh
Run302-compliant-ic2023.2.3-lin-sapphirerapids-rateint-base-smt-on-20231121.sh
```

-----

```
3. Username
```

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## Platform Notes (Continued)

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) 4126610
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) 4126610
virtual memory           (kbytes, -v) unlimited
file locks              (-x) unlimited
```

```
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
/bin/bash ./run_SD550V3_EMR.sh
sh Run302-compliant-ic2023.2.3-lin-sapphirerapids-rateint-base-smt-on-20231121.sh
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 -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=256 --configfile
  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 intrate --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.279/templogs/preenv.intrate.279.0.log --lognum 279.0 --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 8592V
vendor_id       : GenuineIntel
cpu family     : 6
model          : 207
stepping        : 2
microcode       : 0x21000200
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrp_brs
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.
```

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## Platform Notes (Continued)

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 8592V
CPU family:           6
Model:                207
Thread(s) per core:   2
Core(s) per socket:  64
Socket(s):            2
Stepping:             2
BogoMIPS:             4000.00
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 xtTopology
                      nonstop_tsc cpuid aperfmpf tsc_known_freq pn1 pclmulqdq dtes64 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_13 cat_12 cdp_13 invpcid_single
                      cdp_12 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority
                      ept vpid ept_ad fsgsbase tsc_adjust bmil hle avx2 smep bmi2 erms invpcid
                      rtm cqmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
                      intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves
                      cqmq_llc cqmq_occup_llc cqmq_mbm_total cqmq_mbm_local avx_vnni avx512_bf16
                      wbnoinvd dtherm ida arat pln pts hfi avx512vmbi umip pku ospke waitpkg
                      avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme
                      avx512_vpocntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
                      enqcmd fsrm md_clear serialize tsxlptrk pconfig arch_lbr avx512_fp16
                      amx_tile flush_ll1d arch_capabilities

Virtualization:
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):        4
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 Llft:  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 Tsx async abort: Not affected

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
------	----------	----------	------	------	-------	------	----------	----------------

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### Platform Notes (Continued)

L1d	48K	6M	12 Data	1	64	1	64
L1i	32K	4M	8 Instruction	1	64	1	64
L2	2M	256M	16 Unified	2	2048	1	64
L3	320M	640M	20 Unified	3	262144	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: 0-31,128-159  
node 0 size: 257696 MB  
node 0 free: 256781 MB  
node 1 cpus: 32-63,160-191  
node 1 size: 257997 MB  
node 1 free: 257180 MB  
node 2 cpus: 64-95,192-223  
node 2 size: 258031 MB  
node 2 free: 257318 MB  
node 3 cpus: 96-127,224-255  
node 3 size: 257957 MB  
node 3 free: 257184 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: 1056443064 kB

#### 10. who -r

run-level 3 Feb 4 14:54

#### 11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)

Default Target Status  
multi-user degraded

#### 12. Failed units, from systemctl list-units --state=failed

UNIT LOAD ACTIVE SUB DESCRIPTION  
\* ntp\_sync.service loaded failed failed ntp\_sync.service

#### 13. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ irqbalance issue-generator kbdsettings klog lvm2-monitor nsqd postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore 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 ebttables exchange-bmc-os-info firewalld gpm grub2-once haveged haveged-switch-root ipmi ipmievfd issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd ntp_sync
generated	

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## Platform Notes (Continued)

indirect                wickeddd

-----  
14. Linux kernel boot-time arguments, from /proc/cmdline  
    BOOT\_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default  
    root=UUID=1f1165ee-d57c-4884-9a69-769de0319f56  
    ro  
    splash=silent  
    mitigations=auto  
    quiet  
    security=apparmor

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

-----  
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  
    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+madvise [madvise] never  
    enabled               [always] madvise never  
    hugepage\_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

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## Platform Notes (Continued)

19. OS release

```
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP5
```

-----  
20. Disk information

```
SPEC is set to: /home/cpu2017-1.1.9-ic2023.2.3
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdb3        xfs   446G   42G  404G  10%  /
```

-----  
21. /sys/devices/virtual/dmi/id

```
Vendor:          Lenovo
Product:         ThinkSystem SD550 V3
Product Family:  ThinkSystem
Serial:          1234567890
```

-----  
22. 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:

```
9x Samsung M321R8GA0PB0-CWMKH 64 GB 2 rank 5600, configured at 4800
7x Samsung M321R8GA0PB0-CWMXH 64 GB 2 rank 5600, configured at 4800
```

-----  
23. 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

```
===== | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_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.
```

```
===== | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_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.
```

```
===== | 548.exchange2_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.
```



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## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

## Base Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```

## Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin
-lqkmalloc
```



# SPEC CPU®2017 Integer Rate Result

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## Lenovo Global Technology

ThinkSystem SD550 V3  
(2.00 GHz, Intel Xeon Platinum 8592V)

SPECrate®2017\_int\_base = 979

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 9017

Test Date: Feb-2024

Test Sponsor: Lenovo Global Technology

Hardware Availability: Mar-2024

Tested by: Lenovo Global Technology

Software Availability: Dec-2023

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>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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