



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR850 V3  
(2.20 GHz, Intel Xeon Platinum 8460H)

SPECrate®2017\_fp\_base = 1600

SPECrate®2017\_fp\_peak = Not Run

CPU2017 License: 9017

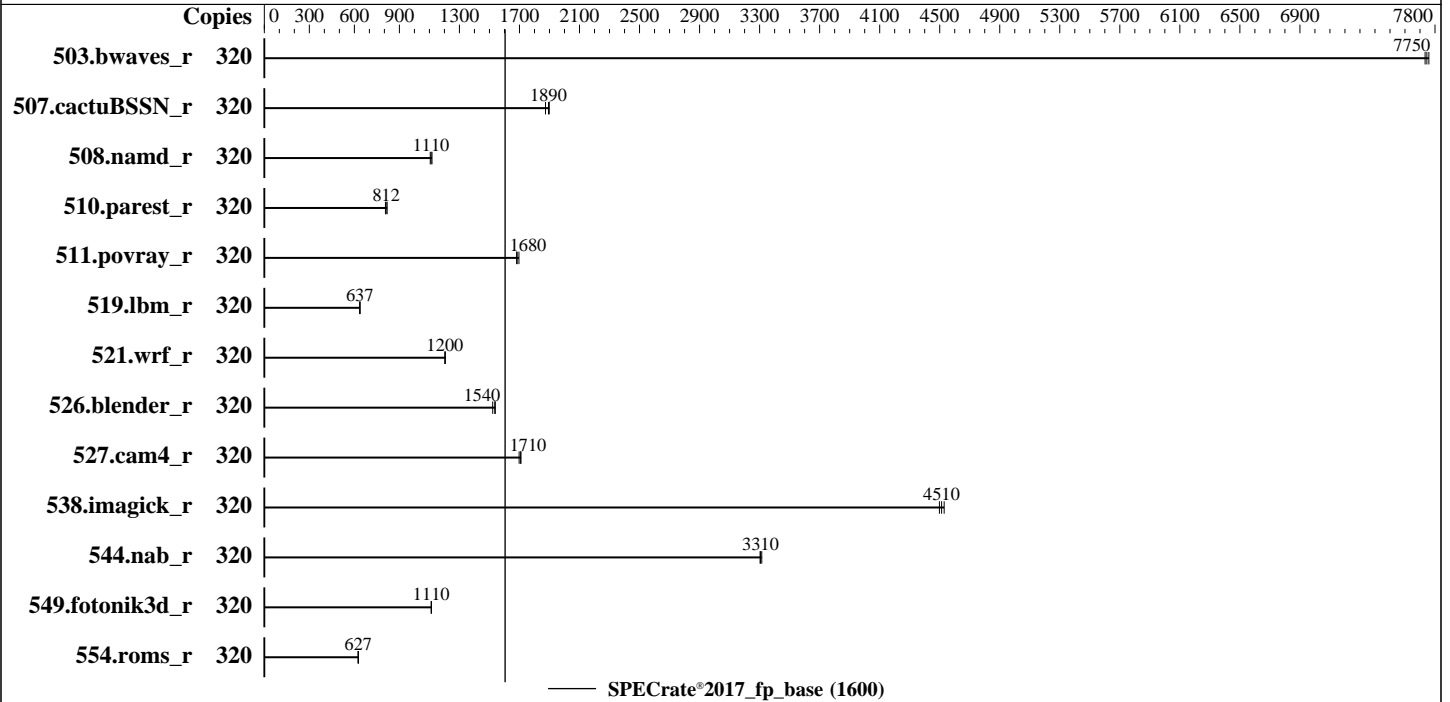
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Aug-2023

Hardware Availability: Jun-2023

Software Availability: Dec-2022



### Hardware

CPU Name: Intel Xeon Platinum 8460H  
 Max MHz: 3800  
 Nominal: 2200  
 Enabled: 160 cores, 4 chips, 2 threads/core  
 Orderable: 2,4 chips  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 2 MB I+D on chip per core  
 L3: 105 MB I+D on chip per chip  
 Other: None  
 Memory: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 960 GB M.2 NVME SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux 9.1 (Plow) (x86\_64)  
 Kernel 5.14.0-162.6.1.el9\_1.x86\_64  
 Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;  
 Parallel: No  
 Firmware: Lenovo BIOS Version RSE105E 1.10 released May-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



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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	320	414	7760	<b>414</b>	<b>7750</b>	415	7730							
507.cactuBSSN_r	320	216	1870	213	1900	<b>214</b>	<b>1890</b>							
508.namd_r	320	275	1110	272	1120	<b>274</b>	<b>1110</b>							
510.parest_r	320	1023	818	<b>1031</b>	<b>812</b>	1037	807							
511.povray_r	320	<b>444</b>	<b>1680</b>	445	1680	440	1700							
519.lbm_r	320	529	638	<b>530</b>	<b>637</b>	531	635							
521.wrf_r	320	<b>595</b>	<b>1200</b>	595	1200	595	1210							
526.blender_r	320	317	1540	<b>317</b>	<b>1540</b>	320	1520							
527.cam4_r	320	<b>328</b>	<b>1710</b>	327	1710	330	1700							
538.imagick_r	320	<b>176</b>	<b>4510</b>	176	4530	177	4500							
544.nab_r	320	<b>163</b>	<b>3310</b>	162	3310	163	3300							
549.fotonik3d_r	320	1121	1110	<b>1121</b>	<b>1110</b>	1120	1110							
554.roms_r	320	814	624	<b>812</b>	<b>627</b>	811	627							

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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-ic2023.0/lib/intel64:/home/cpu2017-1.1.9-ic2023.0/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  
DCU Streamer Prefetcher set to Disabled  
LLC Prefetch set to Disabled  
AMP Prefetch set to Enable  
SNC set to SNC4

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost.localdomain Tue Aug 29 15:04:08 2023

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

-----  
Table of contents  
-----

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-12.e19\_1)
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.localdomain 5.14.0-162.6.1.e19\_1.x86\_64 #1 SMP PREEMPT\_DYNAMIC Fri Sep 30 07:36:03 EDT 2022  
x86\_64 x86\_64 x86\_64 GNU/Linux  
-----

2. w

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### Platform Notes (Continued)

15:04:08 up 2 min, 1 user, load average: 0.12, 0.13, 0.05

USER	TTY	LOGIN@	IDLE	JCPU	PCPU	WHAT
root	tty1	15:03	7.00s	0.90s	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) 8255456
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) 8255456
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
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=320 -c
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=160 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=320 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=160 --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/CPU2017.124/templogs/preenv.fprate.124.0.log --lognum 124.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2023.0

```

-----  
6. /proc/cpuinfo

```

model name      : Intel(R) Xeon(R) Platinum 8460H
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b0001b0
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores      : 40
siblings       : 80
4 physical ids (chips)
320 processors (hardware threads)
physical id 0: core ids 0-39
physical id 1: core ids 0-39

```

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### Platform Notes (Continued)

physical id 2: core ids 0-39  
physical id 3: core ids 0-39  
physical id 0: apicids 0-79  
physical id 1: apicids 128-207  
physical id 2: apicids 256-335  
physical id 3: apicids 384-463

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):               320
On-line CPU(s) list:  0-319
Vendor ID:            GenuineIntel
BIOS Vendor ID:       Intel(R) Corporation
Model name:            Intel(R) Xeon(R) Platinum 8460H
BIOS Model name:      Intel(R) Xeon(R) Platinum 8460H
CPU family:           6
Model:                143
Thread(s) per core:   2
Core(s) per socket:   40
Socket(s):            4
Stepping:              8
BogoMIPS:             4400.00
Flags:                fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                    clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                    lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                    nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                    ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                    sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                    lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                    invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced
                    tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 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 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 amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d
                    arch_capabilities

Virtualization:       VT-x
L1d cache:            7.5 MiB (160 instances)
L1i cache:            5 MiB (160 instances)
L2 cache:             320 MiB (160 instances)
L3 cache:             420 MiB (4 instances)
NUMA node(s):        16
NUMA node0 CPU(s):   0-9,160-169
NUMA node1 CPU(s):   10-19,170-179
NUMA node2 CPU(s):   20-29,180-189
NUMA node3 CPU(s):   30-39,190-199
NUMA node4 CPU(s):   40-49,200-209
NUMA node5 CPU(s):   50-59,210-219

```

(Continued on next page)



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### Platform Notes (Continued)

```

NUMA node6 CPU(s):          60-69,220-229
NUMA node7 CPU(s):          70-79,230-239
NUMA node8 CPU(s):          80-89,240-249
NUMA node9 CPU(s):          90-99,250-259
NUMA node10 CPU(s):         100-109,260-269
NUMA node11 CPU(s):         110-119,270-279
NUMA node12 CPU(s):         120-129,280-289
NUMA node13 CPU(s):         130-139,290-299
NUMA node14 CPU(s):         140-149,300-309
NUMA node15 CPU(s):         150-159,310-319
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf:         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
Vulnerability Spectre v1:   Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:   Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSE-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	7.5M	12	Data	1	64	1	64
L1i	32K	5M	8	Instruction	1	64	1	64
L2	2M	320M	16	Unified	2	2048	1	64
L3	105M	420M	15	Unified	3	114688	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```

available: 16 nodes (0-15)
node 0 cpus: 0-9,160-169
node 0 size: 128680 MB
node 0 free: 128002 MB
node 1 cpus: 10-19,170-179
node 1 size: 129019 MB
node 1 free: 128615 MB
node 2 cpus: 20-29,180-189
node 2 size: 129019 MB
node 2 free: 128486 MB
node 3 cpus: 30-39,190-199
node 3 size: 129019 MB
node 3 free: 128597 MB
node 4 cpus: 40-49,200-209
node 4 size: 129019 MB
node 4 free: 128603 MB
node 5 cpus: 50-59,210-219
node 5 size: 129019 MB
node 5 free: 128543 MB
node 6 cpus: 60-69,220-229
node 6 size: 129019 MB
node 6 free: 128572 MB
node 7 cpus: 70-79,230-239
node 7 size: 129019 MB
node 7 free: 128590 MB
node 8 cpus: 80-89,240-249
node 8 size: 129019 MB

```

(Continued on next page)



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### Platform Notes (Continued)

```

node 8 free: 128696 MB
node 9 cpus: 90-99,250-259
node 9 size: 129019 MB
node 9 free: 128725 MB
node 10 cpus: 100-109,260-269
node 10 size: 129019 MB
node 10 free: 128691 MB
node 11 cpus: 110-119,270-279
node 11 size: 129019 MB
node 11 free: 128679 MB
node 12 cpus: 120-129,280-289
node 12 size: 128981 MB
node 12 free: 128677 MB
node 13 cpus: 130-139,290-299
node 13 size: 129019 MB
node 13 free: 128674 MB
node 14 cpus: 140-149,300-309
node 14 size: 129019 MB
node 14 free: 128706 MB
node 15 cpus: 150-159,310-319
node 15 size: 128988 MB
node 15 free: 128628 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
0:  10 12 12 12 21 21 21 21 21 21 21 21 21 21 21 21
1:  12 10 12 12 21 21 21 21 21 21 21 21 21 21 21 21
2:  12 12 10 12 21 21 21 21 21 21 21 21 21 21 21 21
3:  12 12 12 10 21 21 21 21 21 21 21 21 21 21 21 21
4:  21 21 21 21 10 12 12 12 21 21 21 21 21 21 21 21
5:  21 21 21 21 12 10 12 12 21 21 21 21 21 21 21 21
6:  21 21 21 21 12 12 10 12 21 21 21 21 21 21 21 21
7:  21 21 21 21 12 12 10 21 21 21 21 21 21 21 21 21
8:  21 21 21 21 21 21 21 21 10 12 12 12 21 21 21 21
9:  21 21 21 21 21 21 21 21 12 10 12 12 21 21 21 21
10: 21 21 21 21 21 21 21 21 12 12 10 12 21 21 21 21
11: 21 21 21 21 21 21 21 21 12 12 12 10 21 21 21 21
12: 21 21 21 21 21 21 21 21 21 21 21 21 10 12 12 12
13: 21 21 21 21 21 21 21 21 21 21 21 21 12 10 12 12
14: 21 21 21 21 21 21 21 21 21 21 21 21 12 12 10 12
15: 21 21 21 21 21 21 21 21 21 21 21 21 12 12 12 10

```

```

-----
9. /proc/meminfo
MemTotal:      2113437104 kB

```

```

-----
10. who -r
run-level 3 Aug 29 15:01

```

```

-----
11. Systemd service manager version: systemd 250 (250-12.e19_1)
Default Target Status
multi-user      degraded

```

```

-----
12. Failed units, from systemctl list-units --state=failed
UNIT                                LOAD ACTIVE SUB DESCRIPTION
* NetworkManager-wait-online.service loaded failed failed Network Manager Wait Online
* systemd-sysctl.service            loaded failed failed Apply Kernel Variables

```

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### Platform Notes (Continued)

```

-----
13. Services, from systemctl list-unit-files
STATE          UNIT FILES
enabled        NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond
               dbus-broker getty@ irqbalance kdump low-memory-monitor mdmonitor microcode nis-domainname
               rhsmcrtcd rsyslog rtkit-daemon selinux-autorelabel-mark sshd sssd
               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 firewallld kvm_stat man-db-restart-cache-update nftables
               pesign rdisc rhsm rhsm-facts rpmdb-rebuild 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
-----

```

```

-----
14. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt3)/boot/vmlinuz-5.14.0-162.6.1.el9_1.x86_64
root=UUID=43a7f1b1-66b0-456a-8c3f-451305a00281
ro
resume=UUID=58de1c40-542f-453b-bb6a-6bbd3510660a
-----

```

```

-----
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 defer+madvice [madvice] never
enabled        [always] madvice never
hpage_pmd_size 2097152
shmem_enabled  always within_size advise [never] deny force
-----

```

```

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

```

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### Platform Notes (Continued)

```
alloc_sleep_millisecs 60000
defrag 1
max_ptes_none 511
max_ptes_shared 256
max_ptes_swap 64
pages_to_scan 4096
scan_sleep_millisecs 10000
```

-----  
19. OS release  
From /etc/\*-release /etc/\*-version  
os-release Red Hat Enterprise Linux 9.1 (Plow)  
redhat-release Red Hat Enterprise Linux release 9.1 (Plow)  
system-release Red Hat Enterprise Linux release 9.1 (Plow)

-----  
20. Disk information  
SPEC is set to: /home/cpu2017-1.1.9-ic2023.0  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/nvme0n1p4 xfs 819G 16G 804G 2% /home

-----  
21. /sys/devices/virtual/dmi/id  
Vendor: Lenovo  
Product: ThinkSystem SR850 V3  
Product Family: ThinkSystem  
Serial: None

-----  
22. 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:  
21x SK Hynix HMC94AEBRA102N 64 GB 2 rank 4800  
4x SK Hynix HMC94AEBRA109N 64 GB 2 rank 4800  
7x SK Hynix HMC94AEBRA123N 64 GB 2 rank 4800

-----  
23. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: Lenovo  
BIOS Version: RSE105E-1.10  
BIOS Date: 05/12/2023  
BIOS Revision: 1.10  
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 2023.0.0 Build 20221201  
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=====

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# SPEC CPU®2017 Floating Point Rate Result

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## Lenovo Global Technology

ThinkSystem SR850 V3  
(2.20 GHz, Intel Xeon Platinum 8460H)

SPECrate®2017\_fp\_base = 1600

SPECrate®2017\_fp\_peak = Not Run

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Aug-2023

**Hardware Availability:** Jun-2023

**Software Availability:** Dec-2022

## Compiler Version Notes (Continued)

C++ | 508.namd\_r(base) 510.parest\_r(base)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C++, C | 511.povray\_r(base) 526.blender\_r(base)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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C++, C, Fortran | 507.cactuBSSN\_r(base)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran | 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
Copyright (C) 1985-2022 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 2023.0.0 Build 20221201  
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

(Continued on next page)



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## Base Compiler Invocation (Continued)

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Base Portability Flags

```
503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
```

## Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
```

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# SPEC CPU®2017 Floating Point Rate Result

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## Lenovo Global Technology

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**Tested by:** Lenovo Global Technology

**Test Date:** Aug-2023

**Hardware Availability:** Jun-2023

**Software Availability:** Dec-2022

## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

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

Benchmarks using both Fortran and C:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xsaphirerapids -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 -xsaphirerapids -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 -xsaphirerapids -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-X.html>

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-X.xml>

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml>

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