



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR950 V3
(2.20 GHz, Intel Xeon Platinum 8460H)

SPECrate®2017_fp_base = 3200

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9017

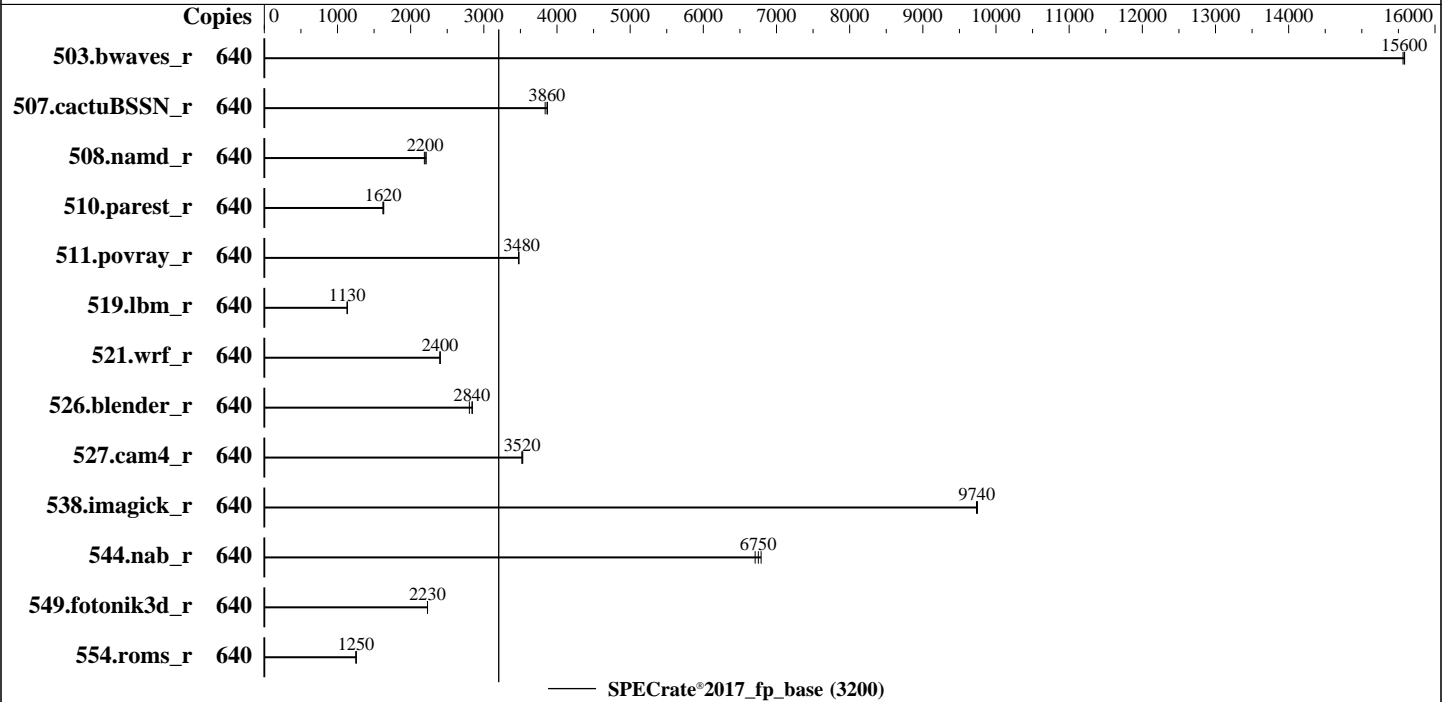
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Dec-2023

Hardware Availability: Oct-2023

Software Availability: Dec-2023



Hardware

CPU Name: Intel Xeon Platinum 8460H
 Max MHz: 3800
 Nominal: 2200
 Enabled: 320 cores, 8 chips, 2 threads/core
 Orderable: 8 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: 4 TB (64 x 64 GB 2Rx4 PC5-4800B-R)
 Storage: 1 x 480 GB SATA SSD
 Other: None

Software

OS: Red Hat Enterprise Linux 9.2 (Plow)
 Kernel 5.14.0-284.11.1.el9_2.x86_64
 Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
 Parallel: No
 Firmware: Lenovo BIOS Version EBE103M 1.10 released Oct-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	640	412	15600	412	15600	412	15600							
507.cactuBSSN_r	640	210	3860	211	3840	209	3870							
508.namd_r	640	278	2190	275	2210	277	2200							
510.parest_r	640	1026	1630	1031	1620	1032	1620							
511.povray_r	640	430	3480	430	3480	430	3470							
519.lbm_r	640	595	1130	595	1130	595	1130							
521.wrf_r	640	597	2400	597	2400	597	2400							
526.blender_r	640	348	2800	343	2840	343	2840							
527.cam4_r	640	317	3530	318	3520	318	3520							
538.imagick_r	640	163	9740	164	9730	163	9750							
544.nab_r	640	161	6710	159	6790	160	6750							
549.fotonik3d_r	640	1119	2230	1118	2230	1118	2230							
554.roms_r	640	811	1250	812	1250	810	1260							

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-ic2023.2.3/lib/intel64:/home/cpu2017-1.1.9-ic2023.2.3/je5.0.1-64"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

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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
SNC set to SNC4
LLC Prefetch set to Disabled
AMP Prefetch set to Enable

Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Dec 12 07:29:48 2023

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

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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. 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 5.14.0-284.11.1.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
07:29:48 up 5:40, 1 user, load average: 12.96, 291.45, 493.14
USER TTY LOGIN@ IDLE JCPU PCPU WHAT

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Platform Notes (Continued)

```
root      tty1      01:49      5:36m  1.24s  0.02s  /bin/bash  ./speccpu_rock.sh
```

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) 16511420
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) 16511420
virtual memory                (kbytes, -v) unlimited
file locks                   (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 31
login -- root
-bash
/bin/bash ./speccpu_rock.sh
/bin/bash ./speccpu_rock.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=640 -c
  ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=320 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=640 --configfile
  ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=320 --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/CPU2017.069/templogs/preenv.fprate.069.0.log --lognum 069.0 --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 8460H
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 8
microcode       : 0x2b0004b1
bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores       : 40
siblings        : 80
8 physical ids (chips)
640 processors (hardware threads)
physical id 0:  core ids 0-39
physical id 1:  core ids 0-39
physical id 2:  core ids 0-39
```

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Platform Notes (Continued)

```
physical id 3: core ids 0-39
physical id 4: core ids 0-39
physical id 5: core ids 0-39
physical id 6: core ids 0-39
physical id 7: 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
physical id 4: apicids 512-591
physical id 5: apicids 640-719
physical id 6: apicids 768-847
physical id 7: apicids 896-975
```

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):                640
On-line CPU(s) list:   0-639
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):             8
Stepping:              8
CPU max MHz:           3800.0000
CPU min MHz:           800.0000
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 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 ibt amx_bf16
                        avx512_fp16 amx_tile amx_int8 flush_lld arch_capabilities
Virtualization:        VT-x
L1d cache:             15 MiB (320 instances)
L1i cache:             10 MiB (320 instances)
L2 cache:              640 MiB (320 instances)
```

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Platform Notes (Continued)

```

L3 cache:                840 MiB (8 instances)
NUMA node(s):            32
NUMA node0 CPU(s):      0-9,320-329
NUMA node1 CPU(s):      10-19,330-339
NUMA node2 CPU(s):      20-29,340-349
NUMA node3 CPU(s):      30-39,350-359
NUMA node4 CPU(s):      40-49,360-369
NUMA node5 CPU(s):      50-59,370-379
NUMA node6 CPU(s):      60-69,380-389
NUMA node7 CPU(s):      70-79,390-399
NUMA node8 CPU(s):      80-89,400-409
NUMA node9 CPU(s):      90-99,410-419
NUMA node10 CPU(s):     100-109,420-429
NUMA node11 CPU(s):     110-119,430-439
NUMA node12 CPU(s):     120-129,440-449
NUMA node13 CPU(s):     130-139,450-459
NUMA node14 CPU(s):     140-149,460-469
NUMA node15 CPU(s):     150-159,470-479
NUMA node16 CPU(s):     160-169,480-489
NUMA node17 CPU(s):     170-179,490-499
NUMA node18 CPU(s):     180-189,500-509
NUMA node19 CPU(s):     190-199,510-519
NUMA node20 CPU(s):     200-209,520-529
NUMA node21 CPU(s):     210-219,530-539
NUMA node22 CPU(s):     220-229,540-549
NUMA node23 CPU(s):     230-239,550-559
NUMA node24 CPU(s):     240-249,560-569
NUMA node25 CPU(s):     250-259,570-579
NUMA node26 CPU(s):     260-269,580-589
NUMA node27 CPU(s):     270-279,590-599
NUMA node28 CPU(s):     280-289,600-609
NUMA node29 CPU(s):     290-299,610-619
NUMA node30 CPU(s):     300-309,620-629
NUMA node31 CPU(s):     310-319,630-639
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
Vulnerability Spectre v1:  Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:  Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBR SB-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      15M    12 Data          1      64      1           64
L1i   32K      10M     8 Instruction    1      64      1           64
L2    2M       640M   16 Unified       2     2048      1           64
L3   105M      840M   15 Unified       3  114688      1           64

```

```

8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 32 nodes (0-31)
node 0 cpus: 0-9,320-329
node 0 size: 128356 MB

```

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Platform Notes (Continued)

```

node 0 free: 127225 MB
node 1 cpus: 10-19,330-339
node 1 size: 129019 MB
node 1 free: 128024 MB
node 2 cpus: 20-29,340-349
node 2 size: 129019 MB
node 2 free: 128034 MB
node 3 cpus: 30-39,350-359
node 3 size: 129019 MB
node 3 free: 128023 MB
node 4 cpus: 40-49,360-369
node 4 size: 129019 MB
node 4 free: 128064 MB
node 5 cpus: 50-59,370-379
node 5 size: 129019 MB
node 5 free: 128066 MB
node 6 cpus: 60-69,380-389
node 6 size: 129019 MB
node 6 free: 128065 MB
node 7 cpus: 70-79,390-399
node 7 size: 129019 MB
node 7 free: 128036 MB
node 8 cpus: 80-89,400-409
node 8 size: 129019 MB
node 8 free: 127983 MB
node 9 cpus: 90-99,410-419
node 9 size: 129019 MB
node 9 free: 127967 MB
node 10 cpus: 100-109,420-429
node 10 size: 129019 MB
node 10 free: 128028 MB
node 11 cpus: 110-119,430-439
node 11 size: 128980 MB
node 11 free: 128048 MB
node 12 cpus: 120-129,440-449
node 12 size: 129019 MB
node 12 free: 128035 MB
node 13 cpus: 130-139,450-459
node 13 size: 129019 MB
node 13 free: 128086 MB
node 14 cpus: 140-149,460-469
node 14 size: 129019 MB
node 14 free: 128089 MB
node 15 cpus: 150-159,470-479
node 15 size: 129019 MB
node 15 free: 128083 MB
node 16 cpus: 160-169,480-489
node 16 size: 129019 MB
node 16 free: 128087 MB
node 17 cpus: 170-179,490-499
node 17 size: 129019 MB
node 17 free: 128102 MB
node 18 cpus: 180-189,500-509
node 18 size: 129019 MB
node 18 free: 128083 MB
node 19 cpus: 190-199,510-519
node 19 size: 129019 MB
node 19 free: 128084 MB
node 20 cpus: 200-209,520-529
node 20 size: 129019 MB

```

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Platform Notes (Continued)

```

node 20 free: 128083 MB
node 21 cpus: 210-219,530-539
node 21 size: 129019 MB
node 21 free: 128080 MB
node 22 cpus: 220-229,540-549
node 22 size: 129019 MB
node 22 free: 127981 MB
node 23 cpus: 230-239,550-559
node 23 size: 129019 MB
node 23 free: 128081 MB
node 24 cpus: 240-249,560-569
node 24 size: 129019 MB
node 24 free: 128096 MB
node 25 cpus: 250-259,570-579
node 25 size: 129019 MB
node 25 free: 128089 MB
node 26 cpus: 260-269,580-589
node 26 size: 129019 MB
node 26 free: 128092 MB
node 27 cpus: 270-279,590-599
node 27 size: 129019 MB
node 27 free: 127649 MB
node 28 cpus: 280-289,600-609
node 28 size: 129019 MB
node 28 free: 128058 MB
node 29 cpus: 290-299,610-619
node 29 size: 129019 MB
node 29 free: 128094 MB
node 30 cpus: 300-309,620-629
node 30 size: 129019 MB
node 30 free: 128084 MB
node 31 cpus: 310-319,630-639
node 31 size: 128994 MB
node 31 free: 128065 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31
0: 10 12 12 12 21 21 21 21 21 21 21 31 31 31 31 31 31 31 31 21 21 21 21 21
21 21 21 31 31 31 31
1: 12 10 12 12 21 21 21 21 21 21 21 31 31 31 31 31 31 31 31 21 21 21 21 21
21 21 21 31 31 31 31
2: 12 12 10 12 21 21 21 21 21 21 21 31 31 31 31 31 31 31 31 21 21 21 21 21
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6: 21 21 21 21 12 12 10 12 31 31 31 31 21 21 21 21 21 21 21 31 31 31 31 31
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9: 21 21 21 21 31 31 31 31 31 12 10 12 12 21 21 21 21 21 21 31 31 31 31 31
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11: 21 21 21 21 31 31 31 31 12 12 12 10 21 21 21 21 21 21 31 31 31 31 31

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```

31 31 31 21 21 21 21
12: 31 31 31 31 31 21 21 21 21 21 21 21 10 12 12 12 31 31 31 31 21 21 21 21 21
21 21 21 31 31 31 31
13: 31 31 31 31 21 21 21 21 21 21 21 12 10 12 12 31 31 31 31 21 21 21 21 21
21 21 21 31 31 31 31
14: 31 31 31 31 21 21 21 21 21 21 21 12 12 10 12 31 31 31 31 21 21 21 21 21
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15: 31 31 31 31 21 21 21 21 21 21 21 12 12 12 10 31 31 31 31 21 21 21 21 21
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16: 31 31 31 31 31 21 21 21 21 21 21 31 31 31 31 10 12 12 12 21 21 21 21 21
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17: 31 31 31 31 21 21 21 21 21 21 31 31 31 31 12 10 12 12 21 21 21 21 21
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18: 31 31 31 31 21 21 21 21 21 21 31 31 31 31 12 12 10 12 21 21 21 21 21
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19: 31 31 31 31 21 21 21 21 21 21 31 31 31 31 12 12 12 10 21 21 21 21 21
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20: 21 21 21 21 31 31 31 31 31 31 31 21 21 21 21 21 21 21 10 12 12 12 31
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23: 21 21 21 21 31 31 31 31 31 31 21 21 21 21 21 21 21 12 12 12 10 31
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24: 21 21 21 21 31 31 31 31 31 31 21 21 21 21 21 21 21 31 31 31 31 10
12 12 12 21 21 21
25: 21 21 21 21 31 31 31 31 31 31 21 21 21 21 21 21 21 31 31 31 31 12
10 12 12 21 21 21
26: 21 21 21 21 31 31 31 31 31 31 21 21 21 21 21 21 21 31 31 31 31 12
12 10 12 21 21 21
27: 21 21 21 21 31 31 31 31 31 31 21 21 21 21 21 21 21 31 31 31 31 12
12 12 10 21 21 21
28: 31 31 31 31 21 21 21 21 21 21 31 31 31 31 31 31 31 21 21 21 21 21
21 21 21 10 12 12 12
29: 31 31 31 31 21 21 21 21 21 21 31 31 31 31 31 31 31 21 21 21 21 21
21 21 21 12 10 12 12
30: 31 31 31 31 21 21 21 21 21 21 31 31 31 31 31 31 31 21 21 21 21 21
21 21 21 12 10 12
31: 31 31 31 31 21 21 21 21 21 21 31 31 31 31 31 31 31 21 21 21 21 21
21 21 21 12 12 12 10

```

```

-----
9. /proc/meminfo
   MemTotal:      4226964416 kB

```

```

-----
10. who -r
    run-level 3 Dec 12 01:49

```

```

-----
11. Systemd service manager version: systemd 252 (252-13.e19_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

```

(Continued on next page)



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SPECrate®2017_fp_peak = Not Run

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Test Sponsor: Lenovo Global Technology

Hardware Availability: Oct-2023

Tested by: Lenovo Global Technology

Software Availability: Dec-2023

Platform Notes (Continued)

13. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond dbus-broker firewalld getty@ insights-client-boot irqbalance kdump low-memory-monitor mdmonitor microcode nis-domainname rhsmcertd rsyslog rtkit-daemon selinux-autorelabel-mark sshd sssd systemd-boot-update systemd-network-generator udisks2 upower
enabled-runtime	systemd-remount-fs
disabled	canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell dnf-system-upgrade kvm_stat man-db-restart-cache-update nftables pesign rdisc rhcd rhsm rhsm-facts rpmdb-rebuild selinux-check-proper-disable serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysex
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=(hd1,gpt2)/boot/vmlinuz-5.14.0-284.11.1.el9_2.x86_64
root=UUID=116409c2-57ac-4857-ace6-bb315b1769ff
ro
resume=UUID=075e4fda-52f2-4584-8323-c813820fb1bd

```

15. cpupower frequency-info

```

analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 3.80 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

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

```

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Software Availability: Dec-2023

Platform Notes (Continued)

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
-----
```

```
-----
19. 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)
-----
```

```
-----
20. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2023.2.3
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb4 xfs 371G 235G 136G 64% /home
-----
```

```
-----
21. /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR950 V3
Product Family: ThinkSystem
Serial: BLRSDV044
-----
```

```
-----
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:
41x SK Hynix HMC94AEBRA102N 64 GB 2 rank 4800
14x SK Hynix HMC94AEBRA109N 64 GB 2 rank 4800
9x SK Hynix HMC94AEBRA123N 64 GB 2 rank 4800
-----
```

```
-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: Lenovo
BIOS Version: EBE103M-1.10
BIOS Date: 10/10/2023
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 2023.2.3 Build x

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Software Availability: Dec-2023

Compiler Version Notes (Continued)

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=====
C++ | 508.namd_r(base) 510.parest_r(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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=====
C++, C | 511.povray_r(base) 526.blender_r(base)
=====

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=====
C++, C, Fortran | 507.cactuBSSN_r(base)
=====

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
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=====
Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
=====

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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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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

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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-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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