SPEC CPU®2017 Floating Point Rate Result

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Lenovo Global Technology

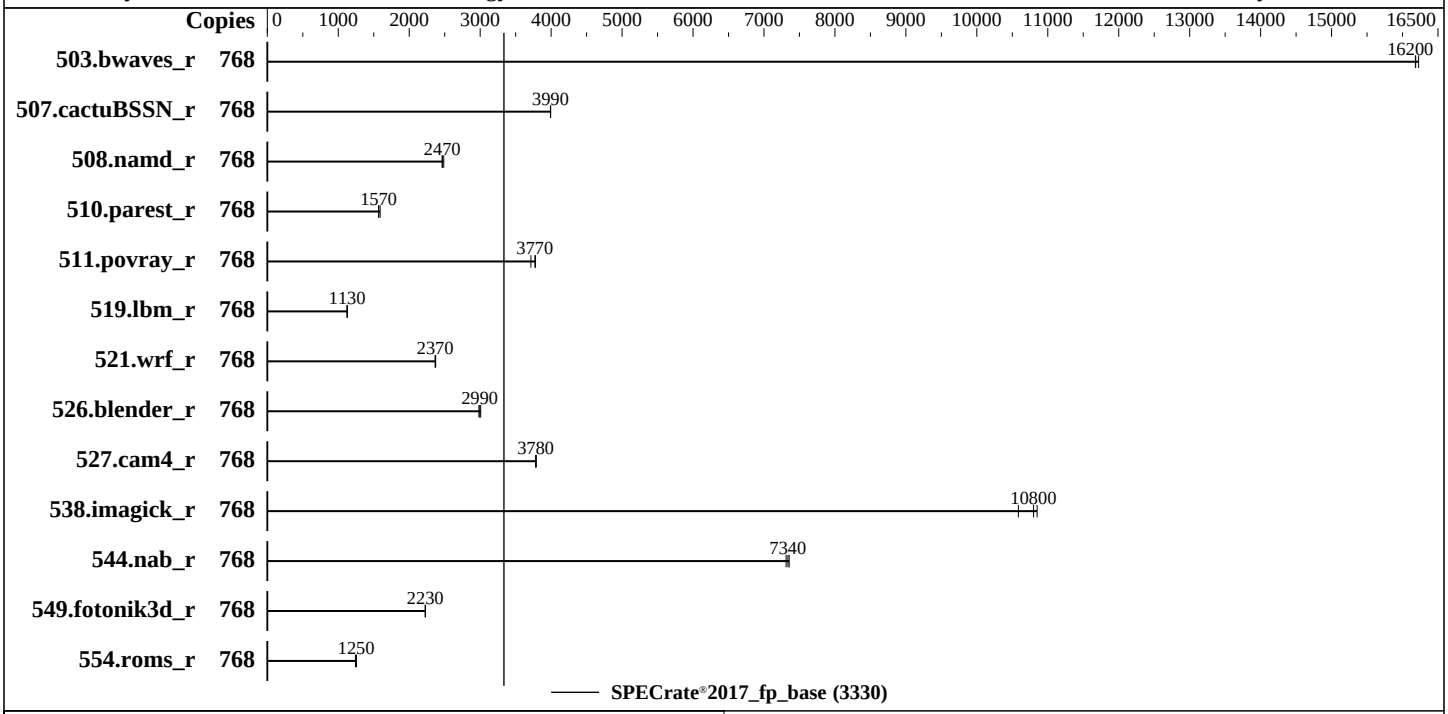
ThinkSystem SR950 V3
(2.10 GHz, Intel Xeon Platinum 8468H)

SPECrate®2017_fp_base = 3330

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 8468H
Max MHz:	3800
Nominal:	2100
Enabled:	384 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

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	768	476	16200	475	16200	**476**	**16200**							
507.cactuBSSN_r	768	244	3990	244	3990	**244**	**3990**							
508.namd_r	768	**296**	**2470**	293	2490	296	2460							
510.parest_r	768	1264	1590	1282	1570	**1279**	**1570**							
511.povray_r	768	**475**	**3770**	474	3780	483	3720							
519.lbm_r	768	**719**	**1130**	718	1130	720	1120							
521.wrf_r	768	**727**	**2370**	725	2370	727	2370							
526.blender_r	768	389	3010	392	2980	**391**	**2990**							
527.cam4_r	768	355	3780	354	3790	**355**	**3780**							
538.imagick_r	768	**177**	**10800**	176	10800	180	10600							
544.nab_r	768	177	7310	**176**	**7340**	176	7350							
549.fotonik3d_r	768	**1344**	**2230**	1343	2230	1344	2230							
554.roms_r	768	982	1240	**974**	**1250**	972	1260							

SPECrate®2017_fp_base = 3330

SPECrate®2017_fp_peak = Not Run

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 Mon Dec 11 08:13:50 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 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
    08:13:50 up  6:38,  1 user,  load average: 13.90, 341.11, 584.99
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
```

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Platform Notes (Continued)

```
  root     tty1      01:36    6:36m  1.30s  0.03s /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) 16511309
  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) 16511309
  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=768 -c
   ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=384 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=768 --configfile
   ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=384 --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/CPU2017.065/templogs/preenv.fprate.065.0.log --lognum 065.0 --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 8468H
    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       : 48
    siblings        : 96
    8 physical ids (chips)
    768 processors (hardware threads)
    physical id 0: core ids 0-47
    physical id 1: core ids 0-47
    physical id 2: core ids 0-47
```

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Platform Notes (Continued)

```
     physical id 3: core ids 0-47
     physical id 4: core ids 0-47
     physical id 5: core ids 0-47
     physical id 6: core ids 0-47
     physical id 7: core ids 0-47
     physical id 0: apicids 0-95
     physical id 1: apicids 128-223
     physical id 2: apicids 256-351
     physical id 3: apicids 384-479
     physical id 4: apicids 512-607
     physical id 5: apicids 640-735
     physical id 6: apicids 768-863
     physical id 7: apicids 896-991
   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):                          768
   On-line CPU(s) list:             0-767
   Vendor ID:                       GenuineIntel
   BIOS Vendor ID:                  Intel(R) Corporation
   Model name:                      Intel(R) Xeon(R) Platinum 8468H
   BIOS Model name:                 Intel(R) Xeon(R) Platinum 8468H
   CPU family:                      6
   Model:                           143
   Thread(s) per core:              2
   Core(s) per socket:              48
   Socket(s):                       8
   Stepping:                        8
   CPU max MHz:                     3800.0000
   CPU min MHz:                     800.0000
   BogoMIPS:                        4200.00
   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_l1d arch_capabilities
   Virtualization:                  VT-x
   L1d cache:                       18 MiB (384 instances)
   L1i cache:                       12 MiB (384 instances)
   L2 cache:                        768 MiB (384 instances)
```

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Platform Notes (Continued)

```
  L3 cache:                        840 MiB (8 instances)
  NUMA node(s):                    32
  NUMA node0 CPU(s):               0-11,384-395
  NUMA node1 CPU(s):               12-23,396-407
  NUMA node2 CPU(s):               24-35,408-419
  NUMA node3 CPU(s):               36-47,420-431
  NUMA node4 CPU(s):               48-59,432-443
  NUMA node5 CPU(s):               60-71,444-455
  NUMA node6 CPU(s):               72-83,456-467
  NUMA node7 CPU(s):               84-95,468-479
  NUMA node8 CPU(s):               96-107,480-491
  NUMA node9 CPU(s):               108-119,492-503
  NUMA node10 CPU(s):              120-131,504-515
  NUMA node11 CPU(s):              132-143,516-527
  NUMA node12 CPU(s):              144-155,528-539
  NUMA node13 CPU(s):              156-167,540-551
  NUMA node14 CPU(s):              168-179,552-563
  NUMA node15 CPU(s):              180-191,564-575
  NUMA node16 CPU(s):              192-203,576-587
  NUMA node17 CPU(s):              204-215,588-599
  NUMA node18 CPU(s):              216-227,600-611
  NUMA node19 CPU(s):              228-239,612-623
  NUMA node20 CPU(s):              240-251,624-635
  NUMA node21 CPU(s):              252-263,636-647
  NUMA node22 CPU(s):              264-275,648-659
  NUMA node23 CPU(s):              276-287,660-671
  NUMA node24 CPU(s):              288-299,672-683
  NUMA node25 CPU(s):              300-311,684-695
  NUMA node26 CPU(s):              312-323,696-707
  NUMA node27 CPU(s):              324-335,708-719
  NUMA node28 CPU(s):              336-347,720-731
  NUMA node29 CPU(s):              348-359,732-743
  NUMA node30 CPU(s):              360-371,744-755
  NUMA node31 CPU(s):              372-383,756-767
  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/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:        Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS SW
                                   sequence
  Vulnerability Srbds:             Not affected
  Vulnerability Tsx async abort:   Not affected

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL   SETS PHY-LINE COHERENCY-SIZE
     L1d       48K      18M   12 Data            1     64        1             64
     L1i       32K      12M    8 Instruction     1     64        1             64
     L2         2M     768M   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: 0-11,384-395
  node 0 size: 128355 MB
```

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Platform Notes (Continued)

```
node 0 free: 127054 MB
node 1 cpus: 12-23,396-407
node 1 size: 129018 MB
node 1 free: 127827 MB
node 2 cpus: 24-35,408-419
node 2 size: 129018 MB
node 2 free: 127857 MB
node 3 cpus: 36-47,420-431
node 3 size: 129018 MB
node 3 free: 127903 MB
node 4 cpus: 48-59,432-443
node 4 size: 129018 MB
node 4 free: 127899 MB
node 5 cpus: 60-71,444-455
node 5 size: 129018 MB
node 5 free: 127912 MB
node 6 cpus: 72-83,456-467
node 6 size: 129018 MB
node 6 free: 127876 MB
node 7 cpus: 84-95,468-479
node 7 size: 129018 MB
node 7 free: 127940 MB
node 8 cpus: 96-107,480-491
node 8 size: 129018 MB
node 8 free: 127847 MB
node 9 cpus: 108-119,492-503
node 9 size: 129018 MB
node 9 free: 127905 MB
node 10 cpus: 120-131,504-515
node 10 size: 129018 MB
node 10 free: 127793 MB
node 11 cpus: 132-143,516-527
node 11 size: 129018 MB
node 11 free: 127940 MB
node 12 cpus: 144-155,528-539
node 12 size: 129018 MB
node 12 free: 127838 MB
node 13 cpus: 156-167,540-551
node 13 size: 129018 MB
node 13 free: 127917 MB
node 14 cpus: 168-179,552-563
node 14 size: 129018 MB
node 14 free: 127917 MB
node 15 cpus: 180-191,564-575
node 15 size: 128979 MB
node 15 free: 127862 MB
node 16 cpus: 192-203,576-587
node 16 size: 129018 MB
node 16 free: 127889 MB
node 17 cpus: 204-215,588-599
node 17 size: 129018 MB
node 17 free: 127924 MB
node 18 cpus: 216-227,600-611
node 18 size: 129018 MB
node 18 free: 127910 MB
node 19 cpus: 228-239,612-623
node 19 size: 129018 MB
node 19 free: 127917 MB
node 20 cpus: 240-251,624-635
node 20 size: 129018 MB
```

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Platform Notes (Continued)

```
node 20 free: 127922 MB
node 21 cpus: 252-263,636-647
node 21 size: 129018 MB
node 21 free: 127851 MB
node 22 cpus: 264-275,648-659
node 22 size: 129018 MB
node 22 free: 127844 MB
node 23 cpus: 276-287,660-671
node 23 size: 129018 MB
node 23 free: 127912 MB
node 24 cpus: 288-299,672-683
node 24 size: 129018 MB
node 24 free: 127921 MB
node 25 cpus: 300-311,684-695
node 25 size: 129018 MB
node 25 free: 127916 MB
node 26 cpus: 312-323,696-707
node 26 size: 129018 MB
node 26 free: 127908 MB
node 27 cpus: 324-335,708-719
node 27 size: 129018 MB
node 27 free: 127421 MB
node 28 cpus: 336-347,720-731
node 28 size: 129018 MB
node 28 free: 127876 MB
node 29 cpus: 348-359,732-743
node 29 size: 129018 MB
node 29 free: 127931 MB
node 30 cpus: 360-371,744-755
node 30 size: 129018 MB
node 30 free: 127916 MB
node 31 cpus: 372-383,756-767
node 31 size: 128993 MB
node 31 free: 127901 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  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  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  21  31  31  31  31  31  31  31  31  21  21  21  21  21
  21  21  21  31  31  31  31
  3:  12  12  12  10  21  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
  4:  21  21  21  21  10  12  12  12  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
  31  31  31  21  21  21  21
  5:  21  21  21  21  12  10  12  12  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
  31  31  31  21  21  21  21
  6:  21  21  21  21  12  12  10  12  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
  31  31  31  21  21  21  21
  7:  21  21  21  21  12  12  12  10  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31
  31  31  31  21  21  21  21
  8:  21  21  21  21  31  31  31  31  10  12  12  12  21  21  21  21  21  21  21  21  31  31  31  31  31
  31  31  31  21  21  21  21
  9:  21  21  21  21  31  31  31  31  12  10  12  12  21  21  21  21  21  21  21  21  31  31  31  31  31
  31  31  31  21  21  21  21
 10:  21  21  21  21  31  31  31  31  12  12  10  12  21  21  21  21  21  21  21  21  31  31  31  31  31
 31  31  31  21  21  21  21
 11:  21  21  21  21  31  31  31  31  12  12  12  10  21  21  21  21  21  21  21  21  31  31  31  31  31
```

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Platform Notes (Continued)

```
    31  31  31  21  21  21  21
    12:  31  31  31  31  21  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  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  21  12  12  10  12  31  31  31  31  21  21  21  21  21
    21  21  21  31  31  31  31
    15:  31  31  31  31  21  21  21  21  21  21  21  21  12  12  12  10  31  31  31  31  21  21  21  21  21
    21  21  21  31  31  31  31
    16:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  10  12  12  12  21  21  21  21  21
    21  21  21  31  31  31  31
    17:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12  10  12  12  21  21  21  21  21
    21  21  21  31  31  31  31
    18:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12  12  10  12  21  21  21  21  21
    21  21  21  31  31  31  31
    19:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12  12  12  10  21  21  21  21  21
    21  21  21  31  31  31  31
    20:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  10  12  12  12  31
    31  31  31  21  21  21  21
    21:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  12  10  12  12  31
    31  31  31  21  21  21  21
    22:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  12  12  10  12  31
    31  31  31  21  21  21  21
    23:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  12  12  12  10  31
    31  31  31  21  21  21  21
    24:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  10
    12  12  12  21  21  21  21
    25:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12
    10  12  12  21  21  21  21
    26:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12
    12  10  12  21  21  21  21
    27:  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  12
    12  12  10  21  21  21  21
    28:  31  31  31  31  21  21  21  21  21  21  21  21  31  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  21  21  31  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  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
    21  21  21  12  12  10  12
    31:  31  31  31  31  21  21  21  21  21  21  21  21  31  31  31  31  31  31  31  31  21  21  21  21  21
    21  21  21  12  12  12  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       4226936204 kB

------------------------------------------------------------
10. who -r
  run-level 3 Dec 11 01:36

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

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

(Continued on next page)

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-sysext
  indirect         sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate
                   systemd-sysupdate-reboot

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(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+madvise [madvise] never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
```

(Continued on next page)

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 HMCG94AEBRA102N 64 GB 2 rank 4800
    14x SK Hynix HMCG94AEBRA109N 64 GB 2 rank 4800
    9x SK Hynix HMCG94AEBRA123N 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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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
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C          | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
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.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 507.cactuBSSN_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.
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         | 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.
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.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

(Continued on next page)

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

(Continued on next page)

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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