SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

ThinkSystem SR950 V3
(2.00 GHz, Intel Xeon Platinum 8450H)

$SPECrate^{®}2017\_int\_base =$ 1800

$SPECrate^{®}2017\_int\_peak =$ Not Run

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

Test Date: Nov-2023
Hardware Availability: Oct-2023
Software Availability: Dec-2023

Benchmark	Copies	Result
500.perlbench_r	448	1350
502.gcc_r	448	1590
505.mcf_r	448	3010
520.omnetpp_r	448	1320
523.xalancbmk_r	448	2510
525.x264_r	448	3440
531.deepsjeng_r	448	1260
541.leela_r	448	1210
548.exchange2_r	448	3620
557.xz_r	448	896

Scale: 0 150 300 450 600 750 900 1100 1300 1500 1700 1900 2100 2300 2500 2700 2900 3100 3300 3650

SPECrate®2017_int_base (1800)

Hardware

CPU Name: Intel Xeon Platinum 8450H
 Max MHz: 3500
 Nominal: 2000
Enabled: 224 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: 75 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: None
Power Management: BIOS and OS set to prefer performance at the cost
 of additional power usage

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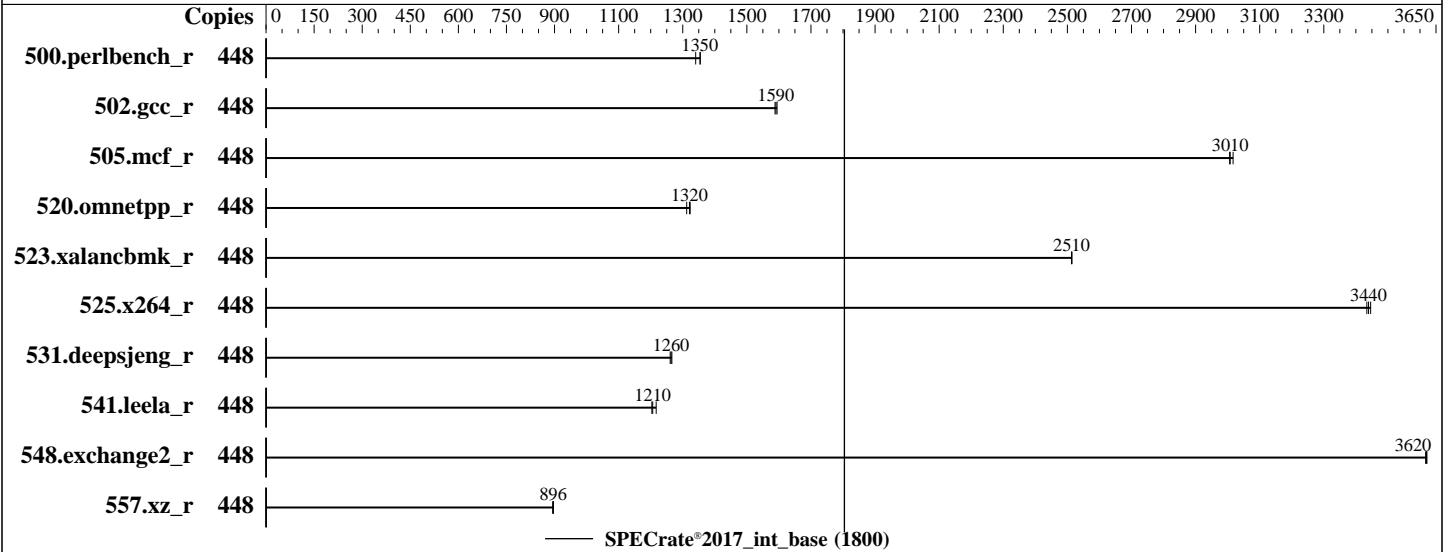
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	448	526	1350	**527**	**1350**	532	1340							
502.gcc_r	448	400	1590	398	1590	**399**	**1590**							
505.mcf_r	448	241	3010	**241**	**3010**	240	3020							
520.omnetpp_r	448	444	1320	448	1310	**445**	**1320**							
523.xalancbmk_r	448	**188**	**2510**	188	2510	188	2510							
525.x264_r	448	**228**	**3440**	228	3430	228	3450							
531.deepsjeng_r	448	406	1270	407	1260	**406**	**1260**							
541.leela_r	448	616	1200	610	1220	**615**	**1210**							
548.exchange2_r	448	**324**	**3620**	324	3620	324	3620							
557.xz_r	448	541	894	**540**	**896**	540	896							

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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
C-States set to Legacy
SNC set to SNC4
LLC Prefetch set to Disabled

 Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Thu Nov 23 09:37:56 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. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
 ------------------------------------------------------------

 ------------------------------------------------------------
 1. uname -a
   Linux localhost.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
    09:37:57 up  3:35,  1 user,  load average: 249.82, 396.11, 425.70
    USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1       06:07    3:27m  1.16s  0.03s /bin/bash ./speccpu_rock.sh

 ------------------------------------------------------------
 3. Username
   From environment variable $USER:  root
```

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Platform Notes (Continued)

```
    -----------------------------------------------------------
 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) 16512103
    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) 16512103
    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=448 -c
      ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=224 --define physicalfirst
      --define invoke_with_interleave --define drop_caches --tune base -o all intrate
    runcpu --nobuild --action validate --define default-platform-flags --define numcopies=448 --configfile
      ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=224 --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/CPU2017.003/templogs/preenv.intrate.003.0.log --lognum 003.0 --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 8450H
    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       : 28
    siblings        : 56
    8 physical ids (chips)
    448 processors (hardware threads)
    physical id 0: core ids 0-27
    physical id 1: core ids 0-27
    physical id 2: core ids 0-27
    physical id 3: core ids 0-27
    physical id 4: core ids 0-27
    physical id 5: core ids 0-27
    physical id 6: core ids 0-27
    physical id 7: core ids 0-27
    physical id 0: apicids 0-55
```

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Platform Notes (Continued)

```
       physical id 1: apicids 128-183
       physical id 2: apicids 256-311
       physical id 3: apicids 384-439
       physical id 4: apicids 512-567
       physical id 5: apicids 640-695
       physical id 6: apicids 768-823
       physical id 7: apicids 896-951
   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):                 448
     On-line CPU(s) list:    0-447
     Vendor ID:              GenuineIntel
     BIOS Vendor ID:         Intel(R) Corporation
     Model name:             Intel(R) Xeon(R) Platinum 8450H
     BIOS Model name:        Intel(R) Xeon(R) Platinum 8450H
     CPU family:             6
     Model:                  143
     Thread(s) per core:     2
     Core(s) per socket:     28
     Socket(s):              8
     Stepping:               8
     CPU max MHz:            3500.0000
     CPU min MHz:            800.0000
     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 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 hfi 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:              10.5 MiB (224 instances)
     L1i cache:              7 MiB (224 instances)
     L2 cache:               448 MiB (224 instances)
     L3 cache:               600 MiB (8 instances)
     NUMA node(s):           32
     NUMA node0 CPU(s):      0-6,224-230
     NUMA node1 CPU(s):      7-13,231-237
     NUMA node2 CPU(s):      14-20,238-244
```

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Platform Notes (Continued)

```
  NUMA node3 CPU(s):              21-27,245-251
  NUMA node4 CPU(s):              28-34,252-258
  NUMA node5 CPU(s):              35-41,259-265
  NUMA node6 CPU(s):              42-48,266-272
  NUMA node7 CPU(s):              49-55,273-279
  NUMA node8 CPU(s):              56-62,280-286
  NUMA node9 CPU(s):              63-69,287-293
  NUMA node10 CPU(s):             70-76,294-300
  NUMA node11 CPU(s):             77-83,301-307
  NUMA node12 CPU(s):             84-90,308-314
  NUMA node13 CPU(s):             91-97,315-321
  NUMA node14 CPU(s):             98-104,322-328
  NUMA node15 CPU(s):             105-111,329-335
  NUMA node16 CPU(s):             112-118,336-342
  NUMA node17 CPU(s):             119-125,343-349
  NUMA node18 CPU(s):             126-132,350-356
  NUMA node19 CPU(s):             133-139,357-363
  NUMA node20 CPU(s):             140-146,364-370
  NUMA node21 CPU(s):             147-153,371-377
  NUMA node22 CPU(s):             154-160,378-384
  NUMA node23 CPU(s):             161-167,385-391
  NUMA node24 CPU(s):             168-174,392-398
  NUMA node25 CPU(s):             175-181,399-405
  NUMA node26 CPU(s):             182-188,406-412
  NUMA node27 CPU(s):             189-195,413-419
  NUMA node28 CPU(s):             196-202,420-426
  NUMA node29 CPU(s):             203-209,427-433
  NUMA node30 CPU(s):             210-216,434-440
  NUMA node31 CPU(s):             217-223,441-447
  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    10.5M   12 Data            1    64      1           64
      L1i      32K      7M     8 Instruction     1    64      1           64
      L2        2M     448M   16 Unified         2  2048      1           64
      L3       75M     600M   15 Unified         3 81920      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: 0-6,224-230
    node 0 size: 128485 MB
    node 0 free: 127625 MB
    node 1 cpus: 7-13,231-237
    node 1 size: 129020 MB
    node 1 free: 128277 MB
    node 2 cpus: 14-20,238-244
```

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Platform Notes (Continued)

```
    node 2 size: 129020 MB
    node 2 free: 128275 MB
    node 3 cpus: 21-27,245-251
    node 3 size: 129020 MB
    node 3 free: 128288 MB
    node 4 cpus: 28-34,252-258
    node 4 size: 129020 MB
    node 4 free: 128287 MB
    node 5 cpus: 35-41,259-265
    node 5 size: 129020 MB
    node 5 free: 128274 MB
    node 6 cpus: 42-48,266-272
    node 6 size: 129020 MB
    node 6 free: 128255 MB
    node 7 cpus: 49-55,273-279
    node 7 size: 129020 MB
    node 7 free: 128299 MB
    node 8 cpus: 56-62,280-286
    node 8 size: 129020 MB
    node 8 free: 128224 MB
    node 9 cpus: 63-69,287-293
    node 9 size: 129020 MB
    node 9 free: 128256 MB
    node 10 cpus: 70-76,294-300
    node 10 size: 129020 MB
    node 10 free: 128262 MB
    node 11 cpus: 77-83,301-307
    node 11 size: 129020 MB
    node 11 free: 128292 MB
    node 12 cpus: 84-90,308-314
    node 12 size: 129020 MB
    node 12 free: 128239 MB
    node 13 cpus: 91-97,315-321
    node 13 size: 129020 MB
    node 13 free: 128323 MB
    node 14 cpus: 98-104,322-328
    node 14 size: 129020 MB
    node 14 free: 128318 MB
    node 15 cpus: 105-111,329-335
    node 15 size: 129020 MB
    node 15 free: 128330 MB
    node 16 cpus: 112-118,336-342
    node 16 size: 129020 MB
    node 16 free: 128311 MB
    node 17 cpus: 119-125,343-349
    node 17 size: 129020 MB
    node 17 free: 128320 MB
    node 18 cpus: 126-132,350-356
    node 18 size: 129020 MB
    node 18 free: 128327 MB
    node 19 cpus: 133-139,357-363
    node 19 size: 129020 MB
    node 19 free: 128325 MB
    node 20 cpus: 140-146,364-370
    node 20 size: 129020 MB
    node 20 free: 128324 MB
    node 21 cpus: 147-153,371-377
    node 21 size: 129020 MB
    node 21 free: 128313 MB
    node 22 cpus: 154-160,378-384
```

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Platform Notes (Continued)

```
      node 22 size: 129020 MB
      node 22 free: 128294 MB
      node 23 cpus: 161-167,385-391
      node 23 size: 129020 MB
      node 23 free: 128321 MB
      node 24 cpus: 168-174,392-398
      node 24 size: 129020 MB
      node 24 free: 128285 MB
      node 25 cpus: 175-181,399-405
      node 25 size: 129020 MB
      node 25 free: 128312 MB
      node 26 cpus: 182-188,406-412
      node 26 size: 128981 MB
      node 26 free: 128263 MB
      node 27 cpus: 189-195,413-419
      node 27 size: 129020 MB
      node 27 free: 127836 MB
      node 28 cpus: 196-202,420-426
      node 28 size: 129020 MB
      node 28 free: 128301 MB
      node 29 cpus: 203-209,427-433
      node 29 size: 129020 MB
      node 29 free: 128324 MB
      node 30 cpus: 210-216,434-440
      node 30 size: 129020 MB
      node 30 free: 128287 MB
      node 31 cpus: 217-223,441-447
      node 31 size: 128997 MB
      node 31 free: 128298 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
        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
```

Lenovo Global Technology

SPECrate®2017_int_base = 1800

ThinkSystem SR950 V3
(2.00 GHz, Intel Xeon Platinum 8450H)

SPECrate®2017_int_peak = Not Run

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

Test Date: Nov-2023
Hardware Availability: Oct-2023
Software Availability: Dec-2023

Platform Notes (Continued)

```
   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:       4227139356 kB


   -----------------------------------------------------------
10. who -r
   run-level 3 Nov 23 06:03


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


   -----------------------------------------------------------
12. 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
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR950 V3
(2.00 GHz, Intel Xeon Platinum 8450H)

SPECrate®2017_int_base =   1800

SPECrate®2017_int_peak = Not Run

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Nov-2023

Hardware Availability: Oct-2023

Software Availability: Dec-2023

Platform Notes (Continued)

```
                      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

  ------------------------------------------------------------
13. 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

  ------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 800 MHz and 3.50 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
       Active: yes

  ------------------------------------------------------------
15. sysctl
   kernel.numa_balancing            1
   kernel.randomize_va_space        2
   vm.compaction_proactiveness     20
   vm.dirty_background_bytes        0
   vm.dirty_background_ratio       10
   vm.dirty_bytes                   0
   vm.dirty_expire_centisecs     3000
   vm.dirty_ratio                  20
   vm.dirty_writeback_centisecs   500
   vm.dirtytime_expire_seconds  43200
   vm.extfrag_threshold           500
   vm.min_unmapped_ratio            1
   vm.nr_hugepages                  0
   vm.nr_hugepages_mempolicy        0
   vm.nr_overcommit_hugepages       0
   vm.swappiness                   60
   vm.watermark_boost_factor    15000
   vm.watermark_scale_factor       10
   vm.zone_reclaim_mode             0

  ------------------------------------------------------------
16. /sys/kernel/mm/transparent_hugepage
   defrag         always defer defer+madvise [madvise] never
   enabled        [always] madvise never
   hpage_pmd_size 2097152
   shmem_enabled  always within_size advise [never] deny force

  ------------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleep_millisecs   60000
   defrag                      1
   max_ptes_none             511
   max_ptes_shared           256
   max_ptes_swap              64
   pages_to_scan            4096
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR950 V3
(2.00 GHz, Intel Xeon Platinum 8450H)

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

Test Date: Nov-2023
Hardware Availability: Oct-2023
Software Availability: Dec-2023

Platform Notes (Continued)

```
   scan_sleep_millisecs    10000


    ----------------------------------------------------------
 18. 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)


    ----------------------------------------------------------
 19. 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  137G  64% /home


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


    ----------------------------------------------------------
 21. 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



    ----------------------------------------------------------
 22. 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      | 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.
------------------------------------------------------------------------------


==============================================================================
C++    | 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.
------------------------------------------------------------------------------
```

(Continued on next page)

SPEC CPU®2017 Integer Rate Result

Lenovo Global Technology

ThinkSystem SR950 V3
(2.00 GHz, Intel Xeon Platinum 8450H)

SPECrate®2017_int_base =   1800

SPECrate®2017_int_peak = Not Run

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

Test Date: Nov-2023
Hardware Availability: Oct-2023
Software Availability: Dec-2023

Compiler Version Notes (Continued)

```
==============================================================================
Fortran | 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.
------------------------------------------------------------------------------
```

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`

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR950 V3
(2.00 GHz, Intel Xeon Platinum 8450H)

SPECrate®2017_int_base =   1800

SPECrate®2017_int_peak = Not Run

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

Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-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
```

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

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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