



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR950 V3

(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 3060

SPECrate®2017_fp_energy_base = 1020

SPECrate®2017_fp_peak = Not Run

SPECrate®2017_fp_energy_peak = Not Run

CPU2017 License: 9017

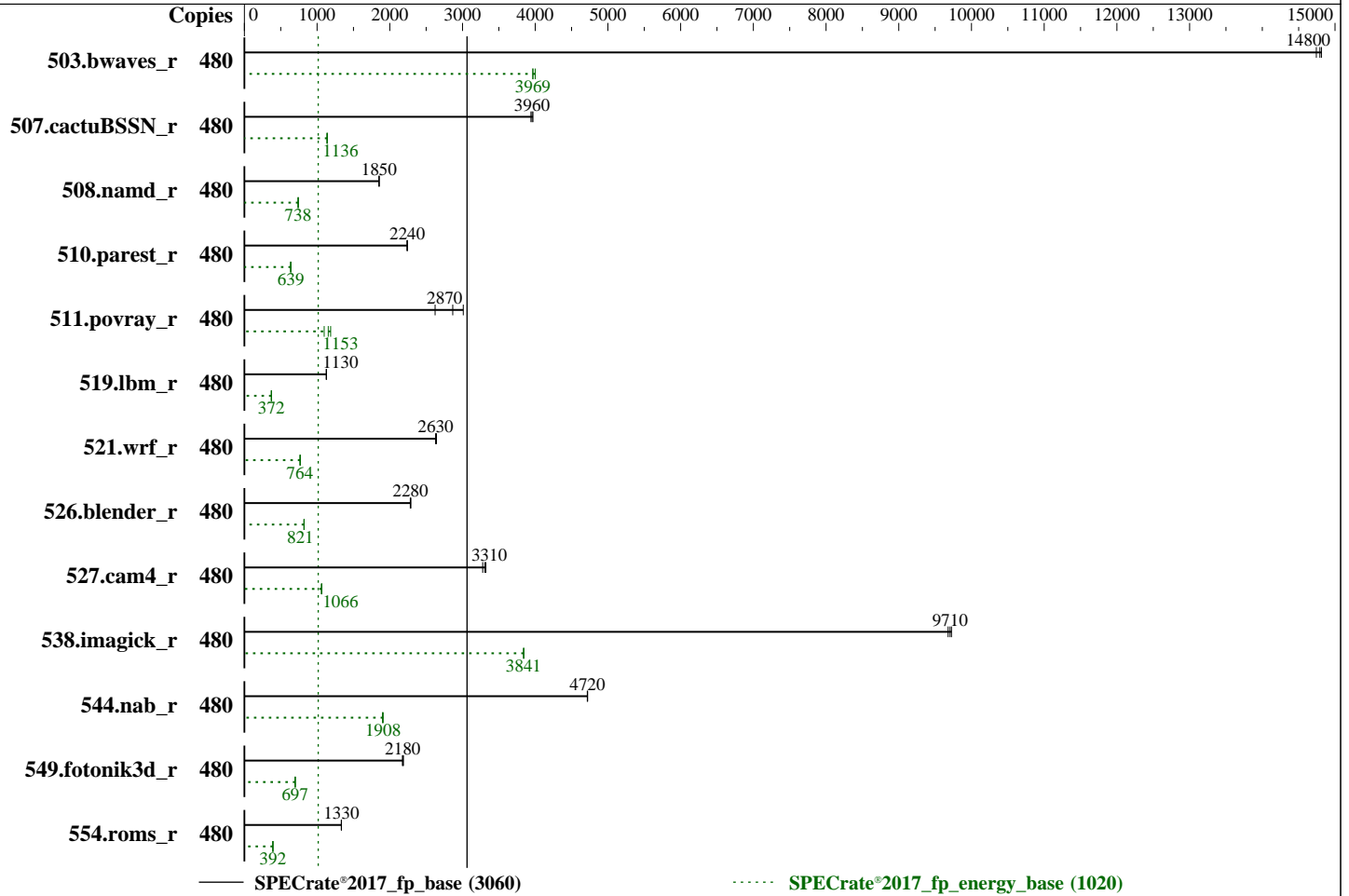
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Aug-2024

Hardware Availability: Oct-2023

Software Availability: Jun-2024



Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
 Enabled: 480 cores, 8 chips
 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: 112.5 MB I+D on chip per chip
 Other: None
 Memory: 4 TB (64 x 64 GB 2Rx4 PC5-4800B-R)
 Storage: 1 x 960GB M.2 NVMe SSD
 Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 Kernel 5.14.21-150500.53-default
 Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;
 Parallel: No
 Firmware: Lenovo BIOS Version EBE107H 2.20 released Jun-2024
 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 set to balance power and performance



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Power

Max. Power (W): 4322.9
Idle Power (W): 1488.0
Min. Temperature (C): 21.94
Elevation (m): 43
Line Standard: 220 V / 50 Hz / 1 phase / 3 wires
Provisioning: Line-powered

Power Settings

Management FW: Version 3.10 of EBX307I
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 8 x 1800 W (redundant)
Details: ThinkSystem V3 1800W 230V Titanium Power Supply 4P57A78359
Backplane: Embedded M.2 drive
Other Storage: None
Storage Model #s: 4XB7A13999
NICs Installed: 1 x ThinkSystem Ethernet 4-port Adaptor @ 10 / 25 Gb
NICs Enabled (FW/OS): 4 / 1
NICs Connected/Speed: 1 @ 10 Gb
Other HW Model #s: 24 x simple-swap dual-rotor 60 mm fan

Power Analyzer #1

Power Analyzer: WIN1:9888
Hardware Vendor: YOKOGAWA, Inc.
Model: YokogawaWT310E
Serial Number: C3SH31009E
Input Connection: Default
Metrology Institute: CNAS
Calibration By: GRG METROLOGY & TEST (BEIJING) CO., LTD.
Calibration Label: J202308266858A-0007
Calibration Date: 16-Oct-2023
PTDaemon® Version: 1.10.0 (82175bac; 2022-08-17)
Setup Description: Connected to PSU1
Current Ranges Used: 20A
Voltage Range Used: 300V

Power Analyzer #2

Power Analyzer: WIN:9888
Hardware Vendor: YOKOGAWA, Inc.
Model: YokogawaWT310E
Serial Number: C3UG05013E
Input Connection: Default
Metrology Institute: CNAS
Calibration By: GRG METROLOGY & TEST (BEIJING) CO., LTD.
Calibration Label: J202308266858A-0004
Calibration Date: 16-Oct-2023
PTDaemon Version: 1.10.0 (82175bac; 2022-08-17)
Setup Description: Connected to PSU1
Current Ranges Used: 20A
Voltage Range Used: 300V

Temperature Meter #1

Temperature Meter: WIN1:9889
Hardware Vendor: Digi International, Inc.
Model: DigiWATCHPORT_H
Serial Number: W63074362
Input Connection: USB
PTDaemon Version: 1.10.0 (82175bac; 2022-08-17)
Setup Description: 50 mm in front of SUT main intake

Temperature Meter #2

Temperature Meter: WIN:9889
Hardware Vendor: Digi International, Inc.
Model: DigiWATCHPORT_H
Serial Number: W63181846
Input Connection: USB
PTDaemon Version: 1.10.0 (82175bac; 2022-08-17)
Setup Description: 50 mm in front of SUT main intake

Base Results Table

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
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Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



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Base Results Table (Continued)

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
503.bwaves_r	480	326	14700	1310	4000	4020	4160	325	14800	1320	3970	4060	4190	325	14800	1320	3970	4070	4200
507.cactuBSSN_r	480	154	3940	585	1140	3800	3910	154	3960	588	1140	3830	3940	153	3970	587	1140	3830	3940
508.namd_r	480	246	1850	670	742	2720	2840	246	1850	673	738	2730	2870	246	1850	673	739	2730	2870
510.parest_r	480	560	2240	2140	639	3810	4320	560	2240	2140	637	3830	4320	562	2240	2150	636	3820	4320
511.povray_r	480	391	2870	1050	1150	2700	2830	372	3010	1030	1190	2750	2830	427	2620	1110	1100	2590	2840
519.lbm_r	480	448	1130	1540	372	3440	3490	448	1130	1550	372	3450	3500	449	1130	1550	371	3450	3510
521.wrf_r	480	407	2640	1530	769	3750	3810	409	2630	1530	767	3750	3820	408	2630	1540	764	3760	3830
526.blender_r	480	320	2280	964	821	3010	3610	319	2290	964	822	3020	3600	320	2280	967	819	3020	3630
527.cam4_r	480	254	3310	858	1070	3380	3540	253	3320	858	1070	3390	3580	256	3280	865	1060	3380	3550
538.imagick_r	480	123	9710	337	3840	2740	3320	123	9680	337	3840	2730	3320	123	9720	336	3840	2740	3320
544.nab_r	480	171	4720	461	1900	2690	2990	171	4720	459	1910	2680	2980	171	4720	460	1900	2690	2980
549.fotonik3d_r	480	855	2190	2970	701	3480	3520	860	2170	2980	699	3470	3530	858	2180	2990	697	3480	3530
554.roms_r	480	572	1330	2140	392	3750	3850	571	1340	2150	392	3760	3870	571	1330	2150	392	3760	3880

SPECrate®2017_fp_base = 3060

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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-ic2024.1/lib/intel64:/home/cpu2017-1.1.9-ic2024.1/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.
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.

(Continued on next page)



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General Notes (Continued)

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 Efficiency - Favor Power and then set it to Custom Mode
Memory Speed set to Maximum Performance
Optimized Power Mode set to Enable
Hyper-Threading set to Disabled
SNC set to SNC4

Sysinfo program /home/cpu2017-1.1.9-ic2024.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on SR950V3 Thu Aug 8 14:36:47 2024

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

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1. uname -a
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5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
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9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
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 SR950V3 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
x86_64 x86_64 x86_64 GNU/Linux

2. w
14:36:47 up 2 min, 1 user, load average: 0.62, 0.55, 0.23
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT

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Platform Notes (Continued)

```
root      tty1      -              14:35   44.00s   2.12s   0.08s sh
Run513-compliant-ic2024.1-lin-sapphirerapids-ratefp-base-smt-off-20240308.sh
```

3. Username

From environment variable \$USER: root

4. ulimit -a

```
core file size          (blocks, -c) unlimited
data seg size           (kbytes, -d) unlimited
scheduling priority     (-e) 0
file size               (blocks, -f) unlimited
pending signals         (-i) 16512622
max locked memory       (kbytes, -l) unlimited
max memory size         (kbytes, -m) unlimited
open files              (-n) 1024000
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) 16512622
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
/bin/bash ./run_SR950V3.sh
sh Run513-compliant-ic2024.1-lin-sapphirerapids-ratefp-base-smt-off-20240308.sh
runcpu --power --nobuild --action validate --define default-platform-flags --define numcopies=480 --c
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define cores=480 --define physicalfirst --define
invoke_with_interleave --define drop_caches --tune base -o all fprate
runcpu --power --nobuild --action validate --define default-platform-flags --define numcopies=480
--configfile ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define cores=480 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base --output_format all --runmode rate --tune
base --size refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.045/templogs/preenv.fprate.045.0.log --lognum 045.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2024.1
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) Platinum 8490H
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b0005d1
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores      : 60
siblings       : 60
8 physical ids (chips)
480 processors (hardware threads)
```

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Platform Notes (Continued)

```

physical id 0: core ids 0-59
physical id 1: core ids 0-59
physical id 2: core ids 0-59
physical id 3: core ids 0-59
physical id 4: core ids 0-59
physical id 5: core ids 0-59
physical id 6: core ids 0-59
physical id 7: core ids 0-59
physical id 0: apicids
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118
physical id 1: apicids
128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
80,182,184,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222,224,226,228,230,23
2,234,236,238,240,242,244,246
physical id 2: apicids
256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,3
08,310,312,314,316,318,320,322,324,326,328,330,332,334,336,338,340,342,344,346,348,350,352,354,356,358,36
0,362,364,366,368,370,372,374
physical id 3: apicids
384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418,420,422,424,426,428,430,432,434,4
36,438,440,442,444,446,448,450,452,454,456,458,460,462,464,466,468,470,472,474,476,478,480,482,484,486,48
8,490,492,494,496,498,500,502
physical id 4: apicids
512,514,516,518,520,522,524,526,528,530,532,534,536,538,540,542,544,546,548,550,552,554,556,558,560,562,5
64,566,568,570,572,574,576,578,580,582,584,586,588,590,592,594,596,598,600,602,604,606,608,610,612,614,61
6,618,620,622,624,626,628,630
physical id 5: apicids
640,642,644,646,648,650,652,654,656,658,660,662,664,666,668,670,672,674,676,678,680,682,684,686,688,690,6
92,694,696,698,700,702,704,706,708,710,712,714,716,718,720,722,724,726,728,730,732,734,736,738,740,742,74
4,746,748,750,752,754,756,758
physical id 6: apicids
768,770,772,774,776,778,780,782,784,786,788,790,792,794,796,798,800,802,804,806,808,810,812,814,816,818,8
20,822,824,826,828,830,832,834,836,838,840,842,844,846,848,850,852,854,856,858,860,862,864,866,868,870,87
2,874,876,878,880,882,884,886
physical id 7: apicids
896,898,900,902,904,906,908,910,912,914,916,918,920,922,924,926,928,930,932,934,936,938,940,942,944,946,9
48,950,952,954,956,958,960,962,964,966,968,970,972,974,976,978,980,982,984,986,988,990,992,994,996,998,10
00,1002,1004,1006,1008,1010,1012,1014

```

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):                 480
On-line CPU(s) list:   0-479
Vendor ID:              GenuineIntel
Model name:             Intel(R) Xeon(R) Platinum 8490H
CPU family:             6
Model:                  143
Thread(s) per core:    1

```

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Platform Notes (Continued)

```

Core(s) per socket:      60
Socket(s):              8
Stepping:              8
BogoMIPS:              3800.00
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 hle
                        avx2 smep bmi2 erms invpcid rtm 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 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 avx512_fp16 amx_tile flush_l1d arch_capabilities
Virtualization:        VT-x
L1d cache:            22.5 MiB (480 instances)
L1i cache:            15 MiB (480 instances)
L2 cache:             960 MiB (480 instances)
L3 cache:             900 MiB (8 instances)
NUMA node(s):        32
NUMA node0 CPU(s):   0-14
NUMA node1 CPU(s):   15-29
NUMA node2 CPU(s):   30-44
NUMA node3 CPU(s):   45-59
NUMA node4 CPU(s):   60-74
NUMA node5 CPU(s):   75-89
NUMA node6 CPU(s):   90-104
NUMA node7 CPU(s):   105-119
NUMA node8 CPU(s):   120-134
NUMA node9 CPU(s):   135-149
NUMA node10 CPU(s):  150-164
NUMA node11 CPU(s):  165-179
NUMA node12 CPU(s):  180-194
NUMA node13 CPU(s):  195-209
NUMA node14 CPU(s):  210-224
NUMA node15 CPU(s):  225-239
NUMA node16 CPU(s):  240-254
NUMA node17 CPU(s):  255-269
NUMA node18 CPU(s):  270-284
NUMA node19 CPU(s):  285-299
NUMA node20 CPU(s):  300-314
NUMA node21 CPU(s):  315-329
NUMA node22 CPU(s):  330-344
NUMA node23 CPU(s):  345-359
NUMA node24 CPU(s):  360-374
NUMA node25 CPU(s):  375-389
NUMA node26 CPU(s):  390-404
NUMA node27 CPU(s):  405-419
NUMA node28 CPU(s):  420-434
NUMA node29 CPU(s):  435-449

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Platform Notes (Continued)

```

NUMA node30 CPU(s):          450-464
NUMA node31 CPU(s):          465-479
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf:          Not affected
Vulnerability Mds:           Not affected
Vulnerability Meltdown:     Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed:     Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1:    Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:    Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRBS-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	22.5M	12	Data	1	64	1	64
L1i	32K	15M	8	Instruction	1	64	1	64
L2	2M	960M	16	Unified	2	2048	1	64
L3	112.5M	900M	15	Unified	3	122880	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: 0-14
node 0 size: 128674 MB
node 0 free: 128118 MB
node 1 cpus: 15-29
node 1 size: 129020 MB
node 1 free: 128586 MB
node 2 cpus: 30-44
node 2 size: 129020 MB
node 2 free: 128637 MB
node 3 cpus: 45-59
node 3 size: 129020 MB
node 3 free: 128690 MB
node 4 cpus: 60-74
node 4 size: 129020 MB
node 4 free: 128615 MB
node 5 cpus: 75-89
node 5 size: 129020 MB
node 5 free: 128726 MB
node 6 cpus: 90-104
node 6 size: 129020 MB
node 6 free: 128461 MB
node 7 cpus: 105-119
node 7 size: 129020 MB
node 7 free: 128638 MB
node 8 cpus: 120-134
node 8 size: 129020 MB
node 8 free: 128829 MB
node 9 cpus: 135-149
node 9 size: 128985 MB
node 9 free: 128795 MB
node 10 cpus: 150-164

```

(Continued on next page)



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CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Aug-2024

Hardware Availability: Oct-2023

Software Availability: Jun-2024

Platform Notes (Continued)

```

node 10 size: 129020 MB
node 10 free: 128822 MB
node 11 cpus: 165-179
node 11 size: 129020 MB
node 11 free: 128823 MB
node 12 cpus: 180-194
node 12 size: 129020 MB
node 12 free: 128615 MB
node 13 cpus: 195-209
node 13 size: 129020 MB
node 13 free: 128636 MB
node 14 cpus: 210-224
node 14 size: 129020 MB
node 14 free: 128501 MB
node 15 cpus: 225-239
node 15 size: 129020 MB
node 15 free: 128556 MB
node 16 cpus: 240-254
node 16 size: 129020 MB
node 16 free: 128676 MB
node 17 cpus: 255-269
node 17 size: 129020 MB
node 17 free: 128622 MB
node 18 cpus: 270-284
node 18 size: 129020 MB
node 18 free: 128608 MB
node 19 cpus: 285-299
node 19 size: 129020 MB
node 19 free: 128667 MB
node 20 cpus: 300-314
node 20 size: 129020 MB
node 20 free: 128676 MB
node 21 cpus: 315-329
node 21 size: 129020 MB
node 21 free: 128847 MB
node 22 cpus: 330-344
node 22 size: 129020 MB
node 22 free: 128800 MB
node 23 cpus: 345-359
node 23 size: 129020 MB
node 23 free: 128735 MB
node 24 cpus: 360-374
node 24 size: 129020 MB
node 24 free: 128787 MB
node 25 cpus: 375-389
node 25 size: 129020 MB
node 25 free: 128796 MB
node 26 cpus: 390-404
node 26 size: 129020 MB
node 26 free: 128784 MB
node 27 cpus: 405-419
node 27 size: 129020 MB
node 27 free: 128737 MB
node 28 cpus: 420-434
node 28 size: 129020 MB
node 28 free: 128622 MB
node 29 cpus: 435-449

```

(Continued on next page)



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Software Availability: Jun-2024

Platform Notes (Continued)

```

node 29 size: 129020 MB
node 29 free: 128610 MB
node 30 cpus: 450-464
node 30 size: 129020 MB
node 30 free: 128645 MB
node 31 cpus: 465-479
node 31 size: 128945 MB
node 31 free: 128564 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
21 21 21 31 31 31 31
3: 12 12 12 10 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 21 12 10 12 12 31 31 31 31 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 12 10 31 31 31 31 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 31 31 12 10 12 12 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 31 31 12 12 10 12 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 31 31 12 12 12 10 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
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

```

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Platform Notes (Continued)

```

23: 21 21 21 21 21 31 31 31 31 31 31 31 31 21 21 21 21 21 21 12 12 12 10 31
31 31 31 21 21 21 21
24: 21 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 21
25: 21 21 21 21 31 31 31 31 31 31 31 31 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 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 31 31 31 31 12
12 12 10 21 21 21 21
28: 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 10 12 12 12
29: 31 31 31 31 21 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 31 21 21 21 21 21
21 21 21 12 12 10 12
31: 31 31 31 31 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: 4227263496 kB

```

```

10. who -r
run-level 3 Aug 8 14:35

```

```

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
Default Target Status
multi-user running

```

```

12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ irqbalance issue-generator
kbdsettings klog lvm2-monitor nscd nvme-fc-boot-connections postfix purge-kernels rollback
rsyslog sapconf smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4
wickedd-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs
disabled autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info
firewalld gpm grub2-once haveged haveged-switch-root ipmi ipmievd issue-add-ssh-keys
kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nvme-fc-autoconnect rpcbind
rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd sysstat
systemd-boot-check-no-failures systemd-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesyncd tuned
generated jexec
indirect uidd wickedd

```

```

13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
root=UUID=b8a1c7fb-42d6-488a-810e-11797ff5b84f
splash=silent
mitigations=auto
quiet

```

(Continued on next page)



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Software Availability: Jun-2024

Platform Notes (Continued)

security=apparmor

14. cpupower frequency-info

analyzing CPU 0:
Unable to determine current policy
boost state support:
Supported: no
Active: no

15. tuned-adm active

It seems that tuned daemon is not running, preset profile is not activated.
Preset profile: throughput-performance

16. sysctl

```
kernel.numa_balancing          0
kernel.randomize_va_space     2
vm.compaction_proactiveness    20
vm.dirty_background_bytes      314572800
vm.dirty_background_ratio      0
vm.dirty_bytes                 629145600
vm.dirty_expire_centisecs      3000
vm.dirty_ratio                 0
vm.dirty_writeback_centisecs   500
vm.dirtytime_expire_seconds    43200
vm.extfrag_threshold           500
vm.min_unmapped_ratio          1
vm.nr_hugepages                0
vm.nr_hugepages_mempolicy      0
vm.nr_overcommit_hugepages     0
vm.swappiness                   60
vm.watermark_boost_factor      15000
vm.watermark_scale_factor      10
vm.zone_reclaim_mode           0
```

17. /sys/kernel/mm/transparent_hugepage

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

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

```
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

(Continued on next page)



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Test Date: Aug-2024
Hardware Availability: Oct-2023
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Platform Notes (Continued)

os-release SUSE Linux Enterprise Server 15 SP5

20. Disk information

SPEC is set to: /home/cpu2017-1.1.9-ic2024.1
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p3 xfs 890G 36G 855G 4% /

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

Vendor: Lenovo
Product: ThinkSystem SR950 V3
Product Family: ThinkSystem
Serial: BLRSDV044

22. dmidecode

Additional information from dmidecode 3.4 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
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: EBE107H-2.20
BIOS Date: 06/18/2024
BIOS Revision: 2.20
Firmware Revision: 3.10

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 2024.1.0 Build 20240308
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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 2024.1.0 Build 20240308
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=====

=====
C++, C | 511.povray_r(base) 526.blender_r(base)
=====

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(Continued on next page)



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Compiler Version Notes (Continued)

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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 2024.1.0 Build 20240308
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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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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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using both C and C++:

icpx icx

(Continued on next page)



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Software Availability: Jun-2024

Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:
icpx icx ifx

Base Portability Flags

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

Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

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

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

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Test Date: Aug-2024

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Software Availability: Jun-2024

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xsaphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsaphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsaphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-AB.html>
<http://www.spec.org/cpu2017/flags/Intel-ic2024-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-AB.xml>
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml>

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