



# SPEC CPU®2017 Integer Rate Result

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## Lenovo Global Technology

(Test Sponsor: Lenovo Global Technology)

### ThinkSystem SR860 V3

(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017\_int\_base = 1810

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 9017

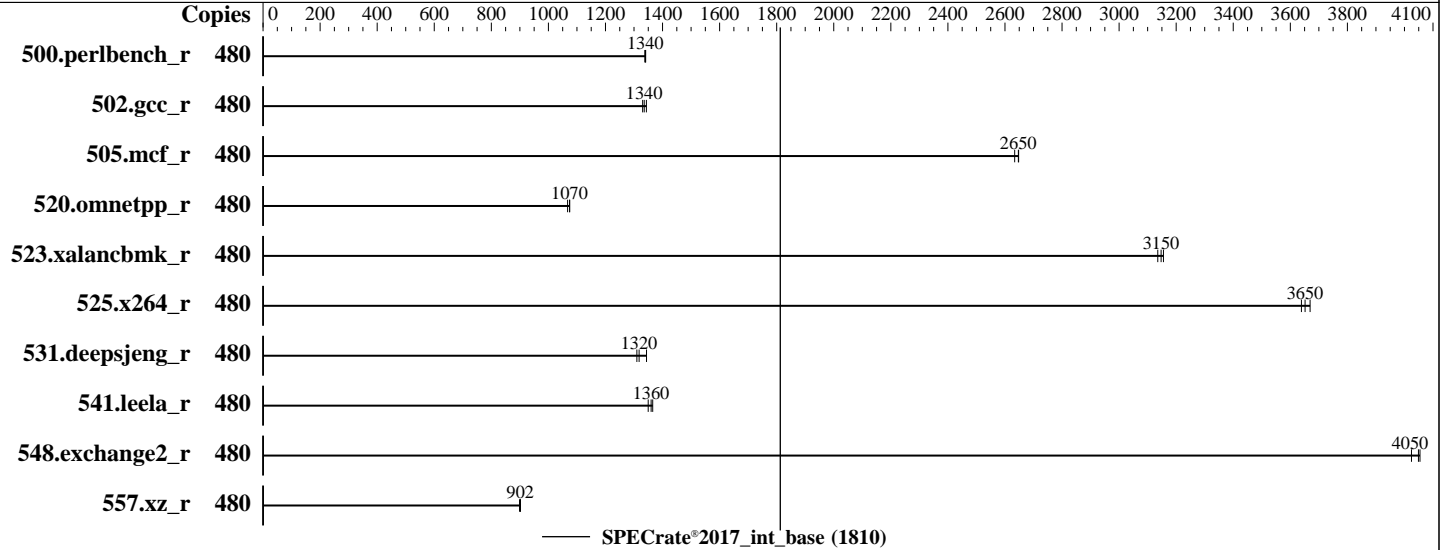
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jul-2023

Hardware Availability: Jun-2023

Software Availability: Dec-2022



### Hardware

CPU Name: Intel Xeon Platinum 8490H  
 Max MHz: 3500  
 Nominal: 1900  
 Enabled: 240 cores, 4 chips, 2 threads/core  
 Orderable: 2,4 chips  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 2 MB I+D on chip per core  
 L3: 112.5 MB I+D on chip per chip  
 Other: None  
 Memory: 1 TB (32 x 32 GB 2Rx8 PC5-4800B-R)  
 Storage: 1 x 480GB SATA SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86\_64)  
 Kernel 5.14.21-150400.22-default  
 Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;  
 Parallel: No  
 Firmware: Lenovo BIOS Version RSE105E 1.10 released May-2023  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None  
 Power Management: BIOS and OS set to prefer performance at the cost of additional power usage



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## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
500.perlbench_r	480	571	1340	<b><u>570</u></b>	<b><u>1340</u></b>	570	1340									
502.gcc_r	480	511	1330	<b><u>509</u></b>	<b><u>1340</u></b>	506	1340									
505.mcf_r	480	294	2630	<b><u>293</u></b>	<b><u>2650</u></b>	293	2650									
520.omnetpp_r	480	586	1070	<b><u>586</u></b>	<b><u>1070</u></b>	590	1070									
523.xalancbmk_r	480	<b><u>161</u></b>	<b><u>3150</u></b>	161	3160	162	3140									
525.x264_r	480	<b><u>230</u></b>	<b><u>3650</u></b>	229	3670	231	3640									
531.deepsjeng_r	480	409	1340	420	1310	<b><u>417</u></b>	<b><u>1320</u></b>									
541.leela_r	480	589	1350	582	1370	<b><u>584</u></b>	<b><u>1360</u></b>									
548.exchange2_r	480	310	4050	312	4020	<b><u>311</u></b>	<b><u>4050</u></b>									
557.xz_r	480	<b><u>575</u></b>	<b><u>902</u></b>	577	899	575	902									

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

## Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk\_r / 623.xalancbmk\_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 [https://www.spec.org/cpu2017/Docs/runrules.html#rule\\_1.4](https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4)), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

## Submit Notes

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

## Operating System Notes

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

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.9-ic2023.0/lib/intel64:/home/cpu2017-1.1.9-ic2023.0/lib/ia32:/home/cpu2017-1.1.9-ic2023.0/je5.0.1-32"
MALLOC_CONF = "retain:true"
```



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## 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.

## Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance and then set it to Custom Mode

C1 Enhanced Mode set to Enabled

UPI Link Disable set to Disabled 1 Link

LLC Prefetch set to Disabled

DCU Streamer Prefetcher set to Disabled

SNC set to SNC4

Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost Thu Jul 27 04:15:50 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 249 (249.11+suse.124.g2bc0b2c447)
  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
- -----

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## Platform Notes (Continued)

1. `uname -a`  
Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT\_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)  
x86\_64 x86\_64 x86\_64 GNU/Linux

---

2. `w`  
04:15:50 up 6:43, 2 users, load average: 90.79, 341.54, 424.21  

USER	TTY	FROM	LOGIN@	IDLE	JCPU	PCPU	WHAT
root	tty1	-	21:33	3:46m	1.28s	0.02s	-bash
root	tty2	-	23:16	4:53m	0.10s	0.10s	-bash

---

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)	4126362
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)	4126362
virtual memory	(kbytes, -v)	unlimited
file locks	(-x)	unlimited

---

5. `sysinfo process ancestry`  

```

/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
-bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=480 -c
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=240 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=480 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=240 --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/CPU2017.099/templogs/preenv.intrate.099.0.log --lognum 099.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2023.0

```

---

6. `/proc/cpuinfo`  

model name	: Intel(R) Xeon(R) Platinum 8490H
vendor_id	: GenuineIntel
cpu family	: 6
model	: 143
stepping	: 8
microcode	: 0x2b0001b0
bugs	: spectre_v1 spectre_v2 spec_store_bypass swapgs

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## Platform Notes (Continued)

```

cpu cores      : 60
siblings      : 120
4 physical ids (chips)
480 processors (hardware threads)
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 0: apicids 0-119
physical id 1: apicids 128-247
physical id 2: apicids 256-375
physical id 3: apicids 384-503

```

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 2.37.2:

```

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:   2
Core(s) per socket:   60
Socket(s):              4
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 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 bmil 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 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 avx512_fp16 amx_tile flush_lld arch_capabilities

Virtualization:        VT-x
L1d cache:             11.3 MiB (240 instances)
L1i cache:             7.5 MiB (240 instances)
L2 cache:              480 MiB (240 instances)
L3 cache:              450 MiB (4 instances)
NUMA node(s):         16
NUMA node0 CPU(s):    0-14,240-254
NUMA node1 CPU(s):    15-29,255-269
NUMA node2 CPU(s):    30-44,270-284

```

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## Platform Notes (Continued)

```

NUMA node3 CPU(s):          45-59,285-299
NUMA node4 CPU(s):          60-74,300-314
NUMA node5 CPU(s):          75-89,315-329
NUMA node6 CPU(s):          90-104,330-344
NUMA node7 CPU(s):          105-119,345-359
NUMA node8 CPU(s):          120-134,360-374
NUMA node9 CPU(s):          135-149,375-389
NUMA node10 CPU(s):         150-164,390-404
NUMA node11 CPU(s):         165-179,405-419
NUMA node12 CPU(s):         180-194,420-434
NUMA node13 CPU(s):         195-209,435-449
NUMA node14 CPU(s):         210-224,450-464
NUMA node15 CPU(s):         225-239,465-479
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf:         Not affected
Vulnerability Mds:         Not affected
Vulnerability Meltdown:    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
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	11.3M	12	Data	1	64	1	64
L1i	32K	7.5M	8	Instruction	1	64	1	64
L2	2M	480M	16	Unified	2	2048	1	64
L3	112.5M	450M	15	Unified	3	122880	1	64

8. numactl --hardware

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

```

available: 16 nodes (0-15)
node 0 cpus: 0-14,240-254
node 0 size: 64165 MB
node 0 free: 62183 MB
node 1 cpus: 15-29,255-269
node 1 size: 64504 MB
node 1 free: 63348 MB
node 2 cpus: 30-44,270-284
node 2 size: 64504 MB
node 2 free: 63410 MB
node 3 cpus: 45-59,285-299
node 3 size: 64504 MB
node 3 free: 63404 MB
node 4 cpus: 60-74,300-314
node 4 size: 64504 MB
node 4 free: 63387 MB
node 5 cpus: 75-89,315-329
node 5 size: 64504 MB
node 5 free: 63412 MB
node 6 cpus: 90-104,330-344
node 6 size: 64504 MB
node 6 free: 63405 MB
node 7 cpus: 105-119,345-359
node 7 size: 64504 MB
node 7 free: 63402 MB
node 8 cpus: 120-134,360-374
node 8 size: 64504 MB

```

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## Platform Notes (Continued)

```

node 8 free: 63406 MB
node 9 cpus: 135-149,375-389
node 9 size: 64504 MB
node 9 free: 63396 MB
node 10 cpus: 150-164,390-404
node 10 size: 64504 MB
node 10 free: 63396 MB
node 11 cpus: 165-179,405-419
node 11 size: 64504 MB
node 11 free: 63393 MB
node 12 cpus: 180-194,420-434
node 12 size: 64469 MB
node 12 free: 63364 MB
node 13 cpus: 195-209,435-449
node 13 size: 64504 MB
node 13 free: 63397 MB
node 14 cpus: 210-224,450-464
node 14 size: 64504 MB
node 14 free: 63403 MB
node 15 cpus: 225-239,465-479
node 15 size: 64421 MB
node 15 free: 63319 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
0:  10 12 12 12 21 21 21 21 31 31 31 31 21 21 21 21
1:  12 10 12 12 21 21 21 21 31 31 31 31 21 21 21 21
2:  12 12 10 12 21 21 21 21 31 31 31 31 21 21 21 21
3:  12 12 12 12 10 21 21 21 31 31 31 31 21 21 21 21
4:  21 21 21 21 10 12 12 12 21 21 21 21 31 31 31 31
5:  21 21 21 21 12 10 12 12 21 21 21 21 31 31 31 31
6:  21 21 21 21 12 12 10 12 21 21 21 21 31 31 31 31
7:  21 21 21 21 12 12 12 10 21 21 21 21 31 31 31 31
8:  31 31 31 31 21 21 21 21 10 12 12 12 21 21 21 21
9:  31 31 31 31 21 21 21 21 12 10 12 12 21 21 21 21
10: 31 31 31 31 21 21 21 21 12 12 10 12 21 21 21 21
11: 31 31 31 31 21 21 21 21 12 12 12 10 21 21 21 21
12: 21 21 21 21 31 31 31 31 21 21 21 21 10 12 12 12
13: 21 21 21 21 31 31 31 31 21 21 21 21 12 10 12 12
14: 21 21 21 21 31 31 31 31 21 21 21 21 12 12 10 12
15: 21 21 21 21 31 31 31 31 21 21 21 21 12 12 12 10

```

```

-----
9. /proc/meminfo
MemTotal:      1056373184 kB

```

```

-----
10. who -r
run-level 3 Jul 26 21:33

```

```

-----
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
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@ haveged irqbalance
issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny

```

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## Platform Notes (Continued)

```

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
                 firewallld gpm grub2-once haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load
                 lunmask man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd
                 serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
                 systemd-network-generator systemd-sysexit systemd-time-wait-sync systemd-timesyncd
indirect        wickedd

```

### 13. Linux kernel boot-time arguments, from /proc/cmdline

```

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=07b494b8-a782-4eba-84f2-ef5cae789da8
splash=silent
mitigations=auto
quiet
security=apparmor

```

### 14. cpupower frequency-info

```

analyzing CPU 0:
  Unable to determine current policy
  boost state support:
    Supported: yes
    Active: yes

```

### 15. sysctl

```

kernel.numa_balancing          0
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+madvice [madvice] never
enabled        [always] madvice 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

```

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## Platform Notes (Continued)

```

max_ptes_shared      256
max_ptes_swap        64
pages_to_scan        4096
scan_sleep_millisecs 10000

```

```

-----
18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP4

```

```

-----
19. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2023.0
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sda3   xfs   445G  12G  433G   3% /

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:      Lenovo
Product:     ThinkSystem SR860 V3
Product Family: ThinkSystem
Serial:      None

```

```

-----
21. dmidecode
Additional information from dmidecode 3.2 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:
19x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
6x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
4x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
3x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800

```

```

-----
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      Lenovo
BIOS Version:     RSE105E-1.10
BIOS Date:        05/12/2023
BIOS Revision:    1.10
Firmware Revision: 1.10

```

## Compiler Version Notes

```

=====
C      | 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 2023.0.0 Build 20221201
Copyright (C) 1985-2022 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 2023.0.0 Build 20221201
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```

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# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

**Lenovo Global Technology**

(Test Sponsor: Lenovo Global Technology)

**ThinkSystem SR860 V3**

(1.90 GHz, Intel Xeon Platinum 8490H)

SPECrate®2017\_int\_base = 1810

SPECrate®2017\_int\_peak = Not Run

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Jul-2023

**Hardware Availability:** Jun-2023

**Software Availability:** Dec-2022

## Compiler Version Notes (Continued)

-----  
Fortran | 548.exchange2\_r(base)  
-----

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

## 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/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64\_lin  
-lqkmallo

C++ benchmarks:

-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math

(Continued on next page)



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**Test Date:** Jul-2023

**Hardware Availability:** Jun-2023

**Software Availability:** Dec-2022

## Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmallo
```

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/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmallo
```

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

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

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

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

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

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

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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