



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR630 V4  
(2.10 GHz, Intel Xeon 6740P)

SPECrate®2017\_int\_base = 972

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 9017

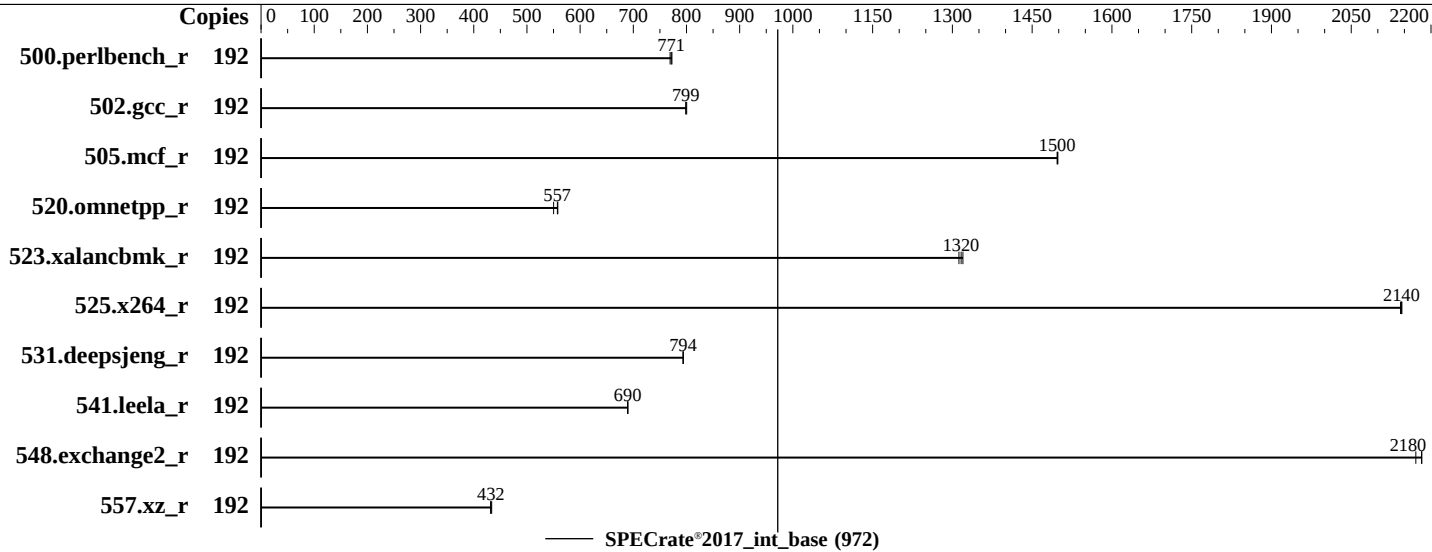
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Mar-2025

Hardware Availability: May-2025

Software Availability: Jun-2024



## Hardware

CPU Name: Intel Xeon 6740P  
Max MHz: 3800  
Nominal: 2100  
Enabled: 96 cores, 2 chips, 2 threads/core  
Orderable: 1,2 chips  
Cache L1: 64 KB I + 48 KB D on chip per core  
L2: 2 MB I+D on chip per core  
L3: 288 MB I+D on chip per chip  
Other: None  
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-6400B-R)  
Storage: 1 x 960 GB NVME SSD  
Other: CPU Cooling: Air

## Software

OS: SUSE Linux Enterprise Server 15 SP6  
Kernel 6.4.0-150600.21-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 IHE109T 1.20 released Feb-2025  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: Not Applicable  
Other: None  
Power Management: BIOS 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 | Seconds | Ratio |
| 500.perlbench_r | 192    | 397        | 769         | 396        | 773         | <u>396</u> | <u>771</u> |        |         |       |         |       |         |       |         |       |
| 502.gcc_r       | 192    | 340        | 800         | 340        | 799         | <u>340</u> | <u>799</u> |        |         |       |         |       |         |       |         |       |
| 505.mcf_r       | 192    | 207        | 1500        | <u>207</u> | <u>1500</u> | 207        | 1500       |        |         |       |         |       |         |       |         |       |
| 520.omnetpp_r   | 192    | 458        | 550         | 451        | 558         | <u>452</u> | <u>557</u> |        |         |       |         |       |         |       |         |       |
| 523.xalancbmk_r | 192    | <u>154</u> | <u>1320</u> | 154        | 1320        | 154        | 1310       |        |         |       |         |       |         |       |         |       |
| 525.x264_r      | 192    | 157        | 2150        | <u>157</u> | <u>2140</u> | 157        | 2140       |        |         |       |         |       |         |       |         |       |
| 531.deepsjeng_r | 192    | 277        | 794         | 277        | 794         | <u>277</u> | <u>794</u> |        |         |       |         |       |         |       |         |       |
| 541.leela_r     | 192    | <u>461</u> | <u>690</u>  | 461        | 690         | 461        | 689        |        |         |       |         |       |         |       |         |       |
| 548.exchange2_r | 192    | <u>231</u> | <u>2180</u> | 230        | 2180        | 232        | 2170       |        |         |       |         |       |         |       |         |       |
| 557.xz_r        | 192    | 478        | 434         | 480        | 432         | <u>480</u> | <u>432</u> |        |         |       |         |       |         |       |         |       |

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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-ic2024.1/lib/intel64:/home/cpu2017-1.1.9-ic2024.1/lib/ia32:/home/cpu2017-1.1.9-ic2024.1/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:

SNC set to Enabled

UPI Link Disable set to Minimum Number of Links Enabled

Sysinfo program /home/cpu2017-1.1.9-ic2024.1/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost Fri Mar 14 03:16:18 2025

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 254 (254.10+suse.84.ge8d77af424)
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 6.4.0-150600.21-default #1 SMP PREEMPT\_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)  
x86\_64 x86\_64 x86\_64 GNU/Linux  
-----

-----  
2. w  
03:16:19 up 2:52, 1 user, load average: 55.28, 147.82, 174.25  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
-----

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

-----  
4. ulimit -a  
core file size (blocks, -c) unlimited  
-----

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## Platform Notes (Continued)

data seg size (kbytes, -d) unlimited  
scheduling priority (-e) 0  
file size (blocks, -f) unlimited  
pending signals (-i) 2062720  
max locked memory (kbytes, -l) 8192  
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) 2062720  
virtual memory (kbytes, -v) unlimited  
file locks (-x) unlimited

```
-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize=42
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
/bin/bash ./02.remote_local_SPEccpu_1.01.sh
sh Run502-compliant-ic2024.1-lin-sapphirerapids-rateint-base-smt-on-20240308.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 -c
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=96 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base -o all intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=192 --configfile
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=96 --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/CPU2017.126/templots/preenv.intrate.126.0.log --lognum 126.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2024.1
-----
```

```
-----
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) 6740P
vendor_id       : GenuineIntel
cpu family      : 6
model           : 173
stepping        : 1
microcode       : 0x1000380
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores       : 48
siblings        : 96
2 physical ids (chips)
192 processors (hardware threads)
physical id 0:  core ids 0-23,64-87
physical id 1:  core ids 0-23,64-87
physical id 0:  apicids 0-47,128-175
physical id 1:  apicids 256-303,384-431
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 2.39.3:
Architecture:          x86_64
-----
```

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## Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit  
Address sizes: 52 bits physical, 57 bits virtual  
Byte Order: Little Endian  
CPU(s): 192  
On-line CPU(s) list: 0-191  
Vendor ID: GenuineIntel  
BIOS Vendor ID: Intel(R) Corporation  
Model name: Intel(R) Xeon(R) 6740P  
BIOS Model name: Intel(R) Xeon(R) 6740P UNKNOWN CPU @ 2.1GHz  
BIOS CPU family: 179  
CPU family: 6  
Model: 173  
Thread(s) per core: 2  
Core(s) per socket: 48  
Socket(s): 2  
Stepping: 1  
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 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 intel\_ppin cdp\_l2 ssbd mba ibrs ibpb stibp ibrs\_enhanced tpr\_shadow 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 user\_shstk avx\_vnni avx512\_bf16 wbnoinvd dtherm ida arat pln pts vnmi 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: 4.5 MiB (96 instances)  
L1i cache: 6 MiB (96 instances)  
L2 cache: 192 MiB (96 instances)  
L3 cache: 576 MiB (2 instances)  
NUMA node(s): 4  
NUMA node0 CPU(s): 0-23,96-119  
NUMA node1 CPU(s): 24-47,120-143  
NUMA node2 CPU(s): 48-71,144-167  
NUMA node3 CPU(s): 72-95,168-191  
Vulnerability Gather data sampling: Not affected  
Vulnerability Itlb multihit: Not affected  
Vulnerability L1tf: Not affected  
Vulnerability Mds: Not affected  
Vulnerability Meltdown: Not affected  
Vulnerability Mmio stale data: Not affected  
Vulnerability Reg file data sampling: Not affected  
Vulnerability Retbleed: Not affected  
Vulnerability Spec rstack overflow: 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 / Automatic IBRS; IBPB conditional; RSB filling; PBRSE-IBRS Not affected; BHI BHI\_DIS\_S  
Vulnerability Srbds: Not affected

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## Platform Notes (Continued)

Vulnerability Tsx async abort: Not affected

From lscpu --cache:

| NAME | ONE-SIZE | ALL-SIZE | WAYS | TYPE        | LEVEL | SETS   | PHY-LINE | COHERENCY-SIZE |
|------|----------|----------|------|-------------|-------|--------|----------|----------------|
| L1d  | 48K      | 4.5M     | 12   | Data        | 1     | 64     | 1        | 64             |
| L1i  | 64K      | 6M       | 16   | Instruction | 1     | 64     | 1        | 64             |
| L2   | 2M       | 192M     | 16   | Unified     | 2     | 2048   | 1        | 64             |
| L3   | 288M     | 576M     | 16   | Unified     | 3     | 294912 | 1        | 64             |

8. numactl --hardware

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

```
available: 4 nodes (0-3)
node 0 cpus: 0-23,96-119
node 0 size: 128754 MB
node 0 free: 127807 MB
node 1 cpus: 24-47,120-143
node 1 size: 129011 MB
node 1 free: 128207 MB
node 2 cpus: 48-71,144-167
node 2 size: 129011 MB
node 2 free: 128087 MB
node 3 cpus: 72-95,168-191
node 3 size: 128929 MB
node 3 free: 128102 MB
node distances:
node  0  1  2  3
0:  10  12  21  21
1:  12  10  21  21
2:  21  21  10  12
3:  21  21  12  10
```

9. /proc/meminfo

MemTotal: 528083684 kB

10. who -r

run-level 3 Mar 14 00:25

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

| 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 nvme-fc-autoconnect postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny                                                                                                                                                                                                                   |
| enabled-runtime | systemd-remount-fs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| disabled        | autofs autovast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info firewallld fsidd gpm grub2-once haveged ipmi ipmievd issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd |
| generated       | ntp_sync                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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## Platform Notes (Continued)

indirect systemd-userdbd wickedd

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

```
BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
root=UUID=c5be0e33-36a7-4fb1-a8dd-78aa43a6d2d8
splash=silent
mitigations=auto
quiet
security=apparmor
```

### 14. cpupower frequency-info

```
analyzing CPU 161:
  Unable to determine current policy
  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+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
max_ptes_shared        256
max_ptes_swap          64
pages_to_scan          4096
scan_sleep_millisecs   10000
```

### 18. OS release

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## Platform Notes (Continued)

From /etc/\*-release /etc/\*-version  
os-release SUSE Linux Enterprise Server 15 SP6

### 19. Disk information

SPEC is set to: /home/cpu2017-1.1.9-ic2024.1

| Filesystem     | Type | Size | Used | Avail | Use% | Mounted on |
|----------------|------|------|------|-------|------|------------|
| /dev/nvme0n1p3 | xfs  | 893G | 48G  | 846G  | 6%   | /          |

### 20. /sys/devices/virtual/dmi/id

Vendor: Lenovo  
Product: ThinkSystem SR630 V4  
Product Family: ThinkSystem  
Serial: 0987654321

### 21. 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:

3x Samsung M321R4GA3PB2-CCPEC 32 GB 2 rank 6400  
9x Samsung M321R4GA3PB2-CCPKC 32 GB 2 rank 6400  
4x Samsung M321R4GA3PB2-CCPPC 32 GB 2 rank 6400

### 22. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: Lenovo  
BIOS Version: IHE109T-1.20  
BIOS Date: 02/28/2025  
BIOS Revision: 1.20  
Firmware Revision: 1.20

## 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 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

Fortran | 548.exchange2\_r(base)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.



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## 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/opt/intel/oneapi/compiler/2024.1/lib -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/opt/intel/oneapi/compiler/2024.1/lib -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/opt/intel/oneapi/compiler/2024.1/lib -lqkmalloc



# SPEC CPU®2017 Integer Rate Result

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## Lenovo Global Technology

ThinkSystem SR630 V4  
(2.10 GHz, Intel Xeon 6740P)

SPECrate®2017\_int\_base = 972

SPECrate®2017\_int\_peak = Not Run

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Mar-2025

**Hardware Availability:** May-2025

**Software Availability:** Jun-2024

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-Birchstream-C.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-Birchstream-C.xml>

<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.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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