



# SPEC CPU®2017 Floating Point Rate Result

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## Lenovo Global Technology

ThinkSystem SR630 V4  
(2.00 GHz, Intel Xeon 6787P)

SPECrate®2017\_fp\_base = 1640

SPECrate®2017\_fp\_peak = Not Run

CPU2017 License: 9017

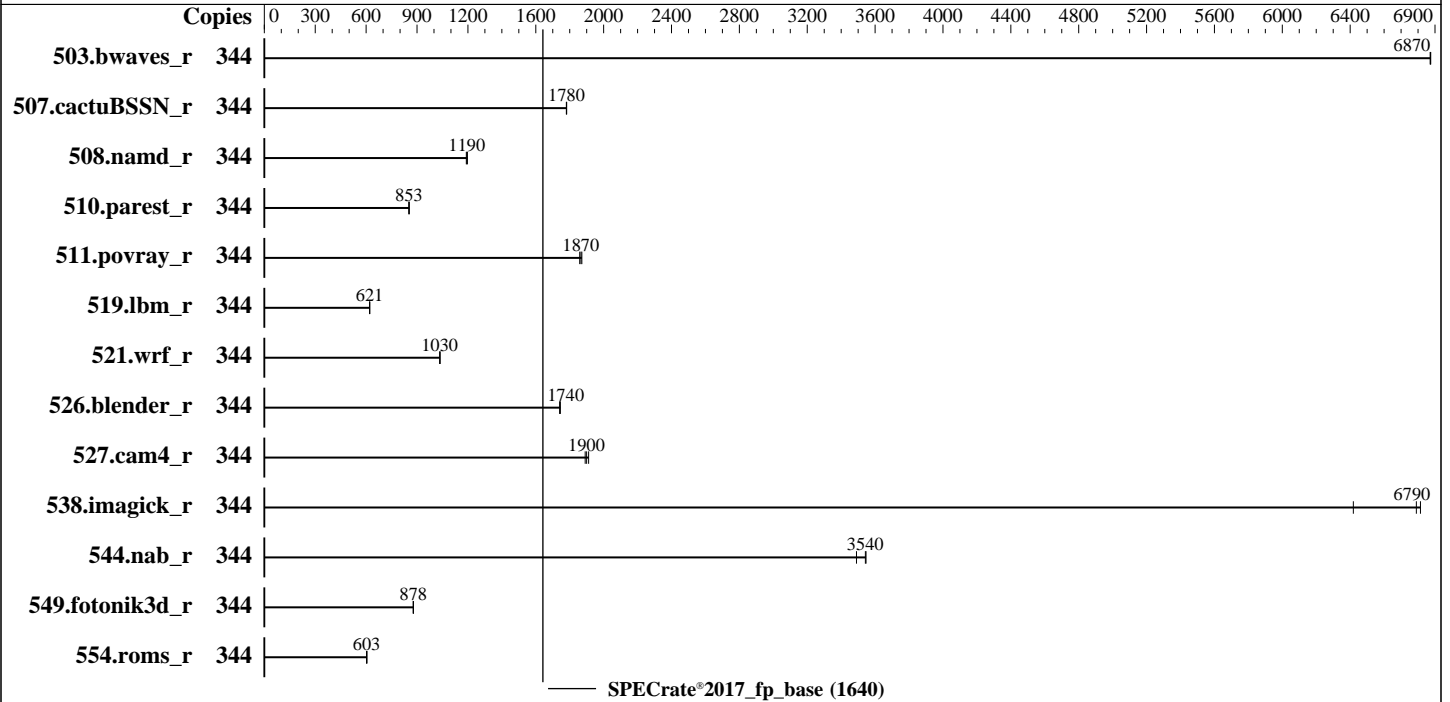
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Feb-2025

Hardware Availability: May-2025

Software Availability: Jun-2024



### Hardware

CPU Name: Intel Xeon 6787P  
 Max MHz: 3800  
 Nominal: 2000  
 Enabled: 172 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: 336 MB I+D on chip per chip  
 Other: None  
 Memory: 512 GB (16 x 32 GB 2Rx8 PC5-88/56B-M, running at 8000)  
 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 IHE109J 1.20 released Jan-2025  
 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 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
503.bwaves_r	344	502	6870	502	6870	<u>502</u>	<u>6870</u>							
507.cactuBSSN_r	344	244	1780	<u>244</u>	<u>1780</u>	245	1780							
508.namd_r	344	273	1200	274	1190	<u>274</u>	<u>1190</u>							
510.parest_r	344	1055	853	<u>1055</u>	<u>853</u>	1055	853							
511.povray_r	344	429	1870	<u>430</u>	<u>1870</u>	432	1860							
519.lbm_r	344	584	621	<u>584</u>	<u>621</u>	584	621							
521.wrf_r	344	<u>745</u>	<u>1030</u>	745	1030	744	1040							
526.blender_r	344	<u>301</u>	<u>1740</u>	300	1740	301	1740							
527.cam4_r	344	<u>317</u>	<u>1900</u>	318	1890	315	1910							
538.imagick_r	344	126	6810	133	6420	<u>126</u>	<u>6790</u>							
544.nab_r	344	<u>163</u>	<u>3540</u>	166	3490	163	3550							
549.fotonik3d_r	344	1527	878	1526	879	<u>1526</u>	<u>878</u>							
554.roms_r	344	907	603	904	605	<u>906</u>	<u>603</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/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.

(Continued on next page)



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## General Notes (Continued)

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

jemalloc, a general purpose malloc implementation  
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

BIOS configuration:  
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 Feb 7 06:10:21 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  
06:10:22 up 6:14, 1 user, load average: 69.32, 248.17, 306.71  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT

3. Username

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### Platform Notes (Continued)

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) 2062151
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) 2062151
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 Run503-compliant-ic2024.1-lin-sapphirerapids-ratefp-base-smt-on-20240308.sh
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=344 -c
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=172 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=344 --configfile
ic2024.1-lin-sapphirerapids-rate-20240308.cfg --define smt-on --define cores=172 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
rate --tune base --size reflate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.004/templogs/preenv.fprate.004.0.log --lognum 004.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2024.1

```

```

6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) 6787P
vendor_id      : GenuineIntel
cpu family     : 6
model          : 173
stepping       : 1
microcode      : 0x1000380
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
cpu cores      : 86
siblings       : 172
2 physical ids (chips)
344 processors (hardware threads)
physical id 0: core ids 0-42,64-106
physical id 1: core ids 0-42,64-106
physical id 0: apicids 0-85,128-213
physical id 1: apicids 256-341,384-469
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
virtualized systems. Use the above data carefully.

```

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### Platform Notes (Continued)

#### 7. lscpu

From lscpu from util-linux 2.39.3:

```

Architecture:                x86_64
CPU op-mode(s):              32-bit, 64-bit
Address sizes:               52 bits physical, 57 bits virtual
Byte Order:                  Little Endian
CPU(s):                      344
On-line CPU(s) list:        0-343
Vendor ID:                   GenuineIntel
BIOS Vendor ID:             Intel(R) Corporation
Model name:                  Intel(R) Xeon(R) 6787P
BIOS Model name:            Intel(R) Xeon(R) 6787P UNKNOWN CPU @ 2.0GHz
BIOS CPU family:            179
CPU family:                  6
Model:                      173
Thread(s) per core:         2
Core(s) per socket:         86
Socket(s):                   2
Stepping:                    1
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 intel_ppin cdp_l2
                             ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow 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 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_lld arch_capabilities
Virtualization:              VT-x
L1d cache:                   8.1 MiB (172 instances)
L1i cache:                   10.8 MiB (172 instances)
L2 cache:                    344 MiB (172 instances)
L3 cache:                    672 MiB (2 instances)
NUMA node(s):                4
NUMA node0 CPU(s):          0-42,172-214
NUMA node1 CPU(s):          43-85,215-257
NUMA node2 CPU(s):          86-128,258-300
NUMA node3 CPU(s):          129-171,301-343
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

```

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### Platform Notes (Continued)

Vulnerability Spec store bypass:	Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1:	Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:	Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling; PBRSE-eIBRS Not affected; BHI BHI_DIS_S
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	8.1M	12	Data	1	64	1	64
L1i	64K	10.8M	16	Instruction	1	64	1	64
L2	2M	344M	16	Unified	2	2048	1	64
L3	336M	672M	16	Unified	3	344064	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: 0-42,172-214
node 0 size: 128679 MB
node 0 free: 127604 MB
node 1 cpus: 43-85,215-257
node 1 size: 129001 MB
node 1 free: 128057 MB
node 2 cpus: 86-128,258-300
node 2 size: 128963 MB
node 2 free: 127942 MB
node 3 cpus: 129-171,301-343
node 3 size: 128920 MB
node 3 free: 127970 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: 527937980 kB

10. who -r

run-level 3 Feb 6 23:56

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 nsd nvme-fc-boot-connections nvme-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 autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info

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### Platform Notes (Continued)

```
indirect
firewalld 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
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 238:
  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
-----
```

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### Platform Notes (Continued)

scan\_sleep\_millisecs 10000

-----  
18. OS release  
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 47G 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:  
16x Samsung M327R4GA3EB0-CLVXB 32 GB 2 rank 8800, configured at 8000

-----  
22. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: Lenovo  
BIOS Version: IHE109J-1.20  
BIOS Date: 01/13/2025  
BIOS Revision: 1.20  
Firmware Revision: 0.84

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

=====  
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  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

=====  
C++, C | 511.povray\_r(base) 526.blender\_r(base)  
-----  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308

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Copyright (C) 1985-2024 Intel Corporation. All rights reserved.

=====  
C++, C, Fortran | 507.cactuBSSN\_r(base)

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

=====  
Fortran | 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)

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

=====  
Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base)

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

## 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

Benchmarks using Fortran, C, and C++:

icpx icx ifx



# SPEC CPU®2017 Floating Point Rate Result

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## Lenovo Global Technology

SPECrate®2017\_fp\_base = 1640

ThinkSystem SR630 V4  
(2.00 GHz, Intel Xeon 6787P)

SPECrate®2017\_fp\_peak = Not Run

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Feb-2025

**Hardware Availability:** May-2025

**Software Availability:** Jun-2024

## 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

```

### Benchmarks using both Fortran and C:

```

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

```

### Benchmarks using both C and C++:

```

-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512

```

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**Hardware Availability:** May-2025

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## Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):

```
-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-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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