# SPEC CPU®2026 Integer Rate Result



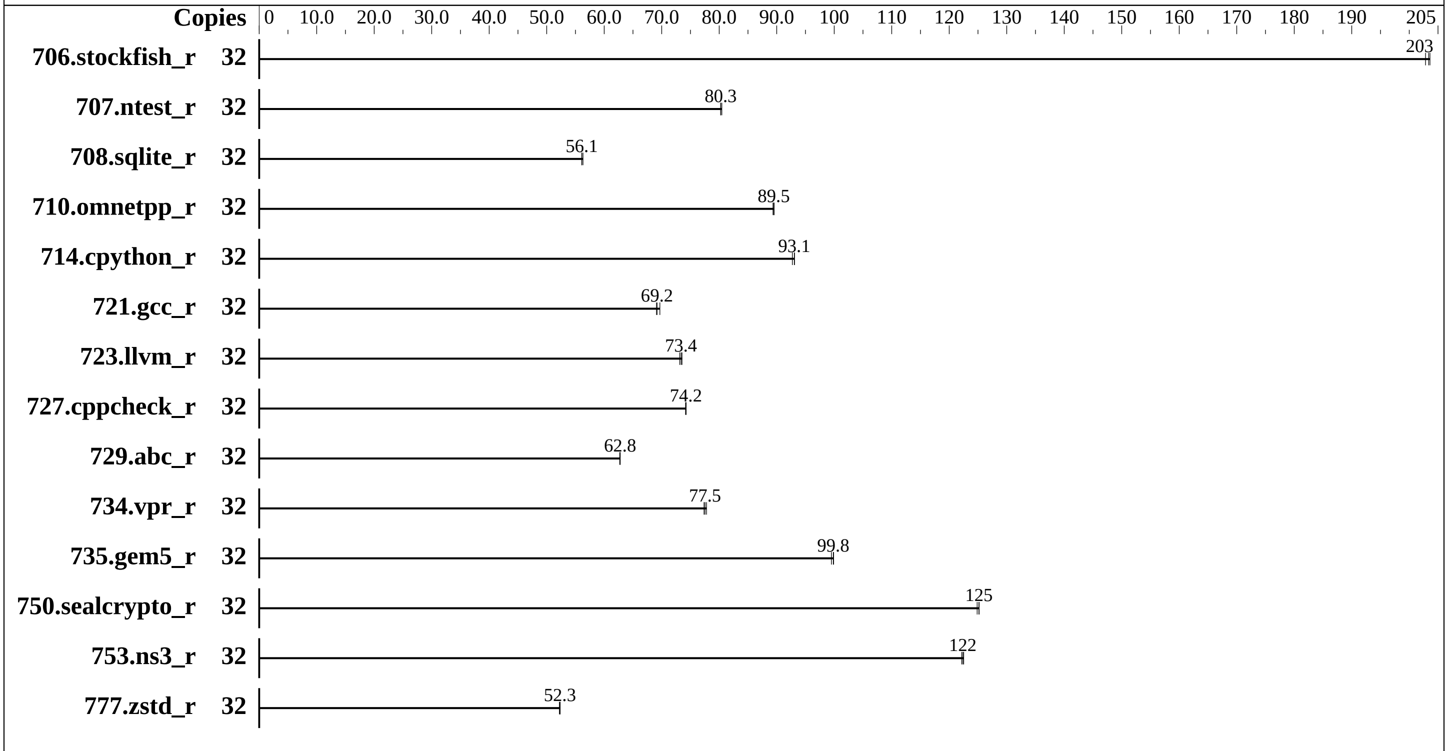
## Lenovo Global Technology

ThinkSystem SR650 V4
(2.80 GHz, Intel Xeon 6503P)

SPECrate®2026_int_base = 85.5

SPECrate®2026_int_peak = Not Run

| | | | |
|---|---|---|---|
| **CPU2026 License:** | 9017 | **Test Date:** | Aug-2026 |
| **Test Sponsor:** | Lenovo Global Technology | **Hardware Availability:** | Aug-2026 |
| **Tested by:** | Lenovo Global Technology | **Software Availability:** | Apr-2026 |




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon 6503P |
| Max MHz: | 4300 |
| Nominal: | 2800 |
| Enabled: | 16 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: | 48 MB I+D on chip per chip |
| Other: | None |
| Memory: | 512 GB (16 x 32 GB 2Rx8 PC5-6400B-R) |
| Storage: | 1 x 1.92 TB NVME SSD |
| Cooling: | Air |
| Other: | None |

### Software

| | |
|---|---|
| OS: | SUSE Linux Enterprise Server 15 SP7<br>Kernel 6.4.0-150700.51-default |
| Compiler: | C/C++: Version 2026.0 of Intel oneAPI DPC++/C++ Compiler for Linux;<br>Fortran: Version 2026.0 of Intel Fortran Compiler for Linux |
| Compiler Category: | Vendor |
| Firmware: | Lenovo BIOS Version IHE119P 1.51 released Jun-2026 |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | Not Applicable |
| Other: | tcmalloc memory allocator v2.18.1 |
| Power Management: | BIOS set to prefer performance at the cost of additional power usage |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 706.stockfish_r | 32 | 198 | 204 | **198** | **203** | 199 | 203 | | | | | | | |
| 707.ntest_r | 32 | 235 | 80.5 | **236** | **80.3** | 236 | 80.2 | | | | | | | |
| 708.sqlite_r | 32 | 300 | 56.3 | 301 | 56.1 | **301** | **56.1** | | | | | | | |
| 710.omnetpp_r | 32 | 174 | 89.5 | 174 | 89.3 | **174** | **89.5** | | | | | | | |
| 714.cpython_r | 32 | 165 | 92.7 | **165** | **93.1** | 165 | 93.1 | | | | | | | |
| 721.gcc_r | 32 | **317** | **69.2** | 315 | 69.7 | 318 | 69.1 | | | | | | | |
| 723.llvm_r | 32 | 221 | 73.5 | **221** | **73.4** | 222 | 73.1 | | | | | | | |
| 727.cppcheck_r | 32 | 155 | 74.1 | 155 | 74.2 | **155** | **74.2** | | | | | | | |
| 729.abc_r | 32 | **234** | **62.8** | 234 | 62.8 | 234 | 62.7 | | | | | | | |
| 734.vpr_r | 32 | **190** | **77.5** | 191 | 77.4 | 190 | 77.8 | | | | | | | |
| 735.gem5_r | 32 | 156 | 99.9 | **156** | **99.8** | 157 | 99.5 | | | | | | | |
| 750.sealcrypto_r | 32 | 137 | 125 | **137** | **125** | 137 | 125 | | | | | | | |
| 753.ns3_r | 32 | 160 | 123 | 161 | 122 | **160** | **122** | | | | | | | |
| 777.zstd_r | 32 | **394** | **52.3** | 395 | 52.2 | 394 | 52.3 | | | | | | | |

**SPECrate®2026_int_base = 85.5**

**SPECrate®2026_int_peak = Not Run**

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/cpu2026-1.0.1-ic2026.0-rate/lib"
```

## General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using CentOS Stream 9.
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
```

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## General Notes (Continued)

```
 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.
 tcmalloc, a fast, multithreaded malloc implementation
 built with the CentOS Stream 9, and the system compiler gcc 11.5.0
 sources available from github.com/gperftools/gperftools
```

## Platform Notes

```
BIOS configuration:
Workload Profile set to General Computing - Peak Frequency
Page Policy set to Adaptive

 Sysinfo program /home/cpu2026-1.0.1-ic2026.0-rate/bin/sysinfo
 Rev: 779ab21020787073335a329f3a45e2cd
 running on localhost Mon Aug  3 04:59:28 2026

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -srvm
  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 (254.24+suse.148.g83b9060b6e)
 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
```

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## Platform Notes (Continued)

```
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -srvm
  Linux 6.4.0-150700.51-default #1 SMP PREEMPT_DYNAMIC Wed Apr 30 21:35:43 UTC 2025 (6930611) x86_64

------------------------------------------------------------
2. w
   04:59:28 up 3 min,  1 user,  load average: 0.09, 0.06, 0.02
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT

------------------------------------------------------------
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) 2062987
  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) 2062987
  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_1.02.sh
 sh Run502-compliant-ic2026.0-lin-sapphirerapids-rateint-base-smt-on-20260429_revB.sh
 runcpu --nobuild --iterations=3 --reportable --action validate --define default-platform-flags --copies 32
```

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## Platform Notes (Continued)

```
    -c ic2026.0-sapphirerapids-cpu2026-1.0.1-rate-20260429_revB.cfg --define smt-on --define cores=16 --define
    physicalfirst --define invoke_with_interleave --define drop_caches --tune base -o all intrate
  runcpu --nobuild --iterations 3 --reportable --action validate --define default-platform-flags --copies 32
    --configfile ic2026.0-sapphirerapids-cpu2026-1.0.1-rate-20260429_revB.cfg --define smt-on --define
    cores=16 --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/CPU2026.131/templogs/preenv.intrate.131.0.log --lognum 131.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2026-1.0.1-ic2026.0-rate

 ------------------------------------------------------------
 6. /proc/cpuinfo
     model name      : Intel(R) Xeon(R) 6503P
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 173
     stepping        : 1
     microcode       : 0x1000423
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
     cpu cores       : 8
     siblings        : 16
     2 physical ids (chips)
     32 processors (hardware threads)
     physical id 0: core ids 0-7
     physical id 1: core ids 0-7
     physical id 0: apicids 0-15
     physical id 1: apicids 128-143
   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 2.40.4:
   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):                               32
   On-line CPU(s) list:                  0-31
   Vendor ID:                            GenuineIntel
   Model name:                           Intel(R) Xeon(R) 6503P
   CPU family:                           6
   Model:                                173
   Thread(s) per core:                   2
   Core(s) per socket:                   8
   Socket(s):                            2
```

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## Platform Notes (Continued)

```
    Stepping:                            1
    BogoMIPS:                            5600.00
    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 avx2 smep bmi2 erms invpcid cqm
                                         rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
                                         intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1
                                         xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                                         split_lock_detect 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:                           768 KiB (16 instances)
    L1i cache:                           1 MiB (16 instances)
    L2 cache:                            32 MiB (16 instances)
    L3 cache:                            96 MiB (2 instances)
    NUMA node(s):                        2
    NUMA node0 CPU(s):                   0-7,16-23
    NUMA node1 CPU(s):                   8-15,24-31
    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;
                                         PBRSB-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
```

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## Platform Notes (Continued)

```
      L1d       48K     768K   12 Data            1    64        1             64
      L1i       64K       1M   16 Instruction     1    64        1             64
      L2         2M      32M   16 Unified         2  2048        1             64
      L3        48M      96M   16 Unified         3 49152        1             64

  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 2 nodes (0-1)
    node 0 cpus: 0-7,16-23
    node 0 size: 257784 MB
    node 0 free: 256961 MB
    node 1 cpus: 8-15,24-31
    node 1 size: 257989 MB
    node 1 free: 257165 MB
    node distances:
    node   0   1
      0:  10  21
      1:  21  10

  ------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       528152692 kB

  ------------------------------------------------------------
  10. who -r
    run-level 3 Aug 3 04:56

  ------------------------------------------------------------
  11. Systemd service manager version: systemd 254 (254.24+suse.148.g83b9060b6e)
    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 nvmefc-boot-connections nvmf-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 ebtables exchange-bmc-os-info
                     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
```

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## Platform Notes (Continued)

```
  indirect         systemd-userdbd wickedd

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.4.0-150700.51-default
  root=UUID=93451c52-aed3-4298-88c8-f1fb1952eaf7
  splash=silent
  mitigations=auto
  quiet
  security=apparmor

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 1:
    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+madvise [madvise] never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
  shmem_enabled   always within_size advise [never] deny force
```

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## Platform Notes (Continued)

```
------------------------------------------------------------
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
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP7

------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2026-1.0.1-ic2026.0-rate
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p3 xfs   1.7T  121G  1.6T   8% /

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Lenovo
    Product:        ThinkSystem SR650 V4
    Product Family: ThinkSystem
    Serial:         0987654321

------------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.6 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:
    7x Samsung M321R4GA3PB2-CCPEC 32 GB 2 rank 6400
    3x Samsung M321R4GA3PB2-CCPKC 32 GB 2 rank 6400
    6x Samsung M321R4GA3PB2-CCPPC 32 GB 2 rank 6400


------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Lenovo
   BIOS Version:      IHE119P-1.51
   BIOS Date:         06/11/2026
```

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## Platform Notes (Continued)

```
    BIOS Revision:     1.51
    Firmware Revision: 2.56
```

## Compiler Version Notes

```
==============================================================================
C      | 708.sqlite_r(base) 714.cpython_r(base) 777.zstd_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2026.0.0 Build 20260331
Copyright (C) 1985-2026 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++    | 706.stockfish_r(base) 707.ntest_r(base) 727.cppcheck_r(base)
       | 753.ns3_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2026.0.0 Build 20260331
Copyright (C) 1985-2026 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C | 710.omnetpp_r(base) 721.gcc_r(base) 723.llvm_r(base) 729.abc_r(base)
       | 734.vpr_r(base) 735.gem5_r(base) 750.sealcrypto_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2026.0.0 Build 20260331
Copyright (C) 1985-2026 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

# Base Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Benchmarks using both C and C++:
`icpx icx`

# Base Optimization Flags

C benchmarks:
-m64 -std=c18 -Wl,-z,muldefs -Wl,-plugin-opt=-inline-threshold=1500
-xsapphirerapids -mprefer-vector-width=512 -O3 -ffp-model=fast -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fno-strict-aliasing -L/usr/local/tcmalloc-2.18.1/lib
-ltcmalloc_minimal

C++ benchmarks:
-m64 -std=c++17 -Wl,-z,muldefs -Wl,-plugin-opt=-inline-threshold=1500
-xsapphirerapids -mprefer-vector-width=512 -O3 -ffp-model=fast -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal

Benchmarks using both C and C++:
-m64 -std=c++17 -std=c18 -Wl,-z,muldefs
-Wl,-plugin-opt=-inline-threshold=1500 -xsapphirerapids
-mprefer-vector-width=512 -O3 -ffp-model=fast -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -fno-strict-aliasing
-L/usr/local/tcmalloc-2.18.1/lib -ltcmalloc_minimal

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2026/results/flags/Lenovo-Platform-SPECcpu-Flags-V1.2-Birchstream-M.html
http://www.spec.org/cpu2026/results/flags/Intel-ic2026-official-linux64-v1.1.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2026/results/flags/Lenovo-Platform-SPECcpu-Flags-V1.2-Birchstream-M.xml
http://www.spec.org/cpu2026/results/flags/Intel-ic2026-official-linux64-v1.1.xml




Tested with SPEC CPU®2026 v1.0.1 on 2026-08-02 16:59:28-0400.
Report generated on 2026-08-27 11:28:19 by CPU2026 PS formatter (86729d3b).
Originally published on 2026-08-26.