



SPEC CPU®2017 Integer Rate Result

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Epsilon IT Sp. z o.o.

SPECrate®2017_int_base = 240

eterio 220 RE3 (2.40 GHz, Intel Xeon Silver 4510)

SPECrate®2017_int_peak = 244

CPU2017 License: 9081

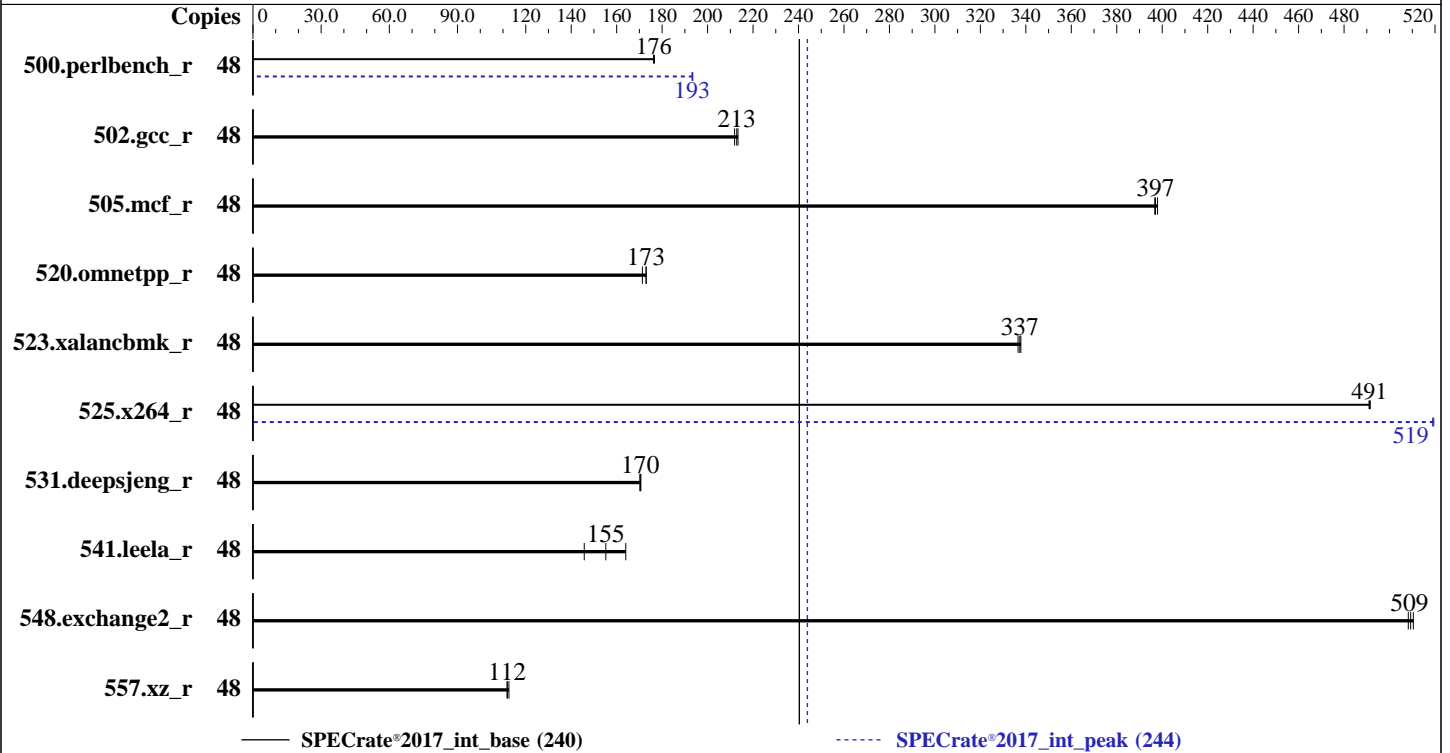
Test Sponsor: Epsilon IT Sp. z o.o.

Tested by: Epsilon IT Sp. z o.o.

Test Date: Feb-2026

Hardware Availability: Dec-2023

Software Availability: Feb-2026



Hardware

CPU Name: Intel Xeon Silver 4510
 Max MHz: 4100
 Nominal: 2400
 Enabled: 24 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chip(s)
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 30 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-6400B-R, running at 4400)
 Storage: 1 x 1.92 TB SATA III SSD
 Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 16.0
 Kernel 6.12.0-160000.9-default x86_64
 Compiler: C/C++: Version 2025.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2025.2 of Intel Fortran Compiler for Linux;
 Parallel: No
 Firmware: BIOS Version 2.8 released Oct-2025
 File System: ext4
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 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	48	433	176	434	176	433	177	48	395	193	396	193	395	194
502.gcc_r	48	319	213	319	213	321	212	48	319	213	319	213	321	212
505.mcf_r	48	196	397	195	397	195	398	48	196	397	195	397	195	398
520.omnetpp_r	48	368	171	364	173	364	173	48	368	171	364	173	364	173
523.xalancbmk_r	48	150	338	150	337	151	337	48	150	338	150	337	151	337
525.x264_r	48	171	492	171	491	171	491	48	162	519	162	519	162	519
531.deepsjeng_r	48	322	171	323	170	323	170	48	322	171	323	170	323	170
541.leela_r	48	512	155	485	164	545	146	48	512	155	485	164	545	146
548.exchange2_r	48	247	508	246	510	247	509	48	247	508	246	510	247	509
557.xz_r	48	460	113	464	112	463	112	48	460	113	464	112	463	112

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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 = "/cpu2017-1.1.9/lib/intel64:/cpu2017-1.1.9/lib/ia32:/cpu2017-1.1.9/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

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.



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Platform Notes

Bios settings:

ENERGY_PERF_BIAS_CFG mode = Performance
Patrol Scrub = Disabled
SNC = Enable SNC2 (2-Clusters)
Hyper-Threading (All) = Enable

BMC Configuration:

Fan mode = Full speed mode

Sysinfo program /cpu2017-1.1.9/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on SUT Fri Feb 27 10:50:14 2026

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

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- 1. uname -a
- 2. w
- 3. Username
- 4. ulimit -a
- 5. sysinfo process ancestry
- 6. /proc/cpuinfo
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- 8. numactl --hardware
- 9. /proc/meminfo
- 10. Systemd service manager version: systemd 257 (257.10+suse.31.gfb9d92682b)
- 11. Services, from systemctl list-unit-files
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- 21. dmidecode
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```
1. uname -a
Linux SUT 6.12.0-160000.9-default #1 SMP PREEMPT_DYNAMIC Fri Jan 16 09:29:05 UTC 2026 (9badd3c) x86_64
x86_64 x86_64 GNU/Linux
```

```
2. w
10:50:14 up 9 min, 2 users, load average: 0.00, 0.03, 0.03
USER  TTY  FROM          LOGIN@  IDLE   JCPU   PCPU   WHAT
root  tty1  -             10:41   13.00s 0.94s  0.01s -bash
root  tty2  -             10:42   28.00s 0.04s  0.04s -bash
```

```
3. Username
From environment variable $USER: root
```

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Platform Notes (Continued)

```

4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size (blocks, -c) unlimited
data seg size (kbytes, -d) unlimited
scheduling priority (-e) 0
file size (blocks, -f) unlimited
pending signals (-i) 4126074
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) 4126074
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

```

```

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize=47
login -- root
-bash
-bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 -c
ic2025.2-linux64-sapphirerapids-rate-20250605.cfg --define smt-on --define cores=24 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak -o pdf intrate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 --configfile
ic2025.2-linux64-sapphirerapids-rate-20250605.cfg --define smt-on --define cores=24 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format pdf --nopower
--runmode rate --tune base:peak --size refrate intrate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /cpu2017-1.1.9

```

```

6. /proc/cpuinfo
model name      : INTEL(R) XEON(R) SILVER 4510
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b000650
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi spectre_v2_user vmscape
cpu cores      : 12
siblings       : 24
2 physical ids (chips)
48 processors (hardware threads)
physical id 0: core ids 0-11
physical id 1: core ids 0-11
physical id 0: apicids 0-23
physical id 1: apicids 64-87
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
virtualized systems. Use the above data carefully.

```

7. lscpu

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Platform Notes (Continued)

From lscpu from util-linux 2.41.1:

```

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):                      48
On-line CPU(s) list:         0-47
Vendor ID:                   GenuineIntel
Model name:                   INTEL(R) XEON(R) SILVER 4510
CPU family:                   6
Model:                       143
Thread(s) per core:          2
Core(s) per socket:          12
Socket(s):                    2
Stepping:                     8
CPU(s) scaling MHz:          20%
CPU max MHz:                  4100.0000
CPU min MHz:                  800.0000
BogoMIPS:                     4800.00
Flags:                        fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                             pse36 clflush dts acpi mmx fxsr sse2 ss ht tm pbe syscall nx
                             pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good
                             nopl xtopology nonstop_tsc cpuid aperfperf tsc_known_freq pni
                             pclmulqdq dtes64 monitor ds_cpl 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 fsgsbase tsc_adjust
                             bmil 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
                             avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
                             vpclmulqdq avx512_vnni avx512_bitalg 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
L1d cache:                   1.1 MiB (24 instances)
L1i cache:                   768 KiB (24 instances)
L2 cache:                     48 MiB (24 instances)
L3 cache:                     60 MiB (2 instances)
NUMA node(s):                 4
NUMA node0 CPU(s):           0-5,24-29
NUMA node1 CPU(s):           6-11,30-35
NUMA node2 CPU(s):           12-17,36-41
NUMA node3 CPU(s):           18-23,42-47
Vulnerability Gather data sampling: Not affected
Vulnerability Indirect target selection: Not affected
Vulnerability Itlb multihit:  Not affected
Vulnerability Lltf:           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

```

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Platform Notes (Continued)

Vulnerability Spectre v2:	Mitigation; Enhanced / Automatic IBRS; IBPB conditional; PRRSB-eIBRS SW sequence; BHI BHI_DIS_S
Vulnerability Srbds:	Not affected
Vulnerability Tsa:	Not affected
Vulnerability Tsx async abort:	Not affected
Vulnerability Vmscape:	Mitigation; IBPB before exit to userspace

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	1.1M	12	Data	1	64	1	64
L1i	32K	768K	8	Instruction	1	64	1	64
L2	2M	48M	16	Unified	2	2048	1	64
L3	30M	60M	15	Unified	3	32768	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: 0-5,24-29
node 0 size: 257627 MB
node 0 free: 257054 MB
node 1 cpus: 6-11,30-35
node 1 size: 258043 MB
node 1 free: 257580 MB
node 2 cpus: 12-17,36-41
node 2 size: 258043 MB
node 2 free: 257414 MB
node 3 cpus: 18-23,42-47
node 3 size: 258031 MB
node 3 free: 257228 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: 1056507172 kB

'who -r' did not return a run level

10. Systemd service manager version: systemd 257 (257.10+suse.31.gfb9d92682b)

```

Default Target Status
multi-user      running

```

11. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	NetworkManager NetworkManager-dispatcher NetworkManager-wait-online appstream-sync-cache audit-rules auditd chronyd dbus-broker firewalld getty@ irqbalance issue-generator kbdsettings klog lvm2-monitor rollback rsyslog smartd soft-reboot-cleanup sshd systemd-pstore wpa_supplicant wtmpdb-update-boot
enabled-runtime	systemd-fsck-root systemd-remount-fs
disabled	blk-availability boot-sysctl ca-certificates ca-certificates-setup chrony-wait console-getty containerd debug-shell dnsmasq docker exchange-bmc-os-info gpm grub2-once hwloc-dump-hwdata ipmievd issue-add-ssh-keys jeos-firstboot jeos-firstboot-snapshot kernel-sysctl kexec-load langset lastlog2-import lunmask lvm-devices-import man-db-create

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Platform Notes (Continued)

```

multipathd nftables nis-domainname rpmconfigcheck rsyncd serial-getty@
setup-systemd-proxy-env smartd_generate_opts snmpd snmptrapd
systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesyncd systemd-udev-load-credentials tuned udisks2
wpa_supplicant@
systemd-userdbd

```

indirect

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

```

BOOT_IMAGE=/boot/vmlinuz-6.12.0-160000.9-default
root=UUID=59f9f04f-e759-4ecc-8e22-28acb39f7f76
mitigations=auto
quiet
security=

```

13. cpupower frequency-info

```

analyzing CPU 25:
  current policy: frequency should be within 800 MHz and 4.10 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

boost state support:
  Supported: yes
  Active: yes

```

14. tuned-adm active

No current active profile.

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

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Platform Notes (Continued)

```

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 16.0

```

```

-----
19. Disk information
SPEC is set to: /cpu2017-1.1.9
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       ext4  877G  20G  813G   3% /

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:          Epsilon IT Sp. z o.o
Product:         eterio 220 RE3
Product Family: Server
Serial:          02600147

```

```

-----
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:
  16x Samsung M321R8GA0PB2-CCPWF 64 GB 2 rank 6400, configured at 4400

```

```

-----
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      American Megatrends International, LLC.
BIOS Version:     2.8
BIOS Date:        10/08/2025
BIOS Revision:    5.32

```

Compiler Version Notes

```

=====
C          | 500.perlbench_r(base, peak) 502.gcc_r(base, peak) 505.mcf_r(base, peak) 525.x264_r(base, peak)
          | 557.xz_r(base, peak)

```

```

-----
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 Intel Corporation. All rights reserved.

```

```

=====
C++       | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
          | 541.leela_r(base, peak)

```

```

-----
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605

```

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Compiler Version Notes (Continued)

Copyright (C) 1985-2025 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2025.2.0 Build 20250605
Copyright (C) 1985-2025 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 -xsaphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/home/specdev/intel-compilers/compiler/2025.2/lib -lqkmalloc

C++ benchmarks:

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

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Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fdelayed-template-parsing
-L/home/specdev/intel-compilers/compiler/2025.2/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/home/specdev/intel-compilers/compiler/2025.2/lib -lqkmalloc
```

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```
500.perlbench_r: -w -std=c11 -m64 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-fno-strict-overflow -fno-strict-aliasing
-L/home/specdev/intel-compilers/compiler/2025.2/lib
-lqkmalloc
```

(Continued on next page)



SPEC CPU®2017 Integer Rate Result

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SPECrate®2017_int_base = 240

eterio 220 RE3 (2.40 GHz, Intel Xeon Silver 4510)

SPECrate®2017_int_peak = 244

CPU2017 License: 9081

Test Sponsor: Epsilon IT Sp. z o.o.

Tested by: Epsilon IT Sp. z o.o.

Test Date: Feb-2026

Hardware Availability: Dec-2023

Software Availability: Feb-2026

Peak Optimization Flags (Continued)

502.gcc_r: basepeak = yes

505.mcf_r: basepeak = yes

```
525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fno-alias
-L/home/specdev/intel-compilers/compiler/2025.2/lib
-lqkmalloc
```

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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

<http://www.spec.org/cpu2017/flags/Intel-ic2025-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Epsilon-Platform-Flags-RevA-Feb-2026-For-Intel-Processors.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2025-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Epsilon-Platform-Flags-RevA-Feb-2026-For-Intel-Processors.xml>

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Tested with SPEC CPU®2017 v1.1.9 on 2026-02-27 04:50:13-0500.

Report generated on 2026-03-25 10:08:00 by CPU2017 PDF formatter v6716.

Originally published on 2026-03-24.