



SPEC CPU®2017 Integer Rate Result

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xFusion

SPECrate®2017_int_base = 890

SPECrate®2017_int_peak = Not Run

CPU2017 License: 6488

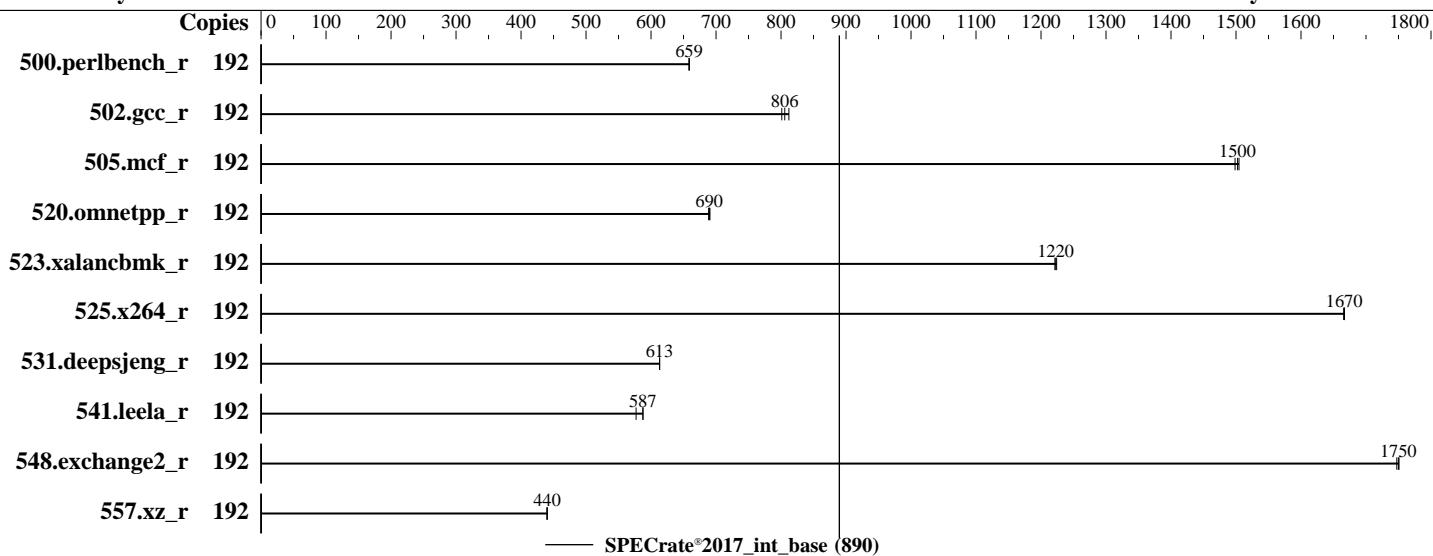
Test Sponsor: xFusion

Tested by: xFusion

Test Date: Apr-2024

Hardware Availability: Jul-2023

Software Availability: Dec-2023



Hardware

CPU Name: Intel Xeon Gold 6418H
Max MHz: 4000
Nominal: 2100
Enabled: 96 cores, 4 chips, 2 threads/core
Orderable: 1,2,4 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 60 MB I+D on chip per chip
Other: None
Memory: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB SATA SSD
Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
5.14.0-70.13.1.el9_0.x86_64
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 01.02.01.04 Released Jan-2024
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	Seconds	Ratio
500.perlbench_r	192	464	659	464	659	464	659									
502.gcc_r	192	339	801	335	812	337	806									
505.mcf_r	192	207	1500	206	1500	207	1500									
520.omnetpp_r	192	365	690	366	689	365	691									
523.xalancbmk_r	192	166	1220	166	1220	166	1220									
525.x264_r	192	202	1670	202	1670	202	1670									
531.deepsjeng_r	192	359	613	359	613	359	613									
541.leela_r	192	541	587	541	588	551	577									
548.exchange2_r	192	287	1750	288	1750	287	1750									
557.xz_r	192	471	440	471	440	471	440									

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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/Uniautos/cpu2017/lib/intel64:/home/Uniautos/cpu2017/lib/ia32:/home/Uniautos/cpu2017/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.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)

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General Notes (Continued)

is mitigated in the system as tested and documented.

Platform Notes

BIOS configuration:

Performance Profile Set to Performance

SNC Set to Enable SNC2 (2-clusters)

```
Sysinfo program /home/Uniautos/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Apr 19 20:51:04 2024
```

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 250 (250-6.el9_0)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

1. uname -a
Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 x86_64 GNU/Linux

2. w
20:51:04 up 21 min, 2 users, load average: 0.69, 37.32, 36.55
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root pts/0 20:32 24.00s 1.08s 0.05s -bash
root pts/1 20:36 6:48 0.05s 0.05s -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) 0  
data seg size (kbytes, -d) unlimited  
scheduling priority (-e) 0  
file size (blocks, -f) unlimited  
pending signals (-i) 8253922  
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) 8253922  
virtual memory (kbytes, -v) unlimited  
file locks (-x) unlimited
```

```
-----  
5. sysinfo process ancestry  
/usr/lib/systemd/systemd --switched-root --system --deserialize 30  
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups  
sshd: root [priv]  
sshd: root@pts/0  
-bash  
/bin/sh ./test-rate-cpu2017.sh  
runcpu --define default-platform-flags --copies 192 -c ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg  
--define smt-on --define cores=96 --define physicalfirst --define invoke_with_interleave --define  
drop_caches --tune base -o all intrate  
runcpu --define default-platform-flags --copies 192 --configfile  
ic2023.2.3-lin-sapphirerapids-rate-20231121.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/CPU2017.121/templogs/preenv.intrate.121.0.log --lognum 121.0 --from_runcpu 2  
specperl $SPEC/bin/sysinfo  
$SPEC = /home/Uniautos/cpu2017
```

```
-----  
6. /proc/cpuinfo  
model name : Intel(R) Xeon(R) Gold 6418H  
vendor_id : GenuineIntel  
cpu family : 6  
model : 143  
stepping : 8  
microcode : 0xb0004d0  
bugs : spectre_v1 spectre_v2 spec_store_bypass swapgs  
cpu cores : 24  
siblings : 48  
4 physical ids (chips)  
192 processors (hardware threads)  
physical id 0: core ids 0-23  
physical id 1: core ids 0-23  
physical id 2: core ids 0-23  
physical id 3: core ids 0-23  
physical id 0: apicids 0-47  
physical id 1: apicids 128-175  
physical id 2: apicids 256-303  
physical id 3: apicids 384-431
```

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Platform Notes (Continued)

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 2.37.4:
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): 192
On-line CPU(s) list: 0-191
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) Gold 6418H
BIOS Model name: Intel(R) Xeon(R) Gold 6418H
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 4
Stepping: 8
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 xtTopology
      nonstop_tsc cpuid aperf mperf 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_13 cat_12 cdp_13 invpcid_single
      intel_ppin cdp_12 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
      flexpriority ept vpid ept_ad 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 cqmm_llc cqmm_occu_llc cqmm_mbmm_total cqmm_mbmm_local split_lock_detect
      avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts avx512vbm1 umip pkru
      ospke waitpkg avx512_vbm1_2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
      tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdir64b
      enqcmd fsrm md_clear serialize tsxlptrk pconfig arch_lbr avx512_fp16
      amx_tile flush_ll1d arch_capabilities
Virtualization: VT-x
L1d cache: 4.5 MiB (96 instances)
L1i cache: 3 MiB (96 instances)
L2 cache: 192 MiB (96 instances)
L3 cache: 240 MiB (4 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-11,96-107
NUMA node1 CPU(s): 12-23,108-119
NUMA node2 CPU(s): 24-35,120-131
NUMA node3 CPU(s): 36-47,132-143
NUMA node4 CPU(s): 48-59,144-155
NUMA node5 CPU(s): 60-71,156-167
NUMA node6 CPU(s): 72-83,168-179
NUMA node7 CPU(s): 84-95,180-191
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
```

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Platform Notes (Continued)

Vulnerability Spectre v1:

Mitigation: usercopy/swapgs 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	4.5M	12	Data	1	64	1	64
L1i	32K	3M	8	Instruction	1	64	1	64
L2	2M	192M	16	Unified	2	2048	1	64
L3	60M	240M	15	Unified	3	65536	1	64

8. numactl --hardware

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

available: 8 nodes (0-7)

node 0 cpus: 0-11,96-107

node 0 size: 257275 MB

node 0 free: 256480 MB

node 1 cpus: 12-23,108-119

node 1 size: 258042 MB

node 1 free: 257489 MB

node 2 cpus: 24-35,120-131

node 2 size: 258042 MB

node 2 free: 257547 MB

node 3 cpus: 36-47,132-143

node 3 size: 258042 MB

node 3 free: 257548 MB

node 4 cpus: 48-59,144-155

node 4 size: 258042 MB

node 4 free: 257406 MB

node 5 cpus: 60-71,156-167

node 5 size: 258042 MB

node 5 free: 257298 MB

node 6 cpus: 72-83,168-179

node 6 size: 258006 MB

node 6 free: 257337 MB

node 7 cpus: 84-95,180-191

node 7 size: 258022 MB

node 7 free: 257504 MB

node distances:

	0	1	2	3	4	5	6	7
0:	10	12	21	21	21	21	21	21
1:	12	10	21	21	21	21	21	21
2:	21	21	10	12	21	21	21	21
3:	21	21	12	10	21	21	21	21
4:	21	21	21	21	10	12	21	21
5:	21	21	21	21	12	10	21	21
6:	21	21	21	21	21	21	10	12
7:	21	21	21	21	21	12	10	21

9. /proc/meminfo

MemTotal: 2113042196 kB

10. who -r

run-level 3 Apr 19 20:29

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Platform Notes (Continued)

11. Systemd service manager version: systemd 250 (250-6.el9_0)
Default Target Status
multi-user degraded

12. Failed units, from systemctl list-units --state=failed
UNIT LOAD ACTIVE SUB DESCRIPTION
* sep5.service loaded failed failed systemd script to load sep5 driver at boot time

13. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online audited crond
dbus-broker firewalld getty@ irqbalance kdump mdmonitor microcode nis-domainname rhsmcertd
rsyslog selinux-autorelabel-mark sep5 sshd sssd systemd-network-generator tuned udisks2
enabled-runtime systemd-remount-fs
disabled console-getty cpupower debug-shell kvm_stat man-db-restart-cache-update nftables rdisc
rhsm rhsm-facts rpmbuild rebuild serial-getty@ sshd-keygen@ systemd-boot-check-no-failures
systemd-pstore systemd-sysext
indirect sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

14. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd2,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
root=UUID=fc5aaa98-7763-4e7f-8371-1b1810d17883
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=UUID=62bda881-0d36-43ce-826e-76cb2ea35911
nohz_full=1-143

15. cpupower frequency-info
analyzing CPU 0:
 Unable to determine current policy
 boost state support:
 Supported: yes
 Active: yes

16. tuned-adm active
Current active profile: throughput-performance

17. 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 40
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 10

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Platform Notes (Continued)

```
vm.watermark_boost_factor      15000
vm.watermark_scale_factor      10
vm.zone_reclaim_mode          0

-----
18. /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

-----
19. /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

-----
20. OS release
    From /etc/*-release /etc/*-version
    os-release      Red Hat Enterprise Linux 9.0 (Plow)
    redhat-release  Red Hat Enterprise Linux release 9.0 (Plow)
    system-release  Red Hat Enterprise Linux release 9.0 (Plow)

-----
21. Disk information
    SPEC is set to: /home/Uniautos/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sdc3        xfs   272G  35G  238G  13%  /home

-----
22. /sys/devices/virtual/dmi/id
    Vendor:          XFUSION
    Product:         2488H V7
    Product Family: EagleStream

-----
23. dmidecode
    Additional information from dmidecode 3.3 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:
    1x Hynix HMCG94AEBRA102N 64 GB 2 rank 4800
    22x Hynix HMCG94AEBRA108N 64 GB 2 rank 4800
    8x Hynix HMCG94AEBRA109N 64 GB 2 rank 4800
    1x Hynix HMCG94AEBRA123N 64 GB 2 rank 4800

-----
24. BIOS
    (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:      XFUSION
    BIOS Version:    01.02.01.04
    BIOS Date:       01/15/2024
```



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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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====

Fortran | 548.exchange2_r(base)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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



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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/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin  
-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/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin  
-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/new_compilers/ic2023.2.3/compiler/lib/intel64_lin  
-lqkmalloc
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html>
<http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-SPR-V1.1-revC.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml>
<http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-SPR-V1.1-revC.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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