SPEC CPU®2017 Integer Rate Result

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xFusion

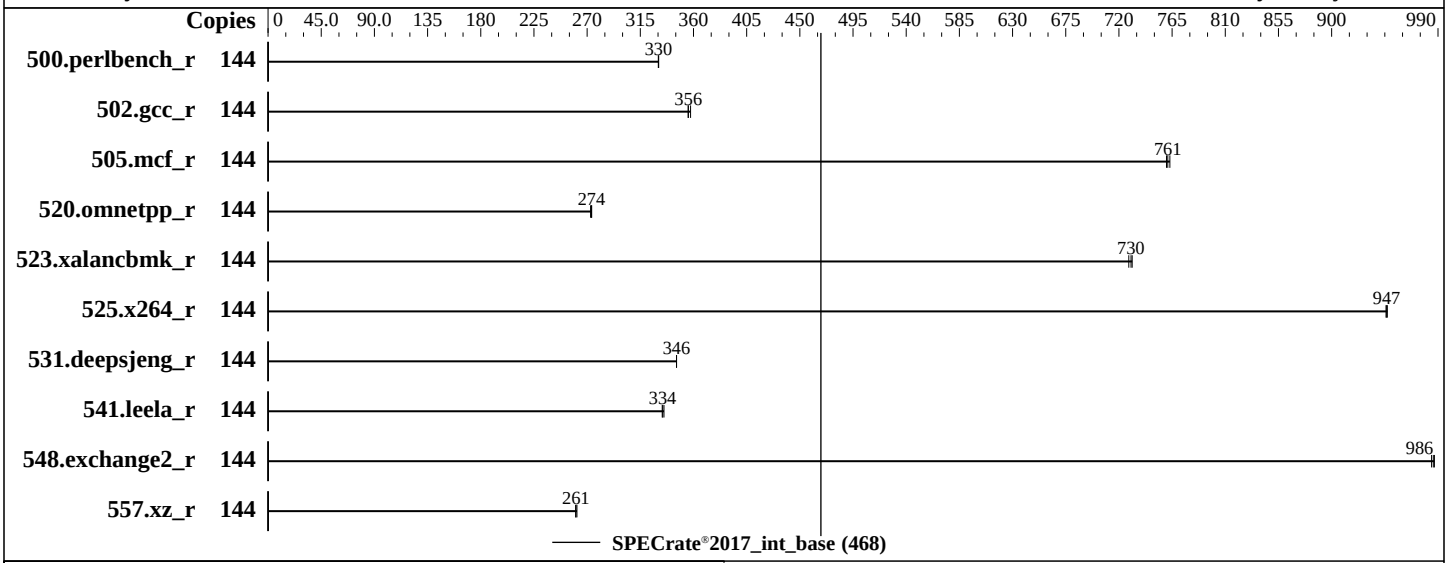
xFusion 2288H V6 (Intel Xeon Platinum 8352V)

SPECrate®2017_int_base = 468

SPECrate®2017_int_peak = Not Run

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Mar-2023
Hardware Availability: Apr-2021
Software Availability: May-2022



Hardware

CPU Name:	Intel Xeon Platinum 8352V
Max MHz:	3500
Nominal:	2100
Enabled:	72 cores, 2 chips, 2 threads/core
Orderable:	1,2 chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	1.25 MB I+D on chip per core
L3:	54 MB I+D on chip per chip
Other:	None
Memory:	512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
Storage:	1 x 960 GB SATA SSD
Other:	None

Software

OS:	Red Hat Enterprise Linux 8.4 (Ootpa) 4.18.0-305.el8.x86_64
Compiler:	C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
Parallel:	No
Firmware:	Version 1.35 Released Feb-2023
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
500.perlbench_r	144	**694**	**330**	694	331	694	330							
502.gcc_r	144	574	355	570	358	**573**	**356**							
505.mcf_r	144	**306**	**761**	305	763	306	760							
520.omnetpp_r	144	690	274	**690**	**274**	692	273							
523.xalancbmk_r	144	**208**	**730**	208	731	209	728							
525.x264_r	144	267	946	**266**	**947**	266	947							
531.deepsjeng_r	144	477	346	477	346	**477**	**346**							
541.leela_r	144	712	335	715	334	**714**	**334**							
548.exchange2_r	144	382	987	**383**	**986**	383	985							
557.xz_r	144	598	260	**597**	**261**	595	261							

SPECrate®2017_int_base = 468

SPECrate®2017_int_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
SPEC has ruled that the compiler used for this result was performing a compilation
that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s
benchmarks using a priori knowledge of the SPEC code and dataset to perform a
transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4
https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer
publish results using this optimization.

This result is left in the SPEC results database for historical reference.
```

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 = "/spec2017_1.19/lib/intel64:/spec2017_1.19/lib/ia32:/spec2017_1.19/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)
is mitigated in the system as tested and documented.
```

Platform Notes

```
BIOS configuration:
Performance Profile Set to Performance
SNC Set to Enabled SNC2 (2-clusters)

Sysinfo program /spec2017_1.19/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Mar  3 05:13:18 2023

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 239 (239-45.el8)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021 x86_64 x86_64 x86_64
```

(Continued on next page)

Platform Notes (Continued)

```
  GNU/Linux

------------------------------------------------------------
2. w
   05:13:18 up 14:27,  2 users,  load average: 0.08, 0.02, 0.03
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                Thu14    6.00s  2.05s  0.08s -bash
  root     pts/0    70.167.0.2       04:30   41:39   0.06s  0.00s less CPU2017.010.intrate.txt

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

------------------------------------------------------------
4. ulimit -a
  core file size          (blocks, -c) 0
  data seg size           (kbytes, -d) unlimited
  scheduling priority             (-e) 0
  file size               (blocks, -f) unlimited
  pending signals                 (-i) 2059989
  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) 2059989
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 18
 login -- root
 -bash
 -bash
 runcpu --define default-platform-flags --copies 144 -c ic2022.1-lin-core-avx512-rate-20220316.cfg --define
   smt-on --define cores=72 --define physicalfirst --define invoke_with_interleave --define drop_caches
   --tune base -o all intrate
 runcpu --define default-platform-flags --copies 144 --configfile ic2022.1-lin-core-avx512-rate-20220316.cfg
   --define smt-on --define cores=72 --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/CPU2017.012/templogs/preenv.intrate.012.0.log --lognum 012.0
   --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /spec2017_1.19

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 106
    stepping        : 6
    microcode       : 0xd000363
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 36
    siblings        : 72
```

(Continued on next page)

Platform Notes (Continued)

```
     2 physical ids (chips)
     144 processors (hardware threads)
     physical id 0: core ids 0-35
     physical id 1: core ids 0-35
     physical id 0: apicids 0-71
     physical id 1: apicids 128-199
   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 2.32.1:
   Architecture:        x86_64
   CPU op-mode(s):      32-bit, 64-bit
   Byte Order:          Little Endian
   CPU(s):              144
   On-line CPU(s) list: 0-143
   Thread(s) per core:  2
   Core(s) per socket:  36
   Socket(s):           2
   NUMA node(s):        4
   Vendor ID:           GenuineIntel
   BIOS Vendor ID:      Intel(R) Corporation
   CPU family:          6
   Model:               106
   Model name:          Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
   BIOS Model name:     Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
   Stepping:            6
   CPU MHz:             2499.997
   BogoMIPS:            4200.00
   Virtualization:      VT-x
   L1d cache:           48K
   L1i cache:           32K
   L2 cache:            1280K
   L3 cache:            55296K
   NUMA node0 CPU(s):   0-17,72-89
   NUMA node1 CPU(s):   18-35,90-107
   NUMA node2 CPU(s):   36-53,108-125
   NUMA node3 CPU(s):   54-71,126-143
   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 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_l3 invpcid_single ssbd mba ibrs ibpb stibp
                        ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1
                        hle 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 wbnoinvd
                        dtherm ida arat pln pts hwp_epp avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes
                        vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid fsrm md_clear
                        pconfig flush_l1d arch_capabilities

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0-17,72-89
   node 0 size: 128027 MB
```

(Continued on next page)

Platform Notes (Continued)

```
  node 0 free: 126590 MB
  node 1 cpus: 18-35,90-107
  node 1 size: 129016 MB
  node 1 free: 127755 MB
  node 2 cpus: 36-53,108-125
  node 2 size: 129016 MB
  node 2 free: 127450 MB
  node 3 cpus: 54-71,126-143
  node 3 size: 128974 MB
  node 3 free: 127736 MB
  node distances:
  node   0   1   2   3
    0:  10  11  20  20
    1:  11  10  20  20
    2:  20  20  10  11
    3:  20  20  11  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       527394876 kB

------------------------------------------------------------
10. who -r
  run-level 3 Mar 2 14:46

------------------------------------------------------------
11. Systemd service manager version: systemd 239 (239-45.el8)
  Default Target  Status
  multi-user      running

------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE      UNIT FILES
  enabled    NetworkManager NetworkManager-dispatcher NetworkManager-wait-online atd auditd autovt@ chronyd
             crond firewalld getty@ import-state irqbalance iscsi iscsi-onboot kdump libstoragemgmt
             loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
             nvmefc-boot-connections rhsmcertd rsyslog selinux-autorelabel-mark smartd sshd sssd syslog
             sysstat timedatex tuned udisks2 vdo
  disabled   arp-ethers blk-availability chrony-wait console-getty cpupower debug-shell ebtables httpd httpd@
             iprdump iprinit iprupdate ipsec iscsid iscsiuio kpatch kvm_stat ledmon nftables nvmf-autoconnect
             oddjobd phoromatic-client phoromatic-server phoronix-result-server php-fpm pmcd pmfind pmie
             pmie_check pmlogger pmlogger_check pmproxy psacct rdisc rhcd rhsm rhsm-facts serial-getty@ snmpd
             snmptrapd sshd-keygen@ systemd-resolved tcsd
  generated  SystemTap compile-server gcc-toolset-10-stap-server gcc-toolset-10-systemtap
             gcc-toolset-9-stap-server gcc-toolset-9-systemtap mst scripts startup
  indirect   sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
  masked     systemd-timedated

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd0,gpt3)/boot/vmlinuz-4.18.0-305.el8.x86_64
  root=UUID=9304e5cd-2e1d-48f6-9359-484ddf980c8a
  ro
  crashkernel=auto
  resume=UUID=aff4e6f4-0757-4e74-b0fd-4e11814d5ccb
  rhgb
  quiet
  idle=poll
  intel_idle.max_cstate=0
```

(Continued on next page)

Platform Notes (Continued)

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

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

------------------------------------------------------------
16. sysctl
  kernel.numa_balancing              1
  kernel.randomize_va_space          2
  vm.compaction_proactiveness        0
  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
  vm.watermark_boost_factor      15000
  vm.watermark_scale_factor         10
  vm.zone_reclaim_mode               0

------------------------------------------------------------
17. /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

------------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_swap              64
  pages_to_scan            4096
  scan_sleep_millisecs    10000

------------------------------------------------------------
19. OS release
  From /etc/*-release /etc/*-version
  os-release     Red Hat Enterprise Linux 8.4 (Ootpa)
  redhat-release Red Hat Enterprise Linux release 8.4 (Ootpa)
  system-release Red Hat Enterprise Linux release 8.4 (Ootpa)

------------------------------------------------------------
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
  itlb_multihit        Not affected
```

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Platform Notes (Continued)

```
   l1tf                Not affected
   mds                 Not affected
   meltdown            Not affected
   spec_store_bypass   Mitigation: Speculative Store Bypass disabled via prctl and seccomp
   spectre_v1          Mitigation: usercopy/swapgs barriers and __user pointer sanitization
   spectre_v2          Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
   srbds               Not affected
   tsx_async_abort     Not affected
For more information, see the Linux documentation on hardware vulnerabilities, for example
     https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html

------------------------------------------------------------
21. Disk information
SPEC is set to: /spec2017_1.19
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda3      xfs   859G  117G  743G  14% /

------------------------------------------------------------
22. /sys/devices/virtual/dmi/id
    Vendor:          XFUSION
    Product:         2288H V6
    Product Family: Whitley
    Serial:          Serial

------------------------------------------------------------
23. dmidecode
  Additional information from dmidecode 3.2 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 M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933


------------------------------------------------------------
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       XFUSION
   BIOS Version:      1.35
   BIOS Date:         02/14/2023
   BIOS Revision:     1.35
```

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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
```

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Compiler Version Notes (Continued)

```
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

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Base Optimization Flags (Continued)

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2022.1.0/linux/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-ic2022-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-ICX-V1.2.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-ICX-V1.2.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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