SPEC CPU®2017 Integer Speed Result

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New H3C Technologies Co., Ltd.

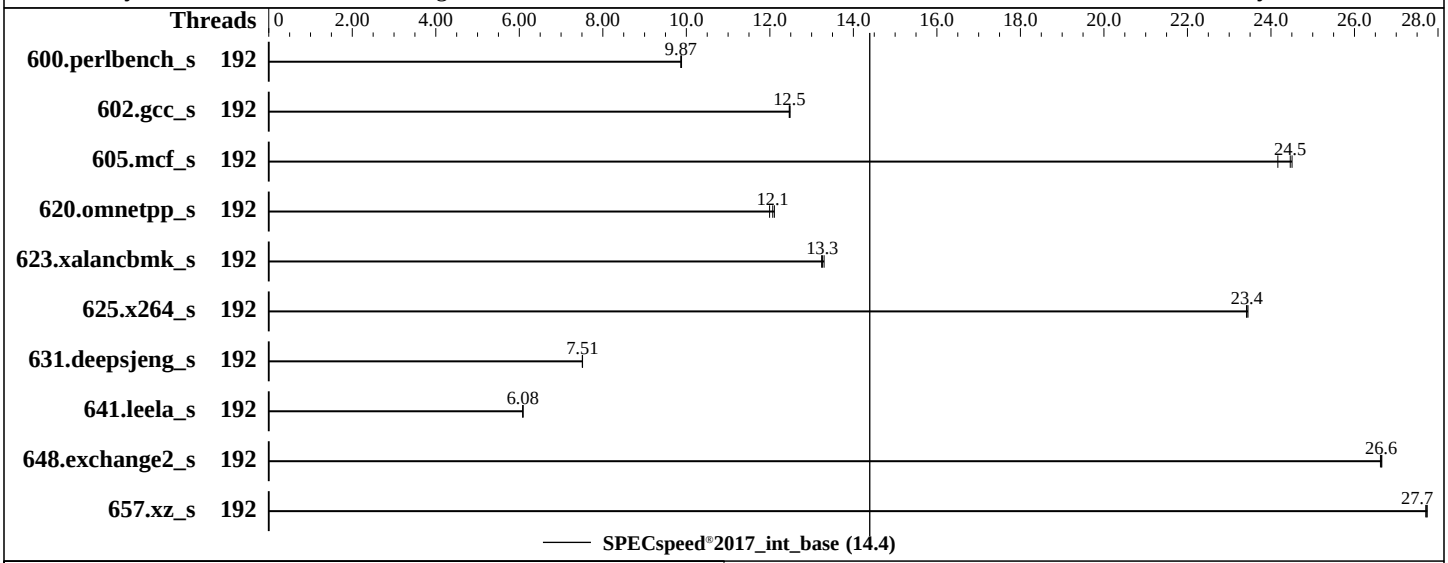
H3C UniServer R3900 G7 (Intel Xeon 6972P)

SPECspeed®2017_int_base = 14.4

SPECspeed®2017_int_peak = Not Run

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

Test Date: Aug-2025
Hardware Availability: Jan-2025
Software Availability: Jun-2024



Hardware

CPU Name:	Intel Xeon 6972P
Max MHz:	3900
Nominal:	2400
Enabled:	96 cores, 1 chip, 2 threads/core
Orderable:	1 chip
Cache L1:	64 KB I + 48 KB D on chip per core
L2:	2 MB I+D on chip per core
L3:	480 MB I+D on chip per chip
Other:	None
Memory:	768 GB (12 x 64 GB 4Rx8 PC5-88/64B-H)
Storage:	1 x 1.92 TB SATA SSD
Other:	CPU Cooling: Air

Software

OS:	SUSE Linux Enterprise Server 15 SP6 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:	Yes
Firmware:	Version 7.10.18 released Aug-2025 BIOS
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 and OS set to prefer performance at the cost of additional power usage.

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	192	**180**	**9.87**	180	9.87	180	9.89							
602.gcc_s	192	**319**	**12.5**	319	12.5	319	12.5							
605.mcf_s	192	195	24.2	193	24.5	**193**	**24.5**							
620.omnetpp_s	192	135	12.1	136	12.0	**135**	**12.1**							
623.xalancbmk_s	192	107	13.2	107	13.3	**107**	**13.3**							
625.x264_s	192	**75.3**	**23.4**	75.3	23.4	75.2	23.4							
631.deepsjeng_s	192	191	7.51	**191**	**7.51**	191	7.51							
641.leela_s	192	280	6.09	**280**	**6.08**	280	6.08							
648.exchange2_s	192	110	26.6	**110**	**26.6**	110	26.7							
657.xz_s	192	223	27.7	223	27.7	**223**	**27.7**							

SPECspeed®2017_int_base = 14.4

SPECspeed®2017_int_peak = Not Run

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

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/speccpu/lib/intel64:/home/speccpu/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Redhat Enterprise Linux 8.0
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
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.
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 Settings:
 SNC = Enable
 LLC Prefetch = Enabled
 ACPI C6x Enumeration =  C6 as ACPI C2
BMC Settings:
 Fan mode = powerful mode

 Sysinfo program /home/speccpu/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Aug 21 14:17:03 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. tuned-adm active
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. 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
    14:17:03 up 4 min,  1 user,  load average: 0.10, 0.25, 0.13
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                14:16    6.00s  0.86s  0.00s -bash

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

 ------------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
```

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Platform Notes (Continued)

```
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 3094081
   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) 3094081
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=31
 login -- root
 -bash
 -bash
 runcpu --nobuild --action validate --define default-platform-flags -c
   ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=96 --tune base -o all --define
   intspeedaffinity --define smt-on --define drop_caches intspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=96 --tune base --output_format all --define
   intspeedaffinity --define smt-on --define drop_caches --nopower --runmode speed --tune base --size
   refspeed intspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.013/templogs/preenv.intspeed.013.0.log --lognum 013.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpu

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) 6972P
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 173
    stepping        : 1
    microcode       : 0x10003a5
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
    cpu cores       : 96
    siblings        : 192
    1 physical ids (chips)
    192 processors (hardware threads)
    physical id 0: core ids 0-31,64-95,128-159
    physical id 0: apicids 0-63,128-191,256-319
  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 2.39.3:
  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):                               192
  On-line CPU(s) list:                  0-191
```

(Continued on next page)

Platform Notes (Continued)

```
Vendor ID:                        GenuineIntel
BIOS Vendor ID:                   Intel(R) Corporation
Model name:                       Intel(R) Xeon(R) 6972P
BIOS Model name:                  Intel(R) Xeon(R) 6972P UNKNOWN CPU @ 2.4GHz
BIOS CPU family:                  179
CPU family:                       6
Model:                            173
Thread(s) per core:               2
Core(s) per socket:               96
Socket(s):                        1
Stepping:                         1
CPU(s) scaling MHz:               25%
CPU max MHz:                      3900.0000
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 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 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 hwp hwp_act_window hwp_epp hwp_pkg_req hfi 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:                        4.5 MiB (96 instances)
L1i cache:                        6 MiB (96 instances)
L2 cache:                         192 MiB (96 instances)
L3 cache:                         480 MiB (1 instance)
NUMA node(s):                     3
NUMA node0 CPU(s):                0-31,96-127
NUMA node1 CPU(s):                32-63,128-159
NUMA node2 CPU(s):                64-95,160-191
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
```

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Platform Notes (Continued)

```
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       64K       6M   16 Instruction     1     64        1             64
     L2         2M     192M   16 Unified         2   2048        1             64
     L3       480M     480M   16 Unified         3 491520        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 3 nodes (0-2)
  node 0 cpus: 0-31,96-127
  node 0 size: 257525 MB
  node 0 free: 256672 MB
  node 1 cpus: 32-63,128-159
  node 1 size: 258031 MB
  node 1 free: 257040 MB
  node 2 cpus: 64-95,160-191
  node 2 size: 257989 MB
  node 2 free: 256651 MB
  node distances:
  node   0   1   2
    0:  10  15  17
    1:  15  10  15
    2:  17  15  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       792110820 kB

------------------------------------------------------------
10. who -r
  run-level 3 Aug 21 14:14

------------------------------------------------------------
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          apparmor auditd cron getty@ irqbalance issue-generator kbdsettings nvmefc-boot-connections
                   nvmf-autoconnect postfix purge-kernels rollback sshd systemd-pstore wicked wickedd-auto4
                   wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
  enabled-runtime  systemd-remount-fs
  disabled         boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell ebtables
                   firewalld grub2-once haveged issue-add-ssh-keys kexec-load lunmask rpmconfigcheck
                   serial-getty@ systemd-boot-check-no-failures systemd-confext systemd-network-generator
                   systemd-sysext systemd-time-wait-sync systemd-timesyncd tuned
  indirect         systemd-userdbd wickedd

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
  root=UUID=03df628f-a54f-4ed2-a425-1eca99e7955e
  splash=silent
  resume=/dev/disk/by-uuid/d0a137a8-ca58-4e61-9c66-e8cc3459ffb6
  mitigations=auto
  quiet
```

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Platform Notes (Continued)

```
  security=apparmor

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 33:
    current policy: frequency should be within 800 MHz and 3.90 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

------------------------------------------------------------
15. tuned-adm active
  No current active profile.

------------------------------------------------------------
16. 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

------------------------------------------------------------
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_shared           256
  max_ptes_swap              64
  pages_to_scan            4096
  scan_sleep_millisecs    10000

------------------------------------------------------------
19. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP6
```

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Platform Notes (Continued)

```
------------------------------------------------------------
20. Disk information
SPEC is set to: /home/speccpu
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p3 xfs   1.1T   52G 1016G   5% /home

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         New H3C Technologies Co., Ltd.
    Product:        H3C UniServer R3900 G7
    Product Family: Rack
    Serial:         210235A526H249000006

------------------------------------------------------------
22. 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:
    12x Hynix HMCG98BDJHA381N 64 GB 4 rank 8800


------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      7.10.18
   BIOS Date:         08/07/2025
   BIOS Revision:     5.35
   Firmware Revision: 2.3
```

Compiler Version Notes

```
==============================================================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(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++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(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.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran | 648.exchange2_s(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.
--------------------------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

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 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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

http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.html
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-Intel-GNR-RevC.html

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

http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml
http://www.spec.org/cpu2017/flags/New_H3C-Platform-Settings-Intel-GNR-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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