SPEC CPU®2017 Integer Rate Result

Fujitsu

PRIMERGY TX1320 M6,
Intel Xeon E-2468, 2.6 GHz

$SPECrate®2017\_int\_base =$ 81.4

$SPECrate®2017\_int\_peak =$ Not Run
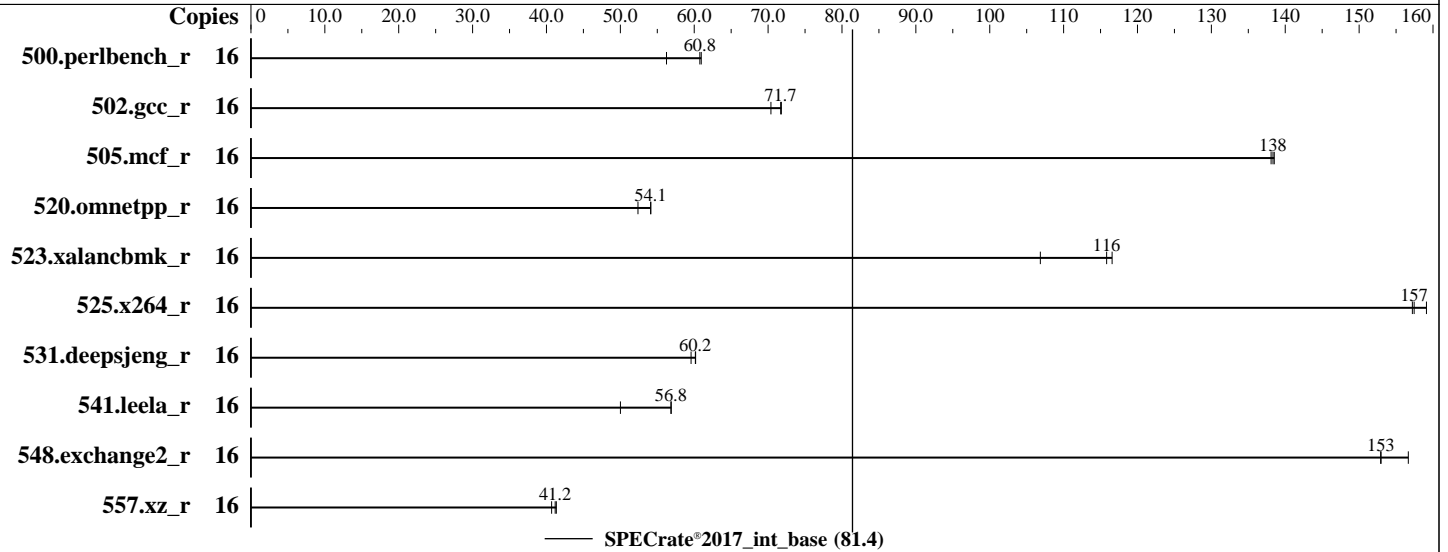
CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Mar-2024
Hardware Availability: Apr-2024
Software Availability: Dec-2023

Copies		
500.perlbench_r	16	60.8
502.gcc_r	16	71.7
505.mcf_r	16	138
520.omnetpp_r	16	54.1
523.xalancbmk_r	16	116
525.x264_r	16	157
531.deepsjeng_r	16	60.2
541.leela_r	16	56.8
548.exchange2_r	16	153
557.xz_r	16	41.2

SPECrate®2017_int_base (81.4)

Hardware

CPU Name: Intel Xeon E-2468
 Max MHz: 5200
 Nominal: 2600
Enabled: 8 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 24 MB I+D on chip per chip
 Other: None
Memory: 64 GB (2 x 32 GB 2Rx8 PC5-4800B-E,
 running at 4400)
Storage: 1 x SATA M.2 SSD, 960 GB
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 5.14.21-150500.53-default
Compiler: C/C++: Version 2024.0.2 of Intel oneAPI
 DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.0.2 of Intel Fortran
 Compiler for Linux;
Parallel: No
Firmware: Fujitsu BIOS Version V5.0.0.27 R1.5.0 for
 D4132-A1x. Released Jul-2024
 tested as V5.0.0.27 R1.0.0 for D4132-A1x Mar-2024
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS set to prefer performance
 at the cost of additional power usage

Standard Performance Evaluation Corporation (info@spec.org)
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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	16	453	56.2	**419**	**60.8**	418	61.0							
502.gcc_r	16	322	70.4	**316**	**71.7**	316	71.8							
505.mcf_r	16	**187**	**138**	187	139	187	138							
520.omnetpp_r	16	388	54.1	**388**	**54.1**	401	52.4							
523.xalancbmk_r	16	**146**	**116**	145	117	158	107							
525.x264_r	16	178	157	**178**	**157**	176	159							
531.deepsjeng_r	16	308	59.6	**305**	**60.2**	305	60.2							
541.leela_r	16	530	50.0	**466**	**56.8**	466	56.9							
548.exchange2_r	16	268	157	274	153	**274**	**153**							
557.xz_r	16	418	41.3	425	40.7	**420**	**41.2**							
SPECrate®2017_int_base =			**81.4**											
SPECrate®2017_int_peak =			**Not Run**											

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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/Benchmark/speccpu/lib/intel64:/home/Benchmark/speccpu/lib/ia32:/home/Benchmark/speccpu/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
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 configuration:
Fan Control = Full
Intel(R) Turbo Boost Max Technology 3.0 = Disabled
Total Memory Encryption = Disabled


Sysinfo program /home/Benchmark/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Mon Mar 25 17:31:09 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 249 (249.16+suse.171.gdad0071f15)
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
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
------------------------------------------------------------


------------------------------------------------------------
1. uname -a
  Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
  x86_64 x86_64 x86_64 GNU/Linux


------------------------------------------------------------
2. w
   17:31:09 up 23 min,  1 user,  load average: 0.00, 0.00, 0.00
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                17:29   13.00s  0.80s  0.05s -bash


------------------------------------------------------------
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
```

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Platform Notes (Continued)

```
  pending signals               (-i) 254568
  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) 254568
  virtual memory         (kbytes, -v) unlimited
  file locks                    (-x) unlimited

  ---------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 30
 login -- root
 -bash
 -bash
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=16 -c
   ic2024.0.2-lin-core-avx2-rate-20231213.cfg --define smt-on --define cores=8 --define physicallogical
   --define no-numa --tune base -o all --define drop_caches intrate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=16 --configfile
   ic2024.0.2-lin-core-avx2-rate-20231213.cfg --define smt-on --define cores=8 --define physicallogical
   --define no-numa --tune base --output_format all --define drop_caches --nopower --runmode rate --tune base
   --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 = /home/Benchmark/speccpu

  ---------------------------------------------------------
6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) E E-2468
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 183
   stepping        : 1
   microcode       : 0x121
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
   cpu cores       : 8
   siblings        : 16
   1 physical ids (chips)
   16 processors (hardware threads)
   physical id 0: core ids 0-7
   physical id 0: apicids 0-15
  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, 48 bits virtual
  Byte Order:                Little Endian
  CPU(s):                    16
  On-line CPU(s) list:       0-15
  Vendor ID:                 GenuineIntel
  Model name:                Intel(R) Xeon(R) E E-2468
```

(Continued on next page)

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Platform Notes (Continued)

```
   CPU family:                      6
   Model:                           183
   Thread(s) per core:              2
   Core(s) per socket:              8
   Socket(s):                       1
   Stepping:                        1
   CPU max MHz:                     6700.0000
   CPU min MHz:                     800.0000
   BogoMIPS:                        5222.40
   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 sse4_1 sse4_2
                                    x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
                                    abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd ibrs ibpb stibp
                                    ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase
                                    tsc_adjust bmi1 avx2 smep bmi2 erms invpcid rdseed adx smap clflushopt
                                    clwb intel_pt sha_ni xsaveopt xsavec xgetbv1 xsaves split_lock_detect
                                    avx_vnni dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
                                    hwp_pkg_req hfi umip pku ospke waitpkg gfni vaes vpclmulqdq tme rdpid
                                    movdiri movdir64b fsrm md_clear serialize pconfig arch_lbr flush_l1d
                                    arch_capabilities
   Virtualization:                  VT-x
   L1d cache:                       384 KiB (8 instances)
   L1i cache:                       256 KiB (8 instances)
   L2 cache:                        16 MiB (8 instances)
   L3 cache:                        24 MiB (1 instance)
   NUMA node(s):                    1
   NUMA node0 CPU(s):               0-15
   Vulnerability Itlb multihit:     Not affected
   Vulnerability L1tf:              Not affected
   Vulnerability Mds:               Not affected
   Vulnerability Meltdown:          Not affected
   Vulnerability Mmio stale data:   Not affected
   Vulnerability Retbleed:          Not affected
   Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
   Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
   Vulnerability Spectre v2:        Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS SW
                                    sequence
   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     384K   12 Data            1    64      1            64
     L1i      32K     256K    8 Instruction     1    64      1            64
     L2        2M      16M   16 Unified         2  2048      1            64
     L3       24M      24M   12 Unified         3 32768      1            64

   -----------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 1 nodes (0)
   node 0 cpus: 0-15
   node 0 size: 63671 MB
   node 0 free: 63131 MB
   node distances:
   node   0
     0:  10
```

(Continued on next page)

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Platform Notes (Continued)

```
         -----------------------------------------------------------
         9. /proc/meminfo
            MemTotal:       65199928 kB


         -----------------------------------------------------------
         10. who -r
           run-level 3 Mar 25 17:07


         -----------------------------------------------------------
         11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
           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 display-manager getty@ irqbalance
                           iscsi issue-generator kbdsettings kdump kdump-early klog libvirtd lvm2-monitor nscd
                           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 dnsmasq ebtables exchange-bmc-os-info
                           firewalld gpm grub2-once haveged haveged-switch-root ipmi ipmievd iscsi-init iscsid
                           issue-add-ssh-keys kexec-load ksm kvm_stat libvirt-guests lunmask man-db-create multipathd
                           nfs nfs-blkmap nfs-server nfsserver rpcbind rpmconfigcheck rsyncd serial-getty@
                           smartd_generate_opts snmpd snmptrapd strongswan strongswan-starter svnserve
                           systemd-boot-check-no-failures systemd-network-generator systemd-nspawn@ systemd-sysext
                           systemd-time-wait-sync systemd-timesyncd tcsd udisks2 virtinterfaced virtnetworkd
                           virtnodedevd virtnwfilterd virtproxyd virtqemud virtsecretd virtstoraged vncserver@
           indirect        pcscd virtlockd virtlogd wickedd

         -----------------------------------------------------------
         13. Linux kernel boot-time arguments, from /proc/cmdline
           BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
           root=UUID=c618afdf-6cef-46b3-b057-498d27bbcac0
           splash=silent
           resume=/dev/disk/by-uuid/501c83e3-725c-4557-9058-1e78999cb97d
           mitigations=auto
           quiet
           security=apparmor
           crashkernel=309M,high
           crashkernel=72M,low


         -----------------------------------------------------------
         14. cpupower frequency-info
           analyzing CPU 0:
             current policy: frequency should be within 800 MHz and 6.40 GHz.
                             The governor "powersave" may decide which speed to use
                             within this range.
             boost state support:
               Supported: yes
               Active: yes


         -----------------------------------------------------------
         15. sysctl
           kernel.numa_balancing           0
           kernel.randomize_va_space       2
           vm.compaction_proactiveness     20
```

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Platform Notes (Continued)

```
   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


----------------------------------------------------------
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 SP5


----------------------------------------------------------
19. Disk information
SPEC is set to: /home/Benchmark/speccpu
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/sda3       xfs   791G  7.2G  784G   1% /home


----------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         FUJITSU
    Product:        PRIMERGY TX1320 M6
    Product Family: SERVER
    Serial:         xxxxxxxxxx


----------------------------------------------------------
21. 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:
    2x Micron Technology MTC20C2085S1EC48BA1 32 GB 2 rank 4800, configured at 4400
```

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Platform Notes (Continued)

```
      ----------------------------------------------------------
      22. BIOS
      (This section combines info from /sys/devices and dmidecode.)
        BIOS Vendor:       FUJITSU // American Megatrends International, LLC.
        BIOS Version:      V5.0.0.27 R1.0.0 for D4132-A1x
        BIOS Date:         03/13/2024
        BIOS Revision:     1.0
```

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 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
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`

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Base Portability Flags (Continued)

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-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/opt/intel/oneapi/compiler/2024.0/lib -lqkmalloc
```

C++ benchmarks:
```
-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/opt/intel/oneapi/compiler/2024.0/lib -lqkmalloc
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/opt/intel/oneapi/compiler/2024.0/lib -lqkmalloc
```

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/Fujitsu-Platform-Settings-V1.0-RPL-RevA.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/Fujitsu-Platform-Settings-V1.0-RPL-RevA.xml

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

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