SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem ST250 V3
(2.60 GHz, Intel Xeon E-2468)

$SPECrate®2017\_int\_base = 80.6$
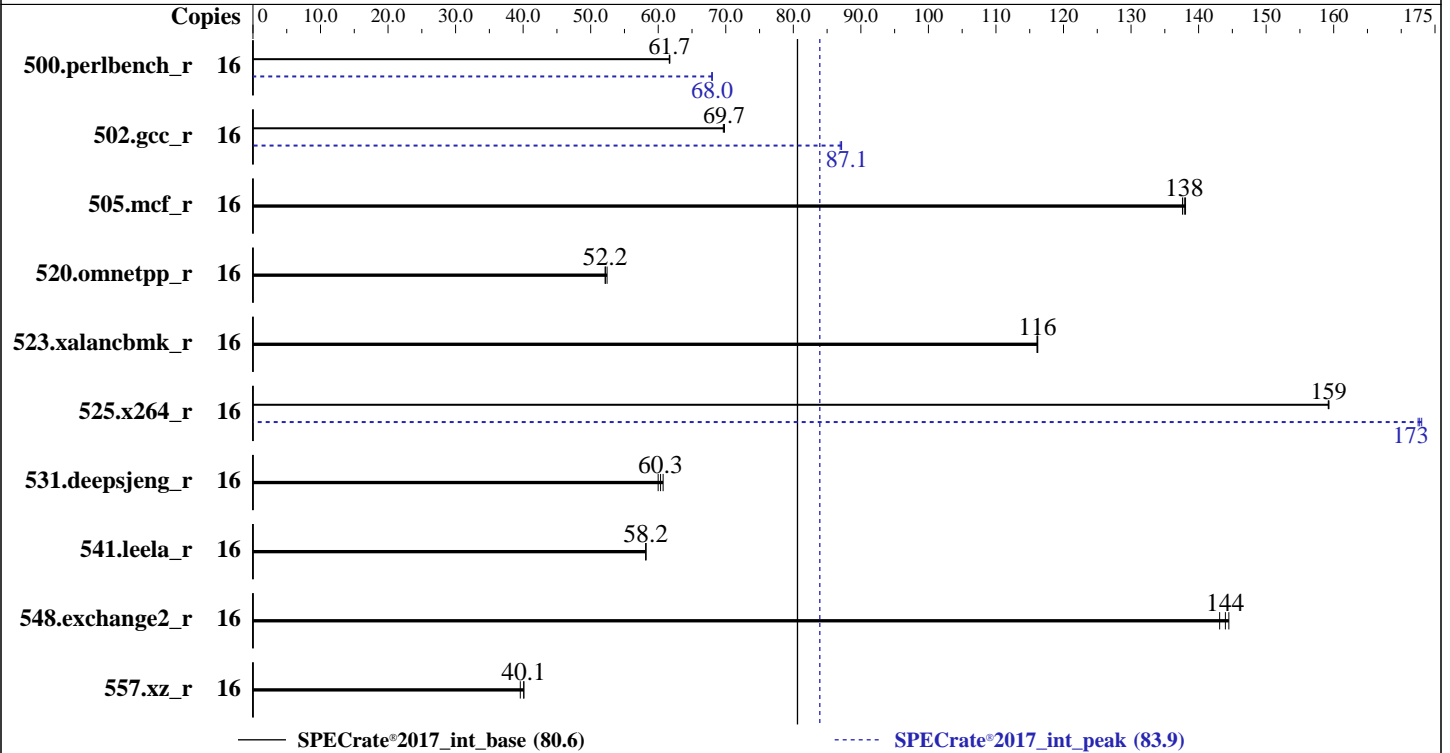
$SPECrate®2017\_int\_peak = 83.9$

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jan-2024
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Benchmark results (Copies = 16 for each):

- 500.perlbench_r: base 61.7, peak 68.0
- 502.gcc_r: base 69.7, peak 87.1
- 505.mcf_r: base 138
- 520.omnetpp_r: base 52.2
- 523.xalancbmk_r: base 116
- 525.x264_r: base 159, peak 173
- 531.deepsjeng_r: base 60.3
- 541.leela_r: base 58.2
- 548.exchange2_r: base 144
- 557.xz_r: base 40.1

——— SPECrate®2017_int_base (80.6)   - - - - SPECrate®2017_int_peak (83.9)

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 1.92 TB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP5
     Kernel 5.14.21-150500.53-default
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: Lenovo BIOS Version CTE101Z 1.10 released Dec-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
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					
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	16	413	61.6	**413**	**61.7**	413	61.7	16	375	67.9	**375**	**68.0**	375	68.0
502.gcc_r	16	325	69.8	325	69.6	**325**	**69.7**	16	260	87.1	261	86.9	**260**	**87.1**
505.mcf_r	16	188	138	**188**	**138**	187	138	16	188	138	**188**	**138**	187	138
520.omnetpp_r	16	400	52.4	**402**	**52.2**	403	52.2	16	400	52.4	**402**	**52.2**	403	52.2
523.xalancbmk_r	16	**145**	**116**	145	116	146	116	16	**145**	**116**	145	116	146	116
525.x264_r	16	**176**	**159**	176	159	176	159	16	**162**	**173**	162	173	162	173
531.deepsjeng_r	16	306	60.0	302	60.7	**304**	**60.3**	16	306	60.0	302	60.7	**304**	**60.3**
541.leela_r	16	**456**	**58.2**	456	58.2	456	58.2	16	**456**	**58.2**	456	58.2	456	58.2
548.exchange2_r	16	293	143	290	144	**291**	**144**	16	293	143	290	144	**291**	**144**
557.xz_r	16	437	39.6	431	40.1	**431**	**40.1**	16	437	39.6	431	40.1	**431**	**40.1**
SPECrate®2017_int_base =		80.6										
SPECrate®2017_int_peak =		83.9										

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/cpu2017-1.1.9-ic2023.2.3/lib/intel64:/home/cpu2017-1.1.9-ic2023.2.3/lib/ia32:/home/cpu2017-1.1.9-ic2023.2.3/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.
 jemalloc, a general purpose malloc implementation

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General Notes (Continued)

```
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 configuration:
Choose Operating Mode set to Maximum Performance

 Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Mon Jan 15 17:50:42 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
   17:50:42 up 2 min,  1 user,  load average: 0.02, 0.01, 0.00
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                17:49    6.00s  0.68s  0.00s -bash

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

 ------------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) unlimited
```

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Platform Notes (Continued)

```
   data seg size              (kbytes, -d) unlimited
   scheduling priority            (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                (-i) 256767
   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) 256767
   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
   ic2023.2.3-lin-core-avx2-rate-20231121.cfg --define smt-on --define cores=8 --define physicallogical
   --define no-numa --tune base,peak -o all --define drop_caches intrate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=16 --configfile
   ic2023.2.3-lin-core-avx2-rate-20231121.cfg --define smt-on --define cores=8 --define physicallogical
   --define no-numa --tune base,peak --output_format all --define drop_caches --nopower --runmode rate --tune
   base:peak --size refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.296/templogs/preenv.intrate.296.0.log --lognum 296.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017-1.1.9-ic2023.2.3


   ----------------------------------------------------------
6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) E E-2468
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 183
   stepping        : 1
   microcode       : 0x11f
   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:                42 bits physical, 48 bits virtual
   Byte Order:                   Little Endian
   CPU(s):                       16
```

(Continued on next page)

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Platform Notes (Continued)

```
   On-line CPU(s) list:        0-15
   Vendor ID:                  GenuineIntel
   Model name:                 Intel(R) Xeon(R) E E-2468
   CPU family:                 6
   Model:                      183
   Thread(s) per core:         2
   Core(s) per socket:         8
   Socket(s):                  1
   Stepping:                   1
   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 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: 64221 MB
     node 0 free: 63688 MB
     node distances:
     node   0
       0:  10
```

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Platform Notes (Continued)

```
          ----------------------------------------------------------
          9. /proc/meminfo
             MemTotal:       65763240 kB


          ----------------------------------------------------------
          10. who -r
            run-level 3 Jan 15 17:49


          ----------------------------------------------------------
          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 getty@ irqbalance issue-generator
                            kbdsettings klog 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 ebtables exchange-bmc-os-info
                            firewalld gpm grub2-once haveged haveged-switch-root ipmi ipmievd issue-add-ssh-keys
                            kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd
                            serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
                            systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd
            generated       ntp_sync
            indirect        wickedd


          ----------------------------------------------------------
          13. Linux kernel boot-time arguments, from /proc/cmdline
            BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
            root=UUID=1a7e87cc-1541-4a67-83ce-e77f091f769b
            splash=silent
            mitigations=auto
            quiet
            security=apparmor


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


          ----------------------------------------------------------
          15. sysctl
            kernel.numa_balancing            0
            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
```

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Platform Notes (Continued)

```
   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/cpu2017-1.1.9-ic2023.2.3
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sdc2       xfs   1.8T   30G  1.8T   2% /


   ----------------------------------------------------------
20. /sys/devices/virtual/dmi/id
   Vendor:         Lenovo
   Product:        ThinkSystem ST250 V3
   Product Family: ThinkSystem
   Serial:         1234567890


   ----------------------------------------------------------
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 Samsung M324R4GA3BB0-CQKOL 32 GB 2 rank 4800, configured at 4400


   ----------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Lenovo
   BIOS Version:      CTE101Z-1.10
   BIOS Date:         12/27/2023
```

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Platform Notes (Continued)

```
    BIOS Revision:    1.10
    Firmware Revision: 1.10
```

Compiler Version Notes

```
==============================================================================
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
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

(Continued on next page)

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Base Compiler Invocation (Continued)

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-AVX2 -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 -xCORE-AVX2 -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 -xCORE-AVX2 -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
```

SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

ThinkSystem ST250 V3
(2.60 GHz, Intel Xeon E-2468)

SPECrate®2017_int_base = 80.6

SPECrate®2017_int_peak = 83.9

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jan-2024
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Peak Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Peak Portability Flags

500.perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
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`

Peak Optimization Flags

C benchmarks:

500.perlbench_r: `-w -std=c11 -m64 -Wl,-z,muldefs`
`-fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2 -flto`
`-Ofast -ffast-math -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fno-strict-overflow`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin`
`-lqkmalloc`

502.gcc_r: `-m32`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/ia32_lin`
`-std=gnu89 -Wl,-z,muldefs -fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2 -flto`
`-Ofast -ffast-math -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib`
`-ljemalloc`

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Peak Optimization Flags (Continued)

505.mcf_r: `basepeak = yes`

525.x264_r: `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -fno-alias`
`-L/home/specdev/new_compilers/ic2023.2.3/compiler/lib/intel64_lin`
`-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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Catlow-A.html`
`http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Catlow-A.xml`
`http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml`

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

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