# SPEC CPU®2017 Integer Rate Result

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## Lenovo Global Technology

$SPECrate®2017\_int\_base = 93.7$

ThinkSystem ST250 V3
(3.20 GHz, Intel Xeon E-2488)

$SPECrate®2017\_int\_peak = 97.8$

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

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

| Benchmark | Copies | Base | Peak |
|---|---|---|---|
| 500.perlbench_r | 16 | 73.9 | 80.8 |
| 502.gcc_r | 16 | 76.5 | 99.0 |
| 505.mcf_r | 16 | 155 | |
| 520.omnetpp_r | 16 | 55.2 | |
| 523.xalancbmk_r | 16 | 139 | |
| 525.x264_r | 16 | 195 | 212 |
| 531.deepsjeng_r | 16 | 72.9 | |
| 541.leela_r | 16 | 70.2 | |
| 548.exchange2_r | 16 | 175 | |
| 557.xz_r | 16 | 44.4 | |

SPECrate®2017_int_base (93.7)          SPECrate®2017_int_peak (97.8)

## Hardware

CPU Name: Intel Xeon E-2488
 Max MHz: 5600
 Nominal: 3200
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 CTE101X 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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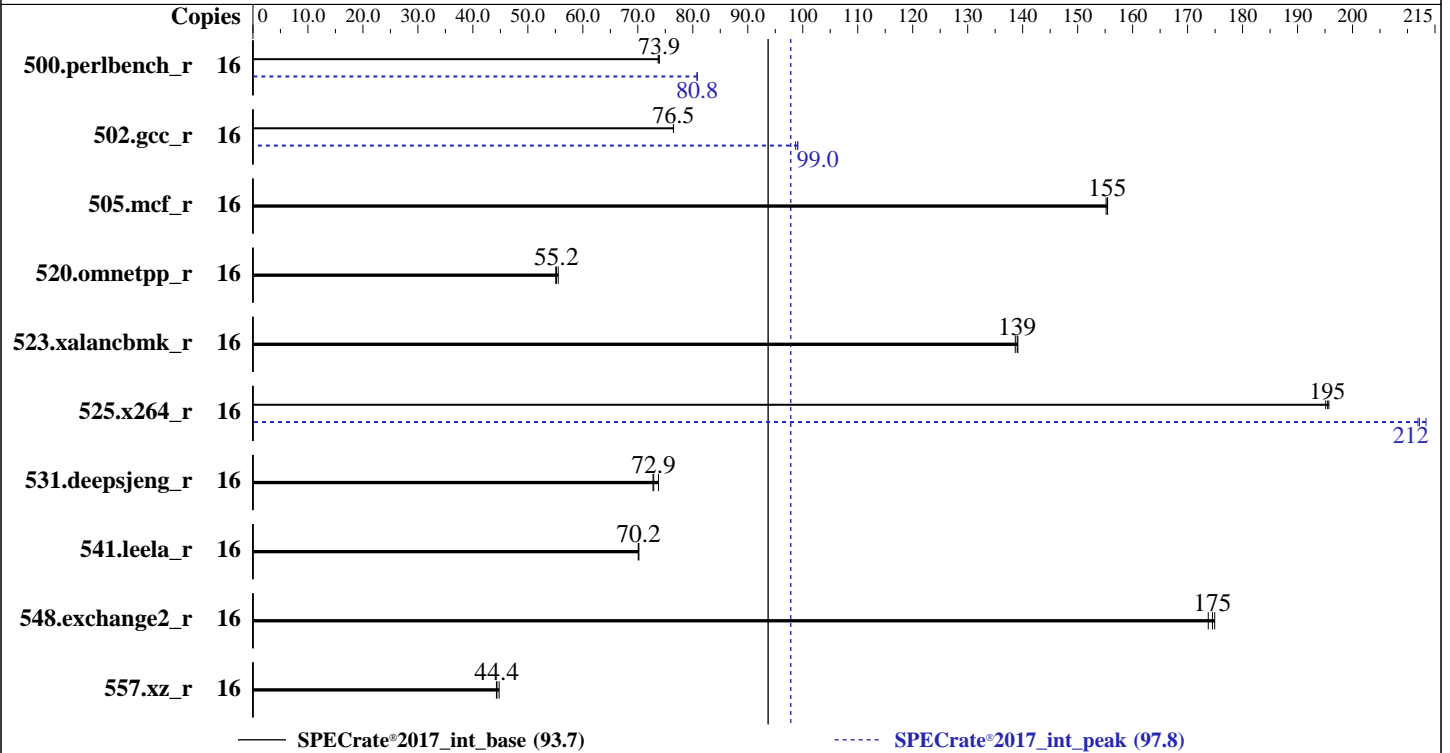
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## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 16 | 345 | 73.9 | 346 | 73.7 | **345** | **73.9** | 16 | 315 | 80.8 | **315** | **80.8** | 315 | 80.8 |
| 502.gcc_r | 16 | **296** | **76.5** | 296 | 76.5 | 296 | 76.5 | 16 | **229** | **99.0** | 230 | 98.7 | 229 | 99.1 |
| 505.mcf_r | 16 | **166** | **155** | 166 | 155 | 167 | 155 | 16 | **166** | **155** | 166 | 155 | 167 | 155 |
| 520.omnetpp_r | 16 | 381 | 55.1 | **380** | **55.2** | 378 | 55.5 | 16 | 381 | 55.1 | **380** | **55.2** | 378 | 55.5 |
| 523.xalancbmk_r | 16 | 122 | 139 | 121 | 139 | **122** | **139** | 16 | 122 | 139 | 121 | 139 | **122** | **139** |
| 525.x264_r | 16 | 144 | 195 | 143 | 196 | **143** | **195** | 16 | 131 | 213 | 132 | 212 | **132** | **212** |
| 531.deepsjeng_r | 16 | **252** | **72.9** | 252 | 72.8 | 249 | 73.8 | 16 | **252** | **72.9** | 252 | 72.8 | 249 | 73.8 |
| 541.leela_r | 16 | **378** | **70.2** | 378 | 70.2 | 378 | 70.1 | 16 | **378** | **70.2** | 378 | 70.2 | 378 | 70.1 |
| 548.exchange2_r | 16 | 241 | 174 | **240** | **175** | 240 | 175 | 16 | 241 | 174 | **240** | **175** | 240 | 175 |
| 557.xz_r | 16 | 386 | 44.8 | **389** | **44.4** | 390 | 44.3 | 16 | 386 | 44.8 | **389** | **44.4** | 390 | 44.3 |
| SPECrate®2017_int_base = | | **93.7** | | | | | | | | | | |
| SPECrate®2017_int_peak = | | **97.8** | | | | | | | | | | |

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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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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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
Adjacent Cache Prefetch set to Disabled

 Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Sun Dec 31 16:39:37 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 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
    16:39:37 up 3 days,  2:22,  1 user,  load average: 0.00, 0.00, 0.00
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                Thu14    6.00s  0.59s  0.00s -bash


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


 ------------------------------------------------------------
 4. ulimit -a
```

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## Platform Notes (Continued)

```
   core file size        (blocks, -c) unlimited
   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/CPU2017.185/templogs/preenv.intrate.185.0.log --lognum 185.0 --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-2488
   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
```

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## Platform Notes (Continued)

```
CPU(s):                     16
On-line CPU(s) list:        0-15
Vendor ID:                  GenuineIntel
Model name:                 Intel(R) Xeon(R) E E-2488
CPU family:                 6
Model:                      183
Thread(s) per core:         2
Core(s) per socket:         8
Socket(s):                  1
Stepping:                   1
BogoMIPS:                   6374.40
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: 62514 MB
  node distances:
  node   0
```

(Continued on next page)

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## Platform Notes (Continued)

```
     0:  10


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


    ----------------------------------------------------------
    10. who -r
      run-level 3 Dec 28 14:17


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

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## Platform Notes (Continued)

```
   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/cpu2017-1.1.9-ic2023.2.3
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       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:    CTE101X-1.10
```

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## Platform Notes (Continued)

```
     BIOS Date:         12/20/2023
     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

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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
(3.20 GHz, Intel Xeon E-2488)

SPECrate®2017_int_base = 93.7

SPECrate®2017_int_peak = 97.8

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

**Test Date:** Dec-2023
**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`

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The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html`
`http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Catlow-A.html`

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