# Lenovo Global Technology

ThinkSystem SR250 V2
(3.20 GHz, Intel Xeon E-2388G)

<table>
<thead>
<tr>
<th>SPEC CPU®2017 Int Base</th>
<th>SPEC CPU®2017 Int Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.8</td>
<td>16.2</td>
</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon E-2388G  
  - Max MHz: 5100  
  - 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: 512 KB I+D on chip per core  
  - L3: 16 MB I+D on chip per chip  
  - Other: None
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-3200AA-E, running at 2933)  
  - Storage: 1 x 960 GB SATA SSD  
  - Other: None

## Software

- **OS:** Red Hat Enterprise Linux release 8.4 (Ootpa)  
  - Kernel 4.18.0-305.el8.x86_64
- **Compiler:**  
  - C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;  
  - Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;  
  - C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version TQE101Q 1.00 released Dec-2021
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 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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## ThinkSystem SR250 V2 (3.20 GHz, Intel Xeon E-2388G)

### SPEC CPU®2017 Integer Speed Result

![SPEC logo]

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**Lenovo Global Technology**

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**CPU2017 License:** 9017

**Test Date:** Feb-2022

**Hardware Availability:** Apr-2022

**Software Availability:** May-2021

---

## Results Table

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<th>Threads</th>
<th>Seconds</th>
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<th>Base</th>
<th>Seconds</th>
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<th>Ratio</th>
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<td>10.1</td>
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<td>602.gcc_s</td>
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<td>605.mcf_s</td>
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<td>20.3</td>
<td>70.1</td>
<td>70.1</td>
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**SPECspeed®2017_int_base = 15.8**

**SPECspeed®2017_int_peak = 16.2**

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/cpu2017-1.1.8-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.8-ic2021.1-revB/je5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

---

## General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB 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.

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology
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SPECspeed®2017_int_base = 15.8
SPECspeed®2017_int_peak = 16.2

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Hardware Availability: Apr-2022
Test Date: Feb-2022
Tested by: Lenovo Global Technology
Software Availability: May-2021

General Notes (Continued)
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Legacy

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca46d
running on localhost.localdomain Wed Feb 9 11:03:41 2022

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) E-2388G CPU @ 3.20GHz
 1 "physical id"s (chips)
 16 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6
Model: 167
Model name: Intel(R) Xeon(R) E-2388G CPU @ 3.20GHz
BIOS Model name: Intel(R) Xeon(R) E-2388G CPU @ 3.20GHz
Stepping: 1
CPU MHz: 4929.703

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SPECspeed®2017_int_base = 15.8
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Platform Notes (Continued)

BogoMIPS: 6384.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15
Flags: fpu vme de pse tsc msr pae 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
aperfmpref perfsource pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpr pdcm pcd id aes xsave avx1 f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single
ssbd ibrs ibpb lars ibrsEnhanced tpr_shadow vmi flexpriority ept vpid ept_ad
fsgrbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid mpx avx512f avx512dq rdseed adx
smap avx512sfma clflushopt intel_pt avx512cd sha_ha avx512bw avx512vl xsaves optx
sxvais xsaveopt xsave vpcmldq avx512_vnni avx512_vnni avx512_vnni avx512_vnni avx512_vnni
flush_l1d arch_capabilities

/proc/cpuinfo cache data
 cache size : 16384 KB

From numacl --hardware
WARNING: a numacl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
 node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 node 0 size: 64325 MB
 node 0 free: 62845 MB
 node distances:
 node 0
 0: 10

From /proc/meminfo
 MemTotal: 65868960 kB
 HugePages_Total: 0
 Hugepagesize: 2048 kB

/sbin/tuned-adm active
 Current active profile: throughput-performance

From /etc/*release* /etc/*version*
os-release:
 NAME="Red Hat Enterprise Linux"
 VERSION="8.4 (Ootpa)"
 ID="rhel"
 ID_LIKE="fedora"

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SPECspeed®2017_int_base = 15.8
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Platform Notes (Continued)

VERSION_ID="8.4"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

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

Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):

run-level 3 Feb 9 00:37:

SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revB

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 790G 103G 688G 13% /home

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
  4x SK Hynix HMA82GU7DJR8N-XN 16 GB 2 rank 3200, configured at 2933

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**SPEC CPU®2017 Integer Speed Result**

**SPECspeed®2017_int_base = 15.8**

**SPECspeed®2017_int_peak = 16.2**

**Platform Notes (Continued)**

**BIOS:**
- BIOS Vendor: Lenovo
- BIOS Version: TQE101Q-1.00
- BIOS Date: 12/29/2021
- BIOS Revision: 1.0
- Firmware Revision: 0.90

*(End of data from sysinfo program)*

**Compiler Version Notes**

```
C   | 600.perlbench_s(peak)
```

```
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

```
C   | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
    | 625.x264_s(base, peak) 657.xz_s(base, peak)
```

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

```
C   | 600.perlbench_s(peak)
```

```
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

```
C   | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
    | 625.x264_s(base, peak) 657.xz_s(base, peak)
```

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```

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Test Date: Feb-2022
Hardware Availability: Apr-2022
Software Availability: May-2021

Compiler Version Notes (Continued)

C++
| 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
| 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran
| 648.exchange2_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

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
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SPEC®2017_int_base = 15.8
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C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX2
-03 -ffast-math -flto -mfpmath=sse -funroll-loops
-qpopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-1qkmalloc

Fortran benchmarks:
m64 -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags
C benchmarks:

(Continued on next page)
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Peak Optimization Flags (Continued)

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs
-xCORE-AVX2 -flto -O3 -ffast-math
-qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

23.xalanbm_k_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_s: basepeak = yes

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-RocketB-A.xml
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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.8 on 2022-02-08 22:03:40-0500.
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