Lenovo Global Technology
ThinkEdge SE450
(2.10 GHz, Intel Xeon Platinum 8352V)

Lenovo Global Technology

SPECrater®2017_int_base = 219
SPECrater®2017_int_peak = Not Run

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

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

Hardware
CPU Name: Intel Xeon Platinum 8352V
Max MHz: 3500
Nominal: 2100
Enabled: 36 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I+D on chip per core
L3: 54 MB I+D on chip per chip
Other: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
Storage: 1 x 960 GB SATA SSD
Other: None

Software
OS: Red Hat Enterprise Linux 8.5
(Kottie)
Kernel 4.18.0-348.el8.x86_64
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
Parallel: No
Compiler: No
Firmware: Lenovo BIOS Version CME104I 1.01 released Mar-2022
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage
**Lenovo Global Technology**

**ThinkEdge SE450**

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**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>125</td>
<td>620</td>
<td>125</td>
<td>621</td>
<td>125</td>
</tr>
</tbody>
</table>

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**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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/cpu2017-1.1.8-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.8-ic202
1.1-revB/lib/ia32:/home/cpu2017-1.1.8-ic2021.1-revB/je5.0.1-32"
MALLOCF_CONF = "retain:true"
```

**General Notes**

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

memory using Red Hat Enterprise Linux 8.1

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Filesystem page cache synced and cleared with:

```bash
sync; echo 3> /proc/sys/vm/drop_caches
```

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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Test Date: May-2022
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General Notes (Continued)

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
SNC set to Enabled

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on localhost.localdomain Fri May 13 01:41:57 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) Platinum 8352V CPU @ 2.10GHz
  1 "physical id"s (chips)
  72 "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 : 36
siblings : 72
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

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): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 36
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation

(Continued on next page)
Lenovo Global Technology
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SPECrate®2017_int_base = 219
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CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
BIOS Model name: Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 55296K
NUMA node0 CPU(s): 0-17,36-53
NUMA node1 CPU(s): 18-35,54-71
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 pdelgb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pcmlmulqdq dtes64 ds_cpl vmx 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 invpcid_single intel_pcntl
ssbd mba ibpbb stibp ibrs Enhanced tpr Shadow vmvi flexpriority ept vpid ept_ad
fsgsbase tsc_adjust sgx bmi1 hle avx2 smep bmi2 erms invpcid cmq rdt_a avx512f
avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni
avx512bw avx512vl xsavesopt xsaveopt xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat pfn pts avx512vdmi umip pku
ospe avx512_vbmi2 gfni vaes vpcmulqdq avx512_vnni avx512_bitalg tme
avx512_vppcntdq la57 rdpid sgx_lc fsrm md_clear pconfig flush_l1d arch_capabilities

/platform/cpuinfo cache data
cache size : 55296 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 36 37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53
node 0 size: 128606 MB
node 0 free: 128099 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 54 55 56 57 58 59 60
61 62 63 64 65 66 67 68 69 70 71
node 1 size: 128976 MB
node 1 free: 128422 MB
node distances:
node 0 1
0: 10 11
1: 11 10

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### Lenovo Global Technology

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**SPEC CPU®2017 Integer Rate Result**

<table>
<thead>
<tr>
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<th>9017</th>
<th>Test Date:</th>
<th>May-2022</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Lenovo Global Technology</td>
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**SPECrate®2017_int_base = 219**

**SPECrate®2017_int_peak = Not Run**

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### Platform Notes (Continued)

- **From `/proc/meminfo**
  - MemTotal: 263765228 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="8.5 (Ootpa)"
    - ID="rhel"
    - ID_LIKE="fedora"
    - VERSION_ID="8.5"
    - PLATFORM_ID="platform:el8"
    - PRETTY_NAME="Red Hat Enterprise Linux 8.5 (Ootpa)"
    - ANSI_COLOR="0;31"
    - redhat-release: Red Hat Enterprise Linux release 8.5 (Ootpa)
    - system-release: Red Hat Enterprise Linux release 8.5 (Ootpa)
    - system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos

- **uname -a:**
  - Linux localhost.localdomain 4.18.0-348.el8.x86_64 #1 SMP Mon Oct 4 12:17:22 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):** Not affected
  - **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
  - **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swaps barriers and __user pointer sanitization
  - **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
  - **CVE-2020-0543 (Special Register Buffer Data Sampling):** Not affected
  - **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

- **run-level 3 May 13 01:40**

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

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
</table>

(Continued on next page)
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Platform Notes (Continued)
/dev/sda4 xfs 819G 26G 794G 4% /home

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkEdge SE450
Product Family: ThinkSystem
Serial: 1234567890

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:
8x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: Lenovo
BIOS Version: CME104I-1.01
BIOS Date: 03/17/2022
BIOS Revision: 1.1
Firmware Revision: 1.10

(End of data from sysinfo program)

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 2021.1 Build 20201113
Copyright (C) 1985-2020 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 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran | 548.exchange2_r(base)
(Continued on next page)
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### Compiler Version Notes (Continued)

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

- `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-AVX512 -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`

`-lqkmalloc`

**C++ benchmarks:**  
`-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto`

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</table>

**Base Optimization Flags (Continued)**

C++ benchmarks (continued):
- 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
- lqkmalloc

Fortran benchmarks:
- w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
- qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
- auto -mbranches-within-32B-boundaries
- L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
- lqkmalloc

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-ICElake-J.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-ICElake-J.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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 2022-05-12 13:41:56-0400.
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