Lenovo Global Technology
ThinkSystem ST250
(3.50 GHz, Intel Xeon E-2146G)

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

SPECrate2017_int_base = 39.9
SPECrate2017_int_peak = Not Run

Test Date: Nov-2018
Hardware Availability: Nov-2018
Software Availability: Aug-2018

Copies

<table>
<thead>
<tr>
<th>Test</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>12</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>12</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>12</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>12</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>12</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>12</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>12</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>12</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>12</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>12</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon E-2146G
Max MHz.: 4500
Nominal: 3500
Enabled: 6 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 256 KB I+D on chip per core
L3: 12 MB I+D on chip per chip
Other: None
Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64)
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux
Parallel: No
Firmware: Lenovo BIOS Version ISE105E 1.01 released Oct-2018
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
## Lenovo Global Technology

ThinkSystem ST250
(3.50 GHz, Intel Xeon E-2146G)

### SPEC CPU2017 Integer Rate Result

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>12</td>
<td>570</td>
<td>33.5</td>
<td>573</td>
<td>33.3</td>
<td>565</td>
<td>33.8</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>12</td>
<td>477</td>
<td>35.6</td>
<td>480</td>
<td>35.4</td>
<td>477</td>
<td>35.6</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>12</td>
<td>420</td>
<td>46.2</td>
<td>421</td>
<td>46.0</td>
<td>422</td>
<td>46.0</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>12</td>
<td>808</td>
<td>19.5</td>
<td>807</td>
<td>19.5</td>
<td>807</td>
<td>19.5</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>12</td>
<td>340</td>
<td>37.2</td>
<td>345</td>
<td>36.7</td>
<td>341</td>
<td>37.2</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>12</td>
<td>237</td>
<td>88.5</td>
<td>243</td>
<td>86.3</td>
<td>242</td>
<td>86.9</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>12</td>
<td>354</td>
<td>38.8</td>
<td>354</td>
<td>38.8</td>
<td>354</td>
<td>38.8</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>12</td>
<td>581</td>
<td>34.2</td>
<td>581</td>
<td>34.2</td>
<td>580</td>
<td>34.3</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>12</td>
<td>385</td>
<td>81.6</td>
<td>383</td>
<td>82.1</td>
<td>383</td>
<td>82.1</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>12</td>
<td>483</td>
<td>26.9</td>
<td>484</td>
<td>26.8</td>
<td>482</td>
<td>26.9</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base =** 39.9  
**SPECrate2017_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"

### General Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic18.0u2/lib/ia32:/home/cpu2017-1.0.5-ic18.0u2/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-32:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-64"
```

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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
```

Yes: 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)
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
Choose Operating Mode set to Custom Mode
CPU P-state Control set to Legacy
Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-nnmv Thu Nov 22 09:58:23 2018

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-2146G CPU @ 3.50GHz
    1 "physical id"s (chips)
    12 "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 : 6
siblings : 12
physical 0: cores 0 1 2 3 4 5

From lsmpc:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 12
  On-line CPU(s) list: 0-11
  Thread(s) per core: 2
  Core(s) per socket: 6
  Socket(s): 1
  NUMA node(s): 1
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 158
  Model name: Intel(R) Xeon(R) E-2146G CPU @ 3.50GHz
  Stepping: 10
  CPU MHz: 3500.000
  CPU max MHz: 4500.0000
  CPU min MHz: 800.0000

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST250
(3.50 GHz, Intel Xeon E-2146G)

SPEC CPU2017 Integer Rate Result

SPECrate2017_int_base = 39.9
SPECrate2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Nov-2018
Tested by: Lenovo Global Technology
Hardware Availability: Nov-2018
Software Availability: Aug-2018

Platform Notes (Continued)

BogoMIPS: 7008.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 12288K
NUMA node0 CPU(s): 0-11
Flags: fpu vme de pse tsc msr pae mce 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 pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt xsaveopt xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp flush_l1d

From numactl --hardware WARNING: a numactl '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
node 0 size: 64365 MB
node 0 free: 63830 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 65910156 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"

(Continued on next page)
Platform Notes (Continued)

uname -a:
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation,
    IBPB, IBRS_FW

run-level 3 Nov 22 09:56

SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2
    Filesystem     Type   Size  Used Avail Use% Mounted on
    /dev/sda2      btrfs  895G   18G  876G   2% /home

Additional information from dmidecode 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.
    BIOS Lenovo -[ISE105E-1.01]- 10/11/2018
    Memory:
        4x Micron 18ASF2G72AZ-2G6D1 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
    557.xz_r(base)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
    541.leela_r(base)
==============================================================================
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================

(Continued on next page)
### Lenovo Global Technology

ThinkSystem ST250  
(3.50 GHz, Intel Xeon E-2146G)

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Nov-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Hardware Availability: Nov-2018</td>
</tr>
</tbody>
</table>

### SPECrate2017_int_base = 39.9

Not Run

### Compiler Version Notes (Continued)

```plaintext
FC  548.exchange2_r(base)
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

C benchmarks:

```plaintext
icc -m64 -std=c11
```

C++ benchmarks:

```plaintext
icpc -m64
```

Fortran benchmarks:

```plaintext
ifort -m64
```

### Base Portability Flags

```plaintext
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:

```plaintext
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:

```plaintext
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem ST250
(3.50 GHz, Intel Xeon E-2146G)

SPECrate2017_int_base = 39.9
SPECrate2017_int_peak = Not Run

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

Test Date: Nov-2018
Hardware Availability: Nov-2018
Software Availability: Aug-2018

Base Optimization Flags (Continued)

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc

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-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-H.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.5 on 2018-11-21 20:58:23-0500.
Originally published on 2018-12-11.