Lenovo Global Technology
ThinkSystem ST250
(3.50 GHz, Intel Xeon E-2134)

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

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>30.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate2017_int_base (30.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>8</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>8</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>8</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>8</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>8</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>8</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>8</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>8</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>8</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
</tr>
</thead>
</table>
| CPU Name: Intel Xeon E-2134  
Max MHz.: 4500  
Nominal: 3500  
Enabled: 4 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: 8 MB I+D on chip per core  
Other: None  
Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)  
Storage: 1 x 960 GB SATA SSD  
Other: None |

<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
</table>
| 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 |
Results Table

<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>8</td>
<td>531</td>
<td>24.0</td>
<td>530</td>
<td>24.0</td>
<td>530</td>
<td>24.0</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>8</td>
<td>402</td>
<td>28.2</td>
<td>399</td>
<td>28.4</td>
<td>402</td>
<td>28.2</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>8</td>
<td>351</td>
<td>36.8</td>
<td>351</td>
<td>36.9</td>
<td>352</td>
<td>36.7</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>8</td>
<td>623</td>
<td>16.9</td>
<td>622</td>
<td>16.9</td>
<td>622</td>
<td>16.9</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>8</td>
<td>296</td>
<td>28.5</td>
<td>295</td>
<td>28.6</td>
<td>292</td>
<td>28.9</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>8</td>
<td>225</td>
<td>62.1</td>
<td>228</td>
<td>61.6</td>
<td>222</td>
<td>63.2</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>8</td>
<td>332</td>
<td>27.6</td>
<td>331</td>
<td>27.7</td>
<td>328</td>
<td>28.0</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>8</td>
<td>536</td>
<td>24.7</td>
<td>546</td>
<td>24.3</td>
<td>548</td>
<td>24.2</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>8</td>
<td>361</td>
<td>58.1</td>
<td>360</td>
<td>58.3</td>
<td>356</td>
<td>58.9</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>8</td>
<td>425</td>
<td>20.3</td>
<td>424</td>
<td>20.4</td>
<td>423</td>
<td>20.4</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 30.0
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 = "SLD_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)
Lenovo Global Technology
ThinkSystem ST250
(3.50 GHz, Intel Xeon E-2134)

SPECrate2017_int_base = 30.0
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

**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 Fri Nov 9 10:14:03 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-2134 CPU @ 3.50GHz
  1 "physical id"s (chips)
  8 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
certs from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 4
siblings : 8
physical 0: cores 0 1 2 3

From lsCPU:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2134 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-2134)

SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology

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

SPECrate2017_int_base = 30.0
SPECrate2017_int_peak = Not Run

Platform Notes (Continued)

BogoMIPS: 7008.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-7
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
aperf aperf perf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdmg fma cx16 xtrr 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
pt1 ssbd ibrs ibpb stibp tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust
bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt
xsaveto xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window
hwp_epp flush_l1d

/proc/cpuinfo cache data
  cache size : 8192 KB

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
  node 0 size: 64367 MB
  node 0 free: 63840 MB
  node distances:
    node 0
      0: 10

From /proc/meminfo
  MemTotal: 65911936 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)
SPEC CPU2017 Integer Rate Result

Lenovo Global Technology
ThinkSystem ST250
(3.50 GHz, Intel Xeon E-2134)

SPECrater2017_int_base = 30.0
SPECrater2017_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

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 9 10:12

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-2134)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>30.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Nov-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability</td>
<td>Nov-2018</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Aug-2018</td>
</tr>
</tbody>
</table>

## Compiler Version Notes (Continued)

```bash
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:**

```bash
icc -m64 -std=c11
```

**C++ benchmarks:**

```bash
icpc -m64
```

**Fortran benchmarks:**

```bash
ifort -m64
```

### 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:**

```bash
-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:**

```bash
-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-2134)

SPECrate2017_int_base = 30.0
SPECrate2017_int_peak = Not Run

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