Lenovo Global Technology
ThinkSystem SD530
(2.50 GHz, Intel Xeon Platinum 8180M)

SPECrate2017_int_base = 264
SPECrate2017_int_peak = 284

Test Date: Jul-2018
Hardware Availability: Aug-2017
Software Availability: May-2018

CPU Name: Intel Xeon Platinum 8180M
Max MHz.: 3800
Nominal: 2500
Enabled: 56 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 38.5 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 800 GB SAS SSD
Other: None

OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
Kernel 4.4.121-92.80-default
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux
Parallel: No
Firmware: Lenovo BIOS Version TEE123N 1.40 released Jun-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library V5.0.1
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
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</tr>
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</table>

**NOTES**

- **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"

- **General Notes**
  Environment variables set by runcpu before the start of the run:
  ```
  LD_LIBRARY_PATH = "/home/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
  LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/je5.0.1-64"
  ```
  Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
  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
  ```
  runcpu command invoked through numactl i.e.:
  ```
  numactl --interleave=all runcpu <etc>
  ```
  jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
  jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;
  jemalloc: sources available from jemalloc.net or
  ```
  ```

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SPECrate2017_int_base = 264
SPECrate2017_int_peak = 284

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

General Notes (Continued)
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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
SNC set to Enable
DCU Streamer Prefetcher set to Disable
MONITOR/MWAIT set to Enable
Execute Disable Bit set to Disable
DCA set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b091c0f
running on Stark-03 Fri Jul 27 01:26:45 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) Platinum 8180M CPU @ 2.50GHz
  2  "physical id"s (chips)
  112 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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

Test Date: Jul-2018
Hardware Availability: Aug-2017
Software Availability: May-2018

Platform Notes (Continued)

Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8180M CPU @ 2.50GHz
Stepping: 4
CPU MHz: 2494.140
BogoMIPS: 4988.28
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27,56-83
NUMA node1 CPU(s): 28-55,84-111
Flags:

From numactl --hardware

WARNING: a numactl 'node' might or might not correspond to a physical chip.

(Continued on next page)
### Platform Notes (Continued)

From `/proc/meminfo`
- MemTotal: 395885348 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release* /etc/*version*`
- SuSE-release:
  - SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 2
  - # This file is deprecated and will be removed in a future service pack or release.
  - # Please check /etc/os-release for details about this release.

- os-release:
  - NAME="SLES"
  - VERSION="12-SP2"
  - VERSION_ID="12.2"
  - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  - ID="sles"
  - ANSI_COLOR="0;32"
  - CPE_NAME="cpe:/o:suse:sles:12:sp2"

```
uname -a:
Linux Stark-03 4.4.121-92.80-default #1 SMP Mon May 21 14:40:10 UTC 2018 (2afdd00)
x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Jul 27 01:23

SPEC is set to: /home/cpu2017.1.0.2.ic18.0

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 689G 15G 675G 3% /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 -[TEE123N-1.40]- 06/12/2018
- Memory:
  - 4x NO DIMM NO DIMM
  - 12x Samsung M393A4K40BB2-CTD 32 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, peak)
```

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Lenovo Global Technology
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SPEC CPU2017 Integer Rate Result
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SPECRate2017_int_base = 264
SPECRate2017_int_peak = 284

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jul-2018
Tested by: Lenovo Global Technology
Hardware Availability: Aug-2017
Software Availability: May-2018

Compiler Version Notes (Continued)

525.x264_r(base, peak) 557.xz_r(base, peak)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CC 500.perlbench_r(peak) 502.gcc_r(peak)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
541.leela_r(base)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
541.leela_r(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 548.exchange2_r(base, peak)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
Lenovo Global Technology
ThinkSystem SD530
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SPECramte2017_int_base = 264
SPECramte2017_int_peak = 284

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

Test Date: Jul-2018
Hardware Availability: Aug-2017
Software Availability: May-2018

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:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation
C benchmarks (except as noted below):
icc -m64 -std=c11

502.gcc_r: icc -m32 -std=c11 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32

C++ benchmarks (except as noted below):
icpc -m64

523.xalancbmk_r: icpc -m32 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32

Fortran benchmarks:
ifort -m64
**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**
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<td>Software Availability: May-2018</td>
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</tbody>
</table>

**SPECrate2017_int_base = 264**  
**SPECrate2017_int_peak = 284**

### 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: -D_FILE_OFFSET_BITS=64 -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: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
  -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
  -fno-strict-overflow -L/usr/local/je5.0.1-64/lib  
  -ljemalloc

- 502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
  -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
  -L/usr/local/je5.0.1-32/lib -ljemalloc

- 505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
  -qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib  
  -ljemalloc

- 525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
  -qopt-mem-layout-trans=3 -fno-alias  
  -L/usr/local/je5.0.1-64/lib -ljemalloc

- 557.xz_r: Same as 505.mcf_r

**C++ benchmarks:**

- 520.omnetpp_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
  -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
  -L/usr/local/je5.0.1-64/lib -ljemalloc

- 523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
  -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
  -L/usr/local/je5.0.1-32/lib -ljemalloc

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## Lenovo Global Technology

**ThinkSystem SD530**  
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</tbody>
</table>

### Peak Optimization Flags (Continued)

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

**Fortran benchmarks:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`
- `-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:

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