Lenovo Global Technology
ThinkSystem SR630
(2.20 GHz, Intel Xeon Silver 4114)

SPECrater2017_int_base = 94.2
SPECrater2017_int_peak = 98.6

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name: Intel Xeon Silver 4114</td>
<td>OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)</td>
</tr>
<tr>
<td>Max MHz.: 3000</td>
<td>Kernel 4.4.21-69-default</td>
</tr>
<tr>
<td>Nominal: 2200</td>
<td>Compiler: C/C++: Version 18.0.0.128 of Intel C/C++</td>
</tr>
<tr>
<td>Enabled: 20 cores, 2 chips, 2 threads/core</td>
<td>Compiler for Linux: Fortran: Version 18.0.0.128 of Intel Fortran</td>
</tr>
<tr>
<td>Orderable: 1.2 chips</td>
<td>Compiler for Linux:</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Firmware: Lenovo BIOS Version IVE113K 1.10 released Sep-2017</td>
</tr>
<tr>
<td>L3: 13.75 MB I+D on chip per chip</td>
<td>File System: btrfs</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x 800 GB SAS SSD</td>
<td>Peak Pointers: 32/64-bit</td>
</tr>
<tr>
<td>Other: None</td>
<td>Other: jemalloc: jemalloc memory allocator library V5.0.1;</td>
</tr>
</tbody>
</table>

<p>|</p>
<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>other: jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;</td>
</tr>
<tr>
<td>other: jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;</td>
</tr>
<tr>
<td>other: jemalloc: sources available from jemalloc.net or releases</td>
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</table>
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ThinkSystem SR630
(2.20 GHz, Intel Xeon Silver 4114)

SPECrate2017_int_base = 94.2
SPECrate2017_int_peak = 98.6

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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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>40</td>
<td>900</td>
<td>70.8</td>
<td>897</td>
<td>71.0</td>
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<tr>
<td>502.gcc_r</td>
<td>40</td>
<td>695</td>
<td>81.5</td>
<td>685</td>
<td>82.7</td>
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<tr>
<td>505.mcf_r</td>
<td>40</td>
<td>538</td>
<td>120</td>
<td>551</td>
<td>117</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>40</td>
<td>864</td>
<td>60.7</td>
<td>866</td>
<td>60.6</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>40</td>
<td>444</td>
<td>95.1</td>
<td>434</td>
<td>97.2</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>40</td>
<td>387</td>
<td>181</td>
<td>381</td>
<td>184</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>40</td>
<td>565</td>
<td>81.2</td>
<td>564</td>
<td>81.3</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>40</td>
<td>885</td>
<td>74.8</td>
<td>883</td>
<td>75.0</td>
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<tr>
<td>548.exchange2_r</td>
<td>40</td>
<td>594</td>
<td>176</td>
<td>594</td>
<td>177</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>40</td>
<td>630</td>
<td>68.6</td>
<td>621</td>
<td>69.5</td>
</tr>
</tbody>
</table>

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"
Bins 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>

Platform Notes
BIOS configuration:
Choose Operating Mode set to Maximum Performance

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

SNC set to Enable
Hardware Prefetcher set to Disable
MONITORMWAIT set to Enable
Execute Disable Bit set to Disable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC Deadline Alloc set to Disable

Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on Cable-SPECcpu2006-SUSE12SP2 Sat Dec 9 02:22:50 2017

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) Silver 4114 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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 : 10
  siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                40
On-line CPU(s) list:   0-39
Thread(s) per core:    2
Core(s) per socket:    10
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
Stepping:              4
CPU MHz:               2194.851
BogoMIPS:              4389.70
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
```

(Continued on next page)
Lenovo Global Technology
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(2.20 GHz, Intel Xeon Silver 4114)

SCREEN CPU2017 Integer Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 94.2
SPECrate2017_int_peak = 98.6

Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

CPU2017 License: 9017
Test Date: Dec-2017
Hardware Availability: Aug-2017
Software Availability: Sep-2017

Platform Notes (Continued)

L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39

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
aperfmperf eagerfpu nni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer tsc
xsave avx f16c rdrand lahf_lm abm 3nowprefetch ida arat epb pln pts dtherm intel_pt
tpr_shadow vmm flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavevc xgetbv1 cqm_llc cqm_occmap llc

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 20 21 22 23 24 25 26 27 28 29
node 0 size: 193110 MB
node 0 free: 192328 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 193504 MB
node 1 free: 192741 MB
node distances:
node   0   1
0:  10  21
1:  21  10

From /proc/meminfo
MemTotal: 395893352 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"

(Continued on next page)
Lenovo Global Technology
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SPECrate2017_int_base = 94.2
SPECrate2017_int_peak = 98.6

Platform Notes (Continued)

ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
Linux Cable-SPECcpu2006-SUSE12SP2 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 9 02:01

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 191G 551G 26% /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 -[IVE113K-1.10]- 09/06/2017
Memory:
   24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
   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
**LENNOVO GLOBAL TECHNOLOGY**

**ThinkSystem SR630**  
(2.20 GHz, Intel Xeon Silver 4114)

---

**SPECraten2017_int_base = 94.2**  
**SPECraten2017_int_peak = 98.6**

---

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

---

**Compiler Version Notes (Continued)**

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

C++ benchmarks:  
icpc

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
Lenovo Global Technology
ThinkSystem SR630
(2.20 GHz, Intel Xeon Silver 4114)

| SPECrate2017_int_base = 94.2 |
| SPECrate2017_int_peak = 98.6 |

| CPU2017 License: 9017 | Test Date: Dec-2017 |
| Test Sponsor: Lenovo Global Technology | Hardware Availability: Aug-2017 |
| Tested by: Lenovo Global Technology | Software Availability: Sep-2017 |

**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

**Base Other Flags**

C benchmarks:
- -m64 -std=c11

C++ benchmarks:
- -m64

Fortran benchmarks:
- -m64

**Peak Compiler Invocation**

C benchmarks:
- icc

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort

**Peak Portability Flags**

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64

(Continued on next page)
**Lenovo Global Technology**  
**ThinkSystem SR630**  
(2.20 GHz, Intel Xeon Silver 4114)  

| SPECrate2017_int_base | 94.2  
|-----------------------|-------  
| SPECrate2017_int_peak | 98.6  

| CPU2017 License | 9017  
| Test Sponsor | Lenovo Global Technology  
| Tested by | Lenovo Global Technology  
| Test Date | Dec-2017  
| Hardware Availability | Aug-2017  
| Software Availability | Sep-2017  

### Peak Portability Flags (Continued)

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: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32  
-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: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32  
-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 SR630**  
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<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>94.2</th>
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</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>98.6</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>
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<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
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<tr>
<td>Test Date</td>
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<td>Aug-2017</td>
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<td>Software Availability</td>
<td>Sep-2017</td>
</tr>
</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
```

### Peak Other Flags

**C benchmarks (except as noted below):**

- `m64` `-std=c11`

- 502.gcc_r: `-m32` `-std=c11`

**C++ benchmarks (except as noted below):**

- `m64`

- 523.xalancbmk_r: `-m32`

**Fortran benchmarks:**

- `m64`

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

- [http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html)

You can also download the XML flags sources by saving the following links:

- [http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml)

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Tested with SPEC CPU2017 v1.0.2 on 2017-12-08 13:22:49-0500.  
Originally published on 2017-12-26.