SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

SPECrate®2017_int_base =   134

ThinkSystem SN550
(3.60 GHz, Intel Xeon Gold 6244)

SPECrate®2017_int_peak = Not Run

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

Test Date: Oct-2019
Hardware Availability: Apr-2019
Software Availability: Aug-2019

Benchmark	Copies	Result
500.perlbench_r	32	101
502.gcc_r	32	111
505.mcf_r	32	181
520.omnetpp_r	32	80.7
523.xalancbmk_r	32	166
525.x264_r	32	273
531.deepsjeng_r	32	110
541.leela_r	32	104
548.exchange2_r	32	270
557.xz_r	32	83.9

SPECrate®2017_int_base (134)

Hardware

CPU Name: Intel Xeon Gold 6244
 Max MHz: 4400
 Nominal: 3600
Enabled: 16 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: 24.75 MB I+D on chip per chip
 Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64)
 Kernel 4.12.14-25.13-default
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 19.0.4.227 of Intel Fortran
 Compiler for Linux
Parallel: No
Firmware: Lenovo BIOS Version IVE142E 2.30 released Aug-2019 tested as IVE141E 2.30 Jul-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: Disable

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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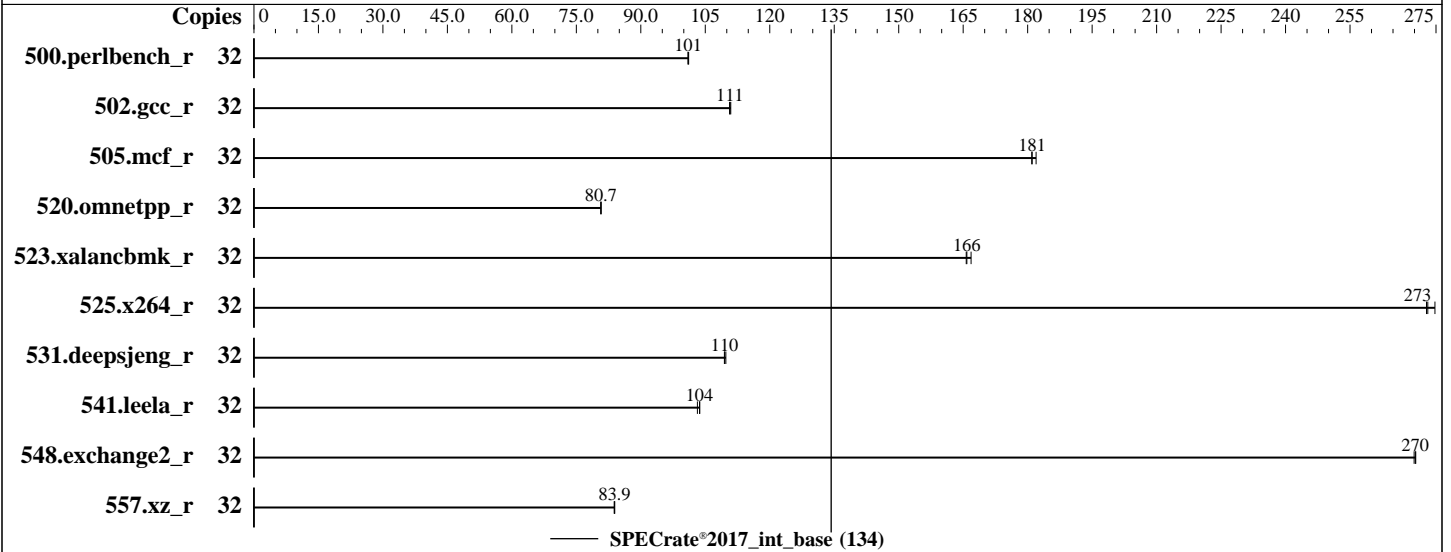
SPECrate®2017_int_peak = Not Run

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Results Table

Benchmark	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	32	**504**	**101**	504	101	504	101							
502.gcc_r	32	408	111	**409**	**111**	410	111							
505.mcf_r	32	**286**	**181**	286	181	284	182							
520.omnetpp_r	32	520	80.7	**520**	**80.7**	520	80.7							
523.xalancbmk_r	32	204	166	**204**	**166**	203	167							
525.x264_r	32	205	273	204	275	**205**	**273**							
531.deepsjeng_r	32	335	109	334	110	**335**	**110**							
541.leela_r	32	511	104	514	103	**511**	**104**							
548.exchange2_r	32	310	270	**310**	**270**	311	270							
557.xz_r	32	412	83.9	**412**	**83.9**	412	83.8							
SPECrate®2017_int_base =		**134**												
SPECrate®2017_int_peak =		**Not Run**												

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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/cpu2017-1.1.0-ic19.0u4/lib/intel64:/home/cpu2017-1.1.0-ic19.0u4/l
      ib/ia32:/home/cpu2017-1.1.0-ic19.0u4/je5.0.1-32"

General Notes

Binaries compiled on a system with 1x Intel Core i9-799X 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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

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General Notes (Continued)

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4)
is mitigated in the system as tested and documented.

Platform Notes

```
BIOS configuration:
Choose Operating Mode set to Maximum Performance
Trusted Execution Technology set to Enable
SNC set to Enable
Stale AtoS set to Enable

 Sysinfo program /home/cpu2017-1.1.0-ic19.0u4/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on linux-cq9p Fri Oct 25 17:55:25 2019

 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) Gold 6244 CPU @ 3.60GHz
       2  "physical id"s (chips)
       32 "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 : 8
       siblings  : 16
       physical 0: cores 4 8 17 18 19 24 25 27
       physical 1: cores 2 3 4 8 17 20 24 26

 From lscpu:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
      Byte Order:          Little Endian
      CPU(s):              32
      On-line CPU(s) list: 0-31
      Thread(s) per core:  2
      Core(s) per socket:  8
```

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Test Date: Oct-2019
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Platform Notes (Continued)

```
        Socket(s):              2
        NUMA node(s):           4
        Vendor ID:              GenuineIntel
        CPU family:             6
        Model:                  85
        Model name:             Intel(R) Xeon(R) Gold 6244 CPU @ 3.60GHz
        Stepping:               6
        CPU MHz:                3600.000
        CPU max MHz:            4400.0000
        CPU min MHz:            1200.0000
        BogoMIPS:               7200.00
        Virtualization:         VT-x
        L1d cache:              32K
        L1i cache:              32K
        L2 cache:               1024K
        L3 cache:               25344K
        NUMA node0 CPU(s):      0,2,5,6,17,18,21,22
        NUMA node1 CPU(s):      1,3,4,7,16,19,20,23
        NUMA node2 CPU(s):      8,11,12,14,24,27,28,30
        NUMA node3 CPU(s):      9,10,13,15,25,26,29,31
        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
    aperfmperf pni pclmulqdq dtes64 ds_cpl 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 cdp_l3 invpcid_single
    intel_ppin ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase
    tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq
    rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec
    xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln
    pts pku ospke avx512_vnni flush_l1d arch_capabilities

 /proc/cpuinfo cache data
    cache size : 25344 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0 2 5 6 17 18 21 22
    node 0 size: 193135 MB
    node 0 free: 186877 MB
    node 1 cpus: 1 3 4 7 16 19 20 23
    node 1 size: 193495 MB
    node 1 free: 193236 MB
    node 2 cpus: 8 11 12 14 24 27 28 30
    node 2 size: 193523 MB
    node 2 free: 193264 MB
```

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CPU2017 License: 9017   **Test Date:**   Oct-2019
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Tested by: Lenovo Global Technology   **Software Availability:** Aug-2019

Platform Notes (Continued)

```
   node 3 cpus: 9 10 13 15 25 26 29 31
   node 3 size: 193521 MB
   node 3 free: 193280 MB
   node distances:
   node   0   1   2   3
     0:  10  11  21  21
     1:  11  10  21  21
     2:  21  21  10  11
     3:  21  21  11  10

 From /proc/meminfo
    MemTotal:        792243708 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"

 uname -a:
    Linux linux-cq9p 4.12.14-25.13-default #1 SMP Tue Aug 14 15:07:35 UTC 2018 (947aa51)
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-3620 (L1 Terminal Fault):         Not affected
 Microarchitectural Data Sampling:          No status reported
 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: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2):         Mitigation: Indirect Branch Restricted
                                            Speculation, IBPB, IBRS_FW


 run-level 3 Oct 25 17:54

 SPEC is set to: /home/cpu2017-1.1.0-ic19.0u4
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sdb3       xfs   893G   75G  818G   9% /
```

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Platform Notes (Continued)

```
   From /sys/devices/virtual/dmi/id
       BIOS:    Lenovo -[IVE141E-2.30]- 07/02/2019
       Vendor:  Lenovo
       Product: ThinkSystem SN550  -[7X16CTO0WW]-
       Product Family: ThinkSystem
       Serial:  1234567890


   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.
     Memory:
       24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933


   (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) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
    Version 19.0.4.227 Build 20190416
  Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  C++      | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
           | 541.leela_r(base)
------------------------------------------------------------------------------
  Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
    Version 19.0.4.227 Build 20190416
  Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------
  Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
    64, Version 19.0.4.227 Build 20190416
  Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

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Base Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

C++ benchmarks:
```
icpc -m64
```

Fortran benchmarks:
```
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:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

C++ benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

Fortran benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

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

http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.html

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

http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml

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

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