SPEC CPU®2017 Integer Rate Result

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Inspur Corporation

Inspur NF8480M5 (Intel Xeon Gold 5120)

$SPECrate^{®}2017\_int\_base = 269$

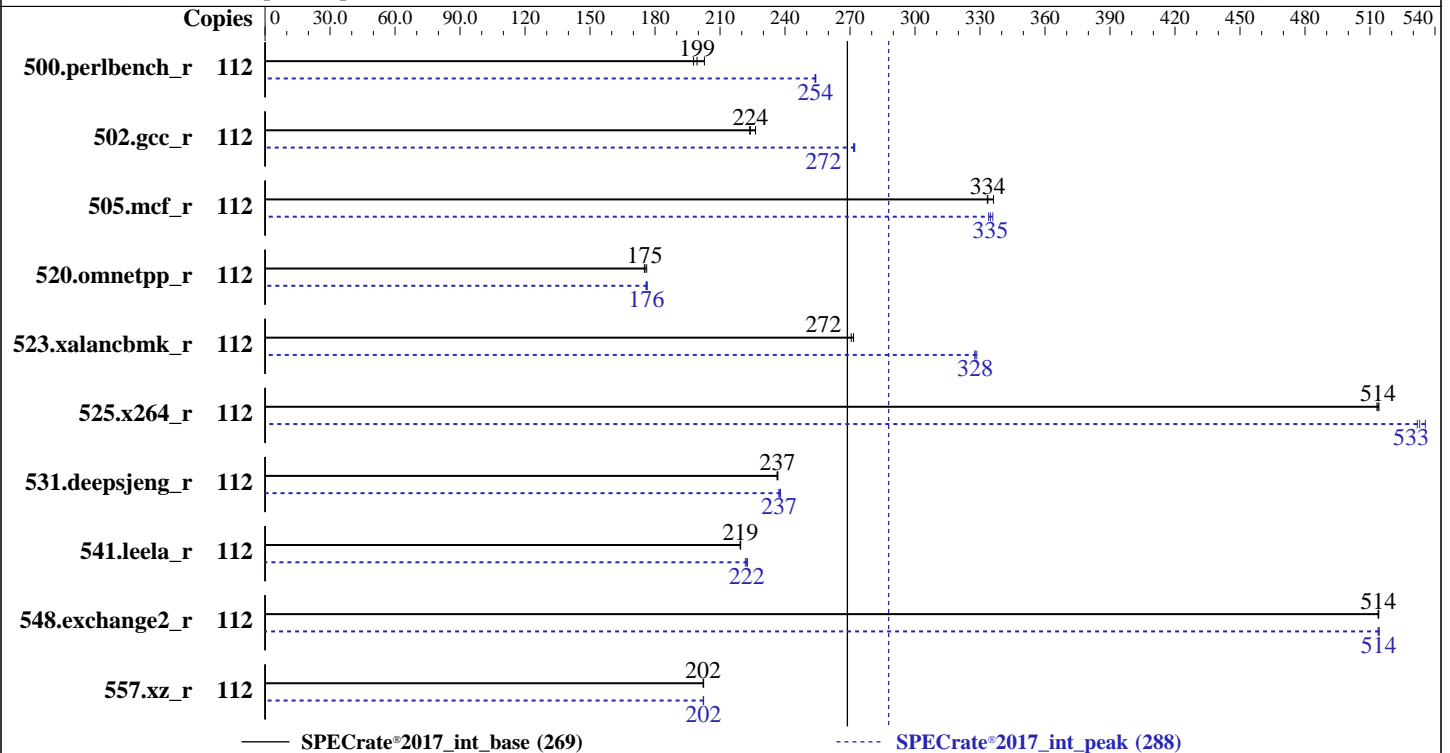$SPECrate^{®}2017\_int\_peak = 288$

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Aug-2019
Hardware Availability: Oct-2017
Software Availability: Dec-2018

Benchmark	Copies	base	peak
500.perlbench_r	112	199	254
502.gcc_r	112	224	272
505.mcf_r	112	334	335
520.omnetpp_r	112	175	176
523.xalancbmk_r	112	272	328
525.x264_r	112	514	533
531.deepsjeng_r	112	237	237
541.leela_r	112	219	222
548.exchange2_r	112	514	514
557.xz_r	112	202	202

SPECrate®2017_int_base (269)   SPECrate®2017_int_peak (288)

Hardware

CPU Name: Intel Xeon Gold 5120
  Max MHz: 3200
  Nominal: 2200
Enabled: 56 cores, 4 chips, 2 threads/core
Orderable: 2,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
  L2: 1 MB I+D on chip per core
  L3: 19.25 MB I+D on chip per chip
  Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage: 1 x 4 TB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP4
  4.12.14-94.41-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: Version 4.1.06 released Jul-2019
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

Power Management: --

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	112	879	203	902	198	**894**	**199**	112	702	254	**702**	**254**	701	254
502.gcc_r	112	701	226	**708**	**224**	709	224	112	583	272	**583**	**272**	584	272
505.mcf_r	112	**543**	**334**	543	333	538	336	112	542	334	**541**	**335**	539	336
520.omnetpp_r	112	834	176	839	175	**838**	**175**	112	836	176	833	176	**835**	**176**
523.xalancbmk_r	112	437	271	**435**	**272**	435	272	112	361	328	**361**	**328**	360	329
525.x264_r	112	**382**	**514**	382	513	381	514	112	**368**	**533**	366	536	369	532
531.deepsjeng_r	112	542	237	**543**	**237**	543	236	112	539	238	**541**	**237**	541	237
541.leela_r	112	**845**	**219**	846	219	845	220	112	**834**	**222**	837	222	833	223
548.exchange2_r	112	571	514	**571**	**514**	571	514	112	**571**	**514**	571	514	571	514
557.xz_r	112	**598**	**202**	598	202	598	202	112	598	202	**598**	**202**	598	202
SPECrate®2017_int_base =						**269**								
SPECrate®2017_int_peak =						**288**								

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"

General Notes

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

LD_LIBRARY_PATH = "/home/CPU2017/lib/ia32:/home/CPU2017/lib/intel64:/home/CPU2017/je5.0.1-32:/home/CPU2017/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>

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.

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General Notes (Continued)

 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.

 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
 https://github.com/jemalloc/jemalloc/releases

Platform Notes

 BIOS and OS configuration:
 SCALING_GOVERNOR set to Performance
 Hardware Prefetch set to Disable
 VT Support set to Disable
 C1E Support set to Disable
 IMC (Integrated memory controller) Interleaving set to 1-way
 Sub NUMA Cluster (SNC) set to Enable
 Sysinfo program /home/CPU2017/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-rtlm Mon Nov 12 13:39:51 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) Gold 5120 CPU @ 2.20GHz
       4 "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 : 14
       siblings : 28
       physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
       physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
       physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
       physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

 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

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Platform Notes (Continued)

```
       Thread(s) per core:    2
       Core(s) per socket:    14
       Socket(s):             4
       NUMA node(s):          8
       Vendor ID:             GenuineIntel
       CPU family:            6
       Model:                 85
       Model name:            Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
       Stepping:              4
       CPU MHz:               2200.000
       CPU max MHz:           3200.0000
       CPU min MHz:           1000.0000
       BogoMIPS:              4400.00
       Virtualization:        VT-x
       L1d cache:             32K
       L1i cache:             32K
       L2 cache:              1024K
       L3 cache:              19712K
       NUMA node0 CPU(s):     0-3,7-9,56-59,63-65
       NUMA node1 CPU(s):     4-6,10-13,60-62,66-69
       NUMA node2 CPU(s):     14-17,21-23,70-73,77-79
       NUMA node3 CPU(s):     18-20,24-27,74-76,80-83
       NUMA node4 CPU(s):     28-31,35-37,84-87,91-93
       NUMA node5 CPU(s):     32-34,38-41,88-90,94-97
       NUMA node6 CPU(s):     42-45,49-51,98-101,105-107
       NUMA node7 CPU(s):     46-48,52-55,102-104,108-111
       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 monitor 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 pti 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 hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke flush_l1d

  /proc/cpuinfo cache data
     cache size : 19712 KB

  From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
  physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 7 8 9 56 57 58 59 63 64 65
    node 0 size: 192065 MB
    node 0 free: 191754 MB
```

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Platform Notes (Continued)

```
  node 1 cpus: 4 5 6 10 11 12 13 60 61 62 66 67 68 69
  node 1 size: 193528 MB
  node 1 free: 193259 MB
  node 2 cpus: 14 15 16 17 21 22 23 70 71 72 73 77 78 79
  node 2 size: 193528 MB
  node 2 free: 193305 MB
  node 3 cpus: 18 19 20 24 25 26 27 74 75 76 80 81 82 83
  node 3 size: 193528 MB
  node 3 free: 193347 MB
  node 4 cpus: 28 29 30 31 35 36 37 84 85 86 87 91 92 93
  node 4 size: 193528 MB
  node 4 free: 193329 MB
  node 5 cpus: 32 33 34 38 39 40 41 88 89 90 94 95 96 97
  node 5 size: 193499 MB
  node 5 free: 193315 MB
  node 6 cpus: 42 43 44 45 49 50 51 98 99 100 101 105 106 107
  node 6 size: 193528 MB
  node 6 free: 193155 MB
  node 7 cpus: 46 47 48 52 53 54 55 102 103 104 108 109 110 111
  node 7 size: 193309 MB
  node 7 free: 193120 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  11  21  21  31  31  21  21
    1:  11  10  21  21  31  31  21  21
    2:  21  21  10  11  21  21  31  31
    3:  21  21  11  10  21  21  31  31
    4:  31  31  21  21  10  11  21  21
    5:  31  31  21  21  11  10  21  21
    6:  21  21  31  31  21  21  10  11
    7:  21  21  31  31  21  21  11  10

 From /proc/meminfo
    MemTotal:       1583630252 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12 SP4

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 4
       # 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.
```

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Platform Notes (Continued)

```
   os-release:
      NAME="SLES"
      VERSION="12-SP4"
      VERSION_ID="12.4"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp4"

 uname -a:
    Linux linux-rtlm 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
    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 12 13:38 last=5

 SPEC is set to: /home/CPU2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p4 xfs    3.6T   68G  3.6T   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 Inspur 4.1.06 07/02/2019
    Memory:
     48x Samsung M393A4K40CB2-CTD 32 GB 2 rank 2666, configured at 2400

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C          | 500.perlbench_r(base, peak) 502.gcc_r(base, peak) 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.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
C++    | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)
       | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 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`

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`

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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
```

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
```

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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`

 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

http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.3-SKL.html

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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/Inspur-Platform-Settings-V1.3-SKL.xml

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

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