SPEC® CPU2017 Integer Rate Result

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Supermicro

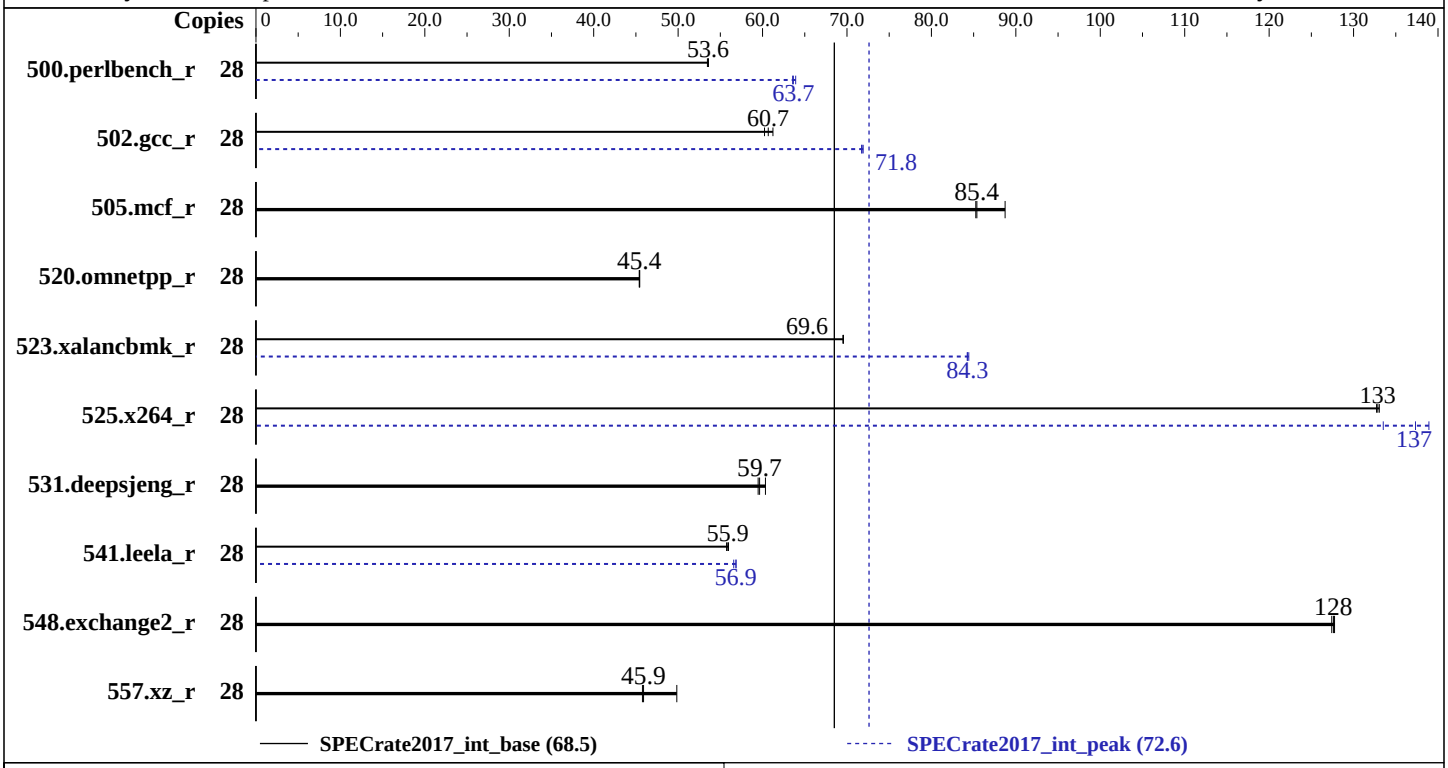
SuperServer 5019P-MT (X11SPi-TF , Intel Xeon Gold 5120)

SPECrate2017_int_base = 68.5

SPECrate2017_int_peak = 72.6

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018



Hardware

CPU Name:	Intel Xeon Gold 5120
Max MHz.:	3200
Nominal:	2200
Enabled:	14 cores, 1 chip, 2 threads/core
Orderable:	1 chip
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:	192 GB (6 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage:	1 x 200 GB SATA III SSD
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP3 (x86_64) Kernel 4.4.114-94.11-default
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:	Supermicro BIOS version 2.1 released Jun-2018
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other:	jemalloc memory allocator library V5.0.1

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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	28	832	53.6	834	53.5	**832**	**53.6**	28	697	63.9	**700**	**63.7**	701	63.6
502.gcc_r	28	648	61.2	**653**	**60.7**	658	60.2	28	551	71.9	**552**	**71.8**	553	71.7
505.mcf_r	28	510	88.7	531	85.3	**530**	**85.4**	28	510	88.7	531	85.3	**530**	**85.4**
520.omnetpp_r	28	808	45.5	809	45.4	**809**	**45.4**	28	808	45.5	809	45.4	**809**	**45.4**
523.xalancbmk_r	28	**425**	**69.6**	425	69.5	425	69.6	28	**351**	**84.3**	350	84.4	351	84.2
525.x264_r	28	368	133	**369**	**133**	369	133	28	353	139	**357**	**137**	367	134
531.deepsjeng_r	28	532	60.3	**538**	**59.7**	539	59.5	28	532	60.3	**538**	**59.7**	539	59.5
541.leela_r	28	832	55.7	829	56.0	**830**	**55.9**	28	815	56.9	819	56.6	**816**	**56.9**
548.exchange2_r	28	576	127	**575**	**128**	574	128	28	576	127	**575**	**128**	574	128
557.xz_r	28	607	49.8	**659**	**45.9**	661	45.8	28	607	49.8	**659**	**45.9**	661	45.8

SPECrate2017_int_base = 68.5

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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/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 i7-6700K 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.
 jemalloc, a general purpose malloc implementation
```

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General Notes (Continued)

```
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS Settings:
LLC prefetch = Enable
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
Hardware P-state = Out of Band Mode
LLC dead line alloc = Disable
Patrol Scrub = Disable
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-cyyj Wed Nov 14 14:45:07 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
      1  "physical id"s (chips)
      28 "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

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                28
     On-line CPU(s) list:   0-27
     Thread(s) per core:    2
     Core(s) per socket:    14
     Socket(s):             1
     NUMA node(s):          1
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 85
     Model name:            Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
     Stepping:              4
```

(Continued on next page)

Platform Notes (Continued)

```
      CPU MHz:               2199.998
      BogoMIPS:              4399.99
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              19712K
      NUMA node0 CPU(s):     0-27
      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 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 ida arat epb invpcid_single pln pts
      dtherm hwp_epp intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vnmi
      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 xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

/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: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  node 0 size: 192077 MB
  node 0 free: 191295 MB
  node distances:
  node   0
    0:  10

From /proc/meminfo
   MemTotal:       196686948 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 3
      # 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-SP3"
```

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Platform Notes (Continued)

```
       VERSION_ID="12.3"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp3"

 uname -a:
    Linux linux-cyyj 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
    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: Barriers
 CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

 run-level 3 Nov 14 14:29

 SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      xfs   145G   38G  108G  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 American Megatrends Inc. 2.1 06/14/2018
   Memory:
    2x NO DIMM NO DIMM
    6x Samsung M393A4K40BB2-CTD 32 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) 525.x264_r(base)
      557.xz_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC   500.perlbench_r(peak) 502.gcc_r(peak) 505.mcf_r(peak) 525.x264_r(peak)
     557.xz_r(peak)
```

(Continued on next page)

Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------

==============================================================================
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
     541.leela_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC   548.exchange2_r(peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 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

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
-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/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

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

523.xalancbmk_r: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

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

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: basepeak = yes

525.x264_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-alias -L/usr/local/je5.0.1-64/lib -ljemalloc

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

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: basepeak = yes

541.leela_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3

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Peak Optimization Flags (Continued)

541.leela_r (continued):
`-L/usr/local/je5.0.1-64/lib -ljemalloc`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SKL-revD.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SKL-revD.xml`

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

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