SPEC® CPU2017 Integer Rate Result

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Supermicro
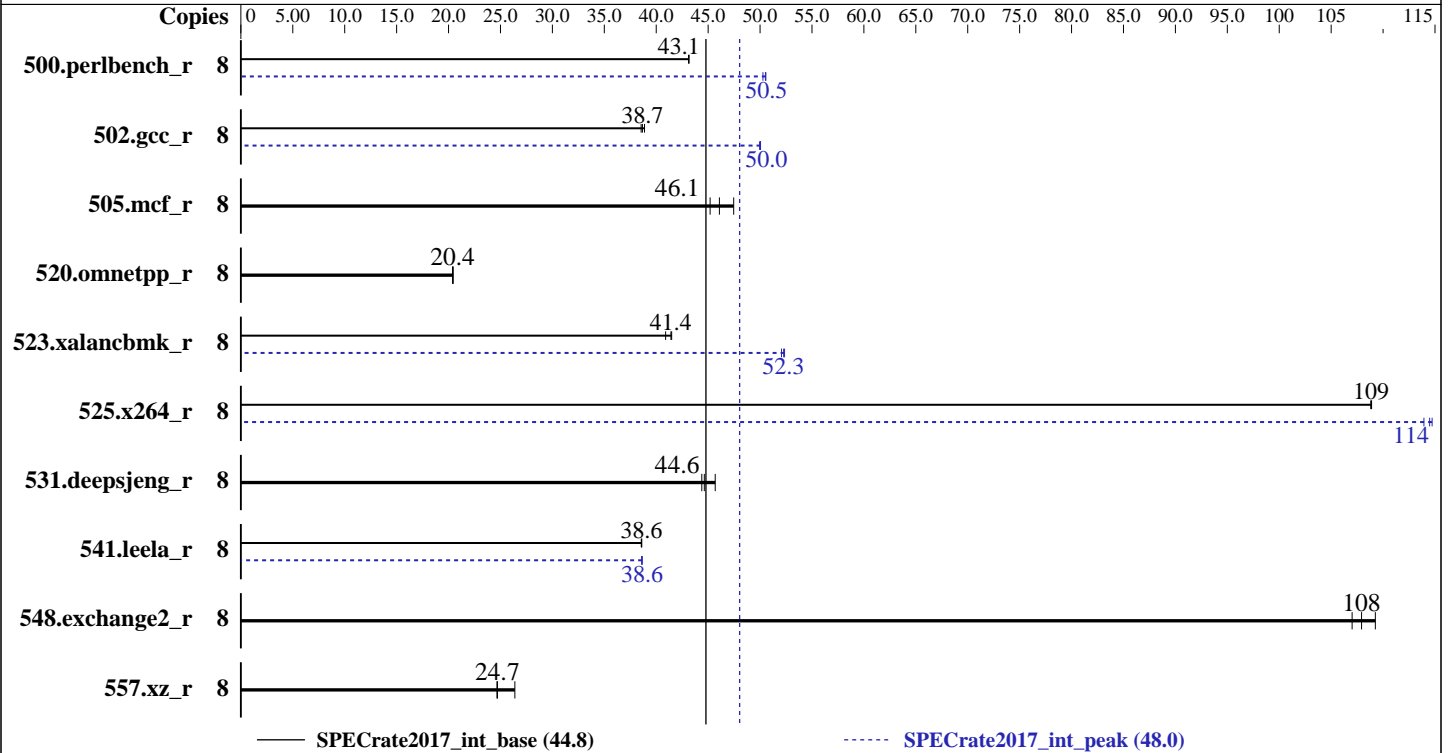
SuperWorkstation 5039C-T (X11SCA , Intel Core i7-9700K)

SPECrate2017_int_base =   44.8

SPECrate2017_int_peak =   48.0

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Jan-2019

Hardware Availability: Oct-2018

Software Availability: Mar-2018

Copies		
500.perlbench_r	8	43.1 / 50.5
502.gcc_r	8	38.7 / 50.0
505.mcf_r	8	46.1
520.omnetpp_r	8	20.4
523.xalancbmk_r	8	41.4 / 52.3
525.x264_r	8	109 / 114
531.deepsjeng_r	8	44.6
541.leela_r	8	38.6 / 38.6
548.exchange2_r	8	108
557.xz_r	8	24.7

——— SPECrate2017_int_base (44.8)   - - - - SPECrate2017_int_peak (48.0)

Hardware

CPU Name: Intel Core i7-9700K

 Max MHz.:   4900

 Nominal: 3600

Enabled: 8 cores, 1 chip

Orderable: 1 chip

Cache L1:   32 KB I + 32 KB D on chip per core

 L2:   256 KB I+D on chip per core

 L3:   12 MB I+D on chip per chip

 Other: None

Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)

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: Version 1.0a released Sep-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

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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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	8	295	43.2	295	43.1	**295**	**43.1**	8	253	50.3	**252**	**50.5**	252	50.6
502.gcc_r	8	291	38.9	**293**	**38.7**	294	38.5	8	226	50.0	227	50.0	**226**	**50.0**
505.mcf_r	8	272	47.5	**281**	**46.1**	286	45.2	8	272	47.5	**281**	**46.1**	286	45.2
520.omnetpp_r	8	**515**	**20.4**	513	20.4	515	20.4	8	**515**	**20.4**	513	20.4	515	20.4
523.xalancbmk_r	8	**204**	**41.4**	204	41.5	207	40.9	8	**162**	**52.3**	161	52.4	162	52.1
525.x264_r	8	129	109	**129**	**109**	129	109	8	122	115	123	114	**122**	**114**
531.deepsjeng_r	8	201	45.7	**205**	**44.6**	207	44.4	8	201	45.7	**205**	**44.6**	207	44.4
541.leela_r	8	343	38.6	**343**	**38.6**	344	38.6	8	343	38.6	343	38.6	**343**	**38.6**
548.exchange2_r	8	**194**	**108**	196	107	192	109	8	**194**	**108**	196	107	192	109
557.xz_r	8	327	26.4	350	24.7	**350**	**24.7**	8	327	26.4	350	24.7	**350**	**24.7**
SPECrate2017_int_base =		**44.8**											
SPECrate2017_int_peak =		**48.0**											

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

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-65nv Fri Jan  4 14:19:12 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) Core(TM) i7-9700K CPU @ 3.60GHz
      1  "physical id"s (chips)
      8 "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  : 8
      physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                8
     On-line CPU(s) list:   0-7
     Thread(s) per core:    1
     Core(s) per socket:    8
     Socket(s):             1
     NUMA node(s):          1
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 158
     Model name:            Intel(R) Core(TM) i7-9700K CPU @ 3.60GHz
     Stepping:              12
     CPU MHz:               4771.037
     CPU max MHz:           4900.0000
     CPU min MHz:           800.0000
     BogoMIPS:              7199.97
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              256K
```

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Platform Notes (Continued)

```
      L3 cache:              12288K
      NUMA node0 CPU(s):     0-7
      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 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 hwp_notify hwp_act_window 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 mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1

  /proc/cpuinfo cache data
     cache size : 12288 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
    node 0 size: 64283 MB
    node 0 free: 63545 MB
    node distances:
    node   0
      0:  10

  From /proc/meminfo
     MemTotal:       65825824 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"
        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:
```

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Platform Notes (Continued)

```
    Linux linux-65nv 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 Jan 4 14:01

 SPEC is set to: /home/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda3       xfs   145G   34G  111G  24% /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. 1.0a 09/27/2018
   Memory:
    4x Micron 18ADF2G72AZ-2G6H1R 16 GB 2 rank 2667

 (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)
 ------------------------------------------------------------------------------
 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)
```

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Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------
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`

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Base Portability Flags (Continued)

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-AVX2 -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-AVX2 -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-AVX2 -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`

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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-AVX2 -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-AVX2 -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-AVX2 -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-AVX2 -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-AVX2 -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

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

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