SPEC® CPU2017 Integer Rate Result

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Huawei

Huawei CH121 V5 (Intel Xeon Gold 6126)

SPECrate2017_int_base =   139

SPECrate2017_int_peak =   148
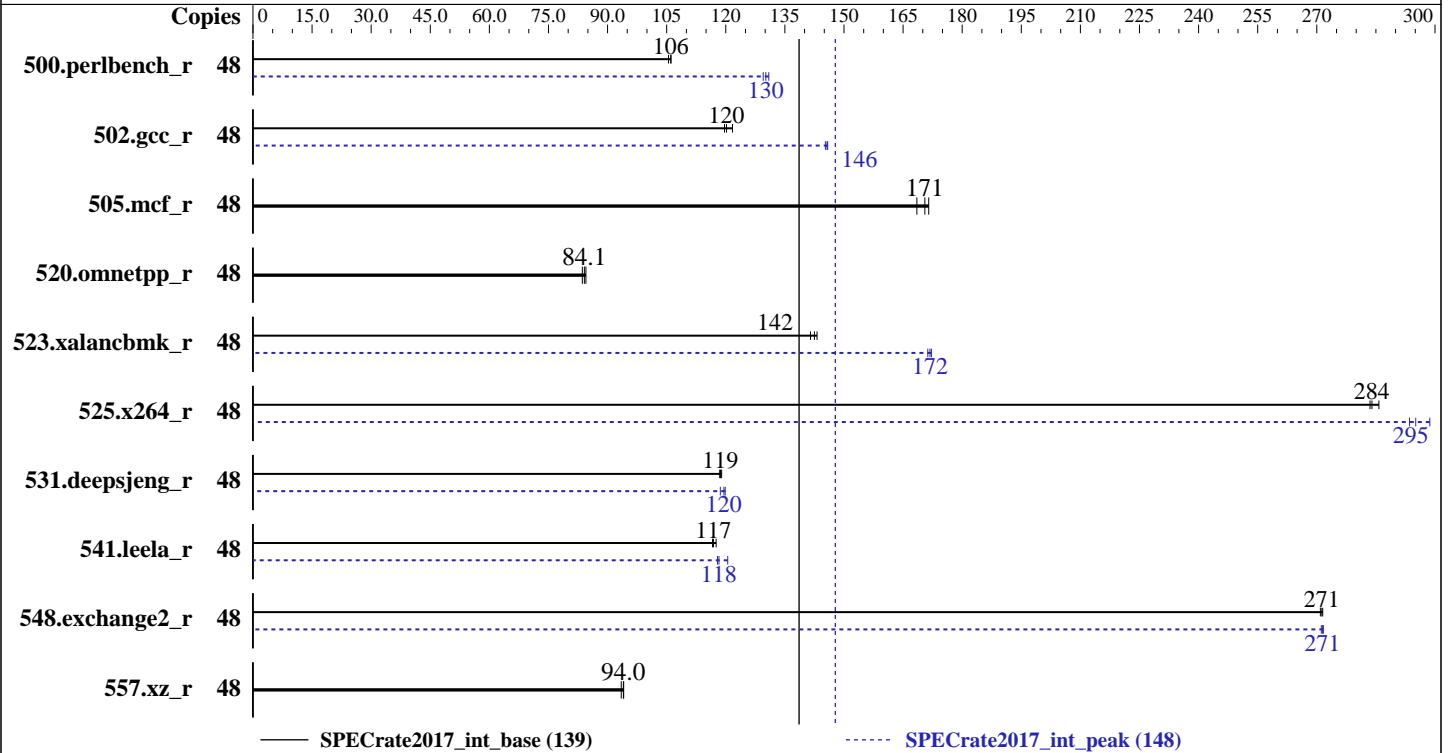
CPU2017 License: 3175

Test Sponsor: Huawei

Tested by: Huawei

Test Date: Dec-2017

Hardware Availability: Jul-2017

Software Availability: Sep-2017

Copies

Benchmark	Copies	base	peak
500.perlbench_r	48	106	130
502.gcc_r	48	120	146
505.mcf_r	48	171	
520.omnetpp_r	48	84.1	
523.xalancbmk_r	48	142	172
525.x264_r	48	284	295
531.deepsjeng_r	48	119	120
541.leela_r	48	117	118
548.exchange2_r	48	271	271
557.xz_r	48	94.0	

——— SPECrate2017_int_base (139)   - - - - **SPECrate2017_int_peak (148)**

Hardware

CPU Name: Intel Xeon Gold 6126

 Max MHz.:   3700

 Nominal: 2600

Enabled: 24 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:   19.25 MB I+D on chip per chip

 Other: None

Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)

Storage: 1 x 1200 GB SAS, 10000 RPM

Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
        4.4.21-69-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 0.37 Released Nov-2017

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;
        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 avilable from jemalloc.net or
        releases

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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	48	720	106	725	105	**721**	**106**	48	584	131	**587**	**130**	590	130
502.gcc_r	48	558	122	**566**	**120**	568	120	48	468	145	**467**	**146**	466	146
505.mcf_r	48	452	172	**455**	**171**	460	169	48	452	172	**455**	**171**	460	169
520.omnetpp_r	48	745	84.5	**749**	**84.1**	753	83.6	48	745	84.5	**749**	**84.1**	753	83.6
523.xalancbmk_r	48	354	143	**356**	**142**	358	142	48	**295**	**172**	296	171	294	172
525.x264_r	48	**296**	**284**	294	286	296	284	48	281	299	286	294	**285**	**295**
531.deepsjeng_r	48	462	119	464	118	**464**	**119**	48	459	120	**460**	**120**	464	119
541.leela_r	48	**680**	**117**	676	118	682	117	48	674	118	660	120	**672**	**118**
548.exchange2_r	48	464	271	**464**	**271**	463	272	48	464	271	463	272	**463**	**271**
557.xz_r	48	555	93.5	**551**	**94.0**	551	94.1	48	555	93.5	**551**	**94.0**	551	94.1
SPECrate2017_int_base =	**139**													
SPECrate2017_int_peak =	**148**													

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 = "/spec2017/lib/ia32:/spec2017/lib/intel64:/spec2017/je5.0.1-32:/spec2017/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>

Platform Notes

BIOS configuration:
Power Policy Set to Performance

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Platform Notes (Continued)

```
SNC Set to Enabled
IMC Interleaving Set to 1 way Interleave
XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-jujq Fri Dec 15 23:40:17 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) Gold 6126 CPU @ 2.60GHz
      2  "physical id"s (chips)
     48 "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 : 12
      siblings  : 24
      physical 0: cores 0 1 3 5 6 8 9 10 11 12 13 14
      physical 1: cores 0 1 2 4 5 6 8 9 10 11 13 14

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                48
     On-line CPU(s) list:   0-47
     Thread(s) per core:    2
     Core(s) per socket:    12
     Socket(s):             2
     NUMA node(s):          4
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 85
     Model name:            Intel(R) Xeon(R) Gold 6126 CPU @ 2.60GHz
     Stepping:              4
     CPU MHz:               2600.007
     BogoMIPS:              5200.01
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              1024K
     L3 cache:              19712K
     NUMA node0 CPU(s):     0-2,5-7,24-26,29-31
     NUMA node1 CPU(s):     3,4,8-11,27,28,32-35
     NUMA node2 CPU(s):     12-14,18-20,36-38,42-44
```

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Platform Notes (Continued)

```
       NUMA node3 CPU(s):       15-17,21-23,39-41,45-47
       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 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 pln pts dtherm intel_pt
    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

 /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: 4 nodes (0-3)
   node 0 cpus: 0 1 2 5 6 7 24 25 26 29 30 31
   node 0 size: 94736 MB
   node 0 free: 93997 MB
   node 1 cpus: 3 4 8 9 10 11 27 28 32 33 34 35
   node 1 size: 96760 MB
   node 1 free: 96072 MB
   node 2 cpus: 12 13 14 18 19 20 36 37 38 42 43 44
   node 2 size: 96760 MB
   node 2 free: 96085 MB
   node 3 cpus: 15 16 17 21 22 23 39 40 41 45 46 47
   node 3 size: 96622 MB
   node 3 free: 95932 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:       394116700 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.
```

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CPU2017 License: 3175		**Test Date:**	Dec-2017
Test Sponsor: Huawei		**Hardware Availability:**	Jul-2017
Tested by: Huawei		**Software Availability:**	Sep-2017

Platform Notes (Continued)

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

 uname -a:
    Linux linux-jujq 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 15 06:08

 SPEC is set to: /spec2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda2       xfs   500G   27G  474G   6% /

 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 INSYDE Corp. 0.37 11/13/2017
    Memory:
     24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

 (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.
------------------------------------------------------------------------------
```

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Software Availability: Sep-2017

Compiler Version Notes (Continued)

```
==============================================================================
  CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
       541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
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`

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Base Portability Flags (Continued)

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 -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`

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

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Peak Compiler Invocation (Continued)

Fortran benchmarks:
`ifort`

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: -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: basepeak = yes
```

```
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: basepeak = yes
```

C++ benchmarks:

```
520.omnetpp_r: basepeak = yes
```

(Continued on next page)

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Peak Optimization Flags (Continued)

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`

531.deepsjeng_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`

541.leela_r: `Same as 531.deepsjeng_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/Huawei-Platform-Settings-SKL-V1.7.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/Huawei-Platform-Settings-SKL-V1.7.xml`

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

Tested with SPEC CPU2017 v1.0.2 on 2017-12-15 10:40:16-0500.
Report generated on 2018-10-31 17:04:39 by CPU2017 PDF formatter v6067.
Originally published on 2018-01-10.

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