SPEC® CPU2017 Integer Rate Result

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Huawei

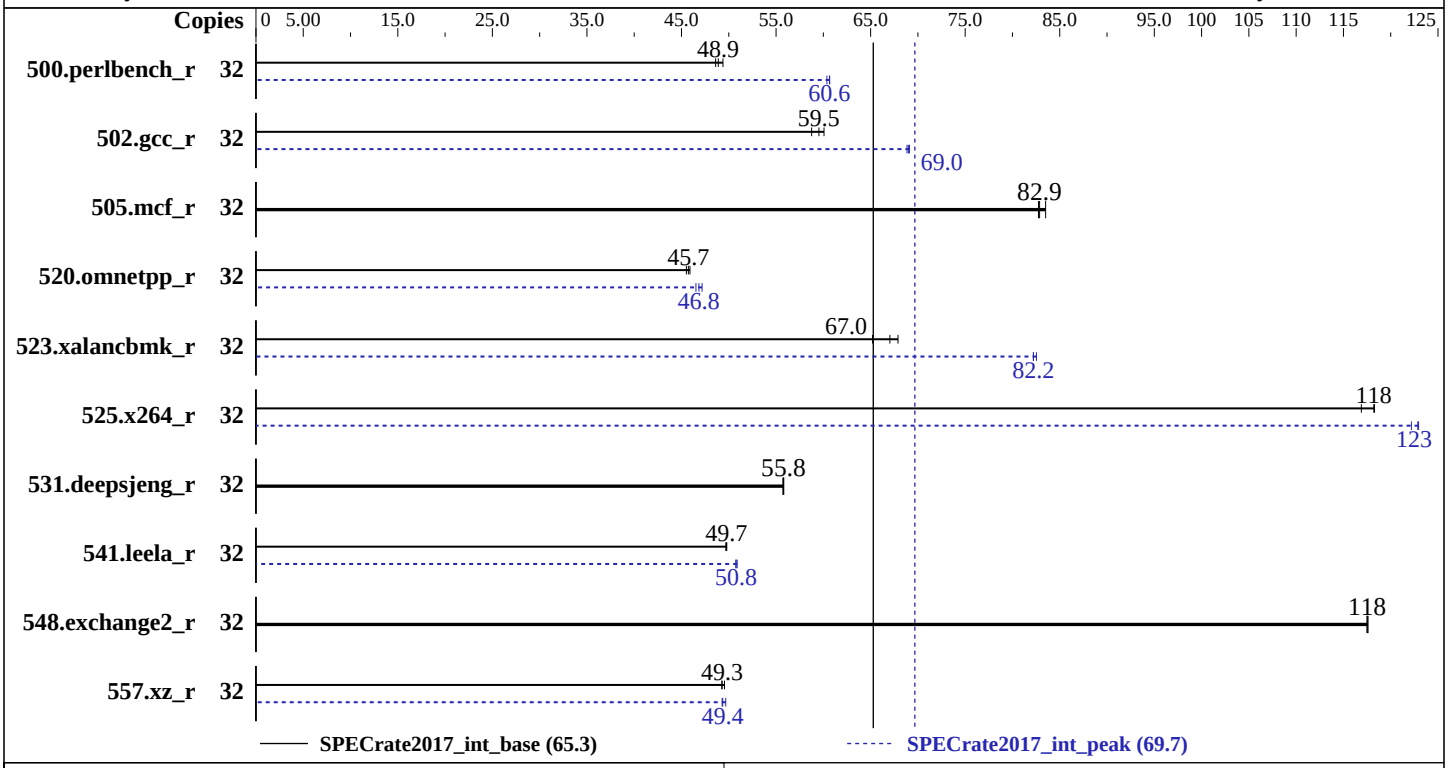
Huawei XH321 V5 (Intel Xeon Silver 4108)

SPECrate2017_int_base = 65.3

SPECrate2017_int_peak = 69.7

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Jun-2018
Hardware Availability: Jul-2017
Software Availability: Jan-2018



Hardware

CPU Name:	Intel Xeon Silver 4108
Max MHz.:	3000
Nominal:	1800
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:	11 MB I+D on chip per chip
Other:	None
Memory:	384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage:	1 x 1200 GB SAS, 10000 RPM
Other:	None

Software

OS:	Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-693.11.6.el7.x86_64
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 0.59 Released Feb-2018
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;

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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	32	1048	48.6	1032	49.4	**1042**	**48.9**	32	840	60.7	**840**	**60.6**	844	60.4
502.gcc_r	32	771	58.8	**761**	**59.5**	754	60.1	32	656	69.1	658	68.8	**657**	**69.0**
505.mcf_r	32	**624**	**82.9**	625	82.7	619	83.5	32	**624**	**82.9**	625	82.7	619	83.5
520.omnetpp_r	32	**918**	**45.7**	915	45.9	922	45.5	32	902	46.5	**896**	**46.8**	890	47.2
523.xalancbmk_r	32	498	67.9	518	65.2	**504**	**67.0**	32	411	82.2	**411**	**82.2**	409	82.5
525.x264_r	32	479	117	474	118	**474**	**118**	32	459	122	**456**	**123**	456	123
531.deepsjeng_r	32	658	55.7	**657**	**55.8**	657	55.8	32	658	55.7	**657**	**55.8**	657	55.8
541.leela_r	32	1066	49.7	1064	49.8	**1065**	**49.7**	32	1044	50.7	1041	50.9	**1044**	**50.8**
548.exchange2_r	32	713	118	**713**	**118**	714	117	32	713	118	**713**	**118**	714	117
557.xz_r	32	**701**	**49.3**	701	49.3	698	49.5	32	696	49.7	**700**	**49.4**	701	49.3

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

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General Notes (Continued)

```
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.
```

Platform Notes

```
BIOS configuration:
Power Policy Set to Performance
SNC Set to Enabled
IMC Interleaving Set to 1-way Interleave
XPT Prefetch Set to Enabled
ADDDC Sparing Set to Disabled
Sysinfo program /spec/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Sun Jun 10 02:57:03 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) Silver 4108 CPU @ 1.80GHz
      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 0 1 2 3 4 5 6 7
      physical 1: 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):                32
     On-line CPU(s) list:   0-31
     Thread(s) per core:    2
     Core(s) per socket:    8
     Socket(s):             2
     NUMA node(s):          2
     Vendor ID:             GenuineIntel
     CPU family:            6
```

(Continued on next page)

Platform Notes (Continued)

```
      Model:                 85
      Model name:            Intel(R) Xeon(R) Silver 4108 CPU @ 1.80GHz
      Stepping:              4
      CPU MHz:               1800.000
      BogoMIPS:              3604.53
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              11264K
      NUMA node0 CPU(s):     0-7,16-23
      NUMA node1 CPU(s):     8-15,24-31

  /proc/cpuinfo cache data
     cache size : 11264 KB

  From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
  physical chip.
    available: 2 nodes (0-1)
    node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
    node 0 size: 195701 MB
    node 0 free: 190621 MB
    node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
    node 1 size: 196608 MB
    node 1 free: 192042 MB
    node distances:
    node   0   1
      0:  10  21
      1:  21  10

  From /proc/meminfo
     MemTotal:       395141652 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  From /etc/*release* /etc/*version*
     os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.3 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VERSION_ID="7.3"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
        ANSI_COLOR="0;31"
        CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
     redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
     system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
```

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Platform Notes (Continued)

```
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.3:ga:server

 uname -a:
    Linux localhost.localdomain 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST
    2017 x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Jun 10 02:55

 SPEC is set to: /spec
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda8      xfs   325G   30G  296G  10% /

 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. 0.59 02/24/2018
   Memory:
    4x NO DIMM NO DIMM
    12x 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, 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.
------------------------------------------------------------------------------

==============================================================================
 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.
```

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Compiler Version Notes (Continued)

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

==============================================================================
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
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 -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`

Fortran benchmarks:
`ifort`

Peak Portability Flags

500.perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`

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Peak Portability Flags (Continued)

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: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-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 -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/usr/local/je5.0.1-64/lib -ljemalloc

557.xz_r: -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:

520.omnetpp_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/je5.0.1-64/lib -ljemalloc

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-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

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Peak Optimization Flags (Continued)

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `Same as 520.omnetpp_r`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

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-V1.9-revC.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-V1.9-revC.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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