SPEC® CPU2017 Integer Rate Result

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Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6126, 2.60 GHz)

SPECrate2017_int_base =   140

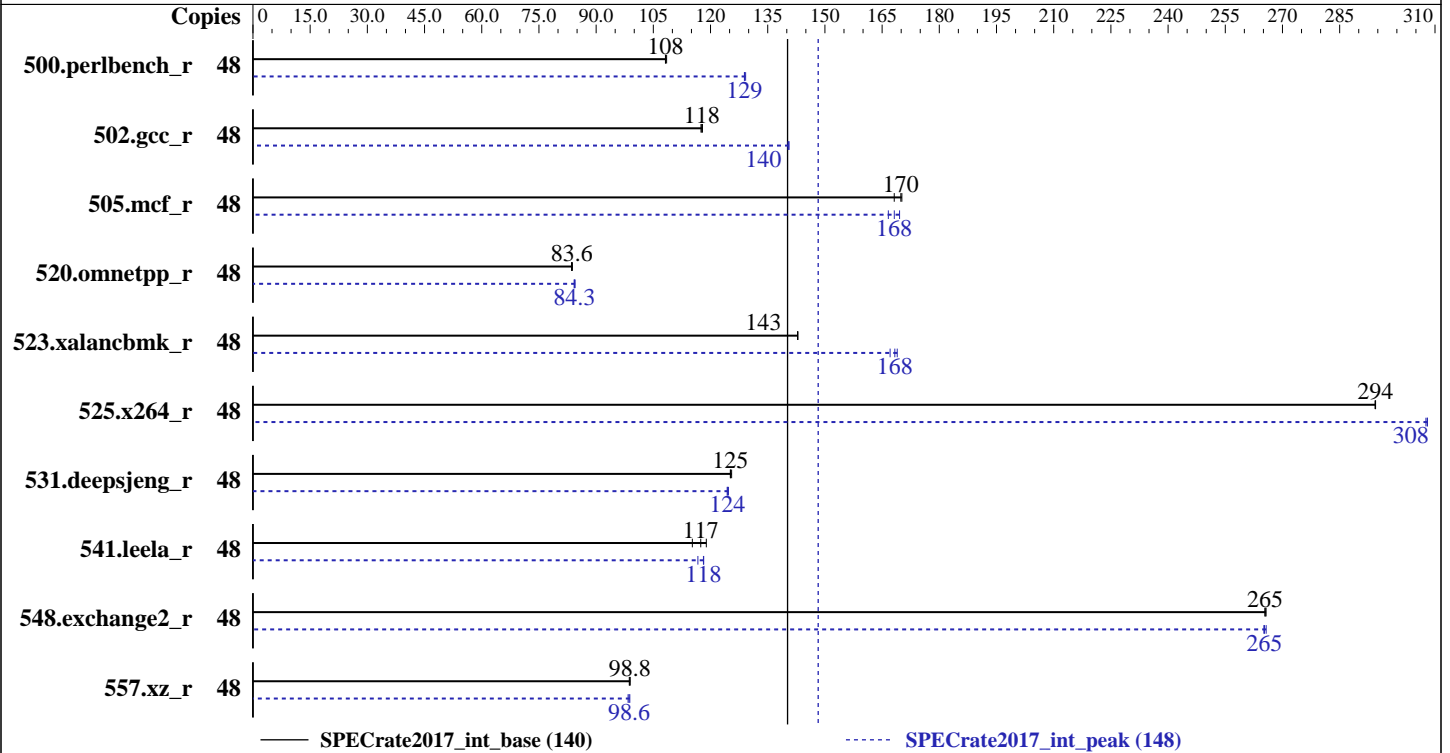SPECrate2017_int_peak =   148

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

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

Copies

Benchmark	Copies	base	peak
500.perlbench_r	48	108	129
502.gcc_r	48	118	140
505.mcf_r	48	170	168
520.omnetpp_r	48	83.6	84.3
523.xalancbmk_r	48	143	168
525.x264_r	48	294	308
531.deepsjeng_r	48	125	124
541.leela_r	48	117	118
548.exchange2_r	48	265	265
557.xz_r	48	98.8	98.6

SPECrate2017_int_base (140)   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: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 400 GB SAS SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
   4.4.120-92.70-default
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
   Compiler for Linux;
   Fortran: Version 19.0.1.144 of Intel Fortran
   Compiler for Linux
Parallel: No
Firmware: Version 4.0.1 released Oct-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator 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	48	706	108	**706**	**108**	704	108	48	**593**	**129**	593	129	591	129
502.gcc_r	48	578	118	**577**	**118**	577	118	48	484	140	**484**	**140**	483	141
505.mcf_r	48	456	170	**457**	**170**	461	168	48	457	170	466	167	**461**	**168**
520.omnetpp_r	48	754	83.6	752	83.8	**753**	**83.6**	48	745	84.5	**747**	**84.3**	748	84.2
523.xalancbmk_r	48	**355**	**143**	355	143	355	143	48	303	167	**301**	**168**	300	169
525.x264_r	48	285	294	286	294	**285**	**294**	48	273	308	**273**	**308**	273	308
531.deepsjeng_r	48	**439**	**125**	439	125	438	126	48	**442**	**124**	442	124	441	125
541.leela_r	48	**677**	**117**	669	119	690	115	48	672	118	**673**	**118**	681	117
548.exchange2_r	48	473	266	474	265	**474**	**265**	48	**474**	**265**	473	266	474	265
557.xz_r	48	525	98.7	**525**	**98.8**	524	98.9	48	525	98.8	527	98.4	**526**	**98.6**

SPECrate2017_int_base =	140
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 = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"

 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.
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.
```

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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General Notes (Continued)

```
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 Settings:
Intel HyperThreading Technology set to Enabled
CPU performance set to Enterprise
Power Performance Tuning set to OS Controls
SNC set to Enabled
IMC Interleaving set to 1-way Interleave
Patrol Scrub set to Disabled
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-dssz Wed Dec  5 03:20:38 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 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 4 5 6 8 9 10 11 12 13
       physical 1: cores 0 1 3 4 5 6 8 9 10 11 12 13

 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
```

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Platform Notes (Continued)

```
         Vendor ID:              GenuineIntel
         CPU family:             6
         Model:                  85
         Model name:             Intel(R) Xeon(R) Gold 6126 CPU @ 2.60GHz
         Stepping:               4
         CPU MHz:                2610.183
         CPU max MHz:            3700.0000
         CPU min MHz:            1000.0000
         BogoMIPS:               5187.79
         Virtualization:         VT-x
         L1d cache:              32K
         L1i cache:              32K
         L2 cache:               1024K
         L3 cache:               19712K
         NUMA node0 CPU(s):      0-2,6-8,24-26,30-32
         NUMA node1 CPU(s):      3-5,9-11,27-29,33-35
         NUMA node2 CPU(s):      12-14,18-20,36-38,42-44
         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 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 hwp_act_window hwp_epp hwp_pkg_req intel_pt rsb_ctxsw spec_ctrl stibp
    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

 /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 6 7 8 24 25 26 30 31 32
   node 0 size: 192098 MB
   node 0 free: 188758 MB
   node 1 cpus: 3 4 5 9 10 11 27 28 29 33 34 35
   node 1 size: 193528 MB
   node 1 free: 190514 MB
   node 2 cpus: 12 13 14 18 19 20 36 37 38 42 43 44
   node 2 size: 193528 MB
   node 2 free: 190502 MB
   node 3 cpus: 15 16 17 21 22 23 39 40 41 45 46 47
   node 3 size: 193525 MB
   node 3 free: 190499 MB
```

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Platform Notes (Continued)

```
   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:       791225968 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.
       # 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-dssz 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Dec 4 11:42

 SPEC is set to: /home/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda3       xfs   212G  151G   62G  71% /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 Cisco Systems, Inc. C220M5.4.0.1.139.1003182107 10/03/2018
   Memory:
    24x 0xCE00 M393A4K40BB2-CTD 32 GB 2 rank 2666

 (End of data from sysinfo program)
```

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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) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
CC   500.perlbench_r(peak) 502.gcc_r(peak)
------------------------------------------------------------------------------
icc (ICC) 19.0.1.144 20181018
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) 19.0.1.144 20181018
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) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 FC   548.exchange2_r(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 19.0.1.144 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

C++ benchmarks:

```
icpc -m64
```

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Base Compiler Invocation (Continued)

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/home/cpu2017/je5.0.1-64/ -ljemalloc`

C++ benchmarks:
`-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=3 -L/home/cpu2017/je5.0.1-64/ -ljemalloc`

Fortran benchmarks:
`-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`
`-L/home/cpu2017/je5.0.1-64/ -ljemalloc`

Peak Compiler Invocation

C benchmarks (except as noted below):
`icc -m64 -std=c11`

 502.gcc_r: `icc -m32 -std=c11 -L/opt/intel/lib/ia32`

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

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Peak Compiler Invocation (Continued)

523.xalancbmk_r: `icpc -m32 -L/opt/intel/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`

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/home/cpu2017/je5.0.1-64/`
`-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/home/cpu2017/je5.0.1-32/ -ljemalloc`

505.mcf_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=3 -L/home/cpu2017/je5.0.1-64/`
`-ljemalloc`

525.x264_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=3 -fno-alias`
`-L/home/cpu2017/je5.0.1-64/ -ljemalloc`

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Peak Optimization Flags (Continued)

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/home/cpu2017/je5.0.1-64/ -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/home/cpu2017/je5.0.1-32/ -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/home/cpu2017/je5.0.1-64/ -ljemalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2018-06-13.html
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2018-06-13.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.xml

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

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