SPEC CPU®2017 Integer Rate Result

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Cisco Systems

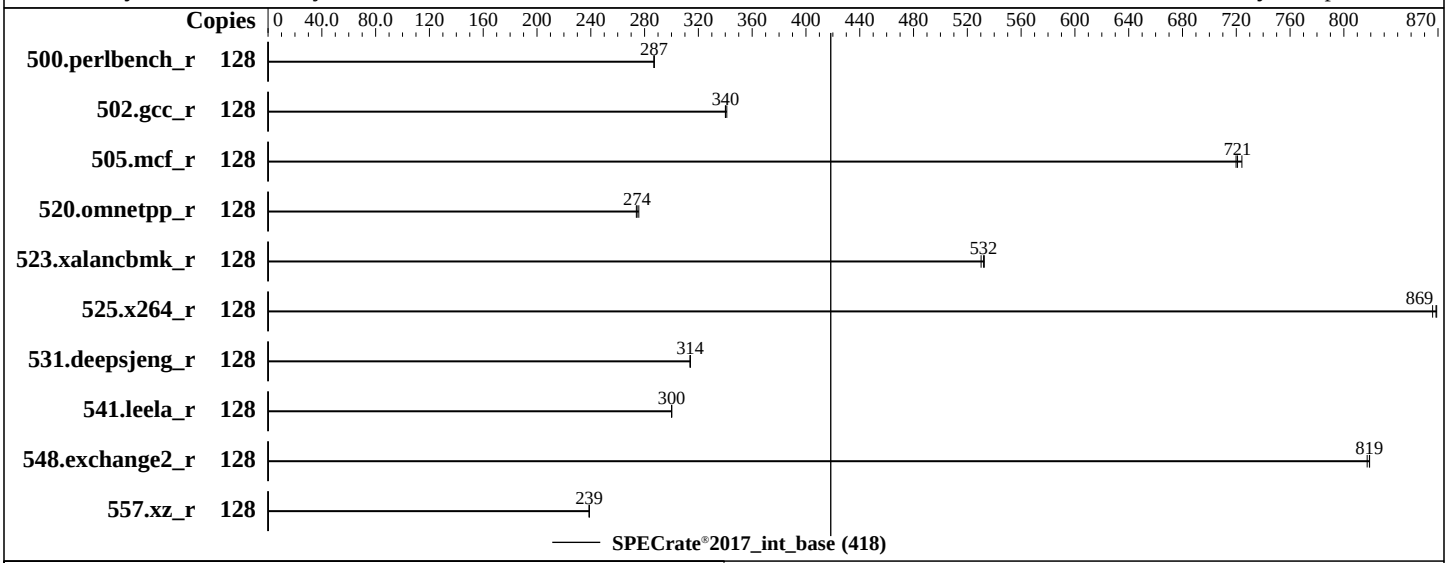
Cisco UCS X210c M6 (Intel Xeon Gold 6338, 2.00GHz)

SPECrate®2017_int_base = 418

SPECrate®2017_int_peak = Not Run

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

Test Date: Nov-2021
Hardware Availability: Sep-2021
Software Availability: Sep-2021



Hardware

CPU Name:	Intel Xeon Gold 6338
Max MHz:	3200
Nominal:	2000
Enabled:	64 cores, 2 chips, 2 threads/core
Orderable:	1,2 Chips
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	1.25 MB I+D on chip per core
L3:	48 MB I+D on chip per chip
Other:	None
Memory:	2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R)
Storage:	1 x 240 GB M.2 SSD SATA
Other:	None

Software

OS:	SUSE Linux Enterprise Server 15 SP3 5.3.18-57-default
Compiler:	C/C++: Version 2021.4.0 of Intel oneAPI DPC++/C++ Compiler Build 20210924 for Linux; Fortran: Version 2021.4.0 of Intel Fortran Compiler Classic Build 20210910 for Linux;
Parallel:	No
Firmware:	Version 5.0.1d released Aug-2021
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None
Power Management:	OS set to prefer performance at the cost of additional power usage

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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	128	710	287	**710**	**287**	710	287							
502.gcc_r	128	**533**	**340**	533	340	531	341							
505.mcf_r	128	287	720	286	724	**287**	**721**							
520.omnetpp_r	128	**612**	**274**	609	276	613	274							
523.xalancbmk_r	128	**254**	**532**	254	533	255	530							
525.x264_r	128	259	866	258	869	**258**	**869**							
531.deepsjeng_r	128	467	314	**467**	**314**	467	314							
541.leela_r	128	706	300	706	300	**706**	**300**							
548.exchange2_r	128	**409**	**819**	409	819	410	817							
557.xz_r	128	579	239	**579**	**239**	579	239							

SPECrate®2017_int_base = 418

SPECrate®2017_int_peak = Not Run

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"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/intel/tbb/2021.4.0/env/../lib/intel64/gcc4.8:/home/intel/mpi/2021
     .4.0//libfabric/lib:/home/intel/mpi/2021.4.0//lib/release:/home/intel/mp
     i/2021.4.0//lib:/home/intel/compiler/2021.4.0/linux/compiler/lib/intel64
     _lin:/home/intel/compiler/2021.4.0/linux/lib:/home/intel/clck/2021.4.0/l
     ib/intel64:/home/cpu2017/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries compiled on a system with 1x Intel Core i9-7940X CPU + 64GB RAM
memory using openSUSE Leap 15.2
Transparent Huge Pages enabled by default
```

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General Notes (Continued)

```
 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>
NA: 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 Settings:
Adjacent Cache Line Prefetcher set to Disabled
DCU Streamer Prefetch set to Disabled
Sub NUMA Clustering set to Enabled
LLC Dead Line set to Disabled
Memory Refresh Rate set to 1x Refresh
ADDDC Sparing set to Disabled
Patrol Scrub set to Disabled
Processor C6 Report set to Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on perf-blade1 Thu Nov 18 09:33:44 2021

 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 6338 CPU @ 2.00GHz
       2  "physical id"s (chips)
       128 "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 : 32
       siblings  : 64
       physical 0: cores 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 28 29 30 31
       physical 1: cores 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 28 29 30 31

 From lscpu from util-linux 2.36.2:
```

(Continued on next page)

Platform Notes (Continued)

```
Architecture:                    x86_64
CPU op-mode(s):                  32-bit, 64-bit
Byte Order:                      Little Endian
Address sizes:                   46 bits physical, 57 bits virtual
CPU(s):                          128
On-line CPU(s) list:             0-127
Thread(s) per core:              2
Core(s) per socket:              32
Socket(s):                       2
NUMA node(s):                    4
Vendor ID:                       GenuineIntel
CPU family:                      6
Model:                           106
Model name:                      Intel(R) Xeon(R) Gold 6338 CPU @ 2.00GHz
Stepping:                        6
CPU MHz:                         2600.000
CPU max MHz:                     3200.0000
CPU min MHz:                     800.0000
BogoMIPS:                        4000.00
Virtualization:                  VT-x
L1d cache:                       3 MiB
L1i cache:                       2 MiB
L2 cache:                        80 MiB
L3 cache:                        96 MiB
NUMA node0 CPU(s):               0-15,64-79
NUMA node1 CPU(s):               16-31,80-95
NUMA node2 CPU(s):               32-47,96-111
NUMA node3 CPU(s):               48-63,112-127
Vulnerability Itlb multihit:     Not affected
Vulnerability L1tf:              Not affected
Vulnerability Mds:               Not affected
Vulnerability Meltdown:          Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via
prctl and seccomp
Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user
pointer sanitization
Vulnerability Spectre v2:        Mitigation; Enhanced IBRS, IBPB conditional, RSB
filling
Vulnerability Srbds:             Not affected
Vulnerability Tsx async abort:   Not affected
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 cpuid aperfmperf 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 cpuid_fault
epb cat_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
```

(Continued on next page)

Platform Notes (Continued)

```
      flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms
      invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb
      intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc
      cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat
      pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke
      avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq
      la57 rdpid fsrm md_clear pconfig flush_l1d arch_capabilities

  From lscpu --cache:
       NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
       L1d       48K       3M   12 Data            1    64        1             64
       L1i       32K       2M    8 Instruction     1    64        1             64
       L2       1.3M      80M   20 Unified         2  1024        1             64
       L3        48M      96M   12 Unified         3 65536        1             64

  /proc/cpuinfo cache data
     cache size : 49152 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 3 4 5 6 7 8 9 10 11 12 13 14 15 64 65 66 67 68 69 70 71 72 73 74 75
    76 77 78 79
    node 0 size: 515648 MB
    node 0 free: 515097 MB
    node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88
    89 90 91 92 93 94 95
    node 1 size: 516088 MB
    node 1 free: 515574 MB
    node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 99 100 101 102
    103 104 105 106 107 108 109 110 111
    node 2 size: 516088 MB
    node 2 free: 515665 MB
    node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117
    118 119 120 121 122 123 124 125 126 127
    node 3 size: 516084 MB
    node 3 free: 515586 MB
    node distances:
    node   0   1   2   3
      0:  10  11  20  20
      1:  11  10  20  20
      2:  20  20  10  11
      3:  20  20  11  10

  From /proc/meminfo
     MemTotal:       2113442860 kB
     HugePages_Total:       0
```

(Continued on next page)

Platform Notes (Continued)

```
   Hugepagesize:       2048 kB

 /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
   performance

 From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP3"
      VERSION_ID="15.3"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP3"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp3"

 uname -a:
   Linux perf-blade1 5.3.18-57-default #1 SMP Wed Apr 28 10:54:41 UTC 2021 (ba3c2e9)
   x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-12207 (iTLB Multihit):                          Not affected
 CVE-2018-3620 (L1 Terminal Fault):                       Not affected
 Microarchitectural Data Sampling:                        Not affected
 CVE-2017-5754 (Meltdown):                                Not affected
 CVE-2018-3639 (Speculative Store Bypass):                Mitigation: Speculative Store
                                                          Bypass disabled via prctl and
                                                          seccomp
 CVE-2017-5753 (Spectre variant 1):                       Mitigation: usercopy/swapgs
                                                          barriers and __user pointer
                                                          sanitization
 CVE-2017-5715 (Spectre variant 2):                      Mitigation: Enhanced IBRS, IBPB:
                                                          conditional, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):                 Not affected

 run-level 3 Nov 17 16:27

 SPEC is set to: /home/cpu2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda3      xfs   181G   42G  140G  24% /home

 From /sys/devices/virtual/dmi/id
    Vendor:         Cisco Systems Inc
    Product:        UCSX-210C-M6
    Serial:         FCH25057AMV
```

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Platform Notes (Continued)

```
 Additional information from dmidecode 3.2 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.
   Memory:
     32x 0xCE00 M393A8G40AB2-CWE 64 GB 2 rank 3200

 BIOS:
    BIOS Vendor:       Cisco Systems, Inc.
    BIOS Version:      X210M6.5.0.1d.0.0816211754
    BIOS Date:         08/16/2021
    BIOS Revision:     5.22

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
        | 525.x264_r(base) 557.xz_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.4.0 Build 20210924
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
        | 541.leela_r(base)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.4.0 Build 20210924
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
  Intel(R) 64, Version 2021.4.0 Build 20210910_000000
Copyright (C) 1985-2021 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.2021-12-22.html
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-ICX-revl.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.2021-12-22.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-ICX-revl.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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