SPEC CPU®2017 Integer Speed Result

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Cisco Systems

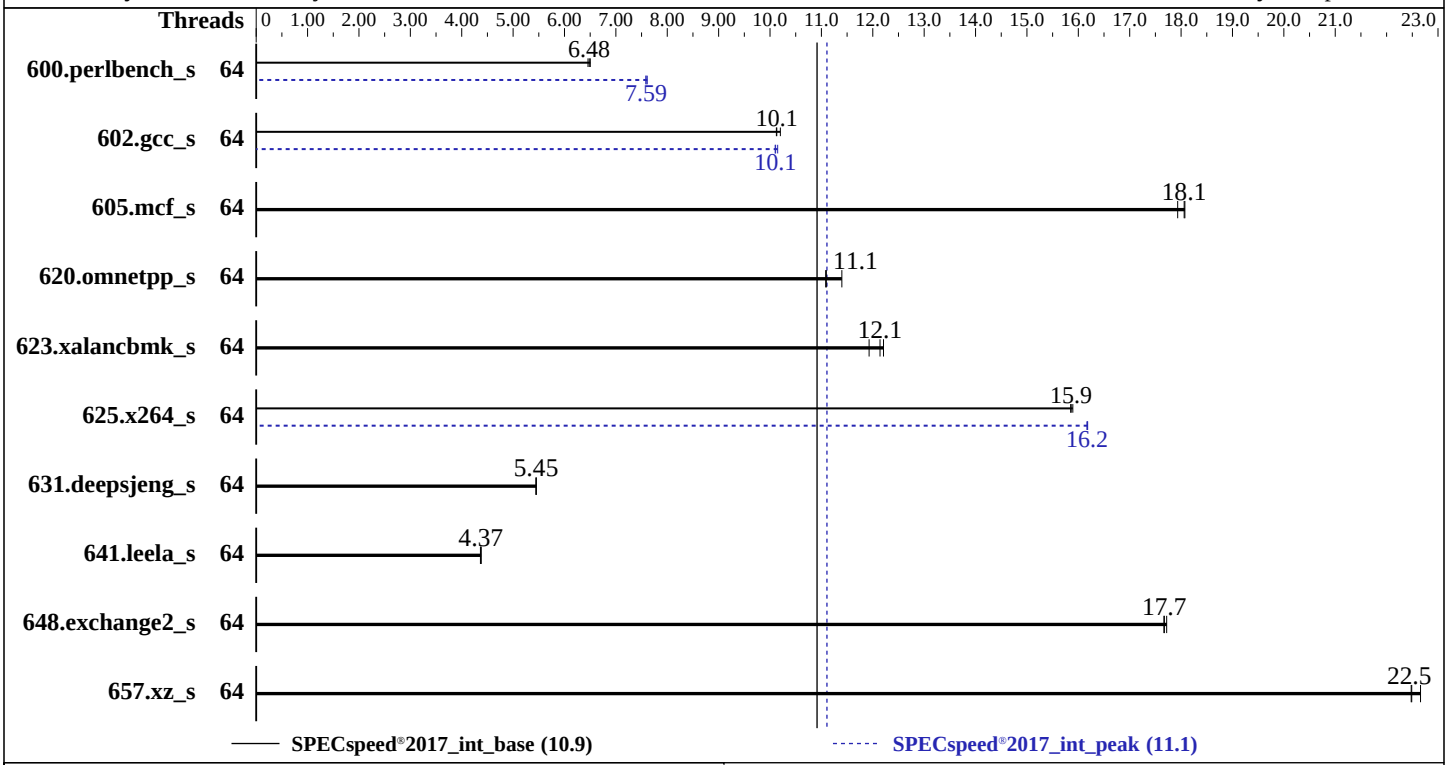
Cisco UCS X210c M6 (Intel Xeon Gold 6338, 2.00GHz)

SPECspeed®2017_int_base = 10.9

SPECspeed®2017_int_peak = 11.1

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
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; C/C++: Version 2021.4.0 of Intel C/C++ Compiler Classic Build 20210910 for Linux;
Parallel:	Yes
Firmware:	Version 5.0.1d released Aug-2021
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other:	jemalloc memory allocator V5.0.1
Power Management:	BIOS and OS set to prefer performance at the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	64	273	6.50	**274**	**6.48**	275	6.46	64	233	7.61	234	7.58	**234**	**7.59**
602.gcc_s	64	**393**	**10.1**	393	10.1	390	10.2	64	**394**	**10.1**	392	10.1	394	10.1
605.mcf_s	64	263	17.9	261	18.1	**261**	**18.1**	64	263	17.9	261	18.1	**261**	**18.1**
620.omnetpp_s	64	143	11.4	**147**	**11.1**	147	11.1	64	143	11.4	**147**	**11.1**	147	11.1
623.xalancbmk_s	64	119	11.9	116	12.2	**117**	**12.1**	64	119	11.9	116	12.2	**117**	**12.1**
625.x264_s	64	**111**	**15.9**	111	15.9	111	15.9	64	109	16.2	**109**	**16.2**	109	16.2
631.deepsjeng_s	64	263	5.45	**263**	**5.45**	263	5.45	64	263	5.45	**263**	**5.45**	263	5.45
641.leela_s	64	390	4.38	391	4.36	**390**	**4.37**	64	390	4.38	391	4.36	**390**	**4.37**
648.exchange2_s	64	166	17.7	166	17.7	**166**	**17.7**	64	166	17.7	166	17.7	**166**	**17.7**
657.xz_s	64	275	22.5	**275**	**22.5**	273	22.7	64	275	22.5	**275**	**22.5**	273	22.7

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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"
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
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:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

General Notes

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

(Continued on next page)

General Notes (Continued)

```
 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>
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.
 jemalloc, a general purpose malloc implementation
 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

```
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
Intel Hyper-Threading Technology set to Disabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on perf-blade1 Mon Nov 29 01:32:56 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)
       64 "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  : 32
       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
```

(Continued on next page)

Platform Notes (Continued)

```
      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:
      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):                          64
      On-line CPU(s) list:             0-63
      Thread(s) per core:              1
      Core(s) per socket:              32
      Socket(s):                       2
      NUMA node(s):                    2
      Vendor ID:                       GenuineIntel
      CPU family:                      6
      Model:                           106
      Model name:                      Intel(R) Xeon(R) Gold 6338 CPU @ 2.00GHz
      Stepping:                        6
      CPU MHz:                         1524.369
      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):               0-31
      NUMA node1 CPU(s):               32-63
      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
```

(Continued on next page)

Platform Notes (Continued)

```
      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
      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: 2 nodes (0-1)
  node 0 cpus: 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
  node 0 size: 1031743 MB
  node 0 free: 1030632 MB
  node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
  57 58 59 60 61 62 63
  node 1 size: 1032180 MB
  node 1 free: 1031500 MB
  node distances:
  node   0   1
    0:  10  20
    1:  20  10

From /proc/meminfo
   MemTotal:       2113458424 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

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

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
```


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Platform Notes (Continued)

```
      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 24 21:13

SPEC is set to: /home/cpu2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda3      xfs   181G   53G  129G  30% /home

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

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
```

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Platform Notes (Continued)

```
 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       | 600.perlbench_s(peak)
------------------------------------------------------------------------------
Intel(R) C 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.
------------------------------------------------------------------------------

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
        | 625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------
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       | 600.perlbench_s(peak)
------------------------------------------------------------------------------
Intel(R) C 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.
------------------------------------------------------------------------------

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
        | 625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------
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++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
```

(Continued on next page)

Compiler Version Notes (Continued)

```
        | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------
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 | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
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

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/home/cpu2017/je5.0.1-64 -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/home/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin
-lqkmalloc

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

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

600.perlbench_s: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

(Continued on next page)

Peak Optimization Flags (Continued)

600.perlbench_s: `-Wl,-z,muldefs -prof-gen`(pass 1) `-prof-use`(pass 2) `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -fno-strict-overflow -mbranches-within-32B-boundaries -L/home/cpu2017/je5.0.1-64 -ljemalloc`

602.gcc_s: `-m64 -std=c11 -Wl,-z,muldefs -fprofile-generate`(pass 1) `-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX512 -flto -Ofast`(pass 1) `-O3 -ffast-math -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries -L/home/cpu2017/je5.0.1-64 -ljemalloc`

605.mcf_s: `basepeak = yes`

625.x264_s: `-DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias -mbranches-within-32B-boundaries -L/home/cpu2017/je5.0.1-64 -ljemalloc`

657.xz_s: `basepeak = yes`

C++ benchmarks:

620.omnetpp_s: `basepeak = yes`

623.xalancbmk_s: `basepeak = yes`

631.deepsjeng_s: `basepeak = yes`

641.leela_s: `basepeak = yes`

Fortran benchmarks:

648.exchange2_s: `basepeak = yes`

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-revJ.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-revJ.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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