SPEC CPU®2017 Integer Speed Result

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Cisco Systems

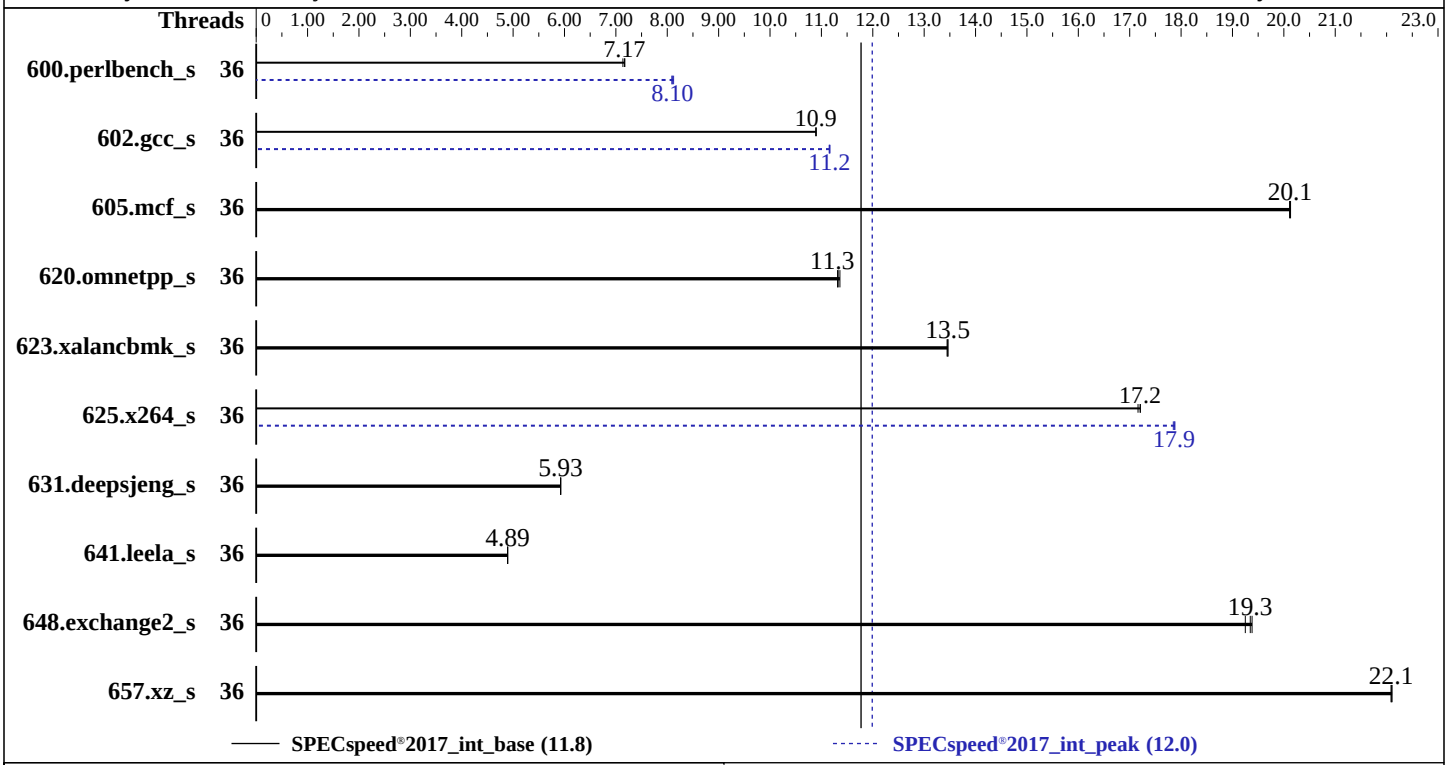
Cisco UCS B200 M6 (Intel Xeon Platinum 8351N, 2.40GHz)

SPECspeed®2017_int_base = 11.8

SPECspeed®2017_int_peak = 12.0

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

Test Date: Sep-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020



Hardware

CPU Name:	Intel Xeon Platinum 8351N
Max MHz:	3500
Nominal:	2400
Enabled:	36 cores, 1 chip
Orderable:	1 Chip
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	1.25 MB I+D on chip per core
L3:	54 MB I+D on chip per chip
Other:	None
Memory:	512 GB (8 x 64 GB 2Rx4 PC4-3200V-R, running at 2933)
Storage:	1 x 240 GB M.2 SSD SATA
Other:	None

Software

OS:	SUSE Linux Enterprise Server 15 SP2 5.3.18-22-default
Compiler:	C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
Parallel:	Yes
Firmware:	Version 4.2.1d released Jul-2021
File System:	btrfs
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	36	**248**	**7.17**	247	7.17	249	7.14	36	219	8.12	**219**	**8.10**	219	8.09
602.gcc_s	36	365	10.9	366	10.9	**366**	**10.9**	36	357	11.2	**357**	**11.2**	357	11.2
605.mcf_s	36	**235**	**20.1**	235	20.1	235	20.1	36	**235**	**20.1**	235	20.1	235	20.1
620.omnetpp_s	36	**144**	**11.3**	144	11.3	144	11.4	36	**144**	**11.3**	144	11.3	144	11.4
623.xalancbmk_s	36	105	13.5	**105**	**13.5**	105	13.4	36	105	13.5	**105**	**13.5**	105	13.4
625.x264_s	36	103	17.2	103	17.2	**103**	**17.2**	36	98.7	17.9	**98.7**	**17.9**	98.8	17.8
631.deepsjeng_s	36	**242**	**5.93**	242	5.93	242	5.93	36	**242**	**5.93**	242	5.93	242	5.93
641.leela_s	36	348	4.90	**349**	**4.89**	349	4.89	36	348	4.90	**349**	**4.89**	349	4.89
648.exchange2_s	36	153	19.2	152	19.4	**152**	**19.3**	36	153	19.2	152	19.4	**152**	**19.3**
657.xz_s	36	280	22.1	**280**	**22.1**	280	22.1	36	280	22.1	**280**	**22.1**	280	22.1

SPECspeed®2017_int_base = 11.8

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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/cpu2017/lib/intel64:/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
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.:
```

(Continued on next page)

General Notes (Continued)

```
 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:
Intel Hyper-Threading Technology set to Disabled
DCU Streamer Prefetch set to Disabled
LLC Dead Line set to Disabled
Memory Refresh Rate set to 1x Refresh
ADDDC Sparing set to Disabled
Patrol Scrub set to Disabled
Energy Efficient Turbo set to Enabled
Processor C6 Report set to Enabled
Processor C1E set to Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on localhost Sat Sep  4 01:21:59 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) Platinum 8351N CPU @ 2.40GHz
       1  "physical id"s (chips)
       36 "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 : 36
       siblings  : 36
       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 32 33 34 35

 From lscpu from util-linux 2.33.1:
      Architecture:        x86_64
      CPU op-mode(s):      32-bit, 64-bit
```

(Continued on next page)

Platform Notes (Continued)

```
      Byte Order:            Little Endian
      Address sizes:         46 bits physical, 57 bits virtual
      CPU(s):                36
      On-line CPU(s) list:   0-35
      Thread(s) per core:    1
      Core(s) per socket:    36
      Socket(s):             1
      NUMA node(s):          1
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 106
      Model name:            Intel(R) Xeon(R) Platinum 8351N CPU @ 2.40GHz
      Stepping:              6
      CPU MHz:               1445.361
      CPU max MHz:           3500.0000
      CPU min MHz:           800.0000
      BogoMIPS:              4800.00
      Virtualization:        VT-x
      L1d cache:             48K
      L1i cache:             32K
      L2 cache:              1280K
      L3 cache:              55296K
      NUMA node0 CPU(s):     0-35
      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 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 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 md_clear pconfig flush_l1d
      arch_capabilities

  /proc/cpuinfo cache data
     cache size : 55296 KB

  From numactl --hardware
  WARNING: a numactl 'node' might or might not correspond to a physical chip.
    available: 1 nodes (0)
    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 32 33 34 35
    node 0 size: 515104 MB
```

(Continued on next page)

Platform Notes (Continued)

```
  node 0 free: 514591 MB
  node distances:
  node   0
    0:  10

From /proc/meminfo
   MemTotal:       527466788 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"
      VERSION="15-SP2"
      VERSION_ID="15.2"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp2"

uname -a:
   Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) 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 Sep 4 01:21
```

(Continued on next page)

Platform Notes (Continued)

```
 SPEC is set to: /home/cpu2017
    Filesystem     Type   Size  Used Avail Use% Mounted on
    /dev/sda2      btrfs  222G  9.1G  212G   5% /home

 From /sys/devices/virtual/dmi/id
     Vendor:         Cisco Systems Inc
     Product:        UCSB-B200-M6
     Serial:         FCH24097576

 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:
     8x 0xCE00 M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2933
     24x NO DIMM NO DIMM

 BIOS:
    BIOS Vendor:       Cisco Systems, Inc.
    BIOS Version:      B200M6.4.2.1d.0.0730210924
    BIOS Date:         07/30/2021
    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 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 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 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C       | 600.perlbench_s(peak)
```

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Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
  64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 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 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
        | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 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 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 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/usr/local/jemalloc64-5.0.1/lib -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/opt/intel/oneapi/compiler/2021.1.1/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`

(Continued on next page)

Peak Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

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/usr/local/jemalloc64-5.0.1/lib -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/usr/local/jemalloc64-5.0.1/lib -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/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

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Peak Optimization Flags (Continued)

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.html`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-ICX-revG.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.xml`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-ICX-revG.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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