SPEC CPU®2017 Floating Point Speed Result

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Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8454H, 2.10GHz)

$SPECspeed®2017\_fp\_base = 353$

$SPECspeed®2017\_fp\_peak = 353$

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

Test Date: Sep-2023
Hardware Availability: Mar-2023
Software Availability: Dec-2022

Threads

Benchmark	Threads	Value
603.bwaves_s	128	1670 / 1660
607.cactuBSSN_s	128	414
619.lbm_s	128	333
621.wrf_s	128	151
627.cam4_s	128	178 / 179
628.pop2_s	128	74.1
638.imagick_s	128	706
644.nab_s	128	799
649.fotonik3d_s	128	212
654.roms_s	128	554

——— SPECspeed®2017_fp_base (353)   - - - - - SPECspeed®2017_fp_peak (353)

Hardware

CPU Name: Intel Xeon Platinum 8454H
 Max MHz: 3400
 Nominal: 2100
Enabled: 128 cores, 4 chips
Orderable: 1,2,3,4 Chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 82.5 MB I+D on chip per chip
 Other: None
Memory: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.9 TB SSD SATA
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
5.14.21-150400.22-default
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++
Compiler for Linux;
Fortran: Version 2023.0 of Intel Fortran Compiler
for Linux;
Parallel: Yes
Firmware: Version 5.1.1e released May-2023
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 set to prefer power save
with minimal impact on performance

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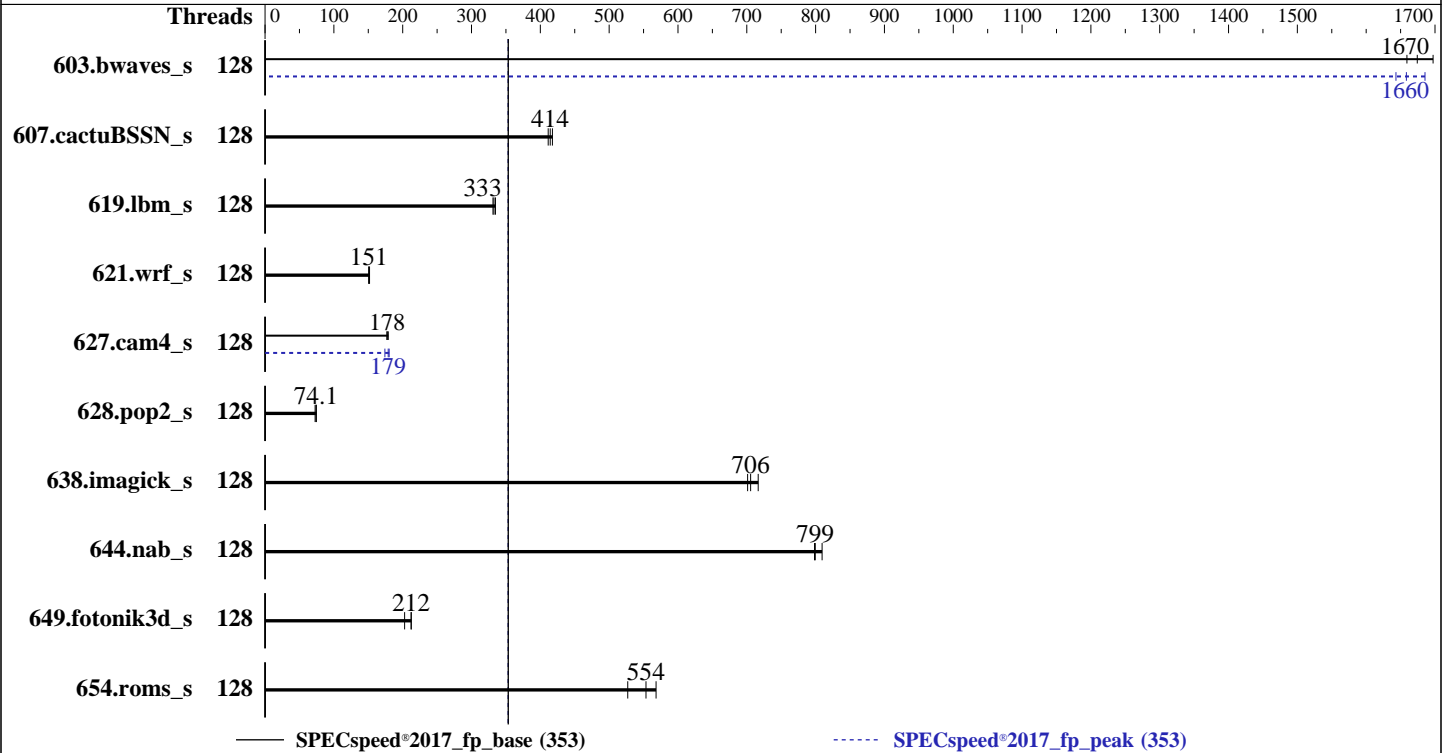**Test Sponsor:** Cisco Systems
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Test Date: Sep-2023
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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	128	34.8	1700	**35.2**	**1670**	35.6	1660	128	35.9	1640	**35.6**	**1660**	35.0	1690
607.cactuBSSN_s	128	39.9	418	**40.2**	**414**	40.5	411	128	39.9	418	**40.2**	**414**	40.5	411
619.lbm_s	128	15.8	331	**15.7**	**333**	15.6	335	128	15.8	331	**15.7**	**333**	15.6	335
621.wrf_s	128	87.8	151	**87.7**	**151**	87.1	152	128	87.8	151	**87.7**	**151**	87.1	152
627.cam4_s	128	49.5	179	**49.9**	**178**	50.1	177	128	**49.5**	**179**	49.1	180	50.9	174
628.pop2_s	128	163	72.7	159	74.5	**160**	**74.1**	128	163	72.7	159	74.5	**160**	**74.1**
638.imagick_s	128	20.6	701	**20.4**	**706**	20.1	717	128	20.6	701	**20.4**	**706**	20.1	717
644.nab_s	128	21.9	798	21.6	809	**21.9**	**799**	128	21.9	798	21.6	809	**21.9**	**799**
649.fotonik3d_s	128	45.0	203	42.9	212	**42.9**	**212**	128	45.0	203	42.9	212	**42.9**	**212**
654.roms_s	128	**28.4**	**554**	27.7	568	29.9	527	128	**28.4**	**554**	27.7	568	29.9	527
SPECspeed®2017_fp_base =	**353**													
SPECspeed®2017_fp_peak =	**353**													

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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,compact"
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 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
 memory using Redhat Enterprise Linux 8.0
 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
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
 Sub NUMA Clustering set to Disabled
```

(Continued on next page)

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Platform Notes (Continued)

```
LLC Dead Line set to Disabled
ADDDC Sparing set to Disabled
Processor C6 Report set to Enabled
UPI Link Enablement 1
UPI Power Management Enabled


 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Sep 19 14:53:39 2023

 SUT (System Under Test) info as seen by some common utilities.

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
 ------------------------------------------------------------


 ------------------------------------------------------------
 1. uname -a
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux


 ------------------------------------------------------------
 2. w
    14:53:39 up 13:02,  1 user,  load average: 87.36, 107.58, 112.63
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                01:54   12:59m  1.44s  0.29s -bash


 ------------------------------------------------------------
 3. Username
   From environment variable $USER:  root


 ------------------------------------------------------------
 4. ulimit -a
    core file size          (blocks, -c) unlimited
    data seg size           (kbytes, -d) unlimited
    scheduling priority             (-e) 0
```

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Platform Notes (Continued)

```
   file size             (blocks, -f) unlimited
   pending signals           (-i) 8255555
   max locked memory     (kbytes, -l) 64
   max memory size       (kbytes, -m) unlimited
   open files                (-n) 1024
   pipe size        (512 bytes, -p) 8
   POSIX message queues    (bytes, -q) 819200
   real-time priority        (-r) 0
   stack size            (kbytes, -s) unlimited
   cpu time            (seconds, -t) unlimited
   max user processes        (-u) 8255555
   virtual memory        (kbytes, -v) unlimited
   file locks                (-x) unlimited


  ------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 30
 login -- root
 -bash
 -bash
 runcpu --define default-platform-flags -c ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=128
   --tune all -o all --define drop_caches fpspeed
 runcpu --define default-platform-flags --configfile ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define
   cores=128 --tune all --output_format all --define drop_caches --nopower --runmode speed --tune base:peak
   --size refspeed fpspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.158/templogs/preenv.fpspeed.158.0.log --lognum 158.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


  ------------------------------------------------------------
6. /proc/cpuinfo
   model name       : Intel(R) Xeon(R) Platinum 8454H
   vendor_id        : GenuineIntel
   cpu family       : 6
   model            : 143
   stepping         : 8
   microcode        : 0x2b000461
   bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores        : 32
   siblings         : 32
   4 physical ids (chips)
   128 processors (hardware threads)
   physical id 0: core ids 0-31
   physical id 1: core ids 0-31
   physical id 2: core ids 0-31
   physical id 3: core ids 0-31
   physical id 0: apicids
   0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62
   physical id 1: apicids
   128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
   80,182,184,186,188,190
   physical id 2: apicids
   256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,3
   08,310,312,314,316,318
   physical id 3: apicids
   384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418,420,422,424,426,428,430,432,434,4
   36,438,440,442,444,446
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
  virtualized systems.  Use the above data carefully.
```

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Platform Notes (Continued)

```
     ----------------------------------------------------------------
     7. lscpu

     From lscpu from util-linux 2.37.2:
       Architecture:            x86_64
       CPU op-mode(s):          32-bit, 64-bit
       Address sizes:           46 bits physical, 57 bits virtual
       Byte Order:              Little Endian
       CPU(s):                  128
       On-line CPU(s) list:     0-127
       Vendor ID:               GenuineIntel
       Model name:              Intel(R) Xeon(R) Platinum 8454H
       CPU family:              6
       Model:                   143
       Thread(s) per core:      1
       Core(s) per socket:      32
       Socket(s):               4
       Stepping:                8
       CPU max MHz:             3400.0000
       CPU min MHz:             800.0000
       BogoMIPS:                4200.00
       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 tsc_known_freq 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 cat_l2 cdp_l3
                                invpcid_single intel_ppin cdp_l2 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 avx_vnni avx512_bf16 wbnoinvd dtherm ida
                                arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku
                                ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                                tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
                                enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16
                                amx_tile flush_l1d arch_capabilities
       Virtualization:          VT-x
       L1d cache:               6 MiB (128 instances)
       L1i cache:               4 MiB (128 instances)
       L2 cache:                256 MiB (128 instances)
       L3 cache:                330 MiB (4 instances)
       NUMA node(s):            4
       NUMA node0 CPU(s):       0-31
       NUMA node1 CPU(s):       32-63
       NUMA node2 CPU(s):       64-95
       NUMA node3 CPU(s):       96-127
       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

      From lscpu --cache:
```

(Continued on next page)

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Platform Notes (Continued)

```
       NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL   SETS PHY-LINE COHERENCY-SIZE
       L1d      48K       6M  12 Data             1     64       1            64
       L1i      32K       4M   8 Instruction      1     64       1            64
       L2        2M     256M  16 Unified          2   2048       1            64
       L3     82.5M     330M  15 Unified          3  90112       1            64


    ----------------------------------------------------------------
    8. numactl --hardware
    NOTE: a numactl 'node' might or might not correspond to a physical chip.
      available: 4 nodes (0-3)
      node 0 cpus: 0-31
      node 0 size: 515730 MB
      node 0 free: 499094 MB
      node 1 cpus: 32-63
      node 1 size: 516087 MB
      node 1 free: 514934 MB
      node 2 cpus: 64-95
      node 2 size: 516087 MB
      node 2 free: 514678 MB
      node 3 cpus: 96-127
      node 3 size: 516006 MB
      node 3 free: 514194 MB
      node distances:
      node   0   1   2   3
        0:  10  21  21  21
        1:  21  10  21  21
        2:  21  21  10  21
        3:  21  21  21  10


    ----------------------------------------------------------------
    9. /proc/meminfo
      MemTotal:       2113446508 kB


    ----------------------------------------------------------------
    10. who -r
      run-level 3 Sep 19 01:52


    ----------------------------------------------------------------
    11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
      Default Target  Status
      multi-user      running


    ----------------------------------------------------------------
    12. Services, from systemctl list-unit-files
      STATE           UNIT FILES
      enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ haveged irqbalance
                      issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
                      smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
      enabled-runtime systemd-remount-fs
      disabled        autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                      chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                      firewalld gpm grub2-once haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load
                      ksm kvm_stat lunmask man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck
                      rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd svnserve
                      systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                      systemd-time-wait-sync systemd-timesyncd udisks2
      indirect        wickedd


    ----------------------------------------------------------------
    13. Linux kernel boot-time arguments, from /proc/cmdline
```

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Platform Notes (Continued)

```
  BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
  root=UUID=e21e8d67-b30a-4ea7-8055-b0885f263ec2
  splash=silent
  mitigations=auto
  quiet
  security=apparmor


  ---------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 3.40 GHz.
                    The governor "powersave" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes


  ---------------------------------------------------------------
15. sysctl
  kernel.numa_balancing            1
  kernel.randomize_va_space        0
  vm.compaction_proactiveness      20
  vm.dirty_background_bytes        0
  vm.dirty_background_ratio        10
  vm.dirty_bytes                   0
  vm.dirty_expire_centisecs        3000
  vm.dirty_ratio                   8
  vm.dirty_writeback_centisecs     500
  vm.dirtytime_expire_seconds      43200
  vm.extfrag_threshold             500
  vm.min_unmapped_ratio            1
  vm.nr_hugepages                  0
  vm.nr_hugepages_mempolicy        0
  vm.nr_overcommit_hugepages       0
  vm.swappiness                    1
  vm.watermark_boost_factor        15000
  vm.watermark_scale_factor        10
  vm.zone_reclaim_mode             0


  ---------------------------------------------------------------
16. /sys/kernel/mm/transparent_hugepage
  defrag          [always] defer defer+madvise madvise never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
  shmem_enabled   always within_size advise [never] deny force


  ---------------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                  1
  max_ptes_none           511
  max_ptes_shared         256
  max_ptes_swap           64
  pages_to_scan           4096
  scan_sleep_millisecs    10000


  ---------------------------------------------------------------
18. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP4
```

(Continued on next page)

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Platform Notes (Continued)

```
    ------------------------------------------------------------
    19. Disk information
    SPEC is set to: /home/cpu2017
      Filesystem     Type   Size  Used Avail Use% Mounted on
      /dev/sdb2      btrfs  222G   26G  195G  12% /home


    ------------------------------------------------------------
    20. /sys/devices/virtual/dmi/id
        Vendor:        Cisco Systems Inc
        Product:       UCSX-410C-M7
        Serial:        FCH264873NP


    ------------------------------------------------------------
    21. dmidecode
      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:
        4x 0xAD00 HMCG94MEBRA121N 64 GB 2 rank 4800
        28x 0xAD00 HMCG94MEBRA123N 64 GB 2 rank 4800


    ------------------------------------------------------------
    22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
        BIOS Vendor:     Cisco Systems, Inc.
        BIOS Version:    X410M7.5.1.1e.0.0524232049
        BIOS Date:       05/24/2023
        BIOS Revision:   5.29
```

Compiler Version Notes

```
==============================================================================
C            | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran      | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
Fortran, C    | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`icx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

Benchmarks using Fortran, C, and C++:
`icpx icx ifx`

Base Portability Flags

603.bwaves_s: `-DSPEC_LP64`
607.cactuBSSN_s: `-DSPEC_LP64`
619.lbm_s: `-DSPEC_LP64`
621.wrf_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
627.cam4_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
628.pop2_s: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
`-assume byterecl`
638.imagick_s: `-DSPEC_LP64`
644.nab_s: `-DSPEC_LP64`
649.fotonik3d_s: `-DSPEC_LP64`
654.roms_s: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
`-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp`
`-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512`

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8454H, 2.10GHz)

SPECspeed®2017_fp_base = 353

SPECspeed®2017_fp_peak = 353

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

Test Date: Sep-2023
Hardware Availability: Mar-2023
Software Availability: Dec-2022

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:
```
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using both Fortran and C:
```
-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using Fortran, C, and C++:
```
-m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int
-mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte
-auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Peak Compiler Invocation

C benchmarks:
```
icx
```

Fortran benchmarks:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

Benchmarks using Fortran, C, and C++:
```
icpx icx ifx
```

Peak Portability Flags

```
Same as Base Portability Flags
```

SPEC CPU®2017 Floating Point Speed Result

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Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8454H, 2.10GHz)

SPECspeed®2017_fp_base = 353

SPECspeed®2017_fp_peak = 353

CPU2017 License: 9019
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Test Date: Sep-2023
Hardware Availability: Mar-2023
Software Availability: Dec-2022

Peak Optimization Flags

C benchmarks:

 619.lbm_s: basepeak = yes

 638.imagick_s: basepeak = yes

 644.nab_s: basepeak = yes

Fortran benchmarks:

 603.bwaves_s: -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xsapphirerapids
-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

 649.fotonik3d_s: basepeak = yes

 654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

 621.wrf_s: basepeak = yes

 627.cam4_s: -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

 628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

 607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
  http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html
  http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-SPR-revM.html

You can also download the XML flags sources by saving the following links:
  http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml
  http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-SPR-revM.xml

SPEC CPU®2017 Floating Point Speed Result

Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8454H, 2.10GHz)

$\text{SPECspeed}^{®}\text{2017\_fp\_base} = 353$

$\text{SPECspeed}^{®}\text{2017\_fp\_peak} = 353$

CPU2017 License: 9019		**Test Date:**	Sep-2023
Test Sponsor:	Cisco Systems	**Hardware Availability:**	Mar-2023
Tested by:	Cisco Systems	**Software Availability:**	Dec-2022

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

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