SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8490H, 1.90GHz)

SPECrate®2017_fp_base = 1860
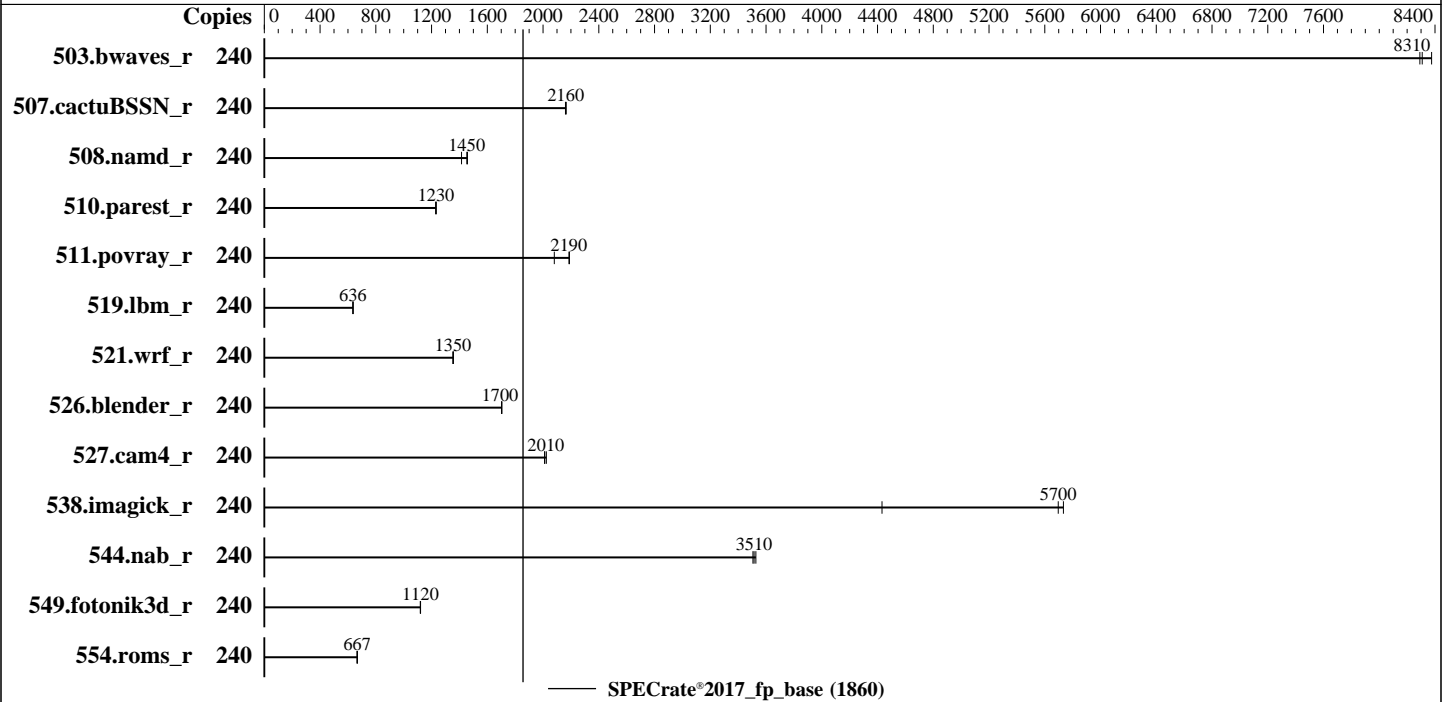
SPECrate®2017_fp_peak = Not Run

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

Test Date: May-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022

Benchmark	Copies	Result
503.bwaves_r	240	8310
507.cactuBSSN_r	240	2160
508.namd_r	240	1450
510.parest_r	240	1230
511.povray_r	240	2190
519.lbm_r	240	636
521.wrf_r	240	1350
526.blender_r	240	1700
527.cam4_r	240	2010
538.imagick_r	240	5700
544.nab_r	240	3510
549.fotonik3d_r	240	1120
554.roms_r	240	667

SPECrate®2017_fp_base (1860)

Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
Enabled: 240 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: 112.5 MB I+D on chip per chip
 Other: None
Memory: 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.6 TB NVMe SSD
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: No
Firmware: Version 5.1.1b released Apr-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS set to prefer performance at the cost
 of additional power usage

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

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	240	290	8290	**290**	**8310**	287	8380							
507.cactuBSSN_r	240	140	2170	**140**	**2160**	141	2160							
508.namd_r	240	161	1420	156	1460	**157**	**1450**							
510.parest_r	240	509	1230	511	1230	**509**	**1230**							
511.povray_r	240	**256**	**2190**	256	2190	269	2080							
519.lbm_r	240	398	636	397	637	**398**	**636**							
521.wrf_r	240	**397**	**1350**	397	1350	396	1360							
526.blender_r	240	**215**	**1700**	215	1700	215	1700							
527.cam4_r	240	**209**	**2010**	209	2010	207	2020							
538.imagick_r	240	104	5730	135	4430	**105**	**5700**							
544.nab_r	240	**115**	**3510**	115	3510	115	3530							
549.fotonik3d_r	240	836	1120	834	1120	**835**	**1120**							
554.roms_r	240	**572**	**667**	573	666	571	667							

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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:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
```

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General Notes (Continued)

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

Submitted_by: "Manjunatha Rangegowda (marangeg)" <marangeg@cisco.com>
Submitted: Tue May 16 03:03:47 EDT 2023
Submission: cpu2017-20230508-36333.sub

Platform Notes

BIOS Settings:
Intel HyperThreading set to Disabled
LLC Dead Line set to Disabled
Processor C6 Report set to Enabled
UPI Link Power Management Disabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on spec-srv Tue May 16 23:22:09 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. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS

 ----
  1. uname -a
   Linux spec-srv 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

(Continued on next page)

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Platform Notes (Continued)

```
  ----------------------------------------------------------
  2. w
     23:22:09 up 11:16,  1 user,  load average: 0.00, 0.00, 0.00
     USER      TTY       FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
     root      tty1      -                12:07    9.00s  1.52s  0.11s -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
     file size               (blocks, -f) unlimited
     pending signals                 (-i) 8255440
     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) 8255440
     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 --nobuild --action validate --define default-platform-flags --define numcopies=240 -c
     ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
     cores=120 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune base -o all
     fprate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=240 --configfile
     ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
     cores=120 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune base
     --output_format all --nopower --runmode rate --tune base --size refrate fprate --nopreenv --note-preenv
     --logfile $SPEC/tmp/CPU2017.106/templogs/preenv.fprate.106.0.log --lognum 106.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017

  ----------------------------------------------------------
  6. /proc/cpuinfo
     model name      : Intel(R) Xeon(R) Platinum 8490H
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 143
     stepping        : 8
     microcode       : 0x2b000461
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores       : 60
     siblings        : 60
     4 physical ids (chips)
     240 processors (hardware threads)
```

(Continued on next page)

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Platform Notes (Continued)

```
    physical id 0: core ids 0-59
    physical id 1: core ids 0-59
    physical id 2: core ids 0-59
    physical id 3: core ids 0-59
    physical id 0: apicids
    0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
    ,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118
    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
    80,182,184,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222,224,226,228,230,23
    2,234,236,238,240,242,244,246
    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
    08,310,312,314,316,318,320,322,324,326,328,330,332,334,336,338,340,342,344,346,348,350,352,354,356,358,36
    0,362,364,366,368,370,372,374
    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
    36,438,440,442,444,446,448,450,452,454,456,458,460,462,464,466,468,470,472,474,476,478,480,482,484,486,48
    8,490,492,494,496,498,500,502
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
  virtualized systems.  Use the above data carefully.


  ---------------------------------------------------------
  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):                    240
    On-line CPU(s) list:       0-239
    Vendor ID:                 GenuineIntel
    Model name:                Intel(R) Xeon(R) Platinum 8490H
    CPU family:                6
    Model:                     143
    Thread(s) per core:        1
    Core(s) per socket:        60
    Socket(s):                 4
    Stepping:                  8
    CPU max MHz:               3500.0000
    CPU min MHz:               800.0000
    BogoMIPS:                  3800.00
    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
```

(Continued on next page)

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Platform Notes (Continued)

```
                          amx_tile flush_l1d arch_capabilities
  Virtualization:         VT-x
  L1d cache:              11.3 MiB (240 instances)
  L1i cache:              7.5 MiB (240 instances)
  L2 cache:               480 MiB (240 instances)
  L3 cache:               450 MiB (4 instances)
  NUMA node(s):           16
  NUMA node0 CPU(s):      0-14
  NUMA node1 CPU(s):      15-29
  NUMA node2 CPU(s):      30-44
  NUMA node3 CPU(s):      45-59
  NUMA node4 CPU(s):      60-74
  NUMA node5 CPU(s):      75-89
  NUMA node6 CPU(s):      90-104
  NUMA node7 CPU(s):      105-119
  NUMA node8 CPU(s):      120-134
  NUMA node9 CPU(s):      135-149
  NUMA node10 CPU(s):     150-164
  NUMA node11 CPU(s):     165-179
  NUMA node12 CPU(s):     180-194
  NUMA node13 CPU(s):     195-209
  NUMA node14 CPU(s):     210-224
  NUMA node15 CPU(s):     225-239
  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:
    NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL    SETS PHY-LINE COHERENCY-SIZE
    L1d       48K    11.3M   12 Data             1      64        1             64
    L1i       32K     7.5M    8 Instruction      1      64        1             64
    L2         2M     480M   16 Unified          2    2048        1             64
    L3     112.5M     450M   15 Unified          3  122880        1             64

  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 16 nodes (0-15)
    node 0 cpus: 0-14
    node 0 size: 128664 MB
    node 0 free: 127656 MB
    node 1 cpus: 15-29
    node 1 size: 129020 MB
    node 1 free: 128479 MB
    node 2 cpus: 30-44
    node 2 size: 129020 MB
    node 2 free: 128498 MB
    node 3 cpus: 45-59
    node 3 size: 129020 MB
    node 3 free: 128491 MB
    node 4 cpus: 60-74
    node 4 size: 129020 MB
    node 4 free: 128492 MB
    node 5 cpus: 75-89
```

(Continued on next page)

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Platform Notes (Continued)

```
   node 5 size: 129020 MB
   node 5 free: 128492 MB
   node 6 cpus: 90-104
   node 6 size: 129020 MB
   node 6 free: 128494 MB
   node 7 cpus: 105-119
   node 7 size: 129020 MB
   node 7 free: 128490 MB
   node 8 cpus: 120-134
   node 8 size: 129020 MB
   node 8 free: 128486 MB
   node 9 cpus: 135-149
   node 9 size: 129020 MB
   node 9 free: 128488 MB
   node 10 cpus: 150-164
   node 10 size: 129020 MB
   node 10 free: 128487 MB
   node 11 cpus: 165-179
   node 11 size: 129020 MB
   node 11 free: 128487 MB
   node 12 cpus: 180-194
   node 12 size: 129020 MB
   node 12 free: 128420 MB
   node 13 cpus: 195-209
   node 13 size: 128985 MB
   node 13 free: 128427 MB
   node 14 cpus: 210-224
   node 14 size: 129020 MB
   node 14 free: 128468 MB
   node 15 cpus: 225-239
   node 15 size: 128973 MB
   node 15 free: 128353 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
     0:  10  12  12  12  21  21  21  21  21  21  21  21  21  21  21  21
     1:  12  10  12  12  21  21  21  21  21  21  21  21  21  21  21  21
     2:  12  12  10  12  21  21  21  21  21  21  21  21  21  21  21  21
     3:  12  12  12  10  21  21  21  21  21  21  21  21  21  21  21  21
     4:  21  21  21  21  10  12  12  12  21  21  21  21  21  21  21  21
     5:  21  21  21  21  12  10  12  12  21  21  21  21  21  21  21  21
     6:  21  21  21  21  12  12  10  12  21  21  21  21  21  21  21  21
     7:  21  21  21  21  12  12  12  10  21  21  21  21  21  21  21  21
     8:  21  21  21  21  21  21  21  21  10  12  12  12  21  21  21  21
     9:  21  21  21  21  21  21  21  21  12  10  12  12  21  21  21  21
    10:  21  21  21  21  21  21  21  21  12  12  10  12  21  21  21  21
    11:  21  21  21  21  21  21  21  21  12  12  12  10  21  21  21  21
    12:  21  21  21  21  21  21  21  21  21  21  21  21  10  12  12  12
    13:  21  21  21  21  21  21  21  21  21  21  21  21  12  10  12  12
    14:  21  21  21  21  21  21  21  21  21  21  21  21  12  12  10  12
    15:  21  21  21  21  21  21  21  21  21  21  21  21  12  12  12  10


   --------------------------------------------------------------
   9. /proc/meminfo
      MemTotal:       2113417372 kB


   --------------------------------------------------------------
   10. who -r
      run-level 3 May 16 12:06

   --------------------------------------------------------------
```

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Platform Notes (Continued)

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


  ------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT          LOAD   ACTIVE SUB    DESCRIPTION
  * sep5.service loaded failed failed systemd script to load sep5 driver at boot time


  ------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          auditd cron getty@ haveged irqbalance issue-generator kbdsettings klog lvm2-monitor nscd
                   nvmefc-boot-connections postfix purge-kernels rollback rsyslog sep5 smartd sshd wicked
                   wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
  enabled-runtime  systemd-remount-fs
  disabled         autofs 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 lunmask man-db-create
                   multipathd nfs nfs-blkmap nvmf-autoconnect 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
  indirect         wickedd


  ------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
  root=UUID=f5d7bf41-1d73-4f7e-a75a-9dd867bc14ba
  splash=silent
  mitigations=auto
  quiet
  security=


  ------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 3.50 GHz.
                    The governor "powersave" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes


  ------------------------------------------------------------
16. sysctl
  kernel.numa_balancing            1
  kernel.randomize_va_space        2
  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                   20
  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
```

(Continued on next page)

Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8490H, 1.90GHz)

SPECrate®2017_fp_base = 1860

SPECrate®2017_fp_peak = Not Run

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

Test Date: May-2023
Hardware Availability: Jun-2023
Software Availability: Dec-2022

Platform Notes (Continued)

```
  vm.swappiness                    1
  vm.watermark_boost_factor    15000
  vm.watermark_scale_factor       10
  vm.zone_reclaim_mode             0


 -------------------------------------------------------------
17. /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


 -------------------------------------------------------------
18. /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


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


 -------------------------------------------------------------
20. Disk information
SPEC is set to: /home/cpu2017
  Filesystem    Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p2 xfs   1.5T  110G  1.4T   8% /


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


 -------------------------------------------------------------
22. 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


 -------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
  BIOS Vendor:      Cisco Systems, Inc.
  BIOS Version:     X410M7.5.1.1b.10.0424230829
  BIOS Date:        04/24/2023
  BIOS Revision:    5.29
```

SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8490H, 1.90GHz)

SPECrate®2017_fp_base = 1860

SPECrate®2017_fp_peak = Not Run

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

Compiler Version Notes

```
==============================================================================
C              | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
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++            | 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
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         | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base)
------------------------------------------------------------------------------
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        | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
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, C     | 521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
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.
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.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:

`icx`

 https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8490H, 1.90GHz)

SPECrate®2017_fp_base = 1860

SPECrate®2017_fp_peak = Not Run

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

Base Compiler Invocation (Continued)

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

Benchmarks using both C and C++:
`icpx icx`

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

Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
`-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:
`-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops`

(Continued on next page)

Cisco Systems

Cisco UCS X410c M7 (Intel Xeon Platinum 8490H, 1.90GHz)

SPECrate®2017_fp_base =   1860

SPECrate®2017_fp_peak = Not Run

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

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

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

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

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

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

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-revG.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-revG.xml

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

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