SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

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

$SPECrate^{®}2017\_fp\_base =$ **1850**

$SPECrate^{®}2017\_fp\_peak =$ 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

Copies

- **503.bwaves_r** 240 — 8100
- **507.cactuBSSN_r** 240 — 2170
- **508.namd_r** 240 — 1440
- **510.parest_r** 240 — 1230
- **511.povray_r** 240 — 2170
- **519.lbm_r** 240 — 639
- **521.wrf_r** 240 — 1350
- **526.blender_r** 240 — 1680
- **527.cam4_r** 240 — 1990
- **538.imagick_r** 240 — 5570
- **544.nab_r** 240 — 3420
- **549.fotonik3d_r** 240 — 1120
- **554.roms_r** 240 — 720

Scale: 0 400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6400 6800 7200 7600 8300

SPECrate®2017_fp_base (1850)

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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SPECrate®2017_fp_base = 1850
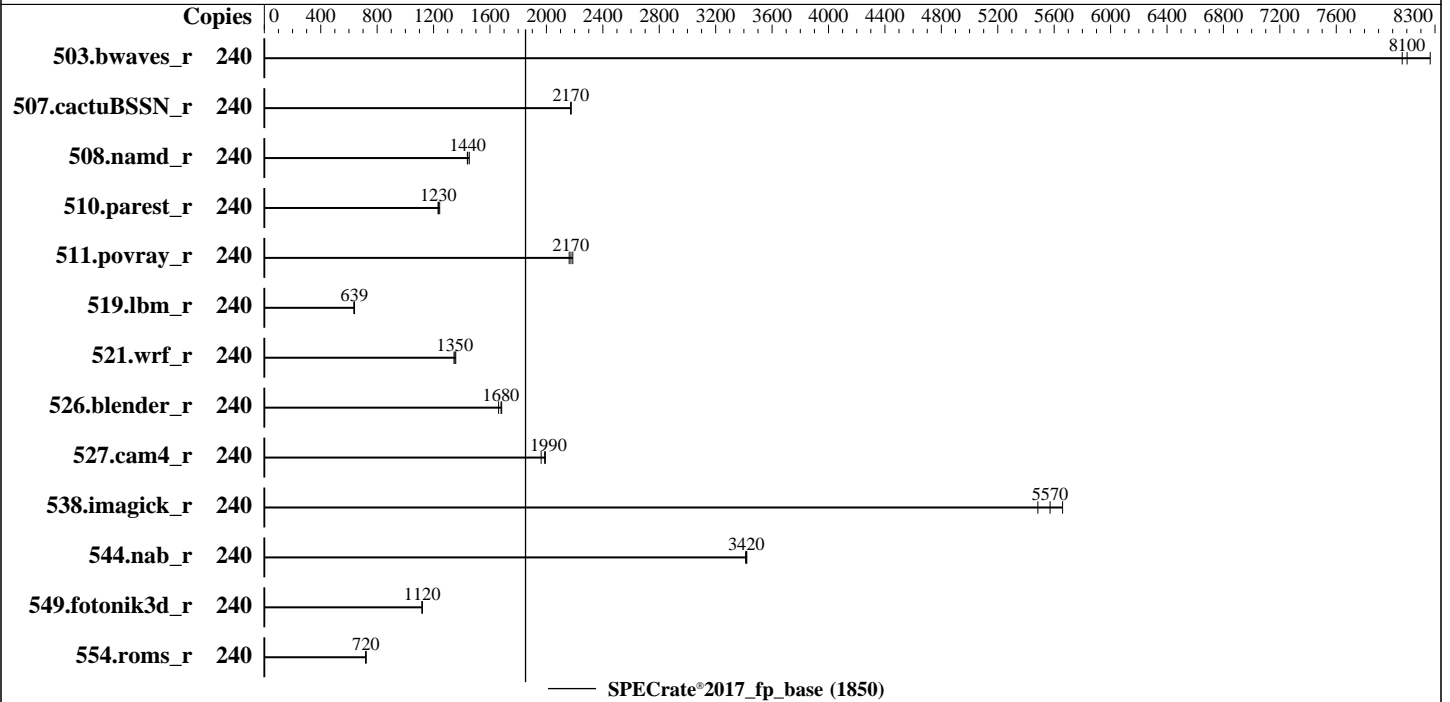
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9019
Test Sponsor: Cisco Systems
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Test Date: May-2023
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Software Availability: Dec-2022

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	240	**297**	**8100**	298	8070	291	8270							
507.cactuBSSN_r	240	**140**	**2170**	140	2170	140	2170							
508.namd_r	240	157	1450	**158**	**1440**	158	1440							
510.parest_r	240	**509**	**1230**	505	1240	509	1230							
511.povray_r	240	259	2160	**258**	**2170**	256	2190							
519.lbm_r	240	396	640	399	635	**396**	**639**							
521.wrf_r	240	**398**	**1350**	396	1360	400	1340							
526.blender_r	240	217	1680	**218**	**1680**	220	1660							
527.cam4_r	240	214	1960	**211**	**1990**	211	1990							
538.imagick_r	240	**107**	**5570**	105	5660	109	5480							
544.nab_r	240	118	3420	**118**	**3420**	118	3410							
549.fotonik3d_r	240	837	1120	835	1120	**835**	**1120**							
554.roms_r	240	531	719	529	721	**529**	**720**							
SPECrate®2017_fp_base =		**1850**												
SPECrate®2017_fp_peak =		**Not Run**												

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/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.

(Continued on next page)

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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
```

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 Sun May  7 01:16:55 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


 ------------------------------------------------------------
 2. w
    01:16:55 up 5 min,  1 user,  load average: 0.39, 2.80, 1.72
```

(Continued on next page)

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Platform Notes (Continued)

```
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                01:16   15.00s  1.76s  0.46s -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 --action=build --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 --action build --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/CPU2017.051/templogs/preenv.fprate.051.0.log --lognum 051.0 --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)
   physical id 0: core ids 0-59
   physical id 1: core ids 0-59
   physical id 2: core ids 0-59
```

(Continued on next page)

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Platform Notes (Continued)

```
     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
                                    amx_tile flush_l1d arch_capabilities
   Virtualization:                  VT-x
   L1d cache:                       11.3 MiB (240 instances)
```

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Platform Notes (Continued)

```
  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: 127855 MB
  node 1 cpus: 15-29
  node 1 size: 129020 MB
  node 1 free: 128637 MB
  node 2 cpus: 30-44
  node 2 size: 129020 MB
  node 2 free: 128769 MB
  node 3 cpus: 45-59
  node 3 size: 129020 MB
  node 3 free: 128738 MB
  node 4 cpus: 60-74
  node 4 size: 129020 MB
  node 4 free: 128798 MB
  node 5 cpus: 75-89
  node 5 size: 128985 MB
  node 5 free: 128790 MB
  node 6 cpus: 90-104
```

(Continued on next page)

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Platform Notes (Continued)

```
    node 6 size: 129020 MB
    node 6 free: 128810 MB
    node 7 cpus: 105-119
    node 7 size: 129020 MB
    node 7 free: 128821 MB
    node 8 cpus: 120-134
    node 8 size: 129020 MB
    node 8 free: 128833 MB
    node 9 cpus: 135-149
    node 9 size: 129020 MB
    node 9 free: 128763 MB
    node 10 cpus: 150-164
    node 10 size: 129020 MB
    node 10 free: 128825 MB
    node 11 cpus: 165-179
    node 11 size: 129020 MB
    node 11 free: 128826 MB
    node 12 cpus: 180-194
    node 12 size: 129020 MB
    node 12 free: 128685 MB
    node 13 cpus: 195-209
    node 13 size: 129020 MB
    node 13 free: 128759 MB
    node 14 cpus: 210-224
    node 14 size: 129020 MB
    node 14 free: 128759 MB
    node 15 cpus: 225-239
    node 15 size: 128973 MB
    node 15 free: 128640 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:       2113417376 kB


    ------------------------------------------------------------
    10. who -r
      run-level 3 May 7 01:13


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

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Platform Notes (Continued)

```
   -------------------------------------------------------
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
     vm.swappiness                    1
     vm.watermark_boost_factor    15000
     vm.watermark_scale_factor       10
```

(Continued on next page)

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 = 1850

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.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  108G  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
```

Compiler Version Notes

```
==============================================================================
C              | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

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

SPECrate®2017_fp_base =   1850

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

Compiler Version Notes (Continued)

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

C++ benchmarks:
```
icpx
```

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

Cisco Systems

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

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

Base Compiler Invocation (Continued)

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 -qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

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

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Tested by: Cisco Systems

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

Base Optimization Flags (Continued)

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.2023-05-23.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.2023-05-23.xml

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

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