SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8444H, 2.90GHz)

SPECrate®2017_fp_base = 472
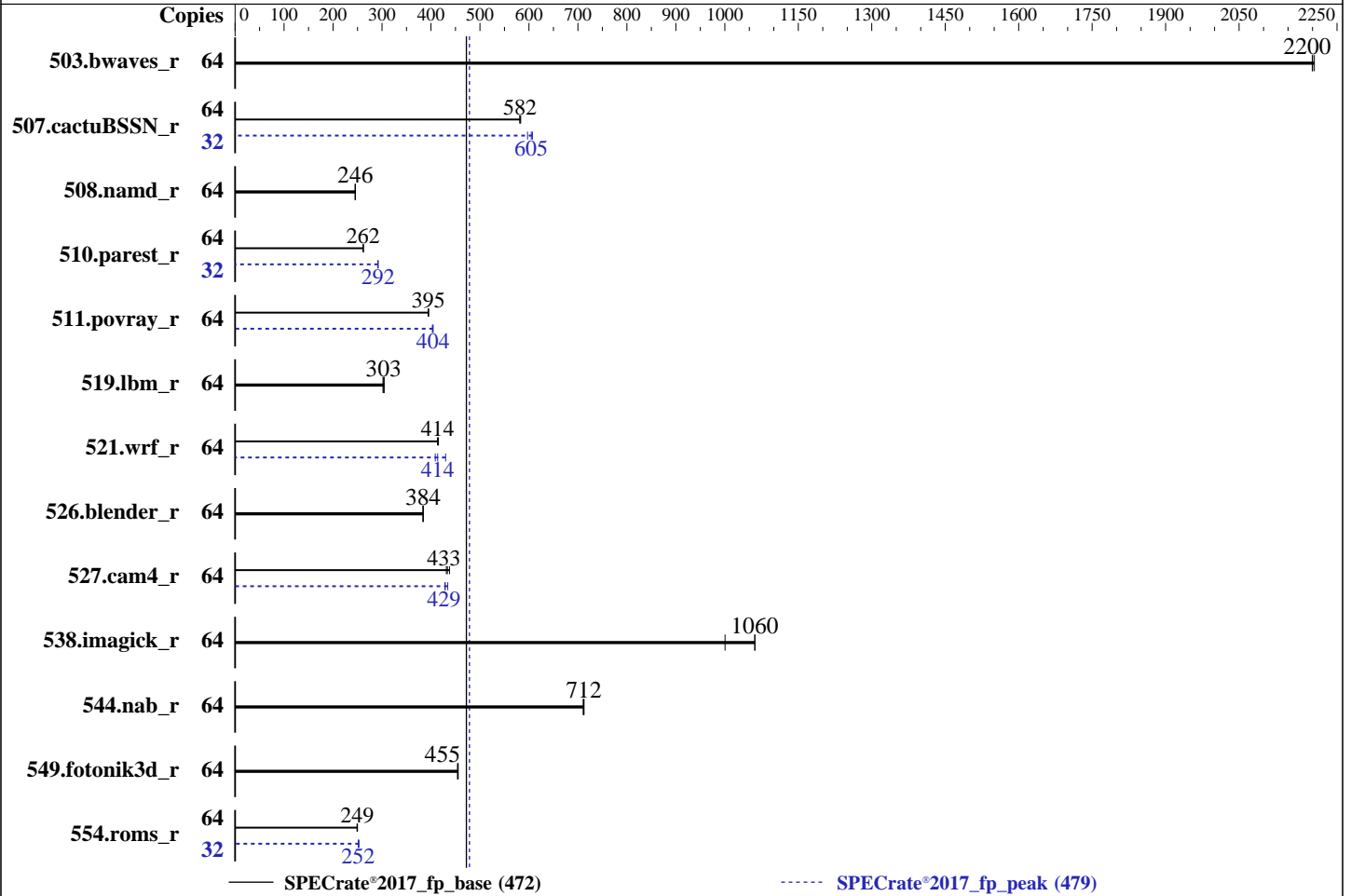
SPECrate®2017_fp_peak = 479

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

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

Benchmark	Copies	Result
503.bwaves_r	64	2200
507.cactuBSSN_r	64	582
507.cactuBSSN_r	32	605
508.namd_r	64	246
510.parest_r	64	262
510.parest_r	32	292
511.povray_r	64	395
511.povray_r	64	404
519.lbm_r	64	303
521.wrf_r	64	414
521.wrf_r	64	414
526.blender_r	64	384
527.cam4_r	64	433
527.cam4_r	64	429
538.imagick_r	64	1060
544.nab_r	64	712
549.fotonik3d_r	64	455
554.roms_r	64	249
554.roms_r	32	252

SPECrate®2017_fp_base (472)   SPECrate®2017_fp_peak (479)

Hardware

CPU Name: Intel Xeon Platinum 8444H
 Max MHz: 4000
 Nominal: 2900
Enabled: 32 cores, 2 chips, 2 threads/core
Orderable: 1,2 Chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 45 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB M.2 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: No
Firmware: Version 4.3.1a released Feb-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS set to prefer performance at the cost of additional power usage

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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	64	291	2200	**292**	**2200**	292	2200	64	291	2200	**292**	**2200**	292	2200
507.cactuBSSN_r	64	139	583	139	581	**139**	**582**	32	66.7	607	**67.0**	**605**	67.8	597
508.namd_r	64	248	245	248	246	**248**	**246**	64	248	245	248	246	**248**	**246**
510.parest_r	64	639	262	**640**	**262**	640	262	32	**287**	**292**	287	292	287	292
511.povray_r	64	378	395	**379**	**395**	379	394	64	**370**	**404**	371	403	370	404
519.lbm_r	64	222	304	223	302	**222**	**303**	64	222	304	223	302	**222**	**303**
521.wrf_r	64	**346**	**414**	345	415	347	413	64	333	430	351	409	**347**	**414**
526.blender_r	64	**254**	**384**	254	384	254	384	64	**254**	**384**	254	384	254	384
527.cam4_r	64	259	431	256	438	**258**	**433**	64	258	434	261	429	**261**	**429**
538.imagick_r	64	159	1000	**150**	**1060**	150	1060	64	159	1000	**150**	**1060**	150	1060
544.nab_r	64	151	712	**151**	**712**	152	711	64	151	712	**151**	**712**	152	711
549.fotonik3d_r	64	548	455	549	454	**548**	**455**	64	548	455	549	454	**548**	**455**
554.roms_r	64	407	250	**408**	**249**	408	249	32	202	251	201	253	**202**	**252**
SPECrate®2017_fp_base =		**472**										
SPECrate®2017_fp_peak =		**479**										

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:

(Continued on next page)

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General Notes (Continued)

```
 sync; echo 3>         /proc/sys/vm/drop_caches
 runcpu command invoked through numactl i.e.:
 numactl --interleave=all runcpu <etc>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS Settings:
Sub NUMA Clustering set to Enable SNC4
LLC Dead Line set to Disabled
ADDDC Sparing set to Disabled
Processor C6 Report set to Enabled
UPI Link Enablement 3
UPI Power Management Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on specsrv Thu Jun 22 22:33:20 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
```

(Continued on next page)

Cisco Systems

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CPU2017 License: 9019

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Test Date: Mar-2023

Hardware Availability: Mar-2023

Software Availability: Dec-2022

Platform Notes (Continued)

```
    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 specsrv 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
       22:33:20 up 5 min,  1 user,  load average: 0.12, 0.53, 0.33
       USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
       root     tty1     -                22:29    8.00s  1.23s  0.15s -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) 4126942
      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) 4126942
      virtual memory          (kbytes, -v) unlimited
      file locks                      (-x) unlimited


    -----------------------------------------------------------
    5. sysinfo process ancestry
```

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Cisco Systems

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CPU2017 License: 9019

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Hardware Availability: Mar-2023

Software Availability: Dec-2022

Platform Notes (Continued)

```
 /usr/lib/systemd/systemd --switched-root --system --deserialize 30
 login -- root
 -bash
 -bash
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=64 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
   cores=32 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all -o all
    fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=64 --configfile
    ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
    cores=32 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all
    --output_format all --nopower --runmode rate --tune base:peak --size refrate fprate --nopreenv
    --note-preenv --logfile $SPEC/tmp/CPU2017.194/templogs/preenv.fprate.194.0.log --lognum 194.0
    --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


 --------------------------------------------------------------
 6. /proc/cpuinfo
     model name        : Intel(R) Xeon(R) Platinum 8444H
     vendor_id         : GenuineIntel
     cpu family        : 6
     model             : 143
     stepping          : 8
     microcode         : 0x2b000161
     bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores         : 16
     siblings          : 32
     2 physical ids (chips)
     64 processors (hardware threads)
     physical id 0: core ids 0-15
     physical id 1: core ids 0-15
     physical id 0: apicids 0-31
     physical id 1: apicids 128-159
  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):                       64
   On-line CPU(s) list:          0-63
```

(Continued on next page)

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

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Platform Notes (Continued)

```
Vendor ID:                  GenuineIntel
Model name:                 Intel(R) Xeon(R) Platinum 8444H
CPU family:                 6
Model:                      143
Thread(s) per core:         2
Core(s) per socket:         16
Socket(s):                  2
Stepping:                   8
CPU max MHz:                4000.0000
CPU min MHz:                800.0000
BogoMIPS:                   5800.00
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:                  1.5 MiB (32 instances)
L1i cache:                  1 MiB (32 instances)
L2 cache:                   64 MiB (32 instances)
L3 cache:                   90 MiB (2 instances)
NUMA node(s):               8
NUMA node0 CPU(s):          0-3,32-35
NUMA node1 CPU(s):          4-7,36-39
NUMA node2 CPU(s):          8-11,40-43
NUMA node3 CPU(s):          12-15,44-47
NUMA node4 CPU(s):          16-19,48-51
NUMA node5 CPU(s):          20-23,52-55
NUMA node6 CPU(s):          24-27,56-59
NUMA node7 CPU(s):          28-31,60-63
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:          Not affected
Vulnerability Mds:           Not affected
Vulnerability Meltdown:      Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
   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     1.5M   12 Data          1     64        1               64
     L1i       32K       1M    8 Instruction   1     64        1               64
     L2         2M      64M   16 Unified       2   2048        1               64
     L3        45M      90M   15 Unified       3  49152        1               64


  ------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 8 nodes (0-7)
   node 0 cpus: 0-3,32-35
   node 0 size: 128670 MB
   node 0 free: 127980 MB
   node 1 cpus: 4-7,36-39
   node 1 size: 129021 MB
   node 1 free: 128805 MB
   node 2 cpus: 8-11,40-43
   node 2 size: 128987 MB
   node 2 free: 128755 MB
   node 3 cpus: 12-15,44-47
   node 3 size: 129021 MB
   node 3 free: 128844 MB
   node 4 cpus: 16-19,48-51
   node 4 size: 129021 MB
   node 4 free: 128807 MB
   node 5 cpus: 20-23,52-55
   node 5 size: 129021 MB
   node 5 free: 128858 MB
   node 6 cpus: 24-27,56-59
   node 6 size: 129021 MB
   node 6 free: 128839 MB
   node 7 cpus: 28-31,60-63
   node 7 size: 128992 MB
   node 7 free: 128837 MB
   node distances:
   node   0    1    2    3    4    5    6    7
     0:  10   12   12   12   21   21   21   21
     1:  12   10   12   12   21   21   21   21
     2:  12   12   10   12   21   21   21   21
     3:  12   12   12   10   21   21   21   21
```

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Platform Notes (Continued)

```
       4:   21   21   21   21   10   12   12   12
       5:   21   21   21   21   12   10   12   12
       6:   21   21   21   21   12   12   10   12
       7:   21   21   21   21   12   12   12   10

  -------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       1056521904 kB


  -------------------------------------------------------------
  10. who -r
     run-level 3 Jun 22 22:28


  -------------------------------------------------------------
  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
     * smartd.service loaded failed failed Self Monitoring and Reporting Technology (SMART) Daemon


  -------------------------------------------------------------
  13. 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
                      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


  -------------------------------------------------------------
  14. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
     root=UUID=7a984919-bd0d-4451-8476-5139e3d5b29b
     splash=silent
     mitigations=auto
     quiet
     security=apparmor
```

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Platform Notes (Continued)

```
   ----------------------------------------------------------------
15. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 800 MHz and 4.00 GHz.
                     The governor "performance" 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
   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
```

(Continued on next page)

Cisco Systems

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SPECrate®2017_fp_base = 472

SPECrate®2017_fp_peak = 479

Platform Notes (Continued)

```
    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/sda3       xfs   220G   13G  208G   6% /


  ------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Vendor:        Cisco Systems Inc
      Product:       UCSC-C240-M7SX
      Serial:        WZP26330JLV


  ------------------------------------------------------------
  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:
      16x 0xAD00 HMCG94MEBRA109N 64 GB 2 rank 4800



  ------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:       Cisco Systems, Inc.
      BIOS Version:      C240M7.4.3.1a.0.0201231701
      BIOS Date:         02/01/2023
      BIOS Revision:     5.29
  The system clock was reset to a future date before running the test
  and the exact test date is updated
```

Compiler Version Notes

```
==============================================================================
C                | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                 | 544.nab_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
```

(Continued on next page)

Cisco Systems

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SPECrate®2017_fp_base = 472

SPECrate®2017_fp_peak = 479

Compiler Version Notes (Continued)

```
   Version 2023.0.0 Build 20221201
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--------------------------------------------------------------------------------


================================================================================
C++            | 508.namd_r(base, peak) 510.parest_r(base, peak)
--------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2023.0.0 Build 20221201
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--------------------------------------------------------------------------------


================================================================================
C++, C         | 511.povray_r(base, peak) 526.blender_r(base, peak)
--------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ 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,
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--------------------------------------------------------------------------------


================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
--------------------------------------------------------------------------------
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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  2023.0.0 Build 20221201
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--------------------------------------------------------------------------------


================================================================================
Fortran        | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
               | 554.roms_r(base, peak)
--------------------------------------------------------------------------------
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--------------------------------------------------------------------------------


================================================================================
```

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8444H, 2.90GHz)

SPECrate®2017_fp_base = 472

SPECrate®2017_fp_peak = 479

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

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

Compiler Version Notes (Continued)

```
Fortran, C      | 521.wrf_r(base, peak) 527.cam4_r(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`

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`

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SPEC CPU®2017 Floating Point Rate Result

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Base Portability Flags (Continued)

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
```

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
```

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

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

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

Peak Compiler Invocation

C benchmarks:
```
icx
```

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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `basepeak = yes`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-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`

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Cisco Systems

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Tested by: Cisco Systems

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Hardware Availability: Mar-2023
Software Availability: Dec-2022

Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: `-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++:

511.povray_r: `-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs`
`-fprofile-generate`(pass 1)
`-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2`(pass 1)
`-flto -Ofast -xCORE-AVX512 -ffast-math -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`

526.blender_r: basepeak = yes

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

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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

SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

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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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