SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Silver 4410Y, 2.00GHz)

$SPECrate^{®}2017\_fp\_base = 326$
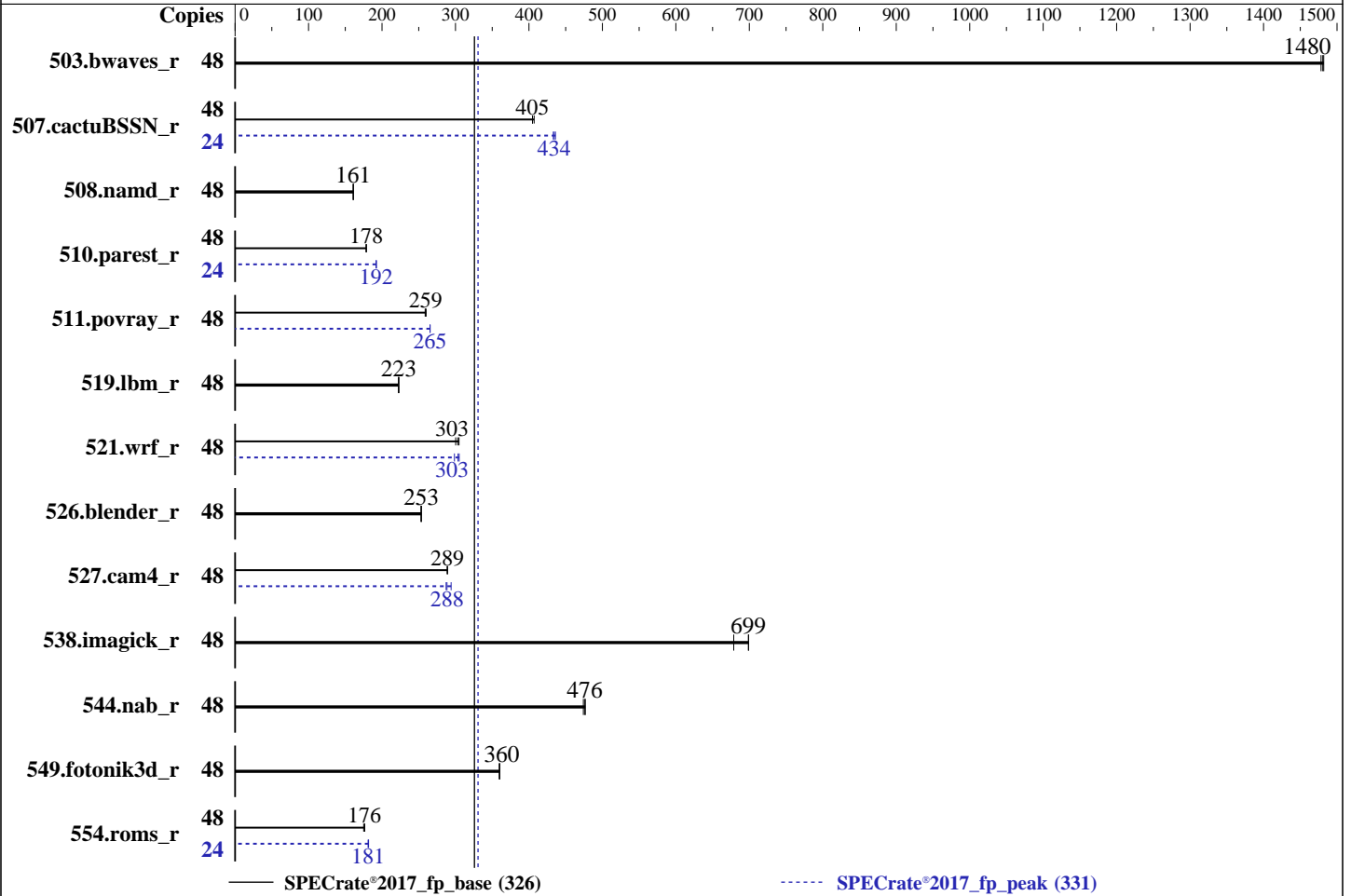
$SPECrate^{®}2017\_fp\_peak = 331$

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

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

SPECrate®2017_fp_base (326)
SPECrate®2017_fp_peak (331)

Benchmark	Copies	base	peak
503.bwaves_r	48	1480	
507.cactuBSSN_r	48 / 24	405	434
508.namd_r	48	161	
510.parest_r	48 / 24	178	192
511.povray_r	48	259	265
519.lbm_r	48	223	
521.wrf_r	48	303	303
526.blender_r	48	253	
527.cam4_r	48	289	288
538.imagick_r	48	699	
544.nab_r	48	476	
549.fotonik3d_r	48	360	
554.roms_r	48 / 24	176	181

Hardware

CPU Name: Intel Xeon Silver 4410Y
 Max MHz: 3900
 Nominal: 2000
Enabled: 24 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: 30 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R, running at 4000)
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 4.3.1d released May-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

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

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Results Table

Benchmark	Base Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
503.bwaves_r	48	325	1480	326	1480	**325**	**1480**	48	325	1480	326	1480	**325**	**1480**
507.cactuBSSN_r	48	150	405	149	407	**150**	**405**	24	69.7	436	70.2	433	**69.9**	**434**
508.namd_r	48	284	161	283	161	**283**	**161**	48	284	161	283	161	**283**	**161**
510.parest_r	48	703	179	704	178	**704**	**178**	24	**327**	**192**	327	192	327	192
511.povray_r	48	433	259	**432**	**259**	431	260	48	**422**	**265**	422	265	422	265
519.lbm_r	48	227	222	**227**	**223**	227	223	48	227	222	**227**	**223**	227	223
521.wrf_r	48	**355**	**303**	353	305	358	300	48	360	299	**354**	**303**	352	305
526.blender_r	48	288	253	**288**	**253**	289	253	48	288	253	**288**	**253**	289	253
527.cam4_r	48	290	289	291	289	**290**	**289**	48	292	287	**291**	**288**	285	294
538.imagick_r	48	176	679	**171**	**699**	171	699	48	176	679	**171**	**699**	171	699
544.nab_r	48	169	477	170	474	**170**	**476**	48	169	477	170	474	**170**	**476**
549.fotonik3d_r	48	**520**	**360**	520	360	519	360	48	**520**	**360**	520	360	519	360
554.roms_r	48	**433**	**176**	432	176	436	175	24	210	182	**210**	**181**	210	181
SPECrate®2017_fp_base =		**326**												
SPECrate®2017_fp_peak =		**331**												

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:
Adjacent Cache Line Prefetcher set to Enabled
DCU streamer Prefetch set to Enabled
Enhanced CPU Performance set to Auto
LLC Dead Line set to Disabled
ADDDC Sparing set to Disabled
Processor C6 Report set to Enabled


 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on srv04 Mon Aug 21 16:38:18 2023

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

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


 ------------------------------------------------------------
 1. uname -a
   Linux srv04 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
```

(Continued on next page)

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Platform Notes (Continued)

```
   16:38:18 up 11 min,  1 user,  load average: 0.08, 0.02, 0.01
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                16:38    9.00s  1.33s  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) 4126997
    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) 4126997
    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=48 -c
    ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
    cores=24 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all -o all
    fprate
  runcpu --action build --action validate --define default-platform-flags --define numcopies=48 --configfile
    ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
    cores=24 --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/CPU2017.261/templogs/preenv.fprate.261.0.log --lognum 261.0
    --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017


  ------------------------------------------------------------
  6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Silver 4410Y
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 8
    microcode       : 0x2b000461
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 12
    siblings        : 24
    2 physical ids (chips)
    48 processors (hardware threads)
    physical id 0: core ids 0-11
```

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CPU2017 License: 9019

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Platform Notes (Continued)

```
    physical id 1: core ids 0-11
    physical id 0: apicids 0-23
    physical id 1: apicids 128-151
  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):                     48
  On-line CPU(s) list:        0-47
  Vendor ID:                  GenuineIntel
  Model name:                 Intel(R) Xeon(R) Silver 4410Y
  CPU family:                 6
  Model:                      143
  Thread(s) per core:         2
  Core(s) per socket:         12
  Socket(s):                  2
  Stepping:                   8
  CPU max MHz:                3900.0000
  CPU min MHz:                800.0000
  BogoMIPS:                   4000.00
  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 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 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
  L1d cache:                  1.1 MiB (24 instances)
  L1i cache:                  768 KiB (24 instances)
  L2 cache:                   48 MiB (24 instances)
  L3 cache:                   60 MiB (2 instances)
  NUMA node(s):               4
  NUMA node0 CPU(s):          0-5,24-29
  NUMA node1 CPU(s):          6-11,30-35
  NUMA node2 CPU(s):          12-17,36-41
  NUMA node3 CPU(s):          18-23,42-47
  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
```

(Continued on next page)

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Platform Notes (Continued)

```
  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     1.1M   12 Data           1    64        1             64
     L1i       32K     768K    8 Instruction    1    64        1             64
     L2         2M      48M   16 Unified        2  2048        1             64
     L3        30M      60M   15 Unified        3 32768        1             64

    ------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 4 nodes (0-3)
   node 0 cpus: 0-5,24-29
   node 0 size: 257659 MB
   node 0 free: 256765 MB
   node 1 cpus: 6-11,30-35
   node 1 size: 258044 MB
   node 1 free: 257524 MB
   node 2 cpus: 12-17,36-41
   node 2 size: 258044 MB
   node 2 free: 257627 MB
   node 3 cpus: 18-23,42-47
   node 3 size: 258024 MB
   node 3 free: 257580 MB
   node distances:
   node   0   1   2   3
     0:  10  12  21  21
     1:  12  10  21  21
     2:  21  21  10  12
     3:  21  21  12  10

    ------------------------------------------------------------
 9. /proc/meminfo
   MemTotal:       1056536032 kB

    ------------------------------------------------------------
 10. who -r
   run-level 3 Aug 21 16:26

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

    ------------------------------------------------------------
 12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         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 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
   indirect        wickedd
```

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Platform Notes (Continued)

```
       ----------------------------------------------------------
       13. Linux kernel boot-time arguments, from /proc/cmdline
         BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
         root=UUID=82136e43-7b14-445e-80c8-a54855d5e2c7
         splash=silent
         mitigations=auto
         quiet
         security=apparmor


       ----------------------------------------------------------
       14. cpupower frequency-info
         analyzing CPU 0:
           current policy: frequency should be within 800 MHz and 3.90 GHz.
                           The governor "powersave" may decide which speed to use
                           within this range.
           boost state support:
             Supported: yes
             Active: yes


       ----------------------------------------------------------
       15. sysctl
         kernel.numa_balancing           1
         kernel.randomize_va_space       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


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


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


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

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Platform Notes (Continued)

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

 ----------------------------------------------------------------
 19. Disk information
 SPEC is set to: /home/cpu2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sdb3      xfs   436G   14G  423G   4% /

 ----------------------------------------------------------------
 20. /sys/devices/virtual/dmi/id
     Vendor:        Cisco Systems Inc
     Product:       UCSC-C240-M7SX
     Serial:        WZP26360KC7

 ----------------------------------------------------------------
 21. dmidecode
   Additional information from dmidecode 3.2 follows.  WARNING: Use caution when you interpret this section.
   The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
   determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
   "DMTF SMBIOS" standard.
   Memory:
     16x 0xCE00 M321R8GA0BB0-CQKDG 64 GB 2 rank 4800, configured at 4000

 ----------------------------------------------------------------
 22. BIOS
 (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:      Cisco Systems, Inc.
     BIOS Version:     C240M7.4.3.1d.0.0503232353
     BIOS Date:        05/03/2023
     BIOS Revision:    5.29
```

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, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
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
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
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
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.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran        | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


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

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`

SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Silver 4410Y, 2.00GHz)

SPECrate®2017_fp_base = 326

SPECrate®2017_fp_peak = 331

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

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`

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`

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SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Silver 4410Y, 2.00GHz)

SPECrate®2017_fp_base = 326

SPECrate®2017_fp_peak = 331

Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-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
```

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`

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Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Silver 4410Y, 2.00GHz)

SPECrate®2017_fp_base = 326

SPECrate®2017_fp_peak = 331

Peak Optimization Flags (Continued)

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

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

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Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Silver 4410Y, 2.00GHz)

SPECrate®2017_fp_base = 326

SPECrate®2017_fp_peak = 331

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

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

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-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-revJ.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-revJ.xml

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

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