SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS X210 M7 (Intel Xeon Gold 6548Y+, 2.50GHz)

$SPECrate^{®}2017\_fp\_base = 763$
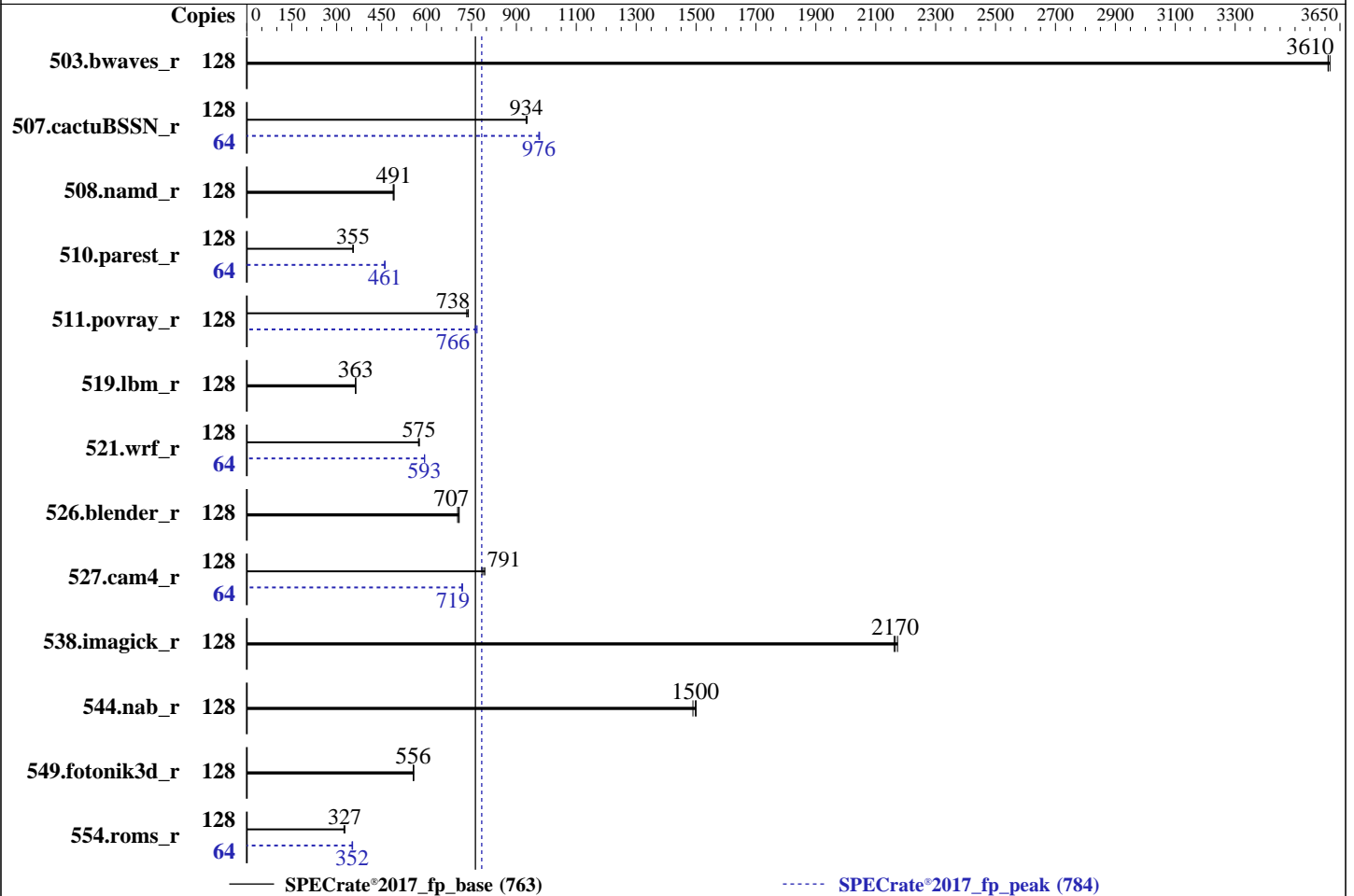
$SPECrate^{®}2017\_fp\_peak = 784$

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

Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Dec-2023

Benchmark	Copies	base	peak
503.bwaves_r	128	3610	
507.cactuBSSN_r	128	934	
	64		976
508.namd_r	128	491	
510.parest_r	128	355	
	64		461
511.povray_r	128	738	
	128		766
519.lbm_r	128	363	
521.wrf_r	128	575	
	64		593
526.blender_r	128	707	
527.cam4_r	128	791	
	64		719
538.imagick_r	128	2170	
544.nab_r	128	1500	
549.fotonik3d_r	128	556	
554.roms_r	128	327	
	64		352

SPECrate®2017_fp_base (763)   SPECrate®2017_fp_peak (784)

Hardware

CPU Name: Intel Xeon Gold 6548Y+
  Max MHz: 4100
  Nominal: 2500
Enabled: 64 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: 60 MB I+D on chip per chip
  Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R, running at 5200)
Storage: 1 TB SATA SSDs 6Gb/s
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
  5.14.21-150400.22-default
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;
  Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 4.3.3a released Jan-2024
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 and OS 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	128	355	3620	356	3610	**356**	**3610**	128	355	3620	356	3610	**356**	**3610**
507.cactuBSSN_r	128	173	936	174	932	**174**	**934**	64	**83.0**	**976**	83.1	975	82.9	978
508.namd_r	128	**248**	**491**	247	491	249	489	128	**248**	**491**	247	491	249	489
510.parest_r	128	**944**	**355**	945	354	942	355	64	363	462	**363**	**461**	364	460
511.povray_r	128	**405**	**738**	407	734	404	740	128	389	769	392	763	**390**	**766**
519.lbm_r	128	371	363	371	363	**371**	**363**	128	371	363	371	363	**371**	**363**
521.wrf_r	128	498	576	**499**	**575**	500	573	64	**242**	**593**	242	593	241	594
526.blender_r	128	275	709	**276**	**707**	277	704	128	275	709	**276**	**707**	277	704
527.cam4_r	128	282	795	285	785	**283**	**791**	64	155	720	**156**	**719**	156	718
538.imagick_r	128	147	2160	147	2170	**147**	**2170**	128	147	2160	147	2170	**147**	**2170**
544.nab_r	128	**144**	**1500**	144	1500	145	1490	128	**144**	**1500**	144	1500	145	1490
549.fotonik3d_r	128	894	558	898	556	**898**	**556**	128	894	558	898	556	**898**	**556**
554.roms_r	128	627	324	623	327	**623**	**327**	64	289	352	288	353	**289**	**352**
SPECrate®2017_fp_base =		**763**												
SPECrate®2017_fp_peak =		**784**												

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>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
```

(Continued on next page)

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General Notes (Continued)

```
sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

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.
```

Platform Notes

```
BIOS Settings:
Sub NUMA Clustering set to Enable SNC2(2-clusters)
Adjacent cache line prefetcher set to Enabled
DCU streamer prefetch set to Disabled
Enhanced CPU performance set to Auto
LLC Dead Line set to Disabled
Processor C6 Report set to Enabled
ADDDC Sparing set to Disabled


 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on srv05 Wed Feb 21 05:39:33 2024

 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 srv05 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
```

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Platform Notes (Continued)

```
  -------------------------------------------------------------
  2. w
     05:39:33 up  5:33,  1 user,  load average: 76.61, 114.08, 121.39
     USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
     root     tty1     -                00:07    5:27m  1.11s  0.17s -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) 4126758
    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) 4126758
    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
   sh runrate.ic2023.sh
   runcpu --action=build --action validate --define default-platform-flags --define numcopies=128 -c
     ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --reportable --iterations 3 --define smt-on --define
     cores=64 --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=128 --configfile
     ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --reportable --iterations 3 --define smt-on --define
     cores=64 --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/CPU2017.010/templogs/preenv.fprate.010.0.log --lognum 010.0
     --from_runcpu 2
   specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017

  -------------------------------------------------------------
  6. /proc/cpuinfo
     model name      : INTEL(R) XEON(R) GOLD 6548Y+
     vendor_id       : GenuineIntel
     cpu family      : 6
     model           : 207
     stepping        : 2
     microcode       : 0x21000200
     bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
     cpu cores       : 32
     siblings        : 64
     2 physical ids (chips)
```

(Continued on next page)

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Platform Notes (Continued)

```
    128 processors (hardware threads)
    physical id 0: core ids 0-31
    physical id 1: core ids 0-31
    physical id 0: apicids 0-63
    physical id 1: apicids 128-191
  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):                      128
    On-line CPU(s) list:         0-127
    Vendor ID:                   GenuineIntel
    Model name:                  INTEL(R) XEON(R) GOLD 6548Y+
    CPU family:                  6
    Model:                       207
    Thread(s) per core:          2
    Core(s) per socket:          32
    Socket(s):                   2
    Stepping:                    2
    CPU max MHz:                 4100.0000
    CPU min MHz:                 800.0000
    BogoMIPS:                    5000.00
    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 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 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:                   3 MiB (64 instances)
    L1i cache:                   2 MiB (64 instances)
    L2 cache:                    128 MiB (64 instances)
    L3 cache:                    120 MiB (2 instances)
    NUMA node(s):                4
    NUMA node0 CPU(s):           0-15,64-79
    NUMA node1 CPU(s):           16-31,80-95
    NUMA node2 CPU(s):           32-47,96-111
    NUMA node3 CPU(s):           48-63,112-127
    Vulnerability Itlb multihit: Not affected
    Vulnerability L1tf:          Not affected
    Vulnerability Mds:           Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
  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       3M   12 Data             1    64      1              64
      L1i      32K       2M    8 Instruction      1    64      1              64
      L2        2M     128M   16 Unified          2  2048      1              64
      L3       60M     120M   15 Unified          3 65536      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: 0-15,64-79
  node 0 size: 257675 MB
  node 0 free: 239825 MB
  node 1 cpus: 16-31,80-95
  node 1 size: 258039 MB
  node 1 free: 245056 MB
  node 2 cpus: 32-47,96-111
  node 2 size: 258039 MB
  node 2 free: 244930 MB
  node 3 cpus: 48-63,112-127
  node 3 size: 257958 MB
  node 3 free: 244853 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:       1056474672 kB


--------------------------------------------------------------
10. who -r
  run-level 3 Feb 21 00:06


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


--------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE             UNIT FILES
  enabled           YaST2-Firstboot YaST2-Second-Stage auditd cron getty@ haveged irqbalance issue-generator
                    kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections 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
```

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Platform Notes (Continued)

```
                   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 udisks2
    indirect       wickedd


  ----------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=f1a623f5-7b90-429d-9d79-3670a3964cf8
    splash=silent
    mitigations=auto
    quiet
    security=


  ----------------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 4.10 GHz.
                      The governor "performance" 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
```

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Platform Notes (Continued)

```
    max_ptes_swap            64
    pages_to_scan          4096
    scan_sleep_millisecs  10000


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


    ----------------------------------------------------------------
    19. Disk information
    SPEC is set to: /home/cpu2017
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sdb2       xfs   893G   72G  822G   8% /


    ----------------------------------------------------------------
    20. /sys/devices/virtual/dmi/id
        Vendor:        Cisco Systems Inc
        Product:       UCSX-210C-M7
        Serial:        FCH270978F6


    ----------------------------------------------------------------
    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 M321R8GA0PB0-CWMCH 64 GB 2 rank 5600, configured at 5200


    ----------------------------------------------------------------
    22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:       Cisco Systems, Inc.
      BIOS Version:      X210M7.4.3.3a.0.0118241337
      BIOS Date:         01/18/2024
      BIOS Revision:     5.32
```

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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
```

(Continued on next page)

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```
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
-------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
-------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 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 2023.2.3 Build x
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x
Copyright (C) 1985-2023 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`

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

SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS X210 M7 (Intel Xeon Gold 6548Y+, 2.50GHz)

SPECrate®2017_fp_base = 763

SPECrate®2017_fp_peak = 784

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

Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Dec-2023

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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CPU2017 License: 9019
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Test Date: Feb-2024
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Software Availability: Dec-2023

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

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Tested by: Cisco Systems

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Hardware Availability: Feb-2024
Software Availability: Dec-2023

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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Test Date: Feb-2024
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Software Availability: Dec-2023

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-ic2023p2-official-linux64.html
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-EMR-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-EMR-revB.xml

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

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