SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8581V, 2.00GHz)

$SPECrate^{®}2017\_fp\_base = 519$

$SPECrate^{®}2017\_fp\_peak = 540$

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

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

Benchmark	Copies	base	peak
503.bwaves_r	120	2160	
507.cactuBSSN_r	120 / 60	555	568
508.namd_r	120	352	
510.parest_r	120 / 60	325	369
511.povray_r	120	530	555
519.lbm_r	120	207	
521.wrf_r	120 / 60	349	423
526.blender_r	120	523	
527.cam4_r	120	572	572
538.imagick_r	120	1960	
544.nab_r	120	1080	
549.fotonik3d_r	120	285	
554.roms_r	120 / 60	212	239

SPECrate®2017_fp_base (519)   SPECrate®2017_fp_peak (540)

Hardware

CPU Name: Intel Xeon Platinum 8581V
 Max MHz: 3900
 Nominal: 2000
Enabled: 60 cores, 1 chip, 2 threads/core
Orderable: 1 Chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 300 MB I+D on chip per chip
 Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC5-5600B-R, running at 4800)
Storage: 1 x 960 GB M.2 SSD SATA
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 5.14.21-150500.53-default
Compiler: C/C++: Version 2024.0.2 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.0.2 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 4.3.3a released Jan-2024
File System: btrfs
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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SPECrate®2017_fp_base = 519
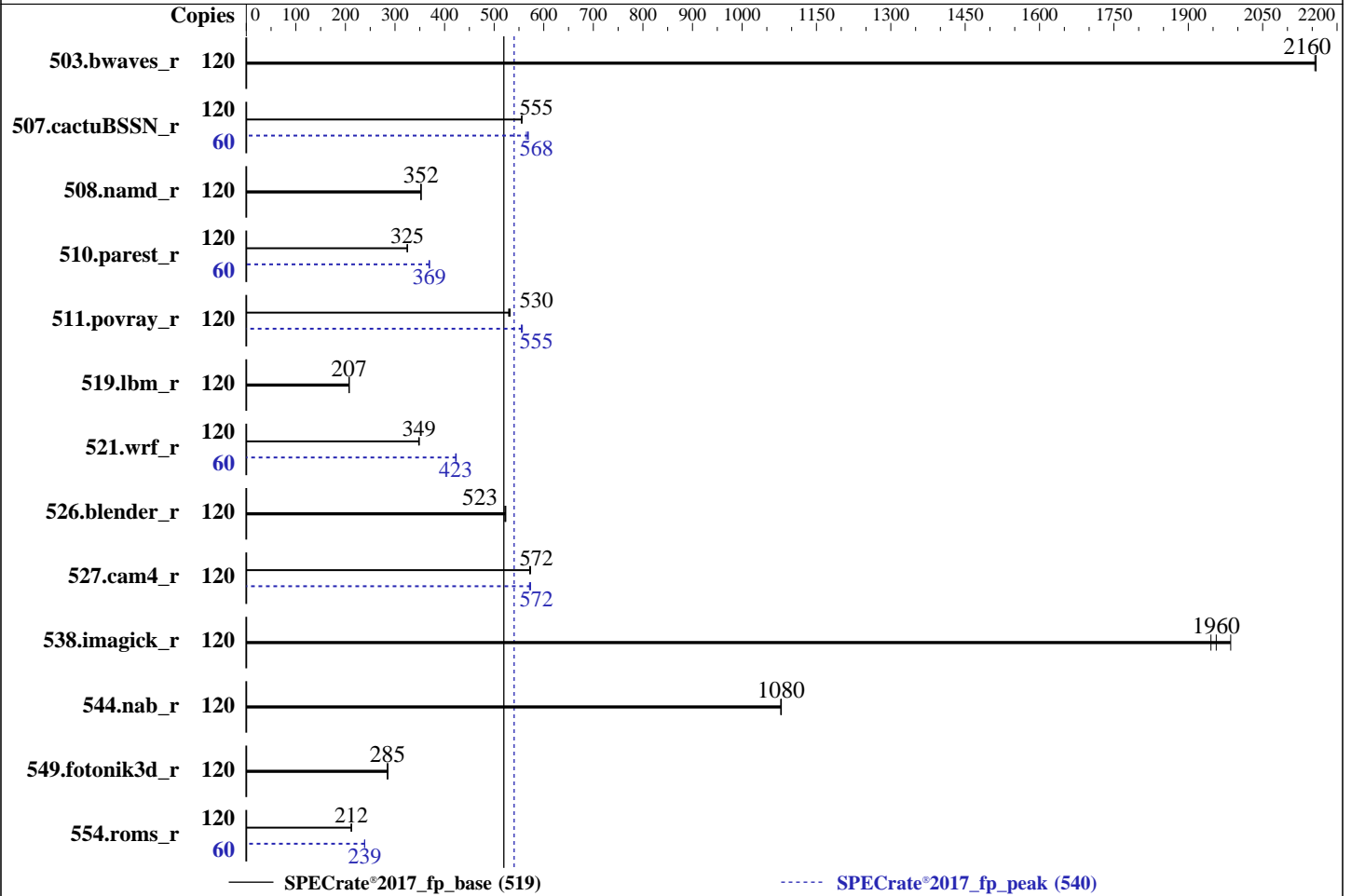
SPECrate®2017_fp_peak = 540

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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	120	558	2160	**558**	**2160**	558	2160	120	558	2160	**558**	**2160**	558	2160
507.cactuBSSN_r	120	**274**	**555**	274	555	273	556	60	134	569	134	565	**134**	**568**
508.namd_r	120	323	353	324	352	**323**	**352**	120	323	353	324	352	**323**	**352**
510.parest_r	120	965	325	967	324	**967**	**325**	60	426	369	**425**	**369**	425	370
511.povray_r	120	529	529	**528**	**530**	526	532	120	**505**	**555**	505	555	503	557
519.lbm_r	120	**610**	**207**	610	207	610	207	120	**610**	**207**	610	207	610	207
521.wrf_r	120	771	349	**771**	**349**	773	348	60	318	423	317	423	**318**	**423**
526.blender_r	120	351	521	349	523	**349**	**523**	120	351	521	349	523	**349**	**523**
527.cam4_r	120	367	572	**367**	**572**	366	573	120	366	573	367	571	**367**	**572**
538.imagick_r	120	**153**	**1960**	150	1990	153	1950	120	**153**	**1960**	150	1990	153	1950
544.nab_r	120	187	1080	**187**	**1080**	187	1080	120	187	1080	**187**	**1080**	187	1080
549.fotonik3d_r	120	**1641**	**285**	1645	284	1638	286	120	**1641**	**285**	1645	284	1638	286
554.roms_r	120	901	212	**899**	**212**	899	212	60	**399**	**239**	399	239	399	239

SPECrate®2017_fp_base =	**519**
SPECrate®2017_fp_peak =	**540**

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)

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

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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

```
Sub NUMA Clustering set to Enable SNC2(2-clusters)
ADDDC Sparing set to Disabled
DCU Streamer Prefetch set to Disabled
Enhanced CPU performance set to Auto
LLC Dead Line set to Disabled
Processor C6 Report set to Enabled


 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Fri May  3 09:13:48 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 (249.16+suse.171.gdad0071f15)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS
 -----------------------------------------------------------


 -----------------------------------------------------------
 1. uname -a
   Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
   x86_64 x86_64 x86_64 GNU/Linux


 -----------------------------------------------------------
 2. w
```

(Continued on next page)

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Platform Notes (Continued)

```
   09:13:48 up  7:04,  1 user,  load average: 78.43, 109.54, 115.78
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                02:11    7:01m  1.06s  0.21s -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) 2062505
  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) 2062505
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited


  ----------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 30
 login -- root
 -bash
 -bash
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=120 -c
   ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --reportable --iterations 3 --define smt-on --define
   cores=60 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all -o all
   fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=120 --configfile
   ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --reportable --iterations 3 --define smt-on --define
   cores=60 --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/CPU2017.063/templogs/preenv.fprate.063.0.log --lognum 063.0
   --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


  ----------------------------------------------------------
6. /proc/cpuinfo
   model name      : INTEL(R) XEON(R) PLATINUM 8581V
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 207
   stepping        : 2
   microcode       : 0x21000200
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
   cpu cores       : 60
   siblings        : 120
   1 physical ids (chips)
   120 processors (hardware threads)
   physical id 0: core ids 0-59
```

(Continued on next page)

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Platform Notes (Continued)

```
      physical id 0: apicids 0-119
   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 2.37.4:
   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):                   120
   On-line CPU(s) list:      0-119
   Vendor ID:                GenuineIntel
   Model name:               INTEL(R) XEON(R) PLATINUM 8581V
   CPU family:               6
   Model:                    207
   Thread(s) per core:       2
   Core(s) per socket:       60
   Socket(s):                1
   Stepping:                 2
   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
                             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 avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
                             hwp_act_window hwp_epp hwp_pkg_req hfi 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:                2.8 MiB (60 instances)
   L1i cache:                1.9 MiB (60 instances)
   L2 cache:                 120 MiB (60 instances)
   L3 cache:                 300 MiB (1 instance)
   NUMA node(s):             2
   NUMA node0 CPU(s):        0-29,60-89
   NUMA node1 CPU(s):        30-59,90-119
   Vulnerability Itlb multihit:    Not affected
   Vulnerability L1tf:             Not affected
   Vulnerability Mds:              Not affected
   Vulnerability Meltdown:         Not affected
   Vulnerability Mmio stale data:  Not affected
   Vulnerability Retbleed:         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, PBRSB-eIBRS SW
                                   sequence
   Vulnerability Srbds:            Not affected
```

(Continued on next page)

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Platform Notes (Continued)

```
  Vulnerability Tsx async abort:   Not affected

From lscpu --cache:
    NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL    SETS PHY-LINE COHERENCY-SIZE
    L1d       48K     2.8M  12 Data              1      64       1             64
    L1i       32K     1.9M   8 Instruction       1      64       1             64
    L2         2M     120M  16 Unified           2    2048       1             64
    L3       300M     300M  20 Unified           3 245760       1             64


-----------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-29,60-89
  node 0 size: 257679 MB
  node 0 free: 222993 MB
  node 1 cpus: 30-59,90-119
  node 1 size: 257977 MB
  node 1 free: 234199 MB
  node distances:
  node   0   1
    0:  10  12
    1:  12  10


-----------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       528032920 kB


-----------------------------------------------------------------
10. who -r
  run-level 3 May 3 02:10


-----------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
  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 display-manager getty@ irqbalance
                   issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
                   smartd sshd systemd-pstore 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 haveged-switch-root ipmi ipmievd issue-add-ssh-keys
                   kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd
                   serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
                   systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2
                   vncserver@
  indirect         wickedd


-----------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
```

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Platform Notes (Continued)

```
  BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
  root=UUID=c651e0e8-e427-466f-8daf-c51164b1b96c
  splash=silent
  mitigations=auto
  quiet
  security=apparmor


  -------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 3.90 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
  scan_sleep_millisecs    10000


  -------------------------------------------------------------
19. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP5
```

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Platform Notes (Continued)

```
    ----------------------------------------------------------
    20. Disk information
    SPEC is set to: /home/cpu2017
      Filesystem     Type   Size  Used Avail Use% Mounted on
      /dev/sda2      btrfs  222G   70G  149G  32% /home


    ----------------------------------------------------------
    21. /sys/devices/virtual/dmi/id
        Vendor:       Cisco Systems Inc
        Product:      UCSC-C240-M7SX
        Serial:       WZP27100DJE


    ----------------------------------------------------------
    22. dmidecode
      Additional information from dmidecode 3.4 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:
        8x 0xCE00 M321R8GA0PB0-CWMCH 64 GB 2 rank 5600, configured at 4800



    ----------------------------------------------------------
    23. BIOS
    (This section combines info from /sys/devices and dmidecode.)
        BIOS Vendor:    Cisco Systems, Inc.
        BIOS Version:   C240M7.4.3.3a.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 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
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 2024.0.2 Build 20231213
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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`

Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`

(Continued on next page)

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8581V, 2.00GHz)

SPECrate®2017_fp_base = 519

SPECrate®2017_fp_peak = 540

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

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

Base Portability Flags (Continued)

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
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8581V, 2.00GHz)

SPECrate®2017_fp_base = 519

SPECrate®2017_fp_peak = 540

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

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

Base Optimization Flags (Continued)

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`

538.imagick_r: `basepeak = yes`

(Continued on next page)

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

Cisco Systems
Cisco UCS C240 M7 (Intel Xeon Platinum 8581V, 2.00GHz)

SPECrate®2017_fp_base = 519

SPECrate®2017_fp_peak = 540

Peak Optimization Flags (Continued)

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
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc

(Continued on next page)

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8581V, 2.00GHz)

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

Peak Optimization Flags (Continued)

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

`-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-ic2024-official-linux64.html`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-EMR-revD.html`

You can also download the XML flags sources by saving the following links:

`http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-EMR-revD.xml`

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

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