SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Gold 6548N, 2.80GHz)

SPECrate®2017_fp_base = 773

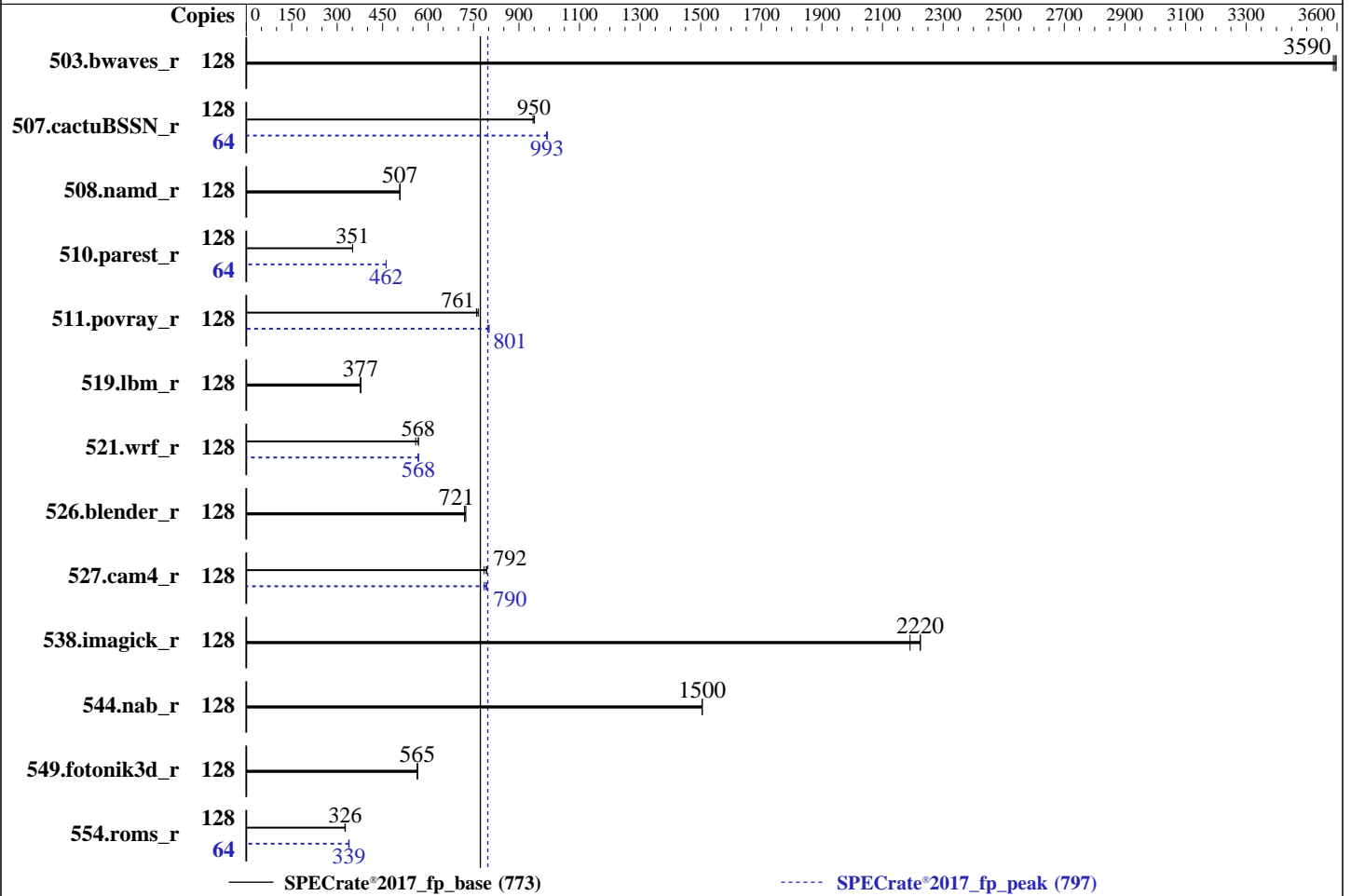SPECrate®2017_fp_peak = 797

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

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

Benchmark	Copies	base	peak
503.bwaves_r	128	3590	
507.cactuBSSN_r	128 / 64	950	993
508.namd_r	128	507	
510.parest_r	128 / 64	351	462
511.povray_r	128	761	801
519.lbm_r	128	377	
521.wrf_r	128	568	568
526.blender_r	128	721	
527.cam4_r	128	792	790
538.imagick_r	128	2220	
544.nab_r	128	1500	
549.fotonik3d_r	128	565	
554.roms_r	128 / 64	326	339

SPECrate®2017_fp_base (773)   SPECrate®2017_fp_peak (797)

Hardware

CPU Name: Intel Xeon Gold 6548N
 Max MHz: 4100
 Nominal: 2800
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 x 960 GB M.2 SSD SATA
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP5
5.14.21-150500.53-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: 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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Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	357	3600	**357**	**3590**	358	3590	128	357	3600	**357**	**3590**	358	3590
507.cactuBSSN_r	128	**171**	**950**	170	951	171	946	64	81.5	994	**81.6**	**993**	81.7	991
508.namd_r	128	239	508	**240**	**507**	240	506	128	239	508	**240**	**507**	240	506
510.parest_r	128	**954**	**351**	954	351	954	351	64	**363**	**462**	363	462	362	462
511.povray_r	128	390	766	393	760	**393**	**761**	128	373	801	**373**	**801**	375	796
519.lbm_r	128	357	378	**358**	**377**	358	377	128	357	378	**358**	**377**	358	377
521.wrf_r	128	**505**	**568**	513	559	505	568	128	504	569	**505**	**568**	506	567
526.blender_r	128	270	721	269	725	**270**	**721**	128	270	721	269	725	**270**	**721**
527.cam4_r	128	282	793	285	785	**283**	**792**	128	**283**	**790**	282	794	285	785
538.imagick_r	128	145	2190	143	2220	**143**	**2220**	128	145	2190	143	2220	**143**	**2220**
544.nab_r	128	143	1500	143	1510	**143**	**1500**	128	143	1500	143	1510	**143**	**1500**
549.fotonik3d_r	128	**883**	**565**	883	565	883	565	128	**883**	**565**	883	565	883	565
554.roms_r	128	625	326	622	327	**623**	**326**	64	300	339	**300**	**339**	301	338
SPECrate®2017_fp_base =		**773**											
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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:
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 localhost Sat Feb 24 23:28:01 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. 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 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

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

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

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Platform Notes (Continued)

```
  2. w
    23:28:01 up 1 min,  1 user,  load average: 0.29, 0.13, 0.05
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                23:27    9.00s  1.19s  0.20s -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) 4126822
    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) 4126822
    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=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 --nobuild --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/CPU2017.004/templogs/preenv.fprate.004.0.log --lognum 004.0
     --from_runcpu 2
   specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017

  -----------------------------------------------------------
  6. /proc/cpuinfo
    model name      : INTEL(R) XEON(R) GOLD 6548N
    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       : 32
    siblings        : 64
    2 physical ids (chips)
    128 processors (hardware threads)
```

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Platform Notes (Continued)

```
      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 2.37.4:
    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):                         128
    On-line CPU(s) list:            0-127
    Vendor ID:                      GenuineIntel
    Model name:                     INTEL(R) XEON(R) GOLD 6548N
    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:                       5600.00
    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:                      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
    Vulnerability Meltdown:         Not affected
    Vulnerability Mmio stale data:  Not affected
    Vulnerability Retbleed:         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, PBRSB-eIBRS SW
                                    sequence
   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: 257654 MB
    node 0 free: 256943 MB
    node 1 cpus: 16-31,80-95
    node 1 size: 258039 MB
    node 1 free: 257466 MB
    node 2 cpus: 32-47,96-111
    node 2 size: 258039 MB
    node 2 free: 257526 MB
    node 3 cpus: 48-63,112-127
    node 3 size: 258000 MB
    node 3 free: 257536 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:       1056497164 kB


  ------------------------------------------------------------
  10. who -r
    run-level 3 Feb 24 23:27


  ------------------------------------------------------------
  11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
    Default Target  Status
    multi-user      running


  ------------------------------------------------------------
  12. Services, from systemctl list-unit-files
    STATE           UNIT FILES
    enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron 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
```

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Platform Notes (Continued)

```
                    kexec-load ksm kvm_stat lunmask man-db-create multipath nfs nfs-blkmap 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-5.14.21-150500.53-default
      root=UUID=ec07819c-bf3e-428b-8399-e735655f61af
      splash=silent
      mitigations=auto
      quiet
      security=apparmor


    ----------------------------------------------------------------
    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 SP5


  ----------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017
  Filesystem      Type   Size  Used Avail Use% Mounted on
  /dev/sda5       btrfs  60G   15G  44G   26% /home


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


  ----------------------------------------------------------------
21. 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:
    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:      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 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
```

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------------------------------------------------------------------------------


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

Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Gold 6548N, 2.80GHz)

SPECrate®2017_fp_base = 773

SPECrate®2017_fp_peak = 797

CPU2017 License:	9019	**Test Date:**	Feb-2024
Test Sponsor:	Cisco Systems	**Hardware Availability:**	Feb-2024
Tested by:	Cisco Systems	**Software Availability:**	Jun-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

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Feb-2024

Hardware Availability: Feb-2024

Software Availability: Jun-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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CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Feb-2024

Hardware Availability: Feb-2024

Software Availability: Jun-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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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Tested by:	Cisco Systems	**Software Availability:**	Jun-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-revA.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-revA.xml

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

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