# SPEC CPU®2017 Floating Point Rate Result

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## Cisco Systems

Cisco UCS X210 M7 (Intel Xeon Bronze 3508U, 2.10GHz)

$SPECrate^{®}2017\_fp\_base = 84.3$

$SPECrate^{®}2017\_fp\_peak = 70.1$

**CPU2017 License:** 9019

**Test Sponsor:** Cisco Systems

**Tested by:** Cisco Systems

**Test Date:** Apr-2024

**Hardware Availability:** Feb-2024

**Software Availability:** Dec-2023

Copies

| Benchmark | Copies | Result |
|---|---|---|
| 503.bwaves_r | 8 | 331 |
| 507.cactuBSSN_r | 8 | 128 |
| 507.cactuBSSN_r | 4 | 69.3 |
| 508.namd_r | 8 | 36.4 |
| 510.parest_r | 8 | 53.9 |
| 510.parest_r | 4 | 29.5 |
| 511.povray_r | 8 | 58.0 |
| 511.povray_r | (peak) | 62.1 |
| 519.lbm_r | 8 | 74.3 |
| 521.wrf_r | 8 | 79.4 |
| 521.wrf_r | 4 | 42.4 |
| 526.blender_r | 8 | 51.7 |
| 527.cam4_r | 8 | 66.4 |
| 527.cam4_r | (peak) | 66.3 |
| 538.imagick_r | 8 | 174 |
| 544.nab_r | 8 | 92.6 |
| 549.fotonik3d_r | 8 | 118 |
| 554.roms_r | 8 | 58.6 |
| 554.roms_r | 4 | 31.6 |

SPECrate®2017_fp_base (84.3)

SPECrate®2017_fp_peak (70.1)

## Hardware

CPU Name: Intel Xeon Bronze 3508U

 Max MHz: 2200

 Nominal: 2100

Enabled: 8 cores, 1 chip

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: 22.5 MB I+D on chip per chip

 Other: None

Memory: 512 GB (8 x 64 GB 2Rx4 PC5-5600B-R, running at 4400)

Storage: 1 x 960 GB M.2 SSD SATA

Other: CPU Cooling: Air

## Software

OS: SUSE Linux Enterprise Server 15 SP4 5.14.21-150400.22-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: xfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 64-bit

Other: jemalloc memory allocator V5.0.1

Power Management: BIOS set to prefer performance at the cost of additional power usage

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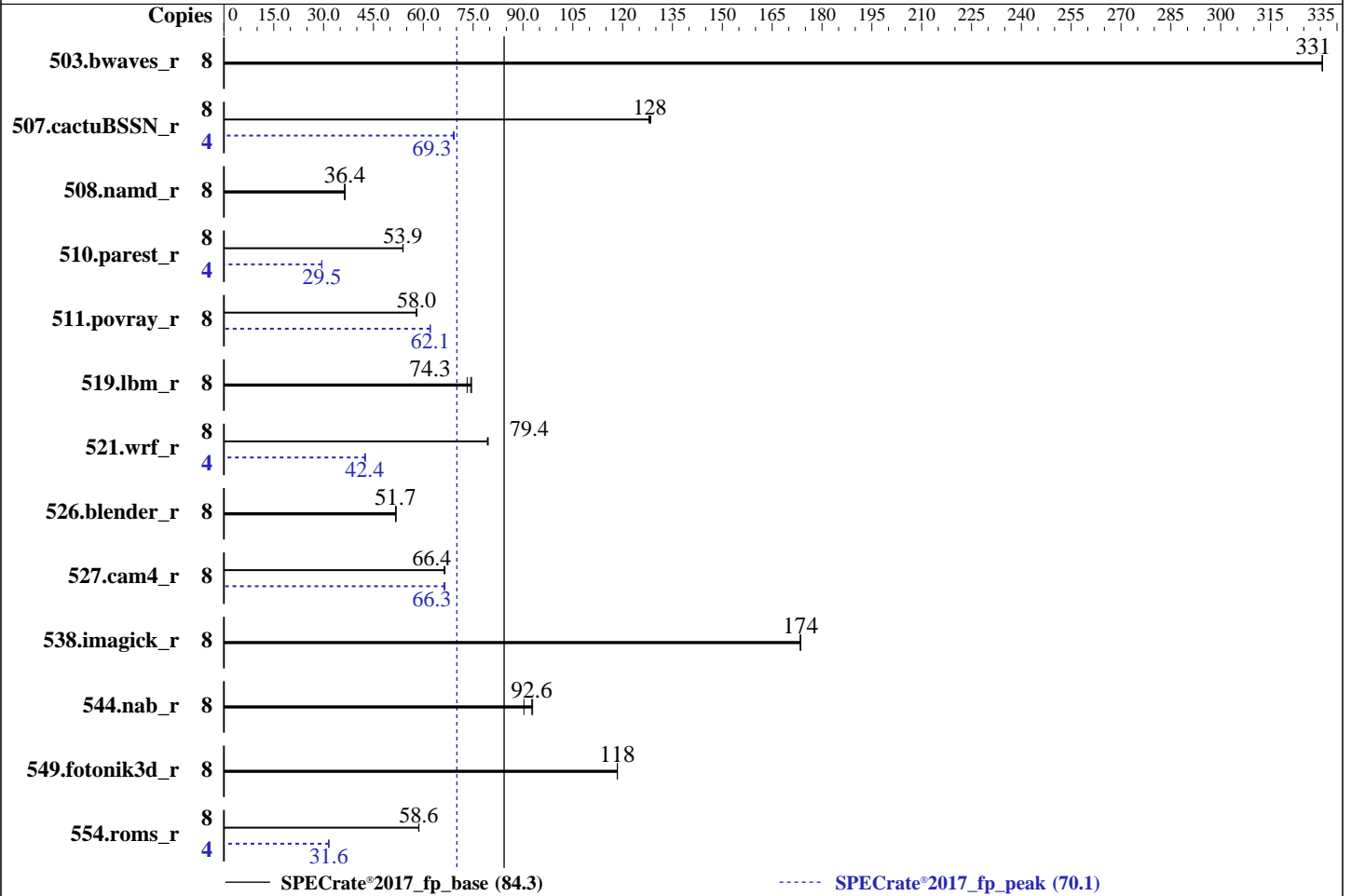SPECrate®2017_fp_peak = 70.1

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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 | 8 | **243** | **331** | 243 | 331 | 243 | 331 | 8 | **243** | **331** | 243 | 331 | 243 | 331 |
| 507.cactuBSSN_r | 8 | 79.2 | 128 | **79.0** | **128** | 78.8 | 128 | 4 | 73.4 | 69.0 | 73.1 | 69.3 | **73.1** | **69.3** |
| 508.namd_r | 8 | 209 | 36.3 | 209 | 36.4 | **209** | **36.4** | 8 | 209 | 36.3 | 209 | 36.4 | **209** | **36.4** |
| 510.parest_r | 8 | 389 | 53.8 | 388 | 53.9 | **388** | **53.9** | 4 | 355 | 29.5 | **355** | **29.5** | 355 | 29.5 |
| 511.povray_r | 8 | 322 | 58.0 | **322** | **58.0** | 323 | 57.9 | 8 | **301** | **62.1** | 301 | 62.1 | 301 | 62.1 |
| 519.lbm_r | 8 | 115 | 73.2 | **114** | **74.3** | 113 | 74.5 | 8 | 115 | 73.2 | **114** | **74.3** | 113 | 74.5 |
| 521.wrf_r | 8 | **226** | **79.4** | 225 | 79.5 | 226 | 79.3 | 4 | **211** | **42.4** | 210 | 42.6 | 211 | 42.4 |
| 526.blender_r | 8 | **236** | **51.7** | 236 | 51.7 | 235 | 51.8 | 8 | **236** | **51.7** | 236 | 51.7 | 235 | 51.8 |
| 527.cam4_r | 8 | 210 | 66.5 | **211** | **66.4** | 211 | 66.3 | 8 | **211** | **66.3** | 210 | 66.5 | 211 | 66.3 |
| 538.imagick_r | 8 | 115 | 174 | **115** | **174** | 115 | 173 | 8 | 115 | 174 | **115** | **174** | 115 | 173 |
| 544.nab_r | 8 | **145** | **92.6** | 145 | 92.9 | 149 | 90.3 | 8 | **145** | **92.6** | 145 | 92.9 | 149 | 90.3 |
| 549.fotonik3d_r | 8 | **263** | **118** | 263 | 118 | 263 | 118 | 8 | **263** | **118** | 263 | 118 | 263 | 118 |
| 554.roms_r | 8 | 217 | 58.7 | 217 | 58.6 | **217** | **58.6** | 4 | **201** | **31.6** | 202 | 31.5 | 201 | 31.6 |
| **SPECrate®2017_fp_base =** | | **84.3** | | | | | | | | | | | | |
| **SPECrate®2017_fp_peak =** | | **70.1** | | | | | | | | | | | | |

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)

**(Continued on next page)**

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## General Notes (Continued)

```
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)
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 srv3-EMR Fri Apr 19 16:25:58 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 srv3-EMR 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
    16:25:58 up  4:50,  1 user,  load average: 5.47, 7.40, 7.80
```

<div align="center">(Continued on next page)</div>

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## Platform Notes (Continued)

```
   USER      TTY      FROM              LOGIN@   IDLE   JCPU   PCPU WHAT
   root      tty1     -                 11:35   4:49m  1.49s  0.15s -bash


   -----------------------------------------------------------
3. Username
   From environment variable $USER:  root


   -----------------------------------------------------------
4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 2062672
   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) 2062672
   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.ic2024.sh
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=8 -c
   ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --reportable --iterations 3 --define smt-on --define
   cores=4 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune all -o all
   fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=8 --configfile
   ic2024.0.2-lin-sapphirerapids-rate-20231213.cfg --reportable --iterations 3 --define smt-on --define
   cores=4 --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/CPU2017.169/templogs/preenv.fprate.169.0.log --lognum 169.0
   --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


   -----------------------------------------------------------
6. /proc/cpuinfo
   model name      : INTEL(R) XEON(R) BRONZE 3508U
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 8
   microcode       : 0x2b000571
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores       : 8
   siblings        : 8
   1 physical ids (chips)
   8 processors (hardware threads)
   physical id 0: core ids 0-7
   physical id 0: apicids 0,2,4,6,8,10,12,14
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
   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):                    8
   On-line CPU(s) list:       0-7
   Vendor ID:                 GenuineIntel
   Model name:                INTEL(R) XEON(R) BRONZE 3508U
   CPU family:                6
   Model:                     143
   Thread(s) per core:        1
   Core(s) per socket:        8
   Socket(s):                 1
   Stepping:                  8
   CPU max MHz:               2200.0000
   CPU min MHz:               800.0000
   BogoMIPS:                  4200.00
   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 flush_l1d arch_capabilities
   L1d cache:                 384 KiB (8 instances)
   L1i cache:                 256 KiB (8 instances)
   L2 cache:                  16 MiB (8 instances)
   L3 cache:                  22.5 MiB (1 instance)
   NUMA node(s):              2
   NUMA node0 CPU(s):         0-3
   NUMA node1 CPU(s):         4-7
   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
   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
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
      L1d       48K     384K   12 Data          1    64      1        64
      L1i       32K     256K    8 Instruction   1    64      1        64
      L2         2M      16M   16 Unified       2  2048      1        64
      L3      22.5M    22.5M   15 Unified       3 24576      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: 0-3
     node 0 size: 257692 MB
     node 0 free: 250282 MB
     node 1 cpus: 4-7
     node 1 size: 257999 MB
     node 1 free: 255025 MB
     node distances:
     node   0   1
       0:  10  12
       1:  12  10


   -------------------------------------------------------------
   9. /proc/meminfo
     MemTotal:       528068548 kB


   -------------------------------------------------------------
   10. who -r
     run-level 3 Apr 19 11:35


   -------------------------------------------------------------
   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
                     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=16c71aca-e386-4aa5-8e77-e7c816146b7c
     splash=silent
     mitigations=auto
     quiet
     security=


   -------------------------------------------------------------
   14. cpupower frequency-info
```

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## Platform Notes (Continued)

```
    analyzing CPU 0:
      current policy: frequency should be within 800 MHz and 2.20 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
      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   891G   35G  857G   4% /


    ----------------------------------------------------------------
    20. /sys/devices/virtual/dmi/id
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
       Vendor:        Cisco Systems Inc
       Product:       UCSX-210C-M7
       Serial:        FCH270978F4


   ------------------------------------------------------------
   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:
       8x 0xCE00 M321R8GA0PB0-CWMCH 64 GB 2 rank 5600, configured at 4400


   ------------------------------------------------------------
   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 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)
----------------------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.0.2 Build 20231213
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----------------------------------------------------------------------------------------------


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

# SPEC CPU®2017 Floating Point Rate Result

## Cisco Systems

Cisco UCS X210 M7 (Intel Xeon Bronze 3508U, 2.10GHz)

SPECrate®2017_fp_base = 84.3

SPECrate®2017_fp_peak = 70.1

**CPU2017 License:** 9019

**Test Sponsor:** Cisco Systems

**Tested by:** Cisco Systems

**Test Date:** Apr-2024

**Hardware Availability:** Feb-2024

**Software Availability:** Dec-2023

## Compiler Version Notes (Continued)

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


===========================================================================================
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
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-------------------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

Benchmarks using both C and C++:
`icpx icx`

Benchmarks using Fortran, C, and C++:
`icpx icx ifx`

## Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`

**(Continued on next page)**

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

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# Base Portability Flags (Continued)

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
```

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
```

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

# Peak Compiler Invocation

C benchmarks:
```
icx
```

C++ benchmarks:
```
icpx
```

Fortran benchmarks:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

Benchmarks using both C and C++:
```
icpx icx
```

Benchmarks using Fortran, C, and C++:
```
icpx icx ifx
```

# Peak Portability Flags

```
Same as Base Portability Flags
```

# Peak Optimization Flags

C benchmarks:

 519.lbm_r: `basepeak = yes`

 538.imagick_r: `basepeak = yes`

 544.nab_r: `basepeak = yes`

C++ benchmarks:

 508.namd_r: `basepeak = yes`

 510.parest_r: `-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

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## Cisco Systems

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# Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: `-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
`-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:

511.povray_r: `-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate`(pass 1) `-fprofile-use=default.profdata`(pass 2) `-xCORE-AVX2`(pass 1) `-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
`-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-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

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

Tested with SPEC CPU®2017 v1.1.9 on 2024-04-19 19:25:57-0400.
Report generated on 2024-05-07 22:24:07 by CPU2017 PDF formatter v6716.
Originally published on 2024-05-07.