



SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8460Y+, 2.00GHz)

SPECrate®2017_fp_base = 809

SPECrate®2017_fp_peak = 838

CPU2017 License: 9019

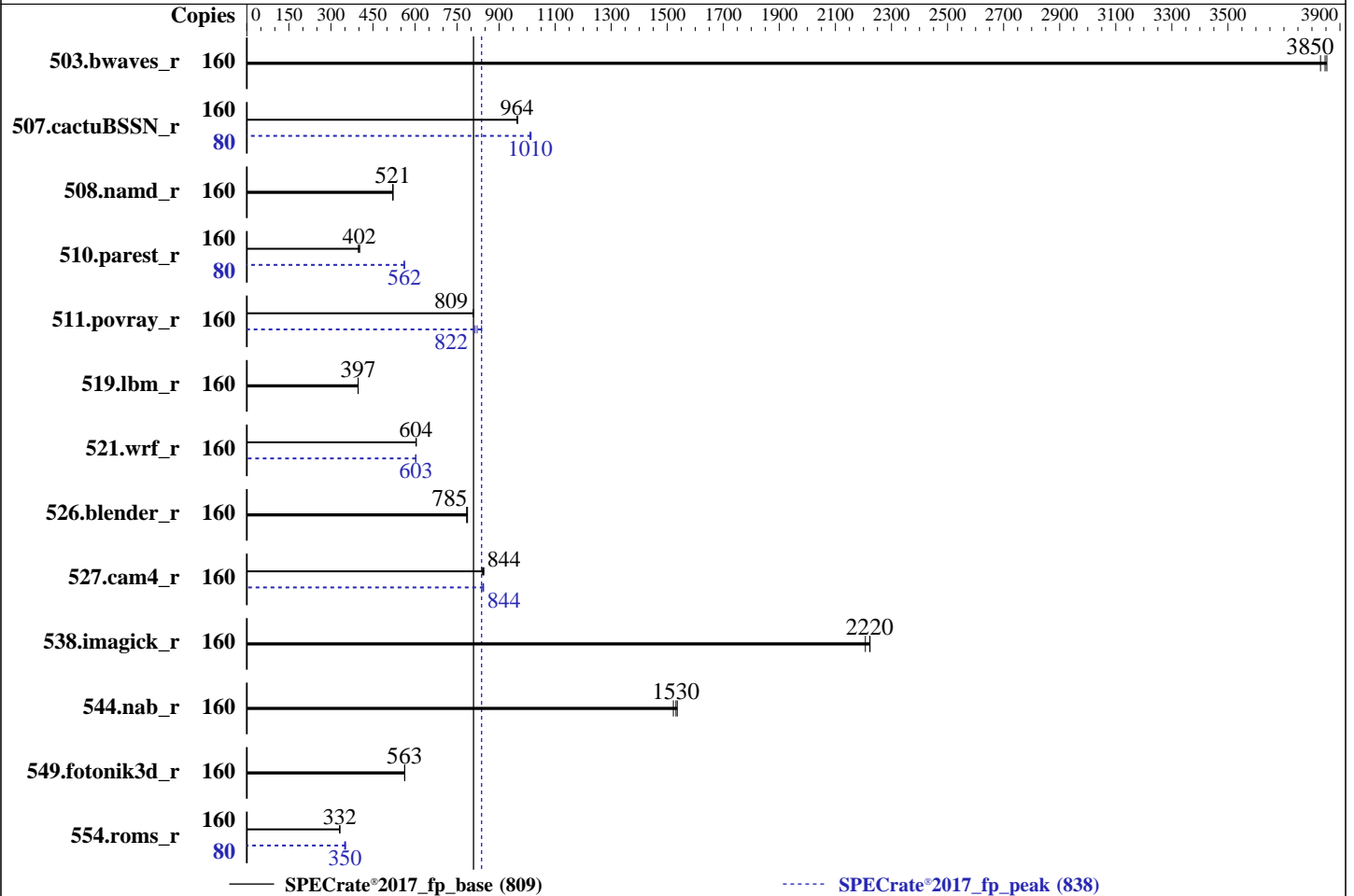
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Apr-2023

Hardware Availability: Mar-2023

Software Availability: Dec-2022



Hardware

CPU Name: Intel Xeon Platinum 8460Y+
 Max MHz: 3700
 Nominal: 2000
 Enabled: 80 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: 105 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
 Storage: 1 x 960 GB M.2 SSD SATA
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-default
 Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2023.0 of Intel Fortran Compiler
 for Linux;
 Parallel: No
 Firmware: Version 4.3.1a released Feb-2023
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: jemalloc memory allocator V5.0.1
 Power Management: BIOS set to prefer performance at the cost
 of additional power usage



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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	160	416	3850	<u>417</u>	<u>3850</u>	419	3830	160	416	3850	<u>417</u>	<u>3850</u>	419	3830
507.cactuBSSN_r	160	210	967	<u>210</u>	<u>964</u>	210	964	80	100	1010	99.9	1010	<u>100</u>	<u>1010</u>
508.namd_r	160	291	522	<u>292</u>	<u>521</u>	292	521	160	291	522	<u>292</u>	<u>521</u>	292	521
510.parest_r	160	<u>1042</u>	<u>402</u>	1041	402	1052	398	80	<u>372</u>	<u>562</u>	372	562	373	562
511.povray_r	160	463	808	462	809	<u>462</u>	<u>809</u>	160	459	814	<u>455</u>	<u>822</u>	446	837
519.lbm_r	160	<u>425</u>	<u>397</u>	425	397	425	397	160	<u>425</u>	<u>397</u>	425	397	425	397
521.wrf_r	160	593	604	<u>593</u>	<u>604</u>	594	604	160	595	602	<u>594</u>	<u>603</u>	594	603
526.blender_r	160	<u>310</u>	<u>785</u>	311	785	309	787	160	<u>310</u>	<u>785</u>	311	785	309	787
527.cam4_r	160	333	839	331	846	<u>332</u>	<u>844</u>	160	<u>332</u>	<u>844</u>	331	844	334	838
538.imagick_r	160	180	2210	179	2220	<u>179</u>	<u>2220</u>	160	180	2210	179	2220	<u>179</u>	<u>2220</u>
544.nab_r	160	<u>176</u>	<u>1530</u>	175	1540	177	1520	160	<u>176</u>	<u>1530</u>	175	1540	177	1520
549.fotonik3d_r	160	<u>1107</u>	<u>563</u>	1107	563	1108	563	160	<u>1107</u>	<u>563</u>	1107	563	1108	563
554.roms_r	160	<u>767</u>	<u>332</u>	769	331	766	332	80	364	349	361	352	<u>363</u>	<u>350</u>

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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.

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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 SNC4
LLC Dead Line set to Disabled
ADDDC Sparing set to Disabled
Processor C6 Report set to Enabled
UPI Link Enablement 3
UPI Power Management Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on srv04 Thu Apr 20 16:40:49 2023

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

Table of contents

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

1. uname -a
Linux srv04 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222) x86_64
x86_64 x86_64 GNU/Linux

2. w
16:40:49 up 6 min, 1 user, load average: 0.20, 0.97, 0.67

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Platform Notes (Continued)

USER	TTY	FROM	LOGIN@	IDLE	JCPU	PCPU	WHAT
root	tty1	-	16:39	9.00s	1.62s	0.24s	-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) 4126772
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) 4126772
virtual memory         (kbytes, -v) unlimited
file locks             (-x) unlimited

```

5. sysinfo process ancestry

```

/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
-bash
runcpu --action=build --action validate --define default-platform-flags --define numcopies=160 -c
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
cores=80 --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=160 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --reportable --iterations 3 --define smt-on --define
cores=80 --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/CPU2017.234/templogs/preenv.fprate.234.0.log --lognum 234.0
--from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

6. /proc/cpuinfo

```

model name      : Intel(R) Xeon(R) Platinum 8460Y+
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b000161
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 40
siblings       : 80
2 physical ids (chips)
160 processors (hardware threads)
physical id 0: core ids 0-39
physical id 1: core ids 0-39

```

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Platform Notes (Continued)

physical id 0: apicids 0-79
physical id 1: apicids 128-207

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):                      160
On-line CPU(s) list:        0-159
Vendor ID:                   GenuineIntel
Model name:                  Intel(R) Xeon(R) Platinum 8460Y+
CPU family:                  6
Model:                      143
Thread(s) per core:         2
Core(s) per socket:         40
Socket(s):                   2
Stepping:                   8
CPU max MHz:                 3700.0000
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 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 intel_ppin 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 split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
                             arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku
                             ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                             tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b
                             enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16
                             amx_tile flush_lld arch_capabilities
Virtualization:              VT-x
L1d cache:                   3.8 MiB (80 instances)
L1i cache:                   2.5 MiB (80 instances)
L2 cache:                    160 MiB (80 instances)
L3 cache:                    210 MiB (2 instances)
NUMA node(s):               16
NUMA node0 CPU(s):          0-4,80-84
NUMA node1 CPU(s):          5-9,85-89
NUMA node2 CPU(s):          10-13,90-93
NUMA node3 CPU(s):          14-19,94-99
NUMA node4 CPU(s):          20-24,100-104
NUMA node5 CPU(s):          25-29,105-109
NUMA node6 CPU(s):          30-34,110-114
NUMA node7 CPU(s):          35-39,115-119
NUMA node8 CPU(s):          40-43,120-123
NUMA node9 CPU(s):          44-49,124-129

```

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Platform Notes (Continued)

```

NUMA node10 CPU(s):          50-54,130-134
NUMA node11 CPU(s):          55-59,135-139
NUMA node12 CPU(s):          60-64,140-144
NUMA node13 CPU(s):          65-69,145-149
NUMA node14 CPU(s):          70-74,150-154
NUMA node15 CPU(s):          75-79,155-159
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf:          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
L1d	48K	3.8M	12	Data	1	64	1	64
L1i	32K	2.5M	8	Instruction	1	64	1	64
L2	2M	160M	16	Unified	2	2048	1	64
L3	105M	210M	15	Unified	3	114688	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```

available: 16 nodes (0-15)
node 0 cpus: 0-4,80-84
node 0 size: 64508 MB
node 0 free: 63805 MB
node 1 cpus: 5-9,85-89
node 1 size: 64159 MB
node 1 free: 63855 MB
node 2 cpus: 10-13,90-93
node 2 size: 64509 MB
node 2 free: 64278 MB
node 3 cpus: 14-19,94-99
node 3 size: 64508 MB
node 3 free: 64013 MB
node 4 cpus: 20-24,100-104
node 4 size: 64509 MB
node 4 free: 64241 MB
node 5 cpus: 25-29,105-109
node 5 size: 64474 MB
node 5 free: 64229 MB
node 6 cpus: 30-34,110-114
node 6 size: 64509 MB
node 6 free: 64212 MB
node 7 cpus: 35-39,115-119
node 7 size: 64509 MB
node 7 free: 64220 MB
node 8 cpus: 40-43,120-123
node 8 size: 64509 MB
node 8 free: 64300 MB
node 9 cpus: 44-49,124-129
node 9 size: 64508 MB
node 9 free: 64107 MB
node 10 cpus: 50-54,130-134
node 10 size: 64509 MB
node 10 free: 64260 MB

```

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Platform Notes (Continued)

```

node 11 cpus: 55-59,135-139
node 11 size: 64509 MB
node 11 free: 64258 MB
node 12 cpus: 60-64,140-144
node 12 size: 64509 MB
node 12 free: 64220 MB
node 13 cpus: 65-69,145-149
node 13 size: 64509 MB
node 13 free: 64253 MB
node 14 cpus: 70-74,150-154
node 14 size: 64509 MB
node 14 free: 64251 MB
node 15 cpus: 75-79,155-159
node 15 size: 64462 MB
node 15 free: 64190 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
0:  10  20  20  20  20  20  20  20  20  20  20  20  20  20  20  20
1:  20  10  20  20  20  20  20  20  20  20  20  20  20  20  20  20
2:  20  20  10  20  20  20  20  20  20  20  20  20  20  20  20  20
3:  20  20  20  10  20  20  20  20  20  20  20  20  20  20  20  20
4:  20  20  20  20  10  20  20  20  20  20  20  20  20  20  20  20
5:  20  20  20  20  20  10  20  20  20  20  20  20  20  20  20  20
6:  20  20  20  20  20  20  10  20  20  20  20  20  20  20  20  20
7:  20  20  20  20  20  20  20  10  20  20  20  20  20  20  20  20
8:  20  20  20  20  20  20  20  20  10  20  20  20  20  20  20  20
9:  20  20  20  20  20  20  20  20  20  10  20  20  20  20  20  20
10: 20  20  20  20  20  20  20  20  20  20  10  20  20  20  20  20
11: 20  20  20  20  20  20  20  20  20  20  20  10  20  20  20  20
12: 20  20  20  20  20  20  20  20  20  20  20  20  10  20  20  20
13: 20  20  20  20  20  20  20  20  20  20  20  20  20  10  20  20
14: 20  20  20  20  20  20  20  20  20  20  20  20  20  20  10  20
15: 20  20  20  20  20  20  20  20  20  20  20  20  20  20  20  10

```

```

-----
9. /proc/meminfo
MemTotal:      1056478368 kB

```

```

-----
10. who -r
run-level 3 Apr 20 16:35

```

```

-----
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 apparmor auditd cron getty@ haveged irqbalance issue-generator kbdsettings klog
lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4
wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs
disabled autofs blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
cups-browsed debug-shell ebttables exchange-bmc-os-info firewallld gpm grub2-once
haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load lunmask man-db-create
multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd serial-getty@
smartd_generate_opts snmpd snmptrapd svnservice systemd-boot-check-no-failures
systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd

```

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Platform Notes (Continued)

indirect wickedd

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

```
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=82136e43-7b14-445e-80c8-a54855d5e2c7
splash=silent
mitigations=auto
quiet
security=apparmor
```

14. cpupower frequency-info

```
analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 3.70 GHz.
                  The governor "powersave" may decide which speed to use
                  within this range.

boost state support:
  Supported: yes
  Active: yes
```

15. sysctl

```
kernel.numa_balancing           1
kernel.randomize_va_space       2
vm.compaction_proactiveness      20
vm.dirty_background_bytes        0
vm.dirty_background_ratio        10
vm.dirty_bytes                    0
vm.dirty_expire_centisecs        3000
vm.dirty_ratio                    20
vm.dirty_writeback_centisecs     500
vm.dirtytime_expire_seconds      43200
vm.extfrag_threshold              500
vm.min_unmapped_ratio            1
vm.nr_hugepages                   0
vm.nr_hugepages_mempolicy        0
vm.nr_overcommit_hugepages       0
vm.swappiness                     1
vm.watermark_boost_factor        15000
vm.watermark_scale_factor        10
vm.zone_reclaim_mode             0
```

16. /sys/kernel/mm/transparent_hugepage

```
defrag           [always] defer defer+madvise madvise never
enabled          [always] madvise never
hpage_pmd_size   2097152
shmem_enabled    always within_size advise [never] deny force
```

17. /sys/kernel/mm/transparent_hugepage/khugepaged

```
alloc_sleep_millisecs   60000
defrag                  1
max_ptes_none           511
max_ptes_shared         256
max_ptes_swap           64
pages_to_scan           4096
scan_sleep_millisecs    10000
```

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Hardware Availability: Mar-2023

Software Availability: Dec-2022

Platform Notes (Continued)

18. OS release

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

19. Disk information

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

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

Vendor: Cisco Systems Inc
Product: UCSC-C240-M7SX
Serial: WZP26360KC7

21. dmidecode

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
16x 0xCE00 M321R8GA0BB0-CQKDG 64 GB 2 rank 4800

22. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: Cisco Systems, Inc.
BIOS Version: C240M7.4.3.1a.0.0201231701
BIOS Date: 02/01/2023
BIOS Revision: 5.29

Compiler Version Notes

=====
C | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

=====
C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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=====
C++, C | 511.povray_r(base, peak) 526.blender_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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Cisco Systems

Cisco UCS C240 M7 (Intel Xeon Platinum 8460Y+, 2.00GHz)

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SPECrate®2017_fp_peak = 838

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Apr-2023

Hardware Availability: Mar-2023

Software Availability: Dec-2022

Compiler Version Notes (Continued)

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

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

=====
Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
=====

=====
Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
=====

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



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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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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 -xsaphirerapids -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
```

(Continued on next page)



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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.profddata(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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Peak Optimization Flags (Continued)

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

```
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512  
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-SPR-revG.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.0-SPR-revG.xml>

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Tested with SPEC CPU®2017 v1.1.9 on 2023-04-20 19:40:48-0400.

Report generated on 2023-05-09 16:05:37 by CPU2017 PDF formatter v6716.

Originally published on 2023-05-09.