



# SPEC CPU®2017 Floating Point Speed Result

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## Cisco Systems

Cisco UCS X210c M7 (Intel Xeon Gold 6444Y, 3.60GHz)

**SPECSpeed®2017\_fp\_base = 268**

**SPECSpeed®2017\_fp\_peak = 268**

**CPU2017 License:** 9019

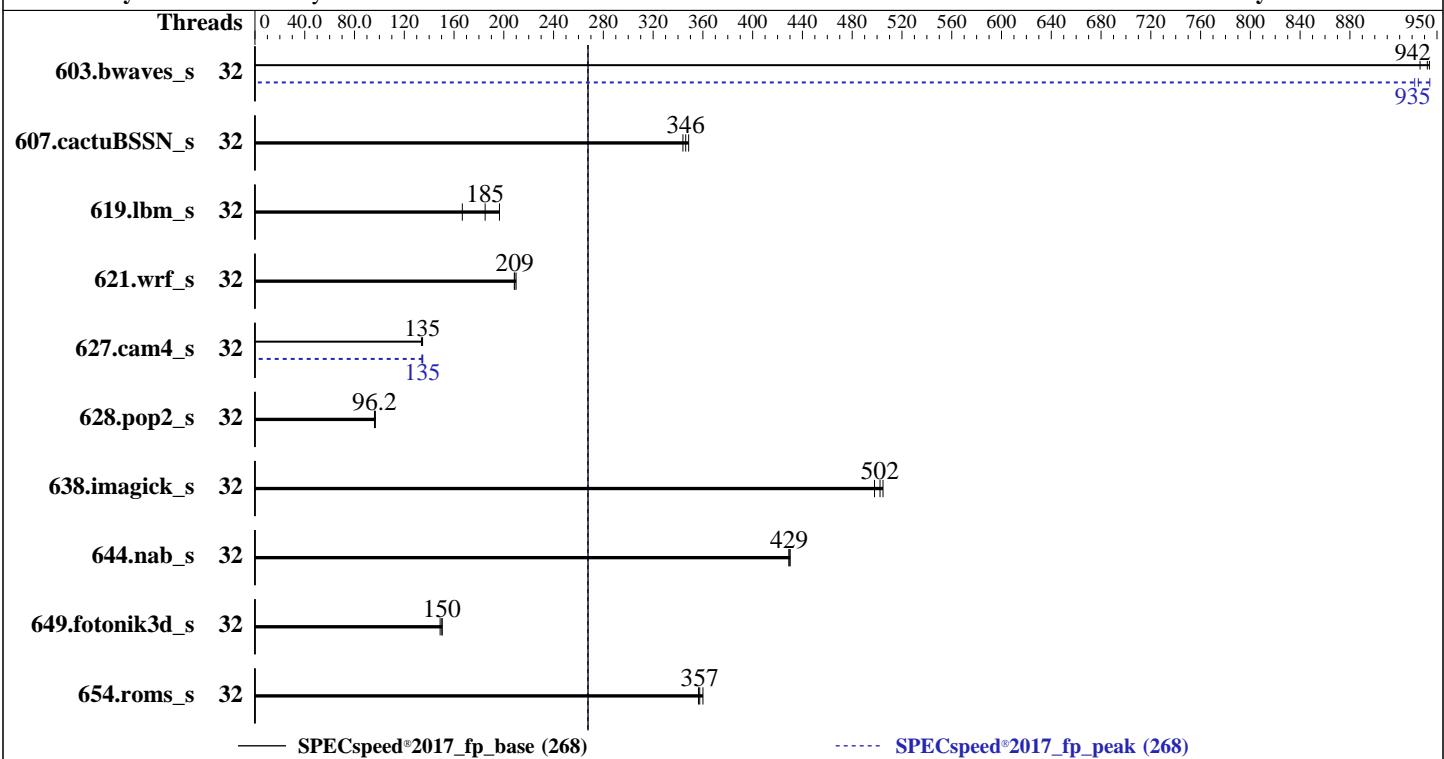
**Test Date:** Apr-2023

**Test Sponsor:** Cisco Systems

**Hardware Availability:** Mar-2023

**Tested by:** Cisco Systems

**Software Availability:** Dec-2022



— SPECSpeed®2017\_fp\_base (268)

----- SPECSpeed®2017\_fp\_peak (268)

## Hardware

CPU Name: Intel Xeon Gold 6444Y  
 Max MHz: 4000  
 Nominal: 3600  
 Enabled: 32 cores, 2 chips  
 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: 45 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

## 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:

Yes

## Firmware:

Version 5.1.1a released Feb-2023

## 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

## Software



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	32	62.5	944	<b>62.6</b>	<b>942</b>	63.0	936	32	<b>63.1</b>	<b>935</b>	63.3	932	62.5	944
607.cactuBSSN_s	32	<b>48.2</b>	<b>346</b>	47.8	349	48.5	344	32	<b>48.2</b>	<b>346</b>	47.8	349	48.5	344
619.lbm_s	32	31.4	167	26.7	197	<b>28.3</b>	<b>185</b>	32	31.4	167	26.7	197	<b>28.3</b>	<b>185</b>
621.wrf_s	32	<b>63.3</b>	<b>209</b>	63.0	210	63.5	208	32	<b>63.3</b>	<b>209</b>	63.0	210	63.5	208
627.cam4_s	32	<b>65.8</b>	<b>135</b>	66.2	134	65.8	135	32	66.1	134	<b>65.8</b>	<b>135</b>	65.7	135
628.pop2_s	32	124	96.0	123	96.8	<b>123</b>	<b>96.2</b>	32	124	96.0	123	96.8	<b>123</b>	<b>96.2</b>
638.imagick_s	32	29.0	498	28.6	505	<b>28.7</b>	<b>502</b>	32	29.0	498	28.6	505	<b>28.7</b>	<b>502</b>
644.nab_s	32	40.6	430	<b>40.7</b>	<b>429</b>	40.7	429	32	40.6	430	<b>40.7</b>	<b>429</b>	40.7	429
649.fotonik3d_s	32	<b>60.7</b>	<b>150</b>	61.3	149	60.6	150	32	<b>60.7</b>	<b>150</b>	61.3	149	60.6	150
654.roms_s	32	44.2	356	<b>44.0</b>	<b>357</b>	43.7	360	32	44.2	356	<b>44.0</b>	<b>357</b>	43.7	360
SPECSpeed®2017_fp_base = 268							SPECSpeed®2017_fp_peak = 268							

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## 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:

KMP\_AFFINITY = "granularity=fine,compact"  
LD\_LIBRARY\_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"  
MALLOC\_CONF = "retain:true"  
OMP\_STACKSIZE = "192M"

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Redhat Enterprise Linux 8.0

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
```

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

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



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## Platform Notes

BIOS Settings:  
Intel Hyper-Threading Technology set to Disabled  
Sub NUMA Clustering set to Disabled  
LLC Dead Line set to Disabled  
ADDC Sparing set to Disabled  
Processor C6 Report set to Enabled  
UPI Link Enablement 1  
UPI Power Management Enabled

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Mon Apr 24 19:38:04 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 localhost 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
19:38:04 up 1:03, 1 user, load average: 23.93, 28.30, 28.80
USER      TTY      FROM          LOGIN@    IDLE      JCPU      PCPU WHAT
root      tty1      -           18:36     1:01m   1.02s   0.08s -bash
```

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

```
4. ulimit -a
core file size          (blocks, -c) unlimited
```

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## Platform Notes (Continued)

```
data seg size          (kbytes, -d) unlimited
scheduling priority   (-e) 0
file size             (blocks, -f) unlimited
pending signals       (-i) 4127019
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) 4127019
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 --define default-platform-flags -c ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=32
--tune all -o all --define drop_caches fsp
runcpu --define default-platform-flags --configfile ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define
cores=32 --tune all --output_format all --define drop_caches --nopower --runmode speed --tune base:peak
--size refspeed fsp --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.017/templogs/preenv.fpspeed.017.0.log --lognum 017.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

---

```
6. /proc/cpuinfo
model name      : Intel(R) Xeon(R) Gold 6444Y
vendor_id       : GenuineIntel
cpu family     : 6
model          : 143
stepping        : 8
microcode       : 0x2b000161
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 16
siblings        : 16
2 physical ids (chips)
32 processors (hardware threads)
physical id 0: core ids 0-15
physical id 1: core ids 0-15
physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30
physical id 1: apicids 128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158
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):                32
```

(Continued on next page)



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## Platform Notes (Continued)

On-line CPU(s) list:

0-31

Vendor ID: GenuineIntel

Model name: Intel(R) Xeon(R) Gold 6444Y

CPU family: 6

Model: 143

Thread(s) per core: 1

Core(s) per socket: 16

Socket(s): 2

Stepping: 8

Frequency boost: enabled

CPU max MHz: 3601.0000

CPU min MHz: 800.0000

BogoMIPS: 7200.00

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 xtTopology nonstop\_tsc cpuid aperfmpfper tsc\_known\_freq pni pclmulqdq dtes64 monitor ds\_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xptr pdcm pcid dca sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer aes xsave avx f16c rdrandlahf\_lm abm 3dnowprefetch cpuid\_fault epb cat\_13 cat\_12 cdp\_13 invpcid\_single intel\_ppin cdp\_12 ssbd mba ibrs ibpb stibp ibrs\_enhanced tpr\_shadow vnmi flexpriority ept vpid ept\_ad fsgsbase tsc\_adjust bmil 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 avx512vbmi umip pkumip ospkewaitpkg 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 tsxlentrk pconfig arch\_lbr avx512\_fp16 amx\_tile flush\_lll arch\_capabilities VT-x

Virtualization:

L1d cache: 1.5 MiB (32 instances)

L1i cache: 1 MiB (32 instances)

L2 cache: 64 MiB (32 instances)

L3 cache: 90 MiB (2 instances)

NUMA node(s): 4

NUMA node0 CPU(s): 0-7

NUMA node1 CPU(s): 8-15

NUMA node2 CPU(s): 16-23

NUMA node3 CPU(s): 24-31

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	1.5M	12	Data	1	64	1	64
L1i	32K	1M	8	Instruction	1	64	1	64
L2	2M	64M	16	Unified	2	2048	1	64
L3	45M	90M	15	Unified	3	49152	1	64

-----  
8. numactl --hardware

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

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## Platform Notes (Continued)

```
available: 4 nodes (0-3)
node 0 cpus: 0-7
node 0 size: 258010 MB
node 0 free: 248950 MB
node 1 cpus: 8-15
node 1 size: 257696 MB
node 1 free: 256967 MB
node 2 cpus: 16-23
node 2 size: 258045 MB
node 2 free: 257446 MB
node 3 cpus: 24-31
node 3 size: 258025 MB
node 3 free: 257604 MB
node distances:
node   0   1   2   3
 0: 10 20 20 20
 1: 20 10 20 20
 2: 20 20 10 20
 3: 20 20 20 10

-----
9. /proc/meminfo
MemTotal:      1056541244 kB

-----
10. who -r
run-level 3 Apr 24 18:34

-----
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 ebtables exchange-bmc-os-info firewalld gpm grub2-once
                  haveged-switch-root ipmi ipmiev4 issue-add-ssh-keys kexec-load ksm kvm_stat 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 udisks2
indirect         wickedd

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=45ccfaea-2135-4a76-bdc1-8f20fdd7be73
splash=silent
mitigations=auto
quiet
security=apparmor

-----
14. cpupower frequency-info
analyzing CPU 0:
```

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## Platform Notes (Continued)

```
current policy: frequency should be within 800 MHz and 3.60 GHz.  
The governor "ondemand" 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  
hugepage_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/sda5    btrfs  60G   23G   37G  39% /home
```

```
-----  
20. /sys/devices/virtual/dmi/id  
Vendor:      Cisco Systems Inc
```

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## Platform Notes (Continued)

Product: UCSX-210C-M7  
Serial: FCH263873HH

-----  
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:

15x 0xAD00 HMCG94MEBRA121N 64 GB 2 rank 4800  
1x 0xAD00 HMCG94MEBRA123N 64 GB 2 rank 4800

-----  
22. BIOS

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

BIOS Vendor: Cisco Systems, Inc.  
BIOS Version: X210M7.5.1.1a.0.0201231806  
BIOS Date: 02/01/2023  
BIOS Revision: 5.29

## Compiler Version Notes

=====

C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak) 644.nab\_s(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++, C, Fortran | 607.cactusBSSN\_s(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.

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 | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak) 654.roms\_s(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 | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_s(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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=====



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## Base Compiler Invocation

C benchmarks:

`icx`

Fortran benchmarks:

`ifx`

Benchmarks using both Fortran and C:

`ifx icx`

Benchmarks using Fortran, C, and C++:

`icpx icx ifx`

## Base Portability Flags

603.bwaves\_s: -DSPEC\_LP64  
607.cactuBSSN\_s: -DSPEC\_LP64  
619.lbm\_s: -DSPEC\_LP64  
621.wrf\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
627.cam4\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG  
628.pop2\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
-assume byterecl  
638.imagick\_s: -DSPEC\_LP64  
644.nab\_s: -DSPEC\_LP64  
649.fotonik3d\_s: -DSPEC\_LP64  
654.roms\_s: -DSPEC\_LP64

## Base Optimization Flags

C benchmarks:

`-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fopenmp  
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

`-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math`

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# SPEC CPU®2017 Floating Point Speed Result

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## Cisco Systems

Cisco UCS X210c M7 (Intel Xeon Gold 6444Y, 3.60GHz)

**SPECspeed®2017\_fp\_base = 268**

**SPECspeed®2017\_fp\_peak = 268**

**CPU2017 License:** 9019

**Test Sponsor:** Cisco Systems

**Tested by:** Cisco Systems

**Test Date:** Apr-2023

**Hardware Availability:** Mar-2023

**Software Availability:** Dec-2022

## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

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

Benchmarks using Fortran, C, and C++:

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

## Peak Compiler Invocation

C benchmarks:

icx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: basepeak = yes

638.imagick\_s: basepeak = yes

(Continued on next page)



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Tested by: Cisco Systems

Software Availability: Dec-2022

## Peak Optimization Flags (Continued)

644.nab\_s: basepeak = yes

Fortran benchmarks:

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

649.fotonik3d\_s: basepeak = yes

654.roms\_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf\_s: basepeak = yes

```
627.cam4_s: -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast  
-ffast-math -futto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP  
-Wno-implicit-int -mprefer-vector-width=512  
-nostandard-realloc-lhs -align array32byte -auto  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

628.pop2\_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN\_s: basepeak = yes

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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