



SPEC CPU®2017 Floating Point Speed Result

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xFusion

FusionServer 1288H V7 (Intel Xeon Silver 4509Y)

SPECSpeed®2017_fp_base = 168

SPECSpeed®2017_fp_peak = 168

CPU2017 License: 6488

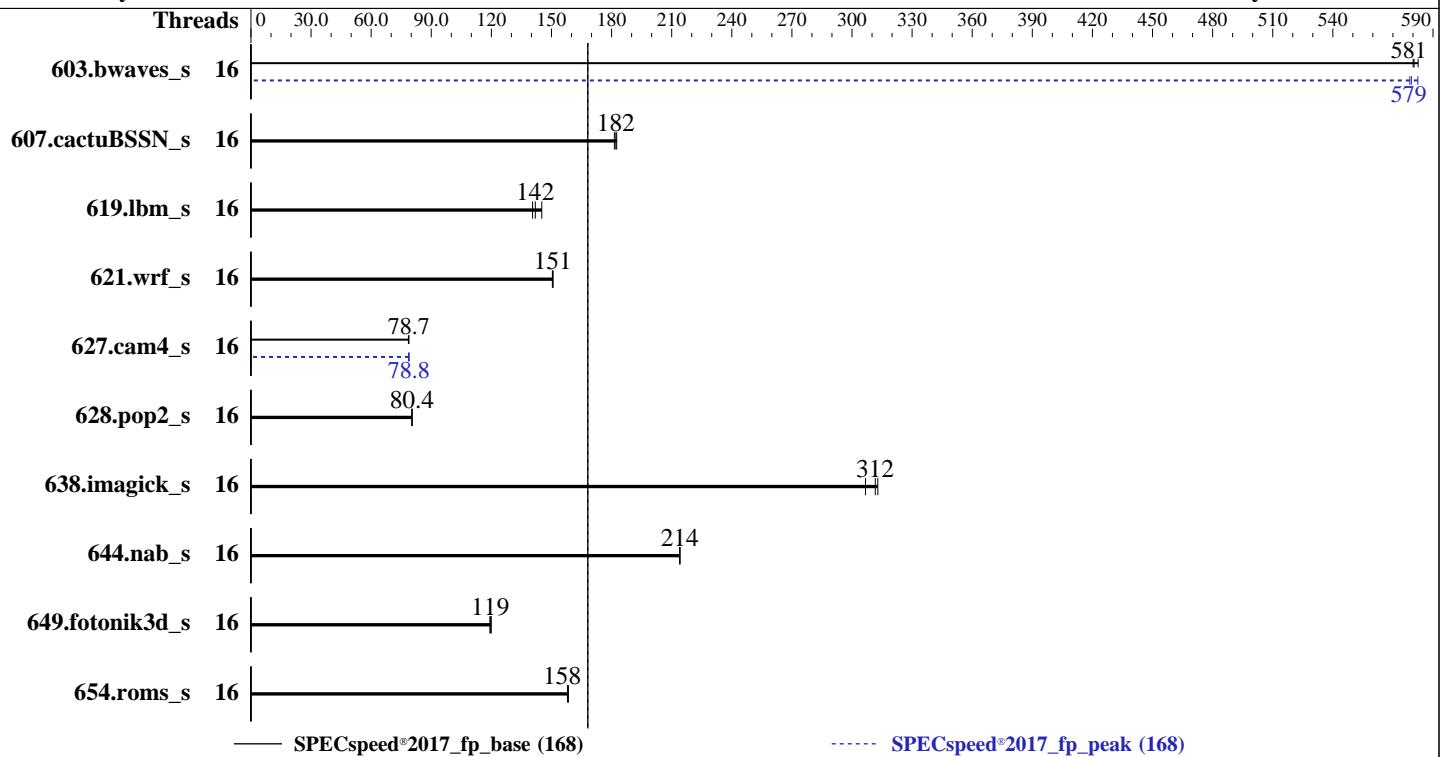
Test Date: Jun-2025

Test Sponsor: xFusion

Hardware Availability: Dec-2023

Tested by: xFusion

Software Availability: Mar-2024



Hardware

CPU Name: Intel Xeon Silver 4509Y
 Max MHz: 4100
 Nominal: 2600
 Enabled: 16 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: 22.5 MB I+D on chip per chip
 Other: None
 Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4400)
 Storage: 1 x 960 GB SATA SSD
 Other: CPU Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.2 (Plow)
 Compiler: 5.14.0-284.11.1.el9_2.x86_64
 C/C++: Version 2024.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2024.1 of Intel Fortran Compiler for Linux;
 Parallel: Yes
 Firmware: Version 01.01.06.16 Released May-2025
 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 and OS set to prefer performance at the cost of additional power usage.



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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	16	101	583	102	580	102	581	16	102	578	101	582	102	579
607.cactuBSSN_s	16	91.3	183	91.5	182	91.9	181	16	91.3	183	91.5	182	91.9	181
619.lbm_s	16	37.3	141	36.9	142	36.1	145	16	37.3	141	36.9	142	36.1	145
621.wrf_s	16	87.7	151	87.9	150	87.8	151	16	87.7	151	87.9	150	87.8	151
627.cam4_s	16	112	78.8	113	78.7	113	78.6	16	113	78.8	112	78.9	113	78.8
628.pop2_s	16	148	80.3	148	80.4	148	80.4	16	148	80.3	148	80.4	148	80.4
638.imagick_s	16	46.1	313	47.0	307	46.3	312	16	46.1	313	47.0	307	46.3	312
644.nab_s	16	81.6	214	81.6	214	81.6	214	16	81.6	214	81.6	214	81.6	214
649.fotonik3d_s	16	76.4	119	76.3	119	76.0	120	16	76.4	119	76.3	119	76.0	120
654.roms_s	16	99.4	158	99.7	158	99.4	158	16	99.4	158	99.7	158	99.4	158
SPECSpeed®2017_fp_base = 168							SPECSpeed®2017_fp_peak = 168							

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 configuration:

Performance Profile Set to Load Balance

Enable LP [Global] Set to Single LP

SNC Set to Disable

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Wed Jun 25 22:37:31 2025
```

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
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9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 252 (252-13.el9_2)
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
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20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

1. uname -a
Linux localhost.localdomain 5.14.0-284.11.1.el9_2.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 12 10:45:03 EDT
2023 x86_64 x86_64 x86_64 GNU/Linux

2. w
22:37:31 up 3:20, 2 users, load average: 6.05, 5.33, 3.18
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root tty1 19:21 3:16m 0.86s 0.00s -bash
root pts/0 19:17 3:16m 0.00s 0.00s -bash

3. Username
From environment variable \$USER: root

4. ulimit -a
real-time non-blocking time (microseconds, -R) unlimited
core file size (blocks, -c) 0
data seg size (kbytes, -d) unlimited
scheduling priority (-e) 0

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Platform Notes (Continued)

```
file size          (blocks, -f) unlimited
pending signals   (-i) 2060257
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) 2060257
virtual memory      (kbytes, -v) unlimited
file locks          (-x) unlimited
```

```
-----  
5. sysinfo process ancestry  
/usr/lib/systemd/systemd --switched-root --system --deserialize 31  
login -- root  
-bash  
-bash  
runcpu --define default-platform-flags -c ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=16  
--tune base,peak -o all --define drop_caches fpspeed  
runcpu --define default-platform-flags --configfile ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define  
cores=16 --tune base,peak --output_format all --define drop_caches --nopower --runmode speed --tune  
base:peak --size refspeed fpspeed --nopreenv --note-preenv --logfile  
$SPEC/tmp/CPU2017.004/templogs/preenv.fpspeed.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) SILVER 4509Y  
vendor_id        : GenuineIntel  
cpu family       : 6  
model           : 143  
stepping         : 8  
microcode        : 0x2b000603  
bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrp_pbrsb  
cpu cores        : 8  
siblings          : 8  
2 physical ids (chips)  
16 processors (hardware threads)  
physical id 0: core ids 0-7  
physical id 1: core ids 0-7  
physical id 0: apicids 0,2,4,6,8,10,12,14  
physical id 1: apicids 64,66,68,70,72,74,76,78  
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):               16  
On-line CPU(s) list:  0-15  
Vendor ID:            GenuineIntel
```

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Platform Notes (Continued)

BIOS Vendor ID:	Intel(R) Corporation							
Model name:	INTEL(R) XEON(R) SILVER 4509Y							
BIOS Model name:	INTEL(R) XEON(R) SILVER 4509Y							
CPU family:	6							
Model:	143							
Thread(s) per core:	1							
Core(s) per socket:	8							
Socket(s):	2							
Stepping:	8							
CPU max MHz:	4100.0000							
CPU min MHz:	800.0000							
BogoMIPS:	5200.00							
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 xtrp 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_13 cat_12 cdp_13 invpcid_single intel_ppin cdp_12 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnumi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid 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 hfi avx512vmbi umip pku ospke waitpkg avx512_vbm12 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpocndq la57 rdpid bus_lock_detect coldemote movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig arch_lbr ibt amx_bf16 avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities							
Virtualization:	VT-x							
L1d cache:	768 KiB (16 instances)							
L1i cache:	512 KiB (16 instances)							
L2 cache:	32 MiB (16 instances)							
L3 cache:	45 MiB (2 instances)							
NUMA node(s):	2							
NUMA node0 CPU(s):	0-7							
NUMA node1 CPU(s):	8-15							
Vulnerability Itlb multihit:	Not affected							
Vulnerability L1tf:	Not affected							
Vulnerability Mds:	Not affected							
Vulnerability Meltdown:	Not affected							
Vulnerability Mmio stale data:	Not affected							
Vulnerability Retbleed:	Not affected							
Vulnerability Spec store bypass:	Mitigation; Speculative Store Bypass disabled via prctl							
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	768K	12	Data	1	64	1	64
L1i	32K	512K	8	Instruction	1	64	1	64
L2	2M	32M	16	Unified	2	2048	1	64
L3	22.5M	45M	15	Unified	3	24576	1	64

8. numactl --hardware

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Platform Notes (Continued)

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

```
available: 2 nodes (0-1)
node 0 cpus: 0-7
node 0 size: 257064 MB
node 0 free: 254160 MB
node 1 cpus: 8-15
node 1 size: 258041 MB
node 1 free: 252903 MB
node distances:
node    0    1
 0:   10   21
 1:   21   10
```

```
9. /proc/meminfo
MemTotal:      527468464 kB
```

```
10. who -r
run-level 3 Jun 25 19:17
```

```
11. Systemd service manager version: systemd 252 (252-13.el9_2)
Default Target  Status
multi-user      running
```

```
12. Services, from systemctl list-unit-files
STATE          UNIT FILES
enabled        NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
                dbus-broker firewalld getty@ insights-client-boot irqbalance kdump low-memory-monitor
                lvm2-monitor mdmonitor microcode nis-domainname rhsmcertd rsyslog rtkit-daemon
                selinux-autorelabel-mark sshd sssd systemd-boot-update systemd-network-generator udisks2
                upower
enabled-runtime systemd-remount-fs
disabled       blk-availability canberra-system-bootup canberra-system-shutdown
                canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell
                dnf-system-upgrade kvm_stat man-db-restart-cache-update nftables pesign rdisc rhcd rhsmd
                rhsm-facts rpmdb-rebuild selinux-check-proper-disable serial-getty@ sshd-keygen@
                systemd-boot-check-no-failures systemd-pstore systemd-sysext
indirect        sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate
                systemd-sysupdate-reboot
```

```
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-284.11.1.el9_2.x86_64
root=/dev/mapper/rhel-root
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
```

```
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:
```

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Platform Notes (Continued)

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                 60  
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      Red Hat Enterprise Linux 9.2 (Plow)  
redhat-release Red Hat Enterprise Linux release 9.2 (Plow)  
system-release Red Hat Enterprise Linux release 9.2 (Plow)
```

```
-----  
19. Disk information  
SPEC is set to: /home/cpu2017  
Filesystem      Type  Size  Used Avail Use% Mounted on  
/dev/mapper/rhel-home xfs   819G  20G  799G  3% /home
```

```
-----  
20. /sys/devices/virtual/dmi/id  
Vendor:          XFUSION  
Product:         1288H V7  
Product Family: Eagle Stream
```

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Platform Notes (Continued)

21. dmidecode

Additional information from dmidecode 3.3 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:

14x Samsung M321R4GA3BB6-CQKDG 32 GB 2 rank 4800, configured at 4400
2x Samsung M321R4GA3BB6-CQKMG 32 GB 2 rank 4800, configured at 4400

22. BIOS

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

BIOS Vendor: XFUSION
BIOS Version: 01.01.06.16
BIOS Date: 05/08/2025
BIOS Revision: 6.16

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 2024.1.0 Build 20240308
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=====

=====

C++, C, Fortran | 607.cactuBSSN_s(base, peak)

=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
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=====

=====

Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)

=====

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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:

-w -std=c11 -m64 -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:

-w -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:

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

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CPU2017 License: 6488

Test Date: Jun-2025

Test Sponsor: xFusion

Hardware Availability: Dec-2023

Tested by: xFusion

Software Availability: Mar-2024

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fopenmp  
-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++:

```
-w -std=c++14 -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 -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)



SPEC CPU®2017 Floating Point Speed Result

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xFusion

FusionServer 1288H V7 (Intel Xeon Silver 4509Y)

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Peak Optimization Flags (Continued)

644.nab_s: basepeak = yes

Fortran benchmarks:

```
603.bwaves_s: -w -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: -w -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-ic2024-official-linux64.html>

<http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-EMR-V1.1.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/xFusion-Platform-Settings-EMR-V1.1.xml>

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