



SPEC CPU®2017 Floating Point Speed Result

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xFusion

SPECspeed®2017_fp_base = 240

xFusion 1288H V6 (Intel Xeon Platinum 8352V)

SPECspeed®2017_fp_peak = 240

CPU2017 License: 6488

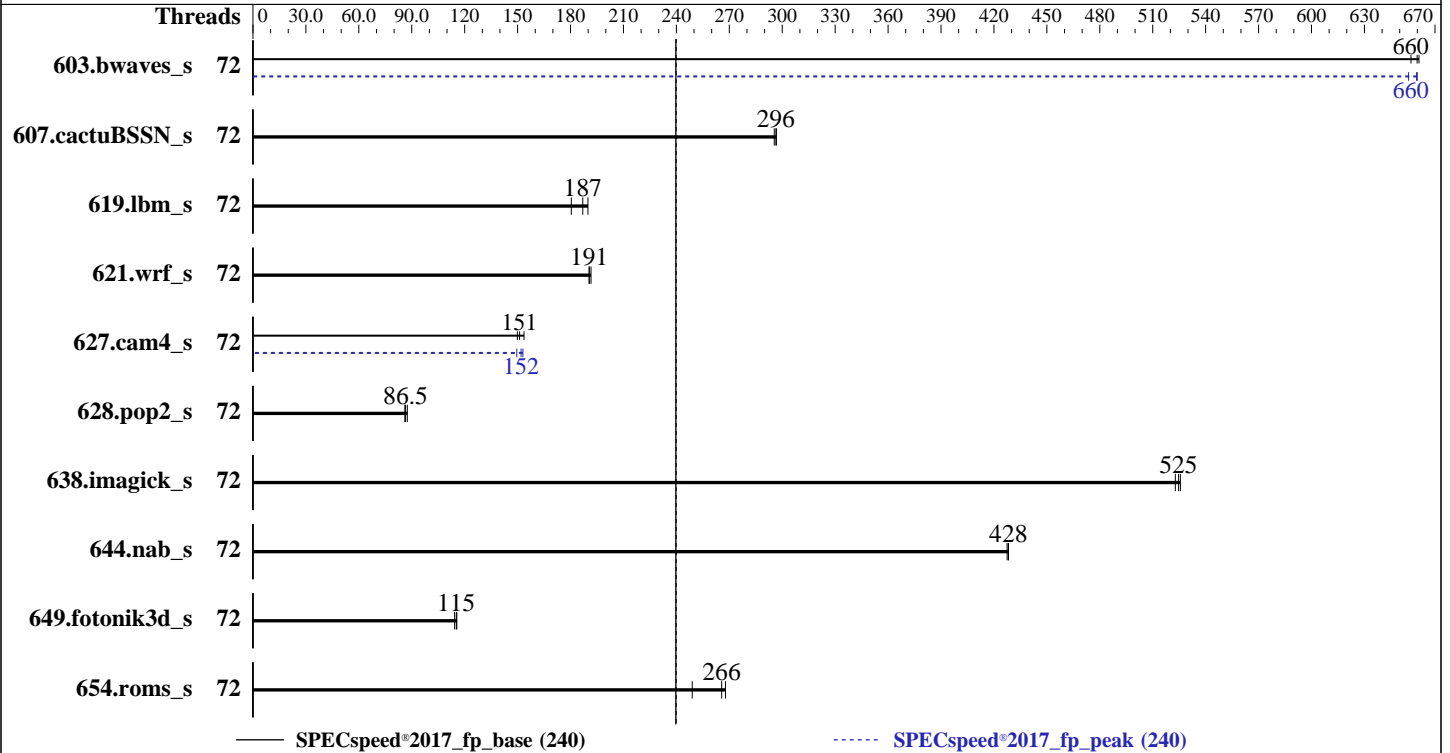
Test Sponsor: xFusion

Tested by: xFusion

Test Date: Mar-2023

Hardware Availability: Apr-2021

Software Availability: May-2022



Hardware

CPU Name: Intel Xeon Platinum 8352V
 Max MHz: 3500
 Nominal: 2100
 Enabled: 72 cores, 2 chips
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1.25 MB I+D on chip per core
 L3: 54 MB I+D on chip per chip
 Other: None
 Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
 Storage: 1 x 960 GB SATA SSD
 Other: None

Software

OS: Red Hat Enterprise Linux 8.4 (Ootpa)
 4.18.0-305.el8.x86_64
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
 Parallel: Yes
 Firmware: Version 1.35 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: 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	72	89.3	661	89.4	660	89.9	656	72	89.5	660	90.1	655	89.4	660
607.cactuBSSN_s	72	56.2	297	56.2	296	56.4	295	72	56.2	297	56.2	296	56.4	295
619.lbm_s	72	29.0	180	27.6	190	28.0	187	72	29.0	180	27.6	190	28.0	187
621.wrf_s	72	69.0	192	69.4	191	69.4	191	72	69.0	192	69.4	191	69.4	191
627.cam4_s	72	57.7	154	59.1	150	58.6	151	72	57.9	153	58.3	152	59.3	150
628.pop2_s	72	138	86.1	136	87.5	137	86.5	72	138	86.1	136	87.5	137	86.5
638.imagick_s	72	27.6	523	27.4	526	27.5	525	72	27.6	523	27.4	526	27.5	525
644.nab_s	72	40.8	428	40.8	428	40.9	427	72	40.8	428	40.8	428	40.9	427
649.fotonik3d_s	72	79.8	114	78.9	116	79.1	115	72	79.8	114	78.9	116	79.1	115
654.roms_s	72	63.2	249	58.8	268	59.3	266	72	63.2	249	58.8	268	59.3	266

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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 = "/spec2017_1.19/lib/intel64:/spec2017_1.19/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

(Continued on next page)



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General Notes (Continued)

sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Platform Notes

BIOS configuration:
Performance Profile Set to Load Balance
Hyper-Threading Set to Disabled

Sysinfo program /spec2017_1.19/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Mar 21 15:10:17 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 239 (239-45.el8)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

1. uname -a
Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021 x86_64 x86_64 x86_64

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Platform Notes (Continued)

GNU/Linux

```

-----
2. w
   15:10:17 up   3:47,  2 users,  load average: 6.01, 6.04, 3.55
USER      TTY      FROM          LOGIN@      IDLE        JCPU   PCPU   WHAT
root      tty1     -             11:23       3:44m      1.13s  0.01s -bash
root      pts/0   70.167.0.2    11:26       3:19m      0.02s  0.02s -bash

```

```

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

```

```

-----
4. ulimit -a
   core file size          (blocks, -c) 0
   data seg size           (kbytes, -d) unlimited
   scheduling priority     (-e) 0
   file size                (blocks, -f) unlimited
   pending signals         (-i) 2060059
   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) 2060059
   virtual memory          (kbytes, -v) unlimited
   file locks               (-x) unlimited

```

```

-----
5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 18
   login -- root
   -bash
   -bash
   runcpu --define default-platform-flags -c ic2022.1-lin-core-avx512-speed-20220316.cfg --define cores=72
     --tune base,peak -o all --define drop_caches fpspeed
   runcpu --define default-platform-flags --configfile ic2022.1-lin-core-avx512-speed-20220316.cfg --define
     cores=72 --tune base,peak --output_format all --define drop_caches --nopower --runmode speed --tune
     base:peak --size refspeed fpspeed --nopreenv --note-preenv --logfile
     $SPEC/tmp/CPU2017.027/temlogs/preenv.fpspeed.027.0.log --lognum 027.0 --from_runcpu 2
   speiperl $SPEC/bin/sysinfo
   $SPEC = /spec2017_1.19

```

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Platform Notes (Continued)

```

6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 106
   stepping        : 6
   microcode       : 0xd000363
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
   cpu cores       : 36
   siblings        : 36
   2 physical ids (chips)
   72 processors (hardware threads)
   physical id 0:  core ids 0-35
   physical id 1:  core ids 0-35
   physical id 0:  apicids
   0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70
   physical id 1:  apicids
   128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,180,182,184,186,188,190,192,194,196,198

```

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 2.32.1:
Architecture:      x86_64
CPU op-mode(s):   32-bit, 64-bit
Byte Order:       Little Endian
CPU(s):           72
On-line CPU(s) list: 0-71
Thread(s) per core: 1
Core(s) per socket: 36
Socket(s):        2
NUMA node(s):    2
Vendor ID:        GenuineIntel
BIOS Vendor ID:   Intel(R) Corporation
CPU family:       6
Model:           106
Model name:       Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
BIOS Model name:  Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz
Stepping:        6
CPU MHz:          939.533
CPU max MHz:      2101.0000
CPU min MHz:      800.0000
BogoMIPS:         4200.00

```

(Continued on next page)



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Platform Notes (Continued)

Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 55296K
NUMA node0 CPU(s): 0-35
NUMA node1 CPU(s): 36-71

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 pni
pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 sse3 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 invpcid_single 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 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 wbnoinvd
dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig
flush_l1d arch_capabilities

8. numactl --hardware

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

```
available: 2 nodes (0-1)
node 0 cpus: 0-35
node 0 size: 257051 MB
node 0 free: 255627 MB
node 1 cpus: 36-71
node 1 size: 258000 MB
node 1 free: 257108 MB
node distances:
node  0  1
  0:  10  20
  1:  20  10
```

9. /proc/meminfo

MemTotal: 527412840 kB

10. who -r

run-level 3 Mar 21 11:22

11. Systemd service manager version: systemd 239 (239-45.el8)

Default Target Status

(Continued on next page)



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Platform Notes (Continued)

multi-user running

12. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	NetworkManager NetworkManager-dispatcher NetworkManager-wait-online atd auditd autovt@ chronyd crond firewalld getty@ import-state irqbalance iscsi iscsi-onboot kdump libstoragemgmt loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname nvme-fc-connections rhsmcertd rsyslog selinux-autorelabel-mark smartd sshd sssd syslog sysstat tuned texlive-udisks2 vdo
disabled	arp-ethers blk-availability chrony-wait console-getty cpupower debug-shell ebttables httpd httpd@ iprddump iprprint iprupdate ipsec iscsid iscsiuiio kpatch kvm_stat ledmon nftables nvmmf-autoconnect oddjobd phoromatic-client phoromatic-server phoronix-result-server php-fpm pmcd pmfind pmie pmie_check pmlogger pmlogger_check pmproxy psacct rdisc rhcd rhsm rhsm-facts serial-getty@ snmpd snmptrapd sshd-keygen@ systemd-resolved tcsh
generated	SystemTap compile-server gcc-toolset-10-stap-server gcc-toolset-10-systemtap gcc-toolset-9-stap-server gcc-toolset-9-systemtap mst scripts startup
indirect	sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
masked	systemd-timedated

13. Linux kernel boot-time arguments, from /proc/cmdline
 BOOT_IMAGE=(hd0,gpt3)/boot/vmlinuz-4.18.0-305.el8.x86_64
 root=UUID=9304e5cd-2e1d-48f6-9359-484ddf980c8a
 ro
 crashkernel=auto
 resume=UUID=aff4e6f4-0757-4e74-b0fd-4e11814d5ccb
 rhgb
 quiet

14. cpupower frequency-info

```
analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 2.10 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

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

15. tuned-adm active

Current active profile: throughput-performance

16. sysctl

kernel.numa_balancing 1

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Platform Notes (Continued)

```

kernel.randomize_va_space      2
vm.compaction_proactiveness    0
vm.dirty_background_bytes      0
vm.dirty_background_ratio      10
vm.dirty_bytes                  0
vm.dirty_expire_centisecs      3000
vm.dirty_ratio                  40
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                   10
vm.watermark_boost_factor      15000
vm.watermark_scale_factor      10
vm.zone_reclaim_mode           0

```

```

-----
17. /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

```

```

-----
18. /sys/kernel/mm/transparent_hugepage/khugepaged
alloc_sleep_millisecs  60000
defrag                  1
max_ptes_none          511
max_ptes_swap          64
pages_to_scan          4096
scan_sleep_millisecs   10000

```

```

-----
19. OS release
From /etc/*-release /etc/*-version
os-release             Red Hat Enterprise Linux 8.4 (Ootpa)
redhat-release         Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release         Red Hat Enterprise Linux release 8.4 (Ootpa)

```

```

-----
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
itlb_multihit         Not affected
lltlf                  Not affected
mds                    Not affected

```

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Platform Notes (Continued)

```

meltdown                Not affected
spec_store_bypass       Mitigation: Speculative Store Bypass disabled via prctl and seccomp
spectre_v1               Mitigation: usercopy/swapgs barriers and __user pointer sanitization
spectre_v2               Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
srbds                    Not affected
tsx_async_abort          Not affected

```

For more information, see the Linux documentation on hardware vulnerabilities, for example <https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html>

21. Disk information

```

SPEC is set to: /spec2017_1.19
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       xfs   859G  117G  743G  14% /

```

22. /sys/devices/virtual/dmi/id

```

Vendor:          XFUSION
Product:         1288H V6
Product Family: Whitley
Serial:          Serial

```

23. 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 Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933

```

24. BIOS

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

```

BIOS Vendor:      XFUSION
BIOS Version:     1.35
BIOS Date:        02/14/2023
BIOS Revision:    1.35

```

Compiler Version Notes

```

=====
C          | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
          | 644.nab_s(base, peak)
=====

```

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Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
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
2022.1.0 Build 20220316
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
2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

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Base Compiler Invocation (Continued)

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 -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast -ffast-math
-flto -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
```

Benchmarks using both Fortran and C:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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SPEC CPU®2017 Floating Point Speed Result

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xFusion

SPECspeed®2017_fp_base = 240

xFusion 1288H V6 (Intel Xeon Platinum 8352V)

SPECspeed®2017_fp_peak = 240

CPU2017 License: 6488
Test Sponsor: xFusion
Tested by: xFusion

Test Date: Mar-2023
Hardware Availability: Apr-2021
Software Availability: May-2022

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto  
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp  
-DSPEC_OPENMP -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

644.nab_s: basepeak = yes

Fortran benchmarks:

```
603.bwaves_s: -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs  
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib
```

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Hardware Availability: Apr-2021
Software Availability: May-2022

Peak Optimization Flags (Continued)

603.bwaves_s (continued):
-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 -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-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-ic2022-official-linux64_revA.html
<http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-ICX-V1.2.html>

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

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml
<http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-ICX-V1.2.xml>

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