



# SPEC CPU®2017 Floating Point Rate Result

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## xFusion

SPECrate®2017\_fp\_base = 1740

FusionServer 5885H V7 (Intel Xeon Platinum 8460H)

SPECrate®2017\_fp\_peak = 1740

CPU2017 License: 6488

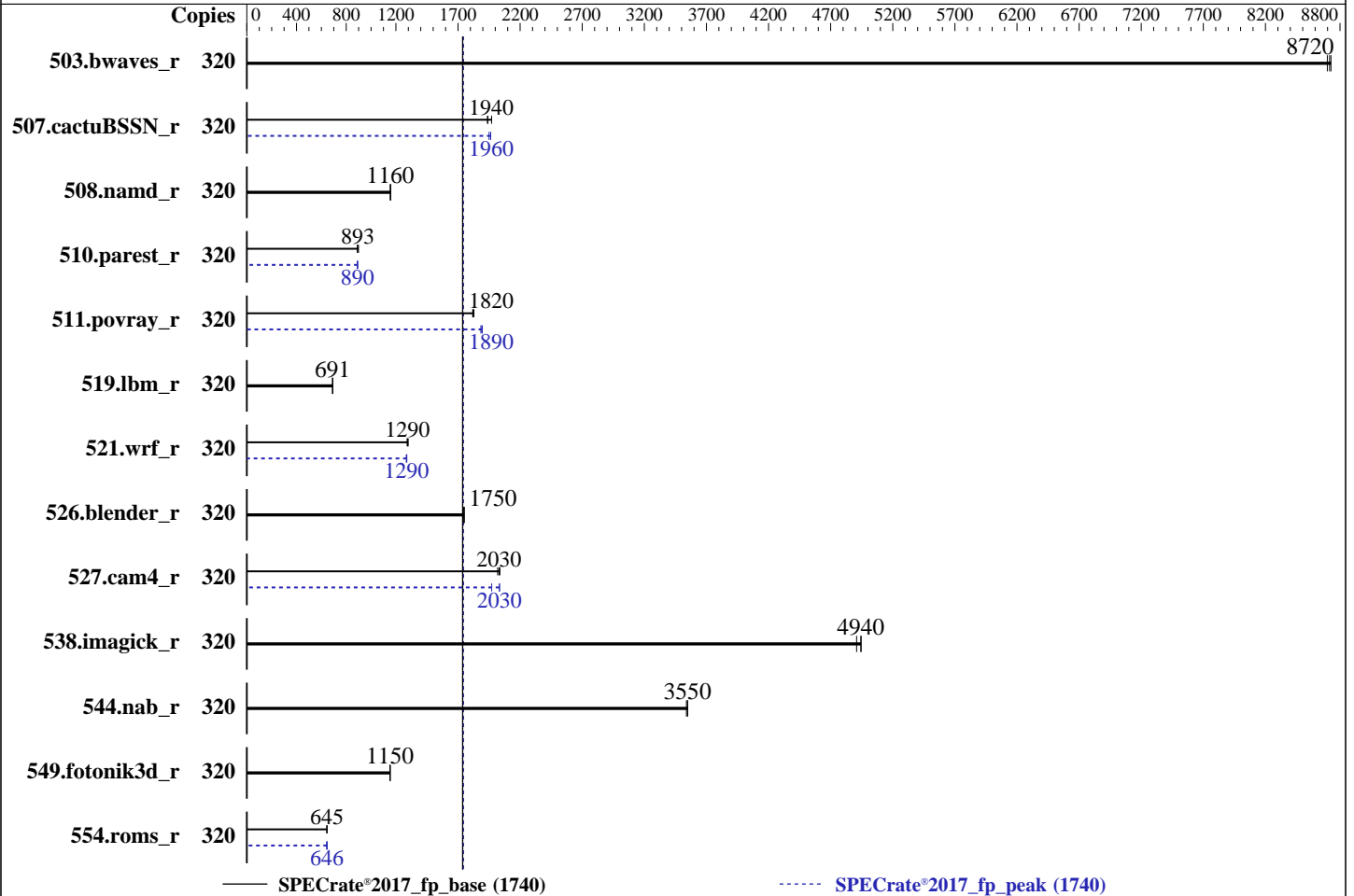
Test Sponsor: xFusion

Tested by: xFusion

Test Date: Jun-2023

Hardware Availability: Apr-2023

Software Availability: Dec-2022



### Hardware

CPU Name: Intel Xeon Platinum 8460H  
 Max MHz: 3800  
 Nominal: 2200  
 Enabled: 160 cores, 4 chips, 2 threads/core  
 Orderable: 1,2,4 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 (32 x 32 GB 2Rx8 PC5-4800B-R)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux release 9.0 (Plow)  
 5.14.0-70.13.1.el9\_0.x86\_64  
 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 2.00.34 Released Apr-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 and OS 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	320	369	8700	<b>368</b>	<b>8720</b>	368	8730	320	369	8700	<b>368</b>	<b>8720</b>	368	8730
507.cactuBSSN_r	320	<b>209</b>	<b>1940</b>	209	1940	206	1970	320	<b>206</b>	<b>1960</b>	206	1960	208	1950
508.namd_r	320	263	1160	263	1160	<b>263</b>	<b>1160</b>	320	263	1160	263	1160	<b>263</b>	<b>1160</b>
510.parest_r	320	<b>938</b>	<b>893</b>	941	889	931	899	320	941	890	<b>941</b>	<b>890</b>	938	893
511.povray_r	320	411	1820	409	1830	<b>410</b>	<b>1820</b>	320	394	1900	<b>395</b>	<b>1890</b>	397	1880
519.lbm_r	320	489	690	<b>488</b>	<b>691</b>	488	692	320	489	690	<b>488</b>	<b>691</b>	488	692
521.wrf_r	320	<b>554</b>	<b>1290</b>	552	1300	555	1290	320	<b>557</b>	<b>1290</b>	558	1280	557	1290
526.blender_r	320	279	1750	279	1750	<b>279</b>	<b>1750</b>	320	279	1750	279	1750	<b>279</b>	<b>1750</b>
527.cam4_r	320	277	2020	<b>276</b>	<b>2030</b>	275	2040	320	284	1970	275	2030	<b>275</b>	<b>2030</b>
538.imagick_r	320	161	4940	<b>161</b>	<b>4940</b>	162	4910	320	161	4940	<b>161</b>	<b>4940</b>	162	4910
544.nab_r	320	<b>152</b>	<b>3550</b>	152	3550	152	3540	320	<b>152</b>	<b>3550</b>	152	3550	152	3540
549.fotonik3d_r	320	1082	1150	<b>1082</b>	<b>1150</b>	1080	1150	320	1082	1150	<b>1082</b>	<b>1150</b>	1080	1150
554.roms_r	320	787	646	<b>788</b>	<b>645</b>	790	644	320	791	643	787	646	<b>787</b>	<b>646</b>

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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/Uniautos/cpu2017/lib/intel64:/home/Uniautos/cpu2017/je5.0.1-64"  
MALLOCONF = "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 configuration:  
Performance Profile Set to Performance  
SNC Set to Enable SNC4 (4-clusters)

Sysinfo program /home/Uniautos/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost.localdomain Fri Jun 9 01:32:52 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 250 (250-6.el9\_0)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent\_hugepage
19. /sys/kernel/mm/transparent\_hugepage/khugepaged
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

-----  
1. uname -a  
Linux localhost.localdomain 5.14.0-70.13.1.el9\_0.x86\_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86\_64  
x86\_64 x86\_64 GNU/Linux  
-----

2. w  
01:32:52 up 5:46, 0 users, load average: 124.33, 263.51, 296.89  
USER TTY LOGIN@ IDLE JCPU PCPU WHAT

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### Platform Notes (Continued)

-----  
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
file size (blocks, -f) unlimited
pending signals (-i) 4125009
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) 4125009
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited
```

-----  
5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
/bin/sh ./run_rate.sh
runcpu --define default-platform-flags --copies 320 -c ic2023.0-lin-sapphirerapids-rate-20221201.cfg
--define smt-on --define cores=160 --define physicalfirst --define invoke_with_interleave --define
drop_caches --tune base,peak -o all fprate
runcpu --define default-platform-flags --copies 320 --configfile
ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=160 --define physicalfirst
--define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
--runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.021/temlogs/preenv.fprate.021.0.log --lognum 021.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/Uniautos/cpu2017
```

-----  
6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) Platinum 8460H
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 8
microcode       : 0x2b0001b0
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores       : 40
siblings        : 80
4 physical ids (chips)
320 processors (hardware threads)
physical id 0:  core ids 0-39
physical id 1:  core ids 0-39
physical id 2:  core ids 0-39
physical id 3:  core ids 0-39
physical id 0:  apicids 0-79
physical id 1:  apicids 128-207
physical id 2:  apicids 256-335
physical id 3:  apicids 384-463
```

(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 2.37.4:

```

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):                 320
On-line CPU(s) list:   0-319
Vendor ID:              GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
Model name:             Intel(R) Xeon(R) Platinum 8460H
BIOS Model name:       Intel(R) Xeon(R) Platinum 8460H
CPU family:             6
Model:                  143
Thread(s) per core:    2
Core(s) per socket:    40
Socket(s):              4
Stepping:               8
BogoMIPS:               4400.00
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 noopl xtopology
                        nonstop_tsc cpuid aperfperf tsc_known_freq pni pclmulqdq dtes64 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 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 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:             7.5 MiB (160 instances)
L1i cache:             5 MiB (160 instances)
L2 cache:              320 MiB (160 instances)
L3 cache:              420 MiB (4 instances)
NUMA node(s):         16
NUMA node0 CPU(s):    0-9,160-169
NUMA node1 CPU(s):    10-19,170-179
NUMA node2 CPU(s):    20-29,180-189
NUMA node3 CPU(s):    30-39,190-199
NUMA node4 CPU(s):    40-49,200-209
NUMA node5 CPU(s):    50-59,210-219
NUMA node6 CPU(s):    60-69,220-229
NUMA node7 CPU(s):    70-79,230-239
NUMA node8 CPU(s):    80-89,240-249
NUMA node9 CPU(s):    90-99,250-259
NUMA node10 CPU(s):   100-109,260-269
NUMA node11 CPU(s):   110-119,270-279
NUMA node12 CPU(s):   120-129,280-289

```

(Continued on next page)



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### Platform Notes (Continued)

```

NUMA node13 CPU(s):          130-139,290-299
NUMA node14 CPU(s):          140-149,300-309
NUMA node15 CPU(s):          150-159,310-319
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
Vulnerability Spectre v1:    Mitigation; usercopy/swaps 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	7.5M	12	Data	1	64	1	64
L1i	32K	5M	8	Instruction	1	64	1	64
L2	2M	320M	16	Unified	2	2048	1	64
L3	105M	420M	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: 0-9,160-169
node 0 size: 63740 MB
node 0 free: 62342 MB
node 1 cpus: 10-19,170-179
node 1 size: 64507 MB
node 1 free: 63431 MB
node 2 cpus: 20-29,180-189
node 2 size: 64507 MB
node 2 free: 63335 MB
node 3 cpus: 30-39,190-199
node 3 size: 64507 MB
node 3 free: 63441 MB
node 4 cpus: 40-49,200-209
node 4 size: 64507 MB
node 4 free: 63427 MB
node 5 cpus: 50-59,210-219
node 5 size: 64507 MB
node 5 free: 63442 MB
node 6 cpus: 60-69,220-229
node 6 size: 64507 MB
node 6 free: 63427 MB
node 7 cpus: 70-79,230-239
node 7 size: 64471 MB
node 7 free: 63409 MB
node 8 cpus: 80-89,240-249
node 8 size: 64507 MB
node 8 free: 63435 MB
node 9 cpus: 90-99,250-259
node 9 size: 64507 MB
node 9 free: 63322 MB
node 10 cpus: 100-109,260-269
node 10 size: 64507 MB
node 10 free: 63400 MB
node 11 cpus: 110-119,270-279
node 11 size: 64507 MB
node 11 free: 63436 MB

```

(Continued on next page)



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### Platform Notes (Continued)

```

node 12 cpus: 120-129,280-289
node 12 size: 64507 MB
node 12 free: 63404 MB
node 13 cpus: 130-139,290-299
node 13 size: 64507 MB
node 13 free: 63446 MB
node 14 cpus: 140-149,300-309
node 14 size: 64507 MB
node 14 free: 63448 MB
node 15 cpus: 150-159,310-319
node 15 size: 64478 MB
node 15 free: 63428 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
0: 10 12 12 12 21 21 21 21 21 21 21 21 21 21 21 21
1: 12 10 12 12 21 21 21 21 21 21 21 21 21 21 21 21
2: 12 12 10 12 21 21 21 21 21 21 21 21 21 21 21 21
3: 12 12 12 10 21 21 21 21 21 21 21 21 21 21 21 21
4: 21 21 21 21 10 12 12 12 21 21 21 21 21 21 21 21
5: 21 21 21 21 12 10 12 12 21 21 21 21 21 21 21 21
6: 21 21 21 21 12 12 12 10 12 21 21 21 21 21 21 21
7: 21 21 21 21 12 12 12 10 21 21 21 21 21 21 21 21
8: 21 21 21 21 21 21 21 10 12 12 12 21 21 21 21 21
9: 21 21 21 21 21 21 21 12 10 12 12 21 21 21 21 21
10: 21 21 21 21 21 21 21 12 12 10 12 21 21 21 21 21
11: 21 21 21 21 21 21 21 12 12 12 10 21 21 21 21 21
12: 21 21 21 21 21 21 21 21 21 21 21 10 12 12 12 12
13: 21 21 21 21 21 21 21 21 21 21 21 12 10 12 12 12
14: 21 21 21 21 21 21 21 21 21 21 21 12 12 12 10 12
15: 21 21 21 21 21 21 21 21 21 21 21 12 12 12 10 12

```

```

-----
9. /proc/meminfo
   MemTotal:      1056040412 kB

```

```

-----
10. who -r
    run-level 3 Jun 8 19:46

```

```

-----
11. Systemd service manager version: systemd 250 (250-6.e19_0)
    Default Target   Status
    multi-user       degraded

```

```

-----
12. Failed units, from systemctl list-units --state=failed
    UNIT                                LOAD    ACTIVE SUB    DESCRIPTION
* dnf-makecache.service loaded failed failed dnf makecache
* sep5.service                        loaded failed failed systemd script to load sep5 driver at boot time

```

```

-----
13. Services, from systemctl list-unit-files
    STATE     UNIT FILES
enabled     NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
            dbus-broker firewalld getty@ irqbalance kdump mdmonitor microcode nis-domainname rhsmcertd
            rsyslog selinux-autorelabel-mark sep5 sshd sssd systemd-network-generator tuned udisks2
enabled-runtime
            systemd-remount-fs
disabled    chrony-wait console-getty cpupower debug-shell kvm_stat man-db-restart-cache-update
            nftables rdisc rhsm rhsm-facts rpmdb-rebuild serial-getty@ sshd-keygen@
            systemd-boot-check-no-failures systemd-pstore systemd-sysex

```

(Continued on next page)



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### Platform Notes (Continued)

indirect            sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

-----  
14. Linux kernel boot-time arguments, from /proc/cmdline  
BOOT\_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9\_0.x86\_64  
root=UUID=058bfd1-c62b-4fad-8d41-5c40aa179007  
ro  
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M  
resume=UUID=b47f1685-a5fa-4d39-b2d7-e3f6e95ad499  
nohz\_full=1-479

-----  
15. cpupower frequency-info  
analyzing CPU 0:  
  Unable to determine current policy  
  boost state support:  
    Supported: yes  
    Active: yes

-----  
16. tuned-adm active  
  Current active profile: throughput-performance

-----  
17. 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                   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

-----  
18. /sys/kernel/mm/transparent\_hugepage  
defrag            always defer defer+madvice [madvice] never  
enabled           [always] madvice never  
hpage\_pmd\_size   2097152  
shmem\_enabled    always within\_size advise [never] deny force

-----  
19. /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

(Continued on next page)





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**Hardware Availability:** Apr-2023  
**Software Availability:** Dec-2022

### Platform Notes (Continued)

scan\_sleep\_millisecs 10000

-----  
20. OS release  
From /etc/\*-release /etc/\*-version  
os-release Red Hat Enterprise Linux 9.0 (Plow)  
redhat-release Red Hat Enterprise Linux release 9.0 (Plow)  
system-release Red Hat Enterprise Linux release 9.0 (Plow)

-----  
21. Disk information  
SPEC is set to: /home/Uniautos/cpu2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda5 xfs 820G 44G 776G 6% /home

-----  
22. /sys/devices/virtual/dmi/id  
Product: 5885H V7  
Product Family: EagleStream

-----  
23. 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:  
32x Samsung M321R4GA3BB6-CQKDG 32 GB 2 rank 4800

-----  
24. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: Byosoft Corporation  
BIOS Version: 2.00.34  
BIOS Date: 04/18/2023

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

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# SPEC CPU®2017 Floating Point Rate Result

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## xFusion

SPECrate®2017\_fp\_base = 1740

FusionServer 5885H V7 (Intel Xeon Platinum 8460H)

SPECrate®2017\_fp\_peak = 1740

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

**Test Date:** Jun-2023  
**Hardware Availability:** Apr-2023  
**Software Availability:** Dec-2022

### Compiler Version Notes (Continued)

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=====  
C++, C, Fortran | 507.cactuBSSN\_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.  
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  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

### 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



# SPEC CPU®2017 Floating Point Rate Result

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## xFusion

SPECrate®2017\_fp\_base = 1740

FusionServer 5885H V7 (Intel Xeon Platinum 8460H)

SPECrate®2017\_fp\_peak = 1740

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

**Test Date:** Jun-2023  
**Hardware Availability:** Apr-2023  
**Software Availability:** Dec-2022

## 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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# SPEC CPU®2017 Floating Point Rate Result

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**xFusion**

SPECrate®2017\_fp\_base = 1740

FusionServer 5885H V7 (Intel Xeon Platinum 8460H)

SPECrate®2017\_fp\_peak = 1740

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

**Test Date:** Jun-2023  
**Hardware Availability:** Apr-2023  
**Software Availability:** Dec-2022

## 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)



# SPEC CPU®2017 Floating Point Rate Result

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xFusion

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SPECrate®2017\_fp\_peak = 1740

CPU2017 License: 6488  
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Tested by: xFusion

Test Date: Jun-2023  
Hardware Availability: Apr-2023  
Software Availability: Dec-2022

## 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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# SPEC CPU®2017 Floating Point Rate Result

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**Software Availability:** Dec-2022

## 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/xFusion-Platform-Settings-SPR-V1.1-revC.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/xFusion-Platform-Settings-SPR-V1.1-revC.xml>

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