



# SPEC CPU®2017 Floating Point Rate Result

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## xFusion

SPECrate®2017\_fp\_base = 1980

FusionServer 2488H V7 (Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_peak = 1990

CPU2017 License: 6488

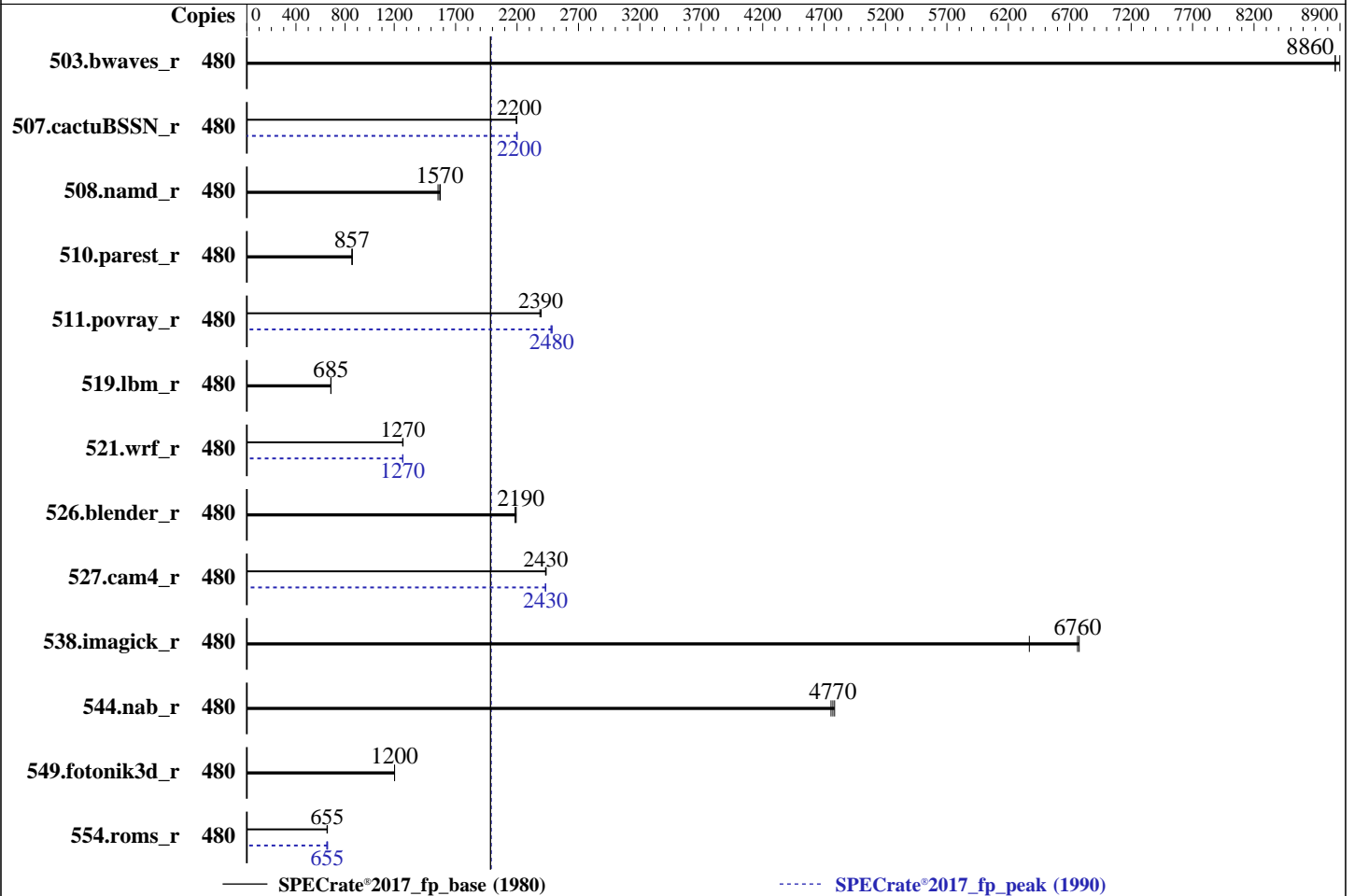
Test Sponsor: xFusion

Tested by: xFusion

Test Date: Feb-2024

Hardware Availability: Jul-2023

Software Availability: Dec-2023



### Hardware

CPU Name: Intel Xeon Platinum 8490H  
 Max MHz: 3500  
 Nominal: 1900  
 Enabled: 240 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: 112.5 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 9.0 (Plow)  
 5.14.0-70.13.1.el9\_0.x86\_64  
 Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++  
 Compiler for Linux;  
 Fortran: Version 2023.2.3 of Intel Fortran  
 Compiler for Linux;  
 Parallel: No  
 Firmware: Version 01.02.01.03 Released Jan-2024  
 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	480	541	8900	<b>543</b>	<b>8860</b>	543	8860	480	541	8900	<b>543</b>	<b>8860</b>	543	8860
507.cactuBSSN_r	480	277	2200	277	2190	<b>277</b>	<b>2200</b>	480	276	2200	277	2200	<b>276</b>	<b>2200</b>
508.namd_r	480	293	1560	289	1580	<b>290</b>	<b>1570</b>	480	293	1560	289	1580	<b>290</b>	<b>1570</b>
510.parest_r	480	1465	857	1464	858	<b>1465</b>	<b>857</b>	480	1465	857	1464	858	<b>1465</b>	<b>857</b>
511.povray_r	480	468	2400	470	2390	<b>468</b>	<b>2390</b>	480	453	2480	<b>452</b>	<b>2480</b>	451	2490
519.lbm_r	480	739	685	738	685	<b>739</b>	<b>685</b>	480	739	685	738	685	<b>739</b>	<b>685</b>
521.wrf_r	480	848	1270	845	1270	<b>846</b>	<b>1270</b>	480	847	1270	<b>847</b>	<b>1270</b>	846	1270
526.blender_r	480	<b>334</b>	<b>2190</b>	333	2190	335	2180	480	<b>334</b>	<b>2190</b>	333	2190	335	2180
527.cam4_r	480	344	2440	345	2430	<b>345</b>	<b>2430</b>	480	345	2430	<b>345</b>	<b>2430</b>	345	2430
538.imagick_r	480	<b>177</b>	<b>6760</b>	176	6780	187	6370	480	<b>177</b>	<b>6760</b>	176	6780	187	6370
544.nab_r	480	<b>169</b>	<b>4770</b>	170	4760	169	4790	480	<b>169</b>	<b>4770</b>	170	4760	169	4790
549.fotonik3d_r	480	<b>1556</b>	<b>1200</b>	1555	1200	1556	1200	480	<b>1556</b>	<b>1200</b>	1555	1200	1556	1200
554.roms_r	480	1162	656	<b>1165</b>	<b>655</b>	1168	653	480	<b>1164</b>	<b>655</b>	1159	658	1172	651

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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 Mon Jan 29 02:04:37 2024

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. 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. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. 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  
02:04:37 up 6 min, 1 user, load average: 0.35, 3.64, 2.55  
USER TTY LOGIN@ IDLE JCPU PCPU WHAT  
root pts/0 02:03 45.00s 1.11s 0.00s tail -100f nohup.out  
-----

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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) 4124876
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) 4124876
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited
```

-----  
5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@pts/0
-bash
/bin/sh ./test-rate-cpu2017.sh
runcpu --define default-platform-flags --copies 480 -c ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg
--define smt-on --define cores=240 --define physicalfirst --define invoke_with_interleave --define
drop_caches --tune base,peak -o all fprate
runcpu --define default-platform-flags --copies 480 --configfile
ic2023.2.3-lin-sapphirerapids-rate-20231121.cfg --define smt-on --define cores=240 --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/CPU2017.008/tempplogs/preenv.fprate.008.0.log --lognum 008.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/Uniautos/cpu2017
```

-----  
6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) Platinum 8490H
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 6
microcode       : 0x2b0004d0
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapsg
cpu cores       : 60
siblings        : 120
4 physical ids (chips)
480 processors (hardware threads)
physical id 0:  core ids 0-59
physical id 1:  core ids 0-59
physical id 2:  core ids 0-59
physical id 3:  core ids 0-59
```

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### Platform Notes (Continued)

physical id 0: apicids 0-119  
physical id 1: apicids 128-247  
physical id 2: apicids 256-375  
physical id 3: apicids 384-503

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):                480
On-line CPU(s) list:   0-479
Vendor ID:             GenuineIntel
BIOS Vendor ID:       Intel(R) Corporation
Model name:            Intel(R) Xeon(R) Platinum 8490H
BIOS Model name:      Intel(R) Xeon(R) Platinum 8490H
CPU family:            6
Model:                 143
Thread(s) per core:    2
Core(s) per socket:    60
Socket(s):             4
Stepping:              6
BogoMIPS:              3800.00
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                        clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                        lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                        nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 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:             11.3 MiB (240 instances)
L1i cache:             7.5 MiB (240 instances)
L2 cache:              480 MiB (240 instances)
L3 cache:              450 MiB (4 instances)
NUMA node(s):         16
NUMA node0 CPU(s):    0-14,240-254
NUMA node1 CPU(s):    15-29,255-269
NUMA node2 CPU(s):    30-44,270-284
NUMA node3 CPU(s):    45-59,285-299
NUMA node4 CPU(s):    60-74,300-314
NUMA node5 CPU(s):    75-89,315-329
NUMA node6 CPU(s):    90-104,330-344
NUMA node7 CPU(s):    105-119,345-359
NUMA node8 CPU(s):    120-134,360-374

```

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### Platform Notes (Continued)

```

NUMA node9 CPU(s):          135-149,375-389
NUMA node10 CPU(s):         150-164,390-404
NUMA node11 CPU(s):         165-179,405-419
NUMA node12 CPU(s):         180-194,420-434
NUMA node13 CPU(s):         195-209,435-449
NUMA node14 CPU(s):         210-224,450-464
NUMA node15 CPU(s):         225-239,465-479
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:         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	11.3M	12	Data	1	64	1	64
L1i	32K	7.5M	8	Instruction	1	64	1	64
L2	2M	480M	16	Unified	2	2048	1	64
L3	112.5M	450M	15	Unified	3	122880	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: 0-14,240-254
node 0 size: 63737 MB
node 0 free: 63302 MB
node 1 cpus: 15-29,255-269
node 1 size: 64505 MB
node 1 free: 64082 MB
node 2 cpus: 30-44,270-284
node 2 size: 64505 MB
node 2 free: 64166 MB
node 3 cpus: 45-59,285-299
node 3 size: 64505 MB
node 3 free: 64218 MB
node 4 cpus: 60-74,300-314
node 4 size: 64505 MB
node 4 free: 64170 MB
node 5 cpus: 75-89,315-329
node 5 size: 64505 MB
node 5 free: 64179 MB
node 6 cpus: 90-104,330-344
node 6 size: 64505 MB
node 6 free: 64179 MB
node 7 cpus: 105-119,345-359
node 7 size: 64505 MB
node 7 free: 63457 MB
node 8 cpus: 120-134,360-374
node 8 size: 64505 MB
node 8 free: 64174 MB
node 9 cpus: 135-149,375-389
node 9 size: 64505 MB
node 9 free: 63162 MB
node 10 cpus: 150-164,390-404
node 10 size: 64505 MB

```

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### Platform Notes (Continued)

```

node 10 free: 64158 MB
node 11 cpus: 165-179,405-419
node 11 size: 64505 MB
node 11 free: 64220 MB
node 12 cpus: 180-194,420-434
node 12 size: 64505 MB
node 12 free: 64209 MB
node 13 cpus: 195-209,435-449
node 13 size: 64469 MB
node 13 free: 64187 MB
node 14 cpus: 210-224,450-464
node 14 size: 64505 MB
node 14 free: 64232 MB
node 15 cpus: 225-239,465-479
node 15 size: 64476 MB
node 15 free: 64167 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 21 12 10 12 12 21 21 21 21 21 21 21
 6: 21 21 21 21 21 12 12 10 12 21 21 21 21 21 21 21
 7: 21 21 21 21 21 12 12 12 10 21 21 21 21 21 21 21
 8: 21 21 21 21 21 21 21 21 10 12 12 12 21 21 21 21
 9: 21 21 21 21 21 21 21 21 12 10 12 12 21 21 21 21
10: 21 21 21 21 21 21 21 21 12 12 10 12 21 21 21 21
11: 21 21 21 21 21 21 21 21 12 12 12 10 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 10 12 12
15: 21 21 21 21 21 21 21 21 21 21 21 12 12 12 10 10

```

```

-----
9. /proc/meminfo
   MemTotal:      1056006464 kB

```

```

-----
10. who -r
    run-level 3 Jan 29 01:58

```

```

-----
11. Systemd service manager version: systemd 250 (250-6.el9_0)
    Default Target   Status
    multi-user       running

```

```

-----
12. Services, from systemctl list-unit-files
STATE                               UNIT FILES
enabled                             NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd crond
                                     dbus-broker firewalld getty@ irqbalance kdump mdmonitor microcode nis-domainname rhsmcertd
                                     rsyslog selinux-autorelabel-mark sshd sssd systemd-network-generator tuned udisks2
enabled-runtime                     systemd-remount-fs
disabled                             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-sysext
indirect                             sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

```

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### Platform Notes (Continued)

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd2,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
root=UUID=fc5aaa98-7763-4e7f-8371-1b1810d17883
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=UUID=62bda881-0d36-43ce-826e-76cb2ea35911
nohz_full=1-479

```

```

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

```

```

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

```

```

-----
16. 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

```

```

-----
17. /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

```

```

-----
18. /sys/kernel/mm/transparent_hugepage/khugepaged
alloc_sleep_millisecs  60000
defrag                  1
max_ptes_none          511
max_ptes_shared        256
max_ptes_swap          64
pages_to_scan          4096
scan_sleep_millisecs   10000

```

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### Platform Notes (Continued)

-----  
19. 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)

-----  
20. Disk information  
SPEC is set to: /home/Uniautos/cpu2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sdc3 xfs 272G 19G 253G 7% /home

-----  
21. /sys/devices/virtual/dmi/id  
Vendor: XFUSION  
Product: 2488H V7  
Product Family: EagleStream

-----  
22. 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:  
18x Samsung M321R4GA3BB6-CQKDG 32 GB 2 rank 4800  
14x Samsung M321R4GA3BB6-CQKEG 32 GB 2 rank 4800

-----  
23. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: XFUSION  
BIOS Version: 01.02.01.03  
BIOS Date: 01/01/2024

### 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 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====  
C++ | 508.namd\_r(base, peak) 510.parest\_r(base, peak)

-----  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====  
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 2023.2.3 Build x  
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x

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# SPEC CPU®2017 Floating Point Rate Result

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## xFusion

SPECrate®2017\_fp\_base = 1980

FusionServer 2488H V7 (Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_peak = 1990

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

**Test Date:** Feb-2024  
**Hardware Availability:** Jul-2023  
**Software Availability:** Dec-2023

### 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 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.  
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 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 2023.2.3 Build x  
Copyright (C) 1985-2023 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 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 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 = 1980

FusionServer 2488H V7 (Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_peak = 1990

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

**Test Date:** Feb-2024  
**Hardware Availability:** Jul-2023  
**Software Availability:** Dec-2023

## 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 -xsaphirerapids -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 -xsaphirerapids -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 -xsaphirerapids -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 -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
```

### Benchmarks using both C and C++:

```
-w -std=c++14 -m64 -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
```

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# SPEC CPU®2017 Floating Point Rate Result

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**xFusion**

SPECrate®2017\_fp\_base = 1980

FusionServer 2488H V7 (Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_peak = 1990

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

**Test Date:** Feb-2024  
**Hardware Availability:** Jul-2023  
**Software Availability:** Dec-2023

## 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
```

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# SPEC CPU®2017 Floating Point Rate Result

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## xFusion

SPECrate®2017\_fp\_base = 1980

FusionServer 2488H V7 (Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_peak = 1990

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

**Test Date:** Feb-2024  
**Hardware Availability:** Jul-2023  
**Software Availability:** Dec-2023

## Peak Optimization Flags (Continued)

538.imagick\_r: basepeak = yes

544.nab\_r: basepeak = yes

C++ benchmarks:

508.namd\_r: basepeak = yes

510.parest\_r: basepeak = yes

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
-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
```



# SPEC CPU®2017 Floating Point Rate Result

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## xFusion

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FusionServer 2488H V7 (Intel Xeon Platinum 8490H)

SPECrate®2017\_fp\_peak = 1990

**CPU2017 License:** 6488

**Test Sponsor:** xFusion

**Tested by:** xFusion

**Test Date:** Feb-2024

**Hardware Availability:** Jul-2023

**Software Availability:** Dec-2023

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-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-ic2023p2-official-linux64.xml>

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

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