



SPEC CPU®2017 Floating Point Rate Result

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xFusion

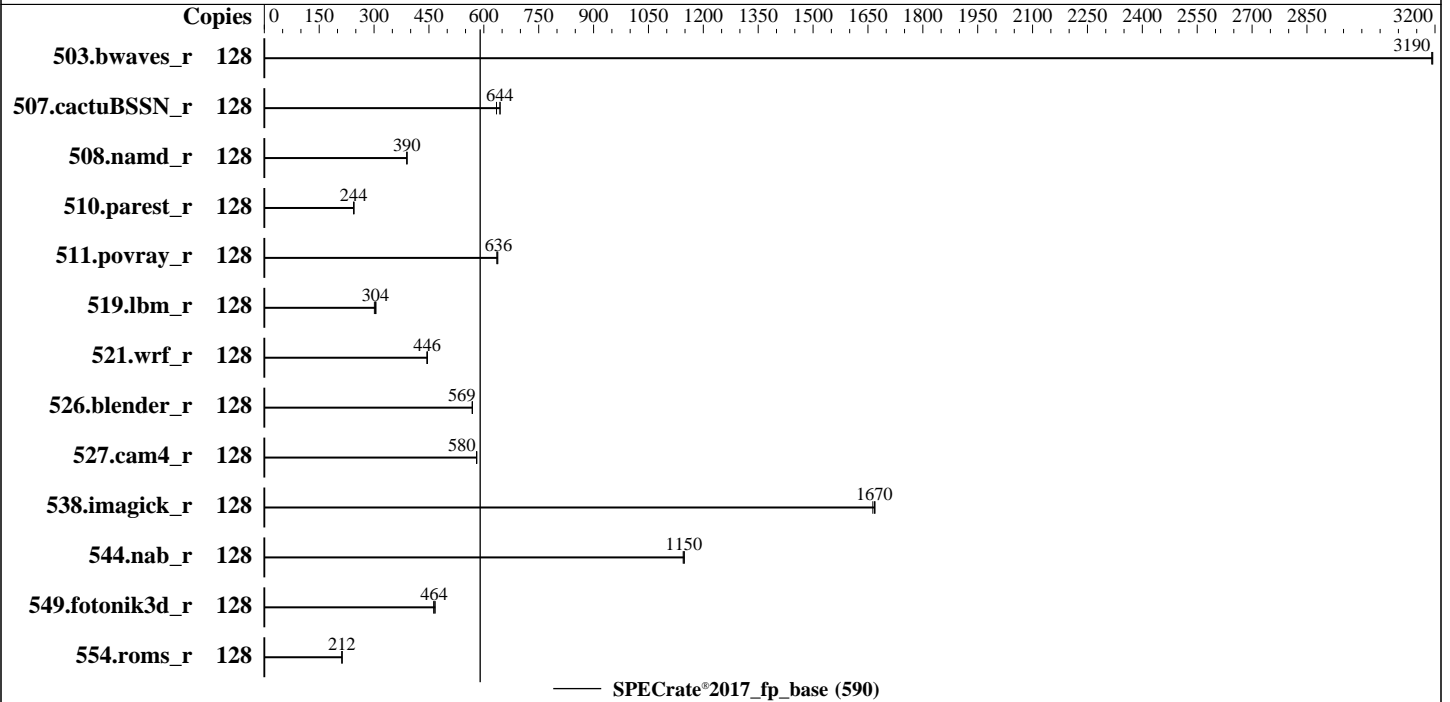
SPECrate®2017_fp_base = 590

FusionServer 2488H V6 (Intel Xeon Gold 6328H)

SPECrate®2017_fp_peak = Not Run

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

Test Date: May-2023
Hardware Availability: Sep-2020
Software Availability: Dec-2022



Hardware

CPU Name: Intel Xeon Gold 6328H
Max MHz: 4300
Nominal: 2800
Enabled: 64 cores, 4 chips, 2 threads/core
Orderable: 1,2,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 22 MB I+D on chip per chip
Other: None
Memory: 1536 GB (48 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
Storage: 1 x 480 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 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Version 1.03 Released Feb-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
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 | 128 | 402 | 3190 | 402 | 3190 | 402 | 3190 | | | | | | | |
| 507.cactuBSSN_r | 128 | 255 | 635 | 252 | 644 | 251 | 645 | | | | | | | |
| 508.namd_r | 128 | 312 | 390 | 312 | 390 | 312 | 390 | | | | | | | |
| 510.parest_r | 128 | 1370 | 244 | 1367 | 245 | 1370 | 244 | | | | | | | |
| 511.povray_r | 128 | 470 | 636 | 468 | 638 | 470 | 636 | | | | | | | |
| 519.lbm_r | 128 | 442 | 305 | 448 | 301 | 444 | 304 | | | | | | | |
| 521.wrf_r | 128 | 643 | 446 | 645 | 444 | 643 | 446 | | | | | | | |
| 526.blender_r | 128 | 343 | 569 | 343 | 568 | 343 | 569 | | | | | | | |
| 527.cam4_r | 128 | 385 | 581 | 386 | 580 | 386 | 580 | | | | | | | |
| 538.imagick_r | 128 | 191 | 1670 | 191 | 1670 | 191 | 1660 | | | | | | | |
| 544.nab_r | 128 | 188 | 1140 | 188 | 1150 | 188 | 1150 | | | | | | | |
| 549.fotonik3d_r | 128 | 1074 | 464 | 1078 | 463 | 1068 | 467 | | | | | | | |
| 554.roms_r | 128 | 957 | 212 | 959 | 212 | 958 | 212 | | | | | | | |

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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/speccpu/lib/intel64:/home/speccpu/je5.0.1-64"
MALLOC_CONF = "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 SNC2 (2-clusters)

Sysinfo program /home/speccpu/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Mon May 22 21:16:42 2023

SUT (System Under Test) info as seen by some common utilities.

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1. uname -a
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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.e18)
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
GNU/Linux

2. w
21:16:42 up 3:24, 2 users, load average: 32.30, 96.32, 115.19
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root pts/0 172.166.0.211 17:53 3:22m 1.24s 0.00s tail -f nohup.out

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Platform Notes (Continued)

```
root pts/1 172.166.0.211 20:08 1:06m 0.01s 0.01s -bash
```

3. Username

From environment variable \$USER: root

4. ulimit -a

```
core file size          (blocks, -c) unlimited
data seg size           (kbytes, -d) unlimited
scheduling priority     (-e) 0
file size               (blocks, -f) unlimited
pending signals         (-i) 6185112
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) 6185112
virtual memory          (kbytes, -v) unlimited
file locks              (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 17
/usr/sbin/sshd -D
-oCiphers=aes256-gcm@openssh.com,chacha20-poly1305@openssh.com,aes256-ctr,aes256-cbc,aes128-gcm@openssh.com,aes128-ctr,aes128-cbc
-oMACs=hmac-sha2-256-etm@openssh.com,hmac-sha1-etm@openssh.com,umac-128-etm@openssh.com,hmac-sha2-512-etm@openssh.com,hmac-sha2-256,hmac-sha1,umac-128@openssh.com,hmac-sha2-512...
sshd: root [priv]
sshd: root@pts/0
-bash
bash test-rate-cpu2017.sh
runcpu --define default-platform-flags --copies 128 -c ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune base -o all fprate
runcpu --define default-platform-flags --copies 128 --configfile ic2023.0-lin-core-avx512-rate-20221201.cfg --define smt-on --define cores=64 --define physicalfirst --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.003/templogs/preenv.fprate.003.0.log --lognum 003.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/speccpu
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) Gold 6328H CPU @ 2.80GHz
vendor_id       : GenuineIntel
cpu family      : 6
model           : 85
stepping        : 11
microcode       : 0x7002302
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores       : 16
siblings        : 32
4 physical ids (chips)
```

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Platform Notes (Continued)

128 processors (hardware threads)
physical id 0: core ids 0-15
physical id 1: core ids 0-15
physical id 2: core ids 0-15
physical id 3: core ids 0-15
physical id 0: apicids 0-31
physical id 1: apicids 32-63
physical id 2: apicids 64-95
physical id 3: apicids 96-127

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):            128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s):         4
NUMA node(s):     8
Vendor ID:         GenuineIntel
BIOS Vendor ID:   Intel(R) Corporation
CPU family:        6
Model:             85
Model name:        Intel(R) Xeon(R) Gold 6328H CPU @ 2.80GHz
BIOS Model name:   Intel(R) Xeon(R) Gold 6328H CPU @ 2.80GHz
Stepping:          11
CPU MHz:           3699.922
BogoMIPS:          5600.00
Virtualization:    VT-x
L1d cache:         32K
L1i cache:         32K
L2 cache:          1024K
L3 cache:          22528K
NUMA node0 CPU(s): 0-3,8-11,64-67,72-75
NUMA node1 CPU(s): 4-7,12-15,68-71,76-79
NUMA node2 CPU(s): 16-19,24-27,80-83,88-91
NUMA node3 CPU(s): 20-23,28-31,84-87,92-95
NUMA node4 CPU(s): 32-35,40-43,96-99,104-107
NUMA node5 CPU(s): 36-39,44-47,100-103,108-111
NUMA node6 CPU(s): 48-51,56-59,112-115,120-123
NUMA node7 CPU(s): 52-55,60-63,116-119,124-127
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 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 cdp_l3 invpcid_single ssbd mba ibrs ibpb stibp
                    ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bml1
                    hle avx2 smep bmi2 erms invpcid cqm mpx rdt_a avx512f avx512dq rdseed adx smap
                    clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves
                    cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local avx512_bf16 dtherm ida arat pln pts
                    hwp_epp pku ospke avx512_vnni md_clear flush_l1d arch_capabilities
```

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Platform Notes (Continued)

8. numactl --hardware

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

```

available: 8 nodes (0-7)
node 0 cpus: 0-3,8-11,64-67,72-75
node 0 size: 191590 MB
node 0 free: 185943 MB
node 1 cpus: 4-7,12-15,68-71,76-79
node 1 size: 193532 MB
node 1 free: 189969 MB
node 2 cpus: 16-19,24-27,80-83,88-91
node 2 size: 193532 MB
node 2 free: 190088 MB
node 3 cpus: 20-23,28-31,84-87,92-95
node 3 size: 193532 MB
node 3 free: 189461 MB
node 4 cpus: 32-35,40-43,96-99,104-107
node 4 size: 193532 MB
node 4 free: 190044 MB
node 5 cpus: 36-39,44-47,100-103,108-111
node 5 size: 193532 MB
node 5 free: 190029 MB
node 6 cpus: 48-51,56-59,112-115,120-123
node 6 size: 193532 MB
node 6 free: 190090 MB
node 7 cpus: 52-55,60-63,116-119,124-127
node 7 size: 193531 MB
node 7 free: 189935 MB
node distances:
node  0  1  2  3  4  5  6  7
  0:  10  11  20  20  20  20  20  20
  1:  11  10  20  20  20  20  20  20
  2:  20  20  10  11  20  20  20  20
  3:  20  20  11  10  20  20  20  20
  4:  20  20  20  20  10  11  20  20
  5:  20  20  20  20  11  10  20  20
  6:  20  20  20  20  20  20  10  11
  7:  20  20  20  20  20  20  11  10

```

9. /proc/meminfo

MemTotal: 1583428100 kB

10. who -r

run-level 3 May 22 17:52

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

Default Target Status
multi-user running

12. Services, from systemctl list-unit-files

```

STATE UNIT FILES
enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd autovt@ crond
firewalld getty@ import-state irqbalance kdump loadmodules lvm2-monitor mdmonitor microcode
nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd syslog tuned udisks2
disabled blk-availability console-getty cpupower debug-shell ebttables iprdump iprinit iprupdate kvm_stat
nftables rdisc rhcd rhsm rhsm-facts serial-getty@ sshd-keygen@ systemd-resolved tcsd
generated SystemTap compile-server gcc-toolset-10-stap-server gcc-toolset-10-systemtap

```

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Platform Notes (Continued)

```
indirect gcc-toolset-9-stap-server gcc-toolset-9-systemtap scripts startup
          sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
```

```
-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd1,gpt2)/vmlinuz-4.18.0-305.el8.x86_64
root=/dev/mapper/rhel-root
ro
crashkernel=auto
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
rhgb
quiet
-----
```

```
-----
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     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+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
-----
```

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Platform Notes (Continued)

| | |
|----------------------|-------|
| 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 |
| lltf | Not affected |
| mds | Not affected |
| 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 |
| srbsds | 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: /home/speccpu

| Filesystem | Type | Size | Used | Avail | Use% | Mounted on |
|-----------------------|------|------|------|-------|------|------------|
| /dev/mapper/rhel-home | xfs | 372G | 37G | 335G | 10% | /home |

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

| | |
|-----------------|----------------------|
| Vendor: | xFusion |
| Product: | 2488H V6 |
| Product Family: | Cedar Island |
| Serial: | 2102313CWY10MA000018 |

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:
 48x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2933

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

| | |
|---------------|---------------------|
| BIOS Vendor: | Byosoft Corporation |
| BIOS Version: | 1.03 |
| BIOS Date: | 11/25/2022 |



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Compiler Version Notes

```

=====
C          | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
-----
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
-----

=====
C++       | 508.namd_r(base) 510.parest_r(base)
-----
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
-----

=====
C++, C    | 511.povray_r(base) 526.blender_r(base)
-----
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.
-----

=====
C++, C, Fortran | 507.cactuBSSN_r(base)
-----
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) 549.fotonik3d_r(base) 554.roms_r(base)
-----
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) 527.cam4_r(base)
-----
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

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Copyright 2017-2023 Standard Performance Evaluation Corporation

xFusion

SPECrate®2017_fp_base = 590

FusionServer 2488H V6 (Intel Xeon Gold 6328H)

SPECrate®2017_fp_peak = Not Run

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

Test Date: May-2023
Hardware Availability: Sep-2020
Software Availability: Dec-2022

Base Compiler Invocation (Continued)

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

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

C++ benchmarks:

-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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Base Optimization Flags (Continued)

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-Wno-implicit-int -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 -xCORE-AVX512 -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast  
-ffast-math -flto -mfpmath=sse -funroll-loops  
-qopt-mem-layout-trans=4 -Wno-implicit-int -nostandard-realloc-lhs  
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

The flag 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-CPX-V1.4.html>

You can also download the XML flag 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-CPX-V1.4.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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