



SPEC CPU®2017 Floating Point Rate Result

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xFusion

SPECrate®2017_fp_base = 299

FusionServer 2288H V6 (Intel Xeon Silver 4316)

SPECrate®2017_fp_peak = 301

CPU2017 License: 6488

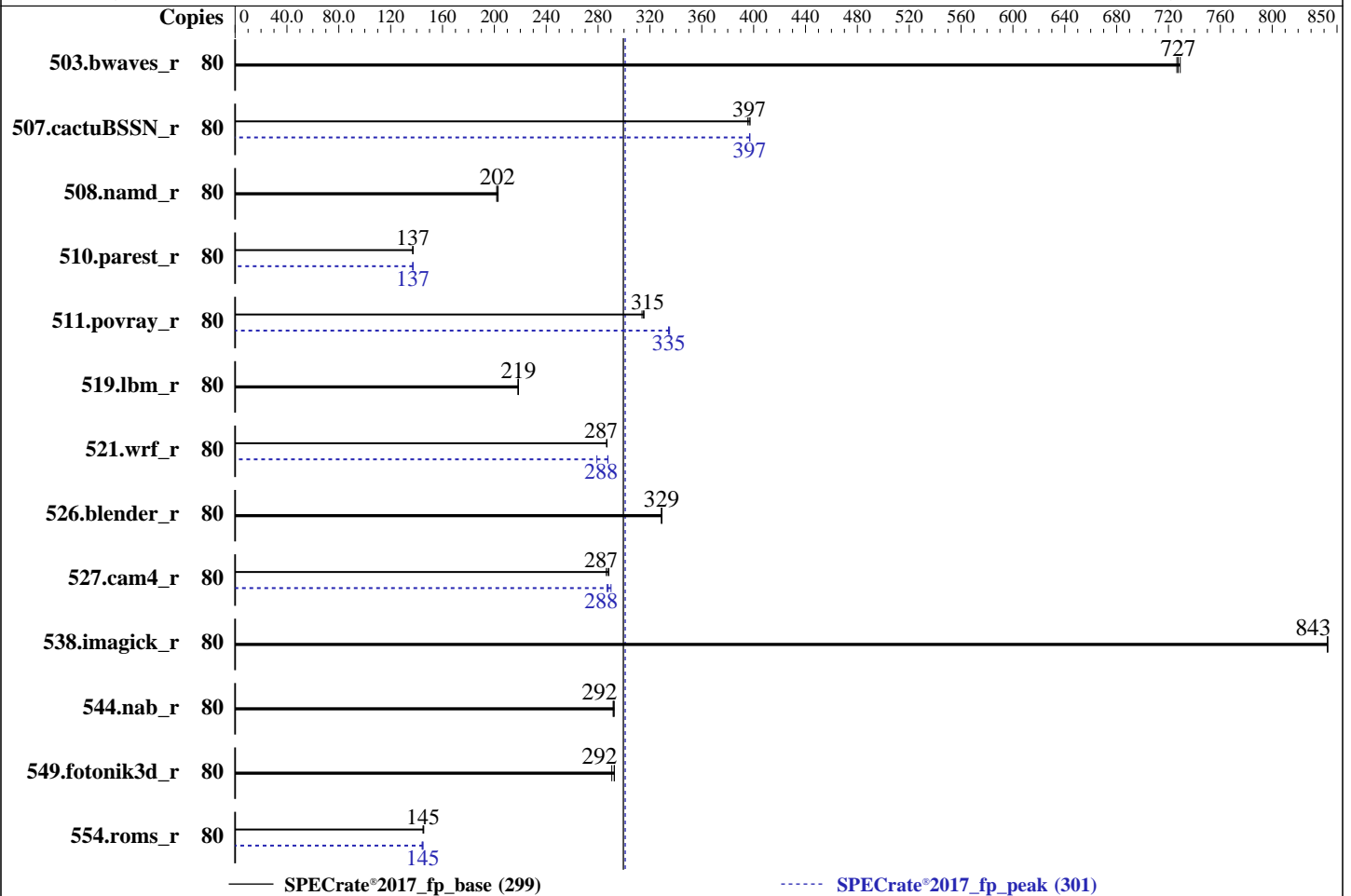
Test Sponsor: xFusion

Tested by: xFusion

Test Date: Apr-2024

Hardware Availability: Apr-2021

Software Availability: Dec-2023



Hardware

CPU Name: Intel Xeon Silver 4316
 Max MHz: 3400
 Nominal: 2300
 Enabled: 40 cores, 2 chips, 2 threads/core
 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: 30 MB I+D on chip per chip
 Other: None
 Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2666)
 Storage: 1 x 1920 GB SATA SSD
 Other: CPU Cooling: Air

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 1.68 Released Mar-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	80	1104	726	<u>1103</u>	<u>727</u>	1100	729	80	1104	726	<u>1103</u>	<u>727</u>	1100	729
507.cactuBSSN_r	80	256	396	<u>255</u>	<u>397</u>	255	397	80	255	397	255	397	<u>255</u>	<u>397</u>
508.namd_r	80	<u>376</u>	<u>202</u>	377	202	375	203	80	<u>376</u>	<u>202</u>	377	202	375	203
510.parest_r	80	1527	137	1525	137	<u>1526</u>	<u>137</u>	80	1525	137	1527	137	<u>1526</u>	<u>137</u>
511.povray_r	80	592	315	<u>593</u>	<u>315</u>	595	314	80	559	334	557	335	<u>558</u>	<u>335</u>
519.lbm_r	80	386	219	387	218	<u>386</u>	<u>219</u>	80	386	219	387	218	<u>386</u>	<u>219</u>
521.wrf_r	80	625	287	625	287	<u>625</u>	<u>287</u>	80	642	279	<u>623</u>	<u>288</u>	623	288
526.blender_r	80	<u>370</u>	<u>329</u>	370	329	370	329	80	<u>370</u>	<u>329</u>	370	329	370	329
527.cam4_r	80	485	288	<u>487</u>	<u>287</u>	489	286	80	483	290	488	287	<u>486</u>	<u>288</u>
538.imagick_r	80	<u>236</u>	<u>843</u>	236	843	236	843	80	<u>236</u>	<u>843</u>	236	843	236	843
544.nab_r	80	<u>461</u>	<u>292</u>	462	292	460	292	80	<u>461</u>	<u>292</u>	462	292	460	292
549.fotonik3d_r	80	1073	291	<u>1066</u>	<u>292</u>	1066	293	80	1073	291	<u>1066</u>	<u>292</u>	1066	293
554.roms_r	80	876	145	873	146	<u>876</u>	<u>145</u>	80	877	145	881	144	<u>878</u>	<u>145</u>

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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/spec2017-ic2023.2.3/lib/intel64:/home/spec2017-ic2023.2.3/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 Enabled SNC2 (2-clusters)

Sysinfo program /home/spec2017-ic2023.2.3/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Apr 19 06:03:41 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
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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. 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
06:03:41 up 19:48, 2 users, load average: 36.99, 68.11, 75.10
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root tty1 Thu10 7:24m 1.49s 0.05s -bash
root pts/0 04:22 1:41m 0.00s 0.00s -bash

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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) 2059968
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) 2059968
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
-bash
runcpu --define default-platform-flags --copies 80 -c ic2023.2.3-lin-core-avx512-rate-20231121.cfg --define
smt-on --define cores=40 --define physicalfirst --define invoke_with_interleave --define drop_caches
--tune base,peak -o all fprate
runcpu --define default-platform-flags --copies 80 --configfile ic2023.2.3-lin-core-avx512-rate-20231121.cfg
--define smt-on --define cores=40 --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/CPU2017.004/templogs/preenv.fprate.004.0.log --lognum
004.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/spec2017-ic2023.2.3
```

6. /proc/cpuinfo

```
model name      : Intel(R) Xeon(R) Silver 4316 CPU @ 2.30GHz
vendor_id      : GenuineIntel
cpu family     : 6
model          : 106
stepping       : 6
microcode      : 0xd0003b9
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 20
siblings       : 40
2 physical ids (chips)
80 processors (hardware threads)
physical id 0: core ids 0-19
physical id 1: core ids 0-19
physical id 0: apicids 0-39
physical id 1: apicids 64-103
```

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for

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Platform Notes (Continued)

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):                80
On-line CPU(s) list:   0-79
Vendor ID:             GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
Model name:            Intel(R) Xeon(R) Silver 4316 CPU @ 2.30GHz
BIOS Model name:       Intel(R) Xeon(R) Silver 4316 CPU @ 2.30GHz
CPU family:            6
Model:                 106
Thread(s) per core:    2
Core(s) per socket:    20
Socket(s):              2
Stepping:              6
CPU max MHz:           3400.0000
CPU min MHz:           800.0000
BogoMIPS:              4600.00
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 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 invpcid_single 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 wbnoinvd dtherm ida arat pln
                        pts hwp_epp 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

Virtualization:        VT-x
L1d cache:             1.9 MiB (40 instances)
L1i cache:             1.3 MiB (40 instances)
L2 cache:              50 MiB (40 instances)
L3 cache:              60 MiB (2 instances)
NUMA node(s):         4
NUMA node0 CPU(s):    0-9,40-49
NUMA node1 CPU(s):    10-19,50-59
NUMA node2 CPU(s):    20-29,60-69
NUMA node3 CPU(s):    30-39,70-79
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/swapgs 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

```

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Platform Notes (Continued)

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	1.9M	12	Data	1	64	1	64
L1i	32K	1.3M	8	Instruction	1	64	1	64
L2	1.3M	50M	20	Unified	2	1024	1	64
L3	30M	60M	12	Unified	3	40960	1	64

8. numactl --hardware

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

```

available: 4 nodes (0-3)
node 0 cpus: 0-9,40-49
node 0 size: 128020 MB
node 0 free: 113795 MB
node 1 cpus: 10-19,50-59
node 1 size: 129019 MB
node 1 free: 118145 MB
node 2 cpus: 20-29,60-69
node 2 size: 128983 MB
node 2 free: 118273 MB
node 3 cpus: 30-39,70-79
node 3 size: 129008 MB
node 3 free: 118327 MB
node distances:
node  0  1  2  3
 0:  10  11  20  20
 1:  11  10  20  20
 2:  20  20  10  11
 3:  20  20  11  10

```

9. /proc/meminfo

MemTotal: 527392792 kB

10. who -r

run-level 3 Apr 18 10:15

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

```

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 lvm2-monitor mdmonitor microcode
           nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
           systemd-network-generator udisks2 upower
enabled-runtime
           systemd-remount-fs
disabled   blk-availability canberra-system-bootup canberra-system-shutdown
           canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell 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

```

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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=/dev/mapper/rhel-root
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
-----
```

```
-----
15. cpupower frequency-info
analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 3.40 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

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

```
-----
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                   20
vm.dirty_writeback_centisecs     500
vm.dirtytime_expire_seconds     43200
vm.extfrag_threshold             500
vm.min_unmapped_ratio           1
vm.nr_hugepages                  0
vm.nr_hugepages_mempolicy       0
vm.nr_overcommit_hugepages      0
vm.swappiness                    60
vm.watermark_boost_factor       15000
vm.watermark_scale_factor       10
vm.zone_reclaim_mode            0
-----
```

```
-----
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/spec2017-ic2023.2.3
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 819G 61G 758G 8% /home

21. /sys/devices/virtual/dmi/id
Vendor: XFUSION
Product: 2288H V6
Product Family: Whitley

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:
16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2666

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: XFUSION
BIOS Version: 1.68
BIOS Date: 03/14/2024
BIOS Revision: 1.68

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
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

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Compiler Version Notes (Continued)

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, 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



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SPECrate®2017_fp_peak = 301

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

Test Date: Apr-2024
Hardware Availability: Apr-2021
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 -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
```

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
```

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Base Optimization Flags (Continued)

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
```

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

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

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Peak Optimization Flags (Continued)

C++ benchmarks:

508.namd_r: basepeak = yes

```
510.parest_r: -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
```

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

```
554.roms_r: -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++:

```
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  
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

526.blender_r: basepeak = yes

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
```



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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-ICX-V1.2.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-ICX-V1.2.xml>

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