# SPEC CPU®2017 Floating Point Speed Result

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## xFusion

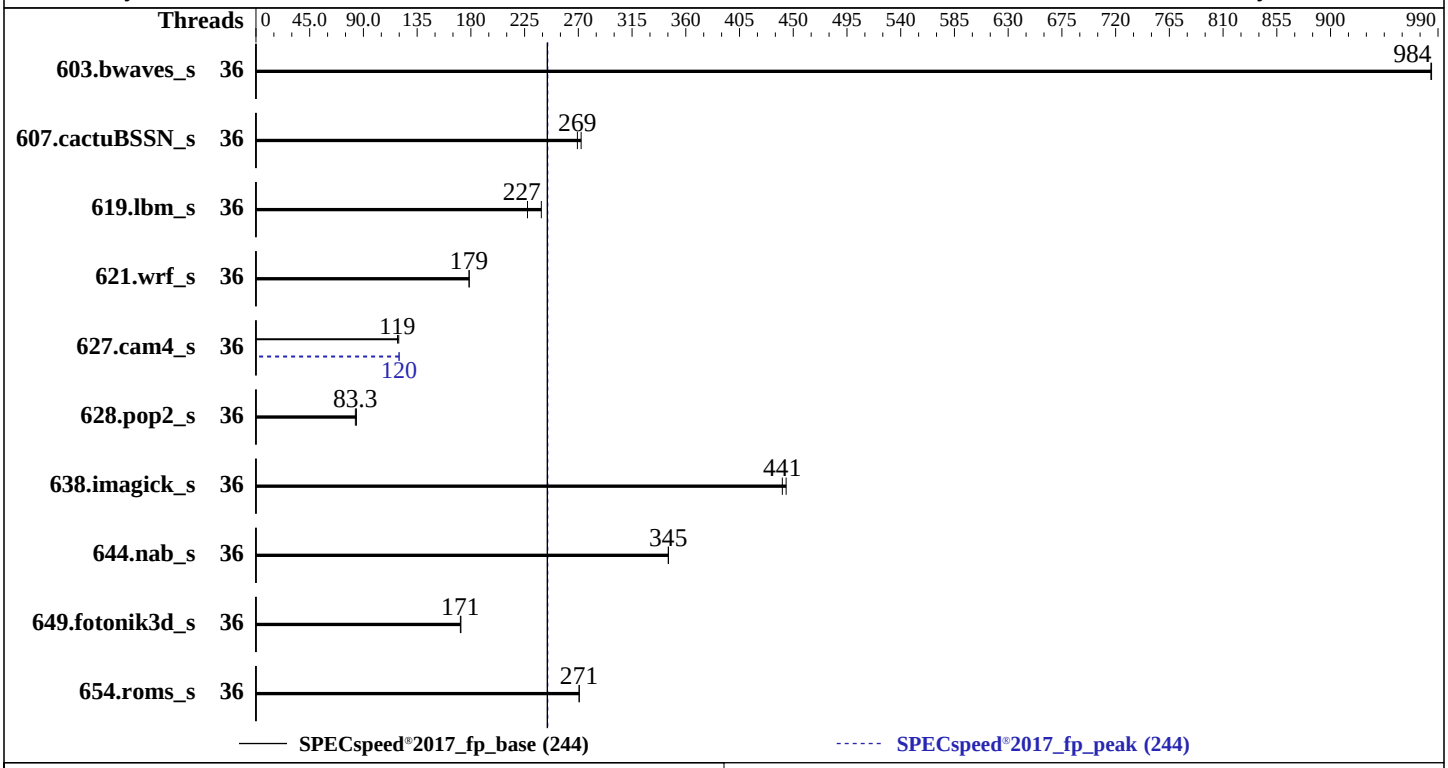
FusionServer 2288H V7 (Intel Xeon Gold 6416H)

SPECspeed®2017_fp_base = 244

SPECspeed®2017_fp_peak = 244

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

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




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Gold 6416H |
| Max MHz: | 4200 |
| Nominal: | 2200 |
| Enabled: | 36 cores, 2 chips |
| Orderable: | 1,2 chips |
| Cache L1: | 32 KB I + 48 KB D on chip per core |
| L2: | 2 MB I+D on chip per core |
| L3: | 45 MB I+D on chip per chip |
| Other: | None |
| Memory: | 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R) |
| Storage: | 1 x 1920 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: | Yes |
| Firmware: | Version 2.00.55 Released Mar-2023 |
| File System: | xfs |
| System State: | Run level 5 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other: | jemalloc memory allocator V5.0.1 |
| Power Management: | OS set to prefer performance at the cost of additional power usage |

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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 603.bwaves_s | 36 | 59.9 | 985 | **60.0** | **984** | | | 36 | 59.9 | 985 | **60.0** | **984** | | |
| 607.cactuBSSN_s | 36 | 61.2 | 272 | **61.9** | **269** | | | 36 | 61.2 | 272 | **61.9** | **269** | | |
| 619.lbm_s | 36 | 21.9 | 239 | **23.0** | **227** | | | 36 | 21.9 | 239 | **23.0** | **227** | | |
| 621.wrf_s | 36 | **74.1** | **179** | 74.1 | 179 | | | 36 | **74.1** | **179** | 74.1 | 179 | | |
| 627.cam4_s | 36 | 74.1 | 120 | **74.8** | **119** | | | 36 | **74.0** | **120** | 73.9 | 120 | | |
| 628.pop2_s | 36 | 141 | 84.2 | **143** | **83.3** | | | 36 | 141 | 84.2 | **143** | **83.3** | | |
| 638.imagick_s | 36 | **32.7** | **441** | 32.5 | 444 | | | 36 | **32.7** | **441** | 32.5 | 444 | | |
| 644.nab_s | 36 | **50.6** | **345** | 50.6 | 345 | | | 36 | **50.6** | **345** | 50.6 | 345 | | |
| 649.fotonik3d_s | 36 | 53.1 | 172 | **53.2** | **171** | | | 36 | 53.1 | 172 | **53.2** | **171** | | |
| 654.roms_s | 36 | 58.1 | 271 | **58.2** | **271** | | | 36 | 58.1 | 271 | **58.2** | **271** | | |

**SPECspeed®2017_fp_base = 244**

**SPECspeed®2017_fp_peak = 244**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/spec2017-icc2023.0/lib/intel64:/spec2017-icc2023.0/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"
```

## General Notes

```
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using 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
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

## Platform Notes

```
BIOS configuration:
Performance Profile Set to Load Balance
Enable LP [Global] Set to Single LP

Sysinfo program /spec2017-icc2023.0/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Jun 30 06:45:30 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. 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
   06:45:30 up 10 min,  2 users,  load average: 0.00, 0.01, 0.00
  USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty2      06:37   10.00s  0.85s  0.00s -bash
  root     pts/0     06:40   26.00s  0.08s  0.08s -bash

------------------------------------------------------------
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
```

**(Continued on next page)**

## Platform Notes (Continued)

```
   file size                  (blocks, -f) unlimited
   pending signals                    (-i) 2060181
   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) 2060181
   virtual memory             (kbytes, -v) unlimited
   file locks                         (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
 login -- root
 -bash
 -bash
 runcpu --define default-platform-flags -c ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=36
   --tune base,peak --iterations 2 -o all --define drop_caches fpspeed
 runcpu --define default-platform-flags --configfile ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define
   cores=36 --tune base,peak --iterations 2 --output_format all --define drop_caches --nopower --runmode
   speed --tune base:peak --size refspeed fpspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.057/templogs/preenv.fpspeed.057.0.log --lognum 057.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /spec2017-icc2023.0

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : Intel(R) Xeon(R) Gold 6416H
    vendor_id       : GenuineIntel
    cpu family      : 6
    model           : 143
    stepping        : 7
    microcode       : 0x2b000111
    bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores       : 18
    siblings        : 18
    2 physical ids (chips)
    36 processors (hardware threads)
    physical id 0: core ids 0-17
    physical id 1: core ids 0-17
    physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34
    physical id 1: apicids 128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162
  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):                          36
  On-line CPU(s) list:             0-35
  Vendor ID:                       GenuineIntel
```

**(Continued on next page)**

## Platform Notes (Continued)

```
  BIOS Vendor ID:                  Intel(R) Corporation
  Model name:                      Intel(R) Xeon(R) Gold 6416H
  BIOS Model name:                 Intel(R) Xeon(R) Gold 6416H
  CPU family:                      6
  Model:                           143
  Thread(s) per core:              1
  Core(s) per socket:              18
  Socket(s):                       2
  Stepping:                        7
  Frequency boost:                 enabled
  CPU max MHz:                     2201.0000
  CPU min MHz:                     800.0000
  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 nopl xtopology
                                   nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                                   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_l1d arch_capabilities
  Virtualization:                  VT-x
  L1d cache:                       1.7 MiB (36 instances)
  L1i cache:                       1.1 MiB (36 instances)
  L2 cache:                        72 MiB (36 instances)
  L3 cache:                        90 MiB (2 instances)
  NUMA node(s):                    2
  NUMA node0 CPU(s):               0-17
  NUMA node1 CPU(s):               18-35
  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

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       48K     1.7M   12 Data            1    64        1             64
     L1i       32K     1.1M    8 Instruction     1    64        1             64
     L2         2M      72M   16 Unified         2  2048        1             64
     L3        45M      90M   15 Unified         3 49152        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-17
```

(Continued on next page)

## Platform Notes (Continued)

```
  node 0 size: 257069 MB
  node 0 free: 255950 MB
  node 1 cpus: 18-35
  node 1 size: 258033 MB
  node 1 free: 257268 MB
  node distances:
  node   0   1
    0:  10  21
    1:  21  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       527465144 kB

------------------------------------------------------------
10. who -r
  run-level 5 Jun 30 06:35

------------------------------------------------------------
11. Systemd service manager version: systemd 250 (250-6.el9_0)
  Default Target  Status
  graphical       degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT         LOAD   ACTIVE SUB    DESCRIPTION
  * 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          ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                   accounts-daemon atd auditd avahi-daemon bluetooth chronyd crond cups dbus-broker gdm
                   getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt
                   low-memory-monitor lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname
                   nvmefc-boot-connections ostree-remount power-profiles-daemon qemu-guest-agent rhsmcertd
                   rsyslog rtkit-daemon selinux-autorelabel-mark sep5 smartd sshd sssd switcheroo-control
                   sysstat systemd-network-generator udisks2 upower vgauthd vmtoolsd
  enabled-runtime  systemd-remount-fs
  disabled         arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown
                   canberra-system-shutdown-reboot chrony-wait cni-dhcp console-getty cpupower cups-browsed
                   dbus-daemon debug-shell dnsmasq firewalld iprdump iprinit iprupdate iscsid iscsiuio kpatch
                   kvm_stat ledmon man-db-restart-cache-update nftables nvmf-autoconnect podman
                   podman-auto-update podman-restart psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts
                   rpmdb-rebuild serial-getty@ speech-dispatcherd sshd-keygen@ systemd-boot-check-no-failures
                   systemd-pstore systemd-sysext wpa_supplicant
  indirect         spice-vdagentd 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,gpt3)/boot/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
  root=UUID=cc4bab05-907e-44ef-b818-2b2874390234
  ro
  crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
  resume=UUID=5ba347ca-8beb-4f6e-9c11-de63dc4ddf5f
  rhgb
  quiet

------------------------------------------------------------
15. cpupower frequency-info
```

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## Platform Notes (Continued)

```
  analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 2.20 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+madvise [madvise] never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
  shmem_enabled   always within_size advise [never] deny force

------------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_shared           256
  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 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: /spec2017-icc2023.0
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda3      xfs   420G   49G  372G  12% /
```

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## Platform Notes (Continued)

```
------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         XFUSION
    Product:        2288H V7
    Product Family: Eagle Stream
    Serial:         serial

------------------------------------------------------------
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 M321R4GA3BB6-CQKDG 32 GB 2 rank 4800


------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       XFUSION
   BIOS Version:      2.00.55
   BIOS Date:         03/07/2023
   BIOS Revision:     0.55
```

## Compiler Version Notes

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

==============================================================================================================
C++, C, Fortran | 607.cactuBSSN_s(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         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
--------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
--------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 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.
```

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## Compiler Version Notes (Continued)

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## Base Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

## Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

## Base Optimization Flags

C benchmarks:
-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int
-mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte
-auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

## Peak Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

**(Continued on next page)**

## Peak Optimization Flags (Continued)

619.lbm_s: `basepeak = yes`

638.imagick_s: `basepeak = yes`

644.nab_s: `basepeak = yes`

Fortran benchmarks:

603.bwaves_s: `basepeak = yes`

649.fotonik3d_s: `basepeak = yes`

654.roms_s: `basepeak = yes`

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`

627.cam4_s: `-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs -align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

628.pop2_s: `basepeak = yes`

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

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

`http://www.spec.org/cpu2017/flags/Intel-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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