SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology

ThinkSystem SR650 V3
(2.10 GHz, Intel Xeon Platinum 8570)

$SPECspeed®2017\_fp\_base = 398$

$SPECspeed®2017\_fp\_peak = \text{Not Run}$
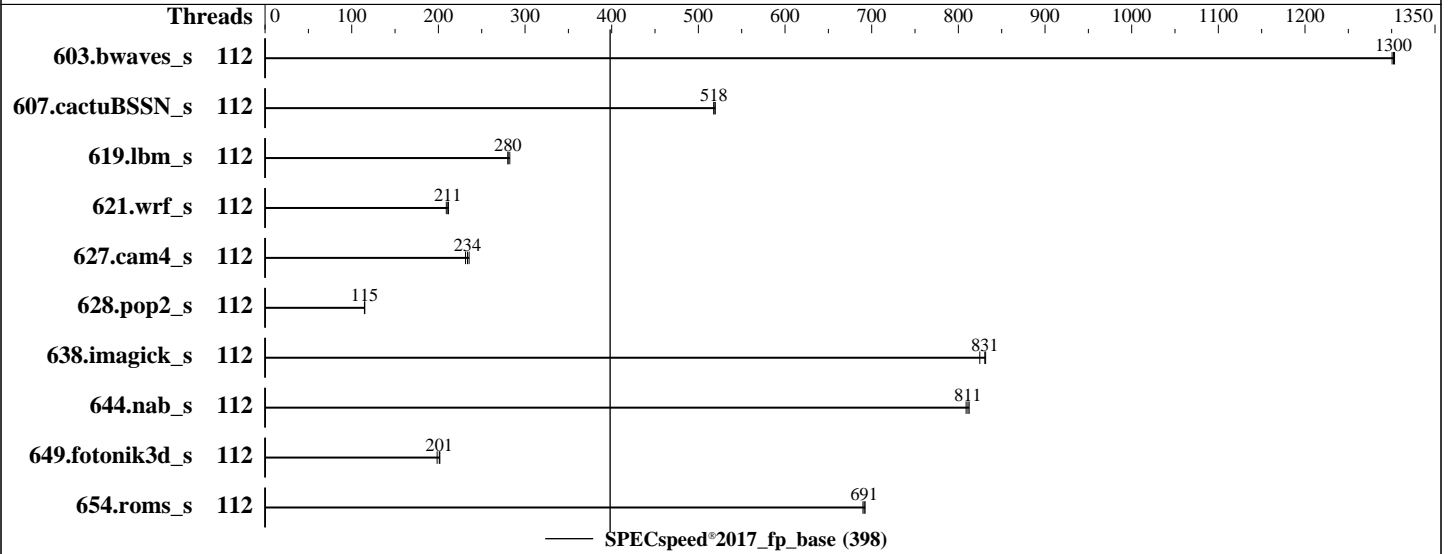
CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

Benchmark	Threads	Result
603.bwaves_s	112	1300
607.cactuBSSN_s	112	518
619.lbm_s	112	280
621.wrf_s	112	211
627.cam4_s	112	234
628.pop2_s	112	115
638.imagick_s	112	831
644.nab_s	112	811
649.fotonik3d_s	112	201
654.roms_s	112	691

SPECspeed®2017_fp_base (398)

Hardware

CPU Name: Intel Xeon Platinum 8570
 Max MHz: 4000
 Nominal: 2100
Enabled: 112 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: 300 MB I+D on chip per chip
 Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R)
Storage: 1 x 960 GB SATA SSD
Other: Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.2 (Plow)
 Kernel 5.14.0-284.11.1.el9_2.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: Yes
Firmware: Lenovo BIOS Version ESE121V 3.10 released Jan-2024
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						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	112	45.3	1300	**45.3**	**1300**	45.4	1300							
607.cactuBSSN_s	112	32.2	518	32.1	520	**32.2**	**518**							
619.lbm_s	112	18.7	280	18.5	282	**18.7**	**280**							
621.wrf_s	112	**62.7**	**211**	63.2	209	62.5	212							
627.cam4_s	112	37.6	235	**37.9**	**234**	38.3	231							
628.pop2_s	112	104	115	103	115	**103**	**115**							
638.imagick_s	112	17.5	825	**17.4**	**831**	17.3	831							
644.nab_s	112	21.5	812	21.6	809	**21.5**	**811**							
649.fotonik3d_s	112	45.2	202	45.9	199	**45.3**	**201**							
654.roms_s	112	22.7	692	22.8	690	**22.8**	**691**							

SPECspeed®2017_fp_base =	**398**
SPECspeed®2017_fp_peak =	**Not Run**

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 = "/home/cpu2017-1.1.9-ic2023.2.3/lib/intel64:/home/cpu2017-1.1.9-ic2023.2.3/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 Redhat Enterprise Linux 8.0
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

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Platform Notes

```
BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
Adjacent Cache Prefetch set to Disabled
Hyper-Threading set to Disabled
C-States set to Legacy
AMP Prefetch set to Enable

 Sysinfo program /home/cpu2017-1.1.9-ic2023.2.3/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Thu Feb 29 02:56:14 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 252 (252-13.el9_2)
 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 5.14.0-284.11.1.el9_2.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 12 10:45:03 EDT
   2023 x86_64 x86_64 x86_64 GNU/Linux


 ------------------------------------------------------------
 2. w
   02:56:14 up 2 min,  1 user,  load average: 0.14, 0.07, 0.02
   USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1       02:55   38.00s  0.76s  0.00s -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
```

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Platform Notes (Continued)

```
    data seg size              (kbytes, -d) unlimited
    scheduling priority             (-e) 0
    file size                  (blocks, -f) unlimited
    pending signals                 (-i) 4126977
    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) 4126977
    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 --nobuild --action validate --define default-platform-flags -c
   ic2023.2.3-lin-core-avx512-speed-20231121.cfg --define cores=112 --tune base -o all --define drop_caches
   fpspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2023.2.3-lin-core-avx512-speed-20231121.cfg --define cores=112 --tune base --output_format all --define
   drop_caches --nopower --runmode speed --tune base --size refspeed fpspeed --nopreenv --note-preenv
   --logfile $SPEC/tmp/CPU2017.249/templogs/preenv.fpspeed.249.0.log --lognum 249.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017-1.1.9-ic2023.2.3


    ----------------------------------------------------------
6. /proc/cpuinfo
    model name       : INTEL(R) XEON(R) PLATINUM 8570
    vendor_id        : GenuineIntel
    cpu family       : 6
    model            : 207
    stepping         : 2
    microcode        : 0x21000200
    bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
    cpu cores        : 56
    siblings         : 56
    2 physical ids (chips)
    112 processors (hardware threads)
    physical id 0: core ids 0-55
    physical id 1: core ids 0-55
    physical id 0: apicids
    0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
    ,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110
    physical id 1: apicids
    128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162,164,166,168,170,172,174,176,178,1
    80,182,184,186,188,190,192,194,196,198,200,202,204,206,208,210,212,214,216,218,220,222,224,226,228,230,23
    2,234,236,238
 Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
 virtualized systems.  Use the above data carefully.


    ----------------------------------------------------------
 7. lscpu
```

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Platform Notes (Continued)

```
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):                      112
  On-line CPU(s) list:         0-111
  Vendor ID:                   GenuineIntel
  BIOS Vendor ID:              Intel(R) Corporation
  Model name:                  INTEL(R) XEON(R) PLATINUM 8570
  BIOS Model name:             INTEL(R) XEON(R) PLATINUM 8570
  CPU family:                  6
  Model:                       207
  Thread(s) per core:          1
  Core(s) per socket:          56
  Socket(s):                   2
  Stepping:                    2
  BogoMIPS:                    4200.00
  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 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 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 ibt amx_bf16
                               avx512_fp16 amx_tile amx_int8 flush_l1d arch_capabilities
  Virtualization:              VT-x
  L1d cache:                   5.3 MiB (112 instances)
  L1i cache:                   3.5 MiB (112 instances)
  L2 cache:                    224 MiB (112 instances)
  L3 cache:                    600 MiB (2 instances)
  NUMA node(s):                2
  NUMA node0 CPU(s):           0-55
  NUMA node1 CPU(s):           56-111
  Vulnerability Itlb multihit: Not affected
  Vulnerability L1tf:          Not affected
  Vulnerability Mds:           Not affected
  Vulnerability Meltdown:      Not affected
  Vulnerability Mmio stale data: Not affected
  Vulnerability Retbleed:      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, PBRSB-eIBRS SW
                               sequence
  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     5.3M   12 Data            1     64        1             64
     L1i       32K     3.5M    8 Instruction     1     64        1             64
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

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Platform Notes (Continued)

```
    L2          2M     224M   16 Unified      2   2048      1           64
    L3        300M     600M   20 Unified      3 245760      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: 0-55
   node 0 size: 515708 MB
   node 0 free: 514335 MB
   node 1 cpus: 56-111
   node 1 size: 516078 MB
   node 1 free: 515062 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10


 -----------------------------------------------------------
 9. /proc/meminfo
   MemTotal:       1056549612 kB


 -----------------------------------------------------------
 10. who -r
   run-level 3 Feb 29 02:54


 -----------------------------------------------------------
 11. Systemd service manager version: systemd 252 (252-13.el9_2)
   Default Target  Status
   multi-user      running


 -----------------------------------------------------------
 12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         NetworkManager NetworkManager-dispatcher NetworkManager-wait-online atd auditd bluetooth
                   chronyd crond dbus-broker firewalld getty@ insights-client-boot irqbalance iscsi
                   iscsi-onboot kdump libstoragemgmt low-memory-monitor lvm2-monitor mcelog mdmonitor
                   microcode multipathd nis-domainname nvmefc-boot-connections rhsmcertd rsyslog rtkit-daemon
                   selinux-autorelabel-mark smartd sshd sssd systemd-boot-update systemd-network-generator
                   tuned udisks2 upower
   enabled-runtime systemd-remount-fs
   disabled        arp-ethers blk-availability canberra-system-bootup canberra-system-shutdown
                   canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell
                   dnf-system-upgrade iprdump iprinit iprupdate iscsid iscsiuio kpatch kvm_stat ledmon
                   man-db-restart-cache-update nftables nvmf-autoconnect pesign psacct rdisc rhcd rhsm
                   rhsm-facts rpmdb-rebuild selinux-check-proper-disable 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 systemd-sysupdate
                   systemd-sysupdate-reboot


 -----------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=(hd3,gpt2)/vmlinuz-5.14.0-284.11.1.el9_2.x86_64
   root=/dev/mapper/rhel-root
   ro
   resume=/dev/mapper/rhel-swap
   rd.lvm.lv=rhel/root
   rd.lvm.lv=rhel/swap
   rhgb
   quiet
```

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Platform Notes (Continued)

```
        ----------------------------------------------------------
        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+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 9.2 (Plow)
          redhat-release Red Hat Enterprise Linux release 9.2 (Plow)
          system-release Red Hat Enterprise Linux release 9.2 (Plow)

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

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Platform Notes (Continued)

```
  20. Disk information
 SPEC is set to: /home/cpu2017-1.1.9-ic2023.2.3
   Filesystem              Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   819G   54G  765G   7% /home

 ----------------------------------------------------------------
 21. /sys/devices/virtual/dmi/id
     Vendor:         Lenovo
     Product:        ThinkSystem SR650 V3 MB,EGS,DDR5,SH,2U
     Product Family: ThinkSystem
     Serial:         1234567890

 ----------------------------------------------------------------
 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:
     5x Samsung M321R8GA0PB0-CWMKH 64 GB 2 rank 5600
     11x Samsung M321R8GA0PB0-CWMXH 64 GB 2 rank 5600


 ----------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:       Lenovo
     BIOS Version:      ESE121V-3.10
     BIOS Date:         01/09/2024
     BIOS Revision:     3.10
     Firmware Revision: 3.90
```

Compiler Version Notes

```
==============================================================================
C              | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
------------------------------------------------------------------------------
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 | 607.cactuBSSN_s(base)
------------------------------------------------------------------------------
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        | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------
```

(Continued on next page)

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Compiler Version Notes (Continued)

```
==============================================================================
Fortran, C    | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
------------------------------------------------------------------------------
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`

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:
`-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp`
`-DSPEC_OPENMP -Wno-implicit-int -L/usr/local/jemalloc64-5.0.1/lib`

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/

Lenovo Global Technology

ThinkSystem SR650 V3
(2.10 GHz, Intel Xeon Platinum 8570)

SPECspeed®2017_fp_base =   398

SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

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

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-ljemalloc
```

Fortran benchmarks:
```
-w -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-AA.html
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-AA.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml

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