SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology
(Test Sponsor: Lenovo Global Technology)

$SPECspeed®2017\_fp\_base = 397$

ThinkSystem SR860 V3
(1.90 GHz, Intel Xeon Platinum 8490H)

$SPECspeed®2017\_fp\_peak = Not Run$

CPU2017 License: 9017	**Test Date:** Jul-2023
Test Sponsor: Lenovo Global Technology	**Hardware Availability:** Jun-2023
Tested by: Lenovo Global Technology	**Software Availability:** Dec-2022

Threads graph (SPECspeed®2017_fp_base (397)):

Benchmark	Threads	Result
603.bwaves_s	240	1500
607.cactuBSSN_s	240	407
619.lbm_s	240	364
621.wrf_s	240	210
627.cam4_s	240	181
628.pop2_s	240	89.6
638.imagick_s	240	603
644.nab_s	240	1090
649.fotonik3d_s	240	197
654.roms_s	240	988

Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
Enabled: 240 cores, 4 chips
Orderable: 2,4 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 112.5 MB I+D on chip per chip
 Other: None
Memory: 1 TB (32 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64)
 Kernel 5.14.21-150400.22-default
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: Lenovo BIOS Version RSE105E 1.10 released May-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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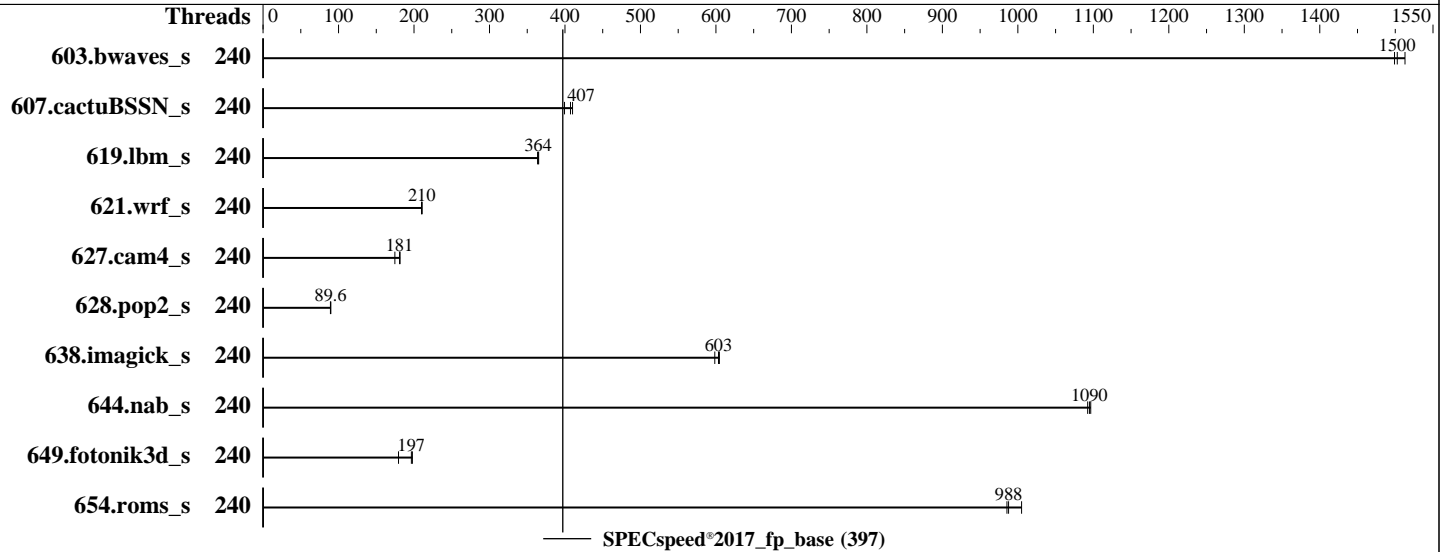SPECspeed®2017_fp_base =   397

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CPU2017 License: 9017	**Test Date:** Jul-2023
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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	240	**39.3**	**1500**	39.0	1510	39.4	1500							
607.cactuBSSN_s	240	40.7	410	41.7	399	**40.9**	**407**							
619.lbm_s	240	**14.4**	**364**	14.4	364	14.3	365							
621.wrf_s	240	62.8	211	**62.8**	**210**	63.0	210							
627.cam4_s	240	**49.0**	**181**	48.8	182	50.8	175							
628.pop2_s	240	133	89.3	132	89.7	**133**	**89.6**							
638.imagick_s	240	24.1	598	23.9	605	**23.9**	**603**							
644.nab_s	240	15.9	1100	**16.0**	**1090**	16.0	1090							
649.fotonik3d_s	240	**46.4**	**197**	46.1	198	50.8	179							
654.roms_s	240	16.0	986	15.7	1000	**15.9**	**988**							
SPECspeed®2017_fp_base =		**397**												
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-ic2023.0/lib/intel64:/home/cpu2017-1.1.9-ic2023.0/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 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
```

Platform Notes

```
 BIOS configuration:
 Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
```

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Platform Notes (Continued)

```
Hyper-Threading set to Disabled
Adjacent Cache Prefetch set to Disabled
DCU IP Prefetcher set to Disabled

 Sysinfo program /home/cpu2017-1.1.9-ic2023.0/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Mon Jul 24 09:56:01 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 249 (249.11+suse.124.g2bc0b2c447)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
 ------------------------------------------------------------

 ------------------------------------------------------------
 1. uname -a
   Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux

 ------------------------------------------------------------
 2. w
    09:56:01 up 19:02,  1 user,  load average: 51.49, 157.41, 189.26
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                Sun14   25:49   1.05s  0.00s -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) 4126750
   max locked memory       (kbytes, -l) 64
```

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Platform Notes (Continued)

```
    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) 4126750
    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
 -bash
 runcpu --nobuild --action validate --define default-platform-flags -c
   ic2023.0-lin-core-avx512-speed-20221201.cfg --define cores=240 --tune base -o all --define drop_caches
   fpspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2023.0-lin-core-avx512-speed-20221201.cfg --define cores=240 --tune base --output_format all --define
   drop_caches --nopower --runmode speed --tune base --size refspeed fpspeed --nopreenv --note-preenv
   --logfile $SPEC/tmp/CPU2017.062/templogs/preenv.fpspeed.062.0.log --lognum 062.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017-1.1.9-ic2023.0

    ------------------------------------------------------------
6. /proc/cpuinfo
    model name       : Intel(R) Xeon(R) Platinum 8490H
    vendor_id        : GenuineIntel
    cpu family       : 6
    model            : 143
    stepping         : 8
    microcode        : 0x2b0001b0
    bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores        : 60
    siblings         : 60
    4 physical ids (chips)
    240 processors (hardware threads)
    physical id 0: core ids 0-59
    physical id 1: core ids 0-59
    physical id 2: core ids 0-59
    physical id 3: core ids 0-59
    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
    ,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118
    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
    2,234,236,238,240,242,244,246
    physical id 2: apicids
    256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290,292,294,296,298,300,302,304,306,3
    08,310,312,314,316,318,320,322,324,326,328,330,332,334,336,338,340,342,344,346,348,350,352,354,356,358,36
    0,362,364,366,368,370,372,374
    physical id 3: apicids
    384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418,420,422,424,426,428,430,432,434,4
    36,438,440,442,444,446,448,450,452,454,456,458,460,462,464,466,468,470,472,474,476,478,480,482,484,486,48
    8,490,492,494,496,498,500,502
```

(Continued on next page)

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Platform Notes (Continued)

```
    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 2.37.2:
      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):                    240
      On-line CPU(s) list:       0-239
      Vendor ID:                 GenuineIntel
      Model name:                Intel(R) Xeon(R) Platinum 8490H
      CPU family:                6
      Model:                     143
      Thread(s) per core:        1
      Core(s) per socket:        60
      Socket(s):                 4
      Stepping:                  8
      BogoMIPS:                  3800.00
      Flags:                     fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                                 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                                 lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                                 nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 ds_cpl
                                 vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2
                                 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
                                 abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3 invpcid_single
                                 intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
                                 flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
                                 erms invpcid rtm 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:                 11.3 MiB (240 instances)
      L1i cache:                 7.5 MiB (240 instances)
      L2 cache:                  480 MiB (240 instances)
      L3 cache:                  450 MiB (4 instances)
      NUMA node(s):              4
      NUMA node0 CPU(s):         0-59
      NUMA node1 CPU(s):         60-119
      NUMA node2 CPU(s):         120-179
      NUMA node3 CPU(s):         180-239
      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 and seccomp
      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:
```

(Continued on next page)

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Platform Notes (Continued)

```
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL    SETS PHY-LINE COHERENCY-SIZE
      L1d     48K     11.3M   12 Data          1    64       1             64
      L1i     32K      7.5M    8 Instruction   1    64       1             64
      L2       2M      480M   16 Unified       2  2048       1             64
      L3   112.5M      450M   15 Unified       3 122880      1             64

    ----------------------------------------------------------------
    8. numactl --hardware
    NOTE: a numactl 'node' might or might not correspond to a physical chip.
      available: 4 nodes (0-3)
      node 0 cpus: 0-59
      node 0 size: 257659 MB
      node 0 free: 254926 MB
      node 1 cpus: 60-119
      node 1 size: 258032 MB
      node 1 free: 257441 MB
      node 2 cpus: 120-179
      node 2 size: 258032 MB
      node 2 free: 257423 MB
      node 3 cpus: 180-239
      node 3 size: 257986 MB
      node 3 free: 257384 MB
      node distances:
      node   0   1   2   3
        0:  10  21  21  21
        1:  21  10  21  21
        2:  21  21  10  21
        3:  21  21  21  10

    ----------------------------------------------------------------
    9. /proc/meminfo
      MemTotal:       1056472708 kB

    ----------------------------------------------------------------
    10. who -r
      run-level 3 Jul 23 14:54

    ----------------------------------------------------------------
    11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
      Default Target  Status
      multi-user      running

    ----------------------------------------------------------------
    12. Services, from systemctl list-unit-files
      STATE           UNIT FILES
      enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ haveged irqbalance
                      issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
                      smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
      enabled-runtime systemd-remount-fs
      disabled        autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                      chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                      firewalld gpm grub2-once haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load
                      lunmask man-db-create multipathd nfs nfs-blkmap rdisc rpcbind rpmconfigcheck rsyncd
                      serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
                      systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd
      indirect        wickedd

    ----------------------------------------------------------------
    13. Linux kernel boot-time arguments, from /proc/cmdline
      BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
```

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Platform Notes (Continued)

```
  root=UUID=07b494b8-a782-4eba-84f2-ef5cae789da8
  splash=silent
  mitigations=auto
  quiet
  security=apparmor


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


  ----------------------------------------------------------
15. 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

  ----------------------------------------------------------
16. /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


  ----------------------------------------------------------
17. /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


  ----------------------------------------------------------
18. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP4

  ----------------------------------------------------------
19. Disk information
```

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Platform Notes (Continued)

```
  SPEC is set to: /home/cpu2017-1.1.9-ic2023.0
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda3       xfs   445G   12G  433G   3% /

   ----------------------------------------------------------
   20. /sys/devices/virtual/dmi/id
       Vendor:        Lenovo
       Product:       ThinkSystem SR860 V3
       Product Family: ThinkSystem
       Serial:        None

   ----------------------------------------------------------
   21. 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:
       19x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
        6x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
        4x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
        3x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800


   ----------------------------------------------------------
   22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
       BIOS Vendor:     Lenovo
       BIOS Version:    RSE105E-1.10
       BIOS Date:       05/12/2023
       BIOS Revision:   1.10
       Firmware Revision: 1.10
```

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 2023.0.0 Build 20221201
Copyright (C) 1985-2022 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 2023.0.0 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) 649.fotonik3d_s(base) 654.roms_s(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.
----------------------------------------------------------------------------------------------
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CPU2017 License: 9017		**Test Date:**	Jul-2023
Test Sponsor: Lenovo Global Technology		**Hardware Availability:** Jun-2023
Tested by: Lenovo Global Technology		**Software Availability:** Dec-2022

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 2023.0.0 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`

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 -xCORE-AVX512 -Ofast -ffast-math -flto`
`-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp`

(Continued on next page)

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

SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology
(Test Sponsor: Lenovo Global Technology)

ThinkSystem SR860 V3
(1.90 GHz, Intel Xeon Platinum 8490H)

SPECspeed®2017_fp_base = 397

SPECspeed®2017_fp_peak = Not Run

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Base Optimization Flags (Continued)

C benchmarks (continued):
```
-DSPEC_OPENMP -Wno-implicit-int -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc
```

Fortran benchmarks:
```
-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:
```
-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++:
```
-m64 -std=c++14 -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/Intel-ic2023-official-linux64.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-W.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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Eaglestream-W.xml

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

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