SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology

$SPECspeed®2017\_fp\_base = 322$

ThinkSystem SR630 V4
(3.00 GHz, Intel Xeon 6527P)

$SPECspeed®2017\_fp\_peak$ = Not Run

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

Test Date: Mar-2025
Hardware Availability: May-2025
Software Availability: Jun-2024

Threads		Result
603.bwaves_s	48	1280
607.cactuBSSN_s	48	362
619.lbm_s	48	327
621.wrf_s	48	201
627.cam4_s	48	153
628.pop2_s	48	76.4
638.imagick_s	48	678
644.nab_s	48	631
649.fotonik3d_s	48	195
654.roms_s	48	403

Scale: 0 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1050 1150 1300

SPECspeed®2017_fp_base (322)

Hardware

CPU Name: Intel Xeon 6527P
 Max MHz: 4200
 Nominal: 3000
Enabled: 48 cores, 2 chips
Orderable: 1,2 chips
Cache L1: 64 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 144 MB I+D on chip per chip
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC5-6400B-R)
Storage: 1 x 960 GB NVME SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP6
 Kernel 6.4.0-150600.21-default
Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2024.1 of Intel Fortran Compiler
 for Linux;
Parallel: Yes
Firmware: Lenovo BIOS Version IHE109T 1.20 released Feb-2025
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 set to prefer performance at the cost of
 additional power usage

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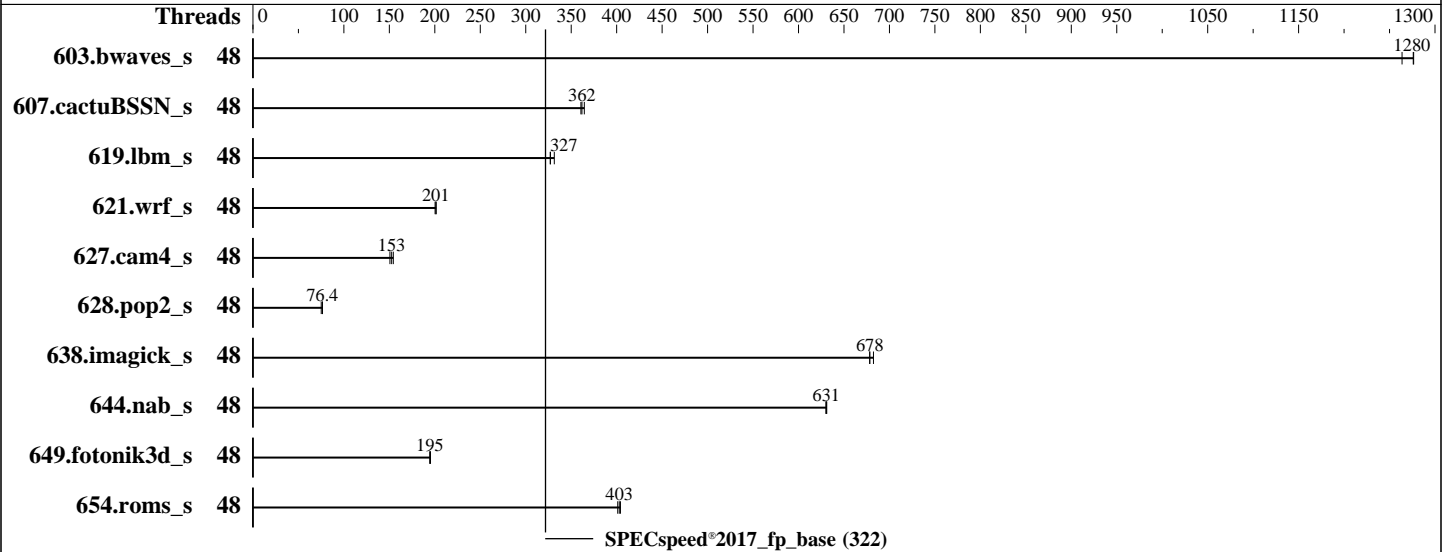|	
CPU2017 License: 9017	**Test Date:** Mar-2025
Test Sponsor: Lenovo Global Technology	**Hardware Availability:** May-2025
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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	48	46.2	1280	46.7	1260	**46.2**	**1280**							
607.cactuBSSN_s	48	46.2	361	45.7	364	**46.1**	**362**							
619.lbm_s	48	15.8	331	16.0	327	**16.0**	**327**							
621.wrf_s	48	**65.7**	**201**	66.0	200	65.6	201							
627.cam4_s	48	57.4	154	**58.1**	**153**	58.8	151							
628.pop2_s	48	155	76.5	158	75.1	**155**	**76.4**							
638.imagick_s	48	**21.3**	**678**	21.1	682	21.3	678							
644.nab_s	48	27.7	630	**27.7**	**631**	27.7	631							
649.fotonik3d_s	48	46.7	195	**46.8**	**195**	46.9	195							
654.roms_s	48	39.2	401	39.0	404	**39.1**	**403**							

SPECspeed®2017_fp_base = **322**

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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-ic2024.1/lib/intel64:/home/cpu2017-1.1.9-ic2024.1/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:
 Workload Profile set to General Computing - Max Performance
```

(Continued on next page)

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Platform Notes (Continued)

```
Hyper-Threading set to Disabled
Adjacent Cache Prefetch set to Disabled
LLC Prefetch set to Enabled
Page Policy set to Adaptive

 Sysinfo program /home/cpu2017-1.1.9-ic2024.1/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Mar 11 17:22:26 2025

 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 254 (254.10+suse.84.ge8d77af424)
 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 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
   x86_64 x86_64 x86_64 GNU/Linux


 ------------------------------------------------------------
 2. w
    17:22:26 up 3 min,  1 user,  load average: 0.00, 0.02, 0.00
   USER      TTY       FROM             LOGIN@   IDLE   JCPU   PCPU WHAT


 ------------------------------------------------------------
 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) 2063001
   max locked memory       (kbytes, -l) 8192
```

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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) 2063001
   virtual memory           (kbytes, -v) unlimited
   file locks                     (-x) unlimited

   ------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=42
 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
 sshd: root [priv]
 sshd: root@notty
 /bin/bash ./02.remote_local_SPECcpu_1.01.sh
 sh Run553-compliant-ic2024.1-lin-sapphirerapids-speedfp-base-smt-off-20240308.sh
 runcpu --nobuild --action validate --define default-platform-flags -c
   ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=48 --tune base -o all --define drop_caches
   fpspeed
 runcpu --nobuild --action validate --define default-platform-flags --configfile
   ic2024.1-lin-sapphirerapids-speed-20240308.cfg --define cores=48 --tune base --output_format all --define
   drop_caches --nopower --runmode speed --tune base --size refspeed fpspeed --nopreenv --note-preenv
   --logfile $SPEC/tmp/CPU2017.098/templogs/preenv.fpspeed.098.0.log --lognum 098.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-ic2024.1

   ------------------------------------------------------------
6. /proc/cpuinfo
   model name        : Intel(R) Xeon(R) 6527P
   vendor_id         : GenuineIntel
   cpu family        : 6
   model             : 173
   stepping          : 1
   microcode         : 0x1000380
   bugs              : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
   cpu cores         : 24
   siblings          : 24
   2 physical ids (chips)
   48 processors (hardware threads)
   physical id 0: core ids 0-23
   physical id 1: core ids 0-23
   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
   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
 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 2.39.3:
 Architecture:                    x86_64
 CPU op-mode(s):                  32-bit, 64-bit
 Address sizes:                   52 bits physical, 57 bits virtual
 Byte Order:                      Little Endian
 CPU(s):                          48
 On-line CPU(s) list:             0-47
```

(Continued on next page)

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Platform Notes (Continued)

```
Vendor ID:                         GenuineIntel
BIOS Vendor ID:                    Intel(R) Corporation
Model name:                        Intel(R) Xeon(R) 6527P
BIOS Model name:                   Intel(R) Xeon(R) 6527P UNKNOWN CPU @ 3.0GHz
BIOS CPU family:                   179
CPU family:                        6
Model:                             173
Thread(s) per core:                1
Core(s) per socket:                24
Socket(s):                         2
Stepping:                          1
BogoMIPS:                          6000.00
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 intel_ppin cdp_l2
                                   ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow 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 user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida
                                   arat pln pts vnmi 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:                         2.3 MiB (48 instances)
L1i cache:                         3 MiB (48 instances)
L2 cache:                          96 MiB (48 instances)
L3 cache:                          288 MiB (2 instances)
NUMA node(s):                      2
NUMA node0 CPU(s):                 0-23
NUMA node1 CPU(s):                 24-47
Vulnerability Gather data sampling:  Not affected
Vulnerability Itlb multihit:       Not affected
Vulnerability L1tf:                Not affected
Vulnerability Mds:                 Not affected
Vulnerability Meltdown:            Not affected
Vulnerability Mmio stale data:     Not affected
Vulnerability Reg file data sampling: Not affected
Vulnerability Retbleed:            Not affected
Vulnerability Spec rstack overflow:  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 / Automatic IBRS; IBPB conditional; RSB filling;
                                   PBRSB-eIBRS Not affected; BHI BHI_DIS_S
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     2.3M   12 Data            1     64        1             64
     L1i       64K       3M   16 Instruction     1     64        1             64
     L2         2M      96M   16 Unified         2   2048        1             64
```

(Continued on next page)

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Platform Notes (Continued)

```
     L3       144M      288M   16 Unified         3 147456       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: 0-23
  node 0 size: 257750 MB
  node 0 free: 256886 MB
  node 1 cpus: 24-47
  node 1 size: 258026 MB
  node 1 free: 257365 MB
  node distances:
  node   0   1
    0:  10  21
    1:  21  10


     ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       528155428 kB


     ------------------------------------------------------------
10. who -r
   run-level 3 Mar 11 17:19


     ------------------------------------------------------------
11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
   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@ irqbalance issue-generator
                   kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections nvmf-autoconnect postfix
                   purge-kernels rollback rsyslog smartd sshd systemd-pstore 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 fsidd gpm grub2-once haveged ipmi ipmievd issue-add-ssh-keys kexec-load lunmask
                   man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd serial-getty@
                   smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures systemd-confext
                   systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd
   generated       ntp_sync
   indirect        systemd-userdbd wickedd


     ------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
   root=UUID=c5be0e33-36a7-4fb1-a8dd-78aa43a6d2d8
   splash=silent
   mitigations=auto
   quiet
   security=apparmor


     ------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 15:
     Unable to determine current policy
```

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Platform Notes (Continued)

```
    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 SP6

    -------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017-1.1.9-ic2024.1
  Filesystem    Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p3 xfs   893G  48G  846G   6% /

    -------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Lenovo
    Product:        ThinkSystem SR630 V4
    Product Family: ThinkSystem
    Serial:         0987654321
```

(Continued on next page)

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Platform Notes (Continued)

```
      ------------------------------------------------------------
   21. dmidecode
     Additional information from dmidecode 3.4 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:
       3x Samsung M321R4GA3PB2-CCPEC 32 GB 2 rank 6400
       9x Samsung M321R4GA3PB2-CCPKC 32 GB 2 rank 6400
       4x Samsung M321R4GA3PB2-CCPPC 32 GB 2 rank 6400


      ------------------------------------------------------------
   22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:       Lenovo
     BIOS Version:      IHE109T-1.20
     BIOS Date:         02/28/2025
     BIOS Revision:     1.20
     Firmware Revision: 1.20
```

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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------


==============================================================================================
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 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------
```

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

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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:
```
-w -std=c11 -m64 -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:
```
-w -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xsapphirerapids -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 -xsapphirerapids -Ofast -ffast-math
```

(Continued on next page)

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

Lenovo Global Technology

ThinkSystem SR630 V4
(3.00 GHz, Intel Xeon 6527P)

SPECspeed®2017_fp_base = 322

SPECspeed®2017_fp_peak = Not Run

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

Test Date: Mar-2025
Hardware Availability: May-2025
Software Availability: Jun-2024

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
```
-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++:
```
-w -std=c++14 -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
```

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-Birchstream-C.html
http://www.spec.org/cpu2017/flags/Intel-ic2024-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-Birchstream-C.xml
http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml

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