### Lenovo Global Technology

ThinkSystem SR250 V2  
(3.70 GHz, Intel Xeon E-2374G)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<tbody>
<tr>
<td>43.9</td>
<td>44.3</td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  

**Hardware**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Result</th>
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<tr>
<td>503.bwaves_r</td>
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<tr>
<td>507.cactuBSSN_r</td>
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<tr>
<td>508.namd_r</td>
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<tr>
<td>510.parest_r</td>
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<td>511.povray_r</td>
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<td>519.lbm_r</td>
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<td>521.wrf_r</td>
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<td>526.blender_r</td>
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<td>527.cam4_r</td>
<td>4</td>
<td>27.4</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>4</td>
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<td>544.nab_r</td>
<td>4</td>
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<td>549.fotonik3d_r</td>
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</tr>
<tr>
<td>554.roms_r</td>
<td>4</td>
<td>63.4</td>
</tr>
</tbody>
</table>

**Software**

| OS | SUSE Linux Enterprise Server 15 SP3 (x86_64)  
Kernel 5.3.18-57-default |
|---|---|
| Compiler | C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;  
Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;  
C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux |
| Firmware | Lenovo BIOS Version TQE104H 1.01 released Jun-2022 tested as TQE103G 1.01 Apr-2022 |
| File System | xfs |
| System State | Run level 3 (multi-user) |
| Base Pointers | 64-bit |
| Peak Pointers | 64-bit |
| Other | jemalloc memory allocator V5.0.1 |
| Power Management | BIOS and OS set to prefer performance at the cost of additional power usage |

---

**CPU Name:** Intel Xeon E-2374G  
**Max MHz:** 5000  
**Nominal:** 3700  
**Enabled:** 4 cores, 1 chip  
**Orderable:** 1 chip  
**Cache L1:** 32 KB I + 48 KB D on chip per core  
**L2:** 512 KB I+D on chip per core  
**L3:** 8 MB I+D on chip per chip  
**Other:** None  
**Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-3200AA-E, running at 2933)  
**Storage:** 1 x 960 GB SATA SSD  
**Other:** None  

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https://www.spec.org/
Lenovo Global Technology
ThinkSystem SR250 V2
(3.70 GHz, Intel Xeon E-2374G)

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

SPECrate®2017_fp_base = 43.9
SPECrate®2017_fp_peak = 44.3

Test Date: May-2022
Hardware Availability: Apr-2022
Software Availability: Jun-2021

Results Table

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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>32.9</td>
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<tr>
<td>554.roms_r</td>
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<td>19.5</td>
<td>326</td>
<td>19.5</td>
<td>329</td>
<td>19.3</td>
</tr>
</tbody>
</table>

| Peak           |       |         |       |       |       |         |       |
|                |      |         |       |       |       |         |       |
| 503.bwaves_r   |  4  |  427    | 94.0  |  425  | 94.3  |  426    | 94.1  |
| 507.cactusBBSSN_r |  4  |  73.5   | 68.9  |  72.0  | 70.3  |  74.7    | 67.8  |
| 508.namd_r     |  4  |  115    | 32.9  |  116  | 32.8  |  115    | 33.0  |
| 510.parest_r   |  4  |  376    | 27.8  |  384  | 27.3  |  383    | 27.3  |
| 511.povray_r   |  4  |  195    | 47.9  |  194  | 48.2  |  195    | 47.9  |
| 519.lbm_r      |  4  |  123    | 34.4  |  122  | 34.5  |  123    | 34.4  |
| 521.wrf_r      |  4  |  209    | 42.9  |  208  | 43.2  |  208    | 43.1  |
| 526.blender_r  |  4  |  172    | 35.5  |  172  | 35.4  |  172    | 35.5  |
| 527.cam4_r     |  4  |  169    | 41.4  |  169  | 41.4  |  169    | 41.4  |
| 538.imagick_r  |  4  |  91.2   | 109   |  89.2 | 111   |  89.2    | 111  |
| 544.nab_r      |  4  |  109    | 62.0  |  110  | 61.3  |  108    | 62.3  |
| 549.fotonik3d_r|  4  |  568    | 27.4  |  568  | 27.4  |  568    | 27.5  |
| 554.roms_r     |  4  |  325    | 19.5  |  326  | 19.5  |  329    | 19.3  |

SPECrate®2017_fp_base = 43.9
SPECrate®2017_fp_peak = 44.3

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

Submit Notes
The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
MALLOC_CONF = "retain:true"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7940X CPU + 64GB RAM
memory using openSUSE Leap 15.2
Transparent Huge Pages disabled by default
echo never > /sys/kernel/mm/transparent_hugepage/enabled

(Continued on next page)
## SPEC CPU®2017 Floating Point Rate Result

**Lenovo Global Technology**

ThinkSystem SR250 V2  
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<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>May-2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Apr-2022</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Jun-2021</td>
</tr>
</tbody>
</table>

### General Notes (Continued)

```plaintext
echo never > /sys/kernel/mm/transparent_hugepage/defrag
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
```

### Platform Notes

**BIOS configuration:**
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Legacy
Hyper-Threading set to Disabled

**Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revA-update1/bin/sysinfo**
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Fri May 27 08:13:06 2022

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
```
model name : Intel(R) Xeon(R) E-2374G CPU @ 3.70GHz
  1 "physical id"s (chips)
  4 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 4
siblings : 4
physical 0: cores 0 1 2 3
```

From lscpu from util-linux 2.36.2:
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 39 bits physical, 48 bits virtual
CPU(s): 4
On-line CPU(s) list: 0-3
```

---

*Continued on next page*
Lenovo Global Technology
ThinkSystem SR250 V2
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SPECrate®2017_fp_base = 43.9
SPECrate®2017_fp_peak = 44.3

Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 167
Model name: Intel(R) Xeon(R) E-2374G CPU @ 3.70GHz
Stepping: 1
CPU MHz: 4971.795
BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 192 KiB
L1i cache: 128 KiB
L2 cache: 2 MiB
L3 cache: 8 MiB
NUMA node0 CPU(s): 0-3
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
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
      pdxem64 dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xptr pdcml pcid sse4_1 sse4_2 x2apic movbe popcnt
tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
ebp invpcid_single ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority
      ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid mpx avx512f
      avx512dq rdseed adx smap avx512ifma ciflushopt intel_pt avx512cd sha_ni avx512bw
      avx512vl xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts avx512v bmi umip pku
      ospke avx512_vbmi2 gfn vaes vpcmnlqdq avx512_vnni avx512_bitalg avx512_vpopcntdq
      rdpid fshr md_clear flush_lld arch_capabilities

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d  48K  192K  12 Data           1   64   1   64
L1i  128K  32K   8 Instruction     1   64   1   64
L2   512K  2M   8 Unified          2 1024  1   64

(Continued on next page)
Lenovo Global Technology
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Test Date: May-2022
Hardware Availability: Apr-2022
Software Availability: Jun-2021

Platform Notes (Continued)

/proc/cpuinfo cache data
    cache size : 8192 KB

From numactl --hardware
    WARNING: a numactl 'node' might or might not correspond to a physical chip.
    available: 1 nodes (0)
    node 0 cpus: 0 1 2 3
    node 0 size: 64234 MB
    node 0 free: 63070 MB
    node distances:
    node 0
    0: 10

From /proc/meminfo
    MemTotal: 65776192 kB
    HugePages_Total: 0
    Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
    os-release:
        NAME="SLES"
        VERSION="15-SP3"
        VERSION_ID="15.3"
        PRETTY_NAME="SUSE Linux Enterprise Server 15 SP3"
        ID="sles"
        ID_LIKE="suse"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:15:sp3"

uname -a:
    Linux localhost 5.3.18-57-default #1 SMP Wed Apr 28 10:54:41 UTC 2021 (ba3c2e9) x86_64
    x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):
    Not affected
CVE-2018-3620 (L1 Terminal Fault):
    Not affected
Microarchitectural Data Sampling:
    Not affected
CVE-2017-5754 (Meltdown):
    Not affected
CVE-2018-3639 (Speculative Store Bypass):
    Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):
    Mitigation: usercopy/swaps barriers and __user pointer sanitization

(Continued on next page)
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Test Date: May-2022
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Software Availability: Jun-2021

Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB:
conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 27 06:35

SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revA-update1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3 xfs 892G 35G 858G 4% /

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR250 V2
Product Family: ThinkSystem
Serial: 1234567890

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:
4x SK Hynix HMA82GU7DJR8N-XN 16 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: Lenovo
BIOS Version: TQE103G-1.01
BIOS Date: 04/19/2022
BIOS Revision: 1.1
Firmware Revision: 1.96

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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==============================================================================

C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)

(Continued on next page)
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Compiler Version Notes (Continued)

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C++, C | 511.povray_r(peak)

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Intel(R) 64, Version 2021.1 Build 20201112_000000
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
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C++, C | 511.povray_r(base)

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C++, C | 511.povray_r(peak)

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C++, C | 511.povray_r(base)

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C++, C | 511.povray_r(peak)

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C++, C | 511.povray_r(base)

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C++, C | 511.povray_r(peak)

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SPECrate®2017_fp_peak = 44.3

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Compiler Version Notes (Continued)

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==============================================================================
C++, C, Fortran  |  507.cactuBSSN_r(base, peak) 549.fotonik3d_r(base, peak)
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Fortran  |  503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
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Intel(R) 64, Version 2021.1 Build 20201112_000000
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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Lenovo Global Technology
ThinkSystem SR250 V2
(3.70 GHz, Intel Xeon E-2374G)

SPECrate®2017_fp_base = 43.9
SPECrate®2017_fp_peak = 44.3

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

Test Date: May-2022
Hardware Availability: Apr-2022
Software Availability: Jun-2021

Base Optimization Flags (Continued)

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

(Continued on next page)
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Peak Compiler Invocation (Continued)

Benchmarks using both C and C++:
511.povray_r: icpc icx
526.blender_r: icpx icx

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes
544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
508.namd_r: basepeak = yes
510.parest_r: basepeak = yes

Fortran benchmarks:
503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes
554.roms_r: basepeak = yes

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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes
527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ip0 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

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

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-RocketB-A.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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Tested with SPEC CPU®2017 v1.1.8 on 2022-05-26 20:13:06-0400.
Report generated on 2022-06-21 17:30:21 by CPU2017 PDF formatter v6442.
Originally published on 2022-06-21.