## Lenovo Global Technology
**ThinkSystem SR665**
3.50 GHz, AMD EPYC 73F3

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>186</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>203</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9017

- **Test Sponsor:** Lenovo Global Technology
- **Tested by:** Lenovo Global Technology
- **Test Date:** Apr-2021
- **Hardware Availability:** Apr-2021
- **Software Availability:** Mar-2021

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>32</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>32</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>32</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>32</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>32</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>32</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_fp_base (186)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_fp_peak (203)</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>271</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>272</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>101</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>123</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>122</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>72.0</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>196</td>
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<tr>
<td>644.nab_s</td>
<td>284</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>116</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>244</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 73F3
- **Max MHz:** 4000
- **Nominal:** 3500
- **Enabled:** 32 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 512 KB I+D on chip per core
- **Cache L3:** 256 MB I+D on chip per chip, 32 MB shared / 2 cores
- **Other:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP5 (x86_64) Kernel 4.12.14-120-default
- **Compiler:** C/C++/Fortran: Version 3.0.0 of AOCC
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version D8E115E 2.01 released Mar-2021
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc: jemalloc memory allocator library v5.1.0
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
**SPEC CPU®2017 Floating Point Speed Result**

**Lenovo Global Technology**
ThinkSystem SR665  
3.50 GHz, AMD EPYC 73F3

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Lenovo Global Technology  
3.50 GHz, AMD EPYC 73F3  
ThinkSystem SR665

---

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>78.3</td>
<td>753</td>
<td>78.4</td>
<td>753</td>
<td>78.4</td>
<td>753</td>
<td>64</td>
<td>76.7</td>
<td>770</td>
<td>76.6</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>62.5</td>
<td>267</td>
<td>61.1</td>
<td>273</td>
<td>61.5</td>
<td>271</td>
<td>32</td>
<td>61.5</td>
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<td>60.8</td>
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<tr>
<td>619.ibm_s</td>
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<td>51.7</td>
<td>101</td>
<td>51.5</td>
<td>102</td>
<td>51.8</td>
<td>101</td>
<td>64</td>
<td>42.4</td>
<td>124</td>
<td>42.6</td>
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<tr>
<td>621.wrf_s</td>
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<td>174</td>
<td>76.9</td>
<td>172</td>
<td>75.1</td>
<td>176</td>
<td>32</td>
<td>73.6</td>
<td>180</td>
<td>74.1</td>
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<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>72.5</td>
<td>122</td>
<td>72.6</td>
<td>122</td>
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<td>64</td>
<td>61.3</td>
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<td>59.3</td>
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<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>164</td>
<td>72.3</td>
<td>165</td>
<td>71.9</td>
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<td>72.0</td>
<td>32</td>
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<td>74.0</td>
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<td>244</td>
<td>63.4</td>
<td>248</td>
<td>64.7</td>
<td>243</td>
<td>32</td>
<td>51.5</td>
<td>206</td>
<td>51.4</td>
</tr>
</tbody>
</table>

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**Compiler Notes**


**Submit Notes**

'The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
See the configuration file for details.

**Operating System Notes**

'ulimit -s unlimited' was used to set environment stack size  
'ulimit -l 2097152' was used to set environment locked pages in memory limit  
runcpu command invoked through numaclt i.e.:  
numactl --interleave=all runcpu <etc>  
'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.  
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.  
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.  
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.  
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout randomization (ASLR) to reduce run-to-run variability.  
To enable Transparent Hugepages (THP) for all allocations,  
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
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SPECspeed®2017_fp_base = 186
SPECspeed®2017_fp_peak = 203

Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To enable THP only on request for peak runs of 628.pop2_s, and 638.imagick_s,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To disable THP for peak runs of 627.cam4_s, 644.nab_s, 649.fotonik3d_s, and 654.roms_s,
'echo never > /sys/kernel/mm/transparent_hugepage/enabled' run as root.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-63"
LD_LIBRARY_PATH = 
"/home/cpu2017-1.1.5-amd-aocc300-milan-A1/amd_speed_aocc300_milan_A_lib/
64;/home/cpu2017-1.1.5-amd-aocc300-milan-A1/amd_speed_aocc300_milan_A_lib/
32;"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREADLIMIT = "64"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"
Lenovo Global Technology
TechSystem SR665
3.50 GHz, AMD EPYC 73F3

SPECspeed®2017_fp_base = 186
SPECspeed®2017_fp_peak = 203

Environment Variables Notes (Continued)

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-31"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7713 CPU + 512GiB Memory using RHEL 8.2

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: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
hhttps://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS configuration:
Operating Mode set to Maximum Performance and then set it to Custom Mode
4-Link xGMI Max Speed set to 16Gbps
SOC P-States set to P0
DLWM Support set to Disabled

Sysinfo program /home/cpu2017-1.1.5-amd-aocc300-milan-A1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on linux-ulti Sat Apr 24 00:34:49 2021

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 : AMD EPYC 73F3 16-Core Processor
  2 "physical id"s (chips)
  64 "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 : 16
siblings : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

(Continued on next page)
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SPECspeed®2017_fp_base = 186
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Platform Notes (Continued)

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 48 bits physical, 48 bits virtual
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 73F3 16-Core Processor
Stepping: 1
CPU MHz: 3500.000
CPU max MHz: 3500.0000
CPU min MHz: 1500.0000
BogoMIPS: 6987.27
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 32768K
NUMA node0 CPU(s): 0-15, 32-47
NUMA nodel CPU(s): 16-31, 48-63
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtsscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf npi pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 movbe popcnt aes avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osw ibs skinit wt cse topext perfctr_core perfctr_nb bpfex perfctr_l1 mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate sme ssbd sev ibrs ibpb stibp vmbcavg fsgsbase bmi1 avx2 smep bmi2 erms invpcid cmtd rdseed adx smap clflushopt clwb sha ni xsaveopt xsave xssaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local clzero irperfp xsaveeprptr wbinvd arat npt lbrv svm_lock nrip_save tsc_scale vmbc_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif umip pku ospke vaes vpclmulqdq rpdpd overflow_recov succor smca

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43

(Continued on next page)
Platform Notes (Continued)

44 45 46 47  
node 0 size: 257840 MB  
node 0 free: 257542 MB  
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56  
57 58 59 60 61 62 63  
node 1 size: 258007 MB  
node 1 free: 257554 MB  
node distances:  
node 0 1  
0: 10 32  
1: 32 10  

From /proc/meminfo  
MemTotal: 528228072 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

(sys) /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance  

From /etc/*release* /etc/*version*  
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)  
VERSION = 12  
PATCHLEVEL = 5  
# This file is deprecated and will be removed in a future service pack or release.  
# Please check /etc/os-release for details about this release.  
os-release:  
NAME="SLES"  
VERSION="12-SP5"  
VERSION_ID="12.5"  
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP5"  
ID="sles"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:12:sp5"  

uname -a:  
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

(Continued on next page)
**Platform Notes (Continued)**

CVE-2017-5753 (Spectre variant 1):
Bypass disabled via prctl and seccomp
Mitigation: usercopy/swapsqgs barriers and __user pointer sanitation

CVE-2017-5715 (Spectre variant 2):
Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 24 00:24

SPEC is set to: /home/cpu2017-1.1.5-amd-aocc300-milan-A1

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdb2      xfs   893G   57G  837G   7% /

From /sys/devices/virtual/dmi/id
Vendor:         Lenovo
Product:        ThinkSystem SR665 MB
Product Family: ThinkSystem
Serial:         1234567890

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200
16x Unknown Unknown

BIOS:
BIOS Vendor:    Lenovo
BIOS Version:   D8E115E-2.01
BIOS Date:      03/04/2021
BIOS Revision:  2.1
Firmware Revision: 3.1

(End of data from sysinfo program)

**Compiler Version Notes**

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

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Compiler Version Notes (Continued)

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

--

C++, C, Fortran | 607.cactuBSSN_s(base, peak)

--

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

--

Fortran, C | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)

--

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

--

Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)

--

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
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Compiler Version Notes (Continued)
AMD clang version 12.0.0 (CLANG: A0CC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

Base Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

Base Portability Flags

603.bwaves.s: -DSPEC_LP64
607.cactuBSSN.s: -DSPEC_LP64
619.lbm.s: -DSPEC_LP64
621.wrf.s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
627.cam4.s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2.s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
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 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3

(Continued on next page)
Base Optimization Flags (Continued)

C benchmarks (continued):
- fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
- mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
- freemap-arrays -mllvm -function-specialize -flv-function-specialization
- mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
- mllvm -enable-lamic-vrp -mllvm -reduce-array-computations=3 -z muldefs
- DSPEC_OPENMPP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
- lflang -lflangrti

Fortran benchmarks:
- m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
- Wl,-mllvm -Wl,-enable-lamic-vrp -Wl,-mllvm -Wl,-region-vectorize
- Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
- Wl,-mllvm -Wl,-reduce-array-computations=3 -Hz,1,0x1 -O3
- march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
- mllvm -fuse-tile-inner-loop -funroll-loops
- mllvm -extra-vectorizer-passes -mllvm -lslr-in-nested-loop
- mllvm -enable-lamic-vrp -mllvm -reduce-array-computations=3
- mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMPP -fopenmp
- fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Benchmarks using both Fortran and C:
- m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
- Wl,-mllvm -Wl,-enable-lamic-vrp -Wl,-mllvm -Wl,-region-vectorize
- Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
- Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
- fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
- mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
- freemap-arrays -mllvm -function-specialize -flv-function-specialization
- mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
- mllvm -enable-lamic-vrp -mllvm -reduce-array-computations=3 -Hz,1,0x1
- Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
- mllvm -extra-vectorizer-passes -mllvm -lslr-in-nested-loop -z muldefs
- DSPEC_OPENMPP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
- lflang -lflangrti

Benchmarks using Fortran, C, and C++:
- m64 -mno-adx -mno-sse4a -std=c++98
- Wl,-mllvm -Wl,-x86-use-vzeroupper=false
- Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
- Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
- fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
- mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000

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Lenovo Global Technology

ThinkSystem SR665
3.50 GHz, AMD EPYC 73F3

SPECspeed®2017_fp_base = 186
SPECspeed®2017_fp_peak = 203

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

Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-lsicm-vrp -mllvm -reduce-array-computations=3
-mllvm -enable-partial-unswitch -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -convert-pow-exp-to-int=false
-Hz,1,0x1 -Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Base Other Flags

C benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Benchmarks using both Fortran and C:
-Wno-unused-command-line-argument -Wno-return-type

Benchmarks using Fortran, C, and C++:
-Wno-unused-command-line-argument -Wno-return-type

Peak Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang
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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: -m64 -mno-adx -mno-sse4a
-W1,-ml1vm -W1,-function-specialize
-W1,-ml1vm -W1,-align-all-nofallthru-blocks=6
-W1,-ml1vm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -ml1vm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-ml1vm -inline-threshold=1000 -ml1vm -enable-gvn-hoist
-ml1vm -global-vectorize-slp=true
-ml1vm -function-specialize -ml1vm -enable-licm-vrp
-ml1vm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: -m64 -mno-adx -mno-sse4a -W1,-ml1vm -W1,-region-vectorize
-W1,-ml1vm -W1,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-ml1vm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -ml1vm -inline-threshold=1000
-ml1vm -enable-gvn-hoist -ml1vm -global-vectorize-slp=true
-ml1vm -function-specialize -ml1vm -enable-licm-vrp
-ml1vm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

Fortran benchmarks:

603.bwaves_s: -m64 -mno-adx -mno-sse4a
-W1,-ml1vm -W1,-enable-X86-prefetching
-W1,-ml1vm -W1,-enable-licm-vrp
-W1,-ml1vm -W1,-function-specialize
-W1,-ml1vm -W1,-align-all-nofallthru-blocks=6
-W1,-ml1vm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-ml1vm -reduce-array-computations=3
-ml1vm -global-vectorize-slp=true -ml1vm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

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Peak Optimization Flags (Continued)

649.fotonik3d_s: basepeak = yes

654.roms_s: Same as 603.bwaves_s

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -mno-adx -mno-sse4a
-W1,-mlllvm -W1,-enable-X86-prefetching
-W1,-mlllvm -W1,-enable-licm-vrp
-W1,-mlllvm -W1,-function-specialize
-W1,-mlllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mlllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mlllvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mlllvm -inline-threshold=1000 -mlllvm -enable-gvn-hoist
-mlllvm -global-vectorize-slp=true
-mlllvm -function-specialize -mlllvm -enable-licm-vrp
-mlllvm -reduce-array-computations=3 -Hz,1,0x1 -O3
-Mrecursive -mlllvm -fuse-tile-inner-loop -funroll-loops
-mlllvm -extra-vectorizer-passes -ml llvm -lsr-in-nested-loop
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

627.cam4_s: -m64 -mno-adx -mno-sse4a
-W1,-mlllvm -W1,-enable-X86-prefetching
-W1,-mlllvm -W1,-enable-licm-vrp
-W1,-mlllvm -W1,-function-specialize
-W1,-mlllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mlllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mlllvm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mlllvm -inline-threshold=1000 -mlllvm -enable-gvn-hoist
-mlllvm -global-vectorize-slp=true
-mlllvm -function-specialize -mlllvm -enable-licm-vrp
-mlllvm -reduce-array-computations=3 -Mrecursive
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98

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Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-enable-licm-vrp
- Wl,-mllvm -Wl,-function-specialize
- Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
- Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver3
- fveclib=AMDLIBM -ffast-math -fflto -fstruct-layout=5
- mlvm -unroll-threshold=50 -fremap-arrays -flv-function-specialization
- mlvm -inline-threshold=1000 -mlllvm -enable-gvn-hoist
- mlvm -global-vectorize-slp=true -mlllvm -function-specialize
- mlllvm -enable-licm-vrp -mlllvm -reduce-array-computations=3
- finline-aggressive -mlllvm -unroll-threshold=100 -mlllvm -reroll-loops
- mlvm -aggressive-loop-unswitch -Mrecursive -DSPEC_OPENMP -fopenmp
- fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

Peak Other Flags

C benchmarks:
- Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
- Wno-unused-command-line-argument -Wno-return-type

Benchmarks using both Fortran and C:
- Wno-unused-command-line-argument -Wno-return-type

Benchmarks using Fortran, C, and C++:
- Wno-unused-command-line-argument -Wno-return-type

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-Milan-E.xml

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