**Dell Inc.**

PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.el8.x86_64</td>
<td>CPU Name: AMD EPYC 7443P</td>
</tr>
<tr>
<td>Compiler: C/C++/Fortran: Version 3.0.0 of AOCC</td>
<td>Max MHz: 4000</td>
</tr>
<tr>
<td>Parallel: Yes</td>
<td>Nominal: 2850</td>
</tr>
<tr>
<td>Firmware: Version 2.2.5 released Apr-2021</td>
<td>Enabled: 24 cores, 1 chip</td>
</tr>
<tr>
<td>File System: tmpfs</td>
<td>Orderable: 1 chip</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Cache L1: 32 KB I+ 32 KB D on chip per core</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>L2: 512 KB I+D on chip per core</td>
</tr>
<tr>
<td>Peak Pointers: 64-bit</td>
<td>L3: 128 MB I+D on chip per chip, 32 MB shared / 6</td>
</tr>
<tr>
<td>Other: jemalloc: jemalloc memory allocator library v5.1.0</td>
<td>cores</td>
</tr>
<tr>
<td>Power Management: BIOS and OS set to prefer performance</td>
<td>Other: None</td>
</tr>
<tr>
<td>at the cost of additional power usage.</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

**SPEC CPU®2017 Floating Point Speed Result**

<table>
<thead>
<tr>
<th>Test Date: Jun-2021</th>
<th>Test Sponsor: Dell Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability: Jul-2021</td>
<td>Tested by: Dell Inc.</td>
</tr>
<tr>
<td>Software Availability: Mar-2021</td>
<td>Thread: 132</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_Base = 132**

| SPECspeed®2017_fp_peak = 133 |

<table>
<thead>
<tr>
<th>SPEC 603.bwaves_s</th>
<th>SPECspeed®2017_fp_Base (132)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads 24</td>
<td>SPECspeed®2017_fp_peak (133)</td>
</tr>
<tr>
<td>SPEC 607.cactuBSSN_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 619.lbm_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 621.wrf_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 627.cam4_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 628.pop2_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 638.imagick_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 644.nab_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 649.fotonik3d_s</td>
<td></td>
</tr>
<tr>
<td>Threads 24</td>
<td></td>
</tr>
<tr>
<td>SPEC 654.roms_s</td>
<td></td>
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<tr>
<td>Threads 24</td>
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Dell Inc.
PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

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>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>172</td>
<td>344</td>
<td>172</td>
<td>344</td>
<td></td>
<td></td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>84.0</td>
<td>198</td>
<td>85.8</td>
<td>194</td>
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<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>75.9</td>
<td>69.0</td>
<td>75.9</td>
<td>69.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>73.8</td>
<td>179</td>
<td>73.5</td>
<td>180</td>
<td></td>
<td></td>
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<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>98.5</td>
<td>89.9</td>
<td>97.9</td>
<td>90.5</td>
<td></td>
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<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>132</td>
<td>90.2</td>
<td>132</td>
<td>90.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>101</td>
<td>142</td>
<td>101</td>
<td>144</td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>83.3</td>
<td>210</td>
<td>83.2</td>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>130</td>
<td>70.0</td>
<td>130</td>
<td>70.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>135</td>
<td>117</td>
<td>135</td>
<td>117</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 133

Compiler Notes

The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

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 limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage, 'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run variability, 'sysctl -w kernel.randomize_va_space=0' run as root.
To enable Transparent Hugepages (THP) for all allocations,
Dell Inc.

PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

**SPEC Speed®2017_fp_base = 132**

**SPEC Speed®2017_fp_peak = 133**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Jun-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

---

**Operating System Notes (Continued)**

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'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 = "0-23"
LD_LIBRARY_PATH = 
"/mnt/ramdisk/cpu2017-1.1.8-aocc300-B2/amd_speed_aocc300_milan_B_lib/lib
;/mnt/ramdisk/cpu2017-1.1.8-aocc300-B2/amd_speed_aocc300_milan_B_lib/lib
32;"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "24"
```

Environment variables set by runcpu during the 603.bwaves_s peak run:

```
GOMP_CPU_AFFINITY = "0 12 1 13 2 14 3 15 4 16 5 17 6 18 7 19 8 20 9 21 10 22
11 23"
```

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:

```
GOMP_CPU_AFFINITY = "0-23"
```

Environment variables set by runcpu during the 619.lbm_s peak run:

```
GOMP_CPU_AFFINITY = "0 12 1 13 2 14 3 15 4 16 5 17 6 18 7 19 8 20 9 21 10 22
11 23"
```

Environment variables set by runcpu during the 654.roms_s peak run:

```
GOMP_CPU_AFFINITY = "0-23"
```

---

**General Notes**

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using openSUSE 15.2

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)

(Continued on next page)
General Notes (Continued)

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:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
- Logical Processor : Disabled
- L3 Cache as NUMA Domain : Enabled
- Virtualization Technology : Disabled
- DRAM Refresh Delay : Performance
- System Profile : Custom
- CPU Power Management : Maximum Performance
- Memory Patrol Scrub : Disabled
- PCI ASPM L1 Link
- Power Management : Disabled
- Algorithm Performance
- Boost Disable (ApbDis): Enabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-aocc300-B2/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acac64d
running on rhel-8-3-amd Mon Jun  7 06:09:01 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 7443P 24-Core Processor
  1 "physical id"s (chips)
  24 "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 : 24
  siblings : 24
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

From lscpu from util-linux 2.32.1:
- Architecture: x86_64
Dell Inc.
PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

SPEC CPU®2017 Floating Point Speed Result

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 133

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Specifying Dell Inc.
PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 133

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 1
NUMA node(s): 4
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7443P 24-Core Processor
Stepping: 1
CPU MHz: 2174.591
BogoMIPS: 5689.20
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 32768K
NUMA node0 CPU(s): 0-5
NUMA node1 CPU(s): 6-11
NUMA node2 CPU(s): 12-17
NUMA node3 CPU(s): 18-23
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm constant_tsc rep_good rep睹 tsc cdg stop tsc cdg rep_good stop tsc cdg stop

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5
node 0 size: 257425 MB
node 0 free: 253030 MB
node 1 cpus: 6 7 8 9 10 11

(Continued on next page)
Dell Inc.

PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 133

Platform Notes (Continued)

node 1 size: 258040 MB
node 1 free: 257758 MB
node 2 cpus: 12 13 14 15 16 17
node 2 size: 258034 MB
node 2 free: 257738 MB
node 3 cpus: 18 19 20 21 22 23
node 3 size: 245926 MB
node 3 free: 245574 MB
node distances:
node 0 1 2 3
  0:  10  11  11  11
  1:  11  10  11  11
  2:  11  11  10  11
  3:  11  11  11  10

From /proc/meminfo
MemTotal:       1043940236 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.3 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.3"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
uname -a:
  Linux rhel-8-3-amd 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 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

(Continued on next page)
Dell Inc.

PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)  SPECsmach2017_fp_base = 132

SPECsmach2017_fp_peak = 133

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Mar-2021

Platform Notes (Continued)

CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jun 7 03:41

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-aocc300-B2

Filesystem     Type   Size  Used Avail Use% Mounted on
tmpfs          tmpfs  125G  4.0G  122G   4% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor:         Dell Inc.
Product:        PowerEdge R6525
Product Family: PowerEdge
Serial:         1234567

Memory:
8x 802C8632802C 72ASS16G72LZ-3G2B3 128 GB 4 rank 3200
24x Not Specified Not Specified

BIOS:
BIOS Vendor:    Dell Inc.
BIOS Version:   2.2.5
BIOS Date:      04/08/2021
BIOS Revision:  2.2

(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)
------------------------------------------------------------------------------
(Continued on next page)
### Dell Inc.

PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>132</th>
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<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>133</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Test Date:** Jun-2021  
**Tested by:** Dell Inc.  
**Hardware Availability:** Jul-2021  
**Software Availability:** Mar-2021

---

### 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)

---

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

---

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

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(Continued on next page)
## Dell Inc.

**PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)**

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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Jun-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Mar-2021

### 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

### 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 -W1,-ml1vm -W1,-region-vectorize  
  - W1,-ml1vm -W1,-function-specialize  
  - W1,-ml1vm -W1,-align-all-nofallthru-blocks=6  
  - W1,-ml1vm -W1,-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-licm-irp -mllvm -reduce-array-computations=3 -z muldefs
- DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
- -lflang -lflangrti

#### Fortran benchmarks:
- m64 -mno-adx -mno-sse4a -W1, -mllvm -W1, -enable-X86-prefetching
- W1, -mllvm -W1, -enable-licm-irp -W1, -mllvm -W1, -region-vectorize
- W1, -mllvm -W1, -function-specialize
- W1, -mllvm -W1, -align-all-nofallthru-blocks=6
- W1, -mllvm -W1, -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 -lsr-in-nested-loop
- mllvm -enable-licm-irp -mllvm -reduce-array-computations=3
- mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp
- -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

#### Benchmarks using both Fortran and C:
- m64 -mno-adx -mno-sse4a -W1, -mllvm -W1, -enable-X86-prefetching
- W1, -mllvm -W1, -enable-licm-irp -W1, -mllvm -W1, -region-vectorize
- W1, -mllvm -W1, -function-specialize
- W1, -mllvm -W1, -align-all-nofallthru-blocks=6
- W1, -mllvm -W1, -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-licm-irp -mllvm -reduce-array-computations=3 -Hz,1,0x1
- Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
- mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop -z muldefs
- DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
- -lflang -lflangrti

#### Benchmarks using Fortran, C, and C++:
- m64 -mno-adx -mno-sse4a -std=c++98
- W1, -mllvm -W1, -x86-use-vzeroupper=false
- W1, -mllvm -W1, -region-vectorize -W1, -mllvm -W1, -function-specialize
- W1, -mllvm -W1, -align-all-nofallthru-blocks=6
- W1, -mllvm -W1, -reduce-array-computations=3 -O3 -march=znver3
- fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
- mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000

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

Benchmarks using Fortran, C, and C++ (continued):
- -fremap-arrays
- -mllvm -function-specialize
- -fllvm -flv-function-specialization
- -mllvm -enable-gvn-hoist
- -mllvm -global-vectorize-slp=true
- -mllvm -enable-lcm-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
- -mrecursion
- -mllvm -fuse-tile-inner-loop
- -funroll-loops
- -mlvm -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
Dell Inc. PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 133

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Mar-2021

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: -m64 -mno-adx -mno-sse4a
-W1, -mlirm -W1, -function-specialize
-W1, -mlivm -W1, -align-all-nofallthru-blocks=6
-W1, -mlivm -W1, -reduce-array-computations=3 -Ofast
-march=xnver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mlivm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mlivm -inline-threshold=1000 -mlivm -enable-gvn-hoist
-mlivm -global-vectorize-slp=true
-mlivm -function-specialize -mlivm -enable-licm-vrp
-mlivm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:
603.bwaves_s: -m64 -mno-adx -mno-sse4a
-W1, -mlivm -W1, -enable-X86-prefetching
-W1, -mlivm -W1, -enable-licm-vrp
-W1, -mlivm -W1, -function-specialize
-W1, -mlivm -W1, -align-all-nofallthru-blocks=6
-W1, -mlivm -W1, -reduce-array-computations=3 -Ofast
-march=xnver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlivm -reduce-array-computations=3
-mlivm -global-vectorize-slp=true -mlivm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

649.fotonik3d_s: basepeak = yes
654.roms_s: Same as 603.bwaves_s

Benchmarks using both Fortran and C:

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

Dell Inc.

PowerEdge R6525 (AMD EPYC 7443P 24-Core Processor)

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 133

CPU2017 License: 55
Test Sponsor: Dell Inc.
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Hardware Availability: Jul-2021
Software Availability: Mar-2021

Peak Optimization Flags (Continued)

621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98
-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 -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true -mllvm -function-specialize
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-finline-aggressive -mllvm -unroll-threshold=100 -mllvm -reroll-loops
-mllvm -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:
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<thead>
<tr>
<th><strong>Dell Inc.</strong></th>
<th><strong>SPECspeed®2017_fp_base = 132</strong></th>
</tr>
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