SPECCPU®2017 Integer Speed Result

Dell Inc.

PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)

SPECSpeed®2017_int_base = 12.2

SPECSpeed®2017_int_peak = 12.2

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

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

Threads  0  1.0  3.0  5.0  7.0  9.0  11.0  13.0  15.0  17.0  19.0  21.0  23.0  25.0
360_ppclbench_s  48  7.13  7.15  13.1
3602_ppcge_s  48  13.2
3605_ppcmcf_s  48  20.3  20.4
3620_ppnometpp_s  48  8.16  8.17
3623_ppxalancbmk_s  48  13.8
3625_ppx264_s  48  16.8  16.9
3631_ppdeepsjeng_s  48  6.21
3641_ppleela_s  48  5.71  5.73
3648_ppexchange2_s  48  23.0  24.9
3657_ppxz_s  48

--- SPECspeed®2017_int_base (12.2) ---
--- SPECspeed®2017_int_peak (12.2) ---

Hardware

CPU Name: AMD EPYC 7413
Max MHz: 3600
Nominal: 2650
Enabled: 48 cores, 2 chips
Orderable: 1.2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 512 KB I+D on chip per core
L3: 128 MB I+D on chip per chip, 32 MB shared / 6 cores
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
Storage: 504 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
Parallel: Yes
Firmware: Version 2.2.0 released Jan-2021
File System: tmpfs
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 and OS set to prefer performance at the cost of additional power usage.
SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 12.2
SPECspeed®2017_int_peak = 12.2

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>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>249</td>
<td>7.13</td>
<td>247</td>
<td>7.18</td>
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<td>602.gcc_s</td>
<td>48</td>
<td>304</td>
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<td>13.1</td>
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<tr>
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<td>48</td>
<td>232</td>
<td>20.3</td>
<td>232</td>
<td>20.3</td>
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<tr>
<td>620.omnetpp_s</td>
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<td>1</td>
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<td>623.xalancbmk_s</td>
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<td>625.x264_s</td>
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<td>105</td>
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<td>1</td>
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<td>16.9</td>
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<td>631.deepsjeng_s</td>
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<td>231</td>
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<td>231</td>
<td>6.21</td>
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<tr>
<td>641.leela_s</td>
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<td>299</td>
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<td>299</td>
<td>5.71</td>
<td>1</td>
<td>298</td>
<td>5.73</td>
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<td>5.73</td>
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<td>648.exchange2_s</td>
<td>48</td>
<td>128</td>
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<td>657.xz_s</td>
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<td>248</td>
<td>24.9</td>
<td></td>
<td>248</td>
<td>25.0</td>
</tr>
</tbody>
</table>

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

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>

'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.

(Continued on next page)
### Operating System Notes (Continued)

To enable Transparent Hugepages (THP) for all allocations,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:
- `GOMP_CPU_AFFINITY = "0-47"
- `LD_LIBRARY_PATH = 
  "/dev/shm/cpu2017-1.1.5/amd_speed_aocc300_milan_B_lib/64;/dev/shm/cpu2017-1.1.5/amd_speed_aocc300_milan_B_lib/32;"
- `MALLOC_CONF = "retain:true"
- `OMP_DYNAMIC = "false"
- `OMP_SCHEDULE = "static"
- `OMP_STACKSIZE = "128M"
- `OMP_THREAD_LIMIT = "48"

Environment variables set by runcpu during the 600.perlbench_s peak run:
- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 602.gcc_s peak run:
- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:
- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 620.omnetpp_s peak run:
- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 625.x264_s peak run:
- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 641.leela_s peak run:
- `GOMP_CPU_AFFINITY = "0"

### General Notes

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

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
Dell Inc. PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)  

**SPECspeed®2017_int_base = 12.2**  
**SPECspeed®2017_int_peak = 12.2**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License</td>
<td>55</td>
</tr>
<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>Mar-2021</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Mar-2021</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

**General Notes (Continued)**

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

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.

Benchmark run from a 504 GB ramdisk created with the cmd: "mount -t tmpfs -o size=504G 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

Sysinfo program /dev/shm/cpu2017-1.1.5/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on rhel-8-3-amd Thu Mar 4 07:20:06 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 7413 24-Core Processor
  - 2 physical id"s (chips)
  - 48 "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 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
- physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
- Architecture: x86_64

(Continued on next page)
Dell Inc.  
PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)  

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

Specspeed®2017_int_base = 12.2  
Specspeed®2017_int_peak = 12.2

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 48  
On-line CPU(s) list: 0-47  
Thread(s) per core: 1  
Core(s) per socket: 24  
Socket(s): 2  
NUMA node(s): 8  
Vendor ID: AuthenticAMD  
CPU family: 25  
Model: 1  
Model name: AMD EPYC 7413 24-Core Processor  
Stepping: 1  
CPU MHz: 3178.090  
BogoMIPS: 5290.12  
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  
NUMA node4 CPU(s): 24-29  
NUMA node5 CPU(s): 30-35  
NUMA node6 CPU(s): 36-41  
NUMA node7 CPU(s): 42-47  
Flags: fpu vme vmx 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 nopl nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate sme ssbd mba sev ibrs ibpb stibp vmmcall fsgsbased bml amx smep bmi2 invpcid cqm rdt_a rdsed adx smap clflushopt clwb sha_ni xsaveopt xsave xgetbv1 xsaveas cqm_llc cqm_occurr_llc cqm_mbb_total cqm_mbb_local clzero irperf xsaveprptr wbnoinvvd amd_pcpin arat npt lbv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassist pfthreshold pfthreshold v_mvmsave_vmload vgif umip pku ospke vaes vpclmulqdq rdpid overflow_reco succor smca

/proc/cpuinfo cache data  
cache size: 512 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 8 nodes (0-7)

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

node 0 cpus: 0 1 2 3 4 5
node 0 size: 128580 MB
node 0 free: 128370 MB
node 1 cpus: 6 7 8 9 10 11
node 1 size: 129012 MB
node 1 free: 122957 MB
node 2 cpus: 12 13 14 15 16 17
node 2 size: 128976 MB
node 2 free: 128782 MB
node 3 cpus: 18 19 20 21 22 23
node 3 size: 128992 MB
node 3 free: 128716 MB
node 4 cpus: 24 25 26 27 28 29
node 4 size: 129010 MB
node 4 free: 128940 MB
node 5 cpus: 30 31 32 33 34 35
node 5 size: 128998 MB
node 5 free: 128942 MB
node 6 cpus: 36 37 38 39 40 41
node 6 size: 129002 MB
node 6 free: 128943 MB
node 7 cpus: 42 43 44 45 46 47
node 7 size: 128997 MB
node 7 free: 128939 MB
node distances:

<table>
<thead>
<tr>
<th>node 0</th>
<th>0 1 2 3 4 5 6 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10 11 11 11 32 32 32 32</td>
</tr>
<tr>
<td>1</td>
<td>11 10 11 11 32 32 32 32</td>
</tr>
<tr>
<td>2</td>
<td>11 11 10 11 32 32 32 32</td>
</tr>
<tr>
<td>3</td>
<td>11 11 11 10 32 32 32 32</td>
</tr>
<tr>
<td>4</td>
<td>32 32 32 32 10 11 11 11</td>
</tr>
<tr>
<td>5</td>
<td>32 32 32 32 11 10 11 11</td>
</tr>
<tr>
<td>6</td>
<td>32 32 32 32 11 11 10 11</td>
</tr>
<tr>
<td>7</td>
<td>32 32 32 32 11 11 11 10</td>
</tr>
</tbody>
</table>

From /proc/meminfo
MemTotal: 1056447212 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)"

(Continued on next page)
Platform Notes (Continued)

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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swappgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
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 Nov 30 05:34

SPEC is set to: /dev/shm/cpu2017-1.1.5
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 504G 5.7G 499G 2% /dev/shm

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge C6525
Product Family: PowerEdge

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.
SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_peak = 12.2

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

Platform Notes (Continued)

Memory:
16x 80AD863280AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 2.2.0
BIOS Date: 01/21/2021
BIOS Revision: 2.2

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_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
------------------------------------------------------------------------------

==============================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_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 | 648.exchange2_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
------------------------------------------------------------------------------
## Dell Inc.

**PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)**

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

### Base Compiler Invocation

**C benchmarks:**
clang

**C++ benchmarks:**
clang++

**Fortran benchmarks:**
flang

### Base Portability Flags

- 600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
- 602.gcc_s: -DSPEC_LP64
- 605.mcf_s: -DSPEC_LP64
- 620.omnetpp_s: -DSPEC_LP64
- 623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
- 625.x264_s: -DSPEC_LP64
- 631.deepsjeng_s: -DSPEC_LP64
- 641.leela_s: -DSPEC_LP64
- 648.exchange2_s: -DSPEC_LP64
- 657.xz_s: -DSPEC_LP64

### Base Optimization Flags

**C benchmarks:**
- m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
- -Wl,-mllvm -Wl,-enable-licm-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
- -mllvm -fremap-arrays -mllvm -function-specialize -flv-function-specialization
- -mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
- -mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs
- -DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
- -lflang -lflangrti

**C++ benchmarks:**
- m64 -std=c++98 -mno-adx -mno-sse4a
- -Wl,-mllvm -Wl,-do-block-reorder=aggressive
- -Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize

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

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Dell Inc.

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Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Mar-2021
Hardware Availability: Mar-2021
Software Availability: Mar-2021

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-OWl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-OWl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -mllvm -enable-partial-unswitch
-mllvm -unroll-threshold=100 -finline-aggressive
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -convert-pow-exp-to-int=false
-z muldefs -mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-OWl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-OWl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-OWl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-OWl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -z muldefs
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang
-lflangrti

Base Other Flags

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

C++ benchmarks:
-OWo-unused-command-line-argument -OWo-return-type

Fortran benchmarks:
-OWo-return-type

Peak Compiler Invocation

C benchmarks:
clang

(Continued on next page)
Dell Inc. PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)

SPECspeed®2017_int_base = 12.2
SPECspeed®2017_int_peak = 12.2

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

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

Peak Compiler Invocation (Continued)

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:


602.gcc_s: Same as 600.perlbench_s
605.mcf_s: Same as 600.perlbench_s
625.x264_s: Same as 600.perlbench_s
657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: -m64 -std=c++98 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-do-block-reorder=aggressive -Wl,-mllvm -Wl,-function-specialize -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

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

```
620.omnetpp_s (continued):
- Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast
- march=znver3 -fveclib=AMDLIBM -ffast-math -flto
- finline-aggressive -mlllvm -unroll-threshold=100
- flv-function-specialization -mlllvm -enable-licm-vrp
- mlllvm -reroll-loops -mlllvm -aggressive-loop-unswitch
- mlllvm -reduce-array-computations=3
- mlllvm -global-vectorize-slp=true
- mlllvm -do-block-reorder=aggressive
- fvirtual-function-elimination -fvisibility=hidden
- DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
- ljemalloc -lflang

623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes
641.leela_s: Same as 620.omnetpp_s
```

Fortran benchmarks:

```
648.exchange2_s: basepeak = yes
```

### Peak Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument -Wno-return-type
```

C++ benchmarks:

```
-Wno-unused-command-line-argument -Wno-return-type
```

Fortran benchmarks:

```
-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:

## SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)

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</table>

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

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

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