Dell Inc.

PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)

SPECspeed\textsuperscript{®}2017\textsubscript{int}_base = 12.2

SPECspeed\textsuperscript{®}2017\textsubscript{int}_peak = 12.2

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

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed\textsuperscript{®}2017\textsubscript{int}_base (12.2)</th>
<th>SPECspeed\textsuperscript{®}2017\textsubscript{int}_peak (12.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>7.13</td>
<td>13.1</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>7.17</td>
<td>13.2</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>8.19</td>
<td>20.3</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>48</td>
<td>8.21</td>
<td>20.4</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
<td>6.17</td>
<td>16.9</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>48</td>
<td>6.21</td>
<td>16.9</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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.

### 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
Dell Inc.

PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)

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

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>248</td>
<td>7.17</td>
<td>249</td>
<td>7.13</td>
<td>1</td>
<td>247</td>
<td>7.17</td>
<td>247</td>
<td>7.19</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>304</td>
<td>13.1</td>
<td>304</td>
<td>13.1</td>
<td>1</td>
<td>302</td>
<td>13.2</td>
<td>303</td>
<td>13.2</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>231</td>
<td>20.4</td>
<td>233</td>
<td>20.3</td>
<td>1</td>
<td>232</td>
<td>20.4</td>
<td>231</td>
<td>20.4</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>48</td>
<td>199</td>
<td>8.19</td>
<td>198</td>
<td>8.22</td>
<td>1</td>
<td>199</td>
<td>8.21</td>
<td>198</td>
<td>8.23</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>48</td>
<td>102</td>
<td>13.9</td>
<td>103</td>
<td>13.7</td>
<td>1</td>
<td>103</td>
<td>13.8</td>
<td>103</td>
<td>13.8</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>48</td>
<td>105</td>
<td>16.9</td>
<td>105</td>
<td>16.9</td>
<td>1</td>
<td>104</td>
<td>16.9</td>
<td>104</td>
<td>16.9</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
<td>231</td>
<td>6.19</td>
<td>232</td>
<td>6.17</td>
<td>1</td>
<td>231</td>
<td>6.21</td>
<td>231</td>
<td>6.21</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>48</td>
<td>299</td>
<td>5.71</td>
<td>299</td>
<td>5.71</td>
<td>48</td>
<td>298</td>
<td>5.72</td>
<td>298</td>
<td>5.72</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
<td>127</td>
<td>23.1</td>
<td>127</td>
<td>23.1</td>
<td>48</td>
<td>127</td>
<td>23.1</td>
<td>127</td>
<td>23.1</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>48</td>
<td>249</td>
<td>24.9</td>
<td>249</td>
<td>24.8</td>
<td>48</td>
<td>249</td>
<td>24.9</td>
<td>249</td>
<td>24.8</td>
</tr>
</tbody>
</table>

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

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.

'nnumactl' 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 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.
Dell Inc.  

PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)  

SPEC CPU®2017 Integer Speed Result  

Copyright 2017-2021 Standard Performance Evaluation Corporation  

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

Dell Inc.  

PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)  

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

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/cpu201 
7-1.1.5/amd_speed_aocc300_milan_B_lib/32:"  
MALLOCS_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 623.xalancbmk_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 631.deepsjeng_s peak run:  
GOMP_CPU_AFFINITY = "0"  

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

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

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 512GiB 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) 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
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

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 e8664e66d2d7080a7fa89d4b38e2f1c
running on rhel-8-3-amd Fri Feb 26 16:09:10 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

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

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

<table>
<thead>
<tr>
<th>SPEC Speed2017 Int Base</th>
<th>SPEC Speed2017 Int Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.2</td>
<td>12.2</td>
</tr>
</tbody>
</table>

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

---

**Platform Notes (Continued)**

---

From `lscpu`:

- **Architecture:** x86_64
- **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:** 2357.264
- **BogoMIPS:** 5289.85
- **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 de pse tsc msr pae 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 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_l1c mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate sme ssbd mba sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsave xsavec xgetbv1 xsaveas cqmxsave cpqm_mbb_total cpqm_mbb_local clzero irperf xsaveerpr wbnoinvd amd_ppn arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassist pausefilter pfthreshold v_vmsave_vmload vgpf umip pku ospke vaes vpclmulqdq rdpid overflow_recover succor smc

/proc/cpuinfo cache data
- **cache size:** 512 KB

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

Dell Inc.

PowerEdge C6525 (AMD EPYC 7413 24-Core Processor)

---

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

### SPECspeed®2017_int_base = 12.2

### SPECspeed®2017_int_peak = 12.2

---

**Platform Notes (Continued)**

From `numactl --hardware` **WARNING:** a numactl 'node' might or might not correspond to a physical chip.

available: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 4 5
node 0 size: 128582 MB
node 0 free: 128403 MB
node 1 cpus: 6 7 8 9 10 11
node 1 size: 129006 MB
node 1 free: 123974 MB
node 2 cpus: 12 13 14 15 16 17
node 2 size: 128966 MB
node 2 free: 128620 MB
node 3 cpus: 18 19 20 21 22 23
node 3 size: 128998 MB
node 3 free: 127895 MB
node 4 cpus: 24 25 26 27 28 29
node 4 size: 129010 MB
node 4 free: 128910 MB
node 5 cpus: 30 31 32 33 34 35
node 5 size: 128998 MB
node 5 free: 128934 MB
node 6 cpus: 36 37 38 39 40 41
node 6 size: 129010 MB
node 6 free: 128902 MB
node 7 cpus: 42 43 44 45 46 47
node 7 size: 129013 MB
node 7 free: 128933 MB

node distances:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>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*`
SPEC CPU®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.

Platform Notes (Continued)

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
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: userscopy/swaps barriers and __user pointer sanitation
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retropine, 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 25 11:40

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

Platform Notes (Continued)

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 80AD863280AD HMAA8GR7A4N-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

(Continued on next page)
SPEC CPU®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: Apr-2021
Software Availability: Mar-2021

Compiler Version Notes (Continued)

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-nofallback-thru-blocks=6
-Wl, -mllvm -Wl, -reduce-array-computations=3 -O3 -march=znver3
-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-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

(Continued on next page)
SPEC CPU®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.
Test Date: Mar-2021
Tested by: Dell Inc.
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Base Optimization Flags (Continued)

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
- -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
- -Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
- -fveclib=AMDLIBM -ffast-math -flto -mllvm -enable-partial-unswitch
- -mllvm -unroll-threshold=100 -finline-aggressive
- -fly-function-specialization -mllvm -loop-unswitch-threshold=200000
- -mllvm -recompilation-unroll=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 -llflangrti

Fortran benchmarks:
- -m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
- -Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
- -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 -z muldefs
- -mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -DSPEC_OPENMP
- -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -llflangrti

Base 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
SPEC CPU®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: Apr-2021
Software Availability: Mar-2021

Peak Compiler Invocation

C benchmarks:
clang

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:
-m64 -std=c++98 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-do-block-reorder=aggressive

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

C++ benchmarks (continued):
- `-Wl,-mllvm -Wl,-function-specialize`
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3 -0fast -march=znver3`
- `-fveclib=AMDLIBM -ffast-math -flto -finline-aggressive`
- `-mllvm -unroll-threshold=100 -flv-function-specialization`
- `-mllvm -enable-licm-vrp -mllvm -reroll-loops`
- `-mllvm -aggressive-loop-unswitch -mllvm -reduce-array-computations=3`
- `-mllvm -global-vectorize-slp=true -mllvm -do-block-reorder=aggressive`
- `-fvirtual-function-elimination -fvisibility=hidden -DSPEC_OPENMP`
- `-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang`

Fortran benchmarks:

```plaintext
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:
