Dell Inc.

PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor)

**SPEC CPU®2017 Integer Speed Result**

**SPECspeed®2017_int_base** = 13.2

**SPECspeed®2017_int_peak** = 13.2

---

**Threads**

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</table>

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**Hardware**

- **CPU Name**: AMD EPYC 7443P
- **Max MHz**: 4000
- **Nominal**: 2850
- **Enabled**: 24 cores, 1 chip
- **Orderable**: 1 chip
- **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 (8 x 128 GB 4Rx4 PC4-3200AA-L)
- **Storage**: 480 GB SATA SSD
- **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 2.1.5 released Mar-2021
- **File System**: xfs
- **System State**: Run level 5 (graphical 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.
Results Table

<table>
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<tr>
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</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)
### SPEC CPU®2017 Integer Speed Result

#### Dell Inc.

PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>13.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
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</table>

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

---

**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 =  
/root/Documents/test/cpu2017-1.1.5/amd_speed_aocc300_milan_B_lib/64;/ro  
/t/ot/Documents/test/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

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.

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

Dell Inc.

PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor)

SPECspeed®2017_int_base = 13.2
SPECspeed®2017_int_peak = 13.2

General Notes (Continued)

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:
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 /root/Documents/test/cpu2017-1.1.5/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Tue Mar 16 18:51:36 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 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
   Architecture: x86_64
   CPU op-mode(s): 32-bit, 64-bit
   Byte Order: Little Endian
   CPU(s): 24
   On-line CPU(s) list: 0-23

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

- **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:** 3953.356
- **CPU max MHz:** 2850.0000
- **CPU min MHz:** 1500.0000
- **BogoMIPS:** 5689.45
- **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 cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr 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 ibr skinit wdt tce topoext perfctr_core perfctr_nb pext perfctr_l1c mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate sme ssbd mba sev ibp stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha ni xsaveopt xsave xgetbv1 xsaves cqm_l1c cqm_l1c cqm_mbm_total cqm_mbm_local clzero irperf xsavepref wxbnowinv amd_ppin arat strict lbv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassist pausefilter pfthreshold v_vmsave_vmload vgif umip pku ospke vaes vpclmulqdq rdpid overflow_recov succor smca

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

```plaintext
    available: 4 nodes (0-3)
    node 0 cpus: 0 1 2 3 4 5
    node 0 size: 257566 MB
    node 0 free: 255432 MB
    node 1 cpus: 6 7 8 9 10 11
    node 1 size: 258028 MB
    node 1 free: 257198 MB
```
# SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor)

---

**SPECspeed®2017_int_base = 13.2**

**SPECspeed®2017_int_peak = 13.2**

---

## Platform Notes (Continued)

| node 2 cpus: 12 13 14 15 16 17 |
| node 2 size: 258032 MB |
| node 2 free: 257556 MB |
| node 3 cpus: 18 19 20 21 22 23 |
| node 3 size: 245928 MB |
| node 3 free: 244077 MB |
| node distances: |
| node distances: |
| node distances: |
| node 0 1 2 3 |
| 0: 10 11 11 11 |
| 1: 10 11 11 11 |
| 2: 11 11 10 11 |
| 3: 11 11 11 10 |

From /proc/meminfo

- MemTotal: 1044071728 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/sbin/tuned-adm active

- Current active profile: throughput-performance

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

From /etc/*release* /etc/*version*

- 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 localhost.localdomain 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

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

CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass):
  Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):
  Mitigation: usercopy/swapsgs 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

SPEC is set to: /root/Documents/test/cpu2017-1.1.5

- **Filesystem**
  - Type: xfs
  - Size: 70G
  - Used: 30G
  - Avail: 41G
  - Use%: 43%
  - Mounted on: /

From /sys/devices/virtual/dmi/id
- **Vendor**: Dell Inc.
- **Product**: PowerEdge C6525
- **Product Family**: PowerEdge
- **Serial**: 1234567

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

- **BIOS**:
  - BIOS Vendor: Dell Inc.
  - BIOS Version: 2.1.5
  - BIOS Date: 03/05/2021
  - BIOS Revision: 2.1

(End of data from sysinfo program)

---

**Compiler Version Notes**

```plaintext
-------------------------------------------------------------------
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)
-------------------------------------------------------------------
```

(Continued on next page)
Dell Inc. PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor) SPECspeed®2017_int_base = 13.2
SPECspeed®2017_int_peak = 13.2

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

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++         | 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

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

(Continued on next page)
Dell Inc.

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SPEC CPU®2017 Integer Speed Result

SPECspeed®2017_int_base = 13.2
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Mar-2021
Tested by: Dell Inc.
Hardware Availability: Mar-2021
Software Availability: Mar-2021

Base Portability Flags (Continued)

605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbnk_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-lcm-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 -falto -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-lcm-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
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -falto -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

(Continued on next page)
Dell Inc. PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor) SPECspeed®2017_int_base = 13.2
SPECspeed®2017_int_peak = 13.2

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- 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
- lflangrti

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

Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Peak Portability Flags

Same as Base Portability Flags
Dell Inc.  
PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor)  

**SPEC CPU®2017 Integer Speed Result**  
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**SPECspeed®2017_int_base = 13.2**  
**SPECspeed®2017_int_peak = 13.2**

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

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**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:**


623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

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

Dell Inc.  
PowerEdge C6525 (AMD EPYC 7443P 24-Core Processor)  

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**Software Availability:** Mar-2021

### Peak Optimization Flags (Continued)

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:


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