Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)

SPECspeed2017_int_base = 6.84
SPECspeed2017_int_peak = 7.03

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

Threads

<table>
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<tr>
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<tr>
<td>602.gcc_s</td>
<td>16</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>16</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>16</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>16</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>16</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>16</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>16</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>16</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>16</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Silver 4109T
Max MHz.: 3000
Nominal: 2000
Enabled: 16 cores, 2 chips
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 11 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
Storage: 480 GB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP2
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux: Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Version 1.3.7 released Feb-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator library V5.0.1
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)

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

SPECspeed2017_int_base = 6.84
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Results Table

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<th>Benchmark</th>
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<th>Ratio</th>
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<td>407</td>
<td>15.2</td>
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<td>15.2</td>
<td>407</td>
<td>15.2</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 6.84
SPECspeed2017_int_peak = 7.03

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

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
OMP_STACKSIZE = "192M"
Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
Yes: 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 at default for 32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;
jemalloc: sources available via jemalloc.net
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
## Dell Inc.

**PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)**

<table>
<thead>
<tr>
<th>SPEC CPU2017 License:</th>
<th>55</th>
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<tr>
<td>Test Sponsor:</td>
<td>Dell Inc.</td>
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<td>Dell Inc.</td>
</tr>
</tbody>
</table>

| SPECspeed2017_int_base = | 6.84 |
| SPECspeed2017_int_peak = | 7.03 |

**Platform Notes**

BIOS settings:
- Sub NUMA Cluster disabled
- Virtualization Technology disabled
- System Profile set to Custom
- CPU Performance set to Maximum Performance
- C States set to Autonomous
- C1E disabled
- Uncore Frequency set to Dynamic
- Energy Efficiency Policy set to Performance
- Memory Patrol Scrub disabled
- Logical Processor disabled
- CPU Interconnect Bus Link Power Management disabled
- PCI ASPM L1 Link Power Management disabled
- Sysinfo program /home/cpu2017rev5/cpu2017/bin/sysinfo
- Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bce091c0f
- running on linux-bgfp Wed Feb 28 17:25:17 2018

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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From /proc/cpuinfo

- model name: Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz
- 2 "physical id"s (chips)
- 16 "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: 8
  - siblings: 8
  - physical 0: cores 0 1 2 3 4 5 6 7
  - physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 16
- On-line CPU(s) list: 0-15
- Thread(s) per core: 1
- Core(s) per socket: 8
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz
- Stepping: 4

(Continued on next page)
**SPEC CPU2017 Integer Speed Result**

**Dell Inc.**

PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)

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

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<th>Feb-2018</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Sep-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2018</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```
CPU MHz:               1995.319
BogoMIPS:              3990.63
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              11264K
NUMA node0 CPU(s):     0,2,4,6,8,10,12,14
NUMA node1 CPU(s):     1,3,5,7,9,11,13,15
Flags:                 fpu vme de pse tsc msr pae mca cmov
                        pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                        lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
                        aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
                        fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
                        xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
                        dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vmmi flexpriority
                        ept vpid fsgsbase tsc_adjust bmi hle avx2 smep bmi2 erm invpcid rtm cqm mpx
                        avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
                        xsaves xcvtobv1 cqm_llc cqm_occup_llc pkpu ospke

/proc/cpuinfo cache data
 cache size : 11264 KB

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 2 4 6 8 10 12 14
 node 0 size: 191990 MB
 node 0 free: 191572 MB
 node 1 cpus: 1 3 5 7 9 11 13 15
 node 1 size: 193517 MB
 node 1 free: 193194 MB
 node distances:
    node 0 1
       0:  10  21
       1:  21  10

From /proc/meminfo
 MemTotal:       394760024 kB
 HugePages_Total:       0
 Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
 SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
 SuSE-release: (Continued on next page)
SPEC CPU2017 Integer Speed Result

Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)

SPECspeed2017_int_base = 6.84
SPECspeed2017_int_peak = 7.03

Platform Notes (Continued)

SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
Linux linux-bgfp 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 28 17:20

SPEC is set to: /home/cpu2017rev5/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   405G   53G  353G  14% /home

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.
BIOS Dell Inc. 1.3.7 02/08/2018
Memory:
22x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
2x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)

SPEC CPU2017 Integer Speed Result
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Dell Inc.

SPECspeed2017_int_base = 6.84
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2017
Software Availability: Feb-2018

Compiler Version Notes (Continued)

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<th>Notes</th>
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<td>600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)</td>
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</tr>
<tr>
<td>icc (ICC)</td>
<td>18.0.0 20170811</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2017 Intel Corporation. All rights reserved.</td>
<td></td>
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CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak) 641.leela_s(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 648.exchange2_s(base, peak)
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64

(Continued on next page)
Dell Inc.  
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)  

<table>
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<tr>
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<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Feb-2018</td>
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</table>

**Base Portability Flags (Continued)**

- 602.gcc_s: -DSPEC_LP64  
- 605.mcfs: -DSPEC_LP64  
- 620.omnetpp_s: -DSPEC_LP64  
- 623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX  
- 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:
- Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
- qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP  
- L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
- Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
- qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
- Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
- qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
- L/usr/local/je5.0.1-64/lib -ljemalloc

**Base Other Flags**

C benchmarks:
- m64 -std=c11

C++ benchmarks:
- m64

Fortran benchmarks:
- m64
| C benchmarks: | icc |
| C++ benchmarks: | icpc |
| Fortran benchmarks: | ifort |

### Peak Portability Flags

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<tr>
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<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>mcf_s</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>omnetpp_s</td>
<td><code>-DSPEC_LP64</code></td>
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<tr>
<td>xalancbmk_s</td>
<td><code>-D_FILE_OFFSET_BITS=64</code> <code>-DSPEC_LINUX</code></td>
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<td>x264_s</td>
<td><code>-DSPEC_LP64</code></td>
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<tr>
<td>deepsjeng_s</td>
<td><code>-DSPEC_LP64</code></td>
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<td>leela_s</td>
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<tr>
<td>xz_s</td>
<td><code>-DSPEC_LP64</code></td>
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</tbody>
</table>

### Peak Optimization Flags

C benchmarks:

```bash
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```bash
602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
```

```bash
605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

(Continued on next page)
## Dell Inc.

PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)

<table>
<thead>
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<th>SPECspeed2017_int_base</th>
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</table>

### Peak Optimization Flags (Continued)

**625.x264_s**:
- `-Wl,-z,muldefs`  
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=3`  
- `-gopenmp`  
- `-DSPEC_OPENMP`  
- `-L/usr/local/je5.0.1-64/lib`  
- `-ljemalloc`

**657.xz_s**:
- Same as 602.gcc_s

**C++ benchmarks**:

**620.omnetpp_s**:
- `-Wl,-z,muldefs`  
- `-prof-gen(pass 1)`  
- `-prof-use(pass 2)`  
- `-ipo`  
- `-xCORE-AVX2`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=3`  
- `-DSPEC_SUPPRESS_OPENMP`  
- `-gopenmp`  
- `-DSPEC_OPENMP`  
- `-L/usr/local/je5.0.1-64/lib`  
- `-ljemalloc`

**623.xalancbmk_s**:
- `-L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32`  
- `-Wl,-z,muldefs`  
- `-prof-gen(pass 1)`  
- `-prof-use(pass 2)`  
- `-ipo`  
- `-xCORE-AVX2`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=3`  
- `-DSPEC_SUPPRESS_OPENMP`  
- `-gopenmp`  
- `-DSPEC_OPENMP`  
- `-L/usr/local/je5.0.1-32/lib`  
- `-ljemalloc`

**631.deepsjeng_s**:
- Same as 620.omnetpp_s

**641.leela_s**:
- Same as 620.omnetpp_s

**Fortran benchmarks**:

**-m64**  
**-std=c11**

### Peak Other Flags

**C benchmarks**:

- `-m64`

**C++ benchmarks (except as noted below)**:

- `-m64`

**623.xalancbmk_s**:

- `-m32`

**Fortran benchmarks**:

- `-m64`
### SPEC CPU2017 Integer Speed Result

**Dell Inc.**  
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00GHz)

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</tbody>
</table>

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

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:
- [Dell-Platform-Flags-PowerEdge14G-revC.xml](http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revC.xml)

---

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2018-02-28 18:25:17-0500.  
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