Dell Inc.

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

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
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</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
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<tr>
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<td>32</td>
<td>92.7</td>
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<tr>
<td>32</td>
<td>73.5</td>
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<tr>
<td>32</td>
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<td>105</td>
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<tr>
<td>32</td>
<td>92.3</td>
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<tr>
<td>32</td>
<td>60.9</td>
</tr>
<tr>
<td>32</td>
<td>49.7</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4109T
- **Max MHz.:** 3000
- **Nominal:** 2000
- **Enabled:** 16 cores, 2 chips, 2 threads/core
- **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:** 460 GB SATA SSD
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 SP2 4.4.21-69-default
- **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:** No
- **Firmware:** version 1.1.7 released Oct-2017
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00 GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
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SPECrate2017_fp_base = 79.9
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Results Table

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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>544.nab_r</td>
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<td>49.5</td>
<td>1024</td>
<td>49.7</td>
</tr>
</tbody>
</table>

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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:
LD_LIBRARY_PATH = "/home/temi/cpu2017/lib/ia32:/home/temi/cpu2017/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/temi/cpu2017/je5.0.1-32:/home/temi/cpu2017/je5.0.1-64"
Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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
runcpu command invoked through numactl i.e.:
umactl --interleave=all runcpu <etc>
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4109T, 2.00 GHz)

**SPEC CPU2017 Floating Point Rate Result**

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

Test Date: Nov-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

**Platform Notes**

BIOS settings:
Sub NUMA Cluster enabled
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 enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/temi/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0091c0f
running on linux-bgfp Fri Nov 17 17:50:53 2017

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: Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz
- 32 cores, 32 sibling (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  - cpu cores: 8
  - sibling: 16
  - 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): 32
- On-line CPU(s) list: 0-31
- Thread(s) per core: 2
- 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 Floating Point Rate Result

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

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- **Test Sponsor:** Dell Inc.  
- **Tested by:** Dell Inc.  
- **Test Date:** Nov-2017  
- **Hardware Availability:** Sep-2017  
- **Software Availability:** Sep-2017

### Platform Notes (Continued)

**CPU MHz:** 1995.300  
**BogoMIPS:** 3990.60  
**Virtualization:** VT-x  
**L1d cache:** 32K  
**L1i cache:** 32K  
**L2 cache:** 1024K  
**L3 cache:** 11264K  
**NUMA node0 CPU(s):** 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30  
**NUMA node1 CPU(s):** 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31  
**Flags:**  
```
fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge 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 ncpu 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 pln pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx mpxsr pkpx rdseed adx smap clflushopt clwb cr3_cipvts a20_mmu_asid mcm lbra msr_pka msr_pkb  
```

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 16 18 20 22 24 26 28 30  
node 0 size: 192920 MB  
node 0 free: 192211 MB  
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31  
node 1 size: 193504 MB  
node 1 free: 192846 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10
```

From `/proc/meminfo`  
```
MemTotal: 395699192 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

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

From `/etc/*release*`  
```
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)
```

(Continued on next page)
**SPEC CPU2017 Floating Point Rate Result**

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**Platform Notes (Continued)**

```
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 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 17 11:40

SPEC is set to: /home/temi/cpu2017
```

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. 1.1.7 08/10/2017

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  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(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, 2.00 GHz)**

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**Compiler Version Notes (Continued)**

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

------------------------------
CC  511.povray_r(base)  526.blender_r(base)
------------------------------

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

------------------------------

FC  507.cactuBSSN_r(base)
------------------------------

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

------------------------------

FC  503.bwaves_r(base)  549.fotonik3d_r(base)  554.roms_r(base)
------------------------------

ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

------------------------------

CC  521.wrf_r(base)  527.cam4_r(base)
------------------------------

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

**Base Compiler Invocation**

C benchmarks:  
icc

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

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Software Availability: Sep-2017

Base Compiler Invocation (Continued)

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

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

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using both C and C++:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11

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

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