Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4309Y, 2.80 GHz)

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

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: May-2021

Threads

Software
OS: Red Hat Enterprise Linux 8.4 (Ootpa)
Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
Compiler Build 20201113 for Linux;
Fortran: Version 2021.1 of Intel Fortran Compiler
Classic Build 20201112 for Linux;
C/C++: Version 2021.1 of Intel C/C++ Compiler
Classic Build 20201112 for Linux
Parallel: Yes
Firmware: Version 1.2.1 released May-2021
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1
Power Management: BIOS and OS set to prefer performance
at the cost of additional power usage.

Hardware
CPU Name: Intel Xeon Silver 4309Y
Max MHz: 3600
Nominal: 2800
Enabled: 16 cores, 2 chips
Orderable: 1.2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I+D on chip per core
L3: 12 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at
2666)
Storage: 512 GB on tmpfs
Other: None

SPECspeed®2017_int_base = 11.1
SPECspeed®2017_int_peak = 11.3

600.perlbench_s 16
602.gcc_s 16
605.mcf_s 16
620.omnetpp_s 16
623.xalancbmk_s 16
625.x264_s 16
631.deepsjeng_s 16
641.leela_s 16
648.exchange2_s 16
657.xz_s 16

--- SPECspeed®2017_int_base (11.1) ---

--- SPECspeed®2017_int_peak (11.3) ---
Dell Inc.  
PowerEdge R750xs (Intel Xeon Silver 4309Y, 2.80 GHz)  

Spec CPU®2017 Integer Speed Result  
Copyright 2017-2021 Standard Performance Evaluation Corporation  

Dell Inc.  
GHz)  

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>
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<tbody>
<tr>
<td>600.perlbench_s</td>
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<td>602.gcc_s</td>
<td>16</td>
<td>392</td>
<td>10.1</td>
<td>391</td>
<td>10.2</td>
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<td>19.9</td>
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<tr>
<td>620.omnetpp_s</td>
<td>16</td>
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<td>7.27</td>
<td>218</td>
<td>7.49</td>
<td>16</td>
<td>224</td>
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<tr>
<td>623.xalancbmk_s</td>
<td>16</td>
<td>103</td>
<td>13.8</td>
<td>103</td>
<td>13.8</td>
<td>16</td>
<td>103</td>
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<tr>
<td>625.x264_s</td>
<td>16</td>
<td>103</td>
<td>17.0</td>
<td>104</td>
<td>17.0</td>
<td>16</td>
<td>99.4</td>
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<td>236</td>
<td>6.07</td>
<td>236</td>
<td>6.06</td>
<td>16</td>
<td>236</td>
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<tr>
<td>648.exchange2_s</td>
<td>16</td>
<td>147</td>
<td>19.9</td>
<td>148</td>
<td>19.8</td>
<td>16</td>
<td>147</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>16</td>
<td>312</td>
<td>19.8</td>
<td>312</td>
<td>19.8</td>
<td>16</td>
<td>312</td>
</tr>
</tbody>
</table>

SPECspeed®2017_int_base = 11.1  
SPECspeed®2017_int_peak = 11.3  

Operating System Notes  
Stack size set to unlimited using "ulimit -s unlimited"  

Environment Variables Notes  
Environment variables set by runcpu before the start of the run:  
KMP_AFFINITY = "granularity=fine,scatter"  
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/je5.0.1-64"  
MALLOCONF = "retain: true"  
OMP_STACKSIZE = "192M"  

General Notes  
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0  
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  
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.  

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

Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4309Y, 2.80 GHz)

SPECspeed®2017_int_base = 11.1
SPECspeed®2017_int_peak = 11.3

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

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: May-2021

General Notes (Continued)

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 512 GB ramdisk created with the cmd: "mount -t tmpfs -o size=512G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
- Logical Processor: Disabled
- Virtualization Technology: Disabled

- System Profile: Custom
- CPU Power Management: Maximum Performance
- C1E: Disabled
- C States: Autonomous
- Memory Patrol Scrub: Disabled
- Energy Efficiency Policy: Performance
- CPU Interconnect Bus Link
  - Power Management: Disabled
- PCI ASPM L1 Link
  - Power Management: Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2021.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on r750xs.jzjpm83.inside.dell.com Fri Aug 20 14:10:18 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: Intel(R) Xeon(R) Silver 4309Y CPU @ 2.80GHz
- 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 from util-linux 2.32.1:
- Architecture: x86_64

(Continued on next page)
Platform Notes (Continued)

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
BIOS Vendor ID: Intel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Silver 4309Y CPU @ 2.80GHz
BIOS Model name: Intel(R) Xeon(R) Silver 4309Y CPU @ 2.80GHz
Stepping: 6
CPU MHz: 2677.785
BogoMIPS: 5600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 12288K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14
NUMA node0 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64monitor 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 cpuid_fault eb坪 cat_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb ibrs_enhanced fsgsbase tc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmq rdt_a avx512ifma avx512sfma clflushopt clwb intel_pt avx512davx512bw avx512vl xsaveopt xsaves cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local splitt_lock_detect wbinvd tcr tso pln pts avx512vbi3 mtrr umip kpu oskpe avx512_vbmi2 gfei vaes vpclmulqdq avx512_vnni avx512_vbmi avx512_vpmem tdper fspmd vmdc cei cei pconfig flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size : 12288 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: 257183 MB
  node 0 free: 247109 MB

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### SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge R750xs (Intel Xeon Silver 4309Y, 2.80 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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</thead>
<tbody>
<tr>
<td>11.1</td>
<td>11.3</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Aug-2021

**Hardware Availability:** Jul-2021

**Software Availability:** May-2021

---

#### Platform Notes (Continued)

- **node 1 cpus:** 1 3 5 7 9 11 13 15
- **node 1 size:** 258006 MB
- **node 1 free:** 257283 MB
- **node distances:**
  - node 0 1
  - 0: 10 20
  - 1: 20 10

From `/proc/meminfo`

- **MemTotal:** 527554520 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="8.4 (Ootpa)"
  - ID="rheil"
  - ID_LIKE="fedora"
  - VERSION_ID="8.4"
  - PLATFORM_ID="platform:el8"
  - PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
  - ANSI_COLOR="0;31"
- **redhat-release:** Red Hat Enterprise Linux release 8.4 (Ootpa)
- **system-release:** Red Hat Enterprise Linux release 8.4 (Ootpa)
- **system-release-cpe:** cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:

```
Linux r750xs.jzjpm83.inside.dell.com 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021 x86_64 x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

<table>
<thead>
<tr>
<th>CVE-2018-12207 (iTLB Multihit):</th>
<th>Not affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-3620 (L1 Terminal Fault):</td>
<td>Not affected</td>
</tr>
<tr>
<td>Microarchitectural Data Sampling:</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754 (Meltdown):</td>
<td>Mitigation: Speculative Store Bypass disabled via prct1 and seccomp</td>
</tr>
<tr>
<td>CVE-2018-3639 (Speculative Store Bypass):</td>
<td>Mitigation: usercopy/swaps barriers and __user pointer sanitization</td>
</tr>
<tr>
<td>CVE-2017-5753 (Spectre variant 1):</td>
<td>Mitigation: Enhanced IBRS, IBPB</td>
</tr>
<tr>
<td>CVE-2017-5715 (Spectre variant 2):</td>
<td></td>
</tr>
</tbody>
</table>

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SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 11.1
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Platform Notes (Continued)

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Aug 20 12:40

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>tmpfs</td>
<td>tmpfs</td>
<td>512G</td>
<td>4.4G</td>
<td>508G</td>
<td>1%</td>
<td>/mnt/ramdisk</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R750xs
Product Family: PowerEdge
Serial: JZJPM83

Additional information from dmidecode 3.2 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:
16x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2666

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.2.1
BIOS Date: 05/28/2021
BIOS Revision: 1.2

(End of data from sysinfo program)

Compiler Version Notes

C  | 600.perlbench_s(peak)
------------------------------------------
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4309Y, 2.80 GHz)

SPEC CPU®2017 Integer Speed Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

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Compiler Version Notes ( Continued )

<table>
<thead>
<tr>
<th>Base Compiler Invocation</th>
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</table>

C benchmarks:
icx

C++ benchmarks:
icpx

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

Dell Inc.
PowerEdge R750xs (Intel Xeon Silver 4309Y, 2.80 GHz)

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

Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -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:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-lqkmalloc

Fortran benchmarks:
-m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

(Continued on next page)
Peak Compiler Invocation (Continued)

600.perlbench
   : icc
C++ benchmarks:
   icpx

Fortran benchmarks:
   ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench : -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
   -xCORE-AVX512 -ipo -O3 -no-prec-div
   -qopt-mem-layout-trans=4 -fno-strict-overflow
   -mbranches-within-32B-boundaries
   -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s : -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
   -fprofile-use=default.proftdata(pass 2) -xCORE-AVX512 -flto
   -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
   -mbranches-within-32B-boundaries
   -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s : basepeak = yes

625.x264_s : -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs
   -xCORE-AVX512 -flto -O3 -ffast-math
   -qopt-mem-layout-trans=4 -fno-alias
   -mbranches-within-32B-boundaries
   -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s : basepeak = yes
C++ benchmarks:

(Continued on next page)
## Dell Inc.

**PowerEdge R750xs (Intel Xeon Silver 4309Y, 2.80 GHz)**

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### Peak Optimization Flags (Continued)

- 620.omnetpp_s: basepeak = yes
- 623.xalancbmk_s: basepeak = yes
- 631.deepsjeng_s: basepeak = yes
- 641.leela_s: basepeak = yes

**Fortran benchmarks:**

- 648.exchange2_s: basepeak = yes

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: