Dell Inc.

PowerEdge XR11 (Intel Xeon Gold 5315Y, 3.20 GHz)

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

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

SPECrate®2017_fp_base = 87.4
SPECrate®2017_fp_peak = 89.4

Copies

503.bwaves_r 16
507.cactuBSSN_r 16
508.namd_r 16
510.parest_r 8
511.povray_r 16
519.lbm_r 16
521.wrf_r 16
526.blender_r 16
527.cam4_r 16
538.imagick_r 16
544.nab_r 16
549.fotonik3d_r 16
554.roms_r 8

--- SPECrate®2017_fp_base (87.4) ---
--- SPECrate®2017_fp_peak (89.4) ---

Hardware

CPU Name: Intel Xeon Gold 5315Y
Max MHz: 3600
Nominal: 3200
Enabled: 8 cores, 1 chip, 2 threads/core
Orderable: 1 chip
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 (8 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)
Storage: 225 GB on tmpfs
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
4.18.0-240.15.1.el8_3.x86_64
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: No
Firmware: Version 0.9.0 released May-2021
File System: tmpfs
System State: Run level 5 (graphical 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.
Dell Inc.  

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SPECrate®2017_fp_base = 87.4  
SPECrate®2017_fp_peak = 89.4

Results Table

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SPECrate®2017_fp_base = 87.4  
SPECrate®2017_fp_peak = 89.4

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/je5.0.1-64"
MALLOCONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1 
Transparent Huge Pages enabled by default
Dell Inc. PowerEdge XR11 (Intel Xeon Gold 5315Y, 3.20 GHz)  

SPEC CPU®2017 Floating Point Rate Result  

**General Notes (Continued)**

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.:
`numactl --interleave=all runcpu <etc>`

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G tmpfs /mnt/ramdisk"

**Platform Notes**

BIOS Settings:
- Sub NUMA Cluster : 2-Way Clustering
- 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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Tue May 18 23:59:50 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
```plaintext
model name : Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz
  1 "physical id"s (chips)
  16 "processors"
```

(Continued on next page)
Platform Notes (Continued)

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 : 16
physical 0: 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: 2
Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5315Y CPU @ 3.20GHz
Stepping: 6
CPU MHz: 3499.979
BogoMIPS: 6400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 12288K
NUMA node0 CPU(s): 0-15
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmperf 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 cpuid_fault epb cat_l3 invpcid_single
intel_pcin ssbd mba ibrs ibpb stibp ibrs_enabled fsbgbase tsc_adjust bmi1 hle avx2
smep bmi2 erness invpcid cmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xgetbv1
xsaves cmq_llc cmq_occach llc cmq_mbtotal cmq_mbtotal cmq_mbt_local split_lock_detect
wbinvd dtherm ida arat pln pts avx512vbm umip pku ospke avx512_vbmi2 gfini vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities

/proc/cpuinfo cache data
  cache size : 12288 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
Dell Inc.  
PowerEdge XR11 (Intel Xeon Gold 5315Y, 3.20 GHz)  

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

Platform Notes (Continued)

physical chip.  
  available: 1 nodes (0)  
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
  node 0 size: 502696 MB  
  node 0 free: 498461 MB  
  node distances:  
    node 0  
      0: 10

From /proc/meminfo  
  MemTotal: 527818980 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="8.3 (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 4.18.0-240.15.1.el8_3.x86_64 #1 SMP Wed Feb 3 03:12:15 EST 2021 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: usercopy/swaps barriers and __user pointer sanitation

(Continued on next page)
Dell Inc.
PowerEdge XR11 (Intel Xeon Gold 5315Y, 3.20 GHz)

SPEC CPU®2017 Floating Point Rate Result

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Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 May 18 19:32
SPECr is set to: /mnt/ramdisk/cpu2017-1.1.5-ic2021.1

From /sys/devices/virtual/dmi/id
  Vendor: Dell Inc.
  Product: PowerEdge XR11
  Product Family: PowerEdge
  Serial: 09900TO

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:
  1x 002C069D002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2933
  7x 00AD069D00AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200, configured at 2933

BIOS:
  BIOS Vendor: Dell Inc.
  BIOS Version: 0.9.0
  BIOS Date: 05/10/2021
  BIOS Revision: 0.9

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_r(base, peak)
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113
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==============================================================================
C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
(Continued on next page)
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PowerEdge XR11 (Intel Xeon Gold 5315Y, 3.20 GHz)

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Compiler Version Notes (Continued)

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C++, C | 511.povray_r(peak)

Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
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C++, C | 511.povray_r(base) 526.blender_r(base, peak)

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(Continued on next page)
Compiler Version Notes (Continued)

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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Base Portability Flags

503. bwaves_r: -DSPEC_LP64
507. cactusBSSN_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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**Dell Inc.**

PowerEdge XR11 (Intel Xeon Gold 5315Y, 3.20 GHz)

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<tr>
<td>87.4</td>
<td>89.4</td>
</tr>
</tbody>
</table>

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

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**Base Optimization Flags (Continued)**

Fortran benchmarks:
- `-w`  
- `-m64`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-O3`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`  
- `-auto`  
- `-ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
- `-w`  
- `-m64`  
- `-std=c11`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-Ofast`  
- `-ffast-math`  
- `-flto`  
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-qopt-mem-layout-trans=4`  
- `-O3`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles`  
- `-mbranches-within-32B-boundaries`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
- `-w`  
- `-m64`  
- `-std=c11`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-Ofast`  
- `-ffast-math`  
- `-flto`  
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-qopt-mem-layout-trans=4`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using Fortran, C, and C++:
- `-w`  
- `-m64`  
- `-std=c11`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-Ofast`  
- `-ffast-math`  
- `-flto`  
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-qopt-mem-layout-trans=4`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles`  
- `-mbranches-within-32B-boundaries`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

---

**Peak Compiler Invocation**

C benchmarks:  
`icx`

C++ benchmarks:  
`icpx`

Fortran benchmarks:  
`ifort`

Benchmarks using both Fortran and C:  
`ifort`  
`icx`

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

Benchmarks using both C and C++:

511.povray_r: icpc icc
526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes
544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -qopt-mem-layout-trans=4 -fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

508.namd_r: basepeak = yes
510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:

503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Dell Inc.
PowerEdge XR11 (Intel Xeon Gold 5315Y, 3.20 GHz)

SPECrate®2017_fp_base = 87.4
SPECrate®2017_fp_peak = 89.4

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

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

Peak Optimization Flags (Continued)

554.roms_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
521.wrf_r: basepeak = yes
527.cam4_r: basepeak = yes

Benchmarks using both C and C++:
511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
507.cactuBSSN_r: 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:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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