## Dell Inc.

**PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 137</th>
<th>SPECspeed®2017_fp_peak = 140</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<tr>
<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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<td>627.cam4_s</td>
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<tr>
<td>628.pop2_s</td>
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<tr>
<td>638.imagick_s</td>
<td>113</td>
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<tr>
<td>644.nab_s</td>
<td>231</td>
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<td>649.fotonik3d_s</td>
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<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>153</td>
<td></td>
</tr>
</tbody>
</table>

### 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:** Yes
- **Firmware:** Version 0.6.2 released Apr-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.

### Hardware

- **CPU Name:** Intel Xeon Gold 6314U
- **Max MHz:** 3400
- **Nominal:** 2300
- **Enabled:** 32 cores, 1 chip
- **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:** 48 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R)
- **Storage:** 225 GB on tmpfs
- **Other:** None

---

Test Date: Apr-2021

Hardware Availability: Jul-2021

Software Availability: Feb-2021

---

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.
### Results Table

<table>
<thead>
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<th>Benchmark</th>
<th>Threads</th>
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<td>104</td>
<td>152</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 137**

**SPECspeed®2017_fp_peak = 140**

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"

---

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

- `KMP_AFFINITY = "granularity=fine,compact"
- `LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.5-lib64:/je5.0.1-64"
- `MALLOC_CONF = "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
```

jemalloc, a general purpose malloc implementation

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

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)
Dell Inc.
PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)

SPECspeed®2017_fp_base = 137
SPECspeed®2017_fp_peak = 140

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Apr-2021
Tested by: Dell Inc.
Hardware Availability: Jul-2021
Software Availability: Feb-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 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G 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

Sysinfo program /mnt/ramdisk/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Tue Apr 20 13:36:13 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) Gold 6314U CPU @ 2.30GHz
1 "physical id"s (chips)
32 "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 : 32
siblings : 32
physical 0: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian

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

**Dell Inc.**

**PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)**

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**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Apr-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021

---

**Platform Notes (Continued)**

```
CPU(s):              32  
On-line CPU(s) list: 0-31  
Thread(s) per core:  1  
Core(s) per socket:  32  
Socket(s):           1  
NUMA node(s):        1  
Vendor ID:           GenuineIntel  
CPU family:          6  
Model:               106  
Model name:          Intel(R) Xeon(R) Gold 6314U CPU @ 2.30GHz  
Stepping:            6  
CPU MHz:             2973.271  
BogoMIPS:            4600.00  
Virtualization:      VT-x  
L1d cache:           48K  
L1i cache:           32K  
L2 cache:            1280K  
L3 cache:            49152K  
NUMA node0 CPU(s):   0-31  
```

**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 pdpesgb rdtscp lm constant_tsc art 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 xtrpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abmf lmm abmd lmovprefetch cpuid_fault epb cat_l3 invpcid_single intel_puin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xsaveopt xsave xsaveopt xsaveopt xsaveopt xsave Opt xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect wboinvd dtherm ida arat pln pts avx512vbmi umip pku ospe avx512_vbmi2 gfni vaes vpcm11qdo avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lid arch_capabilities

```
/proc/cpuinfo cache data
  cache size : 49152 KB
```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a 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 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
    node 0 size: 484752 MB
    node 0 free: 492093 MB
    node distances:
      node 0
        0: 10
```

(Continued on next page)
Dell Inc.  
PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)  

| SPECspeed®2017_fp_base = 137 |
| SPECspeed®2017_fp_peak = 140 |

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

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

**Platform Notes (Continued)**

- From /proc/meminfo
  - MemTotal: 527815508 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 sanitization
  - 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 Apr 20 09:27

  SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5-ic2021.1

  Filesystem | Type | Size | Used | Avail | Use% | Mounted on
  --- | --- | --- | --- | --- | --- | ---

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

**Dell Inc.**

**PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)**

**SPECspeed®2017_fp_base = 137**

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

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**Platform Notes (Continued)**

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<th>tmpfs</th>
<th>tmpfs</th>
<th>225G</th>
<th>13G</th>
<th>213G</th>
<th>6% /mnt/ramdisk</th>
</tr>
</thead>
</table>

From /sys/devices/virtual/dmi/id

Vendor: Dell Inc.  
Product: PowerEdge XR12  
Product Family: PowerEdge  
Serial: 0990104

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:
- 5x 002C0632002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200
- 3x 00CE063200CE M393A8G40AB2-CWE 64 GB 2 rank 3200

BIOS:
- BIOS Vendor: Dell Inc.  
- BIOS Version: 0.6.2  
- BIOS Date: 04/12/2021  
- BIOS Revision: 0.6

(End of data from sysinfo program)

---

**Compiler Version Notes**

```
C | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
  | 644.nab_s(base)
```

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 | 644.nab_s(peak)
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
C | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
  | 644.nab_s(base)
```

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Compiler Version Notes (Continued)

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   | 644.nab_s(peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
C++, C, Fortran | 607.cactuBSSN_s(base, 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.
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.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
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SPEC CPU®2017 Floating Point Speed Result

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CPU2017 License: 55
Test Sponsor: Dell Inc.
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Test Date: Apr-2021
Hardware Availability: Jul-2021
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Compiler Version Notes (Continued)

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Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs

(Continued on next page)
Dell Inc. PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)

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Dell Inc.

SPEC CPU®2017 Floating Point Speed Result

CPU2017 License: 55
Test Sponsor: Dell Inc.
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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,nolimits -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,nolimits -xcore-avx512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc
644.nab_s: icx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

(Continued on next page)
Dell Inc.

PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)

SPECspeed®2017_fp_base = 137
SPECspeed®2017_fp_peak = 140

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

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

Peak Optimization Flags (Continued)

619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes

644.nab_s: -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -flto-openmp
-DSPEC_OPENMP -qopt-mem-layout-trans=4
-finf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:

603.bwaves_s: basepeak = yes
649.fotonik3d_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
**Dell Inc.**

PowerEdge XR12 (Intel Xeon Gold 6314U, 2.30 GHz)

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You can also download the XML flags sources by saving the following links:


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