# SPEC CPU®2017 Integer Rate Result

## Dell Inc. PowerEdge XR12 (Intel Xeon Gold 5318N, 2.10 GHz)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>May-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
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</tbody>
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### CPU2017 License
- 55

### Test Sponsor
- Dell Inc.

### Tested by
- Dell Inc.

### 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: 32/64-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 5318N
- Max MHz: 3400
- Nominal: 2100
- Enabled: 24 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: 36 MB I+D on chip per chip
- Other: None
- Memory: 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
- Storage: 225 GB on tmpfs
- Other: None

### SPECrate®2017 Int Base = 160

<table>
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<tr>
<th>SPECrate®2017 Int Peak = 166</th>
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### SPECrate®2017 Int Peak

<table>
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### Performance

- **SPEC CPU®2017 Int Base** = 160
- **SPEC CPU®2017 Int Peak** = 166

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### Additional Information
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- **Test Sponsor**: Dell Inc.
- **Tested by**: Dell Inc.
- **Hardware Availability**: Jul-2021
- **Software Availability**: Feb-2021
- **Test Date**: May-2021

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**Note:** The SPEC CPU®2017 Integer Rate Result table provides a clear overview of the performance metrics for the Dell Inc. PowerEdge XR12 system, including detailed information on the hardware and software configurations. This information is crucial for understanding the system's capabilities and how they contribute to the SPEC CPU®2017 benchmark scores.
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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/lib/ia32:/mnt/ramdisk/cpu2017-1.1.5-ic2021.1/je5.0.1-32"
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
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.:
Dell Inc.  
PowerEdge XR12 (Intel Xeon Gold 5318N, 2.10 GHz)  

---

**General Notes (Continued)**

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 Thu May 20 03:38:44 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 5318N CPU @ 2.10GHz
  - 1 "physical id"s (chips)
  - 48 "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 : 24
- siblings : 48

(Continued on next page)
Platform Notes (Continued)

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5318N CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2659.079
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K

NUMA node0 CPU(s):
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46
NUMA node1 CPU(s):
1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47
Flags: fpu vme de pse tsc xs save nx 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 nopl xtopology nonstop_tsc cpuid
aperfmpref 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 abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single
intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced fsxgsbase tsc_adjust bmi1 hle avx2
smep bmi2 etsms invpcid cmp tdt_a avx512f avx512dq rdseed adx smap avx512ifma
cflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsxvopt xsxvec xgetbv
xsaves cmq_llc mbm mata mbm_total cmq_mbq_local split_lock_detect wmoninvx
utherm ida arat plm pts tsr vmsm umip pku ospe avx512_vmbi gfnl vaes vpcmullq dq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities

/proc/cpuinfo cache data
cache size: 36864 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

(Continued on next page)
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PowerEdge XR12 (Intel Xeon Gold 5318N, 2.10 GHz)

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**Platform Notes (Continued)**

available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46
node 0 size: 249774 MB
node 0 free: 255728 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
node 1 size: 250358 MB
node 1 free: 242341 MB
node distances:
node 0 1
0: 10 11
1: 11 10

From /proc/meminfo
MemTotal: 527811716 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

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

Dell Inc.

PowerEdge XR12 (Intel Xeon Gold 5318N, 2.10 GHz)  

**SPECrate®2017_int_base = 160**  
**SPECrate®2017_int_peak = 166**

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**Platform Notes (Continued)**

CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs 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 May 20 03:37

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

Filesystem        Type     Size  Used Avail Use% Mounted on
tmpfs             tmpfs    225G  7.1G  218G   4% /mnt/ramdisk

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, configured at 2666  
3x 00CE0632000CE M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666

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       | 500.perlbench_r(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.
```

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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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### Base Compiler Invocation

**C benchmarks:**
- icx

**C++ benchmarks:**
- icpx

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Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-fflto -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
-1qkmalloc

C++ benchmarks:
-w -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
-1qkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc
Dell Inc.
PowerEdge XR12 (Intel Xeon Gold 5318N, 2.10 GHz)

SPECrating®2017_int_base = 160
SPECrating®2017_int_peak = 166

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

### Peak Compiler Invocation

C benchmarks (except as noted below):
- icx
- 500.perlbench_r: icc

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

### Peak Portability Flags

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -D_FILE_OFFSET_BITS=64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64
- 541.leela_r: -DSPEC_LP64
- 548.exchange2_r: -DSPEC_LP64
- 557.xz_r: -DSPEC_LP64

### Peak Optimization Flags

C benchmarks:
- 500.perlbench_r: -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/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
- -ljqkmalloc

- 502.gcc_r: -m32
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
- -std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
- -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
- -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
- -mbranches-within-32B-boundaries
- -L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

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

**Dell Inc.**

PowerEdge XR12 (Intel Xeon Gold 5318N, 2.10 GHz)

<table>
<thead>
<tr>
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**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Test Date:** May-2021

**Hardware Availability:** Jul-2021

**Tested by:** Dell Inc.

**Software Availability:** Feb-2021

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## Peak Optimization Flags (Continued)

505.mcf_r: basepeak = yes


- lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.5 on 2021-05-20 04:38:44-0400.

Report generated on 2021-07-08 13:38:42 by CPU2017 PDF formatter v6442.

Originally published on 2021-07-06.