### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 5318N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>3400</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled:</td>
<td>24 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>36 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)</td>
</tr>
<tr>
<td>Storage:</td>
<td>225 GB on tmpfs</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
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### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux 8.3 (Ootpa)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>4.18.0-240.15.1.el8_3.x86_64</td>
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<tr>
<td>Compiler:</td>
<td>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</td>
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<tr>
<td></td>
<td>None</td>
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<tr>
<td>File System:</td>
<td>tmpfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 5 (graphical multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management:</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage</td>
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</tbody>
</table>

### SPEC CPU®2017 Integer Rate Result

**Dell Inc.**

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 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_int_base = 160 |
| SPECrate®2017_int_peak = 166 |

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<td>500.perlbench_r</td>
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<td>502.gcc_r</td>
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<td>505.mcf_r</td>
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<tr>
<td>520.omnetpp_r</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
</tr>
<tr>
<td>525.x264_r</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
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<tr>
<td>541.leela_r</td>
</tr>
<tr>
<td>548.exchange2_r</td>
</tr>
<tr>
<td>557.xz_r</td>
</tr>
</tbody>
</table>

**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

**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 0.6.3 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.
Dell Inc.

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

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<td>575</td>
<td>90.1</td>
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</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"

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"
MALLOC_CONF = "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.:

(Continued on next page)
Dell Inc.

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

SPEC CPU®2017 Integer Rate Result

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

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

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

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 Wed May 12 12:31:49 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)
Dell Inc.  
PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

**SPEC CPU®2017 Integer Rate Result**

**SPECrate®2017_int_base = 160**

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

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

---

**Platform Notes (Continued)**

physical 0: cores 0 1 10 11 12 13 14 15 16 17 18 19 20 21 22 23

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: 2855.605
- 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 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 nopl xtopology nonstop_tsc cpuid
  - aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
  - xtrr 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 fsbgbase 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 xsave xsetbv1
  - xsaves cqm_llc ibs ibm_branch_target_info ibs_hlv avx2 fec cqm_cache_alignment
  - cqm_l1d ibs_avx2 cqm_mbb_total cqm_mbb_local split_lock_detect wbo
  - dtherm ida arat pnt lnt phys pu_lm emm_i ept pto ut pxg mtr pcid dca
  - cmov_xsave cqm_xsave opt xla_s v512ifma
  - vaes xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt xsaveopt

/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)
**SPEC CPU®2017 Integer Rate Result**

**Dell Inc.**

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

**SPECrate®2017_int_base = 160**

**SPECrate®2017_int_peak = 166**

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<td>Software Availability: Feb-2021</td>
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</tbody>
</table>

**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: 249861 MB
node 0 free: 241874 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: 250003 MB
node 1 free: 256389 MB
node distances:
node 0 1
0: 10 11
1: 11 10

From /proc/meminfo
MemTotal: 527811720 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)

Page 5

Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/
Dell Inc.  
PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)  

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Test Sponsor: Dell Inc.  
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Test Date: May-2021  
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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 12 12:26

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

Filesystem  Type     Size  Used  Avail  Use% Mounted on
/tmpfs      tmpfs     225G  6.9G  219G   4% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge XR11
Product Family: PowerEdge
Serial: 09A000N

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:
2x 002C0632002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666
3x 002C069D002C 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666
1x 00AD063200AD HMAA8GR7JR4N-XN 64 GB 2 rank 3200, configured at 2666
2x 00CE063200CE M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 0.6.3
BIOS Date: 05/04/2020
BIOS Revision: 0.6

(End of data from sysinfo program)

BIOS Note: Version 0.6.3 was built with an incorrect date stamp which is reflected in the sysinfo section. The correct release date is reflected in the "Firmware" field of the disclosure.

Compiler Version Notes

================================================================================
C       | 500.perlbench_r(peak)
================================================================================

(Continued on next page)
Dell Inc.
PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

CPU2017 License: 55
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SPECrate®2017_int_base = 160
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Compiler Version Notes (Continued)

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

------------------------------------------------------------------------------
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel® oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
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C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
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## Dell Inc.

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)

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|          | Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
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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

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

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

## Base Portability Flags

- perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
- gcc_r: `-DSPEC_LP64`
- mcf_r: `-DSPEC_LP64`
- omnetpp_r: `-DSPEC_LP64`
- xalancbmk_r: `-DSPEC_LP64 -DSPEC_LINUX`
- x264_r: `-DSPEC_LP64`
- deepsjeng_r: `-DSPEC_LP64`
- leela_r: `-DSPEC_LP64`
- exchange2_r: `-DSPEC_LP64`
- xz_r: `-DSPEC_LP64`

## Base Optimization Flags

### C benchmarks:
- `-w -std=c11 -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`

### 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 -lqkmalloc`

### 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`
## Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- lqkmalloc

## 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
- -lqkmalloc

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

**Dell Inc.**

PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)  

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<thead>
<tr>
<th>CPU2017 License:</th>
<th>55</th>
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<th>May-2021</th>
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<td>Test Sponsor:</td>
<td>Dell Inc.</td>
<td>Hardware Availability:</td>
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<tr>
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<td>Dell Inc.</td>
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<td>Feb-2021</td>
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**SPECrate®2017_int_base = 160**  
**SPECrate®2017_int_peak = 166**

### Peak Optimization Flags (Continued)

- `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`

- `505.mcf_r`:
  - `basepeak = yes`

- `525.x264_r`:
  - `-w`  
  - `-std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto`  
  - `-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias`  
  - `-mbranches-within-32B-boundaries`  
  - `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`  
  - `-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:

## SPEC CPU®2017 Integer Rate Result

**Dell Inc.**

**PowerEdge XR11 (Intel Xeon Gold 5318N, 2.10 GHz)**

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**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

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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 2021-05-12 13:31:49-0400.
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