### Dell Inc. PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)

- **SPECspeed®2017_fp_base = 199**
- **SPECspeed®2017_fp_peak = 202**

#### Hardware
- **CPU Name:** Intel Xeon Gold 6348
- **Max MHz:** 3500
- **Nominal:** 2600
- **Enabled:** 56 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:** 42 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)
- **Storage:** 1 x 480 GB M.2 SATA SSD
- **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:** Yes
- **Firmware:** Version 1.1.2 released Apr-2021
- **File System:** xfs
- **System State:** Run level 5 (graphical multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.

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

### SPEC CPU®2017 Floating Point Speed Result

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<tr>
<th>Benchmark</th>
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<td>56</td>
<td>265</td>
<td>658</td>
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<tr>
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<td>56</td>
<td>137</td>
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<td>165</td>
<td>409</td>
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<td>155</td>
<td>453</td>
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<td>56</td>
<td>78.4</td>
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<td>56</td>
<td>195</td>
<td>115</td>
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<tr>
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Dell Inc.

PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)

**Results Table**

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<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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<td>70.0</td>
<td>225</td>
<td>56</td>
<td>69.7</td>
<td>226</td>
<td>70.0</td>
</tr>
</tbody>
</table>

**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 = "/home/cpu2017-1.1.5-ic2021.1/lib/intel64:/home/cpu2017-1.1.5-ic2021.1/j e5.0.1-64"
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 Enterpise 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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
SPEC CPU®2017 Floating Point Speed Result

Dell Inc.

PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)

| SPECspeed®2017_fp_base = 199 | SPECspeed®2017_fp_peak = 202 |

| CPU2017 License: 55 | Test Date: Apr-2021 |
| Test Sponsor: Dell Inc. | Hardware Availability: May-2021 |
| Tested by: Dell Inc. | 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.

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 /home/cpu2017-1.1.5-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afea89d4b38e2f1c
running on localhost.localdomain Fri Apr 23 12:40:21 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 6348 CPU @ 2.60GHz
- 2 "physical id"s (chips)
- 56 "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: 28
- siblings: 28
- physical 0: cores 0 1 2 3 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
- physical 1: cores 0 1 2 3 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 56

(Continued on next page)
Dell Inc.

PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)  

**SPECspeed®2017_fp_base** = 199  
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<table>
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**Platform Notes (Continued)**

On-line CPU(s) list: 0-55  
Thread(s) per core: 1  
Core(s) per socket: 28  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 106  
Model name: Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz  
Stepping: 6  
CPU MHz: 3452.220  
BogoMIPS: 5200.00  
Virtualization: VT-x  
L1d cache: 48K  
L1i cache: 32K  
L2 cache: 1280K  
L3 cache: 43008K  
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54  
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55  
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 nop1 xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xptr 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 ibs ibpb stibp ibrs enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma cfлушшошт clwb intel_pt avx512cd sha_hni avx512bw avx512v1 xsaveopt xsaveopt xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect wbnoinvd dtherm ida arat pln pts avx512vbmi ump pu ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

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 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54  
node 0 size: 244894 MB  
node 0 free: 249897 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 49 51 53 55

(Continued on next page)
Dell Inc. PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)

SPECspeed®2017_fp_base = 199
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CPU2017 License: 55
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Test Date: Apr-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Platform Notes (Continued)

node 1 size: 245801 MB
node 1 free: 255455 MB
node distances:
node 0 1
  0: 10 20
  1: 20 10

From /proc/meminfo
  MemTotal: 527810224 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:
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/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
  Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

(Continued on next page)
### Dell Inc.

PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECspeed(^{\text{\textregistered}})2017_fp_base</th>
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<td>SPECspeed(^{\text{\textregistered}})2017_fp_peak</td>
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</table>

**Platform Notes (Continued)**

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

run-level 5 Apr 23 08:47

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1
Filesystem | Type  | Size  | Used  | Avail | Use%  | Mounted on |
---|---|---|---|---|---|---|
/dev/mapper/rhel-home | xfs | 168G | 15G | 154G | 9% | /home |

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R750 xa
Product Family: PowerEdge
Serial: 1234567

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:
16x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200
16x Not Specified Not Specified

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.1.2
BIOS Date: 04/09/2021
BIOS Revision: 1.1

(End of data from sysinfo program)

**Compiler Version Notes**

```
C | 619.llvm_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,
Dell Inc.  

PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)  

SPEC CPU®2017 Floating Point Speed Result  

Specifications and results are for the SPEC CPU®2017 benchmark suite, which measures the floating-point performance of a computer system. 

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SPECspeed®2017_fp_base = 199  
SPECspeed®2017_fp_peak = 202  

Compiler Version Notes (Continued)  

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)  
------------------------------------------------------------------------------  
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)  
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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  
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  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved. 
------------------------------------------------------------------------------  
Fortran          | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)  
| 654.roms_s(base, peak)  
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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  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved. 
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Fortran, C       | 621.wrf_s(base, peak) 627.cam4_s(base, peak)  
| 628.pop2_s(base, peak)  
(Continued on next page)
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CPU2017 License: 55 
Test Sponsor: Dell Inc. 
Tested by: Dell Inc. 

Compiler Version Notes (Continued) 

Intel(R) Fortran 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. 

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 

(Continued on next page)
Dell Inc.  
PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)  

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**Base Optimization Flags (Continued)**

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

Benchmarks using both Fortran and C:
-m64 -std=c11 -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,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

---

**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
SPEC CPU®2017 Floating Point Speed Result

Dell Inc.

PowerEdge R750 xa (Intel Xeon Gold 6348, 2.60 GHz)  SPECspeed®2017_fp_base = 199

SPECspeed®2017_fp_peak = 202

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

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

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

Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

(Continued on next page)
Dell Inc.

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Peak Optimization Flags (Continued)

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

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.

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