### SPEC CPU®2017 Integer Speed Result

**Dell Inc.**

PowerEdge R750xa (Intel Xeon Gold 6312U, 2.40 GHz)

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<td>May-2021</td>
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#### Hardware

- **CPU Name:** Intel Xeon Gold 6312U
- **Max MHz:** 3600
- **Nominal:** 2400
- **Enabled:** 24 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:** 36 MB I+D on chip per chip
- **Other:** None
- **Memory:** 256 GB (8 x 32 GB 2Rx8 PC4-3200AA-R)
- **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:** Yes
- **Firmware:** Version 1.2.4 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.

#### SPECspeed®2017_int_base = 12.1

| SPECspeed®2017_int_peak = 12.3 |

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### Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>600.perlbench_s</td>
<td>24</td>
<td>239</td>
<td>7.42</td>
<td>238</td>
<td>7.45</td>
<td>239</td>
<td>7.42</td>
<td>24</td>
<td>210</td>
<td>8.47</td>
<td>210</td>
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<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>358</td>
<td>11.1</td>
<td>353</td>
<td>11.3</td>
<td><strong>356</strong></td>
<td><strong>11.2</strong></td>
<td>24</td>
<td><strong>344</strong></td>
<td><strong>11.6</strong></td>
<td>346</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>24</td>
<td>226</td>
<td>20.9</td>
<td>224</td>
<td>21.0</td>
<td><strong>225</strong></td>
<td><strong>20.9</strong></td>
<td>24</td>
<td>226</td>
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<td>620.omnetpp_s</td>
<td>24</td>
<td>142</td>
<td>11.5</td>
<td>136</td>
<td>12.0</td>
<td><strong>138</strong></td>
<td><strong>11.8</strong></td>
<td>24</td>
<td>142</td>
<td>11.5</td>
<td>136</td>
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<td>623.xalanchmk_s</td>
<td>24</td>
<td><strong>101</strong></td>
<td><strong>14.0</strong></td>
<td>101</td>
<td>14.0</td>
<td>102</td>
<td>13.9</td>
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<td>100</td>
<td>17.6</td>
<td><strong>99.9</strong></td>
<td><strong>17.7</strong></td>
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<td>95.8</td>
<td>18.4</td>
<td><strong>95.7</strong></td>
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<td>235</td>
<td>6.10</td>
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<td><strong>6.11</strong></td>
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<td>6.10</td>
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<tr>
<td>641.leela_s</td>
<td>24</td>
<td>342</td>
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<td><strong>342</strong></td>
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<td>648.exchange2_s</td>
<td>24</td>
<td><strong>148</strong></td>
<td><strong>19.9</strong></td>
<td>148</td>
<td>19.9</td>
<td>148</td>
<td>19.9</td>
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<td>24</td>
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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,scatter"
- 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"
- 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

Files system 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.

(Continued on next page)
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PowerEdge R750xa (Intel Xeon Gold 6312U, 2.40 GHz)  

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**CPU2017 License:** 55  
**Test Date:** Jun-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.  

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 e8664e66d2d7080afeea89d4b38e2f1c  
running on localhost.localdomain Wed Jun 2 09:29:14 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)  

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) Gold 6312U CPU @ 2.40GHz  
1 "physical id"s (chips)  
24 "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: 24  
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): 24  

(Continued on next page)
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Platform Notes (Continued)

On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6312U CPU @ 2.40GHz
Stepping: 6
CPU MHz: 3490.891
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
NUMA node0 CPU(s): 0-23
Flags: fpu vme de pse tsc msr pae 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_ppln ssbd mba ibrs ibpb stibp ibrsenhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invvpclm cmrm rt_d a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xaves vec xgetbv1 xsavecs cmqm llc cmqm_occup_llc cmqm_mb_total cmqm_kb_local splitlock detect wbnoinvd dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfnia vpr cmul dq avx512_vnni avx512_bitalg tme avx512_vpopcntdq 1a57 rdpid md_clear pconfig flush_lid 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.
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
  node 0 size: 245002 MB
  node 0 free: 228437 MB
  node distances:
    node 0
    0: 10

From /proc/meminfo
  MemTotal: 263576628 KB
Dell Inc.

PowerEdge R750xa (Intel Xeon Gold 6312U, 2.40 GHz)

SPEC CPU®2017 Integer Speed Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

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Platform Notes (Continued)

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: userscopy/swapsgs 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 Jun 2 09:28
    SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5-ic2021.1
    Filesystem     Type     Size  Used Avail Use% Mounted on
    tmpfs     tmpfs     225G   13G  213G   6% /mnt/ramdisk

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### Platform Notes (Continued)

From /sys/devices/virtual/dmi/id

| Vendor:         Dell Inc. |
|------------------|--------------------------|
| Product:        PowerEdge R750xa |
| 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:

8x 002C069D002C 18ASF4G72PD2-3G2E1 32 GB 2 rank 3200
24x Not Specified Not Specified

BIOS:

| BIOS Vendor: Dell Inc. |
|------------------------|------------------------|
| BIOS Version: 1.2.4    |
| BIOS Date: 05/28/2021  |
| BIOS Revision: 1.2     |

(End of data from sysinfo program)

---

### Compiler Version Notes

```
C      | 600.perlbench_s(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.

```
C      | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, 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      | 600.perlbench_s(peak)
```

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000

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

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------------------------------------------------------------------------------
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
        | 625.x264_s(base, peak) 657.xz_s(base, 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++     | 620.omnetpp_s(base, peak) 623.xalanchmk_s(base, peak)
        | 631.deepsjeng_s(base, peak) 641.leela_s(base, 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.
------------------------------------------------------------------------------

Fortran | 648.exchange2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64

(Continued on next page)
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Base Portability Flags (Continued)

602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -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:
-m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

600.perlbench_s: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort
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### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

600.perlbench_s: -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/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -std=c11 -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/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs  
-xCORE-AVX512 -flto -O3 -ffast-math  
-qopt-mem-layout-trans=4 -fno-alias  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

**C++ benchmarks:**

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

**Fortran benchmarks:**

648.exchange2_s: basepeak = yes
Dell Inc.

**PowerEdge R750xa (Intel Xeon Gold 6312U, 2.40 GHz)**

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<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
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<tr>
<td>SPECspeed®2017_int_peak</td>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

**Test Date:** Jun-2021  
**Hardware Availability:** May-2021

**Software Availability:** Feb-2021

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 2021-06-01 21:29:14-0400.
Originally published on 2021-07-06.