## SPEC CPU®2017 Integer Rate Result

### Hewlett Packard Enterprise

**Test Sponsor:** HPE  
**ProLiant DL380 Gen10 Plus**  
(3.00 GHz, Intel Xeon Gold 5317)

### SPECrate®2017_int_base = 203

### SPECrate®2017_int_peak = 209

<table>
<thead>
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### CPU2017 License: 3

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#### Hardware

**CPU Name:** Intel Xeon Gold 5317  
**Max MHz:** 3600  
**Nominal:** 3000  
**Enabled:** 24 cores, 2 chips, 2 threads/core  
**Orderable:** 1, 2 chip(s)  
**Cache L1:** 32 KB I + 48 KB D on chip per core  
**L2:** 1.25 MB I+D on chip per core  
**L3:** 18 MB I+D on chip per chip  
**Other:** None  
**Memory:** 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)  
**Storage:** 1 x 800 GB SAS SSD, RAID 0  
**Other:** None

#### Software

**OS:** Red Hat Enterprise Linux 8.3 (Ootpa)  
**Kernel:** 4.18.0-240.el8.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:** HPE BIOS Version U46 v1.42 05/16/2021 released May-2021  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
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**SPEC CPU Benchmark Suite**

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### Results Table

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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"
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
```

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:
```
LD_LIBRARY_PATH = 
"/home/cpu2017_1.1.8/lib/intel64:/home/cpu2017_1.1.8/lib/ia32:/home/cpu2017_1.1.8/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
SPEC CPU®2017 Integer Rate Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
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General Notes (Continued)

runcpu command invoked through numacl t i.e.:
numactl --interleave=all runcpu <etc>
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon Aug 16 13:17:56 EDT 2021
Submission: cpu2017-20210816-28740.sub

Platform Notes

BIOS Configuration:
Workload Profile set to General Throughput Compute
Memory Patrol Scrubbing set to Disabled
Advanced Memory Protection set to Advanced ECC
XPT Remote Prefetcher set to Enabled
Last Level Cache (LLC) Dead Line Allocation set to Disabled
Enhanced Processor Performance set to Enabled
Enhanced Processor Performance Profile set to Aggressive
Thermal Configuration set to Maximum Cooling
Intel UPI Link Frequency set to Minimum
Intel UPI Link Enablement set to Single Link
D2K set to Disabled
Workload Profile set to Custom
  DCU Stream Prefetcher set to Disabled
  Energy Efficient Turbo set to Enabled
  Adjacent Sector Prefetcher set to Disabled
  Intel UPI Link Power Management set to Enabled

Sysinfo program /home/cpu2017_1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 9b2a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Fri Jun 22 16:46:15 2018

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 5317 CPU @ 3.00GHz

(Continued on next page)
Platform Notes (Continued)

2 "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 : 12
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

From lscpu from util-linux 2.32.1:
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: 12
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
Stepping: 6
CPU MHz: 3492.533
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 18432K
NUMA node0 CPU(s): 0-5, 24-29
NUMA node1 CPU(s): 6-11, 30-35
NUMA node2 CPU(s): 12-17, 36-41
NUMA node3 CPU(s): 18-23, 42-47
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
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr 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_13 invpcid_single ssbd
mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vni flexpriority ept vpid ept_ad
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 xGetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local split_lock_detect wbinvd dtherm ida arat pin pts avx512vbm ium pkp
ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme

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**SPECrate®2017_int_peak = 209**

## Platform Notes (Continued)

```
avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities
```

* /proc/cpuinfo cache data  
  cache size : 18432 KB

* From numactl --hardware  
  WARNING: a numactl 'node' might or might not correspond to a physical chip.  
  available: 4 nodes (0-3)  
  node 0 cpus: 0 1 2 3 4 5 24 25 26 27 28 29  
  node 0 size: 509928 MB  
  node 0 free: 515290 MB  
  node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35  
  node 1 size: 509972 MB  
  node 1 free: 515598 MB  
  node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41  
  node 2 size: 510252 MB  
  node 2 free: 515728 MB  
  node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47  
  node 3 size: 509924 MB  
  node 3 free: 515710 MB  
  node distances:  
  node   0   1   2   3  
  0:  10  20  30  30  
  1:  20  10  30  30  
  2:  30  30  10  20  
  3:  30  30  20  10

* From /proc/meminfo  
  MemTotal: 2113491136 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)

(Continued on next page)
Platform Notes (Continued)

```
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
uname -a:
    Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
    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/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 3 Jun 22 16:41
SPEC is set to: /home/cpu2017_1.1.8
    Filesystem    Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   670G  124G  546G  19% /home

From /sys/devices/virtual/dmi/id
    Vendor:        HPE
    Product:      ProLiant DL380 Gen10 Plus
    Product Family: ProLiant
    Serial:       CN70490X8B

Additional information from dmidecode 3.2 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:
    32x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2933

BIOS:
    BIOS Vendor:   HPE
    BIOS Version: U46
    BIOS Date:    05/16/2021
    BIOS Revision: 1.42
```

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Software Availability: Dec-2020

Platform Notes (Continued)

Firmware Revision: 2.50
(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.
---

==============================================================================
C | 502.gcc_r(peak)
---
Intel(R) 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)
| 525.x264_r(base, peak) 557.xz_r(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.
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(Continued on next page)
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|         | 525.x264_r(base, peak) 557.xz_r(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.       |
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| C       | 500.perlbench_r(peak)                                             |
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| C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)            |
|         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)              |
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
| Version 2021.1 Build 20201113                                        |
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==============================================================================

==============================================================================
| Fortran | 548.exchange2_r(base, peak)                                       |
==============================================================================

(Continued on next page)
## 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.

---

## Base Compiler Invocation

C benchmarks:
- `icx`

C++ benchmarks:
- `icpx`

Fortran benchmarks:
- `ifort`

## Base Portability Flags

- `500.perlb benchmark_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`
- `-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`

(Continued on next page)
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**Base Optimization Flags (Continued)**

C++ benchmarks (continued):
- -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
- -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.mcfr: -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
Hewlett Packard Enterprise  
[Test Sponsor: HPE]  
ProLiant DL380 Gen10 Plus  
[3.00 GHz, Intel Xeon Gold 5317]  

SPEC CPU®2017 Integer Rate Result  
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SPECrate®2017_int_base = 203  
SPECrate®2017_int_peak = 209  

CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE  

Test Date: Aug-2021  
Hardware Availability: Jun-2021  
Software Availability: Dec-2020  

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

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
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.html
SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10 Plus  
(3.00 GHz, Intel Xeon Gold 5317)  

SPECrater®2017_int_base = 203  
SPECrater®2017_int_peak = 209

CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE  

Test Date: Aug-2021  
Hardware Availability: Jun-2021  
Software Availability: Dec-2020

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  
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.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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