## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL360 Gen10 Plus  
(2.30 GHz, Intel Xeon Platinum 8380)

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

### Hardware

- **CPU Name:** Intel Xeon Platinum 8380  
- **Max MHz:** 3400  
- **Nominal:** 2300  
- **Enabled:** 80 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:** 60 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R)  
- **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++: 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 Jun-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

### SPECrate®2017_int_base = 557  
### SPECrate®2017_int_peak = 581

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### Test Details

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

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Results Table

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</table>

SPECrate®2017_int_base = 557
SPECrate®2017_int_peak = 581

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
"/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"

MALLOCONF = "retain: true"
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General Notes

Binaries compiled on a system with 1x Intel Core i9−7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.1
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 May 24 12:41:14 EDT 2021
Submission: cpu2017-20210524-26427.sub

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Tue Jun  1 10:16:53 EDT 2021
Submission: cpu2017-20210524-26427.sub

Platform Notes

The system ROM used for this result contains Intel microcode version 0xd0002a0 for
the Intel Xeon Platinum 8380 processor.
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 Prefetch set to Disabled
Intel UPI Link Power Management set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aaca64d
running on localhost.localdomain Thu May 20 11:55:15 2021

(Continued on next page)
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Platform Notes (Continued)

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) Platinum 8380 CPU @ 2.30GHz
  2 "physical id"s (chips)
  160 "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 : 40
siblings : 80
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

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): 160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 40
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8380 CPU @ 2.30GHz
Stepping: 6
CPU MHz: 973.127
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 61440K
NUMA node0 CPU(s): 0-19,80-99
NUMA node1 CPU(s): 20-39,100-119
NUMA node2 CPU(s): 40-59,120-139
NUMA node3 CPU(s): 60-79,140-159
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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtses64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16

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Software Availability: Jun-2021

Platform Notes (Continued)

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_13 invpcid_single ssbd
mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmx priority ept vpid ept_ad
fsqsb 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 xsaves xsaveopt xgetbv1 xsaves cqm_llc cqm_occunc_11c cqm_mbm_total
cqm_mbn_local split_lock_detect whnoindt dtherm ida arat pl nts avx512vbmni umip pku
ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_vbmi2 avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

From /proc/cpuinfo cache data
cache size : 61440 KB

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 6 7 8 9 10 11 12 13 14 15 16 17 18 19 80 81 82 83 84 85 86 87
88 89 90 91 92 93 94 95 96 97 98 99
node 0 size: 501065 MB
node 0 free: 515167 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 100 101 102
103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119
node 1 size: 501054 MB
node 1 free: 515671 MB
node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 120 121 122
123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
node 2 size: 501212 MB
node 2 free: 515776 MB
node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 140 141 142
143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
node 3 size: 501226 MB
node 3 free: 515572 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: 2113465324 KB
MemFree: 0
MemAvailable: 2048 KB

/sbin/tuned-adm active
Current active profile: throughput-performance

(Continued on next page)
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Platform Notes (Continued)

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.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 May 20 11:42

SPEC is set to: /home/cpu2017

| Filesystem Type  Size  Used Avail Use% Mounted on |
|-------------|-------|-------|-------|------------------|
| /dev/mapper/rhel00-home xfs 670G 70G 600G 11% /home |

From /sys/devices/virtual/dmi/id

    Vendor:           HPE
    Product:          ProLiant DL360 Gen10 Plus
    Product Family:   ProLiant
    Serial:           CN701108CK

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Platform Notes (Continued)

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

BIOS:
BIOS Vendor: HPE
BIOS Version: U46
BIOS Date: 05/16/2021
BIOS Revision: 1.42
Firmware Revision: 2.40

(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)
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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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C       | 500.perlbench_r(peak)
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**Compiler Version Notes (Continued)**

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|-----------------------------------------------|
| 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 | 548.exchange2_r(base, peak) |
|-----------------------------|
| 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**

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**Base Portability Flags**

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| 502.gcc_r: -DSPEC_LP64 |
| 505.mcf_r: -DSPEC_LP64 |
| 520.omnetpp_r: -DSPEC_LP64 |
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| 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 DL360 Gen10 Plus
(2.30 GHz, Intel Xeon Platinum 8380)

SPEC CPU®2017 Integer Rate Result

SPECrate®2017_int_base = 557
SPECrate®2017_int_peak = 581

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

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
-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

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

Hewlett Packard Enterprise
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**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE

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

### Peak Portability Flags (Continued)

- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64
- 541.leea_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  
  -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

- 502.gcc_r: -m32  
  -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin

**C++ benchmarks:**

- 520.omnetpp_r: basepeak = yes
- 523.xalancbmk_r: basepeak = yes
- 531.deepsjeng_r: basepeak = yes

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
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SPECrate®2017_int_base = 557
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<td>Software Availability: Jun-2021</td>
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Peak Optimization Flags (Continued)

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-revC.html

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-revC.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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