Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10 Plus
(2.60 GHz, Intel Xeon Gold 6348)

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10 Plus
(2.60 GHz, Intel Xeon Gold 6348)

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

SPECrate®2017_int_base = 437
SPECrate®2017_int_peak = 453

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

500.perlbench_r 112
502.gcc_r 112
505.mcf_r 112
520.omnetpp_r 112
523.xalancbmk_r 112
525.x264_r 112
531.deepsjeng_r 112
541.leela_r 112
548.exchange2_r 112
557.xz_r 112

--- SPECrate®2017_int_base (437) ---

Hardware

CPU Name: Intel Xeon Gold 6348
Max MHz: 3500
Nominal: 2600
Enabled: 56 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: 42 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/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 05/26/2021 released
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
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL360 Gen10 Plus  
(2.60 GHz, Intel Xeon Gold 6348)

SPEC CPU®2017 Integer Rate Result  
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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

```
sync; echo 3 > /proc/sys/vm/drop_caches  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>  
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/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/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

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.

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.


Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon Jun 21 10:24:59 EDT 2021
Submission: cpu2017-20210621-27554.sub

## Platform Notes

The system ROM used for this result contains Intel microcode version 0xd0002a0 for the Intel Xeon Gold 6348 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 Prefetcher set to Disabled
- Intel UPI Link Power Management set to Enabled

The system ROM used for this result contains Intel microcode version 0xd0002a0 for the Intel Xeon Platinum 8380 processor.

BIOS Configuration:

(Continued on next page)
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Platform Notes (Continued)

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Adjacent Sector Prefetcher set to Disabled
Intel UPI Link Power Management set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acac64d
running on localhost.localdomain Wed Jun 9 09:48:25 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)
112 "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 : 56
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
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

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): 112
    On-line CPU(s) list: 0-111
    Thread(s) per core: 2
    Core(s) per socket: 28
    Socket(s): 2

(Continued on next page)
### Platform Notes (Continued)

| NUMA node(s): | 4 |
| Vendor ID: | GenuineIntel |
| CPU family: | 6 |
| Model: | 106 |
| Model name: | Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz |
| Stepping: | 6 |
| CPU MHz: | 2632.220 |
| BogoMIPS: | 5200.00 |
| Virtualization: | VT-x |
| L1d cache: | 48K |
| L1i cache: | 32K |
| L2 cache: | 1280K |
| L3 cache: | 43008K |
| NUMA node0 CPU(s): | 0-13, 56-69 |
| NUMA node1 CPU(s): | 14-27, 70-83 |
| NUMA node2 CPU(s): | 28-41, 84-97 |
| NUMA node3 CPU(s): | 42-55, 98-111 |

**Flags:**

- fpu
- vme
- de
- pse
- mce
- cmov
- pat
- pse36
- clflush
- dts
- acpi
- mmx
- fxsr
- sse
- sse2
- ss
- ht
- tm
- syscall
- nx
- pdelgb
- rdtsscp
- 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
- xtrr
- pdcm
- pcid
- sse4_1
- sse4_2
- x2apic
- movbe
- popcnt
- tsc_deadline_timer
- aes
- xsave
- avx
- f16c
- rdrand
- lahf_lm
- abm
- avx2
- smep
- bmi2
- erms
- invvpid
- single
- ssbd
- mba
- ibps
- enhanced
- tpr
- shadow
- vnmi
- flexpriority
- ept
- vpid
- ept_ad
- fsgsbase
- tsc_adjust
- bmi1
- hle
- avx2
- smep
- bmi2
- emms
- invvpid
- single
- ssbd
- mba
- ibps
- enhanced
- tpr
- shadow
- vnmi
- flexpriority
- ept
- vpid
- ept_ad
- fsgsbase
- tsc_adjust
- bmi1
- hle
- avx2
- smep
- bmi2
- emms
- invvpid
- single
- ssbd
- mba
- ibps
- enhanced
tpm
- vms
- vms...

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 6 7 8 9 10 11 12 13 56 57 58 59 60 61 62 63 64 65 66 67 68 69
- node 0 size: 502127 MB
- node 0 free: 515386 MB
- node 1 cpus: 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 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
- node 1 size: 502803 MB
- node 1 free: 515782 MB
- node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97
- node 2 size: 501873 MB
SPEC CPU®2017 Integer Rate Result

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Tested by: HPE

SPECrate®2017_int_base = 437
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Test Date: Jun-2021
Hardware Availability: Jun-2021
Software Availability: Jun-2021

Platform Notes (Continued)

node 2 free: 515757 MB
node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 98 99 100 101 102 103 104 105
106 107 108 109 110 111
node 3 size: 503251 MB
node 3 free: 515472 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: 2113477792 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

From /etc/*release* /etc/*version*

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

(Continued on next page)
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Test Date: Jun-2021
Hardware Availability: Jun-2021
Software Availability: Jun-2021

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 3 Jun 9 09:43

SPEC is set to: /home/cpu2017

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<td>xfs</td>
<td>670G</td>
<td>118G</td>
<td>552G</td>
<td>18%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id
Vendor:         HPE
Product:        ProLiant DL360 Gen10 Plus
Product Family: ProLiant
Serial:         CN701108CK

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:       05/26/2021
BIOS Revision:   1.42
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.

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

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**Compiler Version Notes (Continued)**

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502.gcc_r(peak)

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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  
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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)

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

C++ benchmarks:  
icpx

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10 Plus
(2.60 GHz, Intel Xeon Gold 6348)

SPECrate®2017_int_base = 437
SPECrate®2017_int_peak = 453

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</tr>
</tbody>
</table>

Test Sponsor: HPE
Hardware Availability: Jun-2021
Tested by: HPE
Software Availability: Jun-2021

Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_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
-flt0 -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

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
-1qkmalloc

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
-1qkmalloc
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
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SPECrater®2017_int_base = 437
SPECrater®2017_int_peak = 453

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

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

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: -W1,-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
  -ljqkmalloc

  502.gcc_r: -m32
  -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
  -std=gnu89 -W1,-z,muldefs -fprofile-generate(pass 1)
  -fprofile-use=default.profdatalpass 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

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SPEC CPU®2017 Integer Rate Result
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CPU2017 License: 3
Test Sponsor: HPE
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Test Date: Jun-2021
Hardware Availability: Jun-2021
Software Availability: Jun-2021

Peak Optimization Flags (Continued)

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-revC.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revC.xml
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 v1.1.8 on 2021-06-09 00:18:24-0400.
Report generated on 2021-07-06 18:36:57 by CPU2017 PDF formatter v6442.
Originally published on 2021-07-06.