**SPEC CPU®2017 Integer Rate Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10 Plus  
(2.20 GHz, Intel Xeon Gold 6330N)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 360</th>
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<tbody>
<tr>
<td>SPECrate®2017_int_peak = 374</td>
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</table>

**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE  
**Test Date:** Jun-2021  
**Hardware Availability:** Jun-2021  
**Software Availability:** Dec-2020

### Copies

<table>
<thead>
<tr>
<th>Specification</th>
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<tr>
<td>500.perlbench_r</td>
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<tr>
<td>505.mcf_r</td>
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<tr>
<td>520.omnetpp_r</td>
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<td>523.xalancbmk_r</td>
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<td>525.x264_r</td>
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<td>531.deepsjeng_r</td>
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<tr>
<td>541.leela_r</td>
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<td>548.exchange2_r</td>
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<tr>
<td>557.xz_r</td>
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</table>

### Software

**OS:** Red Hat Enterprise Linux 8.3 (Ootpa)  
**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

**Firmware:** HPE BIOS Version U46 v1.42 05/16/2021 released May-2021

**File System:** xfs  
**System State:** Run level 3 (multi-user)

### Hardware

**CPU Name:** Intel Xeon Gold 6330N  
**Max MHz:** 3400  
**Nominal:** 2200  
**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, running at 2666)  
**Storage:** 1 x 800 GB SAS SSD, RAID 0  
**Other:** None

---

**Test Sponsor:** HPE  
**Hardware Availability:** Jun-2021  
**Software Availability:** Dec-2020

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---

**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
### Results Table

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</tbody>
</table>

**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_1.1.8/lib/intel64:/home/cpu2017_1.1.8/lib/ia32:/home/cpu2017_1.1.8/je5.0.1-32"
```
```
MALLOC_CONF = "retain:true"
```

---

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**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(2.20 GHz, Intel Xeon Gold 6330N)

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SPECrate®2017_int_peak = 374

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**Test Sponsor:** HPE
**Tested by:** HPE

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

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Copyright 2017-2021 Standard Performance Evaluation Corporation

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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 Jun  7 11:55:17 EDT 2021
Submission: cpu2017-20210607-26902.sub

Platform Notes
The system ROM used for this result contains Intel microcode version 0xd0002a0 for
the Intel Xeon Gold 6330N 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_1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Fri Jun 22 16:42:58 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

(Continued on next page)
Platform Notes (Continued)

From /proc/cpuinfo

```
model name : Intel(R) Xeon(R) Gold 6330N CPU @ 2.20GHz
   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
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               106
Model name:          Intel(R) Xeon(R) Gold 6330N CPU @ 2.20GHz
Stepping:            6
CPU MHz:             800.113
BogoMIPS:            4400.00
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 tsc msr pae mce cx8 apic sep mtrr pge mca cmov
                     pat pse36 clflush dts acp1 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 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 ssbd mba ibrs ibpb stibp ibrs_enhanced
                     tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle
                     avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
```
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Platform Notes (Continued)

rdseed adx smap avx512ifma cliflushopt clwb intel_pt avx512cd sha ni avx512bw
avx512vl xsaveopt xsavec xgetbv1 xsaves cmq llc cmq occup llc cmq mbm total
cmq mbm local split lock detect wbeni nd dtherm ida arat pln pts avx512vbmi umip pku
ospe avx512_vbm12 gfn1 vaes vpcimulqdq avx512_vnmi avx512_bitalg tme
avx512_vpopcntdq la57 rpdp md clear pconfig flush l1d arch capabilities

/proc/cpuinfo cache data
  cache size: 43008 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 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: 504611 MB
  node 0 free: 515327 MB
  node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80
     81 82 83
  node 1 size: 504827 MB
  node 1 free: 515350 MB
  node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 84 85 86 87 88 89 90 91 92 93 94
     95 96 97
  node 2 size: 504293 MB
  node 2 free: 515532 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: 505384 MB
  node 3 free: 515765 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: 2113477244 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"

(Continued on next page)
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Platform Notes (Continued)

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/swaps barriers and __user pointer sanitation
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 16:42

SPEC is set to: /home/cpu2017_1.1.8
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 670G 208G 462G 32% /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:

(Continued on next page)
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Tested by: HPE

Platform Notes (Continued)

32x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666

BIOS:
BIOS Vendor: HPE
BIOS Version: U46
BIOS Date: 05/16/2021
BIOS Revision: 1.42
Firmware Revision: 2.50

(End of data from sysinfo program)

Compiler Version Notes

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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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Compiler Version Notes (Continued)

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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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| 525.x264_r(base, peak) 557.xz_r(base, 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,

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(2.20 GHz, Intel Xeon Gold 6330N)

SPECraten®2017_int_base = 360
SPECraten®2017_int_peak = 374

Compiler Version Notes (Continued)

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Compiler Version Notes (Continued)

For more information, visit https://www.spec.org/
**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`

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`
- `525.x264_r: -DSPEC_LP64`
- `531.deepsjeng_r: -DSPEC_LP64`

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(2.20 GHz, Intel Xeon Gold 6330N)

SPECrate®2017_int_base = 360
SPECrate®2017_int_peak = 374

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

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

Peak Portability Flags (Continued)

541.leela_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

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

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

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

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</tbody>
</table>

## Peak Optimization Flags (Continued)

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

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-revE.xml

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