Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.70 GHz, Intel Xeon Gold 6258R)

SPEC CPU® 2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

SPECrate® 2017_int_base = 371
SPECrate® 2017_int_peak = 384

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

Test Date: Nov-2020
Hardware Availability: Feb-2020
Software Availability: Aug-2020

Cores

500.perlbench_r 112 259
502.gcc_r 112 264
505.mcf_r 112 307
520.omnetpp_r 112 218
523.xalancbmk_r 112 448
525.x264_r 112 781
531.deepsjeng_r 112 307
541.leela_r 112 290
548.exchange2_r 112 737
557.xz_r 112 223

Hardware
CPU Name: Intel Xeon Gold 6258R
Max MHz: 4000
Nominal: 2700
Enabled: 56 cores, 2 chips, 2 threads/core
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 38.5 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 600 GB SAS SSD
Other: None

Software
OS: Red Hat Enterprise Linux release 8.2 (Ootpa)
Kernel 4.18.0-193.el8.x86_64
Compiler: C/C++: Version 19.1.2.275 of Intel C/C++
        Compiler Build 20200604 for Linux;
        Fortran: Version 19.1.2.275 of Intel Fortran
        Compiler Build 20200623 for Linux;
Parallel: No
Firmware: HPE BIOS Version U30 v2.40(10/26/2020) released Oct-2020
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
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Results Table

<table>
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<tr>
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<td>557.xz_r</td>
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</tr>
</tbody>
</table>

SPECrate®2017_int_base = 371
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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_1.2_binaries/lib/intel64:/home/cpu2017_1.2_binaries/lib/intel64:a32:/home/cpu2017_1.2_binaries/jre5.0.1-32"
MALLOC_CONF = "retain:true"
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CPU2017 License: 3
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Tested by: HPE

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprice Linux 8.0
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.

Platform Notes

BIOS Configuration:
Thermal Configuration set to Maximum Cooling
Memory Patrol Scrubbing set to Disabled
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Enhanced Processor Performance set to Enabled
Workload Profile set to General Throughput Compute
Workload Profile set to Custom
Minimum Processor Idle Power Core C-State set to C1E State
DCU Stream Prefetcher set to Disabled

Sysinfo program /home/cpu2017_1.2_binaries/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7eddb1e6e46a485a0011
running on localhost.localdomain Wed Nov 4 13:28:27 2020

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 6258R CPU @ 2.70GHz
  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 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

(Continued on next page)
Platform Notes (Continued)

From lscpu:
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: 85
Model name: Intel(R) Xeon(R) Gold 6258R CPU @ 2.70GHz
Stepping: 7
CPU MHz: 3700.398
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
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 cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpce 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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3

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: 193123 MB

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Platform Notes (Continued)

node 0 free: 178880 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: 193529 MB
node 1 free: 182754 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: 193529 MB
node 2 free: 182827 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: 193501 MB
node 3 free: 182888 MB
node distances:
node 0 1 2 3
   0: 10 21 31 31
   1: 21 10 31 31
   2: 31 31 10 21
   3: 31 31 21 10

From /proc/meminfo
MemTotal: 792253084 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.2 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.2"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

  itlb_multihit: KVM: Mitigation: Split huge pages
  CVE-2018-3620 (L1 Terminal Fault): Not affected

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Platform Notes (Continued)

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
tsx_async_abort:
Mitigation: Clear CPU buffers; SMT vulnerable
run-level 3 Nov 4 05:54
SPEC is set to: /home/cpu2017_1.2_binaries
Filesystem   Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   504G   74G  431G  15% /home

From /sys/devices/virtual/dmi/id
BIOS: HPE U30 10/26/2020
Vendor: HPE
Product: ProLiant DL380 Gen10
Product Family: ProLiant
Serial: 7CE714P19P

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:
24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from syinfo program)

Compiler Version Notes

==============================================================================
C | 502.gcc_r(peak)
==============================================================================
Intel(R) C Compiler for applications running on IA-32, Version 19.1.2.275
   Build 20200604
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)
==============================================================================

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

Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
C       | 500.perlbench_r(peak) 557.xz_r(peak)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
C       | 502 gcc_r(peak) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604
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)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
C       | 500.perlbench_r(peak) 557.xz_r(peak)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
C       | 502 gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) C Compiler for applications running on IA-32, Version 19.1.2.275 Build 20200604
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
### Compiler Version Notes (Continued)

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</tr>
<tr>
<td></td>
<td>Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<tr>
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<td>500.perlbench_r(peak) 557.xz_r(peak)</td>
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<tr>
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<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>C++</td>
<td>520.omnetpp_r(base, peak) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)</td>
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<tr>
<td></td>
<td>Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200604 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<tr>
<td></td>
<td>548.exchange2_r(base, peak)</td>
</tr>
<tr>
<td></td>
<td>Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.2.275 Build 20200623 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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### Base Compiler Invocation

**C benchmarks:**
- icc

**C++ benchmarks:**
- icpc

**Fortran benchmarks:**
- ifort
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
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<td>Hardware Availability: Feb-2020</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Aug-2020</td>
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</table>

### Base Portability Flags

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -DSPEC_LP64
- 505.mcf_r: -DSPEC_LP64
- 520.ommnetpp_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:
- m64 -qnxtgen -std=c11
- Wl, -plugin-opt=-x86-branches-within-32B-boundaries -Wl, -z, muldefs
- xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
- qopt-mem-layout-trans=4
- L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
- lqkmalloc

C++ benchmarks:
- m64 -qnxtgen -Wl, -plugin-opt=-x86-branches-within-32B-boundaries
- Wl, -z, muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
- funroll-loops -qopt-mem-layout-trans=4
- L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
- lqkmalloc

Fortran benchmarks:
- m64 -Wl, -plugin-opt=-x86-branches-within-32B-boundaries -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/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
- lqkmalloc

### Peak Compiler Invocation

C benchmarks:
- icc

(Continued on next page)
Hewlett Packard Enterprise  
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C++ benchmarks:  
icpc  

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/usr/local/IntelCompiler19 compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin  
-lqkmalloc  

502.gcc_r: -m32  
-L/usr/local/IntelCompiler19 compilers_and_libraries_2020.3.275/linux/compiler/lib/ia32_lin  
-std=gnu89  
-W1, -plugin-opt=-x86-branches-within-32B-boundaries  
-W1,-z,muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profdata(pass 2) -xcORE-AVX512 -flto  
-Ofast(pass 1) -O3 -ffast-math -qnextgen  
-qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib  
-ljemalloc  

505.mcf_r: basepeak = yes
Peak Optimization Flags (Continued)

525.x264_r: -m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.3.275/linux/compiler/lib/intel64_lin
-lqkmalloc

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-V1.3-CLX-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-V1.3-CLX-revC.xml
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml