**SPEC® CPU2017 Integer Rate Result**

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant ML110 Gen10**

(2.10 GHz, Intel Xeon Silver 4208)

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**SPECrate2017_int_base** = **41.9**

**SPECrate2017_int_peak** = **Not Run**

CPU2017 License: **3**

Test Sponsor: **HPE**

Test Date: **Apr-2019**

Hardware Availability: **Apr-2019**

Tested by: **HPE**

Software Availability: **Feb-2019**

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**Copies**

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<th>Test</th>
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<tr>
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**Hardware**

CPU Name: **Intel Xeon Silver 4208**

Max MHz.: **3200**

Nominal: **2100**

Enabled: **8 cores, 1 chip, 2 threads/core**

Orderable: **1 chip(s)**

Cache L1: **32 KB I + 32 KB D on chip per core**

L2: **1 MB I+D on chip per core**

L3: **11 MB I+D on chip per chip**

Other: **None**

Memory: **96 GB (6 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)**

Storage: **1 x 400 GB SAS SSD, RAID 0**

Other: **None**

**Software**

OS: **SUSE Linux Enterprise Server 15 (x86_64)**

Kernel: **4.12.14-23-default**

Compiler: **C/C++: Version 19.0.2.187 of Intel C/C++ Compiler Build 20190117 for Linux; Fortran: Version 19.0.2.187 of Intel Fortran Compiler Build 20190117 for Linux**

Parallel: **No**

Firmware: **HPE BIOS Version U33 02/02/2019 released Apr-2019**

File System: **xfs**

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

Base Pointers: **64-bit**

Peak Pointers: **Not Applicable**

Other: **None**
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(2.10 GHz, Intel Xeon Silver 4208)

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Test Sponsor: HPE  
Tested by: HPE

### Test Date: Apr-2019  
Hardware Availability: Apr-2019  
Software Availability: Feb-2019

### SPECrate2017_int_base = 41.9  
SPECrate2017_int_peak = Not Run

### Results Table

<table>
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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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>`

### General Notes

Environment variables set by runcpu before the start of the run:  
`LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"`  
Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5  
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) (Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML110 Gen10
(2.10 GHz, Intel Xeon Silver 4208)

<table>
<thead>
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General Notes (Continued)

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
- Workload Profile set to General Throughput Compute
- Workload Profile set to Custom
- Energy/Performance Bias set to Balanced Performance

Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on ml110-sles15 Wed Apr 24 23:15:13 2019

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) Silver 4208 CPU @ 2.10GHz
        1  "physical id"s (chips)
    16  "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 : 8
        siblings : 16
    physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 16
    On-line CPU(s) list: 0-15
    Thread(s) per core: 2
    Core(s) per socket: 8
    Socket(s): 1
    NUMA node(s): 1
    Vendor ID: GenuineIntel
    CPU family: 6
    Model: 85
    Model name: Intel(R) Xeon(R) Silver 4208 CPU @ 2.10GHz
    Stepping: 6
    CPU MHz: 2100.000

(Continued on next page)
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SPECrate2017_int_peak = Not Run

Platform Notes (Continued)

BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-15
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbe fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt

From /proc/cpuinfo cache data
  cache size: 11264 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  node 0 size: 96324 MB
  node 0 free: 95798 MB
  node distances:
    node 0
    0: 10

From /proc/meminfo
  MemTotal: 98636200 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15"
    VERSION_ID="15"
    PRETTY_NAME="SUSE Linux Enterprise Server 15"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15"

(Continued on next page)
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Platform Notes (Continued)

uname -a:
    Linux ml110-sles15 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Apr 24 23:12

SPEC is set to: /home/cpu2017_u2
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      xfs   313G   35G  279G  11% /home

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.
    BIOS HPE U33 02/02/2019
    Memory:
    6x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
 CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
    557.xz_r(base)
==============================================================================
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
    541.leela_r(base)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
(Continued on next page)
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Compiler Version Notes (Continued)

------------------------------------------------------------------------------
FC 548.exchange2_r(base)
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

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

C++ benchmarks:
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-lqkmalloc`

Fortran benchmarks:
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
- `-lqkmalloc`

The flags files that were used to format this result can be browsed at:
- [http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.html](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.html)

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-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 CPU2017 v1.0.5 on 2019-04-24 13:45:12-0400.  
Originally published on 2019-06-11.