Hewlett Packard Enterprise
ProLiant DL20 Gen10
(3.40 GHz, Intel Xeon E-2236)

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

Test Date: Oct-2019
Hardware Availability: Nov-2019
Software Availability: Oct-2019

SPECrate®2017_int_base = 44.9
SPECrate®2017_int_peak = Not Run

500.perlbench_r 12 38.5
502.gcc_r 12 38.1
505.mcf_r 12 57.2
520.omnetpp_r 12 21.6
523.xalancbmk_r 12 49.1
525.x264_r 12
531.deepsjeng_r 12 40.8
541.leela_r 12 37.1
548.exchange2_r 12 85.2
557.xz_r 12 27.4

--- SPECrate®2017_int_base (44.9) ---

Hardware

CPU Name: Intel Xeon E-2236
Max MHz: 4800
Nominal: 3400
Enabled: 6 cores, 1 chip, 2 threads/core
Orderable: 1 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 256 KB I+D on chip per core
L3: 12 MB I+D on chip per chip
Other: None
Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-U)
Storage: 1 x 400 GB SATA SSD, RAID 0
Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64) SP1 4.12.14-195-default
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux
Parallel: No
Firmware: HPE BIOS Version U43 09/05/2019 released Sep-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: --
### SPEC CPU®2017 Integer Rate Result

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#### Results Table

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<th>Copies</th>
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<th>Seconds</th>
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<tr>
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<tr>
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<td>27.3</td>
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</tbody>
</table>

**SPECrate®2017_int_base = 44.9**  
**SPECrate®2017_int_peak = Not Run**

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"
- Prior to runcpu invocation
- Filesystem page cache synced and cleared with:
  - `sync; echo 3 > /proc/sys/vm/drop_caches`

### General Notes

- Environment variables set by runcpu before the start of the run:
  - `LD_LIBRARY_PATH = "/../lib/ia32/:../lib/intel64:/../je5.0.1-32:/../je5.0.1-64"`
- Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
- Yes: 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
LLC prefetch set to Enabled
Workload Profile set to General Throughput Compute
Minimum Processor Idle Power Core C-State set to C1E
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-vb4y Tue Oct 1 15:59:18 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) E-2236 CPU @ 3.40GHz
  - 1 "physical id"s (chips)
  - 12 "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: 6
  - siblings: 12
  - physical 0: cores 0 1 2 3 4 5

From lscpu:
- **Architecture:** x86_64
- **CPU op-mode(s):** 32-bit, 64-bit
- **Byte Order:** Little Endian
- **Address sizes:** 39 bits physical, 48 bits virtual
- **CPU(s):** 12
- **On-line CPU(s) list:** 0-11
- **Thread(s) per core:** 2
- **Core(s) per socket:** 6
- **Socket(s):** 1
- **NUMA node(s):** 1
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 158
- **Model name:** Intel(R) Xeon(R) E-2236 CPU @ 3.40GHz
- **Stepping:** 10
- **CPU MHz:** 3400.000
- **BogoMIPS:** 6816.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 256K
- **L3 cache:** 12288K
- **NUMA node0 CPU(s):** 0-11

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Hardware Availability: Nov-2019
Software Availability: Oct-2019

Platform Notes (Continued)

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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
                    aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
                    sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
                    aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single
                    bmi1 hel avx2 smep bmi2 erns invpcid rtm mpx rdseed adx smap clflushopt intel_pt
                    xsaveopt xsavec xgetbv1 xsave xsaveopt xsaves dtherm ida arat pln pts md_clear flush_lid

/proc/cpuinfo cache data
  cache size : 12288 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
  node 0 size: 64021 MB
  node 0 free: 63458 MB
  node distances:
  node 0
  0 : 10

From /proc/meminfo
  MemTotal:       65557548 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
os-release:
  NAME="SLES"
  VERSION="15-SP1"
  VERSION_ID="15.1"
  PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
  ID="sles"
  ID_LIKE="suse"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
  Linux linux-vb4y 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization

(Continued on next page)
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Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Oct 1 15:57

SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs   270G   61G  209G  23% /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 U43 09/05/2019
Memory:
4x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

******************************************************************************
C       | 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

******************************************************************************
C++     | 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

******************************************************************************
Fortran | 548.exchange2_r(base)
******************************************************************************

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
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### Base Compiler Invocation

- **C benchmarks**:
  - `icc -m64 -std=c11`

- **C++ benchmarks**:
  - `icpc -m64`

- **Fortran benchmarks**:
  - `ifort -m64`

### Base Portability Flags

- **C benchmarks**:
  - `-Wl,-z,muldefs -xCORE-AVX2 -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`

- **C++ benchmarks**:
  - `-Wl,-z,muldefs -xCORE-AVX2 -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-AVX2 -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`

### Base Optimization Flags
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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-revB.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-revB.xml