SPEC® CPU2017 Integer Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.70 GHz, Intel Xeon Platinum 8280)

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

SPECratenia2017_int_base = 167
SPECratenia2017_int_peak = Not Run

Hardware
CPU Name: Intel Xeon Platinum 8280
Max MHz.: 4000
Nominal: 2700
Enabled: 28 cores, 1 chip, 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: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)
Storage: 1 x 480 GB SATA 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 20190131 for Linux;
Fortran: Version 19.0.2.187 of Intel Fortran
Compiler Build 20190131 for Linux
Parallel: No
Firmware: HPE BIOS Version I42 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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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>56</td>
<td>665</td>
<td>134</td>
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<tr>
<td>520.omnetpp_r</td>
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</tr>
<tr>
<td>531.deepsjeng_r</td>
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<td>142</td>
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<td>139</td>
<td>674</td>
<td>138</td>
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<td>548.exchange2_r</td>
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<td>313</td>
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<td>557.xz_r</td>
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<td>115</td>
<td>529</td>
<td>114</td>
<td>529</td>
<td>114</td>
</tr>
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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>

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

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)
Hewlett Packard Enterprise
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Test Sponsor: HPE
Test Date: Mar-2019
Tested by: HPE
Hardware Availability: Apr-2019
Software Availability: Feb-2019

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
Enhanced Processor Performance set to Enabled
Workload Profile set to General Throughput Compute
Energy/Performance Bias set to Balanced Performance

Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sy480-gen10 Mon Mar 11 13:11:16 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) Platinum 8280 CPU @ 2.70GHz
   1 "physical id"s (chips)
   56 "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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz

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### Platform Notes (Continued)

```
Stepping:             7
CPU MHz:             2700.000
BogoMIPS:            5400.00
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            39424K
NUMA node0 CPU(s):   0-13,28-41
NUMA node1 CPU(s):   14-27,42-55
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 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 dca sse4_1 sse4_2 x2apic movbe popcnt
```

From `/proc/cpuinfo` cache data
```
cache size : 39424 KB
```

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.
```
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 28 29 30 31 32 33 34 35 36 37 38 39 40 41
node 0 size: 96248 MB
node 0 free: 95741 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 42 43 44 45 46 47 48 49 50 51 52
53 54 55
node 1 size: 96564 MB
node 1 free: 96289 MB
node distances:
  node 0 1
  0: 10 21
  1: 21 10
```

From `/proc/meminfo`
```
MemTotal:       197440272 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From `/etc/*release*` /etc/*version*
```
os-release:
```

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Platform Notes (Continued)

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"

uname -a:  
Linux sy480-gen10 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 Mar 11 13:09

SPEC is set to: /home/cpu2017_u2  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 405G 194G 211G 48% /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 I42 02/02/2019  
Memory:  
12x UNKNOWN NOT AVAILABLE  
12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(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.

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**Compiler Version Notes (Continued)**

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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.

--------------------------------------------------------------------------------------------------

FC 548.exchange2_r(base)

--------------------------------------------------------------------------------------------------
Intel(R) Fortran 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.

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**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
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**Base Optimization Flags**

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 -lgkmalloc`

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 -lgkmalloc`

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 -lgkmalloc`

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.

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