### SPEC® CPU2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
Synergy 480 Gen10  
(1.90 GHz, Intel Xeon Bronze 3204)

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>HPE</th>
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<tbody>
<tr>
<td>Tested by</td>
<td>HPE</td>
</tr>
<tr>
<td>Test Date</td>
<td>Jul-2019</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>May-2019</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Feb-2019</td>
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</tbody>
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#### Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
</tr>
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<tbody>
<tr>
<td>500.perbench_r</td>
<td>32.1</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>38.0</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>50.0</td>
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<tr>
<td>520.omnetpp_r</td>
<td>30.1</td>
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<tr>
<td>523.xalancbmk_r</td>
<td>50.1</td>
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<tr>
<td>525.x264_r</td>
<td>70.7</td>
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<tr>
<td>531.deepsjeng_r</td>
<td>32.4</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>26.9</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>73.7</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>23.5</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base = 39.7**  
**SPECrate2017_int_peak = Not Run**

#### Hardware

- **CPU Name**: Intel Xeon Bronze 3204  
- **Max MHz.**: 1900  
- **Nominal**: 1900  
- **Enabled**: 12 cores, 2 chips  
- **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**: 8.25 MB I+D on chip per chip  
- **Memory**: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2133)  
- **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 I42 05/22/2019 released May-2019  
- **File System**: btrfs  
- **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>
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<th>Seconds</th>
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<tr>
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<td>548.exchange2_r</td>
<td>12</td>
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</table>

**SPECrate2017_int_base = 39.7**

**SPECrate2017_int_peak = Not Run**

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
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)
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SPECrate2017_int_base = 39.7
SPECrate2017_int_pea = Not Run

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

Test Date: Jul-2019
Hardware Availability: May-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
  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 sy480g10-2 Tue Jul 2 09:08:42 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) Bronze 3204 CPU @ 1.90GHz
                2 "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 : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 12
  On-line CPU(s) list: 0-11
  Thread(s) per core: 1
  Core(s) per socket: 6
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 85
  Model name: Intel(R) Xeon(R) Bronze 3204 CPU @ 1.90GHz

(Continued on next page)
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jul-2019
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Platform Notes (Continued)

Stepping: 6
CPU MHz: 1900.000
BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 8448K
NUMA node0 CPU(s): 0-2, 6-8
NUMA node1 CPU(s): 3-5, 9-11
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
sdbye fnm cx16 xtpr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt
vmxscale tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
epb cat13 cdpl3 invpcid_single intel_pinn mba tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed cvm xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occult llc cqm_mbm_total
cqm_mbm_local ibpb ibrs dtherm arat pfn pts pku ospke avx512_vnni arch_capabilities ssbd

/cache/data

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 6 7 8
node 0 size: 193021 MB
node 0 free: 192604 MB
node 0 cpus: 3 4 5 9 10 11
node 0 size: 193337 MB
node 0 free: 193006 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 395630908 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"

(Continued on next page)
Platform Notes (Continued)

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 sy480g10-2 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 Jul 2 09:06

SPEC is set to: /home/cpu2017_u2
   Filesystem   Type  Size  Used  Avail  Use%  Mounted on
   /dev/sdb2    btrfs  371G  93G  277G   26%  /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 05/22/2019
   Memory: 24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933, configured at 2133

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

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.

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
- lqkmalloc

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-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

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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 2019-07-02 10:08:41-0400.