**SPEC® CPU2017 Integer Rate Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML350 Gen10  
(1.70 GHz, Intel Xeon Bronze 3106)

**SPECrate2017_int_base = 44.2**

**SPECrate2017_int_peak = Not Run**

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<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>HPE</th>
<th>Hardware Availability:</th>
<th>Feb-2018</th>
</tr>
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<tbody>
<tr>
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<td>HPE</td>
<td>Software Availability:</td>
<td>Feb-2018</td>
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<tr>
<td>CPU2017 License:</td>
<td>3</td>
<td>Test Date:</td>
<td>Mar-2018</td>
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**Hardware**

- **CPU Name:** Intel Xeon Bronze 3106  
- **Max MHz.:** 1700  
- **Nominal:** 1700  
- **Enabled:** 16 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:** 11 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)  
- **Storage:** 2 x 480 GB SATA SSD, RAID 1  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 (x86_64) SP3  
- **Kernel:** 4.4.114-94.11-default  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
  Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran  
  Compiler for Linux  
- **Parallel:** No  
- **Firmware:** HPE BIOS Version U41 02/14/2018 released Feb-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1

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HPE

ProLiant ML350 Gen10

(1.70 GHz, Intel Xeon Bronze 3106)

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**Hardware Availability:** Feb-2018  
**Software Availability:** Feb-2018  

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### Results Table

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**SPECrate2017_int_base = 44.2**  
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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"
- Prior to runcpu invocation
- Filesystem page cache synced and cleared with:
  -sync; echo 3>/proc/sys/vm/drop_caches
- Runspec command invoked through numactl i.e.:
  -numactl --interleave=all runspec <etc>
- irqbalance disabled with "service irqbalance stop"
- Tuned profile set with "tuned-adm profile throughput-performance"
- VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"
- Numa balancing was disabled using "echo 0 > /proc/sys/kernel/ numa_balancing"

### General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

- Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
- Memory using Redhat Enterprise Linux 7.4
- Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)
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SPECrate2017_int_base = 44.2

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE
Test Date: Mar-2018
Hardware Availability: Feb-2018
Software Availability: Feb-2018

General Notes (Continued)

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.
jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; built with RedHat Enterprise 7.4, and the system compiler gcc 4.8.5; sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

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
Stale A to S set to Disabled
Workload Profile set to General Throughput Compute
Minimum Processor Idle Power Core C-State set to C1E State
Workload Profile set to Custom
Sub-NUMA Clustering set to Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on ml350gen10suse Fri Mar 16 12:34:53 2018

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 3106 CPU @ 1.70GHz
  2 "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 : 8
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: 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: 1

(Continued on next page)
**SPEC CPU2017 Integer Rate Result**

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**SPECrater2017_int_base = 44.2**

**SPECrater2017_int_peak = Not Run**

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

---

**Platform Notes (Continued)**

- Core(s) per socket: 8
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz
- Stepping: 4
- CPU MHz: 1696.028
- BogoMIPS: 3392.05
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 11264K
- NUMA node0 CPU(s): 0-3,8-11
- NUMA node1 CPU(s): 4-7,12-15
- Flags: fpu vme de pse tsc msr pae 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 ncpu xtopology nonstop_tsc aperffmpref eagerfpu 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 avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb invpcid_single pln pts dtherm intel_pt rsb_ctxtsw spec_ctrl retropoline kaiser tpr_shadow vmb and priority ept vpid fsgsbase tsc_adjust bml1 hle avx2 smep bmi2 ervisor dvm mpv
- fma
- axx
- avx512f
- avx512dq
- rdseed
- adx
- rds
- clflushopt
- clwb
- avx512cd
- avx512bw
- avx512vl
- xsaveopt
- xsavex
- xgetbv1
- cqm
- lcc
- cqm_occup_lcc
- pkp
- ospk

/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: 2 nodes (0-1)
- node 0 cpus: 0 1 2 3 8 9 10 11
- node 0 size: 96350 MB
- node 0 free: 95854 MB
- node 1 cpus: 4 5 6 7 12 13 14 15
- node 1 size: 96766 MB
- node 1 free: 96395 MB
- node distances:
- node 0 1
- 0: 10 21
- 1: 21 10

From /proc/meminfo
- MemTotal: 197751460 KB

(Continued on next page)
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SPECrate2017_int_peak = Not Run
SPECrate2017_int_base = 44.2

Platform Notes (Continued)

HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 3
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.
oS-release:
  NAME="SLES"
  VERSION="12-SP3"
  VERSION_ID="12.3"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
  Linux ml350gen10suse 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018
  (4309ff9) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 16 12:33

SPEC is set to: /home/cpu2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda4      xfs   405G  16G  390G  4% /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 U41 02/14/2018
  Memory:
    12x UNKNOWN NOT AVAILABLE
    12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, 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) |
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### Compiler Version Notes (Continued)

- **icc (ICC) 18.0.0 20170811**
  
  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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

  CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
  541.leela_r(base)

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

- **icpc (ICC) 18.0.0 20170811**

  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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

  FC 548.exchange2_r(base)

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

- **ifort (IFORT) 18.0.0 20170811**

  Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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

### Base Compiler Invocation

**C benchmarks:**

- icc

**C++ benchmarks:**

- icpc

**Fortran benchmarks:**

- ifort

### 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
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Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

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-SKX-revH.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-SKX-revH.xml

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