Hewlett Packard Enterprise
ProLiant ML350 Gen 10
(2.20 GHz, Intel Xeon Silver 4114)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>92.9</th>
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<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
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CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE

<table>
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<th>Test Date</th>
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**SPECrate2017_int_base (92.9)**

**Hardware**

- CPU Name: Intel Xeon Silver 4114
- Max MHz.: 3000
- Nominal: 2200
- Enabled: 20 cores, 2 chips, 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: 13.75 MB I+D on chip per chip
- Other: None
- Memory: 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)
- Storage: 2 x 480 GB SATA SSD, RAID-0
- Other: None

**Software**

- OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
- Kernel 4.4.131-94.29-default
- Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
- Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
- Parallel: No
- Firmware: HPE BIOS Version U41 06/15/2018 released Jun-2018
- File System: btrfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: Not Applicable
- Other: jemalloc general purpose malloc implementation v5.0.1
SPEC CPU2017 Integer Rate Result

Hewlett Packard Enterprise (Test Sponsor: HPE)
ProLiant ML350 Gen 10 (2.20 GHz, Intel Xeon Silver 4114)

SPECrate2017_int_base = 92.9
SPECrate2017_int_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Test Date: Aug-2018
Tested by: HPE
Hardware Availability: Jun-2018
Software Availability: May-2018

Results Table

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SPECrate2017_int_base = 92.9
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"
IRQ balance service was stopped using "service irqbalance stop"
Energy perf-bias set with "cpupower -c all -b 0"
Tuned profile set with "tuned-adm profile throughput-performance"
VM Dirty background ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_background_ratio"
VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"
Swappiness was set to 1 using "echo 1 > /proc/sys/vm/swappiness"
KSM Sleep milliseconds was set to 200 using "echo 200 > /sys/kernel/mm/ksm/sleep_millisecs"
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
Zone reclaim mode was set to 1 using "echo 1 > /proc/sys/vm/zone_reclaim_mode"
Transparent Huge Pages enabled by default
Filesystem page cache synced and cleared with:
Prior to runcpu invocation
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen 10
(2.20 GHz, Intel Xeon Silver 4114)

| SPECrate2017_int_base | 92.9 |
| SPECrate2017_int_peak | Not Run |

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

General Notes

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

Binaries compiled on a system with 1x Intel Core i7-6700K 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Configuration
- Workload Profile set to General Peak Frequency Compute
- Processor x2APIC Support set to Disabled
- Memory Patrol Scrubbing set to Disabled
- VT set to Disabled
- VT-d set to Disabled
- SR-IOV set to Disabled
- Minimum Processor Idle Power Core C-State set to C1E State
- Energy/Performance Bias set to Maximum Performance
- Thermal Configuration set to Maximum Cooling

Sysinfo program /cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f6d4985e45859ea9
running on linux-hw9v Fri Aug 24 16:23:19 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) Silver 4114 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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 : 10
siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12

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

Platform Notes (Continued)

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2194.855
BogoMIPS: 4389.71
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
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
aperfperf 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 fl64 rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl stibp ssbd retpoline kaiser tpr_shadow vmi
flexpriority ept vpd fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ersed invpcid rtm
cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsave xgetbv1 cqm_llc cqm_occup_llc pku ospke

/proc/cpuinfo cache data
cache size : 14080 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 20 21 22 23 24 25 26 27 28 29
node 0 size: 96264 MB
node 0 free: 95833 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 96637 MB

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Tested by: HPE

Test Date: Aug-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

Platform Notes (Continued)

node 1 free: 96340 MB
node distances:

node  0:  10  21
   1:  21  10

From /proc/meminfo
MemTotal: 197532192 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP3

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 linux-hw9v 4.4.131-94.29-default #1 SMP Mon May 21 14:41:34 UTC 2018 (f49bc78)
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
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Aug 23 23:03 last=5

SPEC is set to: /cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3 btrfs 443G 34G 409G 8% /

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)
Platform Notes (Continued)
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 06/15/2018
Memory:
24x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666, configured at 2400
(End of data from sysinfo program)
Regarding the sysinfo display about the memory installed,
memory is 192 GB and the dmidecode description should have one line reading as:
24x HPE 815097-B21 8 GB 2 rank 2666, configured at 2400

Compiler Version Notes
==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
     557.xz_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
     541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Base Compiler Invocation
C benchmarks:
icc
C++ benchmarks:
icpc

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Base Compiler Invocation (Continued)

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
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, multdefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1, -z, multdefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-W1, -z, multdefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

(Continued on next page)
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Base Other Flags (Continued)

Fortran benchmarks:  
- \texttt{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-revJ.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-revJ.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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