SPEC® CPU2017 Integer Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen10
(3.30 GHz, Intel Xeon Gold 6234)

SPECspeed2017_int_base = 10.0
SPECspeed2017_int_peak = Not Run

Hardware

CPU Name: Intel Xeon Gold 6234
Max MHz.: 4000
Nominal: 3300
Enabled: 32 cores, 4 chips
Orderable: 1, 2, 4 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 24.75 MB I+D on chip per chip
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
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: Yes
Firmware: HPE BIOS Version U34 02/02/2019 released Apr-2019
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1

Threads

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base (10.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads 0</td>
</tr>
<tr>
<td>600.perlbench_s</td>
</tr>
<tr>
<td>602.gcc_s</td>
</tr>
<tr>
<td>605.mcf_s</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
</tr>
<tr>
<td>625.x264_s</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
</tr>
<tr>
<td>641.leela_s</td>
</tr>
<tr>
<td>648.exchange2_s</td>
</tr>
<tr>
<td>657.xz_s</td>
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE
Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tr>
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<td>625.x264_s</td>
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<td>631.deepsjeng_s</td>
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<td>641.leela_s</td>
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<tr>
<td>648.exchange2_s</td>
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<td>14.3</td>
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<td>14.3</td>
<td>204</td>
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<tr>
<td>657.xz_s</td>
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<td>263</td>
<td>23.5</td>
<td>269</td>
<td>22.9</td>
<td>266</td>
<td>23.3</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64:
/home/cpu2017_u2/jemalloc5.0.1-32:/home/cpu2017_u2/jemalloc5.0.1-64"
OMP_STACKSIZE = "192M"

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) 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:**
- Hyper-Threading set to Disabled
- 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 Peak Frequency Compute
- Minimum Processor Idle Power Core C-State set to C1E State
- Energy/Performance Bias set to Balanced Power
- Workload Profile set to Custom
- Numa Group Size Optimization set to Flat
- Advanced Memory Protection set to Advanced ECC

**Sysinfo program** /home/cpu2017_u2/bin/sysinfo

**Rev:** r5974 of 2018-05-19 9bede8f2999c33d61f64985e45859ea9

**running on linux-vqdi Wed May 29 12:55:38 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) Gold 6234 CPU @ 3.30GHz
- **4 "physical id"s (chips)**
- **32 "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 2 9 17 19 20 24 27
- **physical 1**: cores 2 4 8 9 18 19 24 27
- **physical 2**: cores 1 3 8 9 18 19 20 25
- **physical 3**: cores 2 3 4 8 9 17 18 20

**From lscpu:**

- **Architecture**: x86_64
- **CPU op-mode(s)**: 32-bit, 64-bit
- **Byte Order**: Little Endian
- **CPU(s)**: 32
- **On-line CPU(s) list**: 0-31
- **Thread(s) per core**: 1
- **Core(s) per socket**: 8
- **Socket(s)**: 4
- **NUMA node(s)**: 4
- **Vendor ID**: GenuineIntel
- **CPU family**: 6
- **Model**: 85

(Continued on next page)


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**Platform Notes (Continued)**

- **Model name:** Intel(R) Xeon(R) Gold 6234 CPU @ 3.30GHz
- **Stepping:** 7
- **CPU MHz:** 3300.000
- **BogoMIPS:** 6600.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0-7
- **NUMA node1 CPU(s):** 8-15
- **NUMA node2 CPU(s):** 16-23
- **NUMA node3 CPU(s):** 24-31
- **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 pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcidSingle intel_p6in mba tpr_shadow vnmi flexpriority ept vpid fsbgsbase tsc_adjust bmi1 hle avx2 smep bmi2  

```
From /proc/cpuinfo cache data
  cache size : 25344 KB
```

**Warning:** a numactl 'node' might or might not correspond to a physical chip.
- **available:** 4 nodes (0-3)
- **node 0 cpus:** 0 1 2 3 4 5 6 7
- **node 0 size:** 193119 MB
- **node 0 free:** 192837 MB
- **node 1 cpus:** 8 9 10 11 12 13 14 15
- **node 1 size:** 193534 MB
- **node 1 free:** 193387 MB
- **node 2 cpus:** 16 17 18 19 20 21 22 23
- **node 2 size:** 193534 MB
- **node 2 free:** 193220 MB
- **node 3 cpus:** 24 25 26 27 28 29 30 31
- **node 3 size:** 193504 MB
- **node 3 free:** 193268 MB
- **node distances:**
  - **0:** 10 21 21 21
  - **1:** 21 10 21 21

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<td>Apr-2019</td>
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<td>Feb-2019</td>
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### Platform Notes (Continued)

```
2:  21  21  10  21
3:  21  21  21  10
```

From `/proc/meminfo`
- MemTotal: 792261576 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release* /etc/*version*`

```
os-release:
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 linux-vqdi 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 May 29 12:54

SPEC is set to: /home/cpu2017_u2
- Filesystem Type Size Used Avail Use% Mounted on
- /dev/sda2 btrfs 371G 360G 11G 98% /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 U34 02/02/2019
Memory:
- 24x UNKNOWN NOT AVAILABLE
- 24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from sysinfo program)
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Compiler Version Notes
==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
657.xz_s(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.
------------------------------------------------------------------------------

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
641.leela_s(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  648.exchange2_s(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
600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64

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Base Portability Flags (Continued)

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/home/cpu2017_u2/je5.0.1-64/ -ljemalloc

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:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.html
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-ic19.0u1-flags-linux64.xml
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 2019-05-29 03:25:38-0400.