Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML30 Gen10
(3.60 GHz, Intel Xeon E-2246G)

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

**SPECrater®2017_int_base =** 45.5  
**SPECrater®2017_int_peak =** Not Run

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong> Intel Xeon E-2246G</td>
<td><strong>OS:</strong> SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td><strong>Max MHz:</strong> 4800</td>
<td><strong>Kernel:</strong> 4.12.14-23-default</td>
</tr>
<tr>
<td><strong>Nominal:</strong> 3600</td>
<td><strong>Compiler:</strong> C/C++: Version 19.0.4.227 of Intel C/C++</td>
</tr>
<tr>
<td><strong>Enabled:</strong> 6 cores, 1 chip, 2 threads/core</td>
<td><strong>Compiler Build:</strong> 20190416 for Linux;</td>
</tr>
<tr>
<td><strong>Orderable:</strong> 1 chip</td>
<td><strong>Fortran:</strong> Version 19.0.4.227 of Intel Fortran</td>
</tr>
<tr>
<td><strong>Cache L1:</strong> 32 KB I + 32 KB D on chip per core</td>
<td><strong>Compiler Build:</strong> 20190416 for Linux;</td>
</tr>
<tr>
<td><strong>L2:</strong> 256 KB I+D on chip per core</td>
<td><strong>Parallel:</strong> No</td>
</tr>
<tr>
<td><strong>L3:</strong> 12 MB I+D on chip per chip</td>
<td><strong>Firmware:</strong> HPE BIOS Version U44 09/05/2019 released Nov-2019</td>
</tr>
<tr>
<td><strong>Other:</strong> None</td>
<td><strong>File System:</strong> xfs</td>
</tr>
<tr>
<td><strong>Memory:</strong> 64 GB (4 x 16 GB 2Rx8 PC4-2666V-U)</td>
<td><strong>System State:</strong> Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Storage:</strong> 1 x 400 GB SAS SSD, RAID 0</td>
<td><strong>Base Pointers:</strong> 64-bit</td>
</tr>
<tr>
<td><strong>Other:</strong> None</td>
<td><strong>Peak Pointers:</strong> Not Applicable</td>
</tr>
<tr>
<td><strong>Power Management:</strong> --</td>
<td><strong>Other:</strong> None</td>
</tr>
</tbody>
</table>
## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML30 Gen10  
(3.60 GHz, Intel Xeon E-2246G)  

**SPECrate®2017_int_base = 45.5**  
**SPECrate®2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>12</td>
<td>498</td>
<td>38.3</td>
<td>493</td>
<td>38.8</td>
<td>500</td>
<td>38.2</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>12</td>
<td>455</td>
<td>37.4</td>
<td>448</td>
<td>37.9</td>
<td>454</td>
<td>37.5</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>12</td>
<td>342</td>
<td>56.7</td>
<td>341</td>
<td>56.8</td>
<td>341</td>
<td>56.9</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>12</td>
<td>726</td>
<td>21.7</td>
<td>726</td>
<td>21.7</td>
<td>728</td>
<td>21.6</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>12</td>
<td>257</td>
<td>49.2</td>
<td>258</td>
<td>49.1</td>
<td>257</td>
<td>49.3</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>12</td>
<td>201</td>
<td>105</td>
<td>200</td>
<td>105</td>
<td>201</td>
<td>104</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>12</td>
<td>340</td>
<td>40.5</td>
<td>340</td>
<td>40.5</td>
<td>338</td>
<td>40.6</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>12</td>
<td>535</td>
<td>37.1</td>
<td>536</td>
<td>37.1</td>
<td>535</td>
<td>37.1</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>12</td>
<td>307</td>
<td>103</td>
<td>298</td>
<td>105</td>
<td>306</td>
<td>103</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>12</td>
<td>477</td>
<td>27.2</td>
<td>478</td>
<td>27.1</td>
<td>478</td>
<td>27.1</td>
</tr>
</tbody>
</table>

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

### Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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:
  ```bash
  sync; echo 3 > /proc/sys/vm/drop_caches
  ```

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```bash
LD_LIBRARY_PATH = 
"/home/cpu2017_u4/lib/intel64:/home/cpu2017_u4/lib/ia32:/home/cpu2017_u4
/je5.0.1-32"
```

### General Notes

Binaries compiled on a system with 1x Intel Core i9-799X 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.

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML30 Gen10
(3.60 GHz, Intel Xeon E-2246G)

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.

Platform Notes

BIOS Configuration:
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
Workload Profile set to General Throughput Compute

Sysinfo program /home/cpu2017_u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011

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) E-2246G CPU @ 3.60GHz
        1 "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 : 12
physical 0: 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: 2
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2246G CPU @ 3.60GHz
Stepping: 10
CPU MHz: 3600.000

(Continued on next page)
Platform Notes (Continued)

BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 12288K
NUMA node0 CPU(s): 0-11
Flags: fpu vme de pse tsc msr pae mce 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 apic msr pae mce cx8 apic cpuid

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
   available: 1 nodes (0)
   node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
   node 0 size: 64264 MB
   node 0 free: 63759 MB
   node distances:
     node 0
       0: 10

From /proc/meminfo
   MemTotal: 65806968 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

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

(Continued on next page)
Platform Notes (Continued)

Linux ml30-sles15 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-2018-3620 (L1 Terminal Fault): No status reported
Microarchitectural Data Sampling: No status reported
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass): Vulnerable
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 Oct 17 22:20

SPEC is set to: /home/cpu2017_u4
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 344G 76G 269G 22% /home

From /sys/devices/virtual/dmi/id
BIOS: HPE U44 09/05/2019
Vendor: HPE
Product: ProLiant ML30 Gen10
Product Family: ProLiant
Serial: CN68130P0X

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.
Memory:
4x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2667

(End of data from sysinfo program)
### Compiler Version Notes (Continued)

<table>
<thead>
<tr>
<th>Language</th>
<th>Version</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C++</td>
<td>520.omnetpp_r(base)</td>
<td>523.xalancbmk_r(base)</td>
</tr>
</tbody>
</table>

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```
Fortran | 548.exchange2_r(base) |
```

```
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
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
```
**SPEC CPU®2017 Integer Rate Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML30 Gen10  
(3.60 GHz, Intel Xeon E-2246G)  

SPECrater®2017_int_base = 45.5  
SPECrater®2017_int_peak = Not Run

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Date</th>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
<th>Tested by</th>
<th>Software Availability</th>
</tr>
</thead>
</table>

**Base Optimization Flags**

C benchmarks:
-`-Wall, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div`
-`-qopt-mem-layout-trans=4`
-`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
-`-lqkmalloc`

C++ benchmarks:
-`-Wall, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div`
-`-qopt-mem-layout-trans=4`
-`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
-`-lqkmalloc`

Fortran benchmarks:
-`-Wall, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div`
-`-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
-`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/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


SPEC CPU and SPECrater are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2019-10-17 12:52:20-0400.
Originally published on 2019-11-12.