Hewlett Packard Enterprise
Synergy 480 Gen10
(3.00 GHz, Intel Xeon Gold 6248R)

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

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed®2017_int_base = 10.2</th>
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<tbody>
<tr>
<td>SPECspeed®2017_int_peak = 10.3</td>
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<tr>
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<tr>
<td>600.perlbench_s 48</td>
<td>6.62</td>
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<td>602.gcc_s 48</td>
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<td>9.27</td>
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<td></td>
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</tbody>
</table>

| CPU Name: | Intel Xeon Gold 6248R |
| Max MHz: | 4000 |
| Nominal: | 3000 |
| Enabled: | 48 cores, 2 chips |
| Orderable: | 1, 2 chip(s) |
| Cache L1: | 32 KB I + 32 KB D on chip per core |
| Cache L2: | 1 MB I+D on chip per core |
| Cache L3: | 35.75 MB I+D on chip per chip |
| Other: | None |
| Memory: | 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R) |
| Storage: | 1 x 400 GB SAS SSD, RAID 0 |
| Other: | None |

| Power Management: | BIOS set to prefer performance at the cost of additional power usage |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other: | jemalloc memory allocator V5.0.1 |

| OS: | SUSE Linux Enterprise Server 15 SP1 (x86_64) |
| Compiler: | C/C++: Version 19.0.4.227 of Intel C/C++ |
| Compiler Build: | 20190416 for Linux; |
| Fortran: | Version 19.0.4.227 of Intel Fortran |
| Compiler Build: | 20190416 for Linux; |

| Firmware: | HPE BIOS Version 142 v2.22 (11/13/2019) released Feb-2020 |
| File System: | btrfs |
| Parallel: | Yes |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other: | jemalloc memory allocator V5.0.1 |

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**SPEC CPU®2017 Integer Speed Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
Synergy 480 Gen10
(3.00 GHz, Intel Xeon Gold 6248R)

**SPECspeed®2017_int_base = 10.2**

**SPECspeed®2017_int_peak = 10.3**

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE
Test Date: Feb-2020
Hardware Availability: Feb-2020
Software Availability: Jun-2019

---

### Results Table

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<thead>
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<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
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**SPECspeed®2017_int_base = 10.2**
**SPECspeed®2017_int_peak = 10.3**

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`

---

**Environment Variables Notes**

- Environment variables set by runcpu before the start of the run:
  - KMP_AFFINITY = "granularity=fine,scatter"
  - LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
  - OMP_STACKSIZE = "192M"

---

**General Notes**

- 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.
**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
- Energy/Performance Bias set to Balanced Power
- Workload Profile set to Custom
- Numa Group Size Optimization set to Flat
- IntelUPI Link Power Management set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbf1e6e46a485a0011
running on linux-96aw Tue Feb 11 08:48:40 2020

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 6248R CPU @ 3.00GHz
  2 "physical id"s (chips)
  48 "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 : 24
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6248R CPU @ 3.00GHz

(Continued on next page)
**SPEC CPU®2017 Integer Speed Result**

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Synergy 480 Gen10  
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**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE

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<td>Feb-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Jun-2019</td>
</tr>
</tbody>
</table>

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**Platform Notes (Continued)**

- Stepping: 7  
- CPU MHz: 3000.000  
- BogoMIPS: 6000.00  
- Virtualization: VT-x  
- L1d cache: 32K  
- L1i cache: 32K  
- L2 cache: 1024K  
- L3 cache: 36608K  
- NUMA node0 CPU(s): 0-23  
- NUMA node1 CPU(s): 24-47  
- 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 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 cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pppin ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dcm invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occach llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d arch_capabilities

/proc/cpuinfo cache data  
- cache size: 36608 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 10 11 12 13 14 15 16 17 18 19 20 21 22 23  
- node 0 size: 193024 MB  
- node 0 free: 192520 MB  
- node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47  
- node 1 size: 193333 MB  
- node 1 free: 192998 MB  
- node distances:  
  - node 0 1  
    - 0: 10 21  
    - 1: 21 10

From `/proc/meminfo`  
- MemTotal: 395630244 kB  
- HugePages_Total: 0  
- Hugepagesize: 2048 kB

From `/etc/*release* /etc/*version*`  
- os-release:

(Continued on next page)
## Platform Notes (Continued)

```plaintext
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

```
uname -a:
Linux linux-96aw 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **CVE-2017-5754 (Meltdown):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

```
run-level 3 Feb 11 08:46
```

```
SPEC is set to: /home/cpu2017
```

```
Filesystem     Type   Size  Used Avail Use% Mounted on
/dev/sda2      btrfs  371G   64G  306G  18% /home
```

```
From /sys/devices/virtual/dmi/id
BIOS:    HPE I42 11/13/2019
Vendor:  HPE
Product: Synergy 480 Gen10
Product Family: Synergy
Serial:  MXQ72204FC
```

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:
24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933
```

(End of data from sysinfo program)
Hewlett Packard Enterprise
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Software Availability: Jun-2019

Compiler Version Notes

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<tr>
<td></td>
<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
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<td>C++</td>
<td>620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</td>
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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/usr/local/je5.0.1-64/lib -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_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

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

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Peak Portability Flags

Same as Base Portability Flags
Hewlett Packard Enterprise  
Synergy 480 Gen10  
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Tested by: HPE

Test Date: Feb-2020  
Hardware Availability: Feb-2020  
Software Availability: Jun-2019

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -fno-strict-overflow  
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2  
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3  
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-DSPEC_SUPPRESS_OPENMP  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc

623.xalancbmk_s: -Wl,-z,muldefs -xCORE-AVX512 -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

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(3.00 GHz, Intel Xeon Gold 6248R)

| SPECspeed\textsuperscript{®}2017_int_base | 10.2 |
| SPECspeed\textsuperscript{®}2017_int_peak | 10.3 |

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

Peak Optimization Flags (Continued)

Fortran benchmarks (continued):
- nostandard-realloc-lhs

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.

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