**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
Synergy 480 Gen10 Plus  
(2.00 GHz, Intel Xeon Gold 6330)

<table>
<thead>
<tr>
<th>SPECrate\textsuperscript{2017_int_base} = 364</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate\textsuperscript{2017_int_peak} = Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong> Intel Xeon Gold 6330</td>
<td>OS: Red Hat Enterprise Linux 8.3 (Ootpa)</td>
</tr>
<tr>
<td><strong>Max MHz:</strong> 3100</td>
<td>Kernel 4.18.0-240.el8.x86_64</td>
</tr>
<tr>
<td><strong>Nominal:</strong> 2000</td>
<td>Compiler: C/C++ Version 2021.1 of Intel oneAPI DPC++/C++</td>
</tr>
<tr>
<td><strong>Enabled:</strong> 56 cores, 2 chips, 2 threads/core</td>
<td>Compiler Build 20201113 for Linux;</td>
</tr>
<tr>
<td><strong>Orderable:</strong> 1, 2 chip(s)</td>
<td>Fortran: Version 2021.1 of Intel Fortran Compiler</td>
</tr>
<tr>
<td><strong>Cache L1:</strong> 32 KB I + 48 KB D on chip per core</td>
<td>Classic Build 20201112 for Linux;</td>
</tr>
<tr>
<td><strong>L2:</strong> 1.25 MB I+D on chip per core</td>
<td>Parallel: No</td>
</tr>
<tr>
<td><strong>L3:</strong> 42 MB I+D on chip per chip</td>
<td>Firmware: HPE BIOS Version I44 v1.50 07/29/2021 released Jul-2021</td>
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<tr>
<td><strong>Other:</strong> None</td>
<td>File System: xfs</td>
</tr>
<tr>
<td><strong>Memory:</strong> 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Storage:</strong> 1 x 800 GB SAS SSD, RAID 0</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td><strong>Other:</strong> None</td>
<td>Peak Pointers: Not Applicable</td>
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</tbody>
</table>

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<thead>
<tr>
<th>SPECrate\textsuperscript{2017_int_base} (364)</th>
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<tr>
<td>500.perlbench_r: 112</td>
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<tr>
<td>505.mcf_r: 112</td>
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<tr>
<td>523.xalancbmk_r: 112</td>
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<tr>
<td>531.deepsjeng_r: 112</td>
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<tr>
<td>548.exchange2_r: 112</td>
</tr>
</tbody>
</table>

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.00 GHz, Intel Xeon Gold 6330)

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

Results Table

<table>
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<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>
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<tr>
<td>perlbench_r</td>
<td>112</td>
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<td>718</td>
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<td>gcc_r</td>
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<td>536</td>
<td>296</td>
<td>533</td>
<td>297</td>
<td>535</td>
<td>296</td>
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<tr>
<td>mcf_r</td>
<td>112</td>
<td>292</td>
<td>621</td>
<td>290</td>
<td>624</td>
<td>290</td>
<td>623</td>
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<td>omnetpp_r</td>
<td>112</td>
<td>616</td>
<td>239</td>
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<td>xalanbmk_r</td>
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<td>x264_r</td>
<td>112</td>
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<td>751</td>
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<td>750</td>
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<td>747</td>
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<tr>
<td>deepsjeng_r</td>
<td>112</td>
<td>471</td>
<td>273</td>
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<td>leela_r</td>
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<td>268</td>
<td>695</td>
<td>267</td>
<td>694</td>
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<tr>
<td>exchange2_r</td>
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<td>734</td>
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<td>xz_r</td>
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<td>589</td>
<td>205</td>
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<td>590</td>
<td>205</td>
</tr>
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</table>

SPECrate®2017_int_base = 364
SPECrate®2017_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"
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:
LD_LIBRARY_PATH =
  "/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1

(Continued on next page)
General Notes (Continued)

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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

The system ROM used for this result contains Intel microcode version 0xd0002a0 for the Intel Xeon Gold 6330 processor.

BIOS Configuration:
Workload Profile set to General Throughput Compute
Memory Patrol Scrubbing set to Disabled
Advanced Memory Protection set to Advanced ECC
XPT Remote Prefetcher set to Enabled
Last Level Cache (LLC) Dead Line Allocation set to Disabled
Enhanced Processor Performance set to Enabled
Thermal Configuration set to Maximum Cooling
Intel UPI Link Frequency set to Minimum
Intel UPI Link Enablement set to Single Link
D2K set to Disabled
Workload Profile set to Custom
DCU Stream Prefetcher set to Disabled
Energy Efficient Turbo set to Enabled
Adjacent Sector Prefetch set to Disabled
Intel UPI Link Power Management set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Wed Aug 18 08:02:16 2021

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 6330 CPU @ 2.00GHz
  2 "physical id"s (chips)
 112 "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 : 28
siblings : 56

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.00 GHz, Intel Xeon Gold 6330)

SPECrate®2017_int_base = 364
SPECrate®2017_int_peak = Not Run

CPU2017 License: 3
Test Date: Aug-2021
Test Sponsor: HPE
Hardware Availability: Jul-2021
Tested by: HPE
Software Availability: Dec-2020

Platform Notes (Continued)

physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6330 CPU @ 2.00GHz
Stepping: 6
CPU MHz: 3088.695
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 43008K
NUMA node0 CPU(s): 0-13,56-69
NUMA node1 CPU(s): 14-27,70-83
NUMA node2 CPU(s): 28-41,84-97
NUMA node3 CPU(s): 42-55,98-111
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 pdpelgb rdtsscp
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
xtrp 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 invpcid_single ssbd
mqa ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad
fsqbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnow invpcid cmpqm rdseed adx smap
avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw
avx512vl xsavesopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local split_lock_detect wbnoinvd dtherm ida arat pti avx512vpi avx512vnni
avx512vbig data avx512_vbmi2 gfxn vaes vpclmulqdq avx512_vnni avx512_vbmi2a tme
avx512_vpdpctdq la57 rdpid md_clear pconf fous flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size : 43008 KB

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

From `numactl --hardware`
```plaintext
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 8 9 10 11 12 13 56 57 58 59 60 61 62 63 64 65 66 67 68 69
   node 0 size: 251625 MB
   node 0 free: 257067 MB
   node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80
                    81 82 83
   node 1 size: 251629 MB
   node 1 free: 257476 MB
   node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 84 85 86 87 88 89 90 91 92 93 94
                    95 96 97
   node 2 size: 252185 MB
   node 2 free: 257615 MB
   node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 98 99 100 101 102 103 104 105
                    106 107 108 109 110 111
   node 3 size: 252216 MB
   node 3 free: 257665 MB
   node distances:
   node   0   1   2   3
   0:  10  20  30  30
   1:  20  10  30  30
   2:  30  30  10  20
   3:  30  30  20  10
```

From `/proc/meminfo`
```plaintext
MemTotal:       1056513912 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

/sbin/tuned-adm active
Current active profile: throughput-performance

From `/etc/*release* /etc/*version*`
```plaintext
os-release:
   NAME="Red Hat Enterprise Linux"
   VERSION="8.3 (Ootpa)"
   ID="rhel"
   ID_LIKE="fedora"
   VERSION_ID="8.3"
   PLATFORM_ID="platform:el8"
   PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
   ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
```

(Continued on next page)
Platform Notes (Continued)

uname -a:
    Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

cpe-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store
CVE-2018-3639 (Speculative Store Bypass): Bypass disabled via prctl and
CVE-2017-5753 (Spe arte vari ant 1): Mitigation: usercopy/swapgs
CVE-2017-5715 (Spe arte vari ant 2): barriers and __user pointer
CVE-2020-0543 (Special Register Buffer Data Sampling): Mitigation: Enhanced IBRS, IBPB:
sanitizationconditional, RSB filling
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sdb4      xfs   740G  346G  394G  47% /

From /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        Synergy 480 Gen10 Plus
    Product Family: Synergy
    Serial:         CN70330Q5F

Additional information from dmidecode 3.2 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:
    16x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2933
    16x UNKNOWN NOT AVAILABLE

BIOS:
    BIOS Vendor:       HPE
    BIOS Version:      I44
    BIOS Date:         07/29/2021
    BIOS Revision:     1.50
    Firmware Revision: 2.40
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.00 GHz, Intel Xeon Gold 6330)

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

**SPECrates**
- SPECrate®2017_int_base = 364
- SPECrate®2017_int_peak = Not Run

**Platform Notes (Continued)**
(End of data from sysinfo program)

**Compiler Version Notes**

```
== C benchmarks ==
| 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
| 525.x264_r(base) 557.xz_r(base)

== Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved. ==

== C++ benchmarks ==
| 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
| 541.leela_r(base)

== Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved. ==

== Fortran benchmarks ==
| 548.exchange2_r(base)

== Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved. ==
```

**Base Compiler Invocation**

- C benchmarks: icx
- C++ benchmarks: icpx
- Fortran benchmarks: ifort
SPEC CPU®2017 Integer Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.00 GHz, Intel Xeon Gold 6330)

SPECrater®2017_int_base = 364
SPECrater®2017_int_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Test Date: Aug-2021
Tested by: HPE
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mc_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.leea_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-fflags =sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-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-V1.0-ICX-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
# SPEC CPU®2017 Integer Rate Result

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## Hewlett Packard Enterprise

*Test Sponsor: HPE*

**Synergy 480 Gen10 Plus**

*(2.00 GHz, Intel Xeon Gold 6330)*

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<td>HPE</td>
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<td>Aug-2021</td>
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<td>Jul-2021</td>
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<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
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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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