## SPEC CPU®2017 Integer Rate Result

**Test Sponsor:** HPE  
**Hardware:** Synergy 480 Gen10 Plus  
(3.00 GHz, Intel Xeon Gold 5317)

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**SPECrater®2017_int_base = 202**  
**SPECrater®2017_int_peak = 209**

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### Software

| OS | Red Hat Enterprise Linux 8.3 (Ootpa)  
| Compiler | C/C++, Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;  
| Fortran | Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;  
| Classic | C/C++, Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux  
| Parallel | No  
| Firmware | HPE BIOS Version I44 v1.54 11/03/2021 released Nov-2021  
| File System | xfs  
| System State | Run level 3 (multi-user)  
| Base Pointers | 64-bit  
| Peak Pointers | 32/64-bit  
| Other | jemalloc memory allocator V5.0.1  
| Power Management | BIOS set to prefer performance at the cost of additional power usage
## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
Synergy 480 Gen10 Plus  
(3.00 GHz, Intel Xeon Gold 5317)

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

**SPECrate®2017_int_base = 202**  
**SPECrate®2017_int_peak = 209**

### Results Table

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**SPECrate®2017_int_base = 202**  
**SPECrate®2017_int_peak = 209**

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)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Submitted by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Wed Jan 12 10:02:54 EST 2022
Submission: cpu2017-20220103-30732.sub

Platform Notes

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 Min UPI Speed
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 Prefetcher set to Disabled
Intel UPI Link Power Management set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca646d
running on localhost.localdomain Sat Dec 11 03:34:51 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 5317 CPU @ 3.00GHz
      2 "physical id"s (chips)
Platform Notes (Continued)

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 : 12
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

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):              48
On-line CPU(s) list: 0-47
Thread(s) per core:  2
Core(s) per socket:  12
Socket(s):           2
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               106
Model name:          Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
Stepping:            6
CPU MHz:             3093.150
BogoMIPS:            6000.00
Virtualization:      VT-x
L1d cache:           48K
L1i cache:           32K
L2 cache:            1280K
L3 cache:            18432K
NUMA node0 CPU(s):   0-5,24-29
NUMA node1 CPU(s):   6-11,30-35
NUMA node2 CPU(s):   12-17,36-41
NUMA node3 CPU(s):   18-23,42-47
Flags:               fpu vme de pse tsc msr pae mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpelgb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr 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_13 invpcid_single ssbd
mqa ibrs ibpb stibp ibrs_enhanced tpr_shadow vmx flexpriority ept vpid ept_ad
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdffe single ssbd
da ibrs ibpb stibp ibrs_enhanced tpr_shadow vmx flexpriority ept vpid ept_ad
fsqsbaste tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdffe single ssbd
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CPU2017 License: 3
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Platform Notes (Continued)

/proc/cpuinfo cache data
  cache size : 18432 KB

From numactl --hardware
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 24 25 26 27 28 29
    node 0 size: 509990 MB
    node 0 free: 515123 MB
    node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35
    node 1 size: 509874 MB
    node 1 free: 515749 MB
    node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41
    node 2 size: 510284 MB
    node 2 free: 515791 MB
    node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47
    node 3 size: 510232 MB
    node 3 free: 515734 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
  MemTotal:       2113491180 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB
/sbin/tuned-adm active
  Current active profile: throughput-performance

From /etc/*release* /etc/*version*
  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:

CVE-2018-12207 (iTLB Multihit): Not affected
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: usercopy/swapgs
    barriers and __user pointer
    sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB:
    conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Dec 11 03:33

SPEC is set to: /home/cpu2017
  Filesystem        Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel-home xfs   670G  110G  561G  17% /home

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:
    32x Micron 36ASF8G72PZ-3G2BZ 64 GB 2 rank 3200, configured at 2933

BIOS:
  BIOS Vendor:    HPE
  BIOS Version:  I44
  BIOS Date:  11/03/2021
  BIOS Revision: 1.54
  Firmware Revision: 2.40

(Continued on next page)
Platform Notes (Continued)

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 500.perlbench_r(peak)
==============================================================================
Intel(R) C 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.
==============================================================================
C       | 502.gcc_r(peak)
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
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C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
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<td>Hardware Availability:</td>
<td>Nov-2021</td>
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<td>Software Availability:</td>
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### CPU2017 License: 3  
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**Tested by:** HPE

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**Compiler Version Notes (Continued)**

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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(3.00 GHz, Intel Xeon Gold 5317)

SPECrates: 2017_int_base = 202
SPECrates: 2017_int_peak = 209

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

Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.1 Build 20201112_000000
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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:
-w -std=c11 -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

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

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2022 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(3.00 GHz, Intel Xeon Gold 5317)

SPECrate®2017_int_base = 202
SPECrate®2017_int_peak = 209

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-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

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

500.perlbench_r: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
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)  
Synergy 480 Gen10 Plus  
(3.00 GHz, Intel Xeon Gold 5317)

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

**Peak Optimization Flags**

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)  
-xCORE-AVX512 -ipo -o3 -no-prec-div  
-qopt-mem-layout-trans=4 -fno-strict-overflow  
-mbranches-within-32B-boundaries  
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin  
-Lqkmalloc

502.gcc_r: -m32  
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin  
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto  
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto  
-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias  
-mbranches-within-32B-boundaries  
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin  
-Lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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-revG.html
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**SPEC CPU®2017 Integer Rate Result**

**Hewlett Packard Enterprise**  
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**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE

**Test Date:** Dec-2021  
**Hardware Availability:** Nov-2021  
**Software Availability:** Dec-2020

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-revG.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revG.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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