## SPEC CPU®2017 Integer Rate Result

### Hewlett Packard Enterprise

(Test Sponsor: HPE)

Synergy 480 Gen10 Plus

(2.40 GHz, Intel Xeon Silver 4314)

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![Image of SPEC CPU®2017 Integer Rate Result](image)

**SPECrater®2017_int_base = 234**

**SPECrater®2017_int_peak = 242**

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**CPU2017 License:** 3

**Test Sponsor:** HPE

**Test Date:** Dec-2021

**Hardware Availability:** Nov-2021

**Tested by:** HPE

**Software Availability:** Dec-2020

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**500.perlbench_r**

- Copies: 64
- SPECrate®2017_int_base = 183
- SPECrate®2017_int_peak = 222
- SPECrate®2017_int_base (234)

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**502.gcc_r**

- Copies: 64
- SPECrate®2017_int_base = 195
- SPECrate®2017_int_peak = 222
- SPECrate®2017_int_base (234)

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**505.mcf_r**

- Copies: 64
- SPECrate®2017_int_base = 159
- SPECrate®2017_int_peak = 195

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**520.omnetpp_r**

- Copies: 64
- SPECrate®2017_int_base = 295
- SPECrate®2017_int_peak = 399

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**523.xalancbmk_r**

- Copies: 64
- SPECrate®2017_int_base = 474
- SPECrate®2017_int_peak = 497

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**525.x264_r**

- Copies: 64
- SPECrate®2017_int_base = 174
- SPECrate®2017_int_peak = 174

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**531.deepsjeng_r**

- Copies: 64
- SPECrate®2017_int_base = 170
- SPECrate®2017_int_peak = 170

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**541.leela_r**

- Copies: 64
- SPECrate®2017_int_base = 295
- SPECrate®2017_int_peak = 399

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**548.exchange2_r**

- Copies: 64
- SPECrate®2017_int_base = 466
- SPECrate®2017_int_peak = 466

---

**557.xz_r**

- Copies: 64
- SPECrate®2017_int_base = 130
- SPECrate®2017_int_peak = 130

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**Hardware**

**CPU Name:** Intel Xeon Silver 4314

- **Max MHz:** 3400
- **Nominal:** 2400
- **Enabled:** 32 cores, 2 chips, 2 threads/core
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 24 MB I+D on chip per chip
- **Other:** None

**Memory:** 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)

**Storage:** 1 x 800 GB SAS SSD, RAID 0

**Other:** None

---

**Software**

**OS:** Red Hat Enterprise Linux 8.3 (Ootpa)

- **Kernel:** 4.18.0-240.el8.x86_64

**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;

**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
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
Synergy 480 Gen10 Plus  
(2.40 GHz, Intel Xeon Silver 4314) 

SPEC CPU®2017 Integer Rate Result  

Copyright 2017-2022 Standard Performance Evaluation Corporation

Results Table

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SPECrate®2017_int_base = 234  
SPECrate®2017_int_peak = 242

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
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.

Submitted by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Wed Jan 12 10:02:54 EST 2022
Submission: cpu2017-20220103-30735.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 9b2a61ec0915b55891ef0e16acaf64d
running on localhost.localdomain Wed Dec 15 01:47:41 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) Silver 4314 CPU @ 2.40GHz
  2 "physical id"s (chips)

(Continued on next page)
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Synergy 480 Gen10 Plus
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CPU2017 License: 3
Test Date: Dec-2021
Test Sponsor: HPE
Hardware Availability: Nov-2021
Tested by: HPE
Software Availability: Dec-2020

Platform Notes (Continued)

64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Silver 4314 CPU @ 2.40GHz
Stepping: 6
CPU MHz: 3254.210
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 24576K
NUMA node0 CPU(s): 0-7,32-39
NUMA node1 CPU(s): 8-15,40-47
NUMA node2 CPU(s): 16-23,48-55
NUMA node3 CPU(s): 24-31,56-63
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 rdtdsc
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtst64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrm 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
mba ibrs ibpb ibrs_enhanced tpr_shadow vmni flexpriority ept vpid ept_ad
fsmsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid cmtd rtde rtde_a avx12ifma
clamation clwb intel_pt avx12idc sha ni avx12bw
avx512vl xsaveopt xsave xsavec xgetbv1 xsaves cqm_llc cqm_occurrence llc cqm_mbms_total
ckc_mbb_local split_lock_detect wbnoiwvd dtherm ida atir mts pns avx512vbm unip kpu
ospke avx512_vbmi2 gfn vae vpcmulqdq avx512_vnni avx512_bitalg tme
avx512_vpopcntdq la57 rdfid md_clear pconfig flush_lld arch_capabilities

(Continued on next page)
Platform Notes (Continued)

/proc/cpuinfo cache data
  cache size : 24576 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 6 7 32 33 34 35 36 37 38 39
  node 0 size: 507884 MB
  node 0 free: 515036 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 40 41 42 43 44 45 46 47
  node 1 size: 508025 MB
  node 1 free: 515587 MB
  node 2 cpus: 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55
  node 2 size: 507969 MB
  node 2 free: 515867 MB
  node 3 cpus: 24 25 26 27 28 29 30 31 56 57 58 59 60 61 62 63
  node 3 size: 508711 MB
  node 3 free: 515844 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:       2113487716 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):                              Mitigation: Speculative Store
CVE-2018-3639 (Speculative Store Bypass):              Bypass disabled via prctl and
                                                      seccomp
CVE-2017-5753 (Spectre variant 1):                     Mitigation: usercopy/swapgs
CVE-2017-5715 (Spectre variant 2):                     barriers and __user pointer
                                                      sanitization
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):               Not affected

run-level 3 Dec 15 01:46

SPEC is set to: /home/cpu2017
    Filesystem            Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   670G  112G  559G  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 2666

BIOS:
    BIOS Vendor:       HPE
    BIOS Version:      I44
    BIOS Date:         11/03/2021
    BIOS Revision:     1.54
    Firmware Revision: 2.40
Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10 Plus
(2.40 GHz, Intel Xeon Silver 4314)

SPECrates

SPECrates®2017_int_base = 234
SPECrates®2017_int_peak = 242

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

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)
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
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**SPECrate®2017_int_base = 234**  
**SPECrate®2017_int_peak = 242**

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### Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

### Base Compiler Invocation

C benchmarks:  
icc

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  
-1qkmalloc

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)
 peaks 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

(2.40 GHz, Intel Xeon Silver 4314)

SPECrate®2017_int_base = 234

SPECrate®2017_int_peak = 242

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

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

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
Hewlett Packard Enterprise
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Synergy 480 Gen10 Plus
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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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.

Tested with SPEC CPU®2017 v1.1.8 on 2021-12-14 15:17:40-0500.
Report generated on 2022-01-18 18:59:03 by CPU2017 PDF formatter v6442.
Originally published on 2022-01-18.