### SPEC CPU®2017 Integer Rate Result

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

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

| SPECrate®2017_int_base = | 355 |
| SPECrate®2017_int_peak = | Not Run |

#### 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;

**Parallel:**  
No

**Firmware:**  
HPE BIOS Version I44 v1.50 07/29/2021 released Jul-2021

**File System:**  
xfs

**System State:**  
Run level 3 (multi-user)

**Base Pointers:**  
64-bit

**Peak Pointers:**  
Not Applicable

**Other:**  
None

**Power Management:**  
BIOS set to prefer performance at the cost of additional power usage

#### Hardware

**CPU Name:**  
Intel Xeon Gold 6330N

**Max MHz:**  
3400

**Nominal:**  
2200

**Enabled:**  
56 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:**  
42 MB I+D on chip per chip

**Other:**  
None

**Memory:**  
1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)

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

**Other:**  
None

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<th>SPECrate®2017_int_base (355)</th>
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SPECrater2017_int_peak = Not Run

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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"
MALLOCS_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)
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Software Availability: Dec-2020

General Notes (Continued)

runcpu command invoked through numactl i.e.:
numact1 --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 6330N 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 982a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Sat Aug 21 16:39:32 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 6330N CPU @ 2.20GHz
  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)
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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: 105
Model name: Intel(R) Xeon(R) Gold 6330N CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2719.743
BogoMIPS: 4400.00
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 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 xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrunc pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebpf cat�l3 invpcid_single ssbd mba ibp bdti stibp ibrs_enhanced tpr shadow vnumi lexipriority ept vpid ept_ad fsgsbase ts_cadjust bmi1 hle avx2 smep bmi2 erms invpcid cqcm rdt_a avx512f avx512dq rdseed adx smap avx512fma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsaves cqcm_llc cqcm_occup_llc cqcm_mbb_total cqcm_mbb_local split_lock_detect wboninvd dtherm ida arat pln pts avx512vbmni umip pkum pconf phenum vpfclmulqdq avx512_vnni avx512_bitalg tmm avx512_vpopcntdq la57 rdpid md_clear pconf flush_l1d arch_capabilities /proc/cpuinfo cache data

cache size : 43008 KB

(Continued on next page)
Platform Notes (Continued)

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 8 9 10 11 12 13 56 57 58 59 60 61 62 63 64 65 66 67 68 69
    node 0 size: 251685 MB
    node 0 free: 256995 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: 252105 MB
    node 1 free: 257440 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: 252419 MB
    node 2 free: 257640 MB
    node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 98 99 100 101 102 103 104 105
    106 107 108 109 110 111
    node 3 size: 252150 MB
    node 3 free: 257734 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:       1056513912 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
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs
CVE-2017-5715 (Spectre variant 2): barriers and __user pointer
CVE-2020-0543 (Special Register Buffer Data Sampling): Mitigation: Enhanced IBRS, IBPB:
sanitization
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

SPEC is set to: /home/cpu2017

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 2666
16x UNKNOWN NOT AVAILABLE

BIOS:
BIOS Vendor: HPE
BIOS Version: I44
BIOS Date: 07/29/2021
BIOS Revision: 1.50
Firmware Revision: 2.40

(Continued on next page)
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Platform Notes (Continued)

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 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++     | 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 | 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
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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.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
-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
-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
<table>
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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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