# SPEC CPU®2017 Integer Rate Result



## xFusion

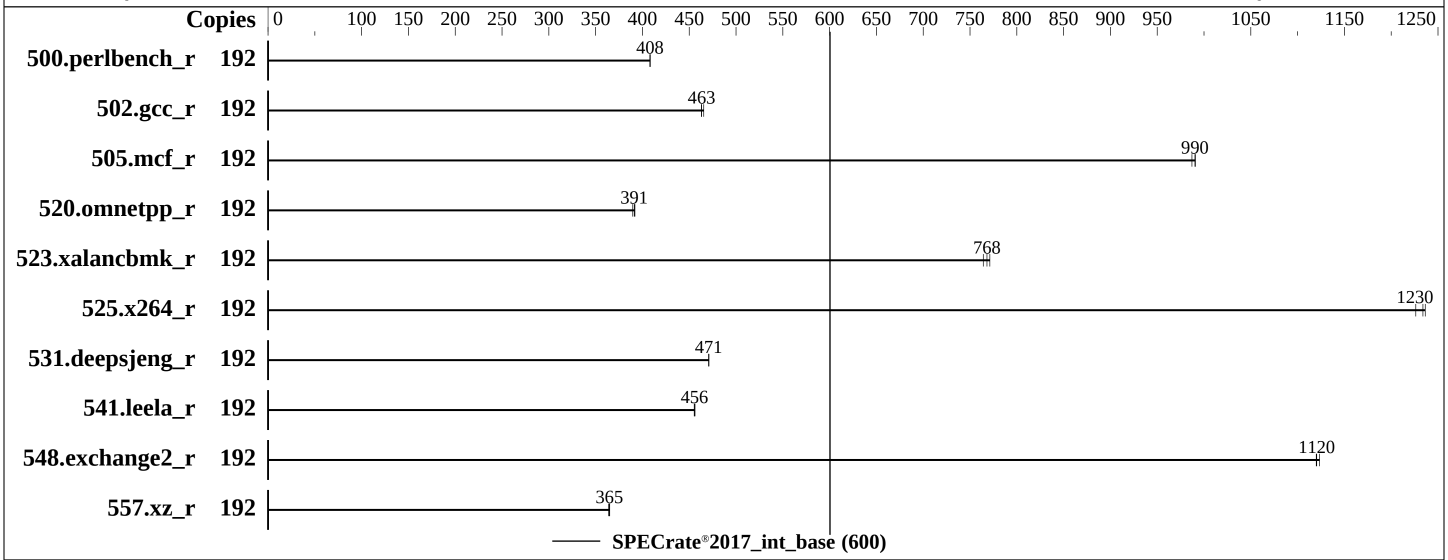
SPECrate®2017_int_base = 600

xFusion 2488H V5 (Intel Xeon Gold 6252N)

SPECrate®2017_int_peak = Not Run

**CPU2017 License:** 6488
**Test Sponsor:** xFusion
**Tested by:** xFusion

**Test Date:** Mar-2022
**Hardware Availability:** Apr-2019
**Software Availability:** Jun-2021




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Gold 6252N |
| Max MHz: | 3600 |
| Nominal: | 2300 |
| Enabled: | 96 cores, 4 chips, 2 threads/core |
| Orderable: | 2,4 chips |
| Cache L1: | 32 KB I + 32 KB D on chip per core |
| L2: | 1 MB I+D on chip per core |
| L3: | 35.75 MB I+D on chip per chip |
| Other: | None |
| Memory: | 768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R) |
| Storage: | 1 x 960 GB SATA SSD |
| Other: | None |

### Software

| | |
|---|---|
| OS: | Red Hat Enterprise Linux release 8.4 (Ootpa) 4.18.0-305.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: | Version 7.87 Released Nov-2020 |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | Not Applicable |
| Other: | None |
| Power Management: | BIOS and OS set to prefer performance at the cost of additional power usage |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 192 | 749 | 408 | 748 | 408 | **749** | **408** | | | | | | | |
| 502.gcc_r | 192 | 587 | 463 | **587** | **463** | 584 | 465 | | | | | | | |
| 505.mcf_r | 192 | 314 | 987 | **313** | **990** | 313 | 991 | | | | | | | |
| 520.omnetpp_r | 192 | **644** | **391** | 646 | 390 | 643 | 392 | | | | | | | |
| 523.xalancbmk_r | 192 | **264** | **768** | 263 | 771 | 265 | 764 | | | | | | | |
| 525.x264_r | 192 | **272** | **1230** | 272 | 1240 | 274 | 1230 | | | | | | | |
| 531.deepsjeng_r | 192 | 467 | 471 | **467** | **471** | 467 | 471 | | | | | | | |
| 541.leela_r | 192 | **698** | **456** | 698 | 455 | 697 | 456 | | | | | | | |
| 548.exchange2_r | 192 | 449 | 1120 | **449** | **1120** | 448 | 1120 | | | | | | | |
| 557.xz_r | 192 | 568 | 365 | **569** | **365** | 570 | 364 | | | | | | | |

**SPECrate®2017_int_base = 600**

**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"
```

## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/spec2017/lib/intel64:/spec2017/lib/ia32:/spec2017/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
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
runcpu command invoked through numactl i.e.:
```

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## General Notes (Continued)

```
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

```
BIOS configuration:
Power Policy Set to Performance
SNC Set to Enabled
IMC Interleaving set to 1-way interleave
XPT Prefetch set to Enabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Sat Mar  5 07:03:52 2022

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 6252N CPU @ 2.30GHz
      4  "physical id"s (chips)
      192 "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  : 48
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
      physical 1: cores 0 1 2 3 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 25 26 27 28 29
      physical 2: cores 0 1 2 3 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 25 26 27 28 29
      physical 3: 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 from util-linux 2.32.1:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                192
     On-line CPU(s) list: 0-191
     Thread(s) per core:  2
     Core(s) per socket:  24
     Socket(s):             4
```

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## Platform Notes (Continued)

```
     NUMA node(s):          8
     Vendor ID:             GenuineIntel
     BIOS Vendor ID:        Intel(R) Corporation
     CPU family:            6
     Model:                 85
     Model name:            Intel(R) Xeon(R) Gold 6252N CPU @ 2.30GHz
     BIOS Model name:       Intel(R) Xeon(R) Gold 6252N CPU @ 2.30GHz
     Stepping:              7
     CPU MHz:               3000.001
     CPU max MHz:           3600.0000
     CPU min MHz:           1000.0000
     BogoMIPS:              4600.00
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              1024K
     L3 cache:              36608K
     NUMA node0 CPU(s):     0-3,7-9,13-15,19,20,96-99,103-105,109-111,115,116
     NUMA node1 CPU(s):     4-6,10-12,16-18,21-23,100-102,106-108,112-114,117-119
     NUMA node2 CPU(s):     24-27,30-32,36-38,43,44,120-123,126-128,132-134,139,140
     NUMA node3 CPU(s):     28,29,33-35,39-42,45-47,124,125,129-131,135-138,141-143
     NUMA node4 CPU(s):     48-51,54-56,60-62,67,68,144-147,150-152,156-158,163,164
     NUMA node5 CPU(s):     52,53,57-59,63-66,69-71,148,149,153-155,159-162,165-167
     NUMA node6 CPU(s):     72-75,79,80,84-86,90-92,168-171,175,176,180-182,186-188
     NUMA node7 CPU(s):     76-78,81-83,87-89,93-95,172-174,177-179,183-185,189-191
     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 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 ssbd
     mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad
     fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
     avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
     xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_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: 8 nodes (0-7)
   node 0 cpus: 0 1 2 3 7 8 9 13 14 15 19 20 96 97 98 99 103 104 105 109 110 111 115 116
   node 0 size: 94939 MB
   node 0 free: 88755 MB
   node 1 cpus: 4 5 6 10 11 12 16 17 18 21 22 23 100 101 102 106 107 108 112 113 114 117
```

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## Platform Notes (Continued)

```
    118 119
    node 1 size: 96762 MB
    node 1 free: 96520 MB
    node 2 cpus: 24 25 26 27 30 31 32 36 37 38 43 44 120 121 122 123 126 127 128 132 133
    134 139 140
    node 2 size: 96725 MB
    node 2 free: 95182 MB
    node 3 cpus: 28 29 33 34 35 39 40 41 42 45 46 47 124 125 129 130 131 135 136 137 138
    141 142 143
    node 3 size: 96762 MB
    node 3 free: 96323 MB
    node 4 cpus: 48 49 50 51 54 55 56 60 61 62 67 68 144 145 146 147 150 151 152 156 157
    158 163 164
    node 4 size: 96762 MB
    node 4 free: 96517 MB
    node 5 cpus: 52 53 57 58 59 63 64 65 66 69 70 71 148 149 153 154 155 159 160 161 162
    165 166 167
    node 5 size: 96762 MB
    node 5 free: 96420 MB
    node 6 cpus: 72 73 74 75 79 80 84 85 86 90 91 92 168 169 170 171 175 176 180 181 182
    186 187 188
    node 6 size: 96762 MB
    node 6 free: 96407 MB
    node 7 cpus: 76 77 78 81 82 83 87 88 89 93 94 95 172 173 174 177 178 179 183 184 185
    189 190 191
    node 7 size: 96760 MB
    node 7 free: 96512 MB
    node distances:
    node   0   1   2   3   4   5   6   7
      0:  10  11  21  21  21  21  21  21
      1:  11  10  21  21  21  21  21  21
      2:  21  21  10  11  21  21  21  21
      3:  21  21  11  10  21  21  21  21
      4:  21  21  21  21  10  11  21  21
      5:  21  21  21  21  11  10  21  21
      6:  21  21  21  21  21  21  10  11
      7:  21  21  21  21  21  21  11  10

  From /proc/meminfo
     MemTotal:       790772828 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

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

  /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
```

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## Platform Notes (Continued)

```
   performance

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux"
      VERSION="8.4 (Ootpa)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="8.4"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
      ANSI_COLOR="0;31"
   redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
   system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:
   Linux localhost.localdomain 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30 EDT 2021
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):                         KVM: Mitigation: Split huge pages
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):                 Vulnerable: Clear CPU buffers
                                                         attempted, no microcode; SMT
                                                         vulnerable

run-level 3 Mar 5 06:57

SPEC is set to: /spec2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda3      xfs   859G  102G  758G  12% /

From /sys/devices/virtual/dmi/id
    Vendor:         serial
```

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## Platform Notes (Continued)

```
     Product:        2488H V5
     Product Family: Purley
     Serial:         serial

 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:
     48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933

 BIOS:
    BIOS Vendor:       INSYDE Corp.
    BIOS Version:      7.87
    BIOS Date:         11/26/2020
    BIOS Revision:     7.87

 (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`

## 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
-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
```

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):
`-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/Intel-ic2021-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-CSL-V1.1.html

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/xFusion-Platform-Settings-CSL-V1.1.xml




Tested with SPEC CPU®2017 v1.1.8 on 2022-03-05 07:03:51-0500.
Report generated on 2022-05-25 13:13:41 by CPU2017 PS formatter v6442.
Originally published on 2022-05-24.