SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

xFusion

xFusion 2488H V6 (Intel Xeon Gold 5320H)

$SPECrate®2017\_int\_base =$ 562

$SPECrate®2017\_int\_peak = Not Run$

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

Benchmark	Copies	Result
500.perlbench_r	160	392
502.gcc_r	160	401
505.mcf_r	160	911
520.omnetpp_r	160	357
523.xalancbmk_r	160	875
525.x264_r	160	1140
531.deepsjeng_r	160	427
541.leela_r	160	415
548.exchange2_r	160	1040
557.xz_r	160	335

SPECrate®2017_int_base (562)

Hardware

CPU Name: Intel Xeon Gold 5320H
 Max MHz: 4200
 Nominal: 2400
Enabled: 80 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: 27.5 MB I+D on chip per chip
 Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 8.3 (Ootpa)
 4.18.0-240.el8.x86_64
Compiler: C/C++: Version 2022.0.0 of Intel oneAPI DPC++/C++ Compiler Build 20211123 for Linux;
 Fortran: Version 2021.5.0 of Intel Fortran Compiler
 Classic Build 20211109 for Linux
Parallel: No
Firmware: Version 0.81 Released Feb-2022
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

Standard Performance Evaluation Corporation (info@spec.org)
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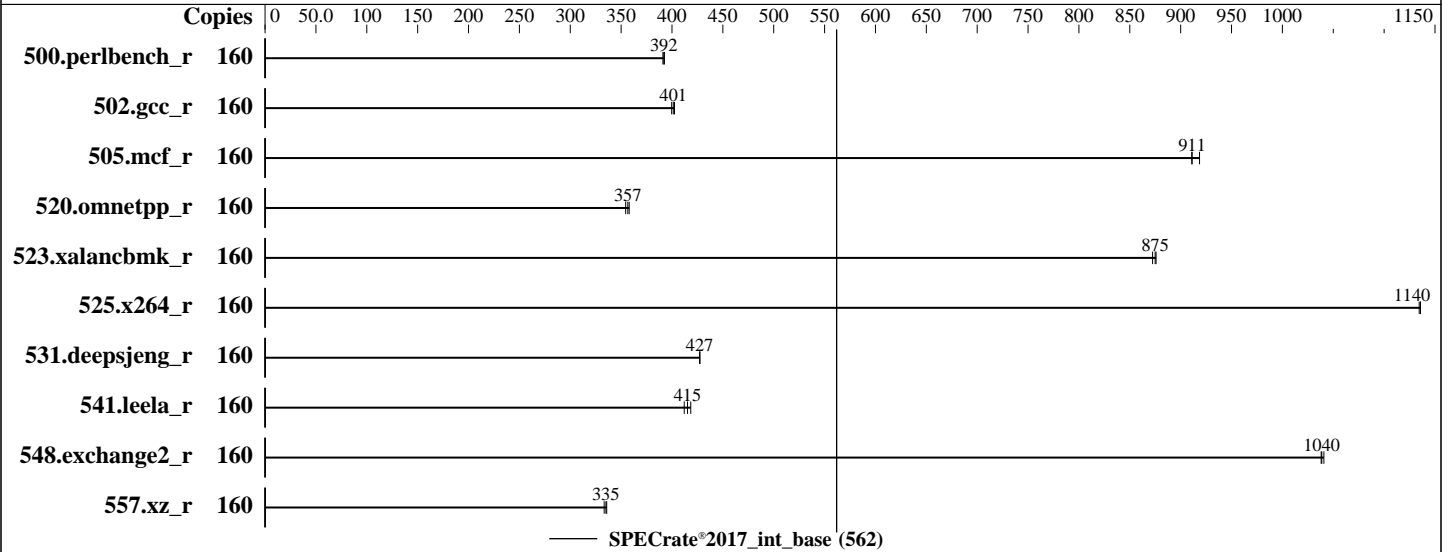SPECrate®2017_int_peak = Not Run

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

Test Date: Apr-2022
Hardware Availability: Jun-2020
Software Availability: Dec-2021

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	160	**650**	**392**	651	391	649	393							
502.gcc_r	160	**565**	**401**	567	400	563	402							
505.mcf_r	160	284	911	281	919	**284**	**911**							
520.omnetpp_r	160	**589**	**357**	586	358	592	354							
523.xalancbmk_r	160	194	872	193	876	**193**	**875**							
525.x264_r	160	**247**	**1140**	247	1130	247	1140							
531.deepsjeng_r	160	429	427	429	427	**429**	**427**							
541.leela_r	160	633	418	643	412	**638**	**415**							
548.exchange2_r	160	403	1040	404	1040	**404**	**1040**							
557.xz_r	160	515	336	518	333	**516**	**335**							
SPECrate®2017_int_base =		**562**												
SPECrate®2017_int_peak =		**Not Run**												

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
SPEC has ruled that the compiler used for this result was performing a compilation
that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s
benchmarks using a priori knowledge of the SPEC code and dataset to perform a
transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4
https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer
publish results using this optimization.

This result is left in the SPEC results database for historical reference.
```

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 = "/opt/intel/oneapi/compiler/2022.0.2/linux/compiler/lib/intel64:
     /opt/intel/oneapi/compiler/2022.0.2/linux/compiler/lib/ia32: /spec2017/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

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Test Sponsor:	xFusion	**Hardware Availability:**	Jun-2020
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General Notes

```
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.3
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.:
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:
Performance Profile Set to Performance
SNC Set to Enabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Fri Apr  8 04:15:09 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 5320H CPU @ 2.40GHz
      4  "physical id"s (chips)
      160 "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 : 20
      siblings  : 40
      physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
      physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
      physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
      physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

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):              160
     On-line CPU(s) list: 0-159
     Thread(s) per core:  2
     Core(s) per socket:  20
     Socket(s):           4
     NUMA node(s):        8
     Vendor ID:           GenuineIntel
     CPU family:          6
     Model:               85
     Model name:          Intel(R) Xeon(R) Gold 5320H CPU @ 2.40GHz
     Stepping:            11
     CPU MHz:             3300.102
     BogoMIPS:            4800.00
```

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Test Date: Apr-2022
Hardware Availability: Jun-2020
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Platform Notes (Continued)

```
       Virtualization:      VT-x
       L1d cache:           32K
       L1i cache:           32K
       L2 cache:            1024K
       L3 cache:            28160K
       NUMA node0 CPU(s):   0-2,5,6,10-12,15,16,80-82,85,86,90-92,95,96
       NUMA node1 CPU(s):   3,4,7-9,13,14,17-19,83,84,87-89,93,94,97-99
       NUMA node2 CPU(s):   20-22,25,26,30-32,35,36,100-102,105,106,110-112,115,116
       NUMA node3 CPU(s):   23,24,27-29,33,34,37-39,103,104,107-109,113,114,117-119
       NUMA node4 CPU(s):   40-42,45,46,50-52,55,56,120-122,125,126,130-132,135,136
       NUMA node5 CPU(s):   43,44,47-49,53,54,57-59,123,124,127-129,133,134,137-139
       NUMA node6 CPU(s):   60-62,65,66,70-72,75,76,140-142,145,146,150-152,155,156
       NUMA node7 CPU(s):   63,64,67-69,73,74,77-79,143,144,147-149,153,154,157-159
       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 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
       avx512_bf16 dtherm ida arat pln pts hwp_epp pku ospke avx512_vnni md_clear flush_l1d
       arch_capabilities

 /proc/cpuinfo cache data
    cache size : 28160 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 5 6 10 11 12 15 16 80 81 82 85 86 90 91 92 95 96
   node 0 size: 185764 MB
   node 0 free: 191005 MB
   node 1 cpus: 3 4 7 8 9 13 14 17 18 19 83 84 87 88 89 93 94 97 98 99
   node 1 size: 187959 MB
   node 1 free: 192704 MB
   node 2 cpus: 20 21 22 25 26 30 31 32 35 36 100 101 102 105 106 110 111 112 115 116
   node 2 size: 187201 MB
   node 2 free: 193311 MB
   node 3 cpus: 23 24 27 28 29 33 34 37 38 39 103 104 107 108 109 113 114 117 118 119
   node 3 size: 186059 MB
   node 3 free: 193311 MB
   node 4 cpus: 40 41 42 45 46 50 51 52 55 56 120 121 122 125 126 130 131 132 135 136
   node 4 size: 186599 MB
   node 4 free: 193271 MB
   node 5 cpus: 43 44 47 48 49 53 54 57 58 59 123 124 127 128 129 133 134 137 138 139
   node 5 size: 186829 MB
   node 5 free: 193278 MB
   node 6 cpus: 60 61 62 65 66 70 71 72 75 76 140 141 142 145 146 150 151 152 155 156
   node 6 size: 186457 MB
   node 6 free: 193385 MB
   node 7 cpus: 63 64 67 68 69 73 74 77 78 79 143 144 147 148 149 153 154 157 158 159
   node 7 size: 186714 MB
   node 7 free: 193365 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  11  20  20  20  20  20  20
     1:  11  10  20  20  20  20  20  20
```

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CPU2017 License: 6488	**Test Date:** Apr-2022
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Platform Notes (Continued)

```
    2:  20  20  10  11  20  20  20  20
    3:  20  20  11  10  20  20  20  20
    4:  20  20  20  20  10  11  20  20
    5:  20  20  20  20  11  10  20  20
    6:  20  20  20  20  20  20  10  11
    7:  20  20  20  20  20  20  11  10

From /proc/meminfo
   MemTotal:       1583419856 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

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 Apr 8 04:01

SPEC is set to: /spec2017
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-root xfs   270G   75G  196G  28% /

From /sys/devices/virtual/dmi/id
    Vendor:        XFUSION
    Product:       2488H V6
    Product Family: Cedar Island
```

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Platform Notes (Continued)

```
      Serial:        123456

 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 M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2666

 BIOS:
    BIOS Vendor:       ByoSoft
    BIOS Version:      0.81
    BIOS Date:         02/10/2022

 (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 2022.0.0 Build 20211123
Copyright (C) 1985-2021 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 2022.0.0 Build 20211123
Copyright (C) 1985-2021 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 2021.5.0
  Build 20211109_000000
Copyright (C) 1985-2021 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.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/2022.0.2/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/2022.0.2/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/2022.0.2/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_revC.2022-04-29.html
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-CPX-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_revC.2022-04-29.xml
http://www.spec.org/cpu2017/flags/xFusion-Platform-Settings-CPX-V1.1.xml

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