SPEC CPU®2017 Integer Rate Result

Supermicro

SuperServer 2049U-TR4
(X11QPH+, Intel Xeon Gold 6240L)

SPECrate®2017_int_base = 500

SPECrate®2017_int_peak = Not Run

CPU2017 License: 001176   **Test Date:**   Oct-2020
Test Sponsor: Supermicro   **Hardware Availability:** Feb-2020
Tested by: Supermicro   **Software Availability:** Apr-2020

Copies	
500.perlbench_r	144	334
502.gcc_r	144	376
505.mcf_r	144	858
520.omnetpp_r	144	330
523.xalancbmk_r	144	661
525.x264_r	144	1010
531.deepsjeng_r	144	394
541.leela_r	144	377
548.exchange2_r	144	944
557.xz_r	144	296

——— SPECrate®2017_int_base (500)

Hardware

CPU Name: Intel Xeon Gold 6240L
 Max MHz: 3900
 Nominal: 2600
Enabled: 72 cores, 4 chips, 2 threads/core
Orderable: 1,2,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2:   1 MB I+D on chip per core
 L3:   24.75 MB I+D on chip per chip
 Other: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-3200AA-R,
            running at 2933)
Storage: 800 GB SATA 3 SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 8.2 (Ootpa)
              4.18.0-193.el8.x86_64
Compiler: C/C++: Version 19.1.1.217 of Intel C/C++
              Compiler for Linux;
              Fortran: Version 19.1.1.217 of Intel Fortran
              Compiler for Linux
Parallel: No
Firmware: version 3.3a released Jul-2020
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 max performance at the cost of additional power usage.

SPEC CPU®2017 Integer Rate Result

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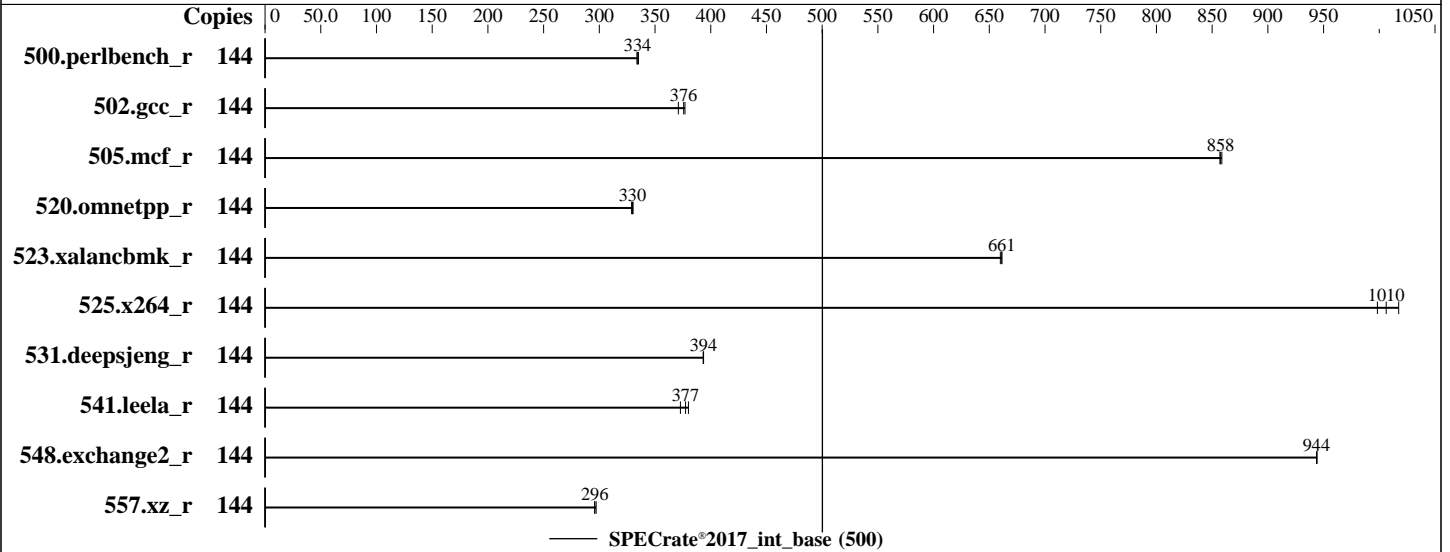
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	144	684	335	687	334	**686**	**334**							
502.gcc_r	144	541	377	**543**	**376**	550	371							
505.mcf_r	144	**271**	**858**	272	857	271	859							
520.omnetpp_r	144	**573**	**330**	574	329	572	330							
523.xalancbmk_r	144	230	661	**230**	**661**	230	660							
525.x264_r	144	248	1020	253	998	**251**	**1010**							
531.deepsjeng_r	144	419	394	**419**	**394**	420	393							
541.leela_r	144	628	380	**632**	**377**	640	373							
548.exchange2_r	144	400	944	400	944	**400**	**944**							
557.xz_r	144	523	297	526	296	**526**	**296**							
SPECrate®2017_int_base =	**500**													
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

```
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
```

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 =
     "/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-
     32"
MALLOC_CONF = "retain:true"
```

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SuperServer 2049U-TR4
(X11QPH+, Intel Xeon Gold 6240L)

$SPECrate®2017\_int\_base =$ **500**

$SPECrate®2017\_int\_peak =$ Not Run

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Oct-2020
Hardware Availability: Feb-2020
Software Availability: Apr-2020

General Notes

```
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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 Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
Super Performance = Enable
Stale AtoS = Enable
Patrol Scrub = Disable
Intel Virtualization Technology = Disable
SNC = Enable
LLC Dead Line Alloc = Disable
Enhanced Halt State (C1E) = Disable
IMC Interleaving = 1-way Interleave

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on 171-109.pnet Tue Oct 20 14:14:15 2020

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 6240L CPU @ 2.60GHz
      4  "physical id"s (chips)
      144 "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 : 18
```

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CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Oct-2020

Hardware Availability: Feb-2020

Software Availability: Apr-2020

Platform Notes (Continued)

```
       siblings  : 36
       physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
       physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

    From lscpu:
       Architecture:        x86_64
       CPU op-mode(s):      32-bit, 64-bit
       Byte Order:          Little Endian
       CPU(s):              144
       On-line CPU(s) list: 0-143
       Thread(s) per core:  2
       Core(s) per socket:  18
       Socket(s):           4
       NUMA node(s):        8
       Vendor ID:           GenuineIntel
       CPU family:          6
       Model:               85
       Model name:          Intel(R) Xeon(R) Gold 6240L CPU @ 2.60GHz
       Stepping:            7
       CPU MHz:             1435.743
       CPU max MHz:         3900.0000
       CPU min MHz:         1000.0000
       BogoMIPS:            5200.00
       Virtualization:      VT-x
       L1d cache:           32K
       L1i cache:           32K
       L2 cache:            1024K
       L3 cache:            25344K
       NUMA node0 CPU(s):   0-2,5,6,9,10,14,15,72-74,77,78,81,82,86,87
       NUMA node1 CPU(s):   3,4,7,8,11-13,16,17,75,76,79,80,83-85,88,89
       NUMA node2 CPU(s):   18-20,23,24,27,28,32,33,90-92,95,96,99,100,104,105
       NUMA node3 CPU(s):   21,22,25,26,29-31,34,35,93,94,97,98,101-103,106,107
       NUMA node4 CPU(s):   36-38,41,42,45,46,50,51,108-110,113,114,117,118,122,123
       NUMA node5 CPU(s):   39,40,43,44,47-49,52,53,111,112,115,116,119-121,124,125
       NUMA node6 CPU(s):   54-56,59,60,63,64,68,69,126-128,131,132,135,136,140,141
       NUMA node7 CPU(s):   57,58,61,62,65-67,70,71,129,130,133,134,137-139,142,143
       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 monitor 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 intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
    flexpriority ept vpid 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
```

(Continued on next page)

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Platform Notes (Continued)

```
    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 : 25344 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 9 10 14 15 72 73 74 77 78 81 82 86 87
   node 0 size: 192117 MB
   node 0 free: 189753 MB
   node 1 cpus: 3 4 7 8 11 12 13 16 17 75 76 79 80 83 84 85 88 89
   node 1 size: 193531 MB
   node 1 free: 191821 MB
   node 2 cpus: 18 19 20 23 24 27 28 32 33 90 91 92 95 96 99 100 104 105
   node 2 size: 193531 MB
   node 2 free: 191867 MB
   node 3 cpus: 21 22 25 26 29 30 31 34 35 93 94 97 98 101 102 103 106 107
   node 3 size: 193531 MB
   node 3 free: 188344 MB
   node 4 cpus: 36 37 38 41 42 45 46 50 51 108 109 110 113 114 117 118 122 123
   node 4 size: 193504 MB
   node 4 free: 191836 MB
   node 5 cpus: 39 40 43 44 47 48 49 52 53 111 112 115 116 119 120 121 124 125
   node 5 size: 193531 MB
   node 5 free: 191533 MB
   node 6 cpus: 54 55 56 59 60 63 64 68 69 126 127 128 131 132 135 136 140 141
   node 6 size: 193531 MB
   node 6 free: 191854 MB
   node 7 cpus: 57 58 61 62 65 66 67 70 71 129 130 133 134 137 138 139 142 143
   node 7 size: 193529 MB
   node 7 free: 191869 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:     1583933828 kB
```

(Continued on next page)

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Platform Notes (Continued)

```
    HugePages_Total:         0
    Hugepagesize:         2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="8.2 (Ootpa)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="8.2"
       PLATFORM_ID="platform:el8"
       PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
    system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

 uname -a:
    Linux 171-109.pnet 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020 x86_64
    x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 itlb_multihit:                        KVM: Vulnerable
 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
 tsx_async_abort:                       Mitigation: Clear CPU buffers; SMT vulnerable

 run-level 3 Oct 19 17:15

 SPEC is set to: /home/cpu2017
    Filesystem              Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   690G   55G  636G   8% /home

 From /sys/devices/virtual/dmi/id
    BIOS:    American Megatrends Inc. 3.3a 07/23/2020
    Vendor:  Supermicro
    Product: X11QPH+
    Product Family: SMC X11
    Serial:  123456789
```

(Continued on next page)

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Platform Notes (Continued)

```
 Additional information from dmidecode 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

 (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) C Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
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) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
  NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icc
```

C++ benchmarks:
```
icpc
```

(Continued on next page)

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Base Compiler Invocation (Continued)

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:
```
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:
```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:
```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -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/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc
```

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CPU2017 License:	001176	**Test Date:**	Oct-2020
Test Sponsor:	Supermicro	**Hardware Availability:**	Feb-2020
Tested by:	Supermicro	**Software Availability:**	Apr-2020

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revH.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revH.xml

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2020-10-20 17:14:15-0400.
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