SPEC CPU®2017 Integer Rate Result

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero DIT400TR-55RL
(2.90 GHz, Intel Xeon Gold 6226R)

SPECrate®2017_int_base = 218
SPECrate®2017_int_peak = 227

CPU2017 License: 006042
Test Date: Jul-2021
Test Sponsor: Netweb Pte Ltd
Hardware Availability: Feb-2020
Tested by: Tyrone Systems
Software Availability: Jun-2021

Covers

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base (218)</th>
<th>SPECrate®2017_int_peak (227)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aliases</td>
<td>Copies</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>500.perlbench_r</td>
<td>64</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
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<td>64</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
</tr>
</tbody>
</table>

CPU Name: Intel Xeon Gold 6226R
Max MHz: 3900
Nominal: 2900
Enabled: 32 cores, 2 chips, 2 threads/core
Orderable: 1,2 Chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 22 MB I+D on chip per chip
Other: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-2933P-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software
OS: CentOS Linux release 8.4.2105
Kernel 4.18.0-305.3.1.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;
C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
Parallel: No
Firmware: Version 3.4 released Nov-2020
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.
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Results Table

Benchmark | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio
---|---|---|---|---|---|---|---|---|---|---|---|---|---|---
500.perlbench_r | 64 | 670 | 152 | 669 | 152 | 668 | 152 | 64 | 577 | 177 | 577 | 177 | 577 | 177
502.gcc_r | 64 | 575 | 158 | 570 | 159 | 573 | 158 | 64 | 476 | 190 | 476 | 190 | 477 | 190
505.mcf_r | 64 | 289 | 358 | 290 | 357 | 289 | 358 | 64 | 289 | 358 | 290 | 357 | 289 | 358
520.omnetpp_r | 64 | 669 | 125 | 671 | 125 | 673 | 125 | 64 | 669 | 125 | 671 | 125 | 673 | 125
523.xalanbmk_r | 64 | 240 | 281 | 242 | 279 | 242 | 279 | 64 | 240 | 281 | 242 | 279 | 242 | 279
525.x264_r | 64 | 239 | 468 | 241 | 465 | 241 | 466 | 64 | 231 | 486 | 231 | 485 | 230 | 487
531.deepsjeng_r | 64 | 407 | 180 | 407 | 180 | 408 | 180 | 64 | 407 | 180 | 407 | 180 | 407 | 180
541.leela_r | 64 | 606 | 175 | 608 | 174 | 608 | 174 | 64 | 606 | 175 | 608 | 174 | 608 | 174
548.exchange2_r | 64 | 386 | 434 | 387 | 433 | 387 | 433 | 64 | 386 | 434 | 387 | 433 | 387 | 433
557.xz_r | 64 | 536 | 129 | 537 | 129 | 537 | 129 | 64 | 529 | 131 | 530 | 130 | 530 | 130

SPECrate®2017_int_base = 218
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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"

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 locally by Netweb
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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CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

General Notes (Continued)

numactl --interleave=all runcpu <etc>

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.
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.
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Settings:
Power Technology set to Custom
Power Performance Tuning set to BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode set to Performance
LLC Dead Line Alloc set to Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aaca6c6d4
running on localhost.localdomain Thu Jul 29 09:28:51 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 6226R CPU @ 2.90GHz
  2 "physical id"s (chips)
  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

(Continued on next page)
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**Platform Notes (Continued)**

- Core(s) per socket: 16
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- BIOS Vendor ID: Intel(R) Corporation
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz
- BIOS Model name: Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz
- Stepping: 7
- CPU MHz: 1497.274
- CPU max MHz: 3900.0000
- CPU min MHz: 1200.0000
- BogoMIPS: 5800.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 22528K
- NUMA node0 CPU(s): 0-15,32-47
- NUMA node0 CPU(s): 16-31,48-63
- 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 rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperf fpu pfpu vfpdu vfp vest mvic vaex smep bmi1 bmi2 aperf_timer smap svm svmctrs dec omron sxv mlem fma cvt_mad mpx rvf dtes64_64bit vm xsave Hibernate hardware cosmi umip rumip icache l1d dcache data l2d dcache l2i cache data /proc/cpuinfo cache data cache size : 22528 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
  node 0 size: 128608 MB
  node 0 free: 124952 MB
  node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
  node 1 size: 128979 MB

(Continued on next page)
**SPEC CPU®2017 Integer Rate Result**

### Platform Notes (Continued)

node 1 free: 127766 MB  
node distances:  
node  0  1  
  0: 10 21  
  1: 21 10  

From `/proc/meminfo`  
MemTotal: 263770444 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 performance  

From `/etc/*release` /etc/*version*  
centos-release: CentOS Linux release 8.4.2105  
centos-release-upstream: Derived from Red Hat Enterprise Linux 8.4  
os-release:  
  NAME="CentOS Linux"  
  VERSION="8"  
  ID="centos"  
  ID_LIKE="rhel fedora"  
  VERSION_ID="8"  
  PLATFORM_ID="platform:el8"  
  PRETTY_NAME="CentOS Linux 8"  
  ANSI_COLOR="0;31"  
redhat-release: CentOS Linux release 8.4.2105  
system-release: CentOS Linux release 8.4.2105  
system-release-cpe: cpe:/o:centos:centos:8  

uname -a:  
Linux localhost.localdomain 4.18.0-305.3.1.el8.x86_64 #1 SMP Tue Jun 1 16:14:33 UTC 2021 x86_64 x86_64 x86_64 GNU/Linux  

Kernel self-reported vulnerability status:  

<table>
<thead>
<tr>
<th>CVE</th>
<th>Status</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVE-2018-12207</td>
<td>iTLB Multihit</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3620</td>
<td>L1 Terminal Fault</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2017-5754</td>
<td>Microarchitectural Data Sampling</td>
<td>Not affected</td>
</tr>
<tr>
<td>CVE-2018-3639</td>
<td>Meltdown</td>
<td>Mitigation: Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>CVE-2017-5753</td>
<td>Spectre variant 1</td>
<td>Mitigation: usercopy/swapgs</td>
</tr>
</tbody>
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Platform Notes (Continued)

barriers and __user pointer sanitization
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

CVE-2017-5715 (Spectre variant 2):

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected

CVE-2019-11135 (TSX Asynchronous Abort):
Mitigation: TSX disabled

run-level 3 Jul 29 17:19

SPEC is set to: /home/cpu2017

From /sys/devices/virtual/dmi/id
Vendor: Tyrone Systems
Product: Tyrone Camarero DIT400TR-55RL
Product Family: SMC X11
Serial: 123456789

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:
8x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 3.4
BIOS Date: 11/10/2020
BIOS Revision: 5.14

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 500.perlbench_r(peak) 557.xz_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)

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## Compiler Version Notes (Continued)

<table>
<thead>
<tr>
<th>Compiler Version</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113</td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
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Compiler Version Notes (Continued)

==============================================================================
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| 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)  
525.x264_r(base, peak) 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, peak) 523.xalancbmk_r(base, peak)  
531.deepsjeng_r(base, peak) 541.leela_r(base, peak) |
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, 
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<td>Fortran</td>
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| 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.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
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

500.perlbench_r: icx

(Continued on next page)
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Peak Compiler Invocation (Continued)

557.xz_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

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/je5.0.1-32/lib -ljemalloc

505.mcf_r: basepeak = yes

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## SPEC CPU®2017 Integer Rate Result

### Tyrone Systems

**Test Sponsor:** Netweb Pte Ltd  
**Tyrone Camarero DIT400TR-55RL**  
**CPU Model:** Intel Xeon Gold 6226R

### SPECrate®2017 Integer Result

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### Peak Optimization Flags (Continued)

525.x264_r:
- `-w` -std=c11  
- `-m64` -m, 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:
- `-Wl,-z,muldefs` -xCORE-AVX512  
- `-ipo`  
- `-O3` -no-prec-div  
- `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:

- 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:


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

- [http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revI.xml](http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revI.xml)

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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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