**SPEC CPU®2017 Integer Rate Result**

**KTNF**
(Test Sponsor: Telecommunications Technology Association)

KTNF KR580S2
(3.00 GHz, Intel Xeon Gold 6354)

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<td>Aug-2021</td>
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<td>Jun-2021</td>
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**SPECrates**

- SPECrater®2017_int_base = 294
- SPECrater®2017_int_peak = 303

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**Hardware**

- **CPU Name:** Intel Xeon Gold 6354
- **Max MHz:** 3600
- **Nominal:** 3000
- **Enabled:** 36 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 39 MB I+D on chip per chip
- **Other:** None
- **Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)
- **Storage:** 1 X 762 GB SATA SSD
- **Other:** None

---

**Software**

- **OS:** CentOS Linux release 8.2.2004 (Core) 4.18.0-193.el8.x86_64
- **Compiler:**
  - C/C++: Version 2021.3.0 of Intel oneAPI DPC++/C++ Compiler Build 20210619 for Linux;
  - Fortran: Version 2021.3.0 of Intel Fortran Compiler
- **Parallel:** No
- **Firmware:** Version KM-M640-027-MS1 released Jun-2021
- **File System:** xfs
- **System State:** Run level 5 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1
- **Power Management:** Default

---

**Copies**

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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/spec/speccpu/cpu2017/ia32:/home/spec/speccpu/cpu2017/intel64:/home/spec/speccpu/cpu2017/je5.0.1-32:/home/spec/speccpu/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
```

General Notes

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>

(Continued on next page)
General Notes (Continued)


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

Patrol Scrub -> Disabled
Intel VT for Directed I/O(VT-d) -> Disabled
LLC dead line alloc -> Disabled
SR-IOV Support -> Disabled
CSM Support -> Disabled
SNC set to Enabled

Sysinfo program /home/spec/speccpu/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d6
running on localhost.localdomain Wed Aug 11 11:01:31 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 6354 CPU @ 3.00GHz
  2 "physical id"s (chips)
  72 "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
siblings : 36
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

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): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2

(Continued on next page)
Platform Notes (Continued)

- Core(s) per socket: 18
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 6354 CPU @ 3.00GHz
- Stepping: 6
- CPU MHz: 3600.000
- CPU max MHz: 3600.0000
- CPU min MHz: 800.0000
- BogoMIPS: 6000.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 39936K
- NUMA node0 CPU(s): 0-8,36-44
- NUMA node1 CPU(s): 9-17,45-53
- NUMA node2 CPU(s): 18-26,54-62
- NUMA node3 CPU(s): 27-35,63-71
- 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 aperfmerf pni pclmulqdq dtss64 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pccid 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 invpcid_single ssbd mba ibrs ibpb stibp ibrsenhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmqm rdt_a avx512f avx512dq rdseed adx smap avx512sfma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsaves xsetbv1 xsaves cmqm_llc cmqm_occup_llc cmqm_mbm_total cmqm_mbm_local wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospee avx512_vbmi2 gfnl vaes vpcmullqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

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 36 37 38 39 40 41 42 43 44
node 0 size: 257378 MB
node 0 free: 256063 MB
node 1 cpus: 9 10 11 12 13 14 15 16 17 45 46 47 48 49 50 51 52 53
node 1 size: 258043 MB
node 1 free: 256848 MB

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

(KTNF (Test Sponsor: Telecommunications Technology Association) KTNF KR580S2 (3.00 GHz, Intel Xeon Gold 6354))

SPECrate®2017_int_base = 294
SPECrate®2017_int_peak = 303

CPU2017 License: A83
Test Sponsor: Telecommunications Technology Association
Tested by: Telecommunications Technology Association

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: Jun-2021

Platform Notes (Continued)

node 2 cpus: 18 19 20 21 22 23 24 25 26 54 55 56 57 58 59 60 61 62
node 2 size: 258043 MB
node 2 free: 255759 MB
node 3 cpus: 27 28 29 30 31 32 33 34 35 63 64 65 66 67 68 69 70 71
node 3 size: 258013 MB
node 3 free: 256234 MB
node distances:
  node 0 1 2 3
  0: 10 11 20 20
  1: 11 10 20 20
  2: 20 20 10 11
  3: 20 20 11 10

From /proc/meminfo
  MemTotal: 1056235408 kB
  HugePages_Total: 2048
  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 8.2.2004 (Core)
  centos-release-upstream: Derived from Red Hat Enterprise Linux 8.2 (Source)
  os-release:
    NAME="CentOS Linux"
    VERSION="8 (Core)"
    ID="centos"
    ID_LIKE="redhat fedora"
    VERSION_ID="8"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="CentOS Linux 8 (Core)"
    ANSI_COLOR="0;31"
  redhat-release: CentOS Linux release 8.2.2004 (Core)
  system-release: CentOS Linux release 8.2.2004 (Core)
  system-release-cpe: cpe:/o:centos:centos:8

uname -a:
  Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri May 8 10:59:10 UTC 2020
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
  CVE-2018-12207 (iTLB Multihit): Not affected

(Continued on next page)
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**Hardware Availability:** Jul-2021  
**Software Availability:** Jun-2021

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**Platform Notes (Continued)**

- **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/swapsgs barriers and __user pointer sanitation
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** No status reported
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

---

**Compiler Version Notes**

```
C | 502.gcc_r(peak)
```

```
Intel(R) oneAPI DPC++/C++ Compiler 2021.3.0 (2021.3.0.20210619)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/intel/oneapi/compiler/2021.3.0/linux/bin
```

(Continued on next page)
KTNF
(Test Sponsor: Telecommunications Technology Association)
KTNF KR580S2
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Copyright 2017-2021 Standard Performance Evaluation Corporation

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### Compiler Version Notes (Continued)

Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/intel/oneapi/compiler/2021.3.0/linux/bin

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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 2021.3.0 (2021.3.0.20210619)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/intel/oneapi/compiler/2021.3.0/linux/bin
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```
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 2021.3.0 (2021.3.0.20210619)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/intel/oneapi/compiler/2021.3.0/linux/bin
```

```
Fortran | 548.exchange2_r(base, peak)

ifort (IFORT) 2021.3.0 20210609  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

**C benchmarks:**  
icx  

**C++ benchmarks:**  
icpx  

(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:**
- `-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/2021.3.0/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/2021.3.0/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/2021.3.0/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`
**SPEC CPU®2017 Integer Rate Result**

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# KTNF
(Test Sponsor: Telecommunications Technology Association)

## KTNF KR580S2
(3.00 GHz, Intel Xeon Gold 6354)

<table>
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<th>SPECrate®2017_int_base</th>
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**CPU2017 License:** A83  
**Test Sponsor:** Telecommunications Technology Association  
**Tested by:** Telecommunications Technology Association  
**Test Date:** Aug-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Jun-2021

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**Peak Compiler Invocation**

C benchmarks (except as noted below):

- icx

- 500.perlbench_r: icc

- 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/2021.3.0/linux/compiler/lib/intel64_lin  
- -lqkmalloc

- 502.gcc_r: -m32  
- -L/opt/intel/oneapi/compiler/2021.3.0/linux/compiler/lib/ia32_lin  
- -std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)  
- -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -ftls  
- -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4

(Continued on next page)
Peak Optimization Flags (Continued)

502.gcc_r (continued):
- mbranches-within-32B-boundaries
- L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-03 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
- mbranches-within-32B-boundaries
- L/opt/intel/oneapi/compiler/2021.3.0/linux/compiler/lib/intel64_lin
- lqkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -03 -no-prec-div
- qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
- L/opt/intel/oneapi/compiler/2021.3.0/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/Intel-ic2021-official-linux64_revA.xml

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