# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

**ThinkSystem SR650 V2**  
(2.30 GHz, Intel Xeon Platinum 8380)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>11.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

<table>
<thead>
<tr>
<th>Threads</th>
<th>0</th>
<th>2.00</th>
<th>4.00</th>
<th>6.00</th>
<th>8.00</th>
<th>10.0</th>
<th>12.0</th>
<th>14.0</th>
<th>16.0</th>
<th>18.0</th>
<th>20.0</th>
<th>22.0</th>
<th>25.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>160</td>
<td>6.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>160</td>
<td>10.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>160</td>
<td>19.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>160</td>
<td>12.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>160</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>160</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>160</td>
<td>5.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>160</td>
<td>4.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>160</td>
<td>19.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>160</td>
<td>24.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8380  
- **Max MHz:** 3400  
- **Nominal:** 2300  
- **Enabled:** 80 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:** 60 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.3 (Ootpa)  
- **Kernel:** 4.18.0-240.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:** Yes  
- **Firmware:** Lenovo BIOS Version AFE109P 1.01 released Apr-2021  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem SR650 V2
(2.30 GHz, Intel Xeon Platinum 8380)

SPECSpeed®2017_int_base = 11.7
SPECSpeed®2017_int_peak = Not Run

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>160</td>
<td>257</td>
<td>6.91</td>
<td>255</td>
<td>6.97</td>
<td>255</td>
<td>6.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>160</td>
<td>378</td>
<td>10.5</td>
<td>379</td>
<td>10.5</td>
<td>382</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>160</td>
<td>250</td>
<td>18.9</td>
<td>248</td>
<td>19.1</td>
<td>247</td>
<td>19.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>160</td>
<td>135</td>
<td>12.1</td>
<td>138</td>
<td>11.8</td>
<td>136</td>
<td>12.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>160</td>
<td>108</td>
<td>13.2</td>
<td>107</td>
<td>13.2</td>
<td>108</td>
<td>13.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>160</td>
<td>105</td>
<td>16.8</td>
<td>104</td>
<td>16.9</td>
<td>105</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>160</td>
<td>252</td>
<td>5.69</td>
<td>252</td>
<td>5.69</td>
<td>252</td>
<td>5.70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>160</td>
<td>368</td>
<td>4.63</td>
<td>368</td>
<td>4.63</td>
<td>368</td>
<td>4.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>160</td>
<td>150</td>
<td>19.6</td>
<td>151</td>
<td>19.5</td>
<td>150</td>
<td>19.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.x2_s</td>
<td>160</td>
<td>251</td>
<td>24.6</td>
<td>253</td>
<td>24.4</td>
<td>254</td>
<td>24.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

---

**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:

- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = 
  
  "*/home/cpu2017-1.1.5-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.5-ic202
  1.1-revB/jed5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

---

**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
```

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.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V2
(2.30 GHz, Intel Xeon Platinum 8380)

SPECSpeed®2017_int_base = 11.7
SPECSpeed®2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Apr-2021
Hardware Availability: May-2021
Software Availability: Jul-2021

General Notes (Continued)

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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Legacy

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Mon Apr 19 13:34:05 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) Platinum 8380 CPU @ 2.30GHz
  2 "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 : 40
  siblings : 80
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

From lscpu:
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: 40
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8380 CPU @ 2.30GHz
Stepping: 6

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V2
(2.30 GHz, Intel Xeon Platinum 8380)

SPECspeed®2017_int_base = 11.7
SPECspeed®2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Apr-2021
Tested by: Lenovo Global Technology
Hardware Availability: May-2021
Software Availability: Jul-2021

Platform Notes (Continued)

CPU MHz: 2999.905
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 61440K
NUMA node0 CPU(s): 0-39,80-119
NUMA node1 CPU(s): 40-79,120-159
Flags: fpu vme de pse tsc msr pae mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtpsc
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 sse3 sdbg fma cx16
xtpre 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 invpcid_single
intel_pni ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept
vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erva invpcid cqm rdt_a
avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni
avx512bw avx512vl xsavesopt xsavec xgetbv1 xsaveav xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local split_lock_detect wbnoimp dtherm ida arat pln pts avx512vbmi umip pku
ospke avx512_vbmi2 gfn_l vcmpclmuldq avx512_vnni avx512_bitalg tmm
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: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35 36 37 38 39 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96
97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118
119
node 0 size: 958946 MB
node 0 free: 1030807 MB
node 1 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 120 121 122 123 124 125 126 127 128 129
130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151
152 153 154 155 156 157 158 159
node 1 size: 964687 MB
node 1 free: 1031366 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V2
(2.30 GHz, Intel Xeon Platinum 8380)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECspeed®2017_int_base = 11.7
SPECspeed®2017_int_peak = Not Run

Test Date: Apr-2021
Hardware Availability: May-2021
Software Availability: Jul-2021

Platform Notes (Continued)

MemTotal: 2113429440 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sbin/tuned-adm active
  Current active profile: balanced
/usr/bin/lsb_release -d
  Red Hat Enterprise Linux release 8.3 (Ootpa)

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/swaps 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 19 13:27

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

**Lenovo Global Technology**
ThinkSystem SR650 V2  
(2.30 GHz, Intel Xeon Platinum 8380)

**SPECspeed®2017_int_base = 11.7**  
**SPECspeed®2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Apr-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: May-2021</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Jul-2021</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB

Filesystem     Type  Size  Used Avail Use% Mounted on  
/dev/sda4      xfs   818G  148G  670G  19% /home

From /sys/devices/virtual/dmi/id
Vendor:         Lenovo
Product:        ThinkSystem SR650 V2 MB
Product Family: ThinkSystem
Serial:         1234567890

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:  
32x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200

BIOS:  
BIOS Vendor:      Lenovo
BIOS Version:     AFE109P-1.01
BIOS Date:        04/08/2021
BIOS Revision:    1.1
Firmware Revision: 1.0

(End of data from sysinfo program)

**Compiler Version Notes**

```
C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)  
       | 625.x264_s(base) 657.xz_s(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++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)  
       | 641.leela_s(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.
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR650 V2
(2.30 GHz, Intel Xeon Platinum 8380)

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology
Lenovo Global Technology

Compiler Version Notes (Continued)

==============================================================================
Fortran | 648.exchange2_s(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

600.perlbench_s: -DSPEC_LP64  -DSPEC_LINUX_X64
602.gcc_s:   -DSPEC_LP64
605.mcf_s:   -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64  -DSPEC_LINUX
625.x264_s:  -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s:  -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s:    -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP  -std=c11  -m64  -fiopenmp  -Wl,-z,muldefs  -xCORE-AVX2
-03  -ffast-math  -flto  -mfpmath=sse  -funroll-loops
-qopt-mem-layout-trans=4  -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib  -ljemalloc

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

Lenovo Global Technology
ThinkSystem SR650 V2
(2.30 GHz, Intel Xeon Platinum 8380)

SPECspeed®2017_int_base = 11.7
SPECspeed®2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Apr-2021
Hardware Availability: May-2021
Software Availability: Jul-2021

Base Optimization Flags (Continued)

C++ benchmarks:
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX2 -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:
-m64 -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.5 on 2021-04-19 01:34:05-0400.
Report generated on 2021-05-12 14:04:26 by CPU2017 PDF formatter v6442.
Originally published on 2021-05-12.