## Lenovo Global Technology

**ThinkSystem SR570**  
(1.90 GHz, Intel Xeon Bronze 3206R)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>81.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Intel Xeon Bronze 3206R</td>
</tr>
<tr>
<td><strong>Max MHz:</strong></td>
<td>1900</td>
</tr>
<tr>
<td><strong>Nominal:</strong></td>
<td>1900</td>
</tr>
<tr>
<td><strong>Enabled:</strong></td>
<td>16 cores, 2 chips</td>
</tr>
<tr>
<td><strong>Orderable:</strong></td>
<td>1,2 chips</td>
</tr>
<tr>
<td><strong>Cache L1:</strong></td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td><strong>L2:</strong></td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td><strong>L3:</strong></td>
<td>11 MB I+D on chip per chip</td>
</tr>
<tr>
<td><strong>Memory:</strong></td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2133)</td>
</tr>
<tr>
<td><strong>Storage:</strong></td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
</table>
| **OS:**                                | SUSE Linux Enterprise Server 15 SP1 (x86_64)  
Kernel 4.12.14-195-default |
| **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:**                          | Lenovo BIOS Version TEE155L 2.61 released May-2020 |
| **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  
BIOS set to prefer performance at the cost of additional power usage |
| **Power Management:**                  |       |
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
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<tr>
<td>503.bwaves_r</td>
<td>16</td>
<td>556</td>
<td>289</td>
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<td>507.cactuBSSN_r</td>
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<td>183</td>
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<td>510.parest_r</td>
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<td>749</td>
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<tr>
<td>511.povray_r</td>
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<td>546</td>
<td>68.4</td>
<td>549</td>
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<td>63.6</td>
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<td>521.wrf_r</td>
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<td>416</td>
<td>86.1</td>
<td>418</td>
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<td>456</td>
<td>53.5</td>
<td>455</td>
<td>53.6</td>
<td></td>
</tr>
<tr>
<td>527.cam4_r</td>
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<td>64.9</td>
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<td>65.0</td>
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<td>538.imagick_r</td>
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<td>465</td>
<td>54.7</td>
<td>464</td>
<td>54.8</td>
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</tbody>
</table>

**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:

```bash
LD_LIBRARY_PATH = 
    "/home/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/j
e5.0.1-64"

MALLOC_CONF = "retain:true"
```
Lenovo Global Technology  
ThinkSystem SR570  
(1.90 GHz, Intel Xeon Bronze 3206R)  

**SPECrate®2017_fp_base = 81.2**  
**SPECrate®2017_fp_peak = Not Run**  

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jun-2020  
**Hardware Availability:** Mar-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 configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enable
Trusted Execution Technology set to Enable
Workload Configuration set to I/O Sensitive
Patrol Scrub set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1b6e646a485a0011
running on linux-rn74 Mon Jun 15 09:31:14 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) Bronze 3206R CPU @ 1.90GHz
  2 "physical id"s (chips)
  16 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(1.90 GHz, Intel Xeon Bronze 3206R)

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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3206R CPU @ 1.90GHz
Stepping: 7
CPU MHz: 1900.000
CPU max MHz: 1900.0000
CPU min MHz: 1000.0000
BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
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
ape.rfmp erf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmm
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
avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local dtherm arat pln pts pu ospke avx512_vnni md_clear 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
Lenovo Global Technology  
ThinkSystem SR570  
(1.90 GHz, Intel Xeon Bronze 3206R)  

SPECrate®2017_fp_base = 81.2
SPECrate®2017_fp_peak = Not Run

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

Test Date: Jun-2020  
Hardware Availability: Mar-2020  
Software Availability: Apr-2020

Platform Notes (Continued)

node 0 size: 192829 MB  
node 0 free: 192408 MB  
node 1 cpus: 8 9 10 11 12 13 14 15  
node 1 size: 193533 MB  
node 1 free: 193137 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10

From /proc/meminfo

MemTotal: 395635788 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*  

os-release:

NAME="SLES"  
VERSION="15-SP1"  
VERSION_ID="15.1"  
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"  
ID="sles"  
ID_LIKE="suse"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:  
Linux linux-rn74 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)  
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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: __user pointer sanitization  
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 15 09:30

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1

Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 892G 41G 851G 5% /

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(1.90 GHz, Intel Xeon Bronze 3206R)

SPECratenew 2017_fp_base = 81.2
SPECratenew 2017_fp_peak = Not Run

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

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE155L-2.61]- 05/20/2020
Vendor: Lenovo
Product: ThinkSystem SR570 -[7Y02RCZ000]-
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:
4x NO DIMM NO DIMM
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)
This system support 8 DIMMs per processor, total 16 DIMMs.
12 DIMM slots installed with 32 GB DIMM for this run,
and running at 2133 due to CPU limitation.

Compiler Version Notes

-----------------------------------------------------------------------------
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_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++             | 508.namd_r(base) 510.parest_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++, C           | 511.povray_r(base) 526.blender_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.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(1.90 GHz, Intel Xeon Bronze 3206R)

SPECrated2017_fp_base = 81.2
SPECrated2017_fp_peak = Not Run

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

Test Date: Jun-2020
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Compiler Version Notes (Continued)

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++, C, Fortran | 507.cactuBSSN_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.
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.
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.

==============================================================================
Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_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.

==============================================================================
Fortran, C | 521.wrf_r(base) 527.cam4_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.
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.

Base Compiler Invocation

C benchmarks:
  icc

C++ benchmarks:
  icpc

Fortran benchmarks:
  ifort

(Continued on next page)
**Base Compiler Invocation (Continued)**

Benchmarks using both Fortran and C:
```
ifort icc
```
Benchmarks using both C and C++:
```
icpc icc
```
Benchmarks using Fortran, C, and C++:
```
icpc icc ifort
```

**Base Portability Flags**

```
503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.ibm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64
```

**Base Optimization Flags**

C benchmarks:
```
-m64 -gnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld.gold -xcORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:
```
-m64 -gnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fuse-ld.gold -xcORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(1.90 GHz, Intel Xeon Bronze 3206R)

SPECraten®2017 fp_base = 81.2
SPECraten®2017 fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2020
Tested by: Lenovo Global Technology
Hardware Availability: Mar-2020
Software Availability: Apr-2020

Base Optimization Flags (Continued)

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both C and C++:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo -no-prec-div
-qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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-CLX-I.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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml
Lenovo Global Technology
ThinkSystem SR570
(1.90 GHz, Intel Xeon Bronze 3206R)

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<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>81.2</th>
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<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>Not Run</td>
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<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
</tr>
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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Jun-2020</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Mar-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

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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 2020-06-14 21:31:13-0400.
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