## SPEC CPU®2017 Integer Speed Result

### Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Bronze 3106, 1.70 GHz)

<table>
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<tr>
<th>Test Sponsor:</th>
<th>Cisco Systems</th>
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</thead>
<tbody>
<tr>
<td>Test Date:</td>
<td>Dec-2017</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Aug-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specspeed®2017_int_base</th>
<th>4.26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specspeed®2017_int_peak</td>
<td>4.40</td>
</tr>
</tbody>
</table>

### SPECCPU2017 Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>16</td>
<td>3.41</td>
<td>4.75</td>
</tr>
<tr>
<td>gcc_s</td>
<td>16</td>
<td>4.89</td>
<td>5.80</td>
</tr>
<tr>
<td>mcf_s</td>
<td>16</td>
<td>3.17</td>
<td>5.84</td>
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<tr>
<td>omnetpp_s</td>
<td>16</td>
<td>3.25</td>
<td>5.44</td>
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<tr>
<td>xalancbmk_s</td>
<td>16</td>
<td>4.41</td>
<td>5.44</td>
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<tr>
<td>x264_s</td>
<td>16</td>
<td>4.75</td>
<td>5.44</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>16</td>
<td>2.51</td>
<td>6.13</td>
</tr>
<tr>
<td>leela_s</td>
<td>16</td>
<td>2.50</td>
<td>6.16</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz_s</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Bronze 3106
- **Max MHz:** 1700
- **Nominal:** 1700
- **Enabled:** 16 cores, 2 chips
- **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:** 11 MB I+D on chip per chip
- **Memory:** 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R, running at 2133)
- **Storage:** 1 x 600 GB SAS HDD, 10K RPM
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 3.1.1d released Jun-2017
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1; jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5; jemalloc: sources available from jemalloc.net or releases
- **Power Management:** --
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Bronze 3106, 1.70 GHz)

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems
Test Date: Dec-2017
Hardware Availability: Aug-2017
Software Availability: Sep-2017

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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>16</td>
<td>622</td>
<td>2.85</td>
<td>619</td>
<td>2.87</td>
<td>619</td>
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<td>16</td>
<td>521</td>
<td>3.41</td>
<td>518</td>
<td>3.42</td>
<td>522</td>
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<tr>
<td>602.gcc_s</td>
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<td>842</td>
<td>4.73</td>
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<td>16</td>
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<td>4.92</td>
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<tr>
<td>605.mcf_s</td>
<td>16</td>
<td>814</td>
<td>5.80</td>
<td>815</td>
<td>5.79</td>
<td>813</td>
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<td>16</td>
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<td>623.xalanchmk_s</td>
<td>16</td>
<td>321</td>
<td>4.41</td>
<td>322</td>
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<td>625.x264_s</td>
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<td>325</td>
<td>5.43</td>
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<td>631.deepsjeng_s</td>
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<td>570</td>
<td>2.51</td>
<td>570</td>
<td>2.51</td>
<td>16</td>
<td>573</td>
<td>2.50</td>
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<td>2.50</td>
<td>573</td>
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<tr>
<td>641.leela_s</td>
<td>16</td>
<td>856</td>
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<td>856</td>
<td>1.99</td>
<td>856</td>
<td>1.99</td>
<td>16</td>
<td>853</td>
<td>2.00</td>
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<td>852</td>
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<tr>
<td>657.xz_s</td>
<td>16</td>
<td>574</td>
<td>10.8</td>
<td>573</td>
<td>10.8</td>
<td>571</td>
<td>10.8</td>
<td>16</td>
<td>565</td>
<td>10.9</td>
<td>565</td>
<td>10.9</td>
<td>565</td>
<td>10.9</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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
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

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly

(Continued on next page)
Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Bronze 3106, 1.70 GHz)

SPECspeed®2017_int_base = 4.26
SPECspeed®2017_int_peak = 4.40

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

General Notes (Continued)

generally available. At the time of this publication, it may
not be shipping, and/or may not be supported, and/or may fail
to meet other tests of General Availability described in the

This measured result may not be representative of the result
that would be measured were this benchmark run with hardware
and software available as of the publication date.

Platform Notes

BIOS Settings:
CPU performance set to Enterprise
Power Performance Tuning set to OS Controls
SNC set to Disabled
Patrol Scrub set to Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-79ix Sun Dec 17 05:08:35 2017

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 3106 CPU @ 1.70GHz
  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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
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

(Continued on next page)
Cisco Systems  
Cisco UCS C220 M5 (Intel Xeon Bronze 3106, 1.70 GHz)  

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<tr>
<th>SPECspeed®2017_int_base</th>
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Test Sponsor: Cisco Systems  
Tested by: Cisco Systems  
Test Date: Dec-2017  
Hardware Availability: Aug-2017  
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### Platform Notes (Continued)

Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz  
Stepping: 4  
CPU MHz: 930.143  
CPU max MHz: 1700.0000  
CPU min MHz: 800.0000  
BogoMIPS: 3392.02  
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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmprefe eagerfpu 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 3nowprefetch arat epb pni dtc hwfp_act_window hwp_epp hwp_pkg_req intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bbr1 hle avx2 smep bmi2  
MemTotal: 394653928 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  
node 0 size: 192019 MB  
node 0 free: 191366 MB  
node 1 cpus: 8 9 10 11 12 13 14 15  
node 1 size: 193384 MB  
node 1 free: 192753 MB

From /proc/meminfo  
MemTotal: 394653928 kB  

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Cisco Systems
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**SPEC CPU®2017 Integer Speed Result**

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**SPECspeed®2017_int_base = 4.26**

**SPECspeed®2017_int_peak = 4.40**

**Platform Notes (Continued)**

Hugepagesize: 2048 kB

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

SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.

os-release:
NAME="SLES"
VERSION="12-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
Linux linux-79ix 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 16 19:00

SPEC is set to: /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sdb7</td>
<td>xfs</td>
<td>416G</td>
<td>122G</td>
<td>295G</td>
<td>30%</td>
<td>/home</td>
</tr>
</tbody>
</table>

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.

BIOS Cisco Systems, Inc. C220M5.3.1.1d.0.0615170645 06/15/2017
Memory:
24x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)

**Compiler Version Notes**

====================================================================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)</th>
</tr>
</thead>
</table>
====================================================================================================================

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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Cisco Systems
Cisco UCS C220 M5 (Intel Xeon Bronze 3106, 1.70 GHz)

| SPECspeed®2017_int_base = 4.26 |
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Compiler Version Notes (Continued)

<table>
<thead>
<tr>
<th>C++</th>
<th>620.omnetpp_s(base, peak) 631.xalancbmk_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>icpc (ICC)</td>
<td>18.0.0 20170811</td>
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<tr>
<td>Copyright</td>
<td>(C) 1985-2017 Intel Corporation. All rights reserved.</td>
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<table>
<thead>
<tr>
<th>Fortran</th>
<th>648.exchange2_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifort (IFORT)</td>
<td>18.0.0 20170811</td>
</tr>
<tr>
<td>Copyright</td>
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</tbody>
</table>

Base Compiler Invocation

C benchmarks:
iccc

C++ benchmarks:
icpc

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
## Cisco Systems

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### Base Optimization Flags

- **C benchmarks:**
  - `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`
  - `-L/usr/local/je5.0.1-64/lib -ljemalloc`

- **C++ benchmarks:**
  - `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc`

- **Fortran benchmarks:**
  - `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`
  - `-L/usr/local/je5.0.1-64/lib -ljemalloc`

### Base Other Flags

- **C benchmarks:**
  - `-m64 -std=c11`

- **C++ benchmarks:**
  - `-m64`

- **Fortran benchmarks:**
  - `-m64`

### Peak Compiler Invocation

- **C benchmarks:**
  - `icc`

- **C++ benchmarks:**
  - `icpc`

- **Fortran benchmarks:**
  - `ifort`

### Peak Portability Flags

- 600.perlbench s: `-DSPEC_LP64 -DSPEC_LINUX_X64`

(Continued on next page)
### Peak Portability Flags (Continued)

- 602.gcc_s: `-DSPEC_LP64`
- 605.mcf_s: `-DSPEC_LP64`
- 620.omnetpp_s: `-DSPEC_LP64`
- 623.xalancbmk_s: `-D_FILE_OFFSET_BITS=64 -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`

### Peak Optimization Flags

**C benchmarks:**

```
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
657.xz_s: Same as 602.gcc_s
```

**C++ benchmarks:**

```
620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```
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Peak Optimization Flags (Continued)

623.xalancbmk_s: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s
641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks (except as noted below):
-m64

623.xalancbmk_s: -m32

Fortran benchmarks:
-m64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.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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