



Etsy

# Migrating a Monolith to the Cloud

Keyur Govande | Chief Architect

@keyurdg

A dark blue background with a white horizontal line near the top. In the top-left corner, there is an orange semi-circle. In the bottom-right corner, there is a blue semi-circle. The text "8 months" is centered in a white serif font.

8 months

DECEMBER 2017

Google  
contract  
signed

AUGUST 2019

DC  
shutdown

DEC  
2017

Google  
contract  
signed

20 months

AUG  
2019

DC  
shutdown

DEC  
2017

Google  
contract  
signed

AUG  
2019

DC  
shutdown

20 months



J F M A M J J A S O N D J F M A M J J A

8 months



8 months



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Giant rewrites  
are hard



Lift + Shift

(Refactor later)

The background features a large, textured orange shape on the left side. To its right, there are two overlapping shapes: a light blue one at the top and a dark blue one below it. A thin white horizontal line runs across the top of the image.

The global  
marketplace for  
unique and creative  
goods



## Our Community

60 million unique items

~2 million sellers

~39 million buyers

\$3.9B transacted in '18

As of December 31, 2018

## Etsy Sellers

87% women

97% work from home

80% are businesses of one

2018 Etsy Seller Census

## Championing Diversity

~ 30% of Etsy engineers are women

4 out of 6 executives are women

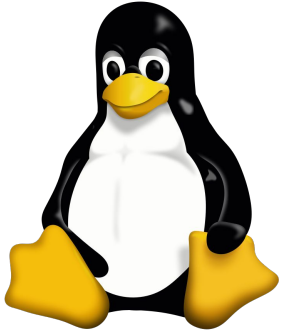
Gender parity on the Board

# Home grown tech



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# Etsy's Architecture



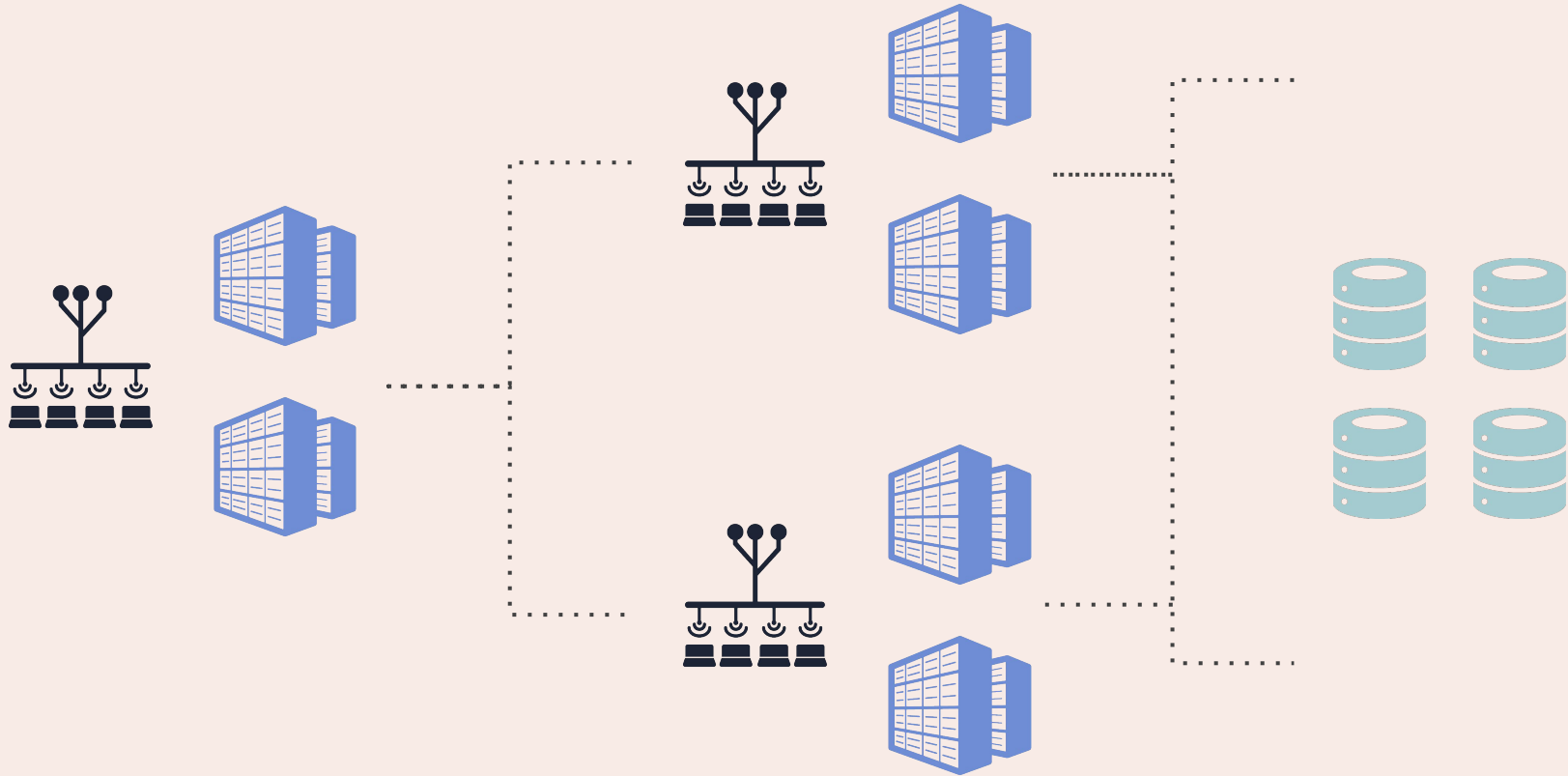
***php***

DB Shards



Memcache

# Etsy's Architecture



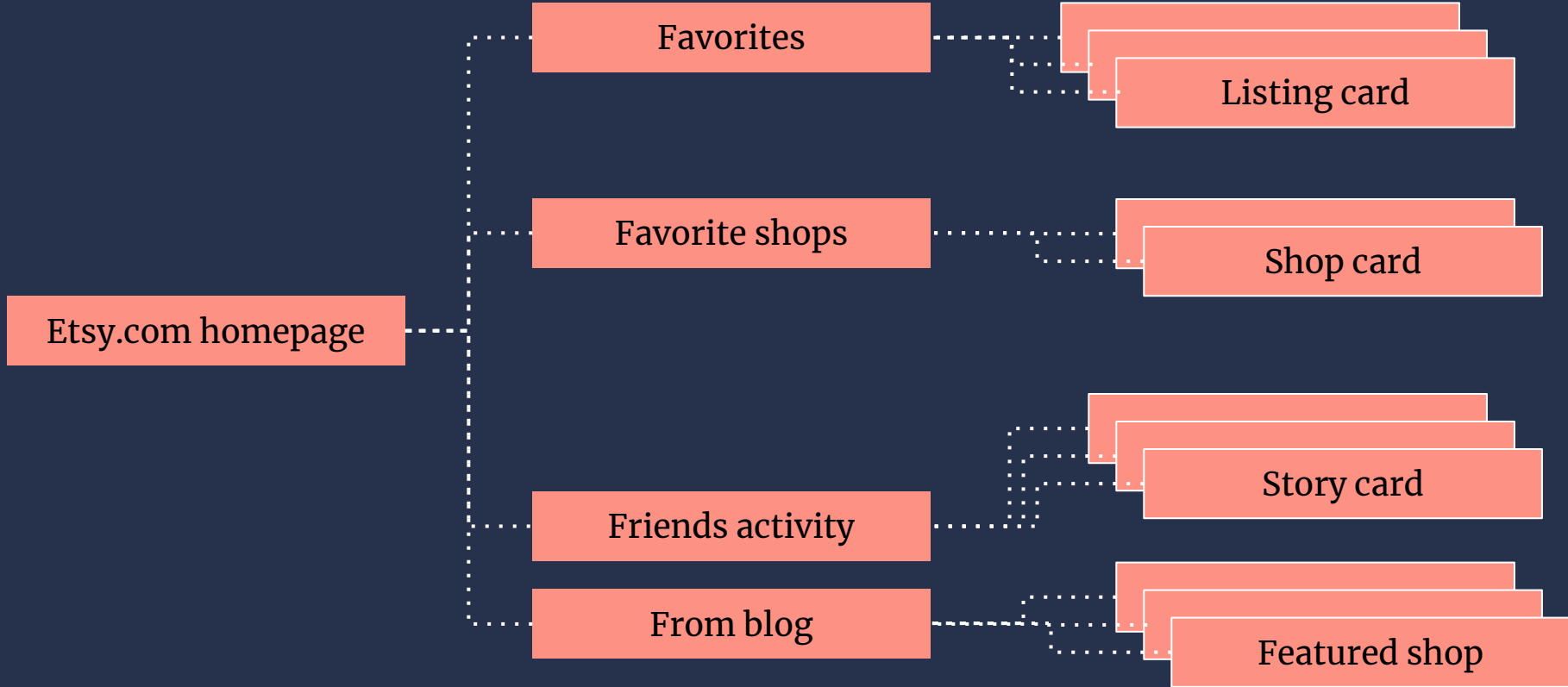


**Paul Wright**

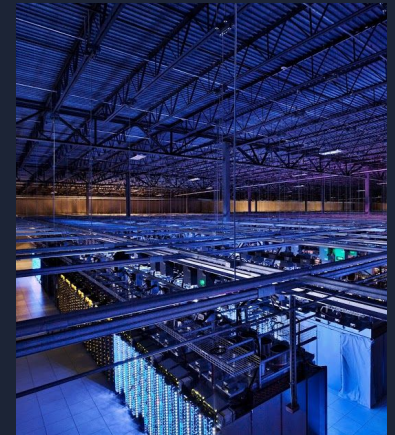
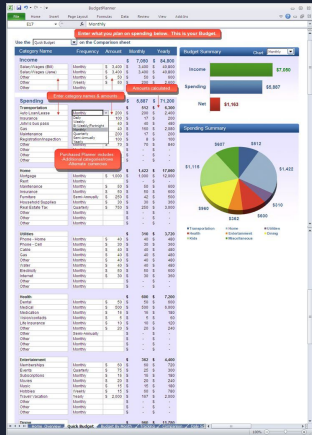
@wrighty

`curl_multi_info_read()` is my new event loop.

10:54 AM - 17 May 2013



# We were data center focused



Budget

6 – 12 months out

Order

3 – 6 months out

Receive

1 month out

Install

1 week out





The background features a large, textured orange shape on the left side. To its right, there are two overlapping semi-circular shapes: a light blue one at the top and a dark blue one below it. The overall composition is abstract and modern.

How on earth  
do we  
migrate?



**PARTNERSHIP**  
**DEC 2017**

**CUTOVER**  
**AUG 19, 2018**



# Google & Etsy partnership





PARTNERSHIP  
DEC 2017

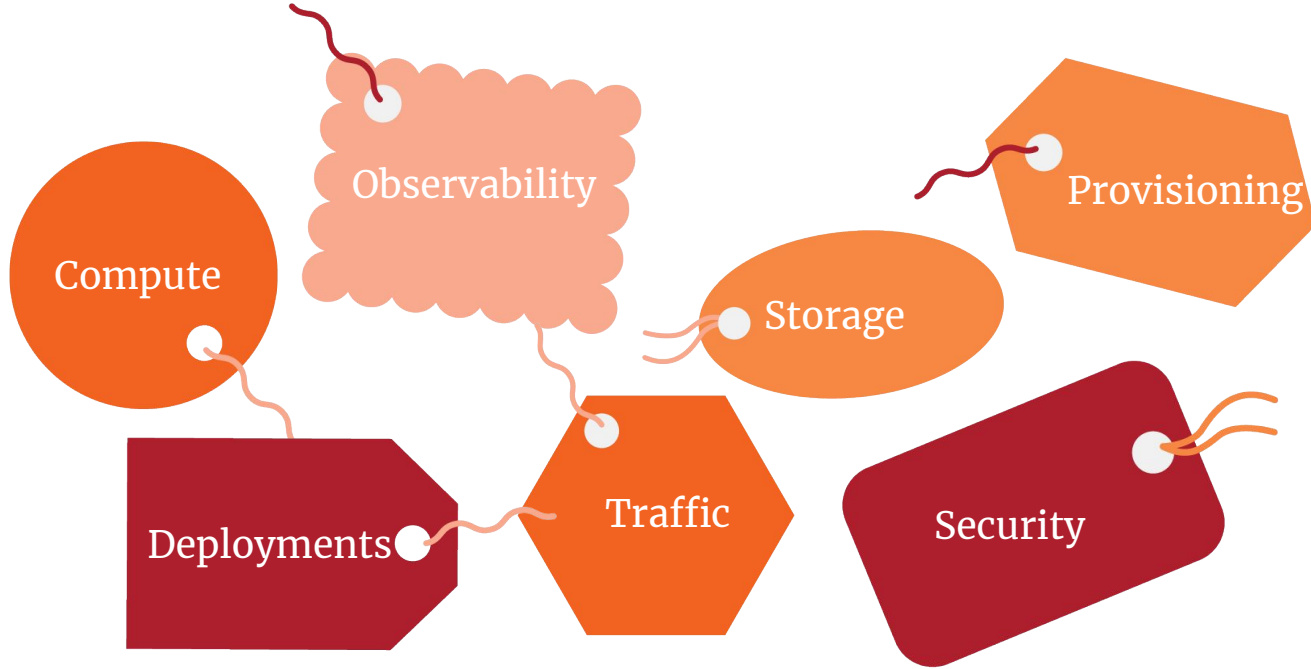


ETSY  
MIGRATION  
SQUAD  
JAN 2018

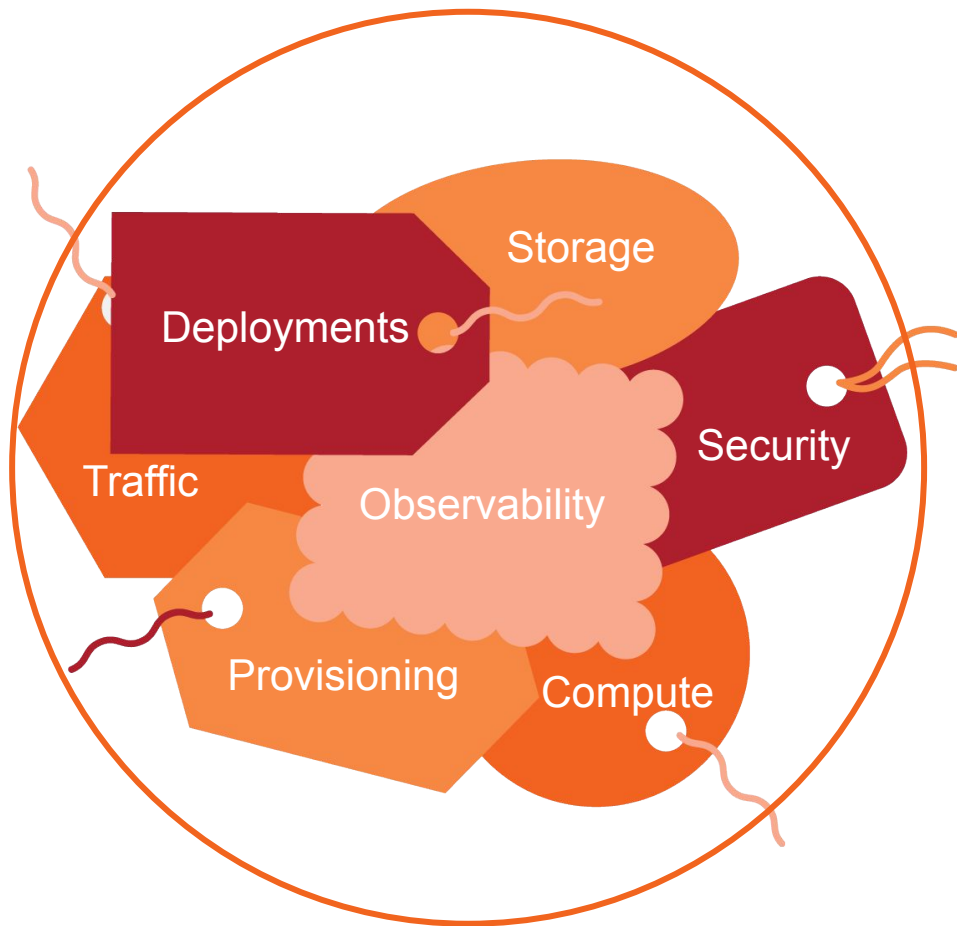


CUTOVER  
AUG 19, 2018





We created a migration squad





PARTNERSHIP  
DEC 2017



ETSY  
MIGRATION  
SQUAD  
JAN 2018



NEW TOOLS



CUTOVER  
AUG 19, 2018





01

No large architecture changes

02

Migrate the fewest systems needed

03

Stay compliant (SOX, PCI)

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Things we  
learned really  
quickly:

Infrastructure as  
code can be hard

Dependency  
tracking is hard

Performance? 🙄

A blue wooden sign with white text is hanging on a glass door. The sign has a distressed, weathered appearance. The text is arranged in three lines: 'Sorry' in a cursive font, 'WE'RE' in a simple sans-serif font, and 'CLOSED' in a large, bold, blocky sans-serif font. The background is a blurred interior space with warm lighting.

*Sorry*  
WE'RE  
**CLOSED**



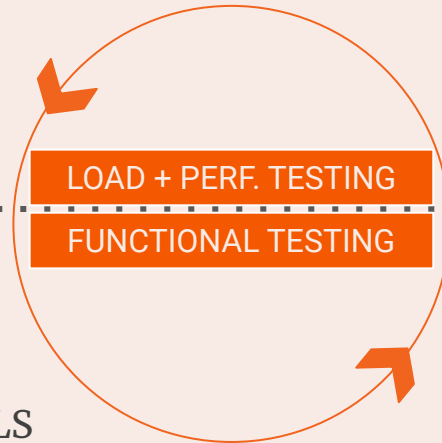
PARTNERSHIP  
DEC 2017



ETSY  
MIGRATION  
SQUAD  
JAN 2018



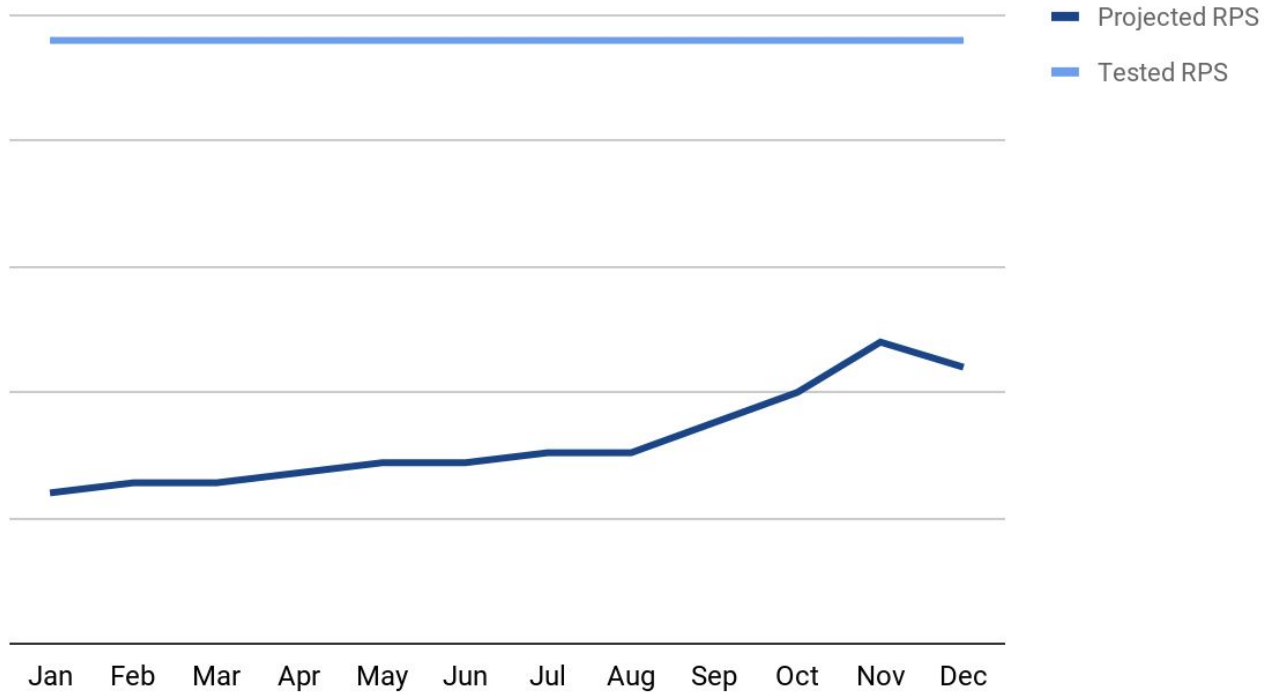
NEW TOOLS



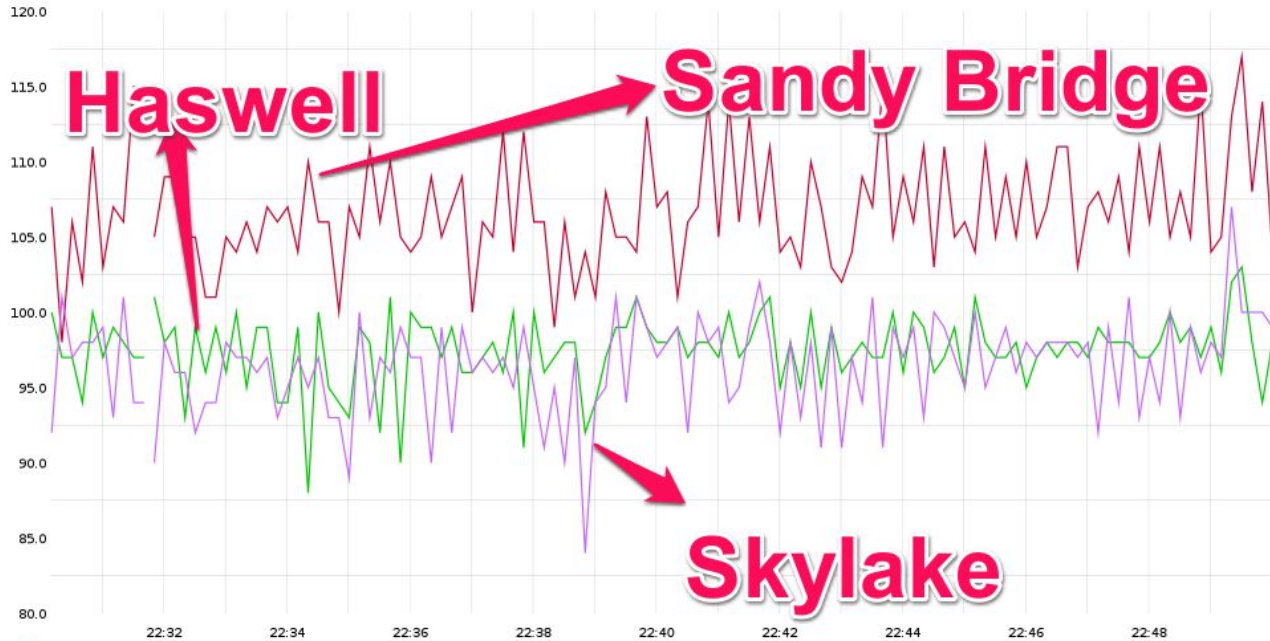
CUTOVER  
AUG 19, 2018



# Projected vs. simulated load

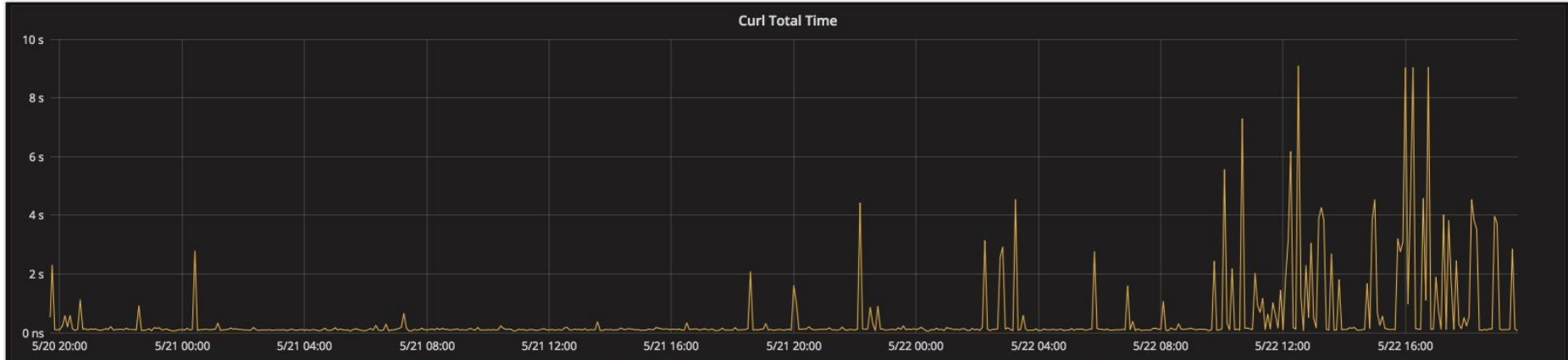


# CPU architecture matters



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99.99% may not be good enough



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# The unexpected cutover







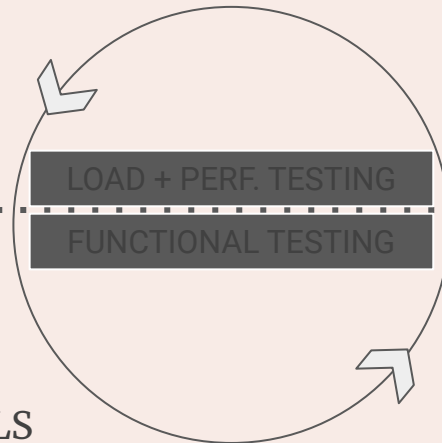
PARTNERSHIP  
DEC 2017



ETSY  
MIGRATION  
SQUAD  
JAN 2018



NEW TOOLS

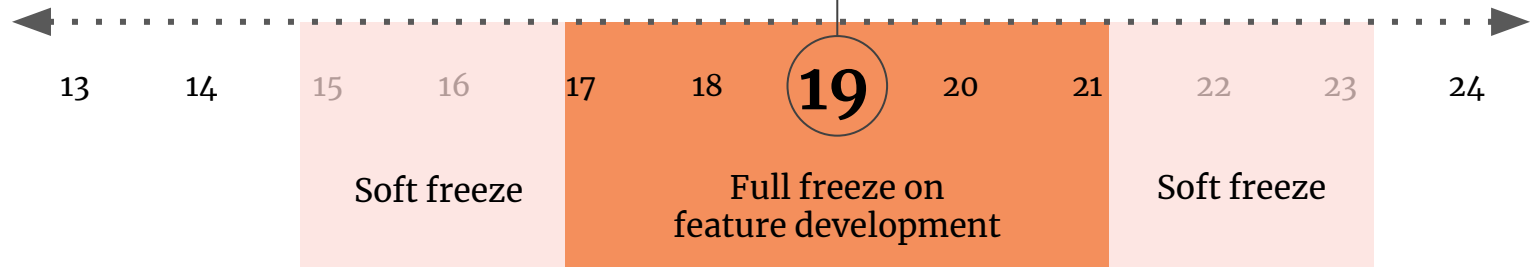


**CUTOVER**  
**AUG 19, 2018**



# AUGUST

Planned downtime  
for cutover  
3am - 7am ET



Heightened monitoring  
and on-call staffing

The background features a large, textured orange shape on the left side. To its right, there are two overlapping semi-circular shapes: a light blue one at the top and a dark blue one below it. The bottom right corner is white, with a dark blue shape partially visible on the right edge.

Cutover day:  
August 19, 2018

Cutover #1

Turn off  
Etsy.com  
in the data  
center

Validation  
+ testing

Ramp up on  
GCP

90

90

60

Roll  
Fwd  
Or  
Roll  
Back?

Turn off  
Etsy.com  
in the data  
center

90

Turn off  
Etsy.com  
in the data  
center

Validation +  
testing

90

90

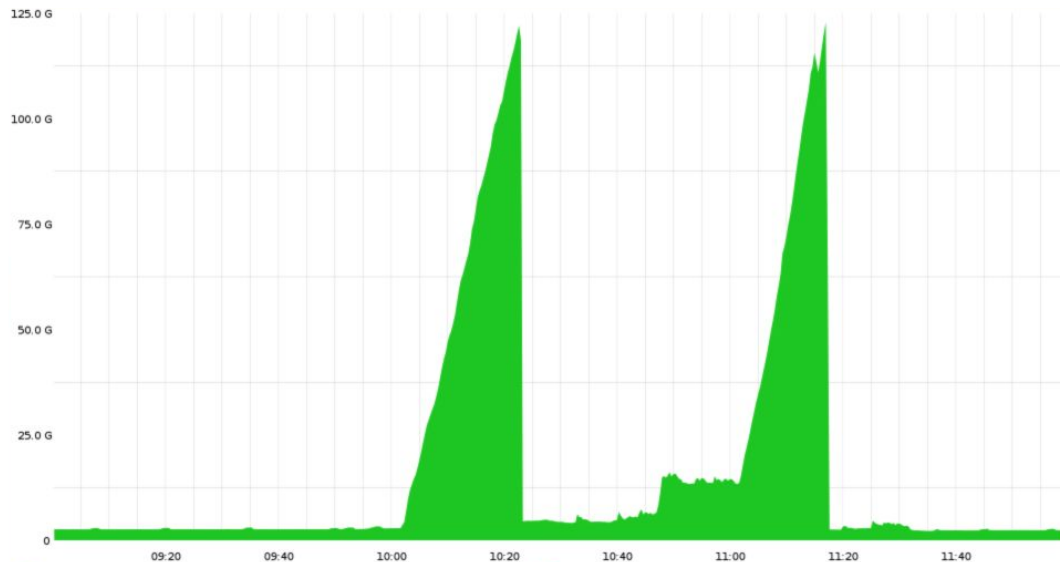
Turn off  
Etsy.com  
in the data  
center

Validation +  
testing

90

90

Out of memory!



Cutover #2

Turn off  
Etsy.com  
in the data  
center

90

Validation + testing

180

Ramp up on  
GCP

60

Roll  
Fwd  
Or  
Roll  
Back?



Turn off  
Etsy.com  
in the data  
center

90

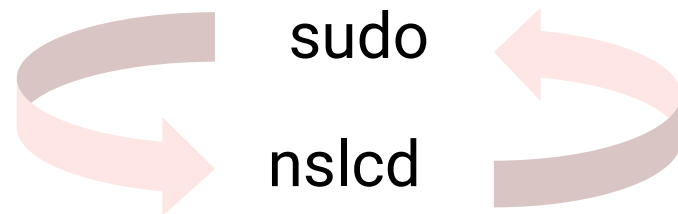
Turn off  
Etsy.com  
in the data  
center

Validation + testing

90

180

Too few threads!

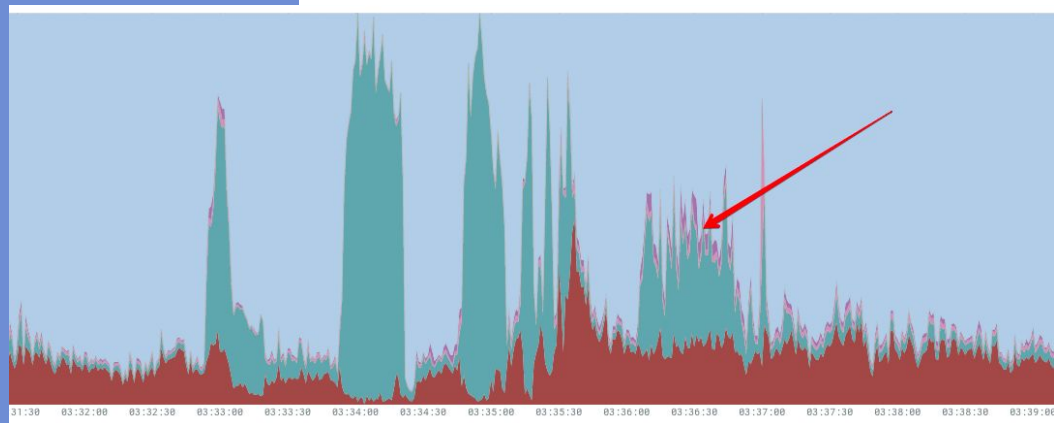


```
threads 60  
uid nslcd  
gid ldap
```

Turn off  
Etsy.com  
in the data  
center

Validation + testing

Too many threads!



90

180

Turn off  
Etsy.com  
in the data  
center

Validation + testing

Ramp up on  
GCP

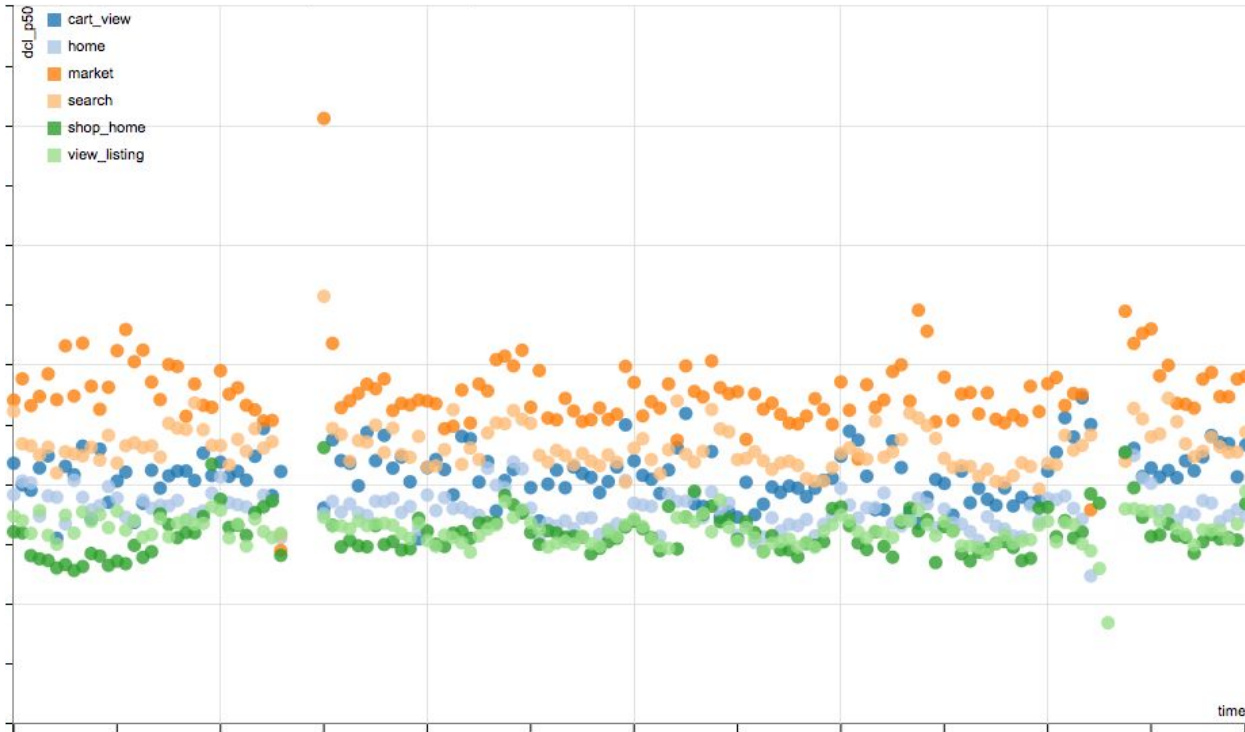
And  
we're  
live!

90

180

60

# Site performance was stable





**Roll Fwd  
Or  
Roll Back?**



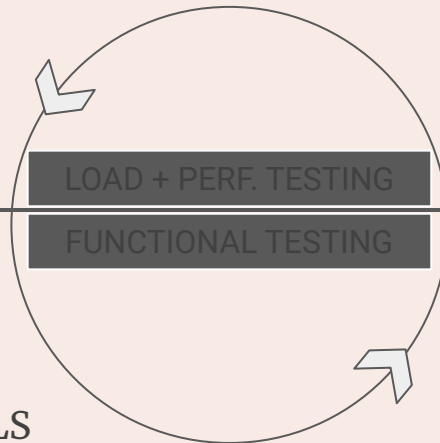
PARTNERSHIP  
DEC 2017



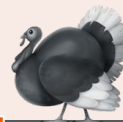
ETSY  
MIGRATION  
SQUAD  
JAN 2018



NEW TOOLS

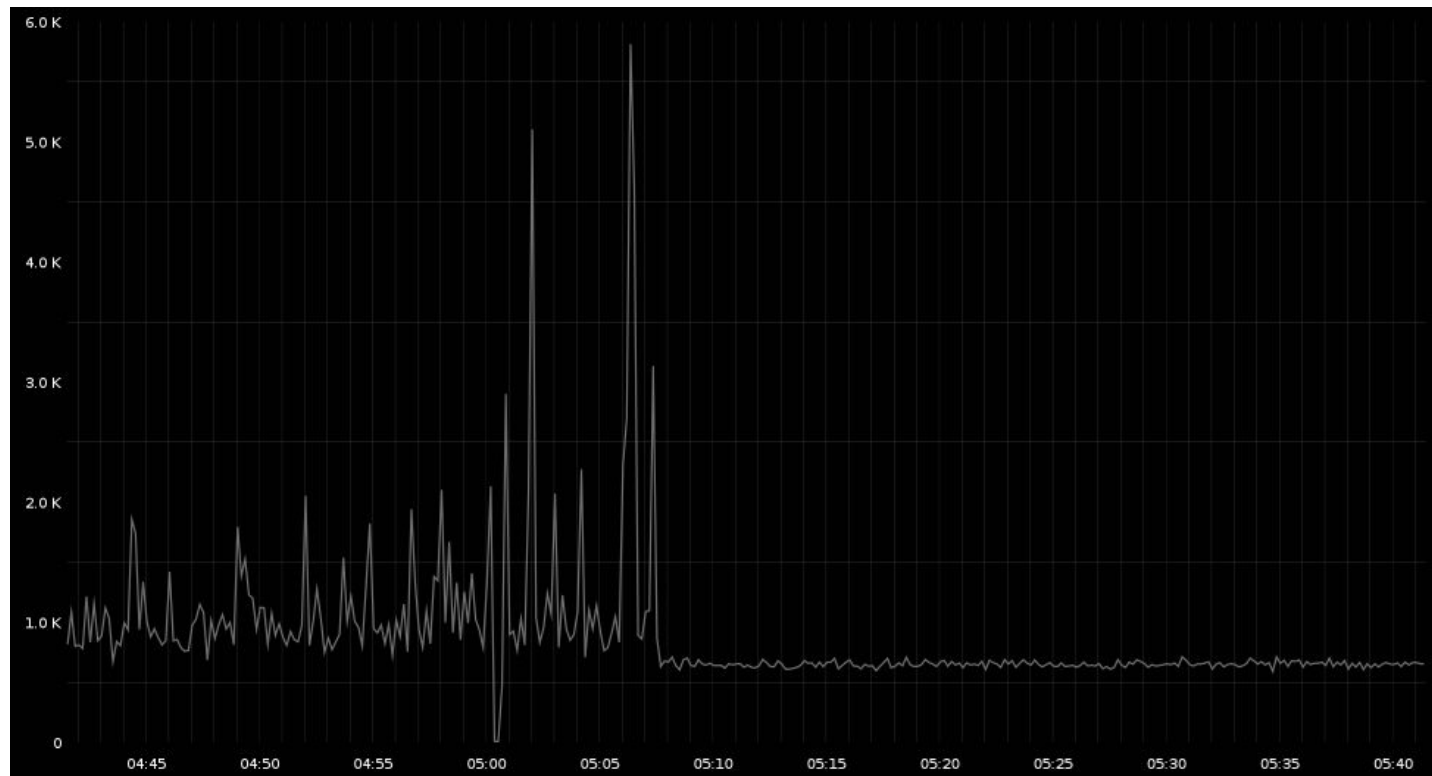


CUTOVER  
AUG 19, 2018



TUNING

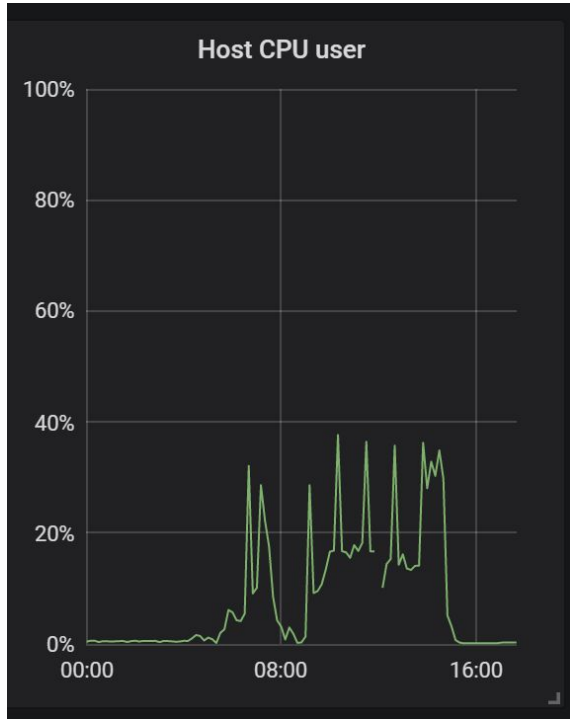
# Optimizing syscalls



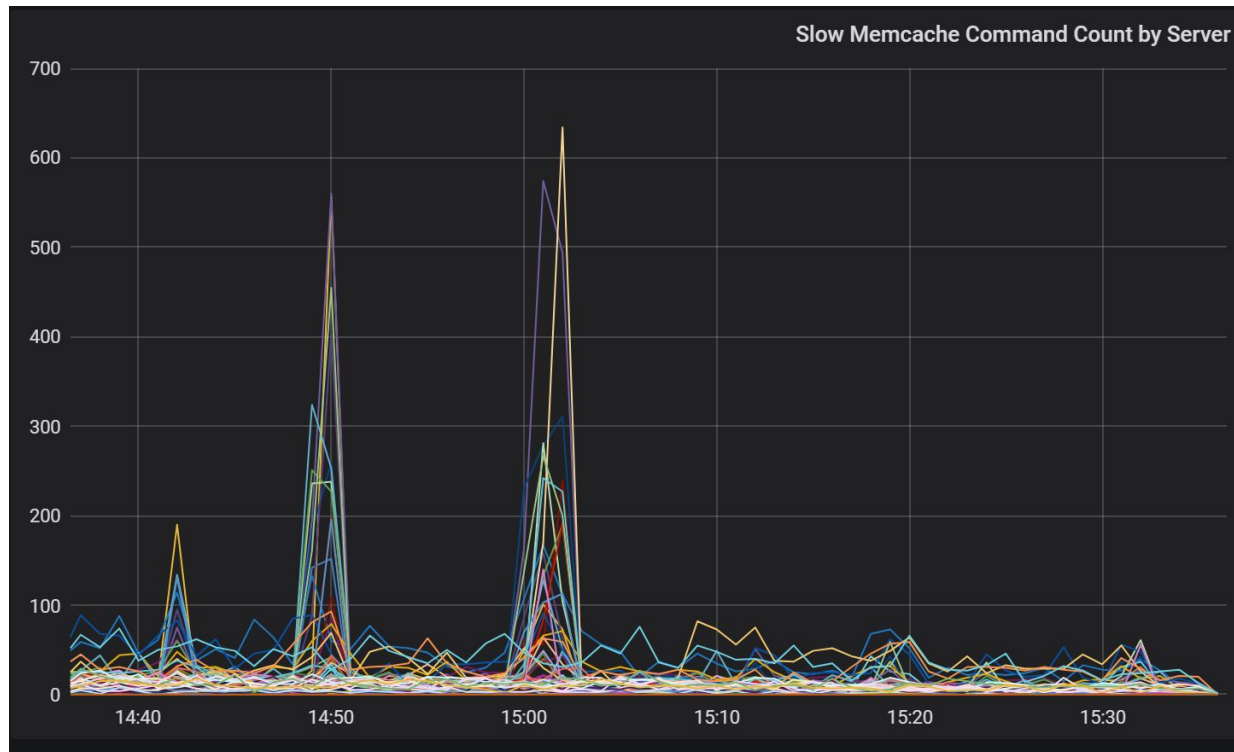


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# MySQL mutex contention surprise



# Network performance surprise





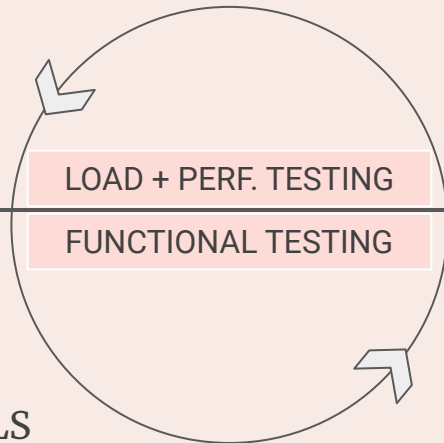
PARTNERSHIP  
DEC 2017



ETSY  
MIGRATION  
SQUAD  
JAN 2018



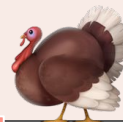
NEW TOOLS



LOAD + PERF. TESTING

FUNCTIONAL TESTING

CUTOVER  
AUG 19, 2018



TUNING



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7+ months



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# Live migrations



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“Infinite  
capacity”



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Long lived  
flows



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# Upcoming challenges

- Situate better in the cloud
  - Tech-debt paydown
  - Cloud-native refactoring
  - Cost management
- Organizational structure
  - SRE





We are hiring!  
[etsy.com/careers](https://etsy.com/careers)

Thank you  
@keyurdg