

Building a PaaS at HubSpot

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A modern office interior with a warm, industrial aesthetic. In the foreground, there are two large, curved sofas with orange and white cushions. Behind them is a kitchen area with white cabinetry, a stainless steel refrigerator, and a tiled backsplash. The background features exposed brick walls, large windows, and wooden beams. A large, white, flower-shaped light fixture hangs from the ceiling.

Blogging
SEO
Social Media
CMS
Lead Management
Landing Pages
Calls-to-Action
Marketing Automation
Email
Analytics
CRM Sync

Over 100 engineers

Over 1,600 deployables

~300 daily deploys

**From `git push` to Production
in about 10 minutes**

**Engineers own the end-to-end
success of their products.**

**They make most tech decisions;
they wear the pagers.**

We don't have an "ops" team.

- 1. Develop locally**
- 2. Provision QA hardware**
- 3. Deploy via local Python script**
- 4. Provision PROD hardware**
- 5. Deploy via local Python script**
- ...**
- 6. Replace hardware at 4am**

**PaaS is all about
empowering engineers.**

**Give them good tools
and a solid foundation so they
can focus on what they do best.**



First Mesos cluster

Sept 2013

Abstracts away machines.

Promotes homogenous environment.

Ability to scale out specific processes.

Centralized service registry.

Singularity

Oct 2013

Web services
Background workers
Cron jobs
One-off tasks

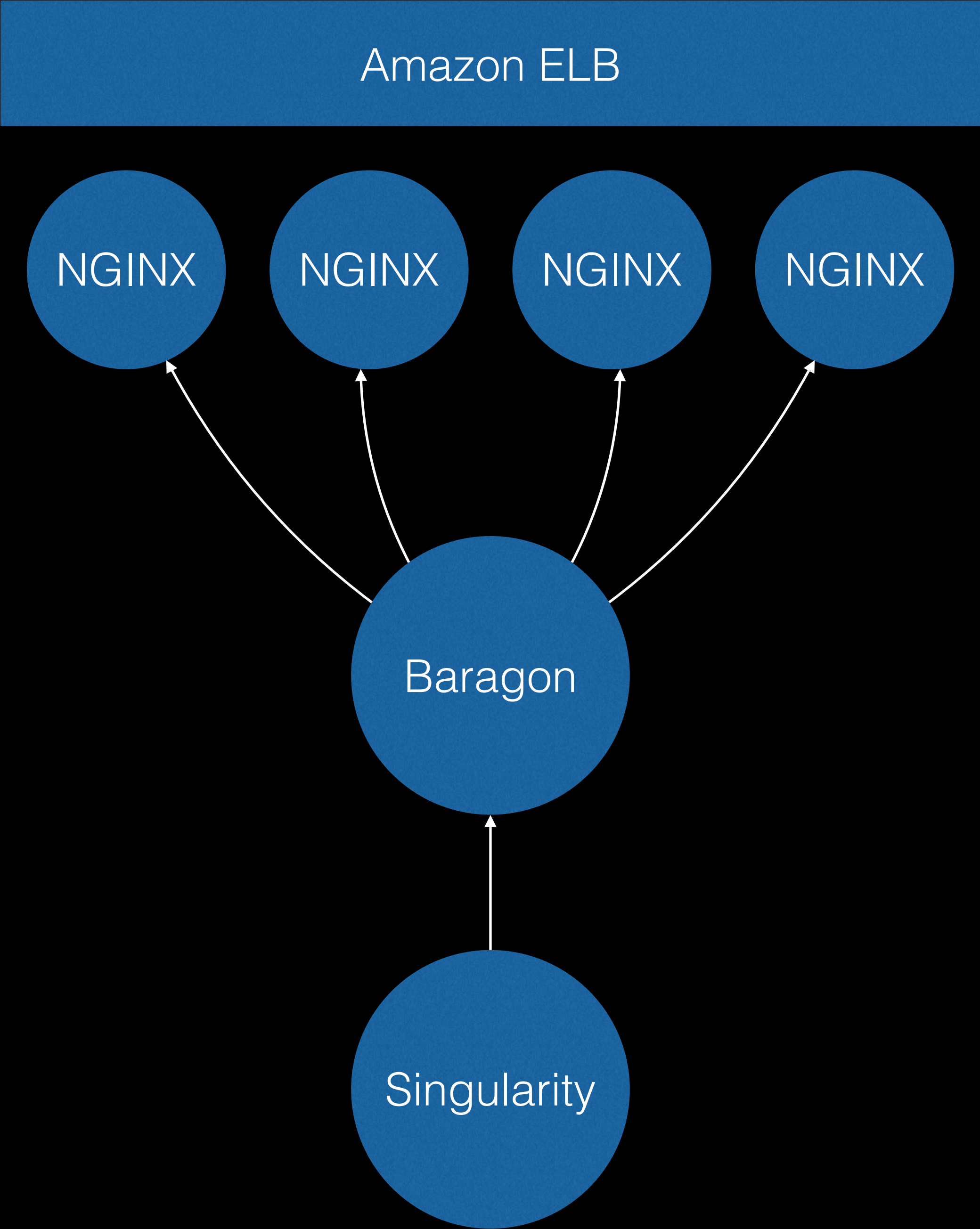
See something, take action

A close-up, low-angle shot of a dinosaur's head, likely a T-Rex, with its mouth open, showing sharp teeth and a yellow eye. The dinosaur is dark-colored with some lighter patches on its head and neck. The background is a clear blue sky.

Baragon

Load Balancer API

Nov 2013




A flock of geese is shown in flight against a clear, light blue sky. The geese are scattered across the frame, with some in the foreground and others further back. They are all captured in various stages of their wing strokes, moving generally from left to right. The text 'QA Migration' is overlaid in the center of the image.

QA Migration

Dec 2013 to June 2014

Migrate to Mesos QA #115

 **Merged** tpetr merged 2 commits into `master` from `mesos_qa` on Dec 13, 2013


 Conversation 2

 Commits 2

 Files changed 2



janky commented on Dec 9, 2013

Owner 

Hello! This PR migrates procfile projects in this repository over to Mesos QA.

What this does

1. Replaces the QA host(s) with `mesos`, which causes subsequent deploys to go to our default Mesos cluster.
2. Sets Java processes' `-Xmx` (max heap) to `${DEPLOY_MEM}`, which is an environment variable set to the amount of memory allocated.
3. If Java's max heap is set in production, the production `DEPLOY_MEM` env var will be set to this value.

Resources

Each service in Mesos will be allocated **1 instance with 1 CPU + 512 MB memory** by default. This probably seems small to you -- we're experimenting with running services on the leaner side. We're also not running multiple QA instances since HA isn't as much a priority in that environment, and Mesos will automatically restart/rebalance tasks when machines become impaired.

Environment Variables

x 1,600

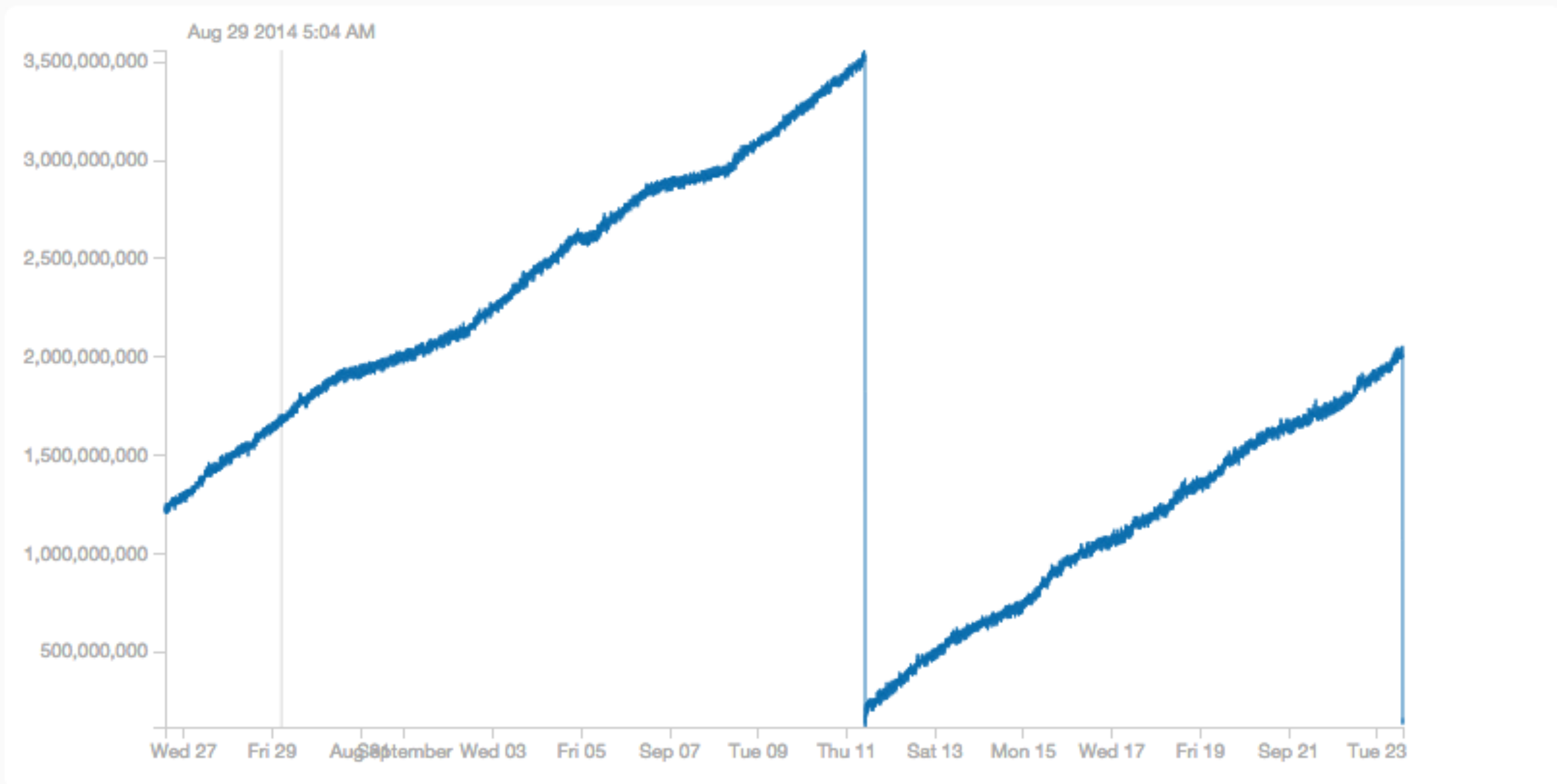
Local filesystem state

singleProcessRunning

Stationary hosts

Memory isolation

```
graph movingAverage(q("closedtsdb.monit.prod.stethoscope.web.baggledges.memory"), 5), from: '-4w'
```

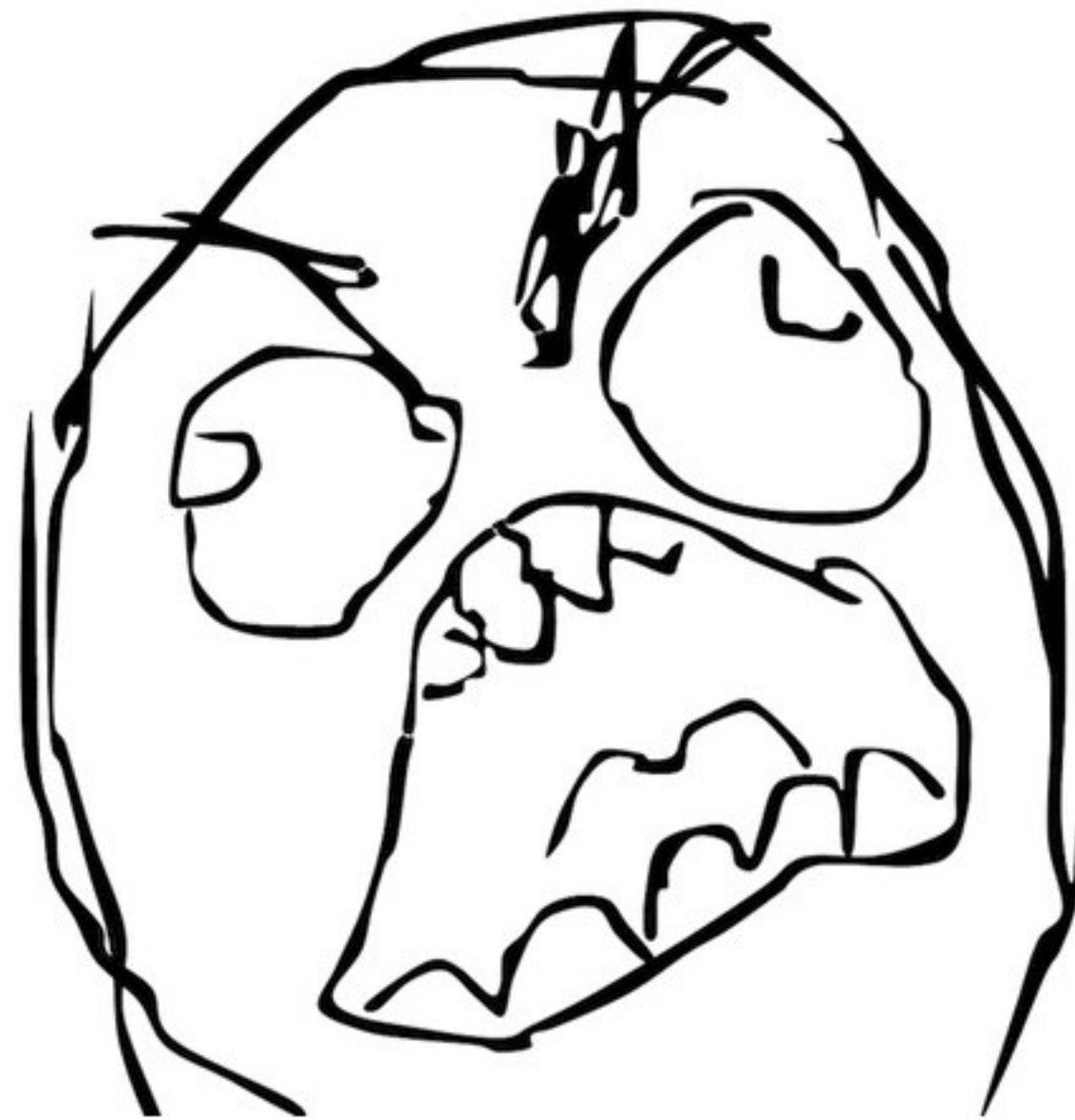


■ movingAverage(closedtsdb.monit.prod.stethoscope.web.baggledges.memory,5) 1689034752

Loaded in 1.3 s

Biggest fear: Inconsistency

***“My service will be the last to
move to Mesos PROD.”***



FFFFFFFF
FFFFFFFF
FFFFFF
FFUU
UUUU
UUUU
UUUU
UUUU
UUUU-

Singularity

Baragon

hubapi.com Agents

“Add host(s) to hubapi.com”

“Update config”

“Request XX is WAITING”

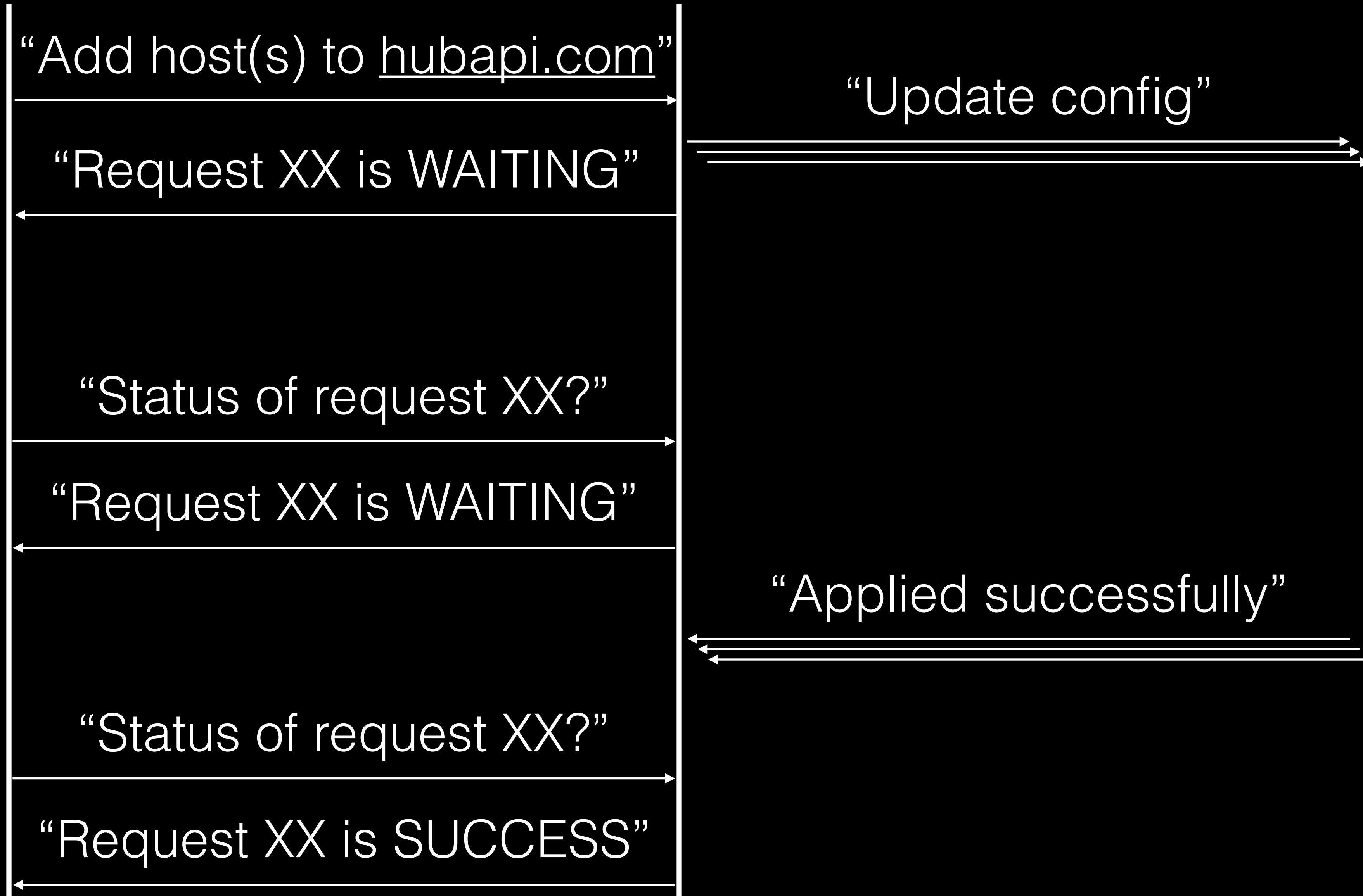
“Status of request XX?”

“Request XX is WAITING”

“Applied successfully”

“Status of request XX?”

“Request XX is SUCCESS”



PROD

QA

 **TEST** 

The image shows two identical, metallic, cylindrical volume knobs with a brushed metal finish and a central vertical slot. They are positioned on a brown, textured surface that resembles a book cover or a piece of wood. Above each knob, the words 'VOLUME I' and 'VOLUME II' are printed in a serif font. Below the knobs, there are numerical markings: '1', '6', '8', '10', and '11' for the left knob, and '1', '6', '8', '10', and '0' for the right knob. The text 'Rebranding with v2' is overlaid in the center in a bold, white, sans-serif font.

**Rebranding
with “v2”**

The background image is a dramatic, apocalyptic scene. It depicts a landscape engulfed in intense orange and yellow flames. Several tall, dark, charred tree trunks stand as sentinels against the fiery sky. In the foreground, the silhouettes of several figures, possibly monks or pilgrims, are visible as they walk across a dark, ashy ground towards the burning horizon. The overall mood is one of devastation and urgency.

The Amazon Rebootpocalypse

Sept 2014

A large flock of Canada geese is captured in flight against a clear blue sky. The geese are seen from below, showing their white underbellies and dark wings. They are flying in various directions, with some in the foreground and others further away, creating a sense of depth and movement. The text 'PROD Migration' is overlaid in the center of the image.

PROD Migration

Feb 2015

Migrate the majority of production services into mesos

#339

 Closed

wsorenson opened this issue on Sep 4, 2014 · 1 comment



wsorenson commented on Sep 4, 2014

Owner



- Make mesos the default for new production services, providing the same increase in developer productivity as people get in QA



wsorenson added the **Big Wins** label on Sep 4, 2014

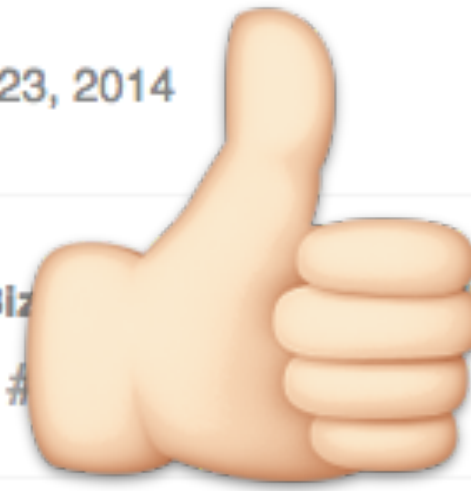


tpetr self-assigned this on Dec 23, 2014



janky referenced this issue in Biz

Update prod to use mesos #



Merged



janky referenced this issue in HubSpotProtected/Mothra on Jan 30

Migrate to Mesos Prod #25

Merged



janky referenced this issue in HubSpotProtected/Login on Jan 30

Migrate to Mesos Prod #116

Merged



janky referenced this issue in HubSpotProtected/Portals on Jan 30

Migrate to Mesos Prod #72

Merged



janky referenced this issue in HubSpotProtected/SkyNet on Jan 30

Migrate to Mesos Prod #14

Merged



janky referenced this issue in HubSpotProtected/HubAuth on Jan 30

“But does this all work?”

**Yes, it powers the
HubSpot product.**

(and other companies too!)

A dramatic photograph of a Space Shuttle launching, with a massive plume of orange and white smoke and fire at the base. The shuttle is ascending vertically against a clear blue sky. The launch pad service structure is visible on the left side of the frame.

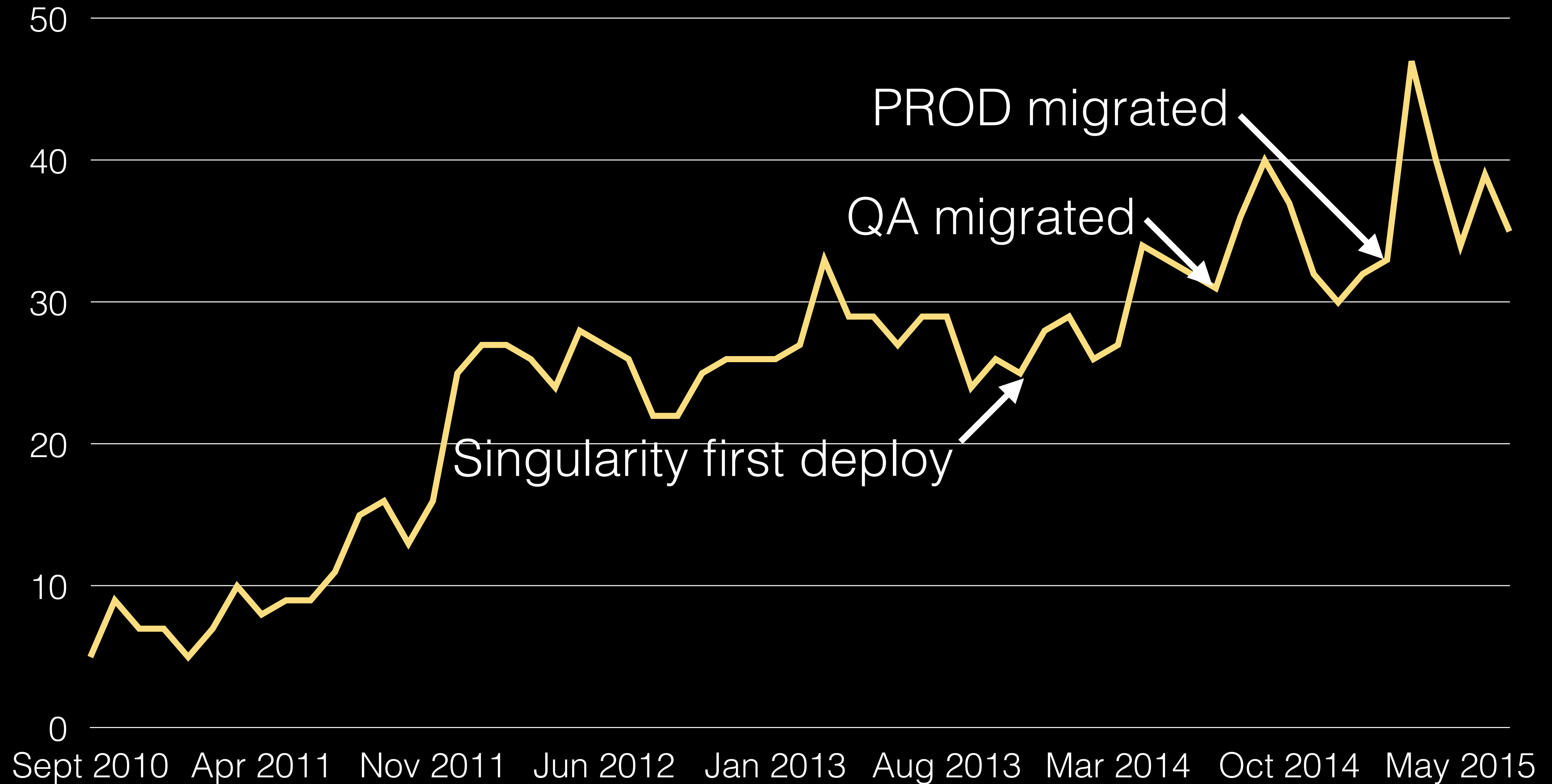
8,000,000

tasks launched in 2015

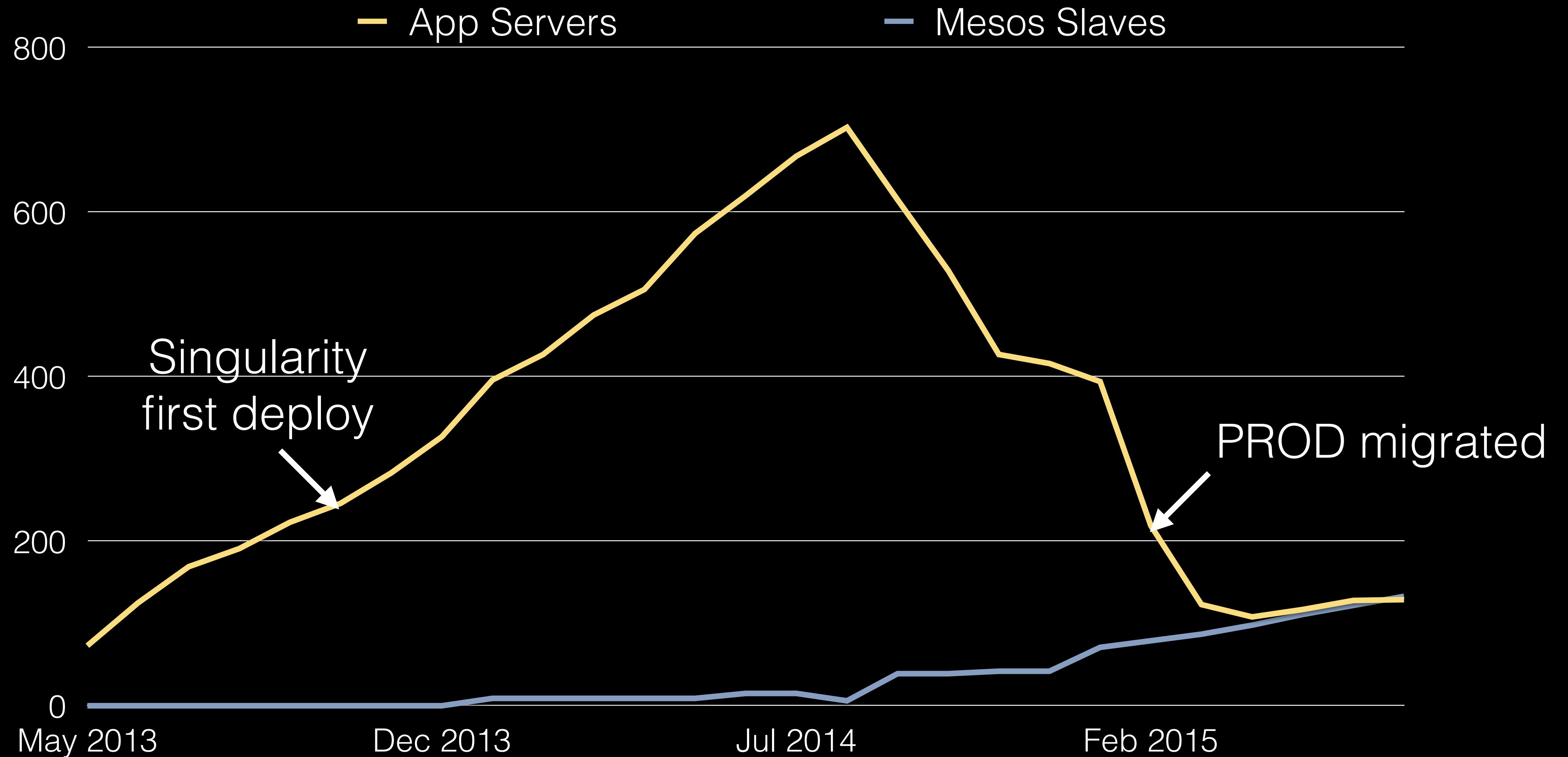
A close-up photograph of a baby with light brown hair and blue eyes, looking slightly to the side with a grumpy or pouting expression. The baby is wearing a green and white long-sleeved shirt. The background is a blurred beach scene with sand and a hazy horizon. Overlaid on the image is white text with a black outline.

**No critical situations
caused by infrastructure.**

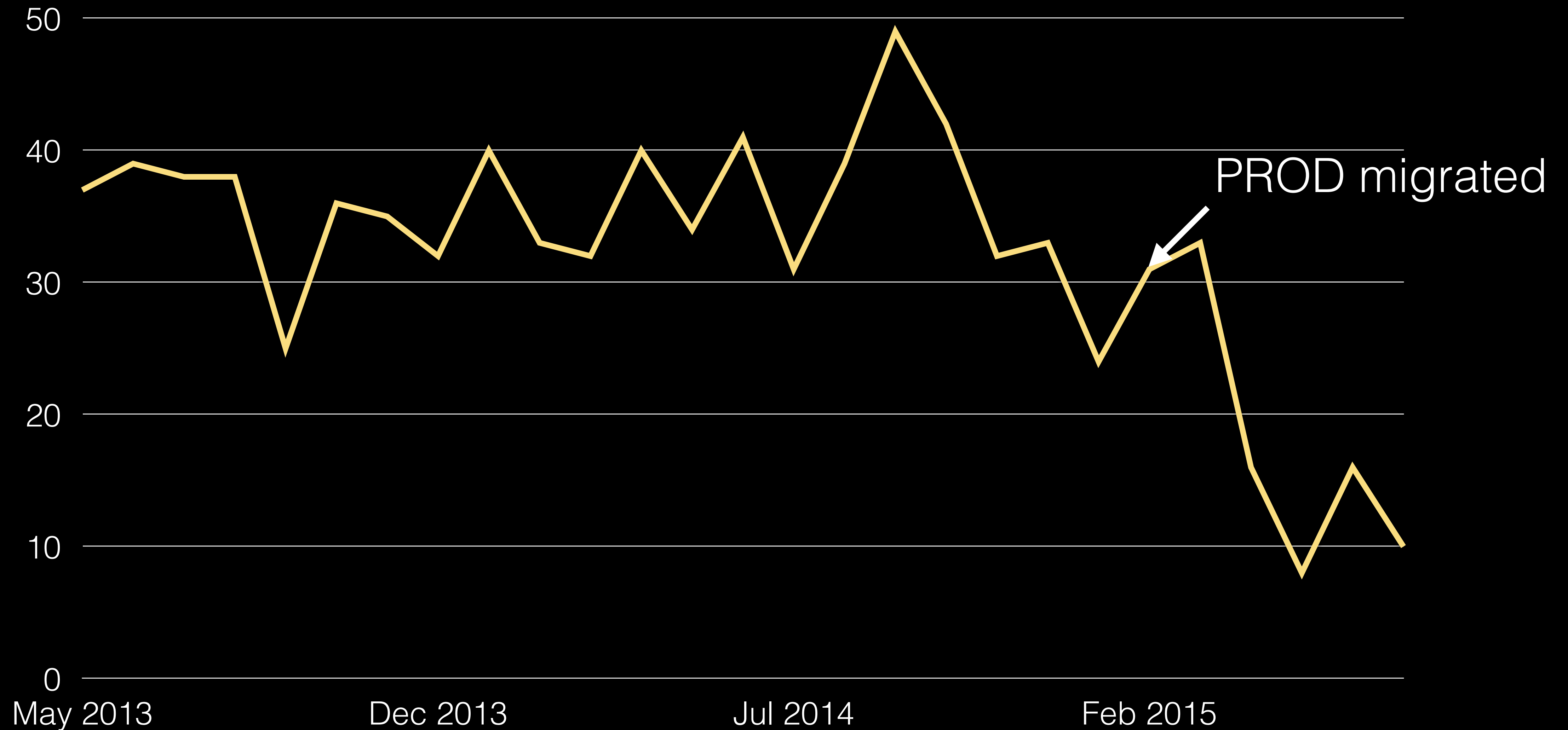
Avg PROD deploys / user



PROD Machines



Rainmaker Users





Ghidorah

Mesos-based Load Balancers

Jan 2015

**NGINX + Baragon Agent
in a Docker image**

Managed by Singularity

**Absorbed 40 standalone
instances in QA**



Blazar

A Modern Build System

July 2015

GitHub Webhooks

Singularity

Heroku-like buildpacks

TL;DR

**We run our product on Mesos,
and you should too.**

**We had to invest
in a custom scheduler
because we started early.**

**There are many
good options now.**



Stand on the shoulders of giants!

Try Singularity today.

github.com/HubSpot/Singularity