# 10 deploys per day

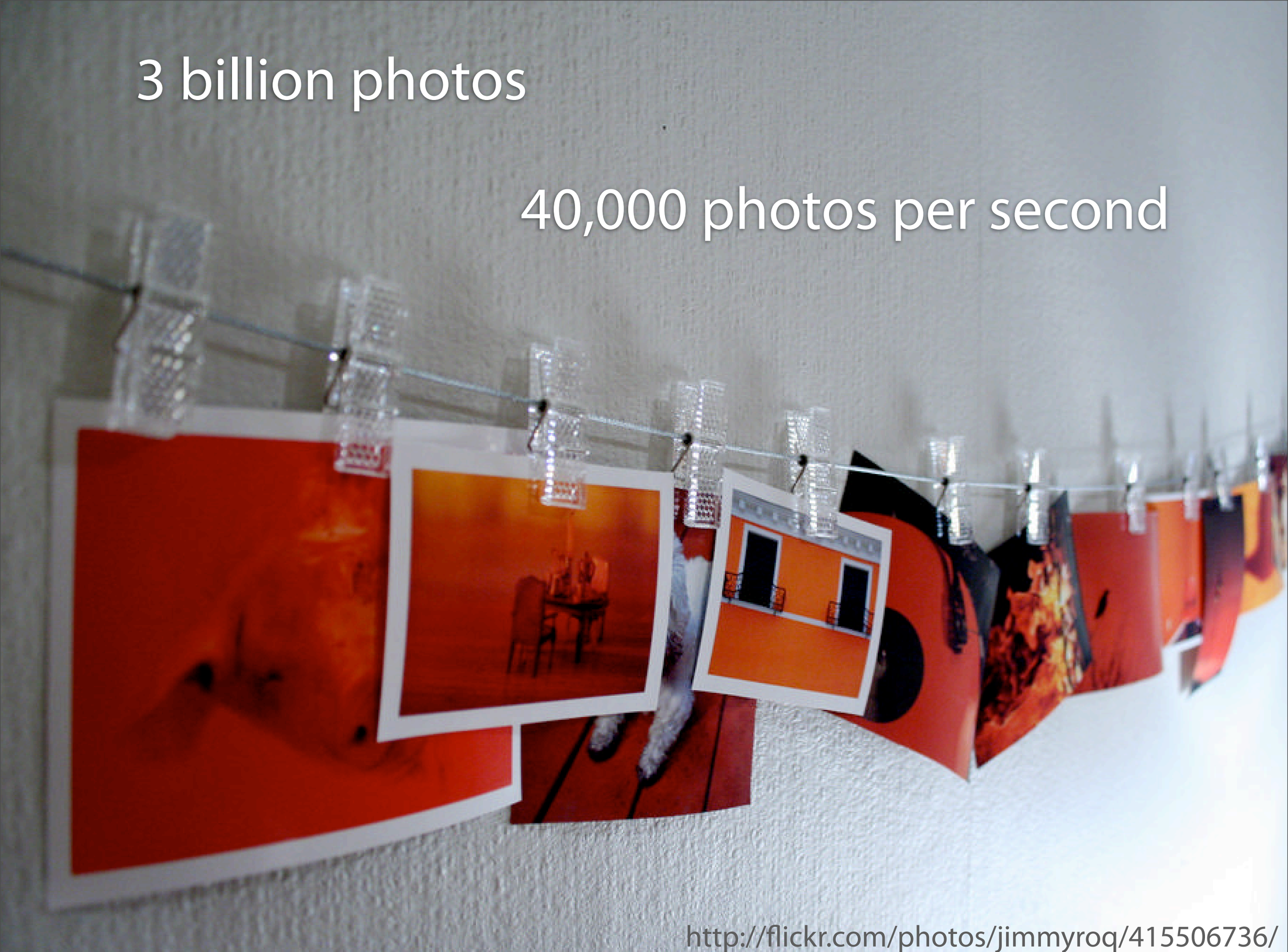
Dev & ops cooperation at Flickr

John Allspaw & Paul Hammond

Velocity 2009

3 billion photos

40,000 photos per second

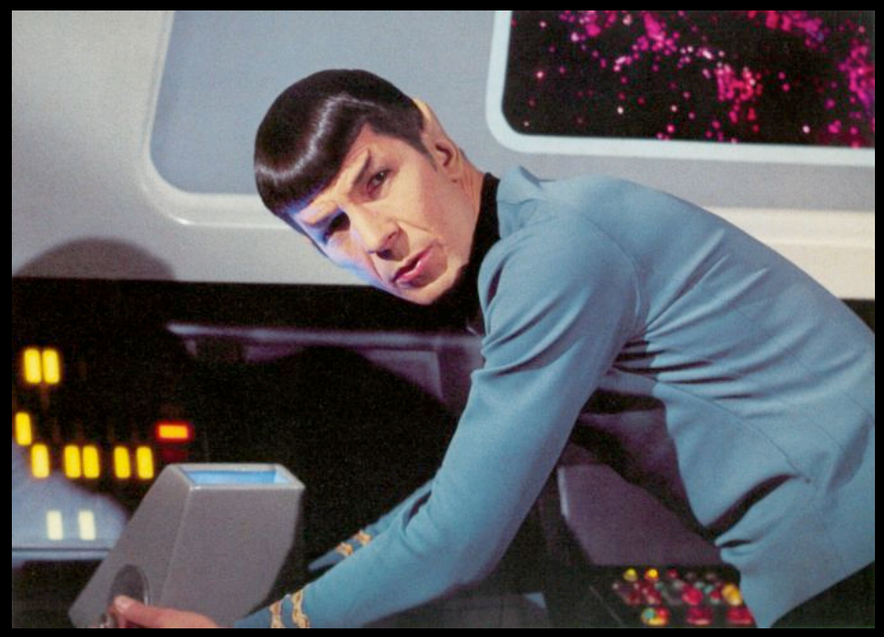


http://flickr.com/photos/jimmyroq/415506736/

# Dev versus Ops

“It’s not my machines, it’s your code!”

“It’s not my code,
it’s your machines!”

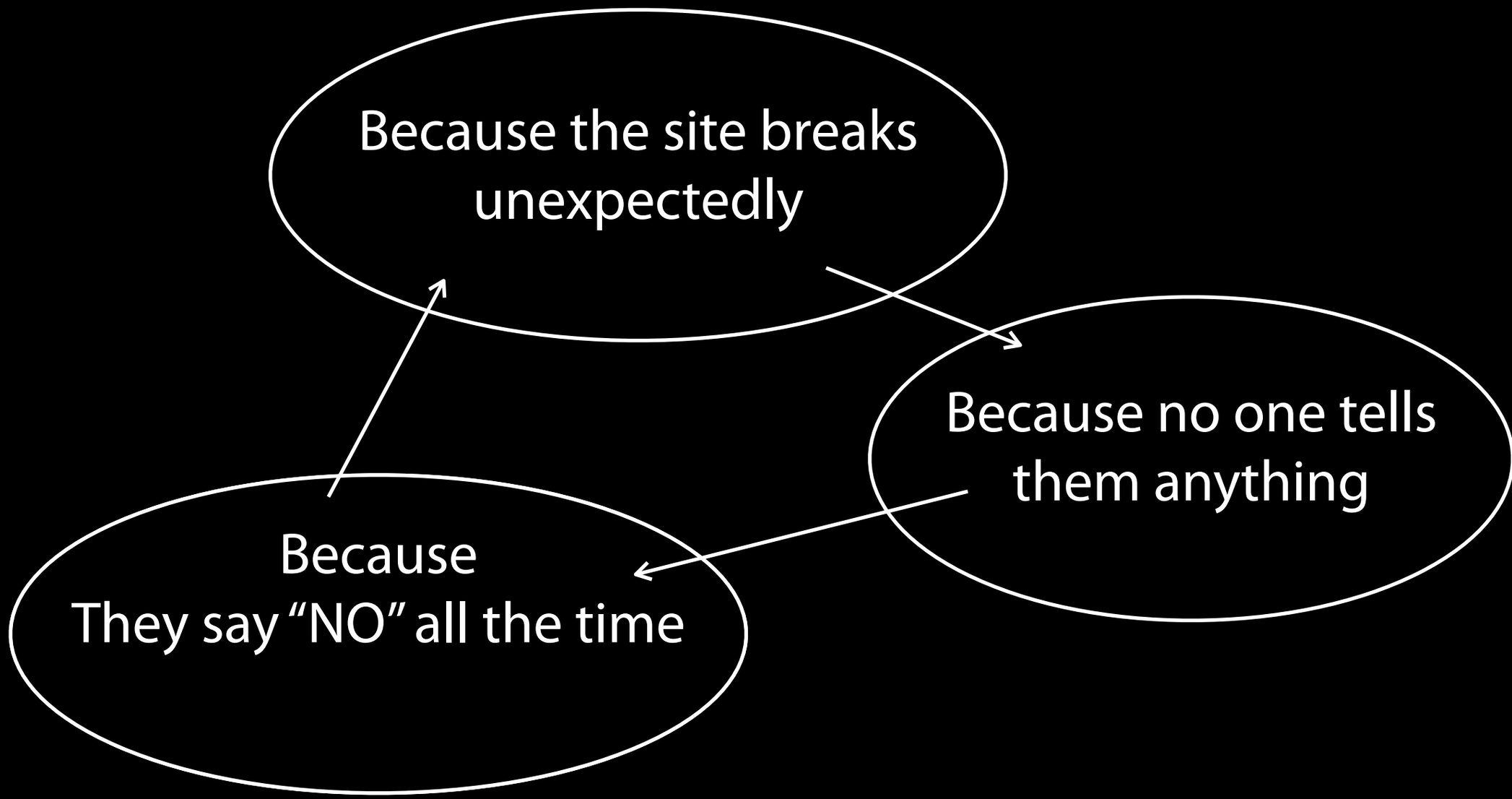


Little bit weird
Sits closer to the boss
Thinks too hard

Pulls levers & turns knobs
Easily excited
Yells a lot in emergencies


Says “No” all the time
Afraid that new fangled things will break the site
Fingerpointy

# Ops stereotype



http://www.flickr.com/photos/stewart/461099066/

# Traditional thinking

Dev's job is to add new features
Ops' job is to keep the site stable and fast

Ops' job is NOT to keep the site stable and fast

Ops' job is to enable the business

(this is dev's job too)

The business requires change

But change is the root cause of most outages!

Discourage change in the interests of stability

or

Allow change to happen as often as it needs to

Lowering risk of change
through tools and culture

Dev and Ops

Ops who think like devs

Devs who think like ops

“But that’s me!”

You can always think more like them

# Tools

# 1. Automated infrastructure

If there is only one thing you do…

Chef

CFengine

BCfg2

FAI

# 1. Automated infrastructure

If there is only one thing you do…

System Imager

Puppet

Cobbler

Role &
configuration
management

OS imaging

# 2. Shared version control


Everyone knows where to look
http://www.flickr.com/photos/thunderchild5/1330744559/

# 3. One step build

# Staging

### Last SVN-triggered precompile of the templates

```
Recompile started at 20:43:45 on 2009-06-19
saving prev version..ok (3 ms)
exporting svn........ok (3202 ms)
changing paths.......ok (1 ms)
grabbing old files...ok (6 ms)
creating folders.....ok (317 ms)
compiling config.....
        host: stage-local
        colo: mud
        prod: 1
....................ok (349 ms)
precompiling.........ok (29.816 sec)
sync strings.........
        added: 14
        deleted: 1
....................ok (16.065 sec)
cleaning up..........ok
```

Last Stage:

```
checking precompile..ok
exporting svn........ok (6.034 sec)
fetching versions....ok (4225 ms)
changing paths.......ok (2 ms)
creating folders.....ok (0 ms)
grabbing snapshot....ok (16489 ms)
baking help form.....ok (2776 ms)
baking autosuggest...ok (298 ms)
fetching generated...ok (6 ms)
push to staging......ok (8525 ms)
asset foldup.........ok (280 ms)
rewriting CSS paths..ok (2745 ms)
baking output.js.....ok (672 ms)
calcing js md5s......ok (210 ms)

Completed in 42.911 sec
```

Perform Staging

If the staging version looks wonky, you can ask the Magi-cal Pixie to recompile all the templates.

Oh Magi-cal Pixie, Make Everything New

# 3. One step build and deploy

# Deploy Log

Before staging or deploying anything that might block deploy, you must check and update the deploy log.

```
[2009-06-18 13:12:13] [mygrant] DEPLOY OK
[2009-06-18 13:08:15] [mygrant] site staged
[2009-06-18 13:05:25] [mygrant] NO DEPLOY PLEASE
[2009-06-18 11:29:23] [aaron] site staged
[2009-06-18 11:19:26] [harmes] site deployed (changes...)
[2009-06-18 11:16:44] [harmes] starting deploy...
[2009-06-18 11:15:15] [harmes] site staged
[2009-06-18 10:20:26] [harmes] site deployed (changes...)
[2009-06-18 10:15:00] [harmes] starting deploy...
[2009-06-18 10:11:16] [harmes] site staged
```

[ph] Add

---

# Deployment

When the staging version is ready, click the button below.

WARNING: This sync's the staging version to the live servers. In theory this is what will change, but you might want to test it maybe?

Last deploy:

```
pulling site from staging host...ok (10.096 sec)
syncing to ramdisk in mud.....ok (5.992 sec)
syncing to ramdisk in re2.....ok (7.443 sec)
stage 1.......................ok (25.322 sec)
stage 2.......................ok (42.108 sec)
stage 3.......................ok (45.952 sec)

Completed in 2 min, 16 sec
```

I'm Feeling Lucky

# Deployment

When the staging version is ready, click the button below.

WARNING: This sync's the staging version to the live servers. In theory this is what will change, but you might want to test it maybe?

Active Deploy:

```
pulling site from staging host...ok (4636 ms)
syncing to ramdisk in mud........ok (6.049 sec)
syncing to ramdisk in re2........ok (7.349 sec)
stage 1..........................ok (50.25 sec)
stage 2..........................ok (1 min, 37 sec)
stage 3..........................
```

Phase 1

Phase 2

Phase 3

Waiting for 151 hosts
Running for 2 minutes & 58 seconds

I'm Feeling Lucky

[2009-06-22 16:03:57] [harmes] site deployed (changes...)

# Who? When? What?

Hudson

search | ph | logout

Hudson » tools_statsd

ENABLE AUTO REFRESH

- Back to Dashboard
- **Status**
- Changes
- Workspace
- Build Now
- Delete Project
- Configure
- Subversion Polling Log

**Build History** (trend)

- #31 Jun 3, 2009 3:06:12 PM
- #30 Jun 2, 2009 7:03:12 PM
- #29 Jun 2, 2009 7:00:13 PM
- #28 Jun 2, 2009 6:59:13 PM
- #27 Jun 2, 2009 6:51:12 PM
- #26 Jun 2, 2009 6:50:12 PM
- #25 Jun 2, 2009 6:09:12 PM
- #24 Jun 2, 2009 6:07:12 PM
- #23 Jun 2, 2009 5:57:12 PM
- #22 May 29, 2009 5:58:12 PM
- #21 May 29, 2009 4:41:12 PM
- #20 May 29, 2009 2:15:12 PM

# Project tools_statsd

add description

Workspace

Last Successful Artifacts

- flickr_statsd-20090603.1244066774.T51204.tgz

Recent Changes

## Permalinks

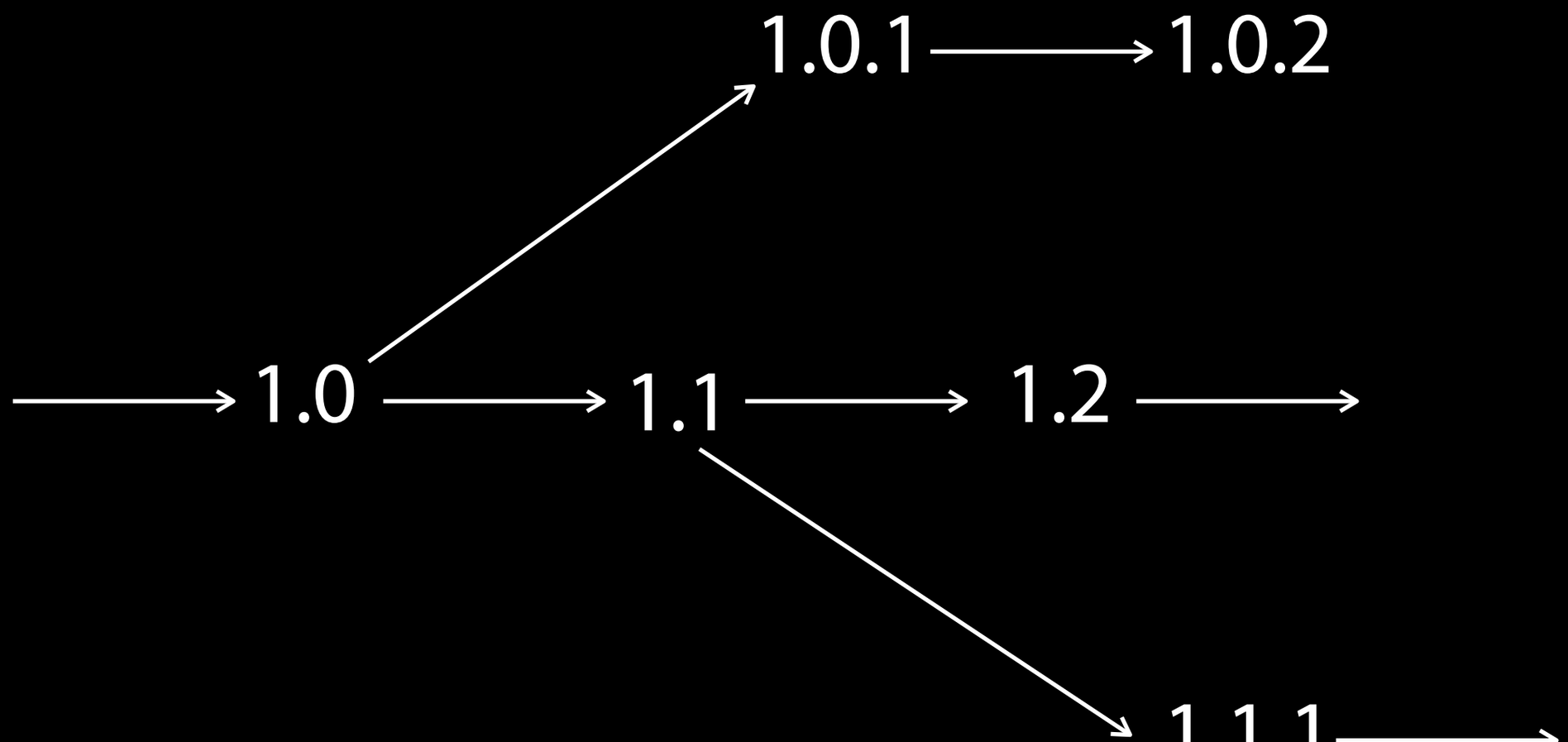
- Last build (#31), 19 days ago
- Last stable build (#31), 19 days ago
- Last successful build (#31), 19 days ago
- Last failed build (#10), 1 mo 5 days ago

# Small frequent changes

http://www.flickr.com/photos/mauren/2429240906/

# 4. Feature flags

(aka branching in code)




# Desktop software


# Web software

http://www.flickr.com/photos/8720628@N04/2188922076/

# Always ship trunk


Everyone knows exactly where to look
http://www.flickr.com/photos/thunderchild5/1330744559/

# Feature flags

```
#php
if ($cfg['enable_feature_video']){
    …
}
```

```
{* smarty *}
{if $cfg.enable_feature_beehive}
    …
{/if}
```

http://www.flickr.com/photos/healthserviceglasses/3522809727/

# Private betas

# Bucket testing

http://www.flickr.com/photos/davidw/2063575447/

http://www.flickr.com/photos/jking89/3031204314/

# Dark launches


# Free contingency switches

http://www.flickr.com/photos/flattop341/260207875/

# 5. Shared metrics

flickr

**Cluster Report for Fri, 19 Jun 2009 05:43:28 +0000** Last Site Deploy: Fri, 19 Jun 2009 04:59:15 +0000 Get Fresh Data

**Metric** load_one **Last** hour **Sorted** descending Physical View

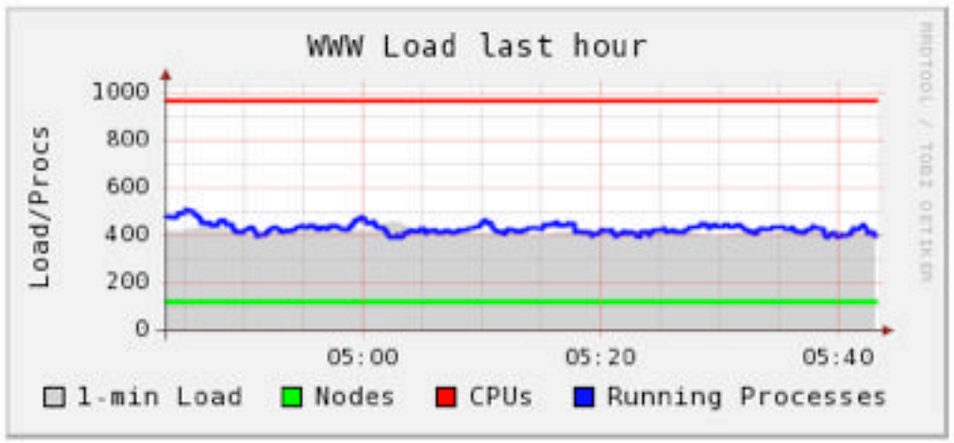
Flickr MUD Grid > WWW > --Choose a Node

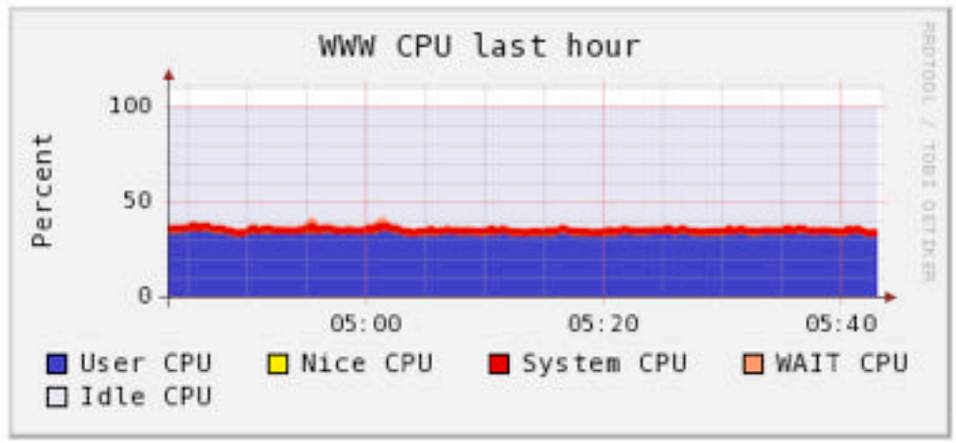
custom graph

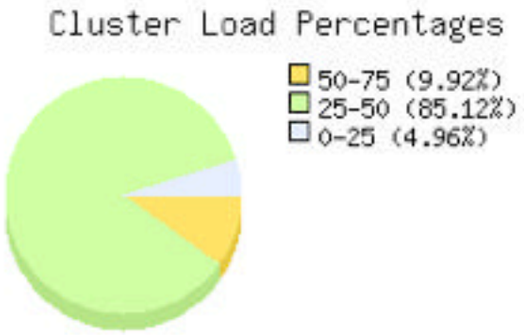
## Overview of WWW

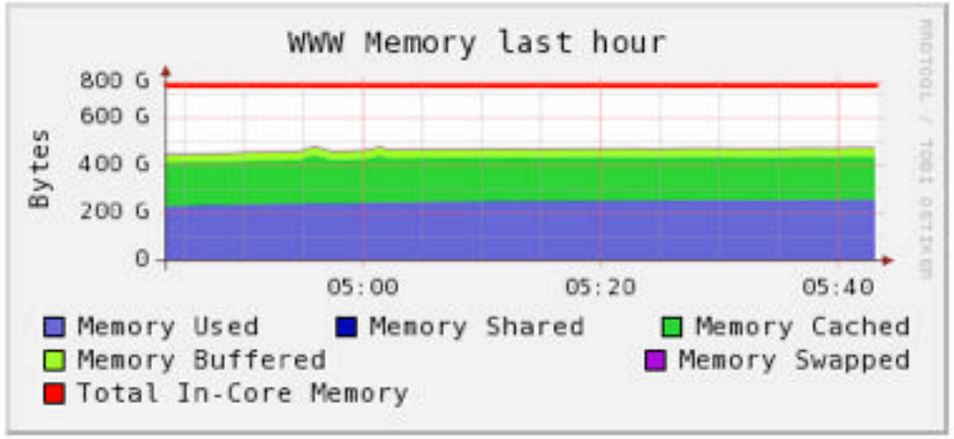
CPUs Total:
Hosts up:
Hosts down:

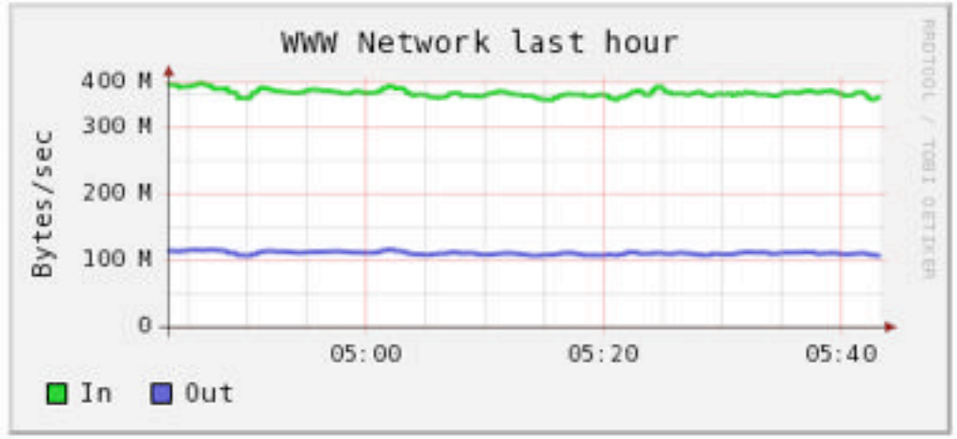
Avg Load (15, 5, 1m):
**41%, 42%, 41%**
Localtime:
**2009-06-19 05:43**



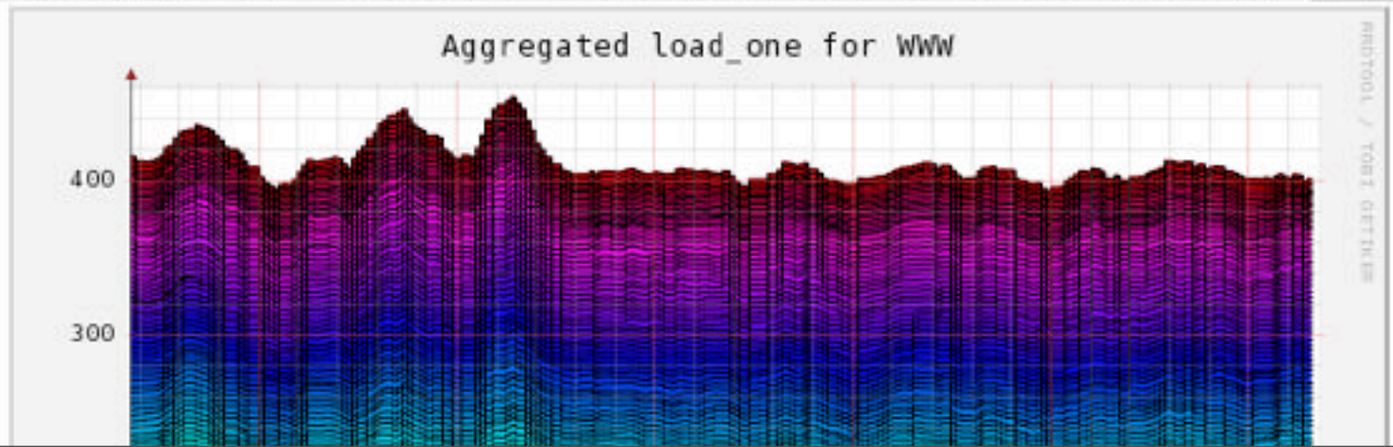



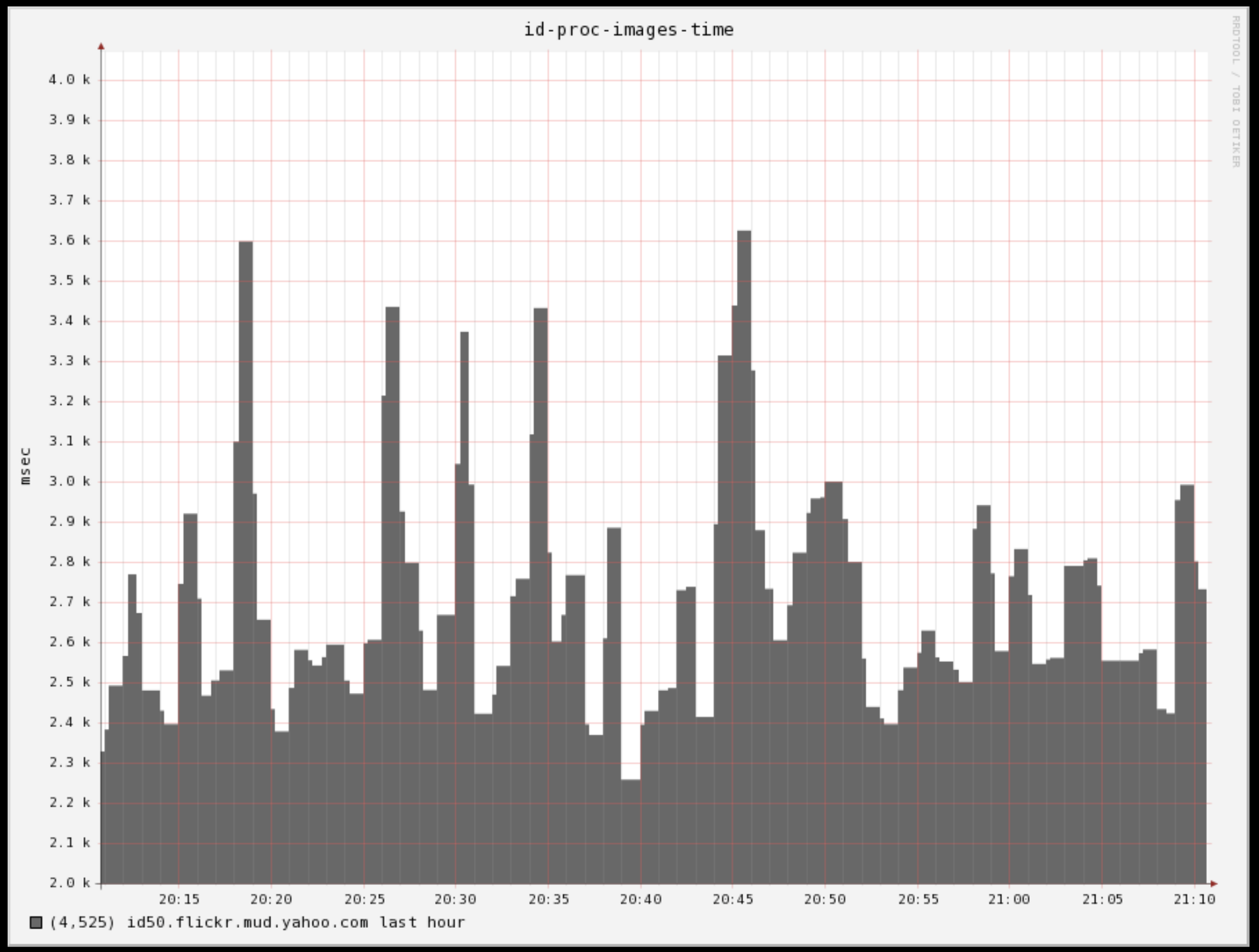



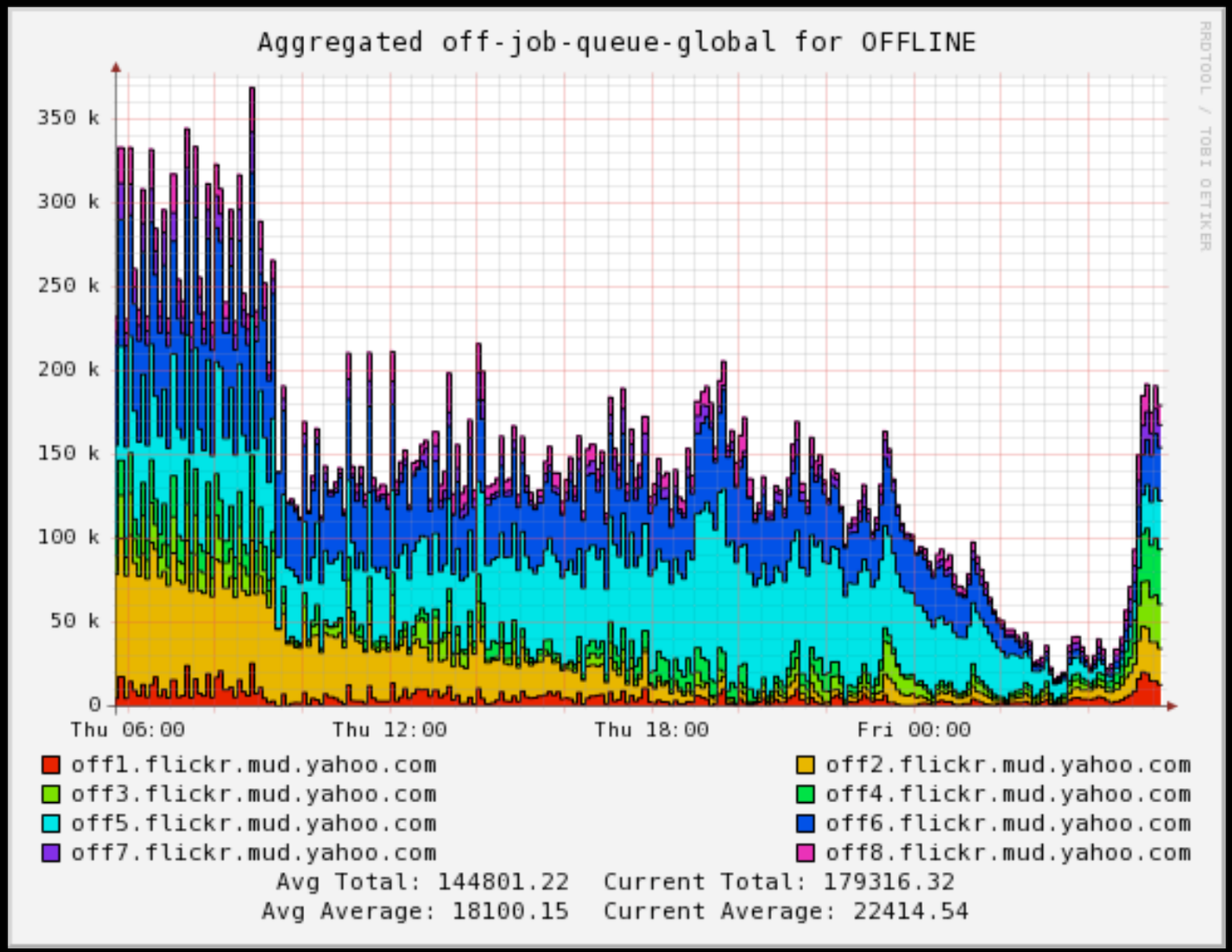

Show Hosts: yes ◉ no ○ | **WWW load_one last hour sorted descending** | Columns 4



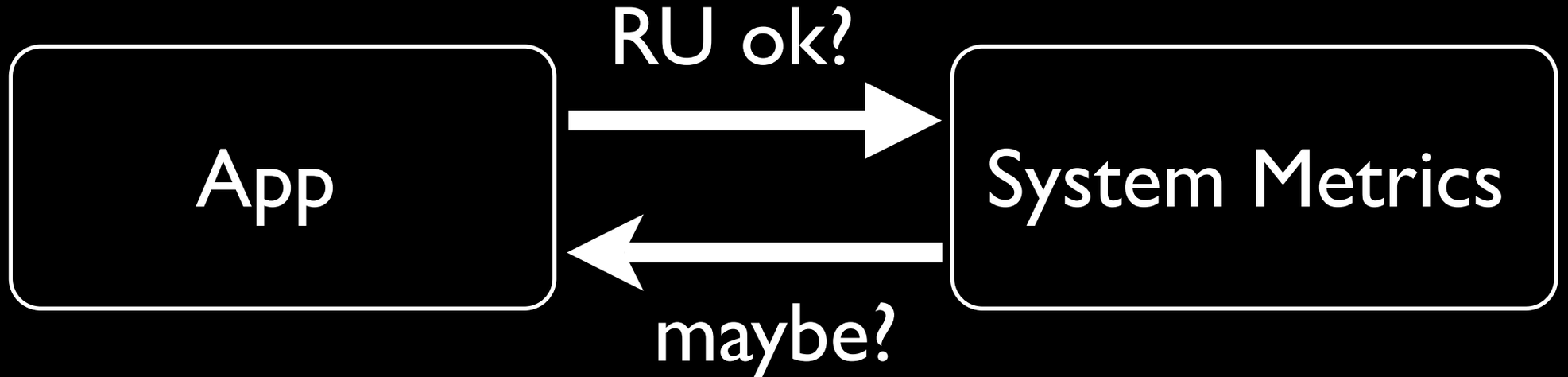
# Application level metrics



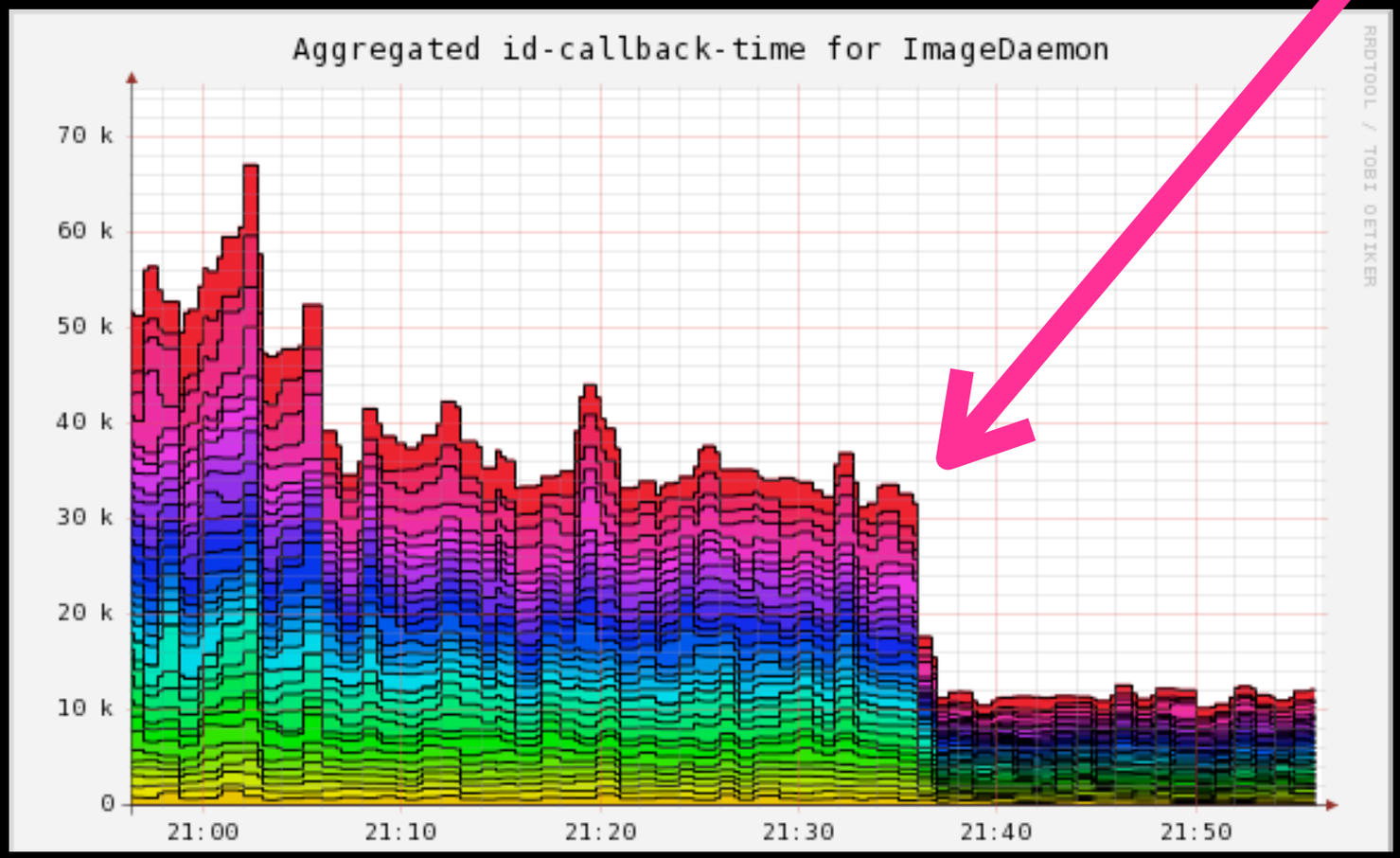
# Application level metrics



# Adaptive feedback loops

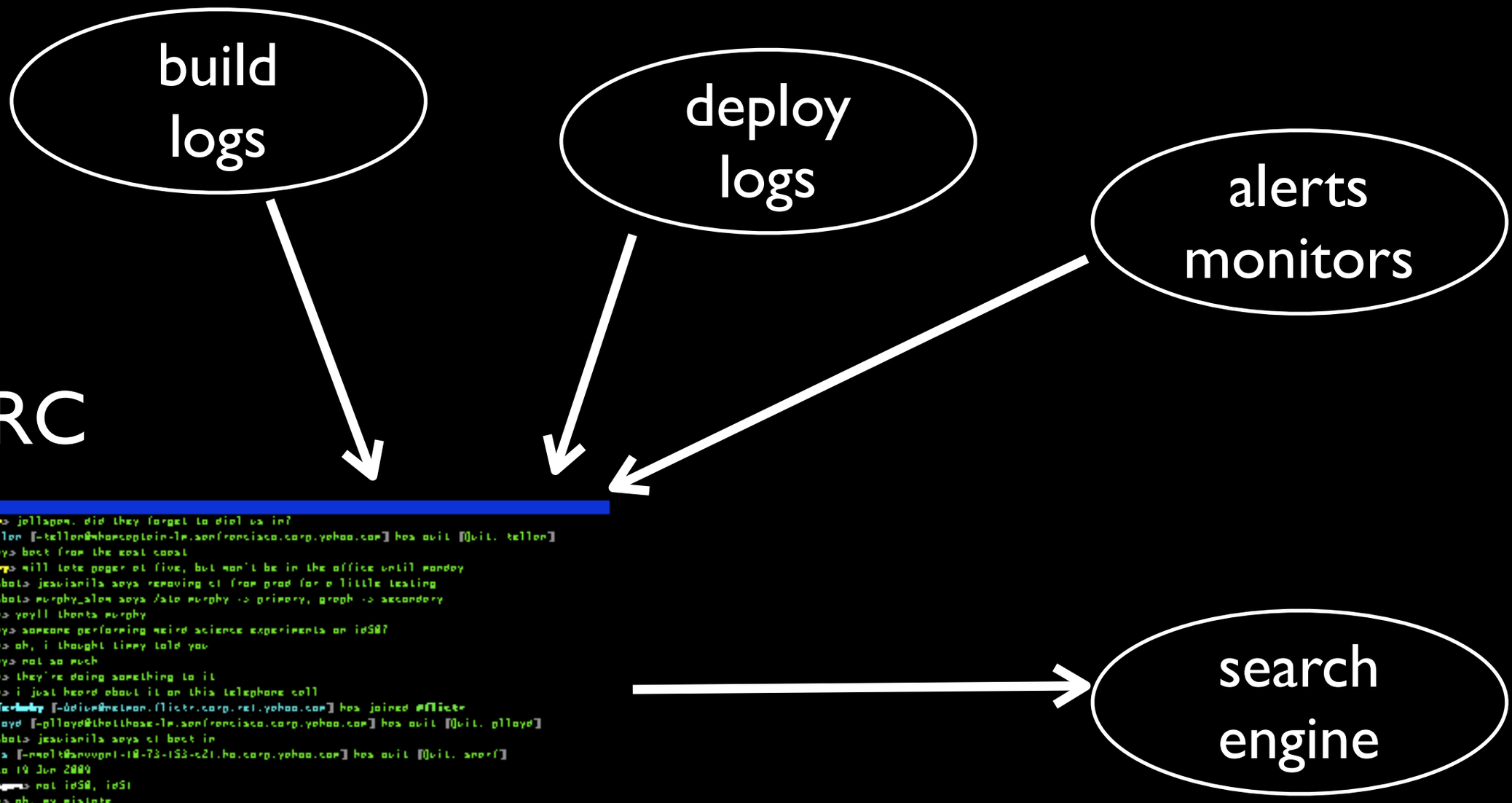


**Cluster Report for Mon, 6 Apr 2009 21:56:45 +0000** Last Site Deploy: Mon, 6 Apr 2009 21:36:03 +0000



# 6. IRC and IM robots

# Dev, Ops, and Robots
# Having a conversation



# Culture

# 1. Respect

If there is only one thing you do…

# Don’t stereotype

(not all developers are lazy)

http://www.flickr.com/photos/aaronjacobs/64368770/


http://www.flickr.com/photos/chrisdag/2286198568/
Respect other people's expertise,
opinions and responsibilities


http://www.flickr.com/photos/jwheare/2580631103/

Don’t just say “No”

http://www.flickr.com/photos/alancleaver/2661424637/

# Don’t hide things

Developers: Talk to ops about the impact of your code:

- what metrics will change, and how?
- what are the risks?
- what are the signs that something is going wrong?
- what are the contingencies?

This means you need to work this out before talking to ops

# 2. Trust

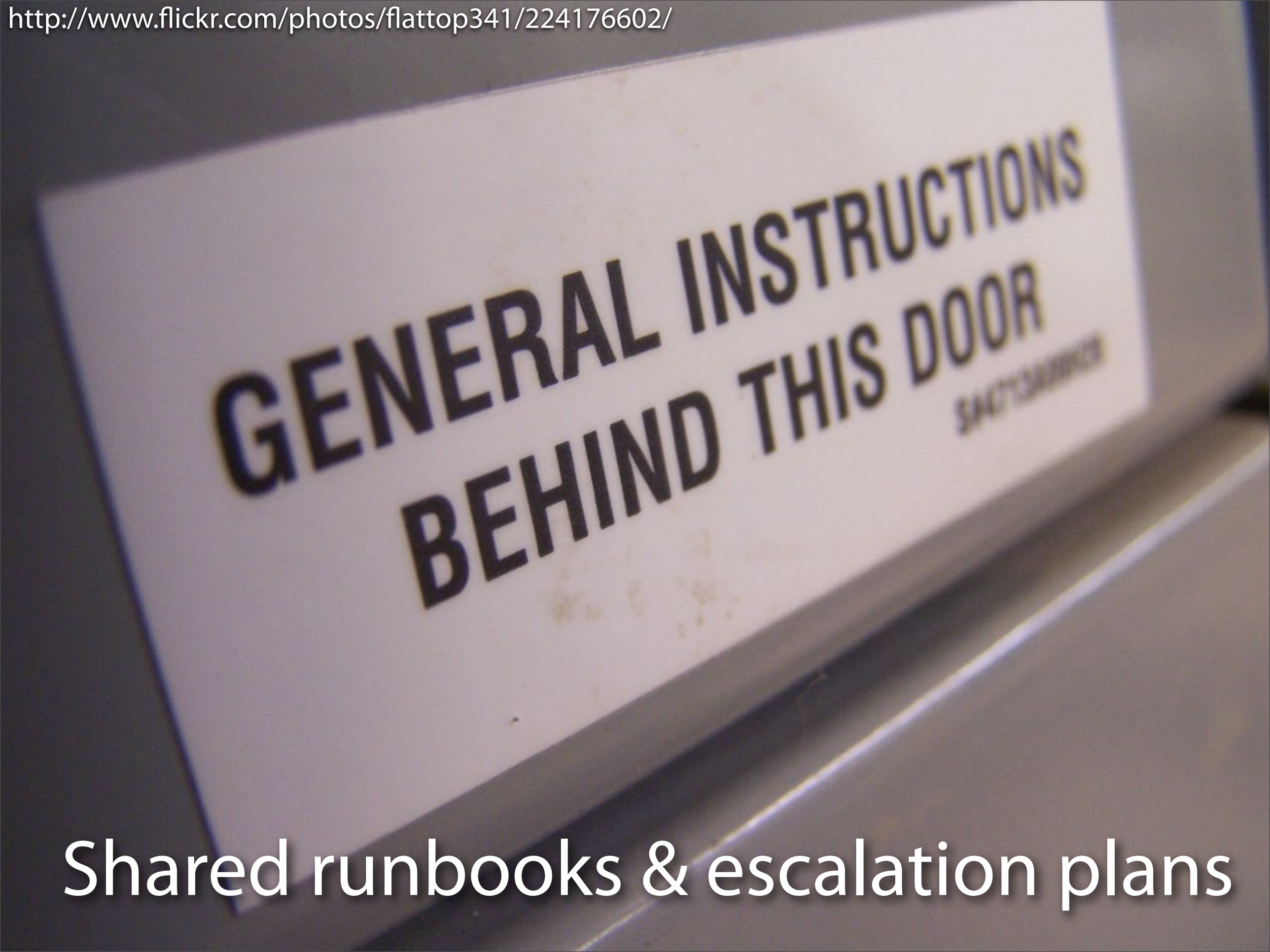
Ops needs to trust dev to involve them on feature discussions

Dev needs to trust ops to discuss infrastructure changes

Everyone needs to trust that everyone else is doing their best for the business

http://www.flickr.com/photos/85128884@N00/2650981813/

http://www.flickr.com/photos/flattop341/224176602/




# Shared runbooks & escalation plans

http://www.flickr.com/photos/telstar/2861103147/

# Provide knobs and levers

http://www.flickr.com/photos/williamhook/3468484351/

# Ops: Be transparent, give devs access to systems

3. Healthy attitude about failure

http://www.flickr.com/photos/pinksherbet/447190603/

# Failure will happen

If you think you can prevent failure then
you aren't developing your ability to respond


http://www.flickr.com/photos/toms/2323779363/

http://www.flickr.com/photos/changereality/2349538868/

# Fire drills

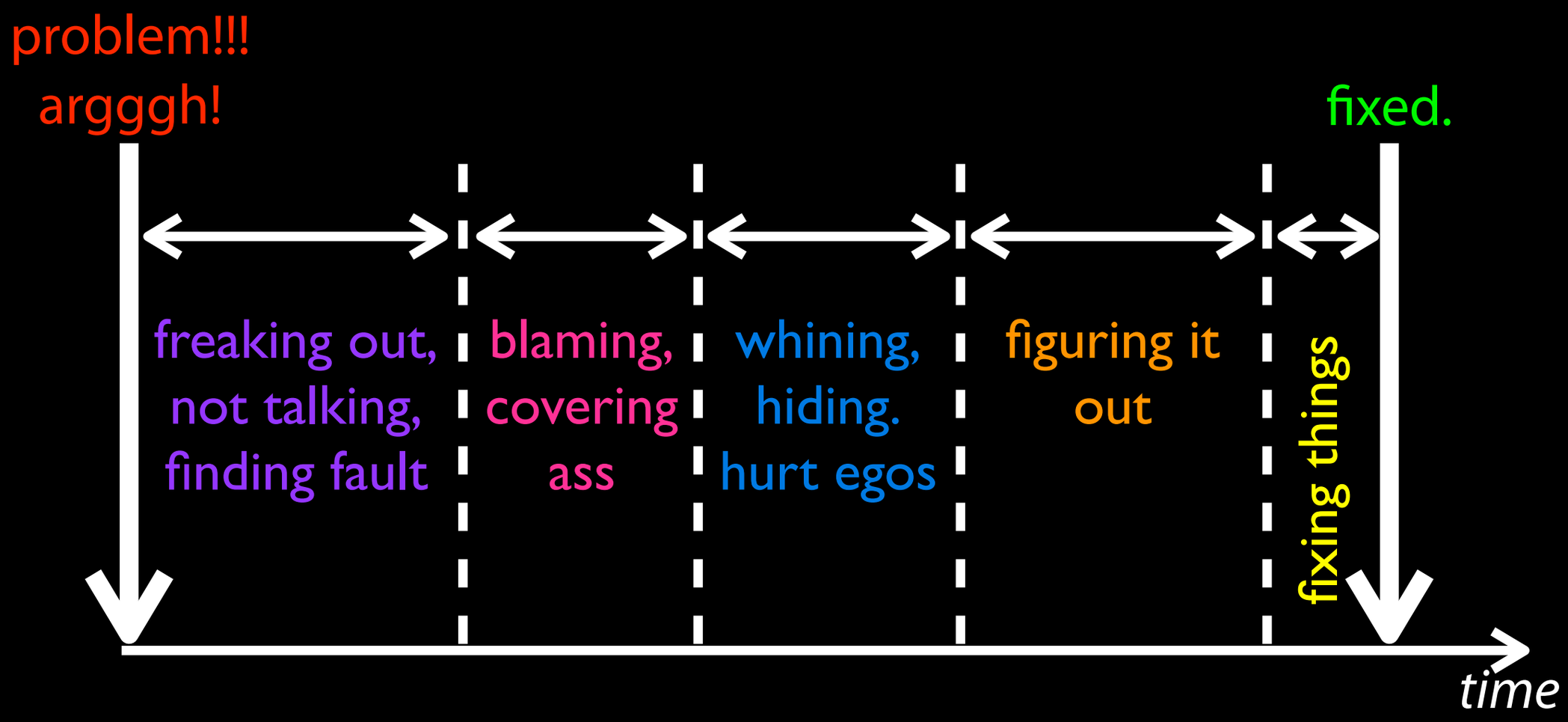

http://www.flickr.com/photos/dnorman/2678090600

# 4. Avoiding Blame

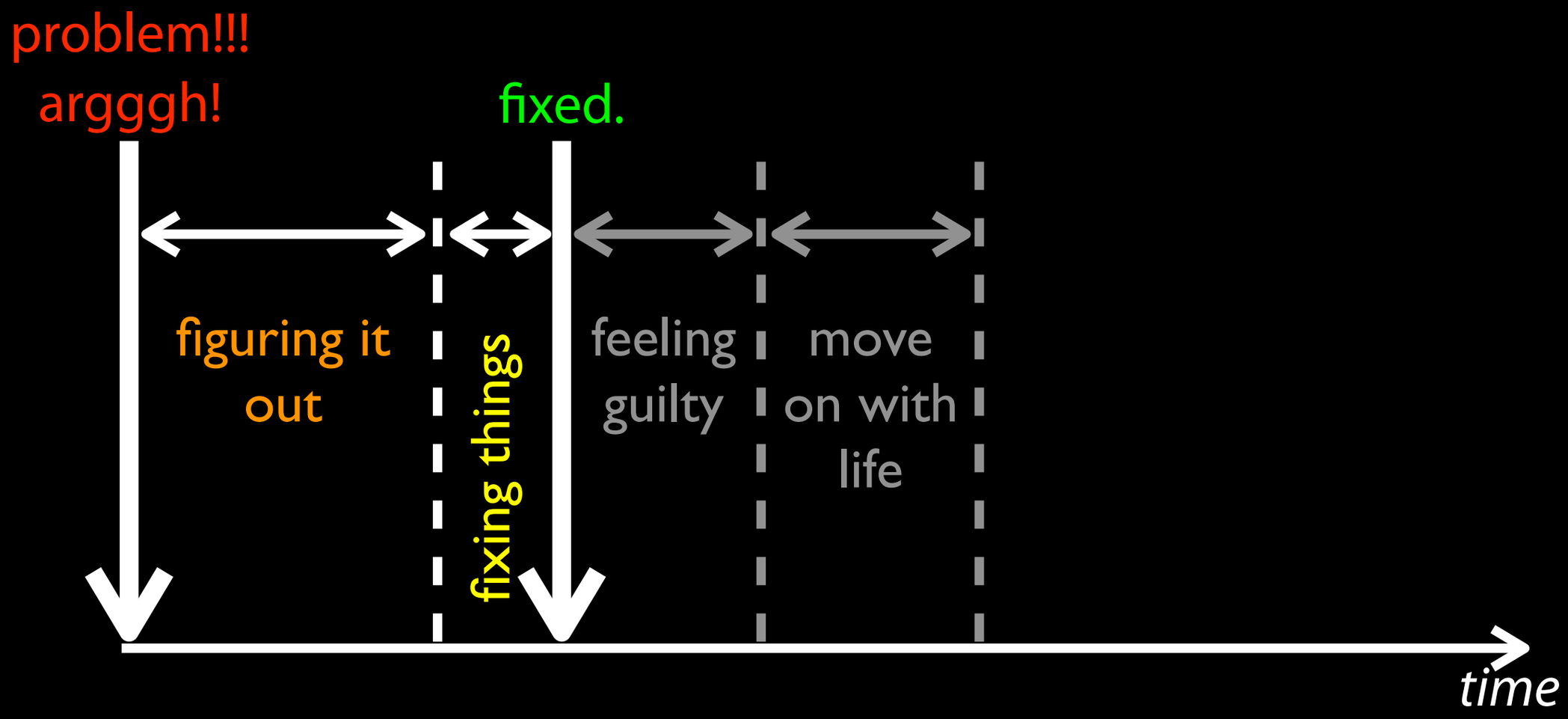
# No fingerpointing

http://www.flickr.com/photos/rocketjim54/2955889085/

# Fingerpointyness



# Being productive




Developers: Remember that someone else will probably get woken up when your code breaks
http://www.flickr.com/photos/alex-s/353218851/

http://www.flickr.com/photos/allspaw/2819774755/

Ops: provide constructive feedback on current aches and pains

1. Automated infrastructure
2. Shared version control
3. One step build and deploy
4. Feature flags
5. Shared metrics
6. IRC and IM robots

1. Respect
2. Trust
3. Healthy attitude about failure
4. Avoiding Blame

This is not easy

You could just carry on shouting at each other...

(Thank you)