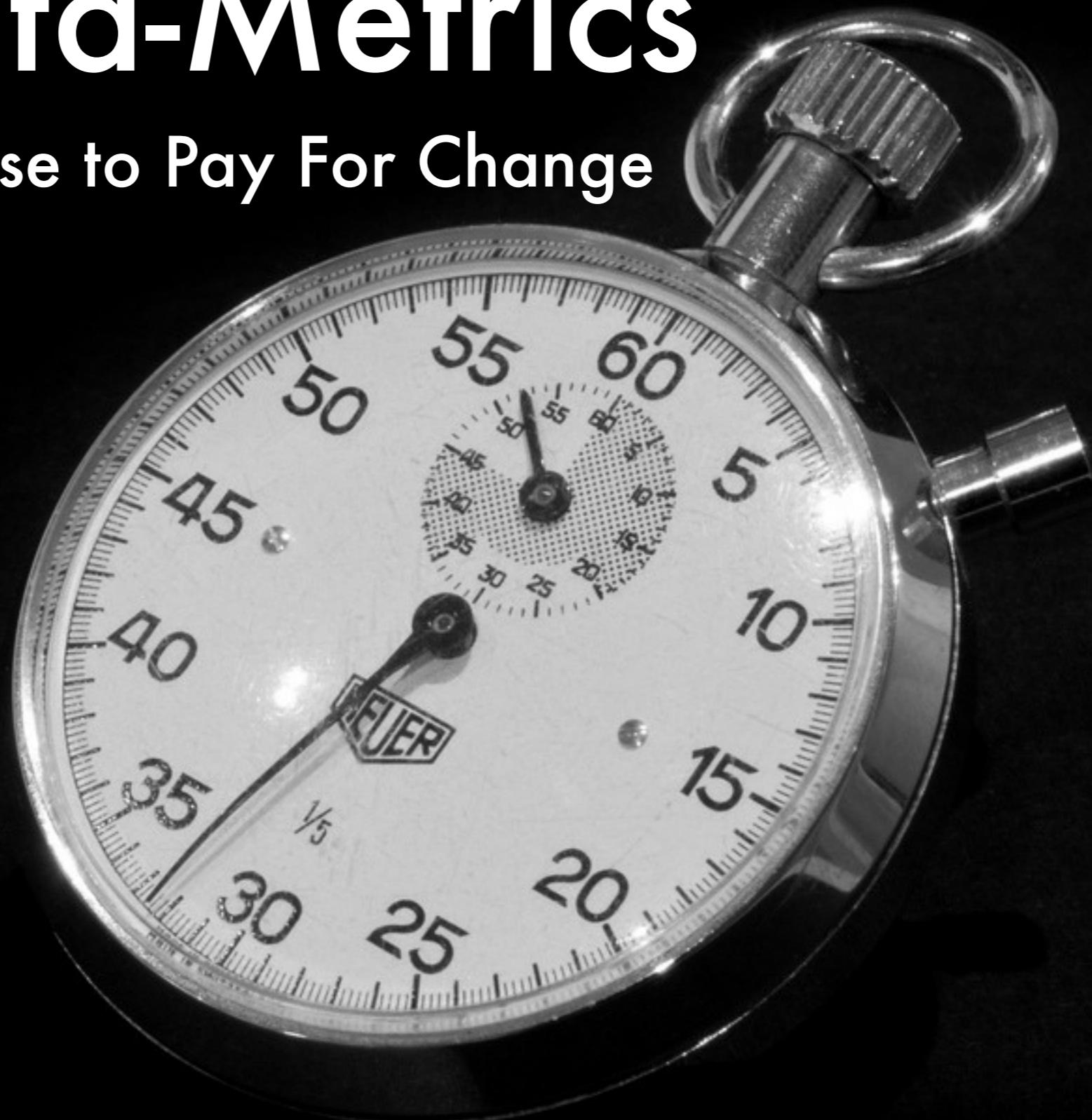


Ops Meta-Metrics

The Currency You Use to Pay For Change



John Allspaw
VP Operations

Etsy.com

Zoom: 1d 5d 1m 3m 6m YTD 1y 5y 10y Max

Oct 16, 2008 - Oct 16, 2008

-230.5 (-5.65%)

Oct 10, 2008 - Oct 10, 2008

Warning

**Graphs and numbers in this presentation
are sort of made up**

Thu Oct 16

09:30

10:30

11:30

12:30

13:30

14:30

15:30

2006

2007

2008

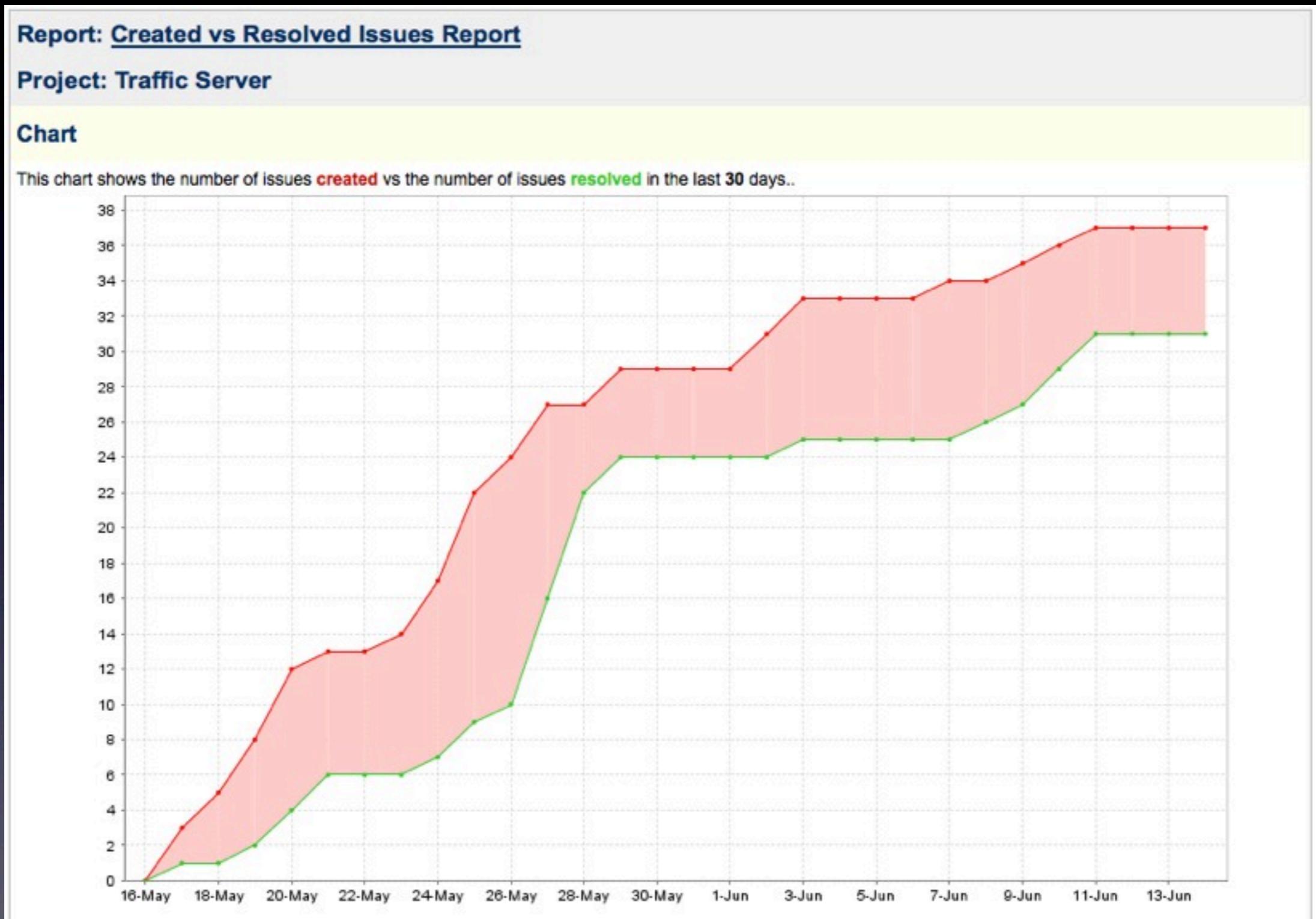


`/usr/nagios/libexec/check_ops.pl`

A dynamic photograph of a cowboy in mid-air, having just been thrown from a dark brown horse with a white blaze on its forehead. The horse is captured in a powerful, rearing pose. The cowboy, wearing a white cowboy hat, a blue and white plaid shirt, a tan vest, and jeans, is suspended in the air with arms outstretched. The background is a blurred, brown, textured surface of a rodeo arena.

How R U Doing?

We track bugs already...



Example: <https://issues.apache.org/jira/browse/TS>

We should track
these, too...

We should track
these, too...

Changes (Who/What/When/Type)

We should track
these, too...

Changes (Who/What/When/Type)
Incidents (Type/Severity)

We should track
these, too...

Changes (Who/What/When/Type)

Incidents (Type/Severity)

Response to Incidents (TTR/TTD)

trepidation |,trepɪ'dā sh ən|

noun

1 a feeling of fear or agitation about something that may happen : *the men set off in fear and trepidation.*

2 archaic trembling motion.

DERIVATIVES

trepidatious | - sh əs | adjective

ORIGIN late 15th cent.: from Latin *trepidatio(n-)*, from *trepidare* ‘be agitated, tremble,’ from *trepidus* ‘alarme

Change

Required.

Often feared.

Why?



This is why

OMGWTF OUTAGES!!!1!!

🎵🎵
la de da,
everything's fine
🎵

change
happens

Etsy down for about 20 minutes, Oct 26

October 26, 2008 at 8:29 pm · Filed under Down Time · By JB

source:

<http://fix.etsy.com/?p=437>

Etsy experienced a short downtime getting a 500 server error or whatever. It appears to be resolved now.

Facebook Not Working Again

by Dank Kush on Feb.20, 2010, under World News

facebook.

If you've been cursing Facebook this morning, you're not alone. We're hearing from users on our Facebook page and on Twitter complain about site load time, 404 errors, issues with image uploading, CSS load-time issue and mobile performance errors.

October 20, 2009 10:10 AM PDT

Flickr hit with Tuesday morning outage

by Josh Lowensohn and Tom Krazit

A A Font size Print E-mail Share 7 comments

83 retweet f Share 34

Yahoo-owned social photo site Flickr went dark Tuesday at around 8:50 a.m. PDT. The outage, which remains ongoing at time of this initial post, is keeping users from accessing

of errors when on the site itself.

Change PTSD?



Brace For Impact?

Alternative brace positions



POSITION 1:
Head down and hug knees



POSITION 2:
Cradle head on seat in front



Brace For Impact?

But wait....



la de da,
everything's fine



(OMGWTF)

change
happens



But wait....



la de da,
everything's fine



change
happens



(OMGWTF)

How **much** change is this?

But wait....



la de da,
everything's fine



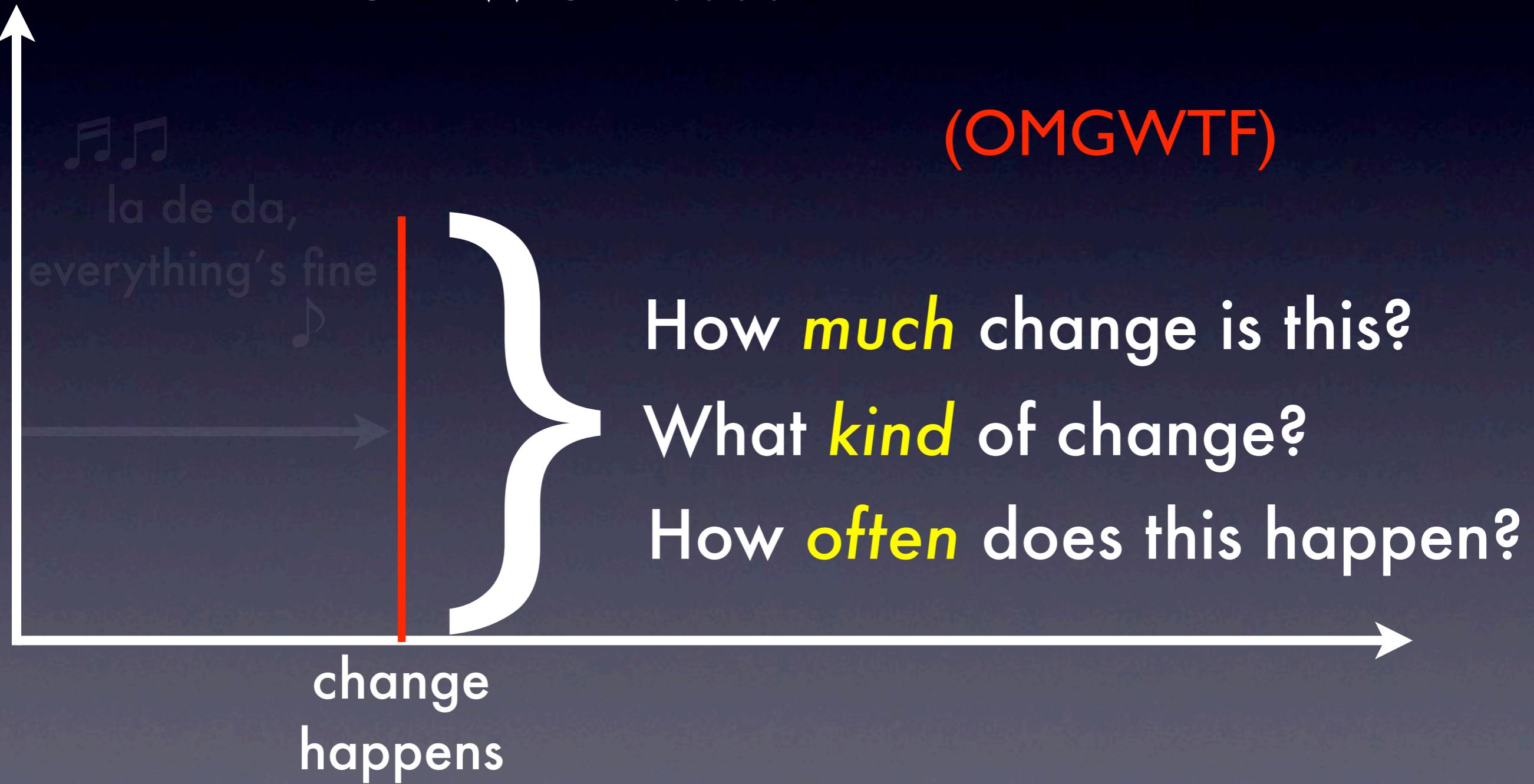
change
happens



(OMGWTB)

How **much** change is this?
What **kind** of change?

But wait....



Need to raise confidence that

change != outage

...incidents **can** be
handled **well**



...root causes **can** be fixed
quick enough



A photograph of a person performing a handstand on a trapeze bar against a blue sky with scattered white clouds. The person is wearing a black t-shirt, blue wristbands, and patterned shorts. They are holding onto the trapeze bar with one hand and a safety strap with the other. The perspective is from below, looking up at the person.

...change can be
safe enough

But how?

How do we have confidence in *anything*
in our infrastructure?

We measure it.
And graph it.
And alert on it.

Tracking Change

1. Type
2. Frequency/Size
3. Results of those changes

Types of Change

Layers	Examples
App code	PHP/Rails/etc or 'front-end' code
Services code	Apache, MySQL, DB schema, PHP/Ruby versions, etc.
Infrastructure	OS/Servers, Switches, Routers, Datacenters, etc.

(you decide what these are for your architecture)

Code Deploys: Who/What/When

WHEN **WHO** **WHAT**

j Commits since last prod deploy !!

Auto scroll command output?

Add an arbitrary log message:

PROJECT-### to link to jira and add a comment

• [web] | 2010-06-07 23:20:38 | PRODUCTION | jwong | Production Deploy: old 26721, new: 26722 [diff](#)

• [web] | 2010-06-07 23:18:22 | PRINCESS | jwong | Princess Deploy: old: 26721, new: 26722 [diff](#)

• [web] | 2010-06-07 23:16:37 | QA | jwong | Adding Jonathan and Any to about.php old: 26721, new: 26722 [diff](#)

• [web] | 2010-06-07 23:08:57 | PRODUCTION | ncook | Production Deploy: old 26697, new: 26721 [diff](#)

• [web] | 2010-06-07 23:06:57 | PRINCESS | ncook | Princess Deploy: old: 26697, new: 26721 [diff](#)

• [web] | 2010-06-07 23:06:30 | QA | ncook | transaction link fix old: 26697, new: 26721 [diff](#)

• [web] | 2010-06-07 21:46:25 | PRODUCTION | ncook | Production Deploy: old 26658, new: 26697 [diff](#)

• [web] | 2010-06-07 21:42:29 | PRINCESS | ncook | Princess Deploy: old: 26658, new: 26697 [diff](#)

• [web] | 2010-06-07 21:38:00 | QA | ncook | transaction should have all images old: 26658, new: 26697 [diff](#)

The screenshot shows a deployment log interface. On the left, under 'WHEN', there is a red box around the timestamp '2010-06-07 23:20:38'. In the center, under 'WHO', there is a red box around the name 'jwong'. On the right, under 'WHAT', there is a red box around the word 'diff' in the log entry. Red arrows point from each of these three highlighted areas to their respective bolded labels ('WHEN', 'WHO', 'WHAT') at the top of the slide.

Code Deploys: Who/What/When

Last 2 Chef changes

Last 2 prod deploys

The screenshot shows a web-based monitoring tool for the Etsy platform. At the top left, the word "Etsy" is displayed in its signature orange font. In the center, a modal window titled "Etsy Grid Report for Tue, 08 Jun 2010 12:35:08 +0000" is open, displaying a list of recent code pushes and a merge commit. Below the modal, there are two dropdown menus: "Last hour" and "Sorted descending". At the bottom of the page, there are two dropdown menus under "Etsy Grid >": "Choose a Source" and "Choose a Destination". The "Choose a Source" menu is currently expanded, showing options like "Adminpanel", "Apis", "DBLists", and "DBNest". On the far right, there are links for "Get Fresh Data" and "RRDTOOL".

Etsy Grid Report for Tue, 08 Jun 2010 12:35:08 +0000

2010-06-07 23:20:38: web PRODUCTION push by jwong
2010-06-07 23:08:57: web PRODUCTION push by ncook
Wed Jun 2 21:49:31 2010 +0000 6e7ee3e root Merge branch 'master' of [REDACTED]
Wed Jun 2 17:48:11 2010 -0400 d07f48d Chris Munns need to make this just rotate the client log,
since on the server it was rotating both

Last hour Sorted descending

Etsy Grid >

--Choose a Source

--Choose a Destination

Etsy Grid (27)

CPUs Total: 988

Etsy Grid Load last

Etsy Grid Memory

other changes

Issue Navigator

Query: line: 1 character: 71 [Query syntax](#)

```
project = SYS AND issuetype = "Database Task" OR issuetype = "Network" AND resolution = Unresolved
```

[Search](#) [Turn off auto-complete](#)

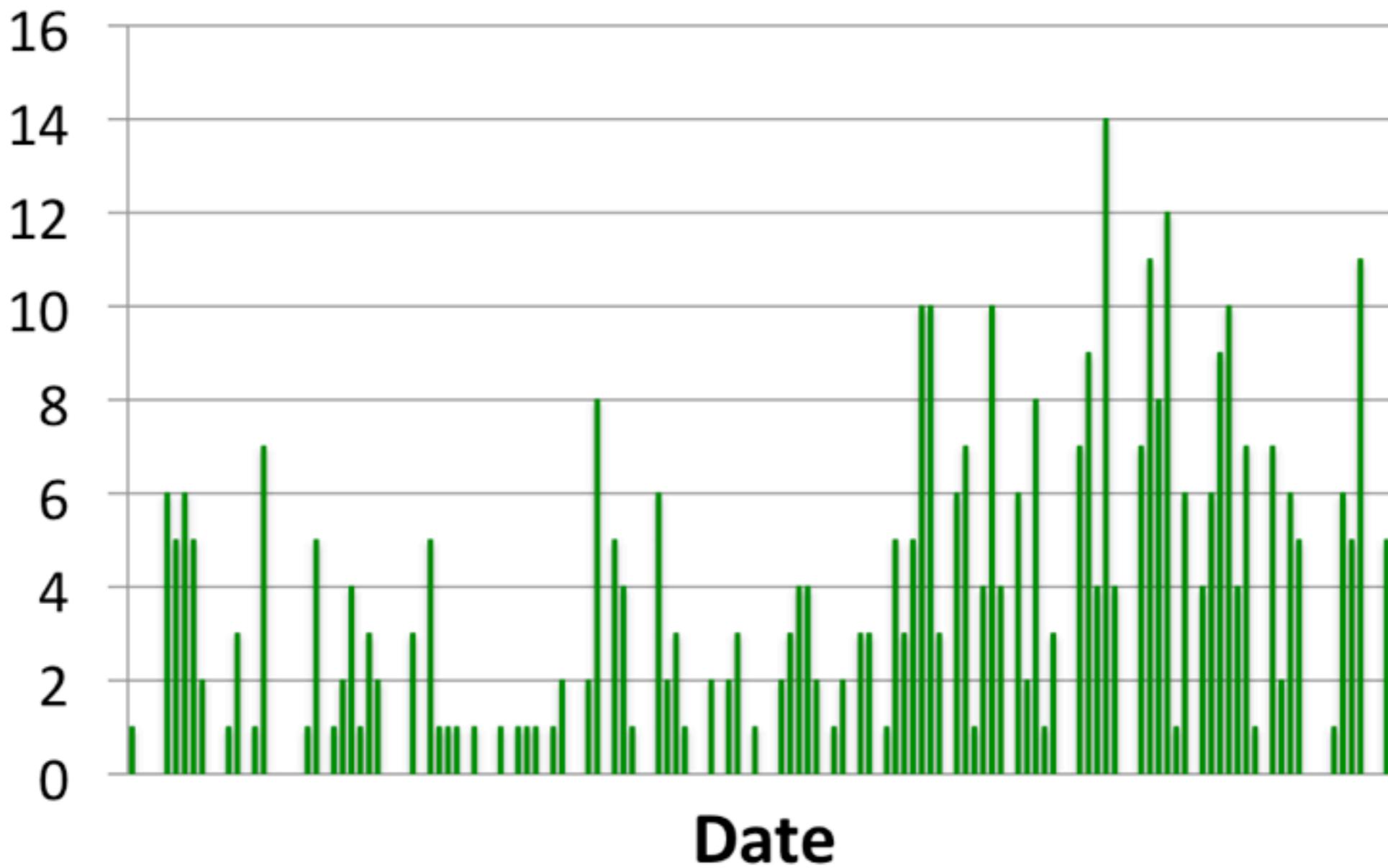
Displaying issues 1 to 14 of 14 matching issues.

T	Key	Summary	Assignee	Reporter	Fix Version/s	Pr	Status	Res	Created	Updated	Due
---	-----	---------	----------	----------	---------------	----	--------	-----	---------	---------	-----

(insert whatever ticketing/tracking you have)

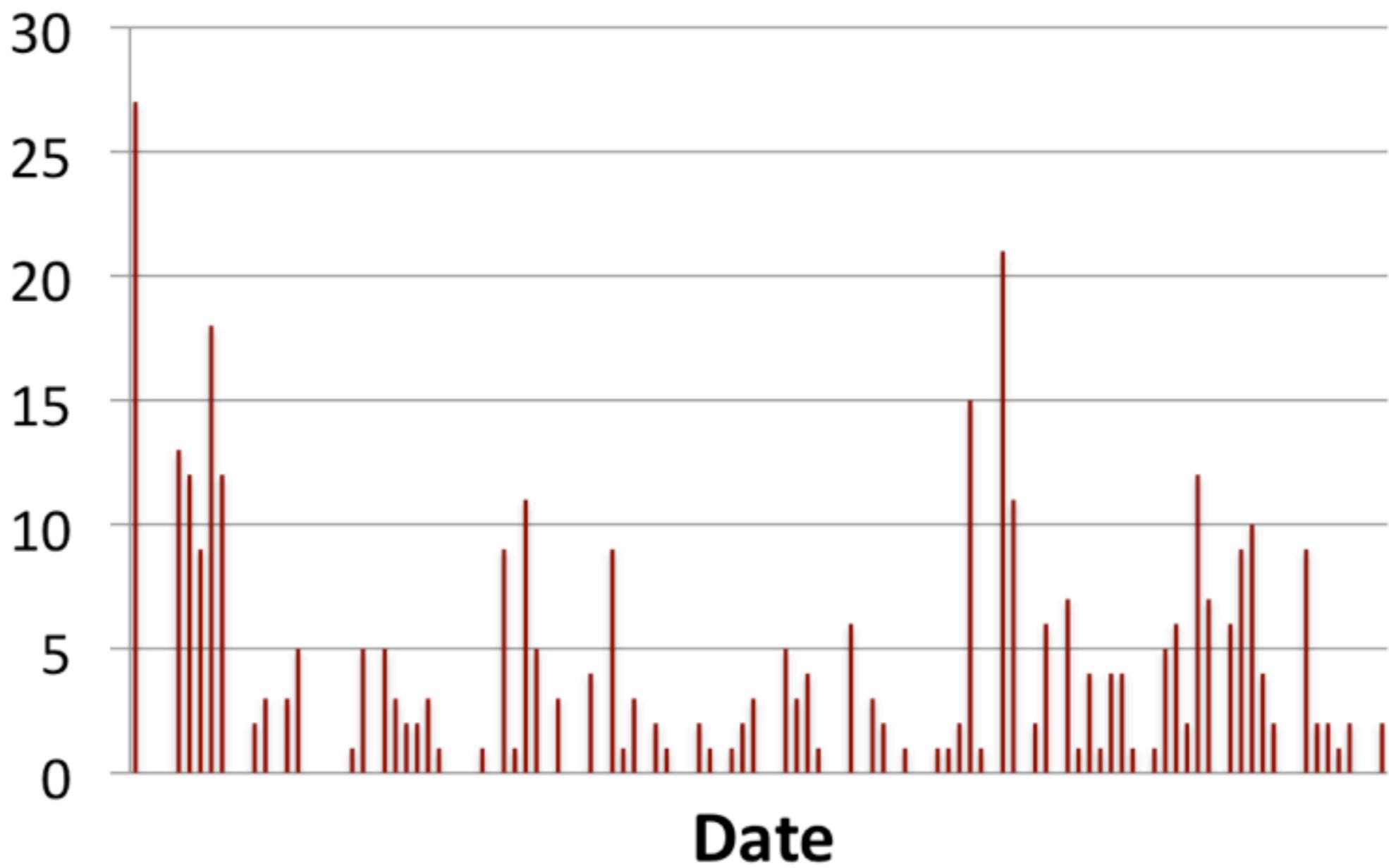
Frequency

Code Deploys Per Day



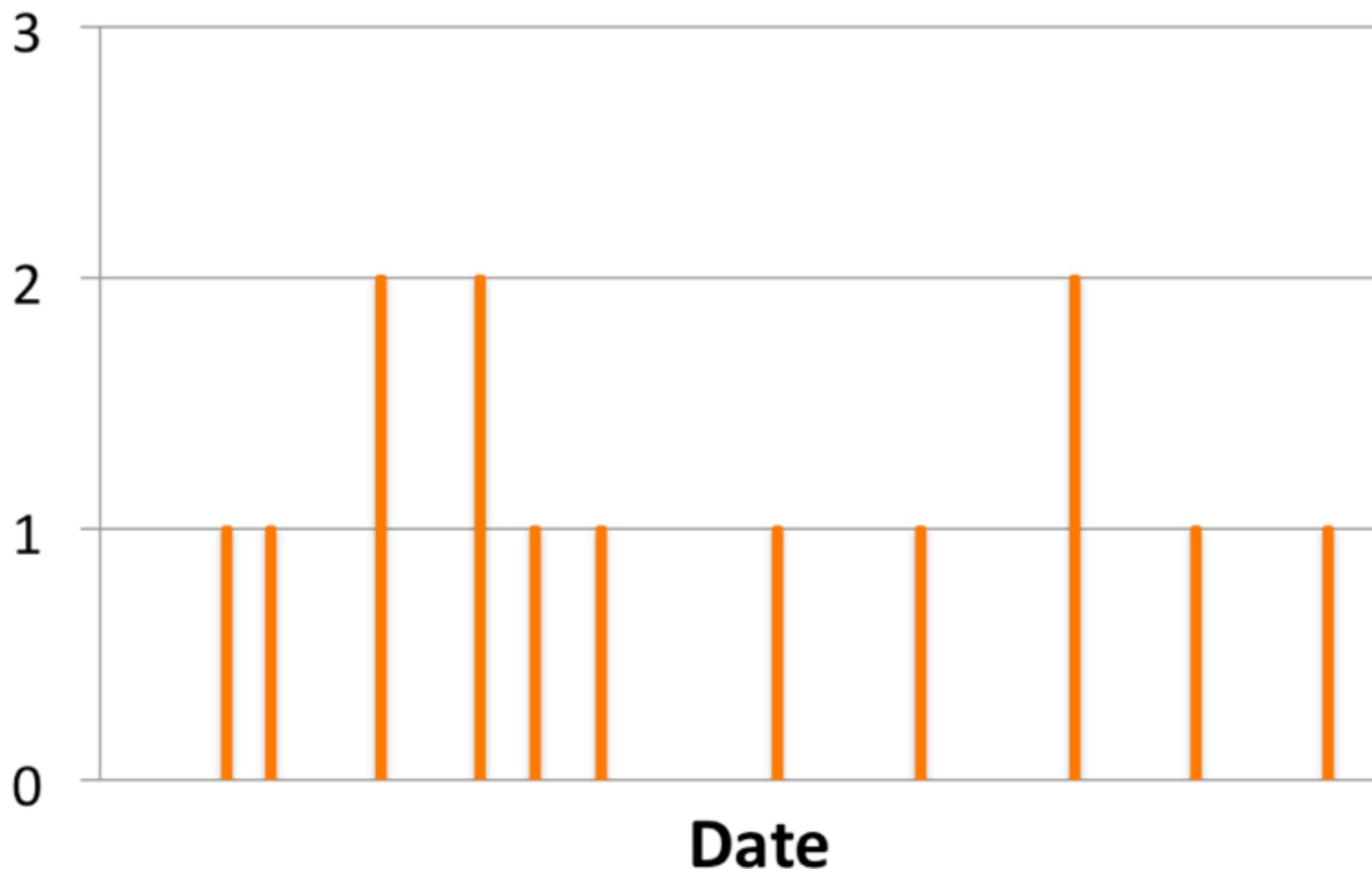
Frequency

Cfg Mgmt Changes Per Day



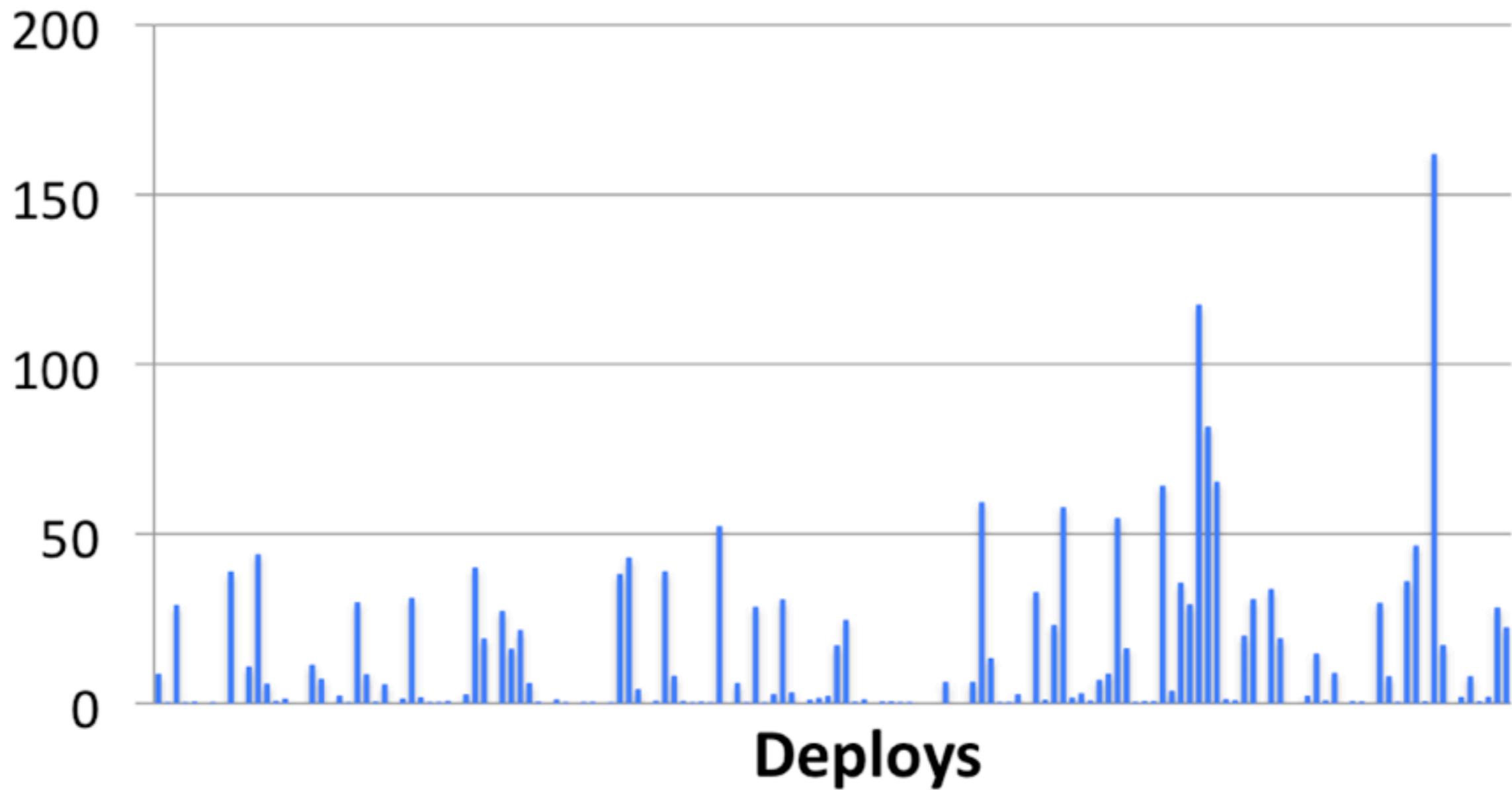
Frequency

DB Schema Changes Per Day



Size

Lines of Code Changed Per Deploy



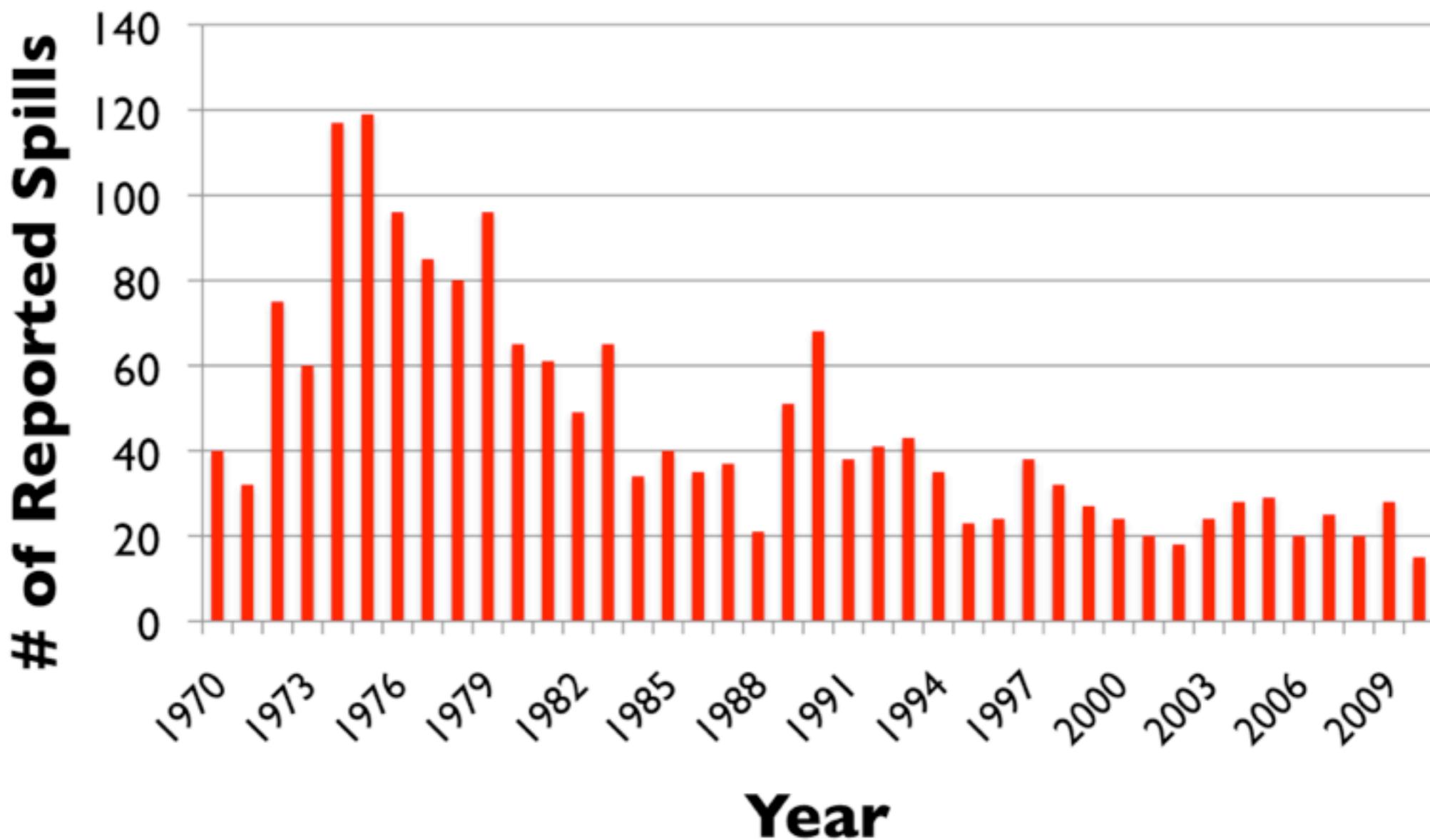


Tracking Incidents

Incident Frequency

Oil Spills By Year

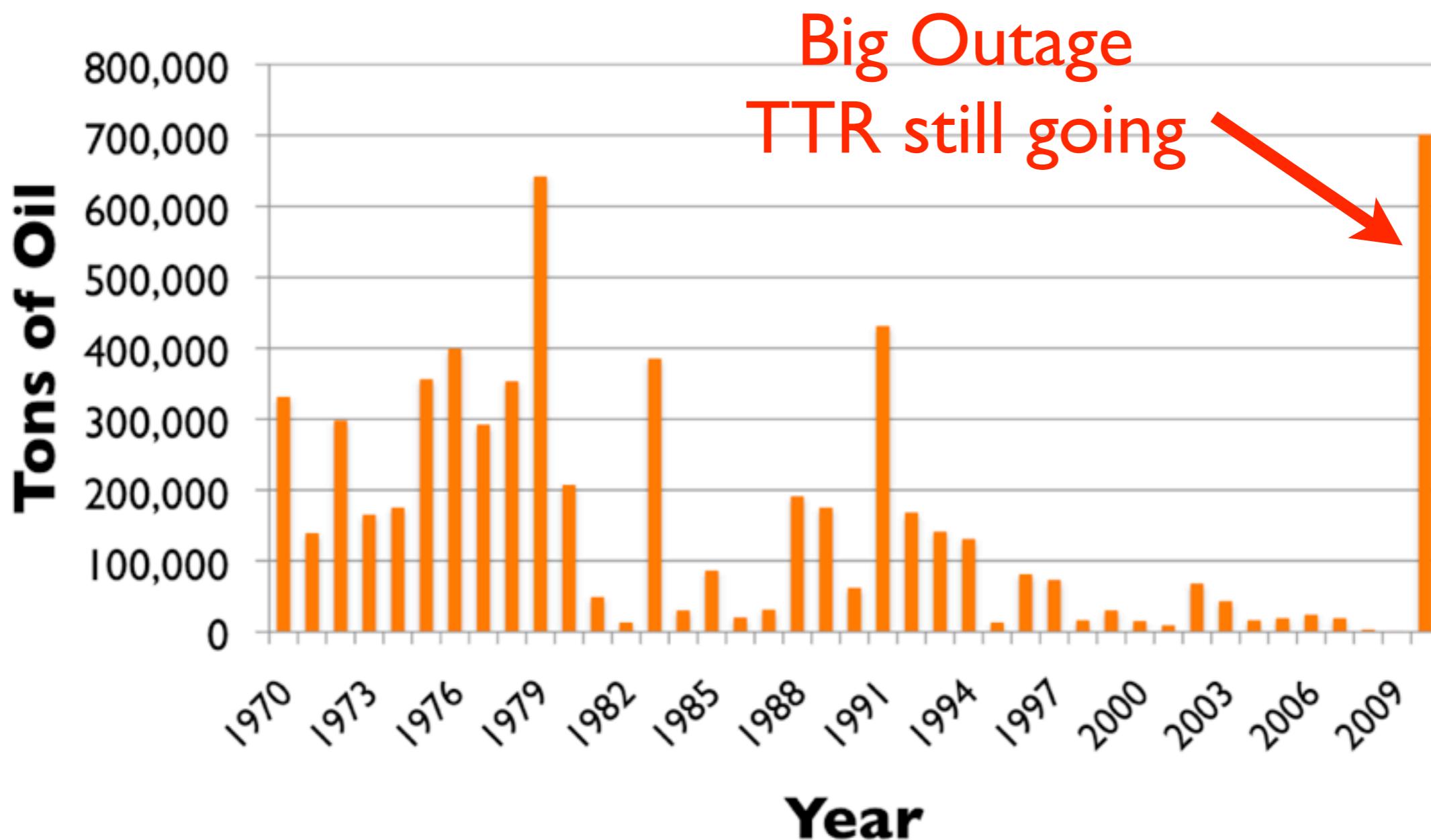
source: (incidentnews.gov and www.itopf.com)



Incident Size

Oil Spill Size By Year, Tons

source: (incidentnews.gov and www.itopf.com)



Big Outage
TTR still going

Tracking Incidents

1. Frequency
2. Severity
3. Root Cause
4. Time-To-Detect (TTD)
5. Time-To-Resolve (TTR)

The How
Doesn't
Matter



Incident/Degradation Tracking

Date	Start Time	Detect Time	Resolve Time	Severity	Root Cause	PostMortem Done?
1/2/08	12:30 ET	12:32 ET	12:45 ET	Sev1	DB Change	Yes
3/7/08	18:32 ET	18:40 ET	18:47 ET	Sev2	Capacity	Yes
5/3/08	17:55 ET	17:55 ET	18:14 ET	Sev3	Hardware	Yes

Incident/Degradation Tracking

Date	Start Time	Detect Time	Resolve Time	Severity	Root Cause	PostMortem Done?
These will give you context for your rates of change.						

(You'll need them for postmortems, anyway.)

Change: Incident Ratio



Change: Incident Ratio

Important.

Change: Incident Ratio

Important.

Not because all changes are equal.

Change:Incident Ratio

Important.

Not because all changes are equal.

Not because all incidents are equal, or
change-related.

Change: Incident Ratio

But because humans will irrationally make a permanent connection between the two.



Severity



Severity

Not all incidents are created equal.

Severity

Not all incidents are created equal.

Something like:

Severity

Not all incidents are created equal.

Something like:

Severity

Not all incidents are created equal.

Something like:

SEV1 Full outage, or effectively unusable.

Severity

Not all incidents are created equal.

Something like:

SEV1 Full outage, or effectively unusable.

SEV2 Significant degradation for subset of users.

Severity

Not all incidents are created equal.

Something like:

SEV1 Full outage, or effectively unusable.

SEV2 Significant degradation for subset of users.

SEV3 Minor impact on user experience.

Severity

Not all incidents are created equal.

Something like:

SEV1 Full outage, or effectively unusable.

SEV2 Significant degradation for subset of users.

SEV3 Minor impact on user experience.

SEV4 No impact, but time-sensitive failure.

Root Cause?

(Not all incidents are change related)

Something like:

Note: this can be difficult to categorize.

http://en.wikipedia.org/wiki/Root_cause_analysis

Root Cause?

(Not all incidents are change related)

Something like:

1. Hardware Failure
2. Datacenter Issue
3. Change: Code Issue
4. Change: Config Issue
5. Capacity/Traffic Issue
6. Other

Note: this can be difficult to categorize.

http://en.wikipedia.org/wiki/Root_cause_analysis

Recording Your Response



(worth the hassle)



Time



la de da,
everything's fine



Time





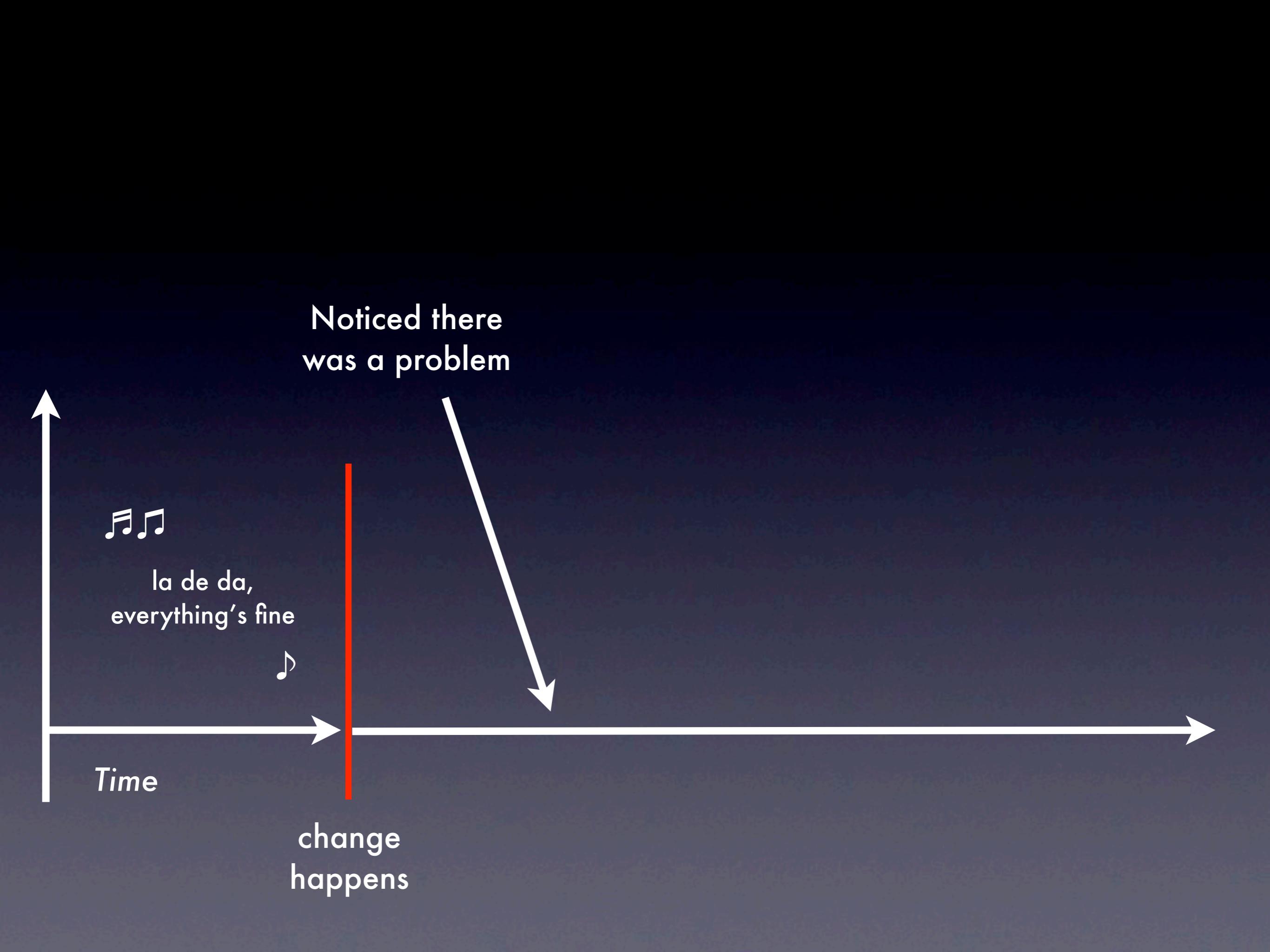
la de da,
everything's fine



Time

change
happens





Noticed there
was a problem



la de da,
everything's fine



Time

change
happens

Noticed there
was a problem



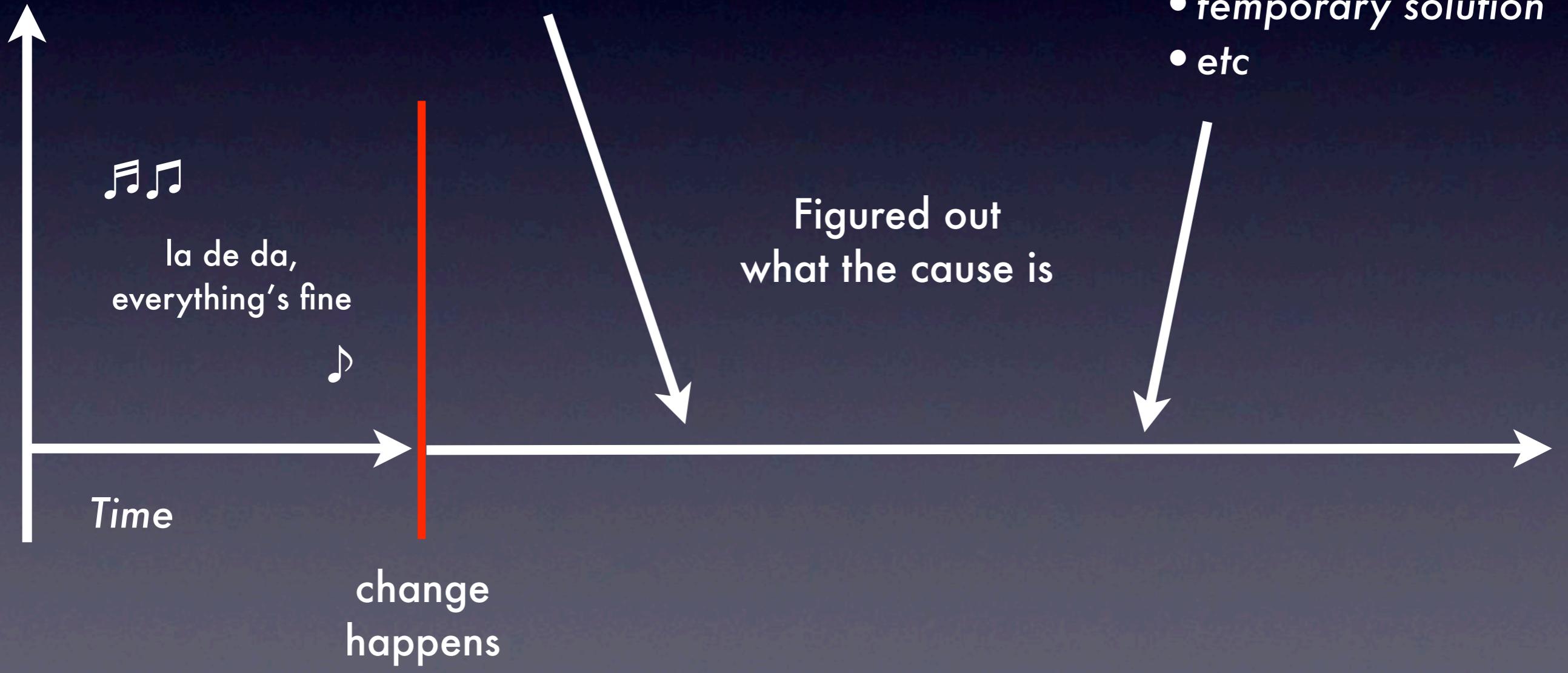
la de da,
everything's fine

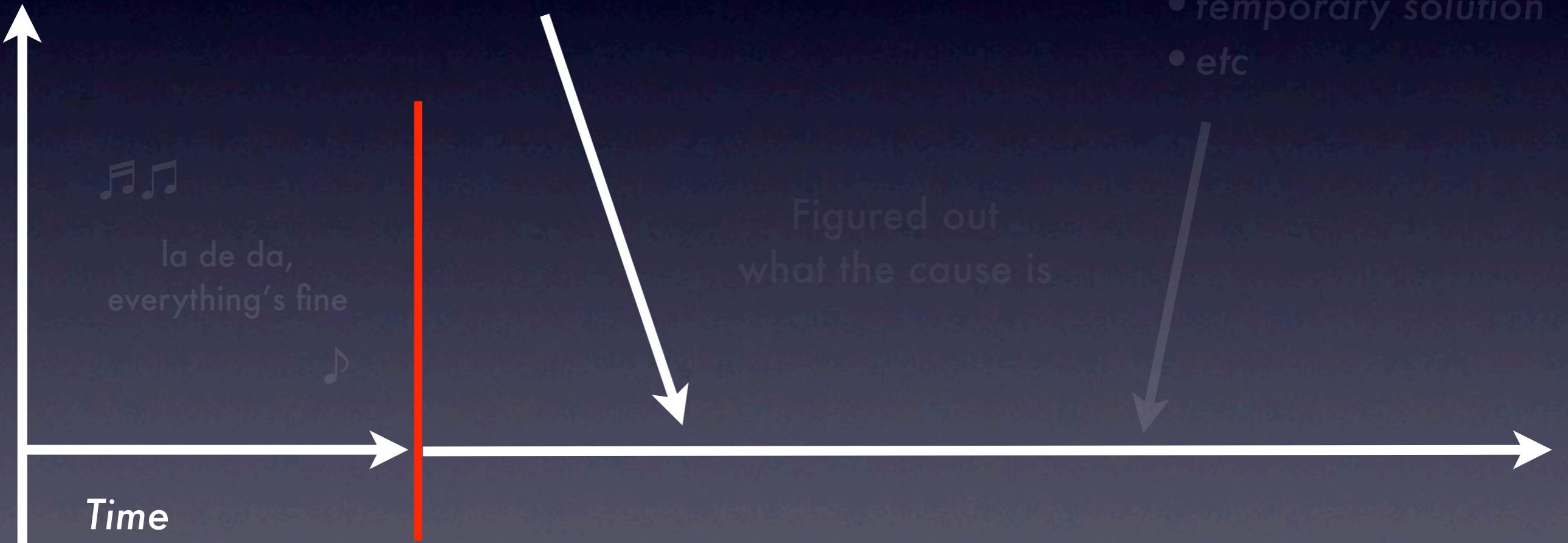


Time

change
happens

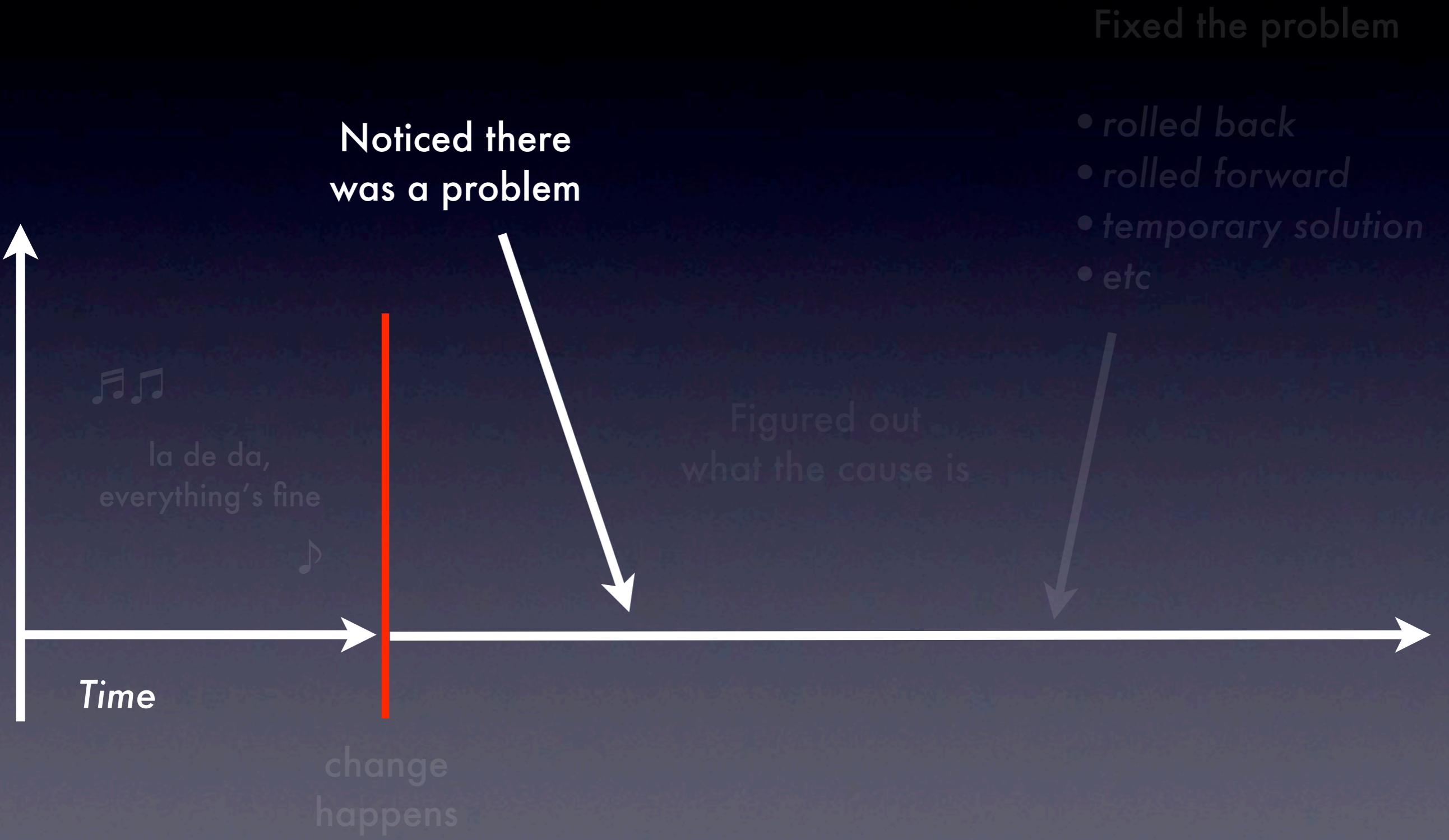
Figured out
what the cause is



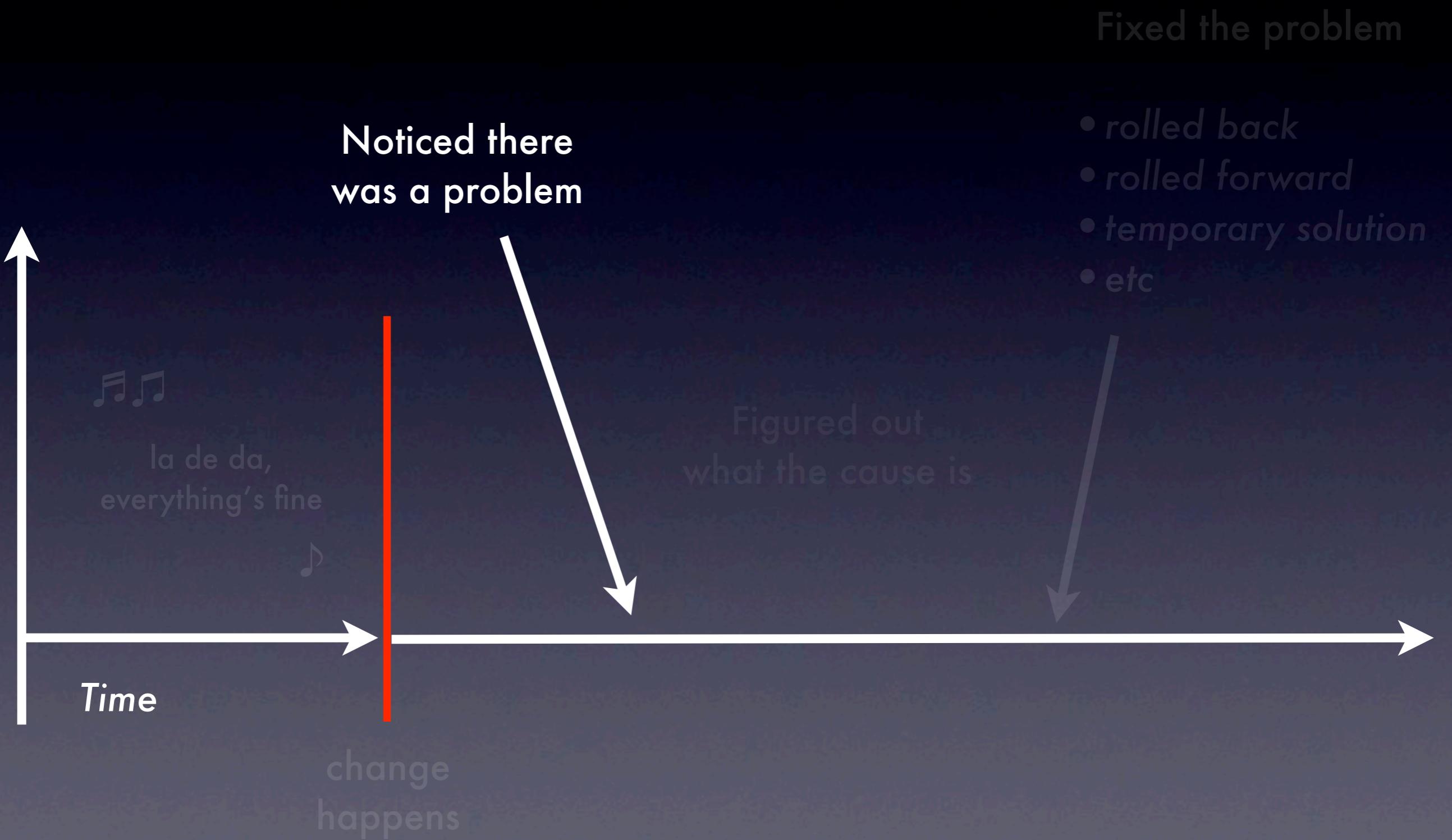


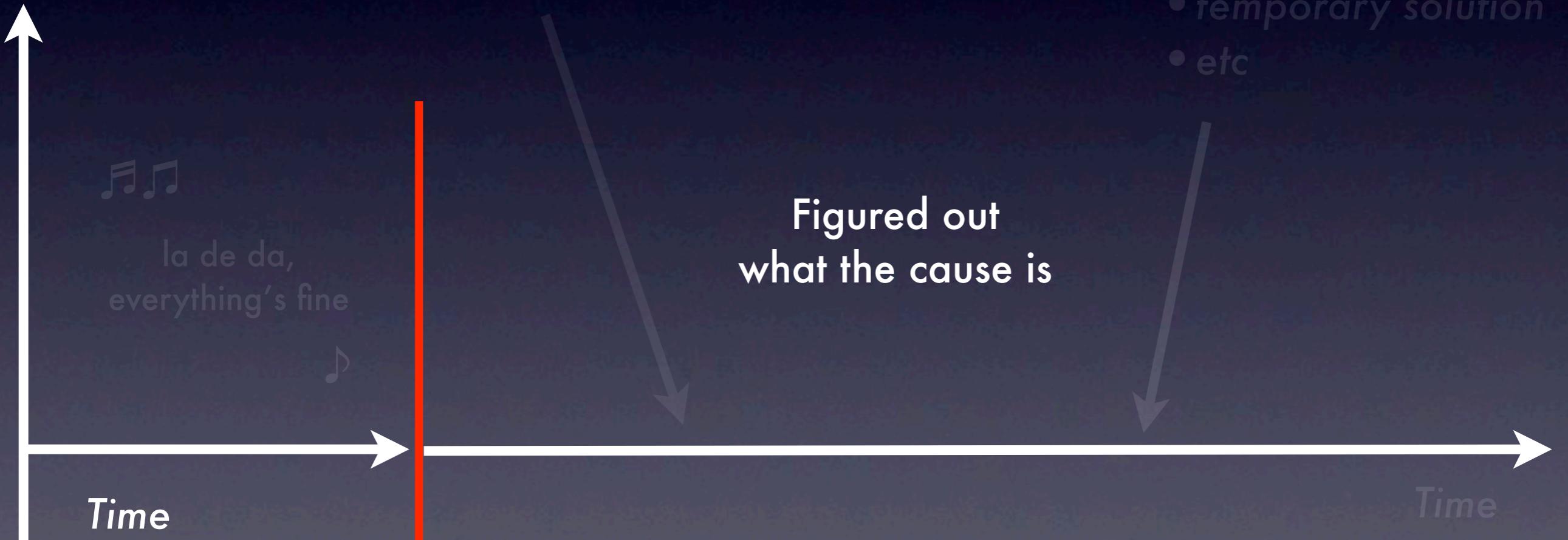
change
happens

- Coordinate troubleshooting/diagnosis



- Coordinate troubleshooting/diagnosis
- Communicate to support/community/execs





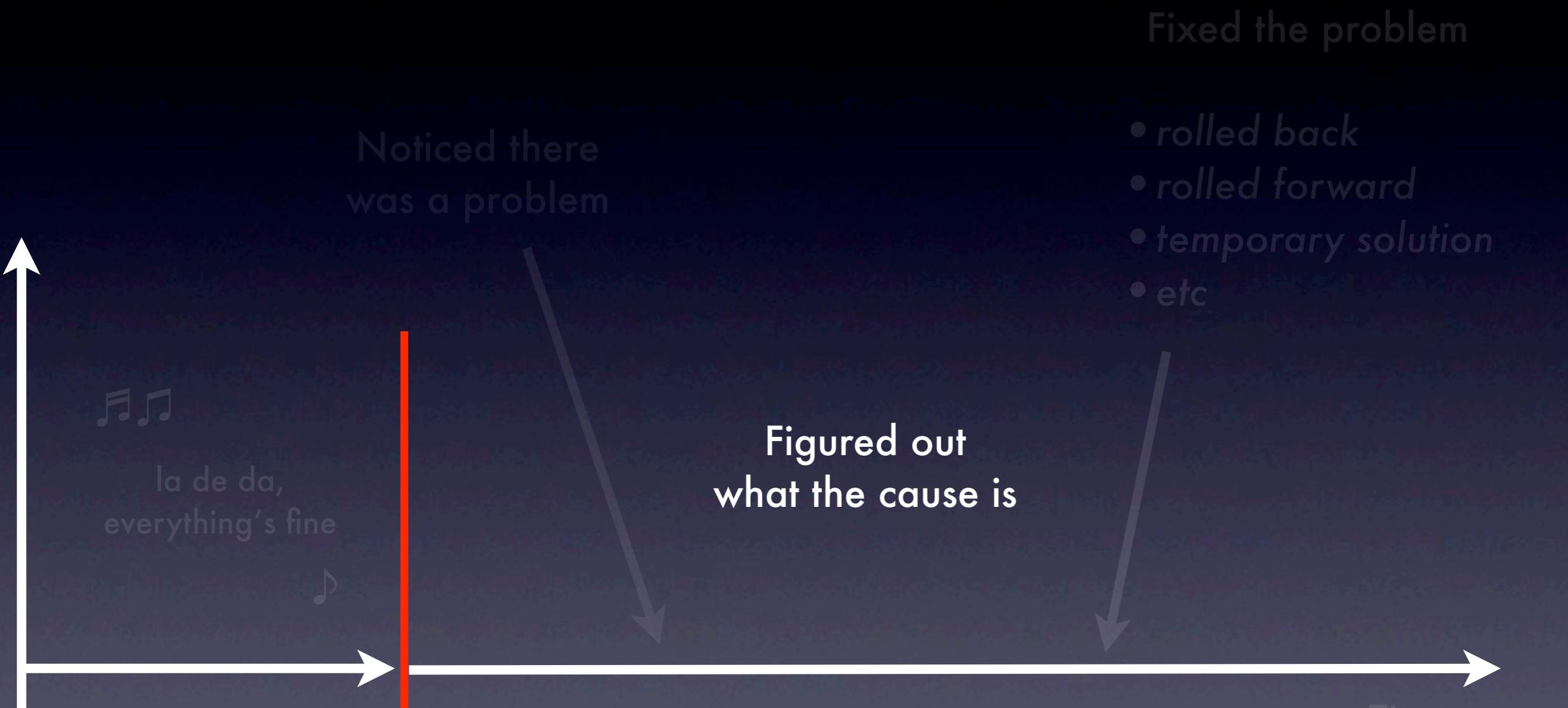
Noticed there
was a problem

Figured out
what the cause is

Fixed the problem

- *rolled back*
- *rolled forward*
- *temporary solution*
- *etc*

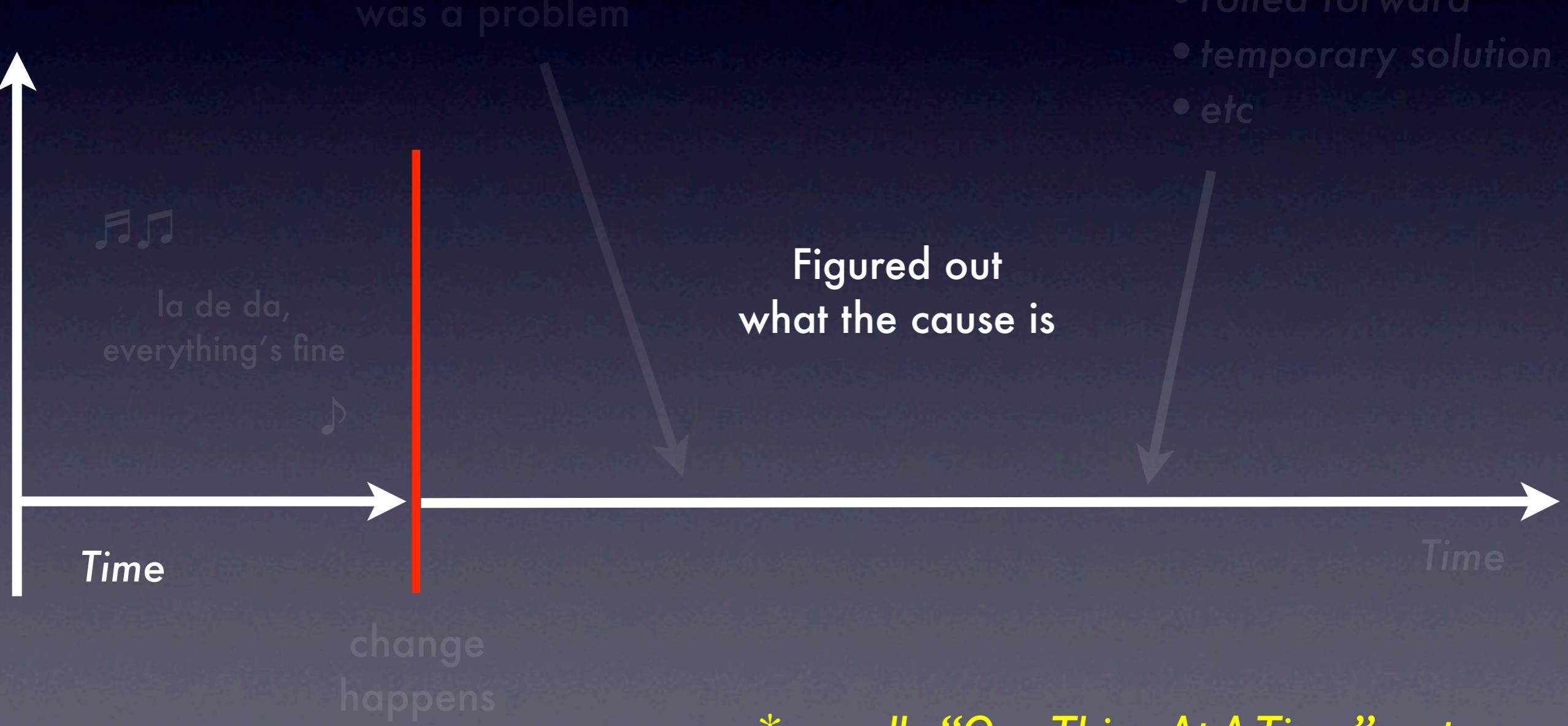
- Coordinate responses*



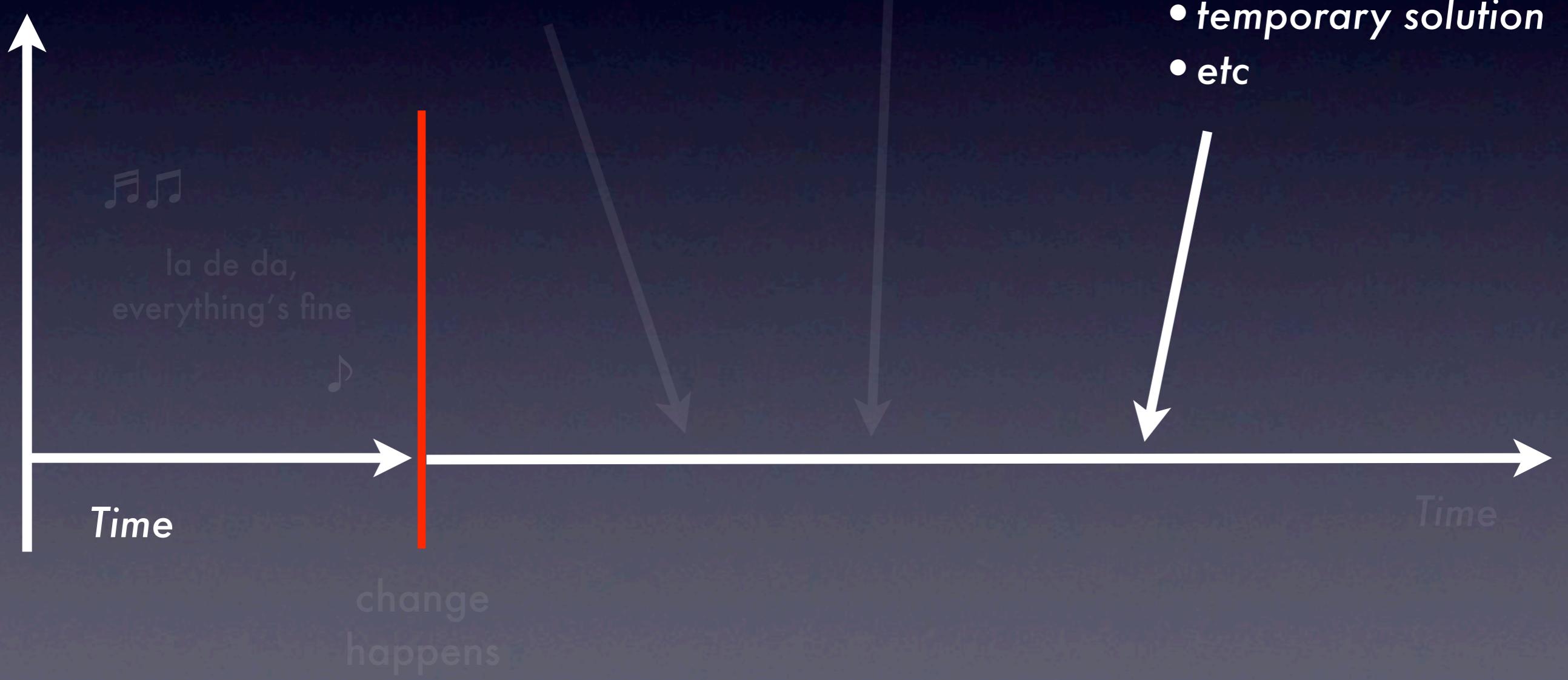
change
happens

* usually, “One Thing At A Time” responses

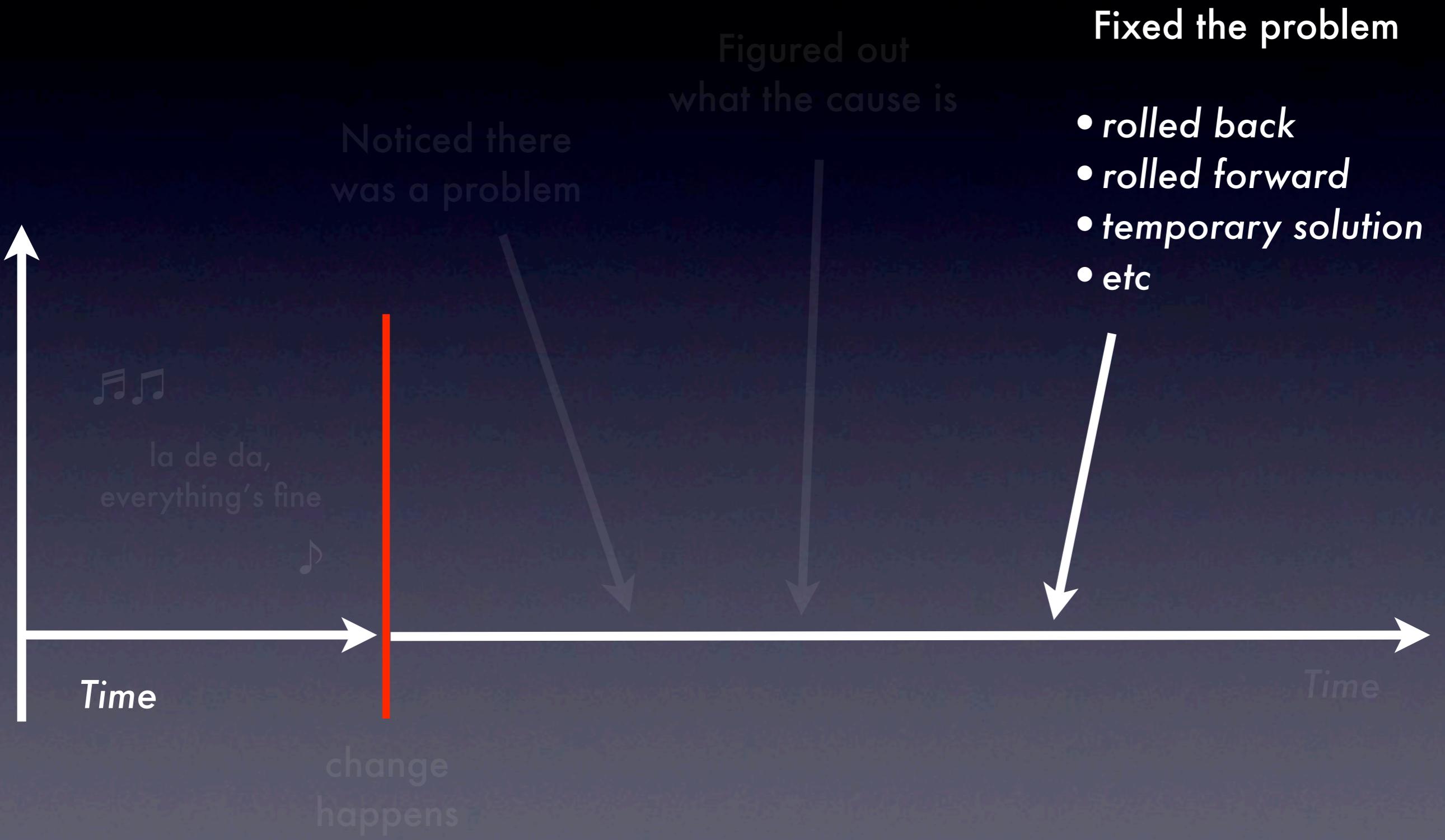
- Coordinate responses*
- Communicate to support/community/execs



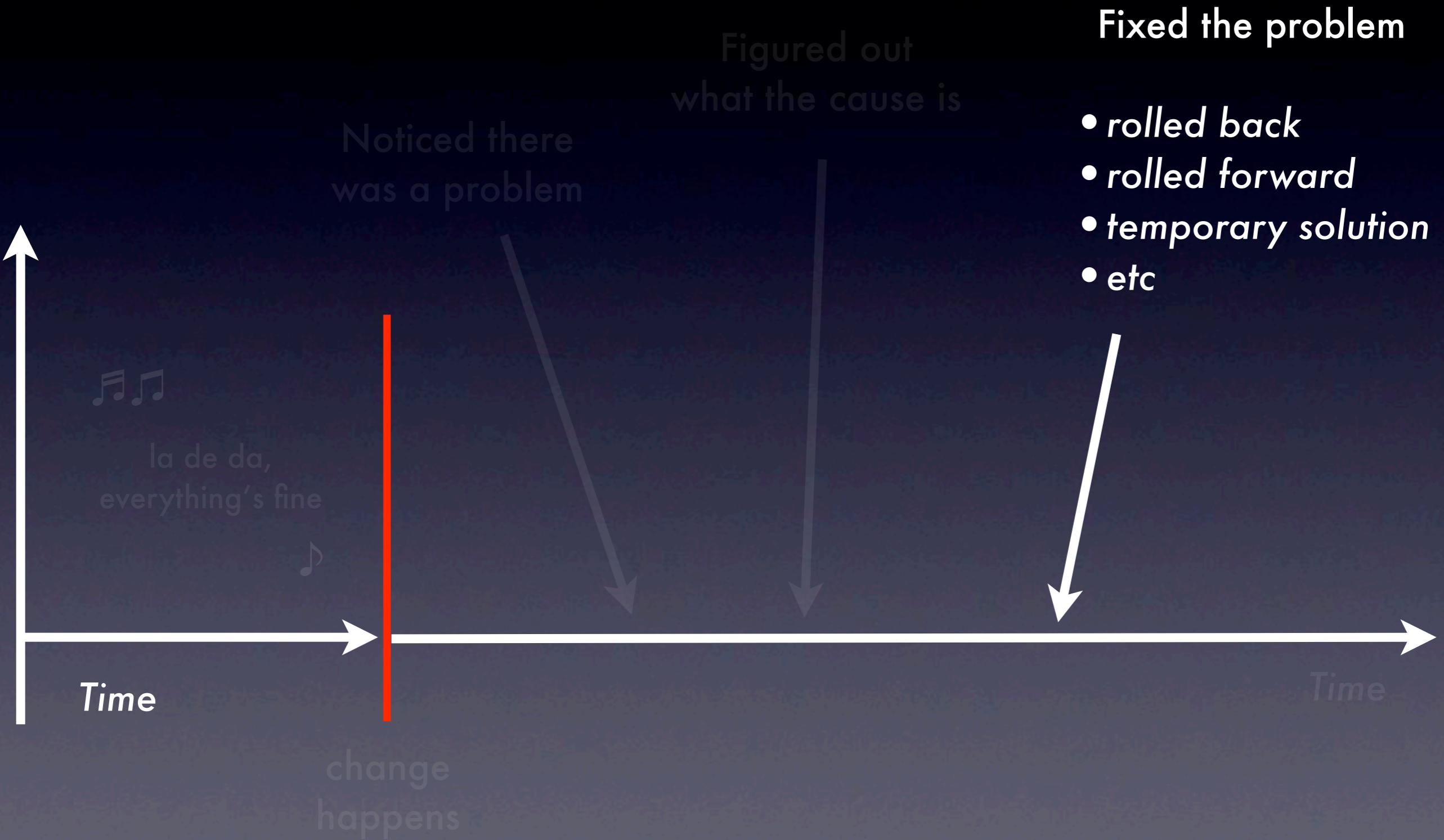
* usually, “One Thing At A Time” responses



- Confirm stability, resolving steps



- Confirm stability, resolving steps
- Communicate to support/community/execs



Communications

<http://etsystatus.com>

Etsy

Status of Etsy.com
If you're here, it could be because
Etsy's down. Rest assured that
we're aware of it, and we'll post info
about it right here and @etsystatus
on Twitter.

May 21st Site Issue

In Tech Updates on May 22, 2010 by jailspaw

8:37pm EST: We were able to identify the bug that caused the problem and have pushed a fix to prevent this from happening again. Thank you for understanding while we fixed this issue.

twitter.com/etsystatus

twitter

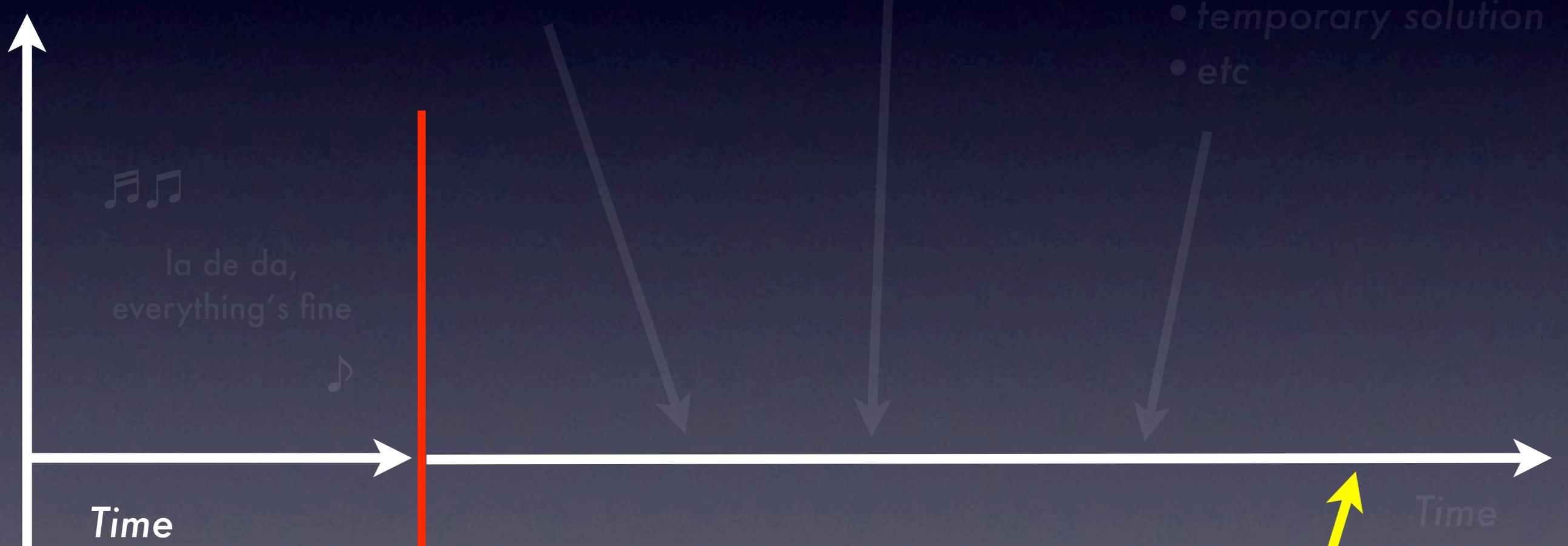
Home Profile Find People Settings Help Sign out

May 21st Site Issue: <http://wp.me/pks2S-aa>

5:47 PM May 21st via WordPress.com

Reply Retweet

Etsy etsystatus
Etsy Status



Noticed there
was a problem

Figured out
what the cause is

Fixed the problem

- *rolled back*
- *rolled forward*
- *temporary solution*
- *etc*

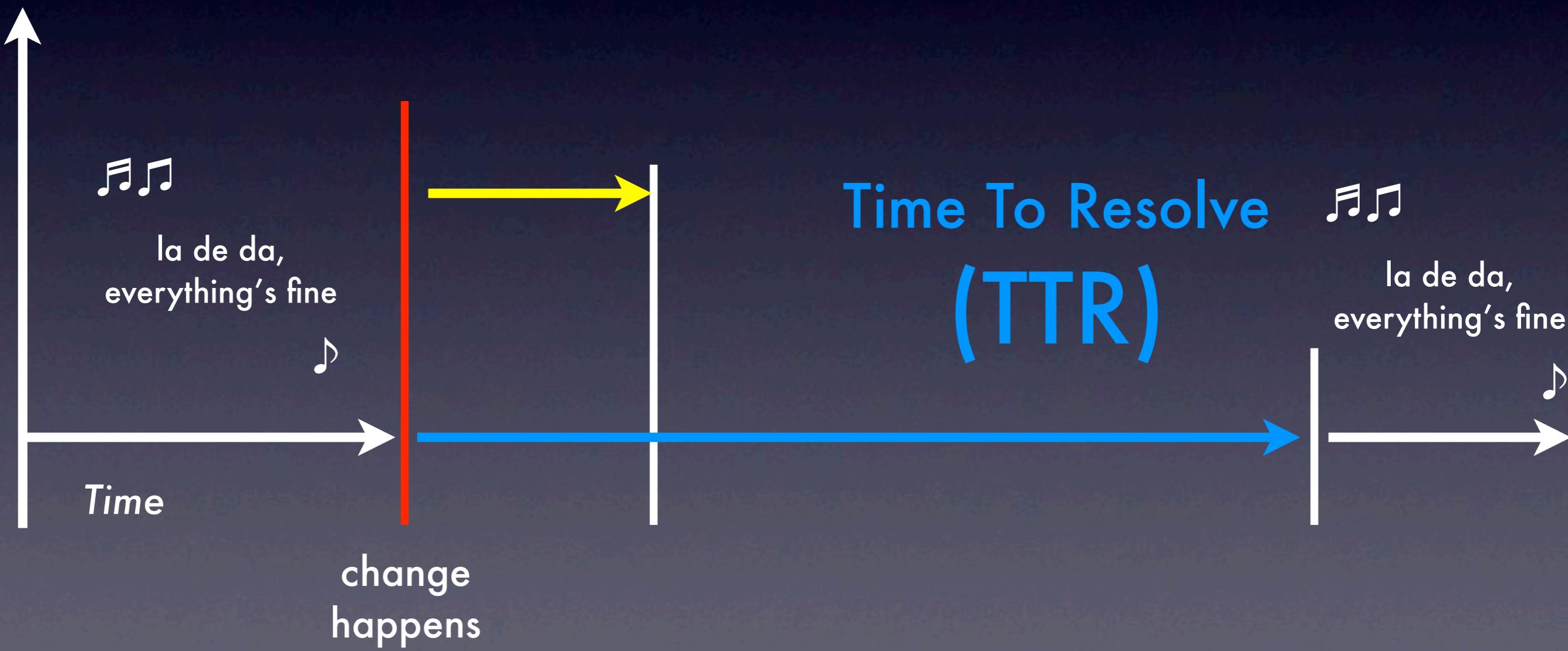
♩ ♩
la de da,
everything's fine
♪

Time

change
happens

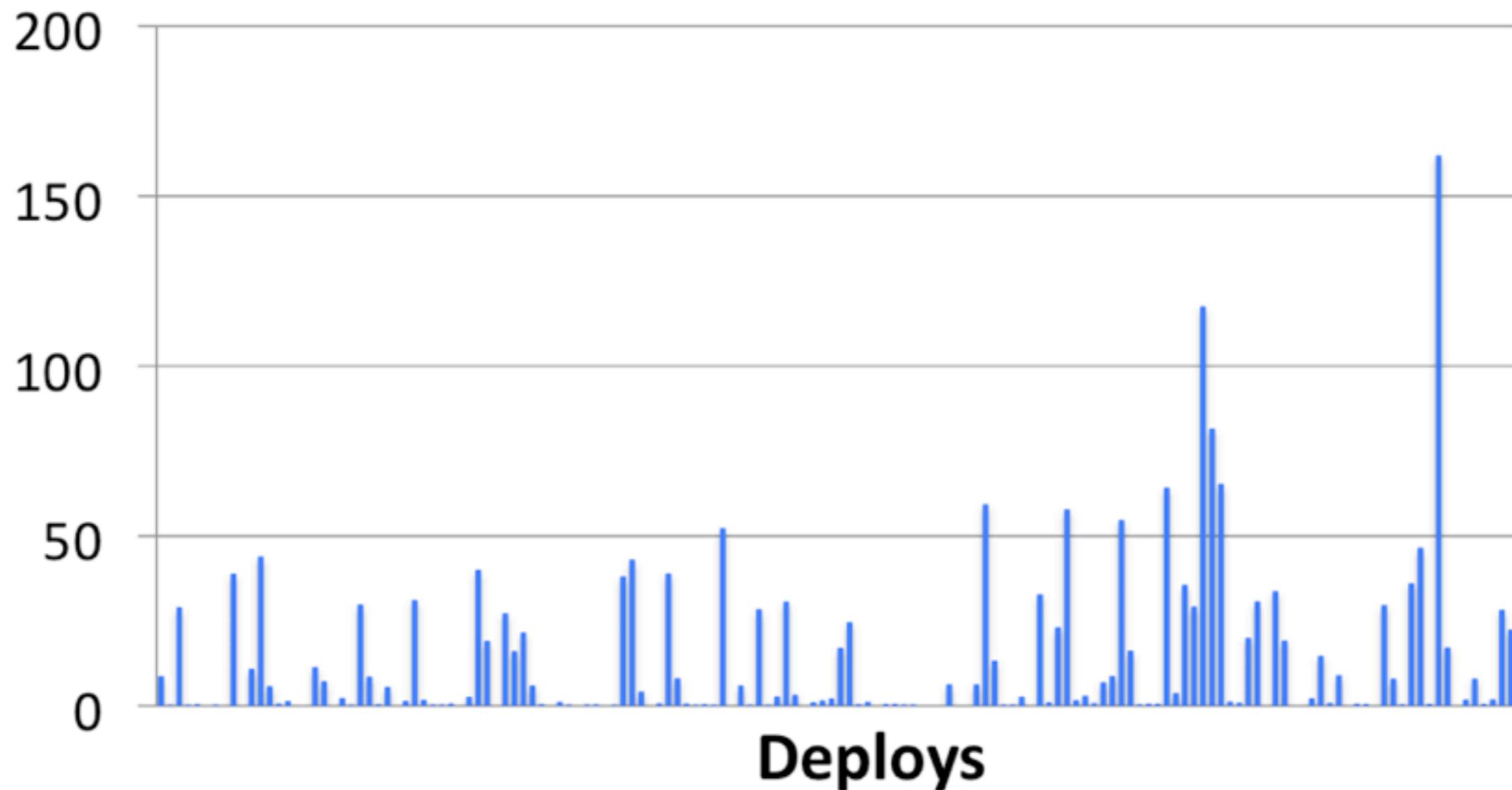
PostMortem

Time To Detect (TTD)



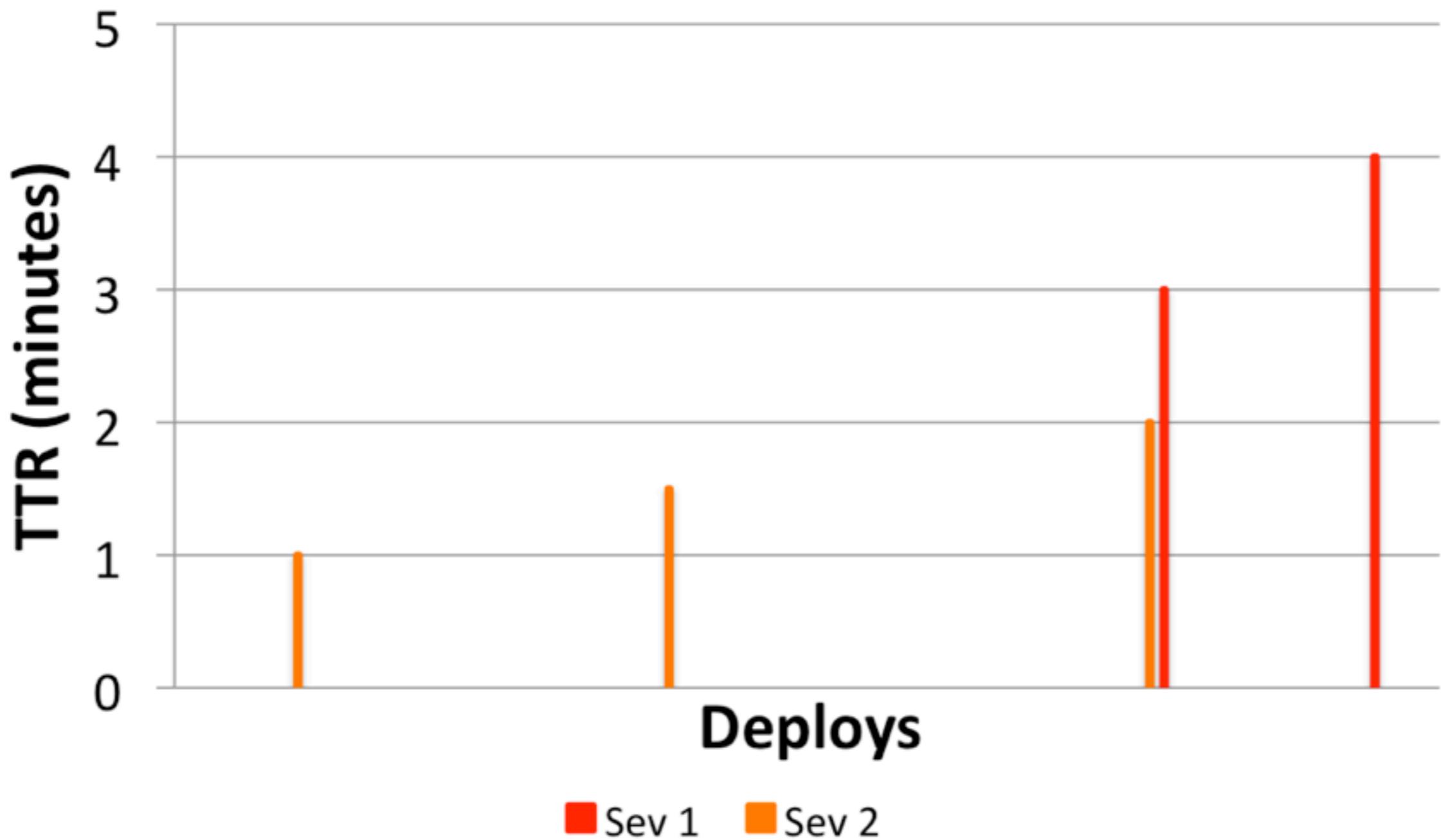
Hypothetical Example: “We’re So Nimble!”

Lines of Code Changed Per Deploy



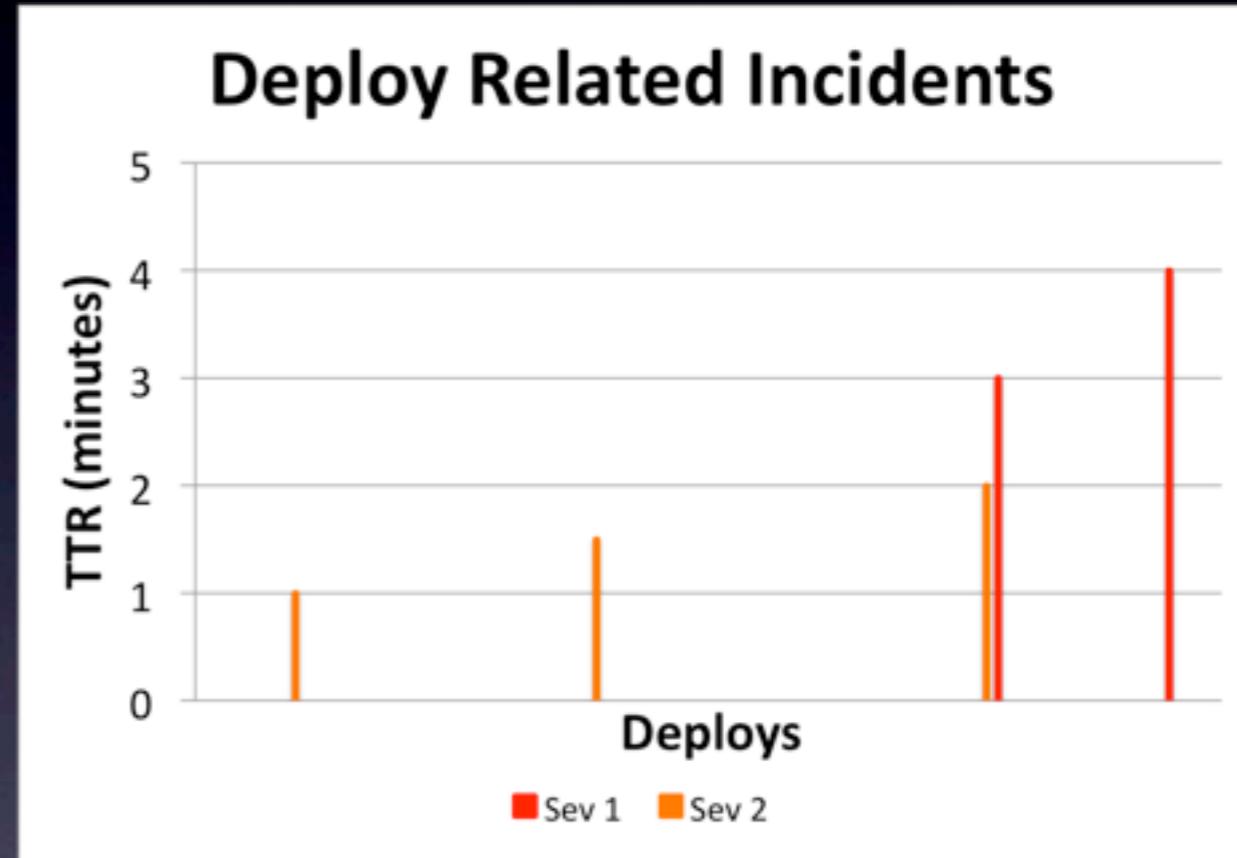
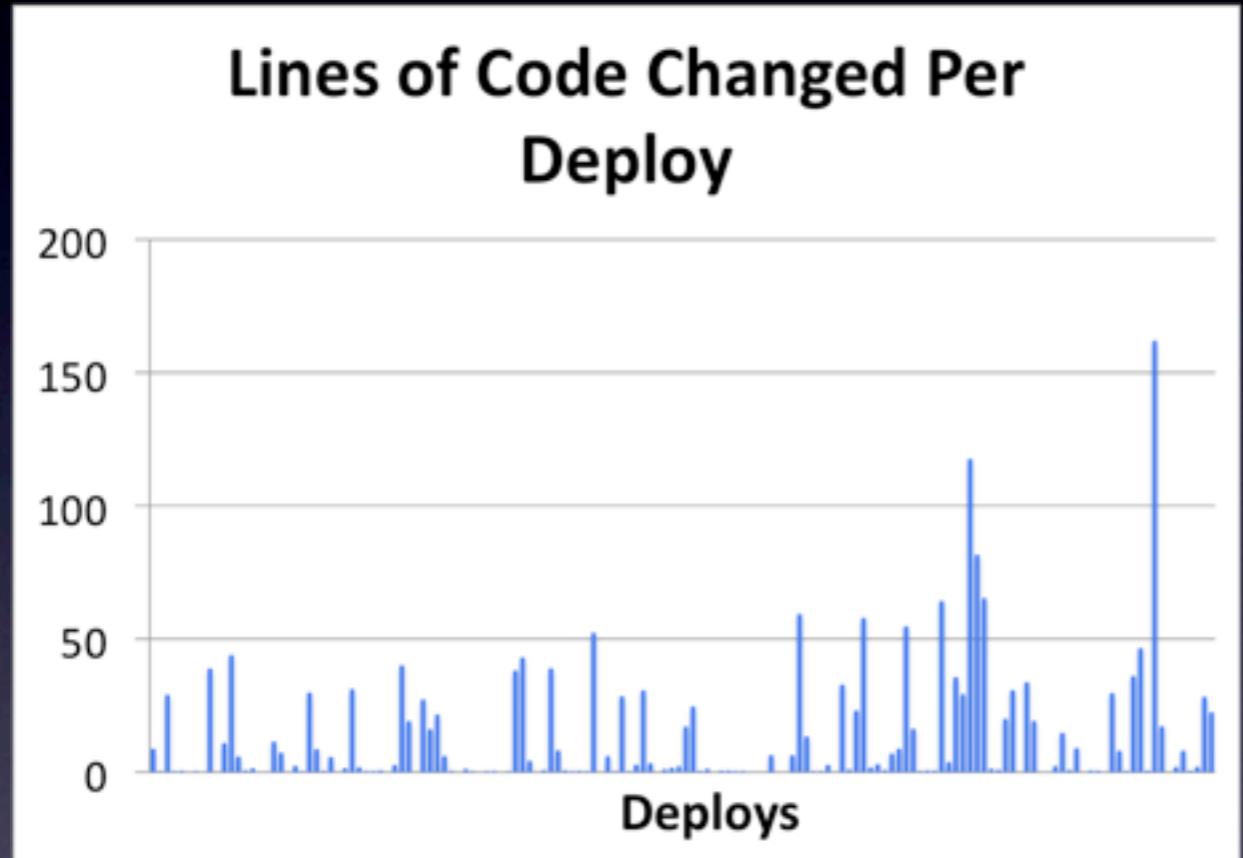
Nimble, But Stumbling?

Deploy Related Incidents

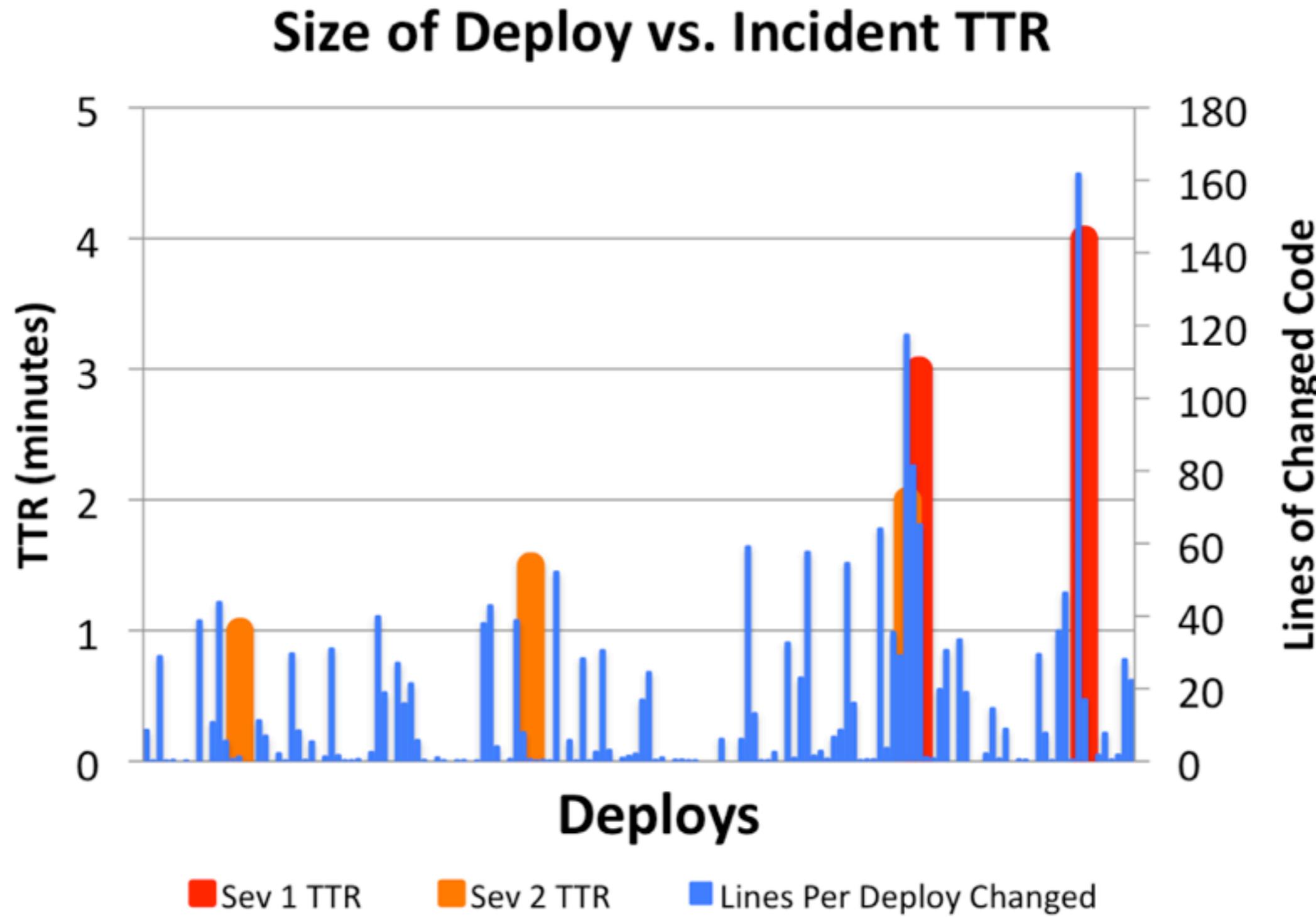


Is There Any Pattern?

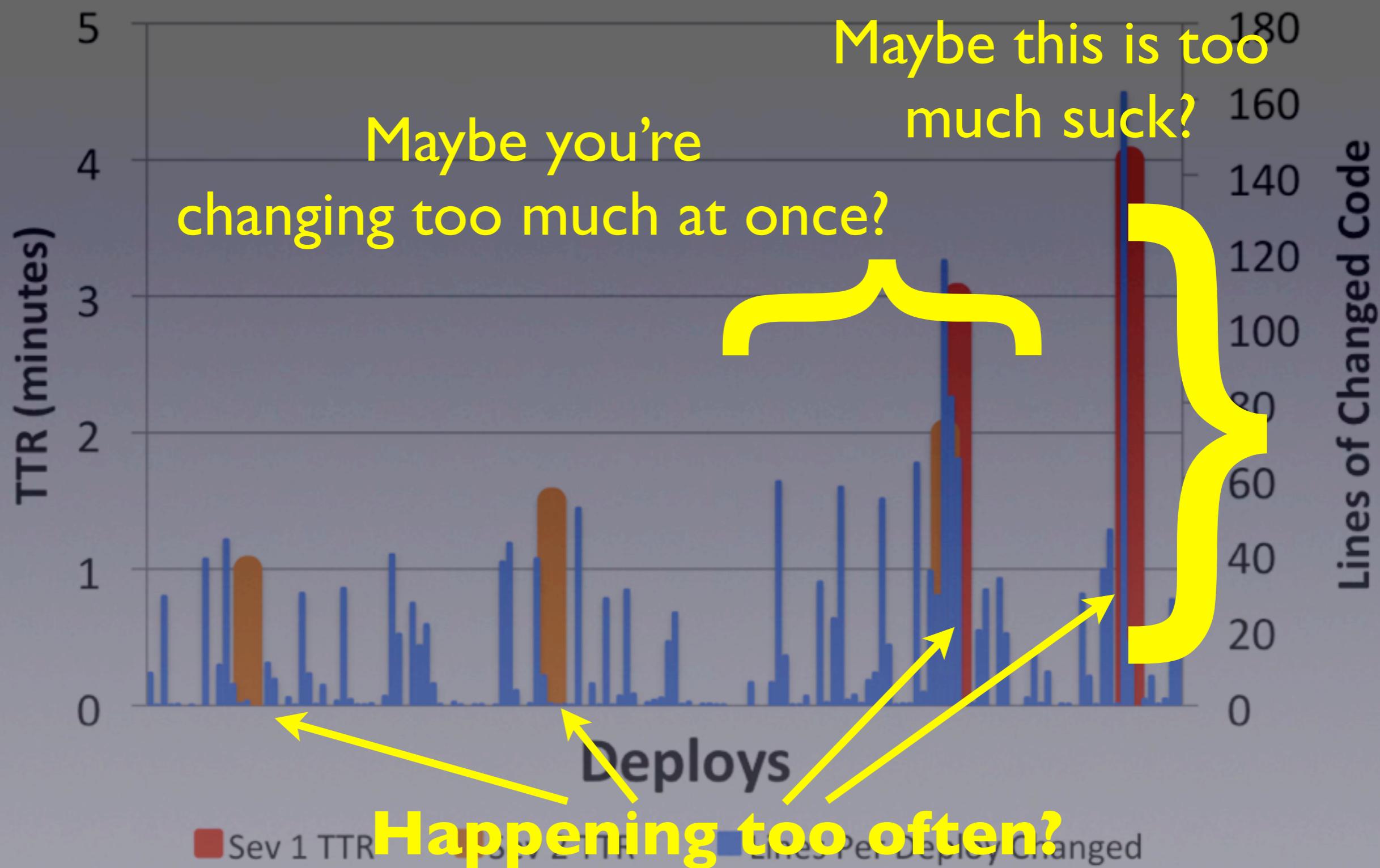
Nimble, But Stumbling?



Nimble, But Stumbling?



Size of Deploy vs. Incident TTR

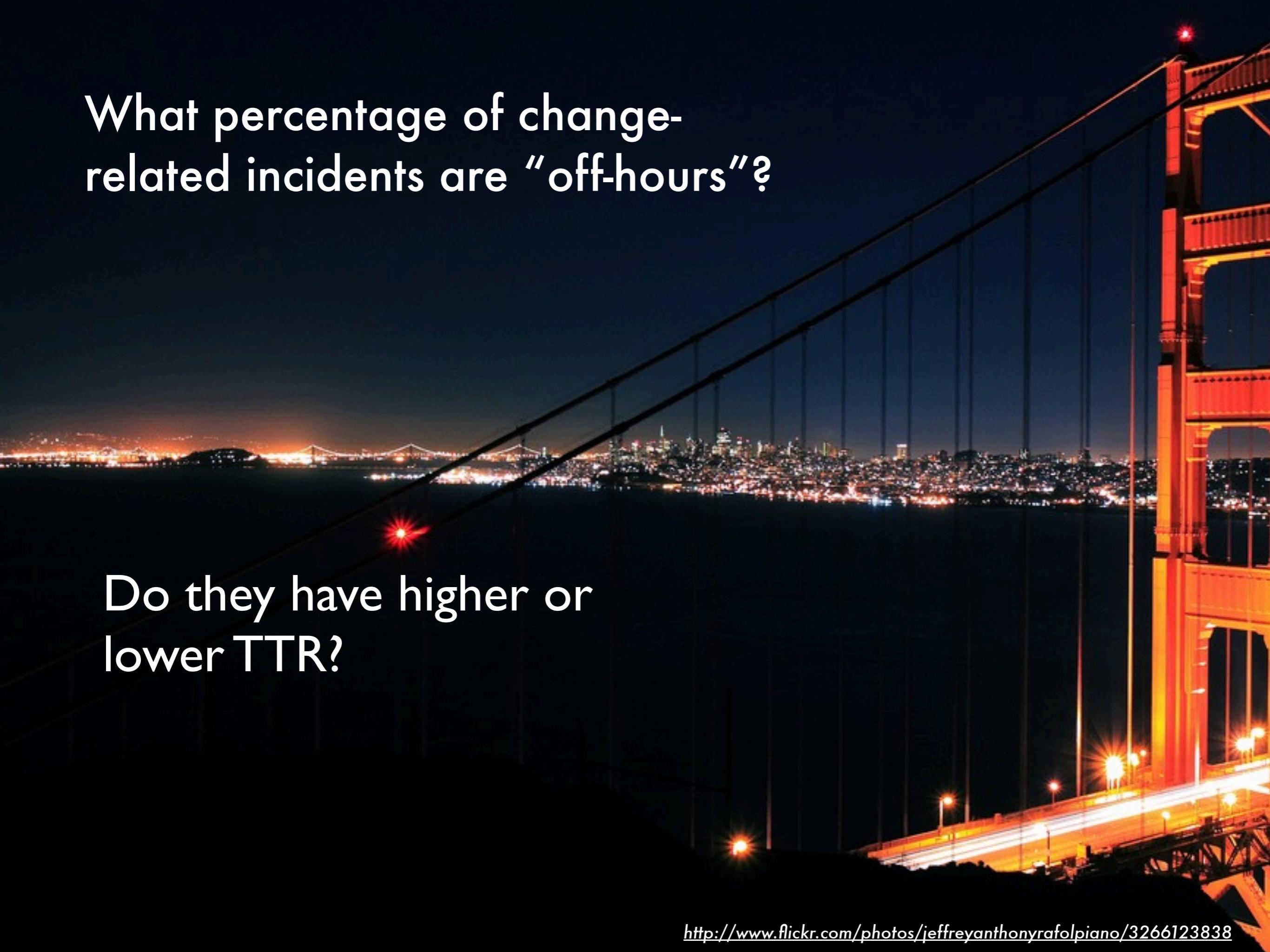


What percentage of incidents are related to change?



What percentage of change-related incidents are “off-hours”?

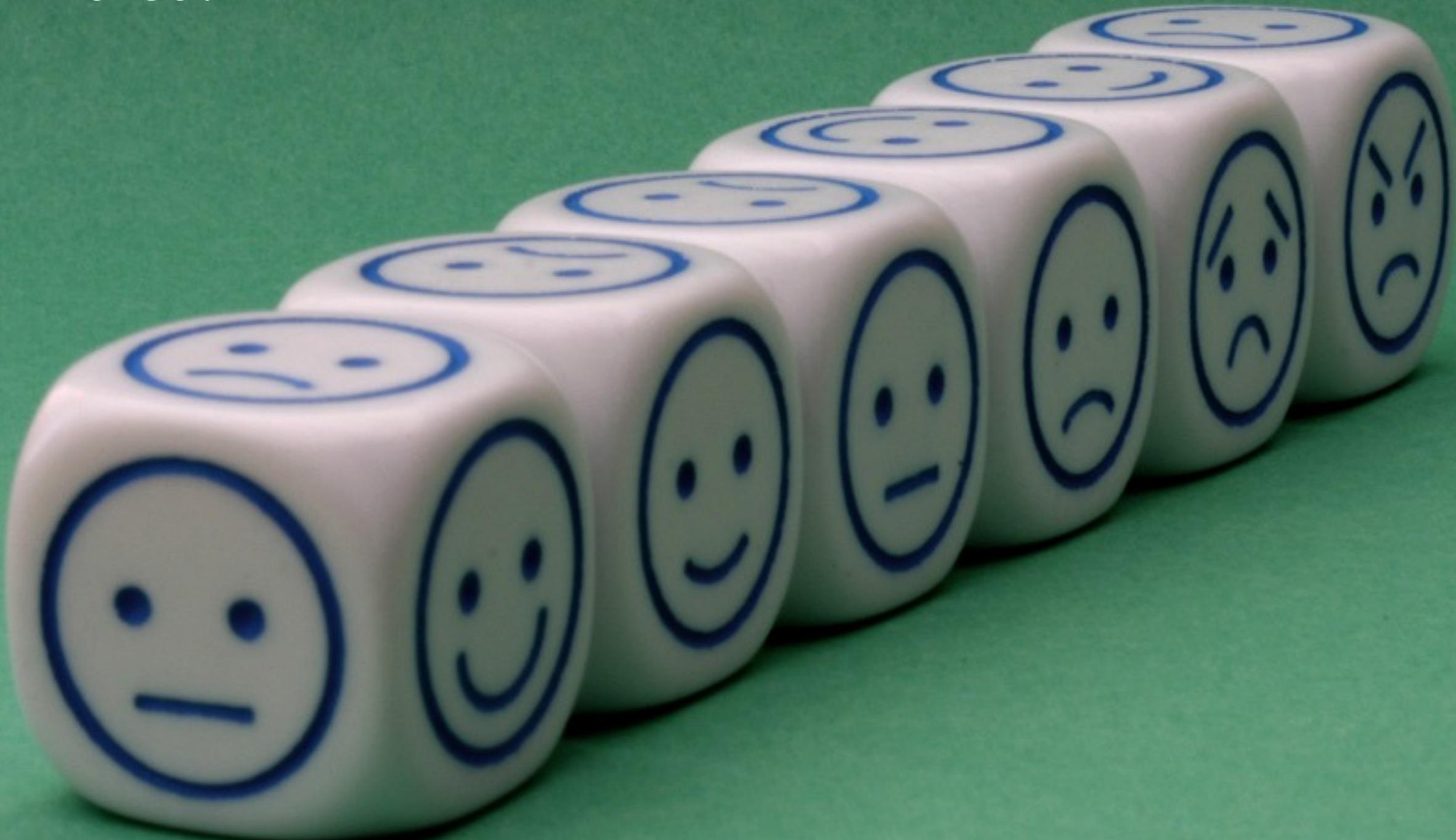




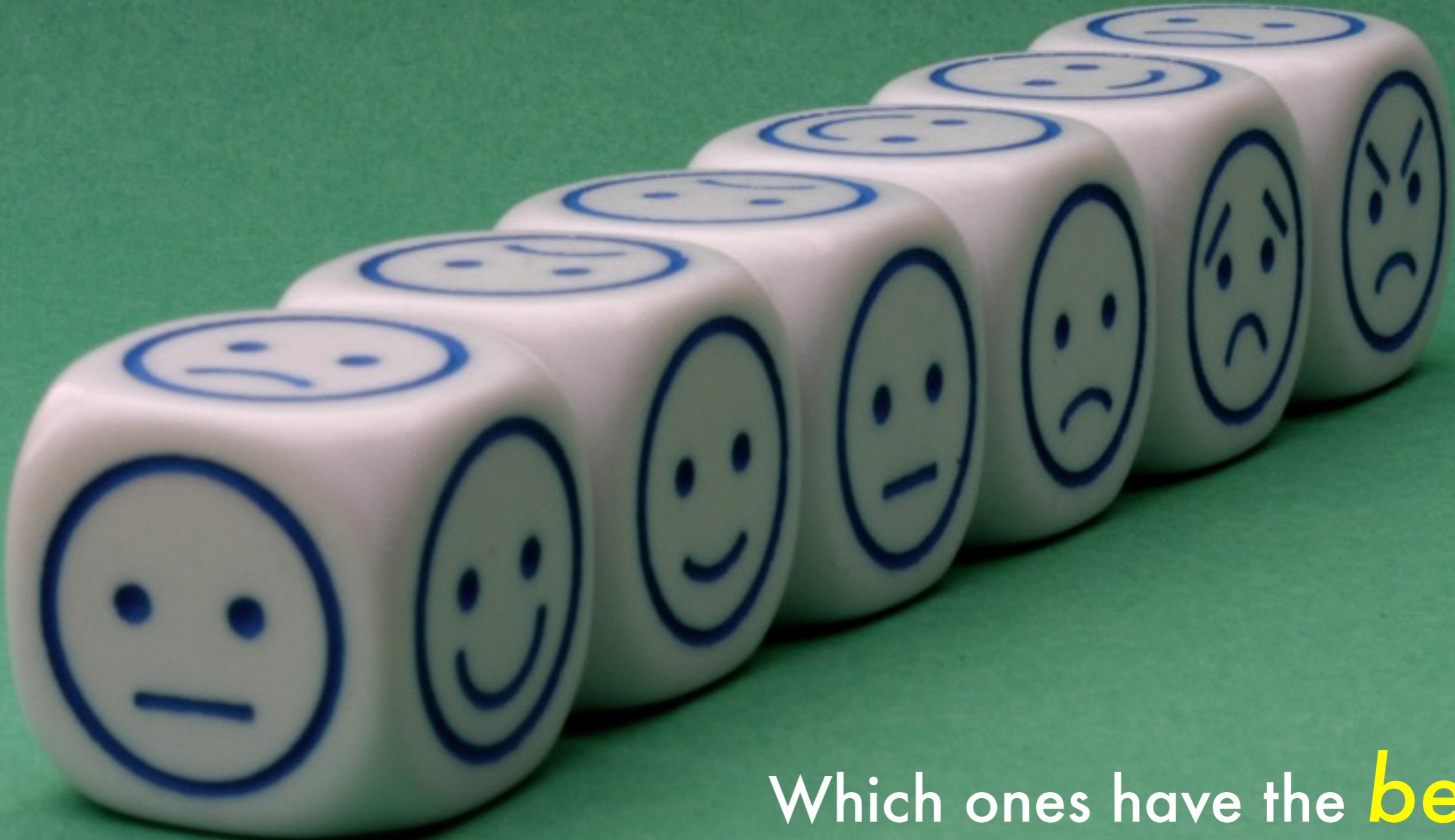
What percentage of change-related incidents are “off-hours”?

Do they have higher or lower TTR?

What types of change have the **worst** success rates?



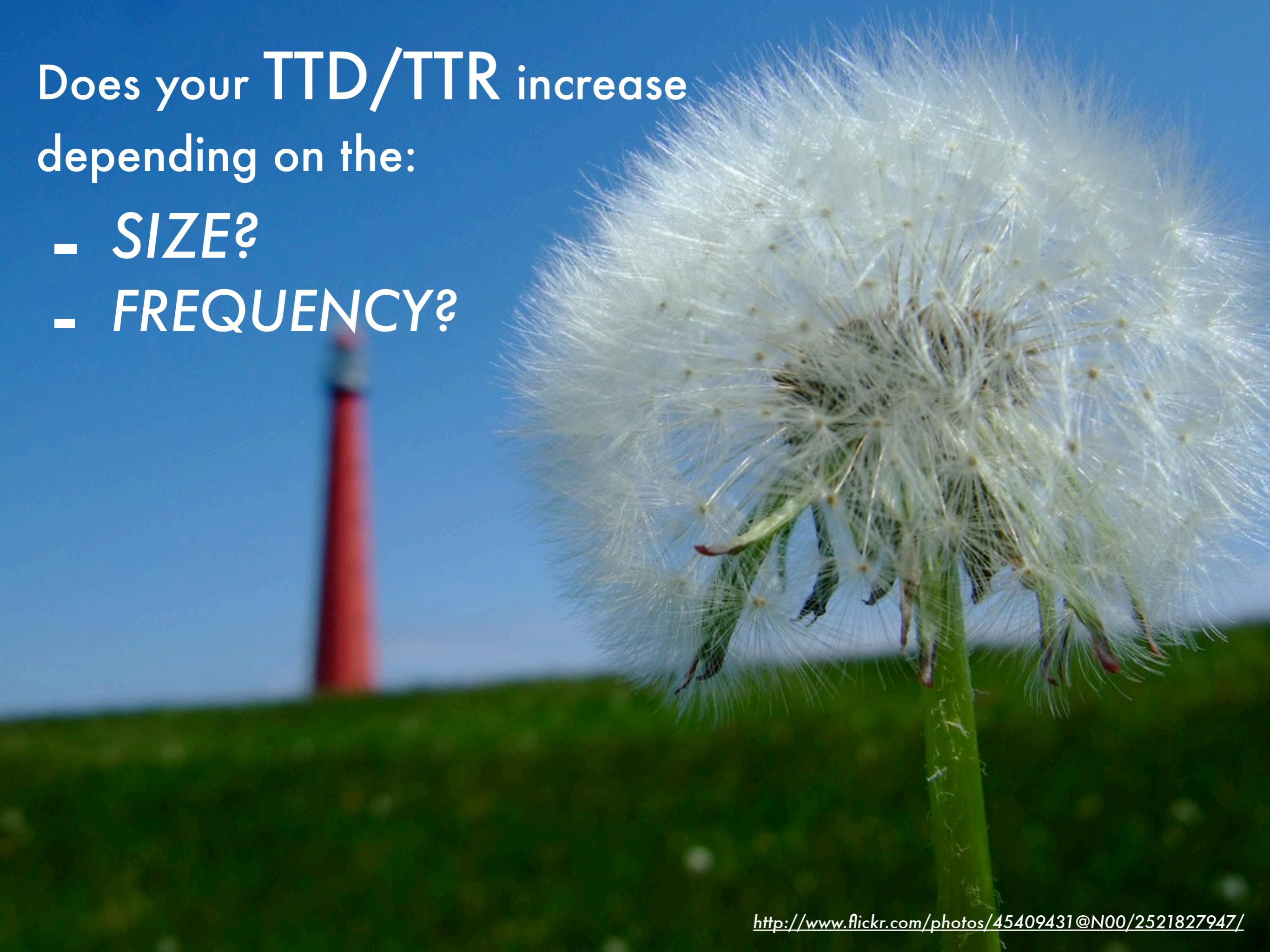
What types of change have the **worst** success rates?



Which ones have the **best** success rates?

Does your TTD/TTR increase
depending on the:

- SIZE?
- FREQUENCY?



A close-up photograph of a mantis silhouetted against a bright blue background. The mantis is positioned on the left side of the frame, its body oriented vertically. It has long, thin legs and antennae. The background is a solid, vibrant blue.

Side effect is
that you're
also tracking
successful
changes to
production
as well

Q2 2010

Type	Successes	Failures	Success Rate	Incident Minutes(Sev 1 /2)
App code	420	5	98.81	8
Config	404	3	99.26	5
DB Schema	15	1	93.33	10
DNS	45	0	100	0
Network (misc)	5	0	100	0
Network (core)	1	0	100	0

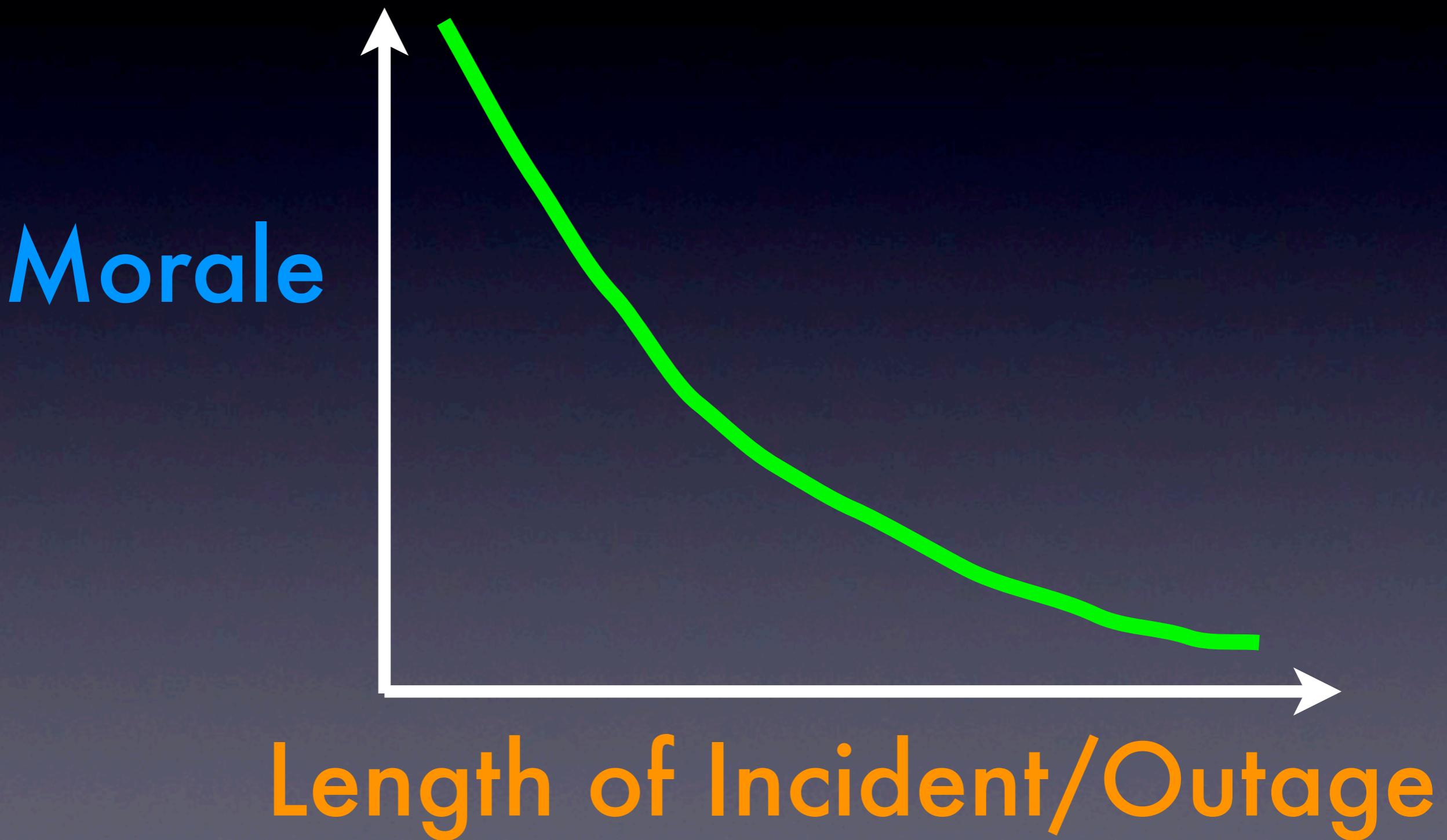
Q2 2010

Type	Successes	Failures	Success Rate	Incident Minutes(Se v1/2)
App code	420	1	98.81	8
Config	404	0	99.26	5
DB Schema	15	0	93.33	10
DNS	45	0	100	0
Network (misc)	5	0	100	0
Network (core)	1	0	100	0

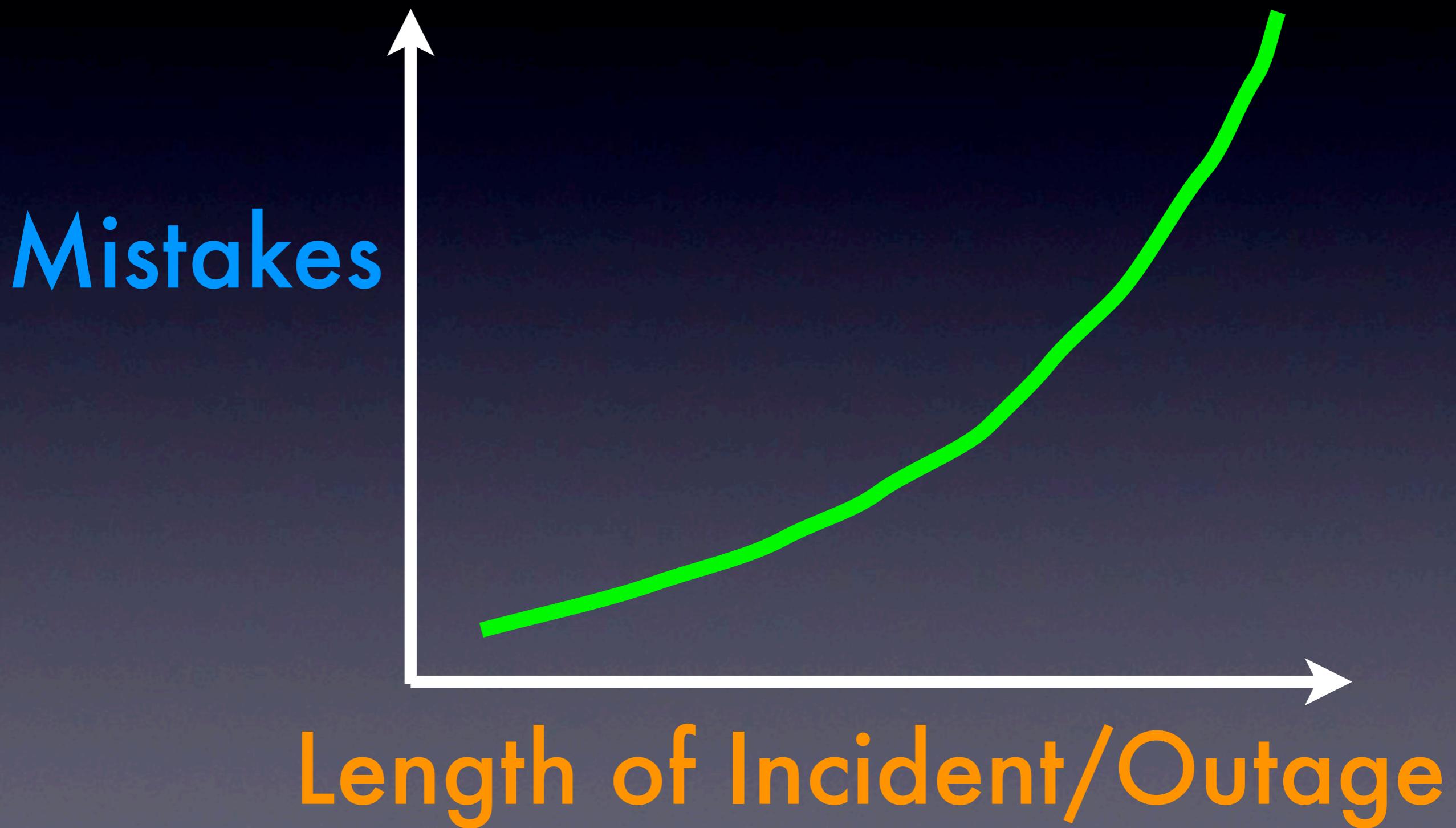
Some Observations



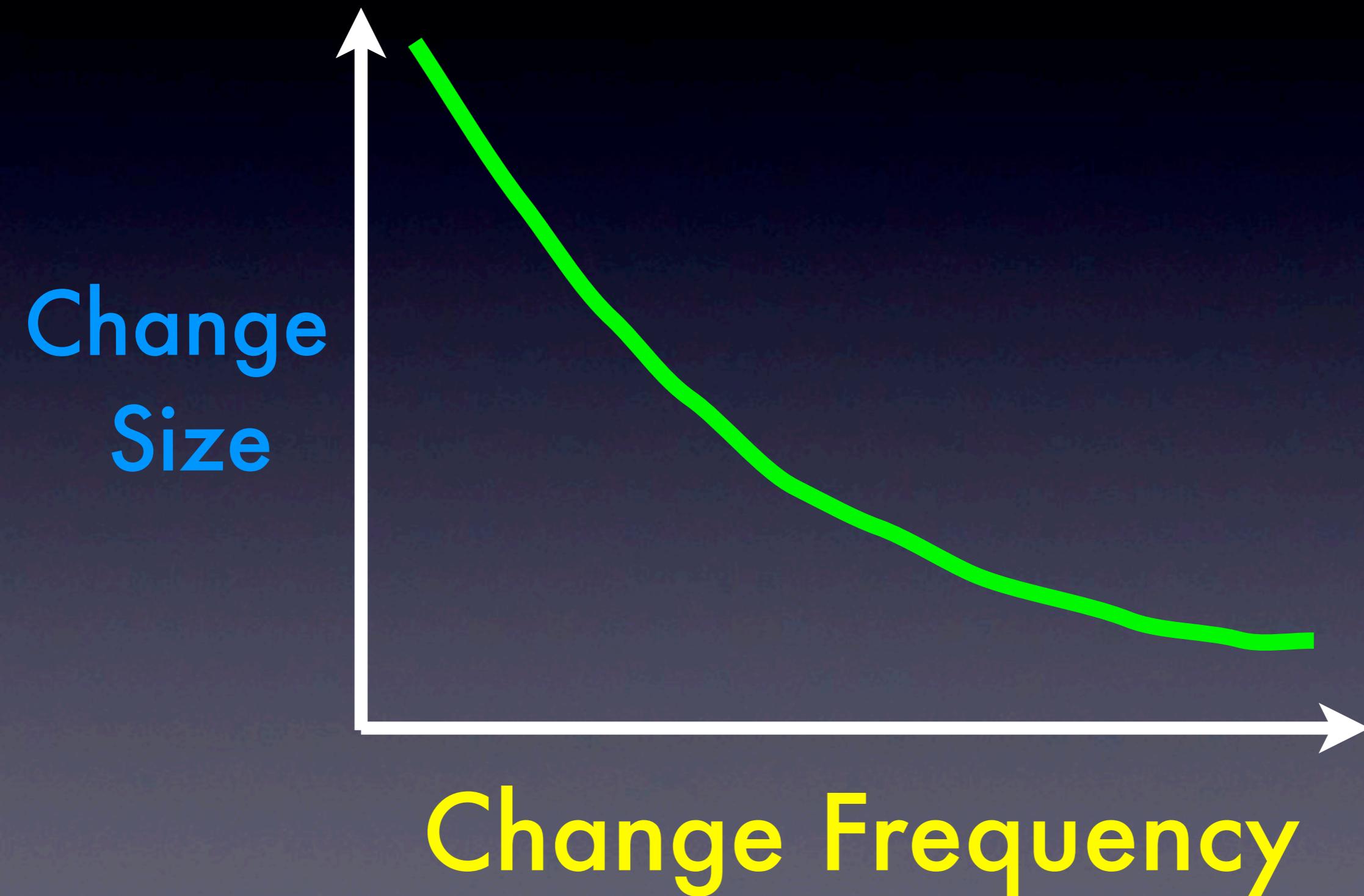
Incident Observations



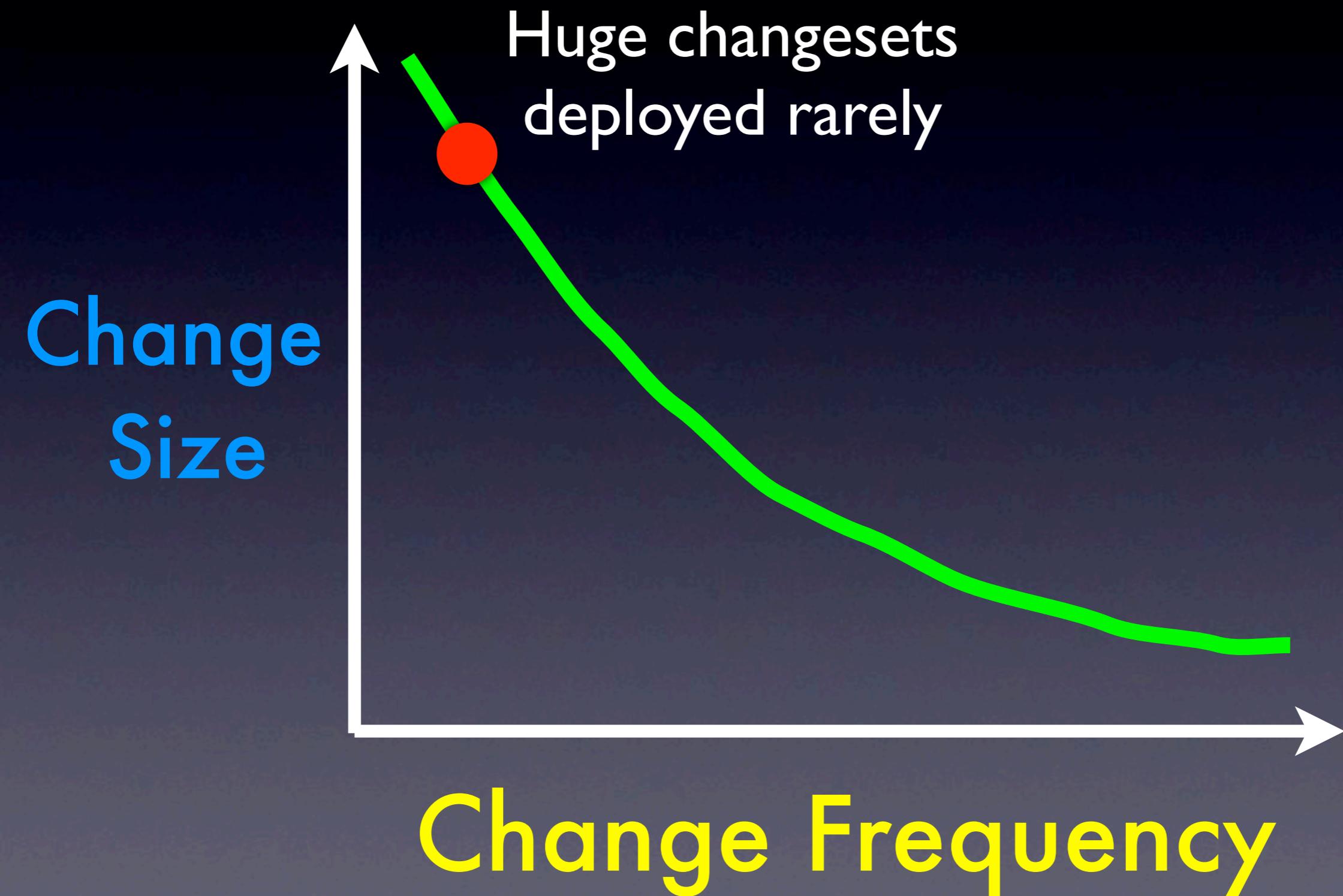
Incident Observations



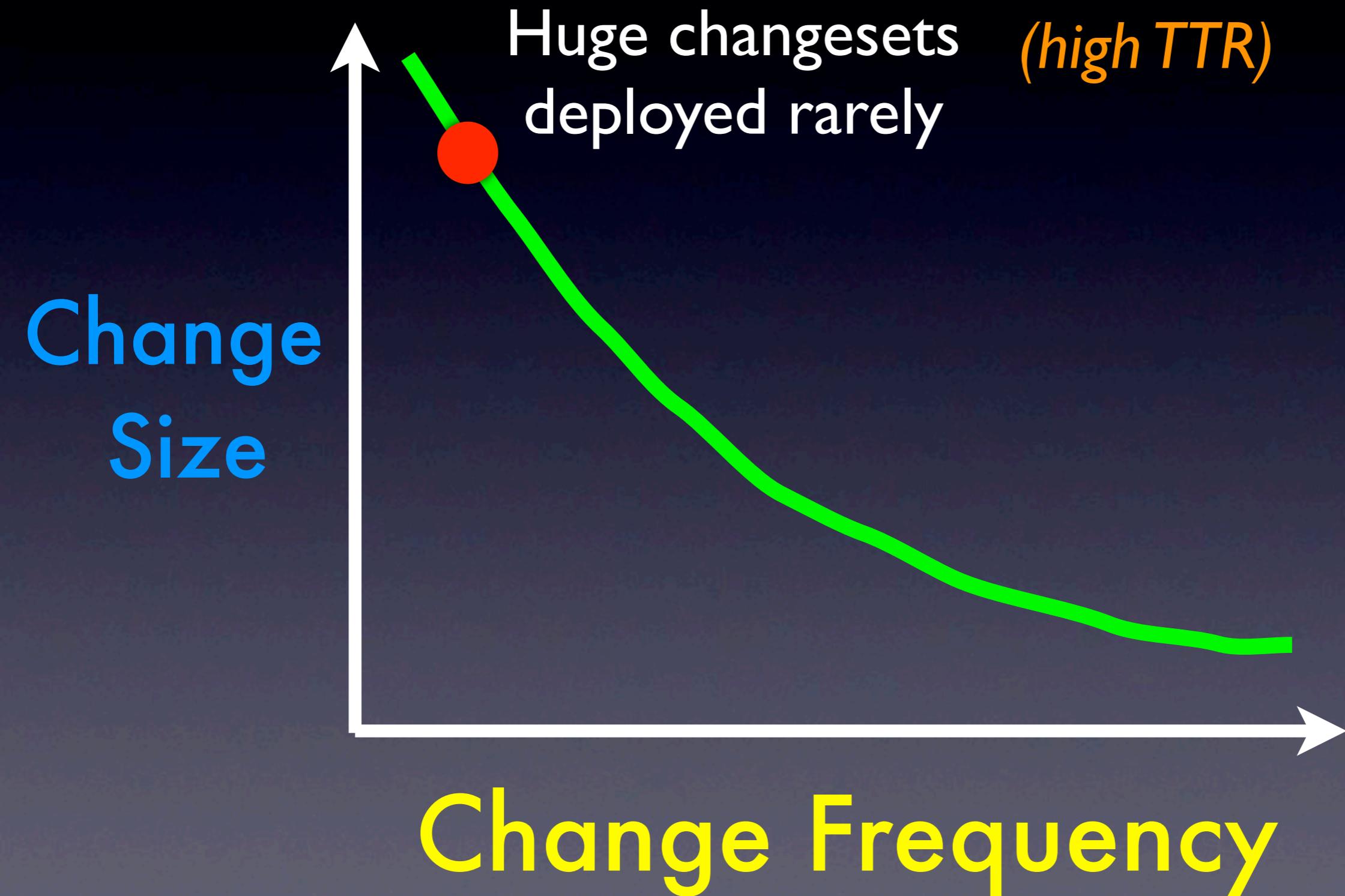
Change Observations



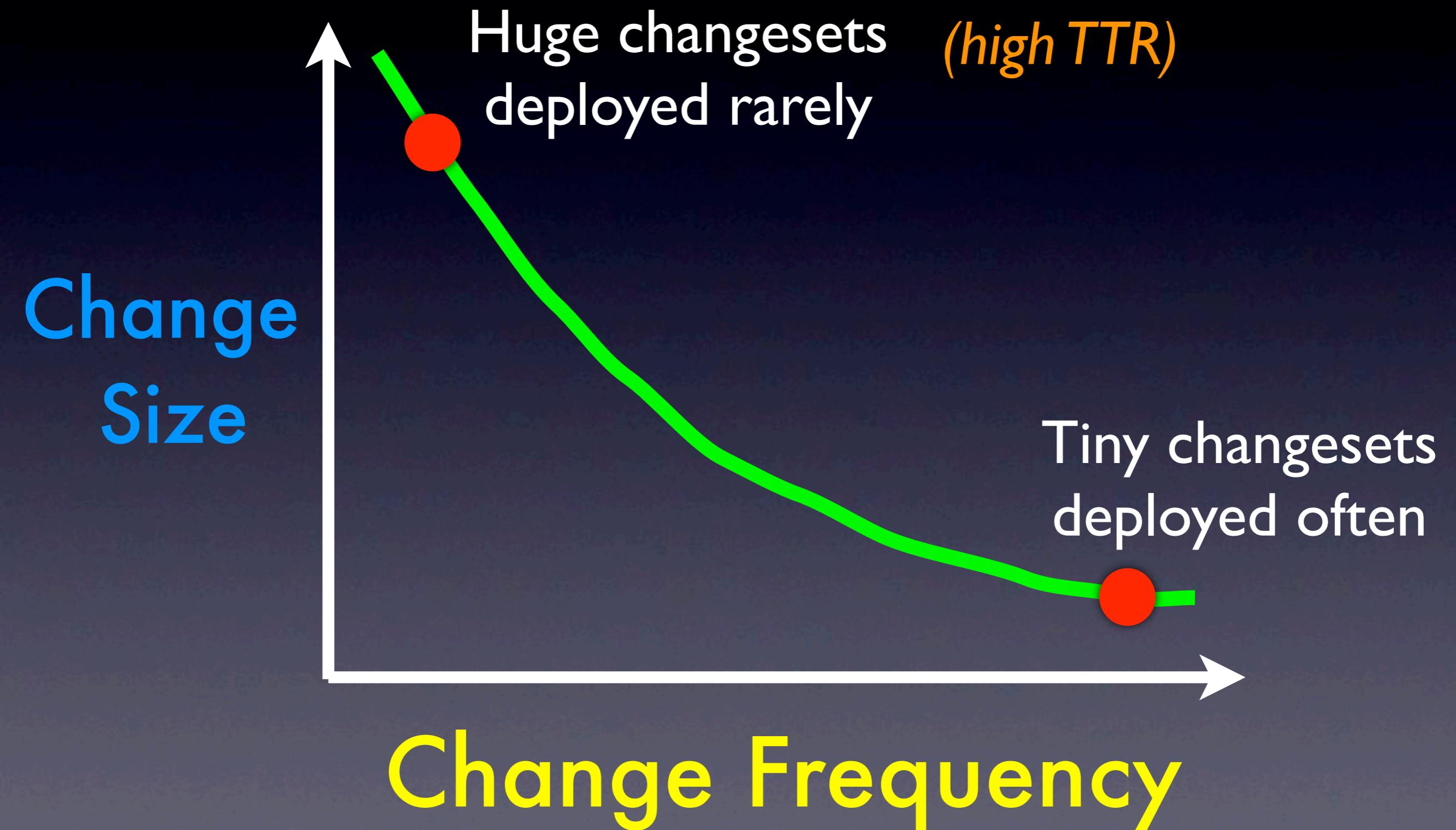
Change Observations



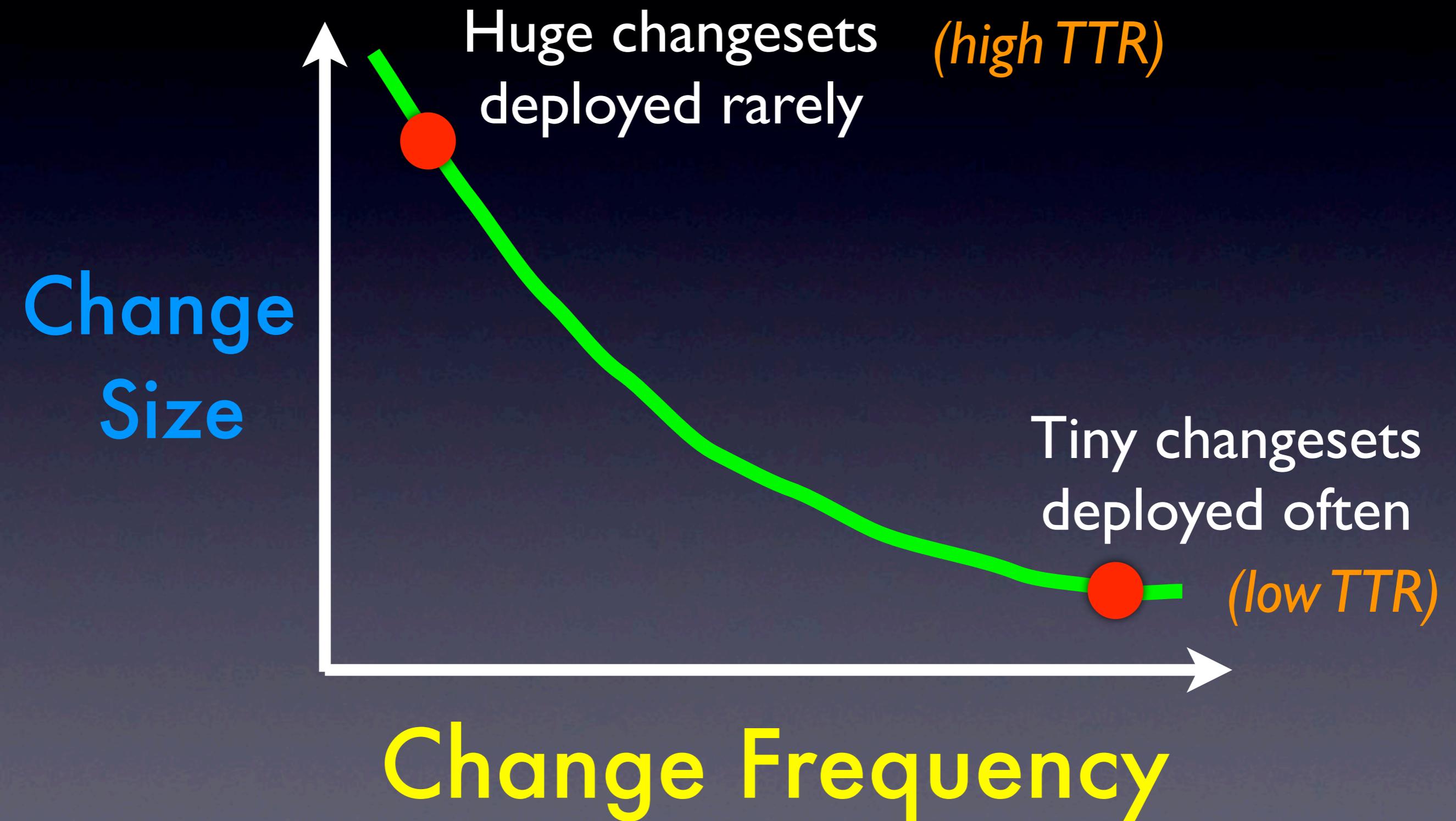
Change Observations



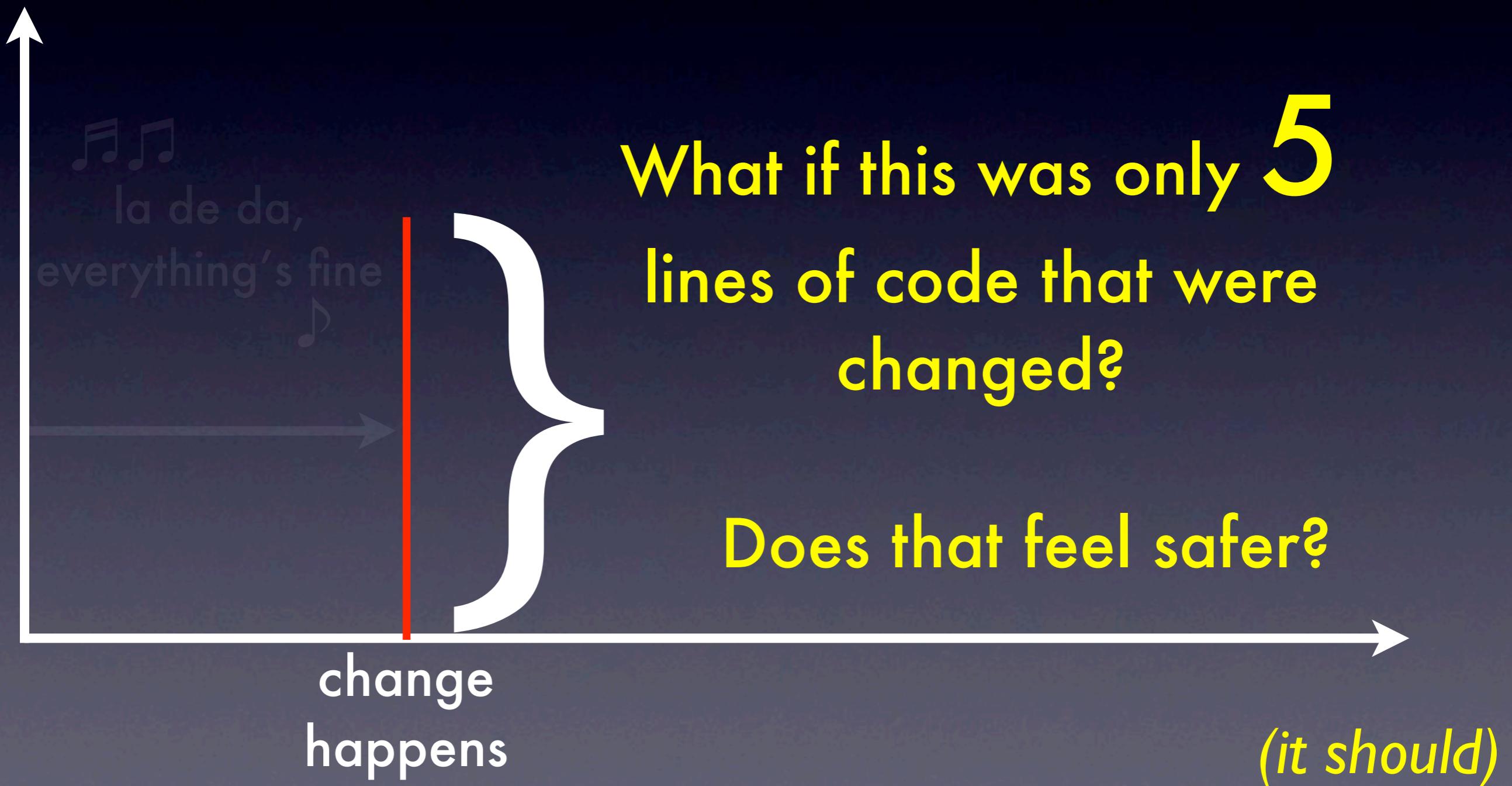
Change Observations

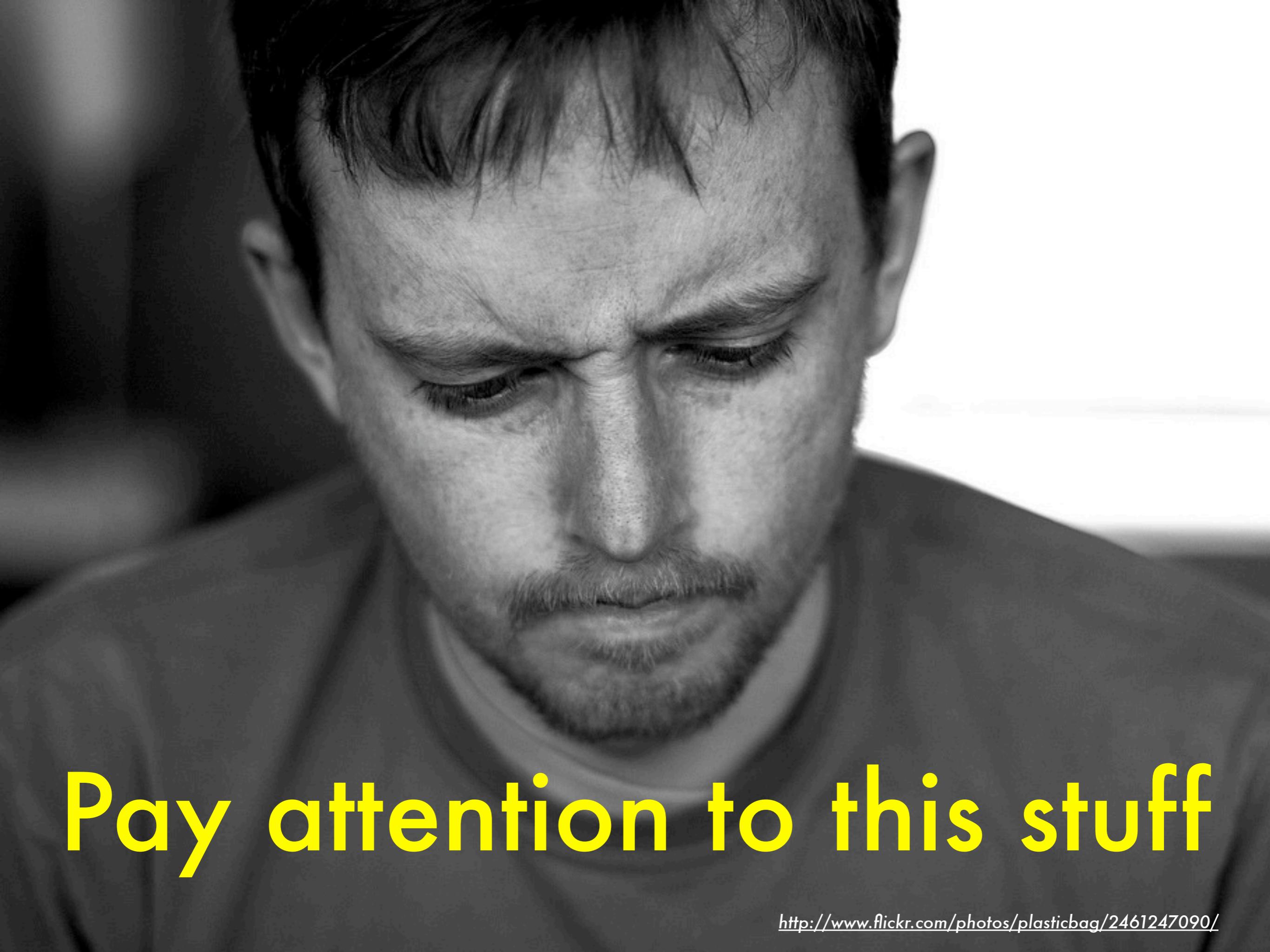


Change Observations



Specifically....





Pay attention to this stuff

We're Hiring Ops!

SF & NYC

Etsy

In May:

- \$22.9M of goods were sold by the community
- 1,895,943 new items listed
- 239,340 members joined

The End

Bonus Time!!1!



Continuous Deployment

Described in 6 graphs

(Originally Cal Henderson's idea)

