

# Fast and Simple

## Observing Code and Infra Deployments at Honeycomb

**Shelby Spees**

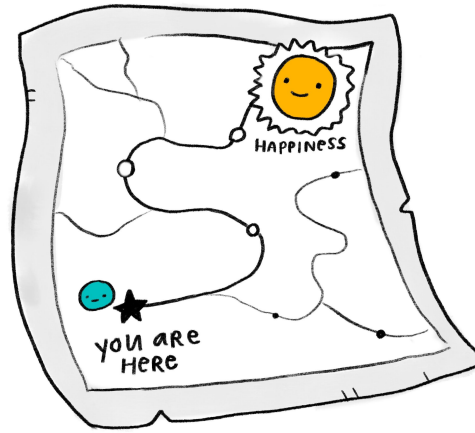
@shelbyspees

#SKILupDay

June 18, 2020

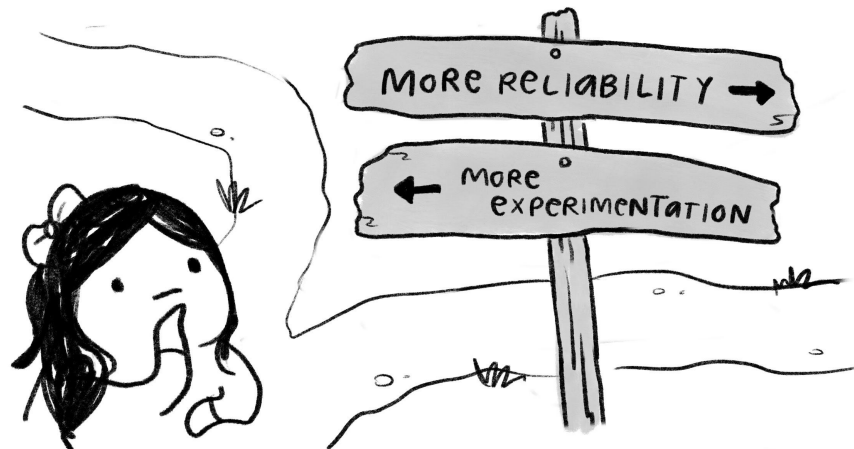


w/ illustrations by @emilywithcurls!



# Observability is evolving quickly.





We need **velocity** *and* **reliability**.

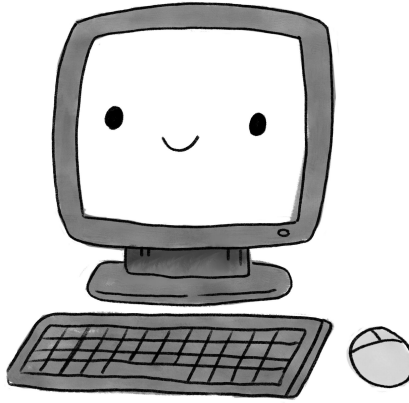




**A dozen engineers **build** Honeycomb.**

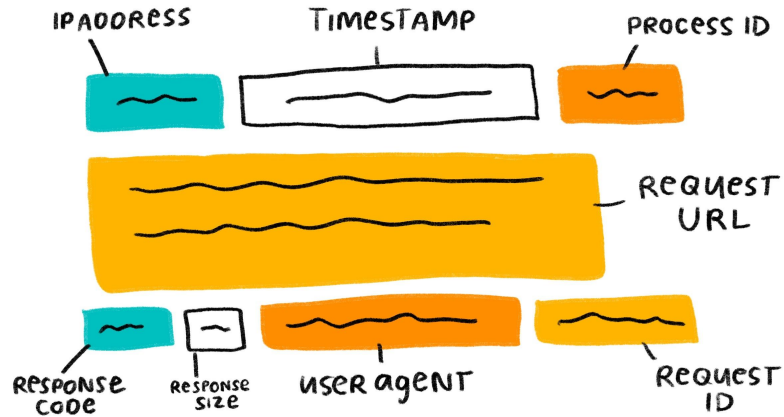






**We make systems humane to run,**





by **ingesting** telemetry,





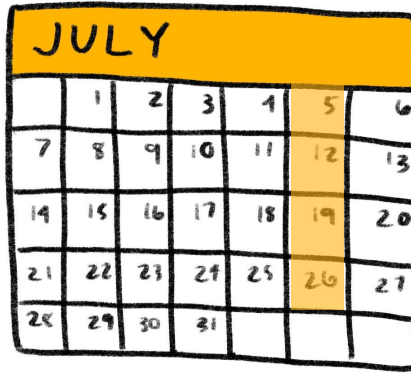
enabling data **exploration**,





and **empowering** engineers.





Yes, we **deploy** on Fridays.





# distinct build\_id per day

Datasets / system\_stats

Add to Board Share ... 11/1 12:00am to 6/11 8:03am

Add a description for this query

fx VISUALIZE  
COUNT\_DISTINCT(build\_id)

WHERE  
build\_id != 0  
host\_group != labrador

GROUP BY  
None; combine all rows

ORDER BY  
None

LIMIT  
None

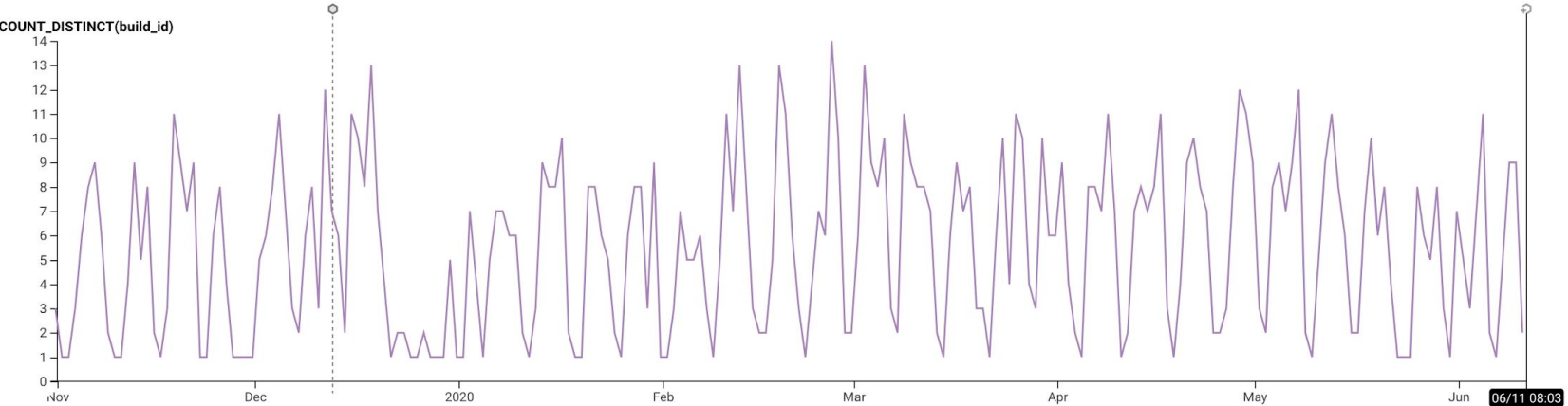
Run Query

Run 8 minutes ago

Nov 1 2019, 12:00 AM - Jun 11 2020, 8:03 AM Granularity: 1 day

Results BubbleUp Traces Raw Data

Graph Settings

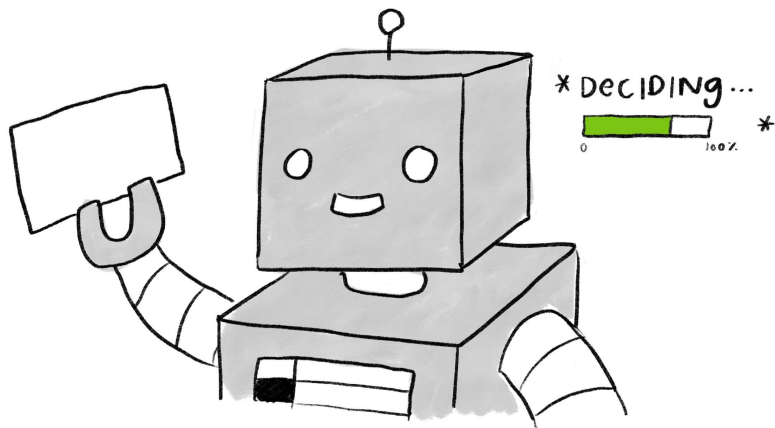


COUNT_DISTINCT(build_id)
879

elapsed query time: 2.521905601s rows examined: 90,322,310 nodes reporting: 100%



@shelbyspees at #SKILupDay



**Continuous delivery** is an investment.

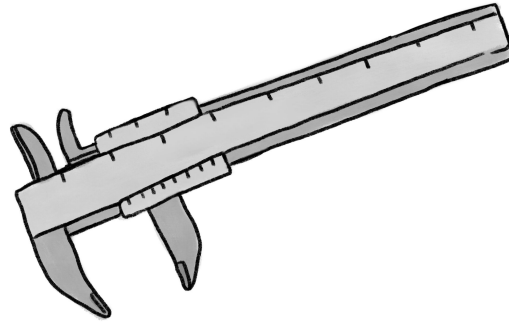




# How did we get **there**?

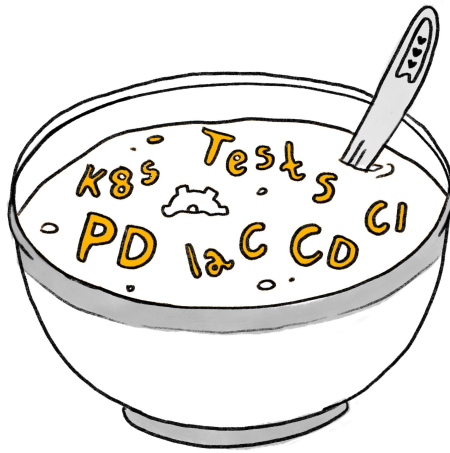




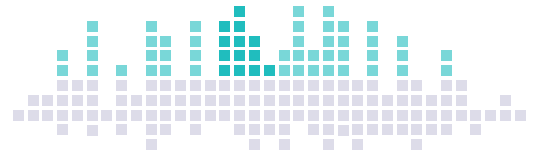


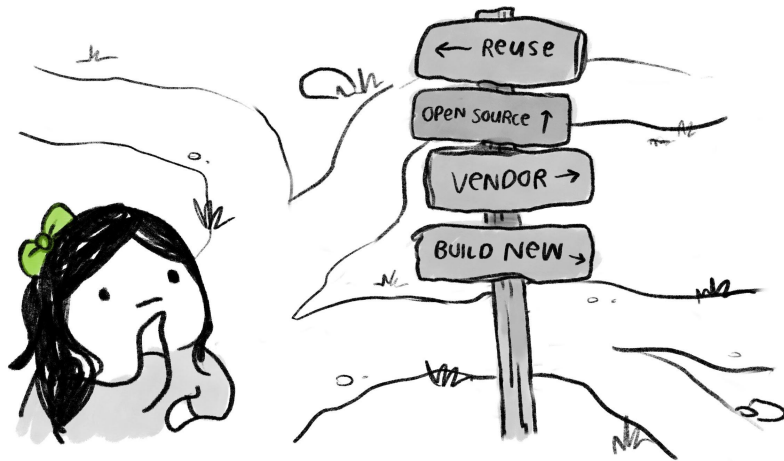
**Investment** in tooling paid off,





but we didn't need **all the soup.**



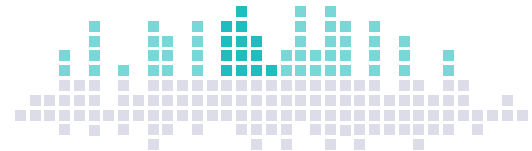


We needed to be thoughtful.





and we needed **cultural process** too!

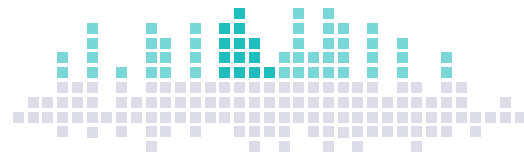


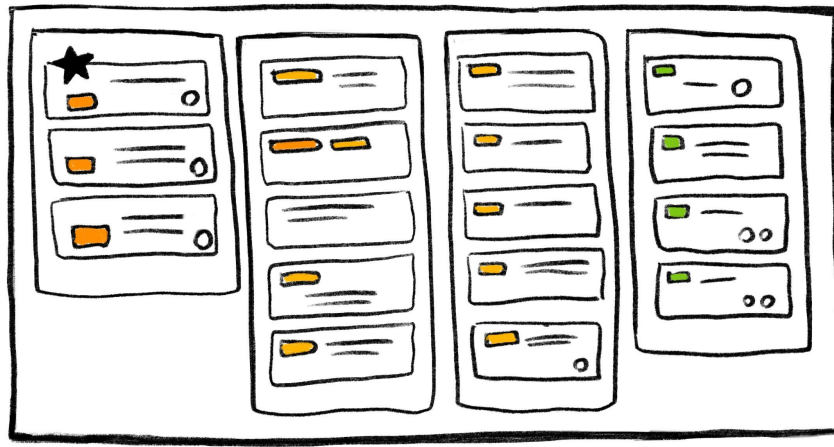


# Continuously evaluate tech debt.

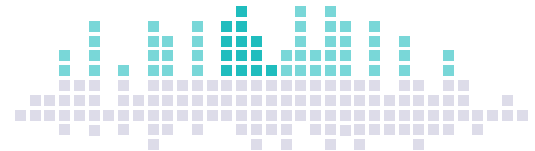


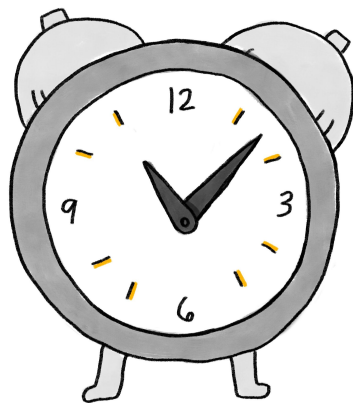
@shelbyspees at #SKILupDay





and improve **where it matters.**





# Speed up product development.

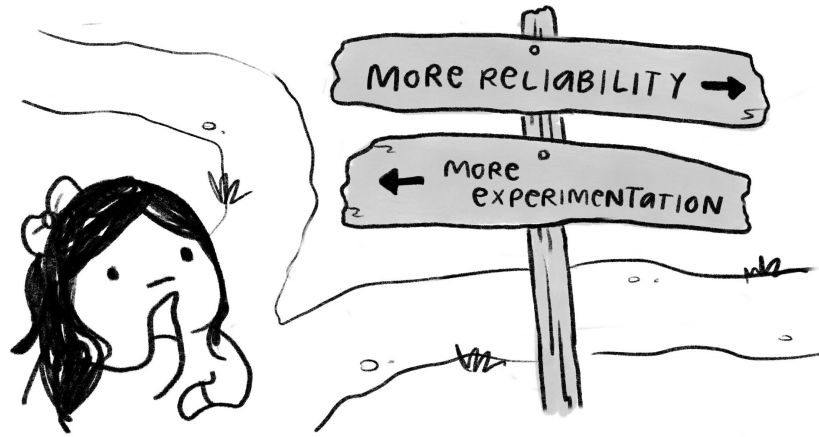




**and infrastructure safety.**







**Embrace risk**, but **mitigate** it.





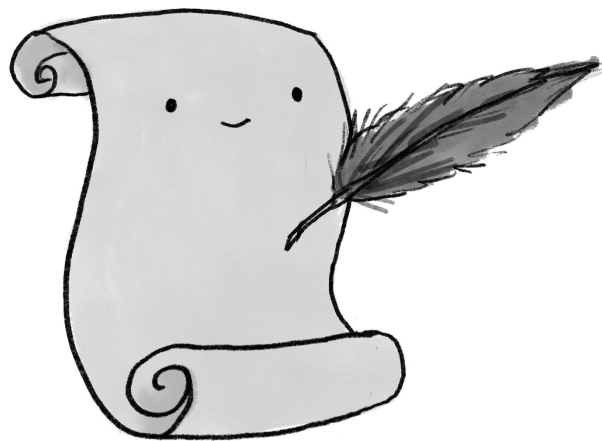
and never stop **improving.**



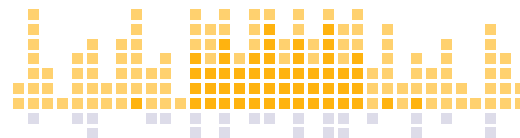
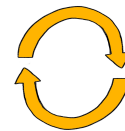
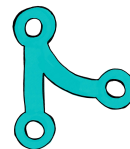
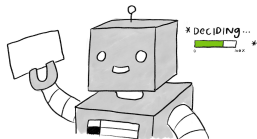
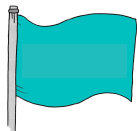


# Shipping prod features



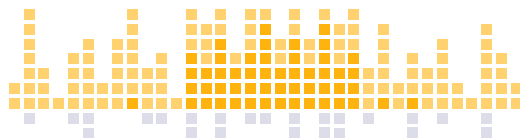
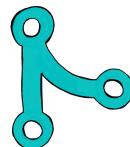
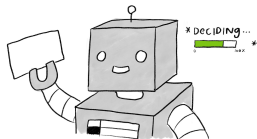
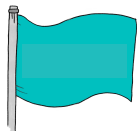


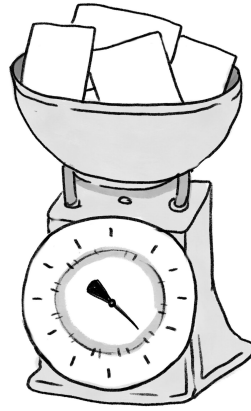
# What's our recipe?



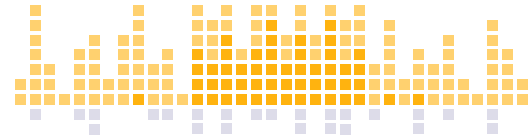
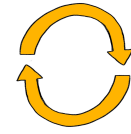
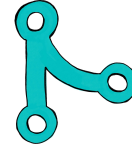
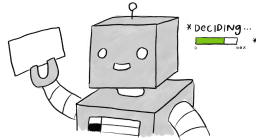
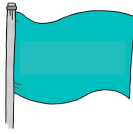


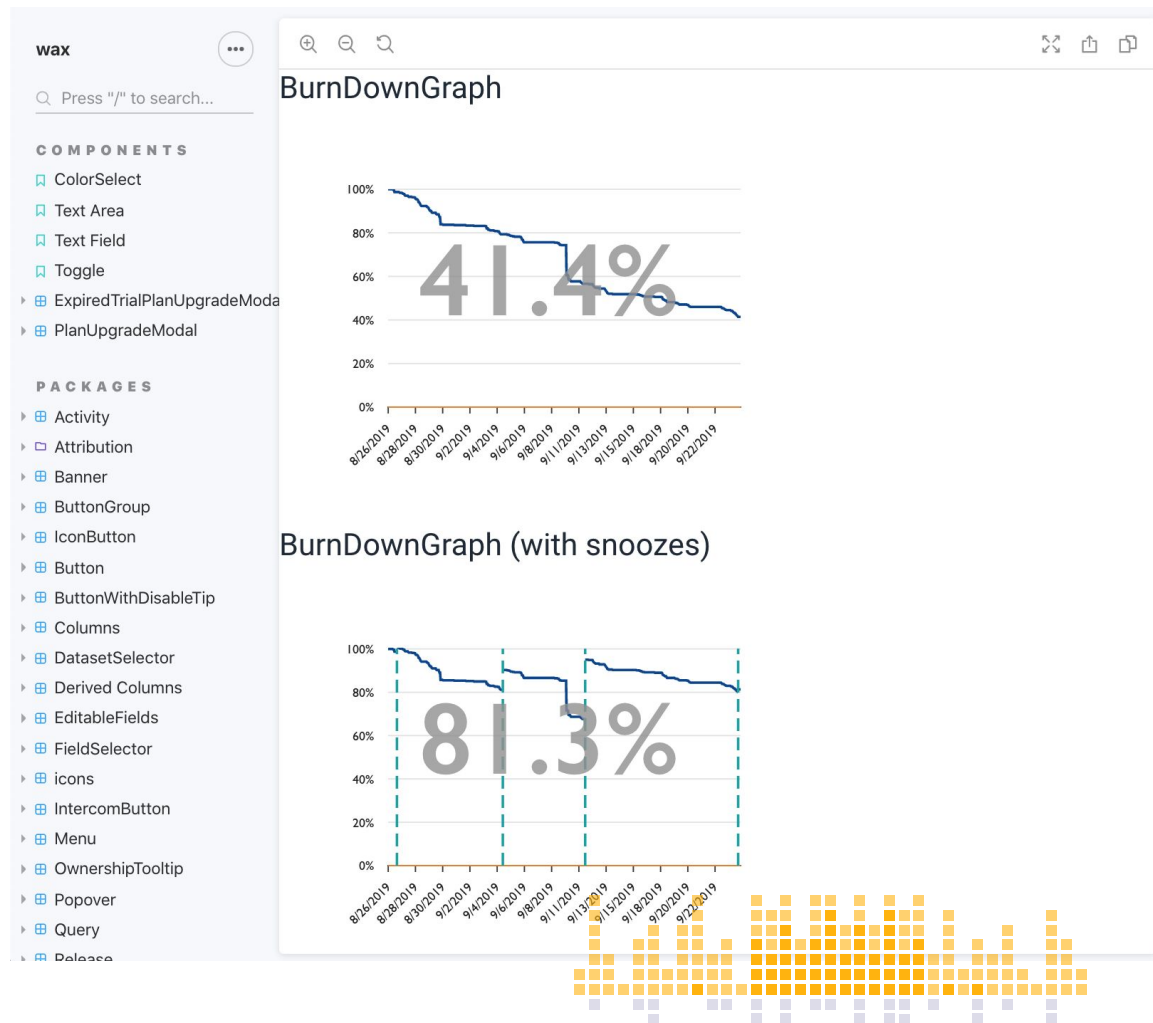
# Instrument as we code.

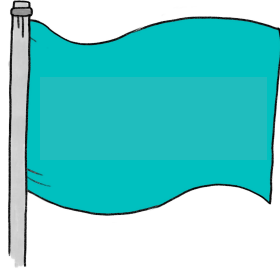




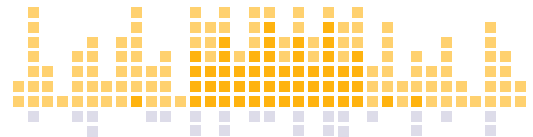
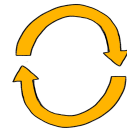
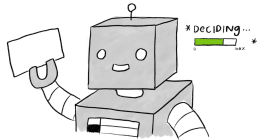
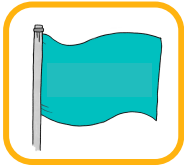
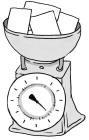
# Functional and visual testing.



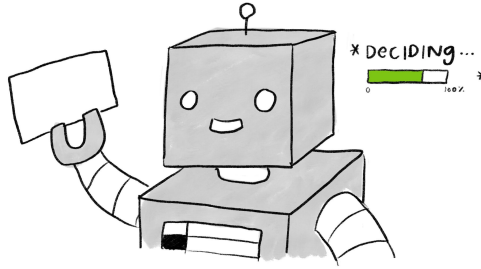




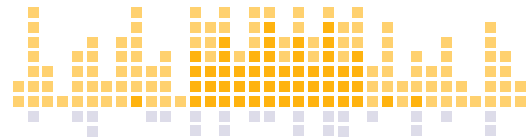
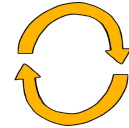
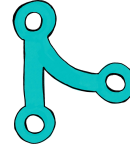
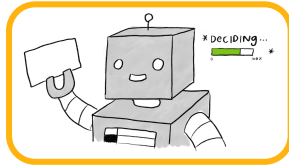
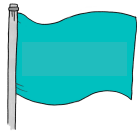
# Design for **feature flag** deployment.







# Automated **integration.**



Welcome to a preview of  
the new CircleCI Job  
experience

Please note that this is  
currently a work in  
progress and functionality  
may change over time.

Old Experience

Pipelines / build-hound

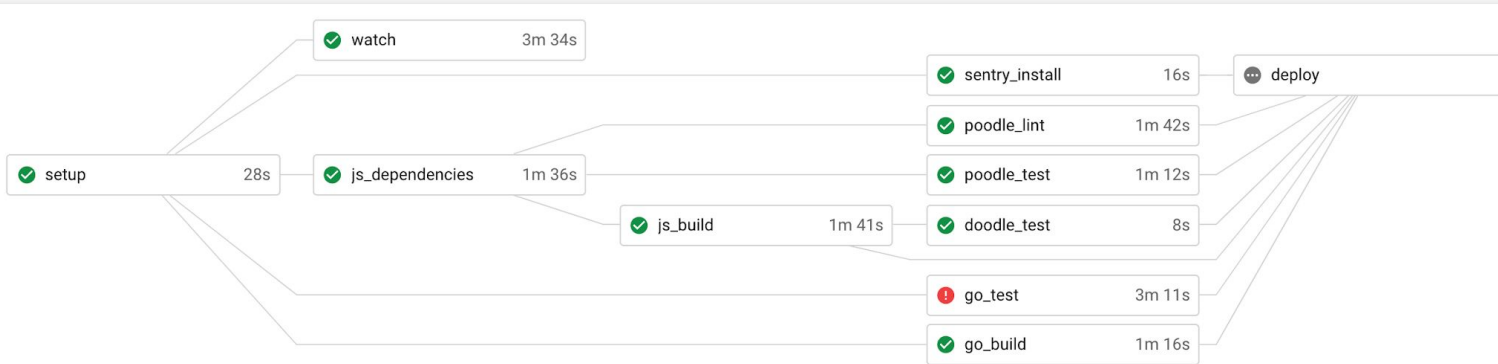
build-hound FAILED

Rerun

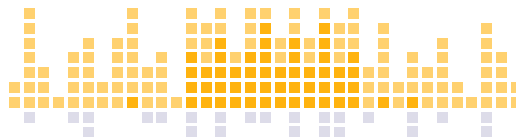
Duration 4m 9s  
Finished 3 days ago

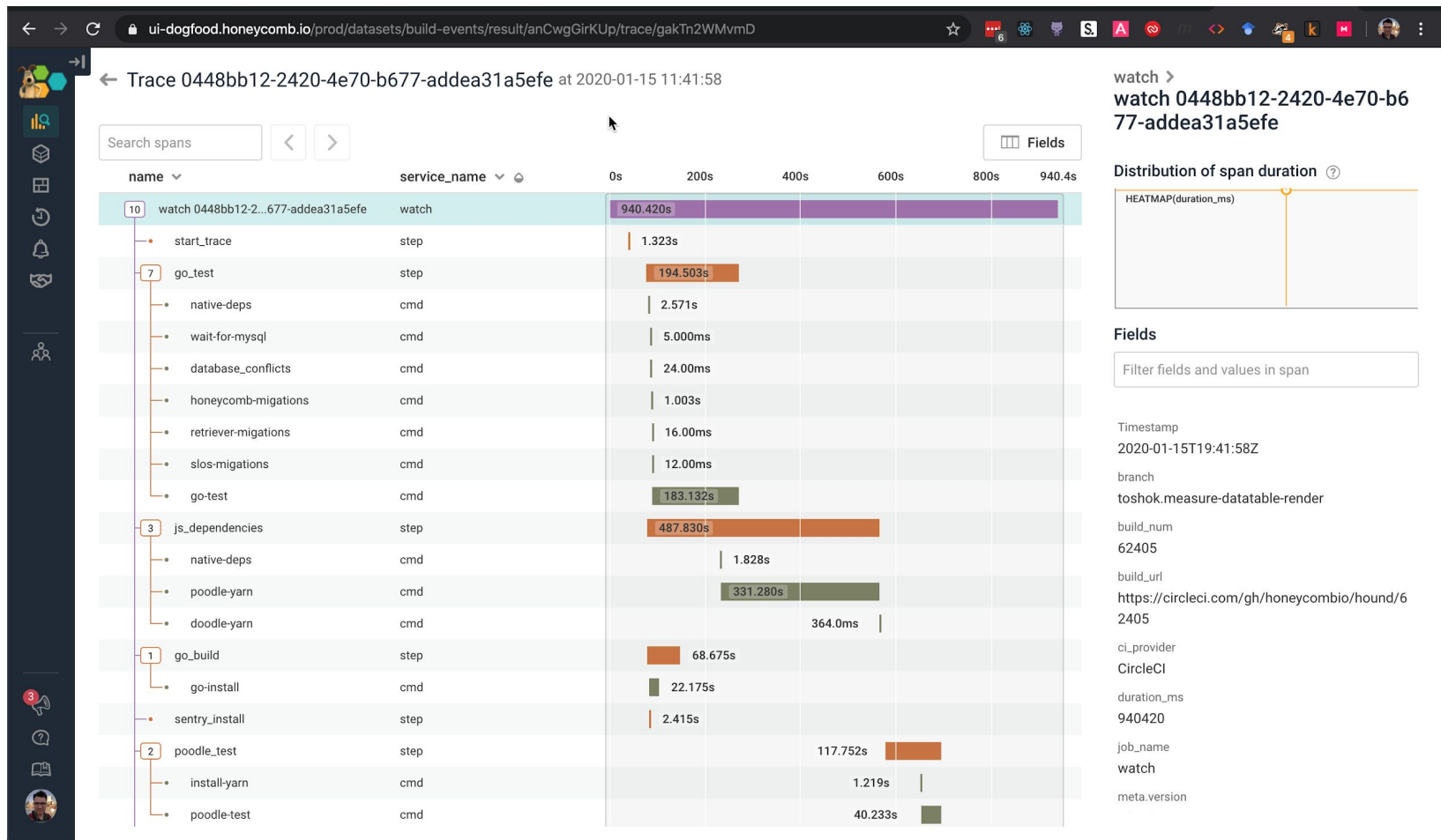
2c6cf25

travis.limit-cleanup  
tredman



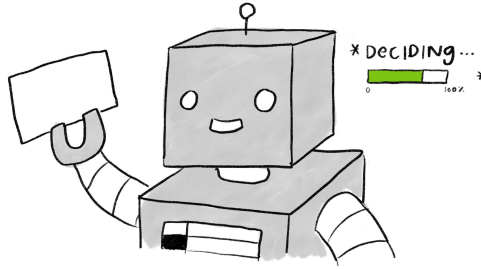
CircleCI's view of Honeycomb build & deploy



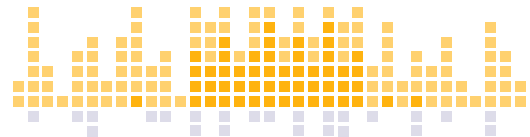
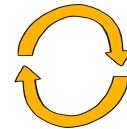
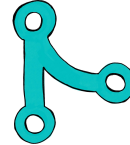
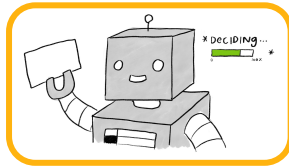
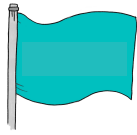
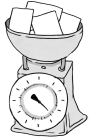


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Honeycomb's trace of Honeycomb build & deploy

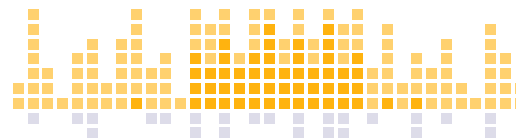
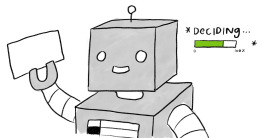
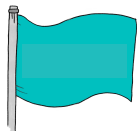


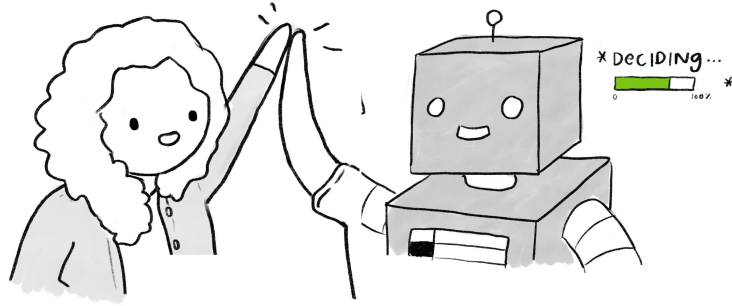
# Automated **integration.**



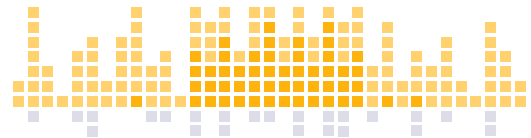
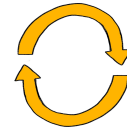
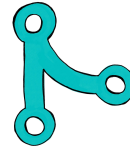
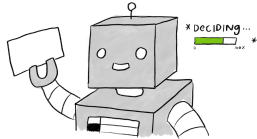
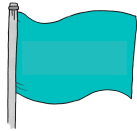


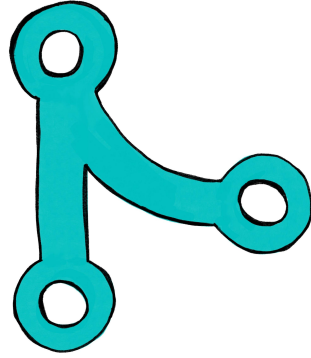
# Human PR review.



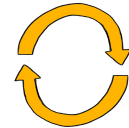
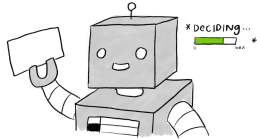
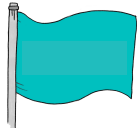


# Automated integration.

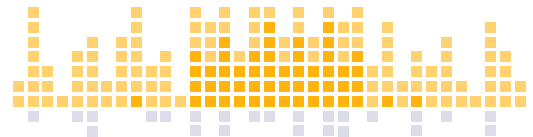


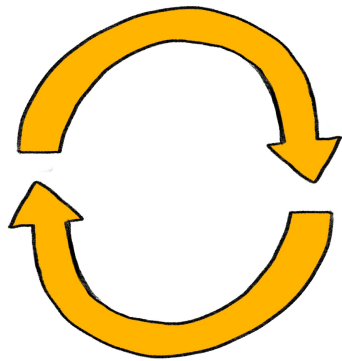


Green button **merge.**

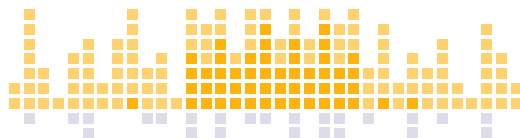
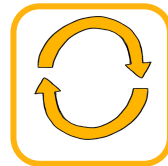
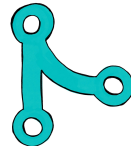
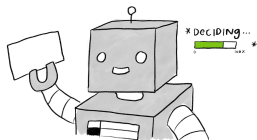
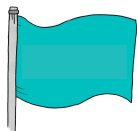


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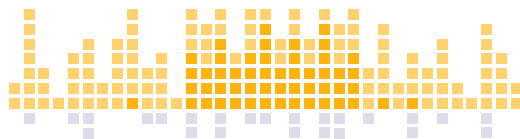
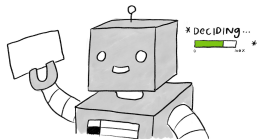
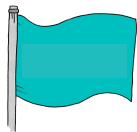
# Auto-updates, rollbacks, & pins.

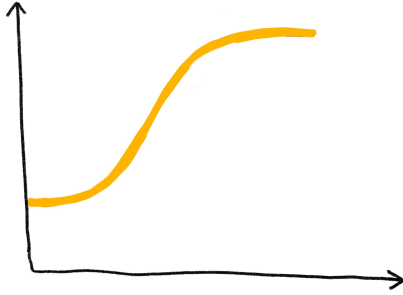




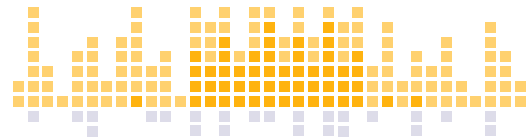
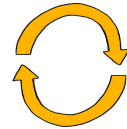
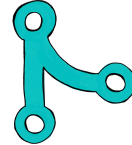
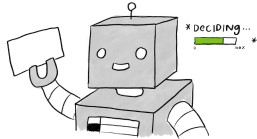
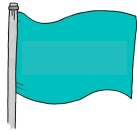
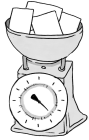


# Observe behavior in prod.



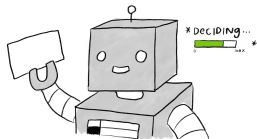
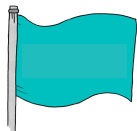


Prod: customers **observe** data.

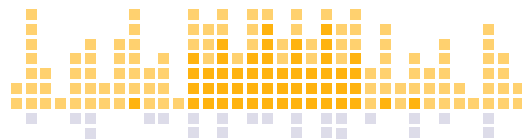




# Dogfood **observes** prod.



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← SLO Usage Tracking Query changed. [Update Board](#)

## SLO Adoption: Page Views

☆ Add to Board

↪ Share

...

Last 1 month 4 days 7 hours 57 minutes 42 seconds

⏮

⏭

Datasets / poodle

Add a description for this query

fx VISUALIZE  
COUNT

WHERE  
request.url exists  
AND  
request.url contains /slo/

GROUP BY  
None; combine all rows

ORDER BY  
COUNT desc

LIMIT  
None

Run Query

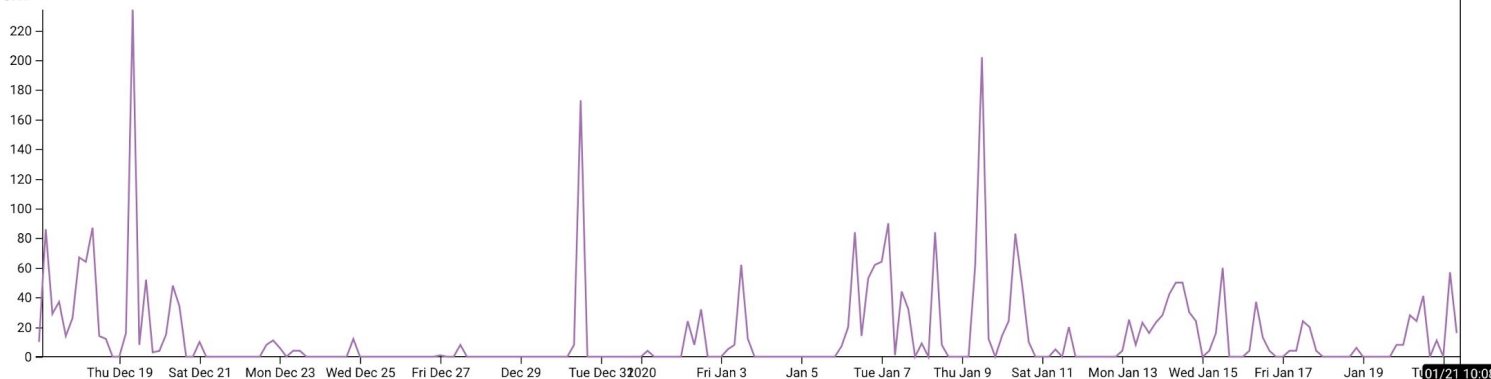
Run 2 minutes ago

Dec 17 2019, 2:10 AM – Jan 21 2020, 10:08 AM Granularity: 4 hr

Results BubbleUp Traces Raw Data

⚙ Graph Settings

COUNT

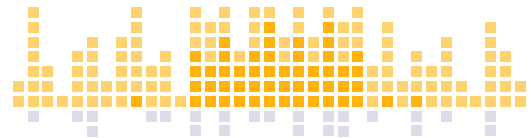
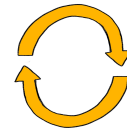
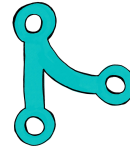
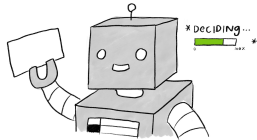
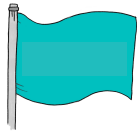
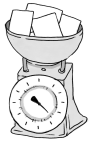


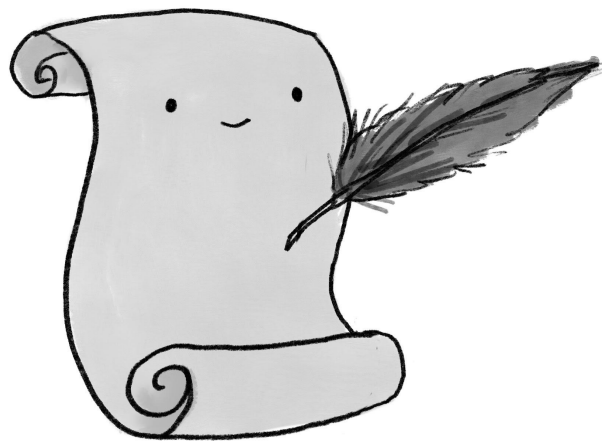
	COUNT
	3,029



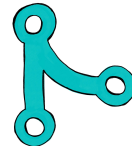
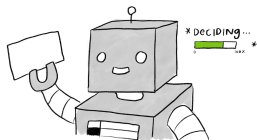
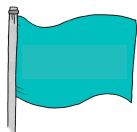


Kibble **observes** dogfood.

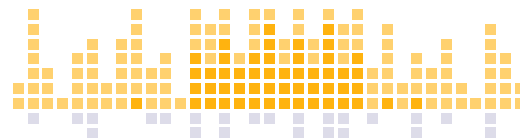




# That's how 12 eng **deploy** 12x/day!



@shelbyspees at #SKILupDay

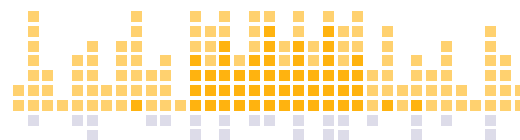




**DORA data describes feedback loops.**



@shelbyspees at #SKILupDay



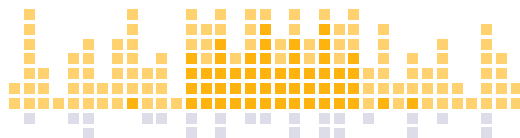
# start with lead time.



10 min builds (x3 at worst), 1h for peer review,  
hourly push train = **3 hours to deploy a change.**



@shelbyspees at #SKILupDay





start with lead time.

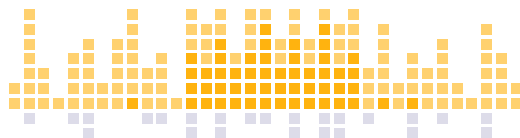
deploy frequency goes up.

```
#·update·the·deployable·version·at·19·minutes·past·the·hour·everywhere  
#·deploy·the·services·every·hour··stagger·kibble,·dogfood,·and·prod·by  
#·at·15min·each,·20,·35,·and·50·minutes·past·the·hour  
#·currently·overridden·for·labrador·(static·site)  
default["deploy"]["cron_minute"]["production"]·=·"50"  
default["deploy"]["cron_minute"]["dogfood"]·=·"35"  
default["deploy"]["cron_minute"]["kibble"]·=·"20"  
  
#·run·the·job·that·sets·the·deployable·version·at·19·past,·one·minute·before·the  
#·deploys·will·start·running·in·kibble.·NOTE·this·value·is·used·in·the  
#·`hound_util`·cookbook,·not·here.  
default["deploy"]["update_deploy"]·=·"19"
```

Builds go out **every hour** if there's a change.  
1-2 new commits per build artifact.



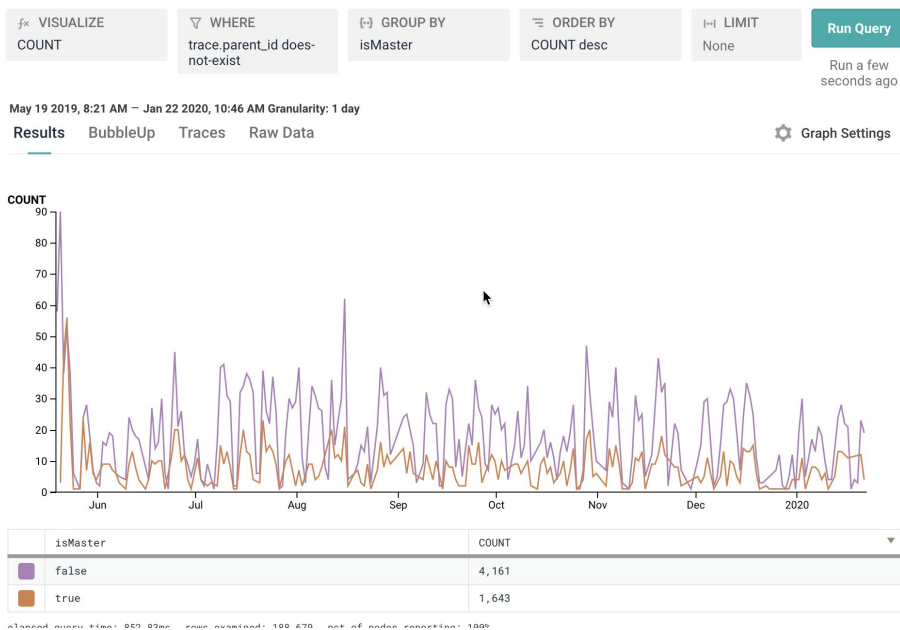
@shelbyspees at #SKILupDay



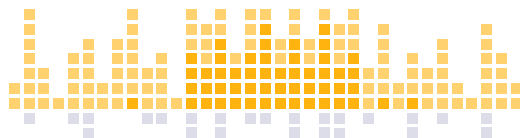
start with lead time.

deploy frequency goes up.

change fail rate goes down.



Increased confidence via testing. Flag-flip or fix-forward, not emergency rollback. **0.1% fail rate.**



start with lead time.

deploy frequency goes up.

change fail rate goes down.

time to restore goes down.

- [Trace Overview](#)

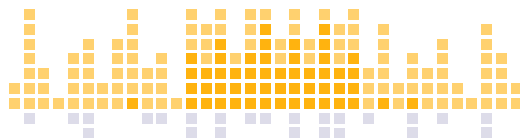
Added 10 months ago — Last requested 1 minute ago

If true, the new Trace Overview display in the Trace Inspector is displayed.

trace-overview

ON

Flag flip takes **30 seconds**. Rollback to previous build takes **<10 min**. Fix-forward takes **20 min**.



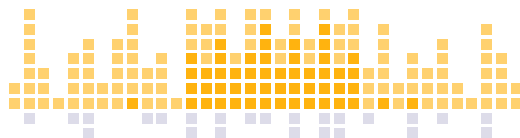
# High productivity product engineering:

start with lead time. (<3 hours)

deploy frequency goes up. (hourly, >12x/day)

change fail rate goes down. (<0.1%)

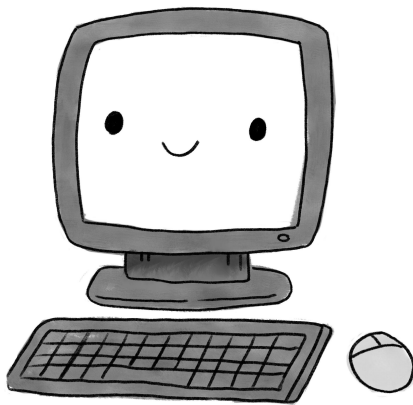
time to restore goes down. (seconds to minutes)





But what about **infra**?





**Infrastructure empowers product.**

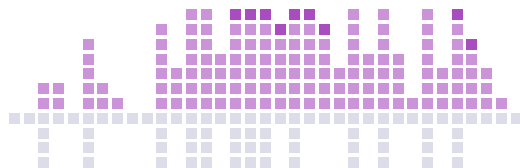


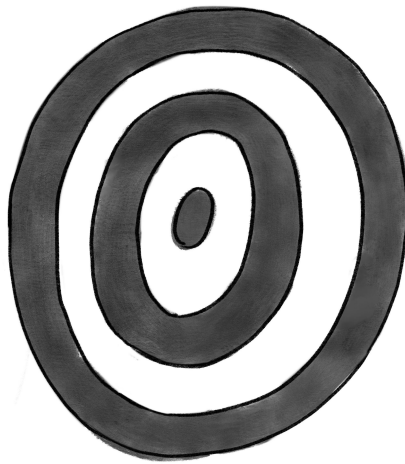
@shelbyspees at #SKILupDay





**Kubernetes isn't the goal.**

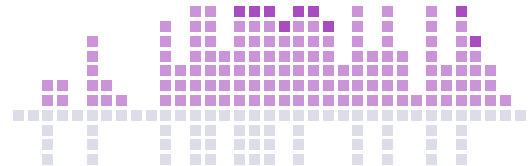




**Reliability and simplicity is.**



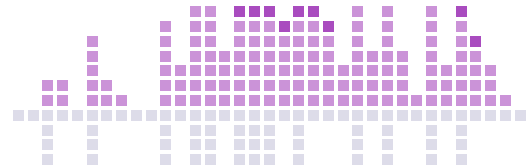
@shelbyspees at #SKILupDay

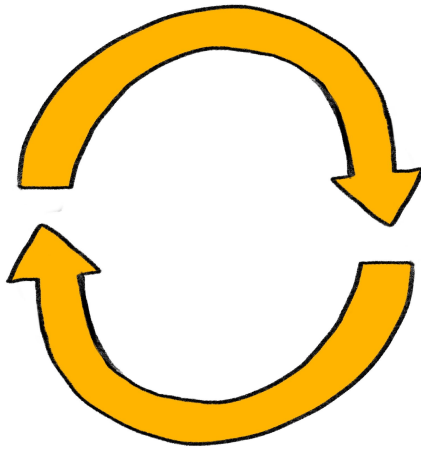






# Everyone starts somewhere.

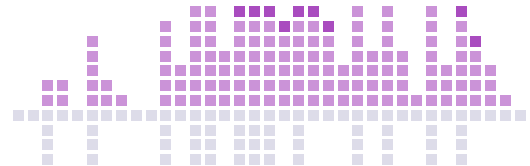


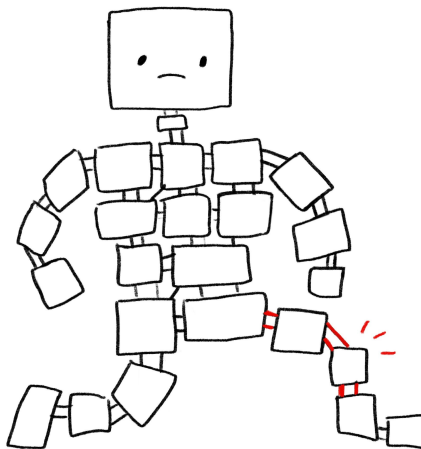


**Automate** the painful parts.

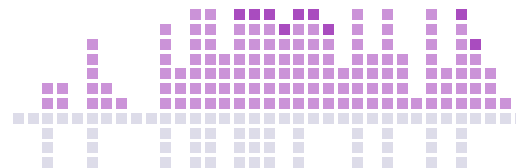


@shelbyspees at #SKILupDay



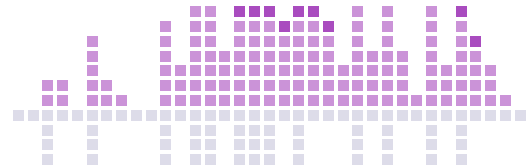


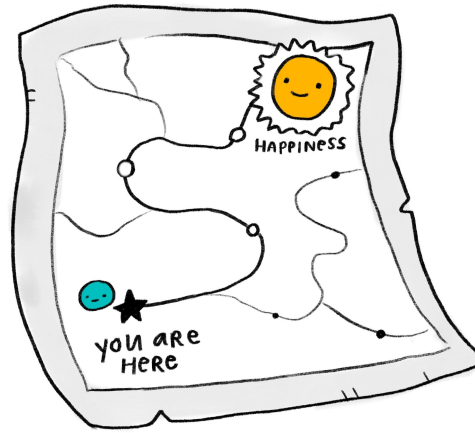
# Fix the duct tape!



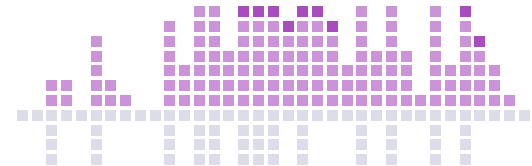


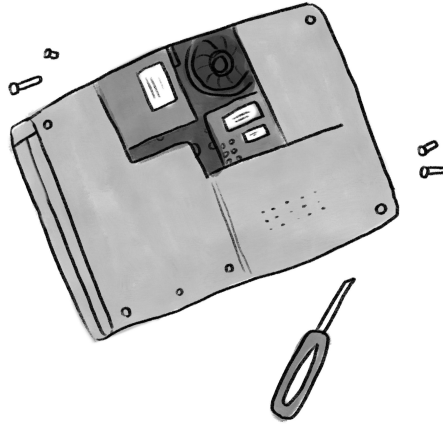
**Keep the environment clean.**



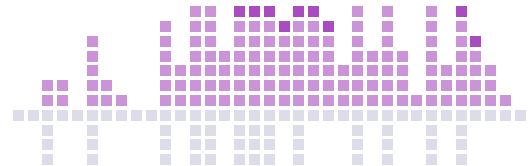


# How do we do it?





# Raw VMs are **simpler** than containers.



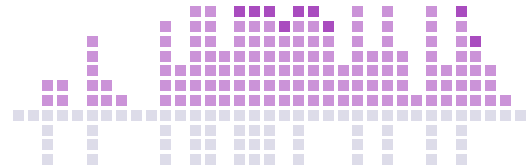


**Cold boot from Chef, use cron to sync.**

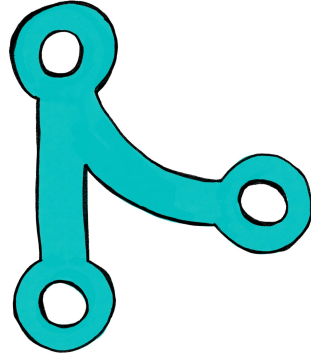




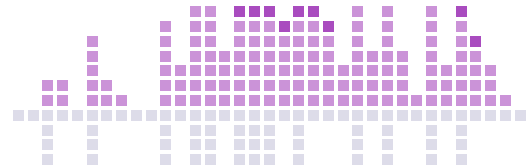
# Outsource utilities like blob storage.





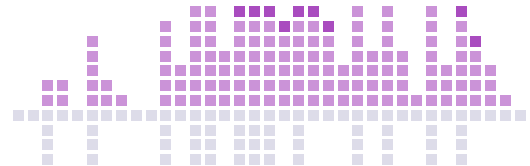


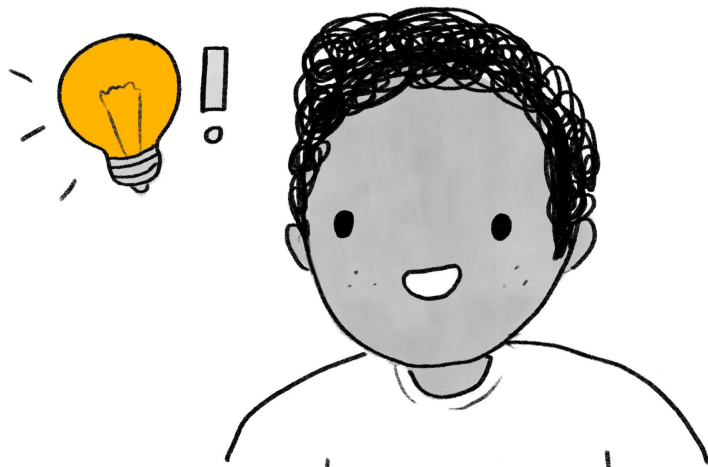
# Repeatable infrastructure with code.





# Centralize state & locking.

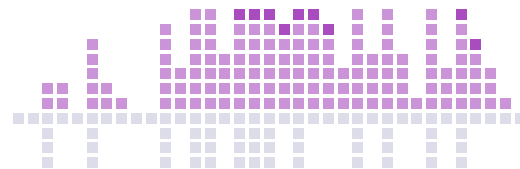




# Remove barriers to setup.

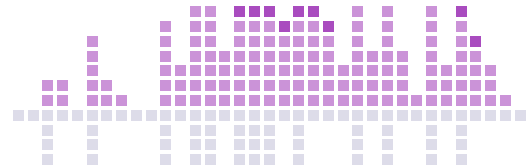


@shelbyspees at #SKILupDay





# Diff and release in browser.



# Allow 20% of prod instances to run on-demand #447

[Edit](#)

**Merged** lizthegrey merged 1 commit into `master` from `lizf.fix-spot` 6 hours ago

Conversation 0

Commits 1

Checks 1

Files changed 1

+1 -1

all commits ▾ File filter... ▾ Jump to... ▾



No Whitespace

0 / 1 files viewed ⓘ

Review changes ▾

2 terraform/modules/autoscaling\_groups/shepherd\_asg.tf

Viewed ...

```
@@ -168,7 +168,7 @@ resource "aws_autoscaling_group" "shepherd_asg" {  
168 168     mixed_instances_policy {  
169 169     instances_distribution {  
170 170     ...  
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900 900     ...  
9
```

## All checks have passed

13 successful checks



atlas/honeycomb/kubernetes — Run not triggered: T...



atlas/honeycomb/prod — Terraform plan: 0 to add, 1...

[Details](#)



check-infra — Workflow: check-infra

[Details](#)



sentinel/honeycomb/base — Policy checks passed

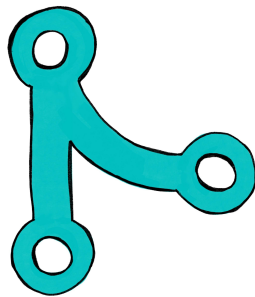
[Details](#)



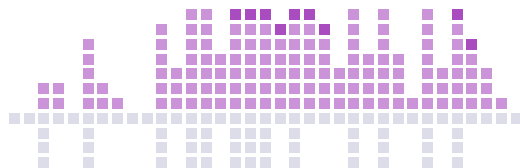
@shelbyspees at #SKILupDay

```
{  
  on_strategy = "prioritized"  
  capacity    = 35  
  age_above_base_capacity = 10 -> 0  
  strategy    = "lowest-price"  
  s           = 2  
  
  specification {  
    ...  
  }  
}
```










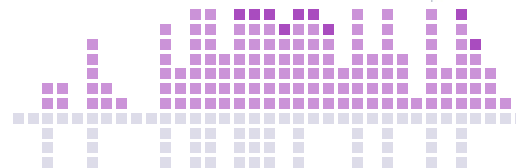


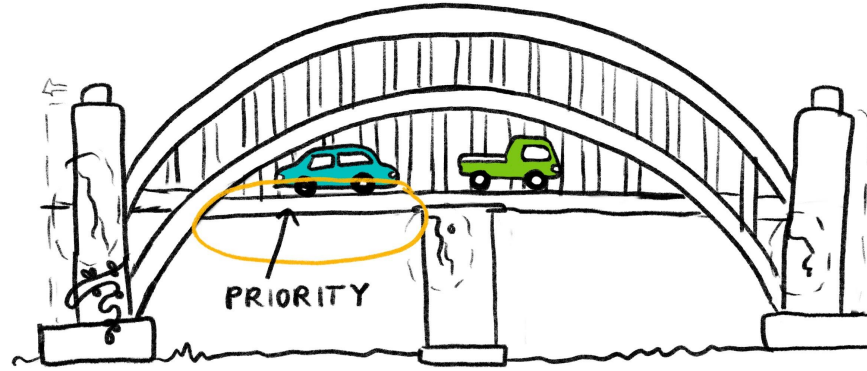
**Remote** run from git.



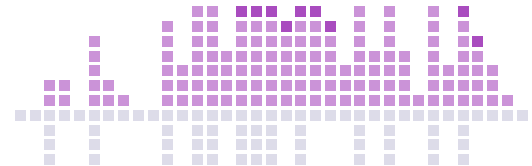
## Run List

	<b>Revert "Allow 20% of prod instances to run on-demand" (#448)</b> <span>CURRENT</span>	<span>✓ APPLIED</span>
#run-eMmN3VwovBP8NWX4   <a href="#">lizthegrey</a> triggered from GitHub   Branch <code>master</code>   <a href="#">fd7fee0</a>		
5 hours ago		
	<b>Allow 20% of prod instances to run on-demand (#447)</b>	<span>✓ APPLIED</span>
#run-Vd7miibVisRAwrB2   <a href="#">lizthegrey</a> triggered from GitHub   Branch <code>master</code>   <a href="#">b80330f</a>		
6 hours ago		
	<b>actually redirect HTTPS traffic. (#444)</b>	<span>✓ APPLIED</span>
#run-KAamLNTt51wji5Fe   <a href="#">lizthegrey</a> triggered from GitHub   Branch <code>master</code>   <a href="#">944a14e</a>		
a day ago		
	<b>fix remaining apply issues. (#443)</b>	<span>✓ APPLIED</span>
#run-xRdsnkWQDB4P6k4B   <a href="#">lizthegrey</a> triggered from GitHub   Branch <code>master</code>   <a href="#">e7a4e14</a>		
a day ago		
	<b>fix tags &amp; syntax (#442)</b>	<span>✗ ERRORED</span>
#run-Z9K3KSb71ZS9jnx5   <a href="#">lizthegrey</a> triggered from GitHub   Branch <code>master</code>   <a href="#">cf1c12f</a>		
a day ago		
	<b>add quarantine service. (#441)</b>	<span>✗ ERRORED</span>
#run-tSjr7wofSVGvSje7   <a href="#">lizthegrey</a> triggered from GitHub   Branch <code>master</code>   <a href="#">1dca77c</a>		
a day ago		
	<b>[terraform] add buckets for storing trace decisions between restarts in ...</b>	<span>✓ PLANNED</span>
#run-hj34neLhBPPCpQ3j   <a href="#">tredman</a> triggered from GitHub   Branch <code>master</code>   <a href="#">9c367d0</a>		
a day ago		





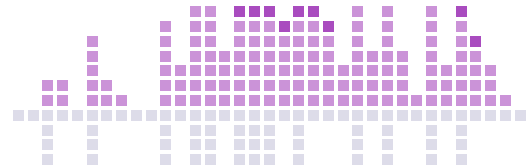
# Sentinel guardrails.

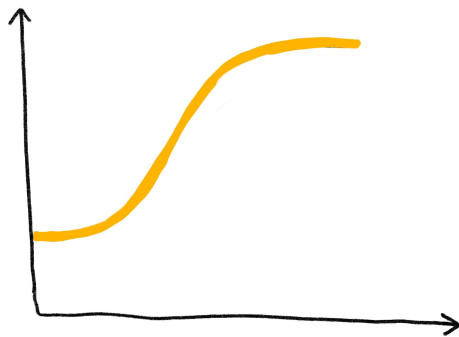




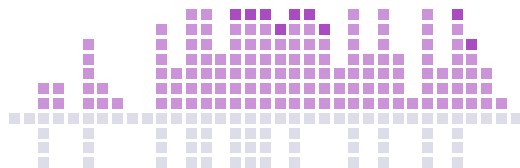


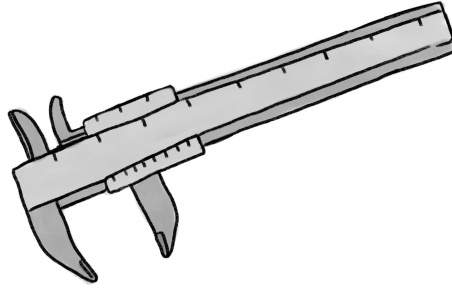
**Notify only on risky changes.**



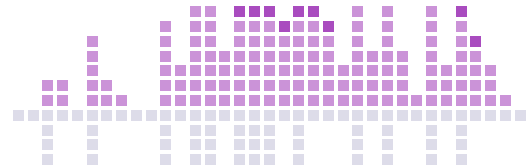


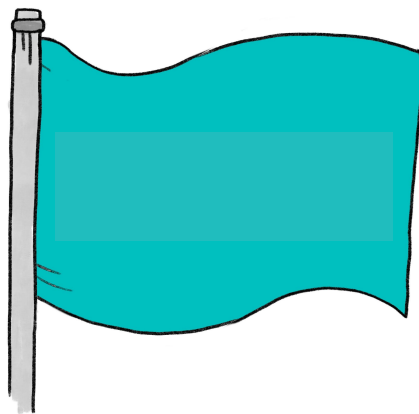
# Deploy changes incrementally!



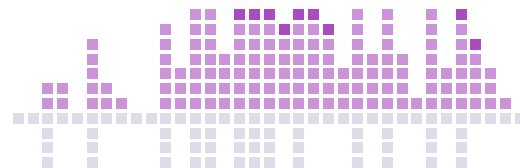


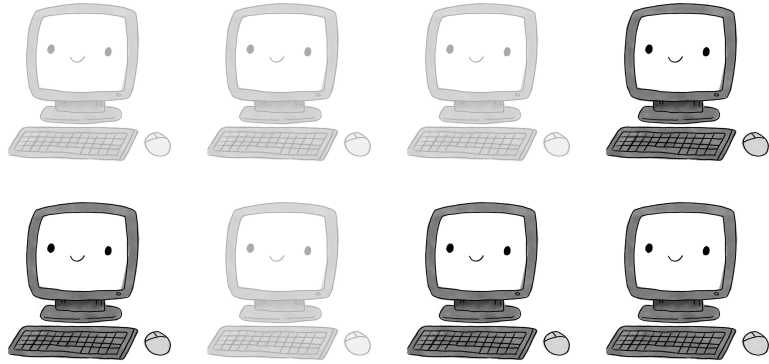
# Use **modern** components.



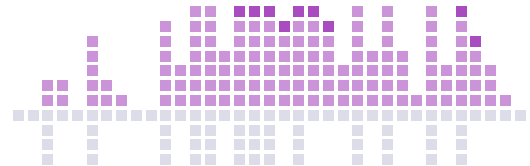


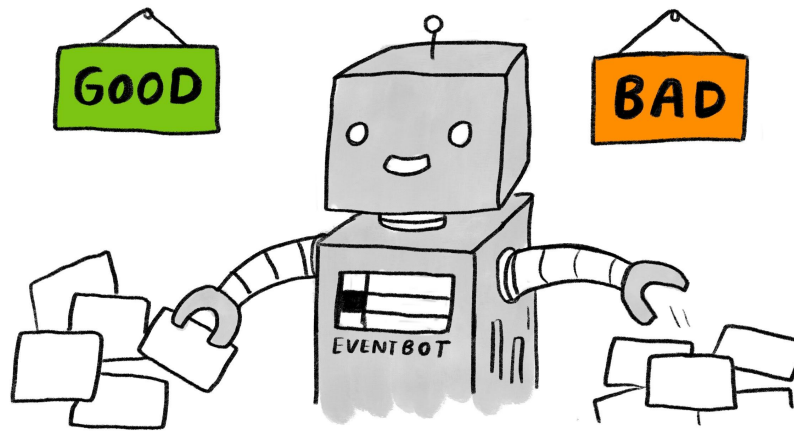
# Feature **flags**... for infra!



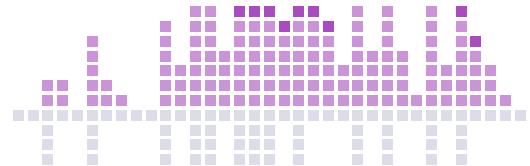


# Ephemeral fleets & autoscaling.





**Quarantine bad traffic.**

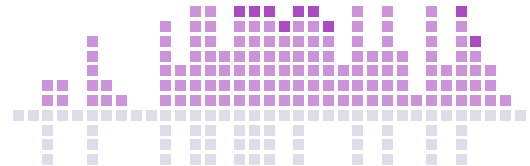




# Delete unused code & components.



@shelbyspees at #SKILupDay

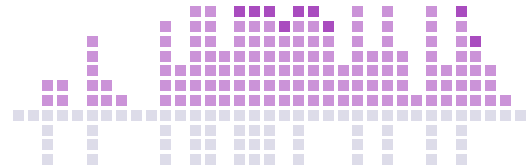




# Refactor continuously!



@shelbyspees at #SKILupDay







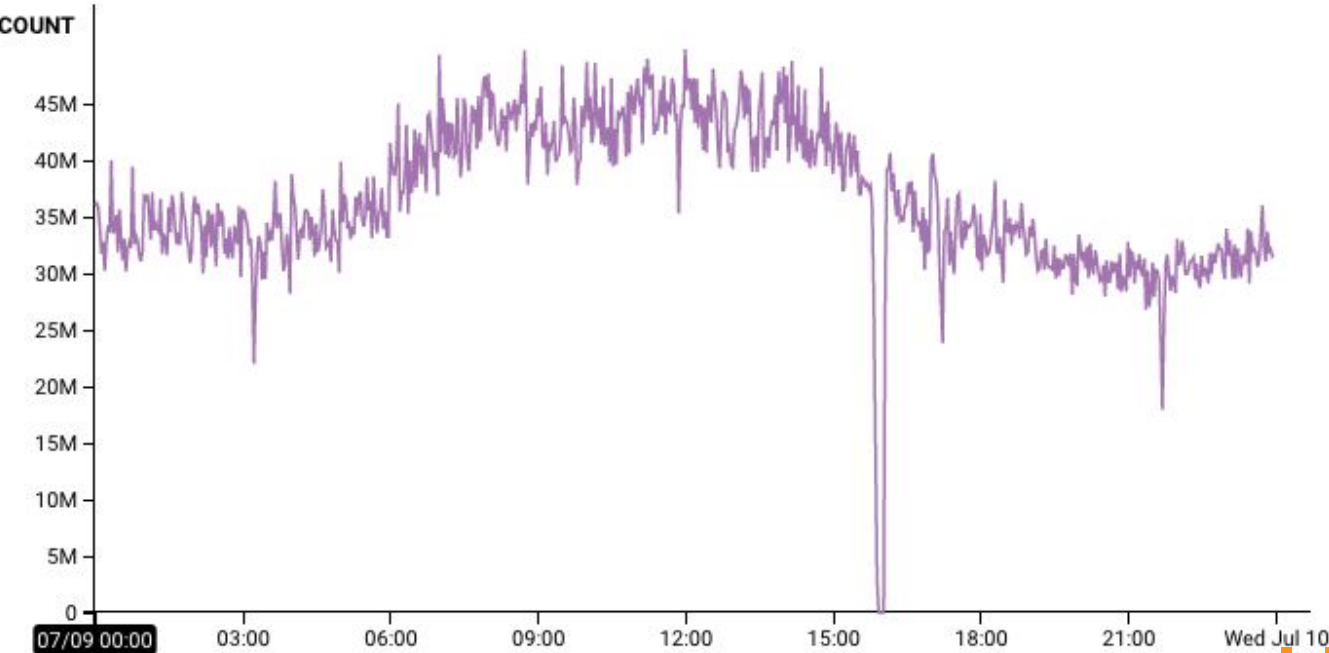
# What if it goes **wrong**?



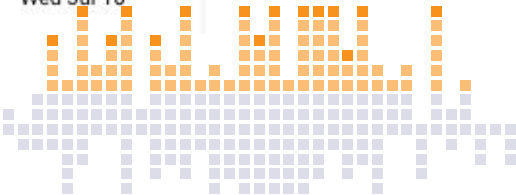
Jul 9 2019, 12:00 AM – Jul 10 2019, 12:00 AM

Results   BubbleUp   Traces   Raw Data

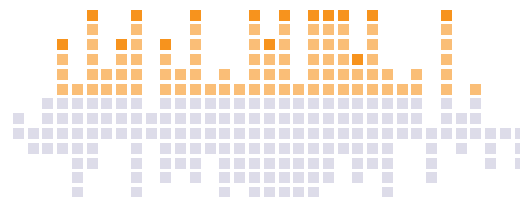
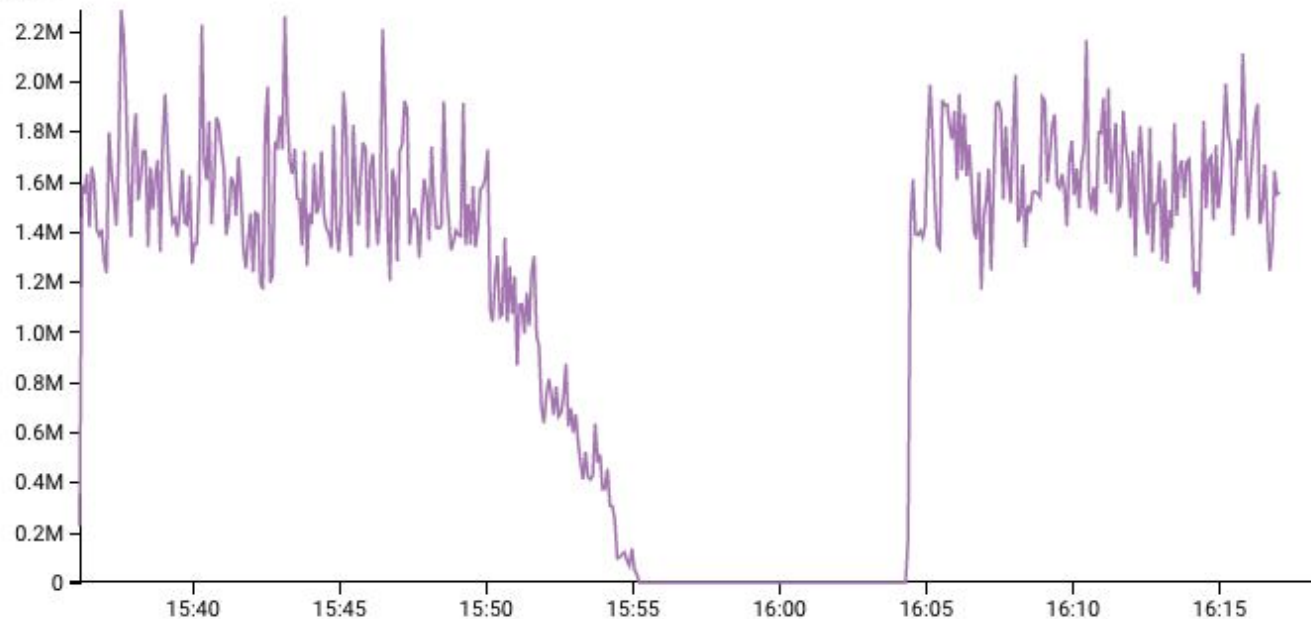
⚙ Graph Settings

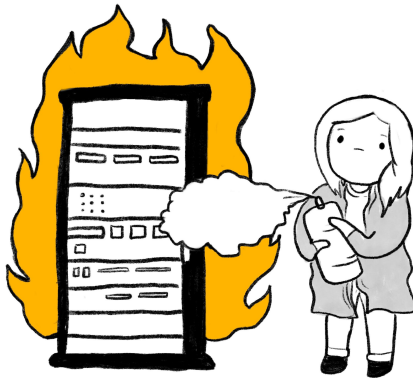


@shelbyspees at #SKILupDay

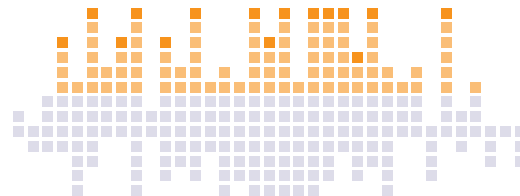


COUNT



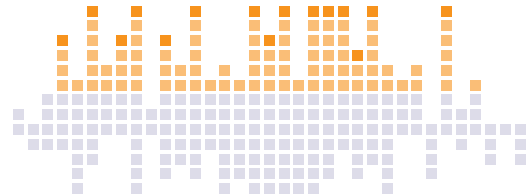


# How broken is “too broken”?



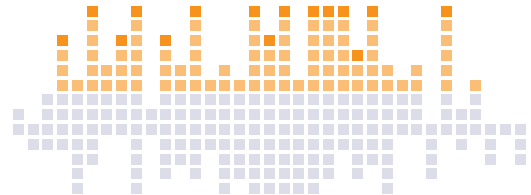


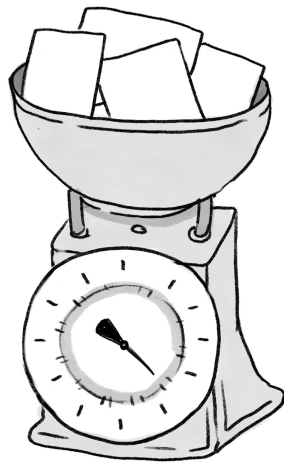
**Service Level Objectives** define success.





**SLOs are common language.**

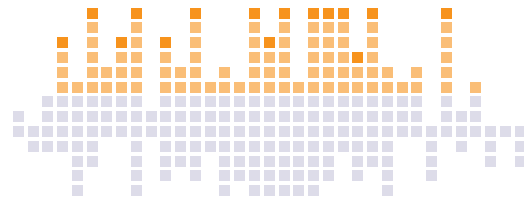


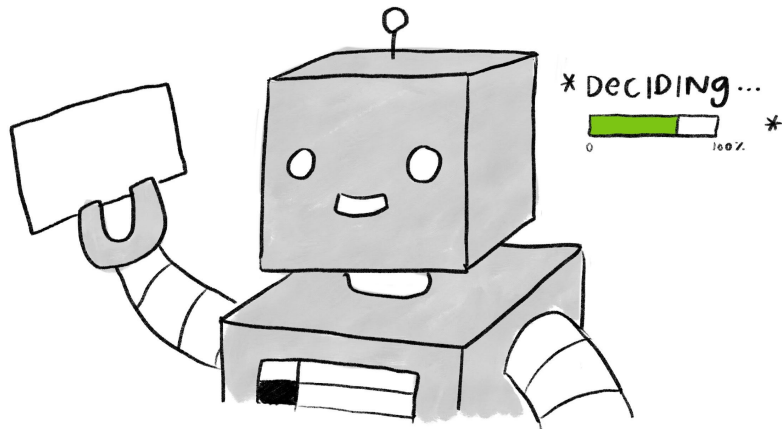


# How many **eligible events** did we see?

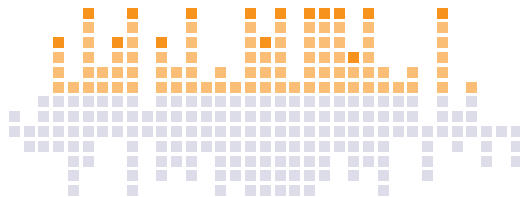


@shelbyspees at #SKILupDay

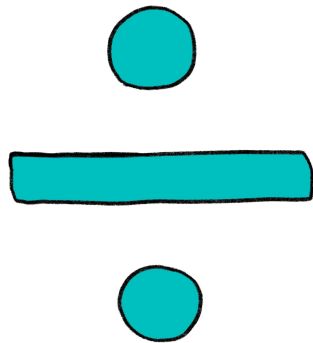




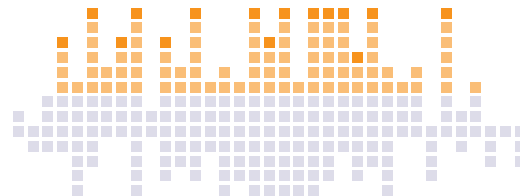
# HTTP Code 200? Latency < 100ms?







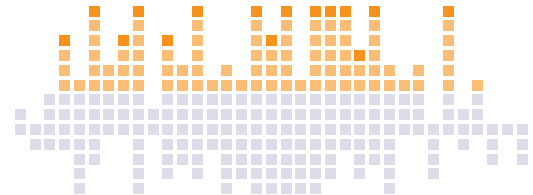
**Availability:** Good / Eligible Events



JULY						
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

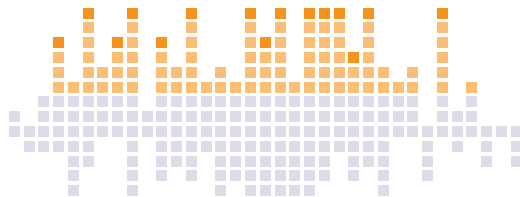


Use a **window** and **target percentage**.



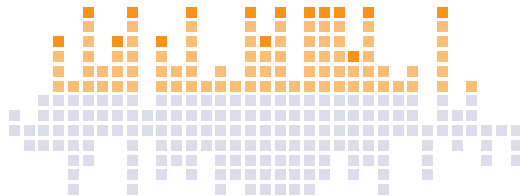
$$1 - x$$

Error budget: **allowed** unavailability



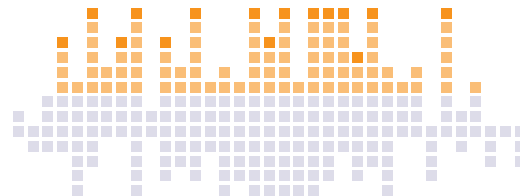


# Drive alerting with SLOs.



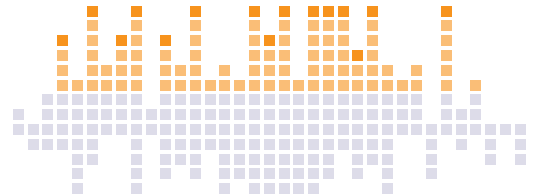


We keep **SLOs** at Honeycomb.



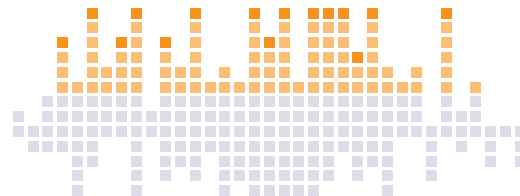
# 99.99%

We **store** incoming telemetry.



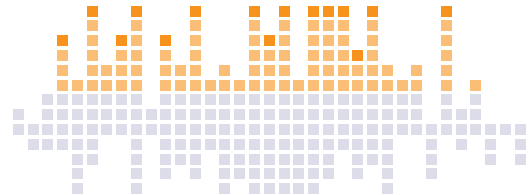
# 99.9%

**Default dashboards usually load in 1s.**



# 99%

Often, **queries** come back under 10s.



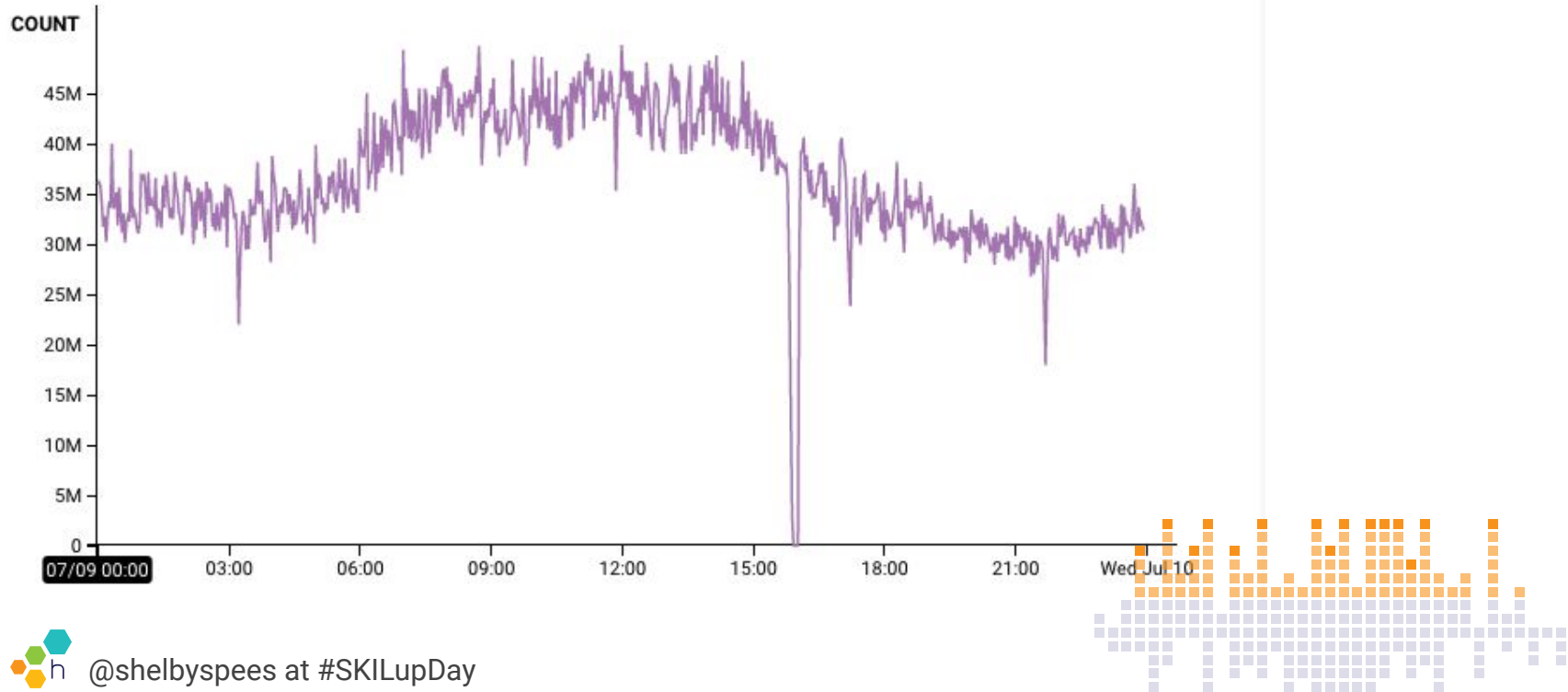


# User Data Throughput

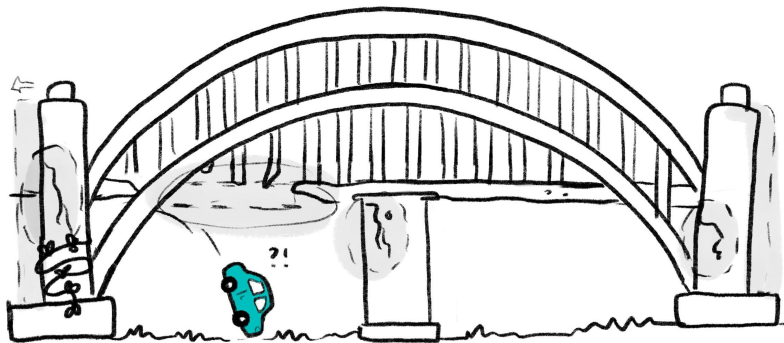
Jul 9 2019, 12:00 AM – Jul 10 2019, 12:00 AM

Results BubbleUp Traces Raw Data

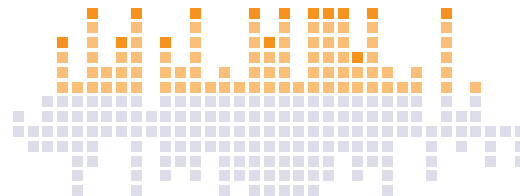
⚙️ Graph Settings

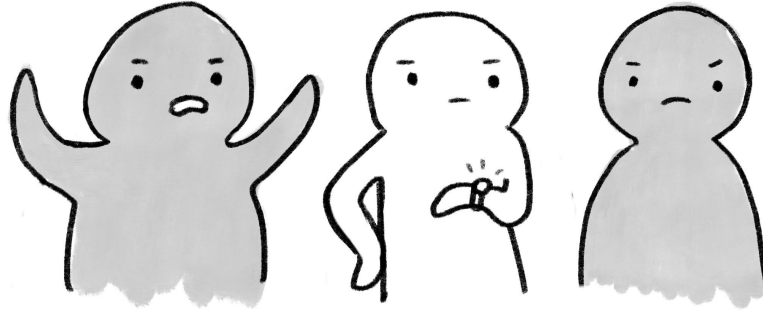


@shelbyspees at #SKILupDay

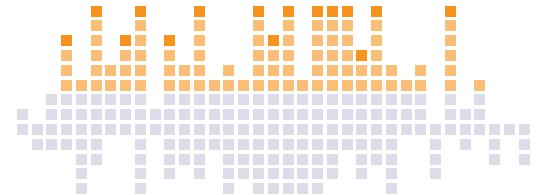


**We dropped customer data.**



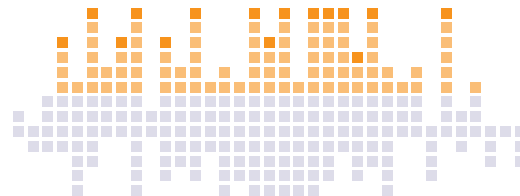


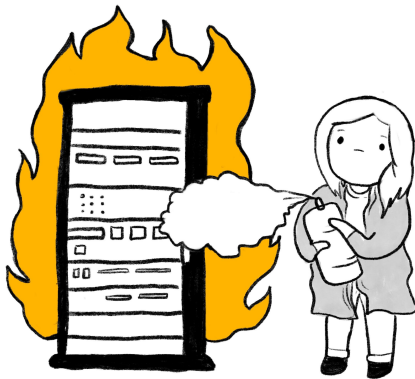
but **rolled back** (at human speed)



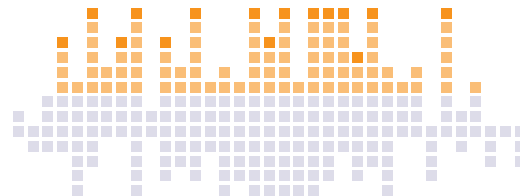


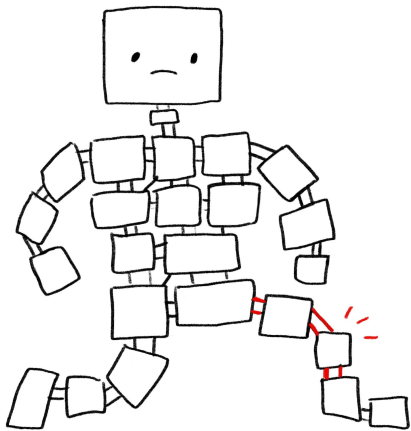
**We communicated to customers.**



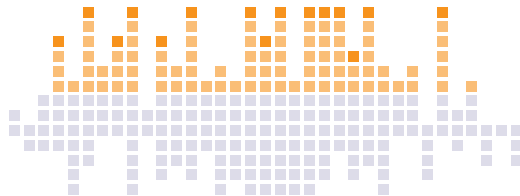


**We'd burned triple our **error budget**.**



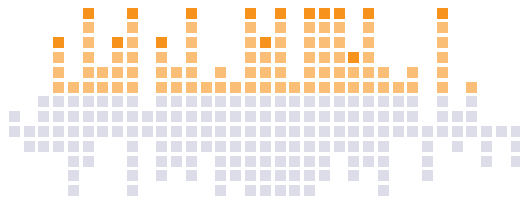


**We halted deploys.**





**How** did this happen?

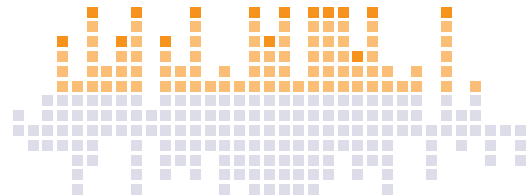


**We checked in code that **didn't build**.**

**We had **experimental CI** build wiring.**

**Our scripts deployed **empty binaries**.**

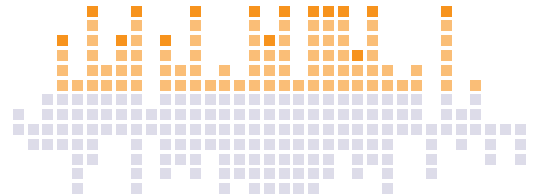
**There was no **health check & rollback**.**

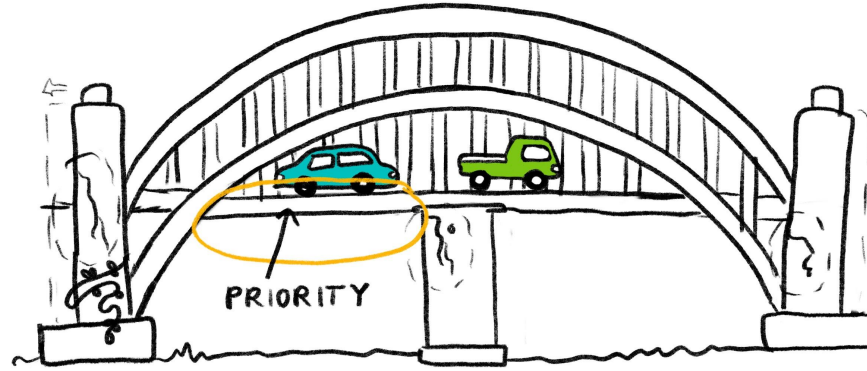




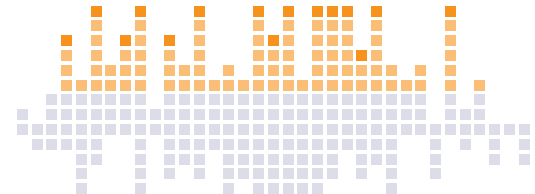


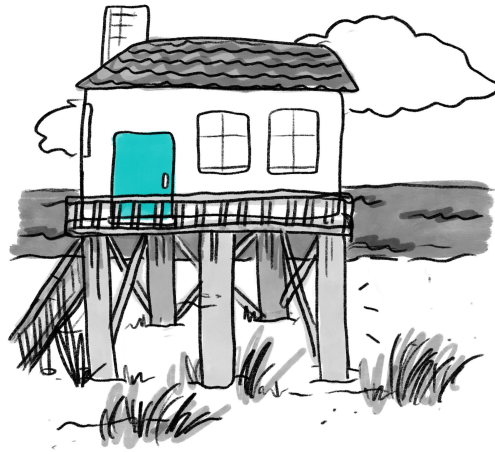
**We re-prioritized stability.**



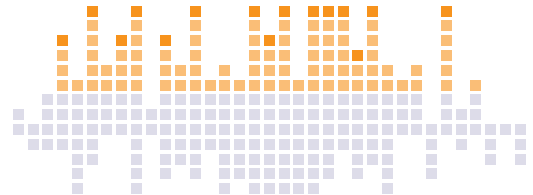


We mitigated the key risks,





then resumed **building.**





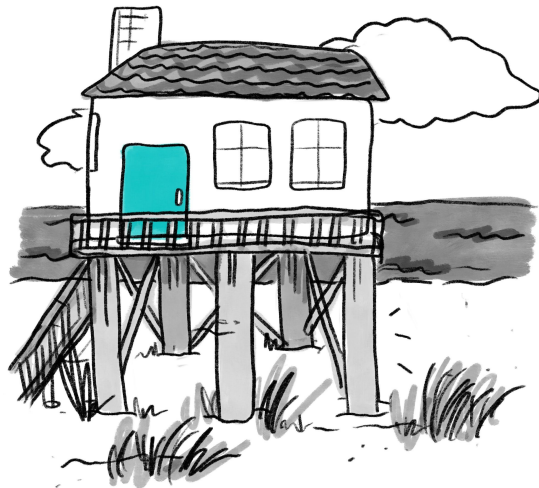
# What's ahead for us?





**Be more reliable & scalable.**



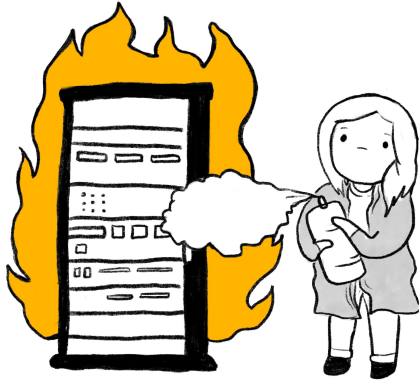


Launch **new services** easily.



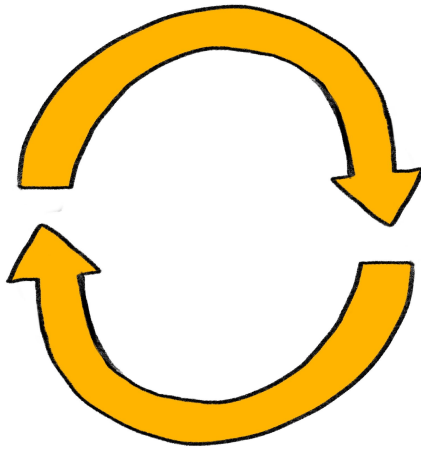
@shelbyspees at #SKILupDay





**Burn less money.**





**Continue modernizing & refactoring.**







**Sleep easily at night.**





**You can do this too, step by step.**





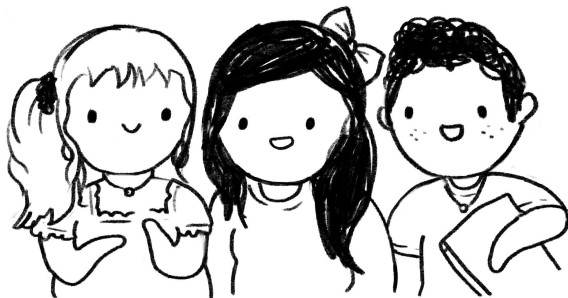
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# Understand & control production.



**Go faster** on **stable** infra.  
**Manage risk** and **iterate**.

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