



AWS
re:Invent

D O P 2 0 6 - S

Breaking the monolith with style and speed

Bruce Wong

Director of Engineering
StitchFix

Nitika Daga

Lead Software Engineer
StitchFix



Migration Mastery



Goals

Incremental
fast
migration

The role
observability
plays

**Zero
downtime!**



STITCH FIX

FAST COMPANY

THE
WORLD'S

50

MOST
INNOVATIVE
COMPANIES

The Definitive
List of Who
Matters in 2019

No. 5

STITCH FIX
CEO KATRINA LAKE IS REMAKING
RETAIL WITH DATA

FEATURING

DISNEY
APPLE
DOMINO'S
TARGET
SWEETGREEN
TWITCH
NBA
FANATICS
SQUARE
ALIBABA
ZOLA
PELOTON

+

PLUS

Shoshana
Zuboff on why
Facebook
won't change
P.16





Introducing Nitika Daga, Lead Software Engineer

@nitika_daga

	Feb 22 12:10:32.449		i-0123456ab7c89d0e1		monolithic_db > — drop_table(:skus)
	Feb 22 12:10:32.450		i-0123456ab7c89d0e1		monolithic_db > -> 0.0219s
	Feb 22 12:10:32.452		i-0123456ab7c89d0e1		monolithic_db > — drop_table(:color_ways)
	Feb 22 12:10:32.453		i-0123456ab7c89d0e1		monolithic_db > -> 0.0134s
	Feb 22 12:10:32.454		i-0123456ab7c89d0e1		monolithic_db > — drop_table(:styles)
	Feb 22 12:10:32.456		i-0123456ab7c89d0e1		monolithic_db > -> 0.0139s





Zero downtime

+



No loss of data

=



Incremental delivery



1. **Dual-write** data to both monolith and microservice



2. **Dual-read** data from both sources to validate microservice



3. **Migrate** consuming applications onto the microservice



4. **Audit** and migrate any direct SQL accesses to monolith



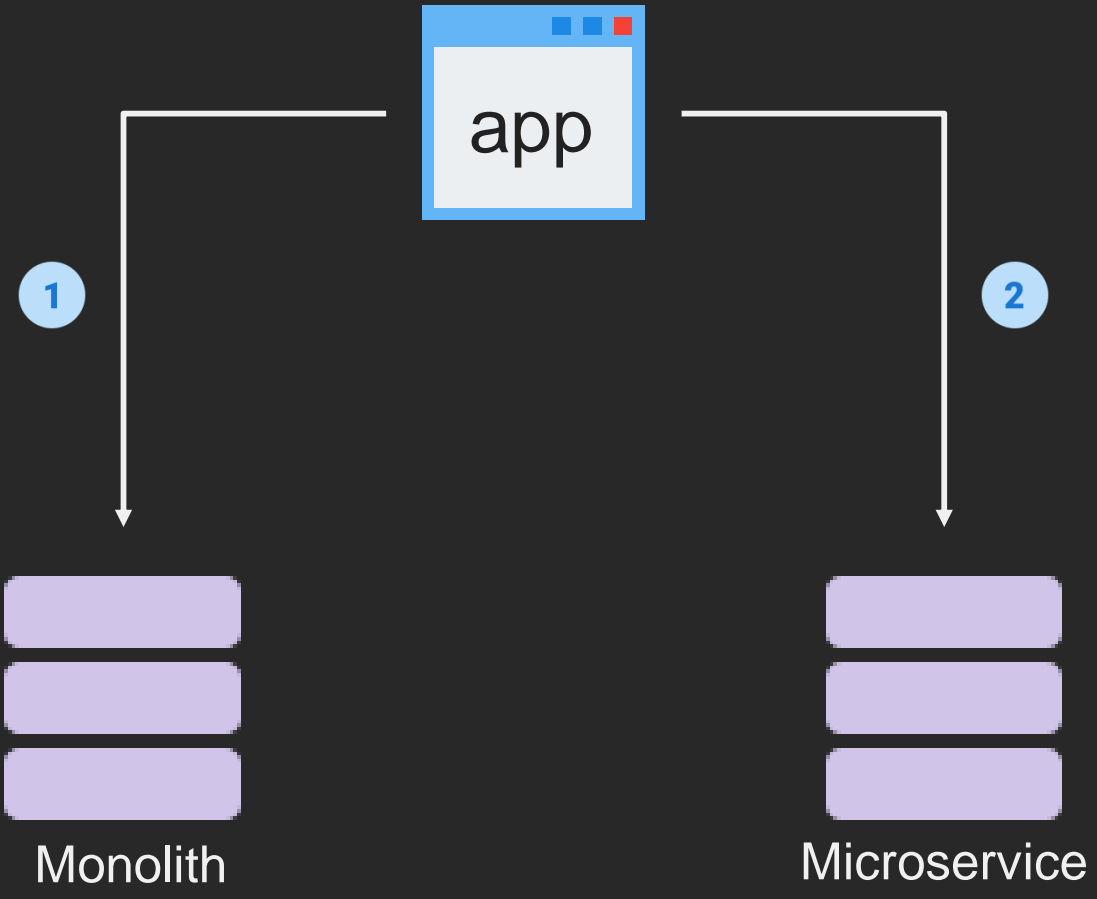
5. **Flip switch** to make microservice the source of truth for reads



6. **Delete** tables from monolith

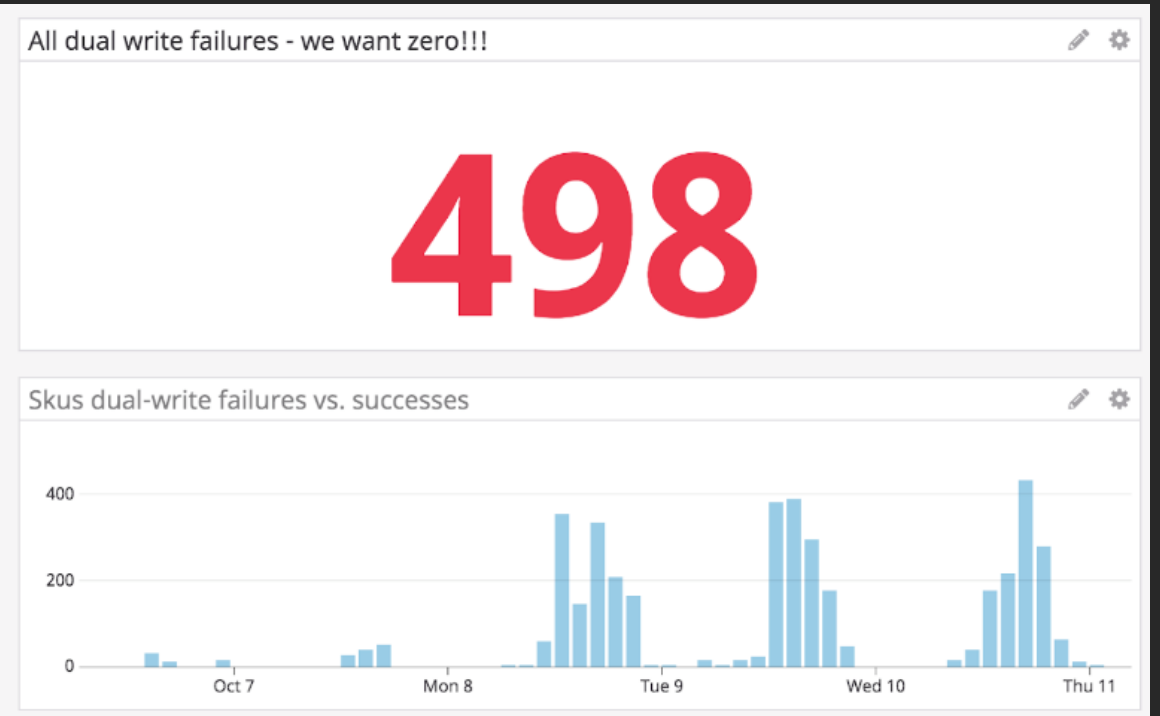
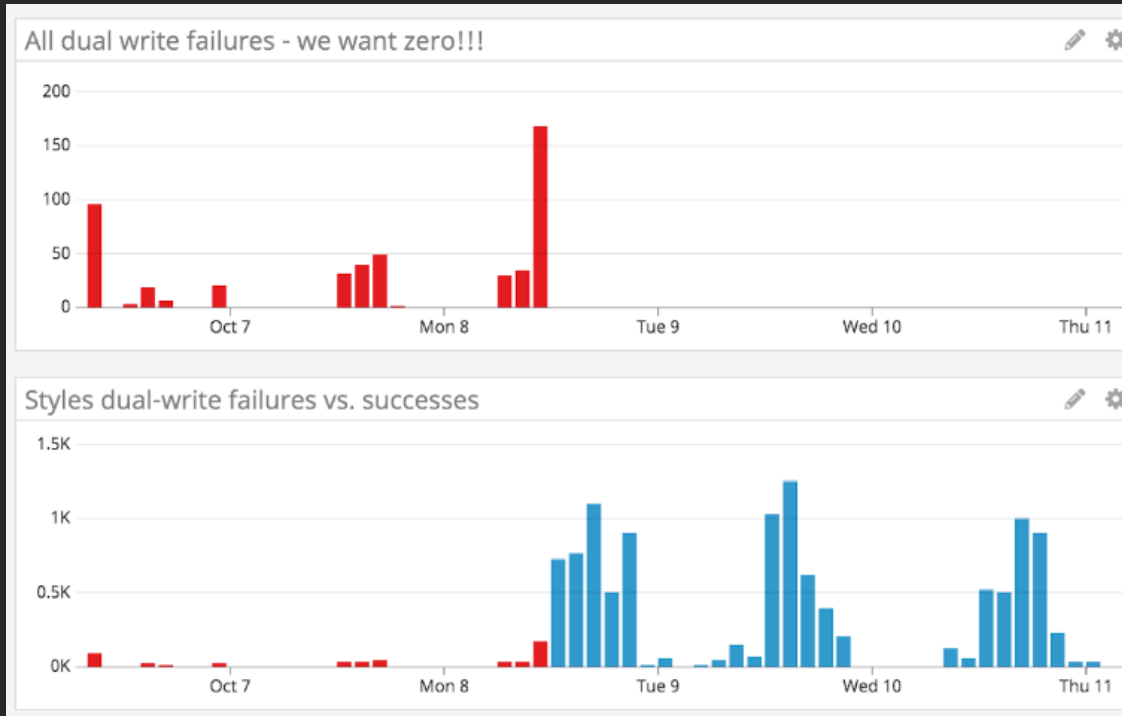


1. Dual-write



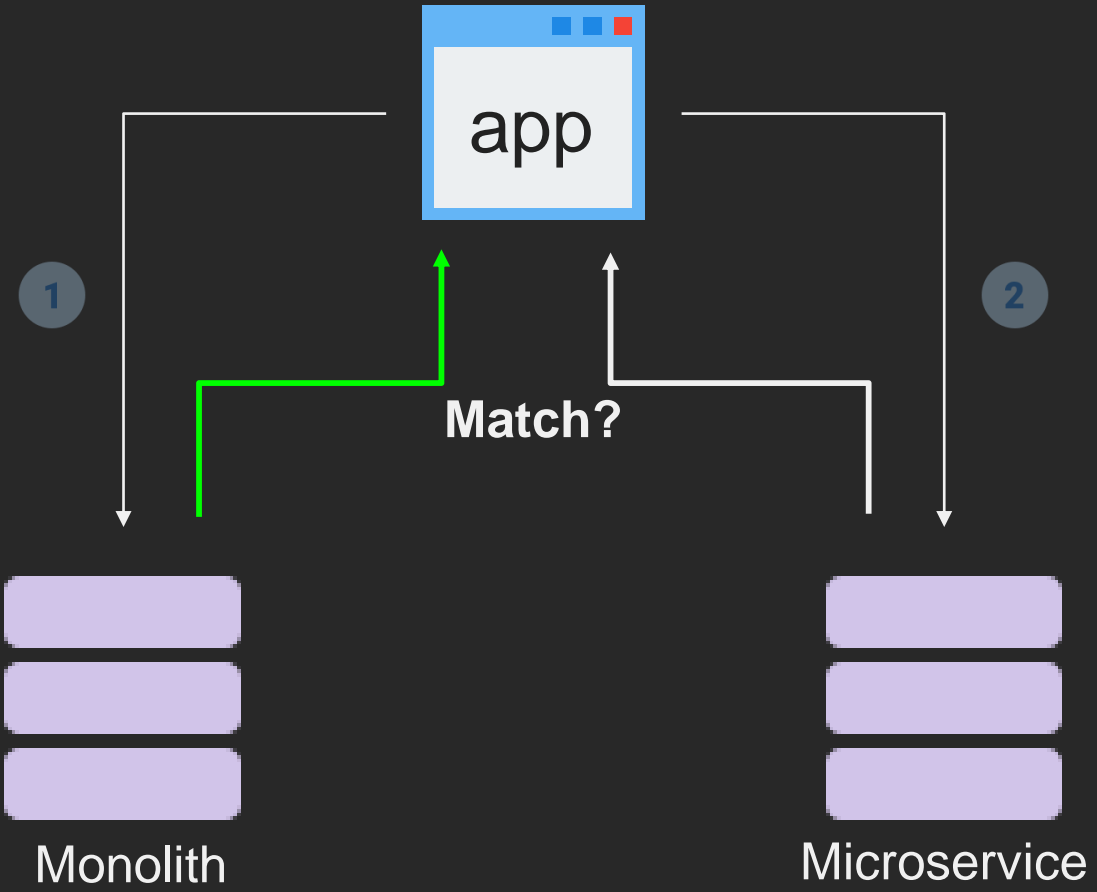


1. Dual-write



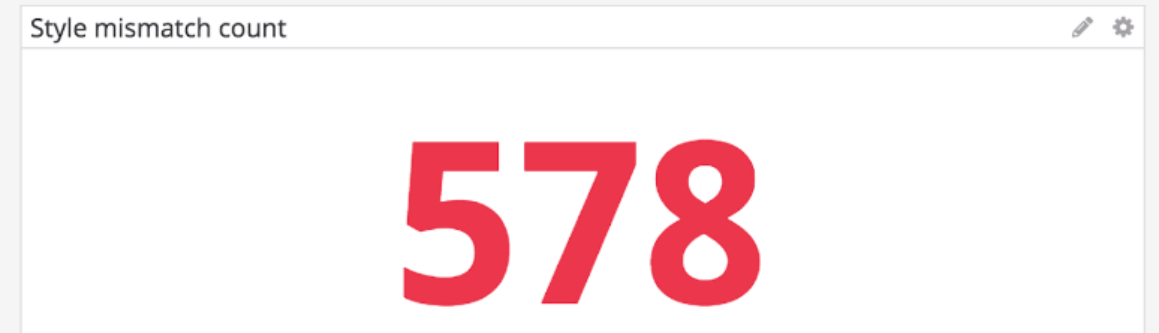
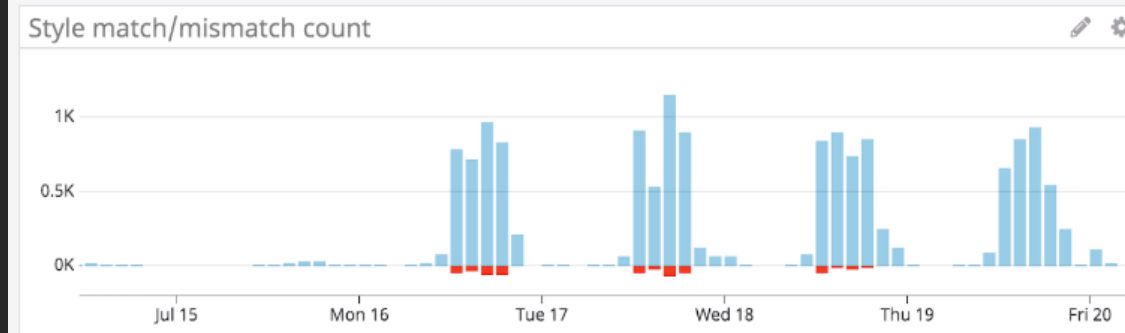
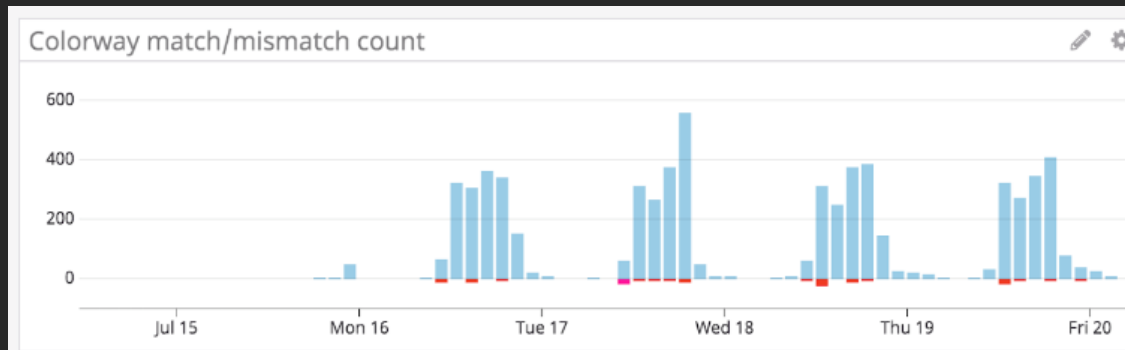


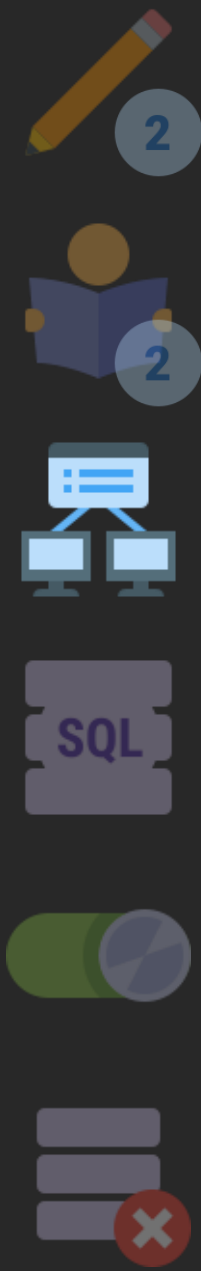
2. Dual-read



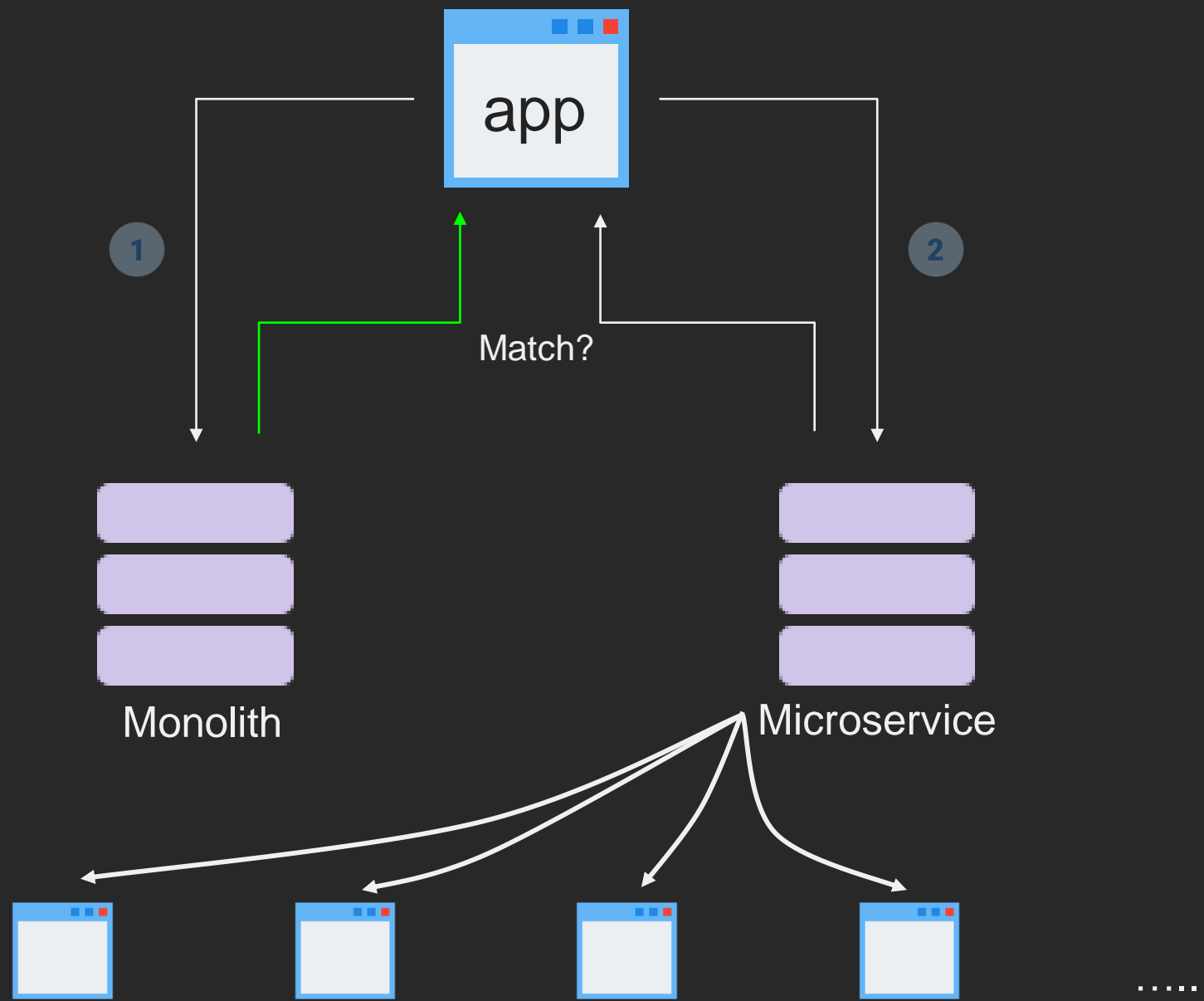


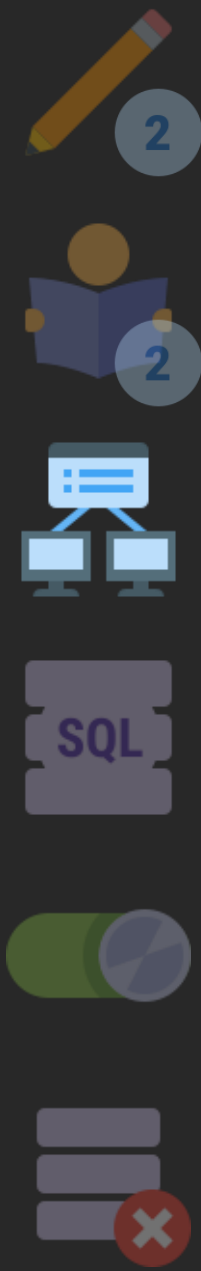
2. Dual-read





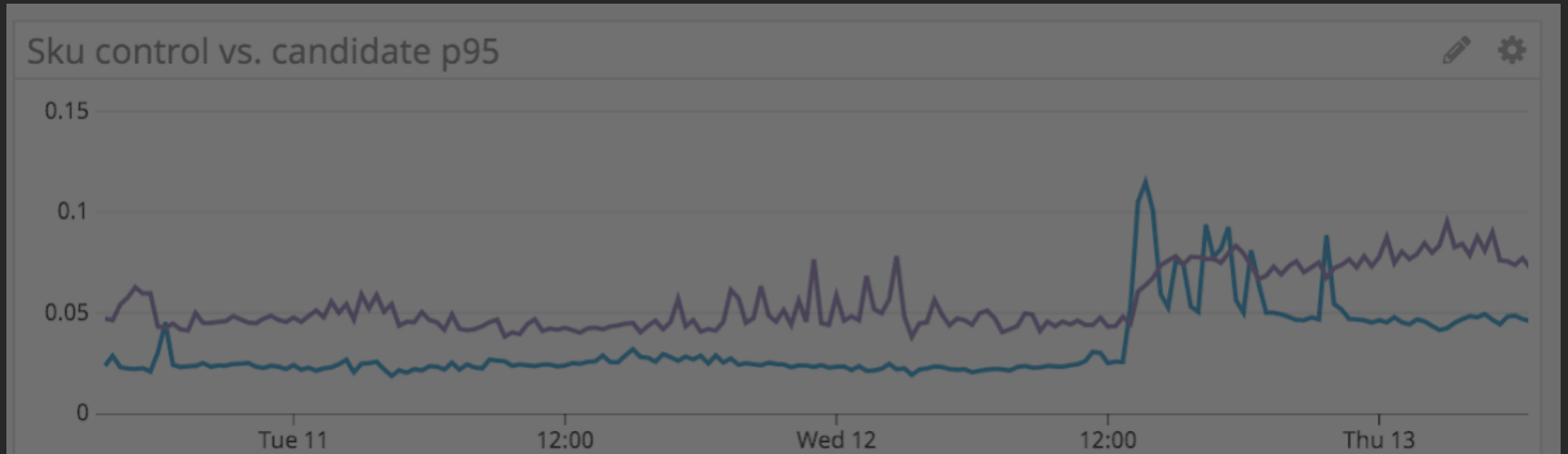
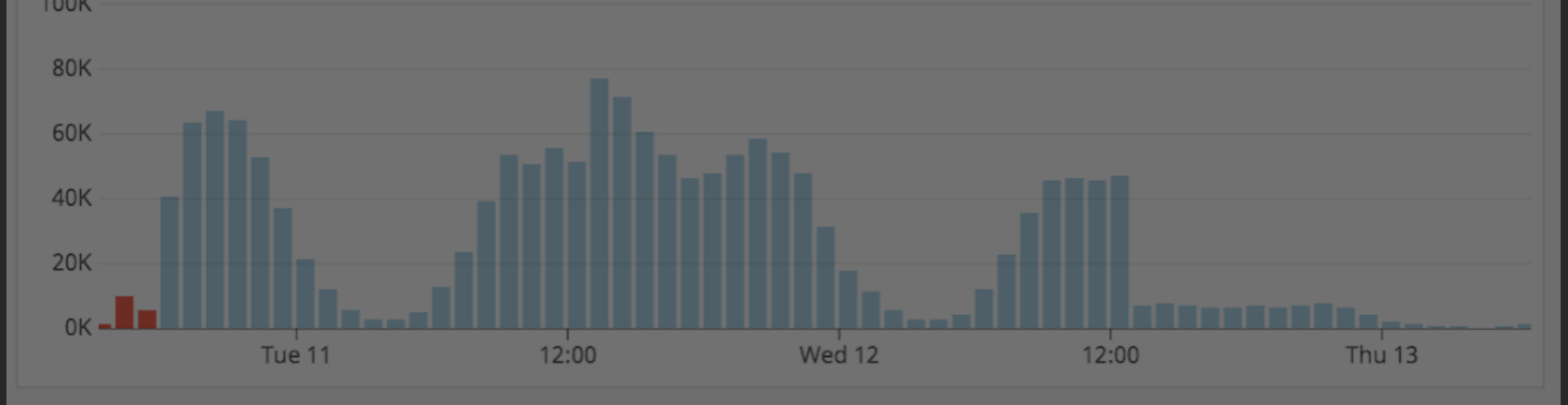
3. Migrate

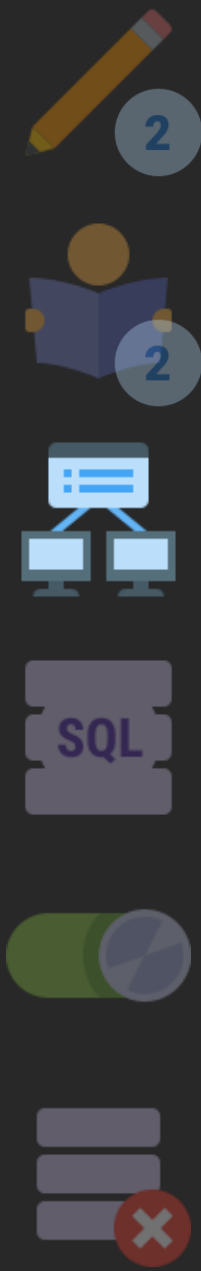




3. Migrate

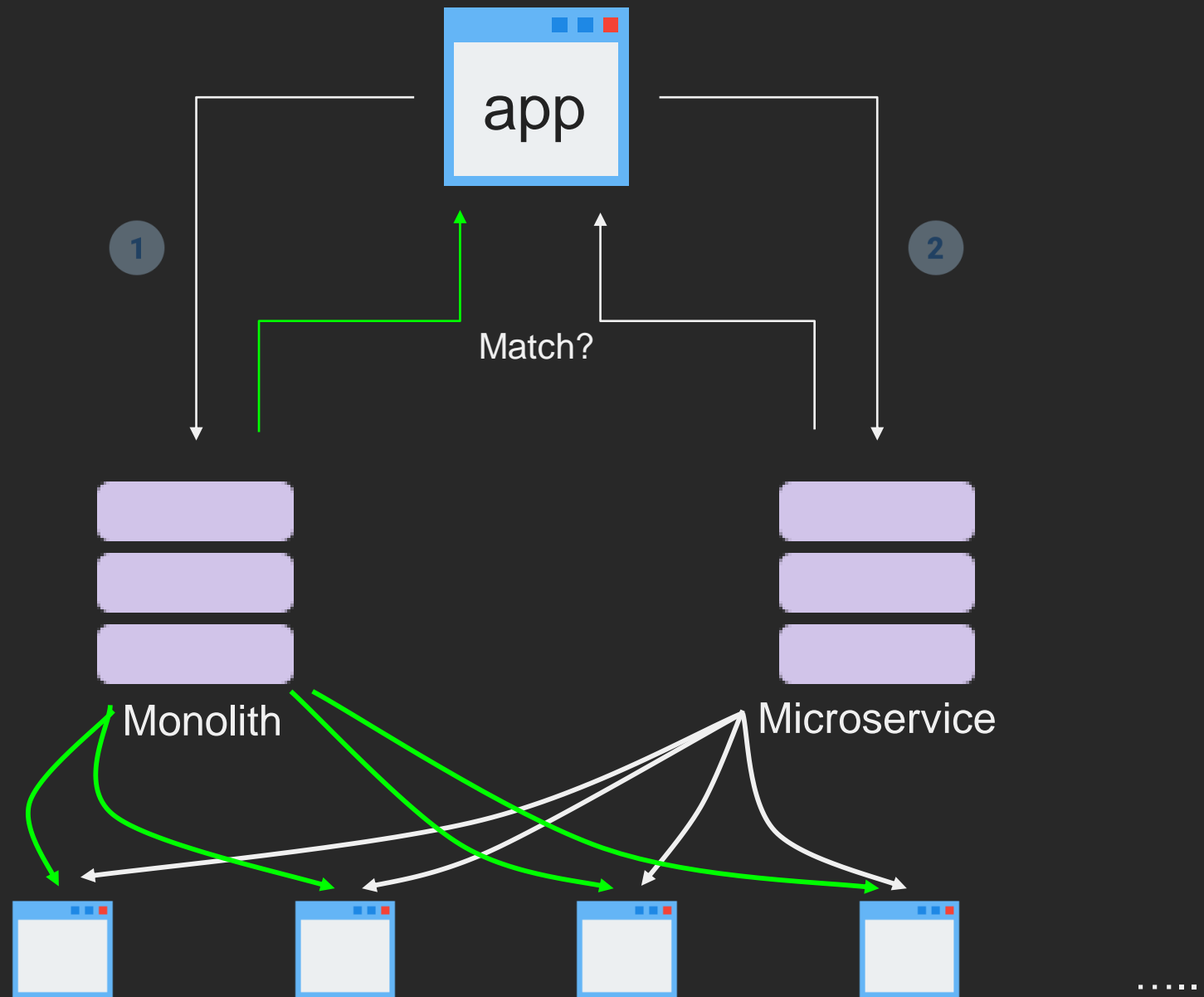
Sku Read Source	
56.58M	/app/app/services/size_quantities_service.rb:21
1.20M	/app/app/jobs/elasticsearch_updater.rb:14
476.53K	/app/app/services/sku_based_allocation_service.rb:39
429.76K	/app/app/models/concerns/style_variant_model.rb:672
325.65K	/app/app/services/pricing/item_sync_service.rb:24
235.05K	/app/app/services/allocation_service.rb:62
196.69K	/app/app/models/concerns/style_model.rb:142
70.75K	/app/app/models/concerns/style_variant_model.rb:157
46.34K	/app/app/views/style_variants/index.html.haml:58
44.16K	/app/app/models/concerns/style_variant_model.rb:104

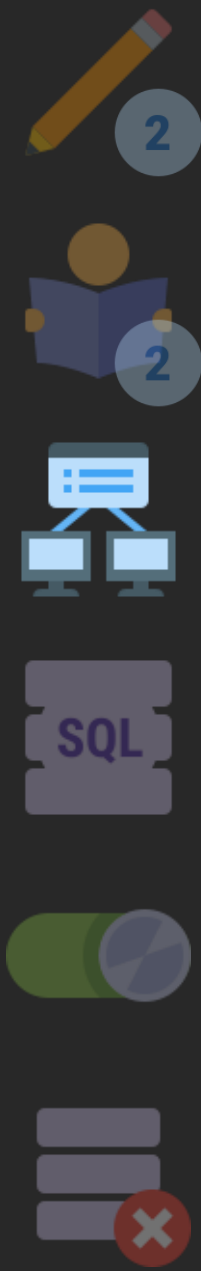




3. Migrate

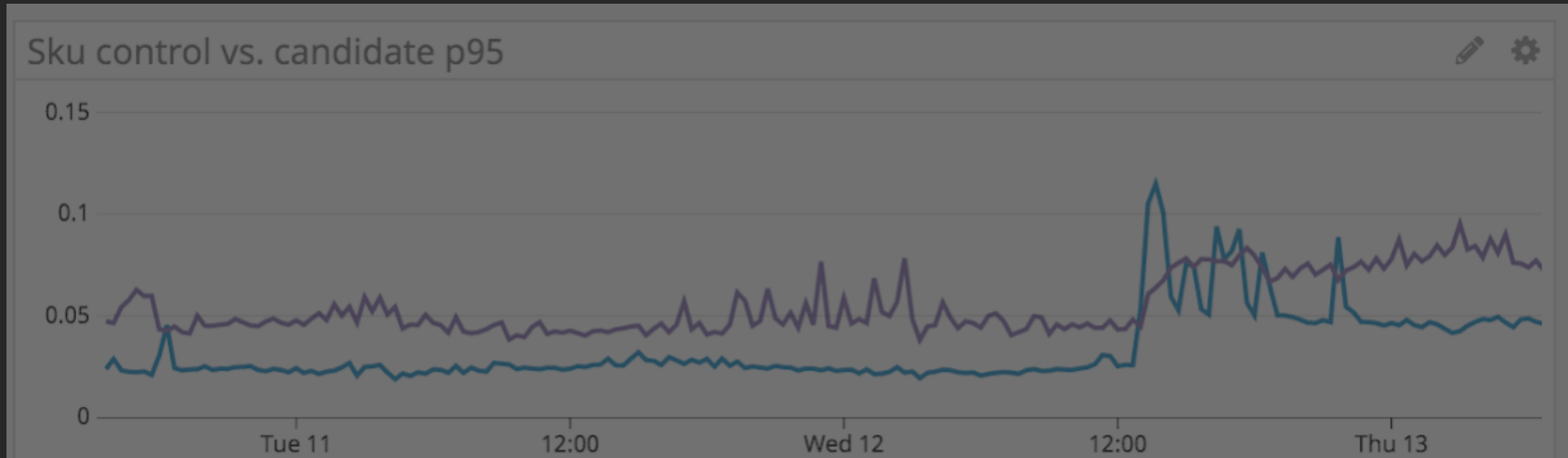
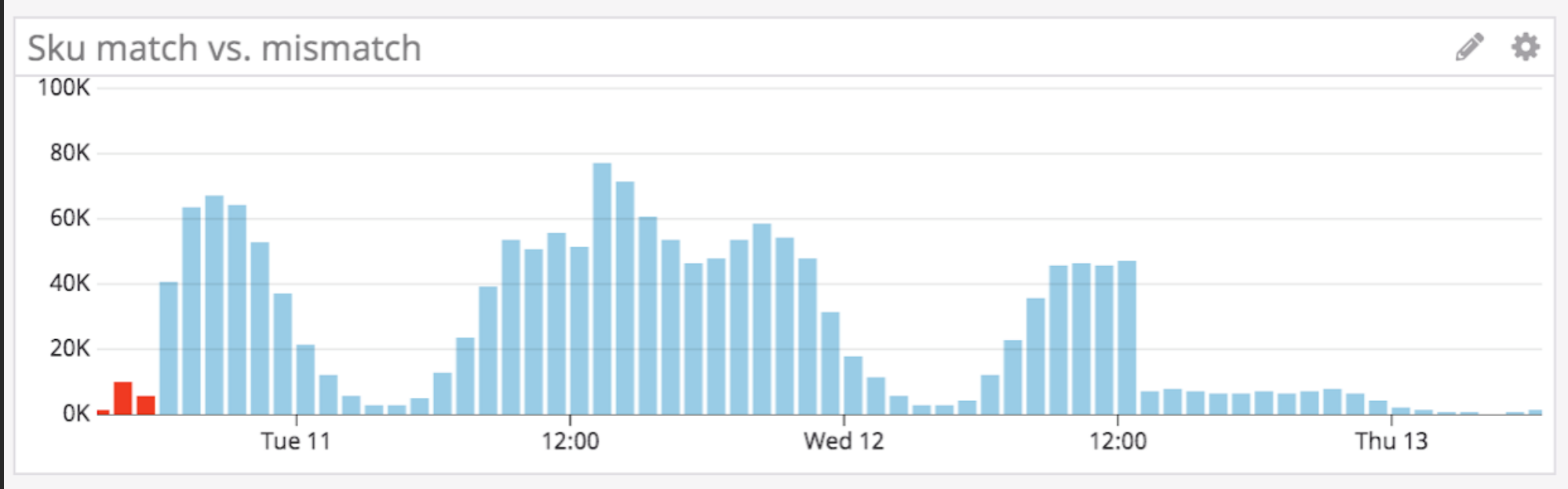
Dual-reading

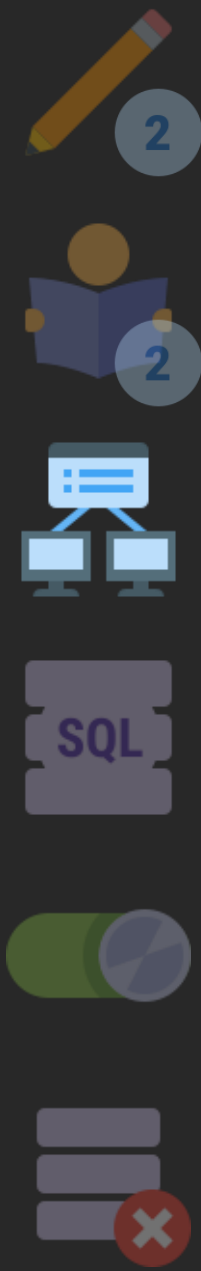




3. Migrate

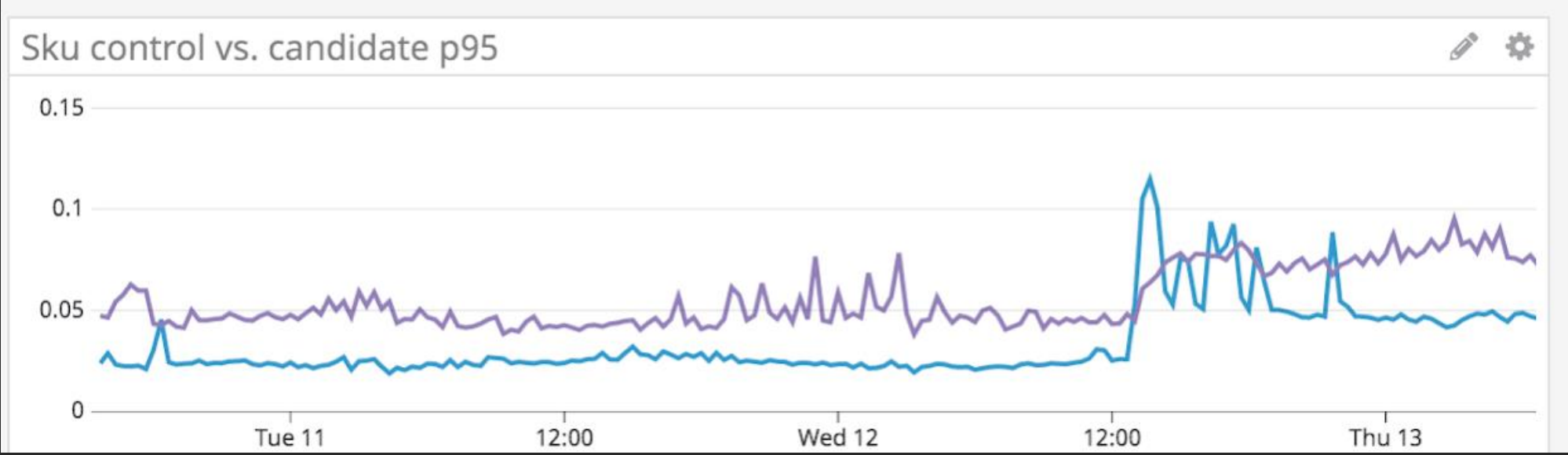
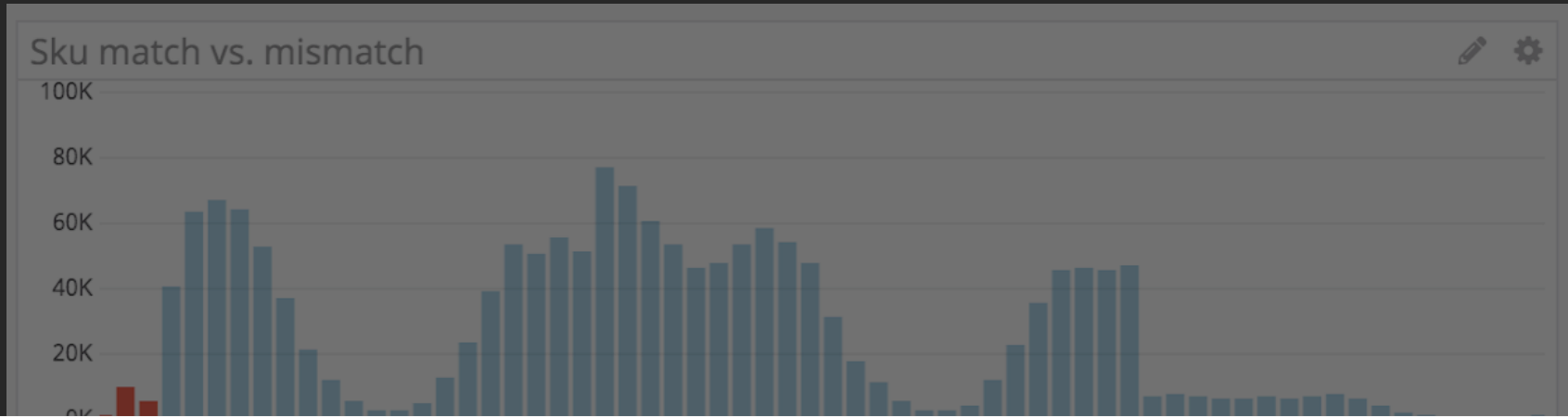
Sku Read Source	
56.58M	/app/app/services/size_quantities_service.rb:21
1.20M	/app/app/jobs/elasticsearch_updater.rb:14
476.53K	/app/app/services/sku_based_allocation_service.rb:39
429.76K	/app/app/models/concerns/style_variant_model.rb:672
325.65K	/app/app/services/pricing/item_sync_service.rb:24
235.05K	/app/app/services/allocation_service.rb:62
196.69K	/app/app/models/concerns/style_model.rb:142
70.75K	/app/app/models/concerns/style_variant_model.rb:157
46.34K	/app/app/views/style_variants/index.html.haml:58
44.16K	/app/app/models/concerns/style_variant_model.rb:104

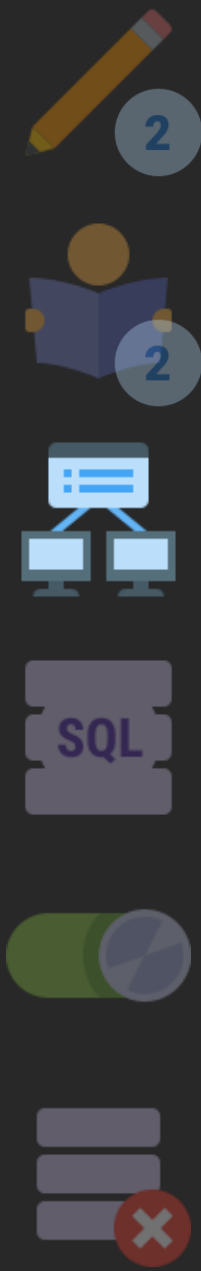




3. Migrate

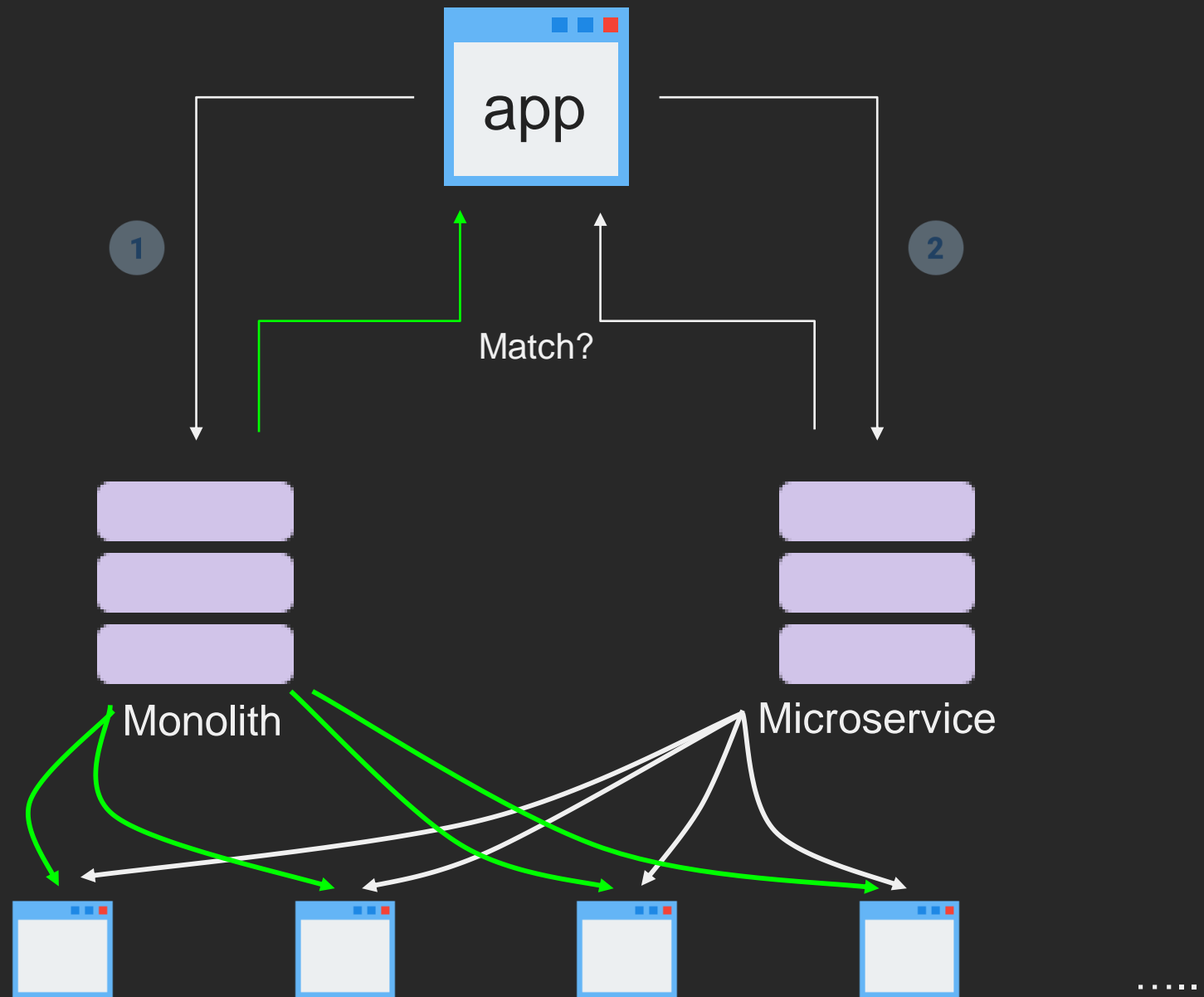
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46.34K	/app/app/views/style_variants/index.html.haml:58
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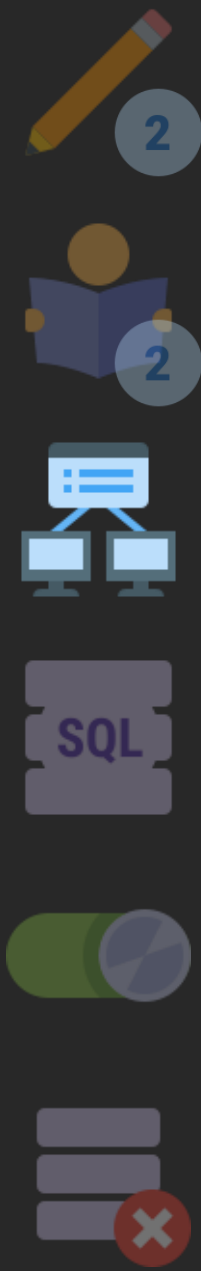




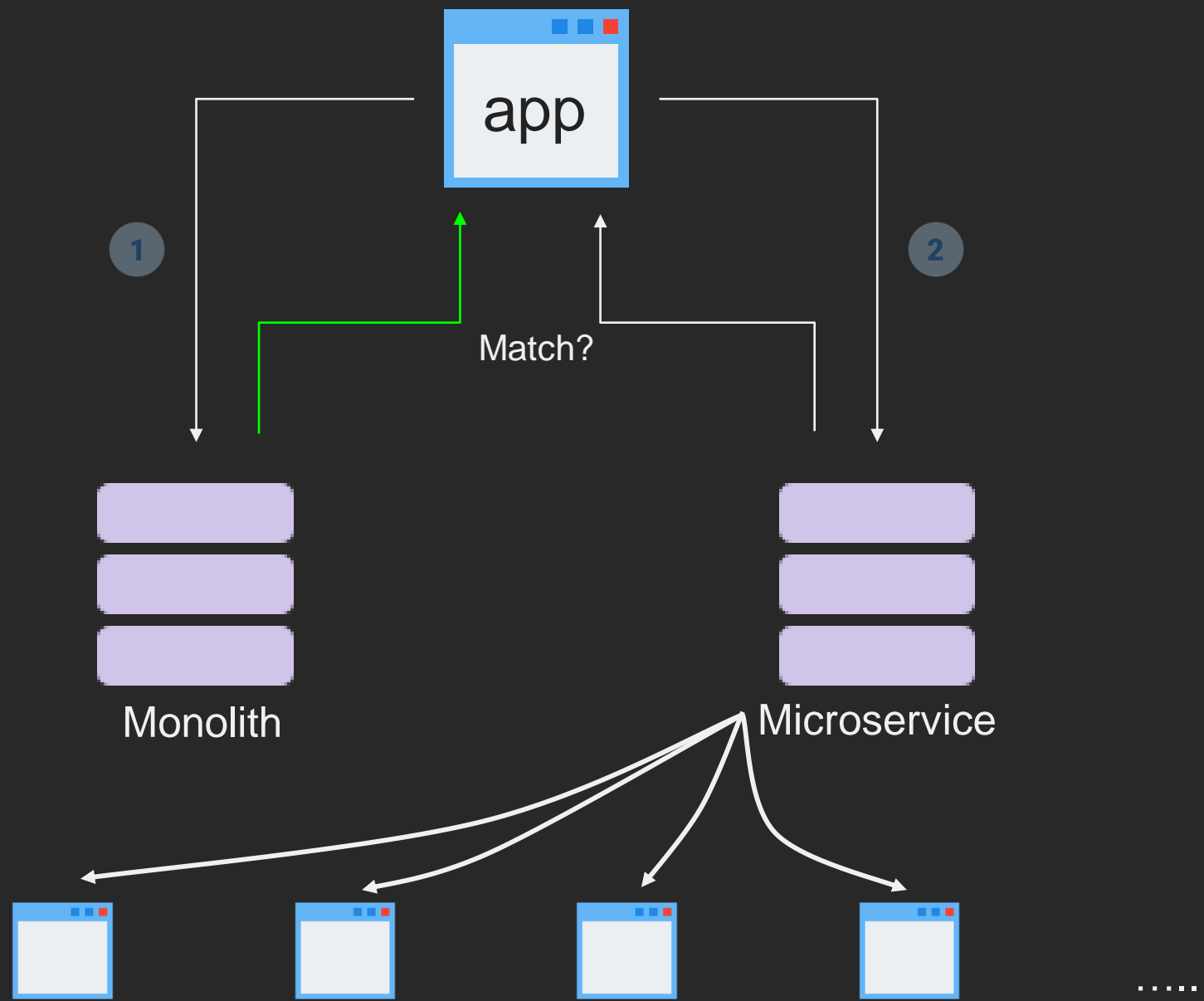
3. Migrate

Dual-reading





3. Migrate





4. Audit

↓	NAME	REQUESTS	AVG LATENCY	TOTAL TIME ↓	ERRORS	ERROR RATE
☆	SELECT colorway . * FROM colorway WHERE colorway . id = ? LIMIT ?	94.5k <div></div>	3 ms <div></div>	238 s <div></div>	0 <div></div>	0% <div></div>
☆	SELECT colorway . * FROM colorway WHERE colorway . id = ?	10.3k <div></div>	4 ms <div></div>	41.3 s <div></div>	0 <div></div>	0% <div></div>
☆	SELECT colorway . * FROM colorway WHERE colorway . active = ? ORDER BY colorway . nam...	40 <div></div>	3 ms <div></div>	110 ms <div></div>	0 <div></div>	0% <div></div>
☆	SELECT colorway.color, buy.cost, item.size, FROM colorway JOIN...colorway colors on (colo...	3 <div></div>	11 ms <div></div>	31.7 ms <div></div>	0 <div></div>	0% <div></div>
☆	SELECT colorway . * FROM colorway WHERE colorway . id IN (?)	3 <div></div>	2 ms <div></div>	7.41 ms <div></div>	0 <div></div>	0% <div></div>



5. Flip switch(es)

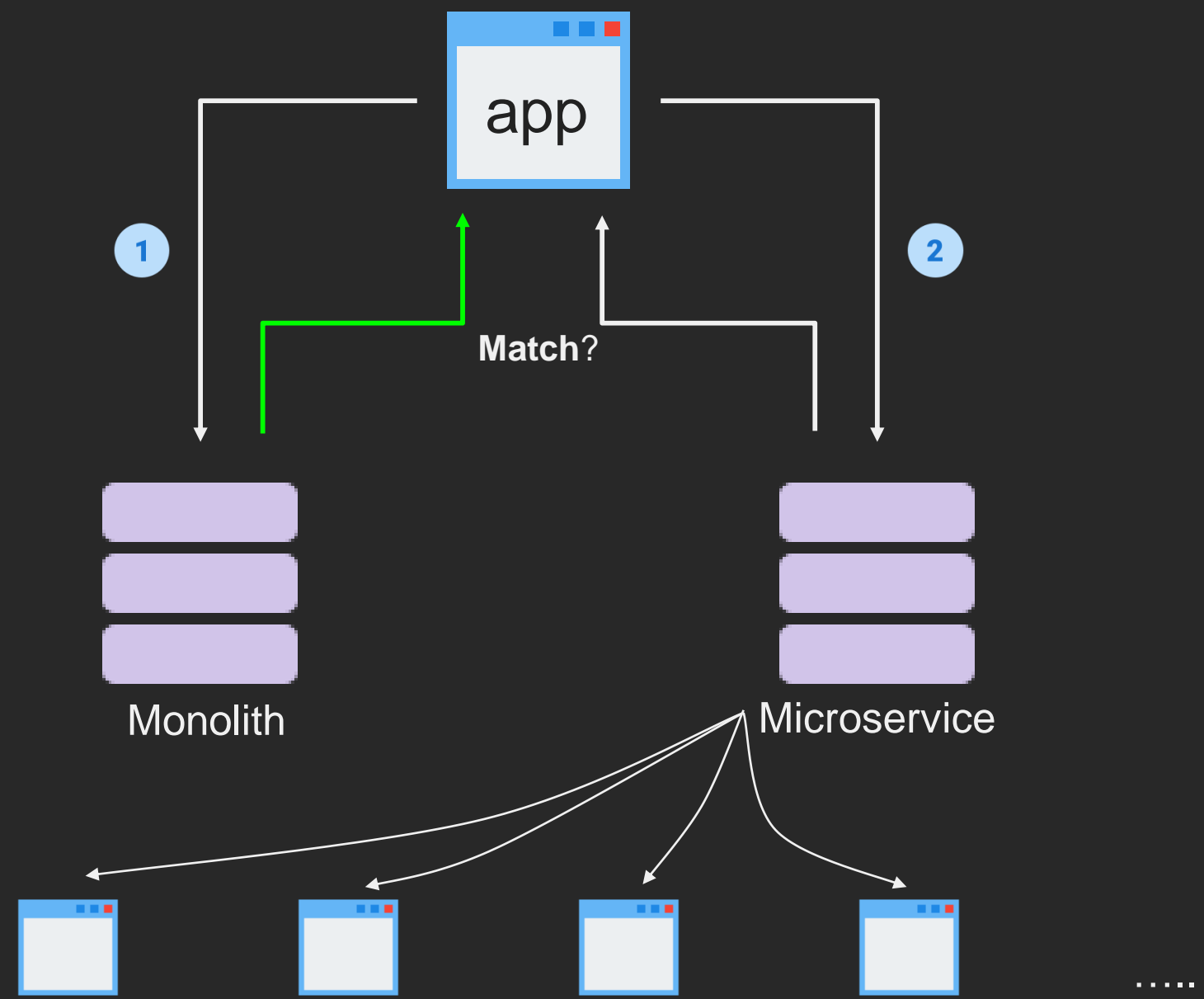


```
switch = ENV["SWITCH_VALUE"]
```

```
if switch == true  
  { ... }  
else  
  { ... }  
end
```

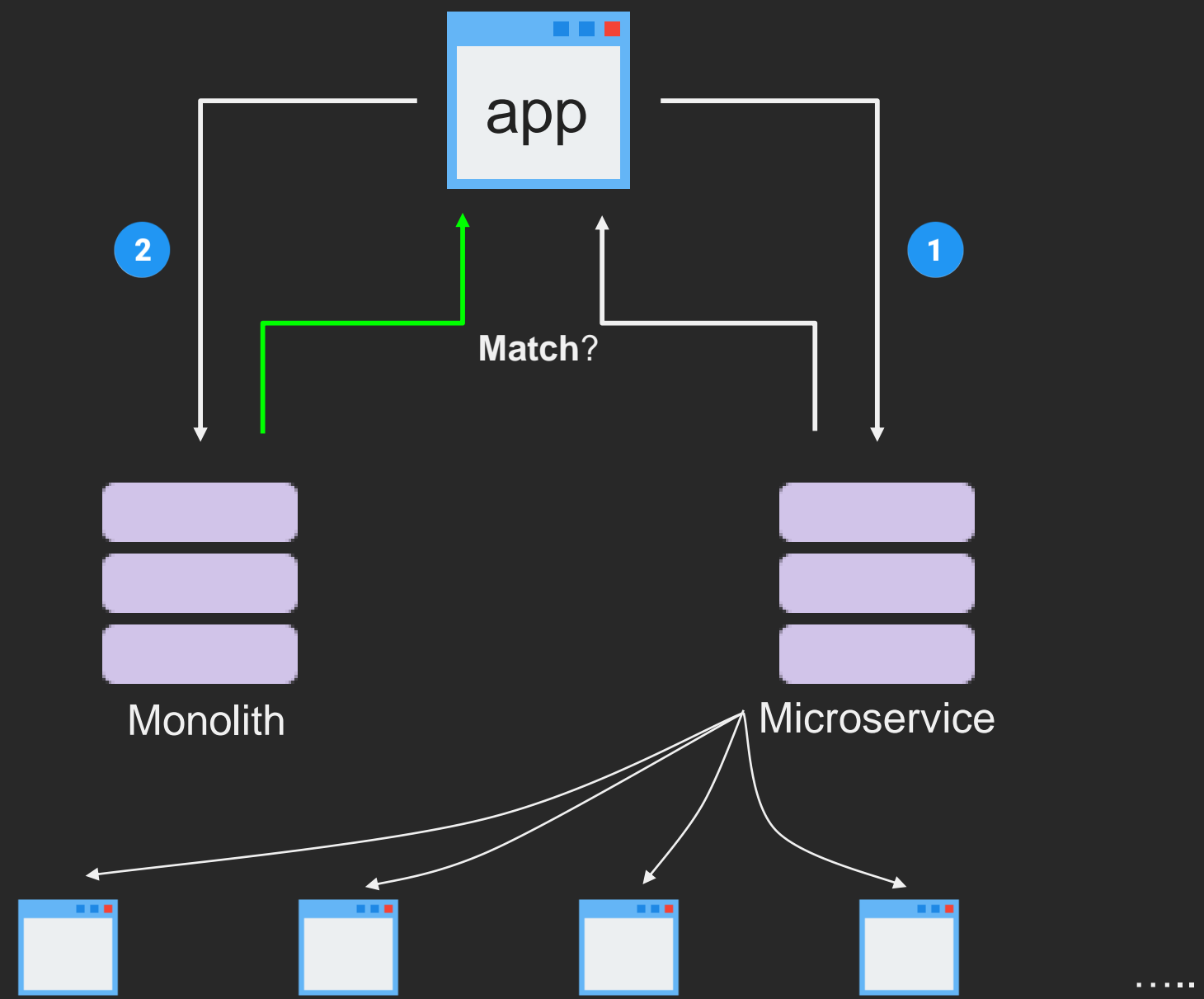


5. Flip switch(es)



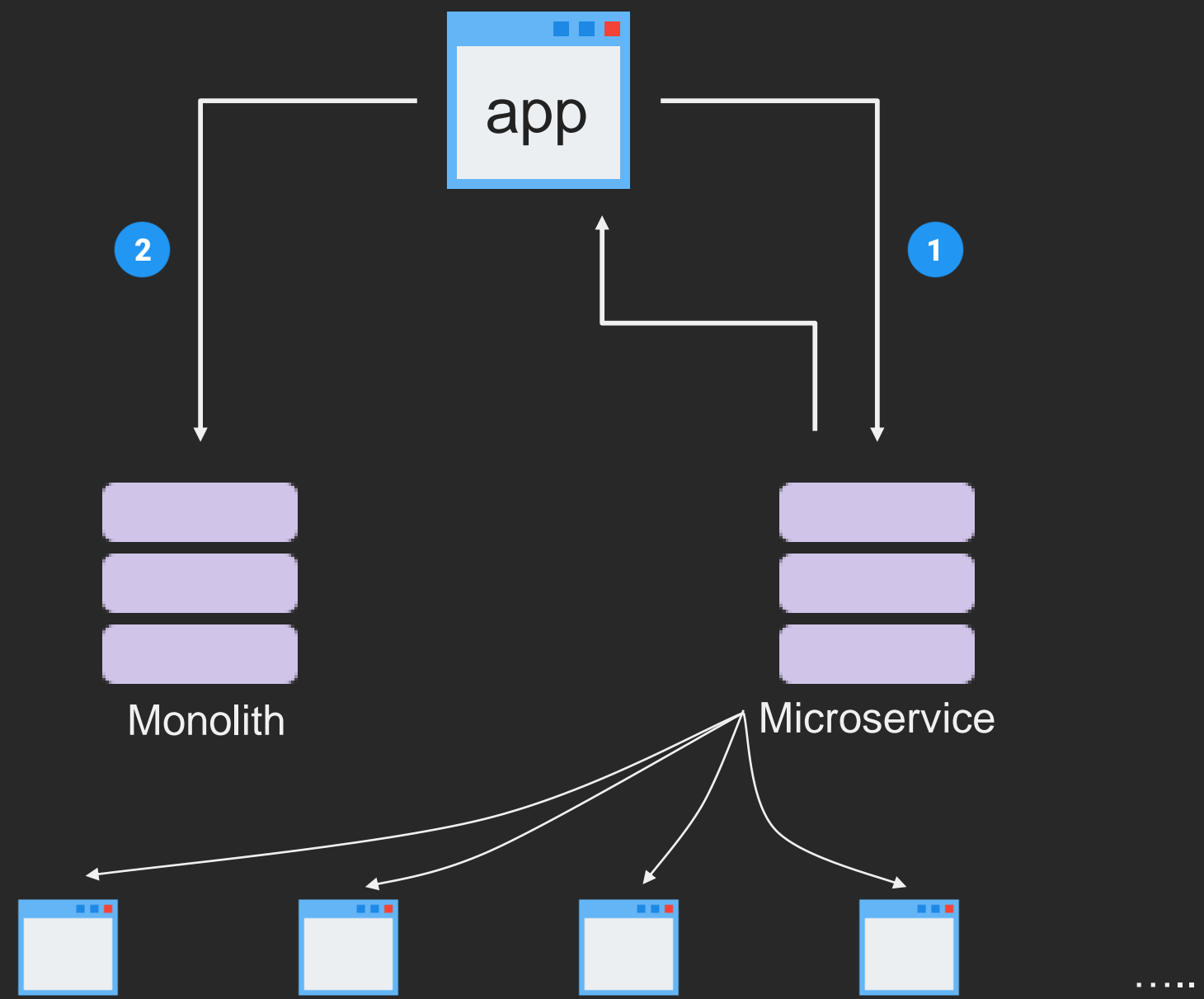


5. Flip switch(es)



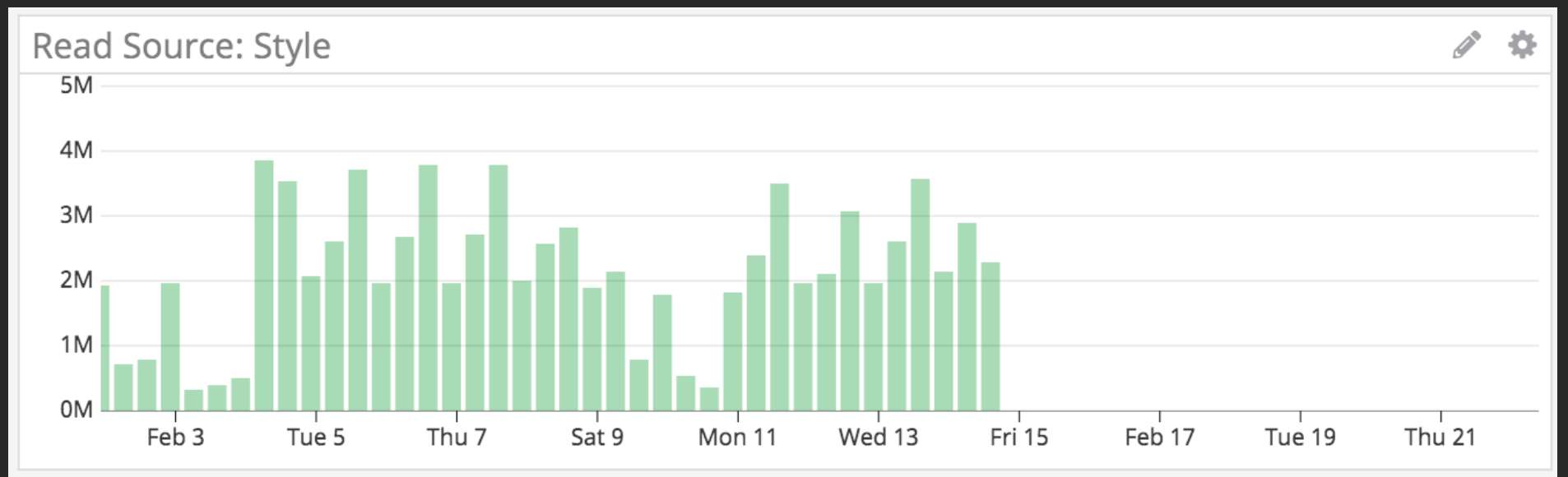


5. Flip switch(es)





5. Flip switch(es)





nitikadaga@monolithic_db:~\$ bundle exec rake db:migrate



```
| Feb 22 12:10:32.446 | i-0123456ab7c89d0e1 | monolithic_db > == 20190222123456 DropStyleTables: migrating =====
| Feb 22 12:10:32.449 | i-0123456ab7c89d0e1 | monolithic_db > - drop_table(:skus)
| Feb 22 12:10:32.450 | i-0123456ab7c89d0e1 | monolithic_db > -> 0.0219s
| Feb 22 12:10:32.452 | i-0123456ab7c89d0e1 | monolithic_db > - drop_table(:color_ways)
| Feb 22 12:10:32.453 | i-0123456ab7c89d0e1 | monolithic_db > -> 0.0134s
| Feb 22 12:10:32.454 | i-0123456ab7c89d0e1 | monolithic_db > - drop_table(:styles)
| Feb 22 12:10:32.456 | i-0123456ab7c89d0e1 | monolithic_db > -> 0.0139s
| Feb 22 12:10:32.446 | i-0123456ab7c89d0e1 | monolithic_db > == 20190222123456 DropStyleTables: migrated =====
```



6. Delete

Recap



1. **Dual-write**



2. **Dual-read**



3. **Migrate**



4. **Audit**



5. **Flip switch**



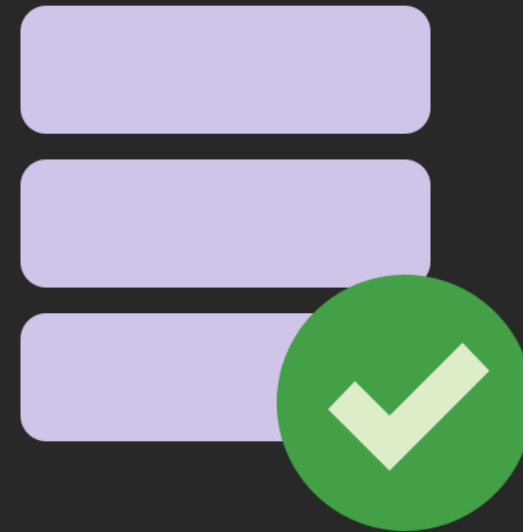
6. **Delete**



Incremental delivery



Zero downtime



No loss of data



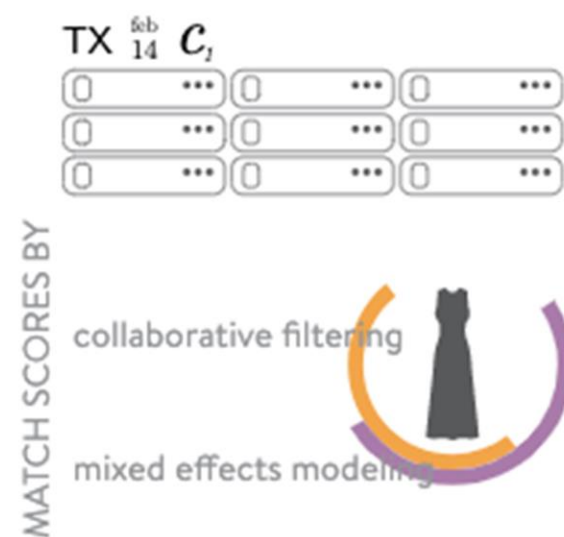
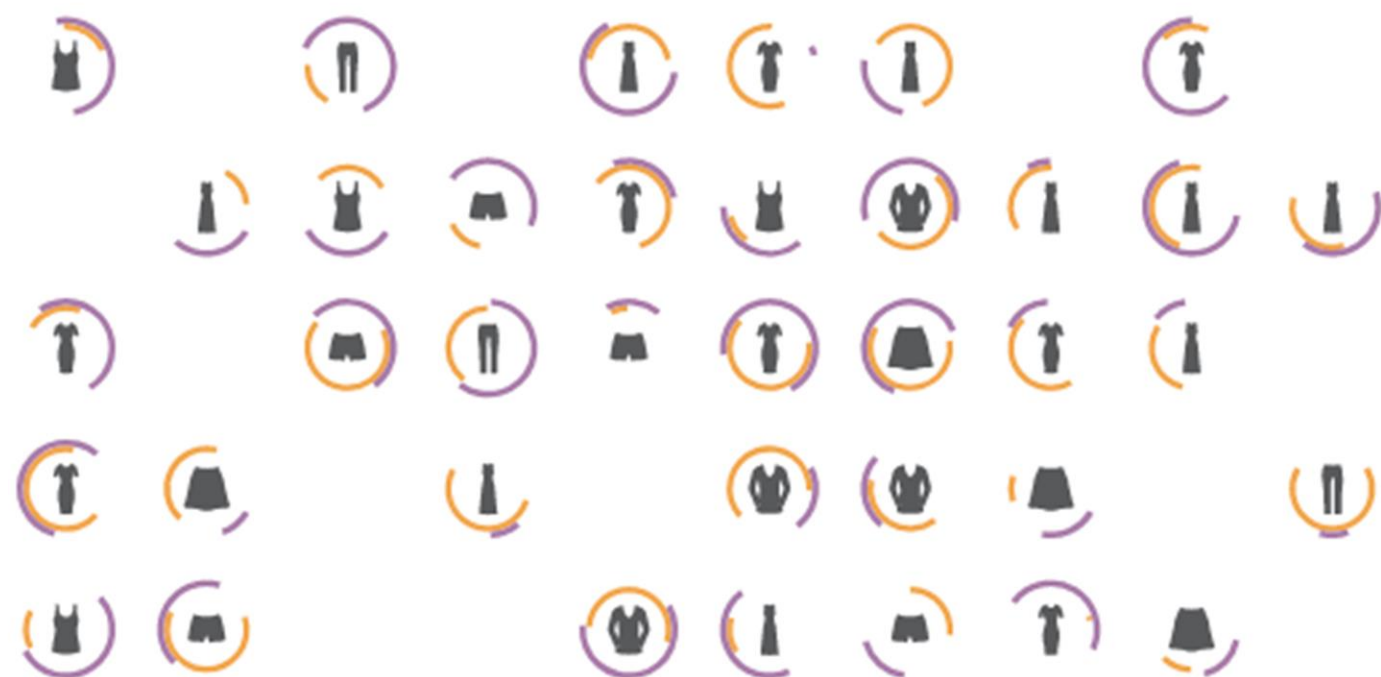
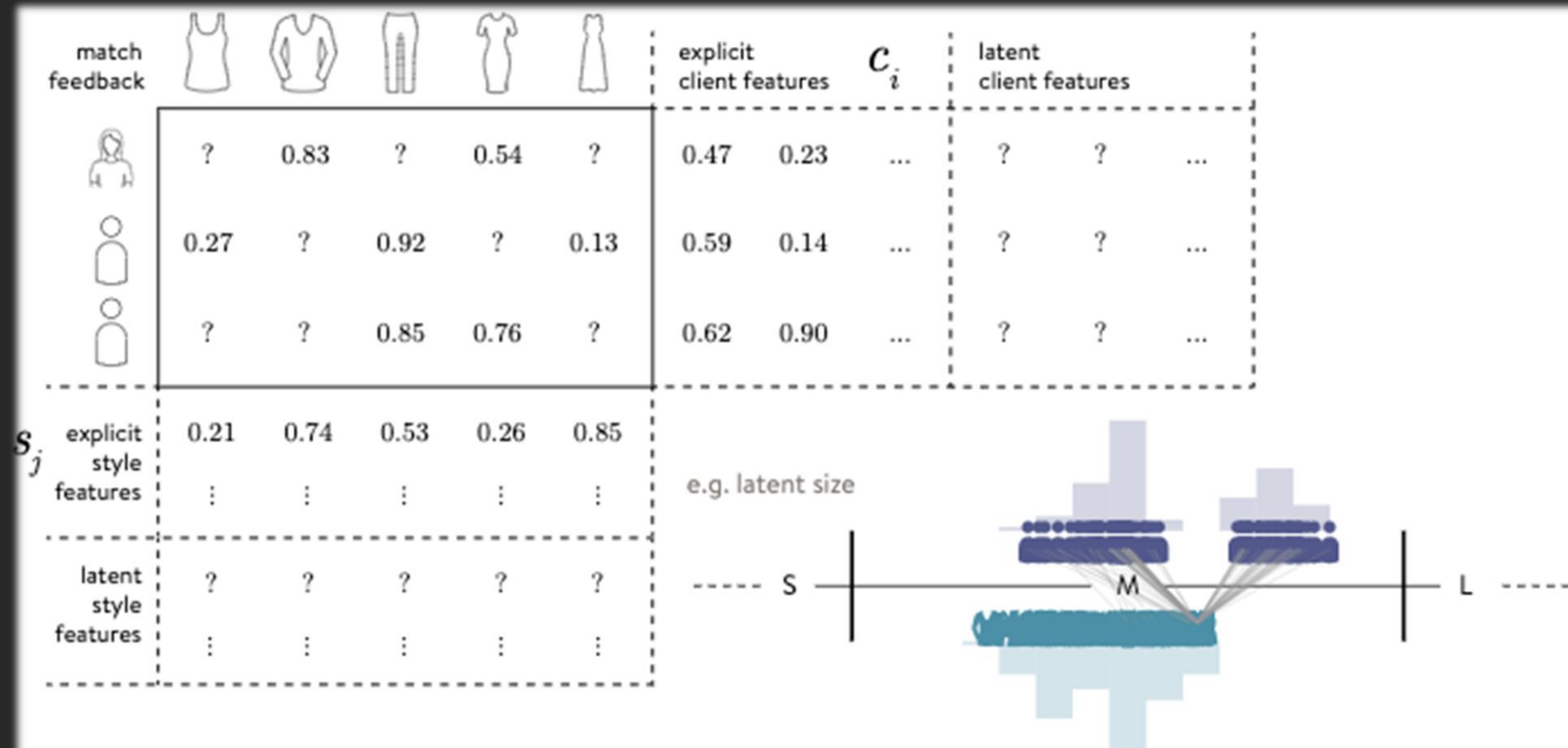
Benefits and next steps

Success and next steps

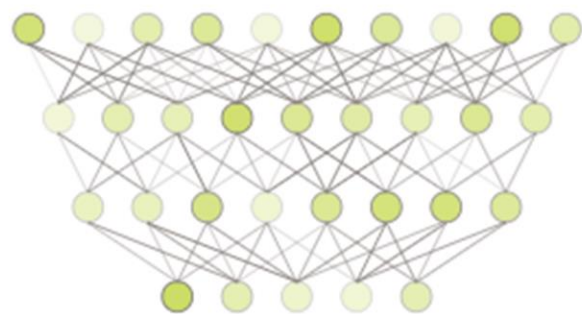
FIRST
of
many

**Codified
playbook**

**Zero
downtime!**



pinned
image
she likes



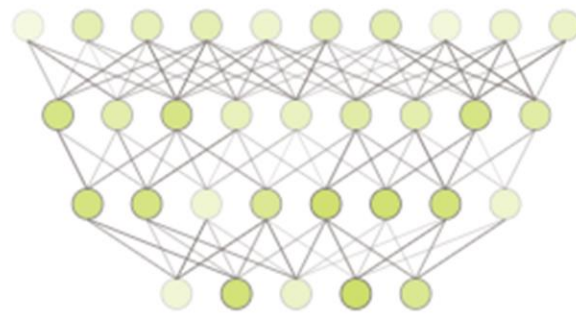
vector
description

55 93 74 87 43 ...

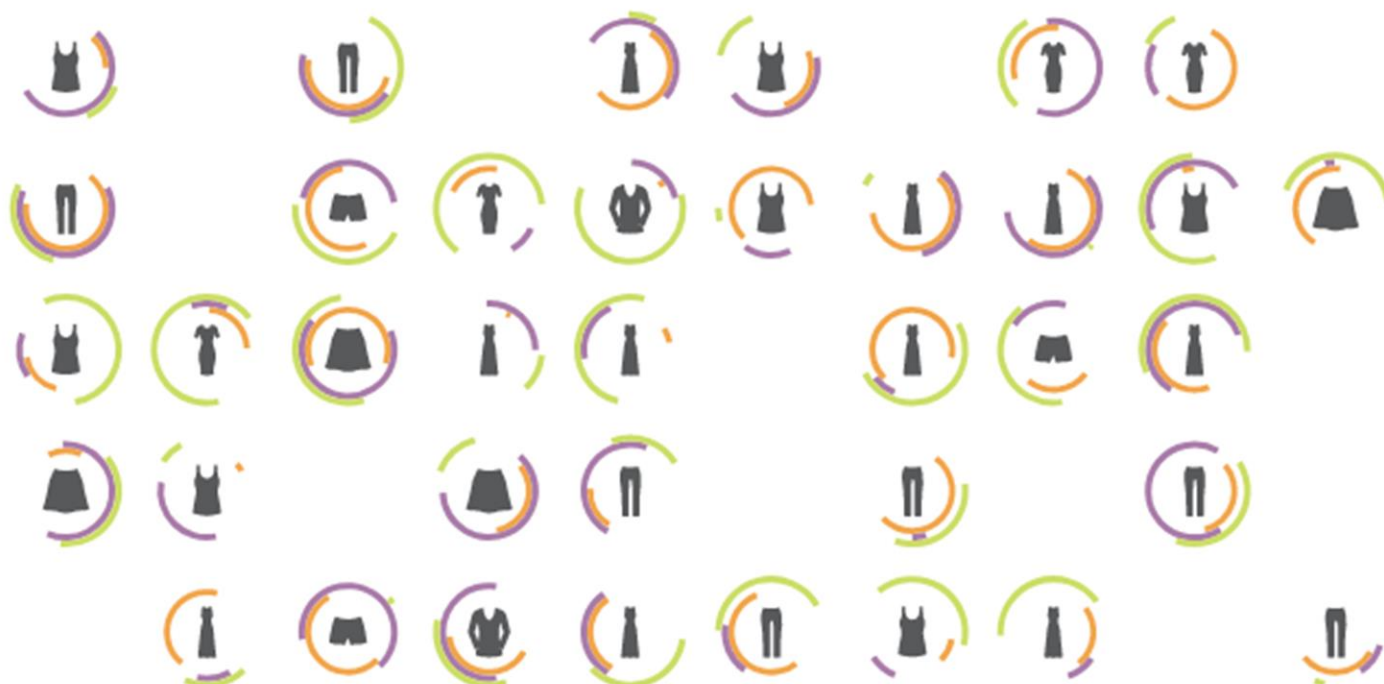
cosine
similarity

0.62

image
of clothing
in inventory



39 72 12 14 28 ... vector
description



$$TX_{14}^{feb} C_i$$

0	...	0	...	0	...
0	...	0	...	0	...
0	...	0	...	0	...

MATCH SCORES BY

convolutional neural nets

collaborative filtering

mixed effects modeling





MultiThreaded

Technology at Stitch Fix

```
skirt_style(ver):[...]  
for i in j:  
    curate(si, sj)  
    sel.append(sj)  
return sel
```

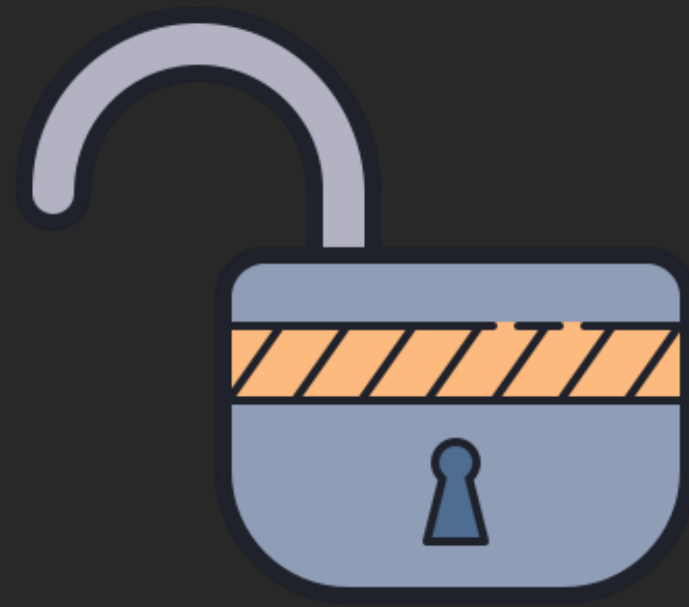
<https://multithreaded.stitchfix.com/>

Recap talk goals

Incremental
fast
migration

The role
observability
plays

**Zero
downtime!**



Confidence, speed, and safety are
unlocked by great observability

Q&A

Thank you!

Bruce Wong

@bruce_m_wong

Nitika Daga

@nitika_daga



Please complete the session
survey in the mobile app.