#CODEBEAMSF

PETER HASTIE

LEVELING UP AT B/R

PETER HASTIE

- Lead engineer at Bleacher Report (B/R)
  - Oversee the team responsible for adding discussion features to our app
- Joined B/R in 2013
- Worked with Elixir, Ruby and Node.js as backend team member
- @sillypog
- I live here

BLEACHER REPORT

- Second largest sports site in US
- Most engaged sports brand
- Making it easy to be a sports fan
- Early adopters of Elixir

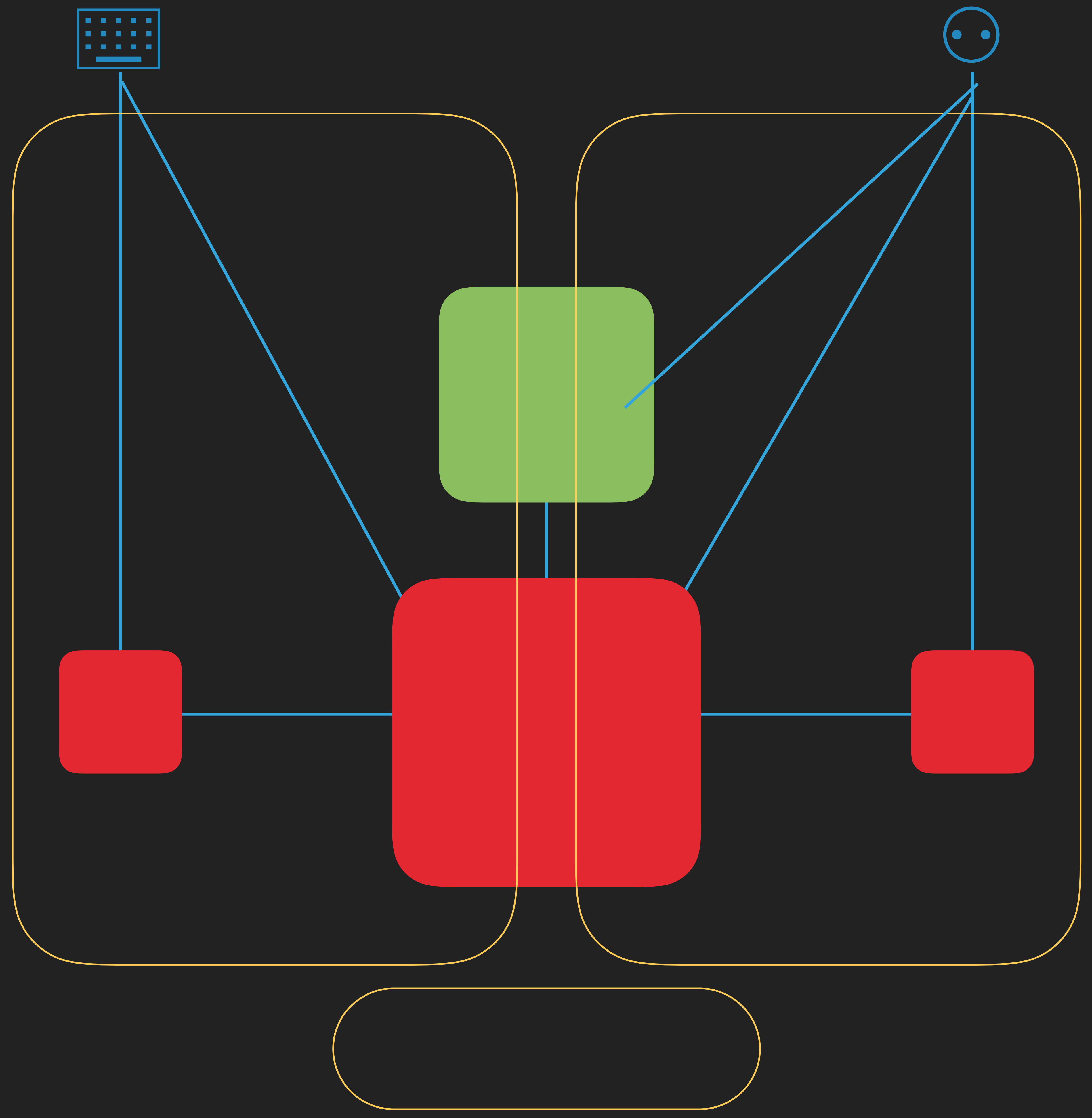
ADOPTING ELIXIR

BEN MARX, JOSE VALIM, BRUCE TATE

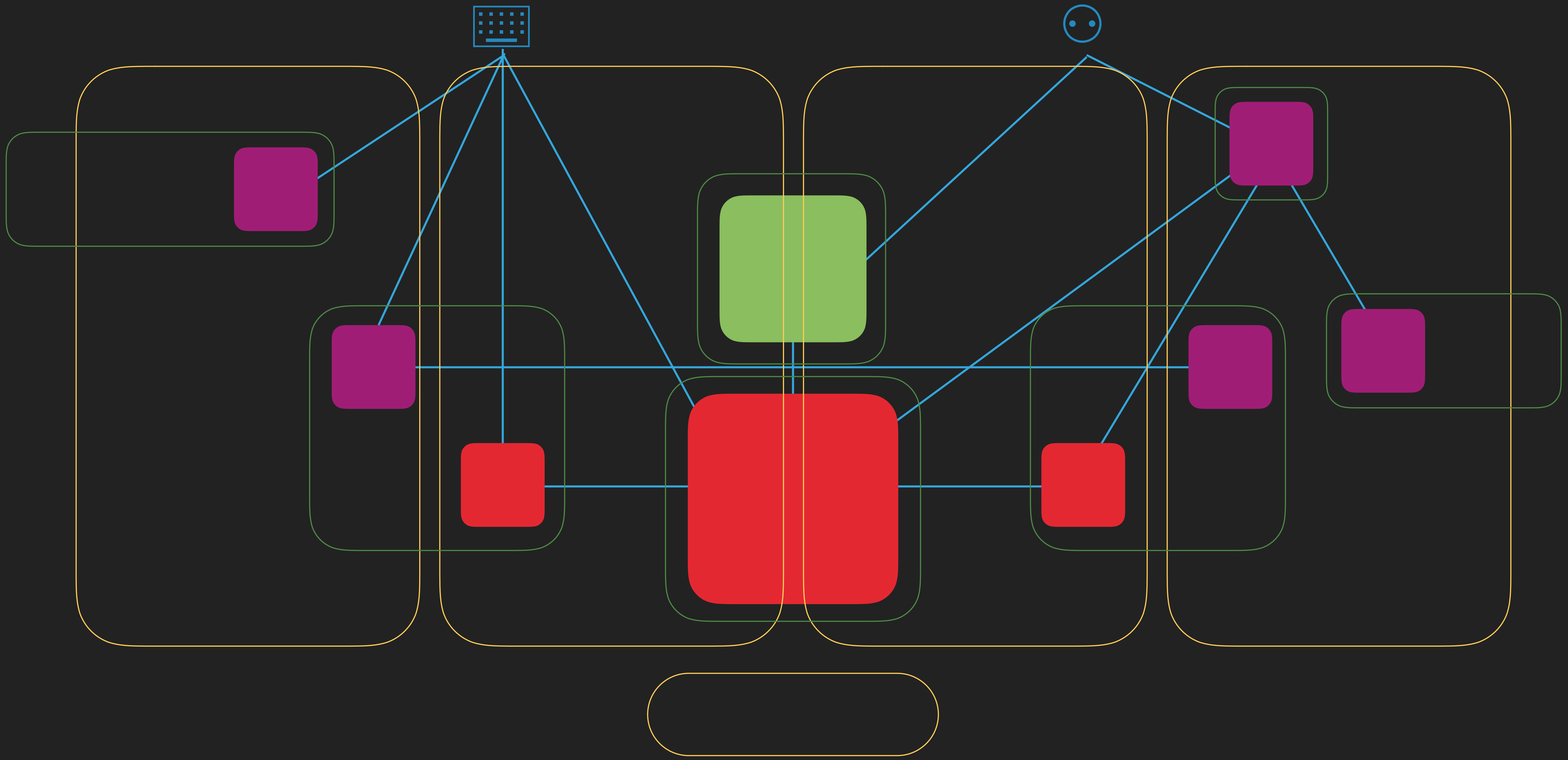
ADOPTING ELIXIR – STEPS TO GO TO PRODUCTION

As Written	As Remembered
Proof of concept	Proof of concept
Identify need	Isolate engineers
Get buy-in	Get turnt
Duplex & monitor	#YOLO

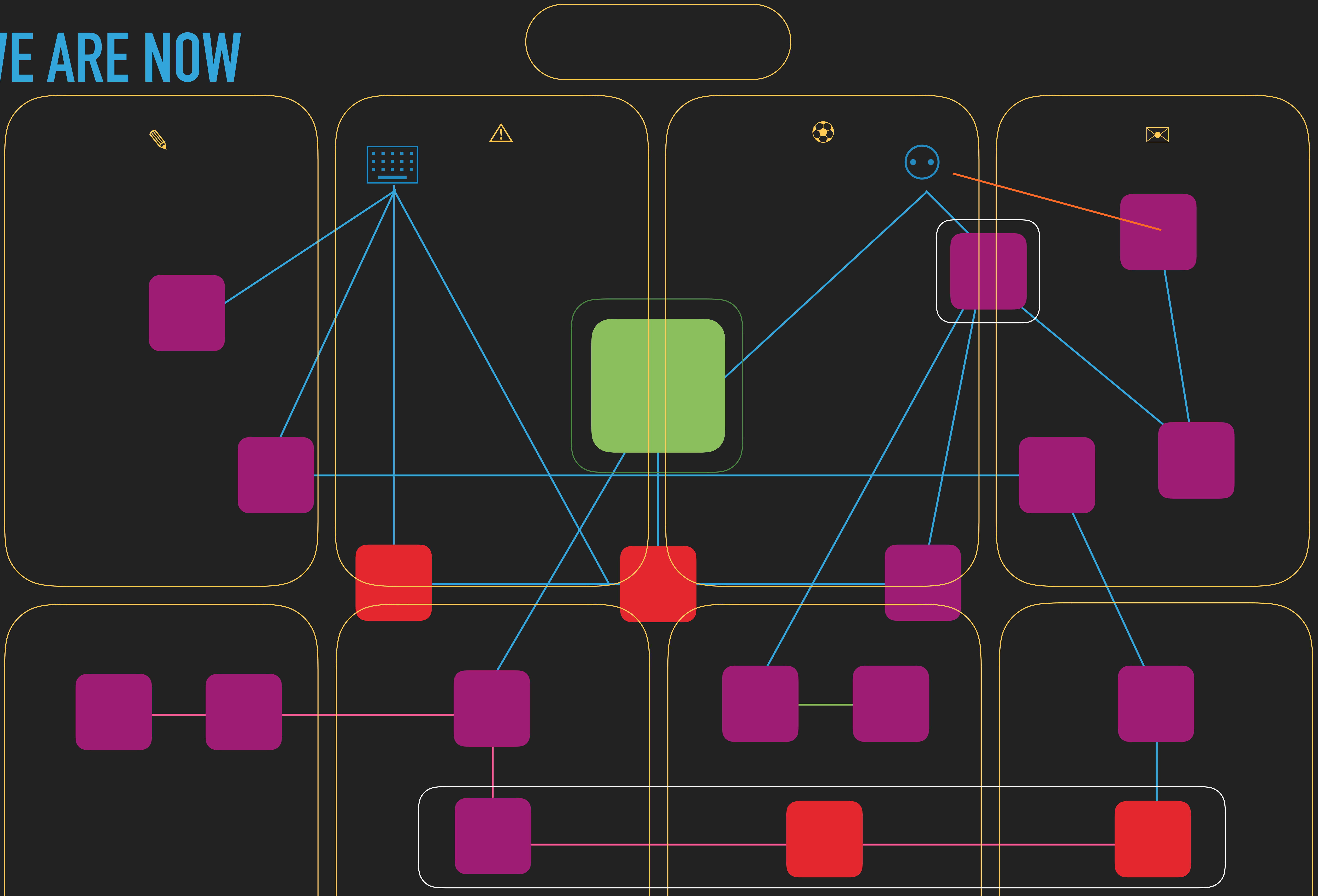
WHERE WE STARTED



WHERE WE GOT TO



WHERE WE ARE NOW



THAT'S WHAT I LOVE ABOUT THIS OPS TEAM, MAN. WE GET BIGGER, THEY STAY THE SAME SIZE.

LEVELING UP:

DEPLOYMENT

DEPLOYING TO PRODUCTION

- Support for moving to microservice architecture
  - Limit hosting needs by using vendors
  - Docker
  - Elastic Beanstalk

ELASTIC BEANSTALK

- AWS orchestration service for deploying applications
  - EC2, ELB, autoscaling
  - Supports Ruby, node.js, and others
  - Supports Docker
    - Multicontainer support
    - Single container running per instance

OWN IT

Fast flow trumps optimization

DOCKER FOR LOCAL DEVELOPMENT

- Easy local setup for new developers
- Consistent setup and teardown of dependencies
- Guaranteed to work on everyone’s laptop
- Development environment can match production

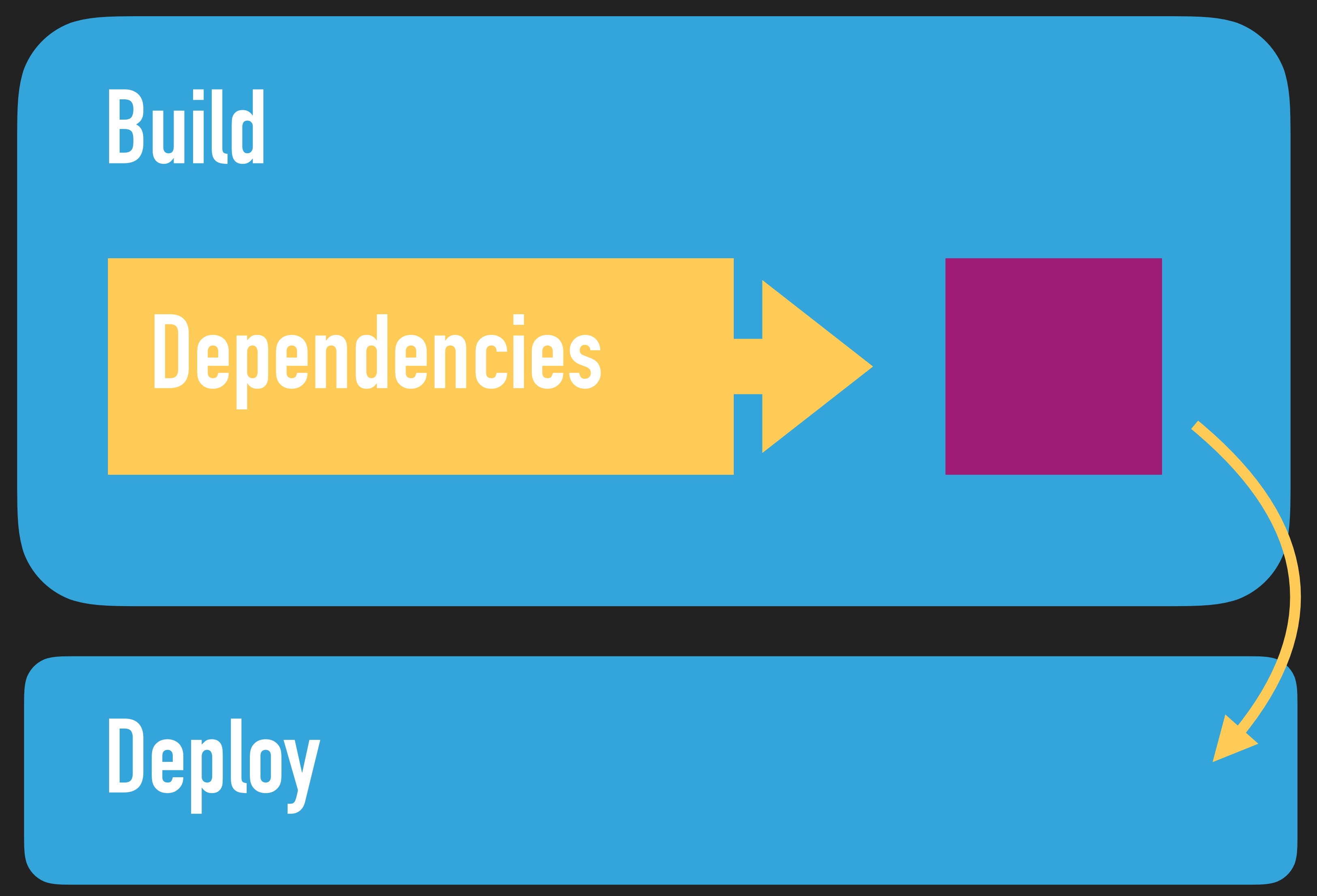
dev.bleacherreport.com/starting-a-phoenix-project-with-docker-ab2a171fa2f4

RUNNING LOCALLY WITH DEVBOX & DOCKER-COMPOSE

```
devbox start -p br

docker-compose build --build-arg MIX_ENV=dev --build-arg HEX_API_KEY=redacted

docker-compose run web mix do deps.get, compile

docker-compose run web mix do ecto.create, ecto.migrate

docker-compose up
```

MOVING TO MULTI-STAGE DOCKERFILES

MULTI-STAGE DOCKERFILE



DOCKER-COMPOSE.YML

```
version: '3.4'

services:
  web: &web
    build:
      context: .
      target: build
    command: mix phx.server
    env_file:
      - docker/development/secret/default.env
    ports:
      - "4006:4006"
    networks:
      - br
    volumes:
      - .:/app:delegated

  worker:
    <<: *web
    environment:
      - ROLE=worker
    ports:
      - "4007:4007"

networks:
  br:
    external: true
```

RUNNING LOCALLY FROM THE BUILD STAGE

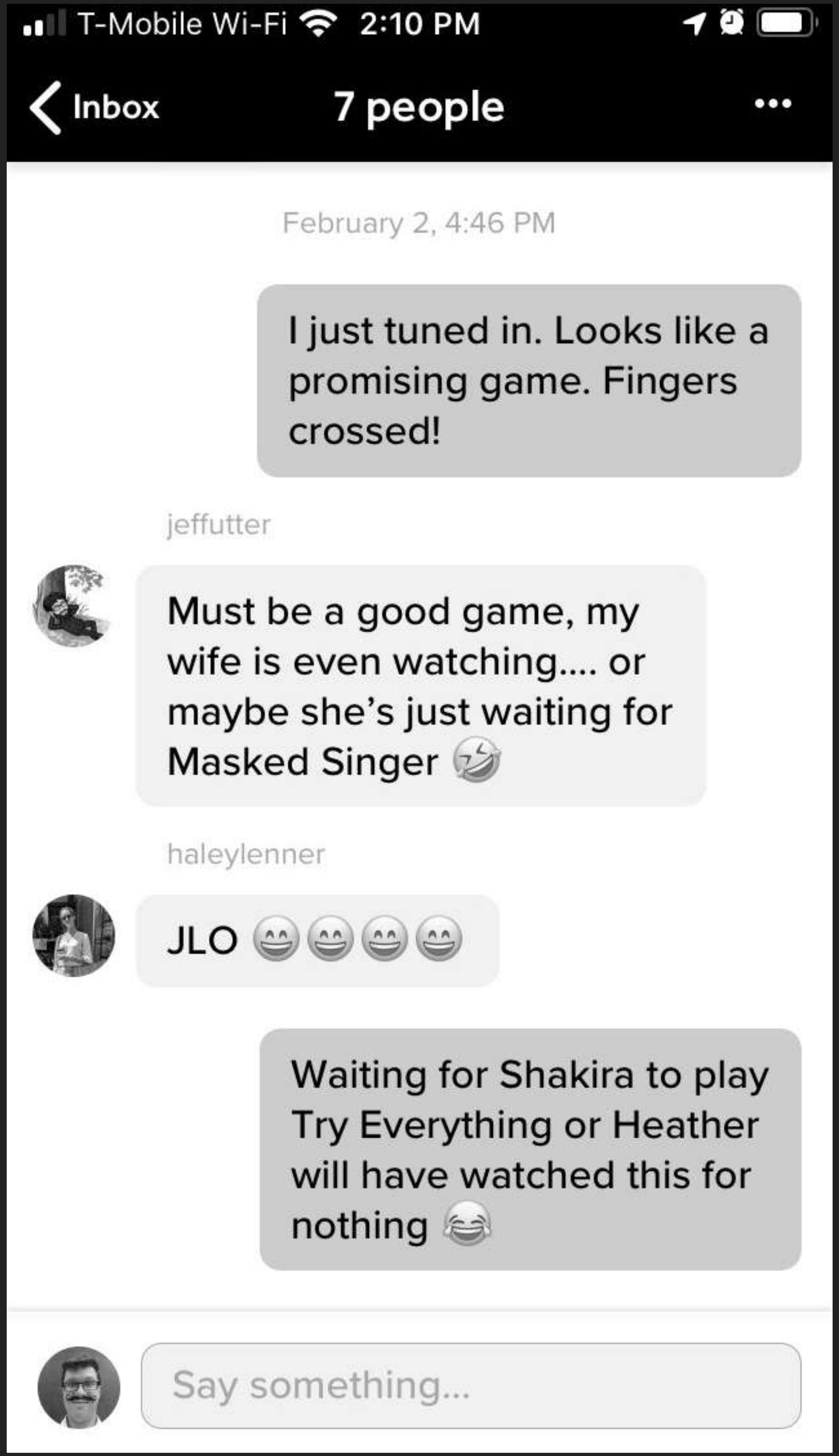
```
devbox start -p br

docker-compose build --build-arg MIX_ENV=dev --build-arg HEX_API_KEY=redacted

docker-compose run web mix do deps.get, compile

docker-compose run web mix do ecto.create, ecto.migrate

docker-compose up
```

ELIXIR CLUSTERS

On Elastic Beanstalk with Docker

WE BUILT A CHAT FEATURE

- Lets fans share content and discuss games in real time
- Great case for Phoenix websockets
- Multi-instance application for scaling
- Users could connect to any node
- Nodes need to be aware of each other



February 2, 4:46 PM

I just tuned in. Looks like a promising game. Fingers crossed!

jeffutter

Must be a good game, my wife is even watching.... or maybe she's just waiting for Masked Singer 🤣

haleylenner

JLO 😄😄😄😄

Waiting for Shakira to play Try Everything or Heather will have watched this for nothing 😂

NODES REGISTER WITH LIBCLUSER

- https://github.com/bitwalker/libcluster
  - Automatic cluster formation/healing for Elixir applications
  - Choice of clustering strategies
- https://github.com/kyleaa/libcluster_ec2
  - Uses AWS APIs to retrieve tagged nodes
  - Patched for EB to customize node name
- Containers on EB need:
  - ip-based hostname inserted into hosts file for loopback interface
  - epmd ports exposed

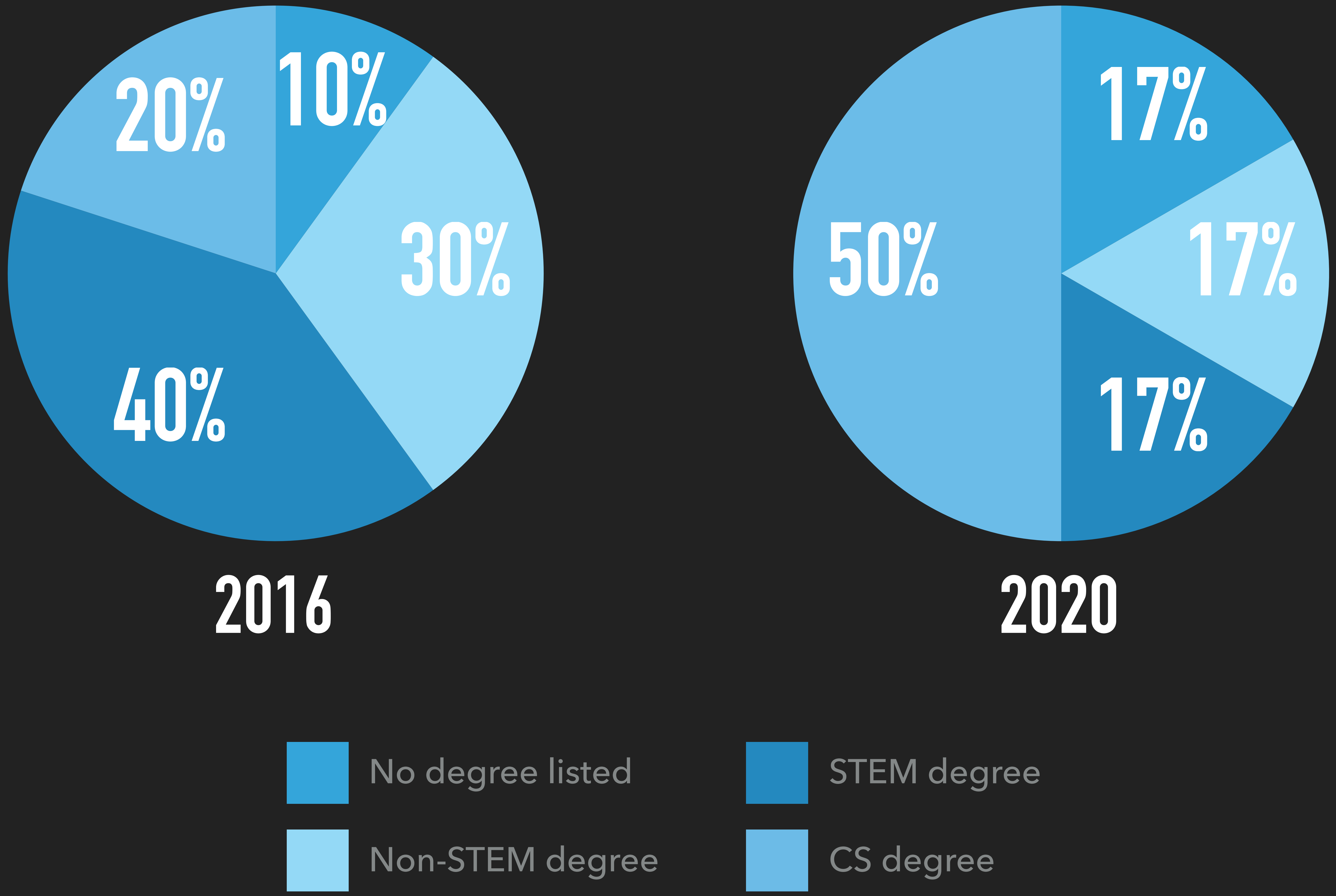
LEVELING UP:

SKILLS

WE DON'T DO WHITEBOARD INTERVIEWS.

Bleacher Report

B/R ELIXIR TEAM DEMOGRAPHICS


2016

2020

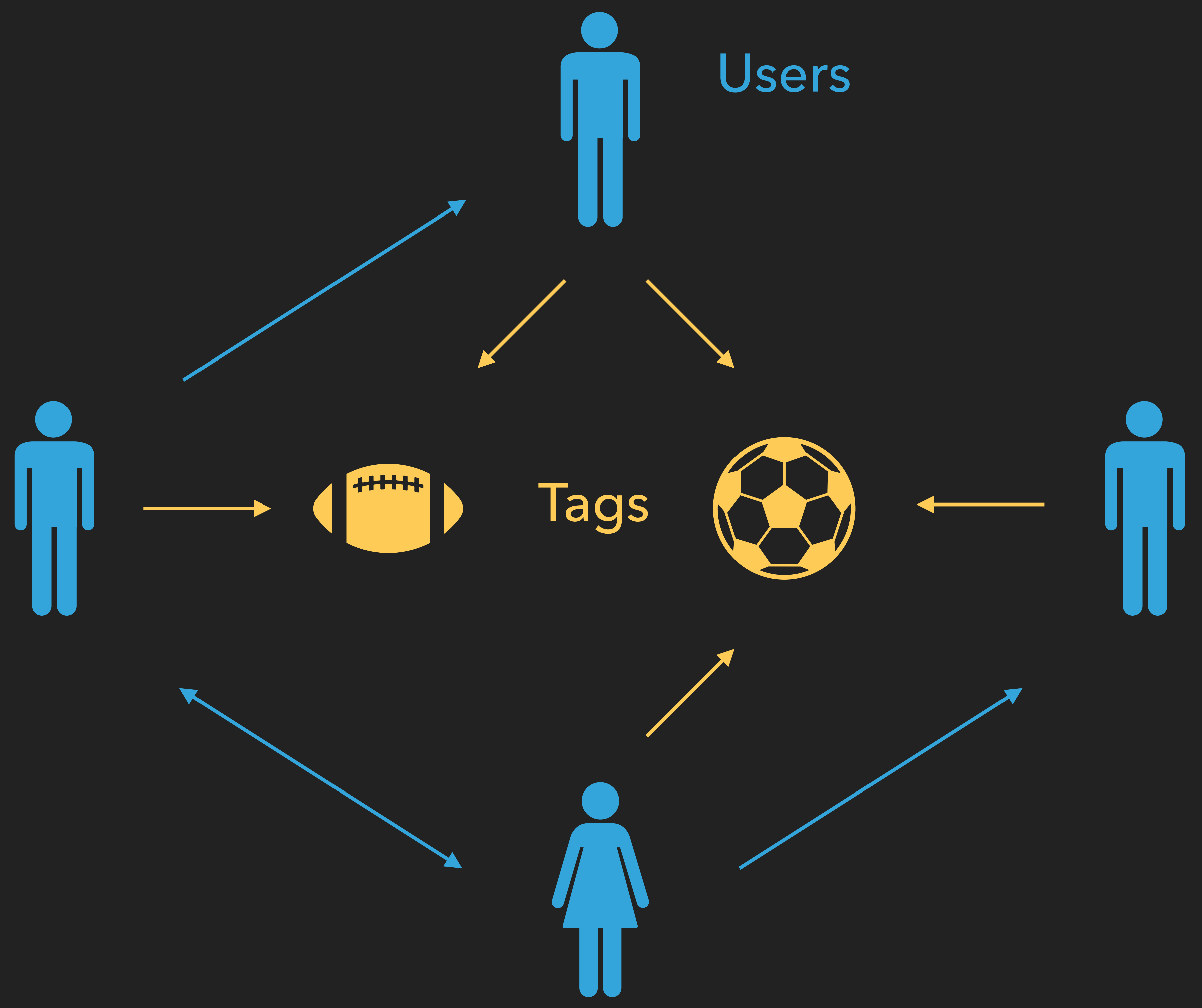
CITY COLLEGE OF SAN FRANCISCO
WELLNESS CENTER

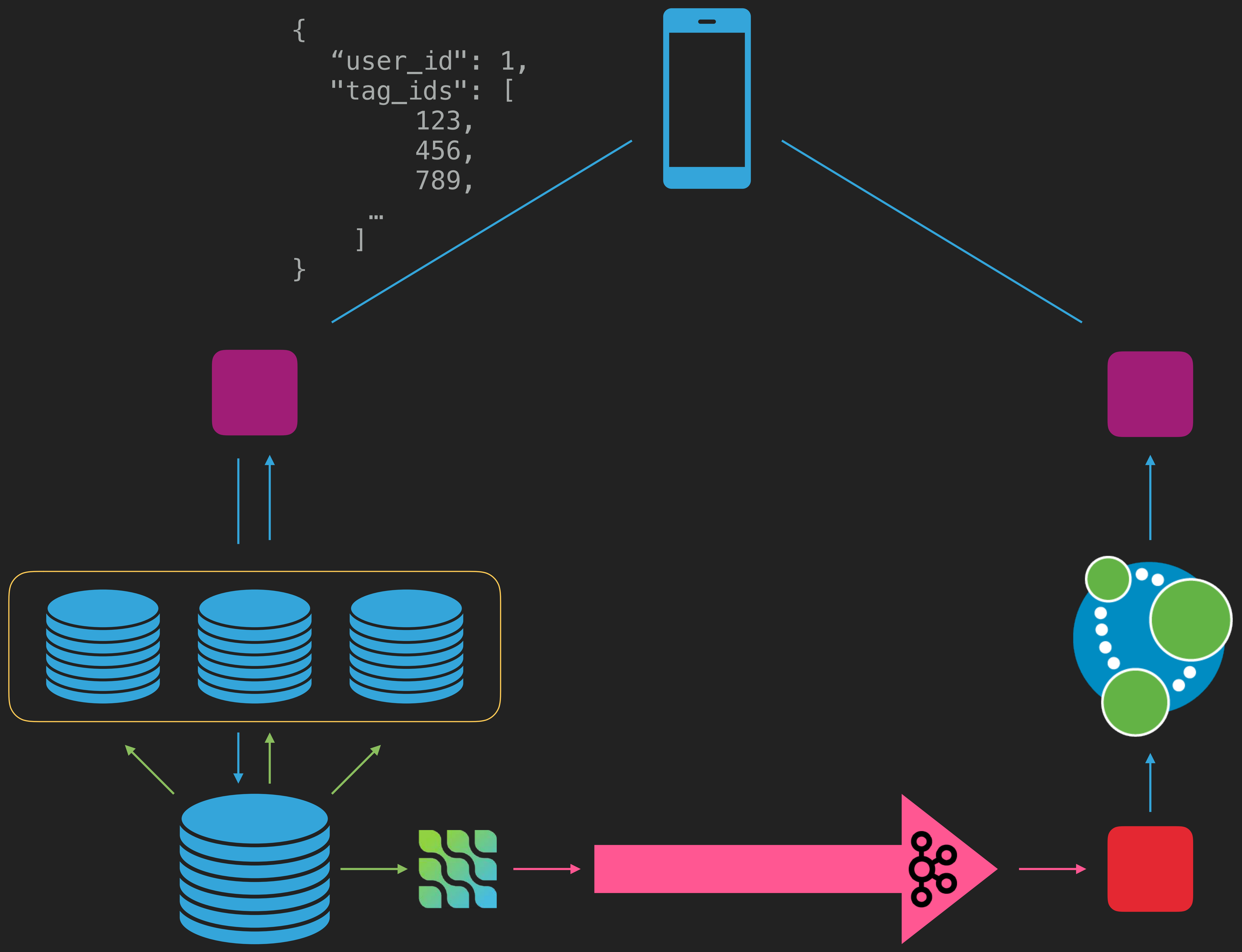
https://dev.bleacherreport.com/delicate-sensibilities-techniques-to-block-offensive-usernames-1dbdfdd1f994

RUIN YOUR VACATION WITH LINKED-LISTS

Post-mortem

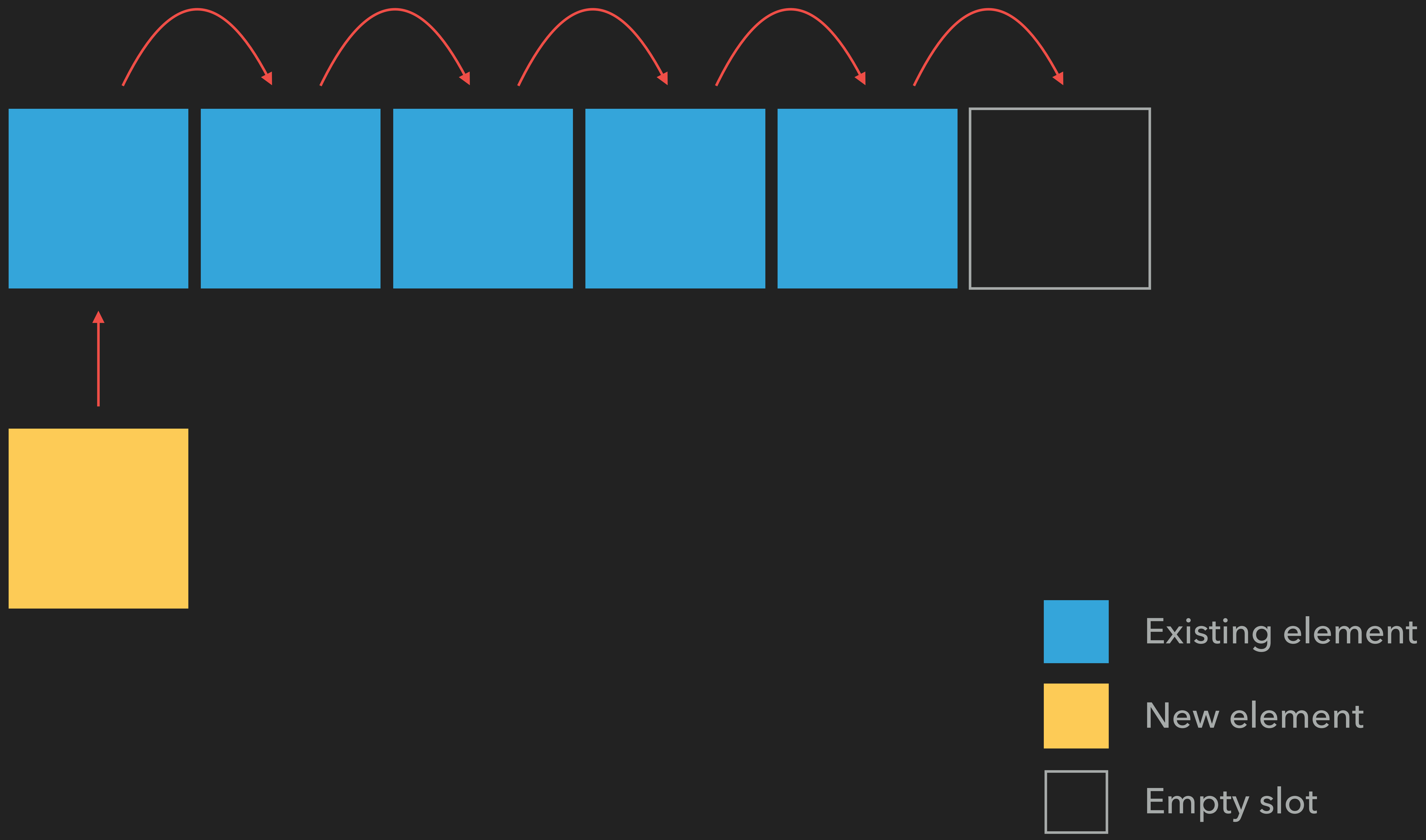
SOCIAL GRAPH PROJECT

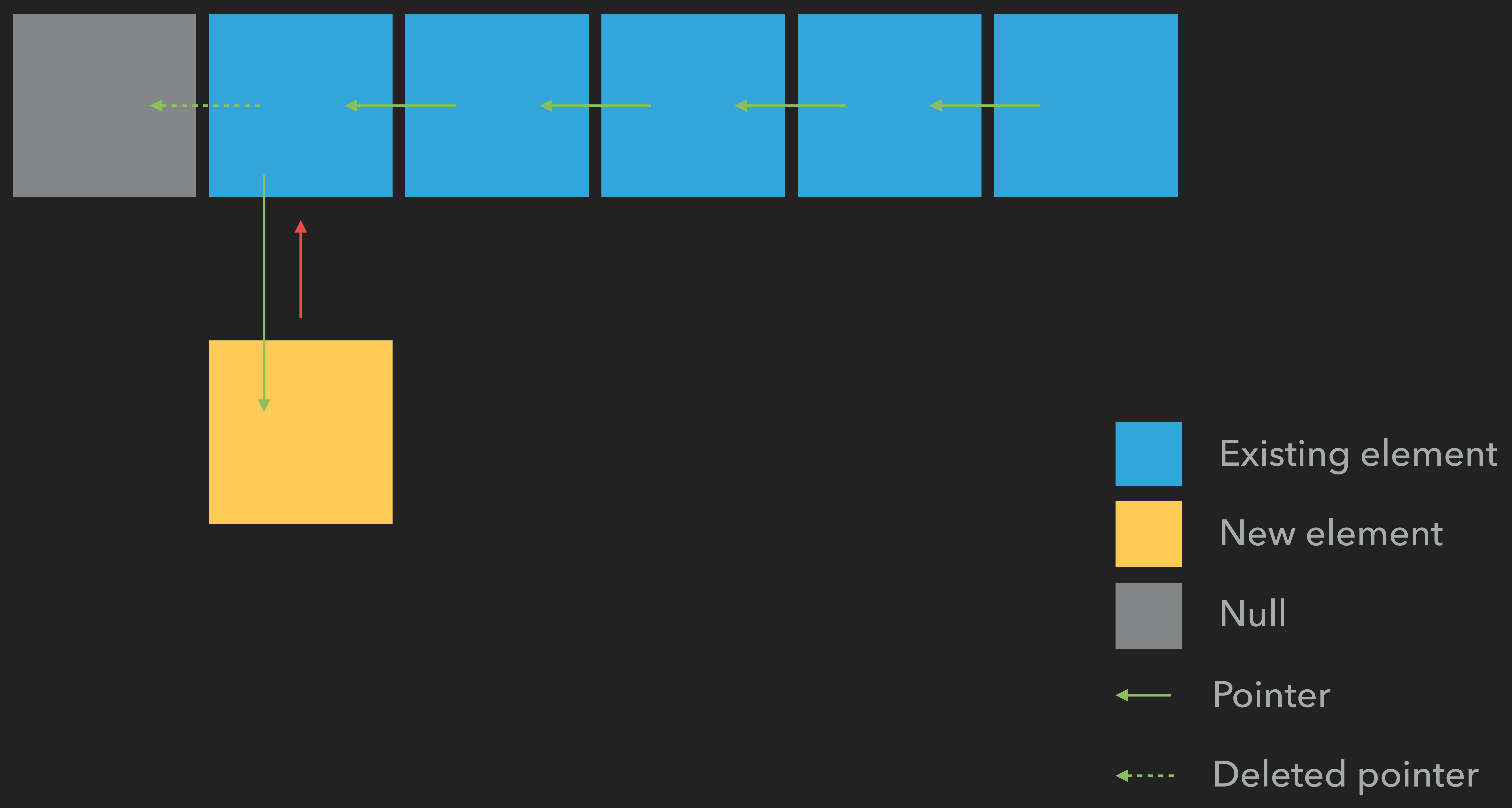




```
{
   “user_id": 1,
   "tag_ids": [
          123,
          456,
          789,

       …
     ]
}
```

user_id	tag_id	position
1	124	1
1	72	2
1	89	3
2	124	1
2	33	2
2	65	3


Existing element
New element
Empty slot



🟦 Existing element

🟨 New element

⬜ Null

← Pointer

⇠ Deleted pointer

id	user_id	tag_id	previous
1	1	124	null
2	1	72	1
3	1	89	2
4	2	124	null
5	2	33	4
6	2	65	5

```
WITH RECURSIVE list(id, previous_item_id) AS (
  SELECT id, previous_item_id
  FROM tags_users as first
  WHERE previous_item_id IS NULL
  AND user_id = '3744df95-734f-4513-b2c4-c1df2bc2633d'
  UNION
  SELECT next.id, next.previous_item_id
  FROM tags_users as next
  JOIN list ON list.id = next.previous_item_id
)
SELECT *
FROM tags_users
WHERE EXISTS (
  SELECT 1
  FROM list
  WHERE list.id = tags_users.id
);
```

RECURSIVE CTE SUPPORT ADDED IN ECTO 3.2

with_cte(query, name, list)

```
def link_list(tags_users, previous \\ nil, output \\ [])
def link_list([], _, output), do: Enum.reverse(output)

def link_list(tags_users, previous, output) do
  case Enum.find_index(tags_users, &(&1.previous_tag_id == previous)) do
    nil ->
      Enum.reverse(output)

    index ->
      {next, remaining} = List.pop_at(tags_users, index)
      link_list(remaining, next.tag_id, [next | output])
  end
end
```

0/nil
10
1/0
9
3/2
8
2/1
7
4/3
6
6/5
5
7/6
4
8/7
3
5/4
2
9/8
1

DEVELOPMENT & RELEASE PROCESS

- Work with service owners and client devs to understand feature
- Work with DBA to tune migrations
- Ensure unit tests pass
- Test migrations and new code on staging
- Run integration test suite on new code
- Release to production

whathappened

POSTMORTEM

- Updating millions of user records caused replication lag
- Disparities between API documentation and unit tests
- Gaps in integration test coverage
- We were relying on default ordering of records
- Android, iOS clients use different APIs and caching rules
- Clients can send back incomplete lists
- Requires a high-volume of reads from master

KEEP IT SIMPLE

Peter Hastie