

Help! I accidentally
distributed my system!

Rachel Myers, Emily Nakashima

@eanakashima



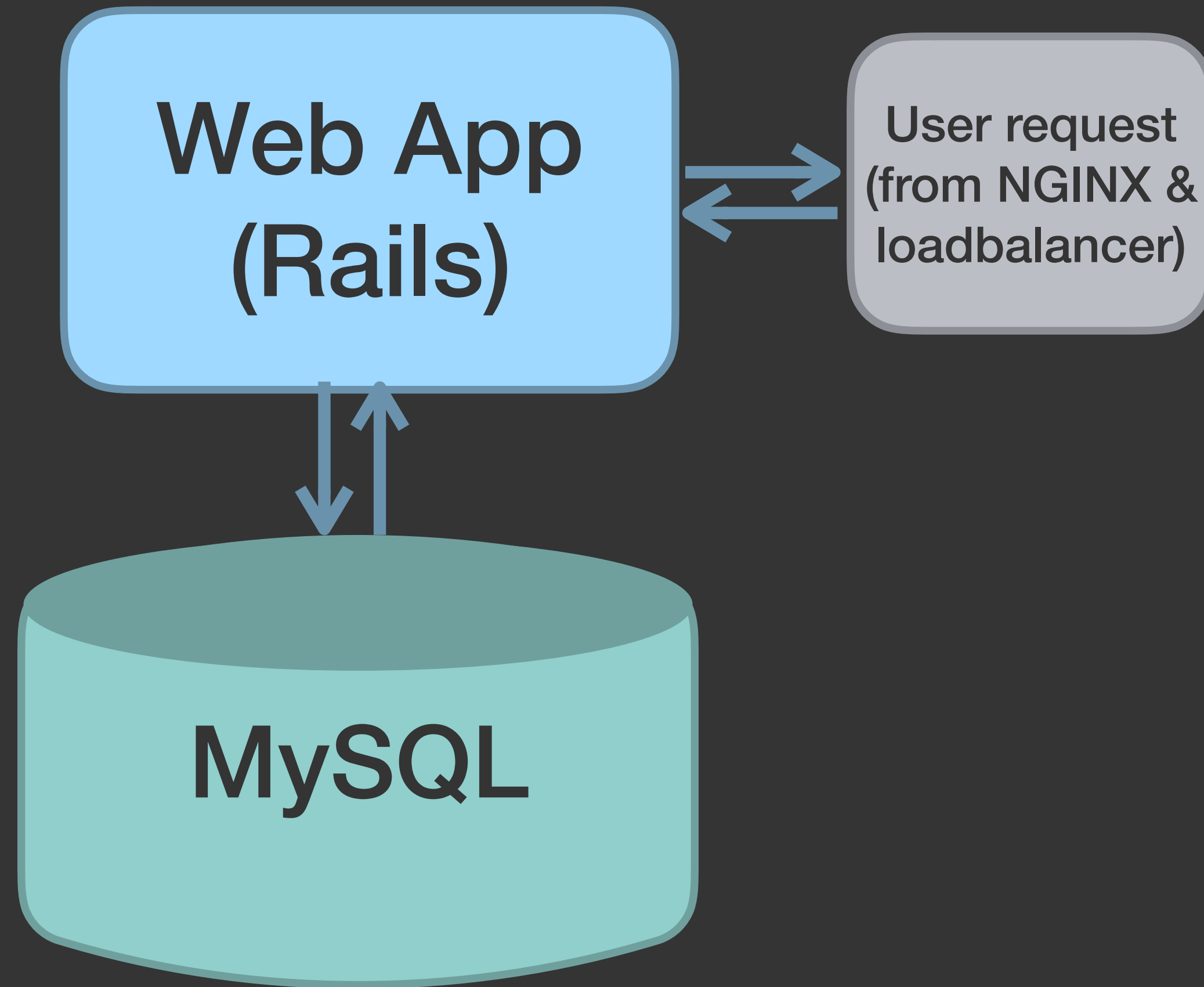
@rachelmyers



Firebase

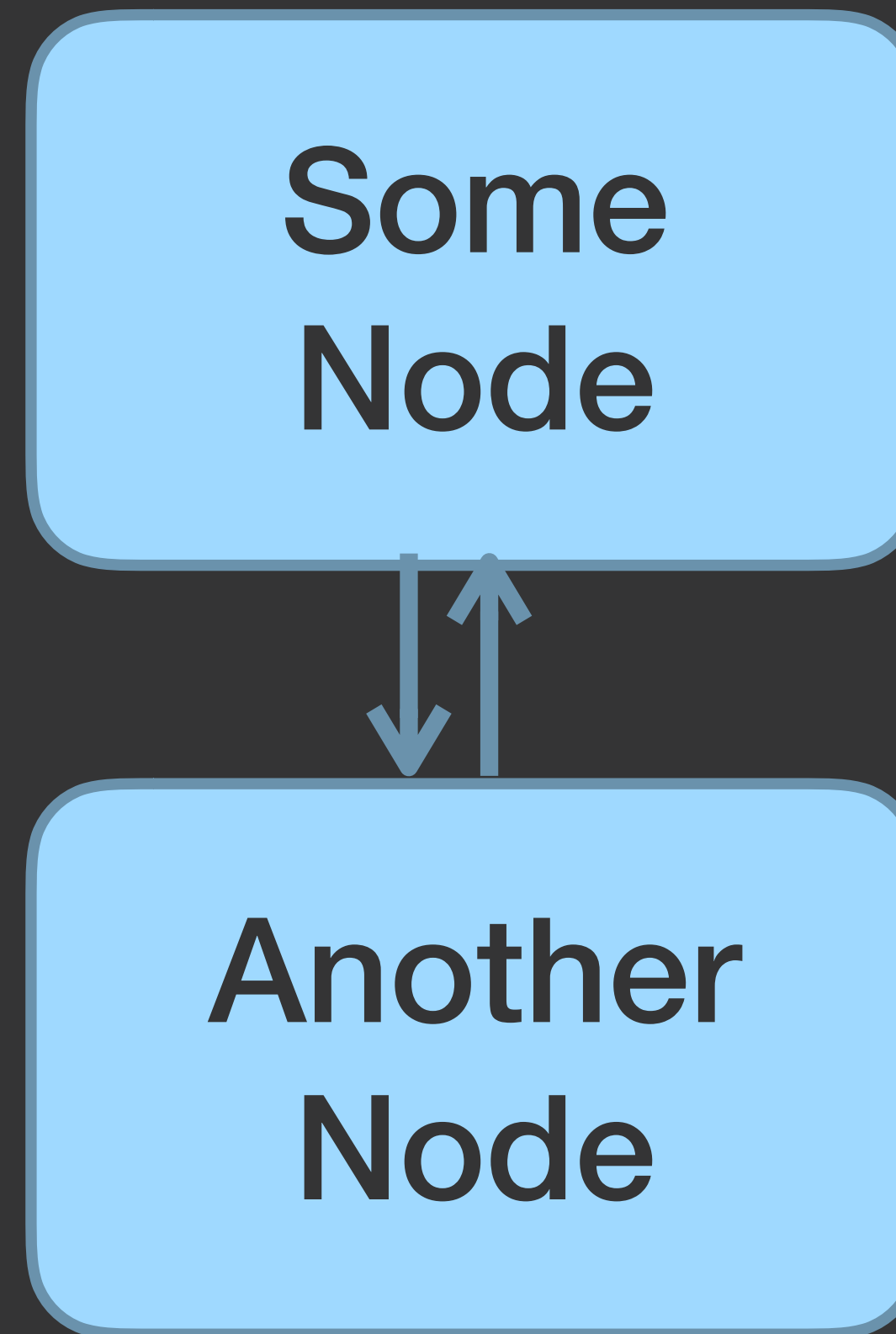
ModCloth 

GitHub



What even **is**
a distributed system?

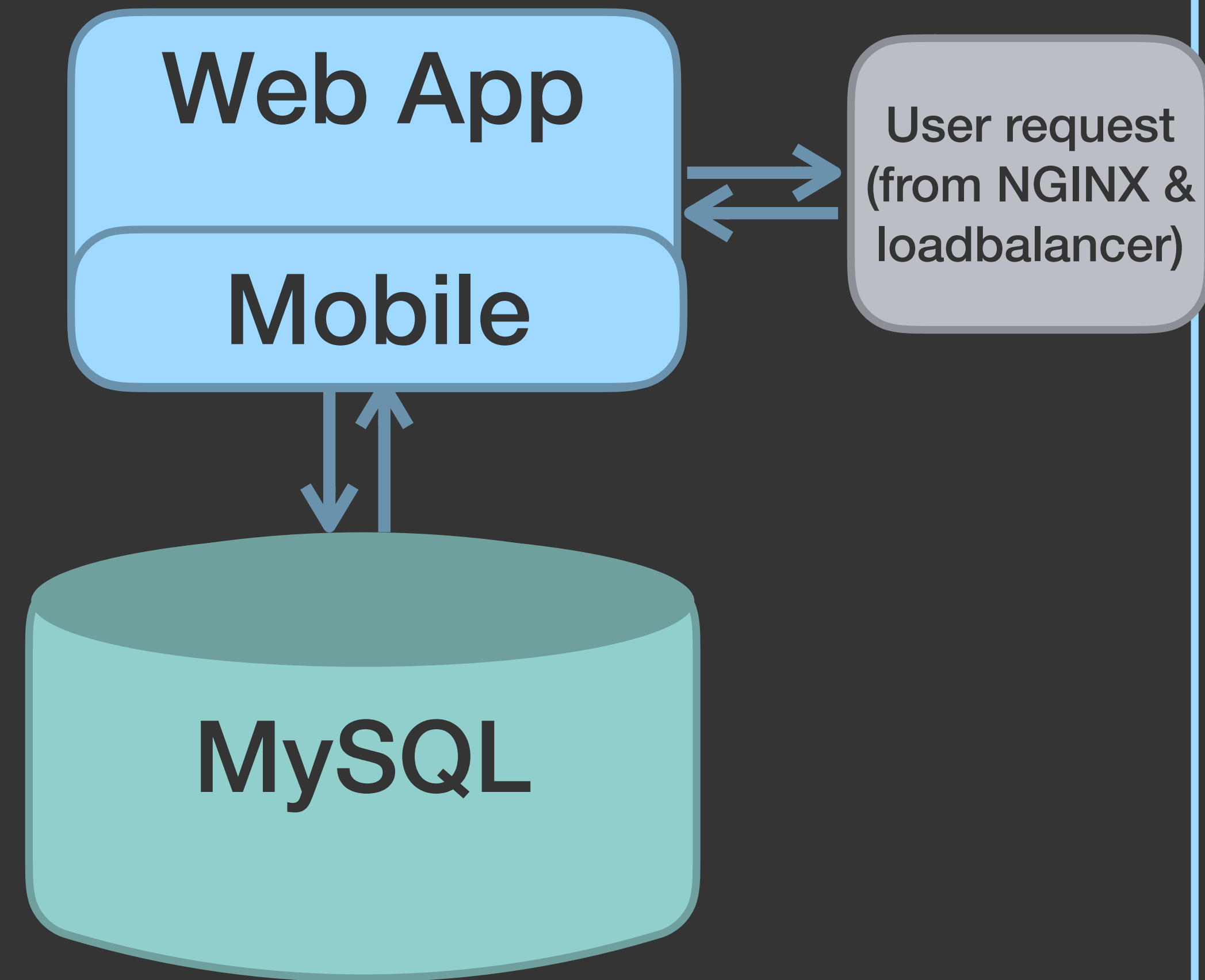
What even is a distributed system?

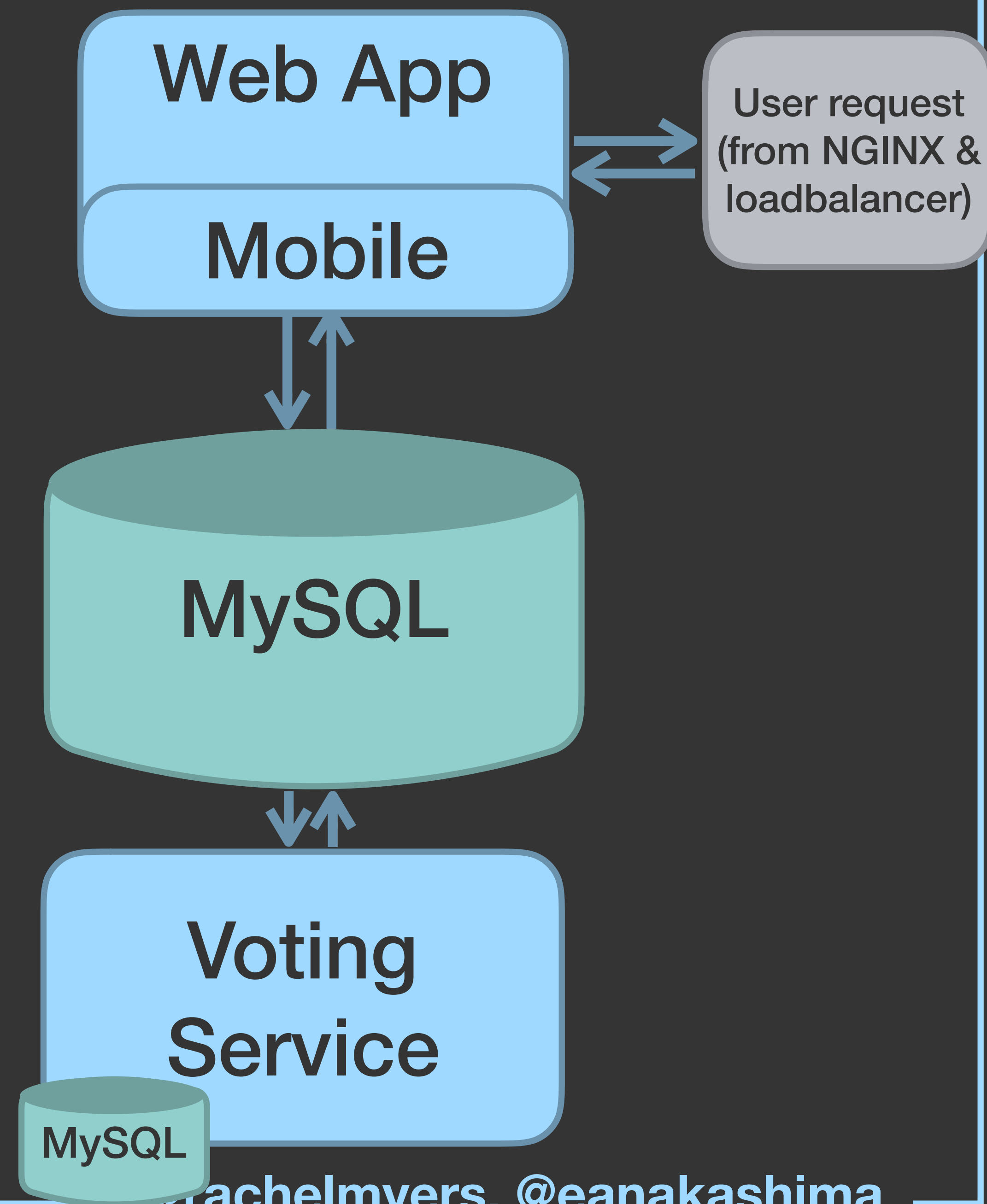


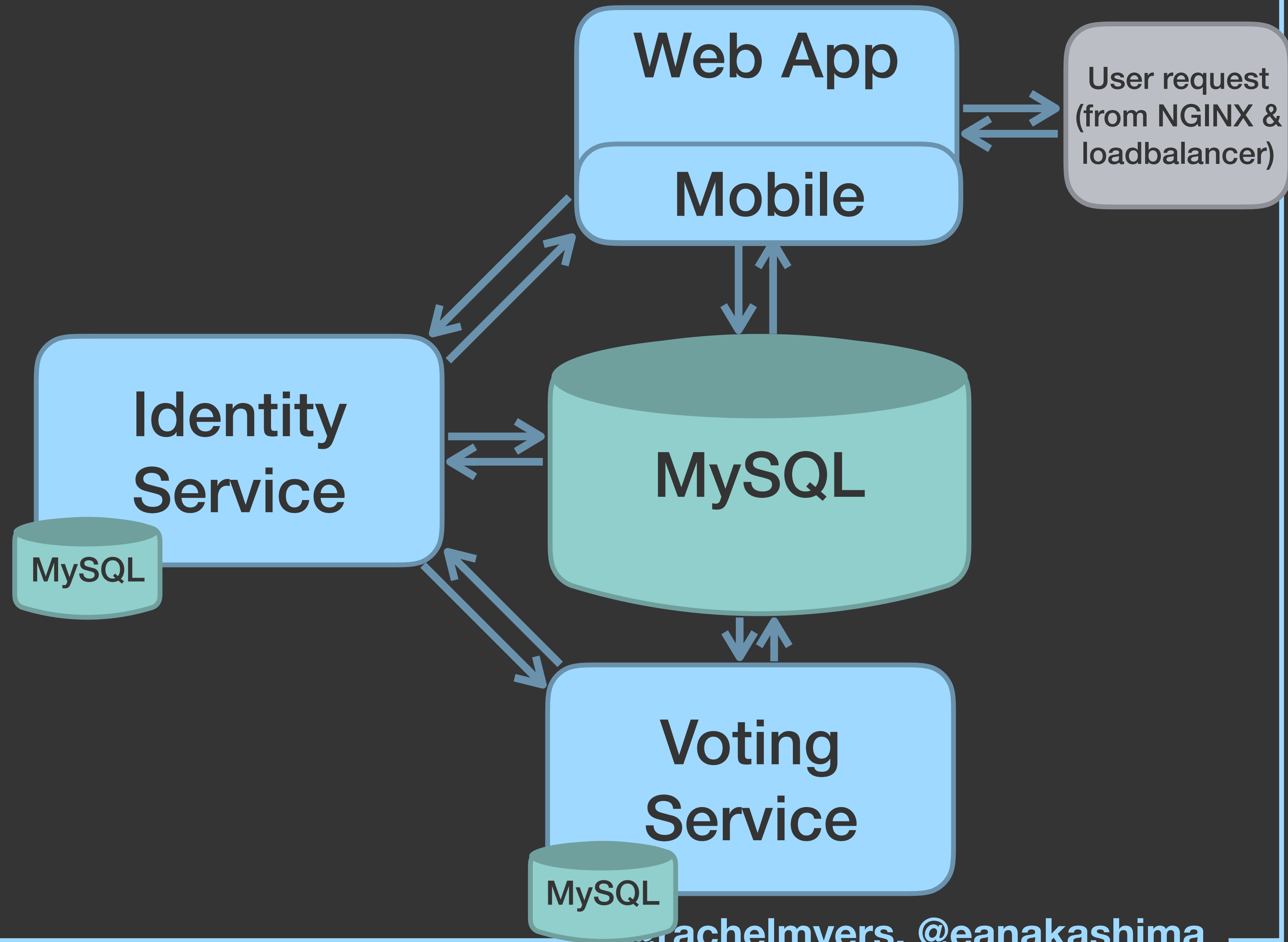
Designing distributed systems

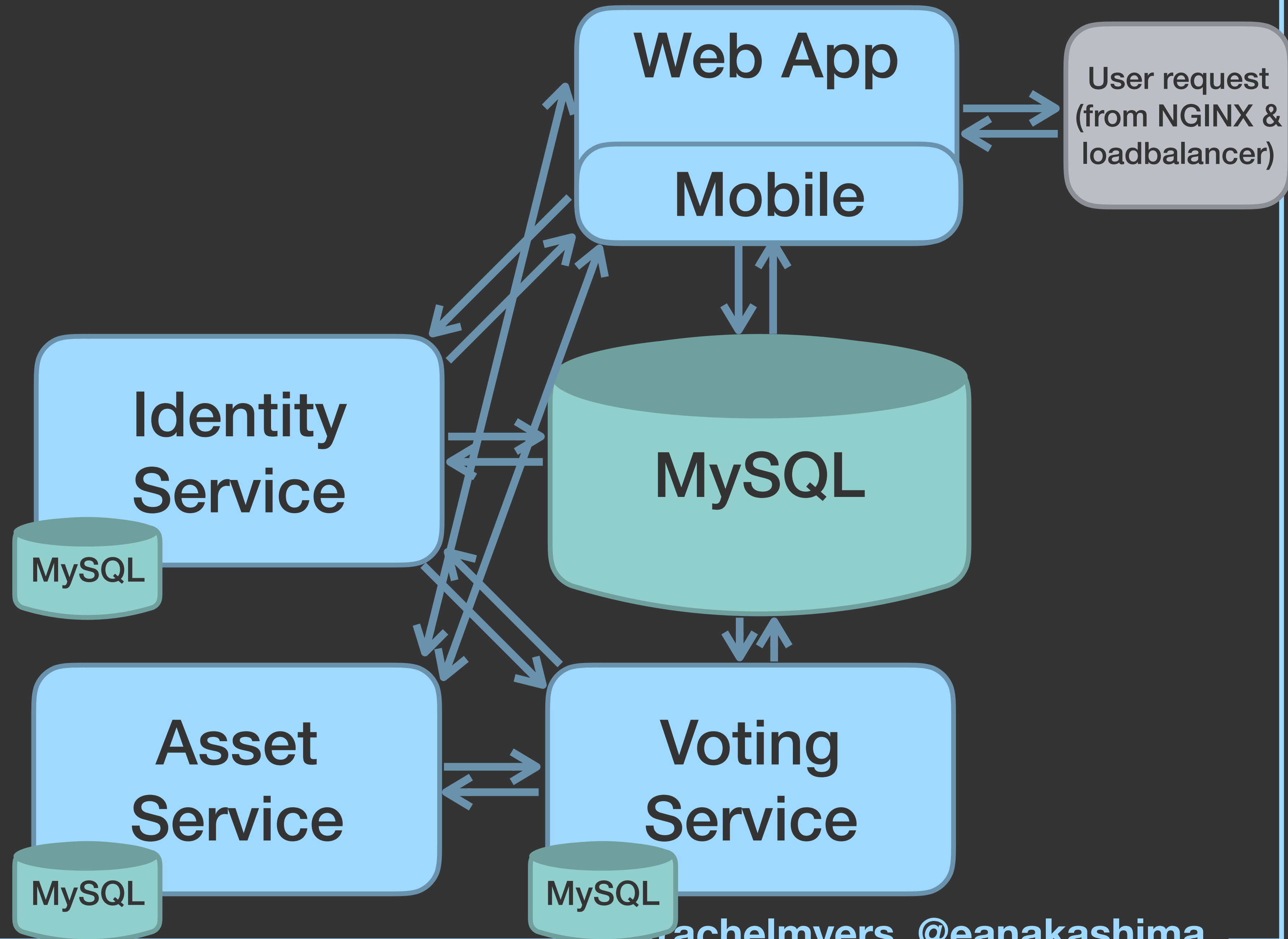
- What are the “nouns” in my system?
- What are the patterns for reading data?
- What are the patterns for writing data?
- Do different flows have different performance, consistency, & availability requirements?

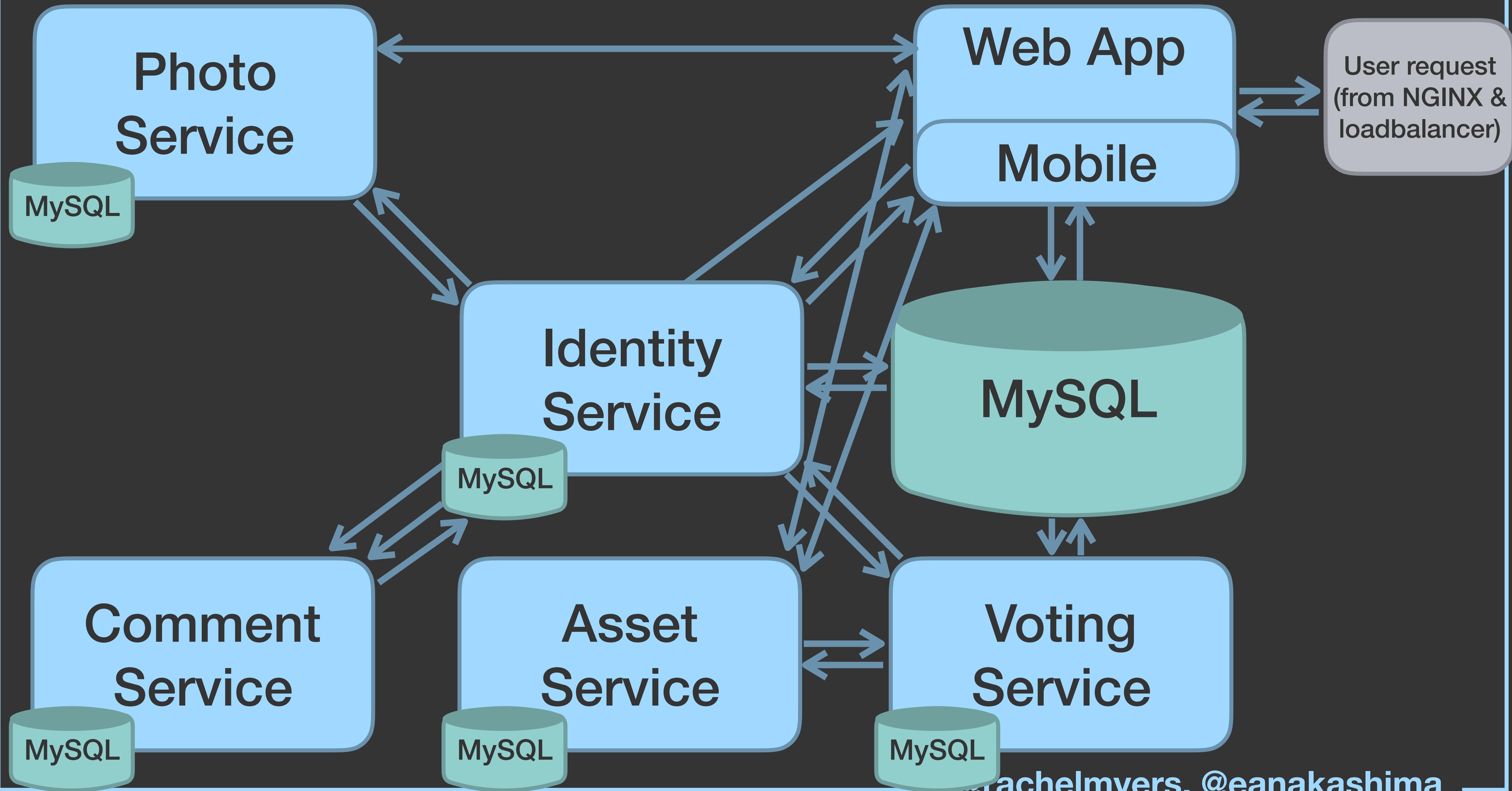




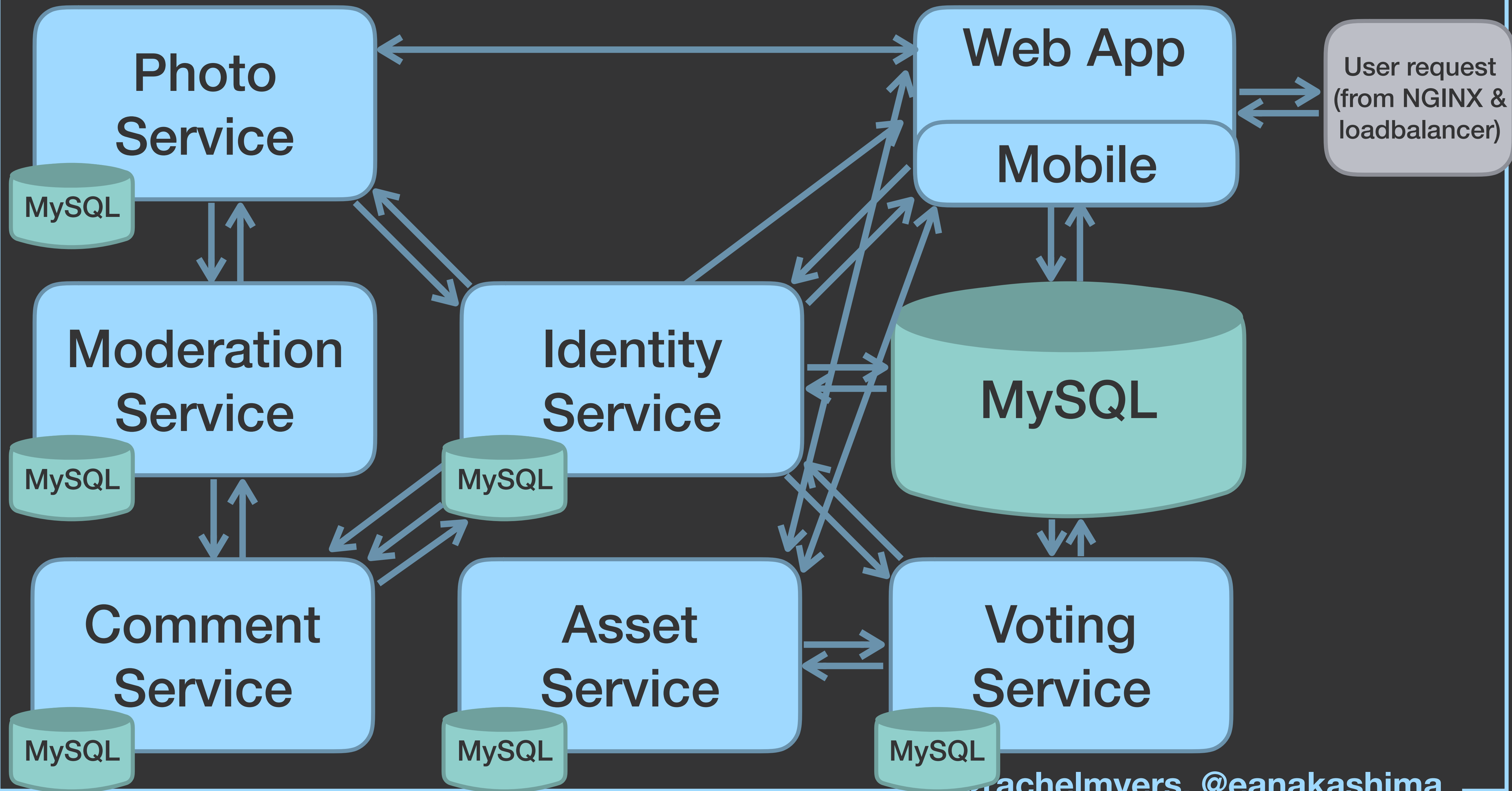




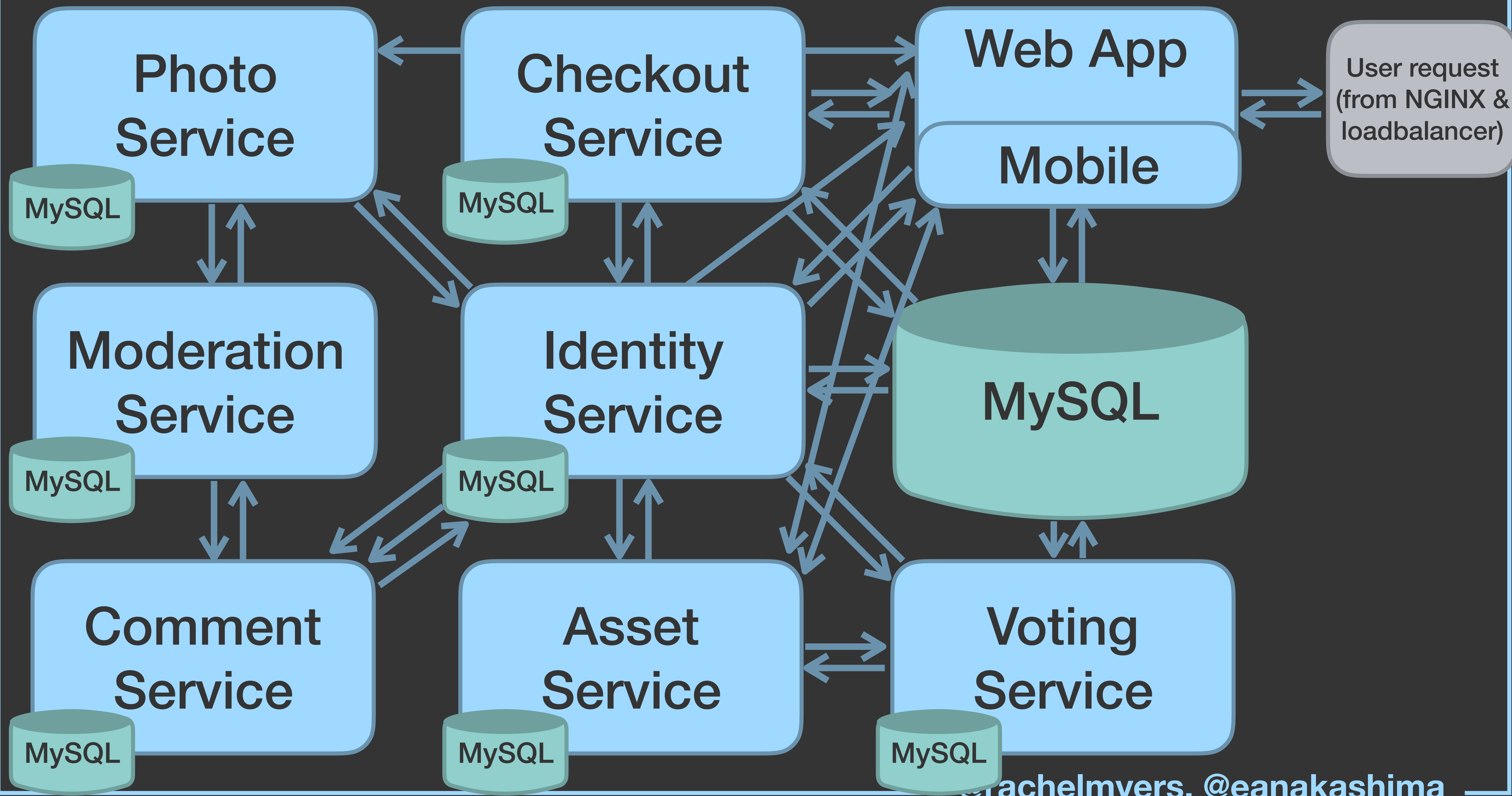




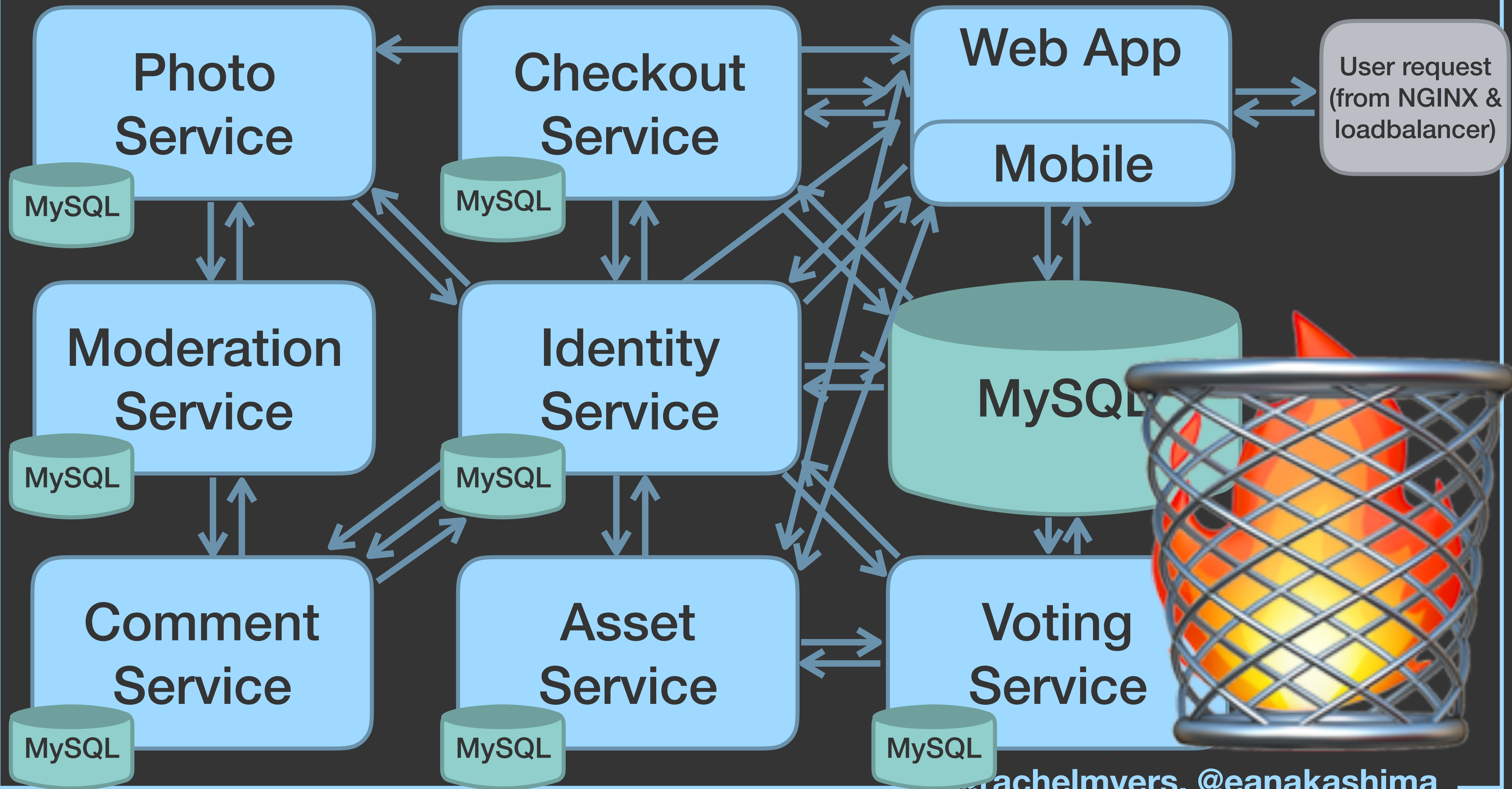
ModCloth



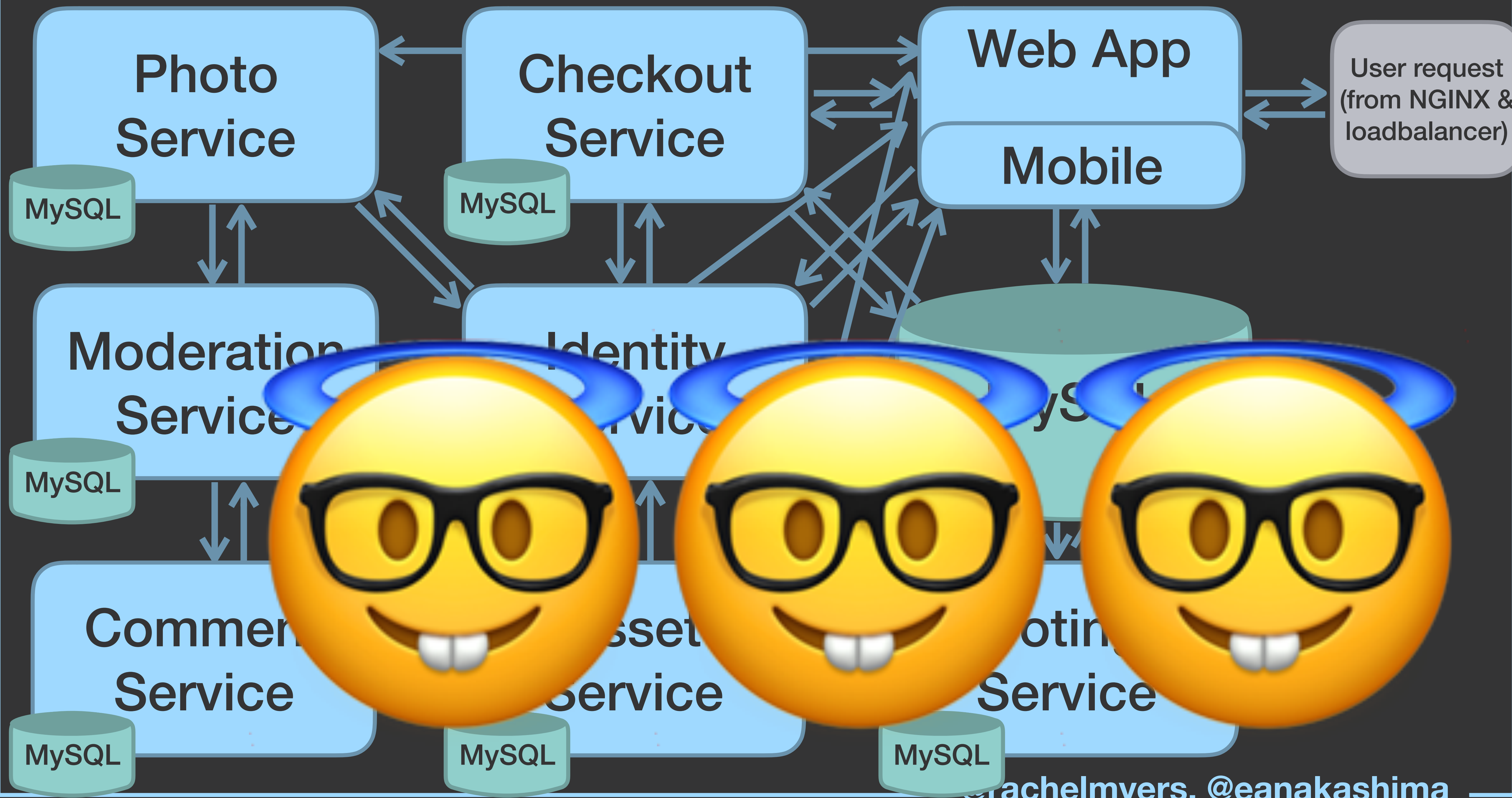
ModCloth



ModCloth



ModCloth



And this was
intentional 😂

An accidental distributed system







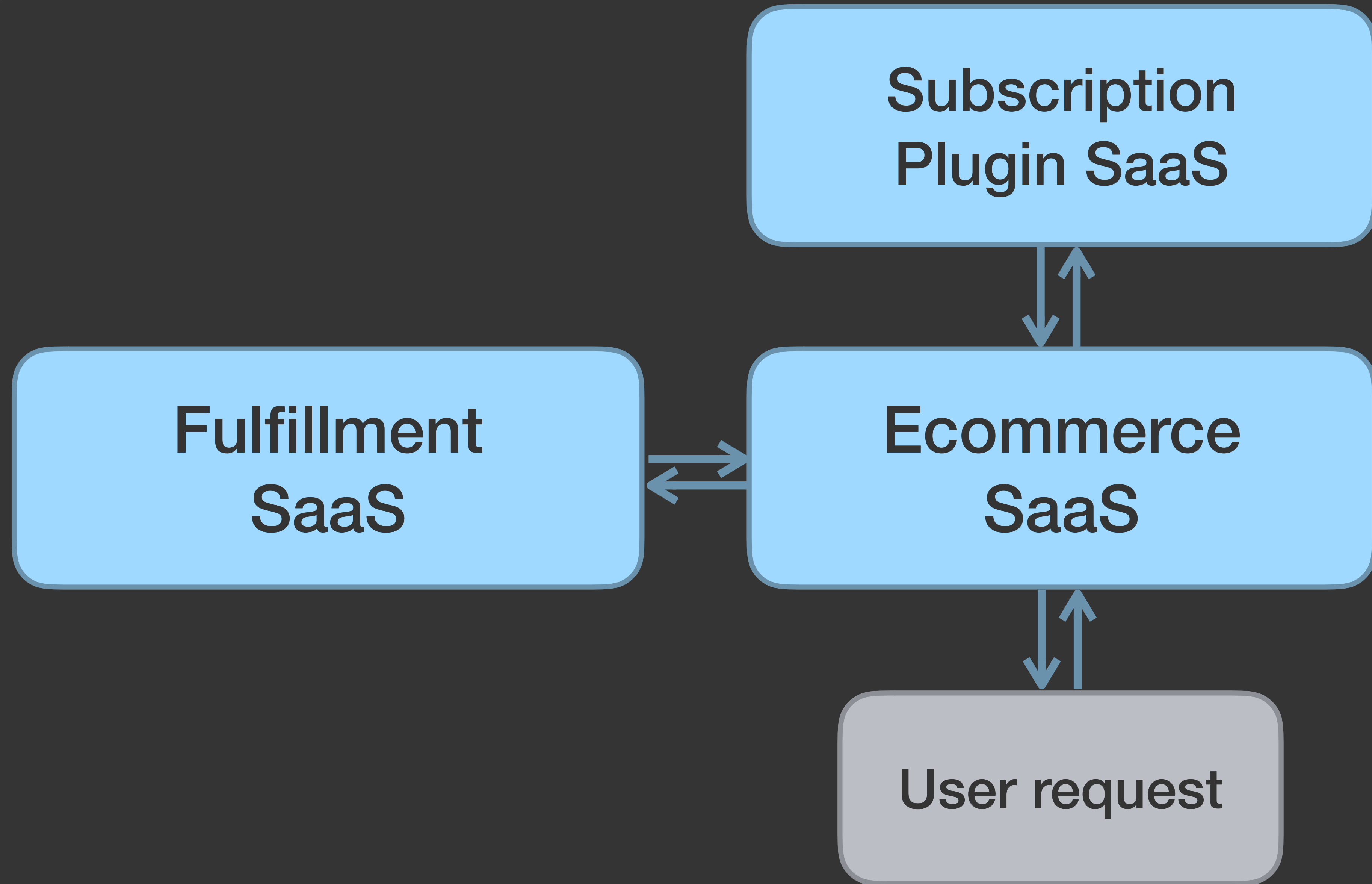
Subscription
Plugin SaaS

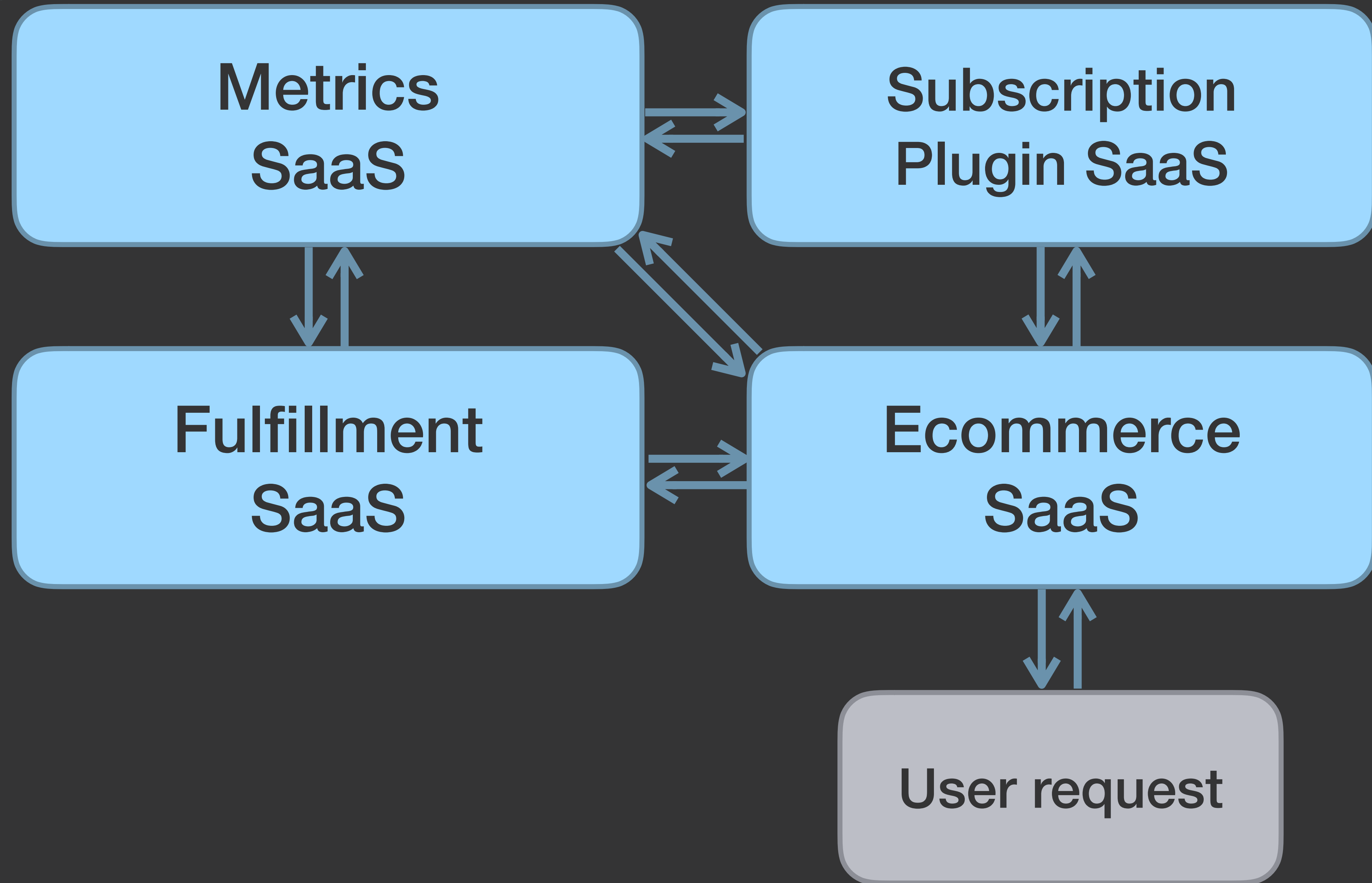


Ecommerce
SaaS



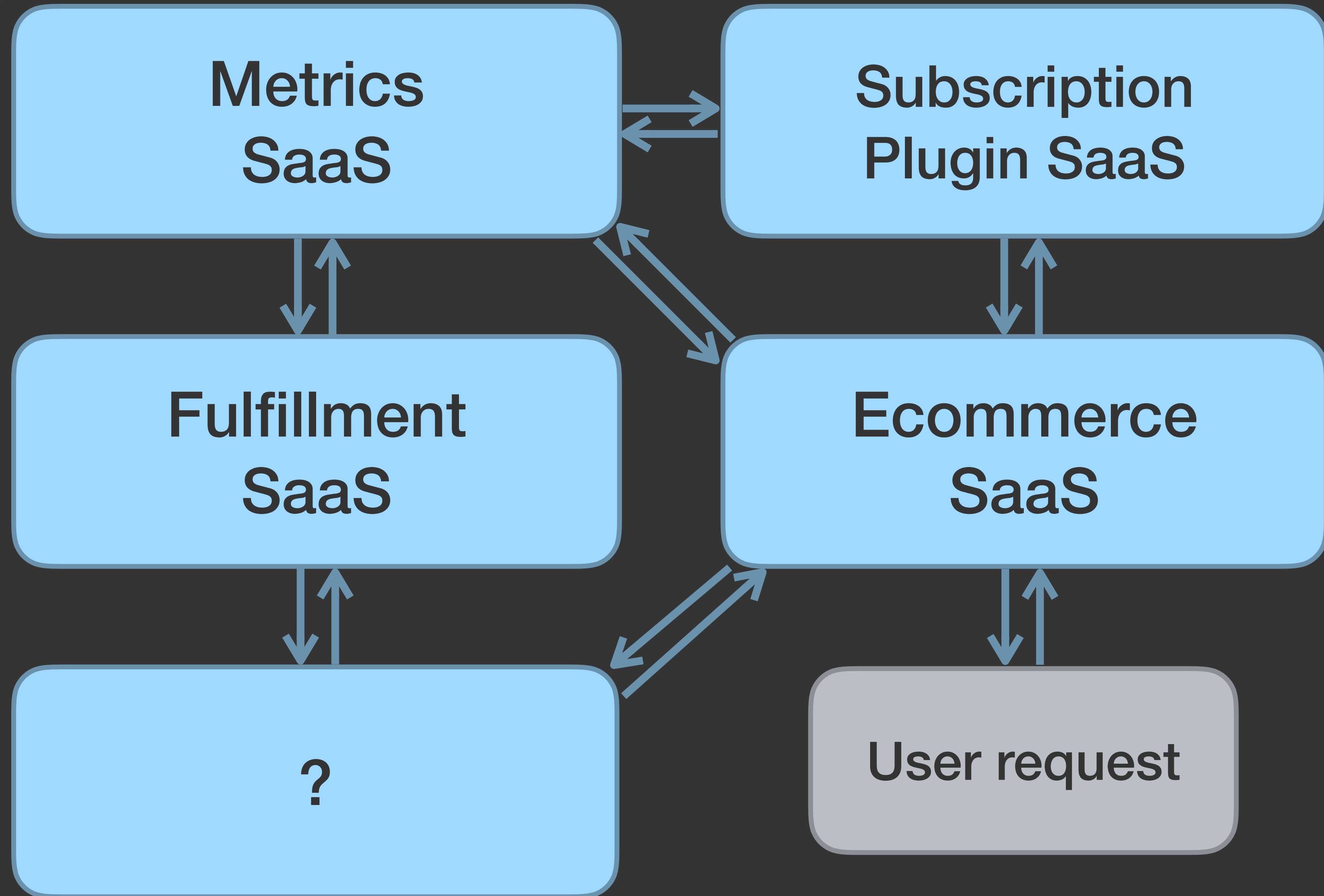
User request

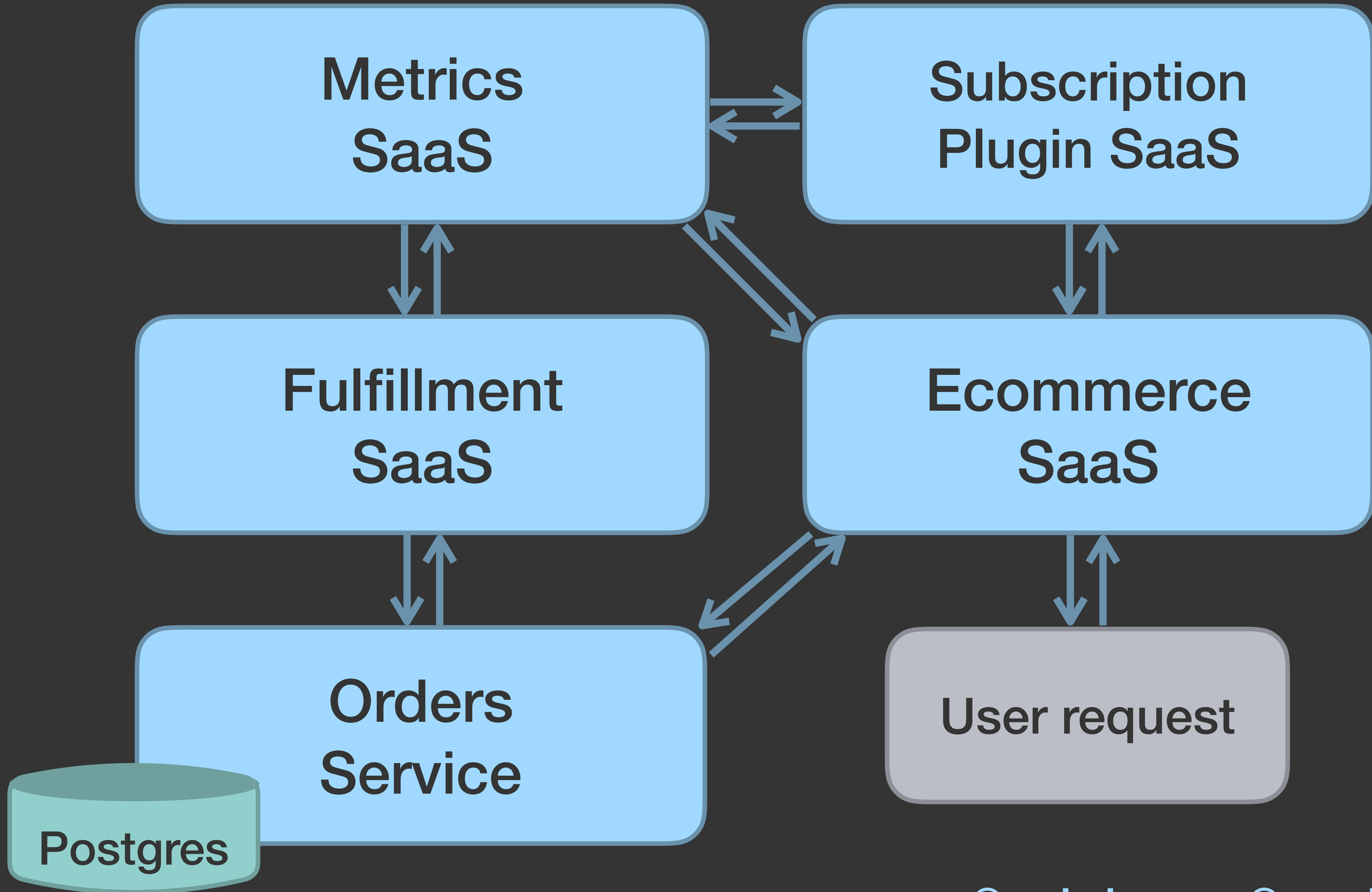


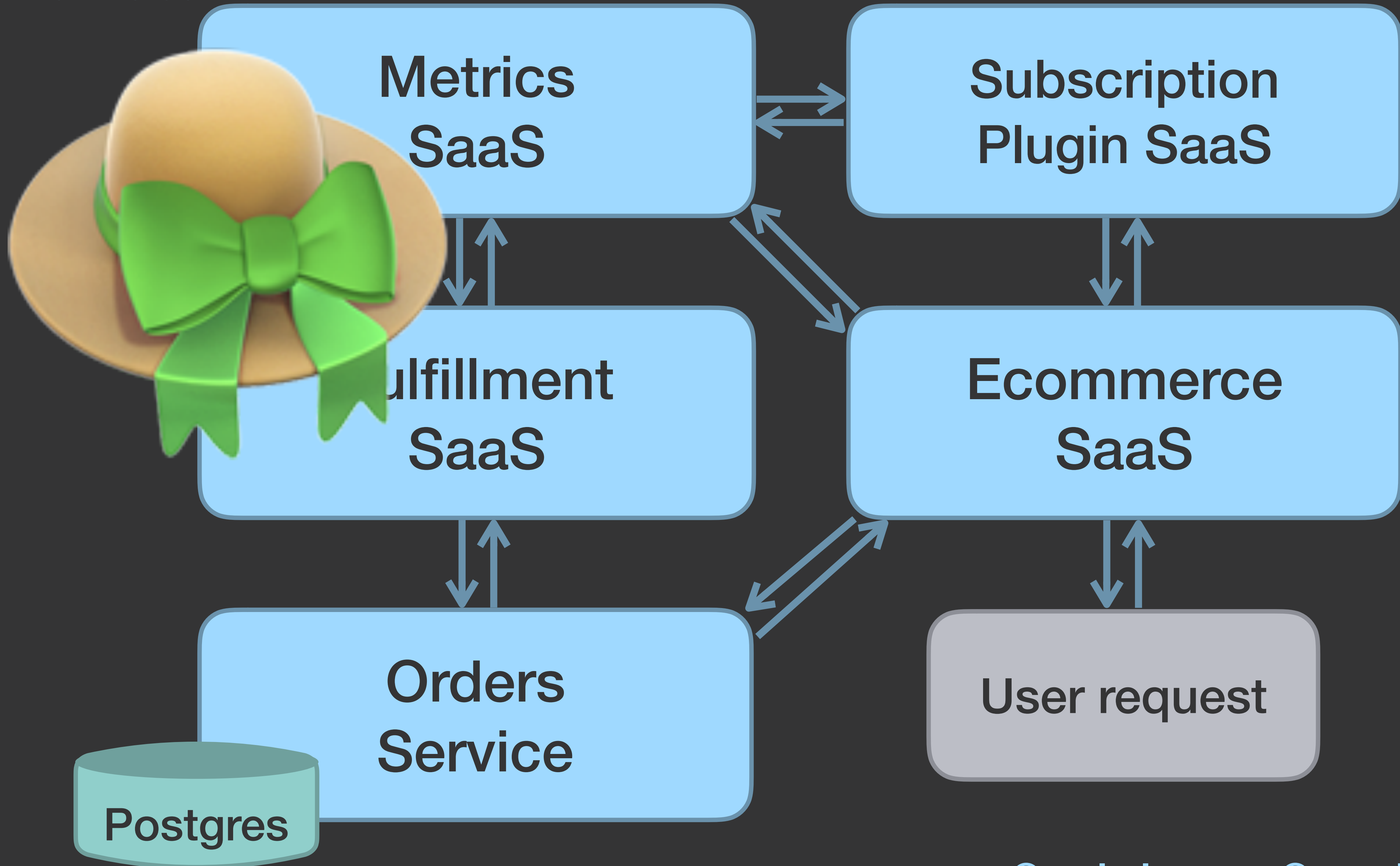




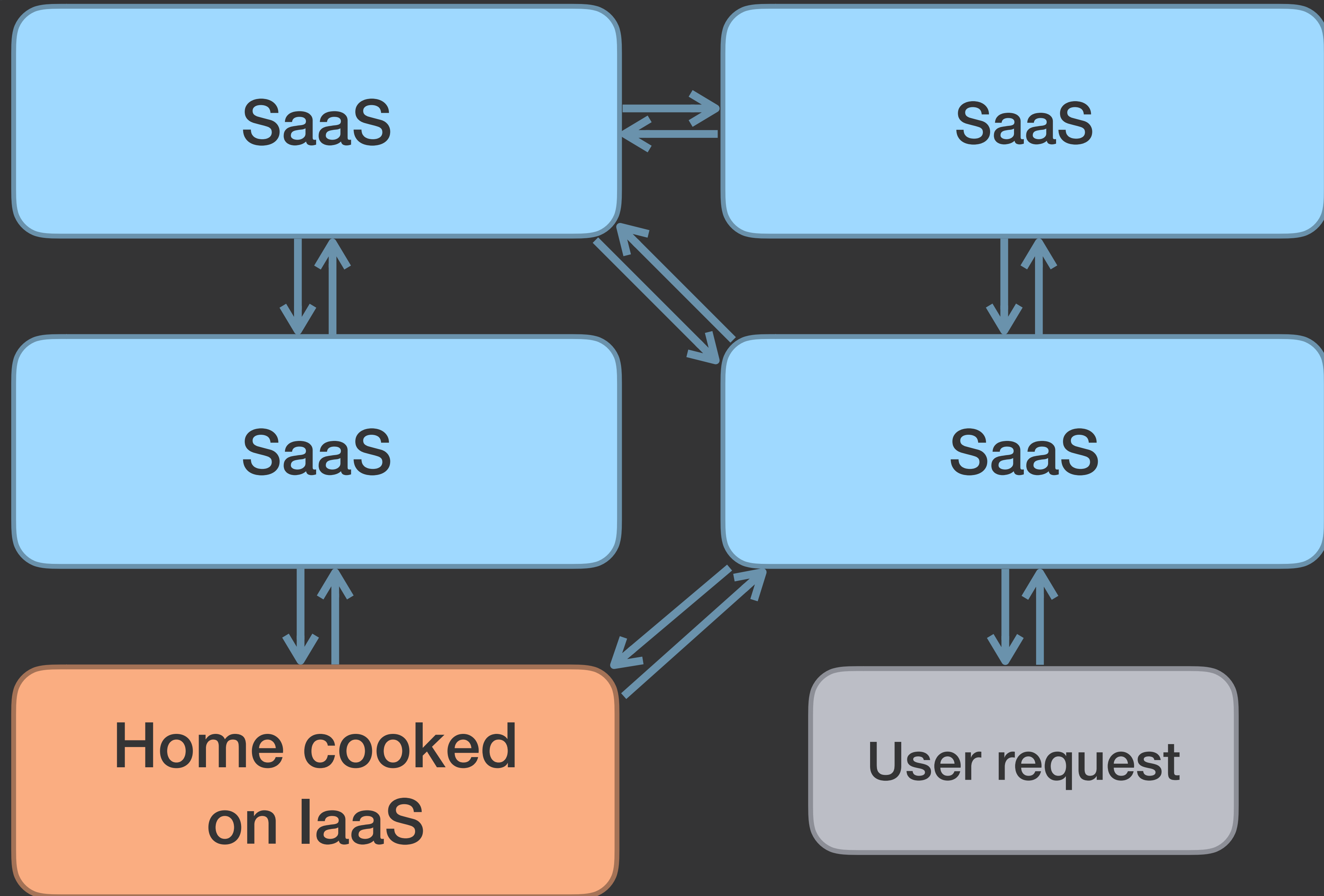








New requirements for buy vs build



Buy or Build

- Will it improve availability?
- Will it improve recovery?
- Will you have visibility or points of control?
- Will you have customizability?
- Will you know when your changes take effect?
- Can you audit changes?

IaaS, PaaS, BaaS, & FaaS

Cloud Infrastructure

IaaS



Amazon EC2



Google Compute Engine



IaaS

- Will it improve availability? ✓
- Will it improve recovery? ✓
- Will you have visibility or points of control? ✓
- Will you have customizability? ✓
- Will you know when your changes take effect? ✓
- Can you audit changes? ✓

Platforms

PaaS









heroku



Google app engine



PaaS

- Will it improve availability? 
- Will it improve recovery? 
- Will you have visibility or points of control? 
- Will you have customizability? 
- Will you know when your changes take effect? 
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Backends

BaaS




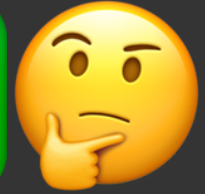





Firebase



(RIP Parse)



BaaS

- Will it improve availability?  
- Will it improve recovery? 
- Will you have visibility or points of control? 
- Will you have customizability? 
- Will you know when your changes take effect? 
- Can you audit changes? 

Functions

FaaS

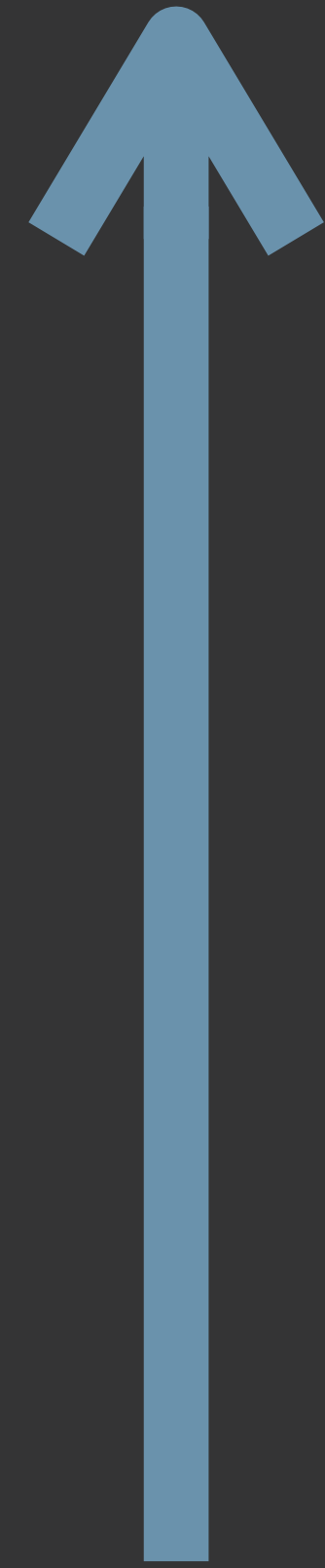


FaaS

- Will it improve availability? 🤔
- Will it improve recovery? 🤔
- Will you have visibility or points of control? 🤔
- Will you have customizability? ✅
- Will you know when your changes take effect? 🤔
- Can you audit changes? 🤔

How to choose?

Faster to start
Harder to change

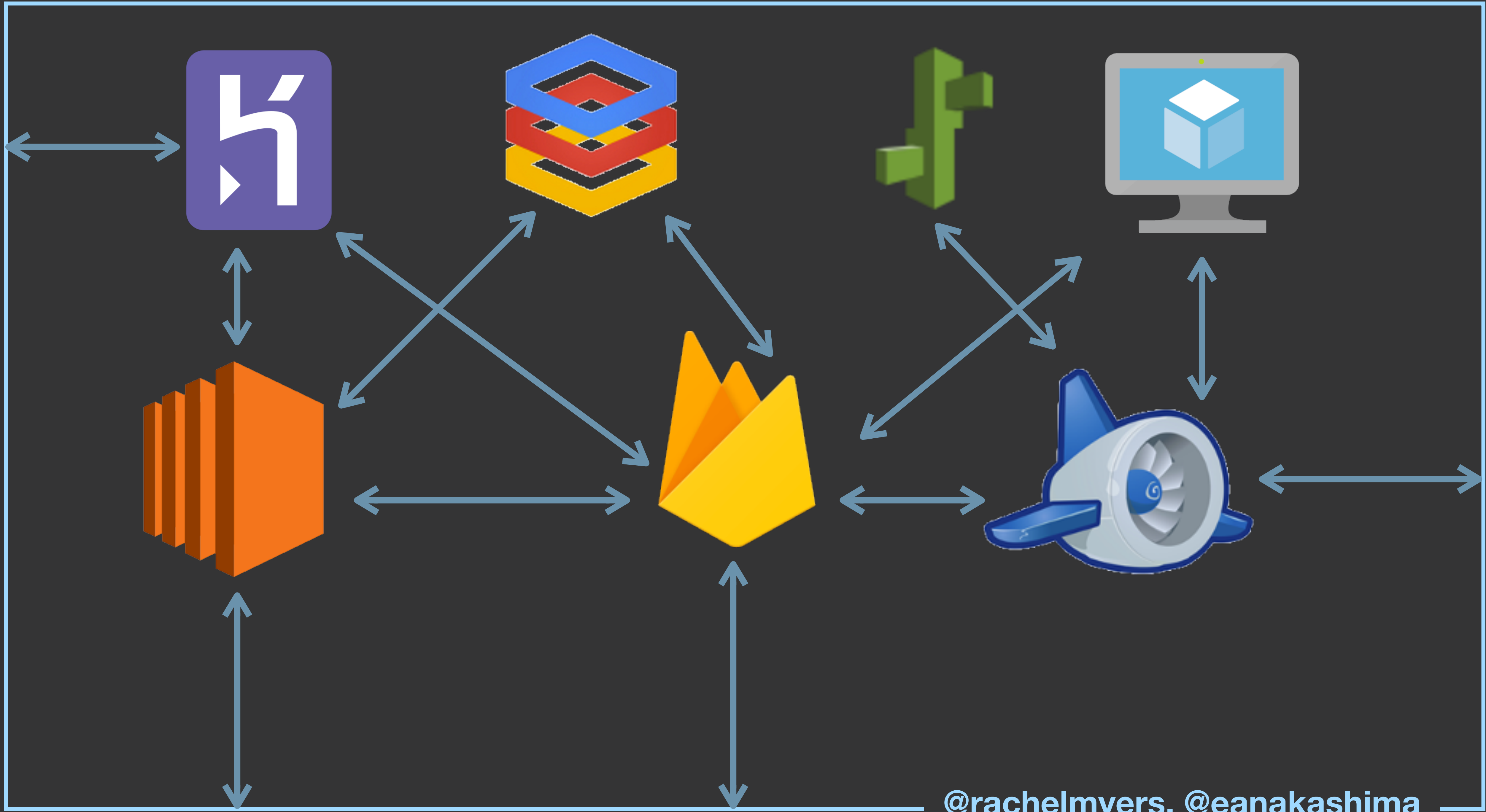


Backend

Platform

Infrastructure





@rachelmyers, @eanakashima

Surprise Distributed Systems

Surprise distributed system: browsers

“The browser is part of your distributed system, not just a client you support”

- @danielespeset

The one where we DDOS'd ourselves

Topo Designs x Howler Brothers Mountain Pack


Secure | <https://wanelo.co/p/66608437/topo-designs-x-howler-brothers-mountain-pack>

Find amazing products

JOIN SIGN IN

codyhuffine saved this to [Deep Ellum](#)
3 months ago

1 person saved this from [malaparte](#)

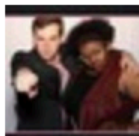



Topo Designs x Howler Brothers Mountain Pack
\$198.00 from [Topo Designs](#)

Save Buy

Saved to
Deep Ellum, Bags & Luggage

Collections

 **Deep Ellum**
@codyhuffine

 **Bags & Luggage**
@malaparte

What happened?

The screenshot shows a web browser window with the URL 'Topo Designs' and a user email 'nakashima@aya...'. The page features a navigation bar with a search bar containing 'Find amazing products', and links for 'JOIN' and 'SIGN IN'. Below the navigation bar is a grid of ten product listings, each with an image, a title, and a price.

Product Name	Price
Heavyweight Pocket Tee	\$45.00
Heavyweight Long Sleeve Pocket Tee	\$59.00
Mountain Shirt - Plaid Flannel	\$129.00
Women's Coverall	\$189.00
Topo Designs x Howler Brothers Mountain Pack	\$198.00
Work Pants - Natural Canvas	\$149.00
Breaker Shirt Jacket	\$149.00
3-Day Briefcase	\$189.00
Commuter Briefcase	\$189.00
Climb Pants	\$129.00


```
// if the page is long enough to scroll
if (document.body.clientHeight > window.innerHeight) {



    // add a scroll event listener
    document.addEventListener('scroll', function(e) {

        // if within 100px of the bottom of the page
        if (window.innerHeight + window.scrollY + 100 >
            document.body.clientHeight)
            fetchNextPage();

    });

// else fetch another page of results immediately
} else {
    fetchNextPage();
}
```

Frontend complexity is only increasing


Yehuda Katz 
@wycats Follow 

Front end software development is:

- real-time (instant load, 60fps)
- distributed, incremental (synchronize remote data as needed)
- asynchronous
- reactive (react to user actions in realtime)

Front end is the hardest kind of dev I do. The folks who do it every day are heroes.

7:53 AM - 14 Nov 2017

1,774 Retweets 4,726 Likes 

Instrumentation Rule 1:

Start at the edge.

Corollary: The edge may
be further than you think.

Secret distributed system: vendors

LaunchDarkly

Secret distributed system: vendors

The image shows a browser window displaying the LaunchDarkly homepage and a screenshot of the dashboard. The homepage features the LaunchDarkly logo, navigation links for Product, Resources, and Support, and buttons for Start Trial and Sign In. The main headline reads "Ship Faster with Confidence" and includes a sub-headline: "Eliminate risk and deliver value using feature management in your development cycles. Deploy code when you want. Release features when you're ready. Control your users' experience." A prominent teal button says "START YOUR 30-DAY TRIAL".

The dashboard screenshot shows a sidebar with navigation options: Feature Flags, Users, Segments, Dev Console, Audit Log, Quickstart, Documentation, and Integrations. The main content area is titled "Dashboard" and "Your feature flags". It lists several feature flags with their status and last requested time:

Feature Flag	Key	Status	Last Requested
Site Maintenance Mode	maintenance-mode	ON	Added 2 days ago Last requested a few seconds ago
Enable Debugger	enable-debugger	OFF	Added 29 days ago Last requested a 17 minutes ago
New UI	new-ui	ON	Added 9 months ago Last requested a few seconds ago
RabbitMQ Kill Switch	rabbitmq-kill-switch	ON	Added 12 months ago Last requested a 1 day ago
New Recommendations Engine	engine-enable	OFF	Added 12 months ago Last requested a 2 days ago

```
# instantiate the flag with a default value
# falls back to default value if service is offline
show_feature = ld_client.variation(
  "allow_traces",
  { :key => "user@example.com" },
  false
)

if show_feature
  # application code to show the feature
else
  # the code to run if the feature is off
```

Secret distributed system: vendors

How it Works - LaunchDarkly x

Secure | <https://launchdarkly.com/how-it-works/>

Emily

LaunchDarkly Product Resources Support Start Trial Sign In →

We Push Changes When They Happen

We use server-sent events (SSE), a protocol for one-way real-time messaging, to send messages to your servers whenever you change feature flag rules on your dashboard. The SSE connection is handled automatically by our SDKs.

The diagram illustrates the Server-Sent Events (SSE) process. On the left, a circular icon contains a toggle switch, representing a change in a feature flag rule on the dashboard. A dotted arrow points from this icon to a central globe icon, which represents the distributed system or the SDKs. Another dotted arrow points from the globe to a large circular area on the right, representing the client system. This area contains icons for a smartphone, a desktop computer, and server racks, along with toggle switches and refresh symbols, indicating that the client system receives real-time updates and refreshes its state.

ima

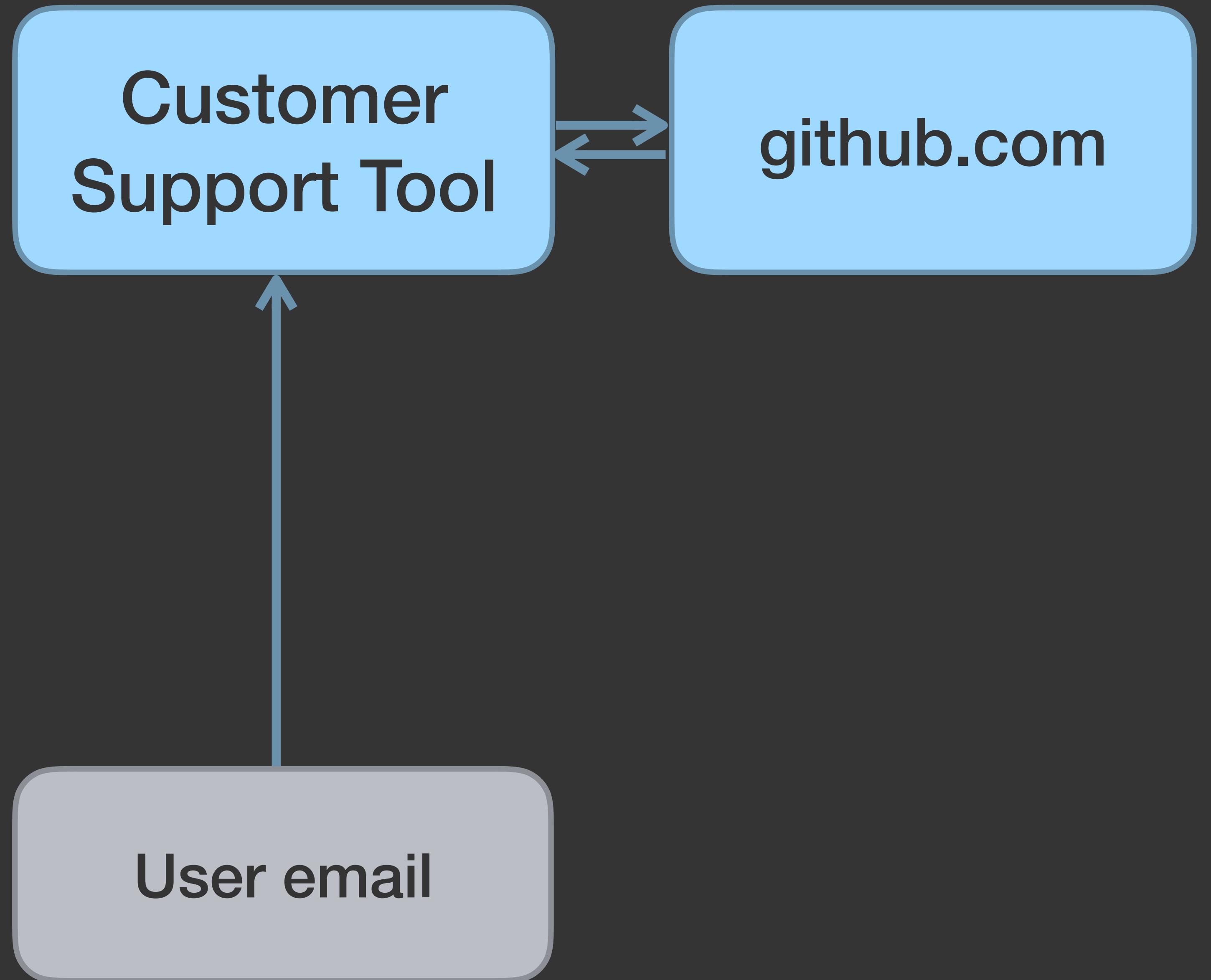
Logo from LaunchDarkly

Instrumentation Rule 2: Wrap 3rd party calls

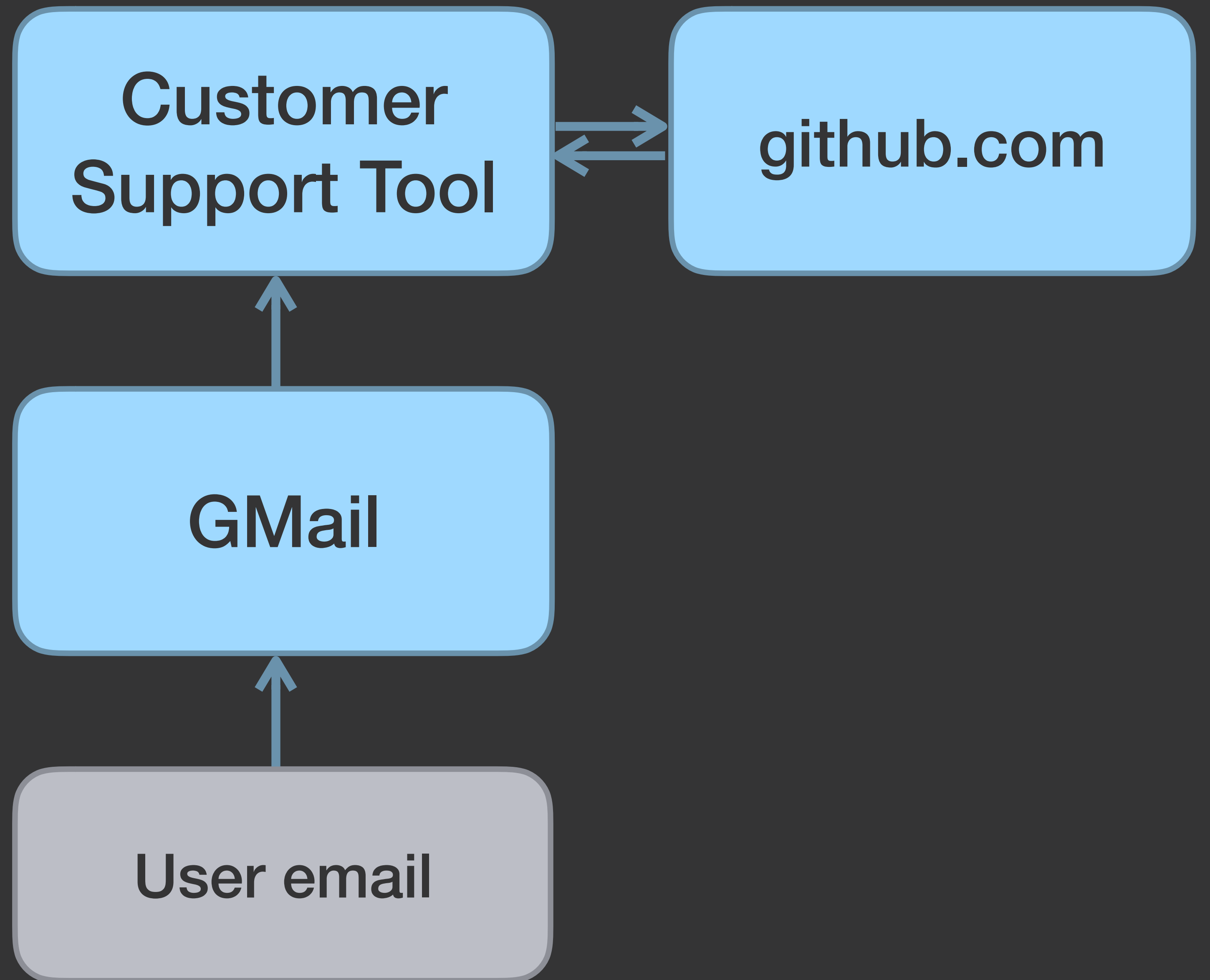
Secret distributed
system: vendors

GitHub's customer support application

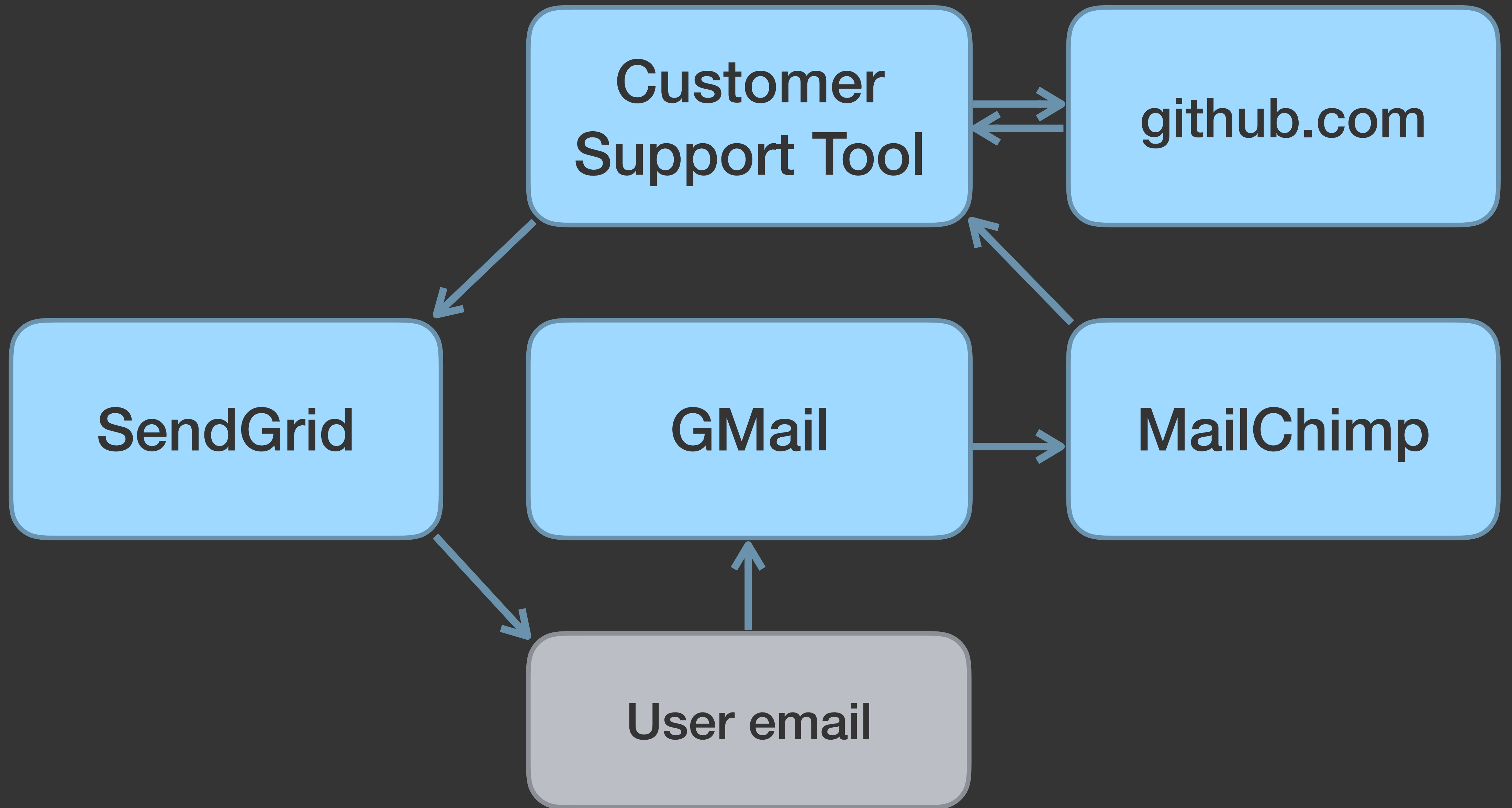
GitHub customer support tool



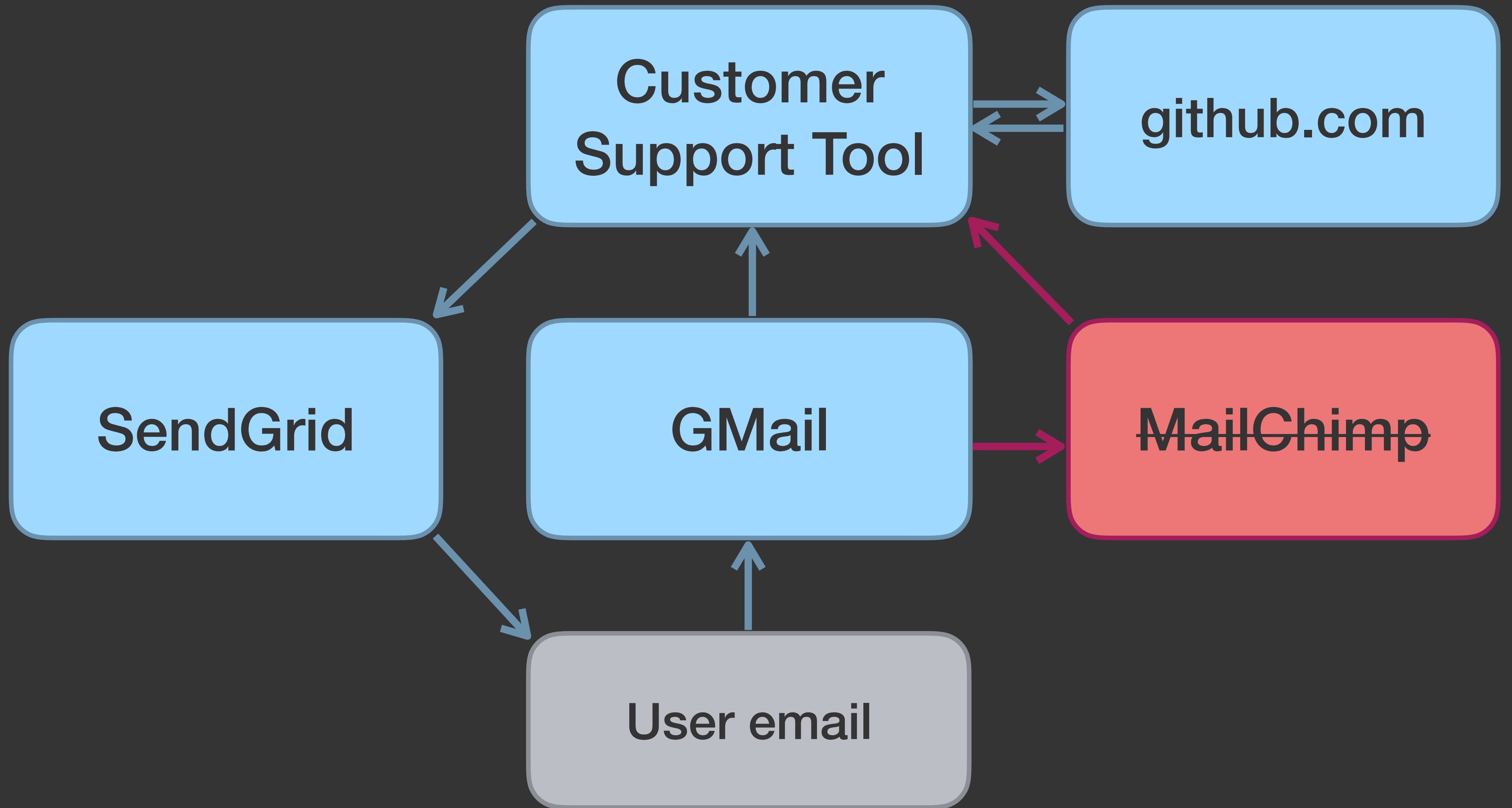
GitHub customer support tool



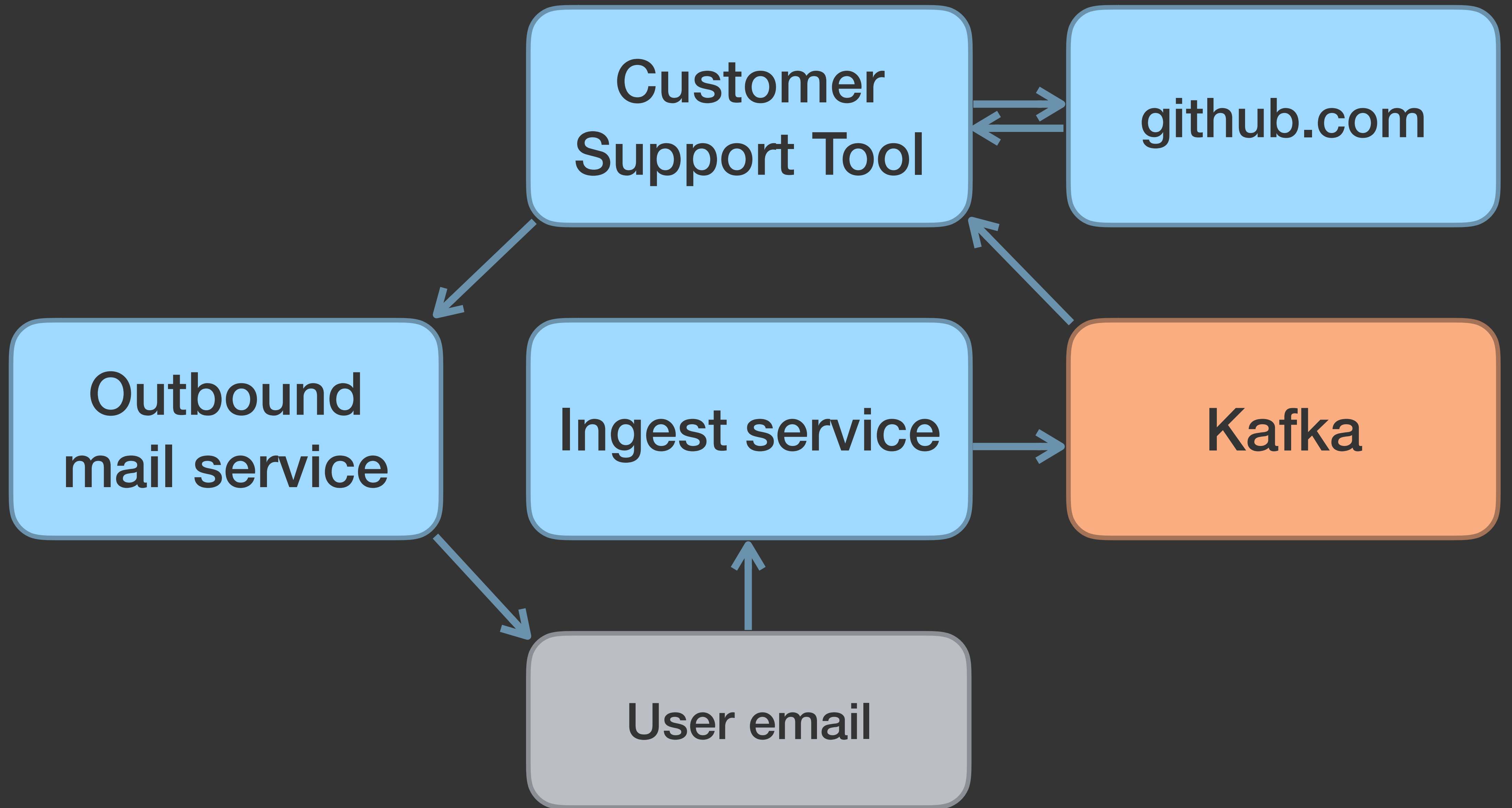
GitHub customer support tool



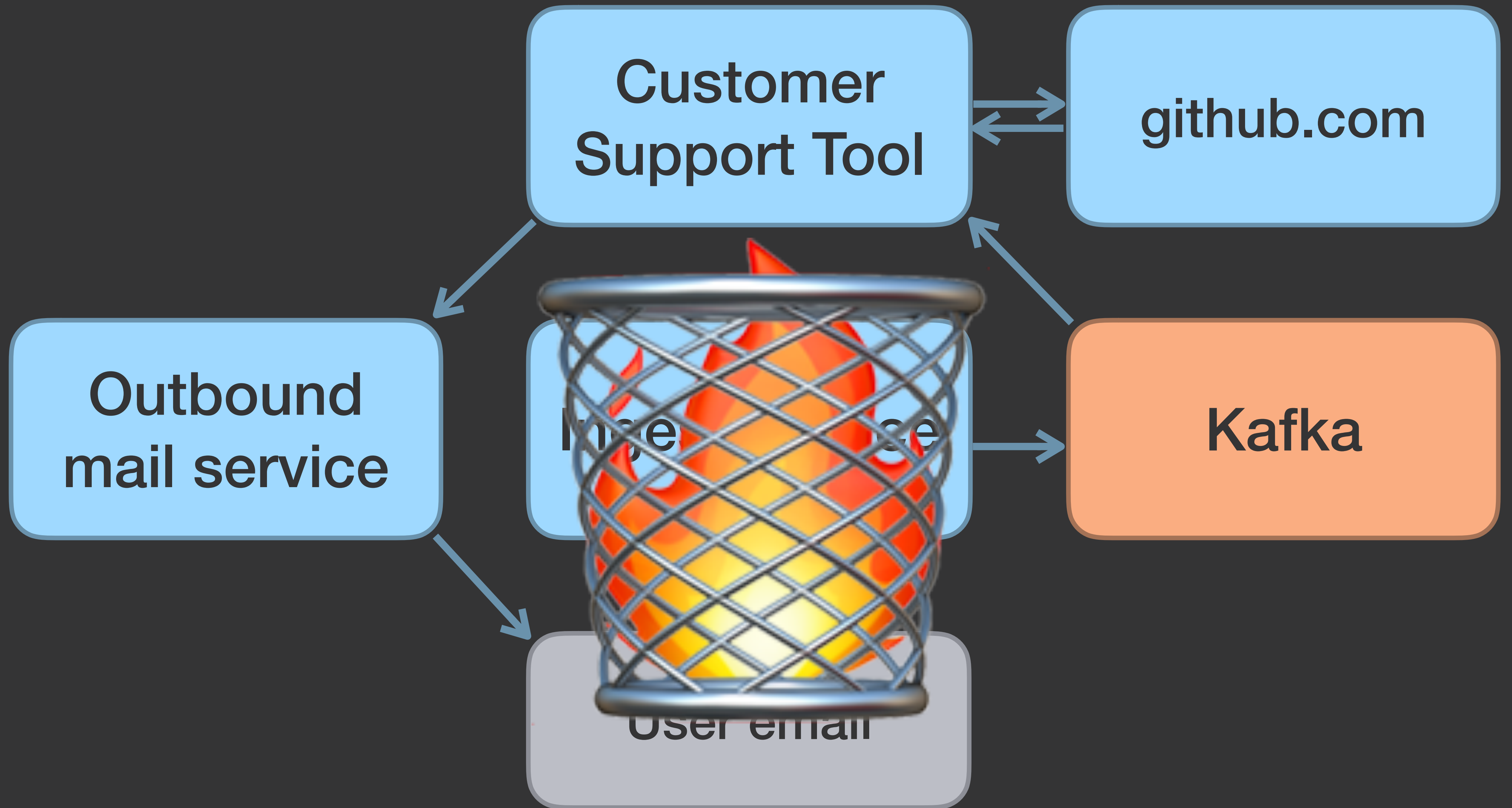
GitHub customer support tool



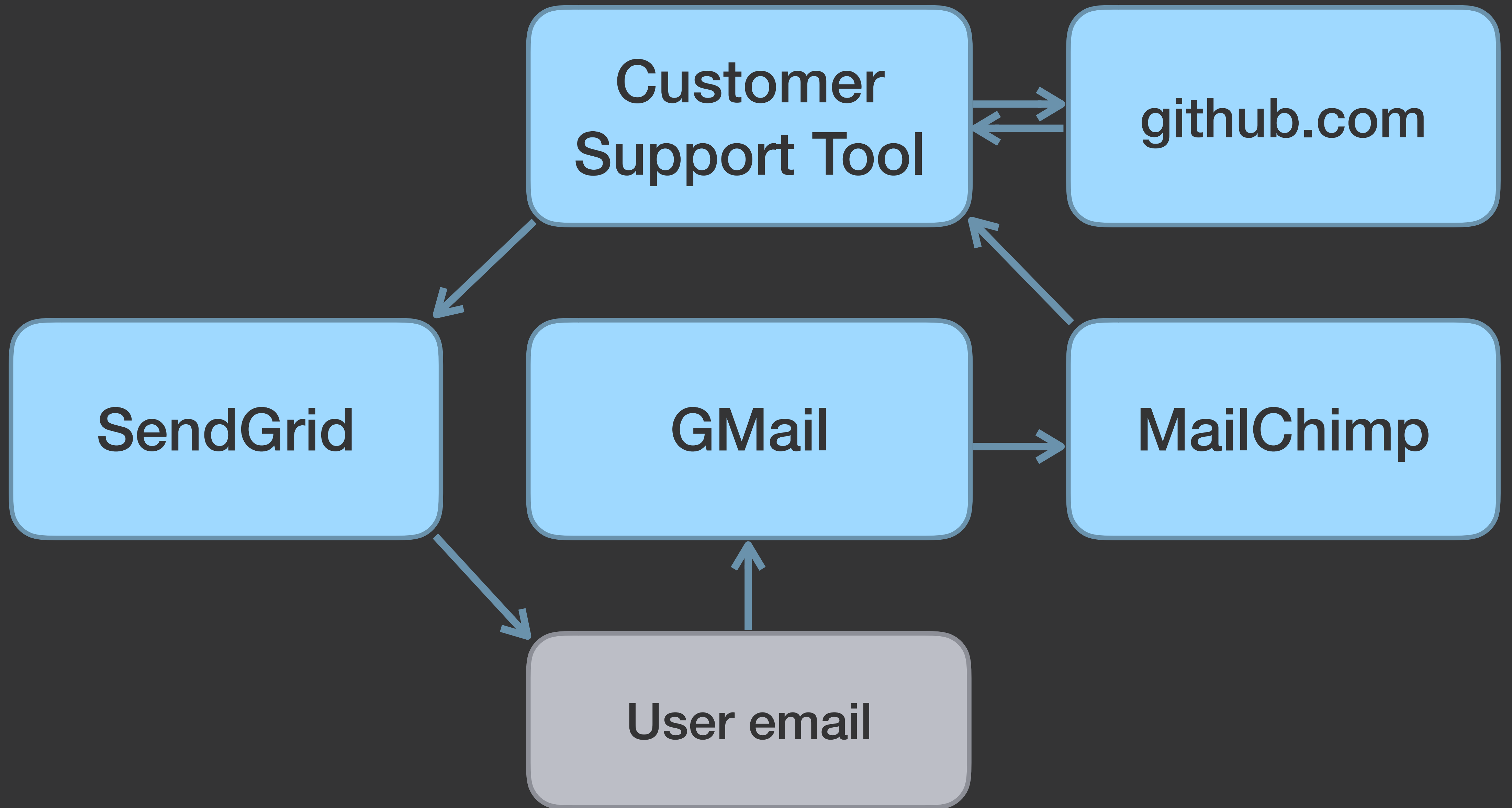
GitHub customer support tool



GitHub customer support tool



GitHub customer support tool



Cognitive Load

Instrumentation & Chill ❄️

Fewer Alerts





Charity Majors @mipsytipsey · 23 Sep 2017

Prediction: we are going to move towards far fewer paging alerts as systems get more and more complex. Latency, errors, request rate

6 15 57



Charity Majors

@mipsytipsey

Following

Maybe a few end-to-end checks that traverse critical business functions. That's it. Nothing else should wake you up middle of the night.

3:07 PM - 23 Sep 2017

9 Retweets 68 Likes



3 9 68

Unknown unknown

unknowns



Outsource Your Brain



Use tools that let you...

- Ask, what is happening now to this user? Endpoint? Team?
- Ask, how does this compare to the aggregate case?
- Jump between levels of abstraction
- See both breadth & depth
- Understand how data flows

Observability...

not just for

ops thought leaders!

“The ability to ask arbitrary questions about your system from the outside, and understand what is happening on the inside.”

-@mipsytipsy

@rachelmyers, @eanakashima



elastic

papertrail

splunk>



logs



DATADOG



Prometheus



Grafana



librato

metrics



JAEGER



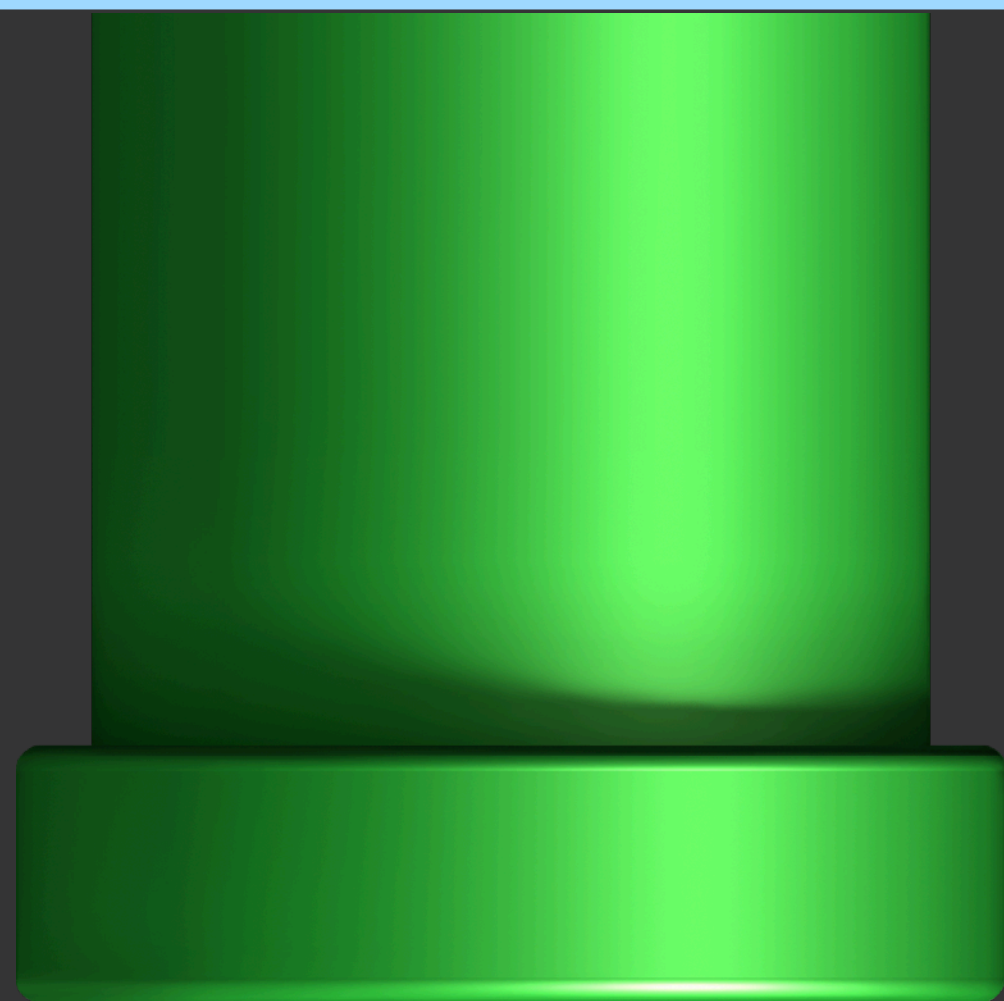
LIGHTSTEP



ZIPKIN

traces / events

How to pick an
observability tool?

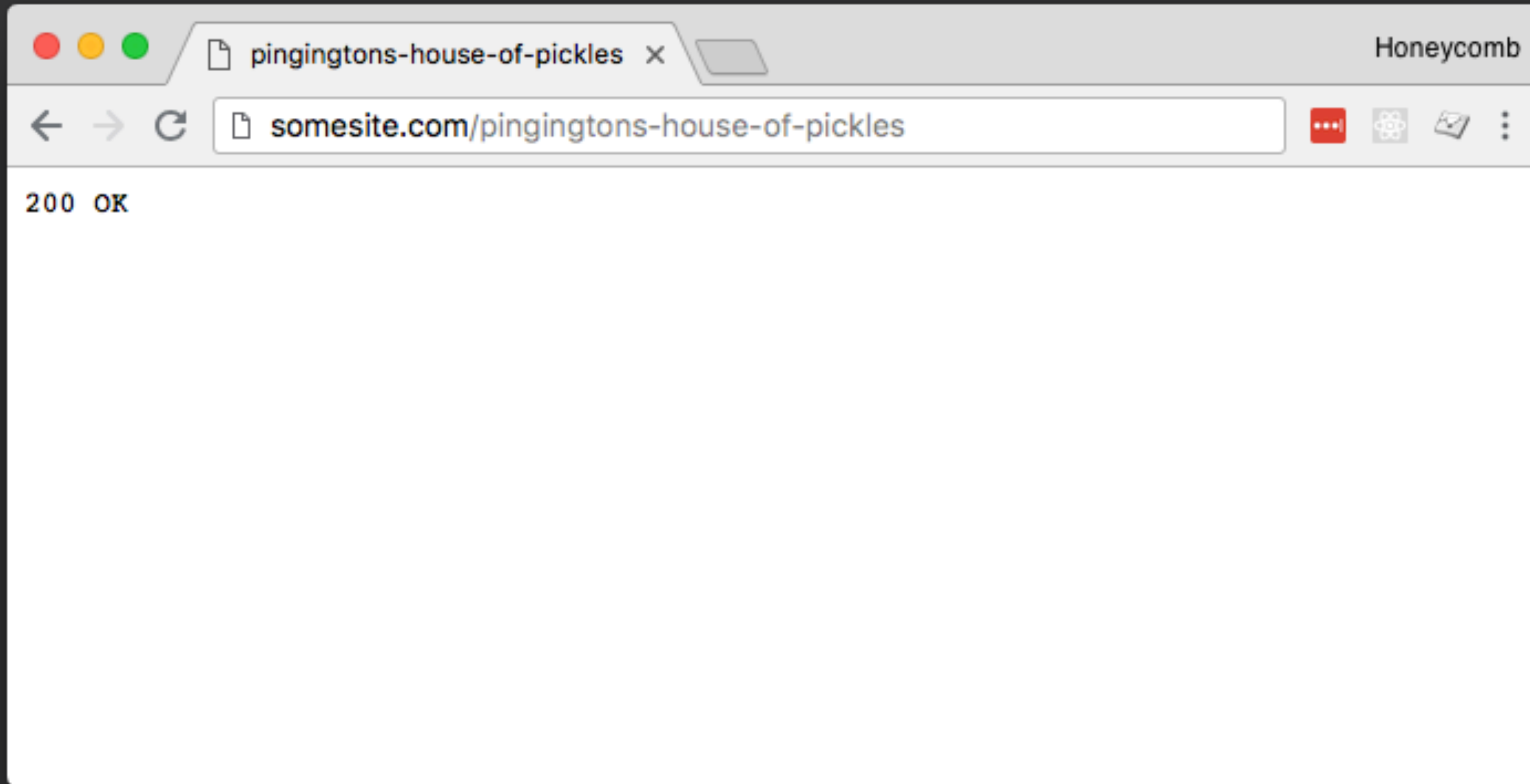


Crawl the pipes





No really,
instrumentation



```
# monitoring endpoint
Location ~ /ping {
  return 200 '200 ok';
}
```

Instrumentation Rule 3:

Your instrumentation
should support depth-
and breadth-first

Conclusion

Two Vendors:
Two Conclusions 🤨

1. We're all distributed
systems ~~engineers~~
operators.



2. Trust your tools





Thank you