WHAT COMES AFTER MICROSERVICES?

MATT RANNEY

UBER

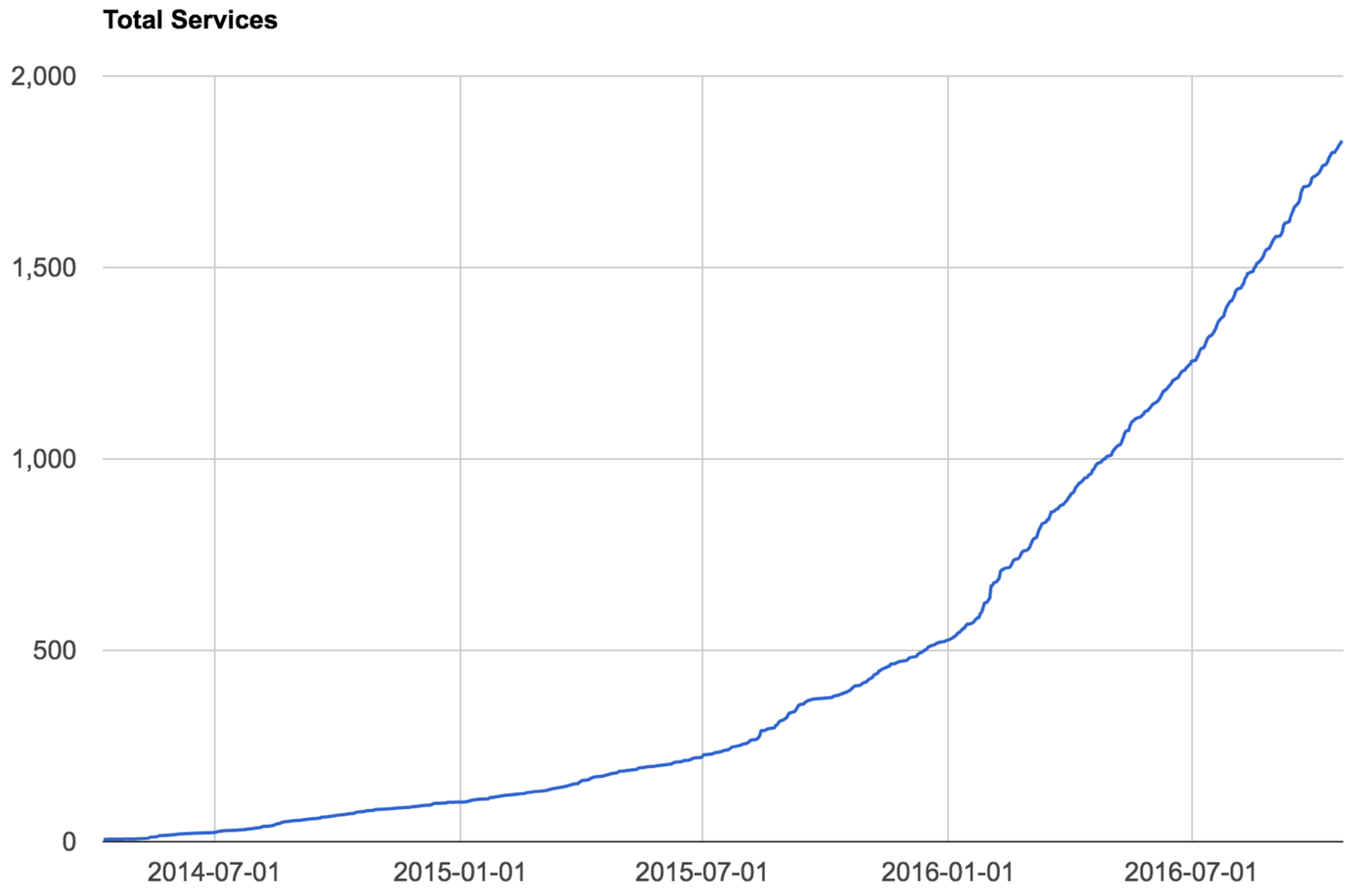
WHAT COMES AFTER MICROSERVICES?

MATT RANNEY

UBER

We hired lots of engineers.

They wrote lots of software.


Total Services
2,000
1,500
1,000
500
0
2014-07-01
2015-01-01
2015-07-01
2016-01-01
2016-07-01

Services Total
1797

Traced (actively/passively)
659

Instrumented (actively)
505

Services Traced (%)
37%

Services Instrumented (%)
28%

Tier-0 Total
22

Services Traced
8

Services Instrumented
5

Services Traced (%)
36%

Services Instrumented (%)
23%

Tier-1 Total
35

Services Traced
29

Services Instrumented
26

Services Traced (%)
83%

Services Instrumented (%)
74%

Tier-2 Total
320

Services Traced
196

Services Instrumented
164

Services Traced (%)
61%

Services Instrumented (%)
51%

This causes lots of problems.

Why use microservices at all?

Easier releases?

Efficiency somehow?

Scaling the organization?

Coupling

APRIL 2016

```
mjr:~$ perl -ne '$c++; $p++ if /personal/; $conf++ if /config/; END { print "$c total\n$p personal\n$conf conf\n";}' all_repos
7005 total
1074 personal
374 conf
```

MAY 2016

```
mjr:~$ perl -ne '$c++; $p++ if /personal/; $conf++ if /config/; END { print "$c total\n$p personal\n$conf conf\n";}' all_repos
8263 total
1137 personal
407 conf
```

OCTOBER 2016

```
mjr:$ perl -ne '$c++; $p++ if /personal/; $conf++ if /config/; END { print "$c total\n$p personal\n$conf conf\n"}' all_repos
14306 total
1435 personal
3046 conf
```

New problems

Sharded database

RPC

Service discovery

Rate limiting

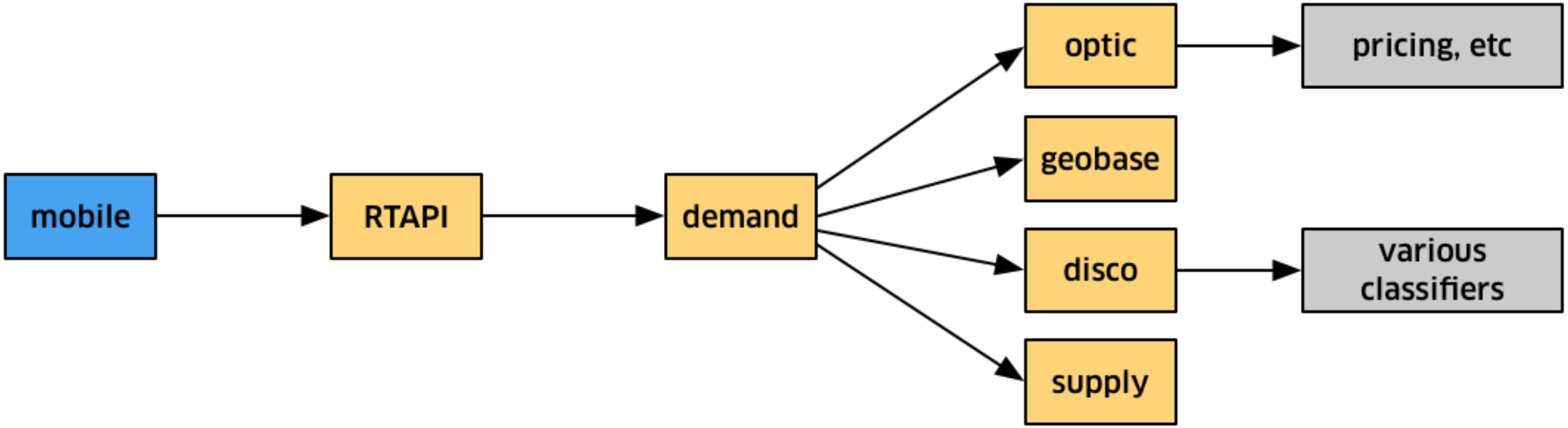
Circuit breaking

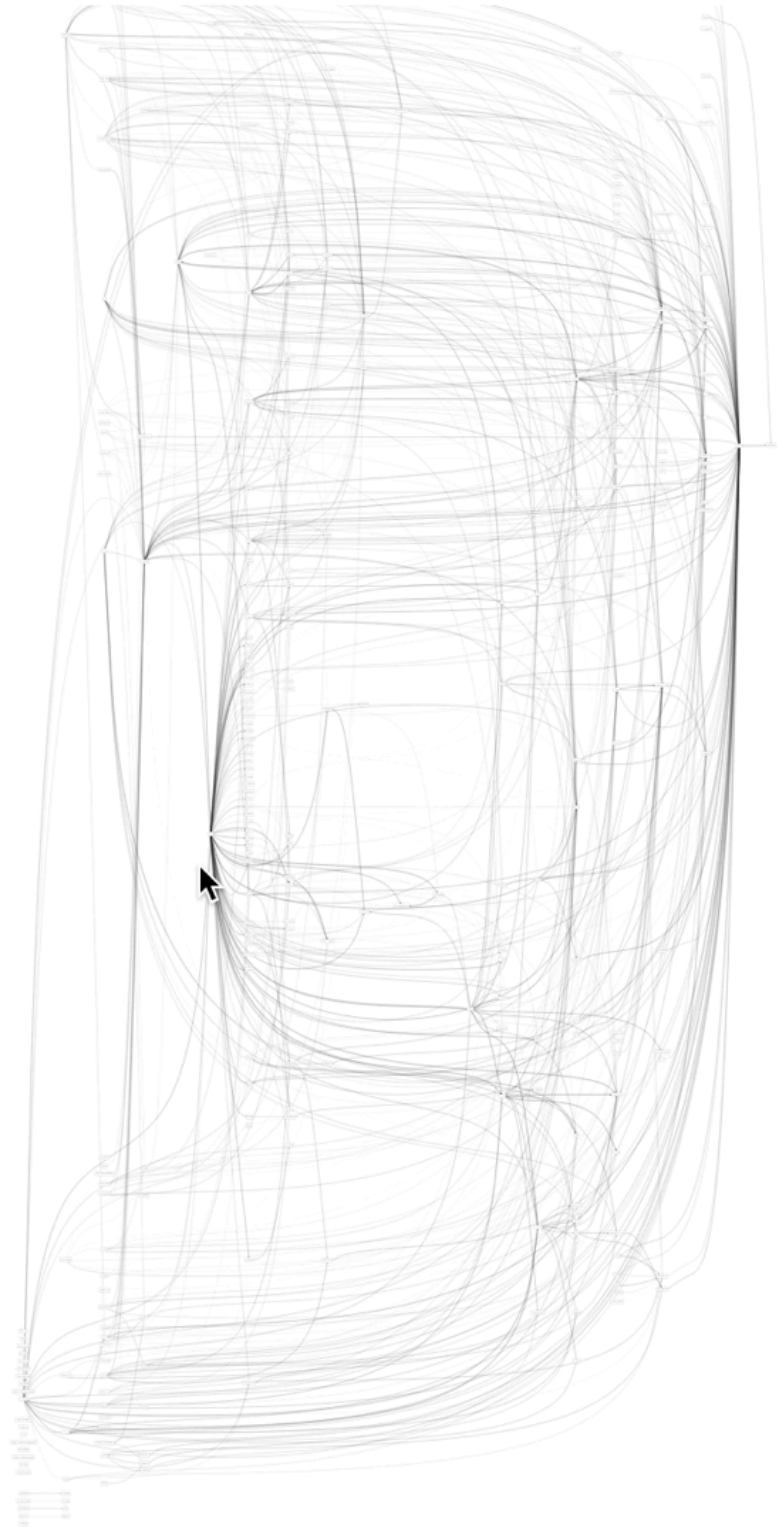
Tracing

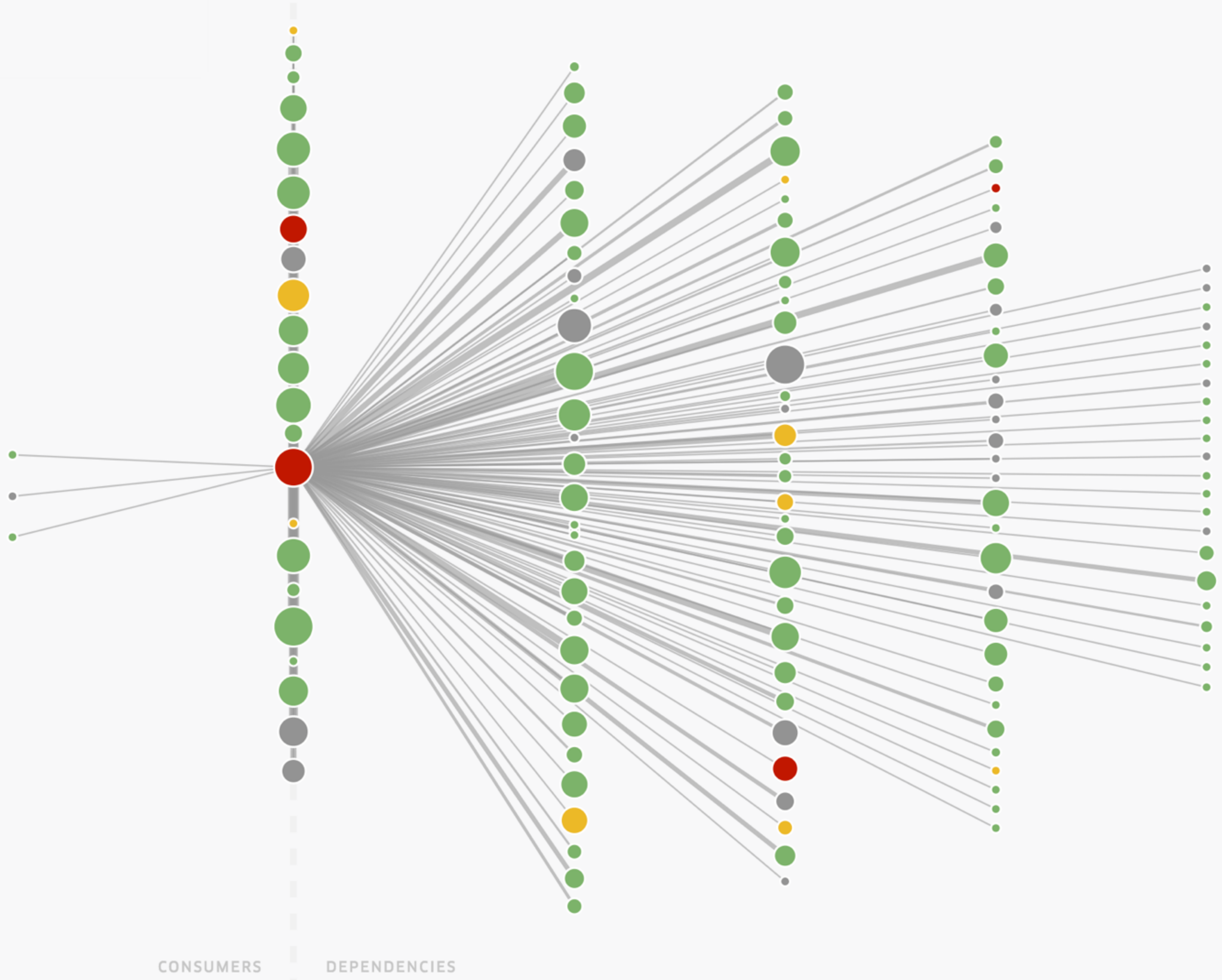
Release management

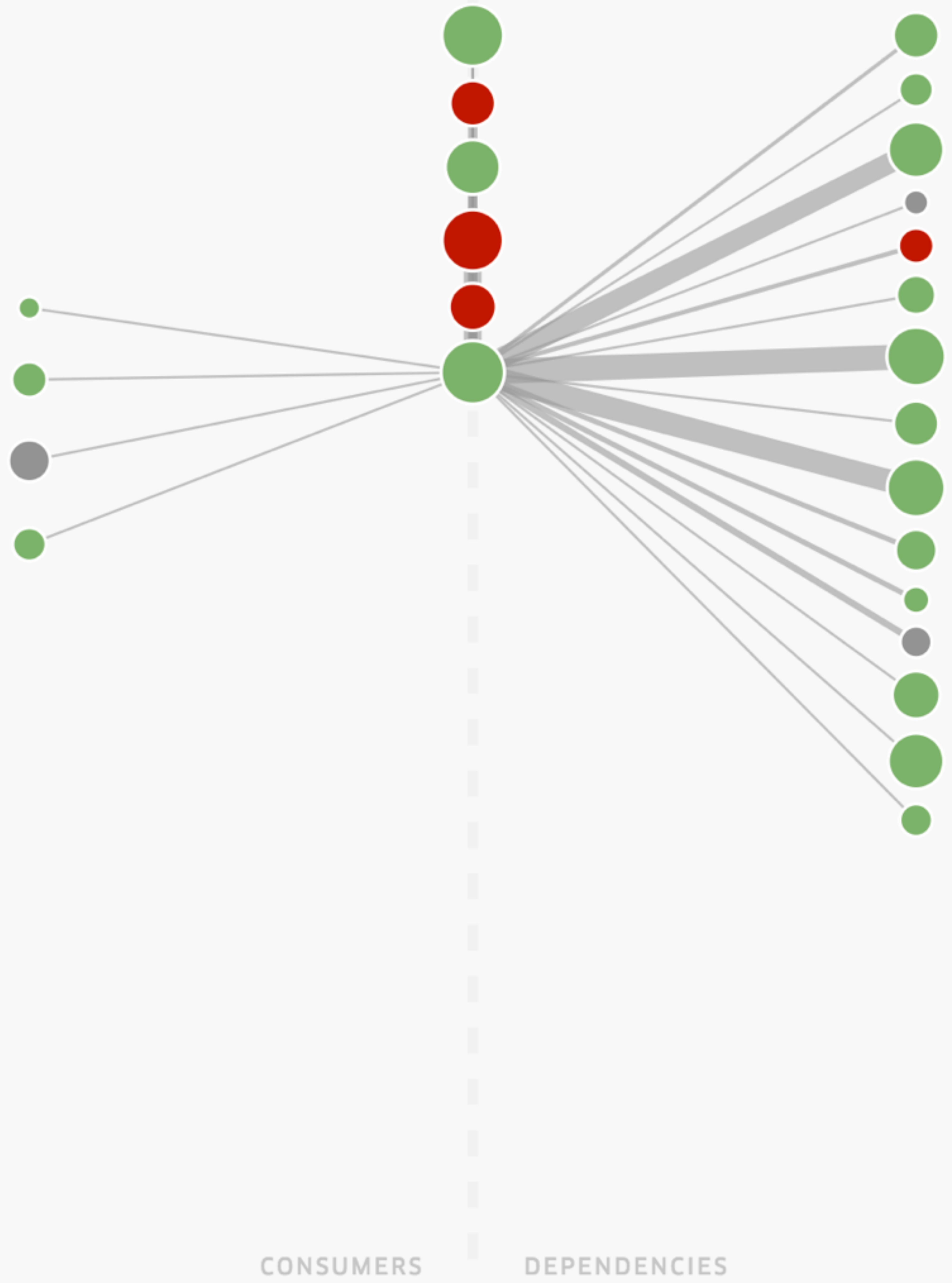
New problems

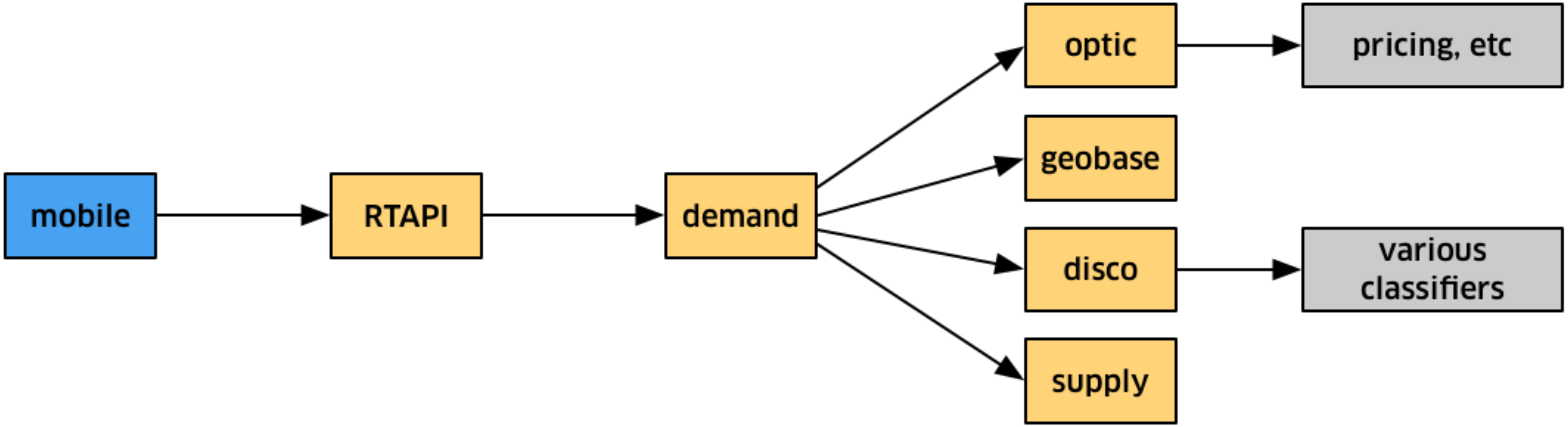
Composability

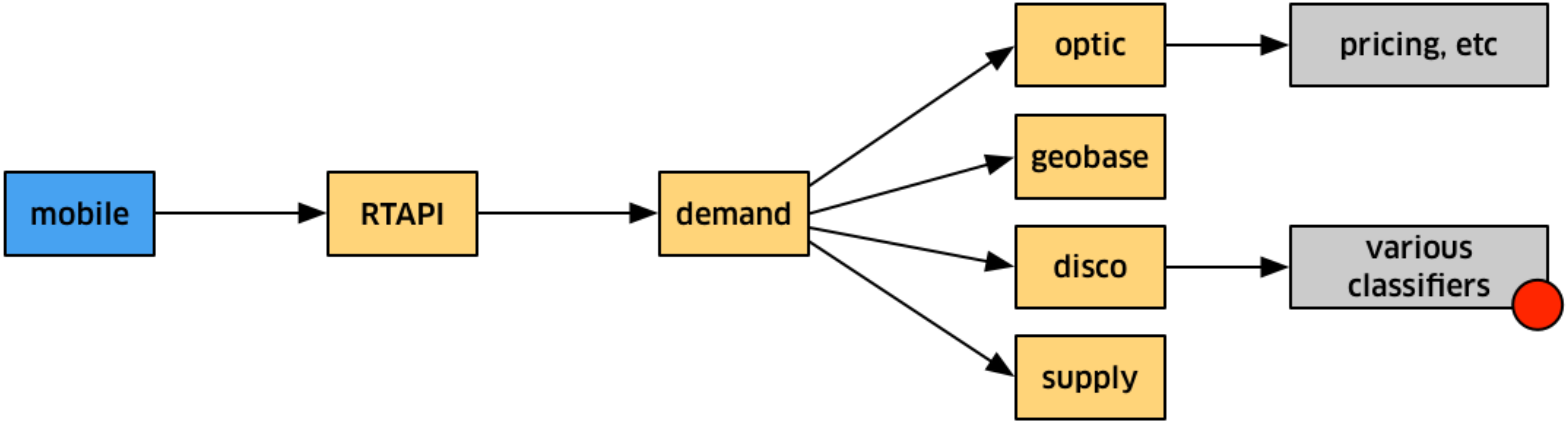

mobile
RTAPI
demand
optic
geobase
disco
supply
pricing, etc
various classifiers

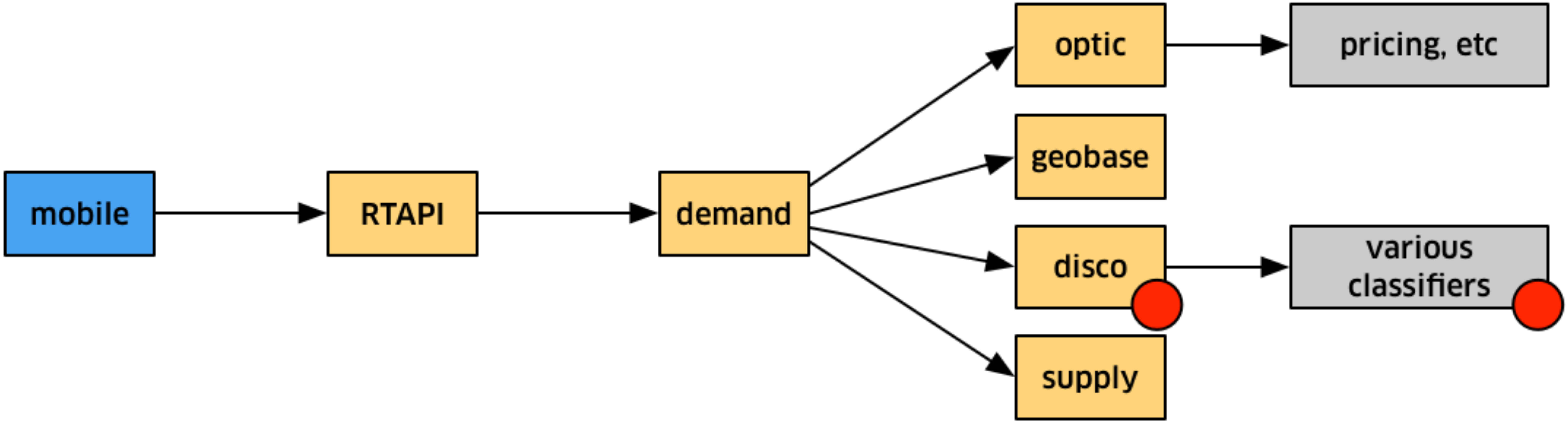


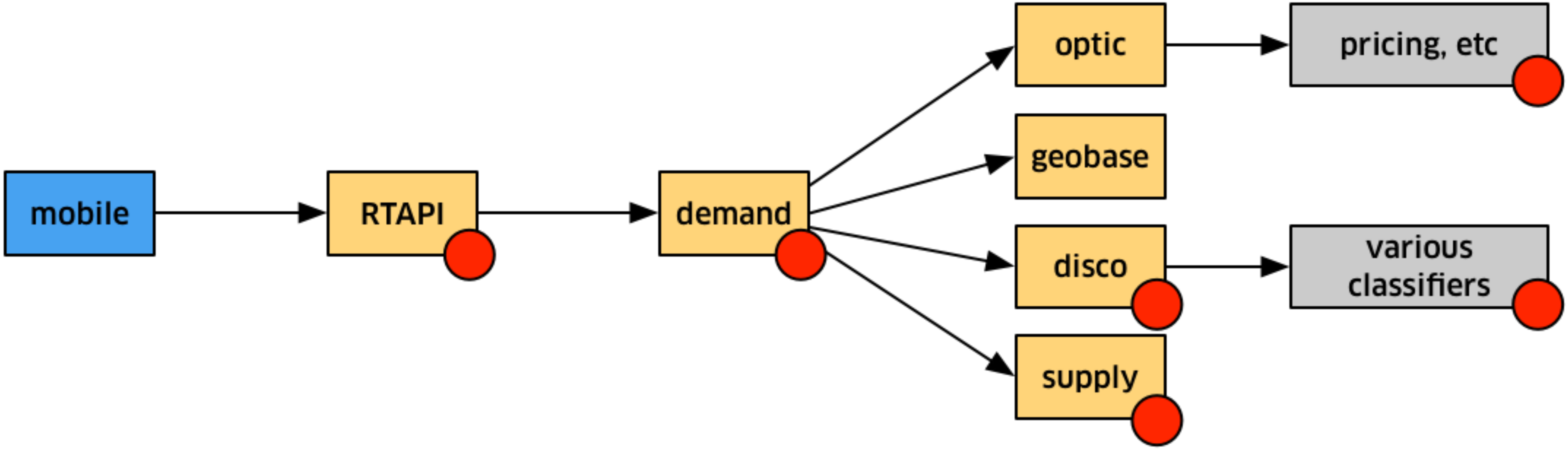

CONSUMERS
DEPENDENCIES


CONSUMERS
DEPENDENCIES


mobile
RTAPI
demand
optic
geobase
disco
supply
pricing, etc
various classifiers

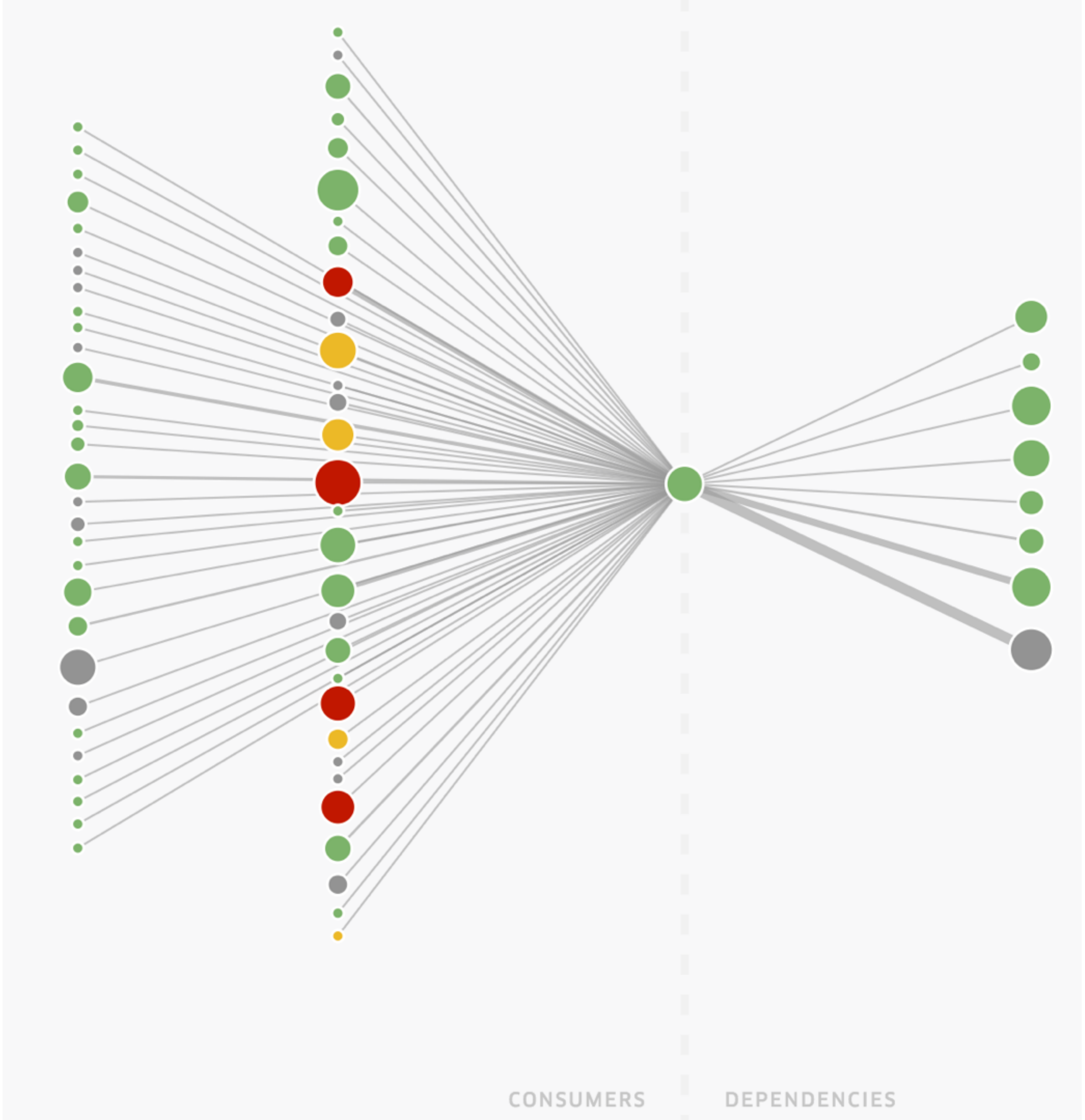

mobile
RTAPI
demand
optic
geobase
disco
supply
pricing, etc
various classifiers


mobile
RTAPI
demand
optic
geobase
disco
supply
pricing, etc
various classifiers


mobile
RTAPI
demand
optic
geobase
disco
supply
pricing, etc
various classifiers

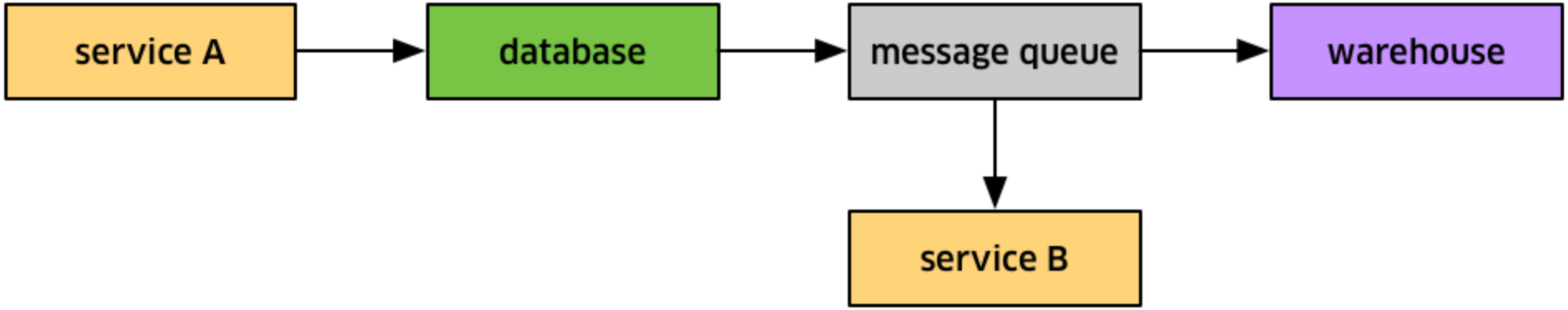
Composability

Services want their own storage.


CONSUMERS
DEPENDENCIES

Developing against this system is hard.

Evolving schemas is hard.


service A
database
message queue
warehouse
service B

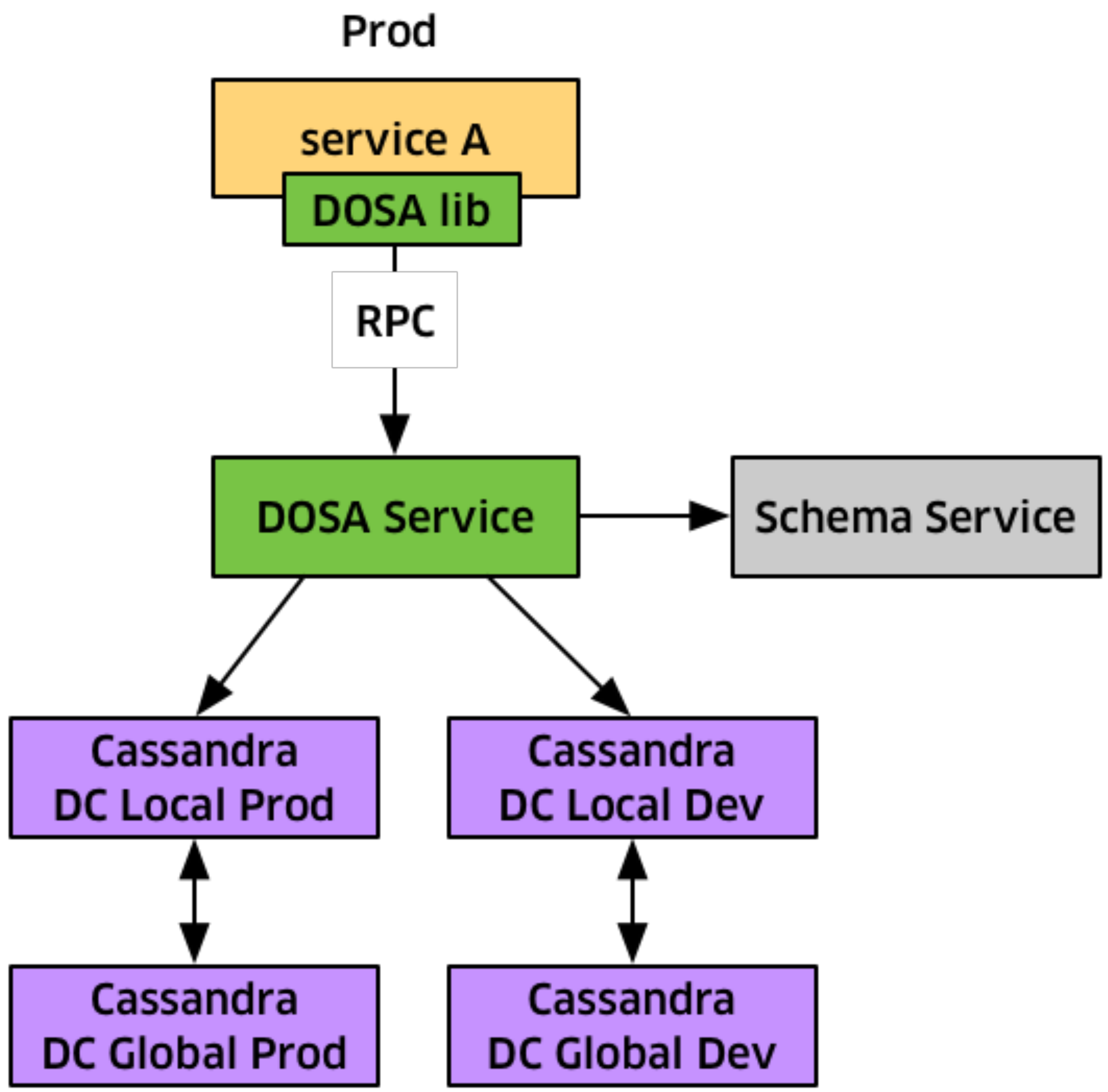
Having 1M services should be as easy as 1K or 10.

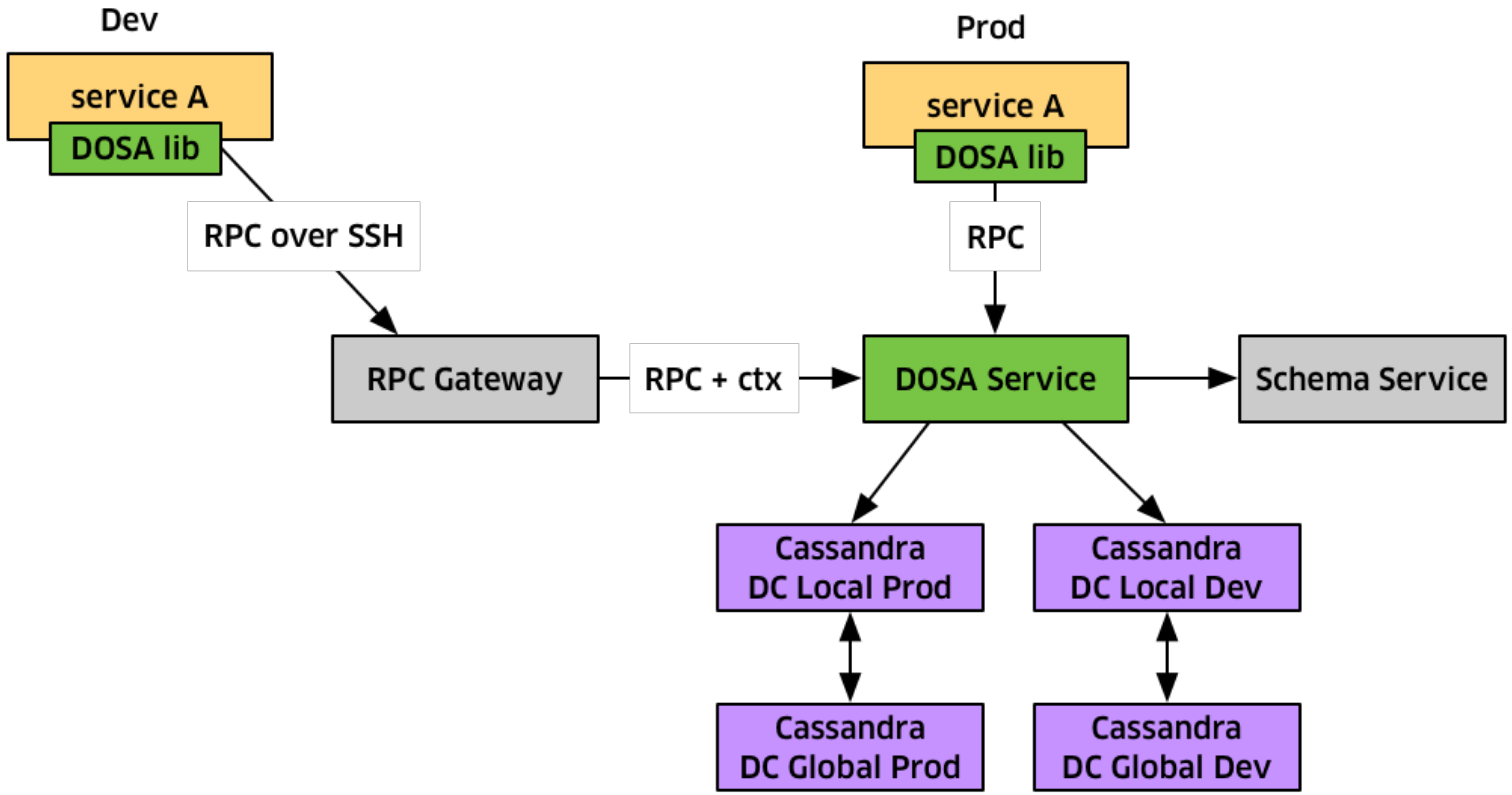
Provisioning storage should be easy as checking in code.

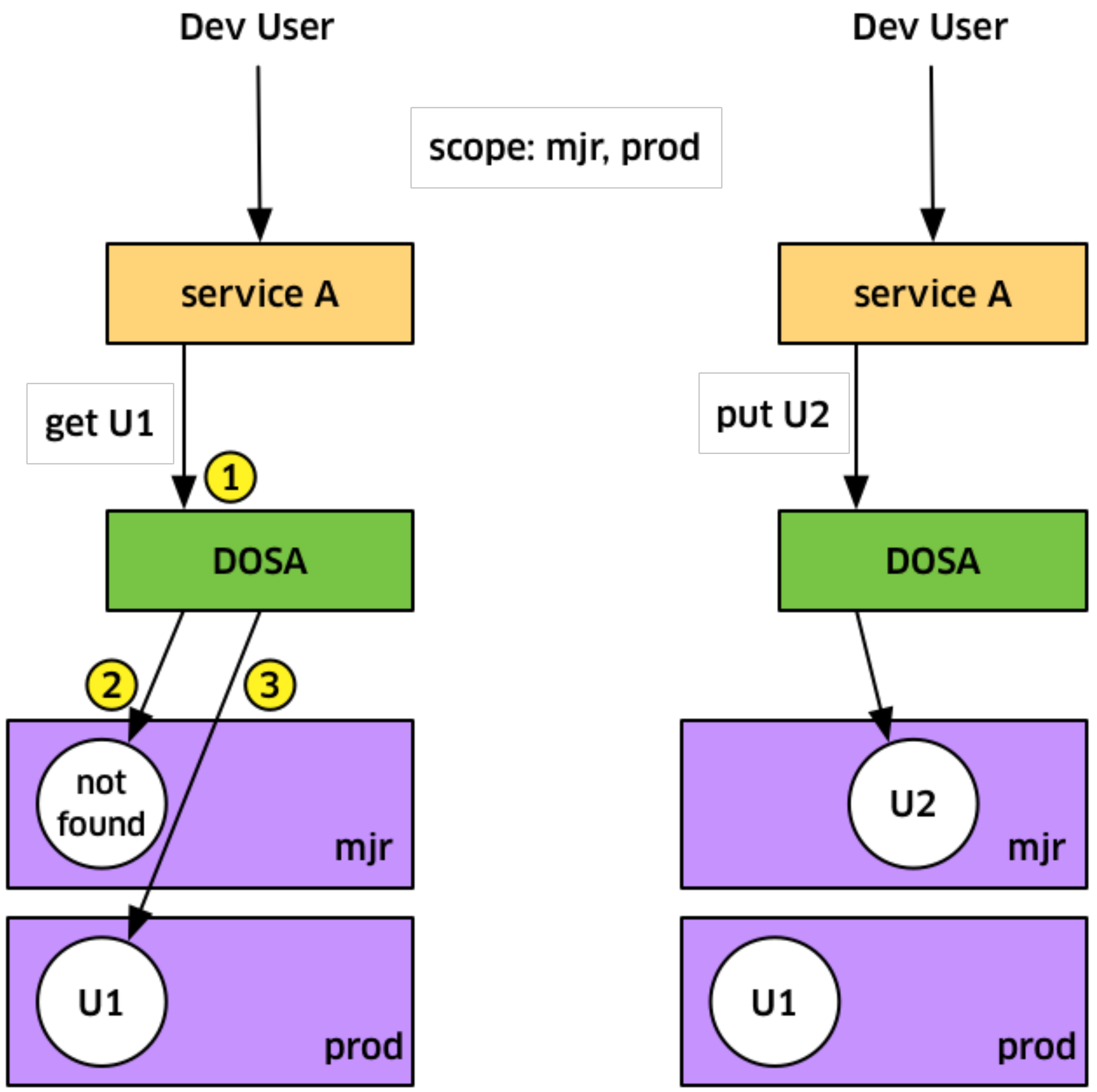
Devs should be able to safely test with real production data.

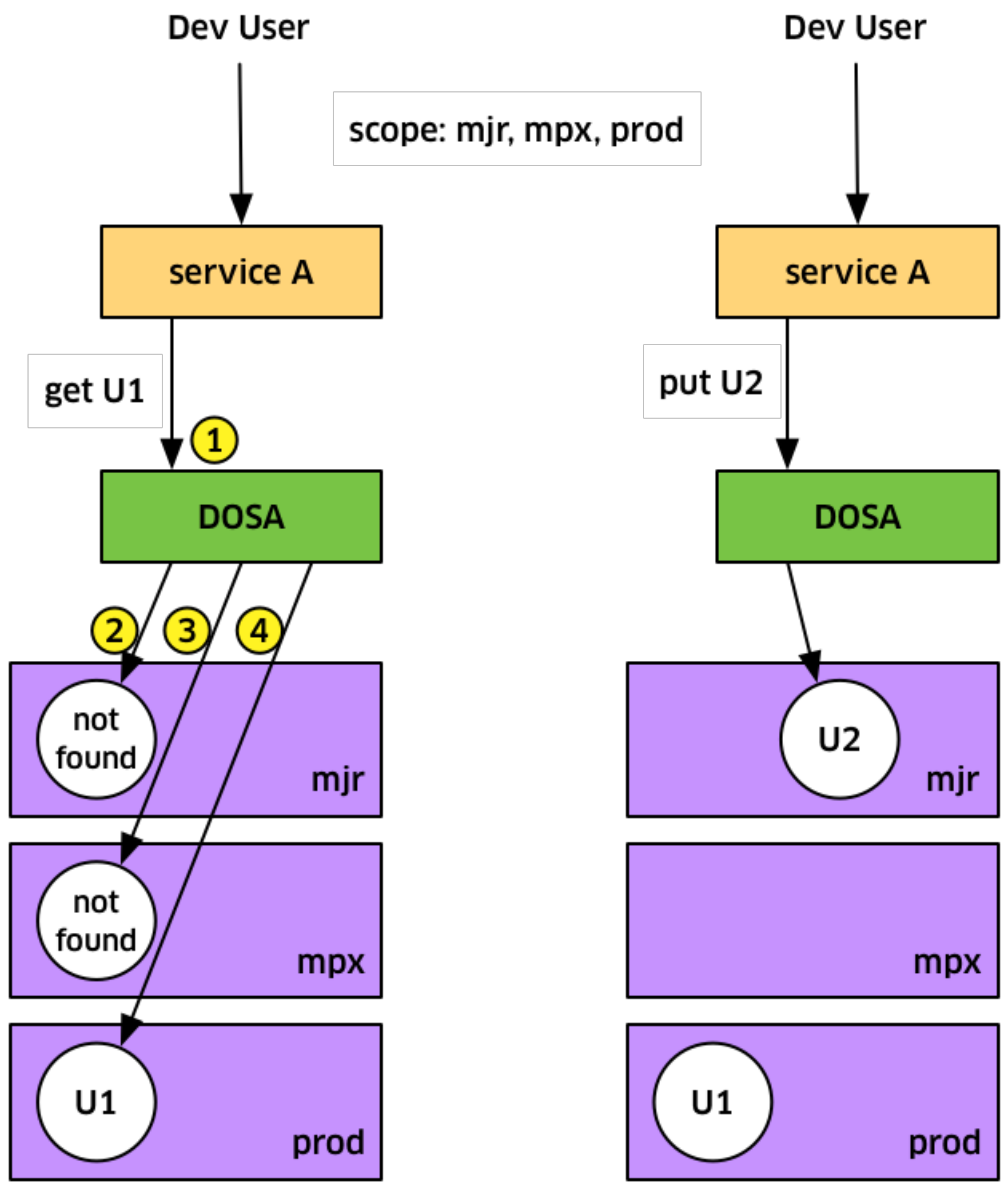
Fancy types are useful.

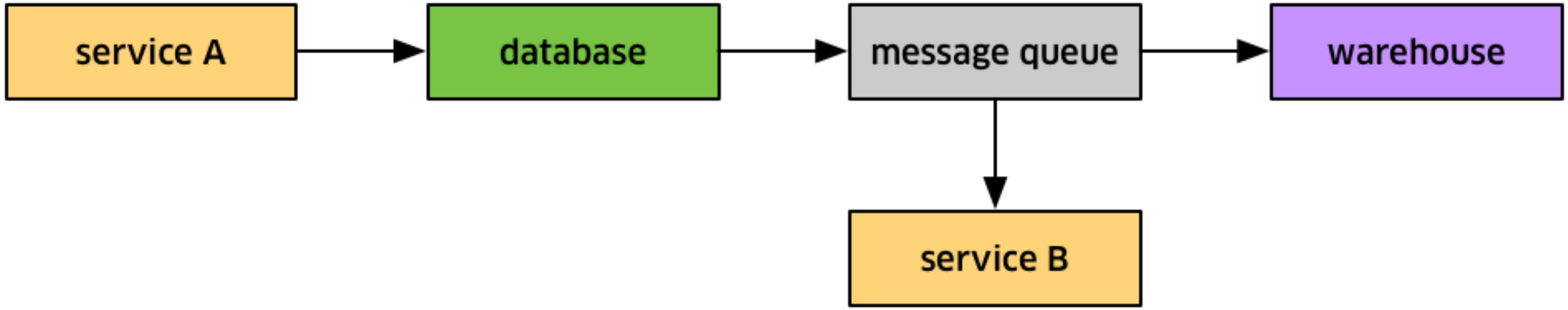
DOSA


Prod
service A
DOSA lib
RPC
DOSA Service
Schema Service
Cassandra DC Local Prod
Cassandra DC Local Dev
Cassandra DC Global Prod
Cassandra DC Global Dev

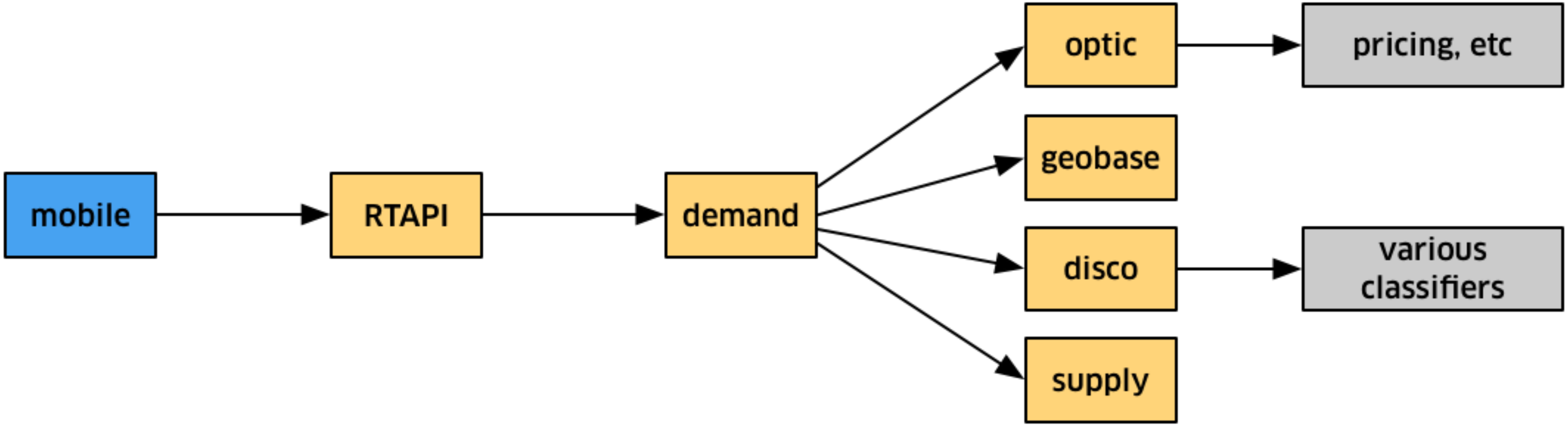

Dev
service A
DOSA lib
RPC over SSH
Prod
service A
DOSA lib
RPC
RPC Gateway
RPC + ctx
DOSA Service
Schema Service
Cassandra DC Local Prod
Cassandra DC Local Dev
Cassandra DC Global Prod
Cassandra DC Global Dev

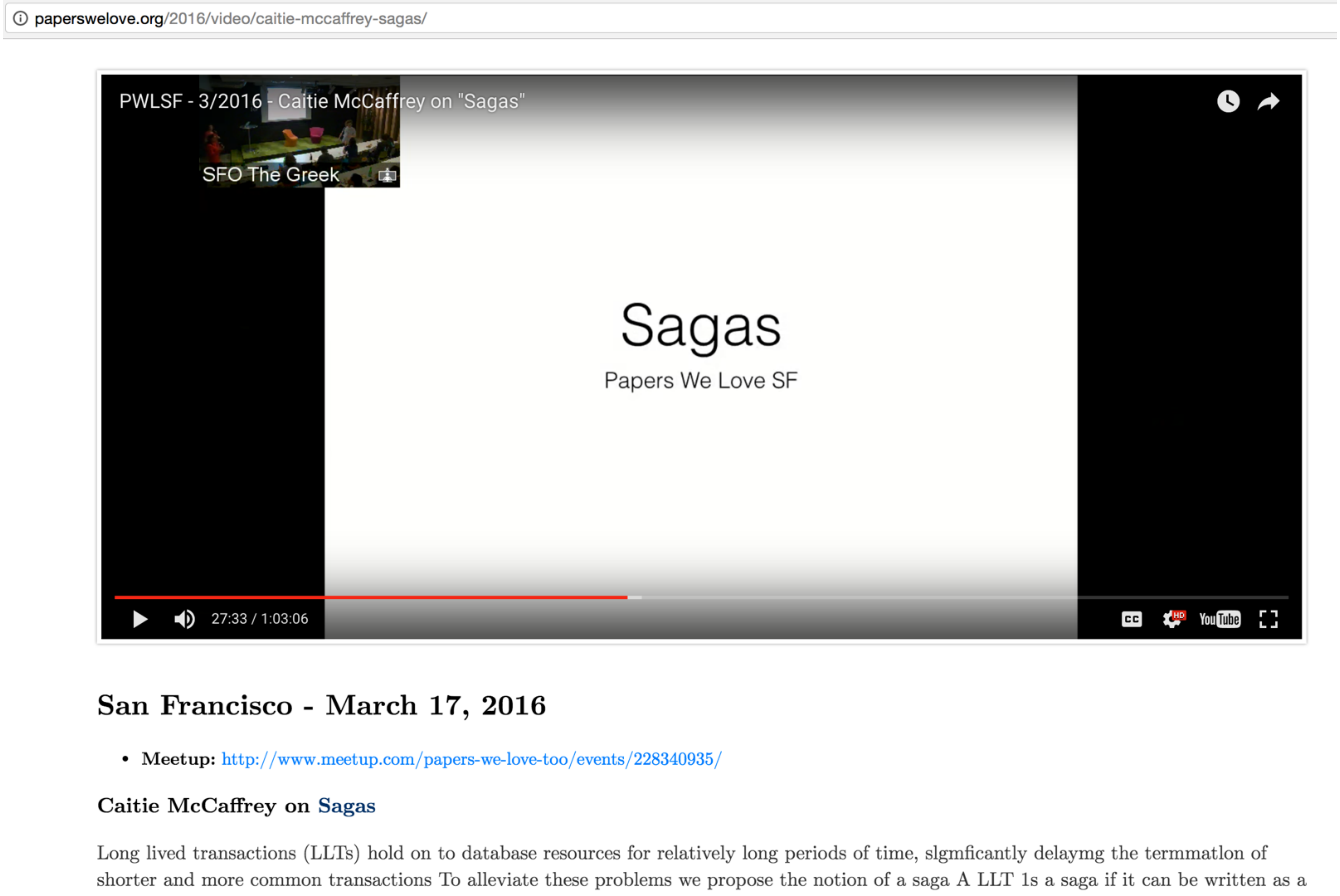

Dev User
Dev User
scope: mjr, prod
service A
service A
get U1
put U2
1
DOSA
DOSA
2
3
not found
mjr
U2
mjr
U1
prod
U1
prod


Dev User
Dev User
scope: mjr, mpx, prod
service A
service A
get U1
put U2
1
DOSA
DOSA
2
3
4
not found
mjr
U2
mjr
not found
mpx
mpx
U1
prod
U1
prod


service A
database
message queue
warehouse
service B

Composability


mobile
RTAPI
demand
optic
geobase
disco
supply
pricing, etc
various classifiers



paperswelove.org/2016/video/caitie-mccaffrey-sagas/

PWLSF - 3/2016 - Caitie McCaffrey on "Sagas"

SFO The Greek

Sagas

Papers We Love SF

27:33 / 1:03:06

San Francisco - March 17, 2016

- **Meetup:** http://www.meetup.com/papers-we-love-too/events/228340935/

Caitie McCaffrey on Sagas

Long lived transactions (LLTs) hold on to database resources for relatively long periods of time, slgmficantly delaymg the termmatlon of shorter and more common transactions To alleviate these problems we propose the notion of a saga A LLT 1s a saga if it can be written as a

RPC

https://christophermeiklejohn.com/pl/2016/04/12/rpc.html

Christopher Meiklejohn home lasp research courses publications videos code curriculum vitae

Remote Procedure Call

12 Apr 2016

This is one post in a series about programming models and languages for distributed computing that I'm writing as part of my history of distributed programming techniques.

Relevant Reading

- *A Critique of the Remote Procedure Call Paradigm*, Tanenbaum and van Renesse, 1987 *[Tanenbaum and Renesse (1987)]*.
- *A Note On Distributed Computing*, Kendall, Waldo, Wollrath, Wyant, 1994 *[Kendall et al. (1994)]*.
- *It's Just A Mapping Problem*, Vinoski, 2003 *[Vinoski (2003)]*.
- *Convenience Over Correctness*, Vinoski, 2008 *[Vinoski (2008)]*.

Commentary

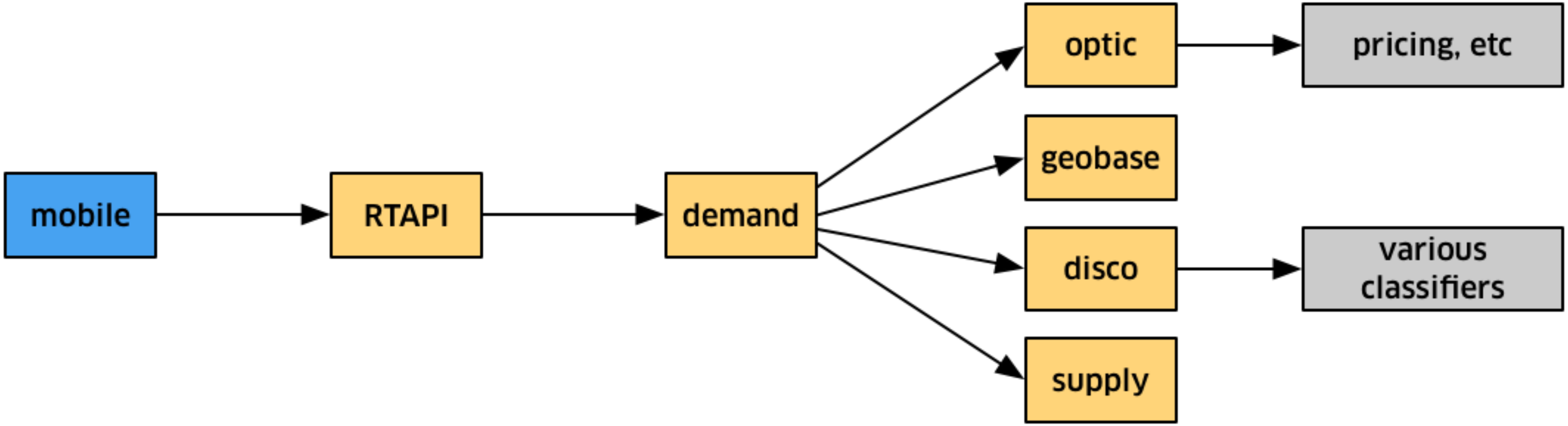
> "Does developer convenience really trump correctness, scalability, performance, separation of concerns, extensibility, and accidental complexity?" *[Vinoski (2008)]*

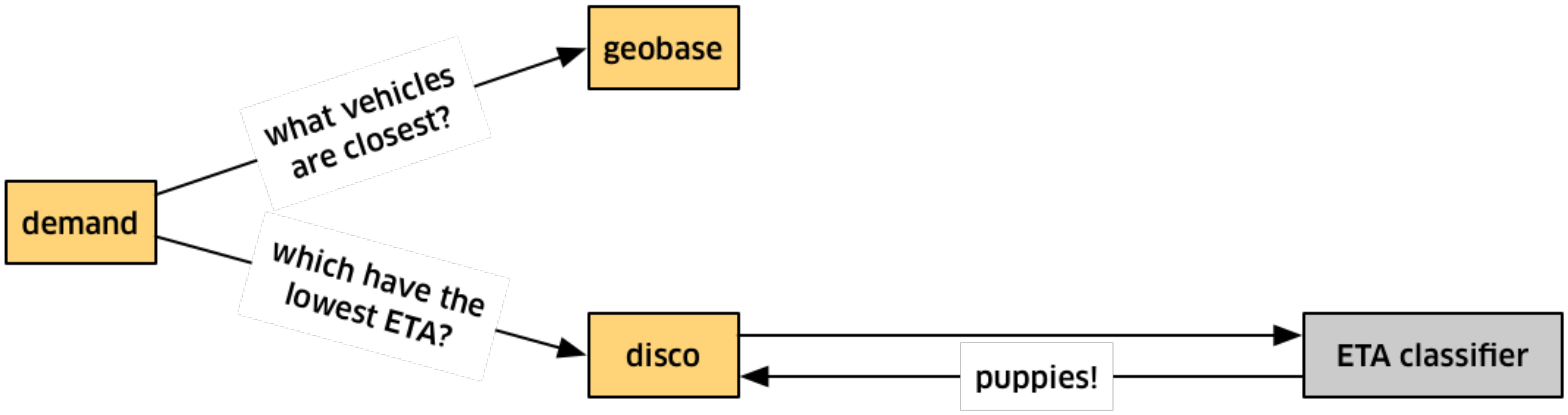
Timeline

- 1974: RFC 674,
  "Procedure Call Protocol Documents, Version 2"
  RFC 674 attempts to define a general way to share resources across **all 70 nodes** of the Internet. This work is performed at Bolt, Beranek and Newman (BBN Technologies).[1]

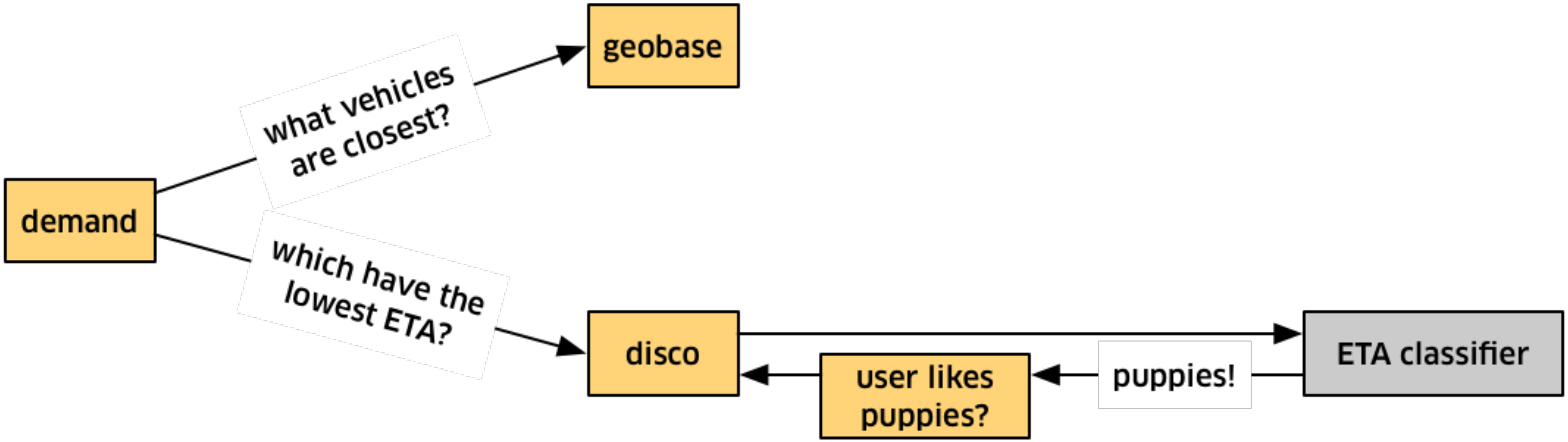
Asynchronous message passing FTW

“Does developer convenience really trump correctness, scalability, performance, separation of concerns, extensibility, and accidental complexity?” [Vinoski (2008)]


mobile
RTAPI
demand
optic
geobase
disco
supply
pricing, etc
various classifiers



demand
what vehicles are closest?
geobase
which have the lowest ETA?
disco
ETA classifier
puppies!


geobase
what vehicles are closest?
demand
which have the lowest ETA?
disco
ETA classifier
user likes puppies?
puppies!

Composable event processors

Workflow? Serverless?

Why are we here?

Let’s make the tools for building big be better than the tools for starting small.

“Does developer convenience really trump correctness, scalability, performance, separation of concerns, extensibility, and accidental complexity?” [Vinoski (2008)]

Composability

THANKS