How Spotify Migrated HTTP Ingress Systems to Envoy

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About us

- ❏ software engineers in **ATC** squad (**A**ir **T**raffic **C**ontrol)
- ❏ owners of Spotify's perimeter
- ❏ "ops in teams"

Agenda

- ❏ how we migrated a part of Spotify's perimeter to Envoy
- ❏ future of Spotify's perimeter
- ❏ key takeaways from migration


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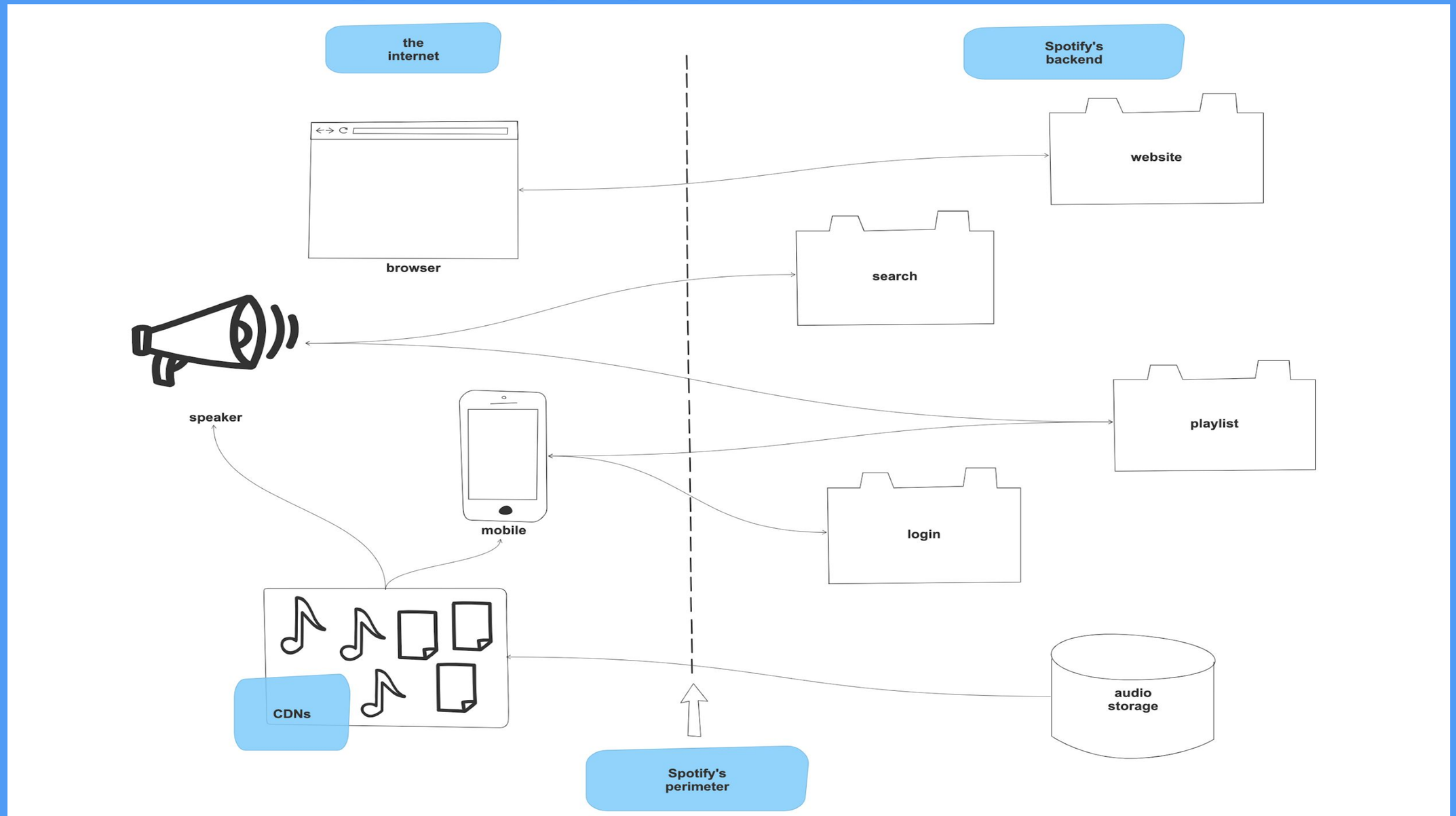
Miss You
Best Friend
1:57
4:27
09:41
9:41 AM
100%
Foster The People
FOLLOWING
1 079 908 FOLLOWERS
SHUFFLE PLAY
POPULAR
1 Pumped up Kicks
92 077 824
2 Helena Beat
34 493 970
Best Friend
Foster The People
PLAYING FROM ARTIST
Calvin Harris
CALVIN
HARRIS
BLAME
FEAT. JOHN NEWMAN
Blame
Calvin Harris
0:54
3:34

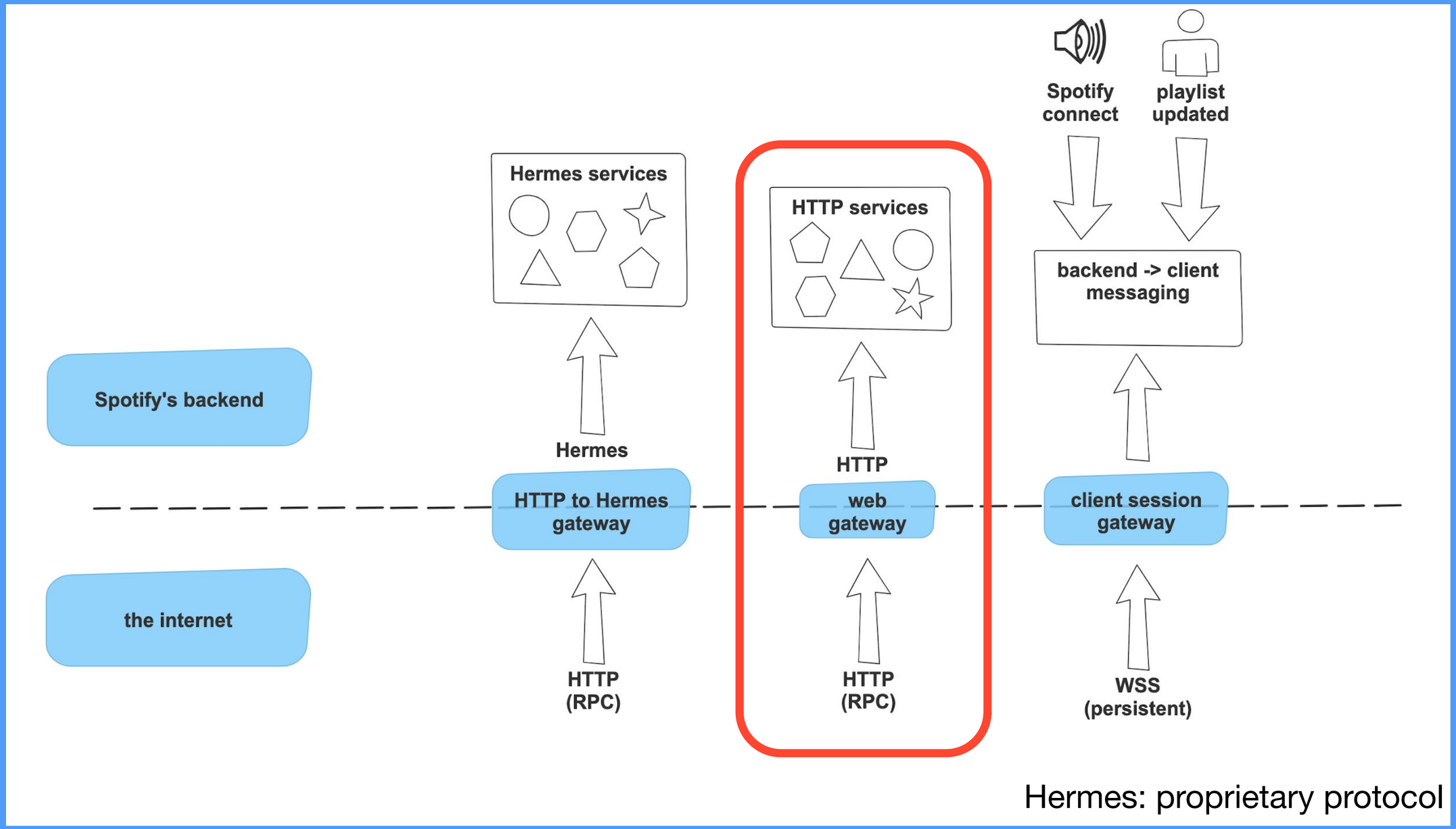
About Spotify

- 248M MAUs
- 79 markets
- 8M+ RPS
- 1500+ engineers, 280+ squads
- 1200+ microservices in production

About Spotify (cont.)

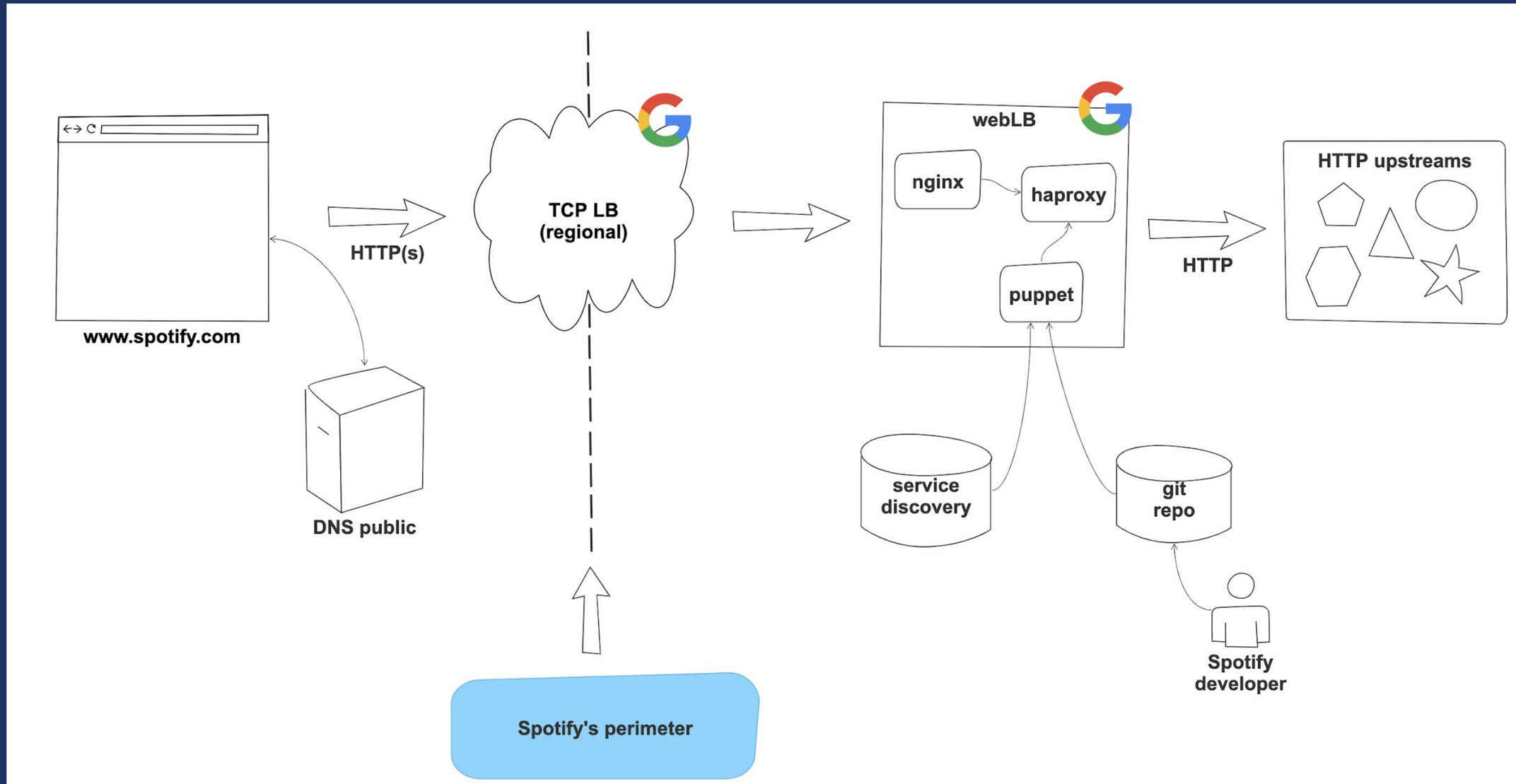


Spotify's perimeter



Hermes: proprietary protocol

Old web gateway: impl

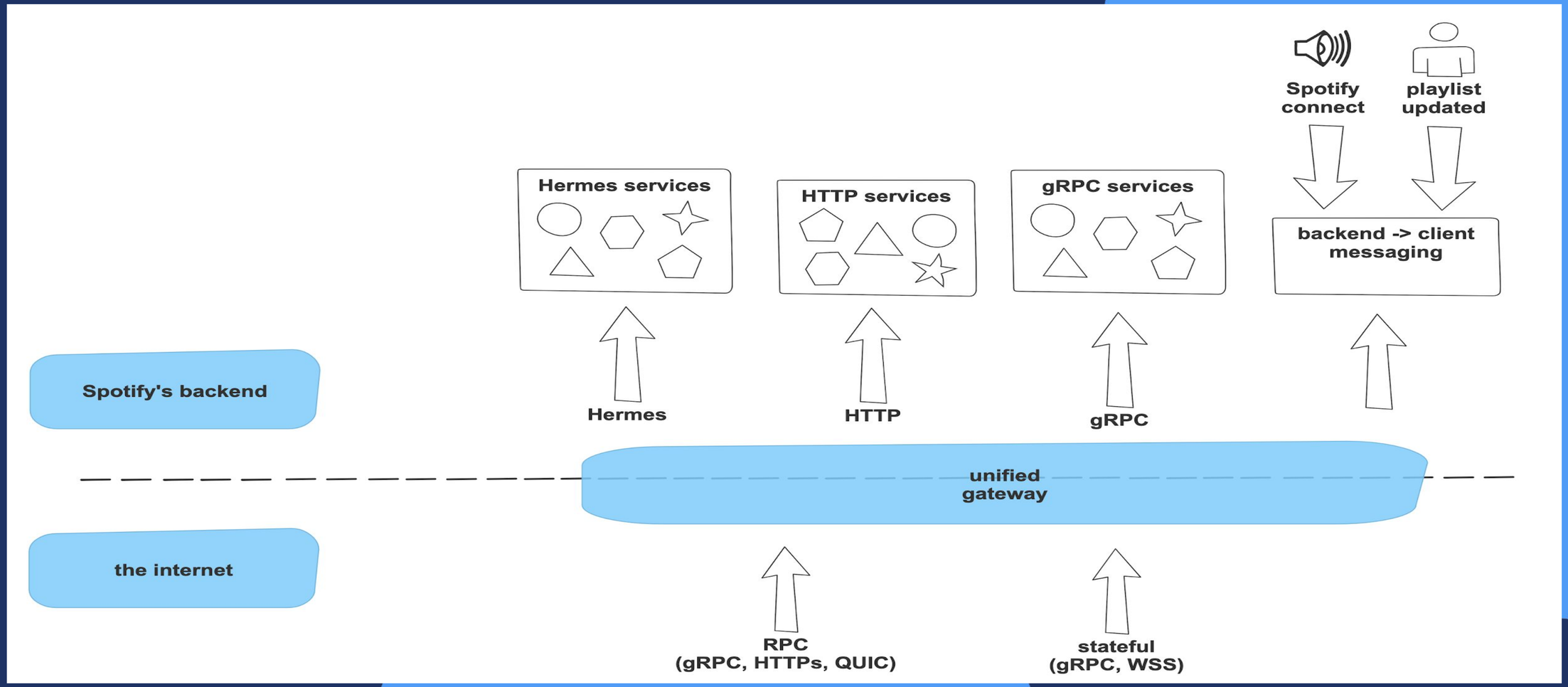


Old web gateway - limitations

- ❏ underinvested
- ❏ service discovery headaches
- ❏ high operational cost

Why migrate?

- ❏ unified perimeter
- ❏ avoid fragmentation or duplication of features

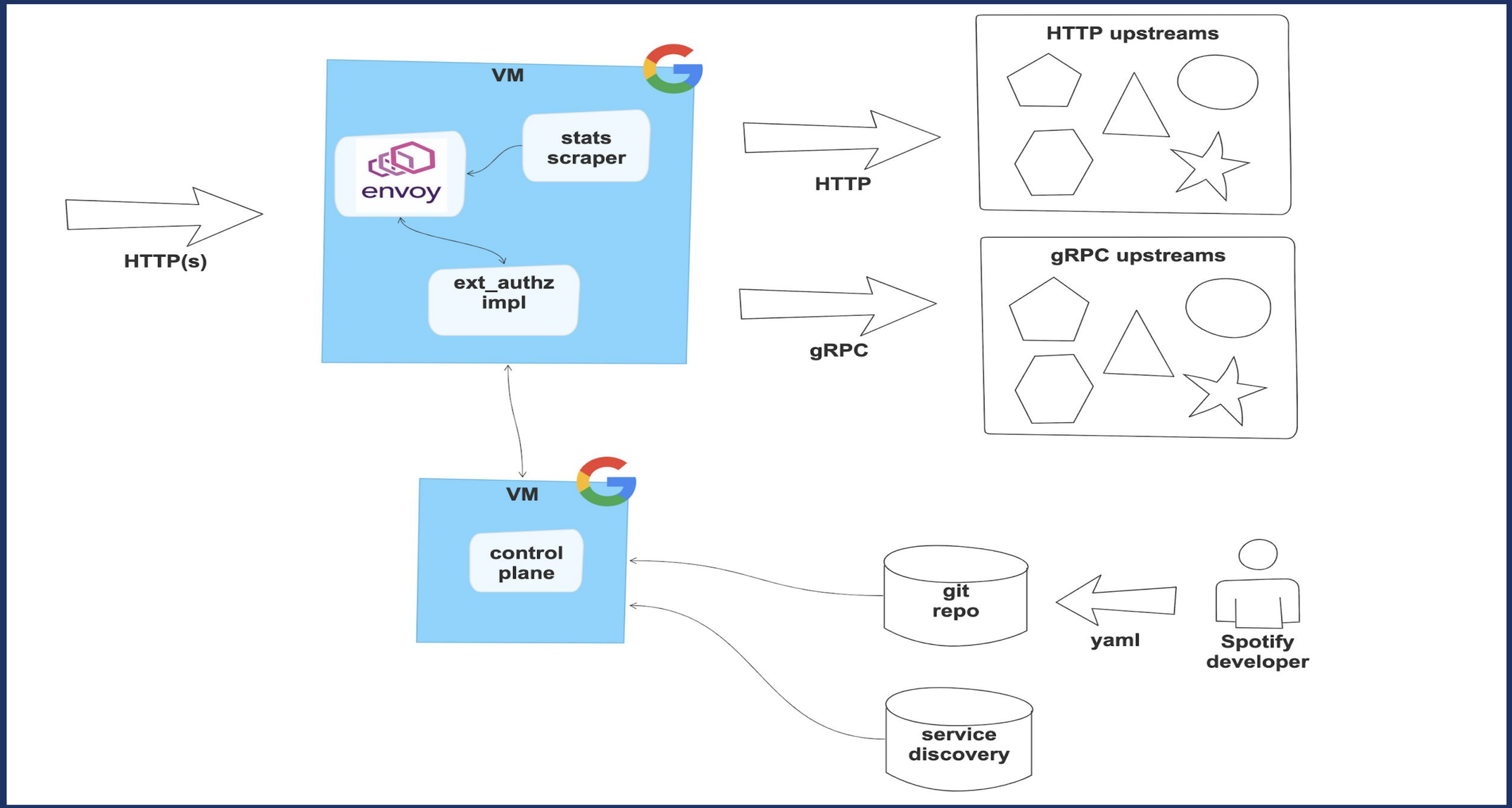


Why Envoy?

- ❏ cloud native perimeter
- ❏ xDS
- ❏ vibrant contributor community

Spotify®

Enter Edge


HTTP upstreams
VM
stats scraper
envoy
HTTP
HTTP(s)
ext_authz impl
gRPC upstreams
gRPC
VM
control plane
git repo
yaml
Spotify developer
service discovery

The migration - requirements

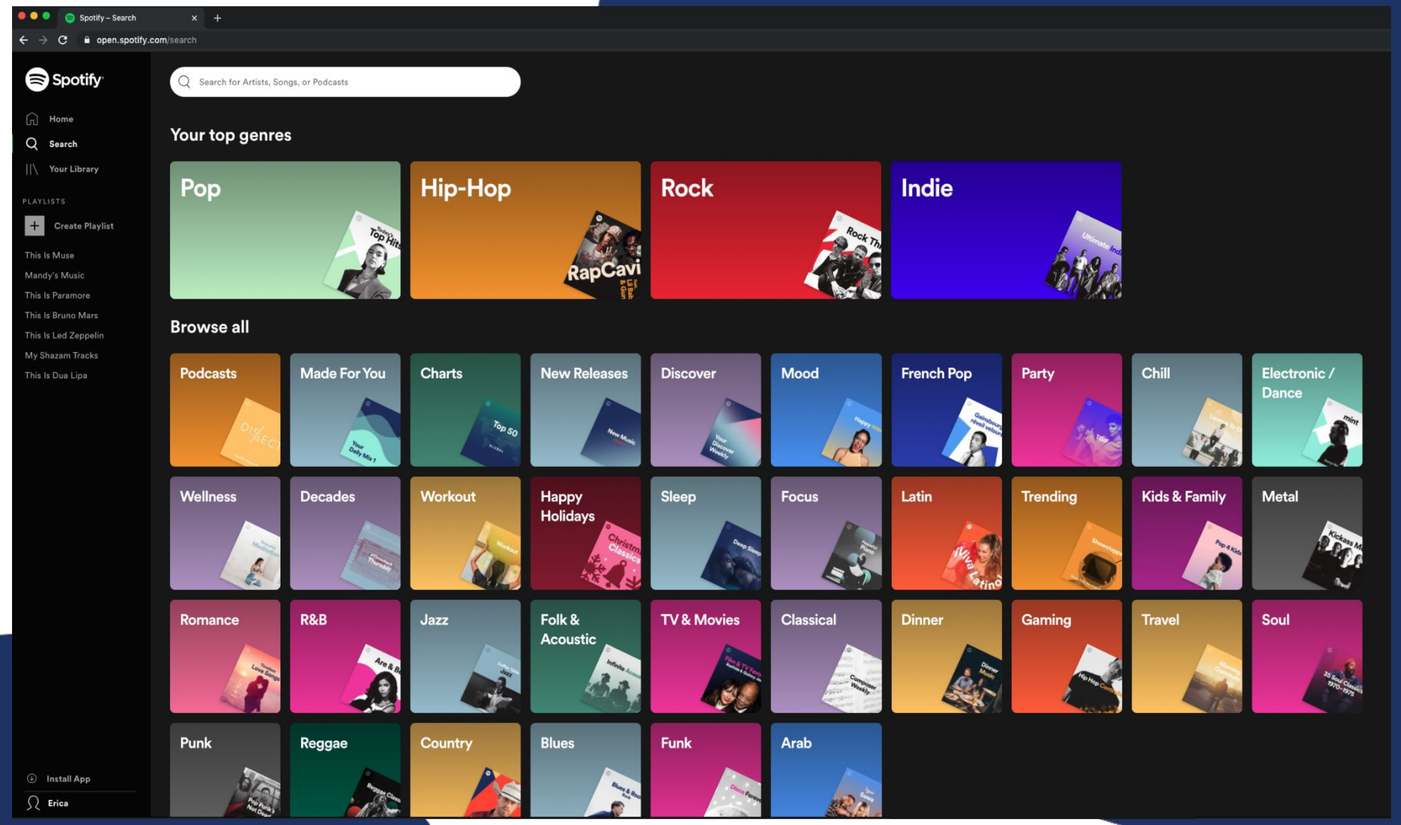
1. transparent to owners of upstreams
2. transparent to end users of upstreams
3. gradual
4. quick fallback

The migration - stage 1

- ❏ non-critical service that we own
- ❏ optimize for speed over safety
- ❏ global DNS change (#yolo)

The migration - stage 2

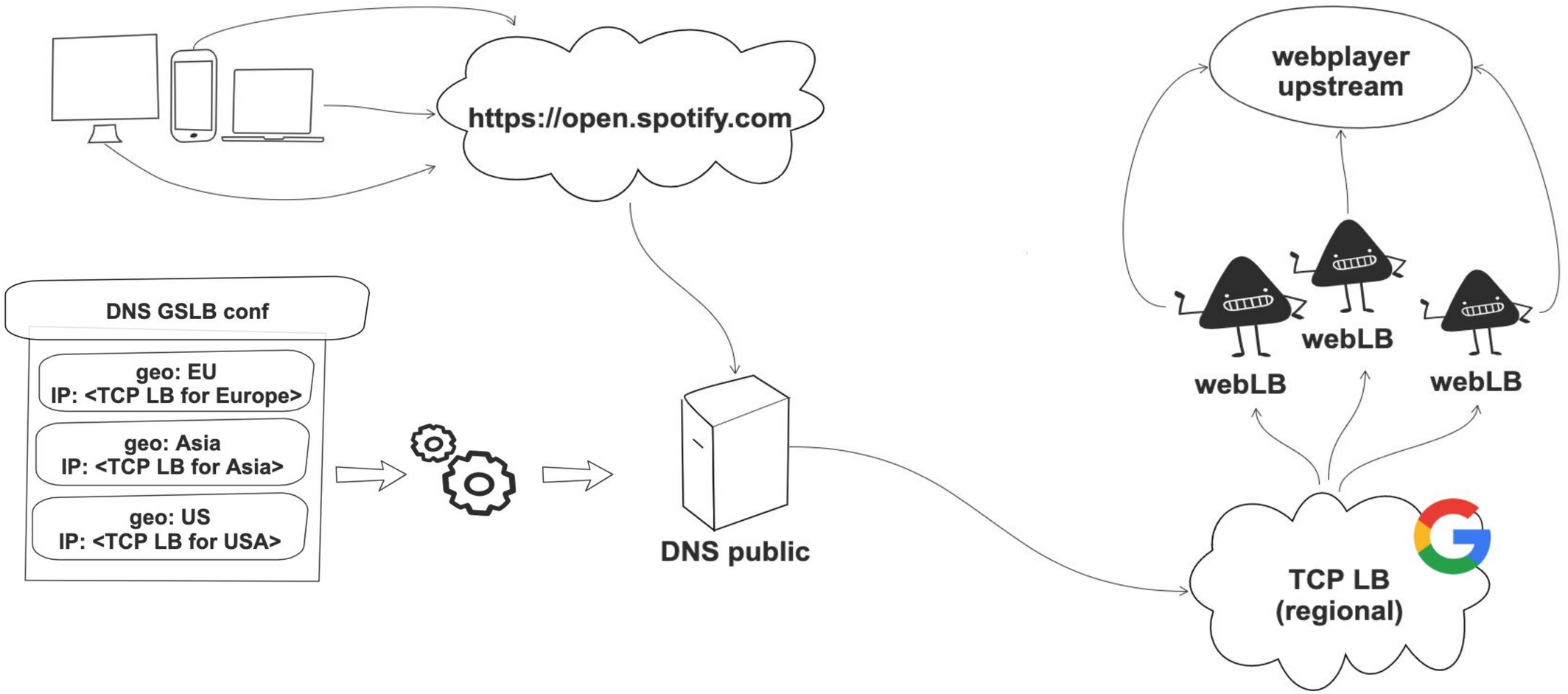
- ❏ critical service, owned by another team
- ❏ optimize for safety



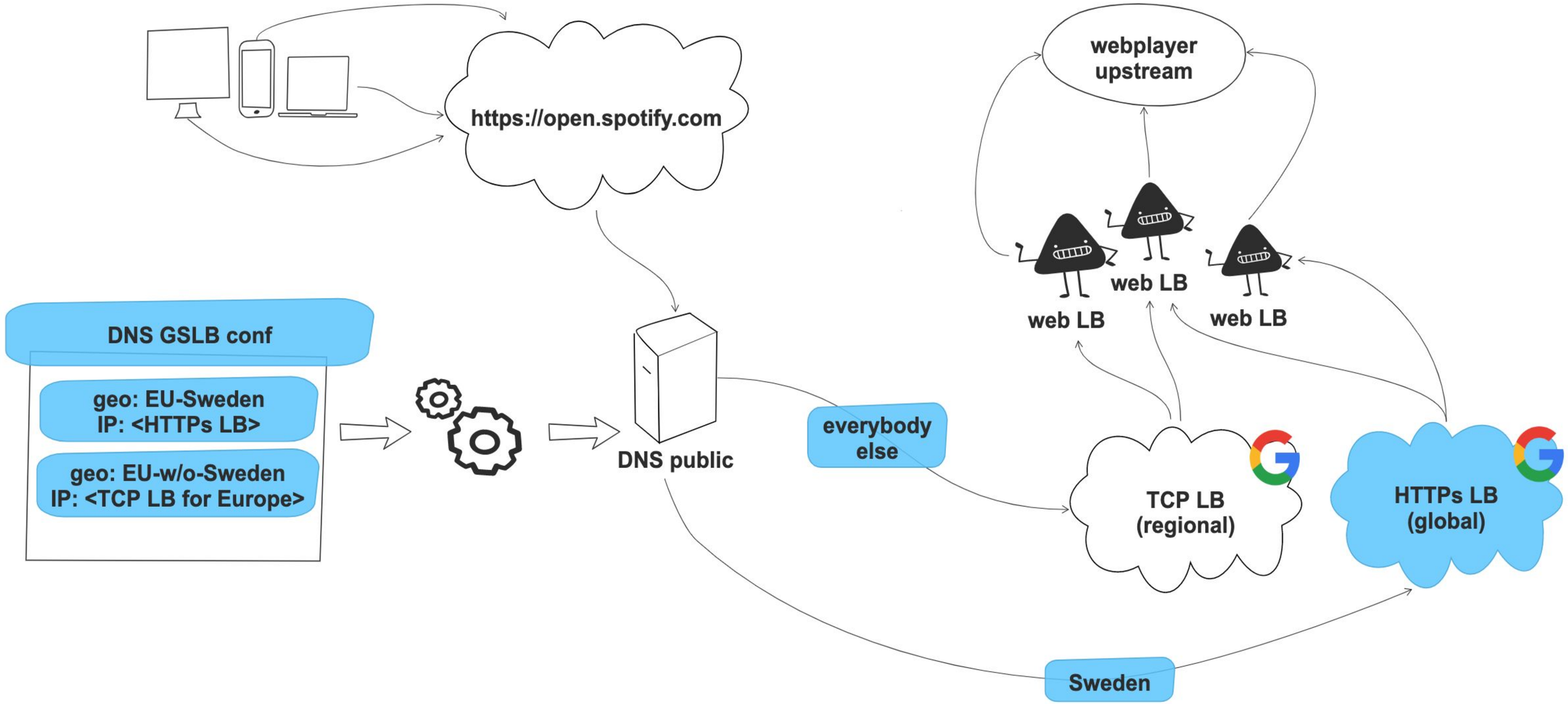
Stage 2 - strategy

1. shift some traffic to Edge
2. monitor, react
3. repeat, until all traffic is shifted to Edge

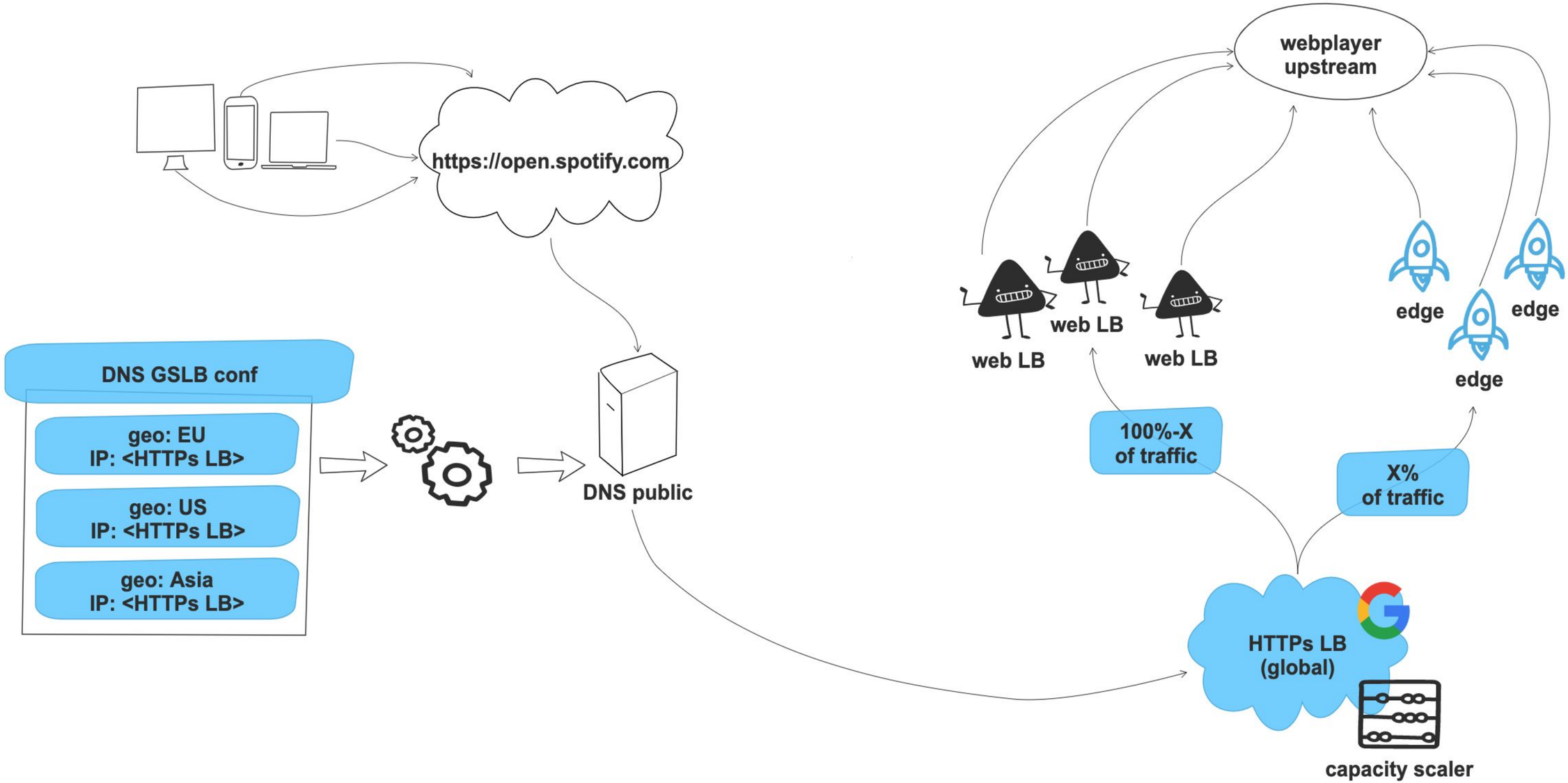
webplayer - before Edge



webplayer on Edge - swap LBs



webplayer on Edge - ramp up traffic



The migration - stage 3

- ❏ 130+ remaining HTTP upstreams
- ❏ reduce migration surface
- ❏ add missing config params to Edge
- ❏ script away!

What went well

- ❏ “panic button” indispensable
- ❏ coordination and communication, trust was built
- ❏ in time for Spotify hack week!
- ❏ contributing back PRs! #1 #2

Learnings and failures

- ❏ zero downtime: not quite
- ❏ grasping the failure modes
- ❏ software entropy
- ❏ state drift

Future plans - short term

- ❑ support for more auth schemes
- ❑ rate limiting
- ❑ automated mitigation against bad deploys

Future plans - long term

- ❑ Move all traffic behind edge
- ❑ remove header decoration from ext_authz service
- ❑ declarative infrastructure
- ❑ leverage K8s

Key takeaways

1. design for failure
2. try, fail, adjust, repeat
3. if possible, reduce migration surface
4. you can do it!

Thanks for listening!

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