Have you tried turning it off and turning it on again?

Tanya Reilly
(@whereistanya)

Where are you in the stack?

Frontend!

CMS

Backend!

MY SKILLZ RESUME

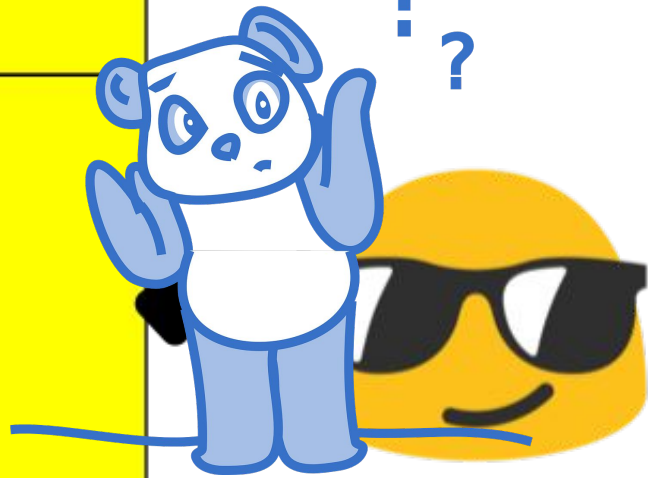
Where are you in the stack?

Frontend!

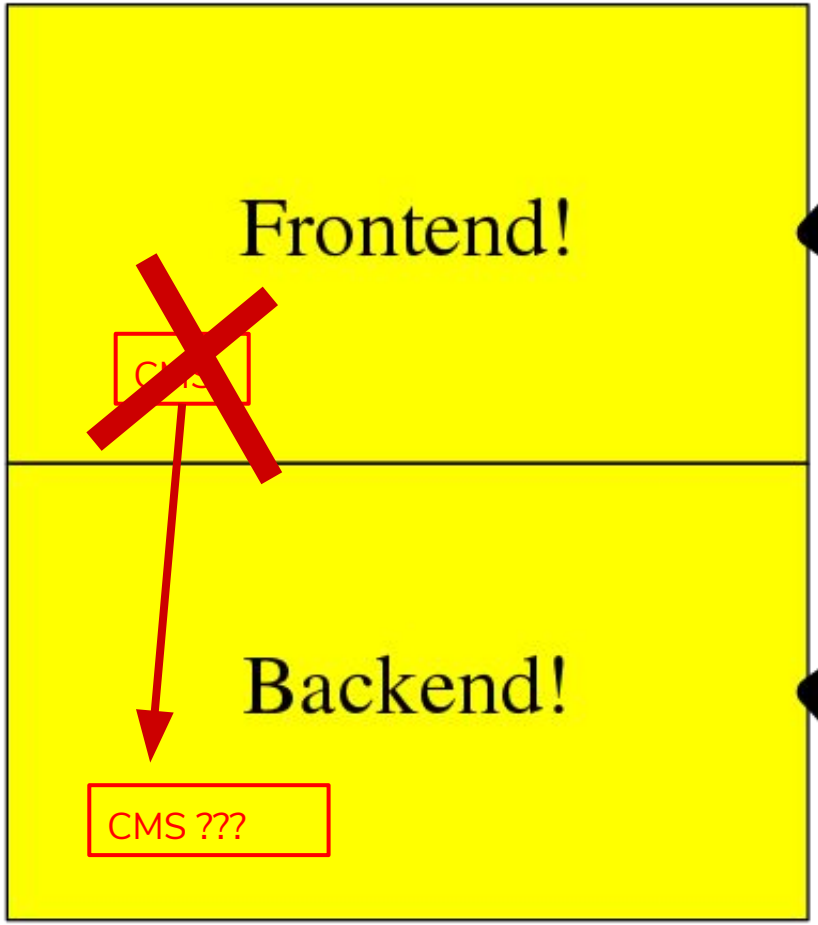
CMS

Backend!

MY SKILLZ RESUME

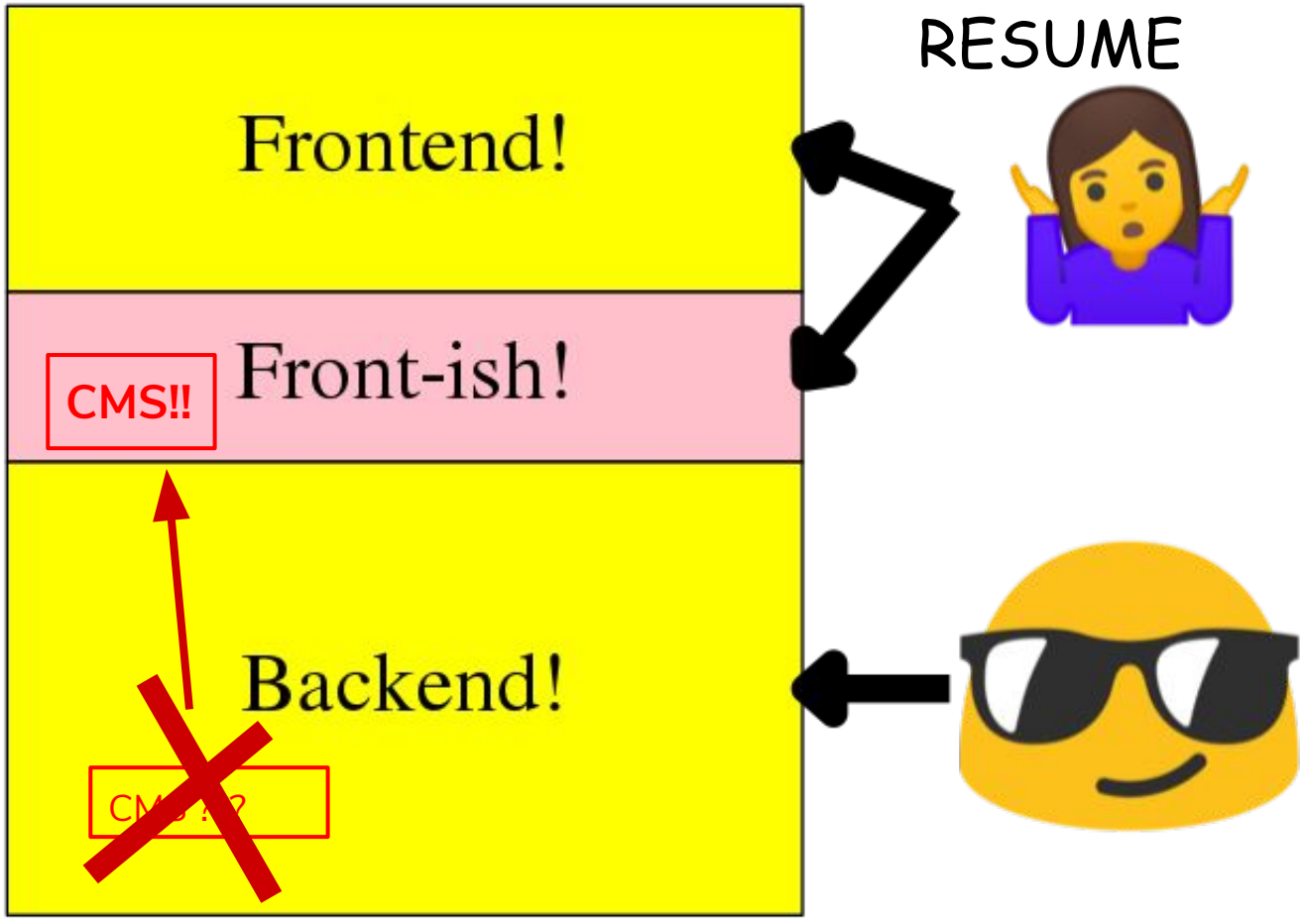


Where are you in the stack?



MY SKILLZ RESUME

Where are you in the stack?



What is it?

Abstractions let us specialise

¯_(ツ)_/¯
Unknowable frontend user things

My users
The ones I know about, anyway

My stuff
The center of the universe!

My dependencies
The ones I know about, anyway

¯_(ツ)_/¯
Unknowable backend infrastructure things

Zeynep Tufekci
@zeynep

Follow

"Huddle around the fire, children. I'll tell you how inter-dependencies in complex coupled systems took it all down. Eat your cockroaches!"

RETWEETS 55 LIKES 101

2:50 PM - 2 Mar 2017

4 55 101

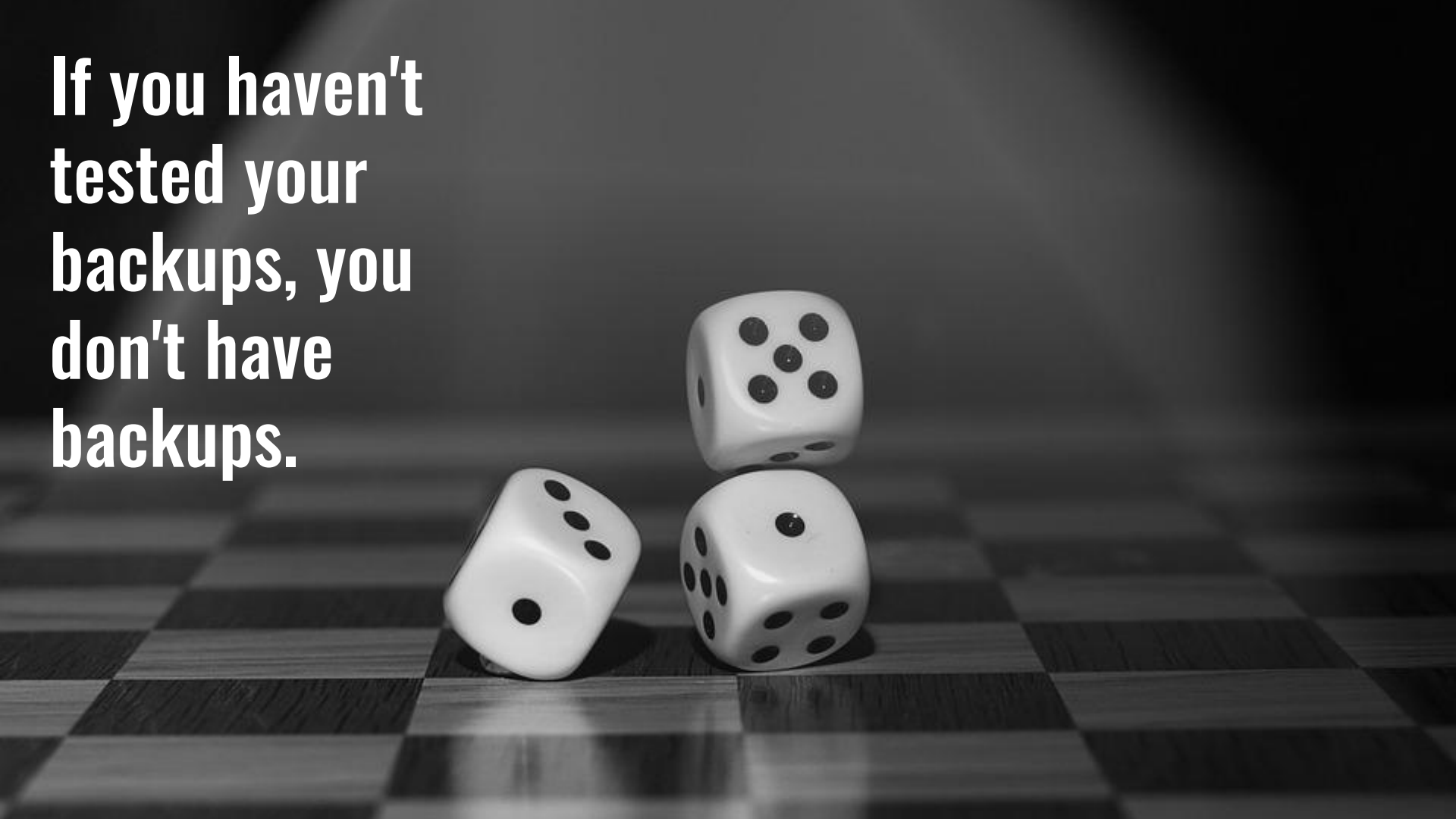
- fallback plans
- dependencies
- what can we do?

Fallback plans

Of course! I copied it to /tmp/ database.bak

backups

Backup, Backup Backup and Test Restores, T-Town Photo Booth CC BY 2.0


If you haven't tested your backups, you don't have backups.

Take two, they're small

the identical(ish!) failover site

1. Is it real?

2. Is it up to date?

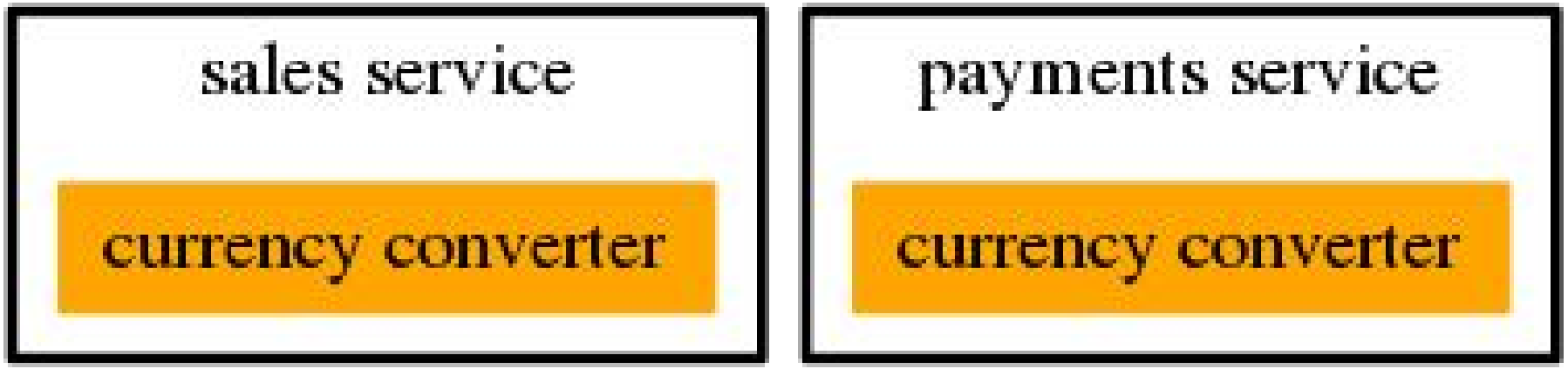
3. Is the idea of actually using it kind of terrifying?

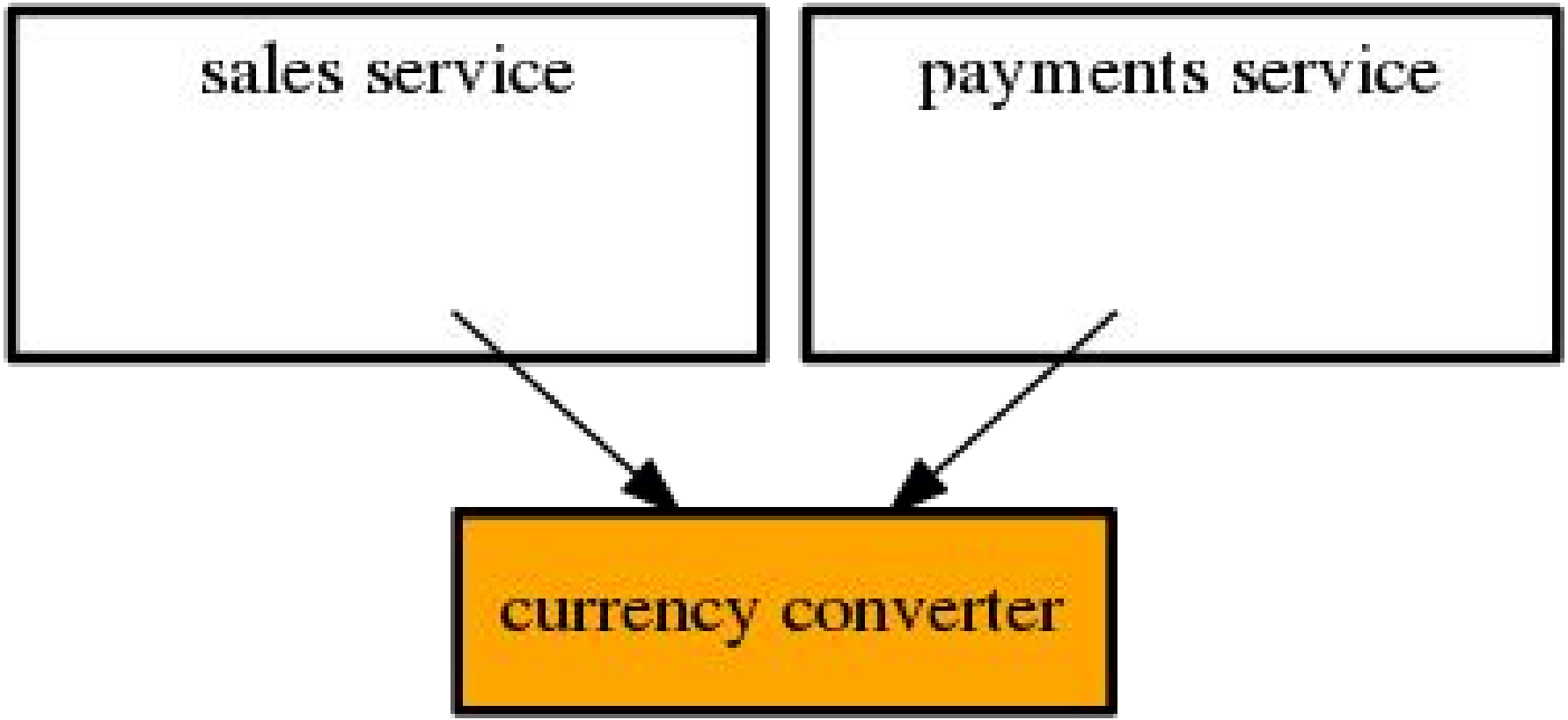
FreeImages.com/barun patro

Two sites? I've forgotten how to count that low

replicated everything

- fallback plans
- dependencies
- what can we do?


sales service
currency converter
payments service
currency converter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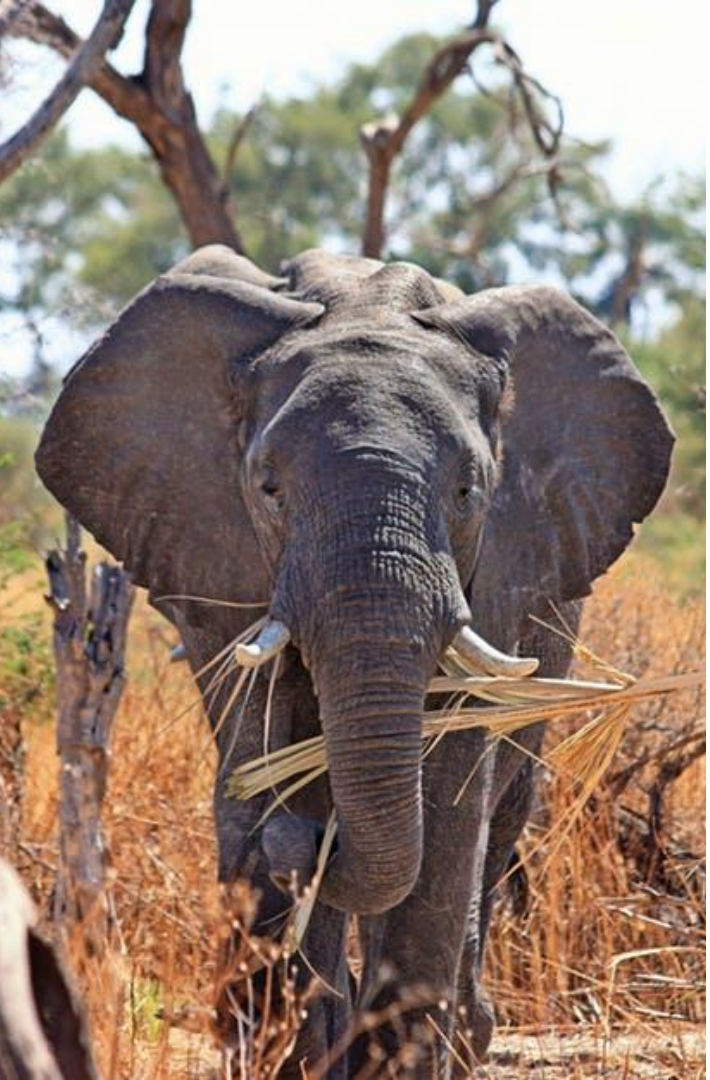
Unknowable backend infrastructure things

Jenga Tower of 50 blocks, Johannes Bader CC BY 2.0



Everybody's backend is someone else's frontend

“

"A service cannot be more available than the intersection of all its critical dependencies."

-- "The Calculus of Service Availability"
Ben Treynor, Mike Dahlin, Vivek Rau, Betsy Beyer

Your stack... is really more of a "pile", isn't it?

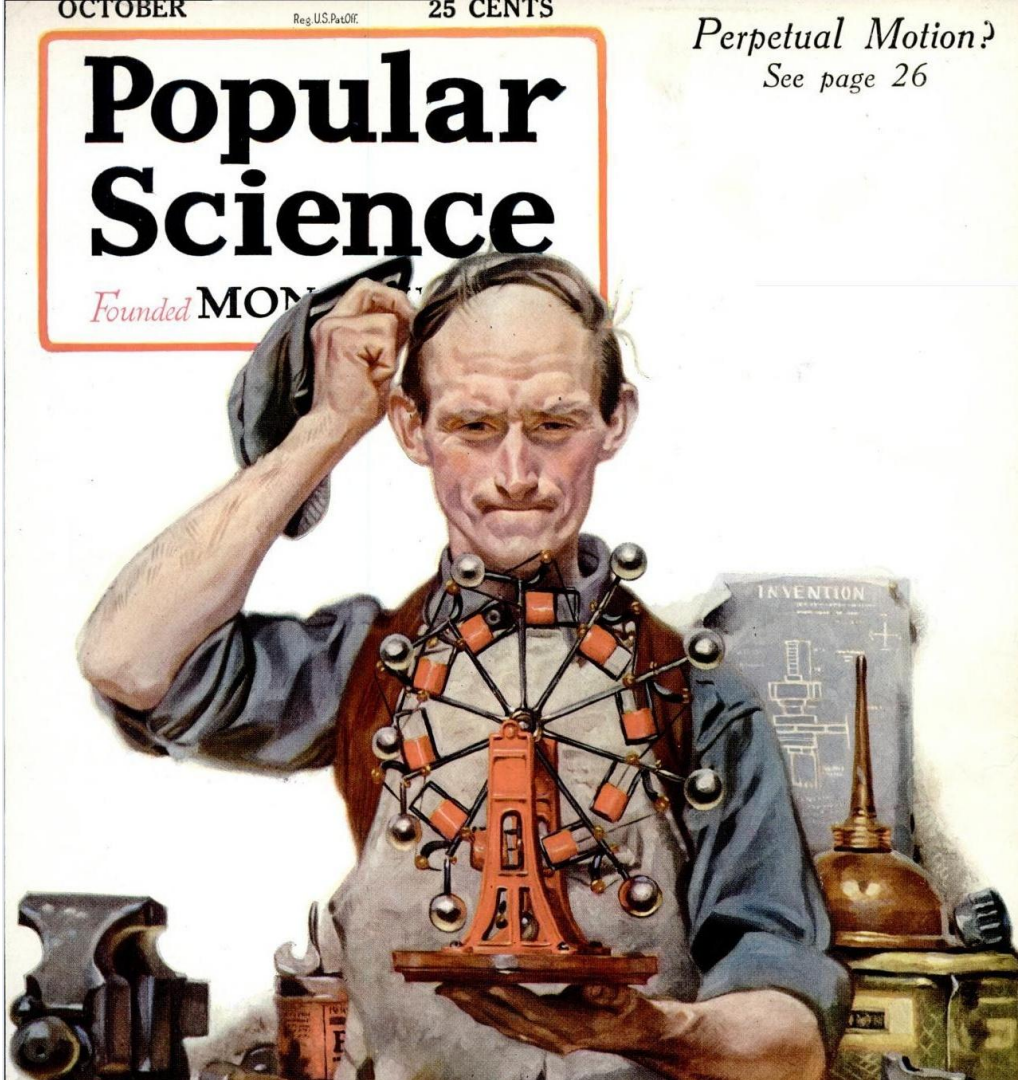
dependency cycles

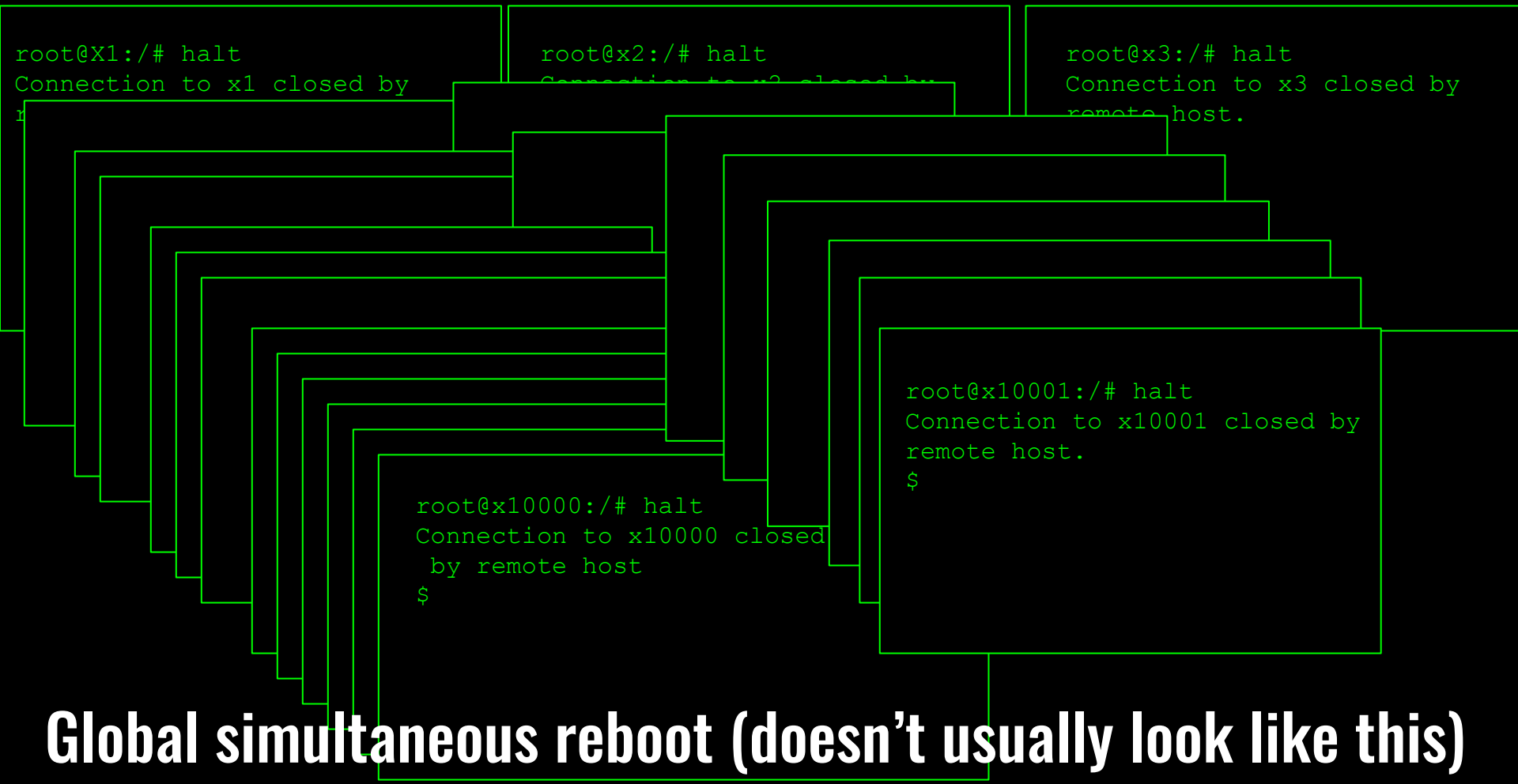
uh...

control plane cycles

Why would we ever restart it?

machines that run forever (until they don't)

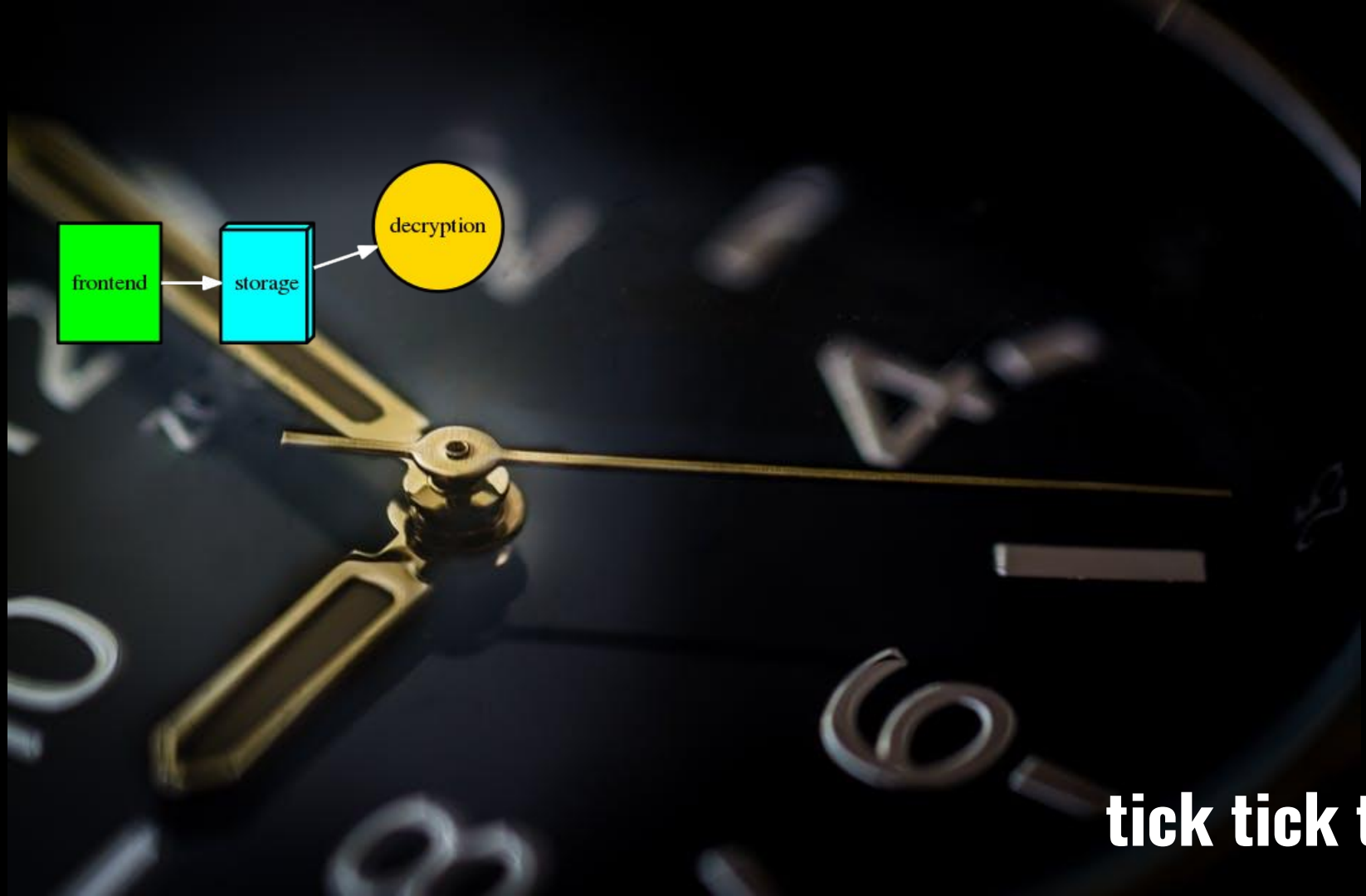




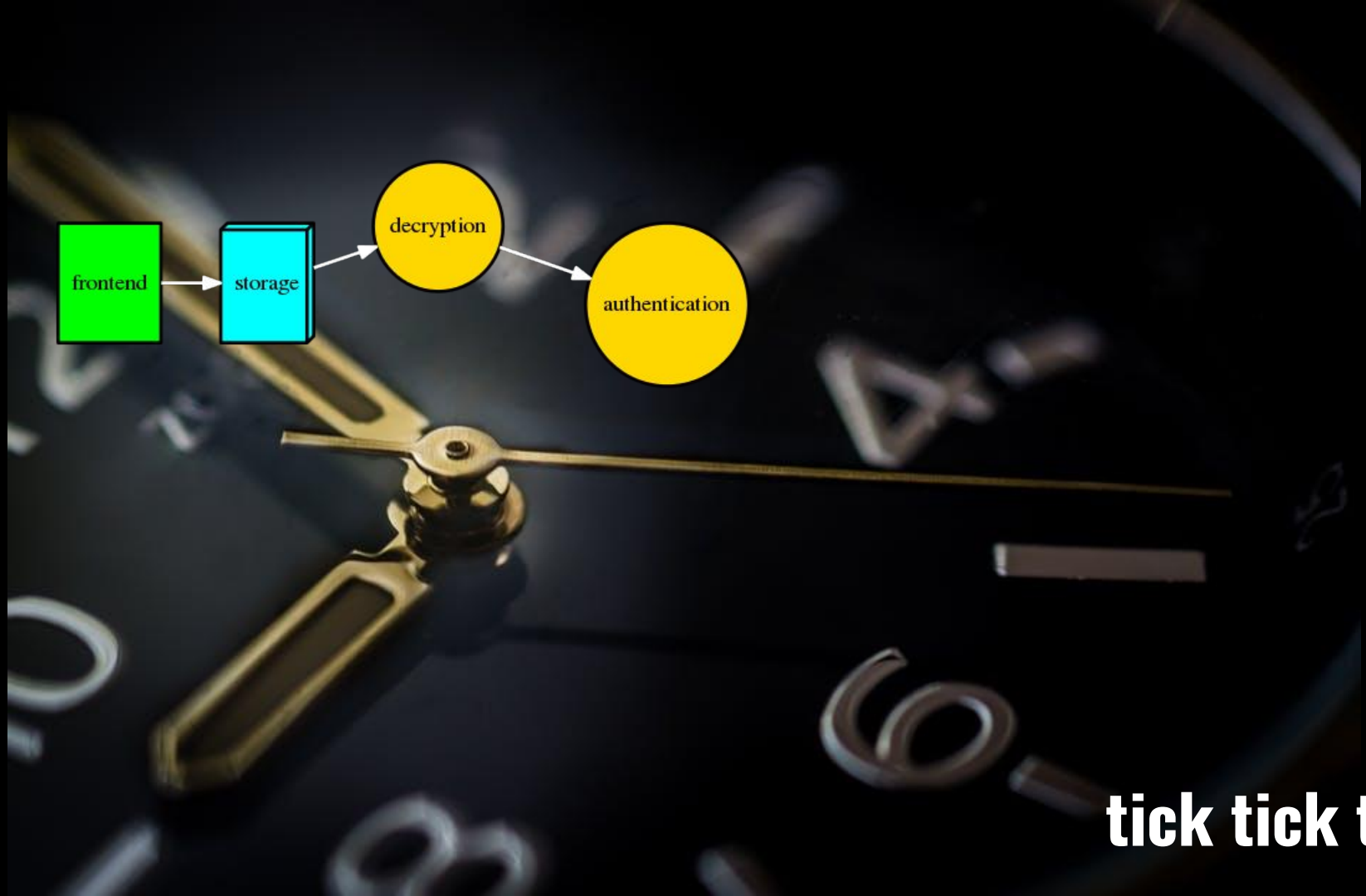
Global simultaneous reboot (doesn't usually look like this)


tick tick tick...

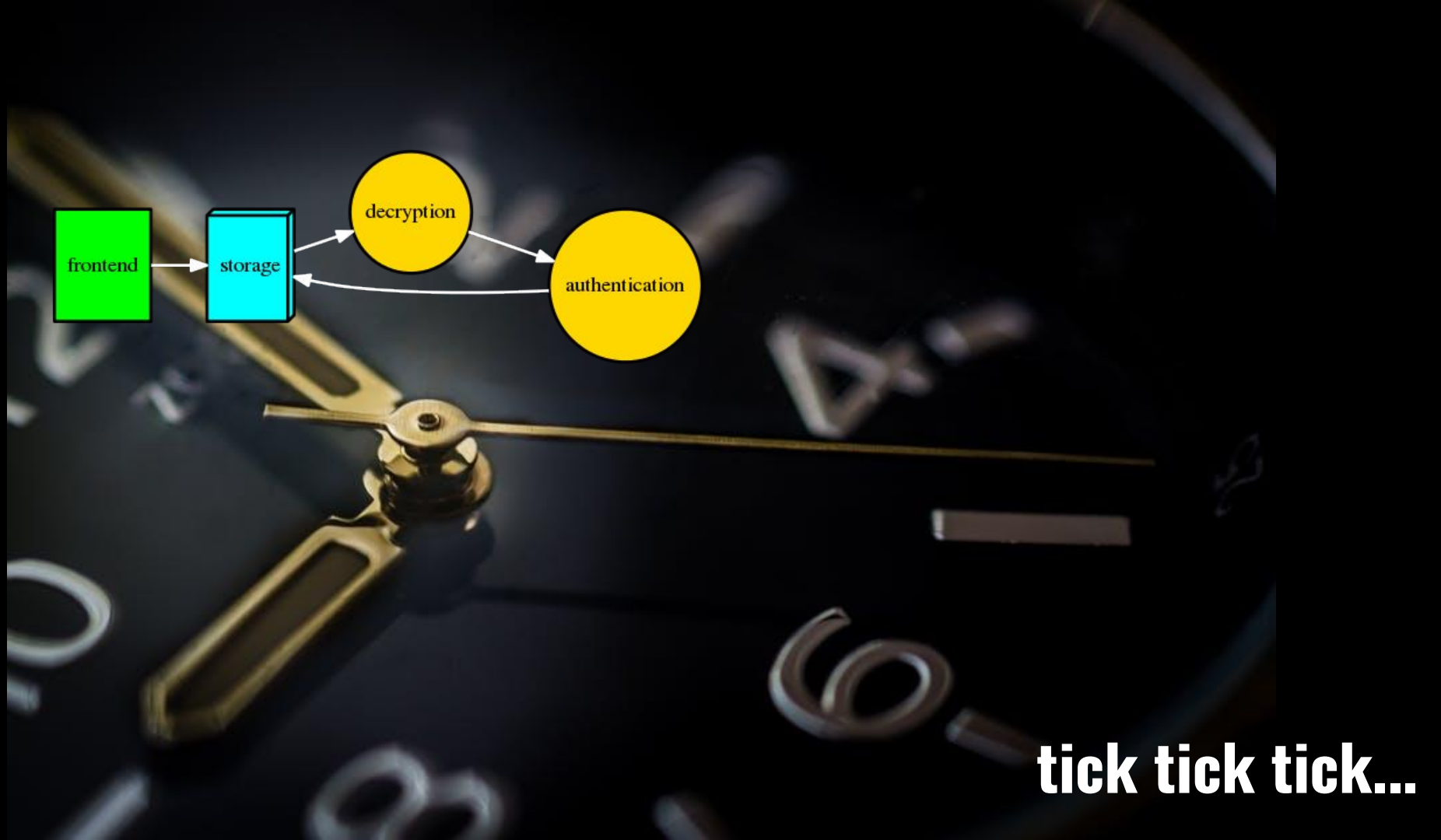
tick tick tick...

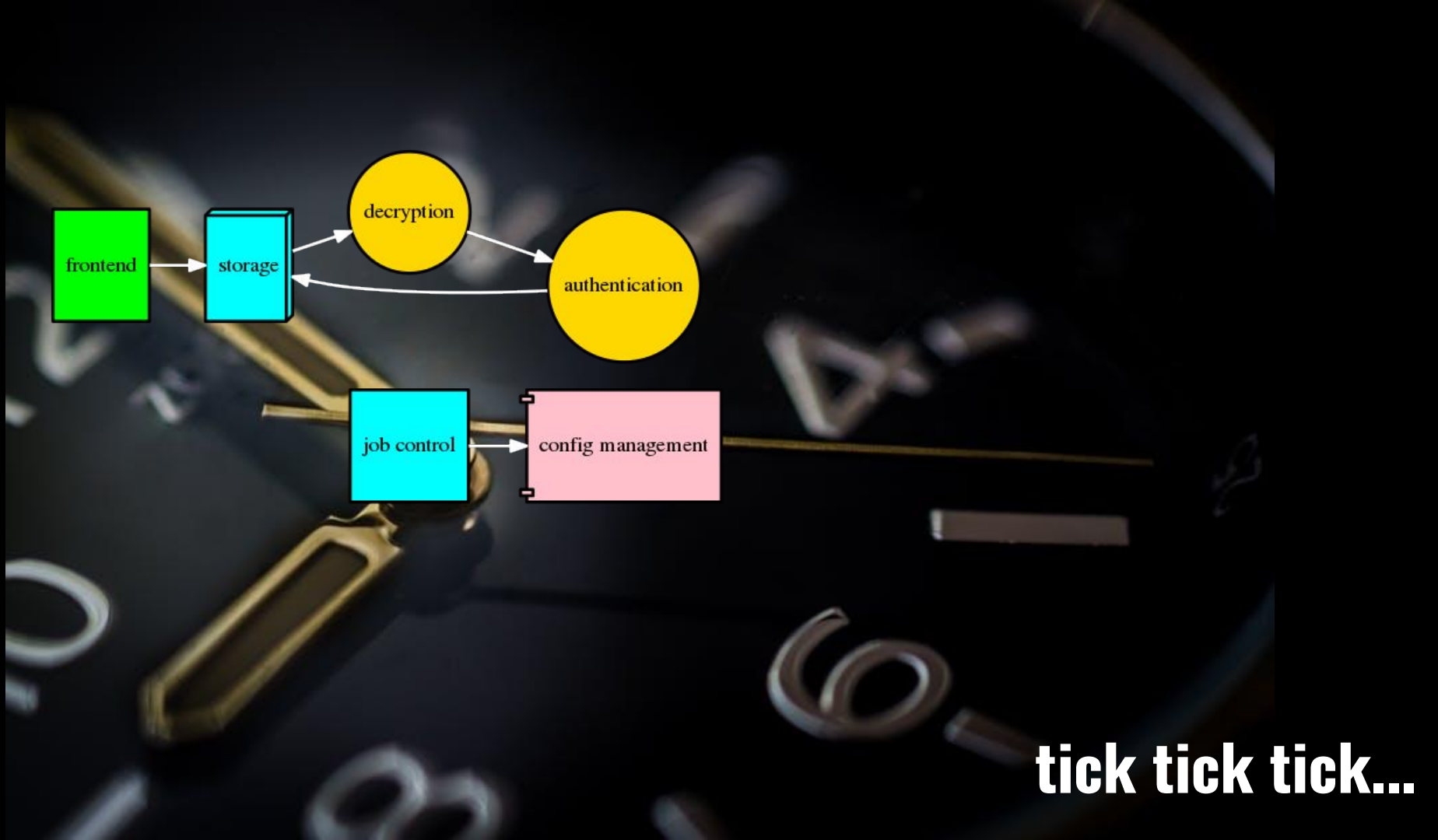


tick tick tick...

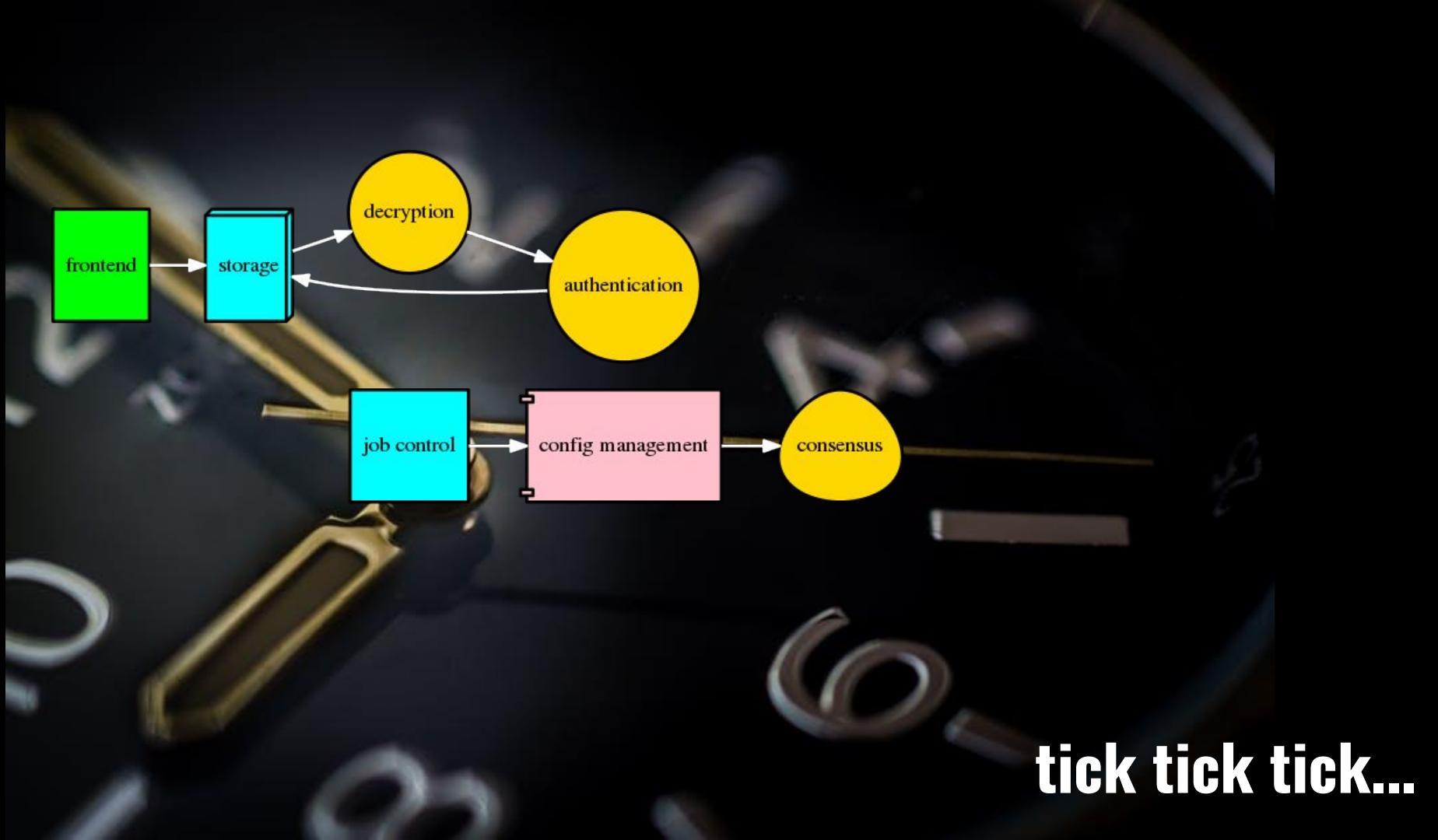


tick tick tick...

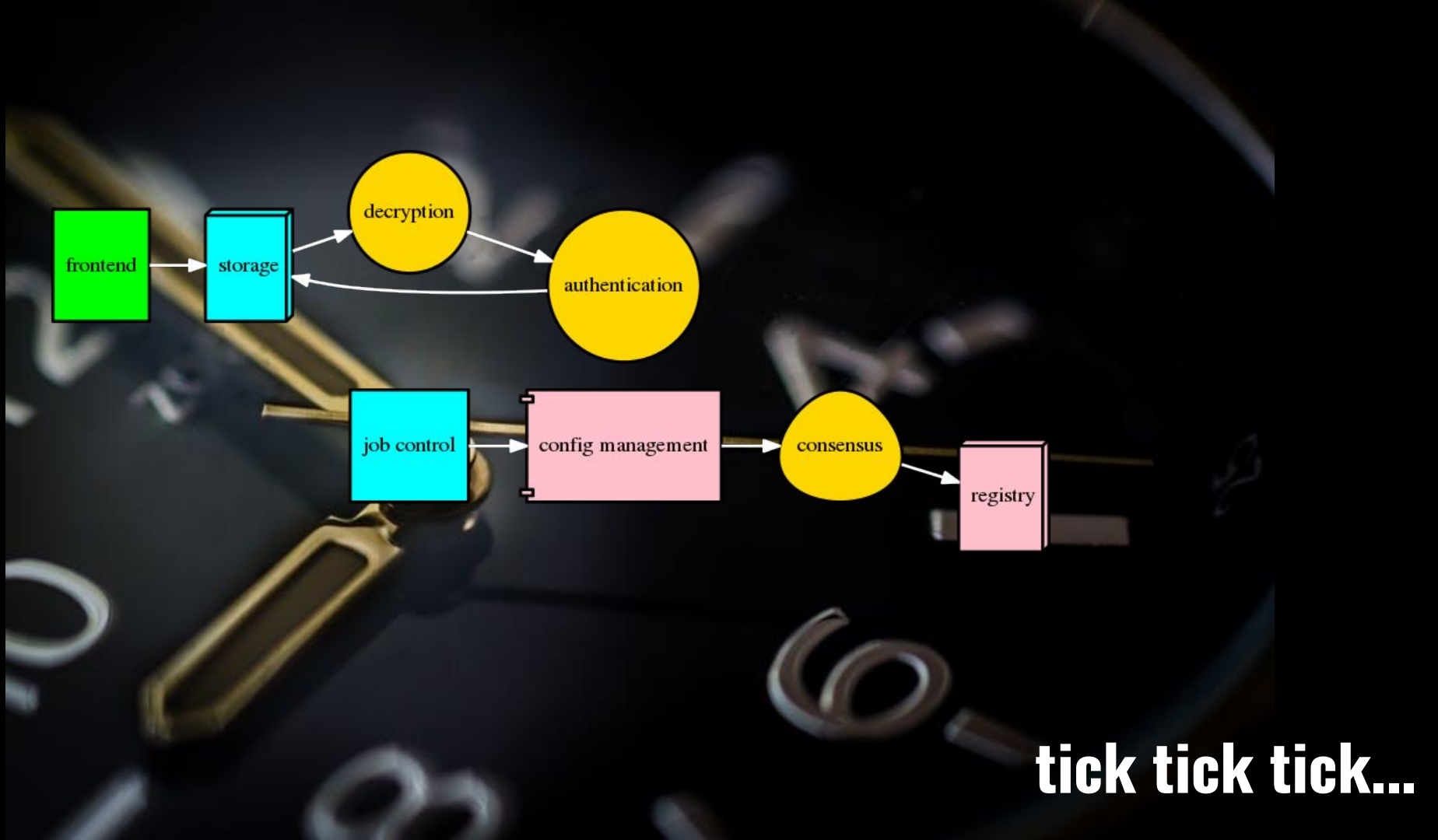

frontend
storage
decryption
authentication
tick tick tick...



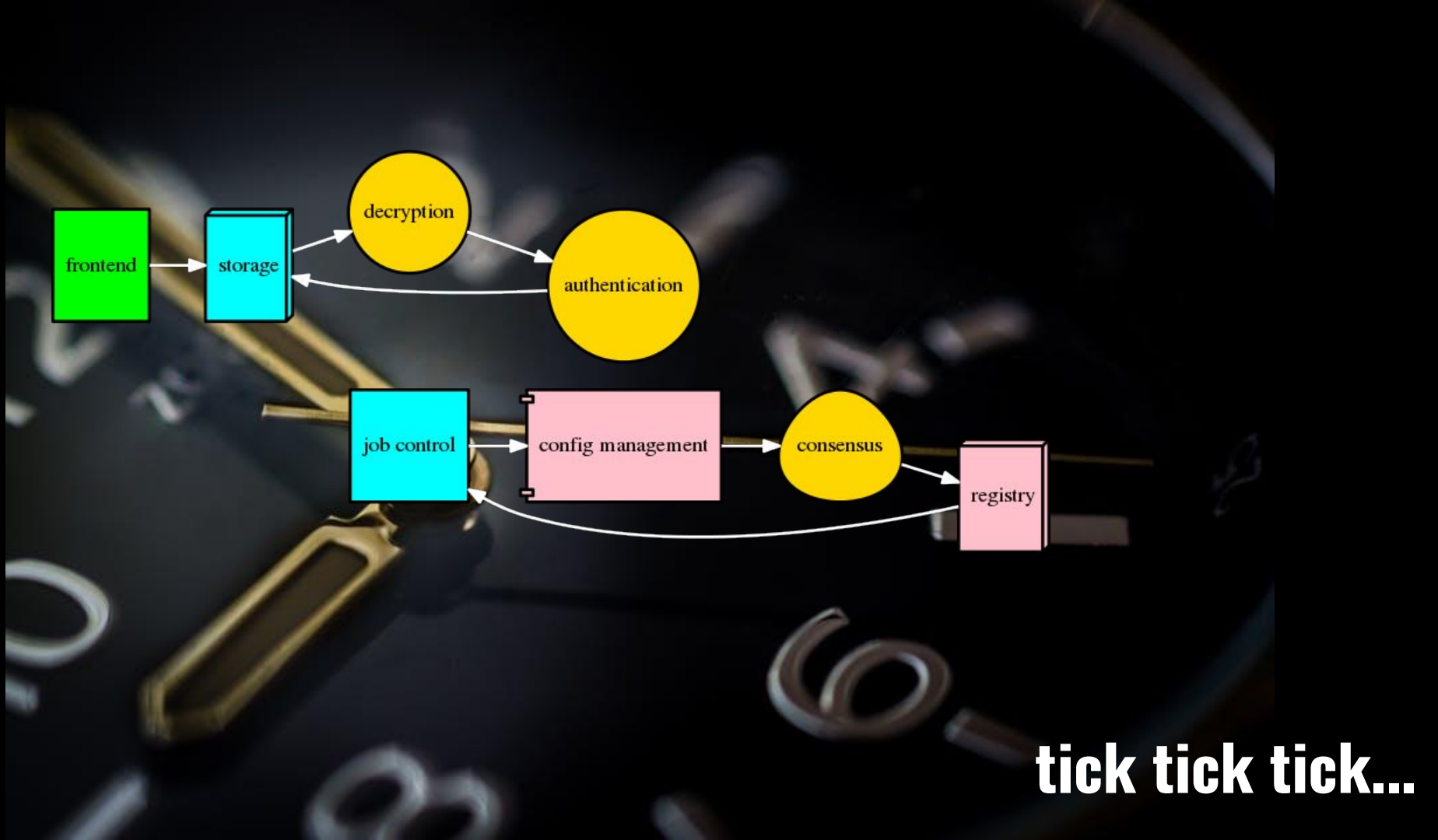
tick tick tick...

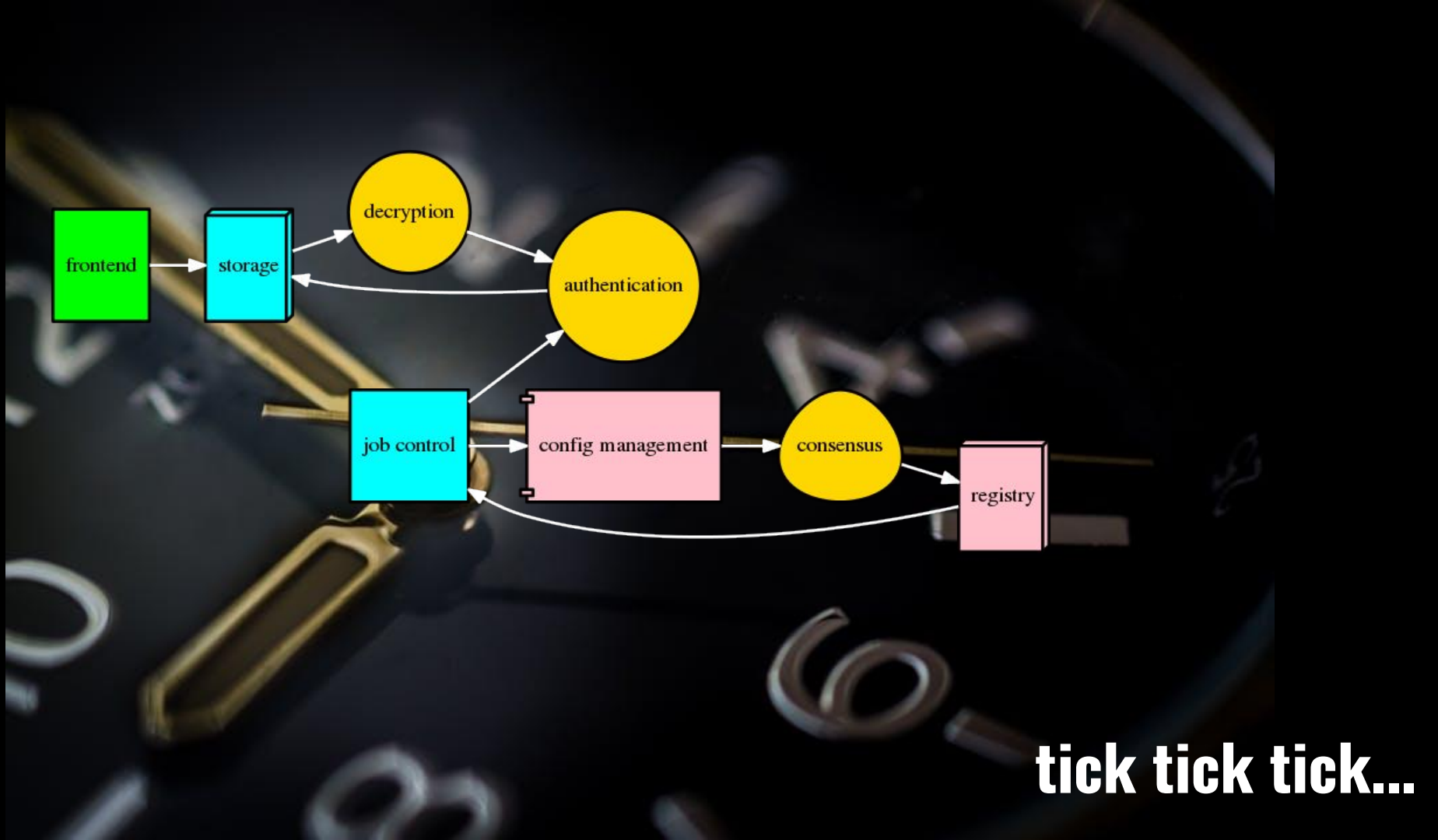


tick tick tick...



tick tick tick...


frontend
storage
decryption
authentication
job control
config management
consensus
registry
tick tick tick...



tick tick tick...

- fallback plans
- dependencies
- what can we do?

We're built on top of... really? Are you sure?

dependency discovery

It's Turtles All The Way Down, William Warby. CC BY 2.0

design docs obscure information

Original design. "We keep an in-memory index of the available cats with some metadata about them. The cat chooser uses the information from the user's request to determine the attributes that needs to be fulfilled. It checks the index for cats that match those attributes. It pulls those cats from storage and returns one to the user.

Indexers run at startup and at intervals to update the metadata and make sure we have accurate cat sentiment analysis and geolocation data."

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User story: cat must be a cat. "Since catness analysis is an expensive operation, we only run the catness analyzer on pictures that have a high likelihood of being served, i.e., those aleady indexed with geolocation and sentiment data. We'll take the index from the cat chooser and run catness analysis over the cats from that queue."

lists are better

webserver -> cat_chooser
cat_chooser -> cat_geotagger
cat_chooser -> cat_sentiment_analyzer
cat_chooser -> catness_analyzer
cat_chooser -> storage
catness_analyzer -> cat_chooser
catness_analyzer -> storage
cat_geotagger -> storage
cat_sentiment_analyzer -> storage

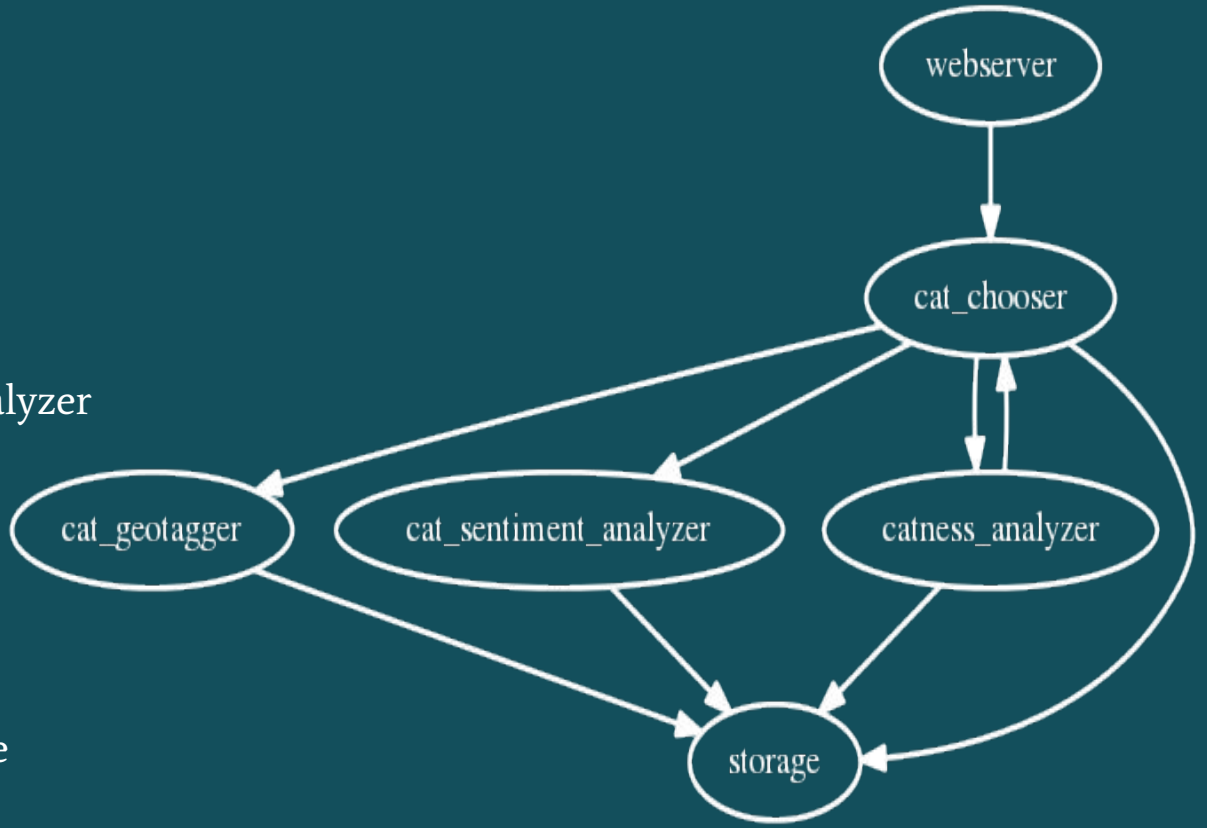
pictures are even better

```
digraph {

  webserver -> cat_chooser
  cat_chooser -> cat_geotagger
  cat_chooser -> cat_sentiment_analyzer
  cat_chooser -> catness_analyzer
  cat_chooser -> storage
  catness_analyzer -> cat_chooser
  catness_analyzer -> storage
  cat_geotagger -> storage
  cat_sentiment_analyzer -> storage
}
```

pictures are even better

```
$ /usr/bin/dot -T png -o cats.png cats.dot
```

```
digraph {

  webserver -> cat_chooser
  cat_chooser -> cat_geotagger
  cat_chooser -> cat_sentiment_analyzer
  cat_chooser -> catness_analyzer
  cat_chooser -> storage
  catness_analyzer -> cat_chooser
  catness_analyzer -> storage
  cat_geotagger -> storage
  cat_sentiment_analyzer -> storage
}
```



But don't put humans in charge of remembering what connects to what

This is Site Reliability. THERE ARE RULES.

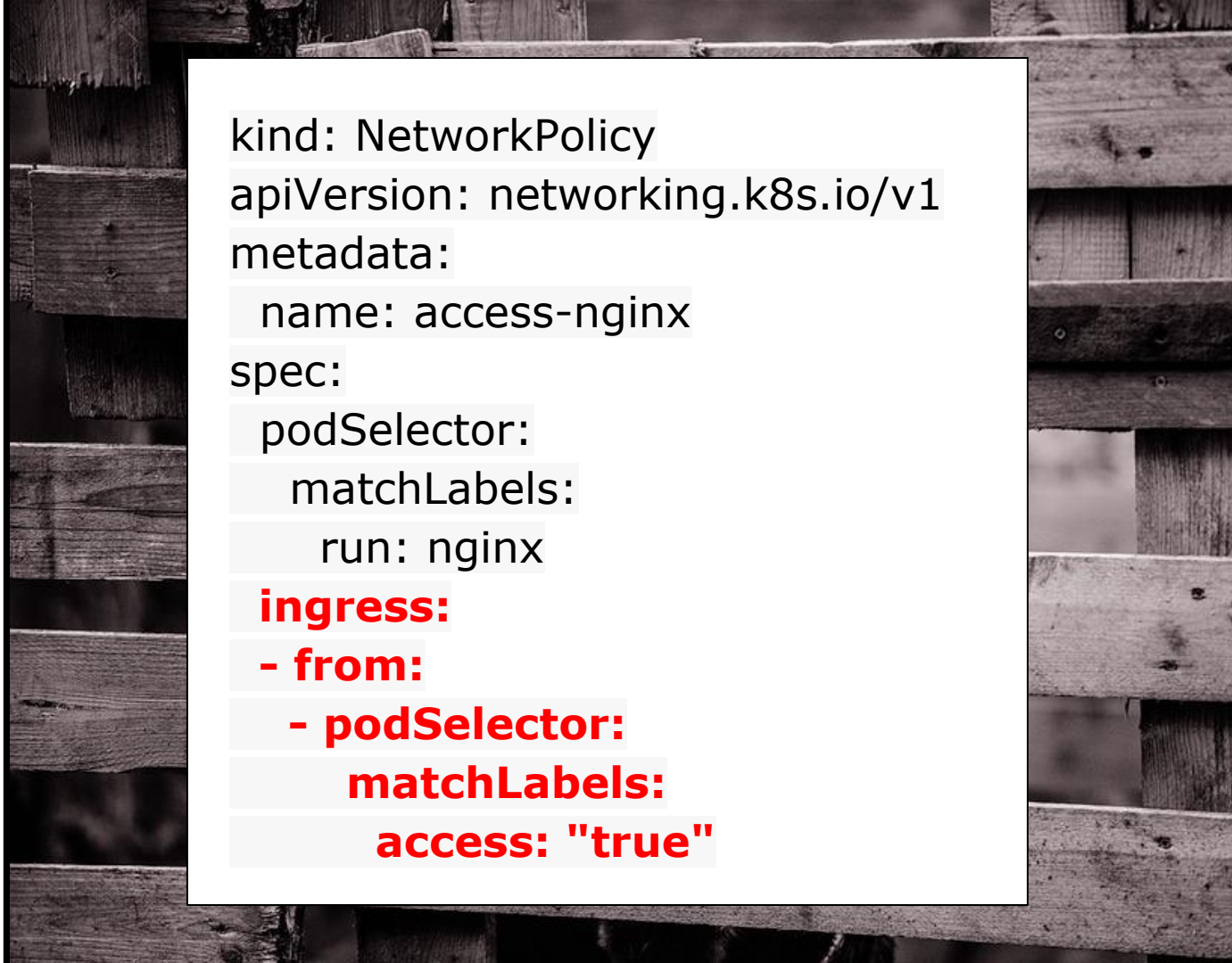
dependency policies

Are you on the guest list?

policy enforcement

Are you on the guest list?

policy enforcement



```
kind: NetworkPolicy
apiVersion: networking.k8s.io/v1
metadata:
  name: access-nginx
spec:
  podSelector:
    matchLabels:
      run: nginx
  ingress:
  - from:
    - podSelector:
        matchLabels:
          access: "true"
```

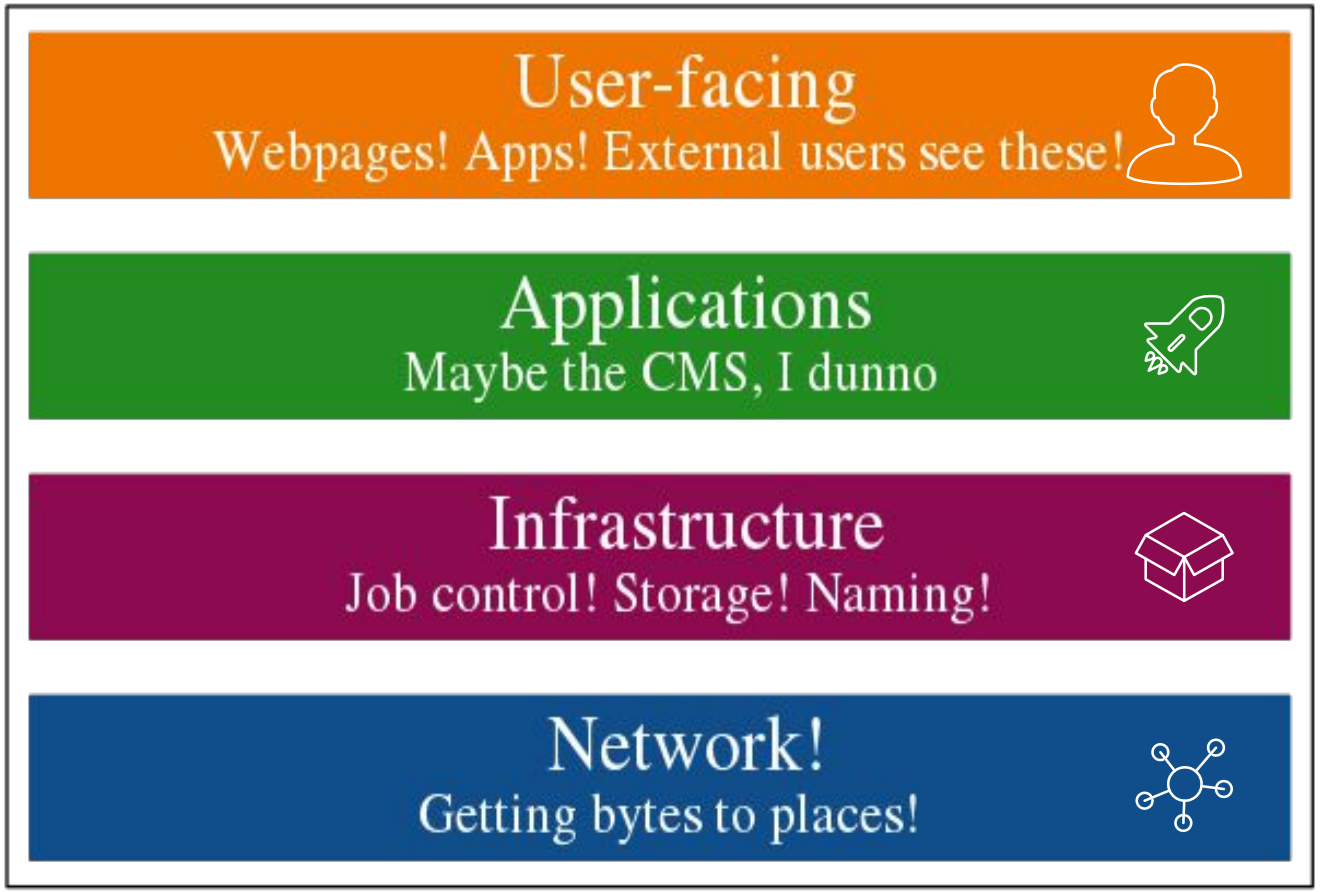
Manage your dependencies early

Some sock yarn, Kara, CC BY-ND 2.0

(It’s harder later on)

Look, an actual stack!

architecting in layers




soft dependencies

The reserve parachute is always packed by an expert

reliable
fallback
plans

Really, try turning it off and turning it on again

testing

in conclusion...

- ❏ small fallback plans
- ❏ test everything
- ❏ manage dependencies
- ❏ architect in layers

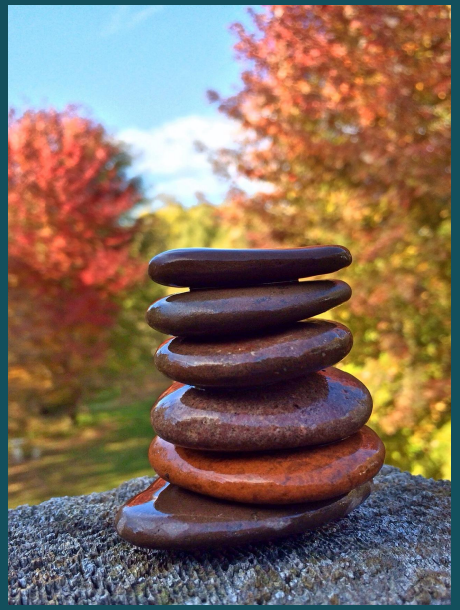
fallback plans:

small, simple, solid

- ❑ small fallback plans
- ❑ test everything
- ❑ manage dependencies
- ❑ architect in layers

if it's not tested, assume it doesn't work

- ❏ small fallback plans
- ❏ test everything
- ❏ manage dependencies
- ❏ architect in layers



manage your dependencies before you need to

- ❏ small fallback plans
- ❏ test everything
- ❏ manage dependencies
- ❏ architect in layers

dependencies go down the stack

hope is not a strategy

@whereistanya
https://github.com/whereistanya/graphviz/