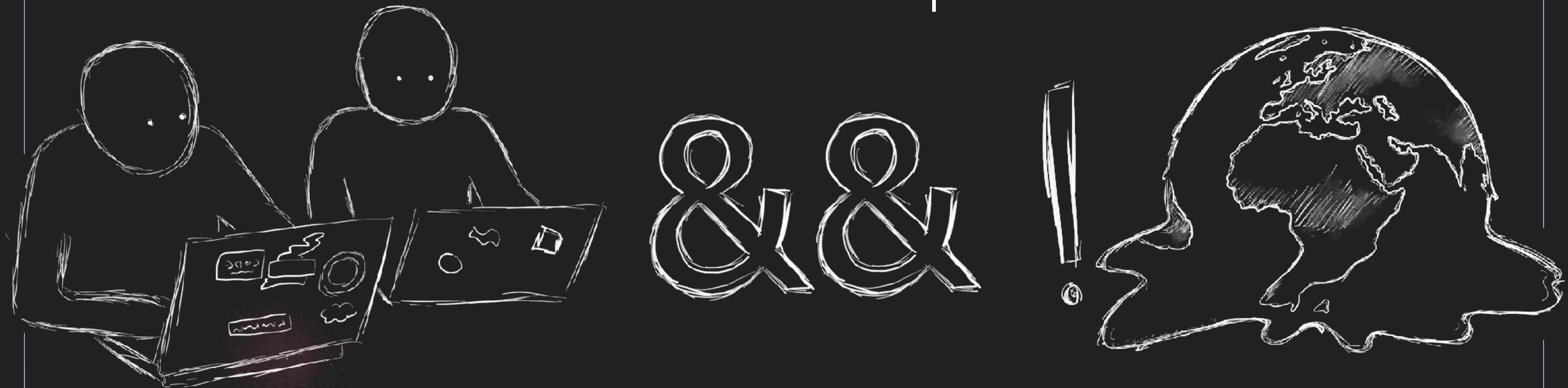


# how to work in tech and not wreck the planet



Holly Cummins  
**IBM Garage**

@holly\_cummins



we have a  
problem.



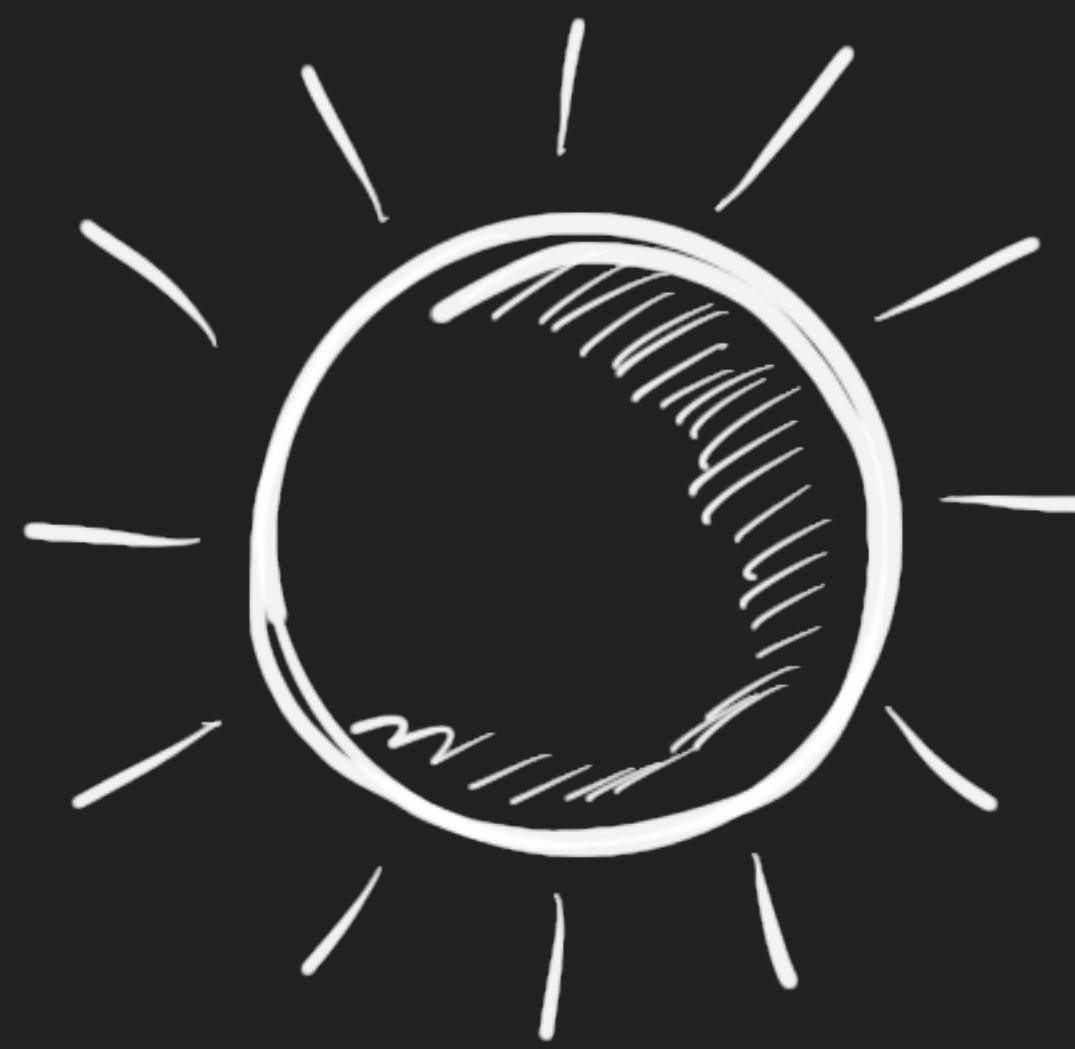
we have a  
problem.

the earth is  
getting warmer

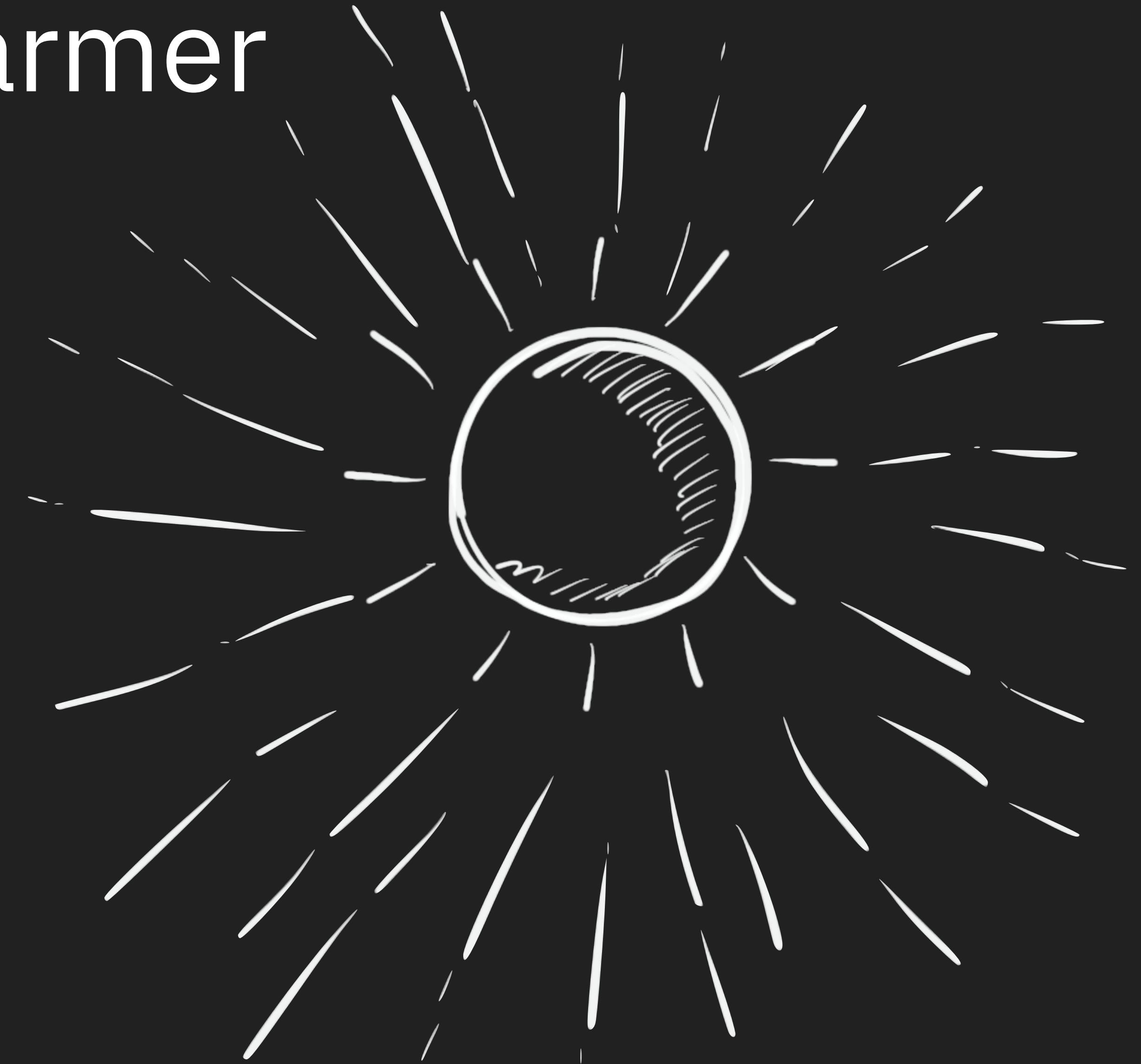
the earth is  
getting warmer



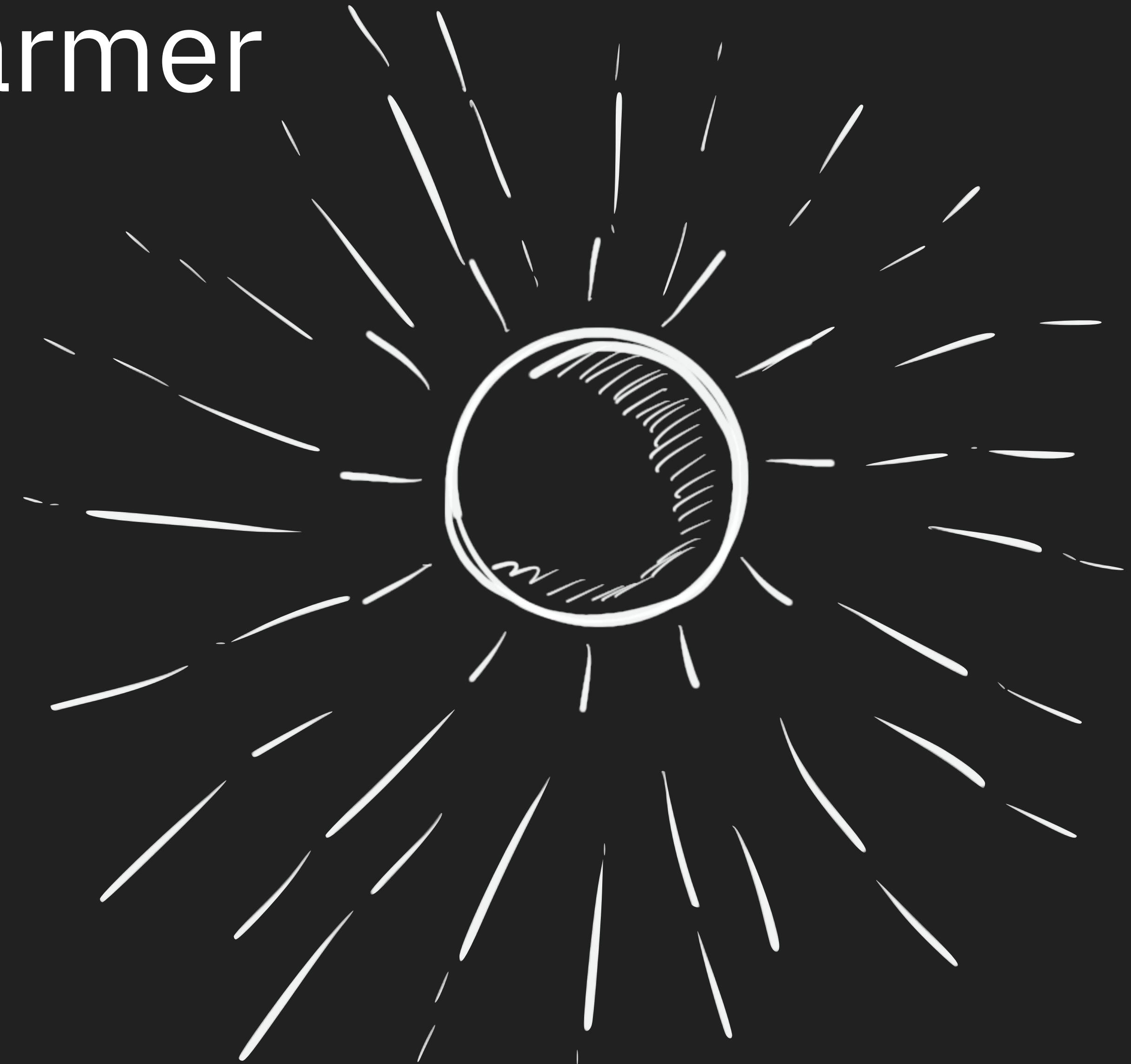
# warmer



# uncomfortably warmer



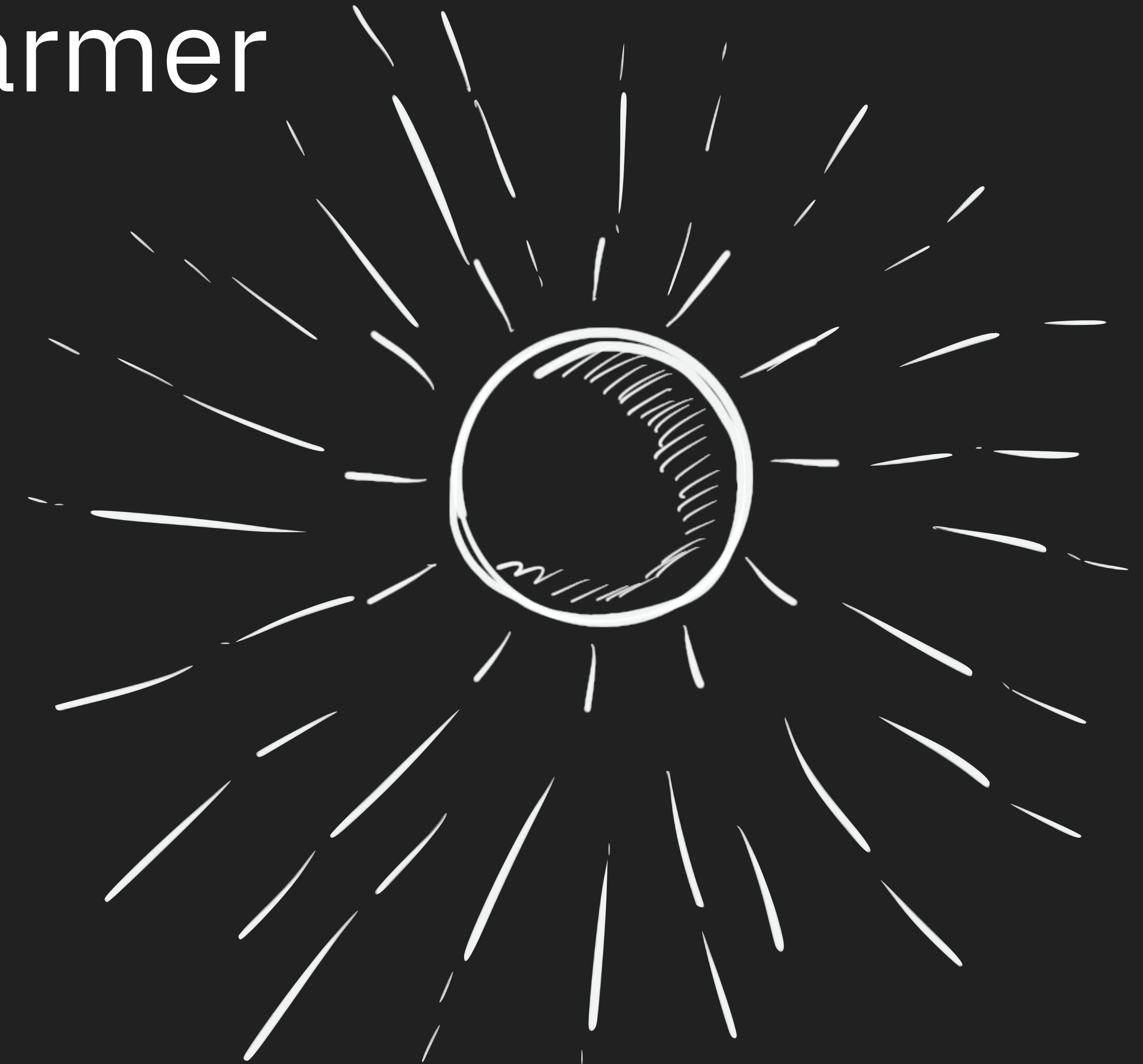
uncomfortably warmer  
drought



uncomfortably warmer

drought

floods

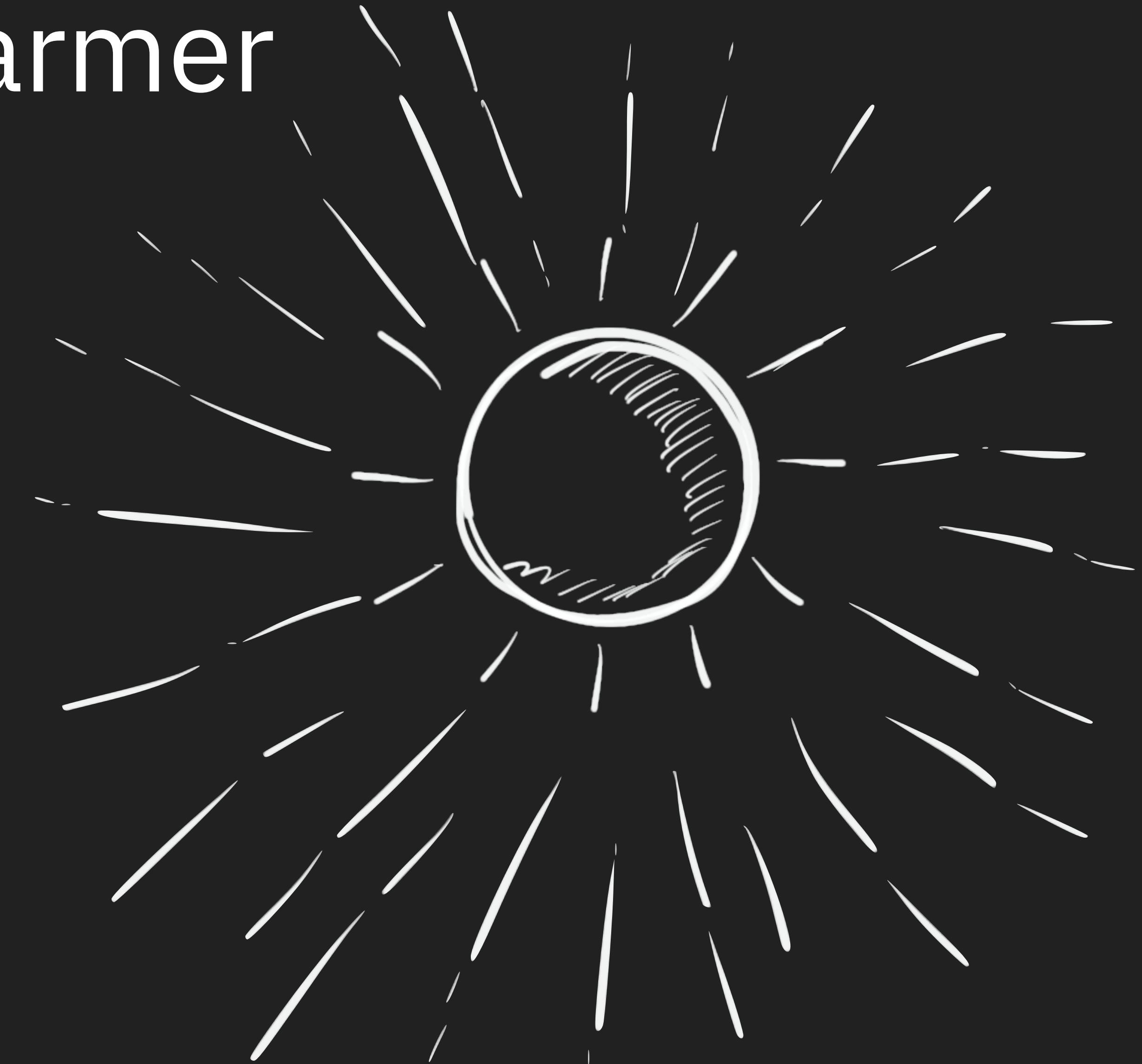


uncomfortably warmer

drought

floods

submersion



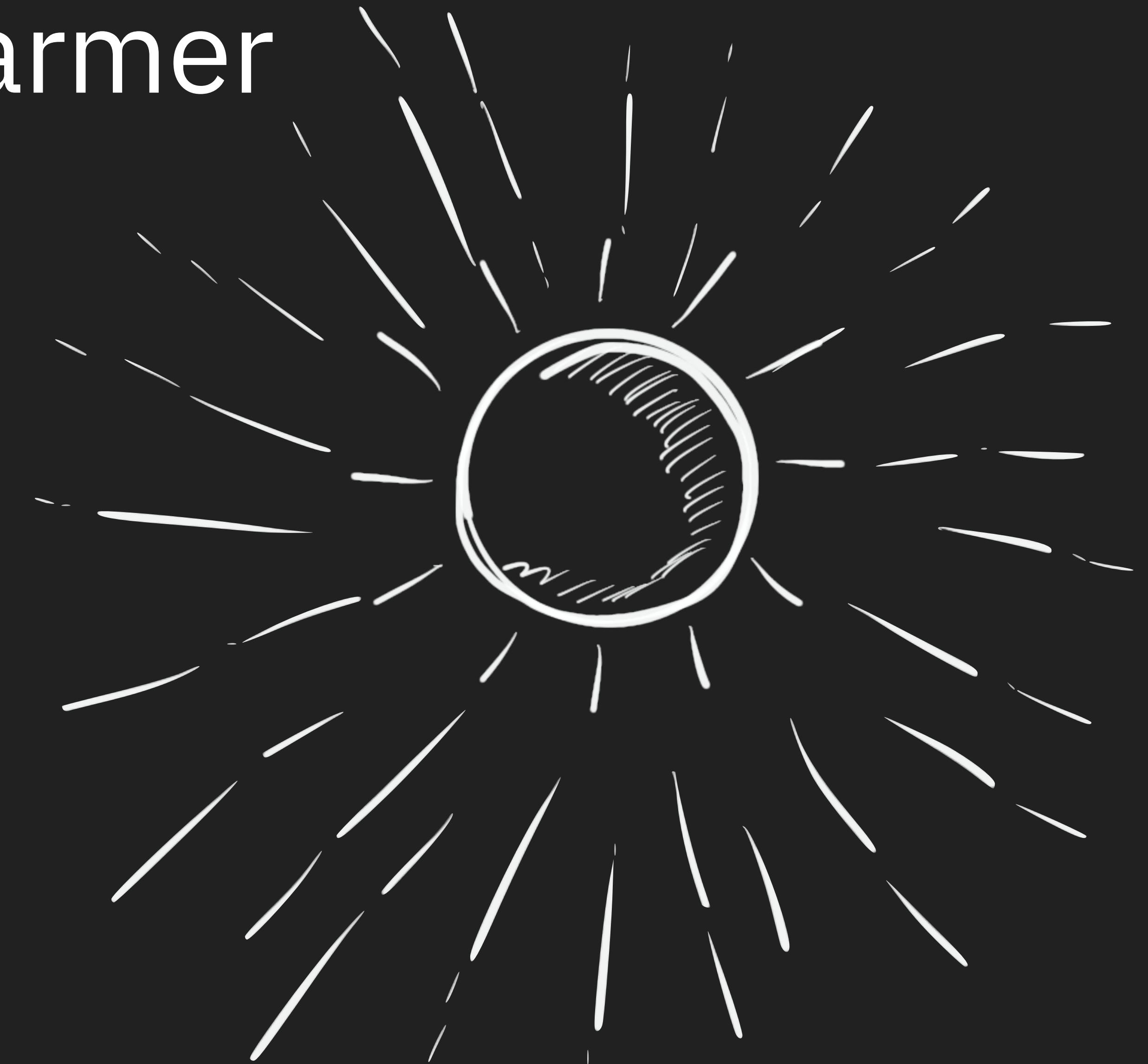
uncomfortably warmer

drought

floods

submersion

hurricanes



uncomfortably warmer

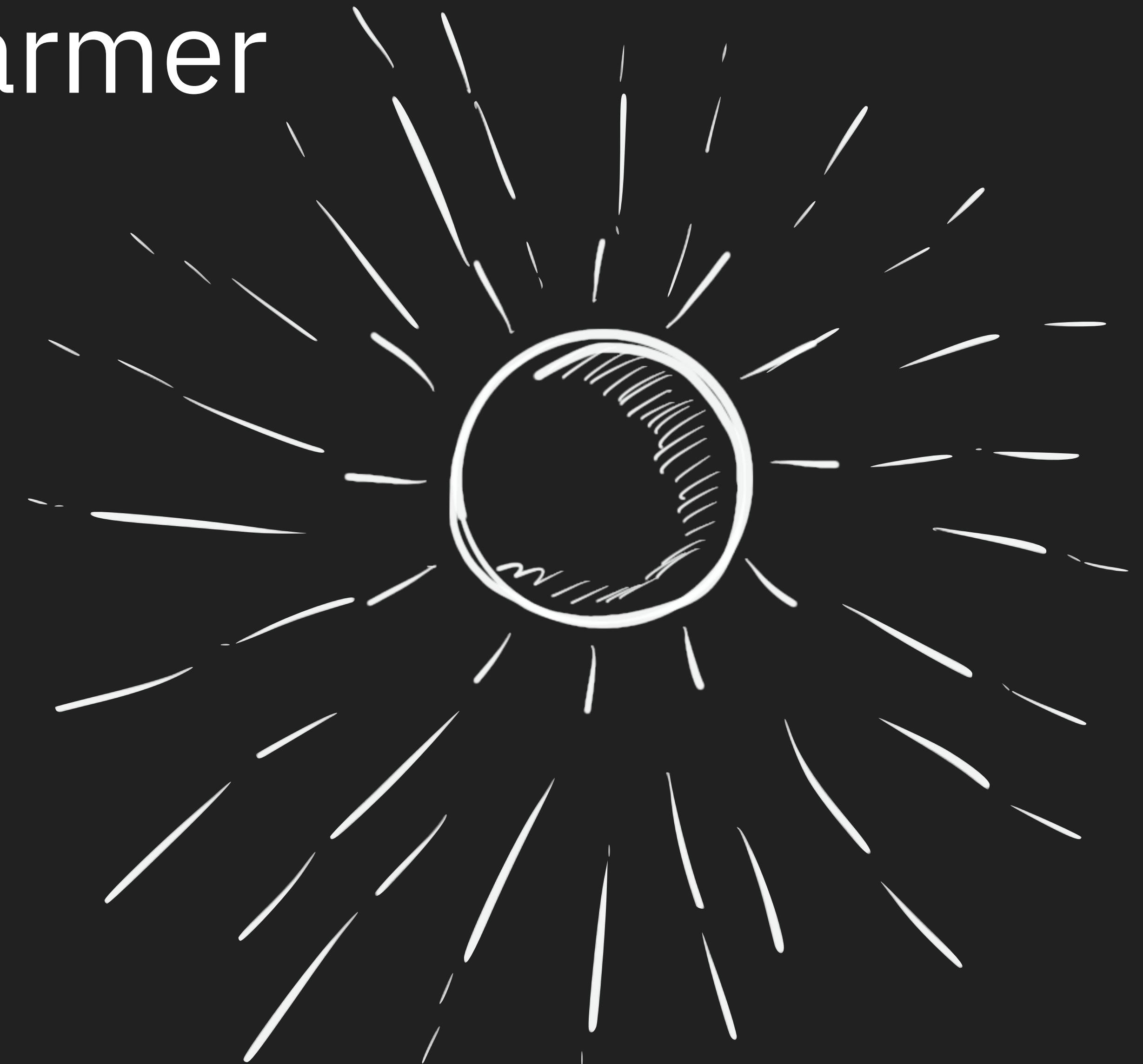
drought

floods

submersion

hurricanes

fires





there's a bug in our 2030 flood  
risk graph for Tokyo ... isn't there?





there's a bug in our 2030 flood  
risk graph for Tokyo ... isn't there?

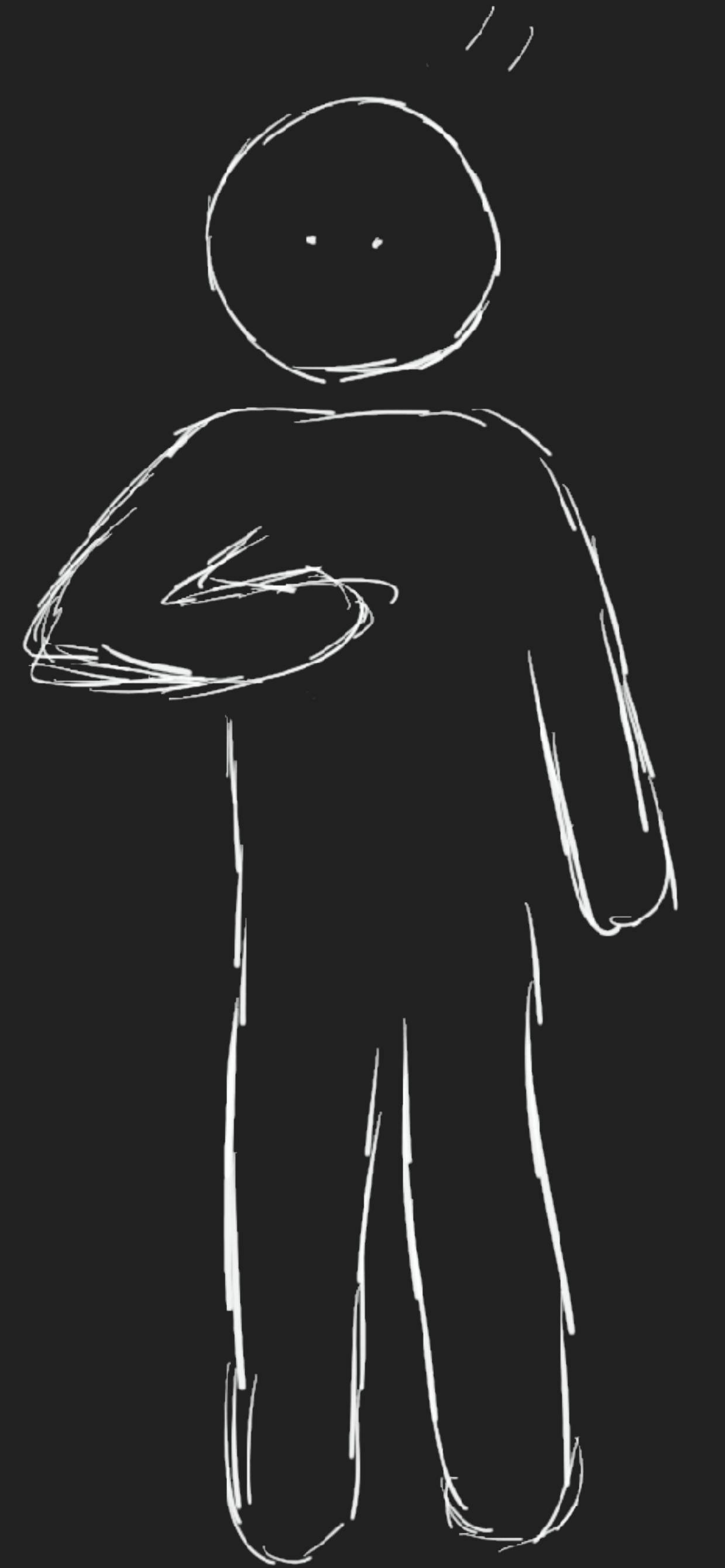
uh ... no.

# technical debt

# borrowing against the future

# environmental debt

# borrowing against the future



#IBMGarage

@holly\_cummins



me?

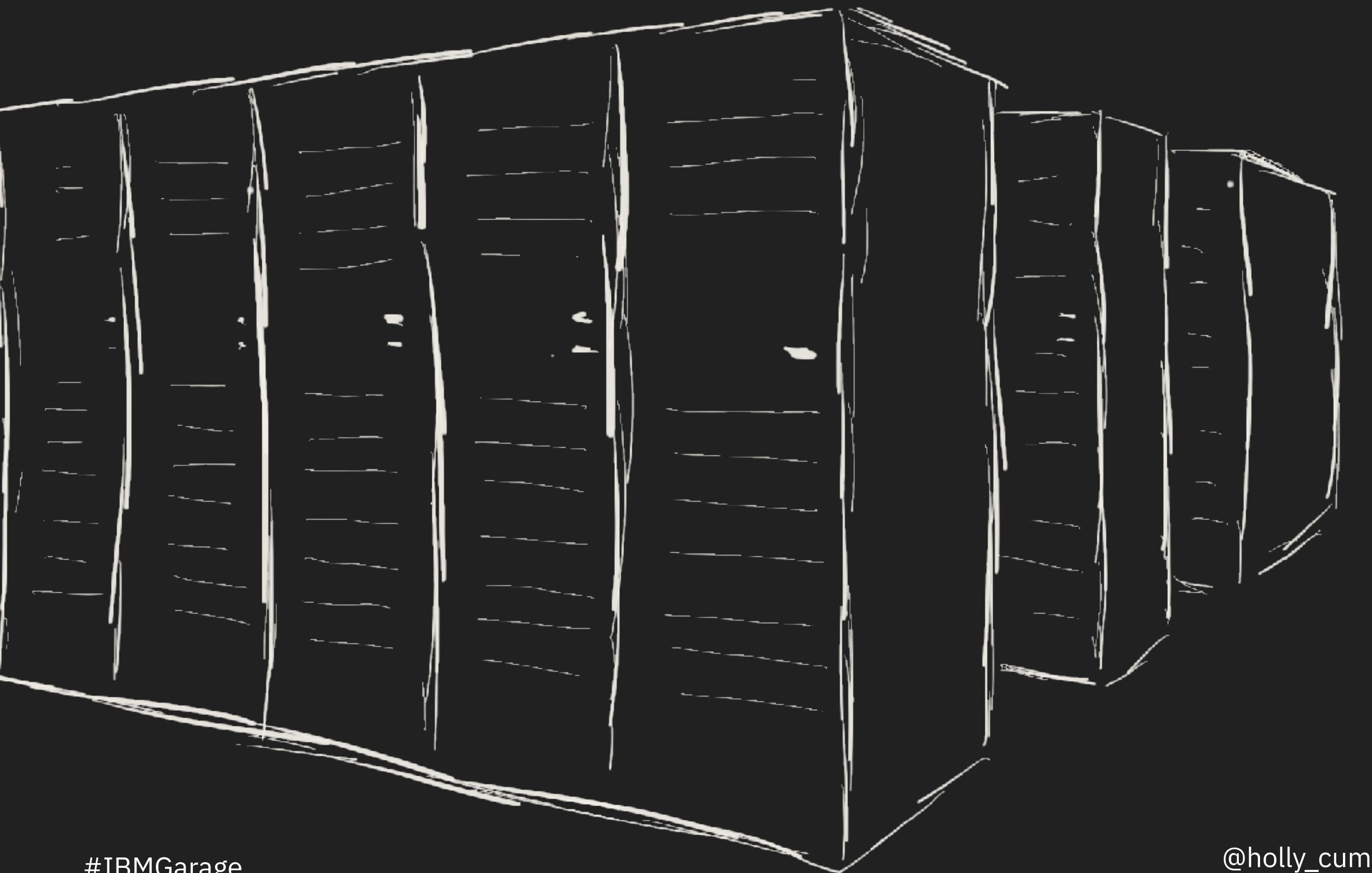


me?  
you?

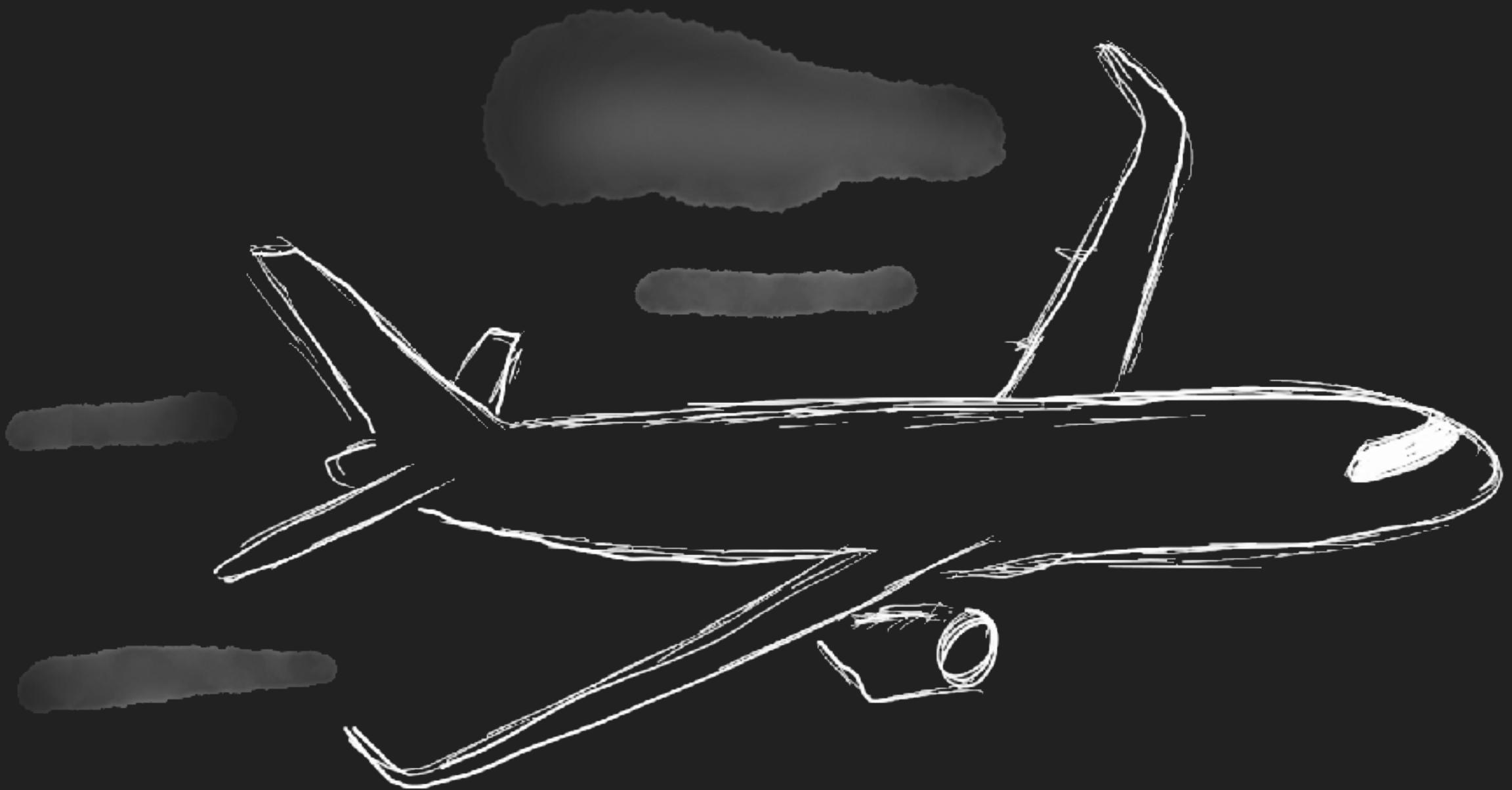


computers  
**contribute to**  
climate change

# data centres



# aviation

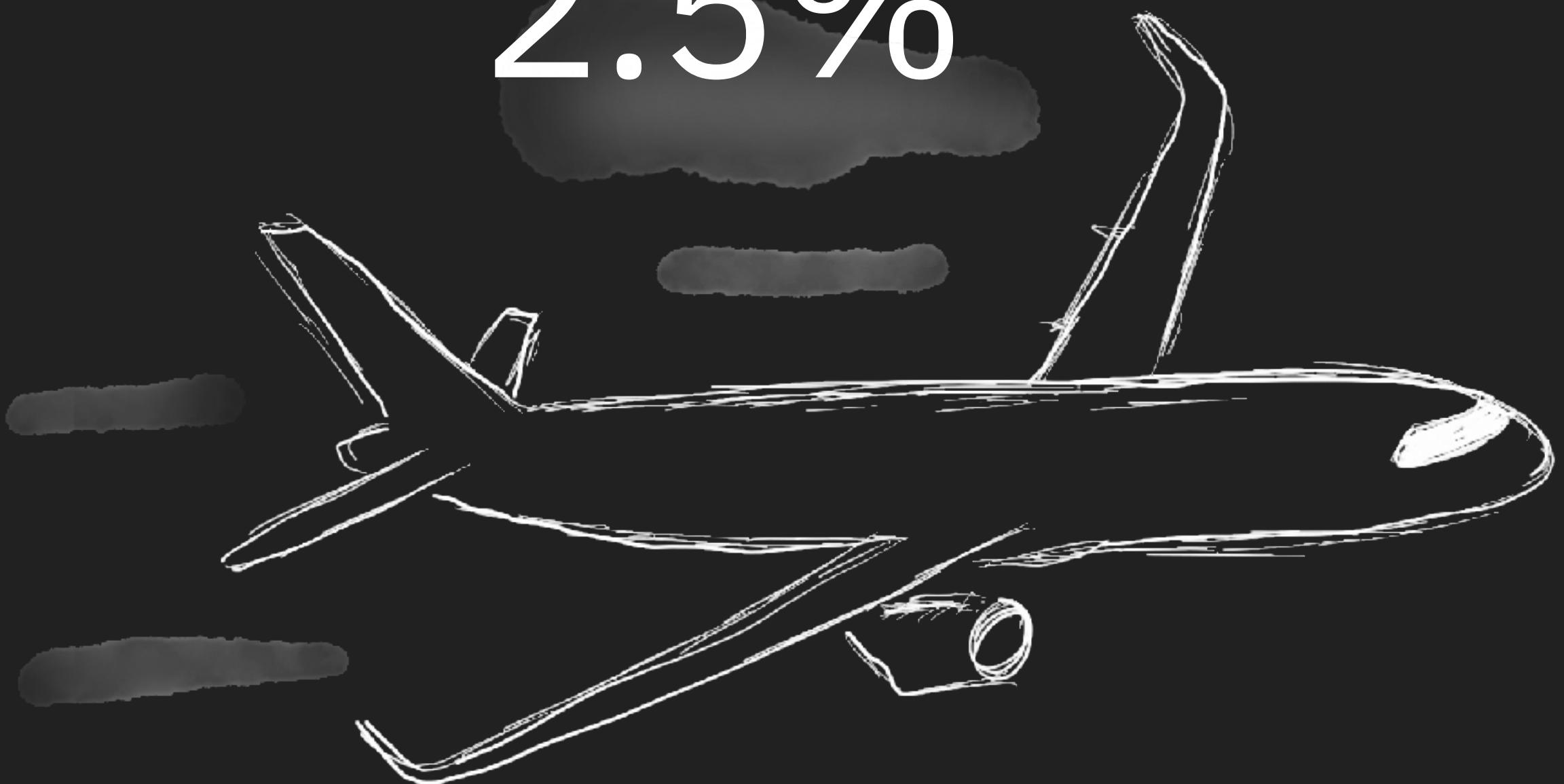


# data centres



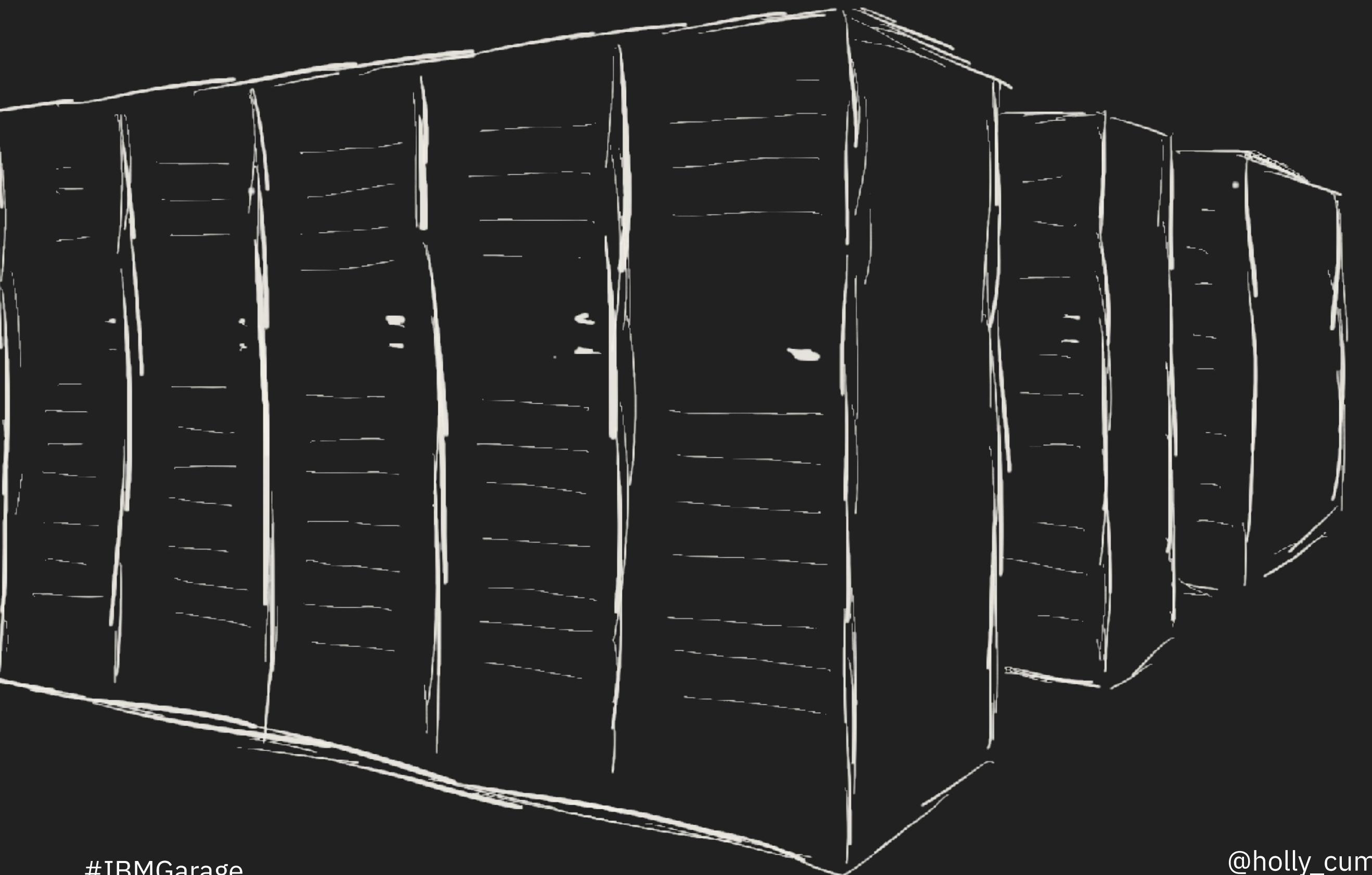
# aviation

2.5%



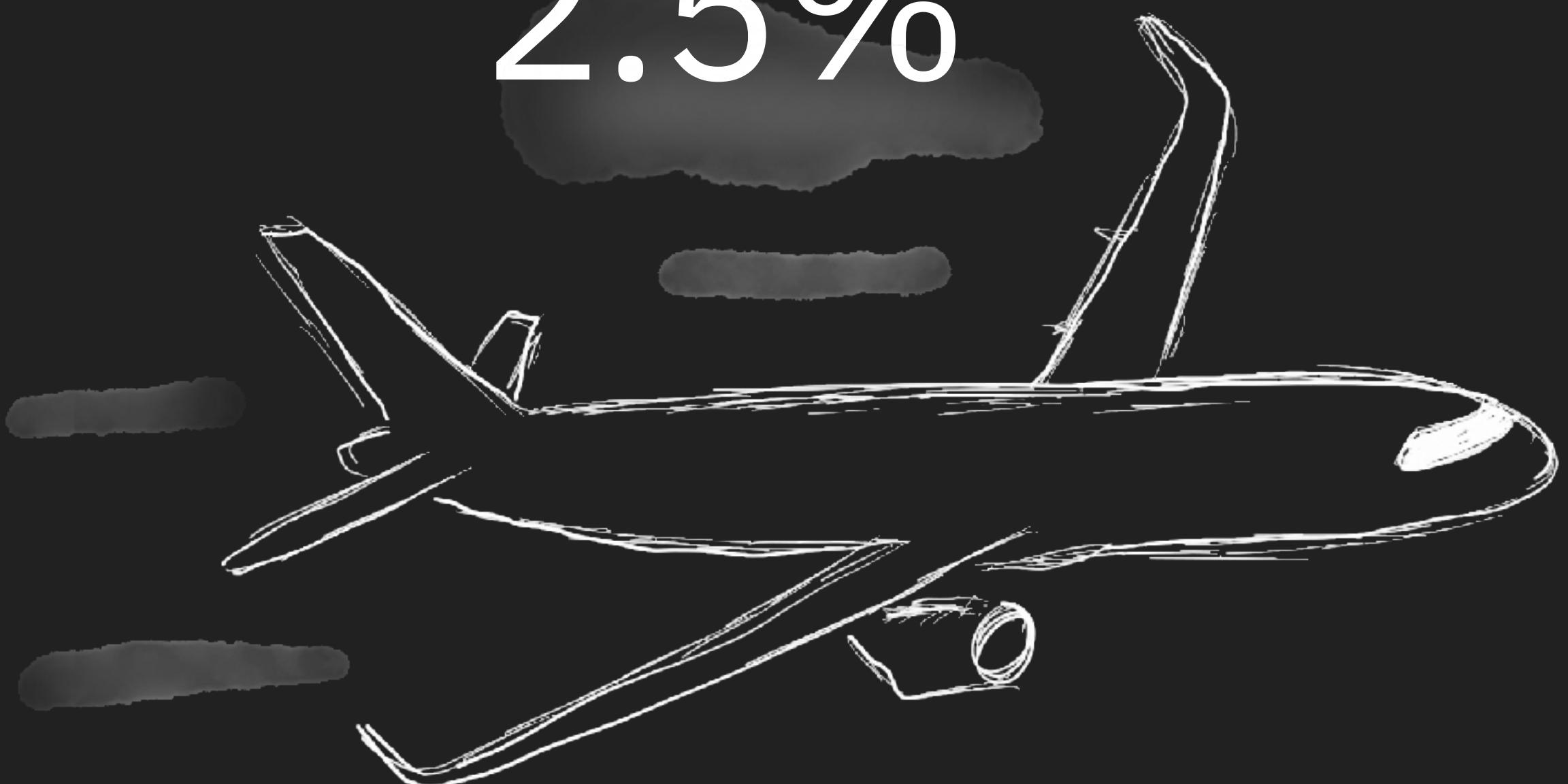
data centres

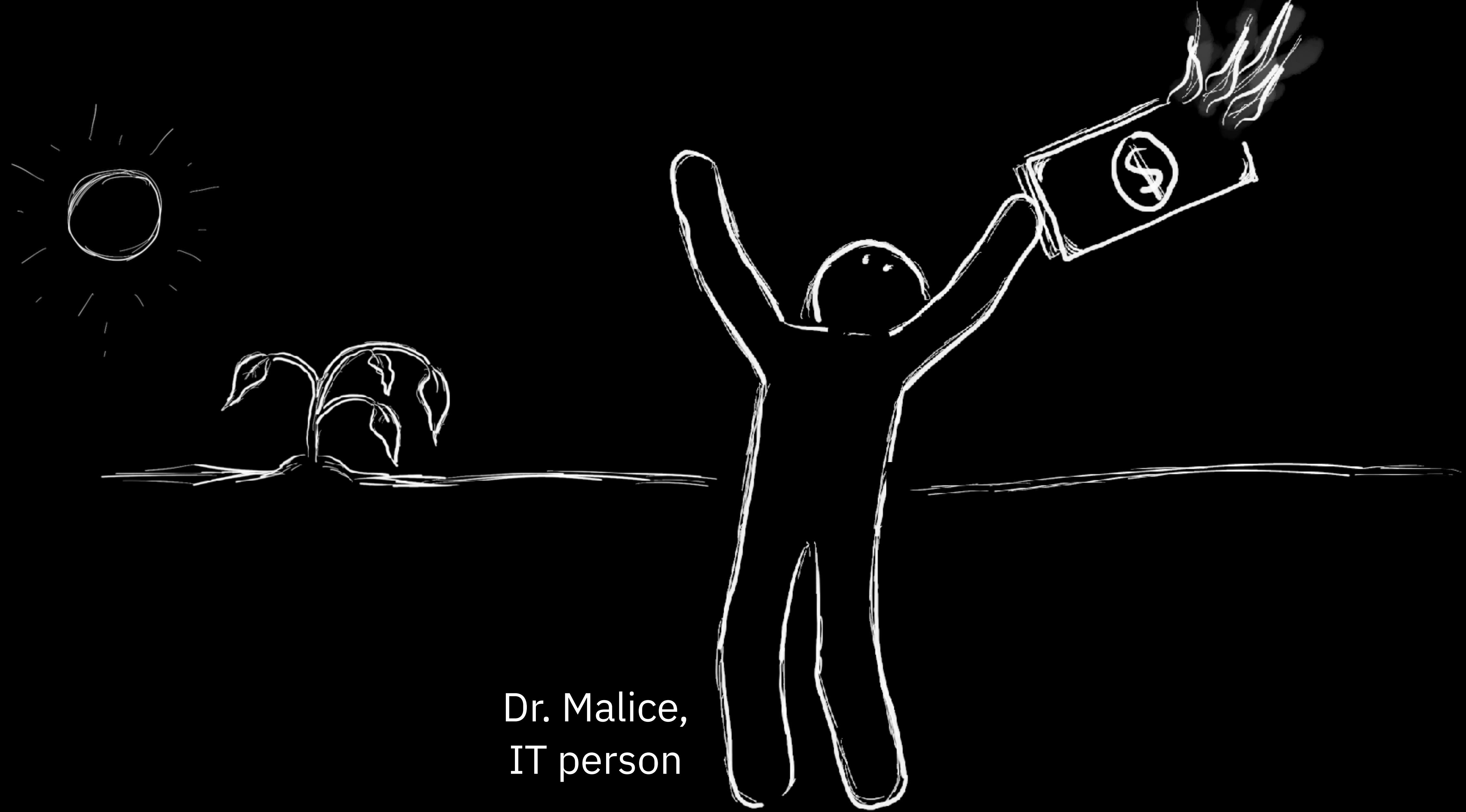
1-2%



aviation

2.5%





Dr. Malice,  
IT person

# waste





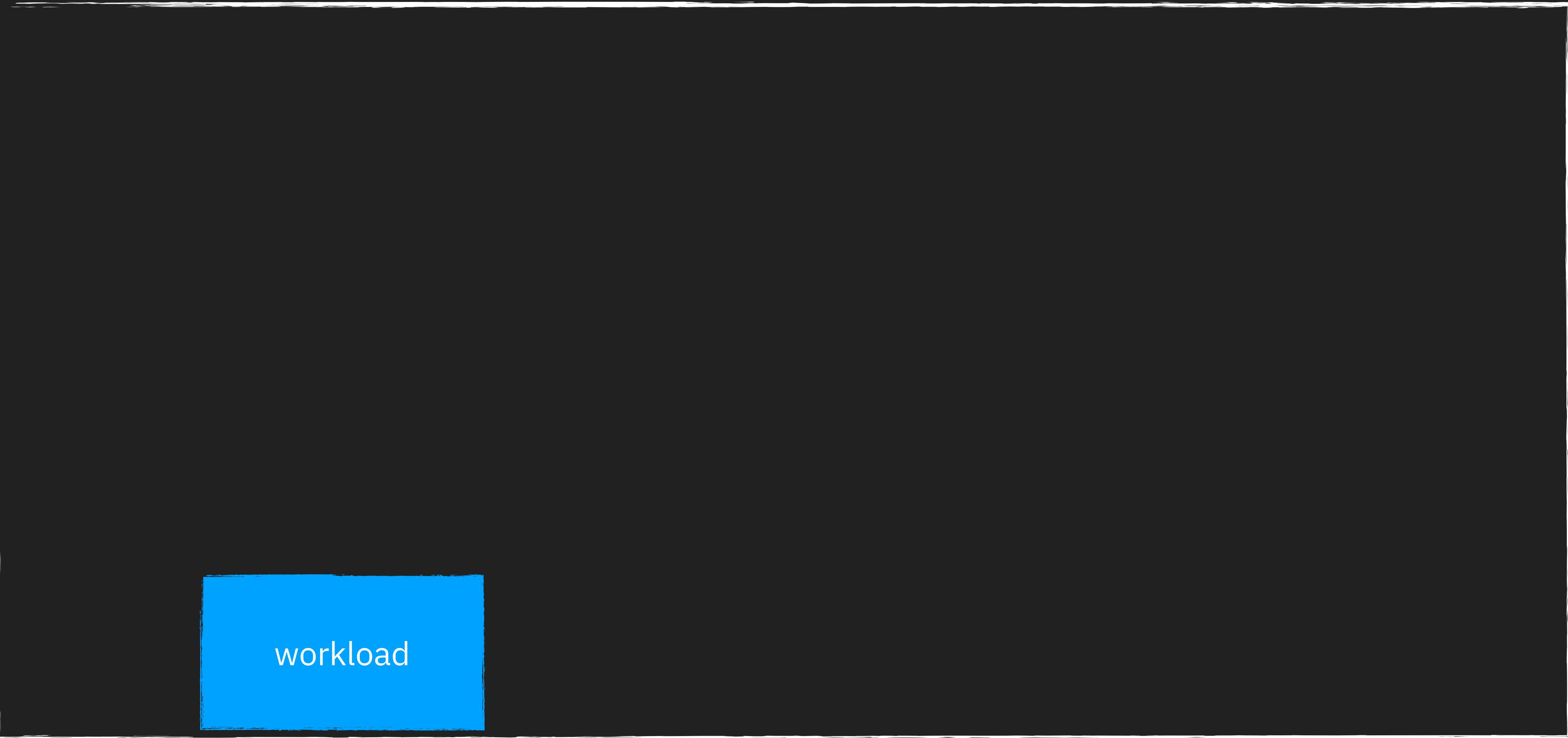
workload

runtime environment: virtual machine, physical machine or cluster



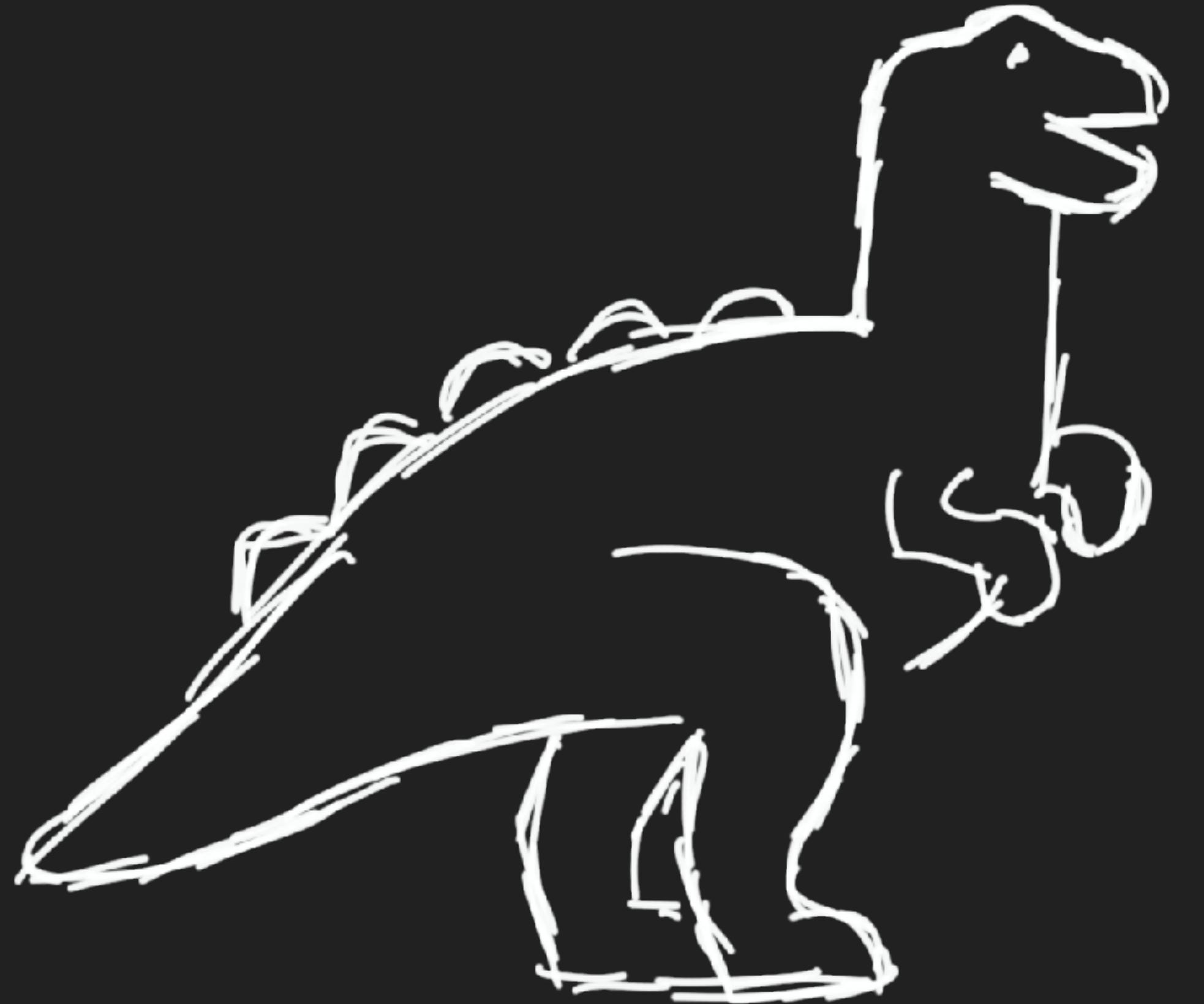
workload

runtime environment: virtual machine, physical machine or cluster

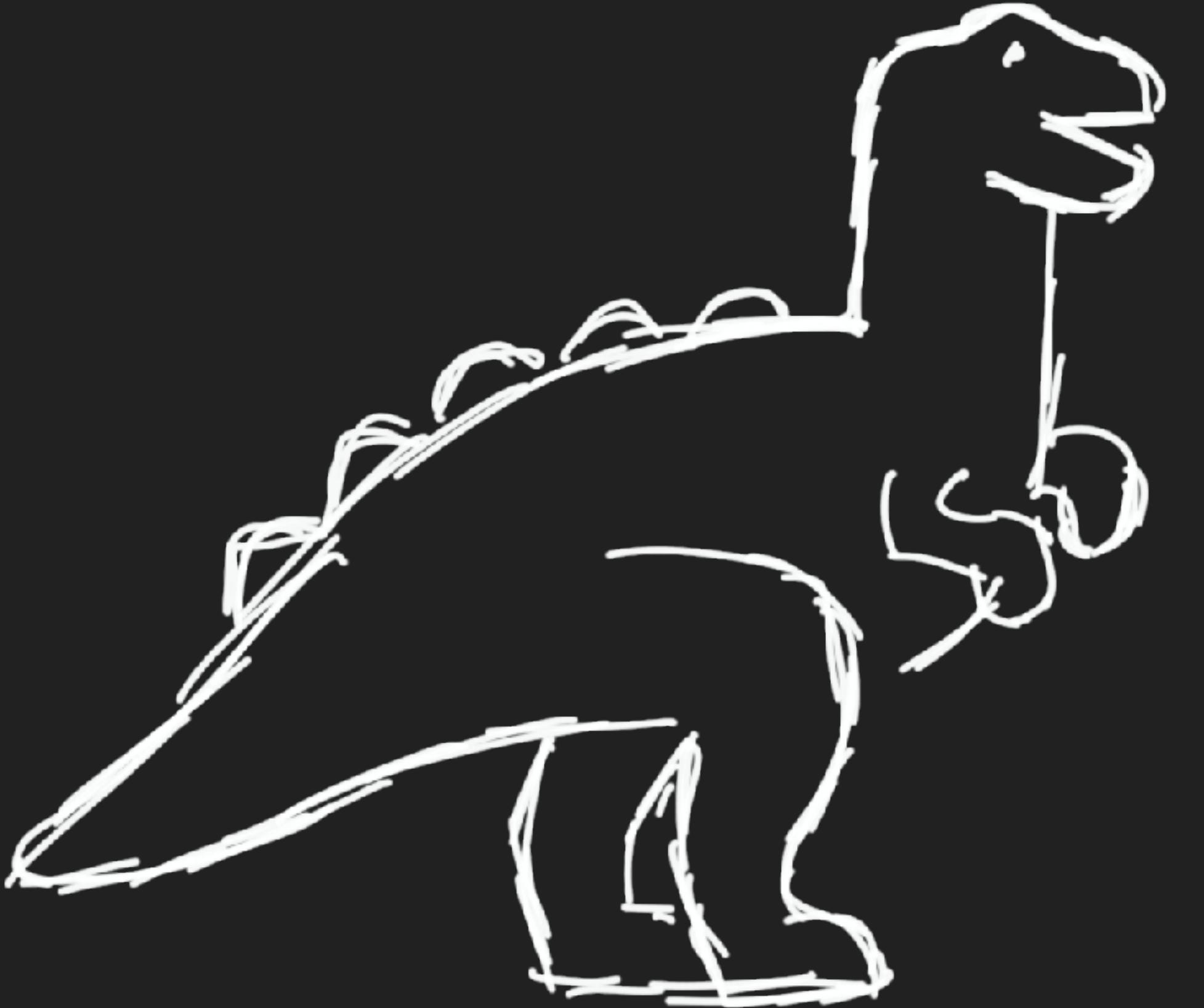


workload

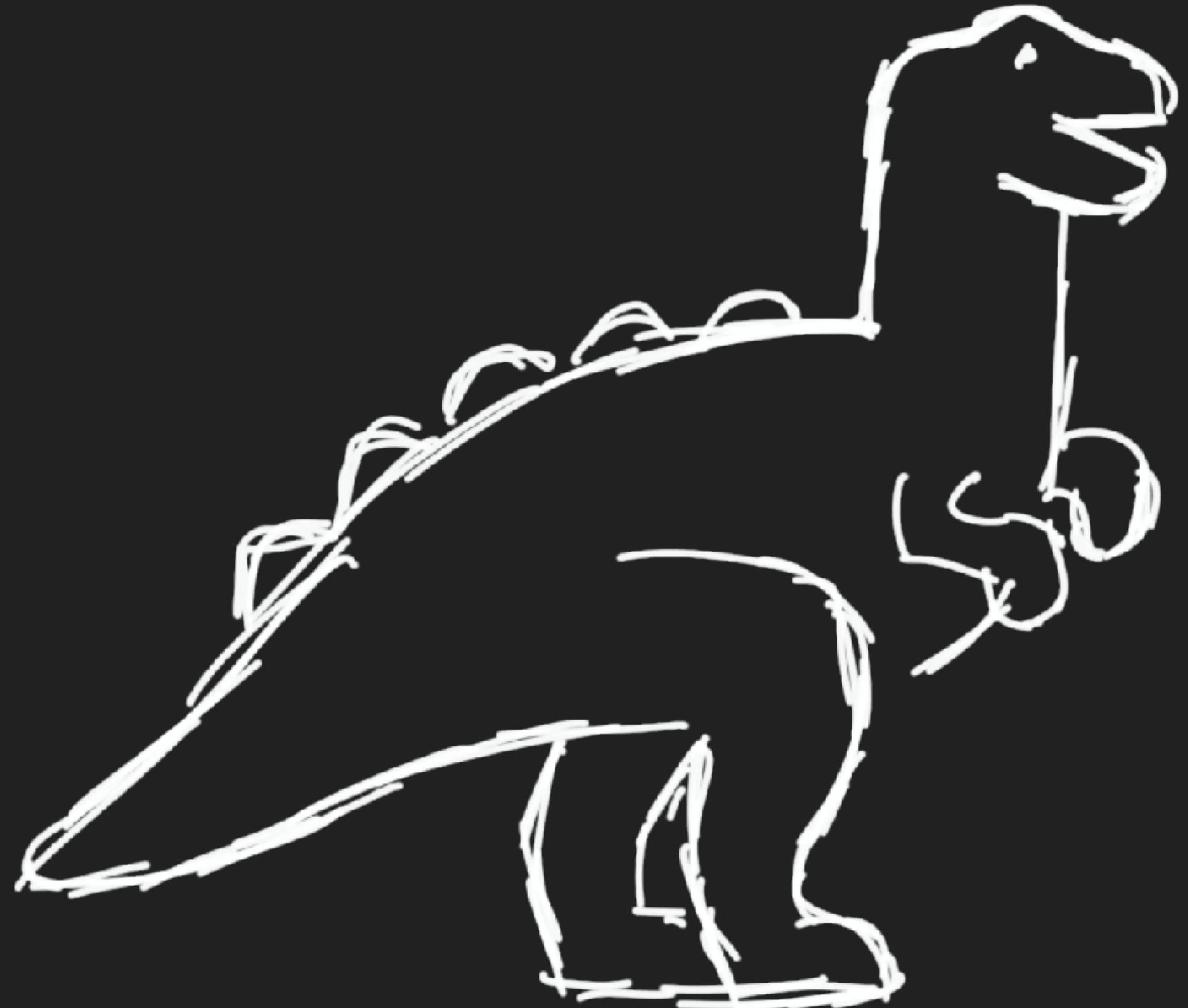
# utilisation elasticity



mainframes



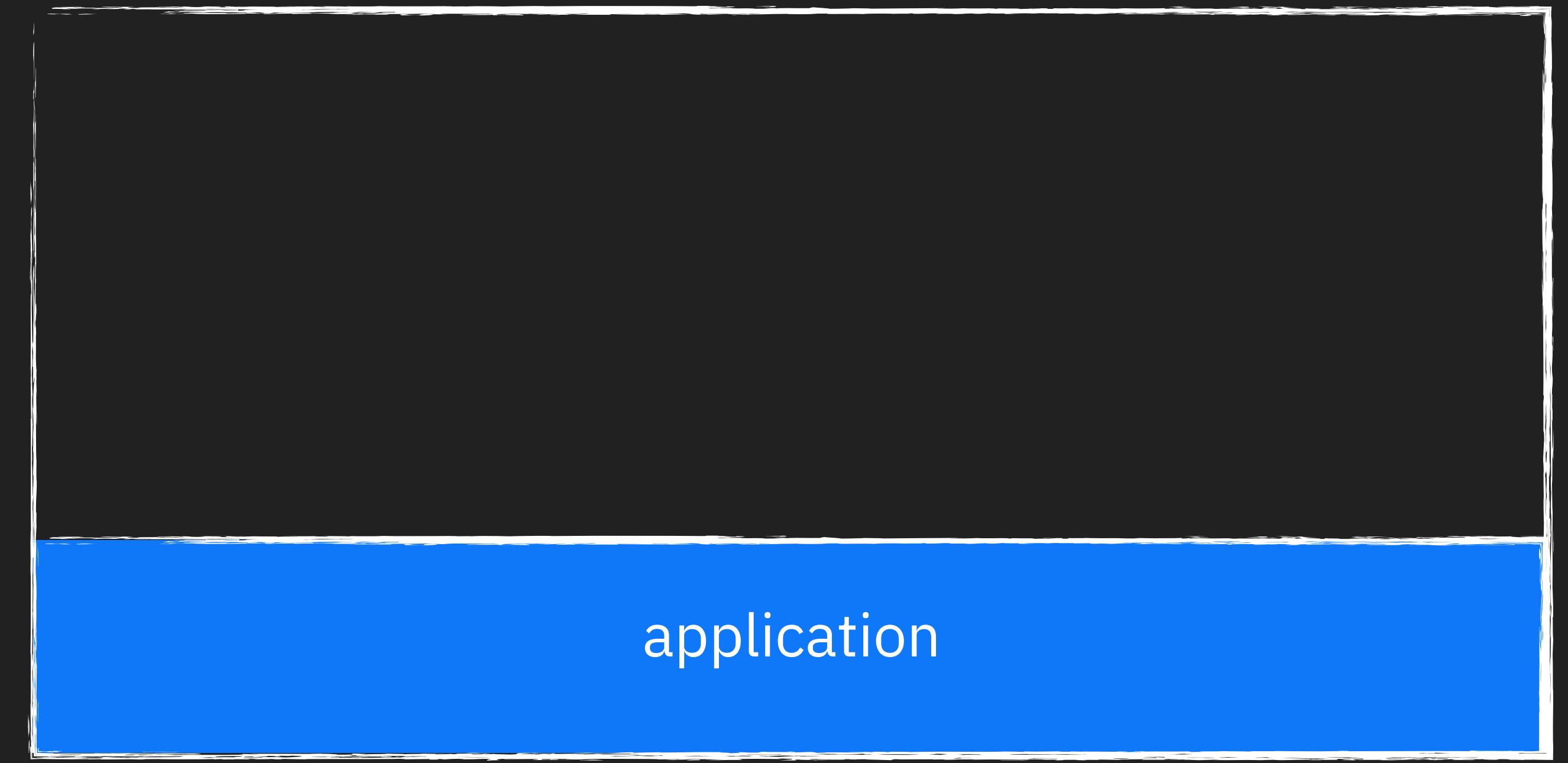
mainframes are  
super-efficient

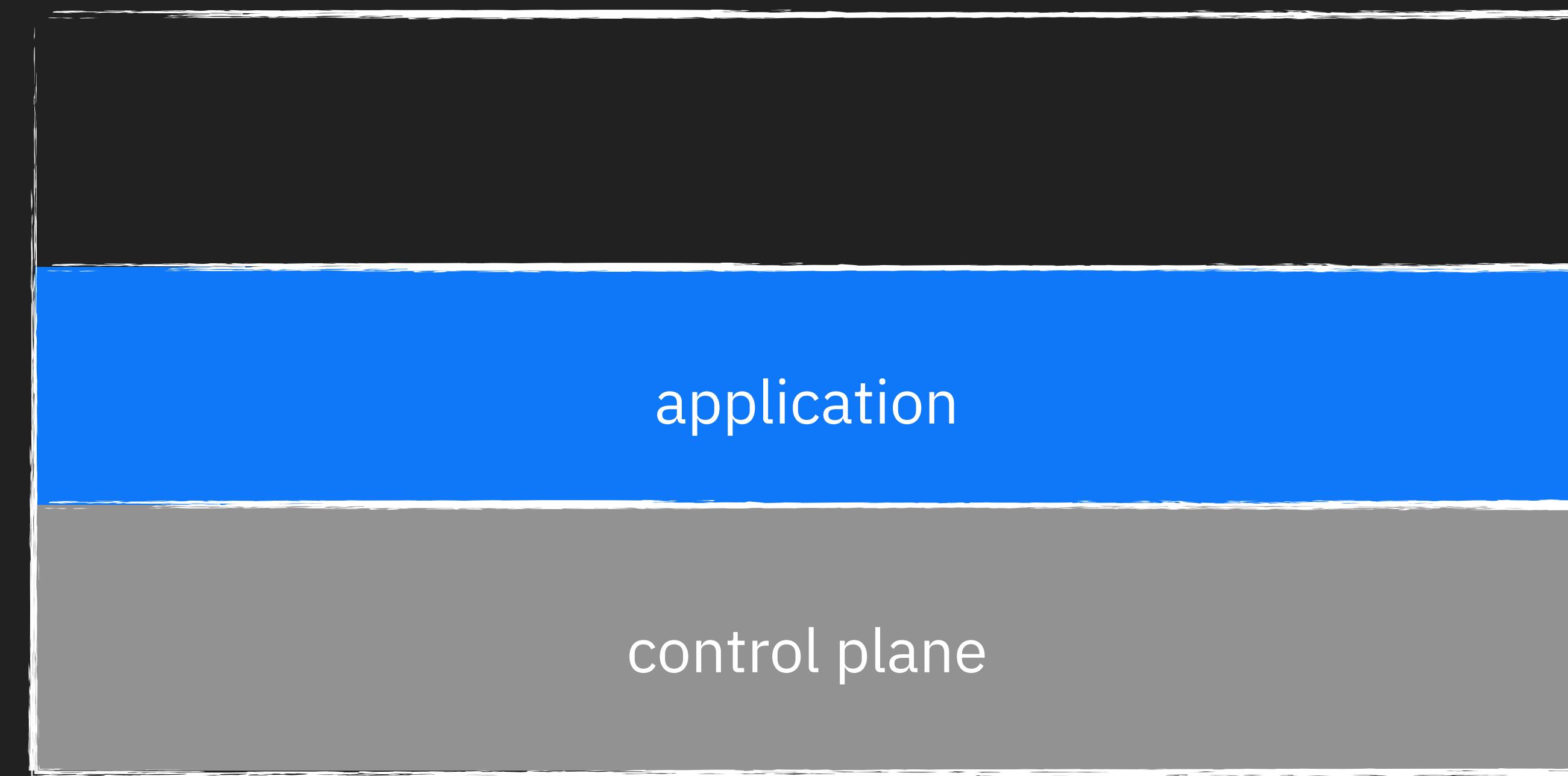


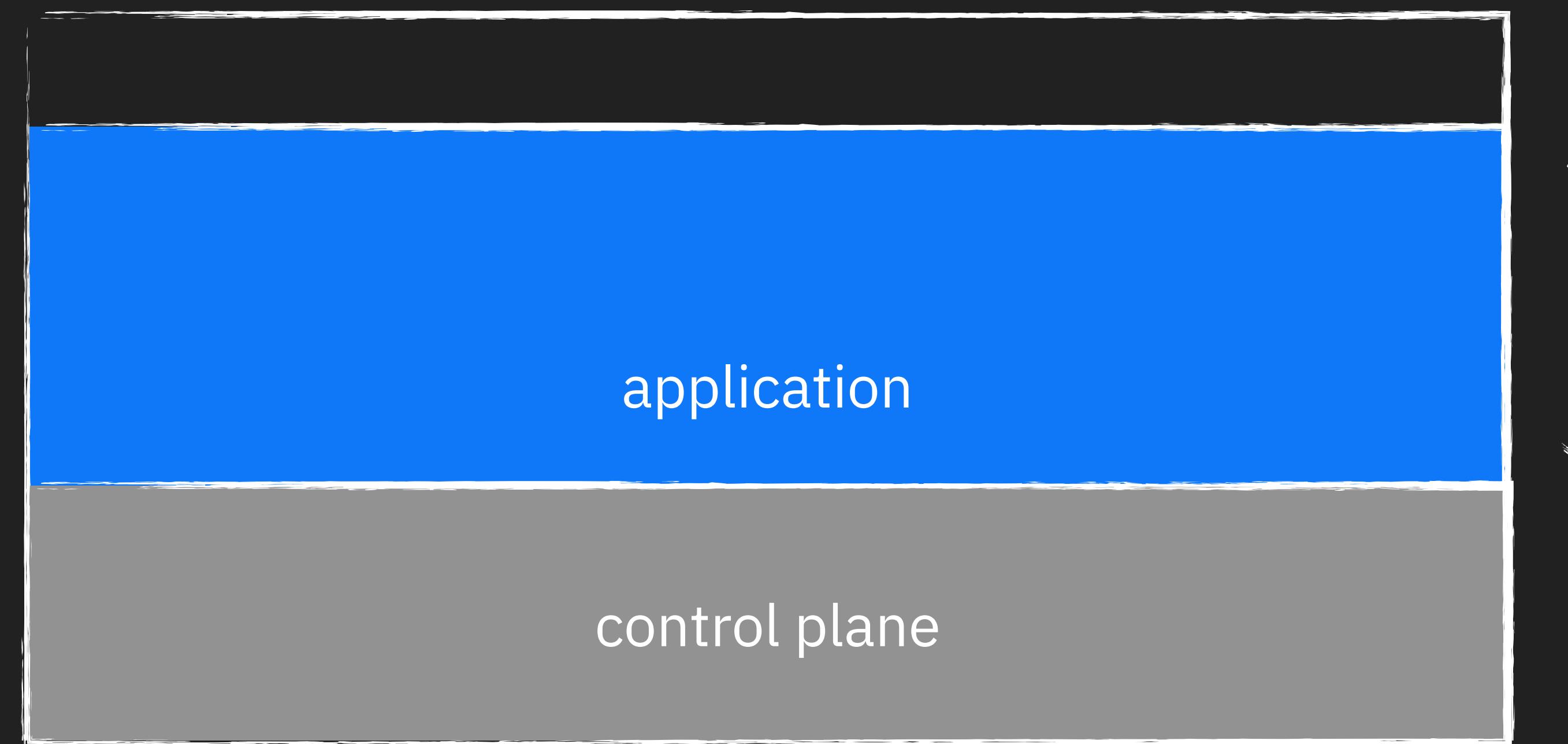
IBM zSeries

50%

power consumption of x86  
(30% more performance)

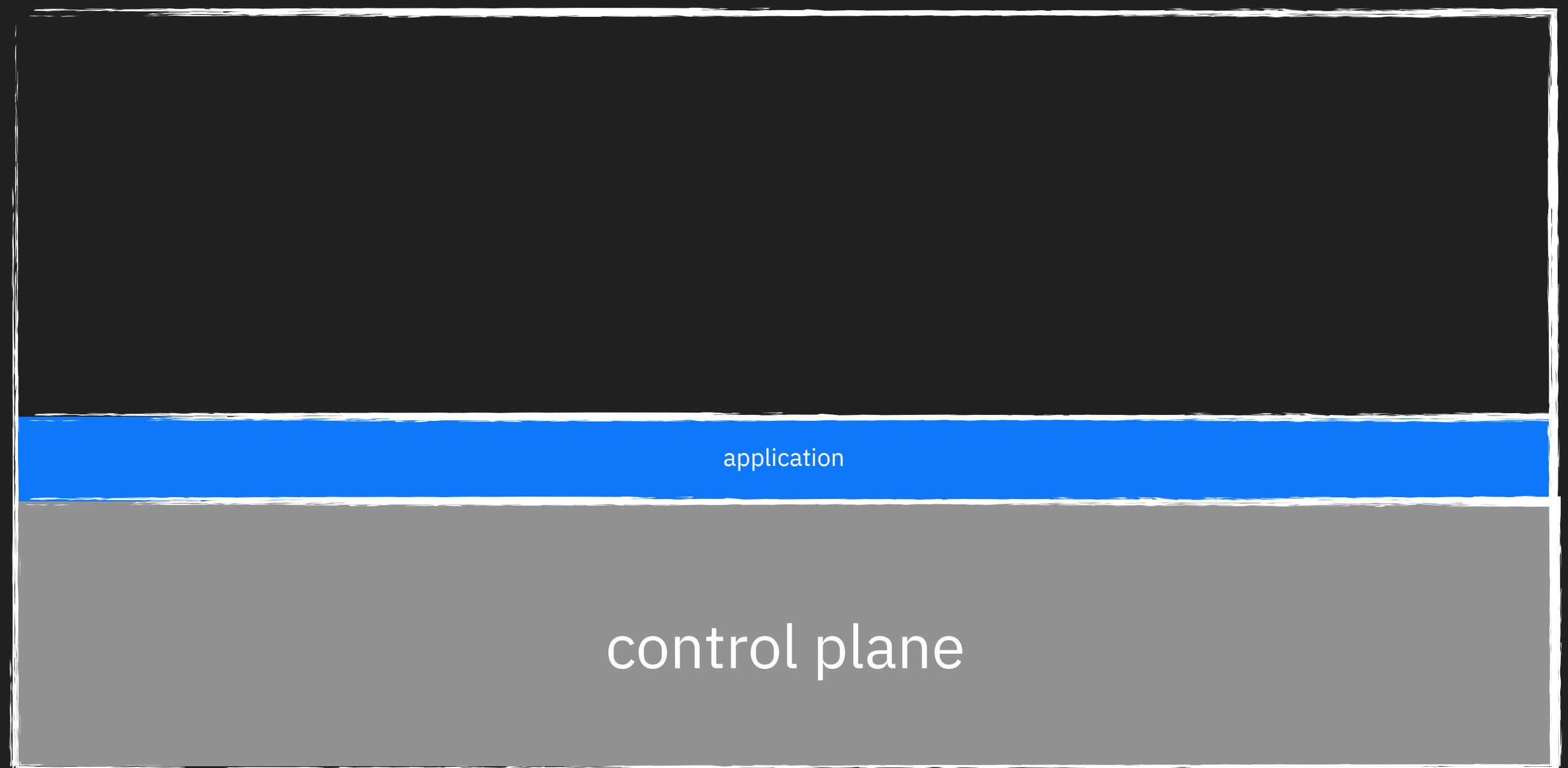






!

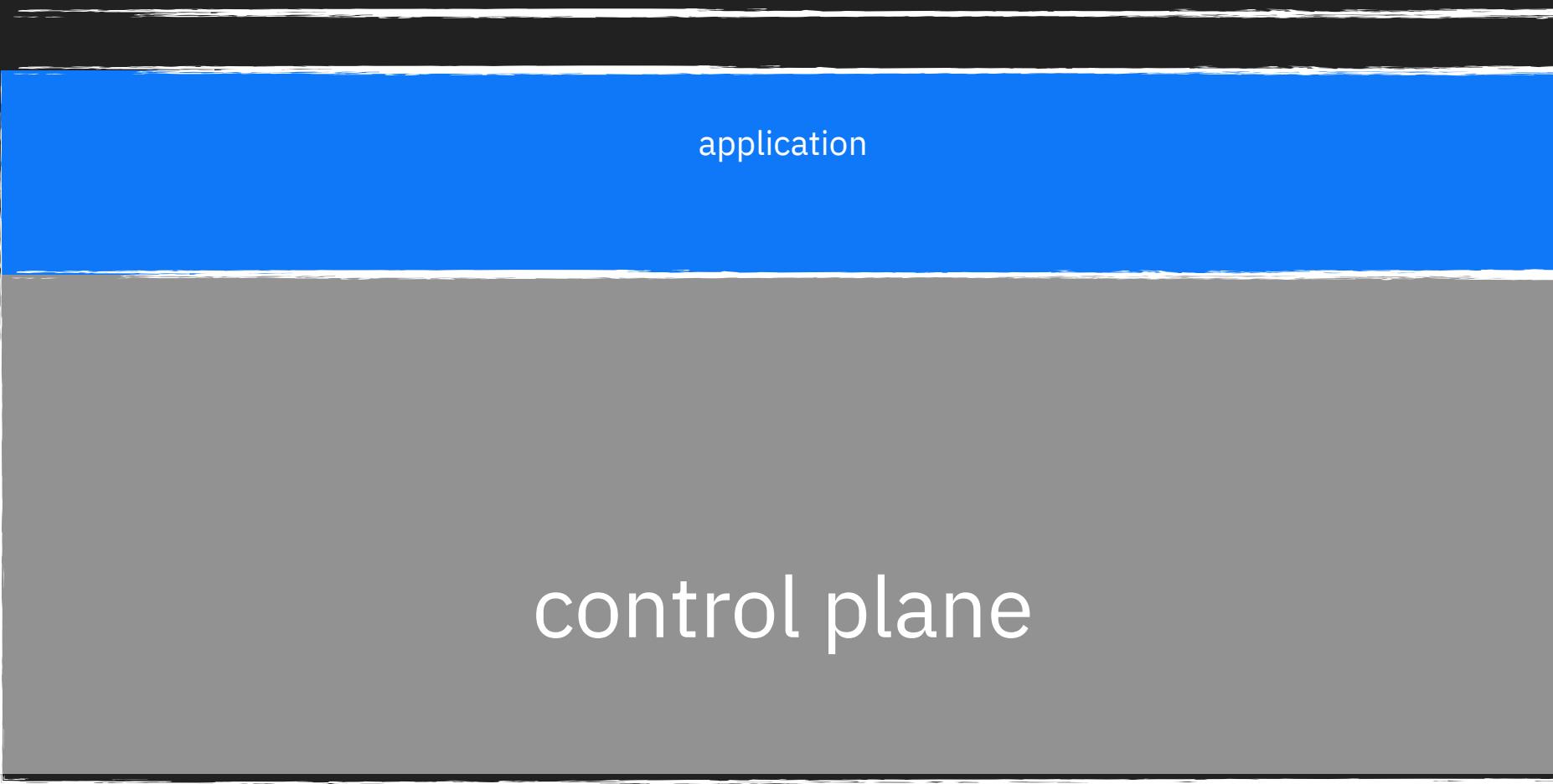
clusters are less elastic than applications



manual replica count  
horizontal auto-scaling

!

clusters are less elastic than applications

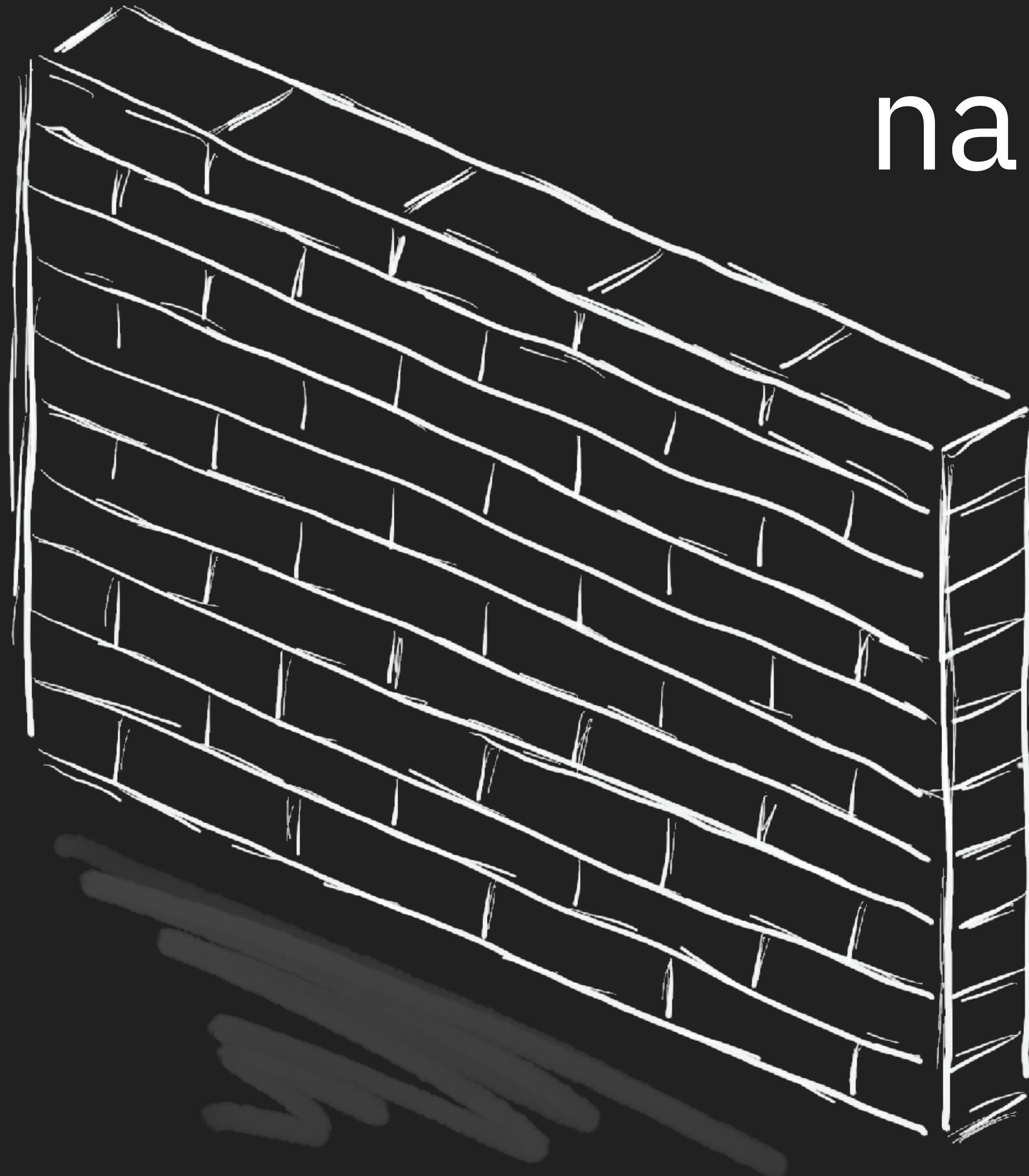


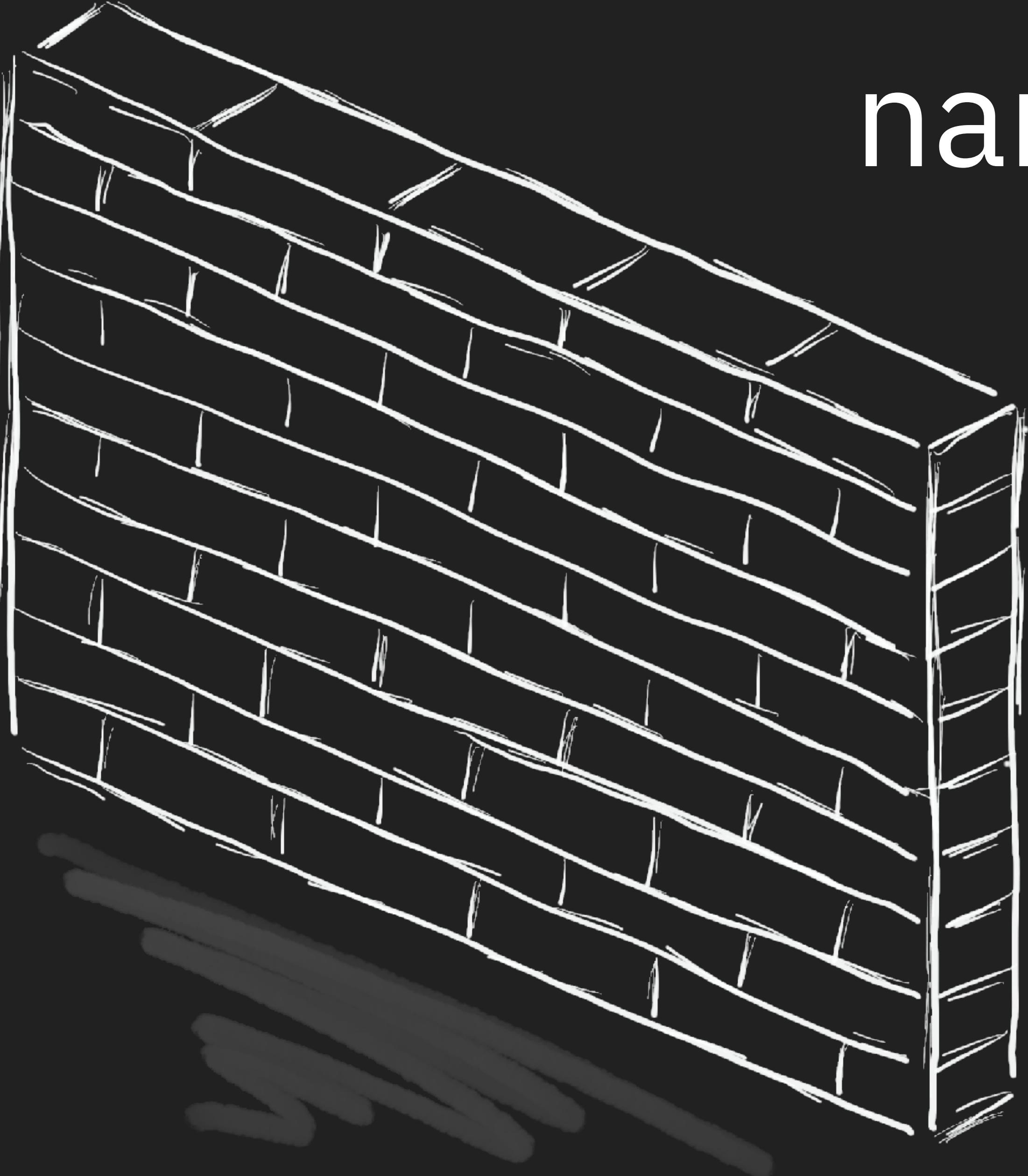
!

every cluster has overhead

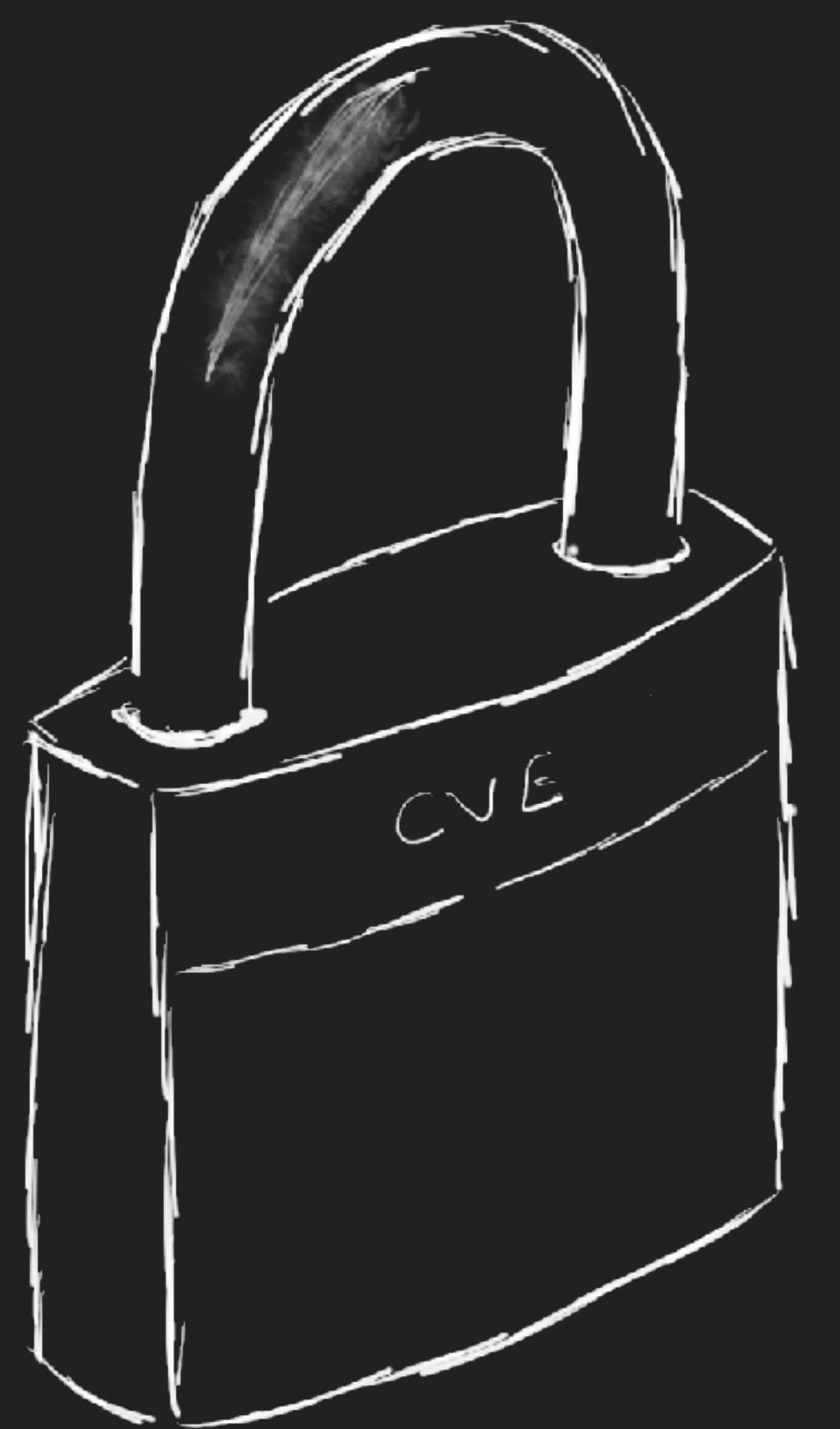
conway's law is for clusters, too

# namespaces



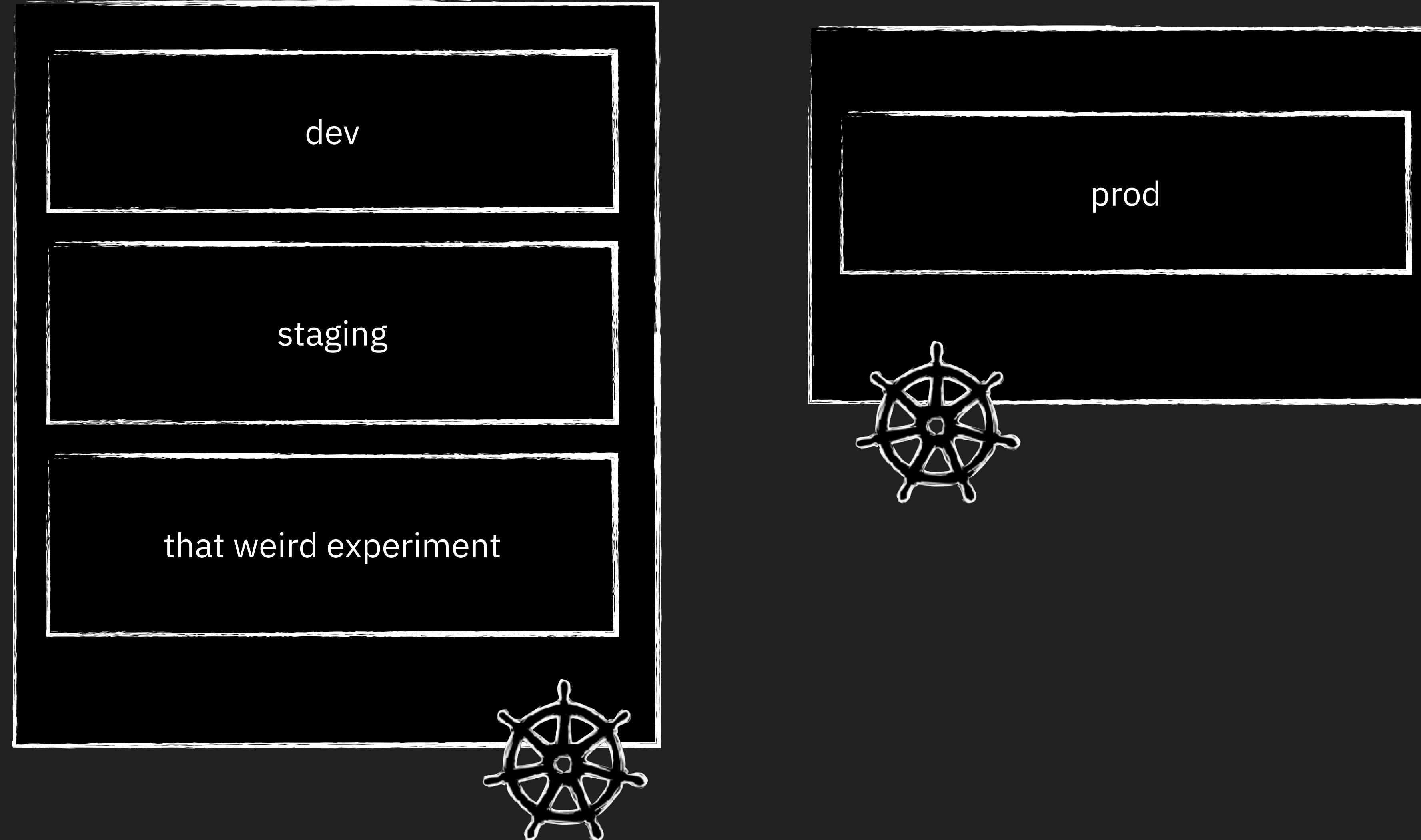


namespace isolation  
is not enough

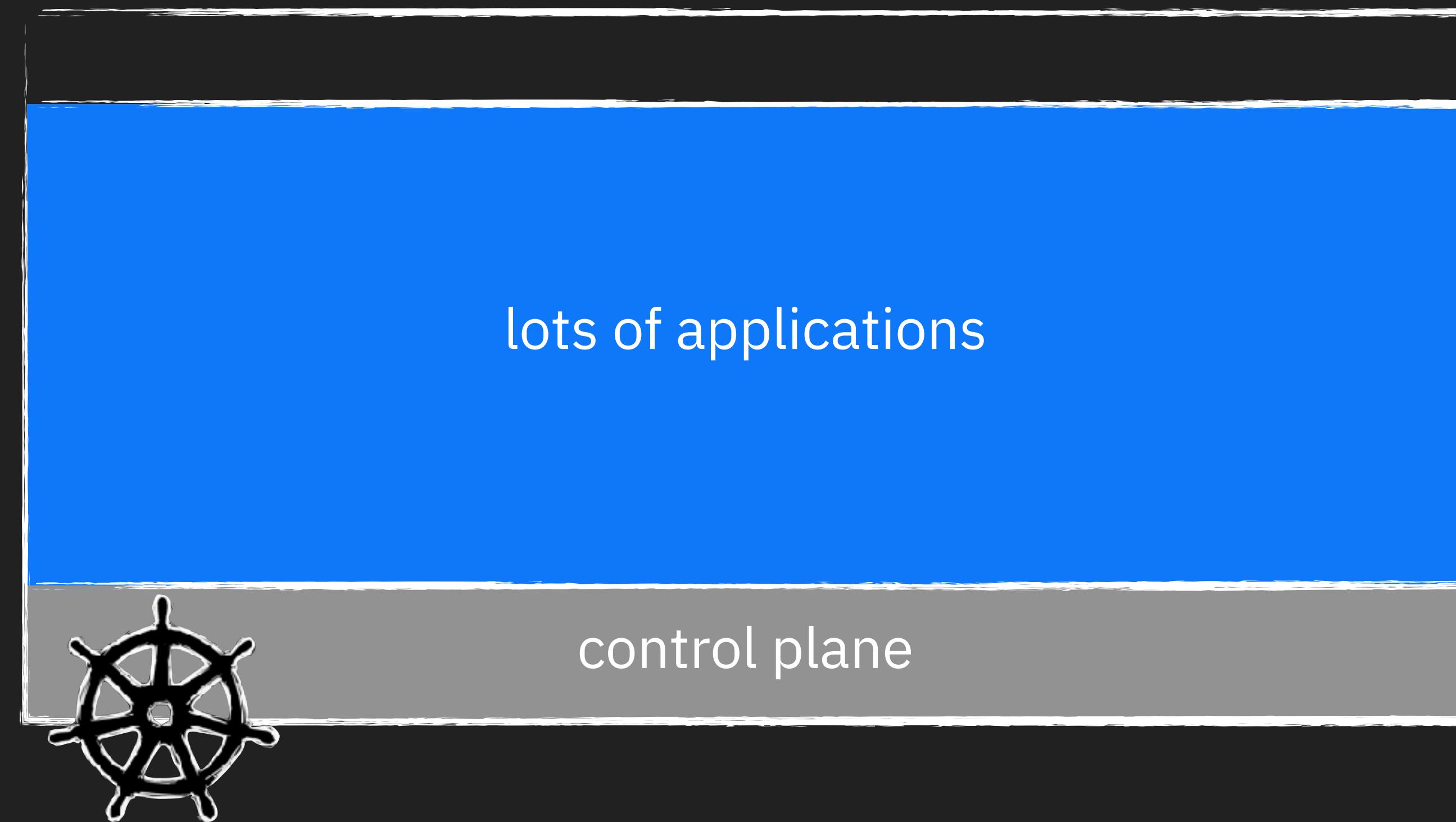


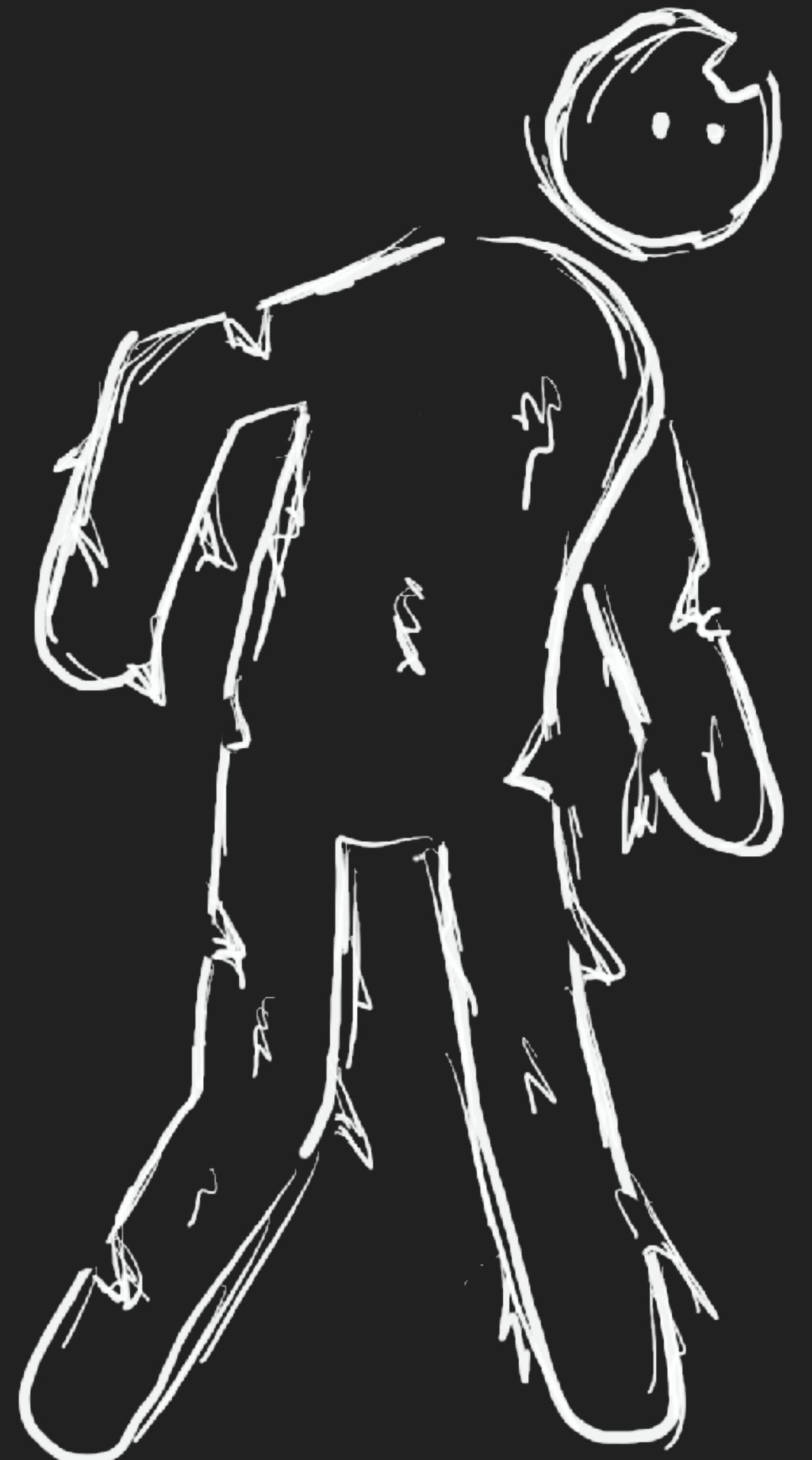
#IBMGarage

@holly\_cummins

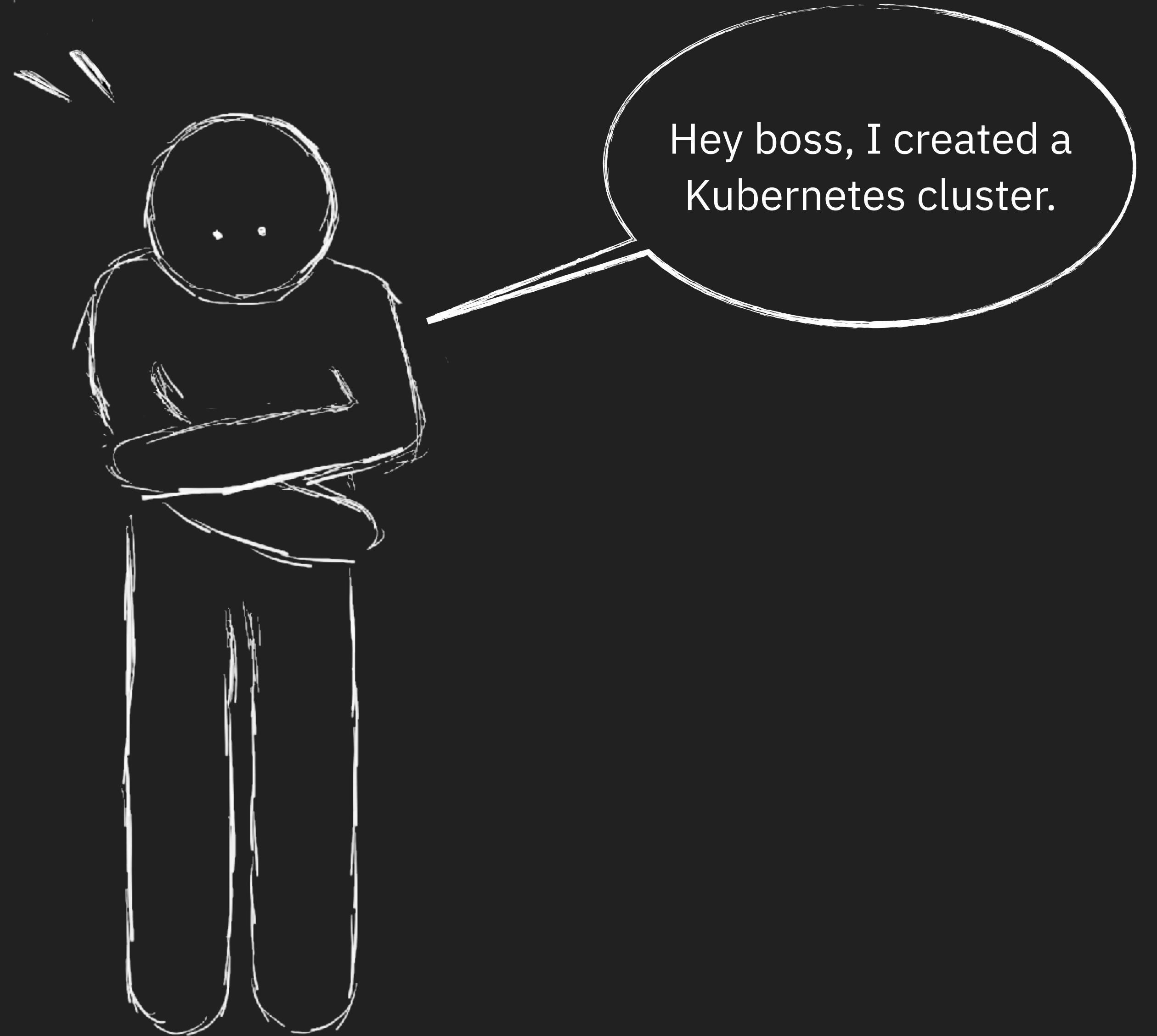


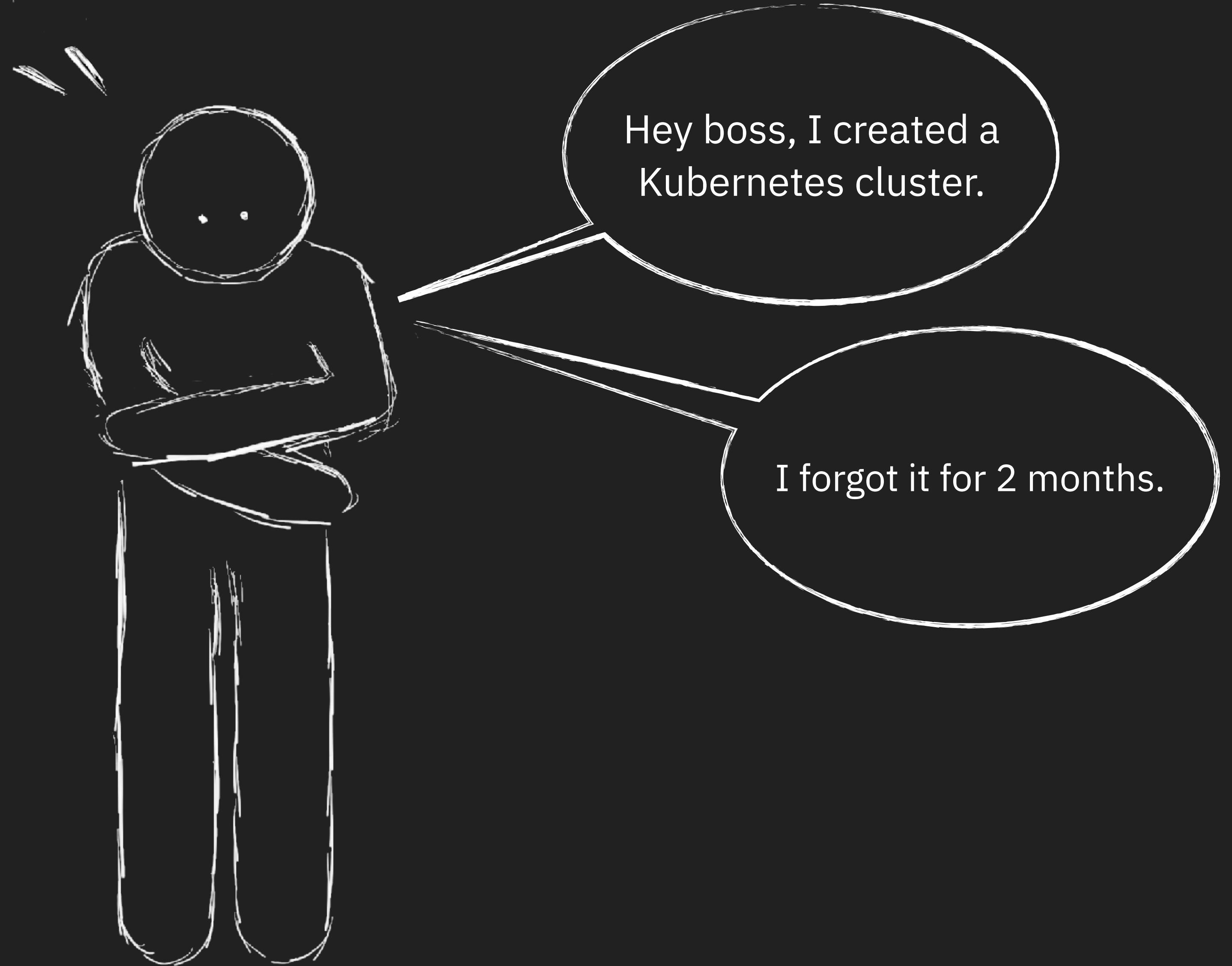
# is this a win?

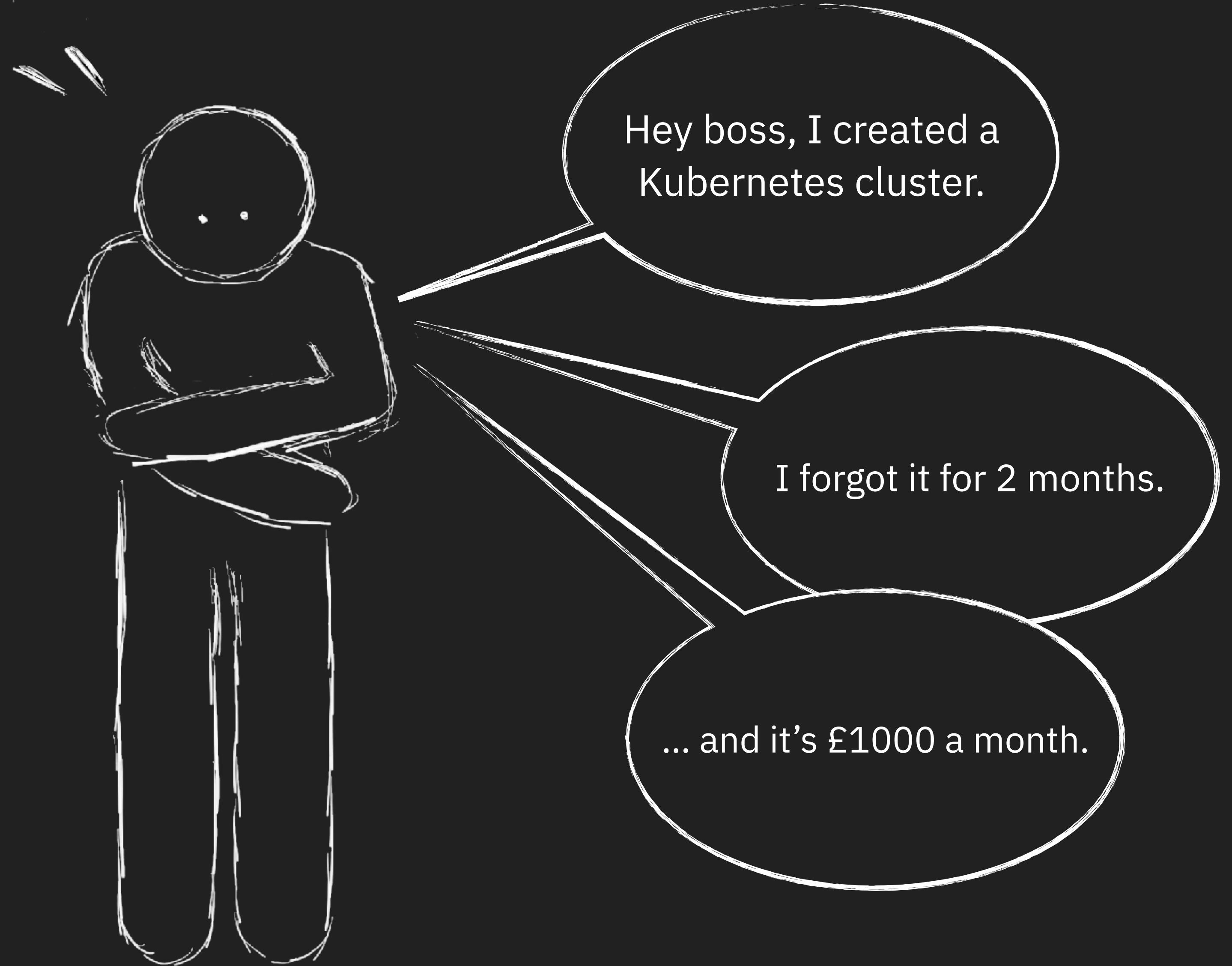




# zombie workload







2017 survey

25%

of 16,000 servers  
doing no useful work



2017 survey

25%

of 16,000 servers  
doing no useful work

“perhaps someone  
forgot to turn them off”



£

==





#IBMGarage

@holly\_cummins

is there a  
solution?





~~ACTION NEEDED~~ Accounts + servers



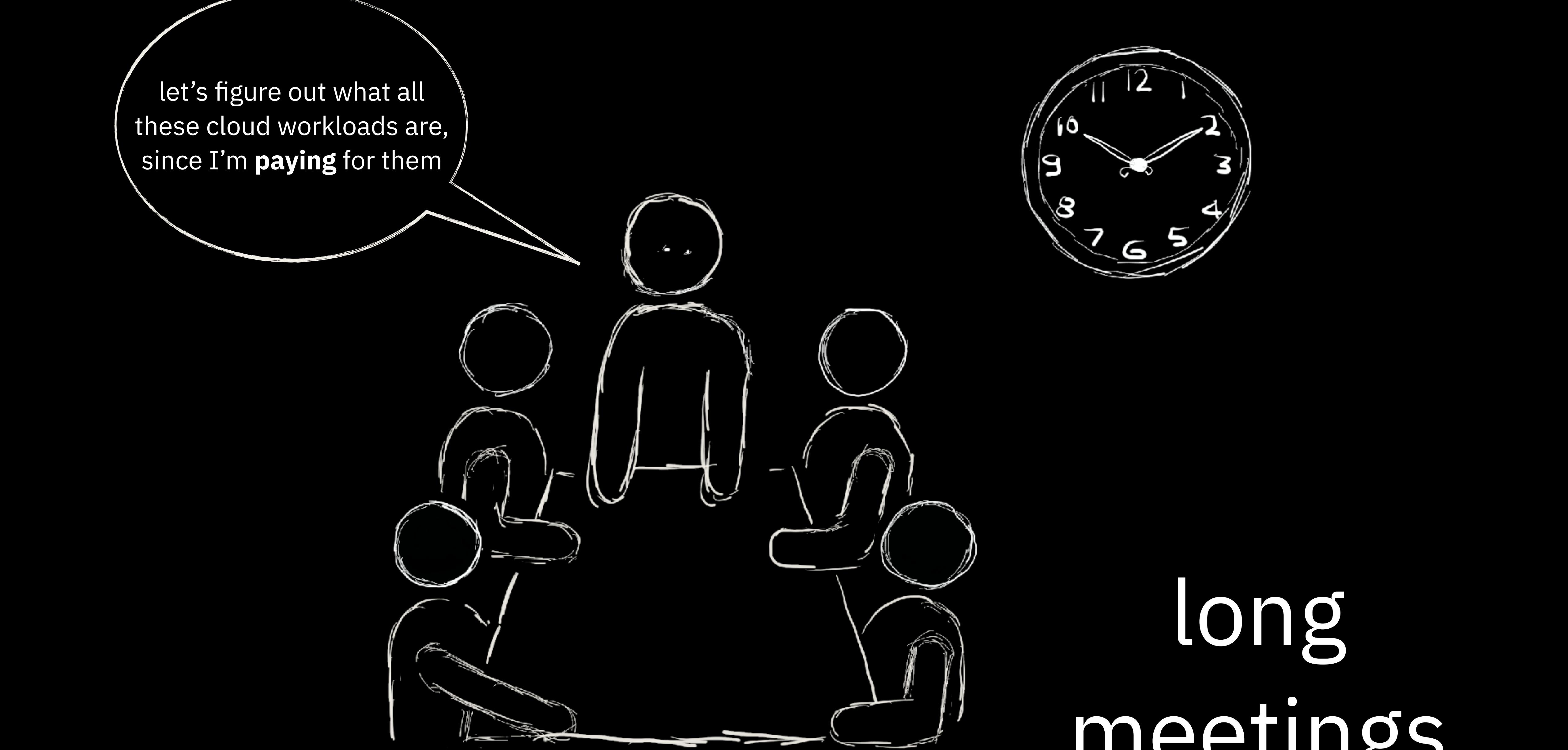
Folks,

chaos! Accounts! Tidy up! Please! So much money!  
Tidy! Please! Who is using?! Owner?? Help!

Cheers,

Kedar

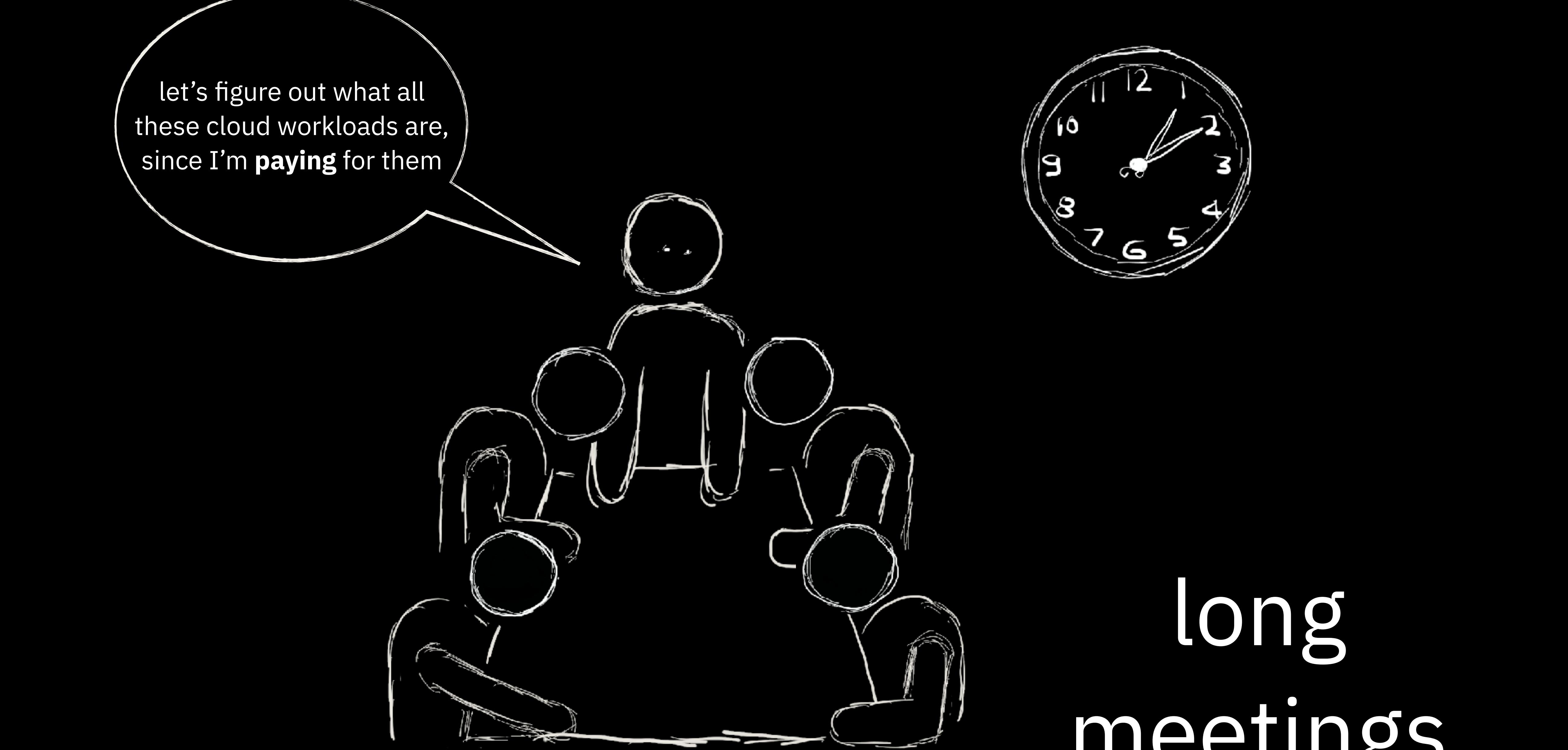
# pleading emails



let's figure out what all  
these cloud workloads are,  
since I'm **paying** for them

long  
meetings

IT Department, UK Bank



let's figure out what all  
these cloud workloads are,  
since I'm **paying** for them



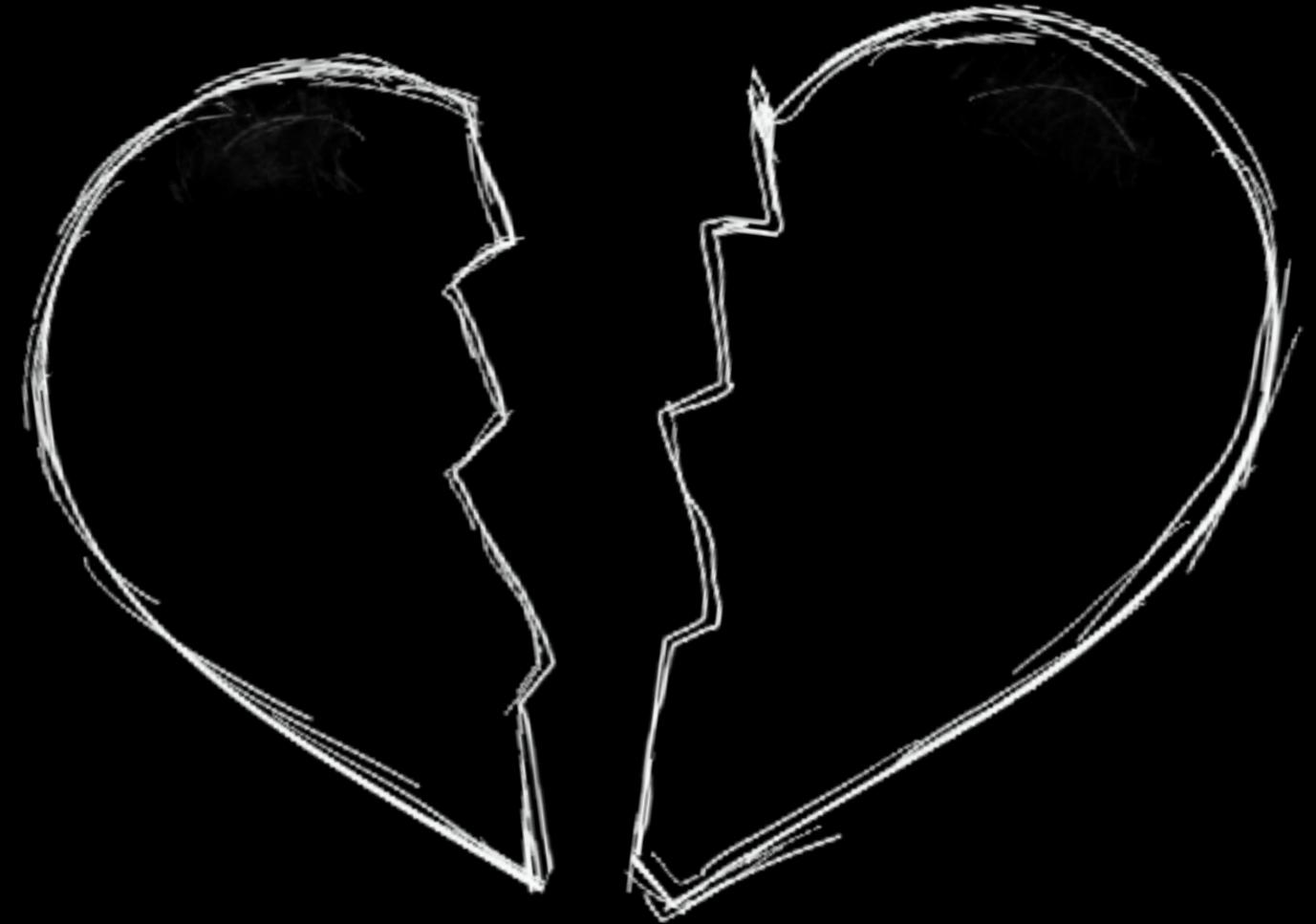
long  
meetings

IT Department, UK Bank

# tags

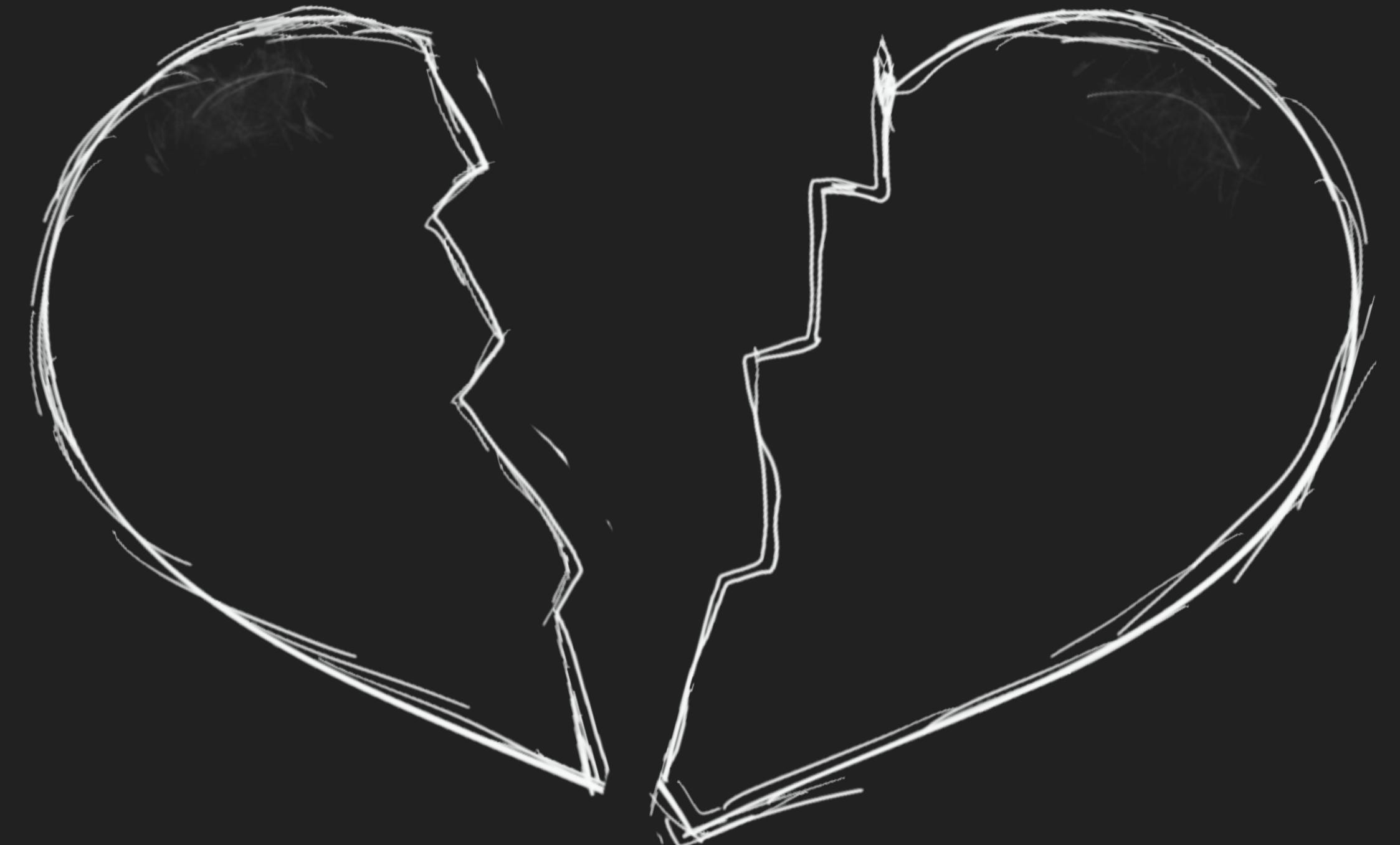




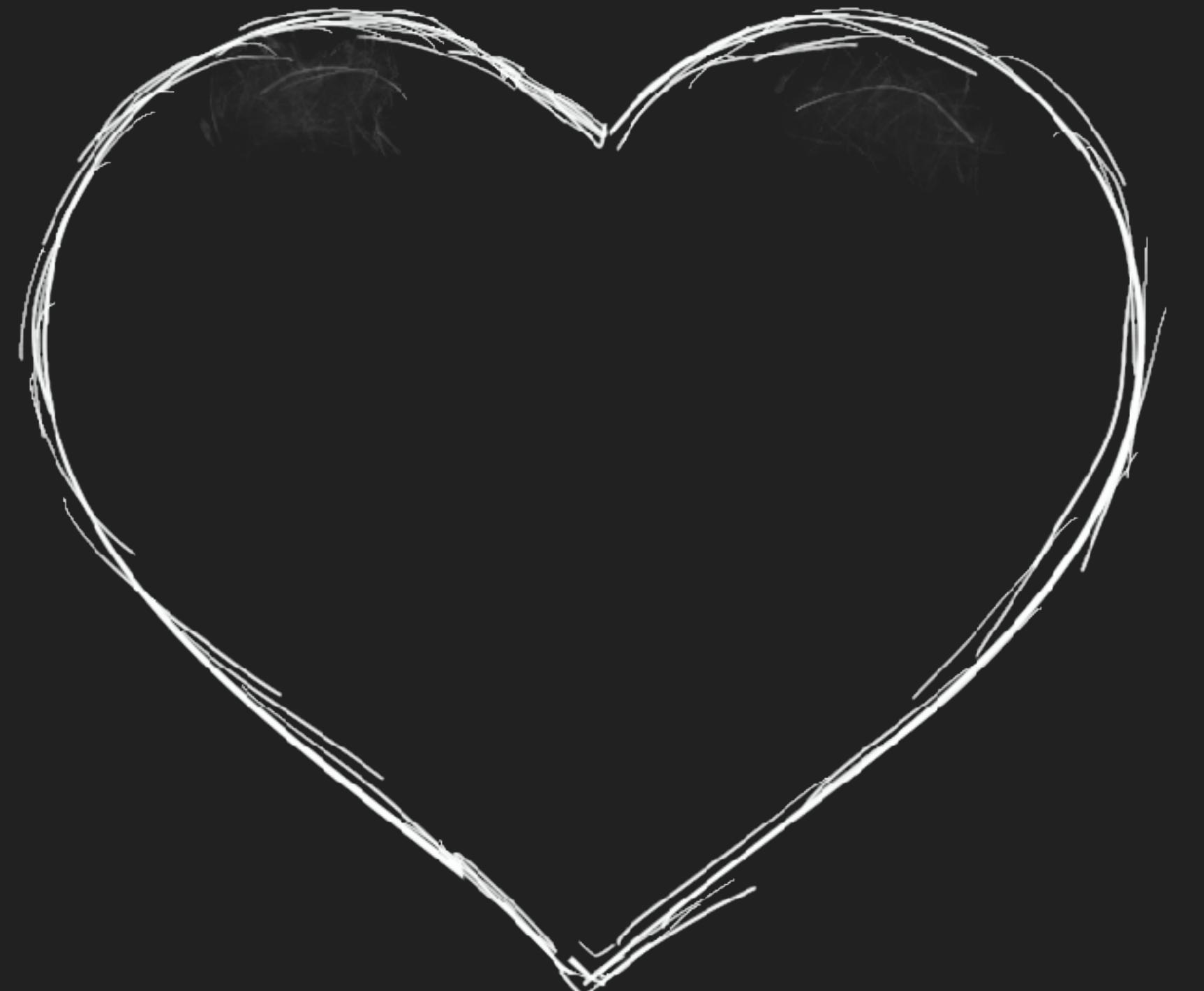


governance

make it **easiest** to  
do the right thing



make it easiest to  
do the right thing



# finops



is the cloud  
zombie-proof?



is the cloud  
zombie-proof?

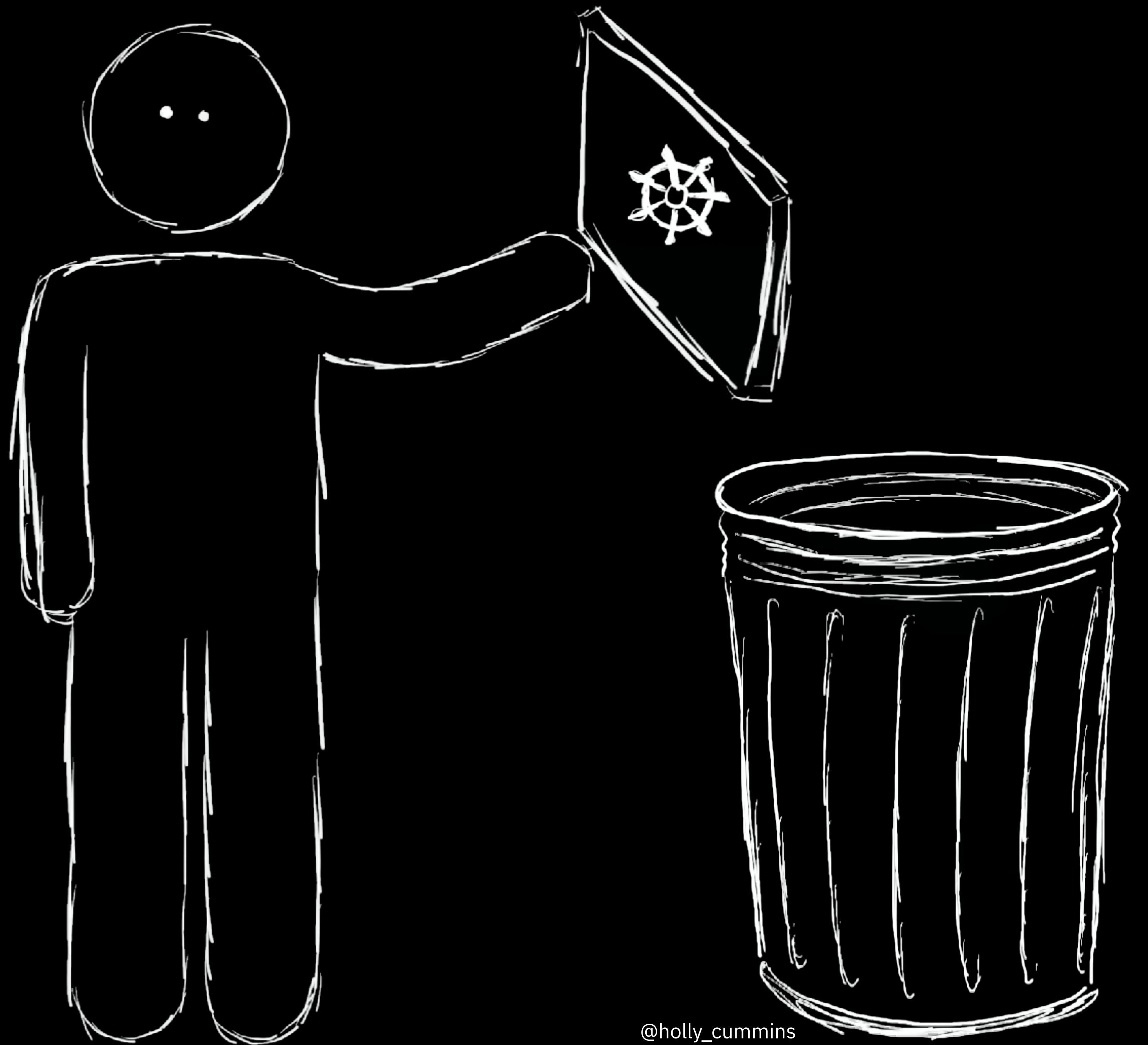




# gitops

# gitops

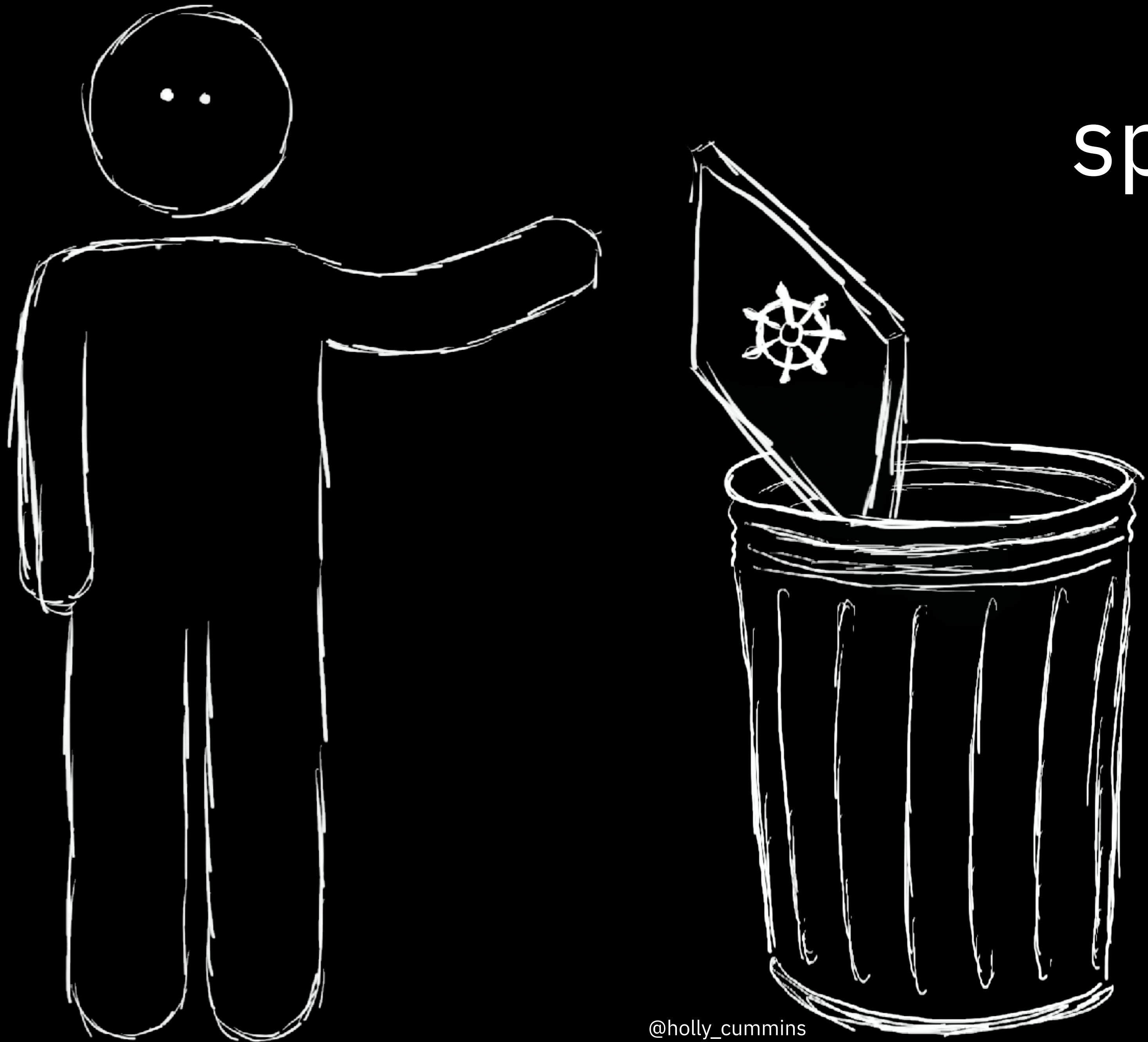
## (infrastructure as code)

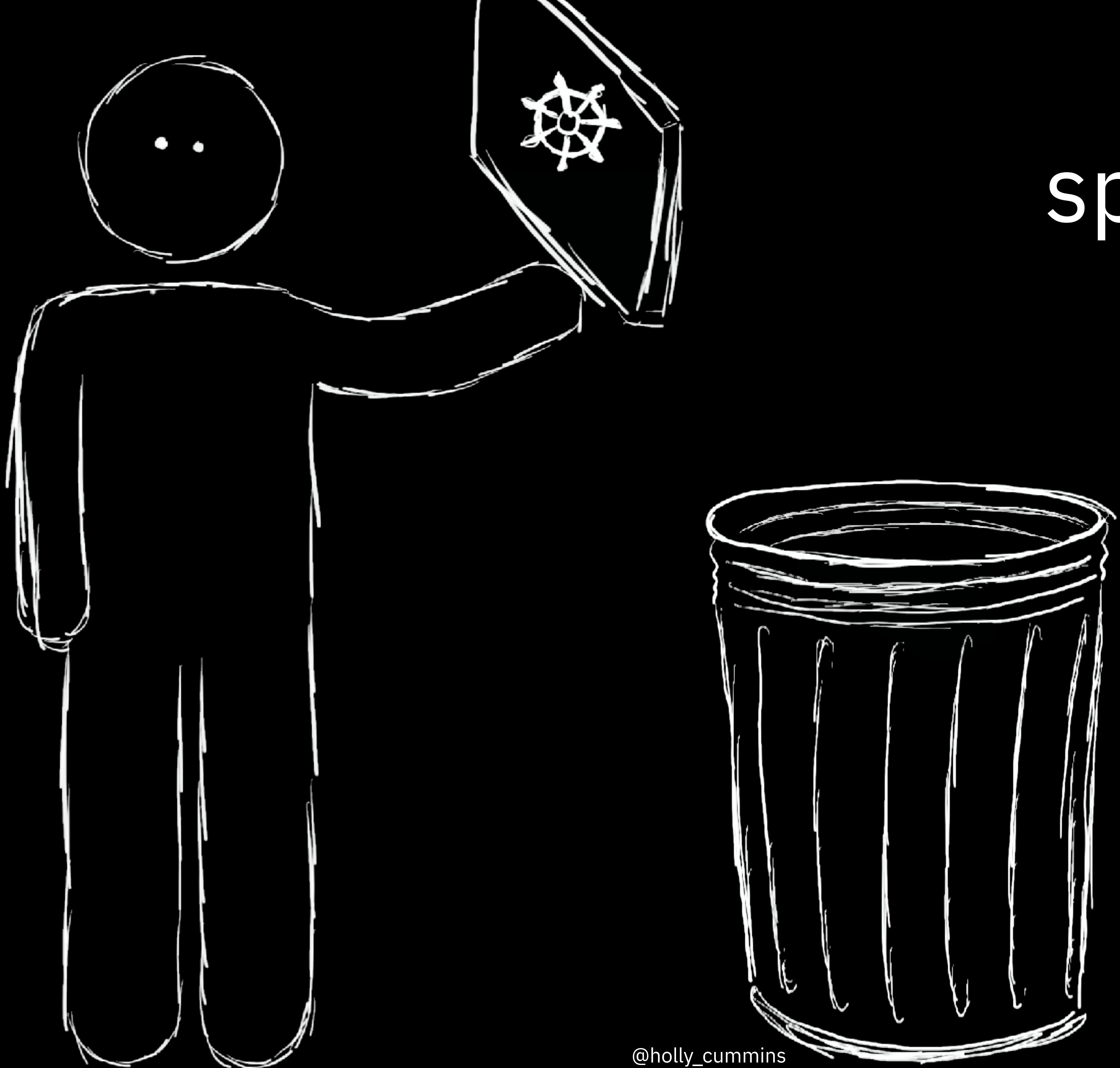


#IBMGarage

@holly\_cummins

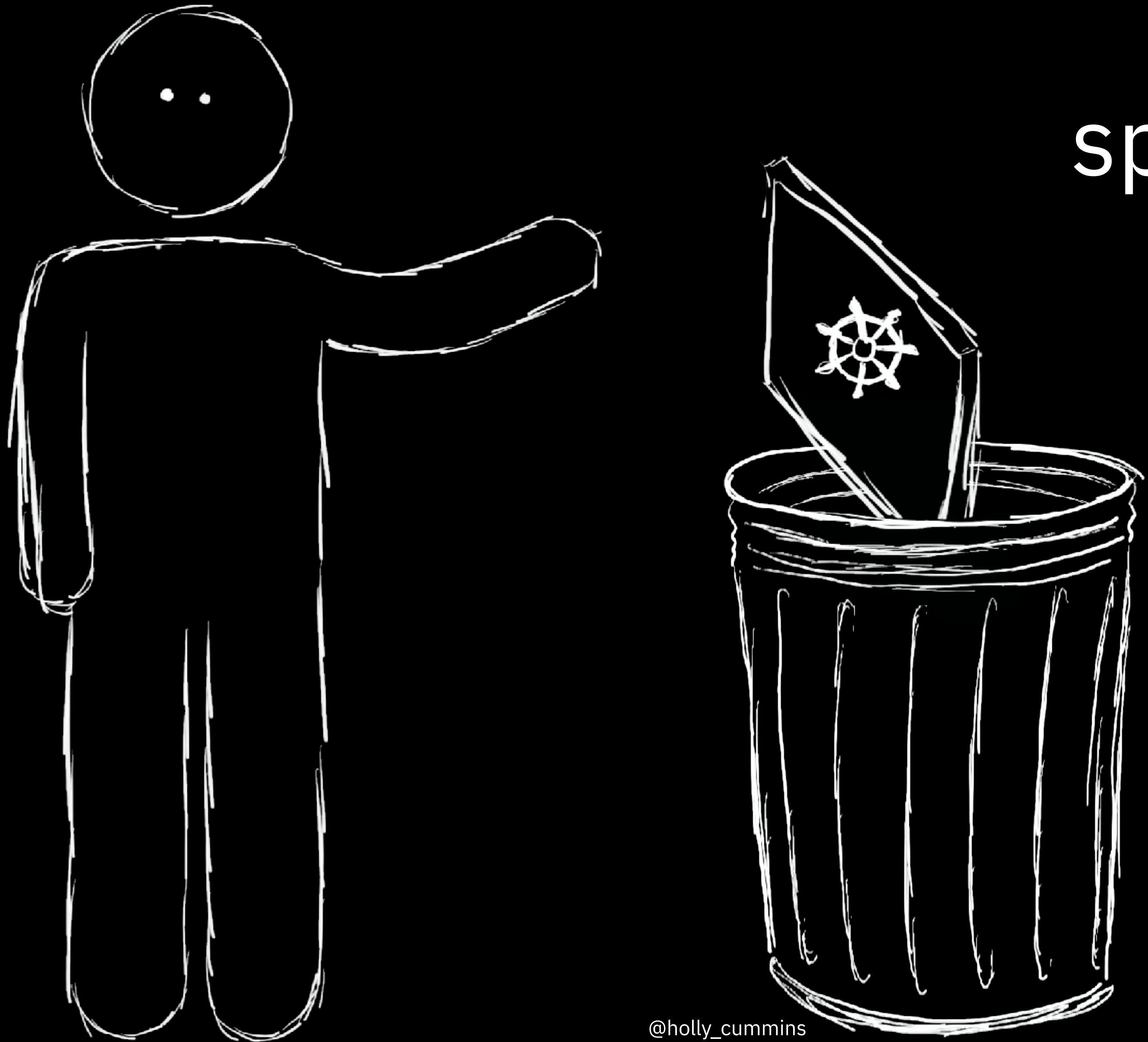
spin it down



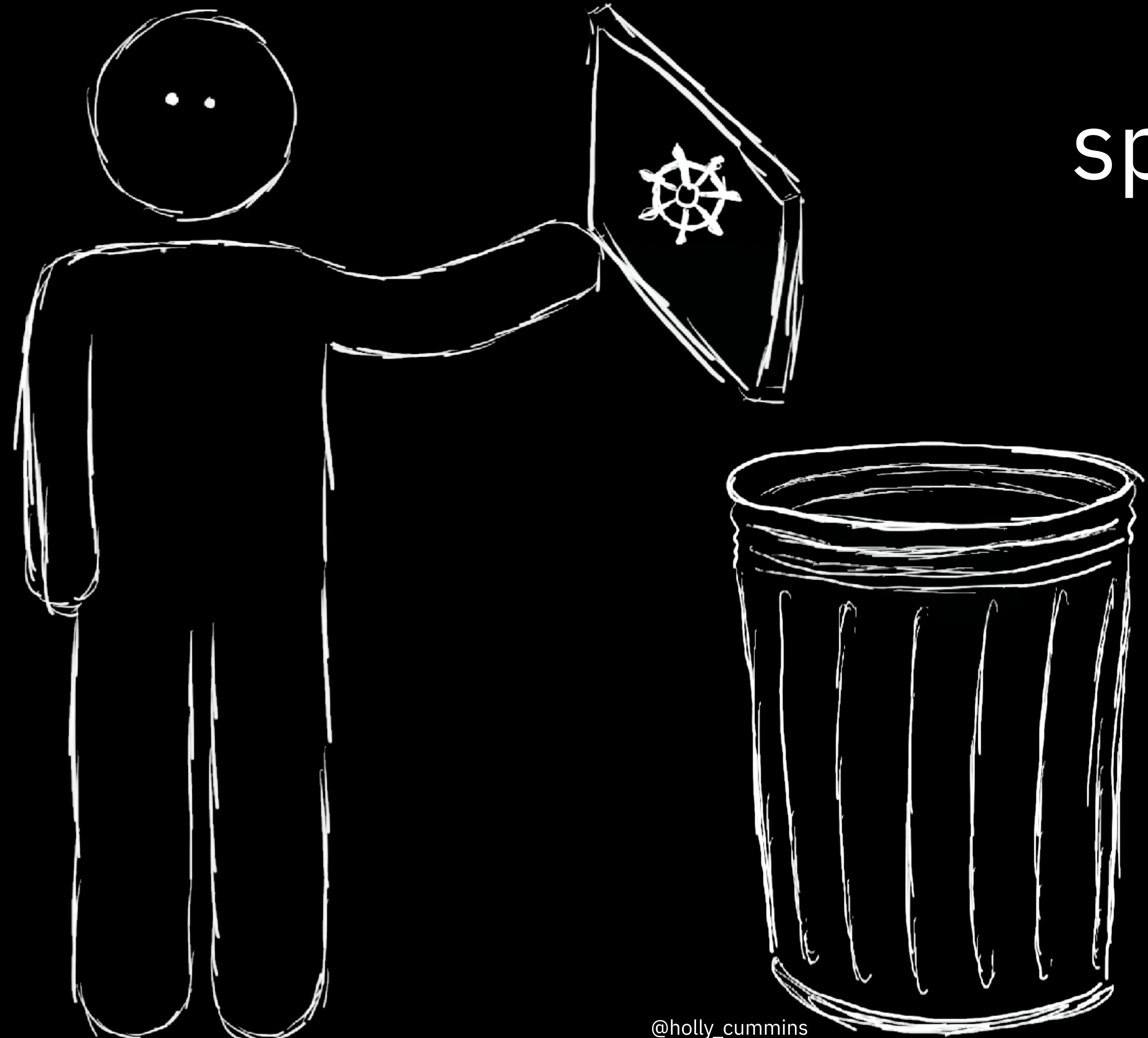


spin it down  
spin it up

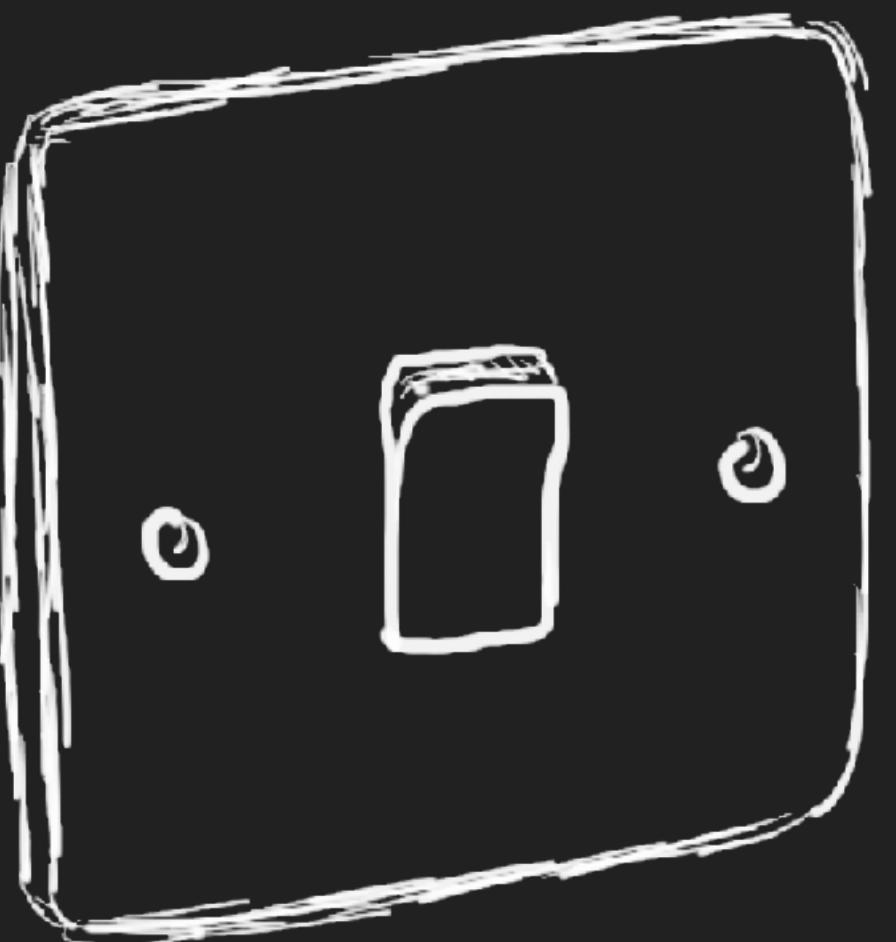
spin it down  
spin it up



spin it down  
spin it up

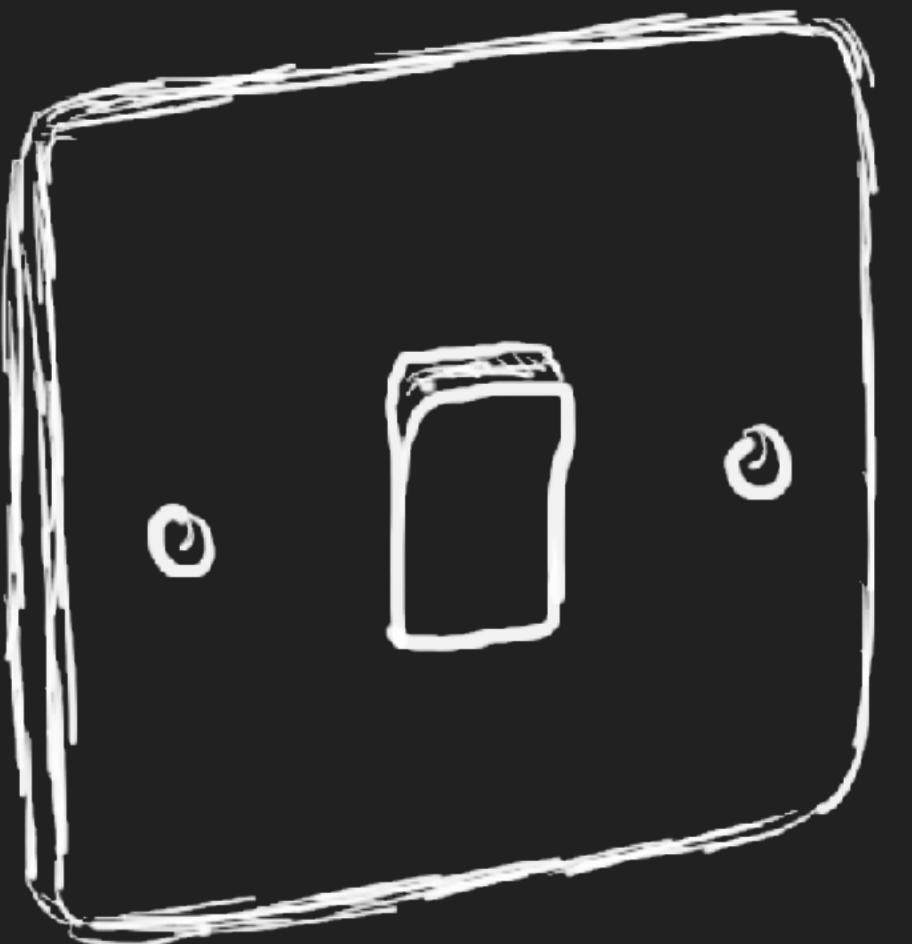


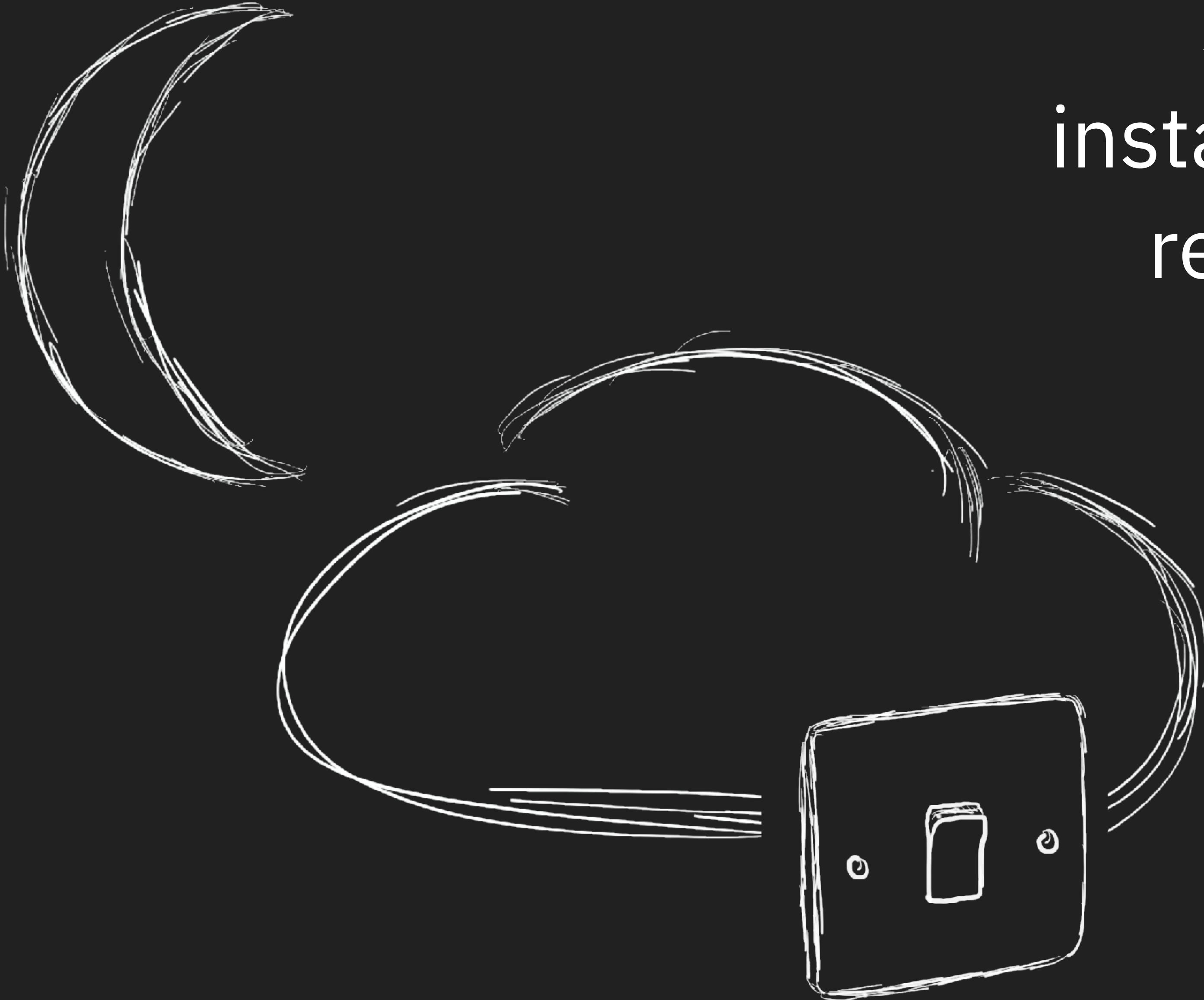
# spinning down clusters: the new lights off?



spinning down clusters:  
the new lights off?

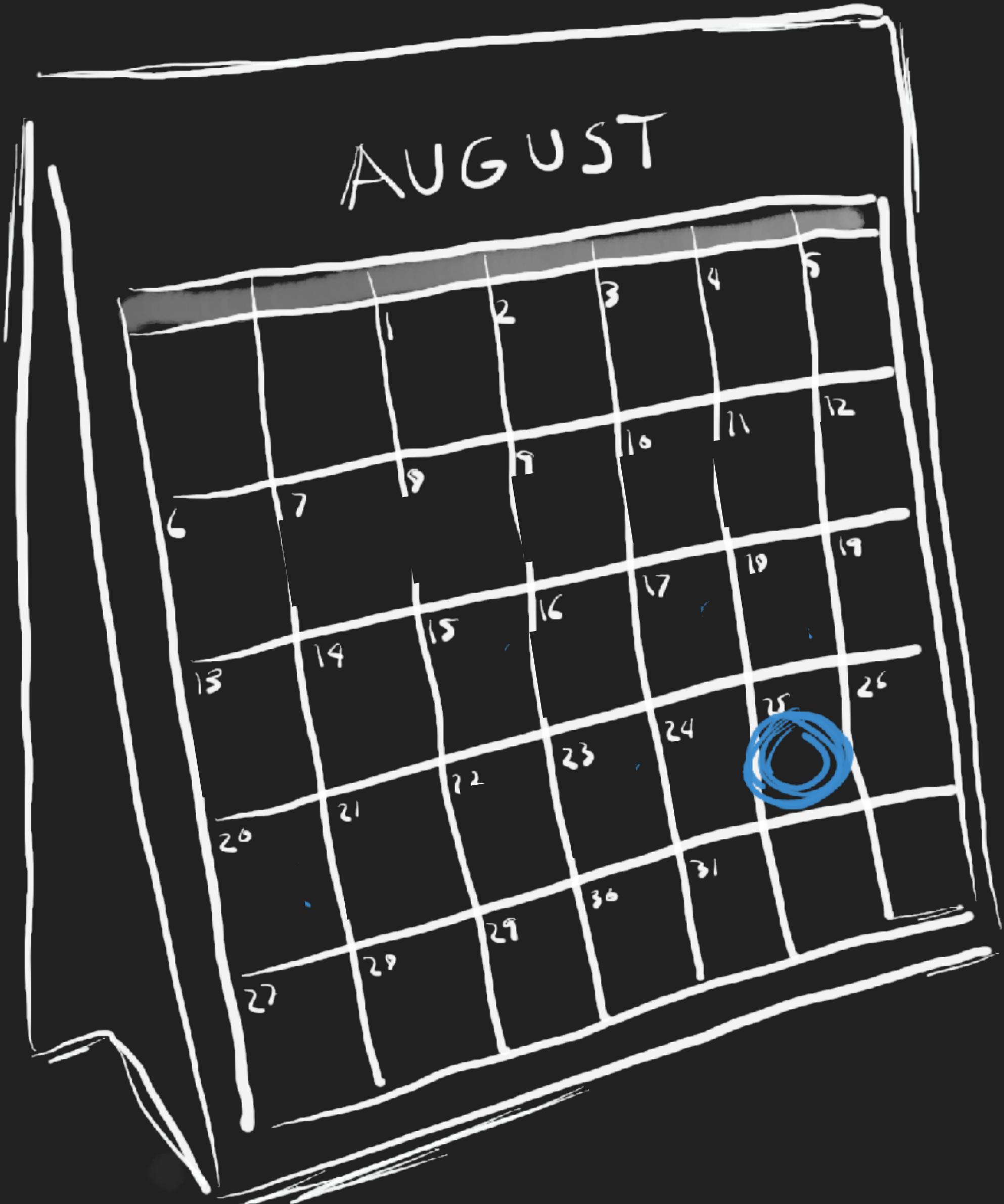
oh. it **is.**





shutting down  
instances out of hours  
reduced costs by

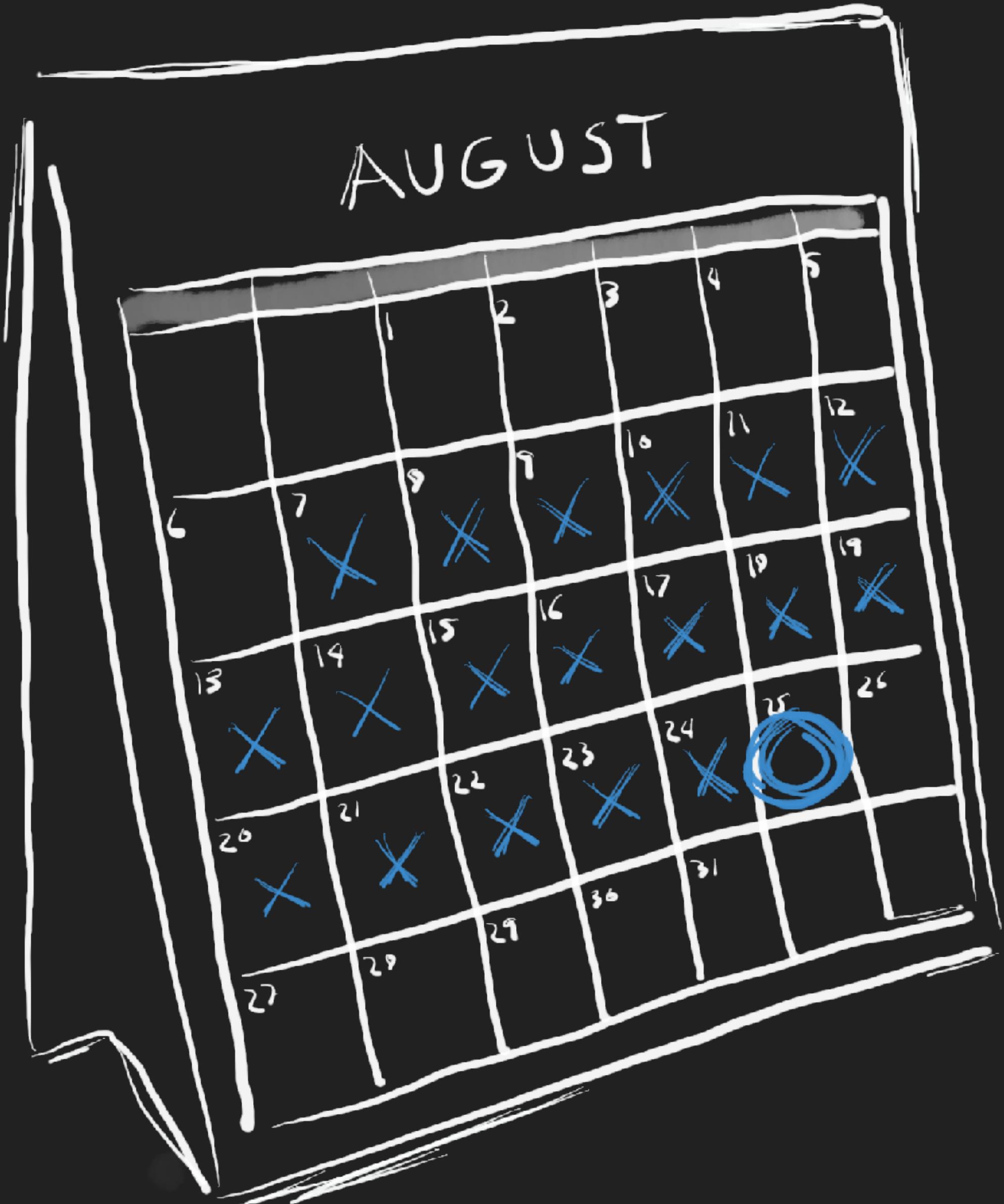
37%



large bank, 2013

50%

reduction in CPUs with a  
lease system



large bank, 2013

50%

reduction in CPUs with a  
lease system

# multicloud management

# traffic monitoring

# cautions

beware  
micro-optimisation  
theatre



is my travel sustainable?



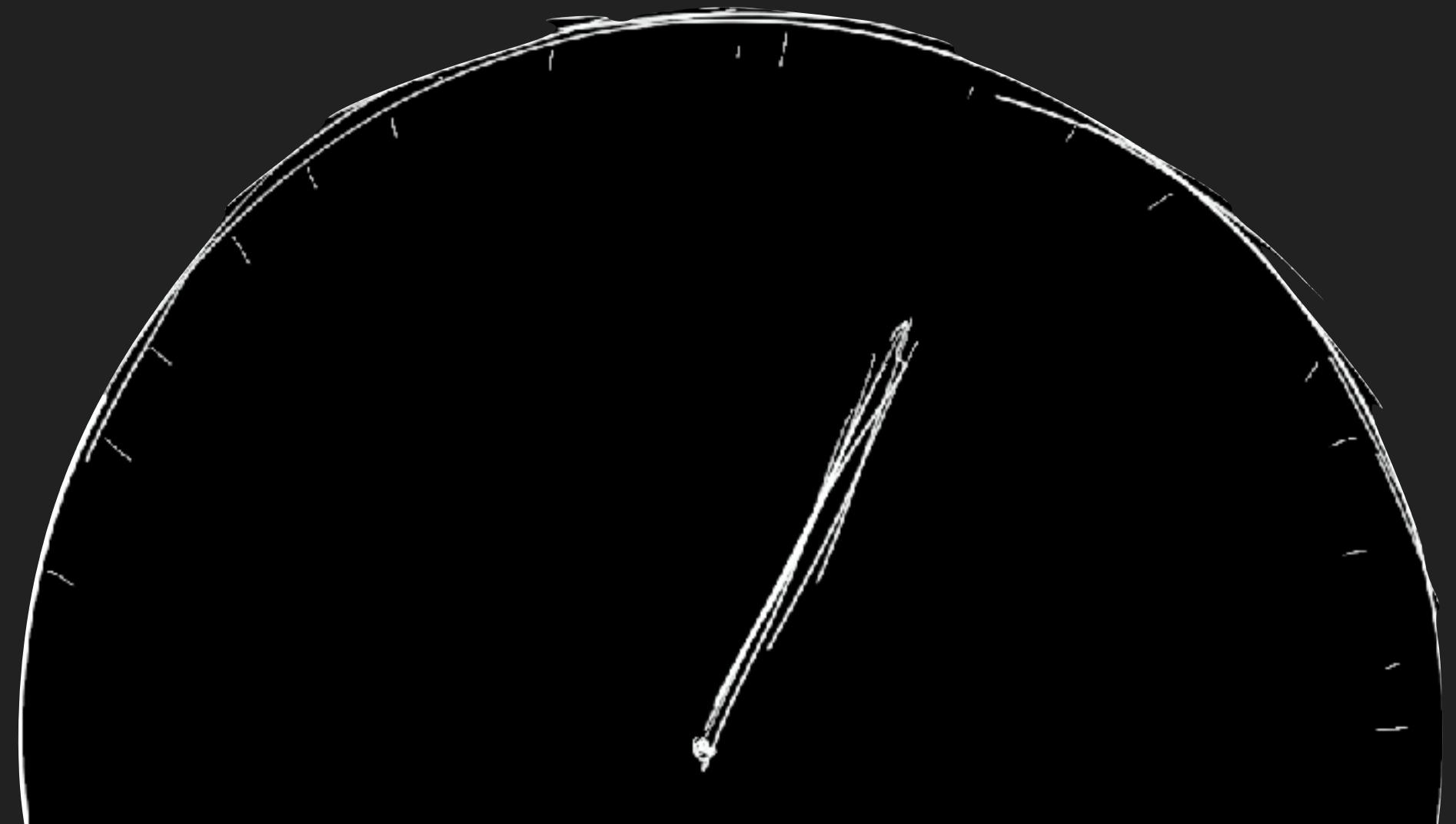
is my travel sustainable?

# fixing the wrong problem

but ... every little helps...

think about the other things  
you're not optimising

knowledge helps us  
focus on optimisations  
that matter

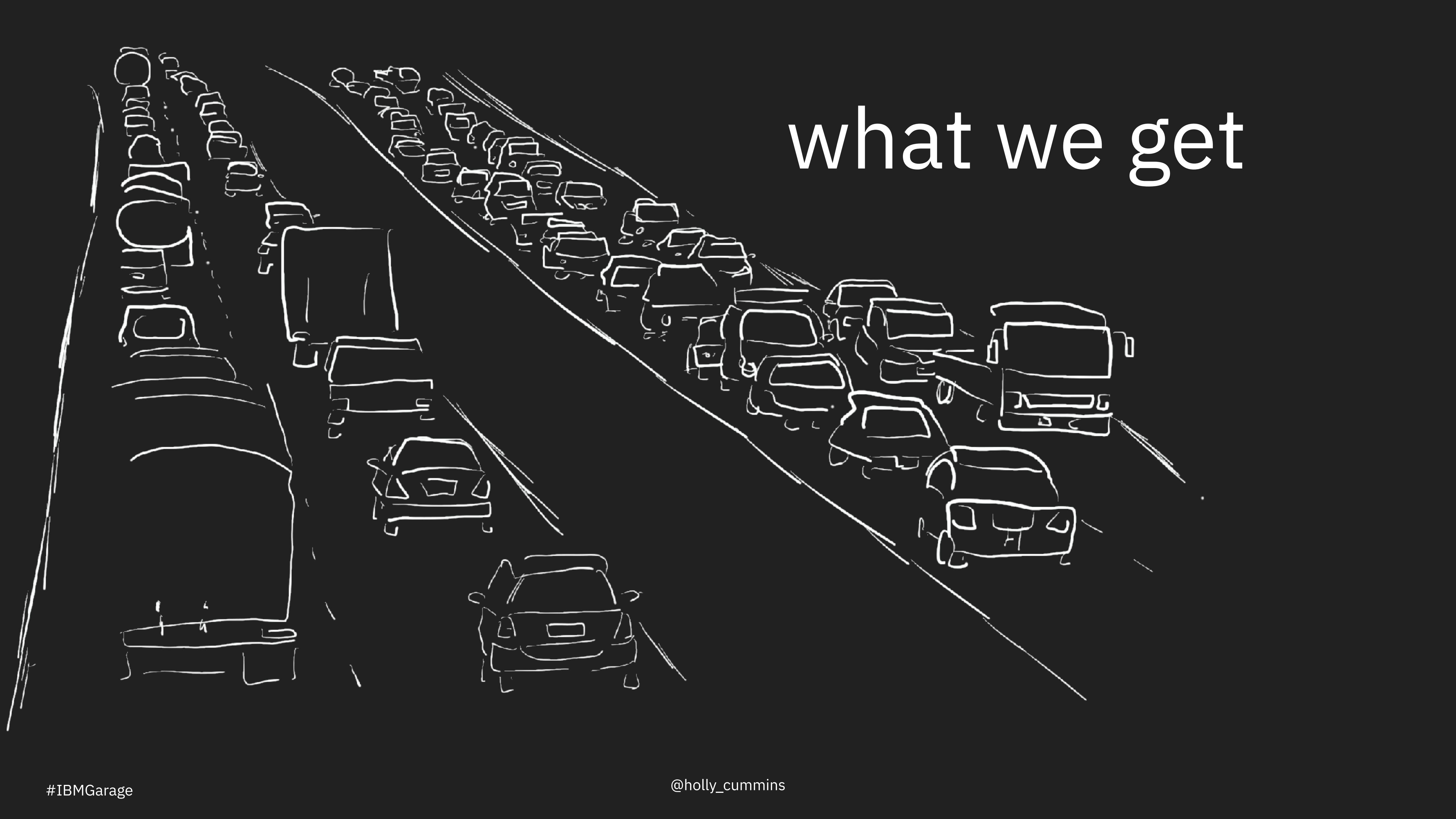


# jevons' paradox

# the highway problem

what we  
imagine when  
we widen roads





what we get

unsolved problem == opportunity



#IBMGarage

@holly\_cummins

# system designers, support



# system designers, support

performance  
make it fast and lean

better utilisation  
elasticity  
multi-tenancy

de-zombification  
visibility  
disposability





#IBMGarage

@holly\_cummins

# users ...



# users ...

up utilisation  
aim for elasticity  
limit sprawl



de-zombification  
know what you're using  
turn it off



Thank you.

**Questions?**

@holly\_cummins

**IBM Garage**

**IBM**