nine ways to fail at cloud native

Holly Cummins
IBM Garage
@holly_cummins

IBM

I’m a consultant with the IBM Garage.

These are my scary stories

fail

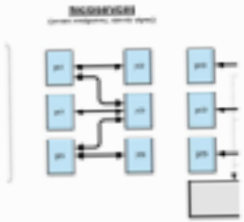
the magic morphing meaning

what **is** cloud native?

Daniel Bryant
@danielbryantuk

Following

I've gotta hand it to @bibryam, he's got a great way of framing things... :-)

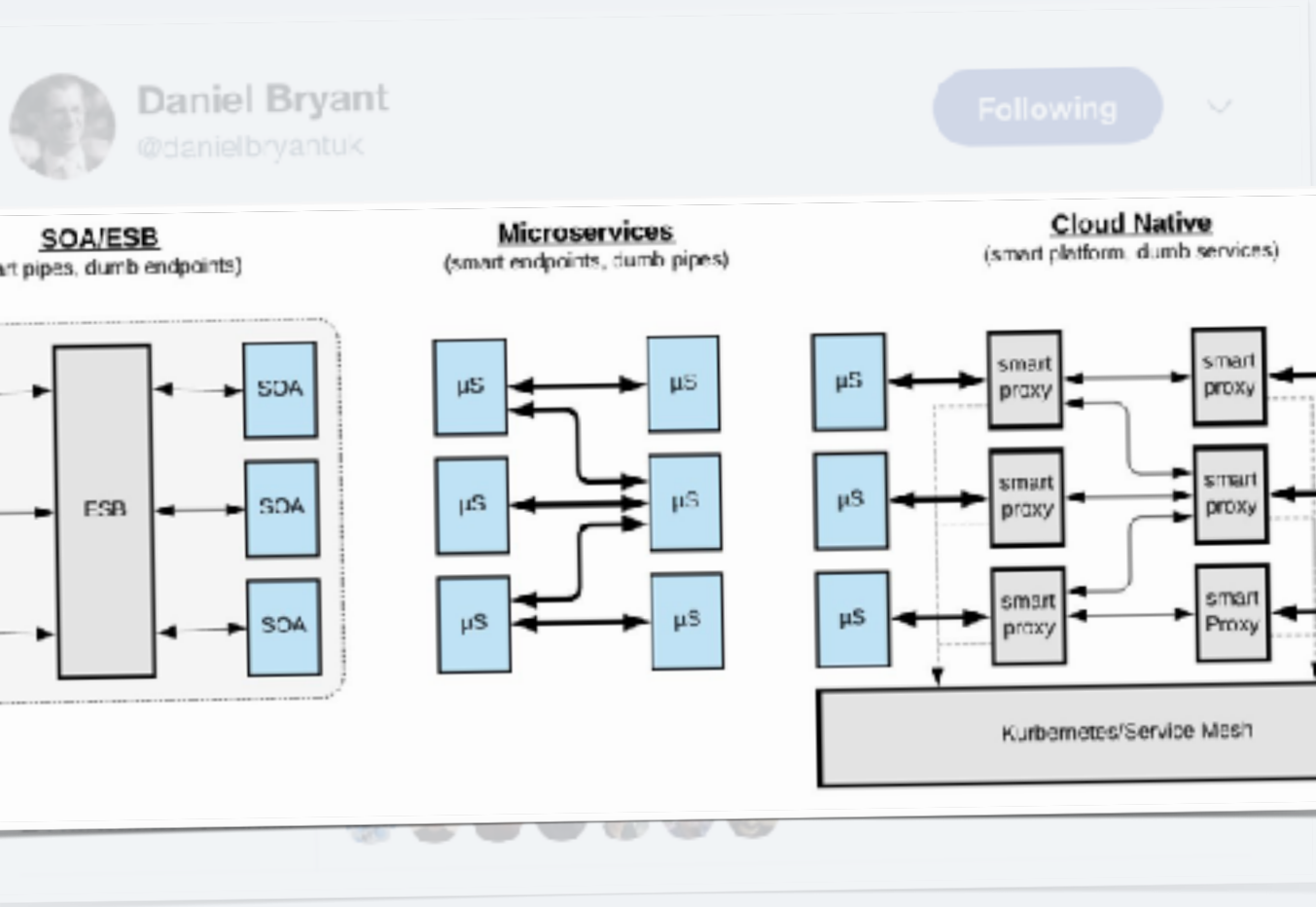


Bilgin Ibryam @bibryam
ESB -> Microservices -> CloudNative

8:42 AM - 7 Aug 2018

2 Retweets **7** Likes

Credit to @bibryam



#IBMGarage

@holly_cummins

(a great article, btw)

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Microservices in a Post-Kubernetes Era

Posted by Bilgin Ibryam, reviewed by Daniel Bryant on Sep 01, 2018. Estimated reading time: 8 minutes

Key Takeaways

- The microservice architecture is still the most popular architectural style for distributed systems. But Kubernetes and the cloud native movement has redefined certain aspects of application design and development at scale.
- On a cloud native platform, observability of services is not enough. A more fundamental prerequisite is to make microservices automatable, by implementing health checks, reacting to signals, declaring resource consumption, etc.
- In the post-Kubernetes era, using libraries to implement operational networking

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Microservices

8 minutes | 1 Discuss

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Key Takeaways

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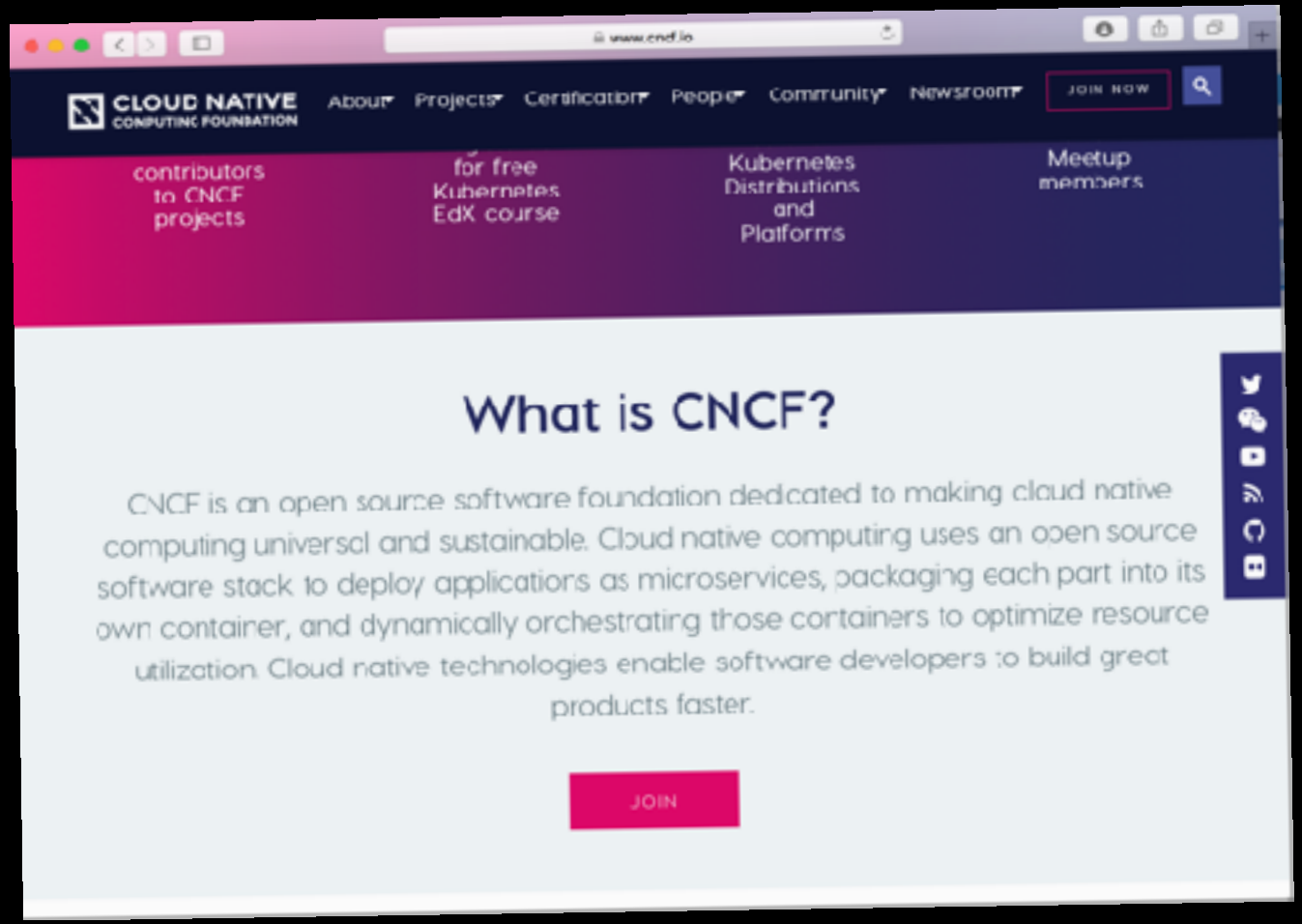
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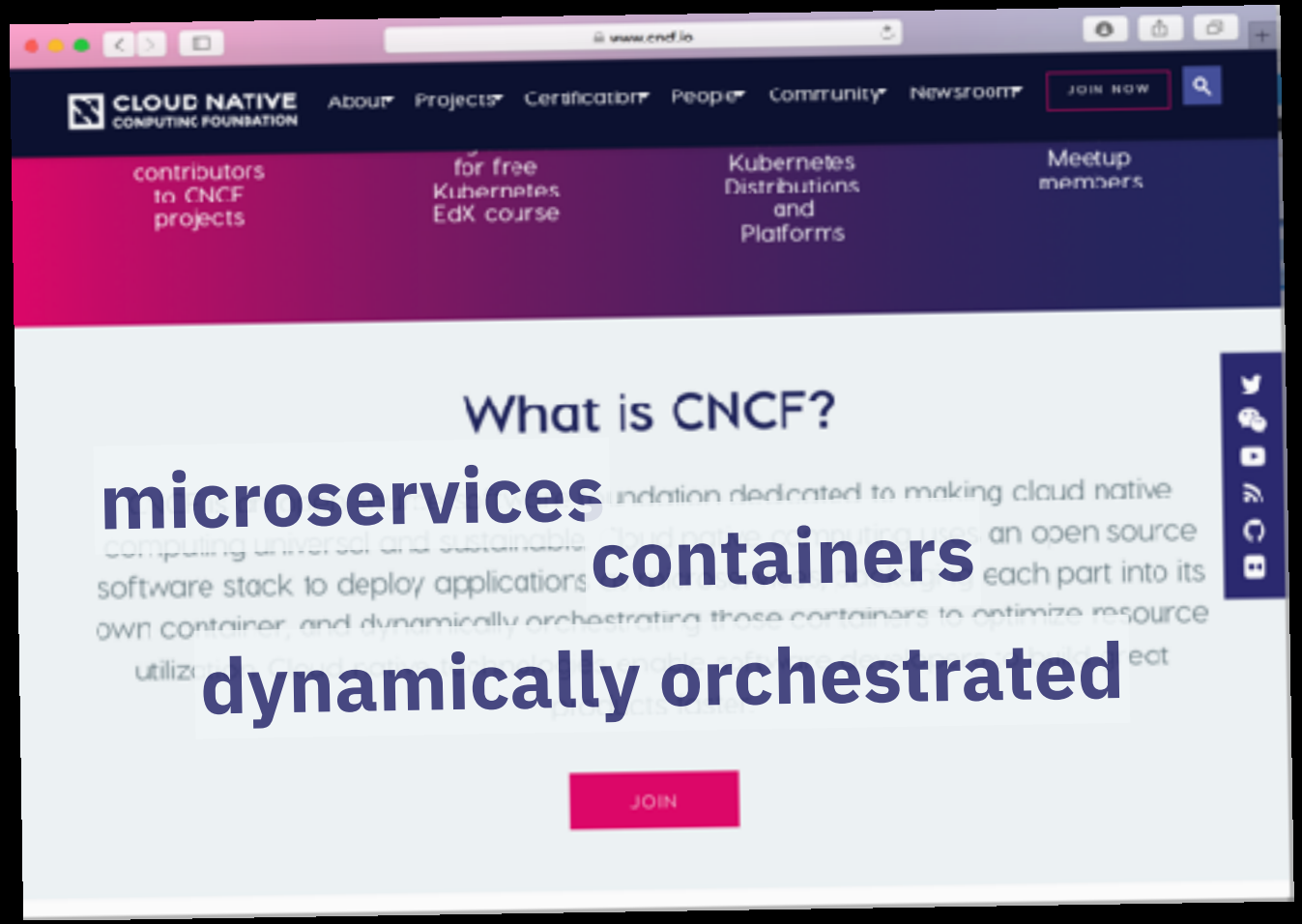
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flowcon

"the cloud native computing foundation is **wrong** ... about cloud native."

Dr Holly

flowcon

"the cloud native computing foundation is **wrong** ... about cloud native."

Dr Holly

Dr Holly


Sam Newman
@samnewman
Interesting side effect of the Cloud Native Foundation is now that I'm commonly speaking to people who believe it can't be cloud native without Kubernetes
10:38 PM · Nov 19, 2020 · Tweetbot for iOS
15 Retweets
4 Quote Tweets
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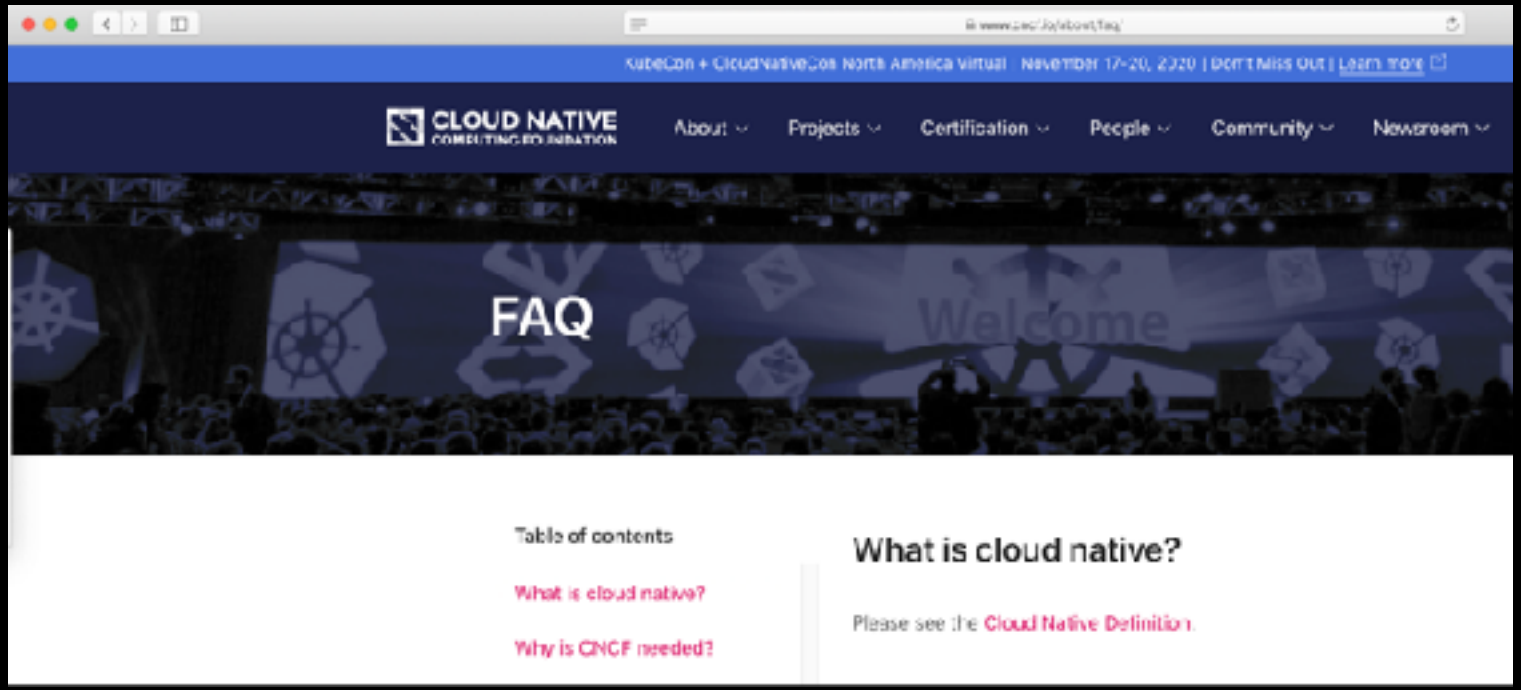
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What is cloud native?
Why is CNCF needed?
What is cloud native?
Please see the Cloud Native Definition

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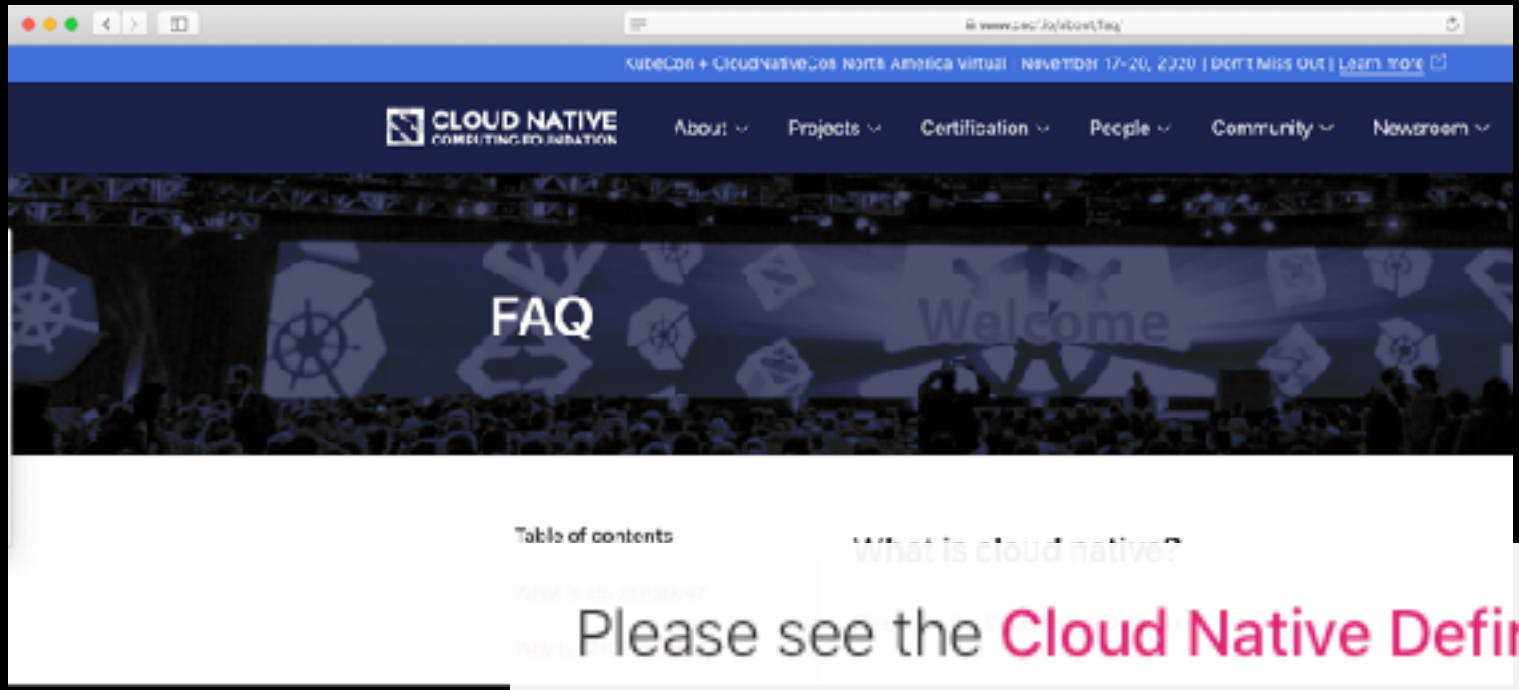

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The Cloud Native Computing Foundation seeks to drive adoption of this paradigm by fostering and sustaining an ecosystem of open source, vendor-neutral projects. We democratize state-of-the-art patterns to make these innovations accessible to everyone.

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18 contributors +6

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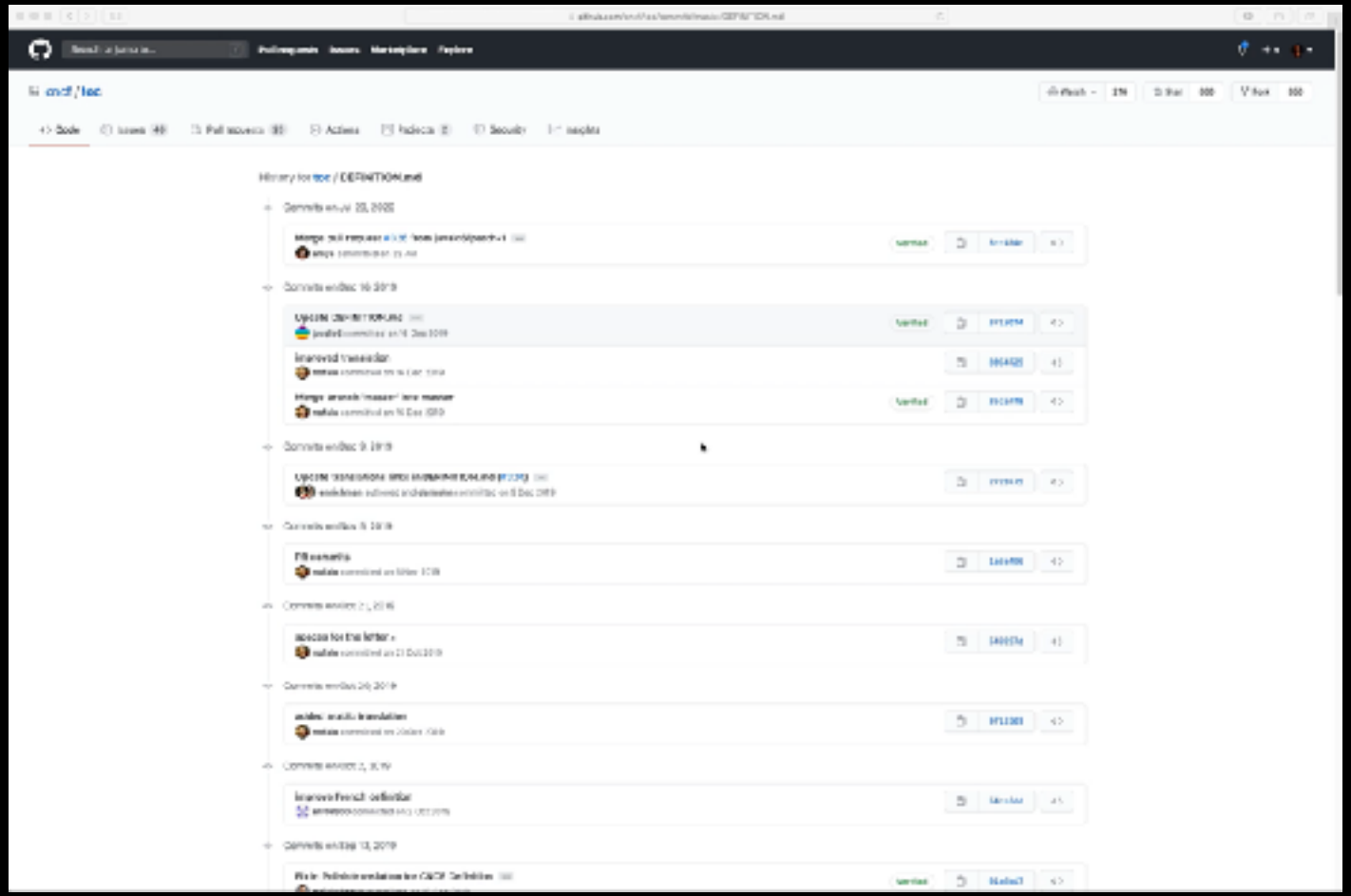
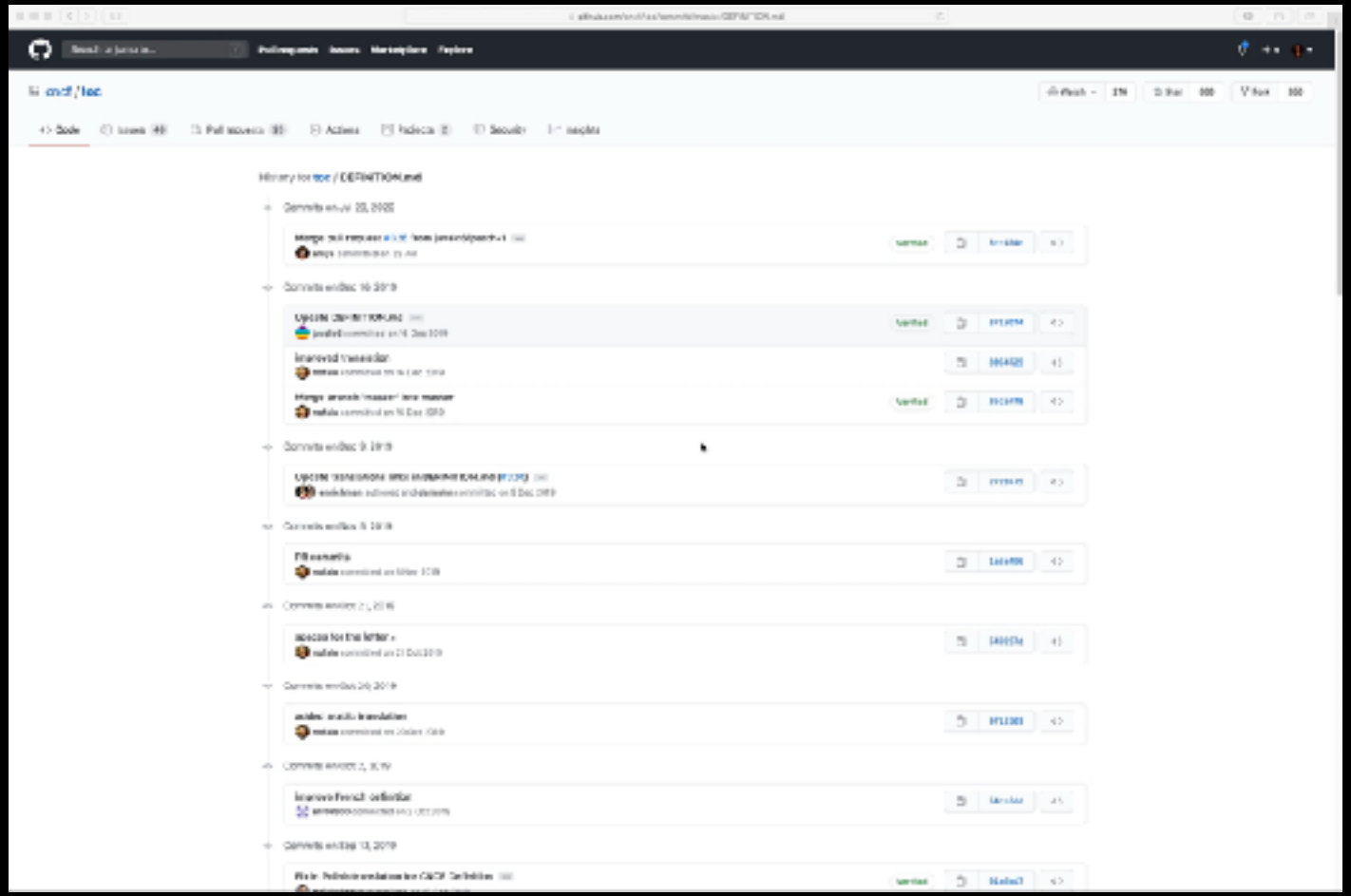


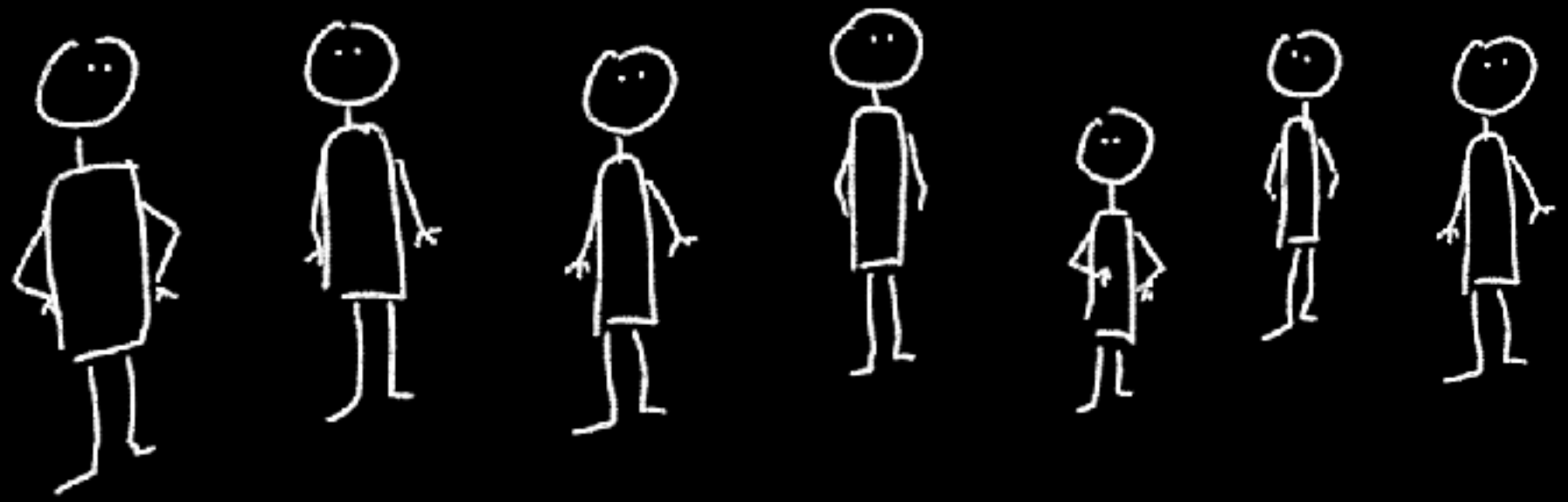


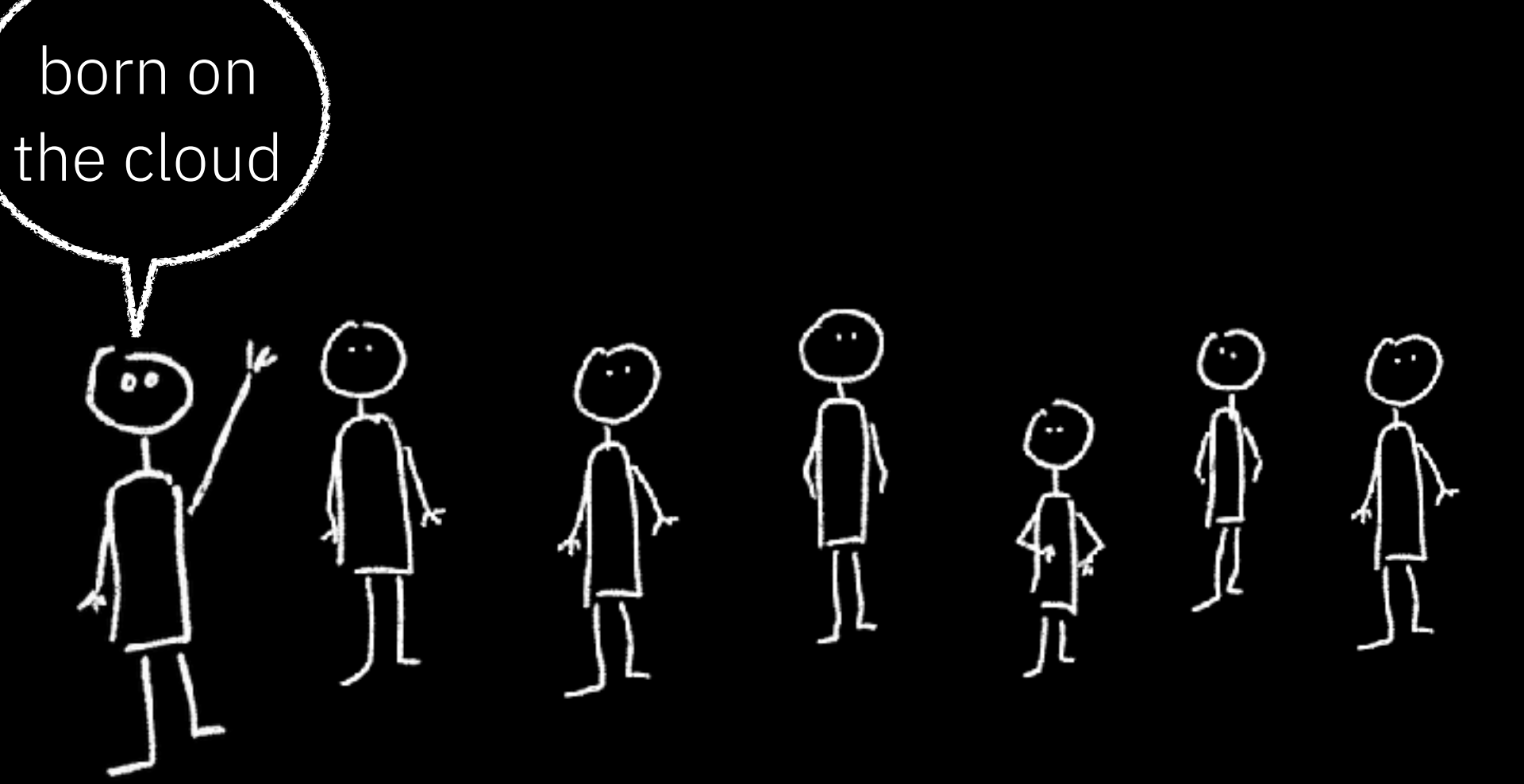
✓ **Create Cloud Native Definition**

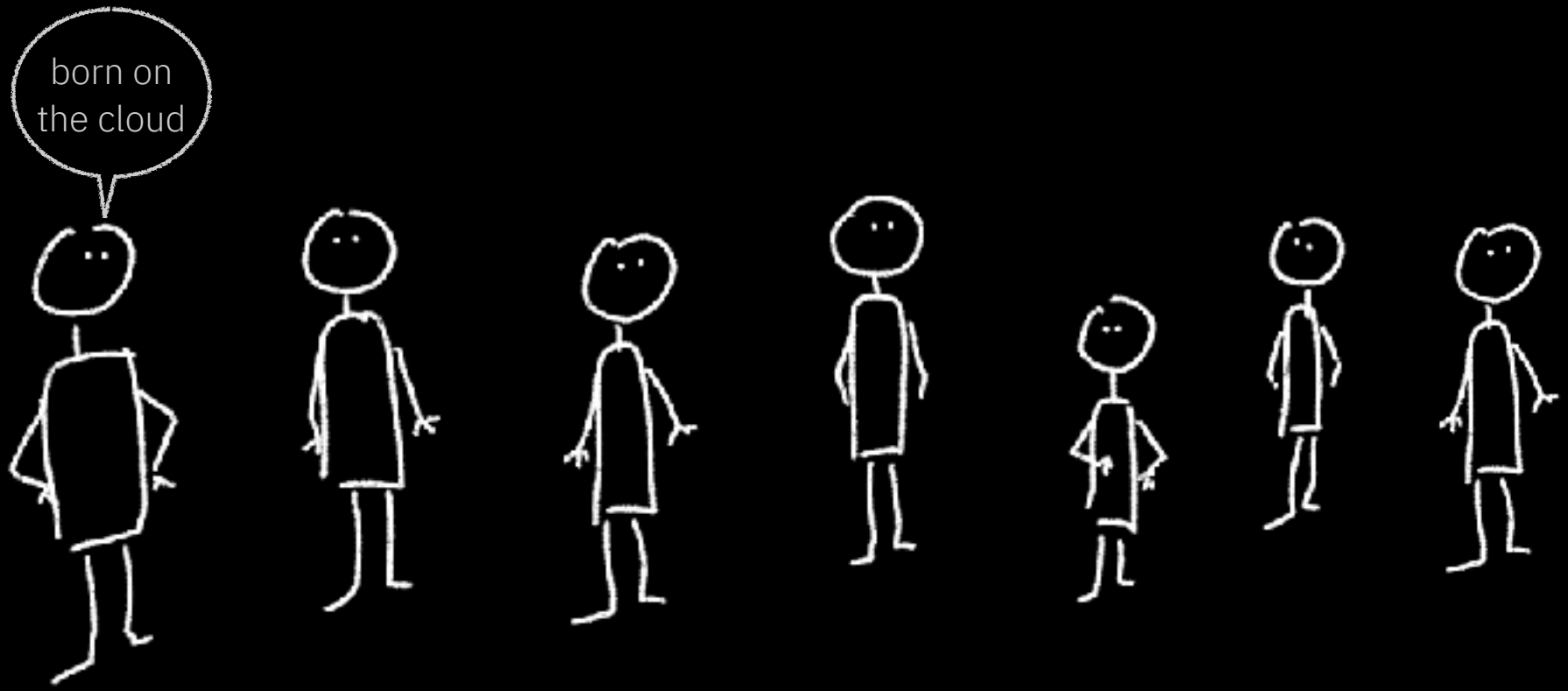
Based on 11 drafts from https://docs.google.com/document/d/1d9Ks3UvUV8sZj4rLbAMwmq0HZwi1CwnOZWGtrCuf0uk/

master (#117)

dankohn committed on 20 May 2018 Verified




born on
the cloud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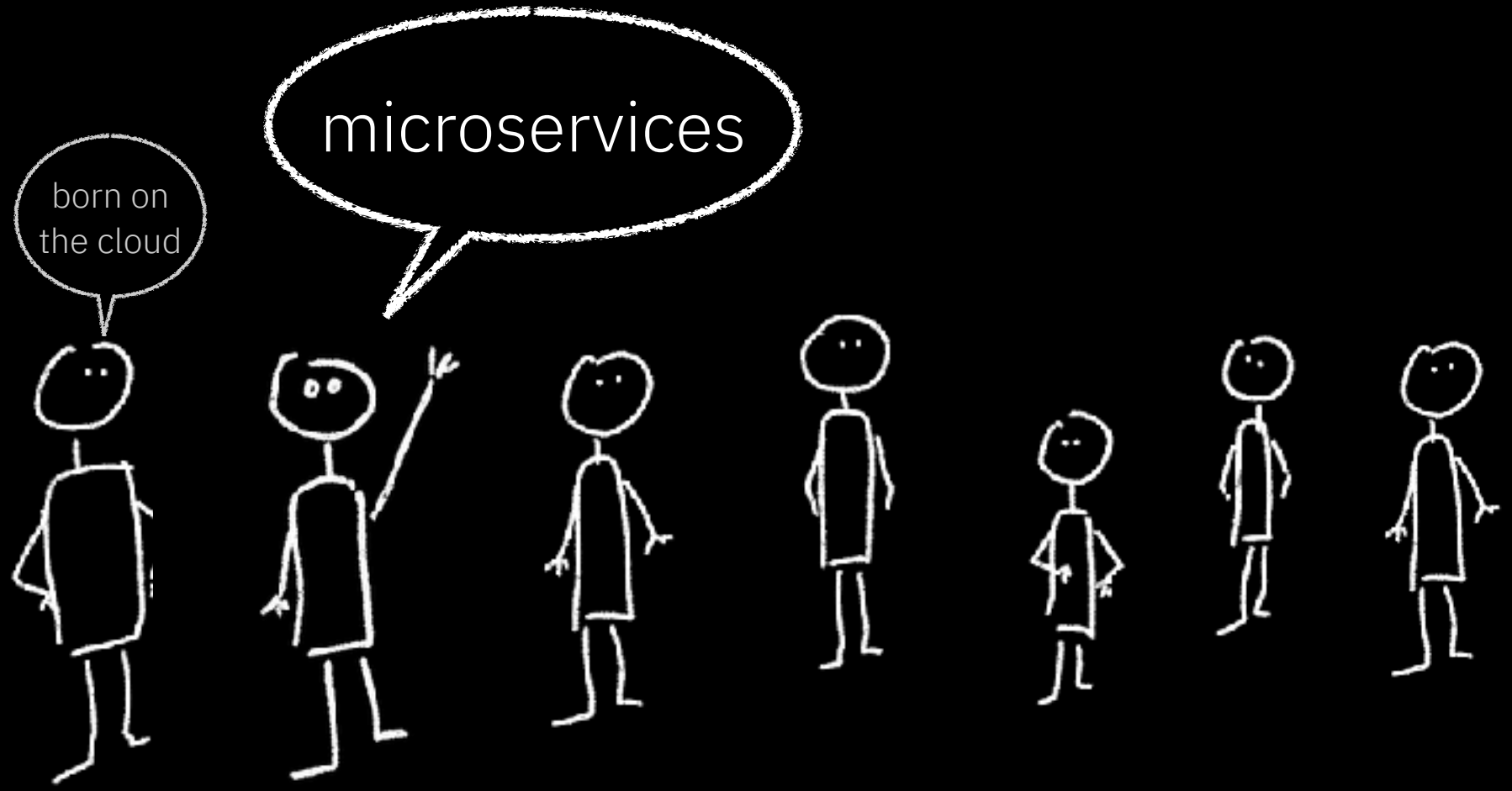
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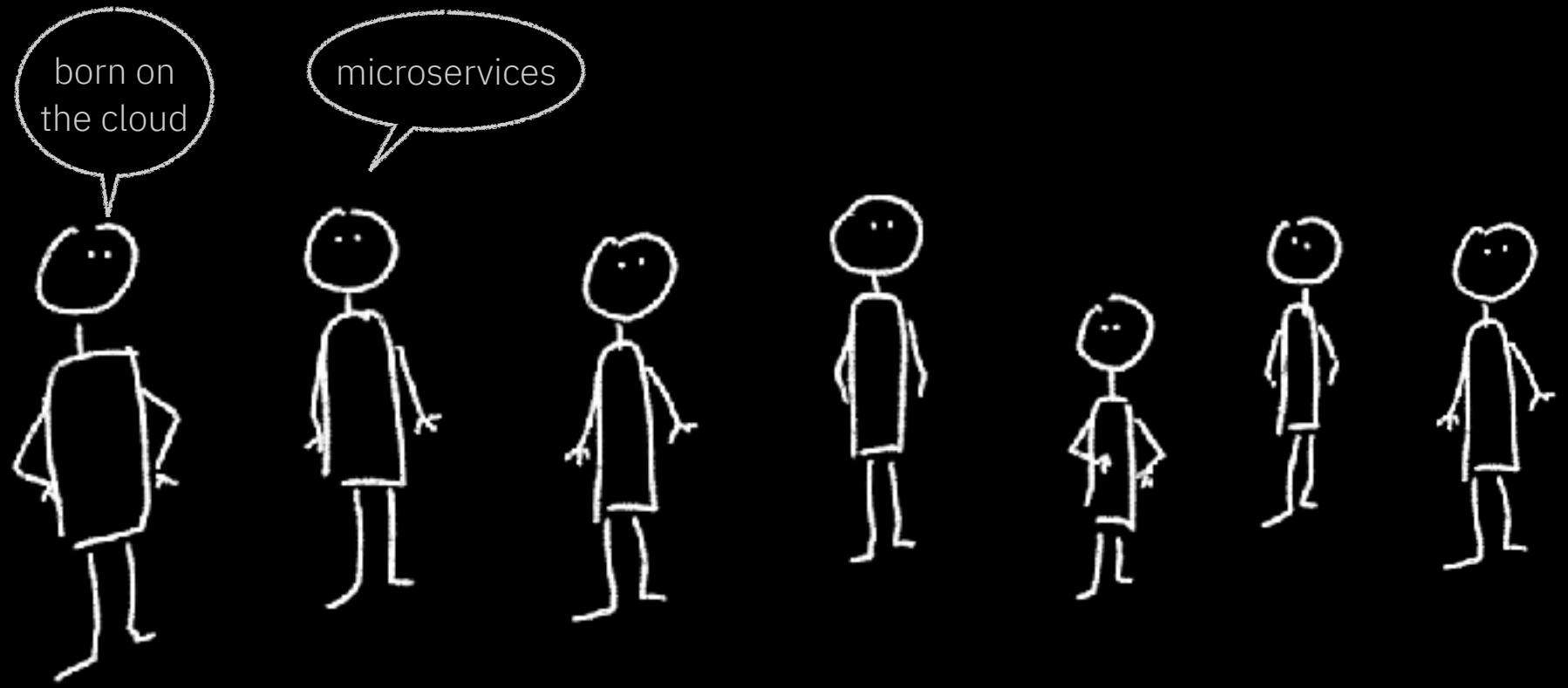
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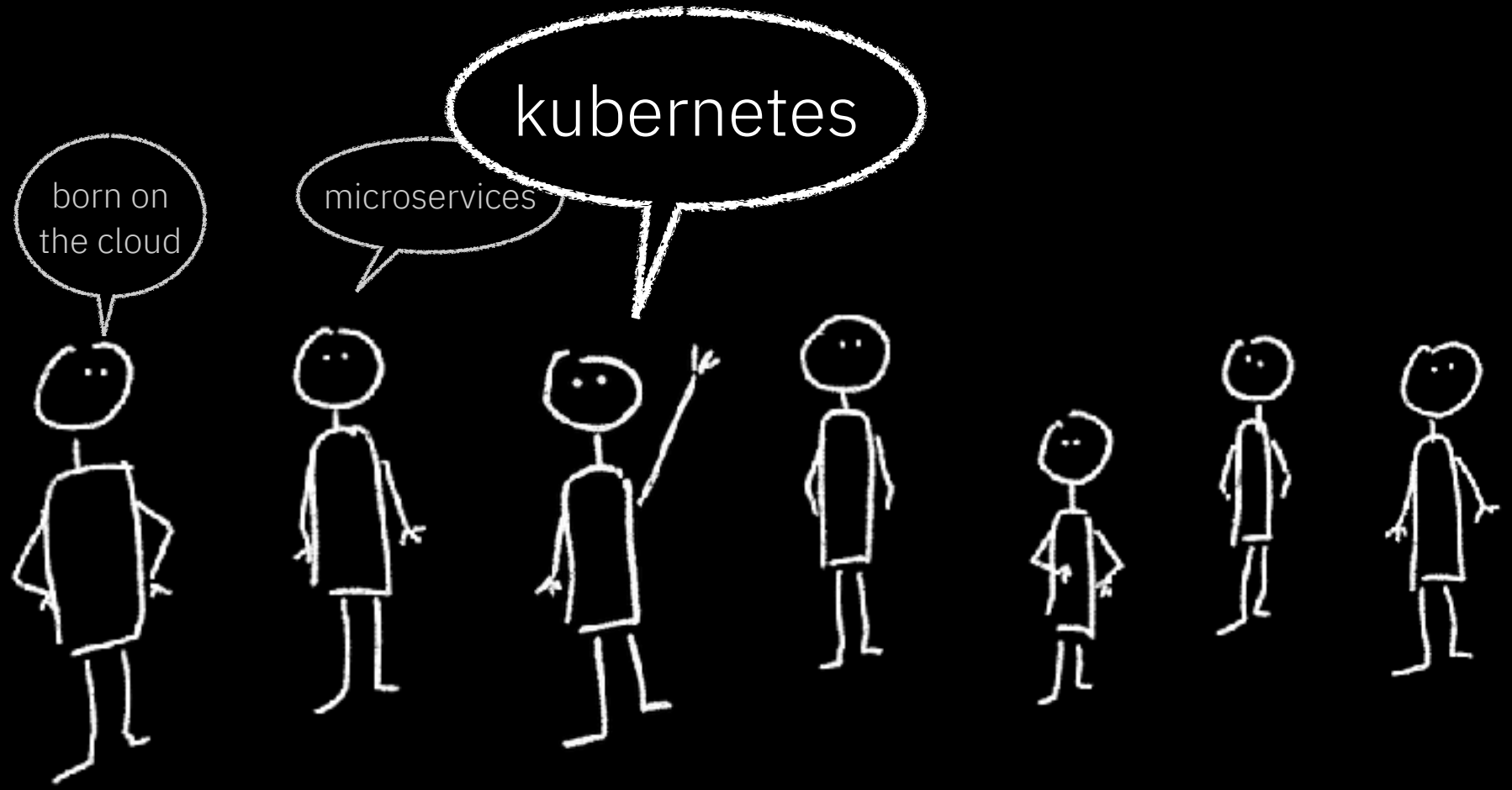
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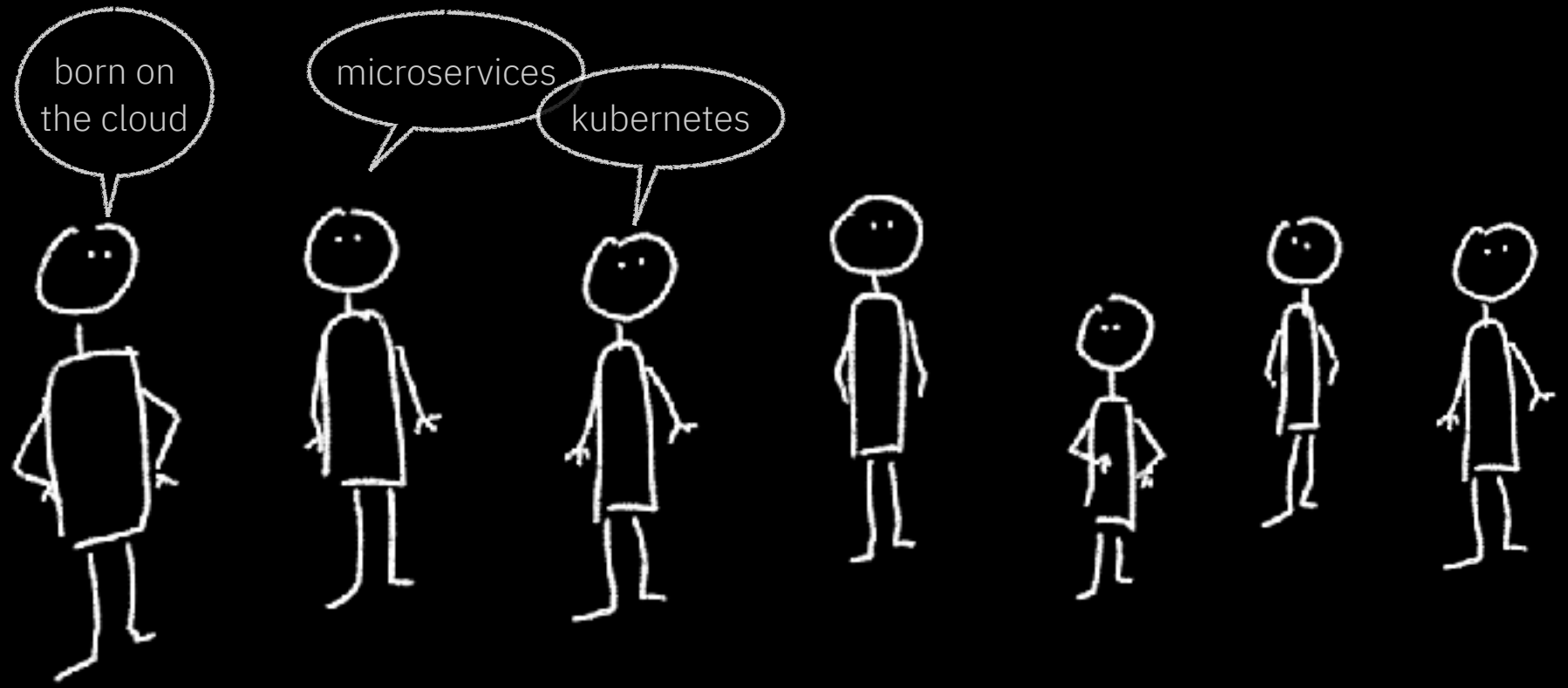
microservices
kubernetes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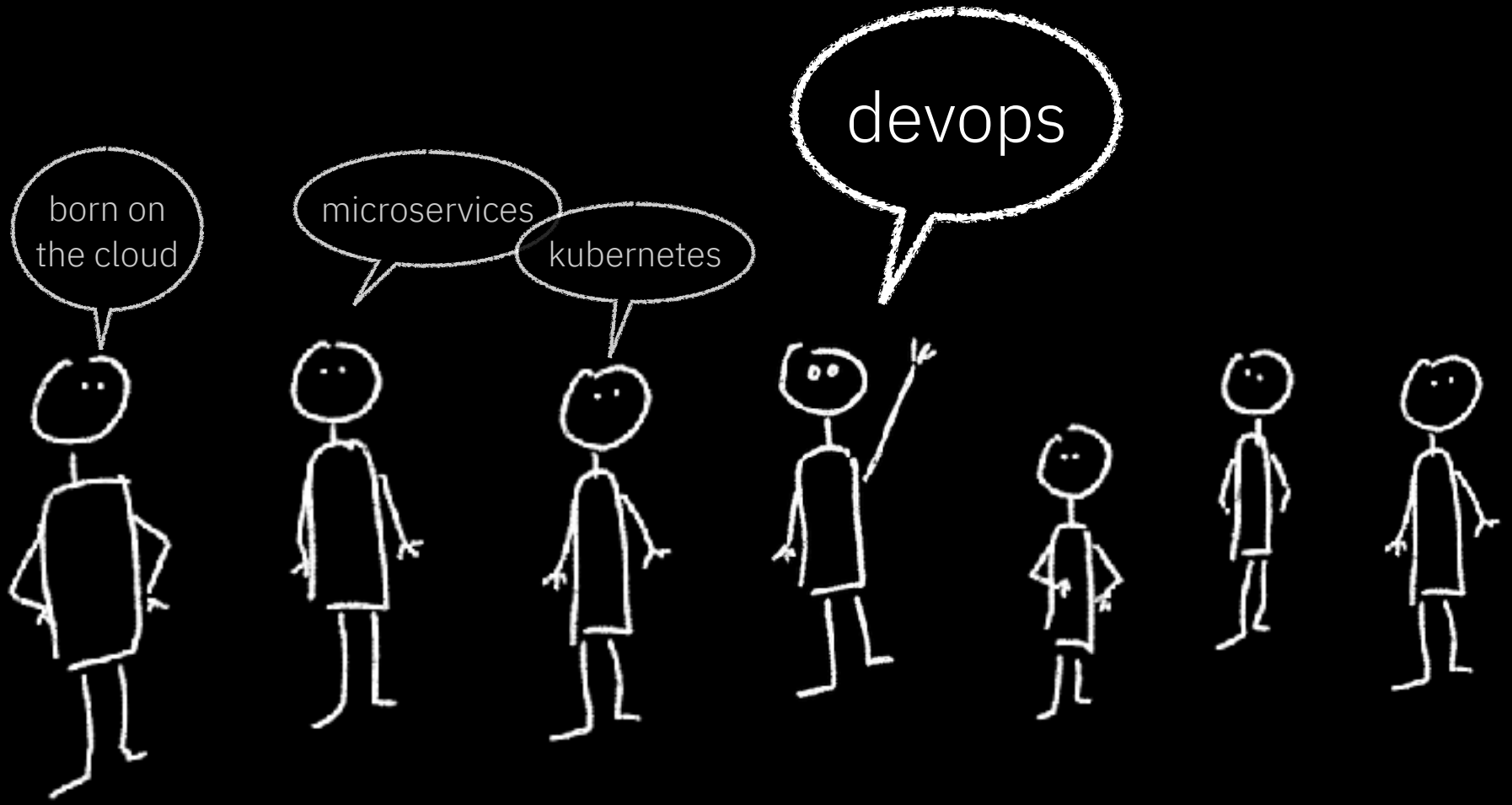
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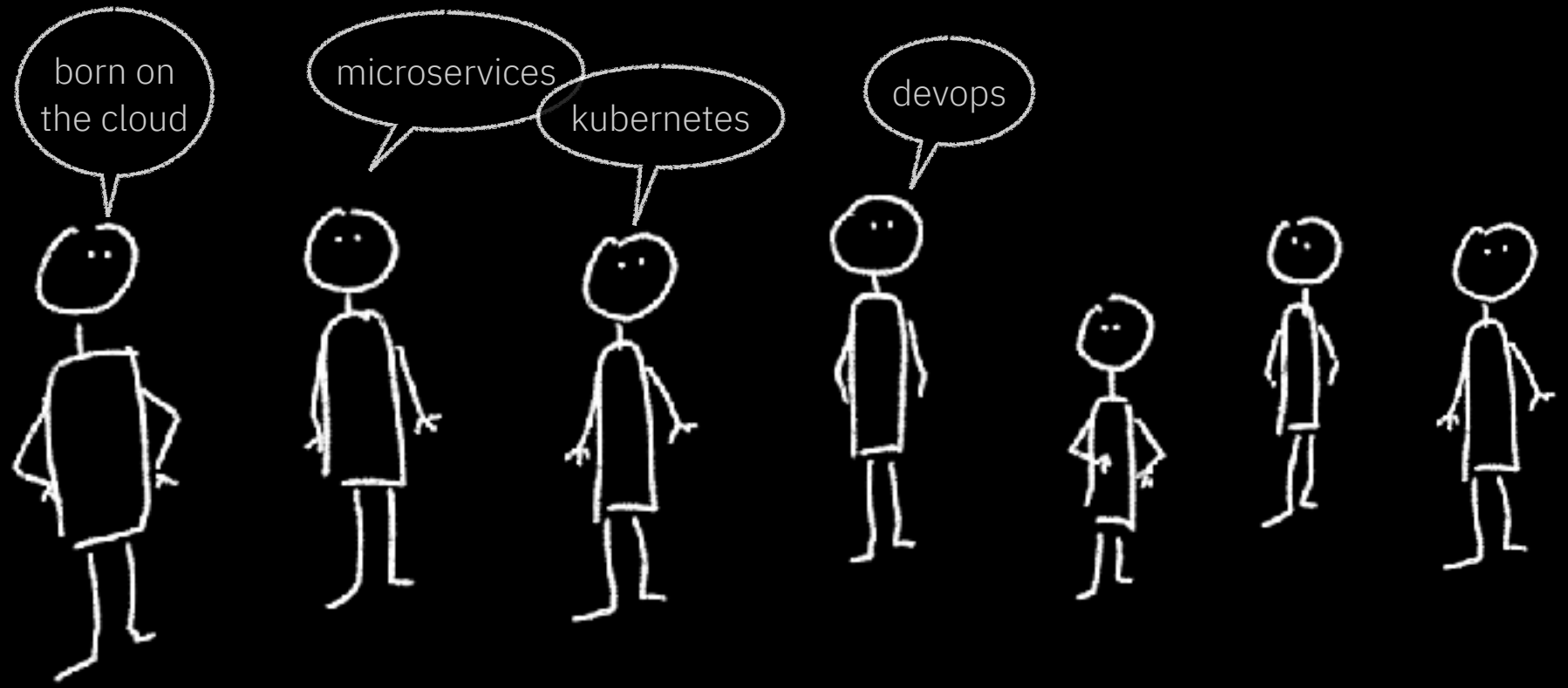
microservices
kubernetes
devops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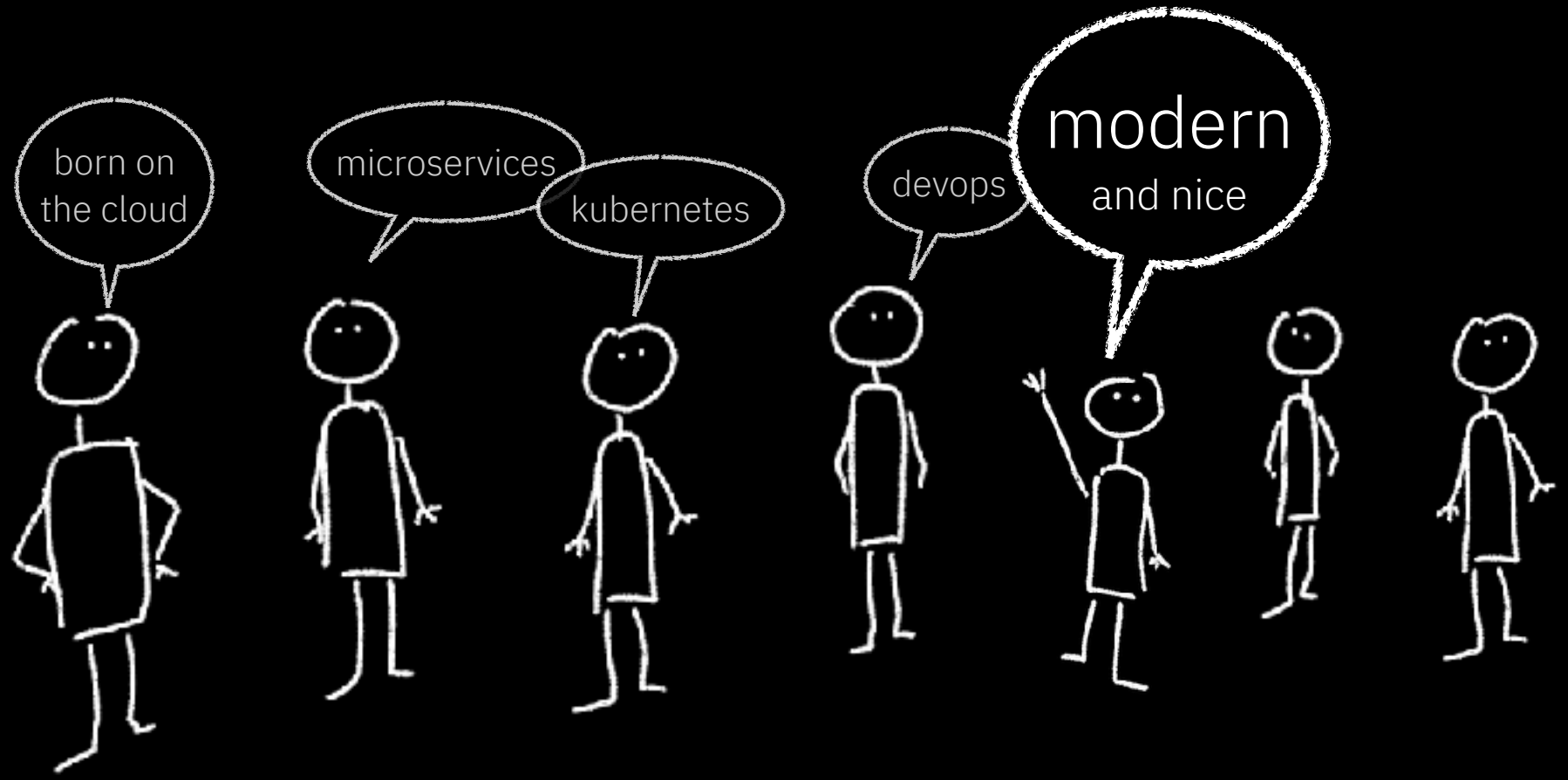
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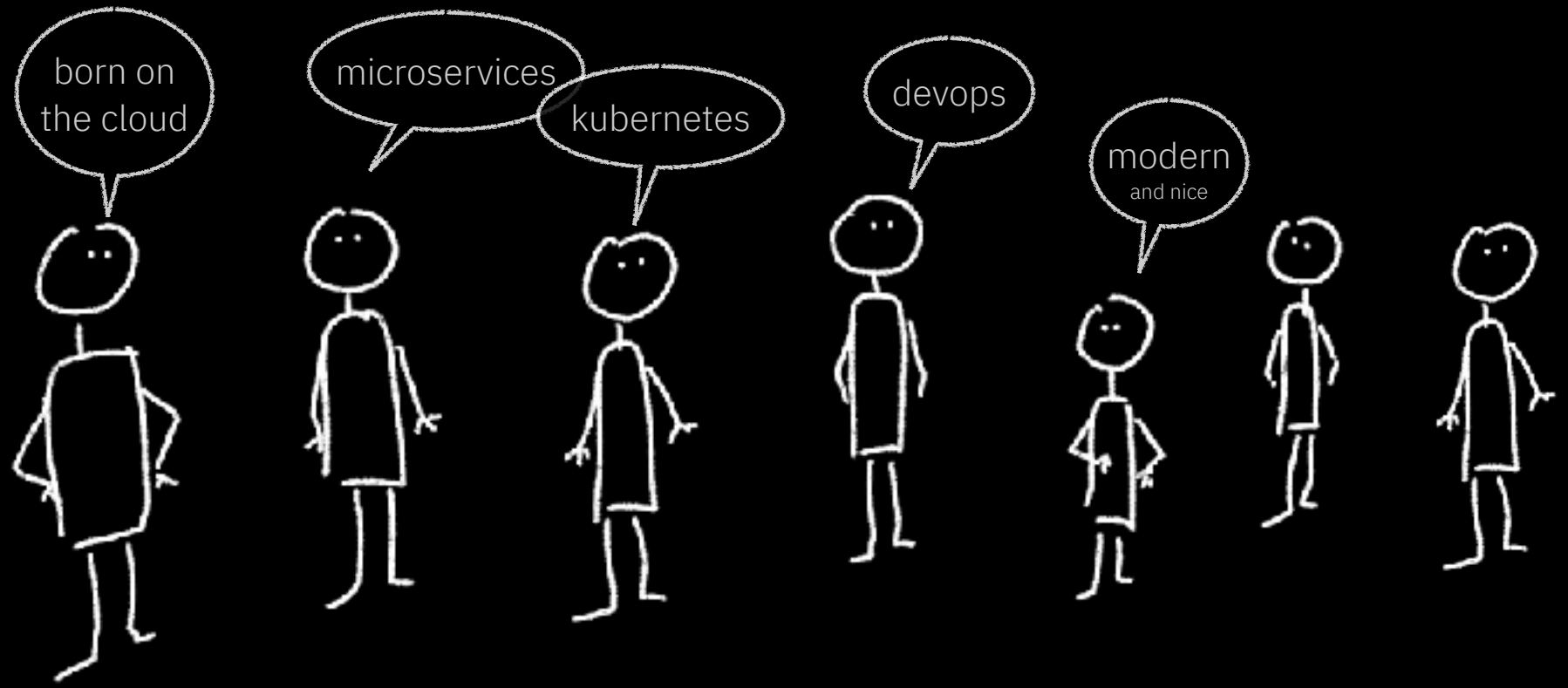
microservices
kubernetes
devops
modern
and nice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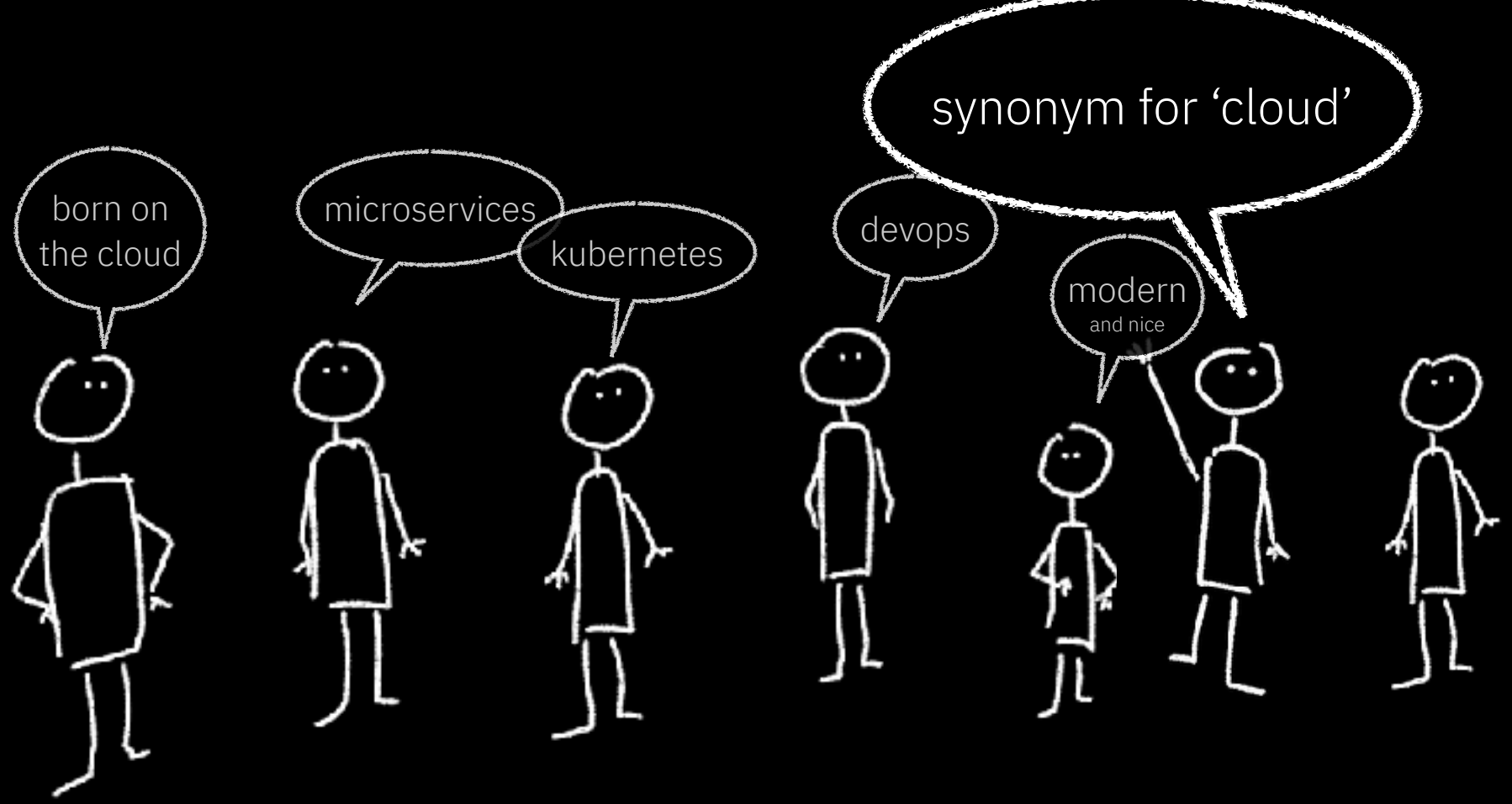
synonym for ‘cloud’
born on the cloud
microservices
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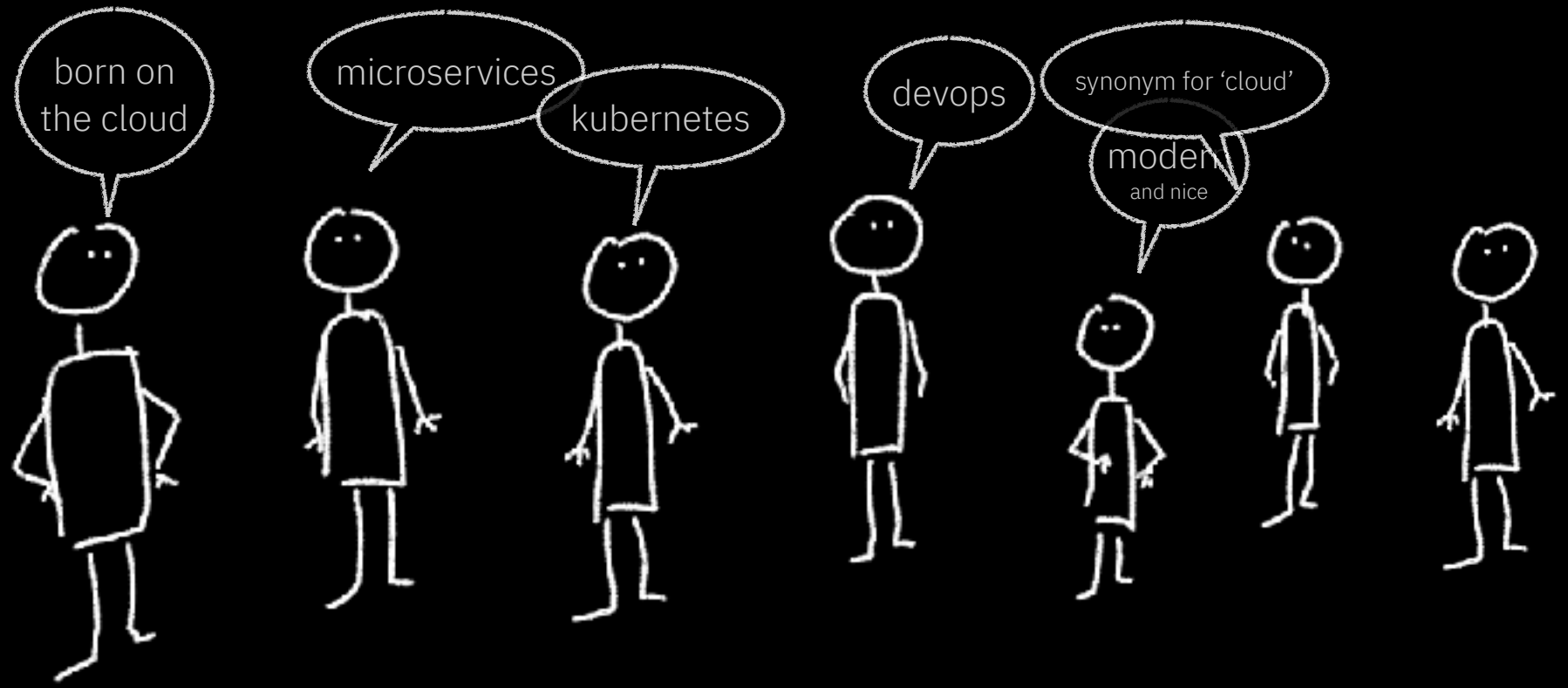
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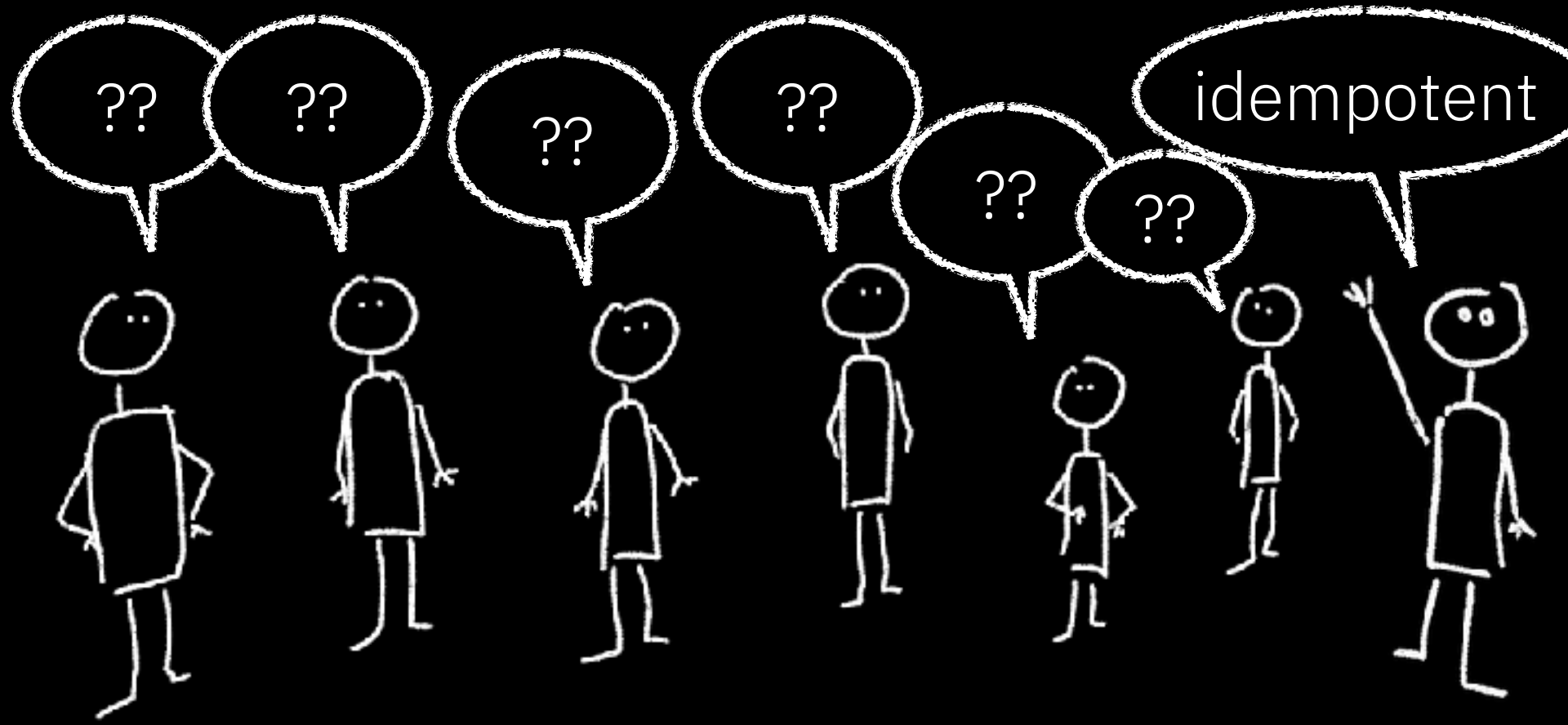
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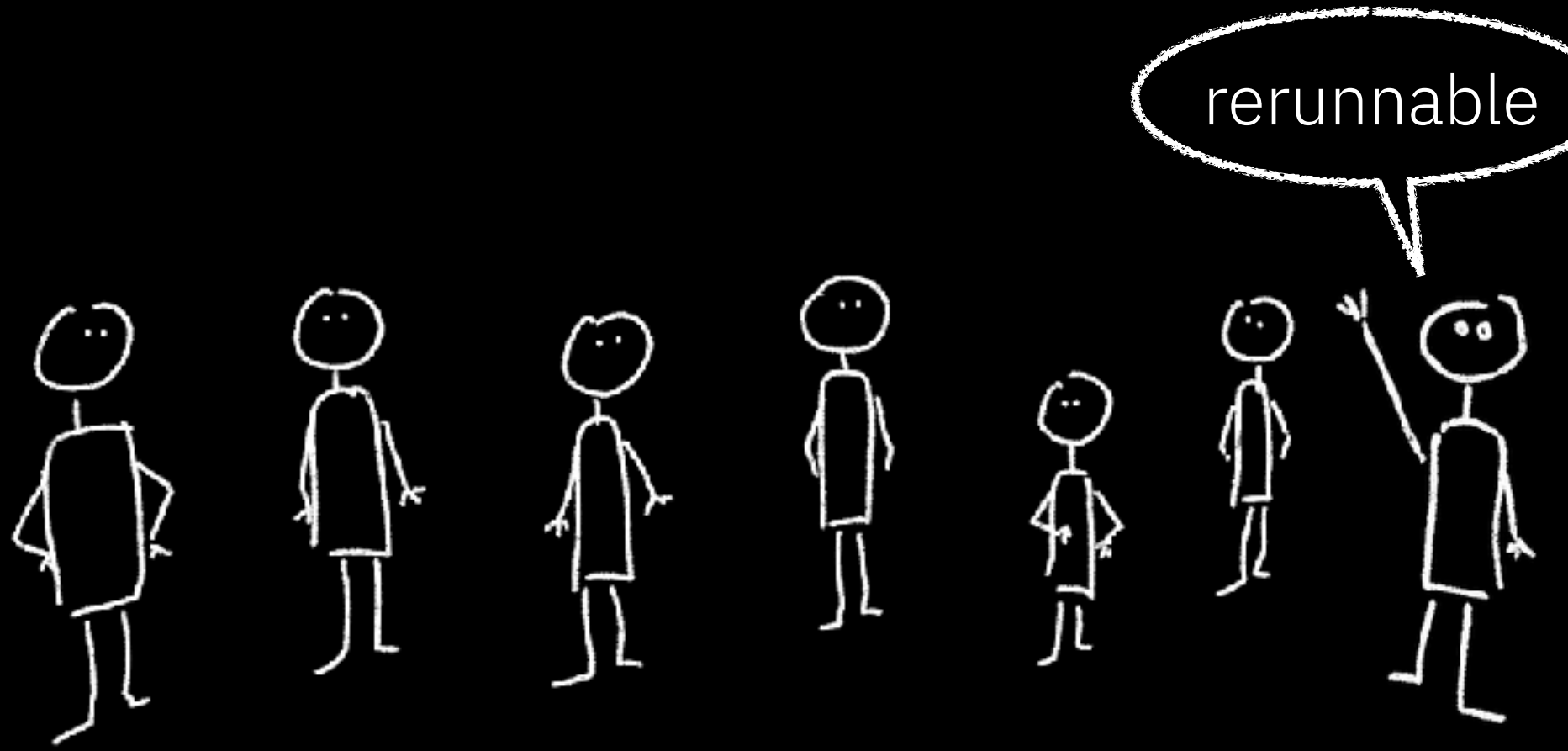
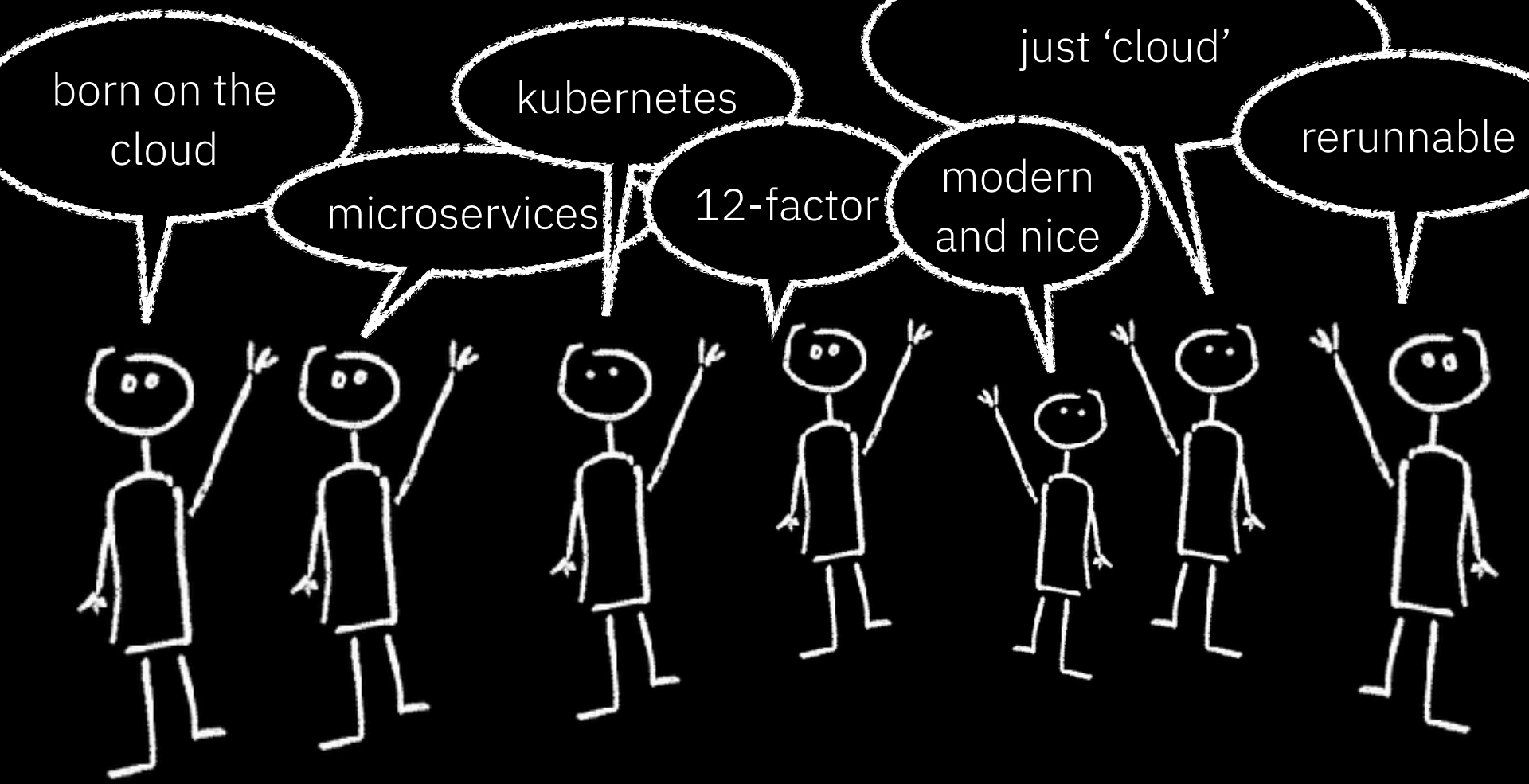
idempotent


rerunnable


born on the cloud
microservices
kubernetes
12-factor
modern and nice
just ‘cloud’
rerunnable

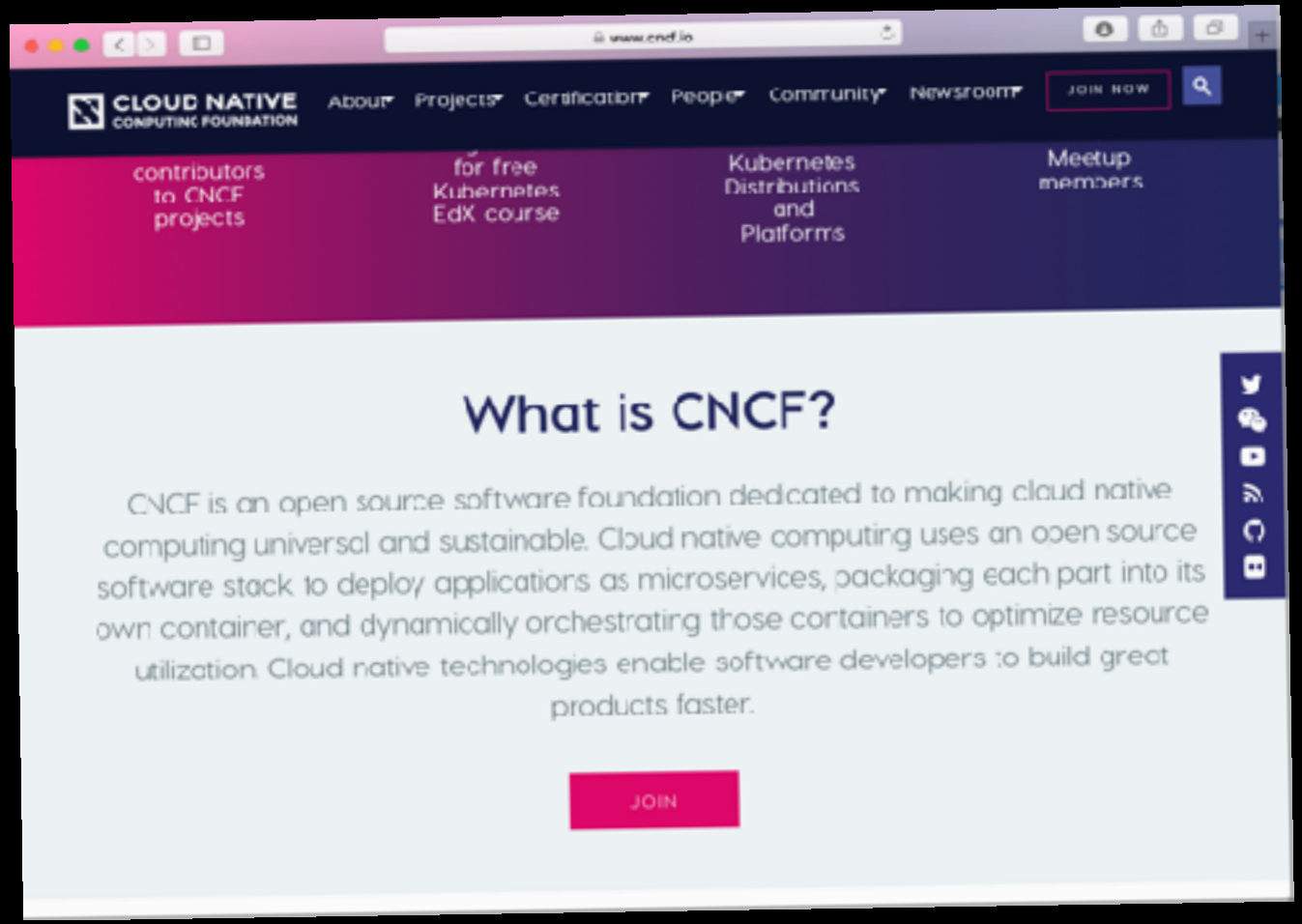
cloud native is **not**

cloud native is **not**
a synonym for ‘microservices’

if ‘cloud native’ has to be a synonym for anything,
it would be ‘idempotent’

if ‘cloud native’ has to be a synonym for anything,
it would be ‘idempotent’

which definitely needs a synonym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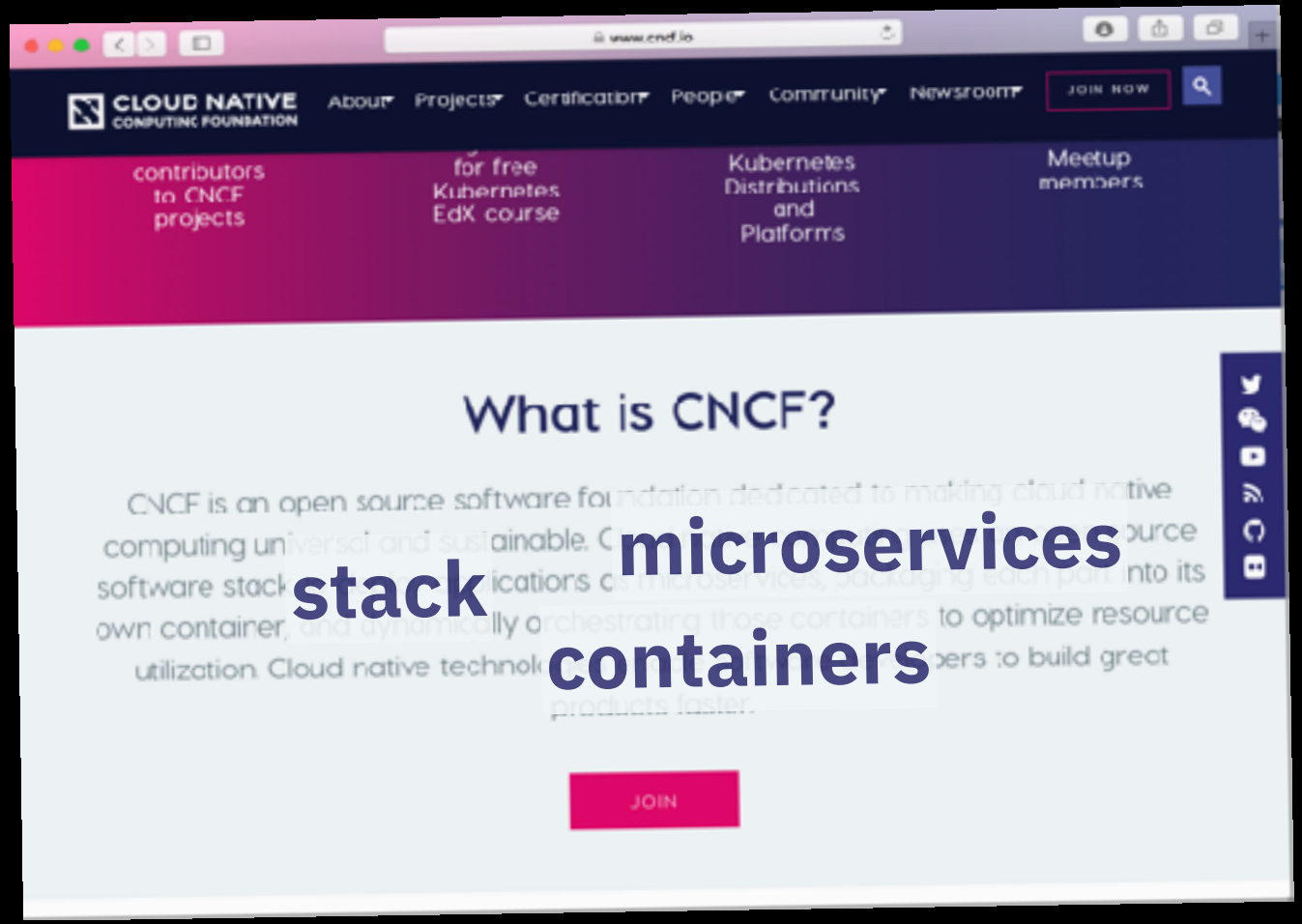
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These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.

immutable infrastructure

microservices

exemplify

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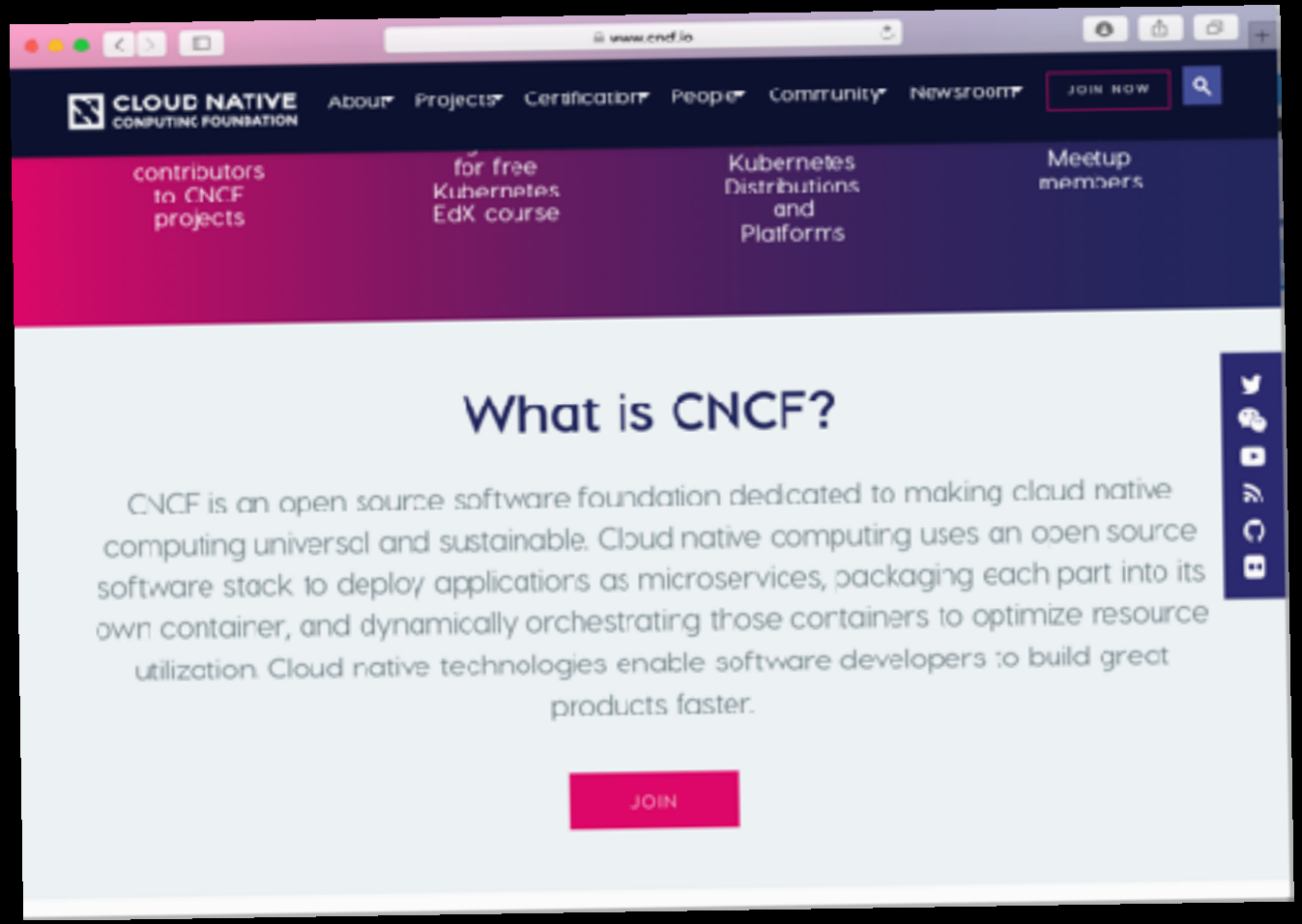
why?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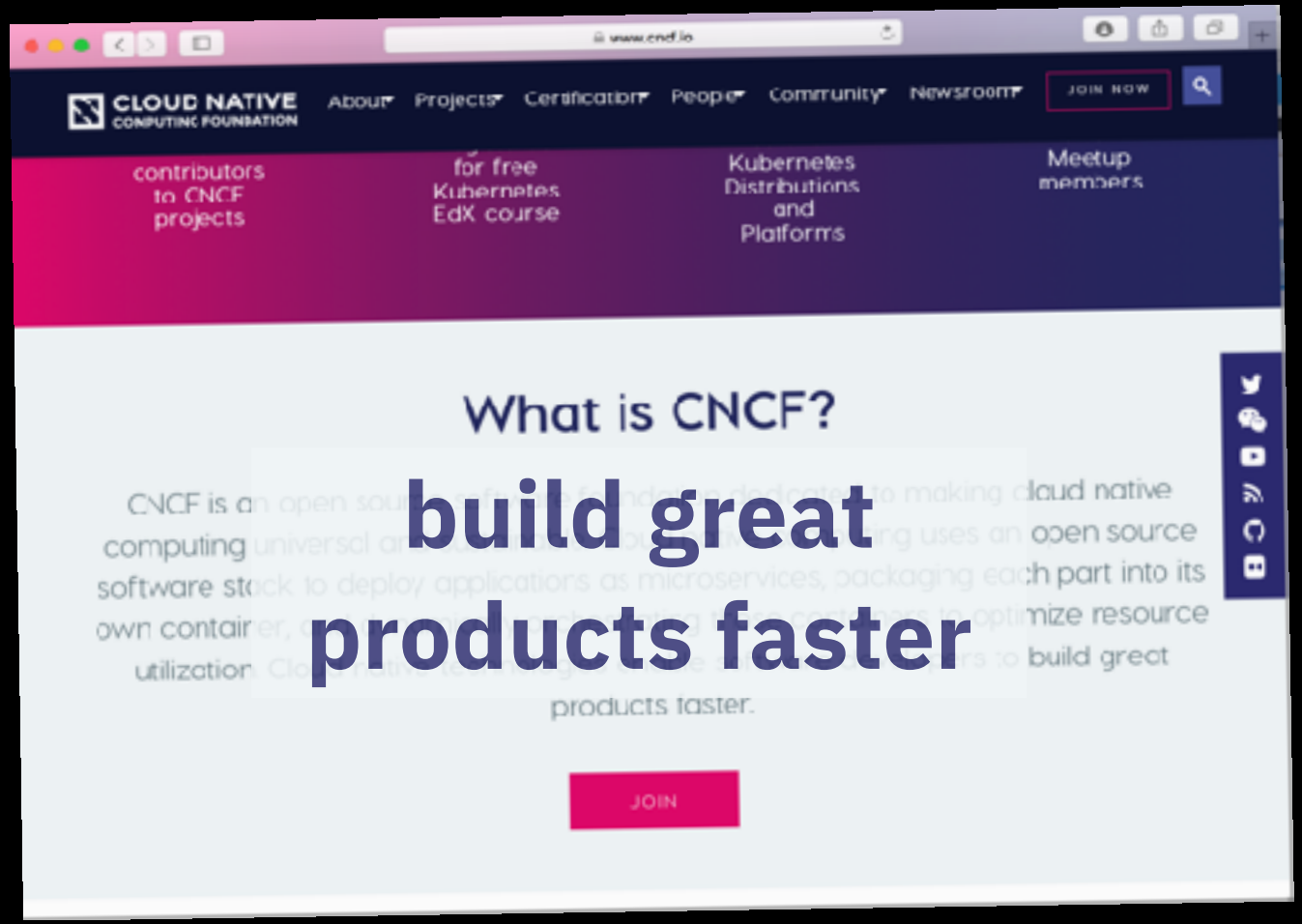

build great products faster

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make high-impact changes frequently and predictably with minimal toil

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IBM **Garage**

@holly_cummins

what **problem** are we trying to solve?

fail

the muddy goal

what **problem** are we trying to solve?

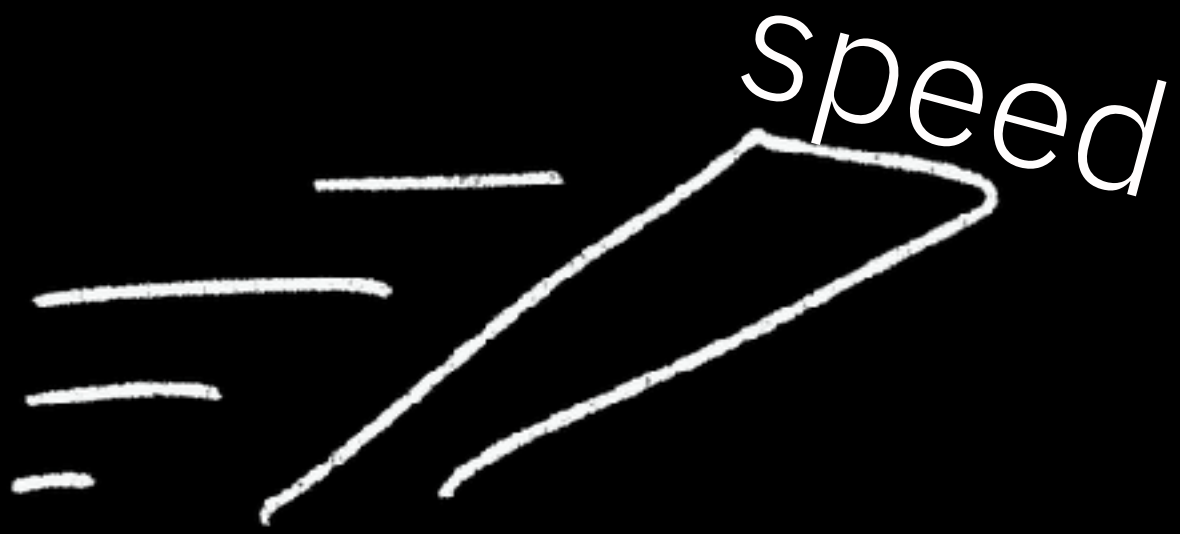
“everyone else is doing it?”

wishful mimicry

why cloud?

cost

e l a s t i c i t y


Speed

exotic capabilities

why cloud native?

2011

12

factors

2011

12 factors

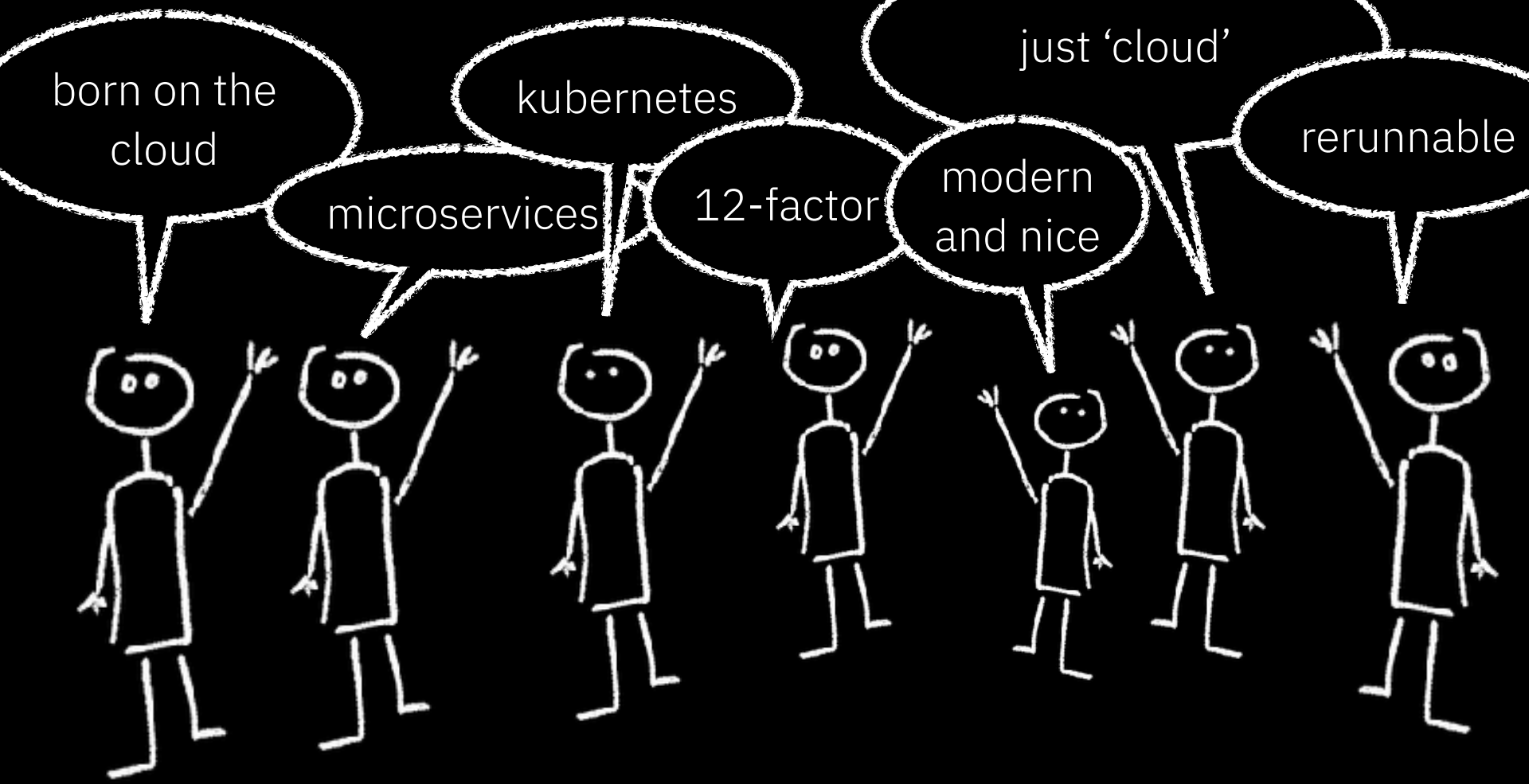
how to write a cloud application so you don’t get electrocuted

2010 the dawn of cloud native

Ian Cooper @ICooper · 1h

Replying to @samnewman

It does seem perverse that Cloud Native, which I thought origins just implied 'built to operate in cloud infrastructure' as opposed to say, 'lift-and-shift from a data centre', now means 'runs on Kubernetes.'.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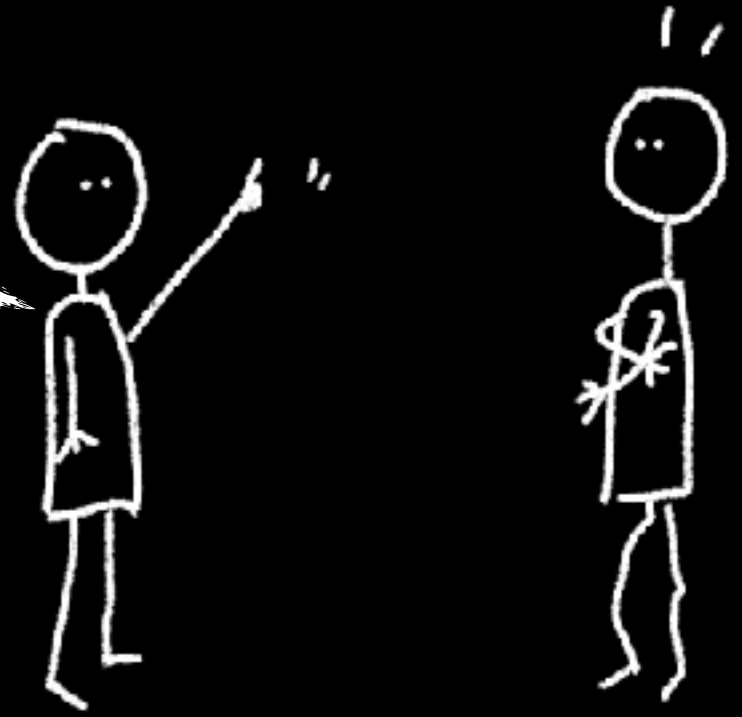
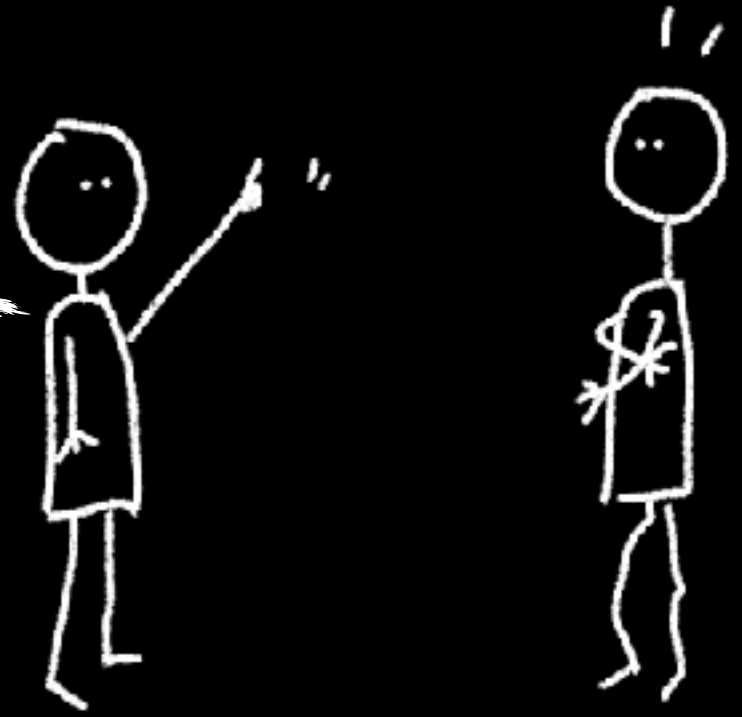
microservices
kubernetes
12-factor
modern and nice
just ‘cloud’
rerunnable

are we all agreed on the goal?

why are there no **microservices** in this cloud native app Alice?



why is the cloud **only** saving us money, Alice?



fail

microservices envy

microservices are not the **goal**

microservices
are not the **goal**

they are the **means**

“we’re going too slowly.

we need to get rid of COBOL and make microservices!”

“we’re going too slowly.

we need to get rid of COBOL and make microservices!”

“… but our release board only meets twice a year.”

containers are a good base

it’s not a **competition** to see how many you can have

containers are a good base

distributed monolith

distributed monolith

but without compile-time checking
... or guaranteed function execution

reasons **not** to do microservices

small team

not planning to release independently

don’t want complexity of a service mesh - or worse yet, rolling your own

domain model doesn’t split nicely

fail

cloud-native spaghetti

“every time we change one microservice, another breaks”

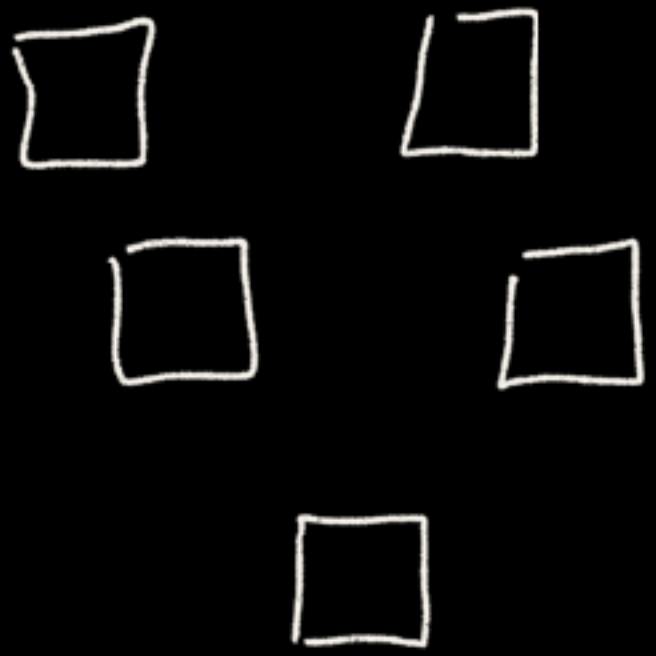
cloud-native spaghetti is still spaghetti

(Image: Cloudy with a Chance of Meatballs.)

distributed != decoupled

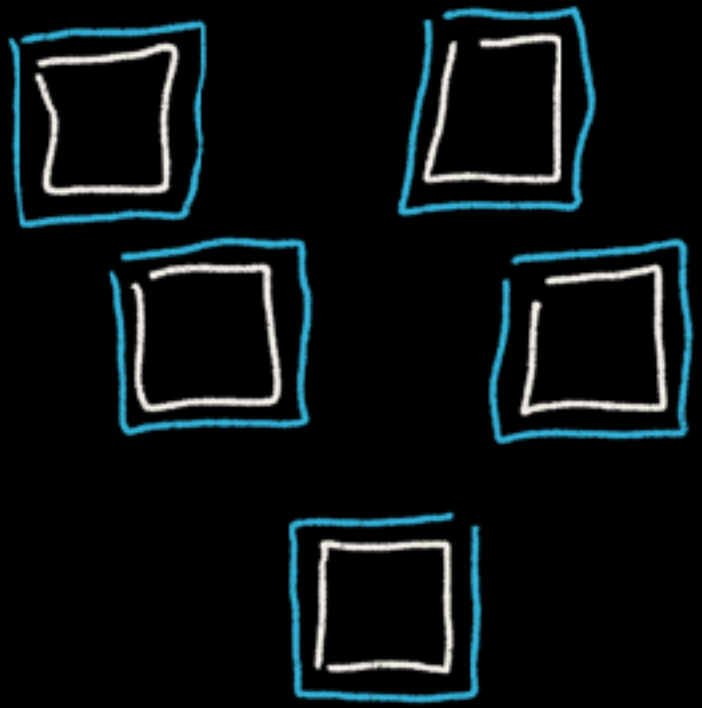
“each of our microservices has duplicated the same object model … with twenty classes and seventy fields”

Microservice



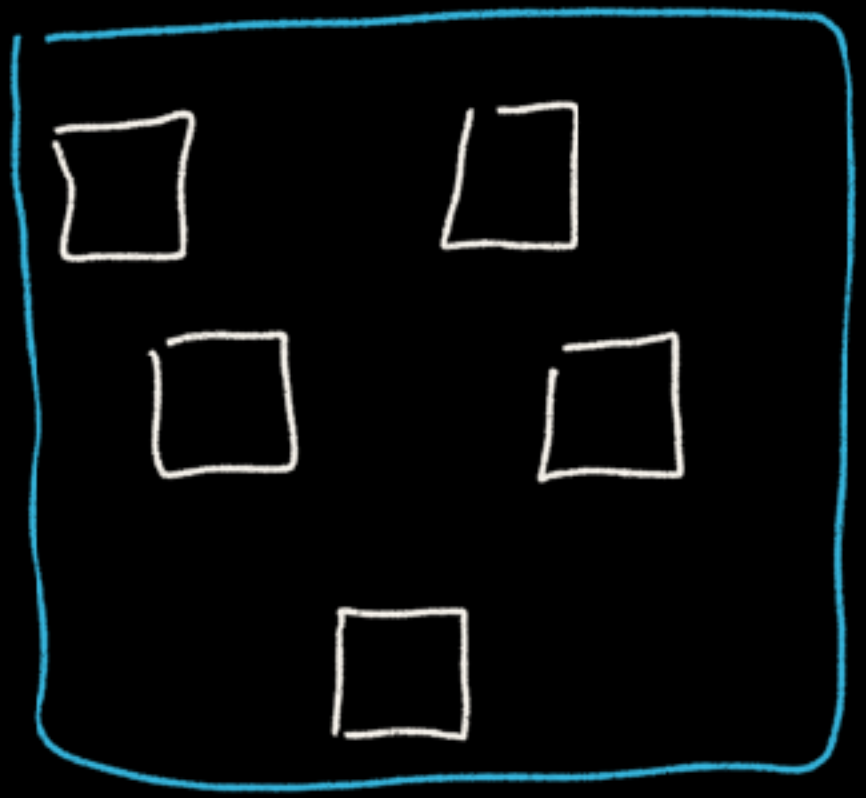
Microservice

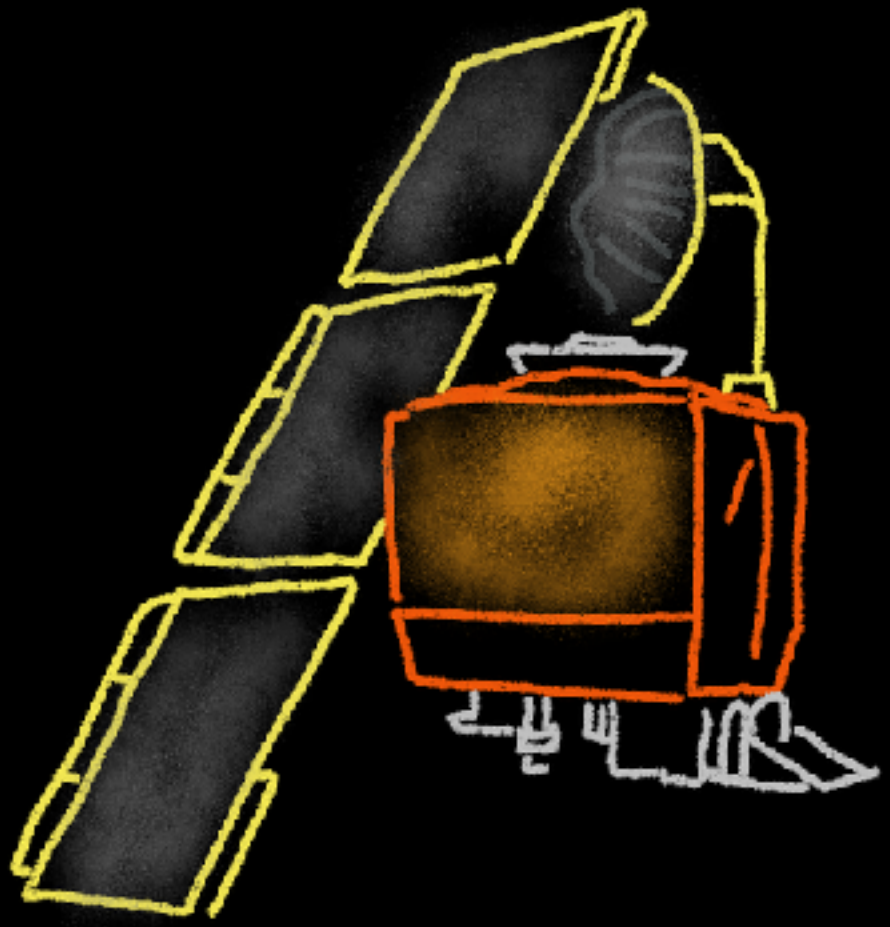
Domain

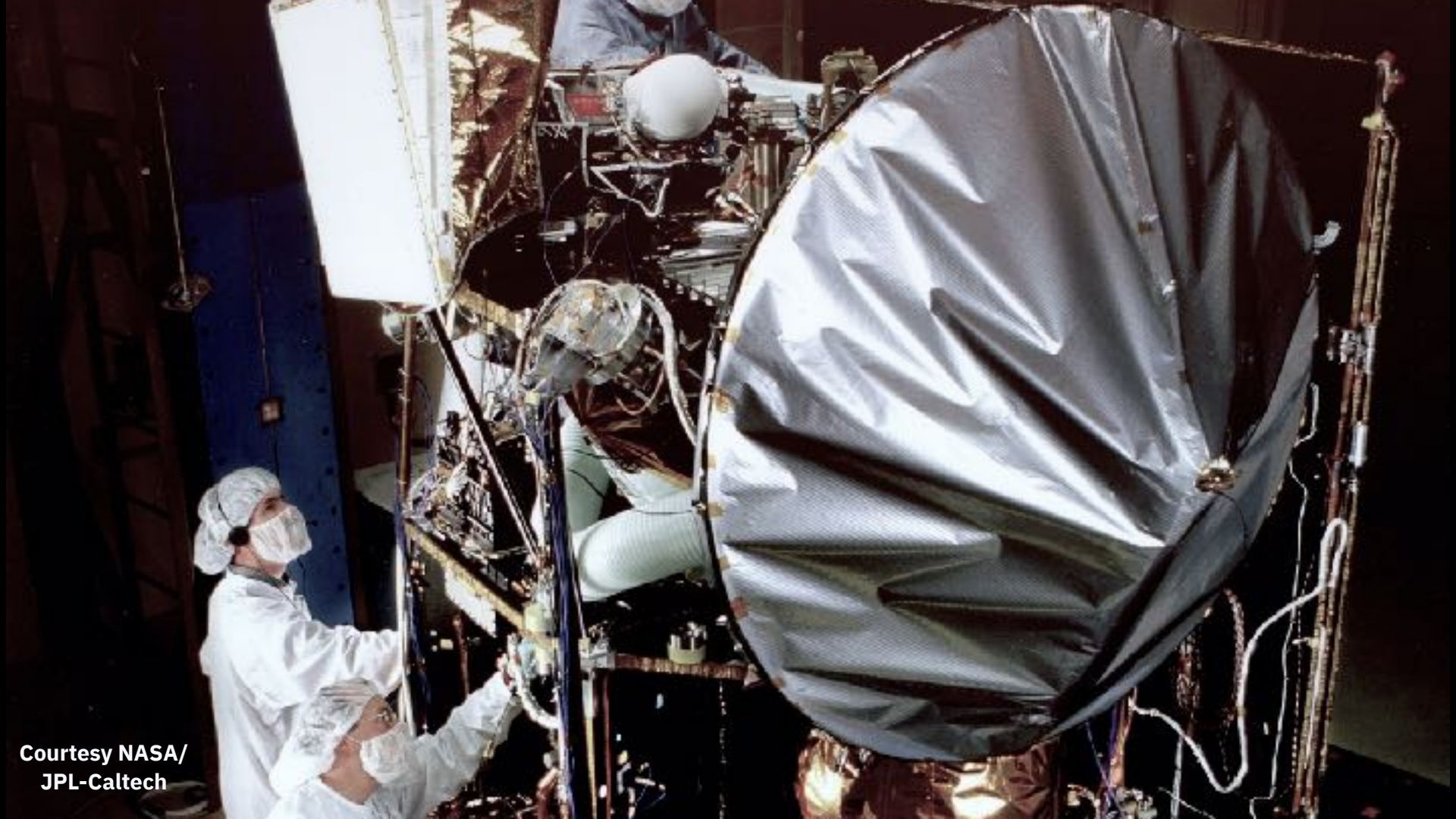


Microservice

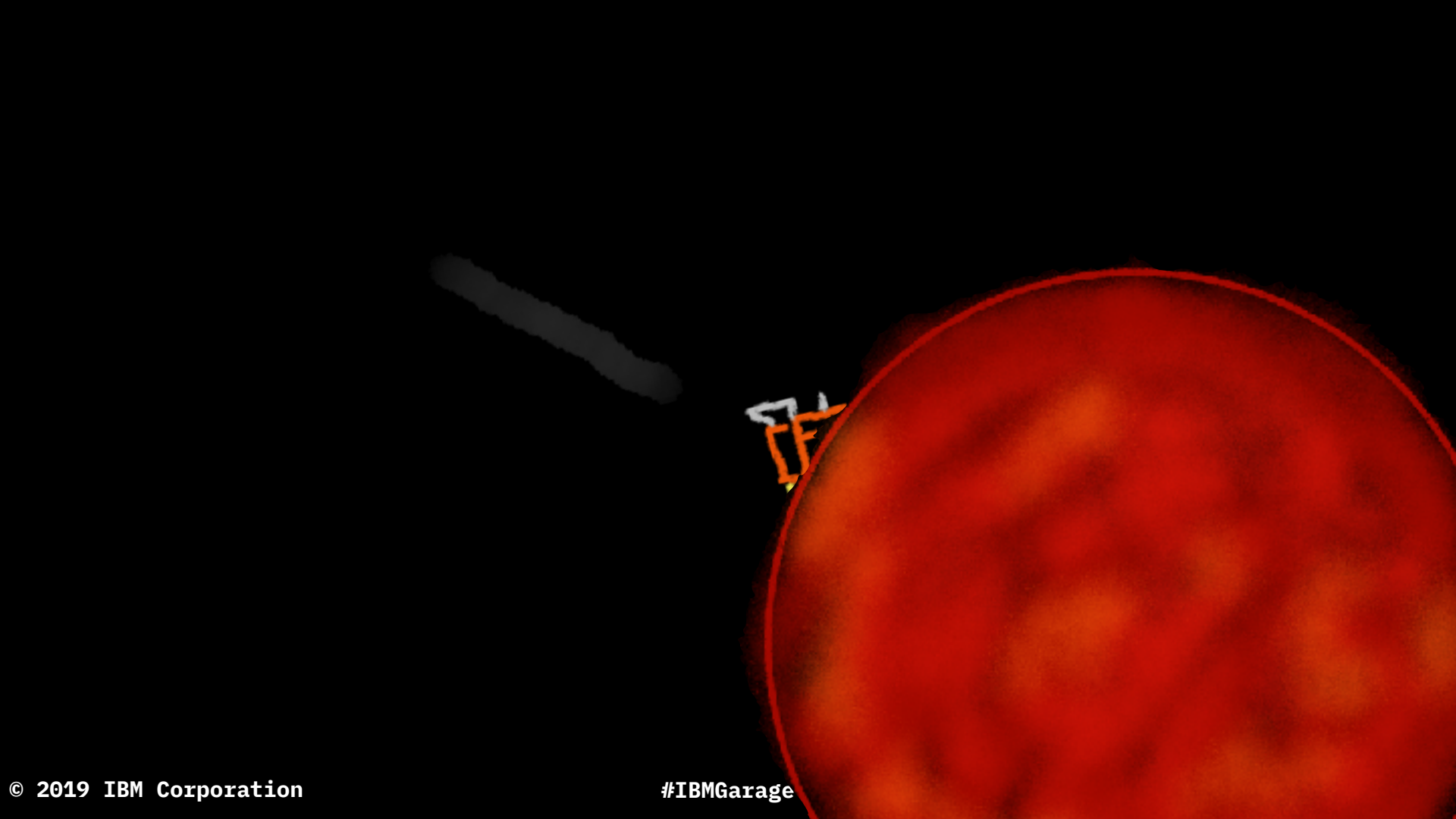
Domain

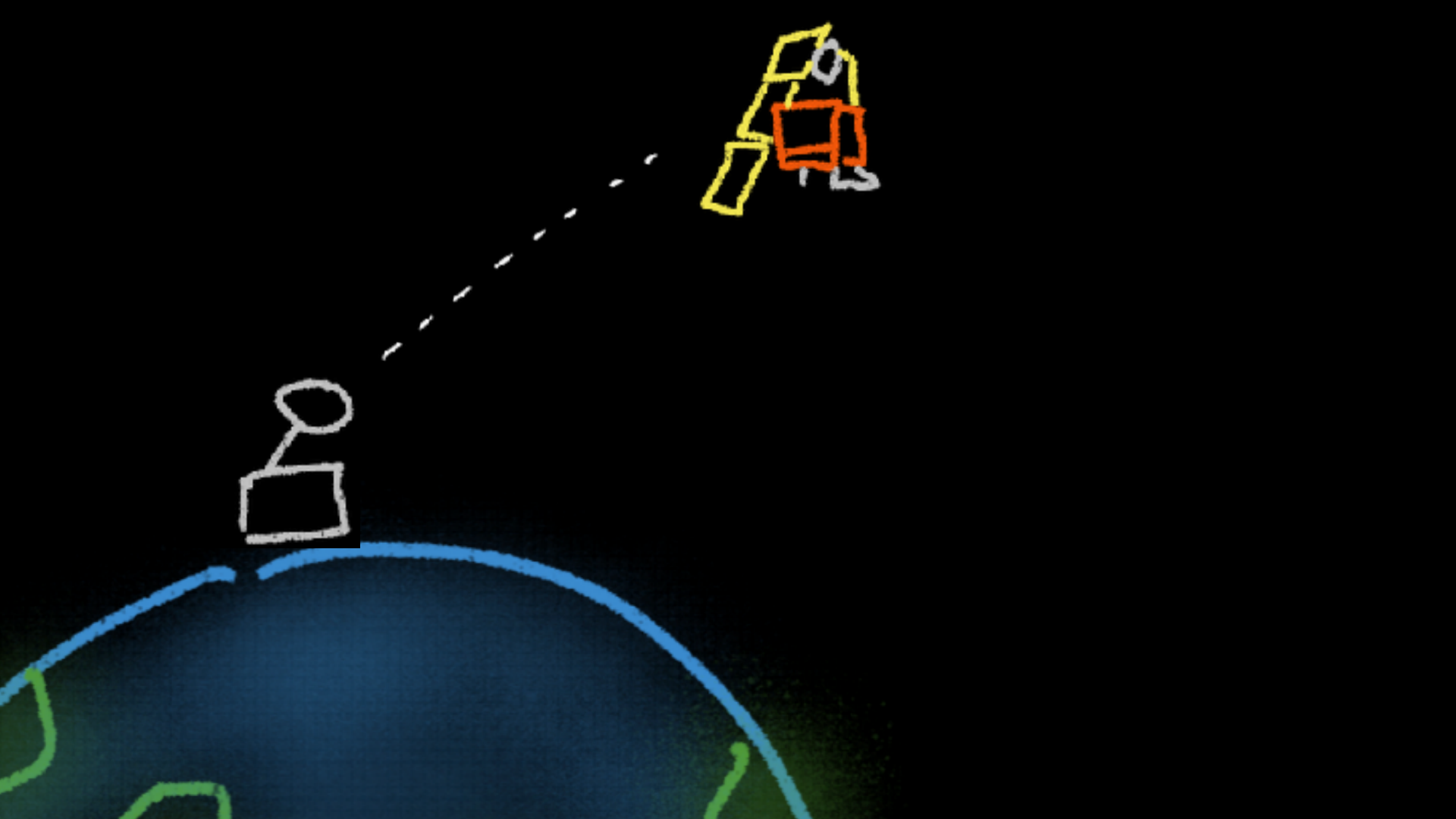


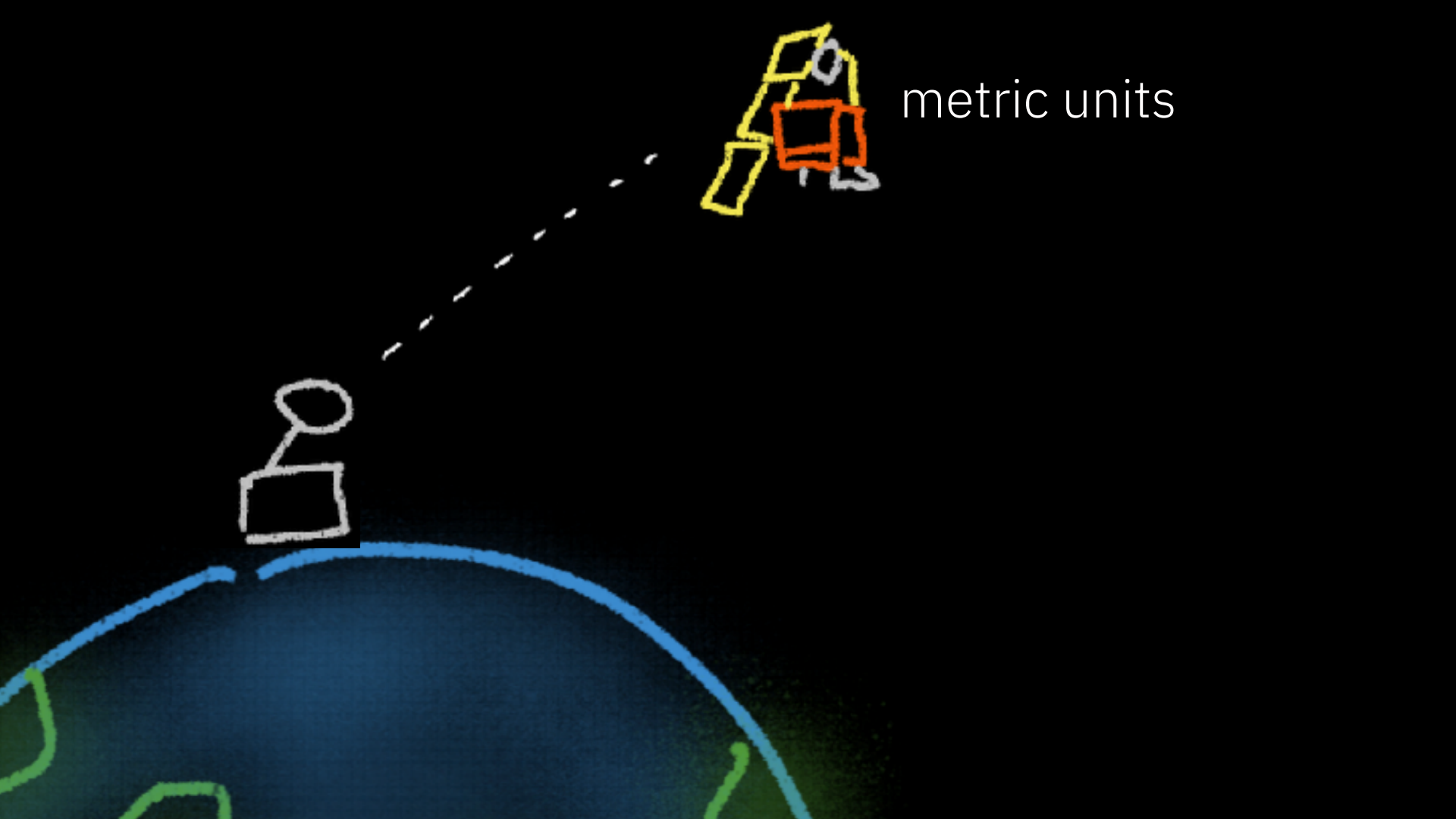


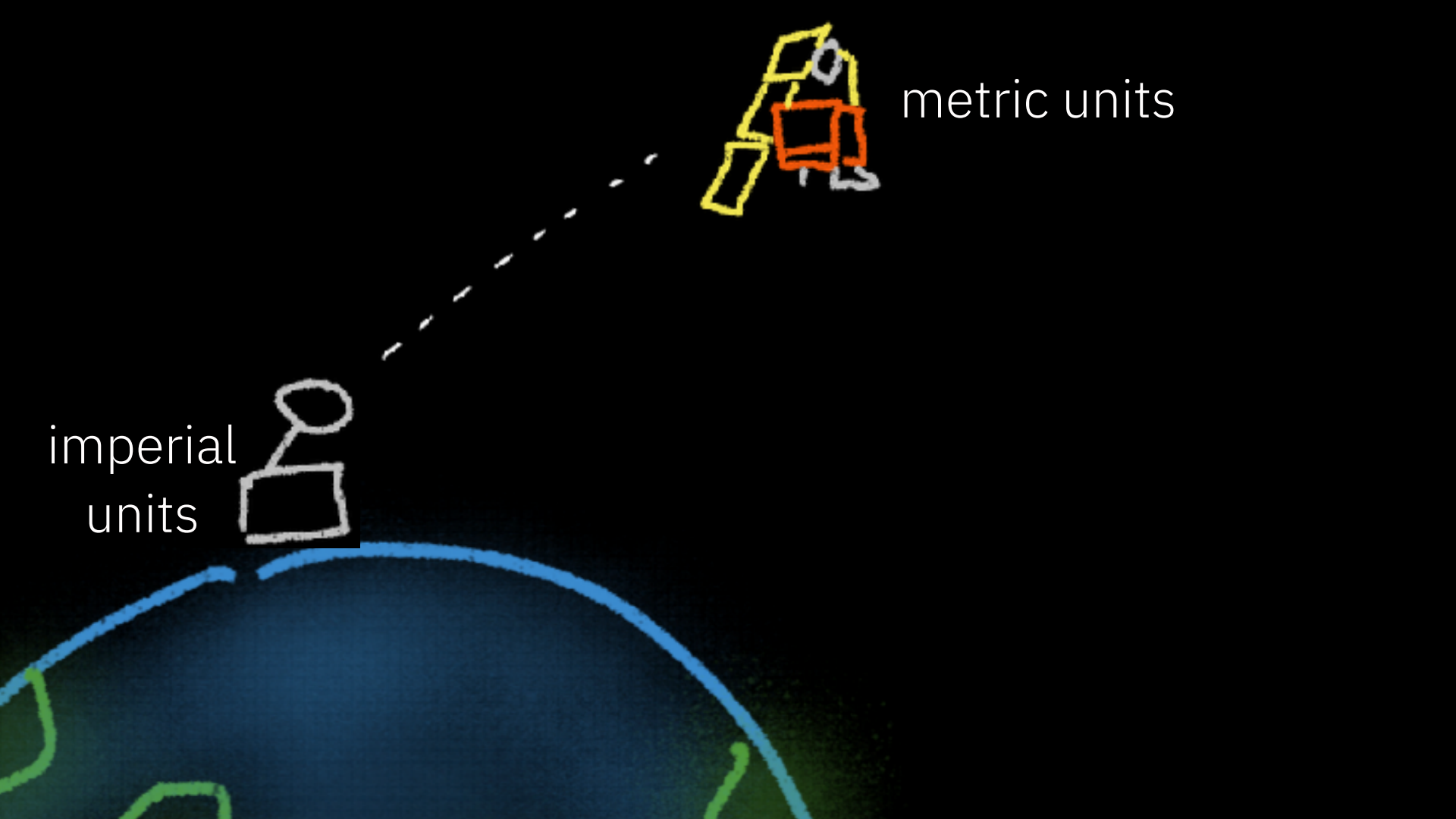


Courtesy NASA/
JPL-Caltech






metric units


metric units
imperial units


metric units
imperial units
distributing did not help

microservices **need**
consumer-driven contract tests

fail

the not-actually-continuous
continuous integration and
continuous deployment

“we have a CI/CD”

CI/CD is something you **do**
not a tool you buy

“i’ll merge my branch into our CI next week”

“CI/CD … CI/CD … CI/CD …

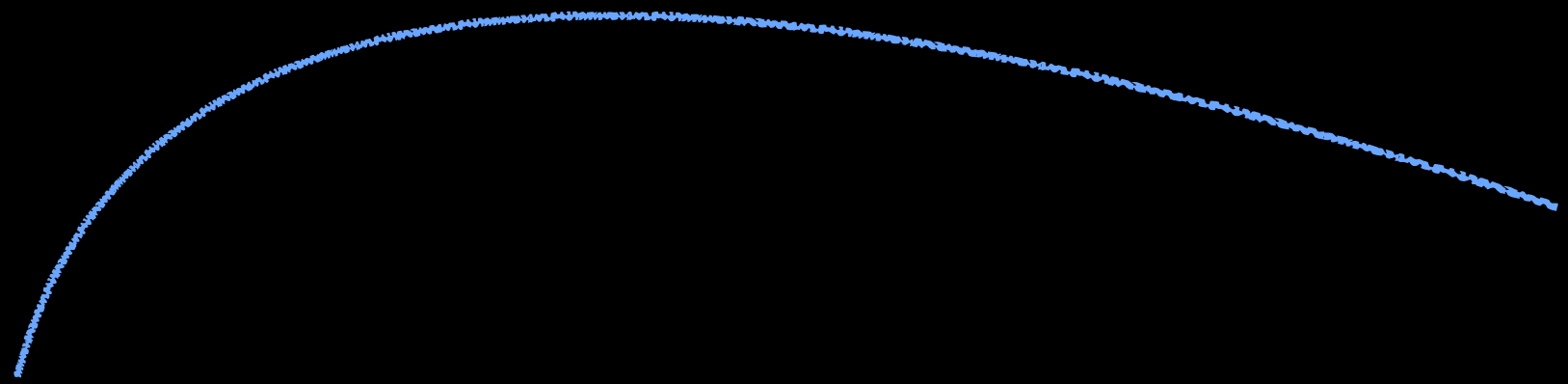
we release every six months …

CI/CD …. ”

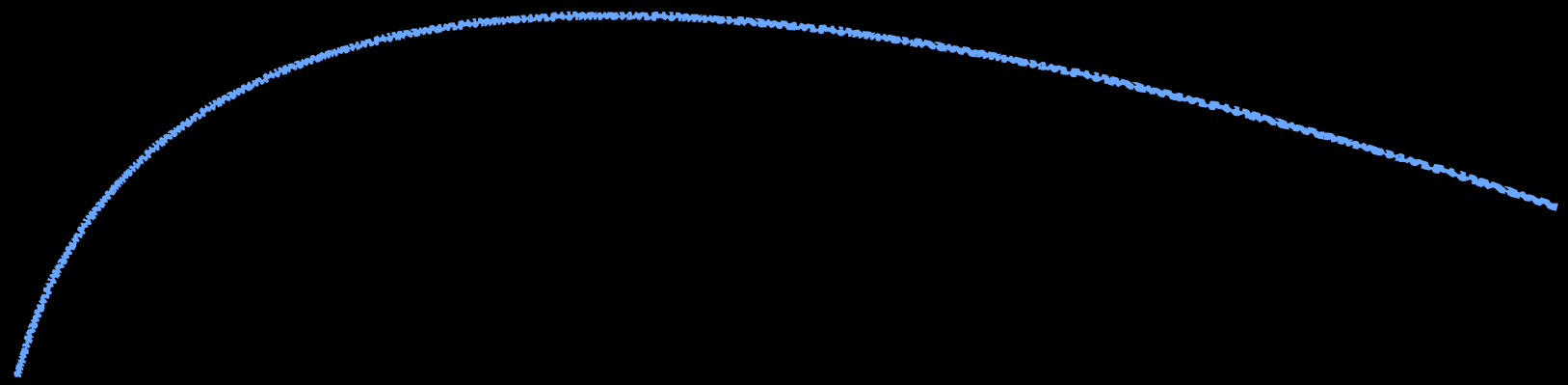
continuous.

I don’t think that word means
what you think it means.

how often should you push to master?

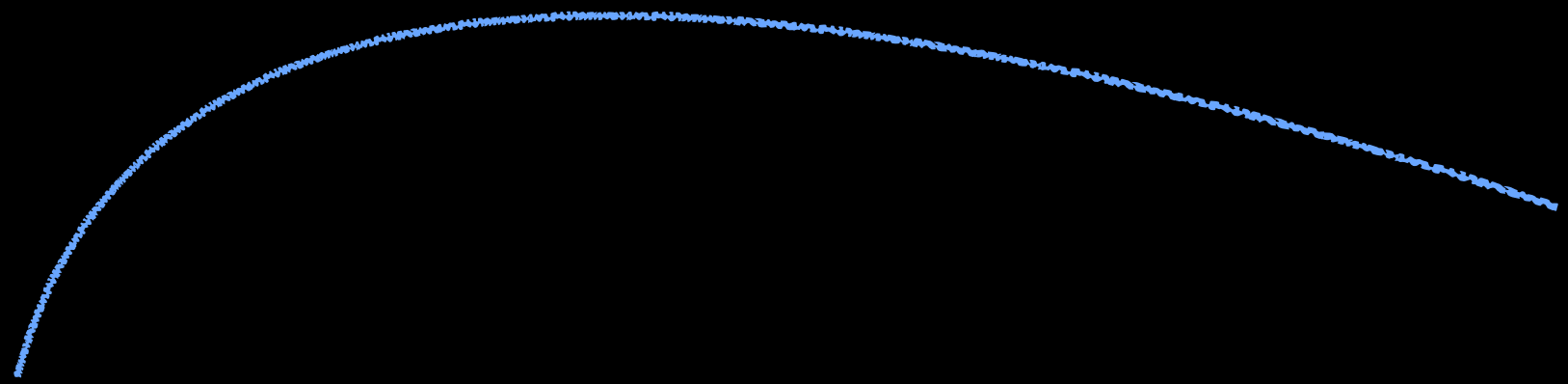


how often should you integrate?



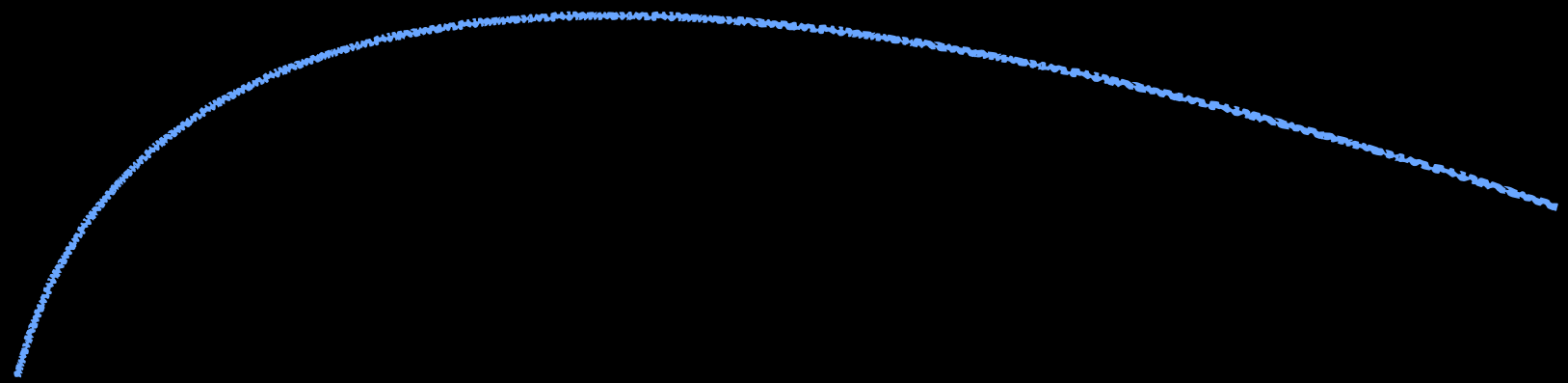
how often should you integrate?

every character



how often should you integrate?

every character

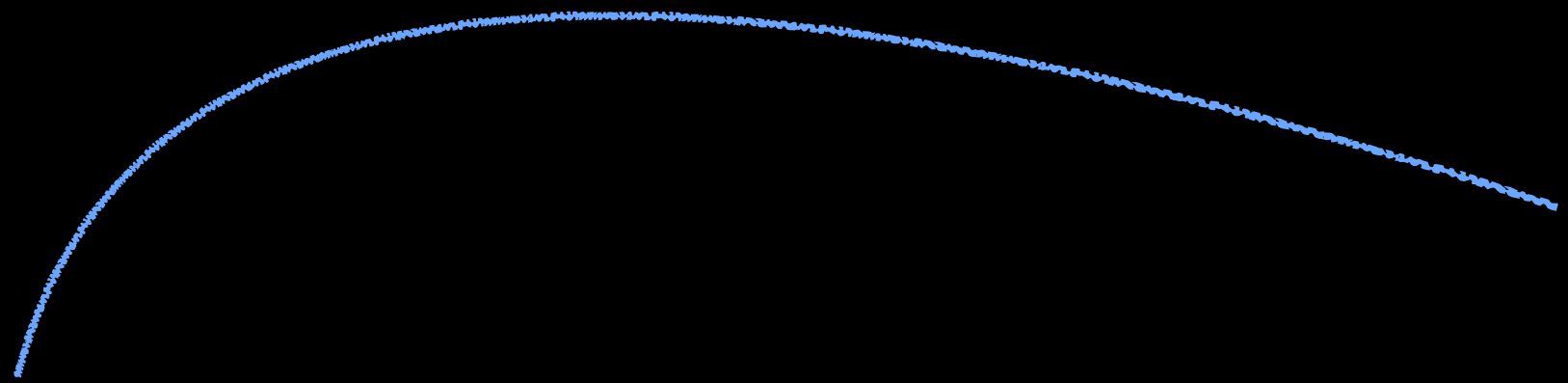


actually continuous
... but stupid

how often should you integrate?

every character

every commit
(several times an hour)



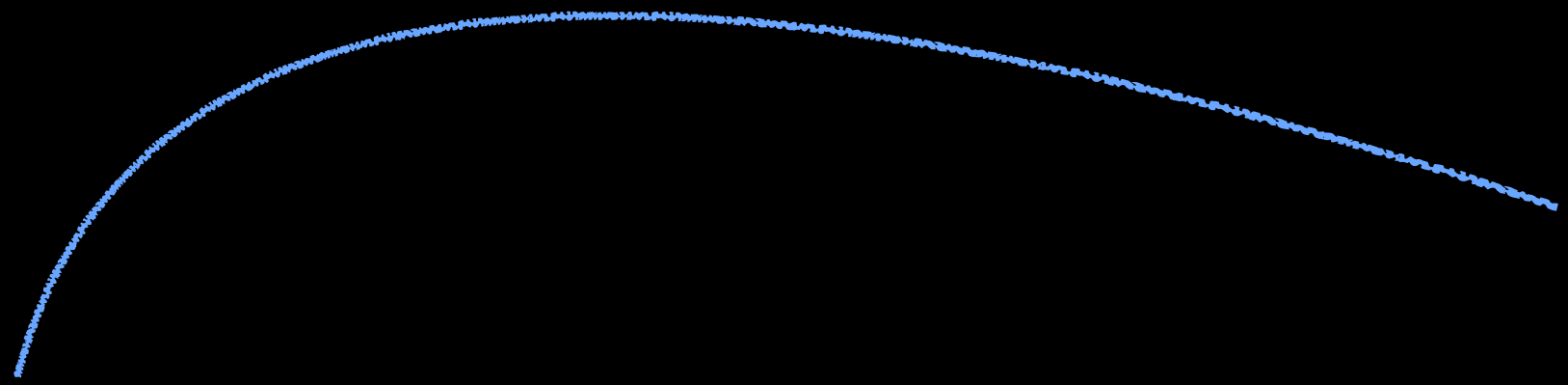
actually continuous
... but stupid

how often should you integrate?

every few commits
(several times a day)

every character

every commit
(several times an hour)



actually continuous
... but stupid

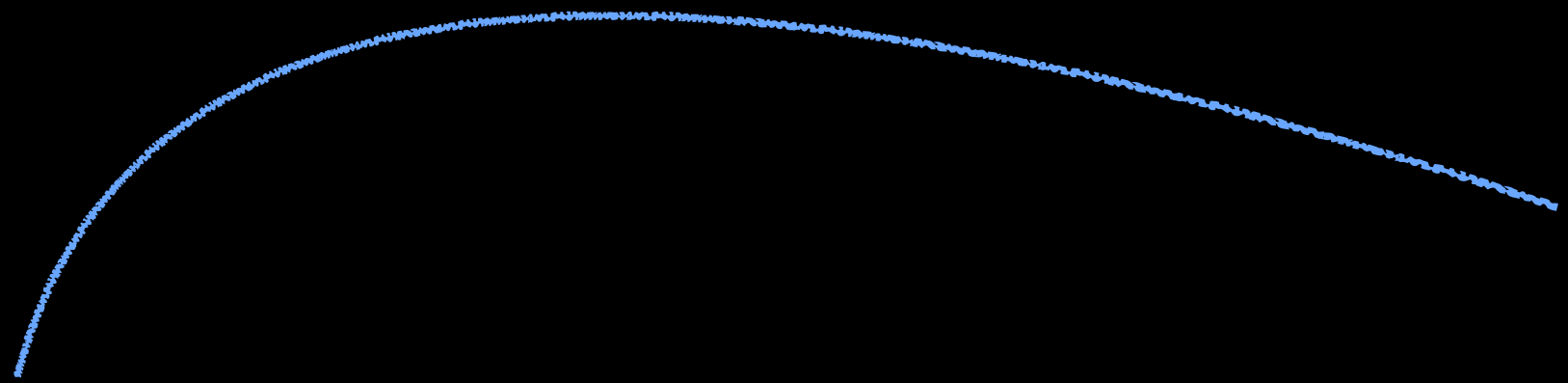
how often should you integrate?

every few commits
(several times a day)

every character

every commit
(several times an hour)

once a day



actually continuous
... but stupid

how often should you integrate?

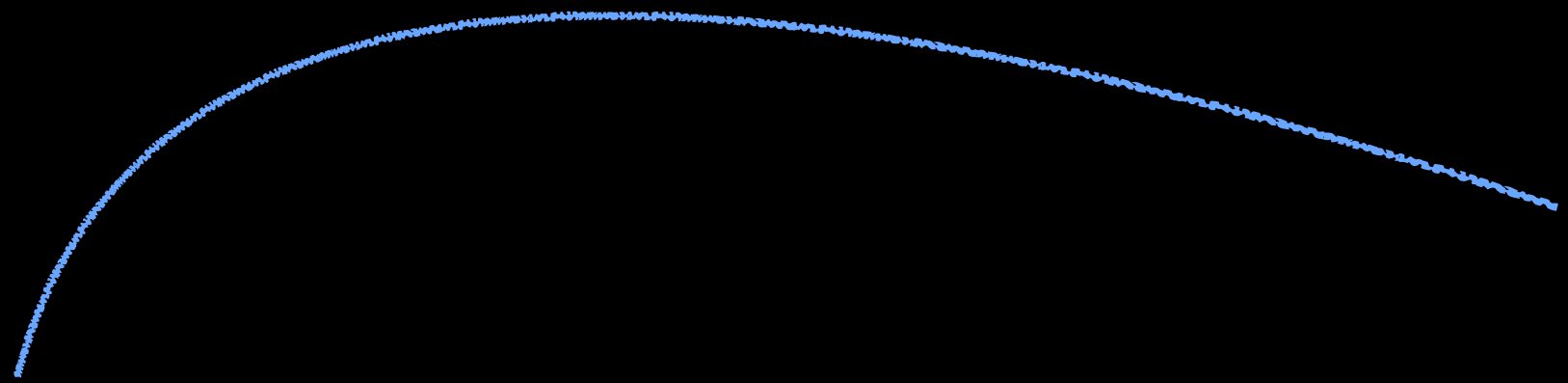
every few commits
(several times a day)

every character

every commit
(several times an hour)

once a day

once a
week



actually continuous
... but stupid

how often should you integrate?

every few commits
(several times a day)

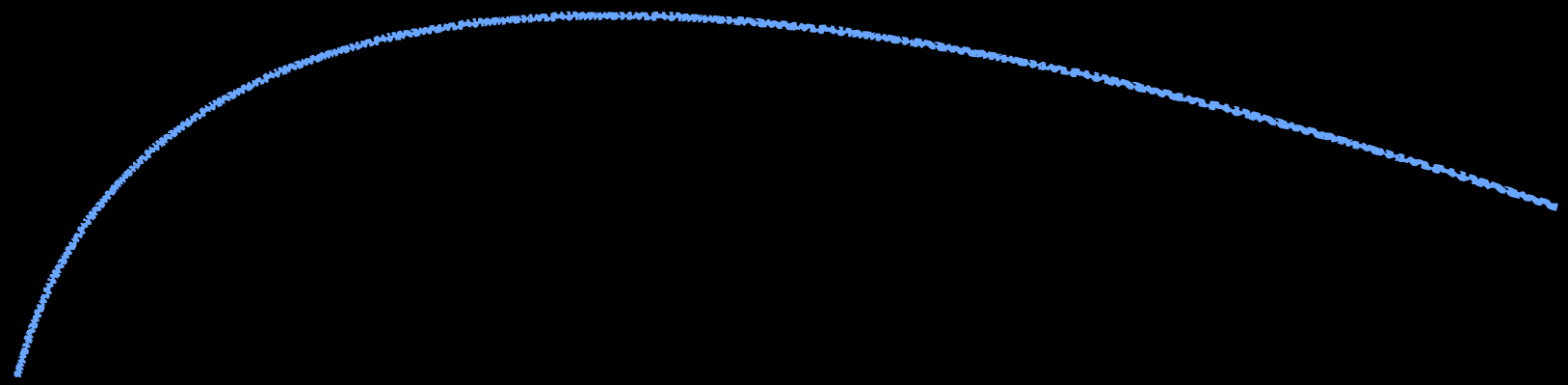
every character

every commit
(several times an hour)

once a day

once a
week

once a
month



actually continuous
... but stupid

how often should you integrate?

every few commits
(several times a day)

every character

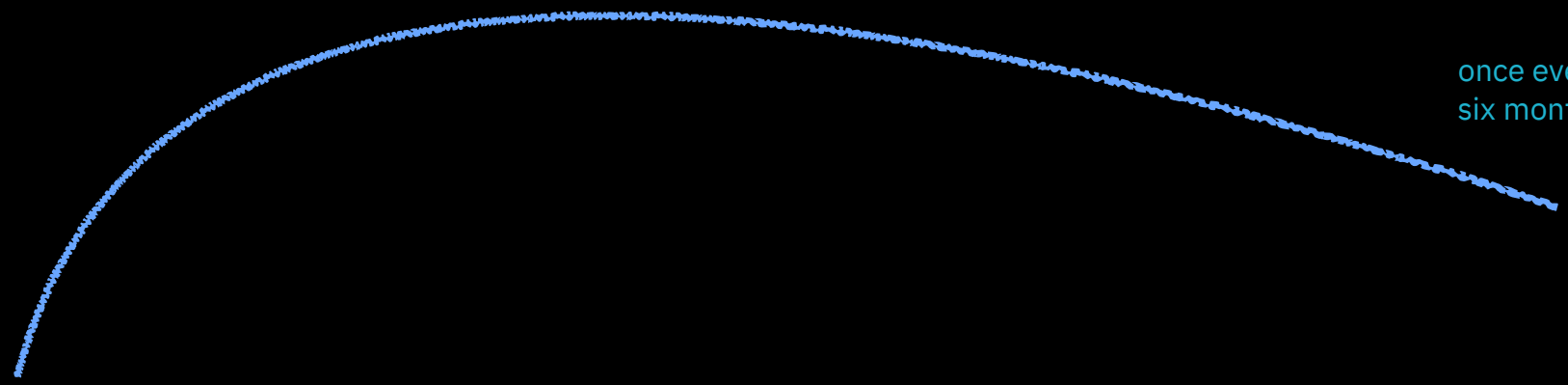
every commit
(several times an hour)

once a day

once a
week

once a
month

once every
six months



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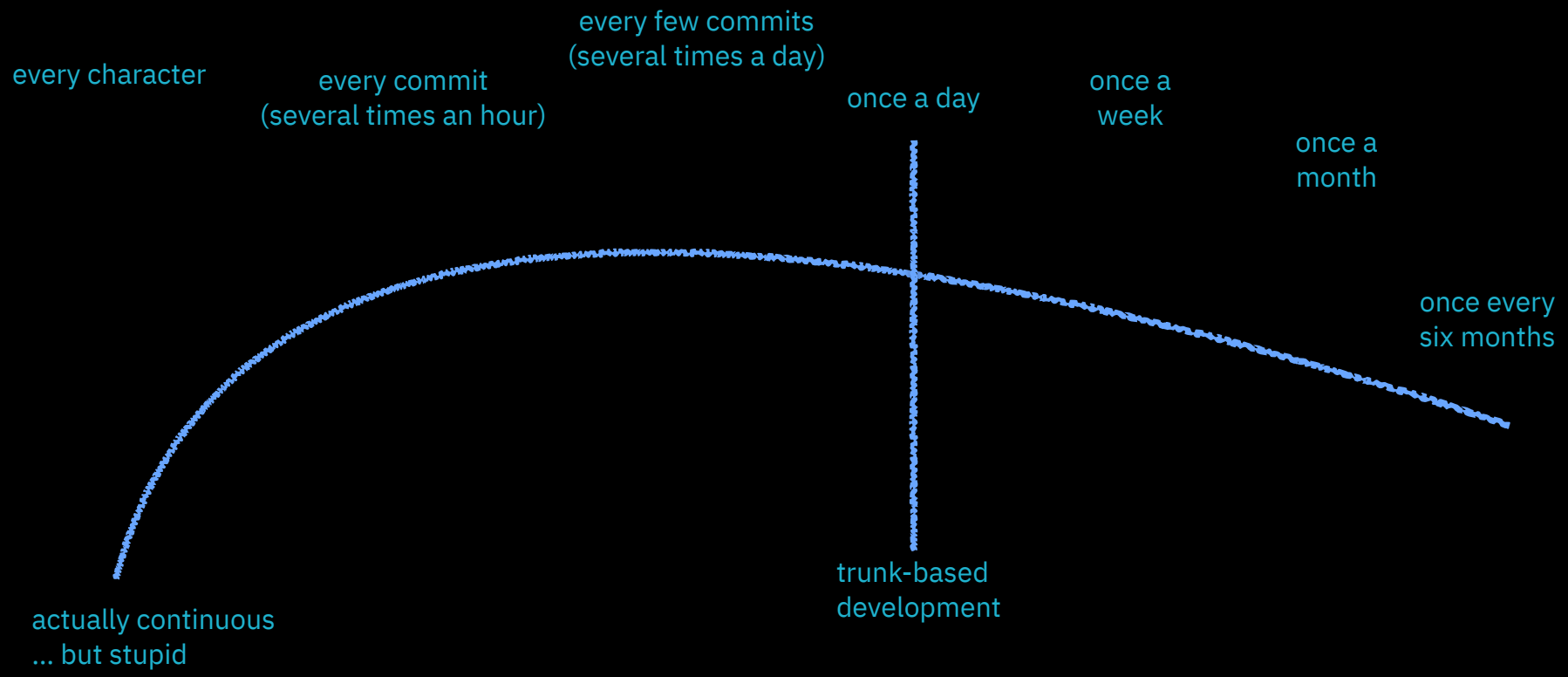
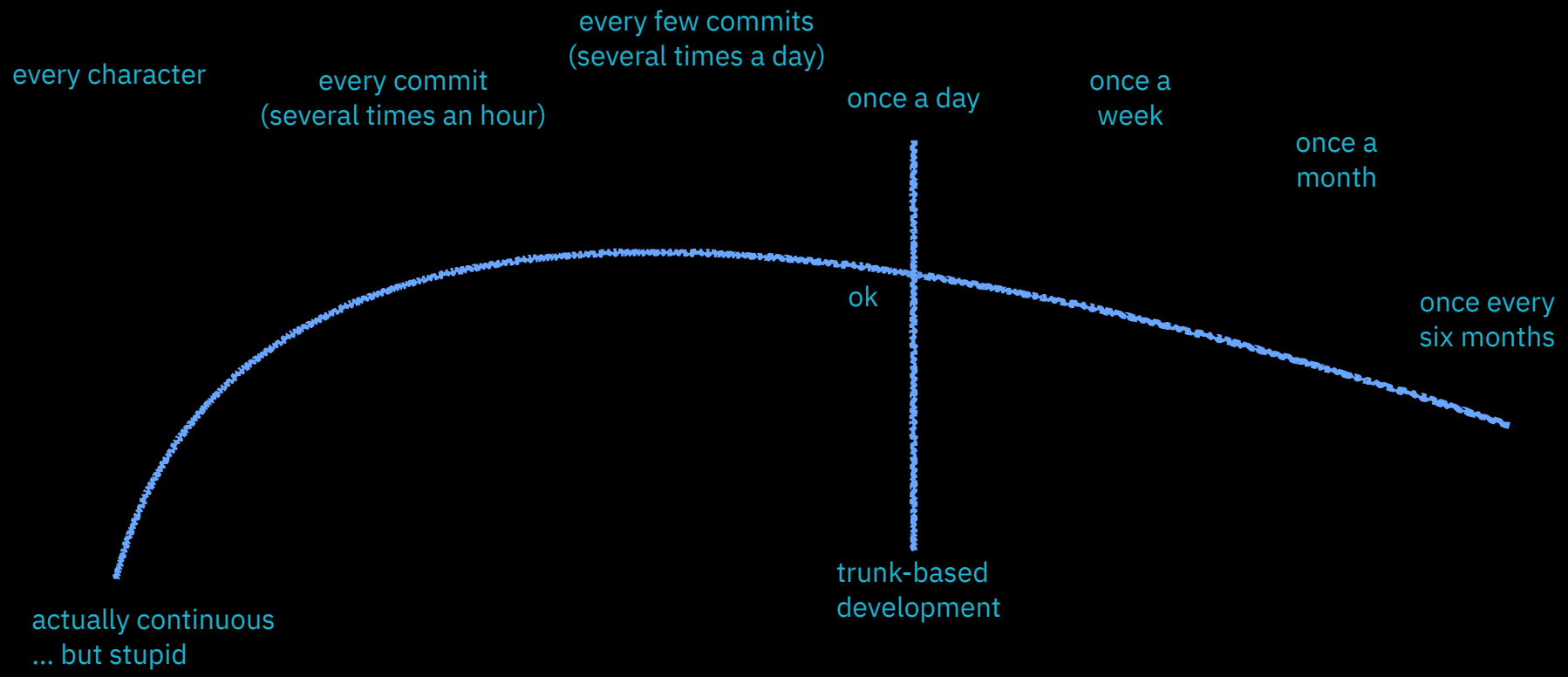
... but stupid

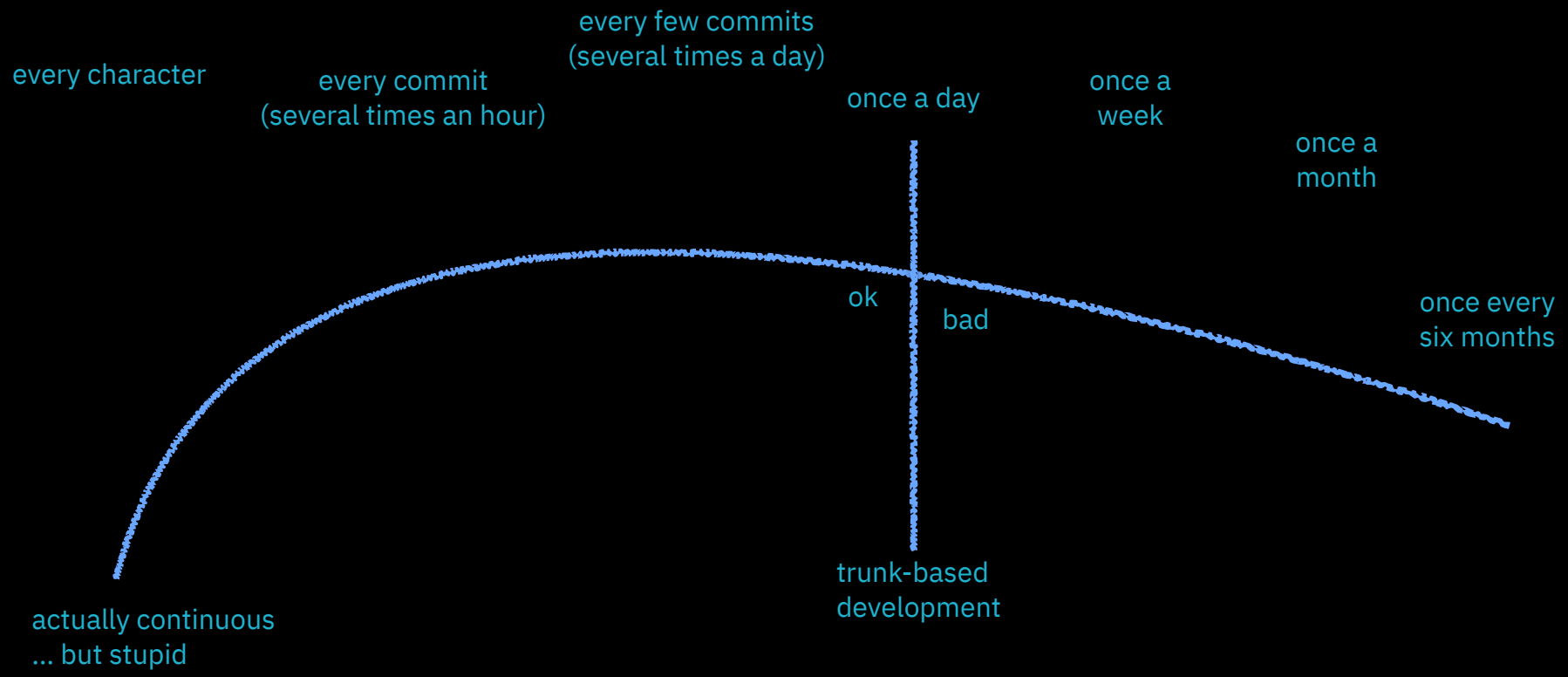
how often should you integrate?



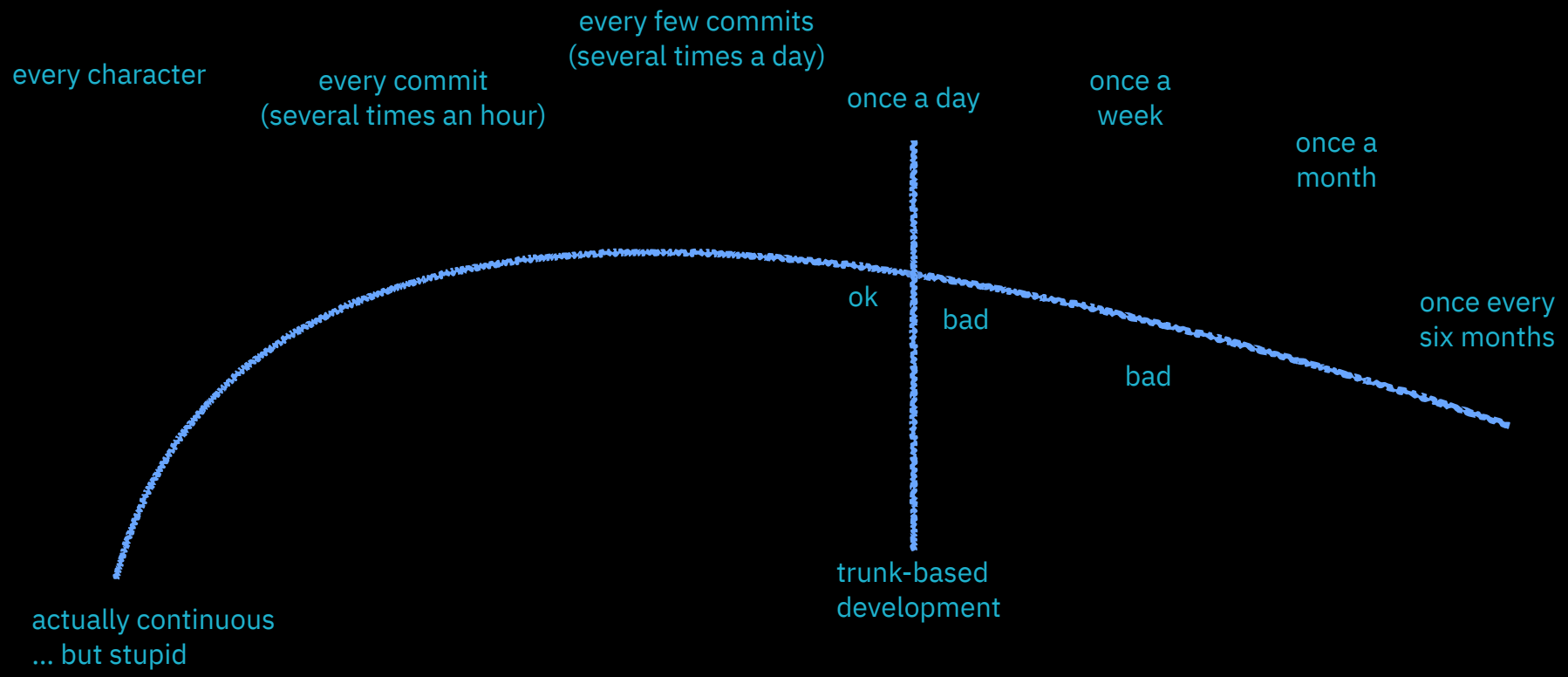
how often should you integrate?



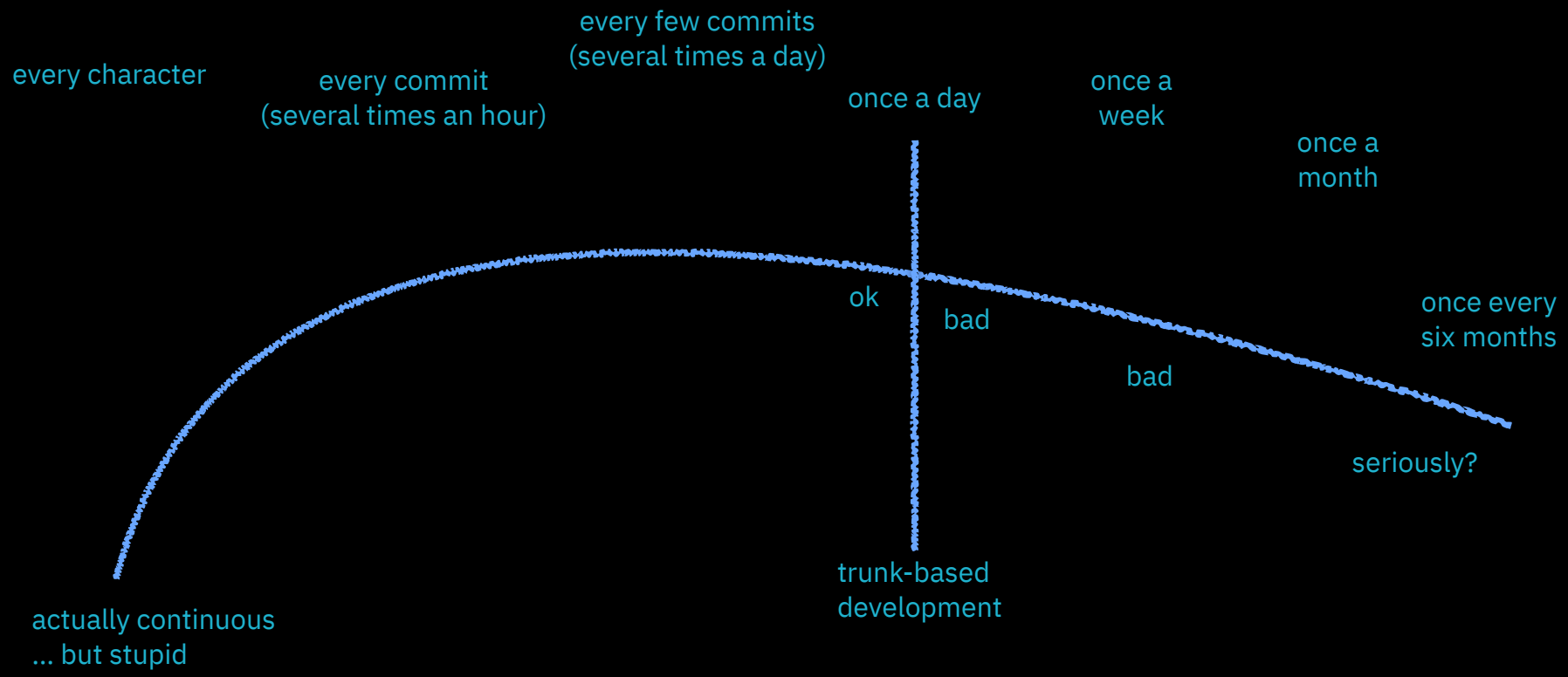
how often should you integrate?



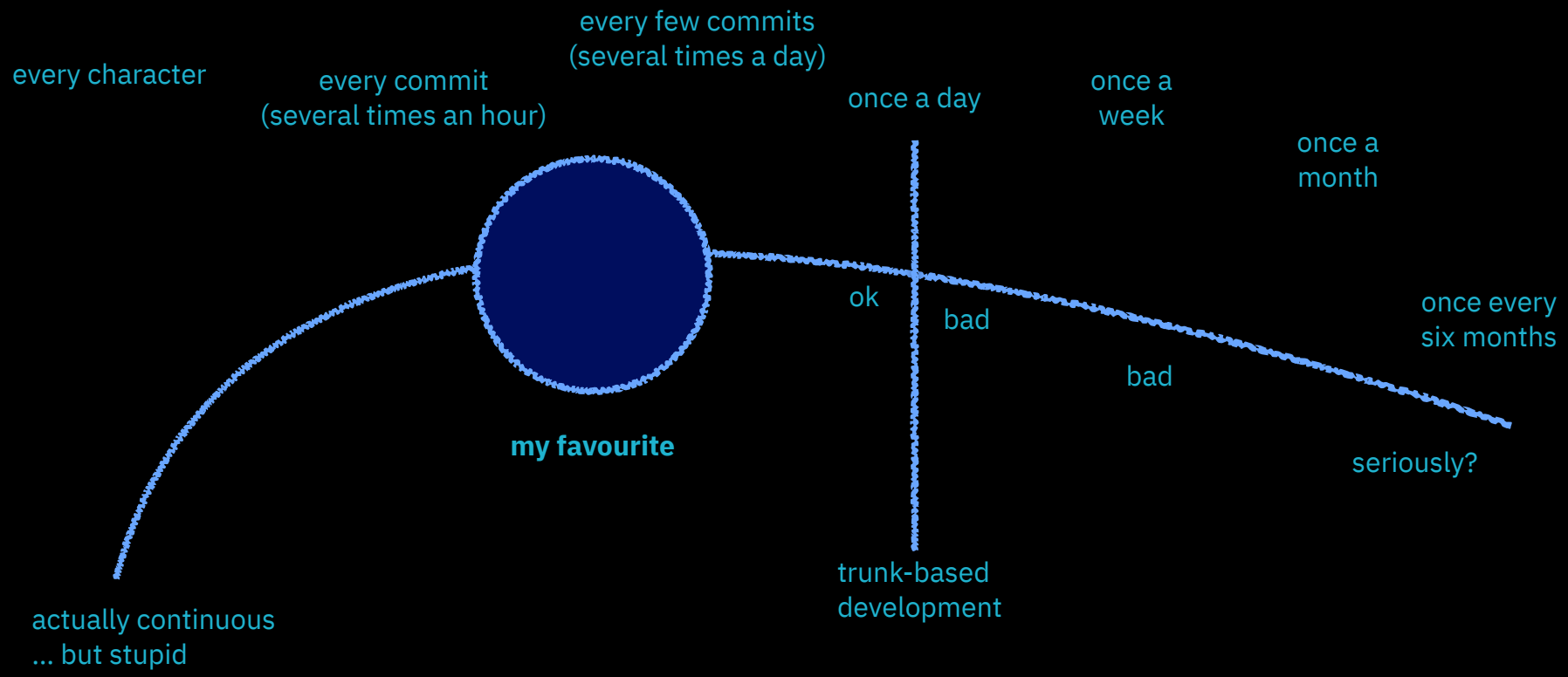
how often should you integrate?



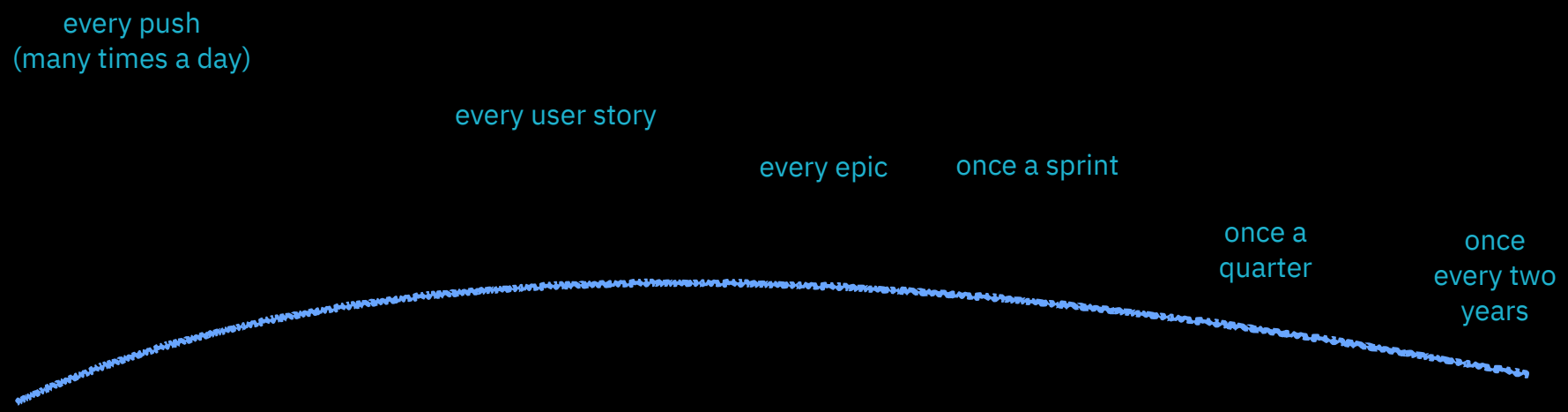
how often should you integrate?



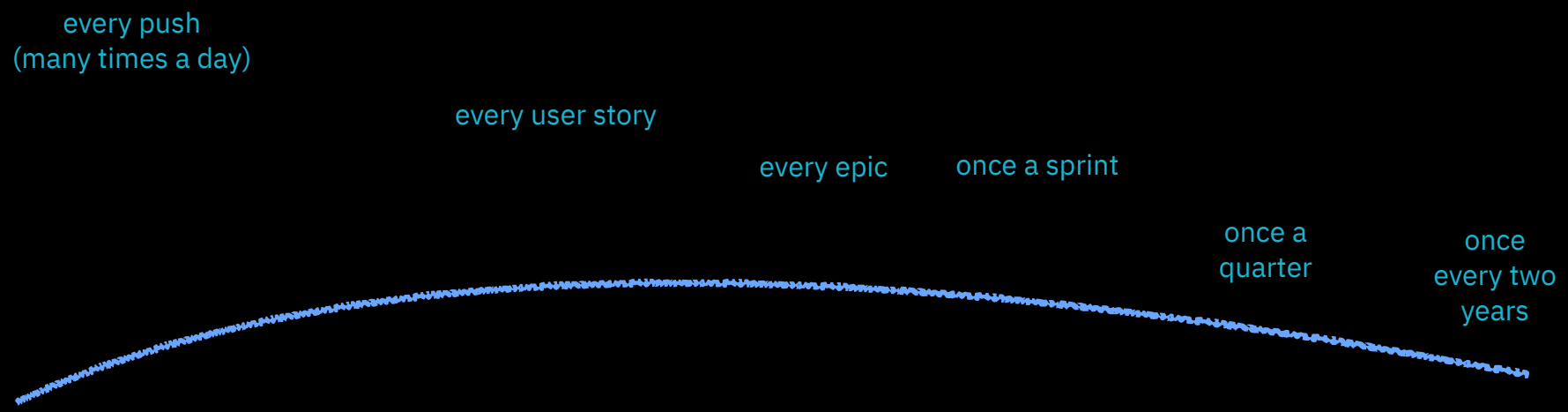
how often should you integrate?



how often should you release?



how often should you deploy?



how often should you deploy?

every push
(many times a day)

every user story

every epic

once a sprint

once a
quarter

once
every two
years

(need a good handle on
feature flags)

how often should you deploy?

every push
(many times a day)

every user story

every epic

once a sprint

ok

once a
quarter

once
every two
years

(need a good handle on
feature flags)

how often should you deploy?

every push
(many times a day)

every user story

every epic

once a sprint

once a
quarter

once
every two
years

ok

old-
school

(need a good handle on
feature flags)

how often should you deploy?

every push
(many times a day)

every user story

every epic

once a sprint

once a
quarter

once
every two
years

ok

sigh

old-
school

(need a good handle on
feature flags)

how often should you deploy?

every push
(many times a day)

every user story

every epic

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once a
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years

ok

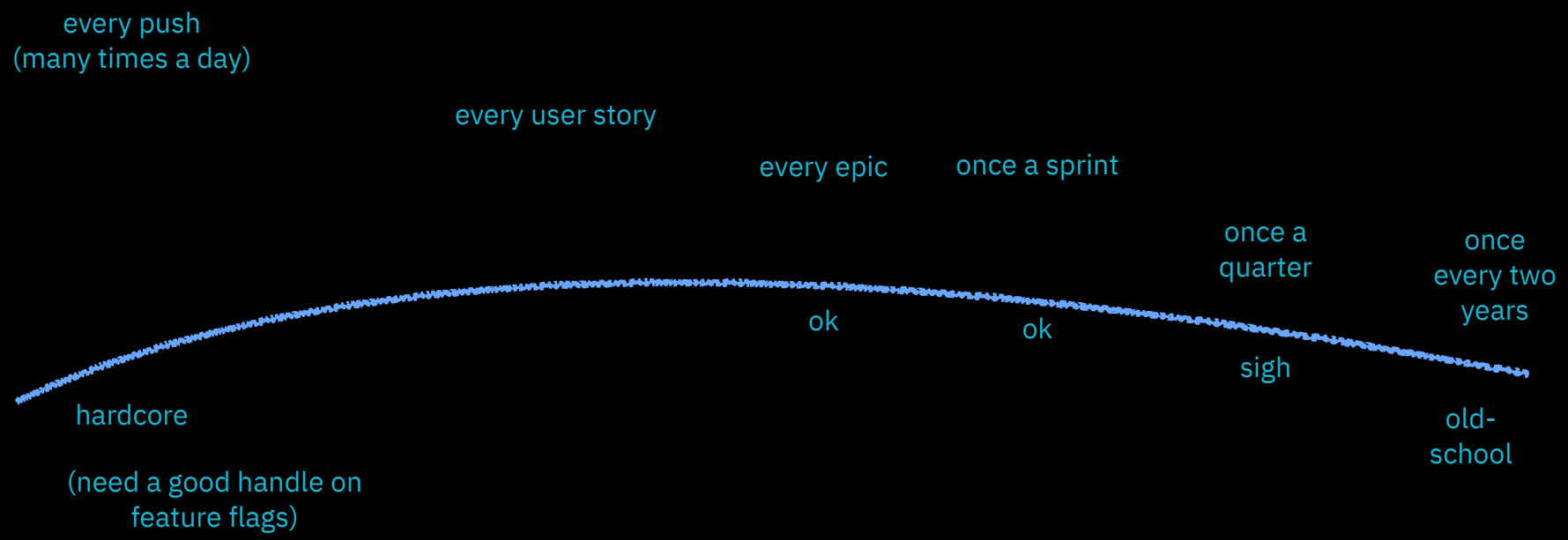
ok

sigh

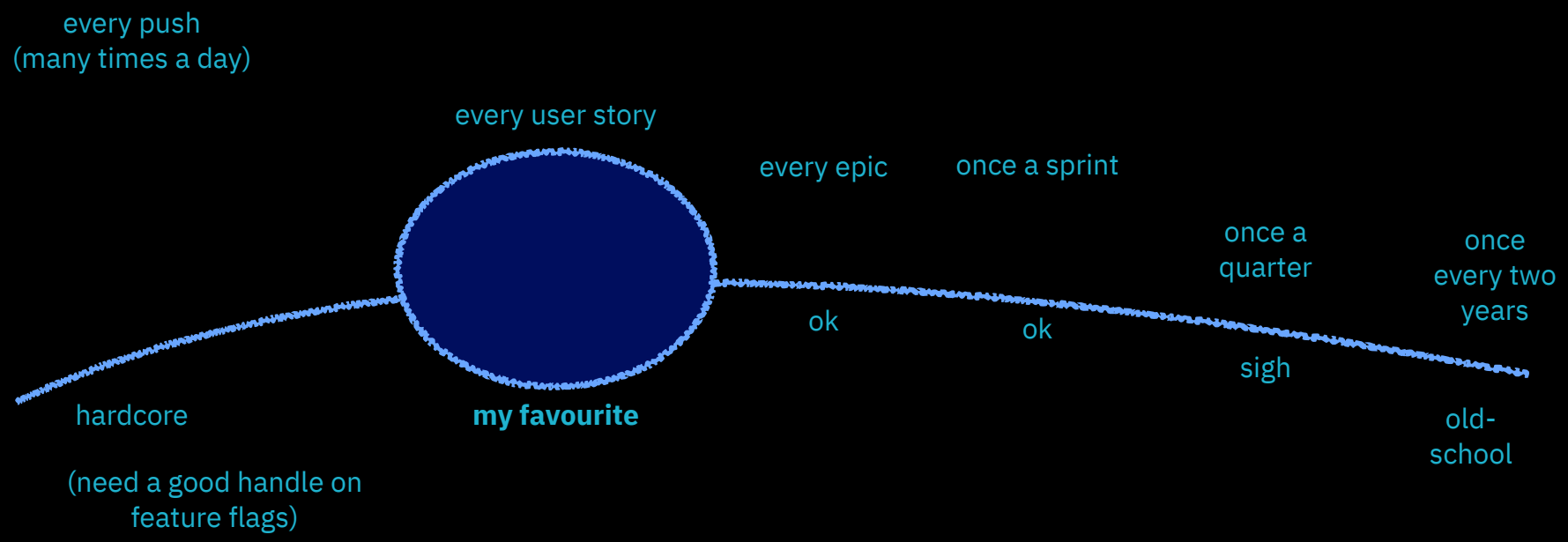
old-
school

(need a good handle on
feature flags)

how often should you deploy?



how often should you deploy?

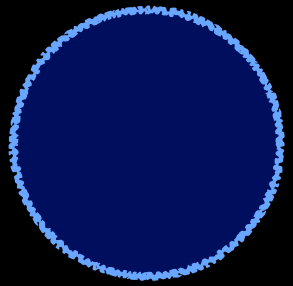


how often should you test in staging?

how often should you deliver?

how often should you deliver?

every push



my favourite

“we can’t actually **release** this.”


why?

what’s stopping more frequent deploys?

“we can’t release this microservice…

we deploy all our microservices at the same time.”

“we can’t ship until every feature is complete”

if you're not embarrassed by your first release it was too late

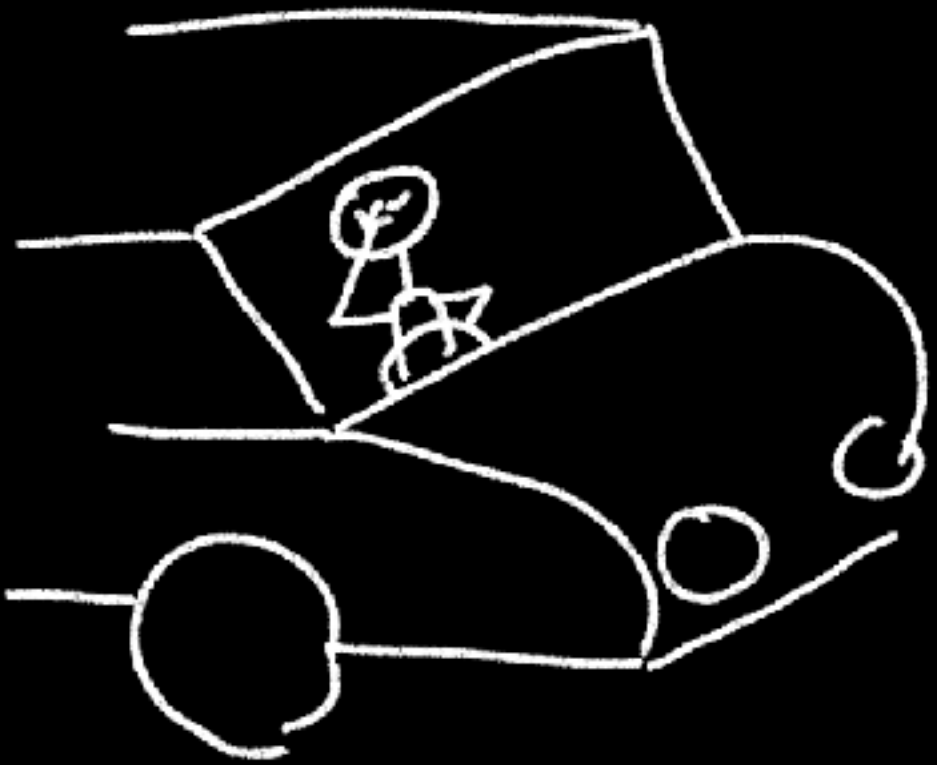
- Reid Hoffman

speed

speed

what’s the point of architecture that can go faster, if you don’t go faster?

what’s the point of architecture that can go faster, if you don’t go faster?



drive a car

feedback is good engineering

feedback is good business

deferred wiring

feature flags

A/B testing

canary deploys

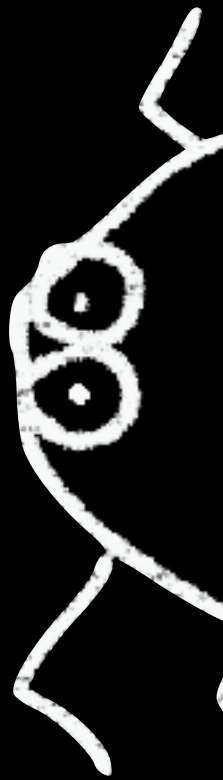
fail

the
‘someday’
automation

“our tests aren’t automated”

“we don’t know if our code works”

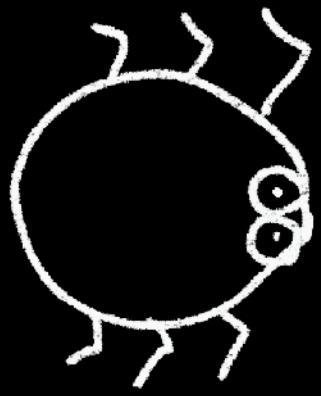
“we don’t know if our code works”



systems **will** behave in unexpected ways

dependency updates can change behaviour

“we can’t ship until we have more confidence in the quality”

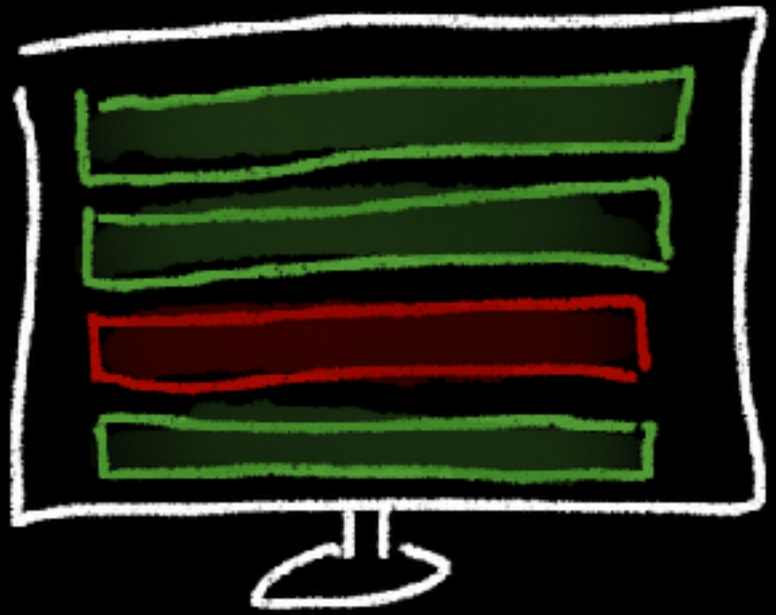


microservices **need**
automated integration tests

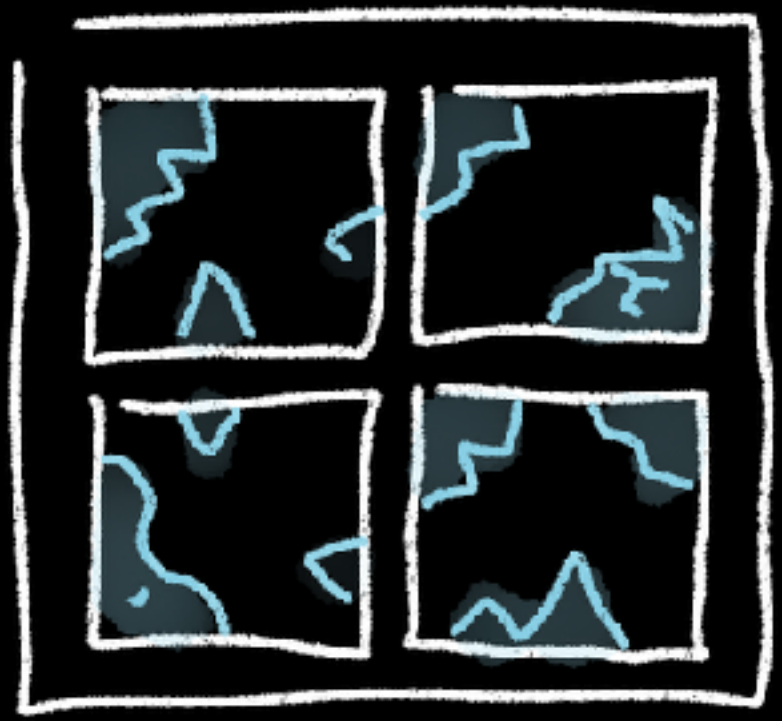
not a good CI/CD indicator

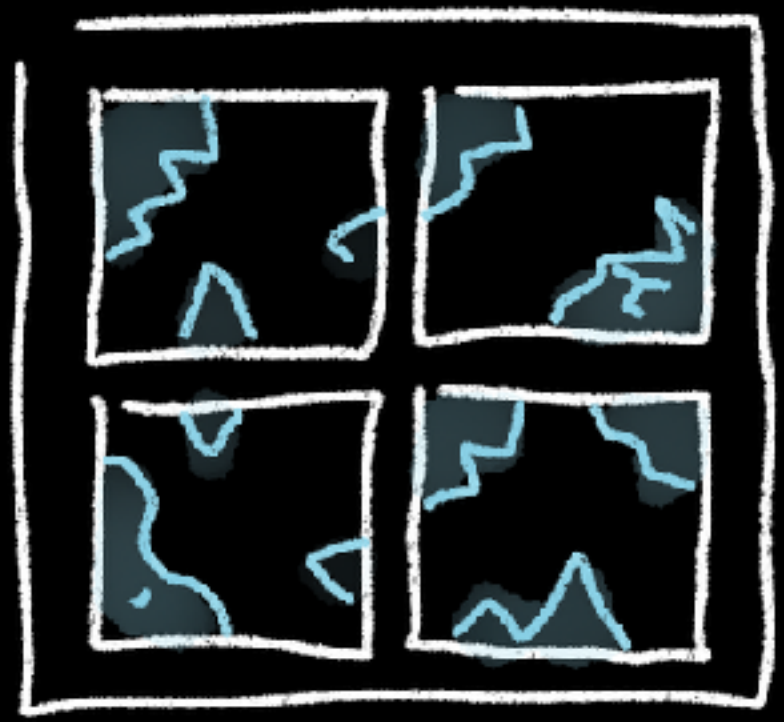
a good CI/CD indicator

“we don’t know when the build is broken”



a good build radiator

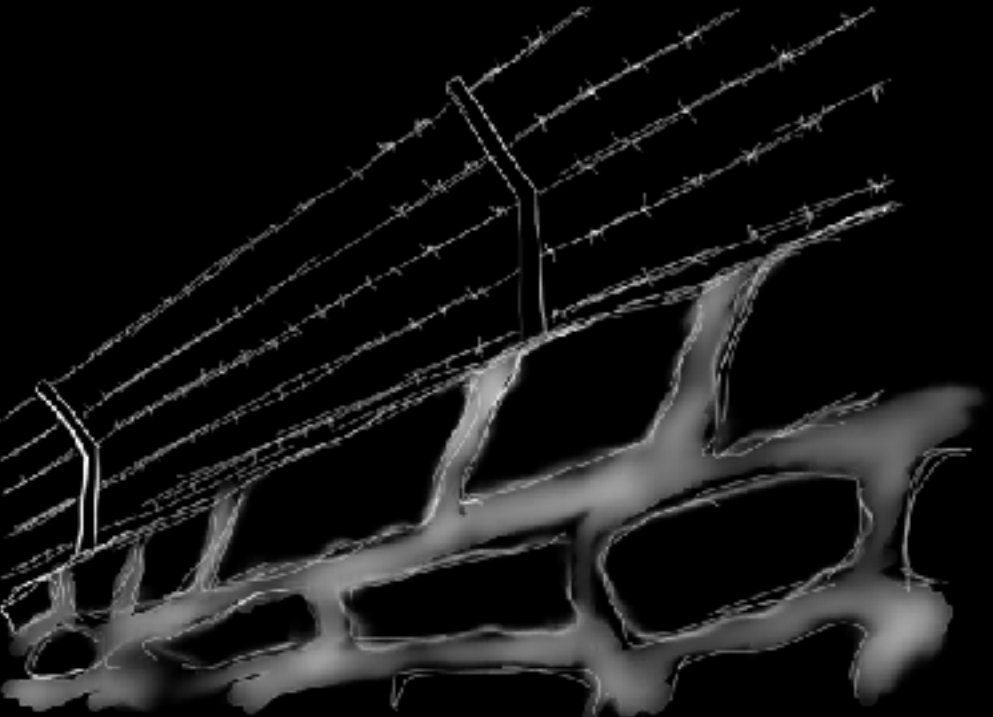




“oh yes, that build has been broken for a few weeks...”

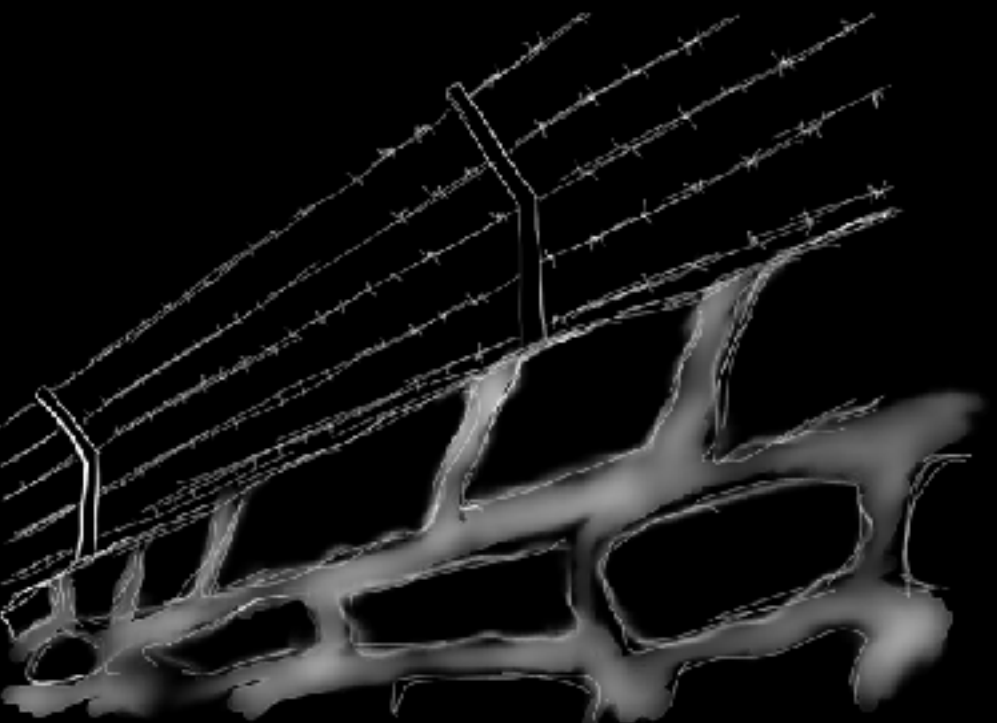
fail

the locked-
down totally
rigid inflexible
un-cloudy cloud

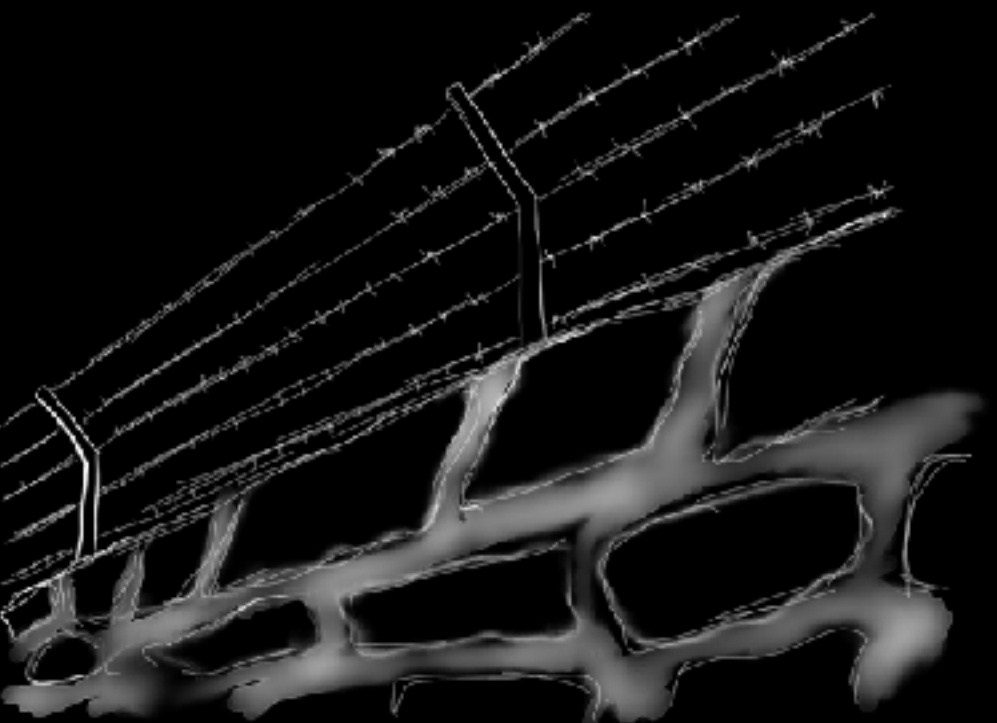


@holly_cummins

“we’ve configured our network!



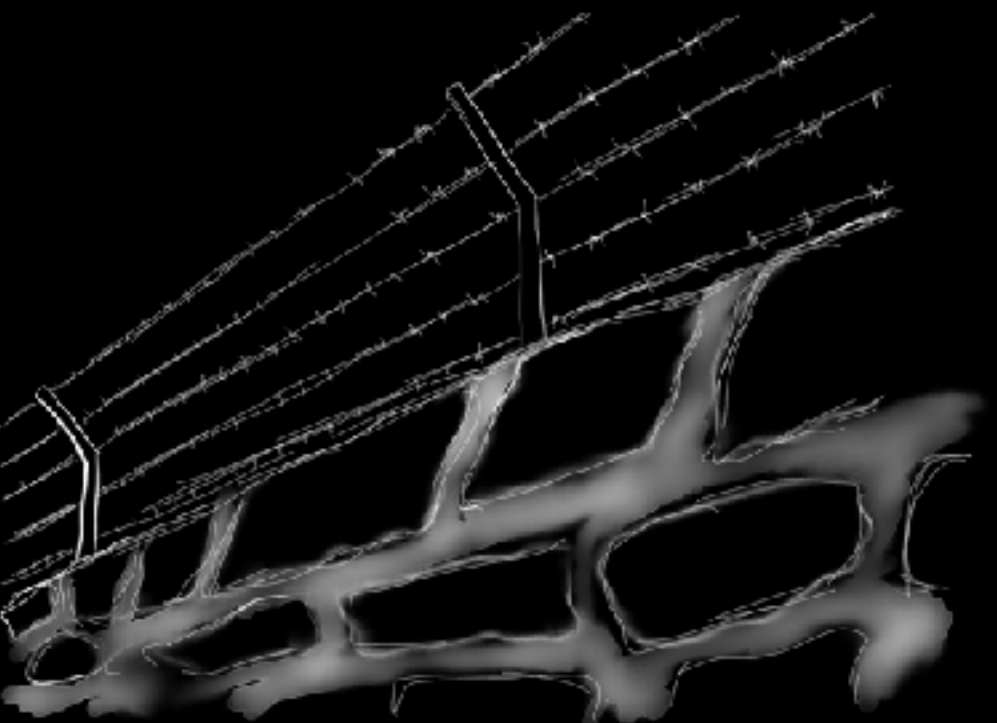
@holly_cummins



“we’ve configured our network!

you can either access the cloud servers ... or access jira.

@holly_cummins



“we’ve configured our network!

you can either access the cloud servers ... or access jira.

to access both you’d need two machines.”

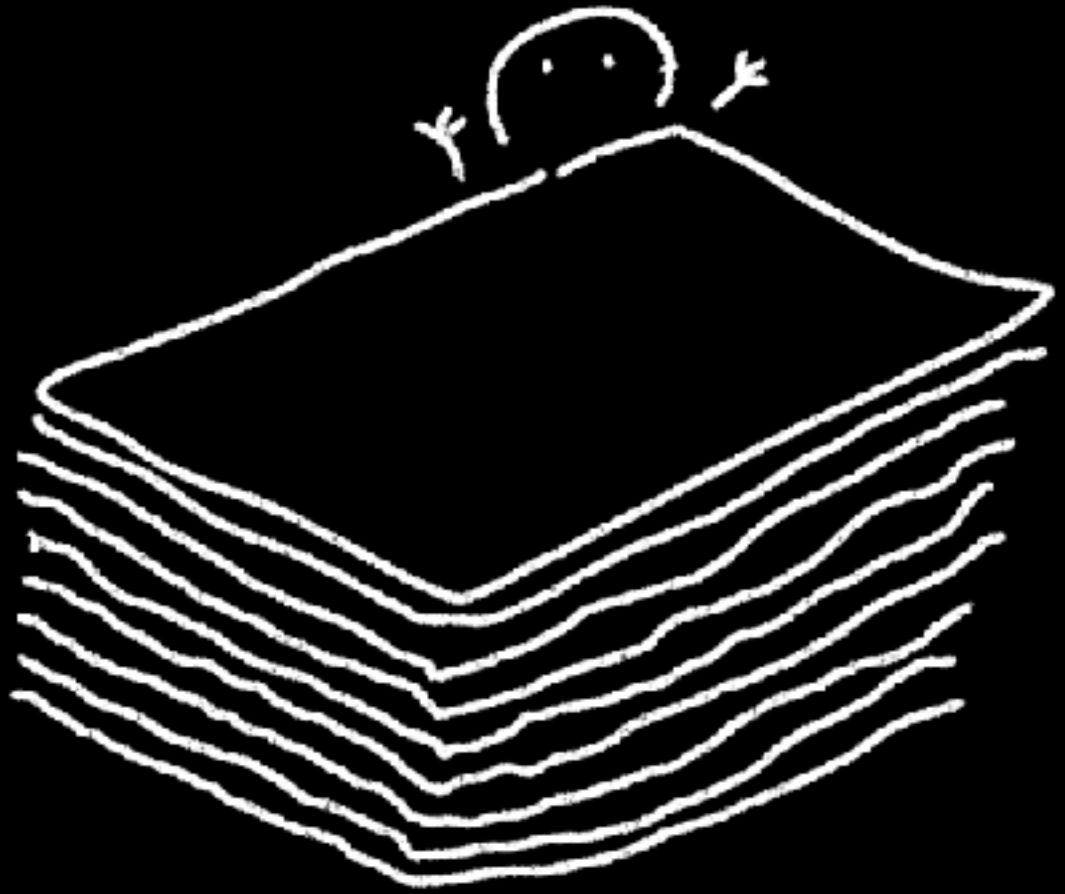
@holly_cummins

“it takes us a week to start coding.”

“it takes us a week to start coding.”

“two days to get a repo ...

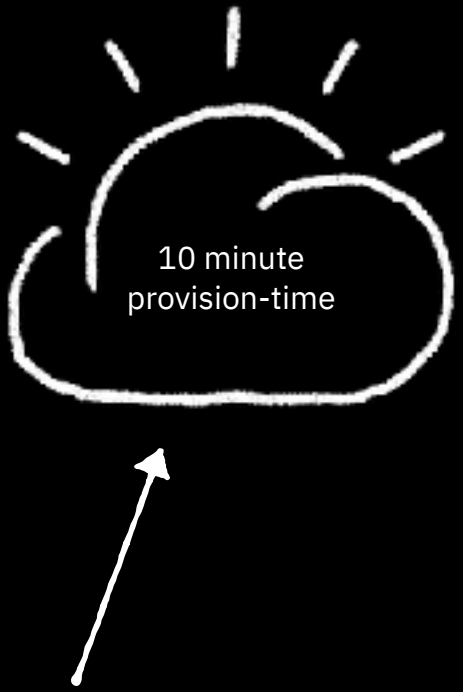
two days to get a pipeline ...”



“we’ve scheduled the architecture board review for a month after the project is ready to ship”

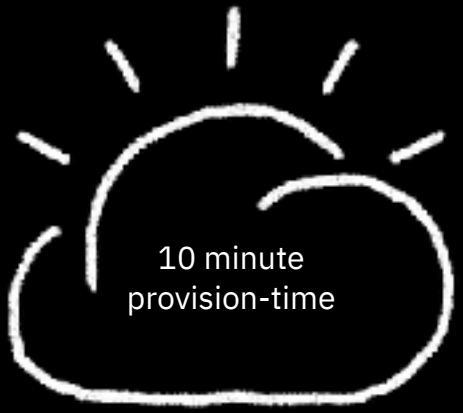
@holly_cummins

“this provisioning software is broken”

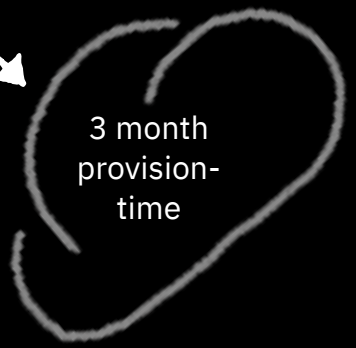


what we sold

“this provisioning software is broken”

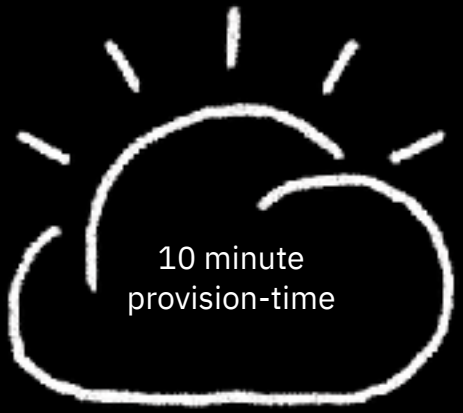


what the client thought they'd got



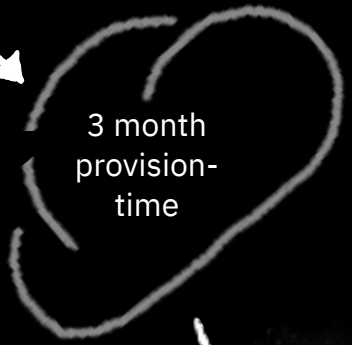
what we sold

"this provisioning software is broken"



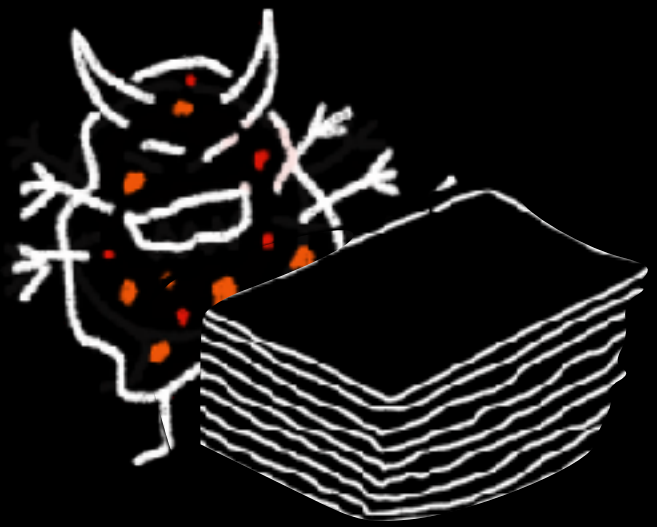
what we sold

what the client thought they'd got

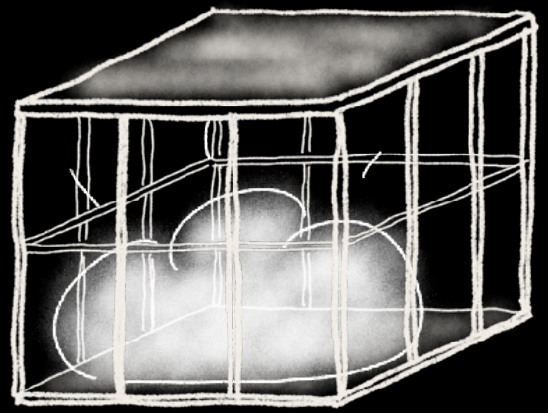


the reason

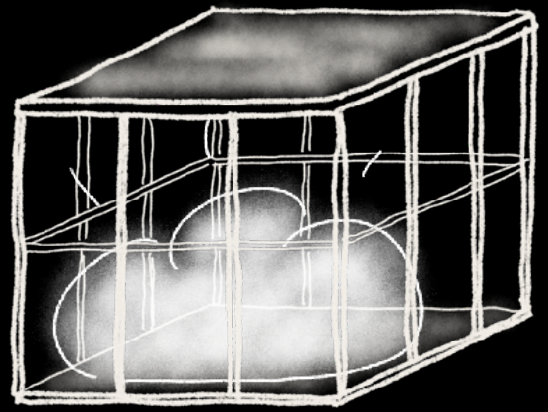
"this provisioning software is broken"



old-style governance isn’t going to work



Provider A



Provider A

Provider B

“we’re going to change cloud provider to fix our procurement process!”

Provider A

Provider B

“we’re going to change cloud provider to fix our procurement process!”

if the developers are the only ones changing, cloud native is not going to work

there is a **cost**:

developers leave

fail

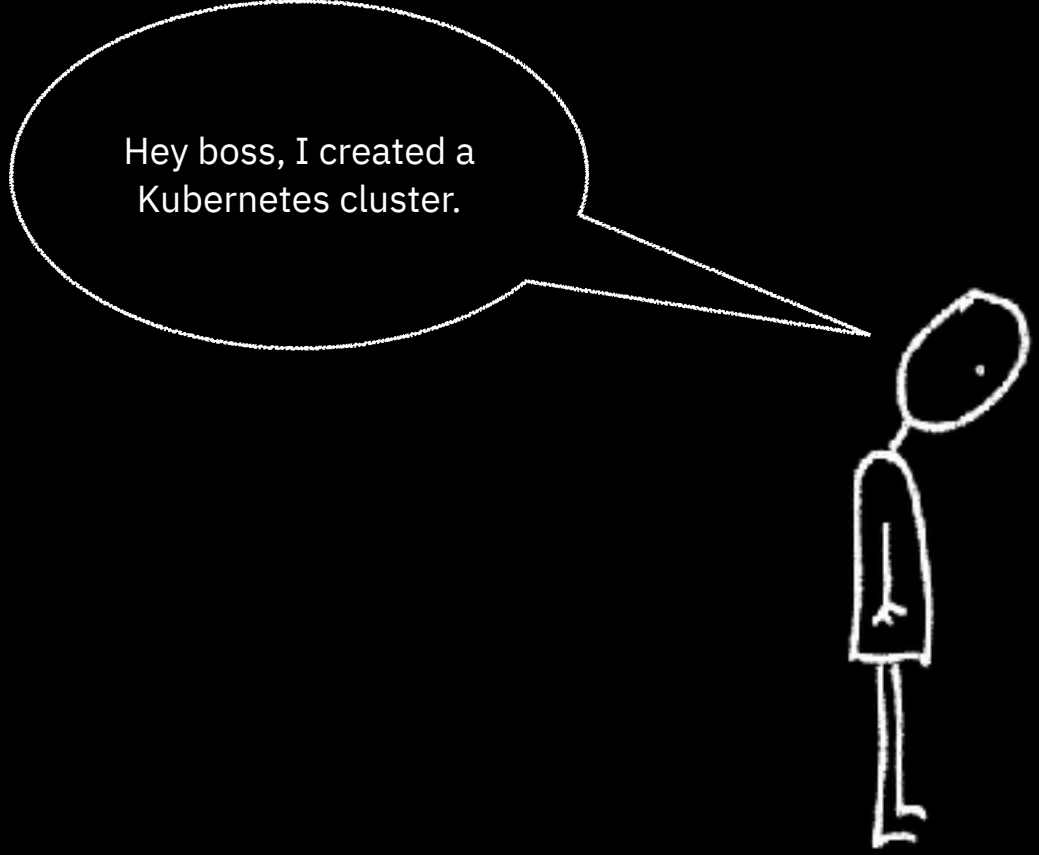
the mystery money pit

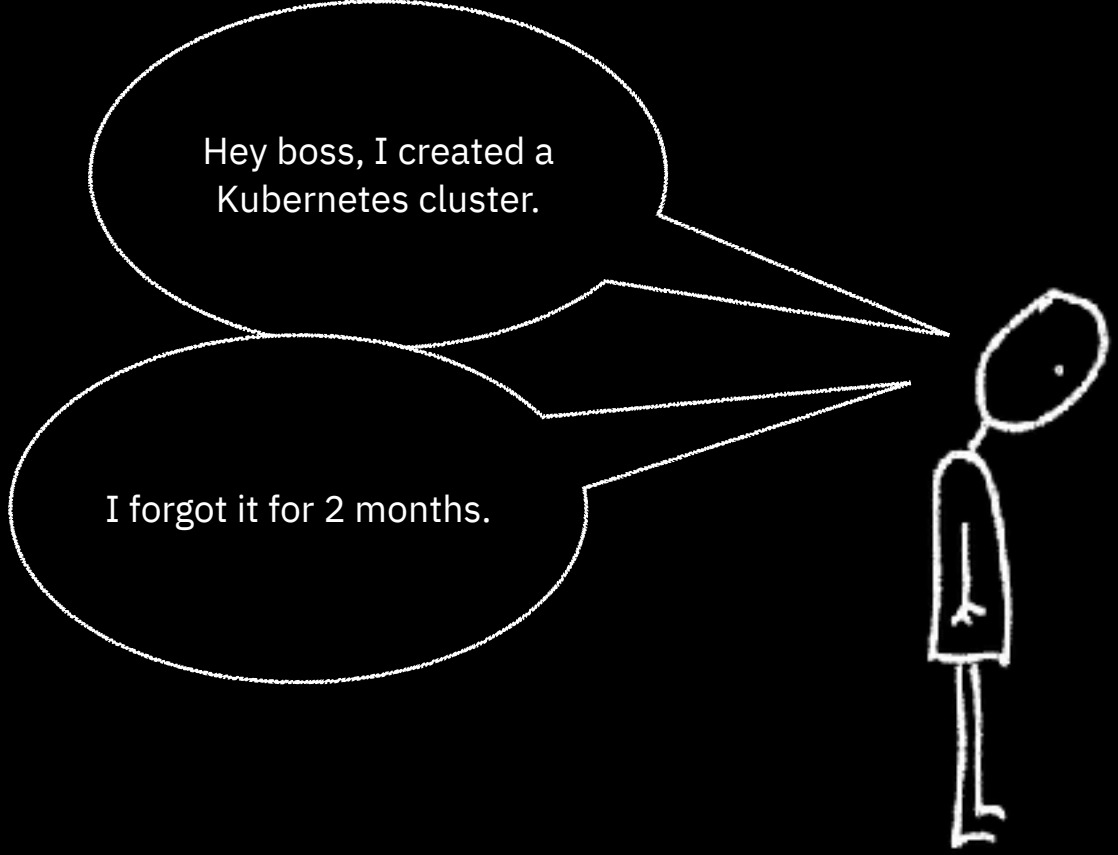
the cloud makes it so **easy**

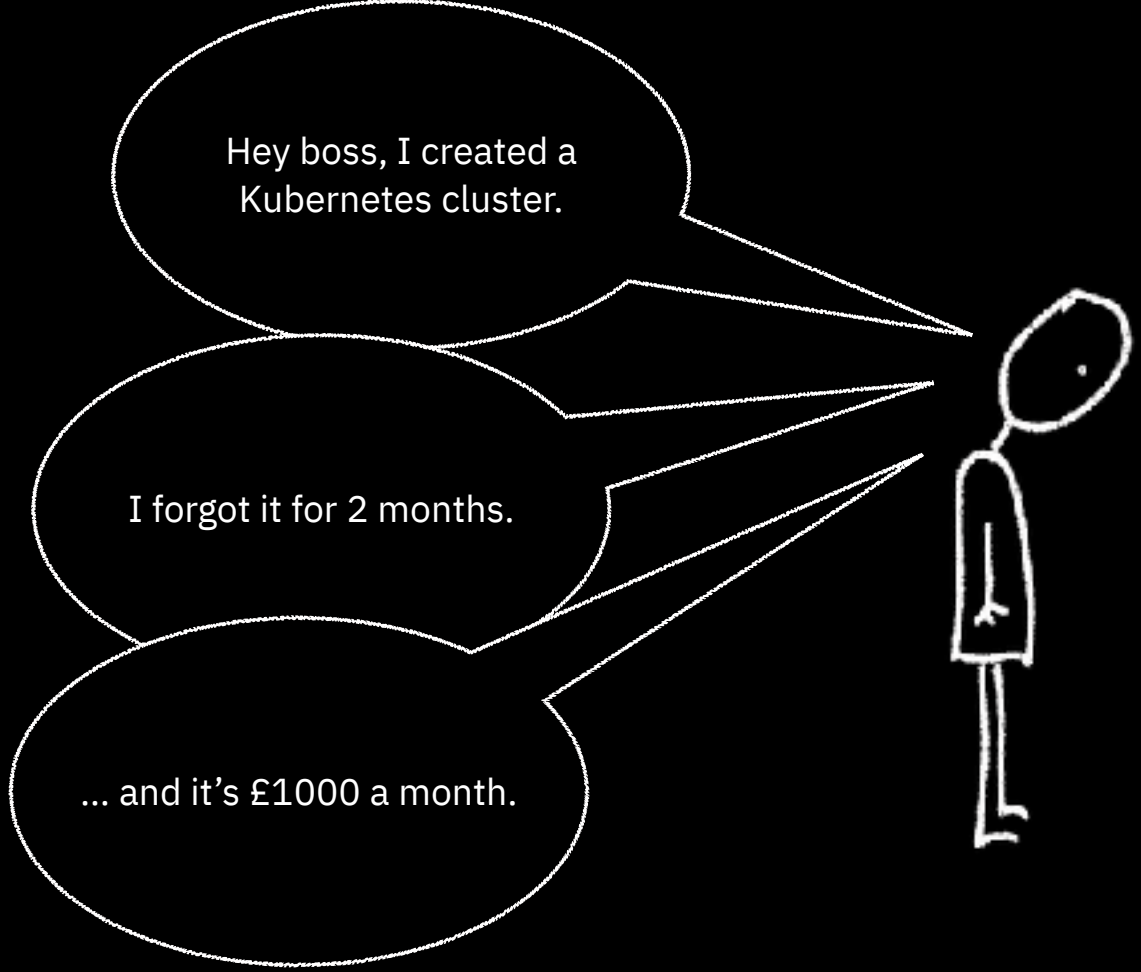
to provision hardware.

that doesn’t mean the hardware is free.

or useful.


Hey boss, I created a Kubernetes cluster.


Hey boss, I created a Kubernetes cluster.
I forgot it for 2 months.


Hey boss, I created a Kubernetes cluster.
I forgot it for 2 months.
... and it’s £1000 a month.

2017 survey

25%

of 16,000 servers
doing no useful work

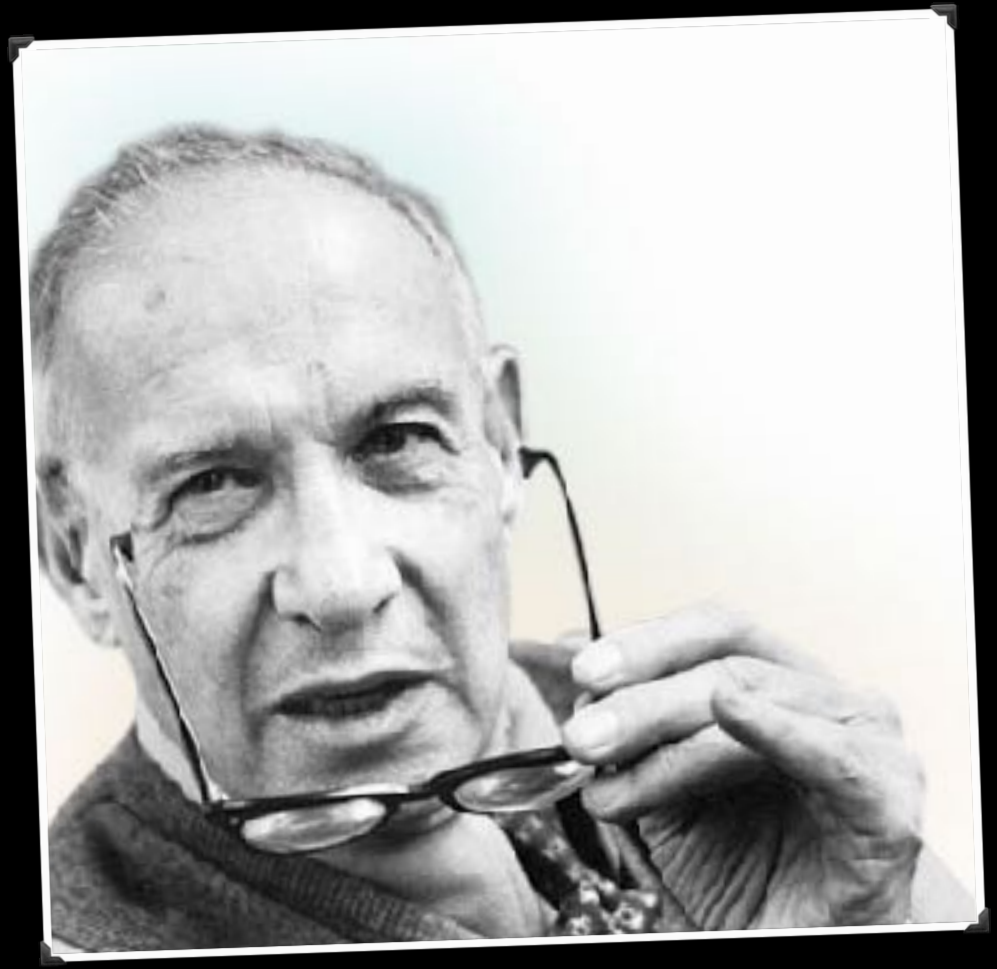
2017 survey

25%

of 16,000 servers
doing no useful work

“perhaps someone forgot to turn them off”


ouch



There is surely nothing quite so useless as doing with great efficiency what should not be done at all.

— Peter Drucker

“we have **no idea** how much we’re spending on cloud.”

cloud to manage your clouds

IBM Multicloud Manager

Create resource | Catalog | Docs | Support

Clusters

Search

Name	Namespace	Labels	Endpoint	Status	Nodes	Klusterlet Version	Kubernetes Version	Storage	Memory	CPU
aks	aksnamespace	cloud=Azure datacenter=eastus environment=Prod name=aks owner=poc region=US vendor=AKS	-	Ready	3	3.1.2-dev	v1.12.6	-	3%	9%
eks	eksnamespace	cloud=AWS datacenter=us-east-1 environment=public name=eks owner=poc region=US vendor=EKS	-	Ready	3	3.1.2-dev	v1.11.8-eks-7c34c0	-	5%	12%
gke	gkenamespace	cloud=Google datacenter=us-east1-b environment=Prod name=gke owner=poc region=US vendor=GKE	-	Ready	3	3.1.2-dev	v1.11.7-gke.12	-	8%	35%
icp	icpnamespace	cloud=IBM datacenter=frankfurt environment=Dev name=icp owner=poc region=EU vendor=ICP	launch	Ready	5	3.1.2-dev	v1.12.4+icp-ee	100%	35%	17%
iks	iksnamespace	cloud=IBM datacenter=berlin environment=secure location=public name=iks owner=poc region=EU vendor=IKS	-	Ready	2	3.1.2-dev	v1.11.3+IKS	-	59%	44%
		cloud=IBM datacenter=frankfurt								

FinOps

fail

microservices ops mayhem

SRE

site reliability engineering

@notty_cummins

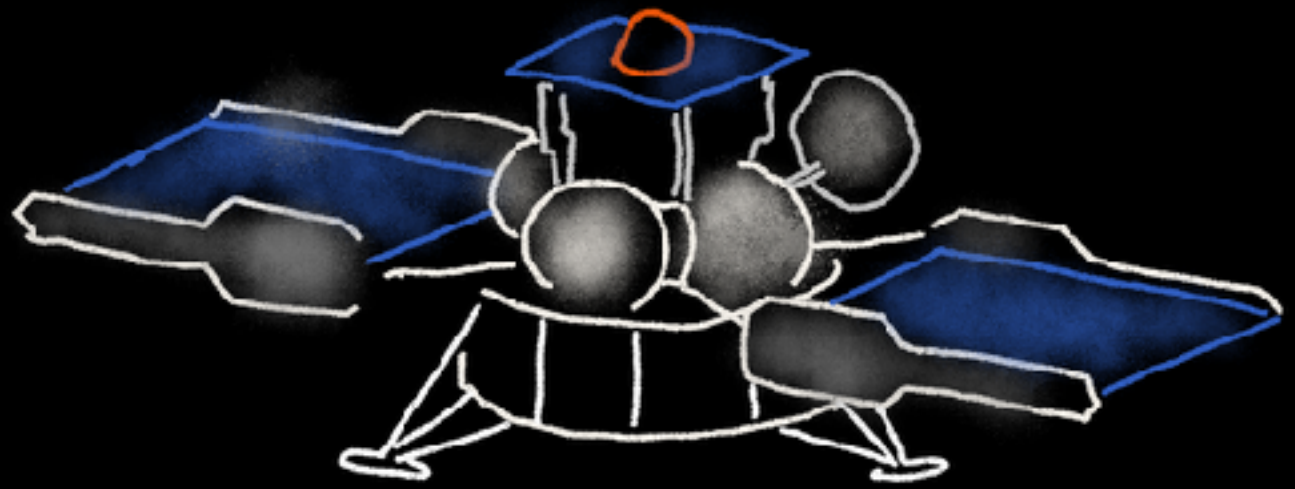
make

releases

deeply **boring**

@notty_cummins

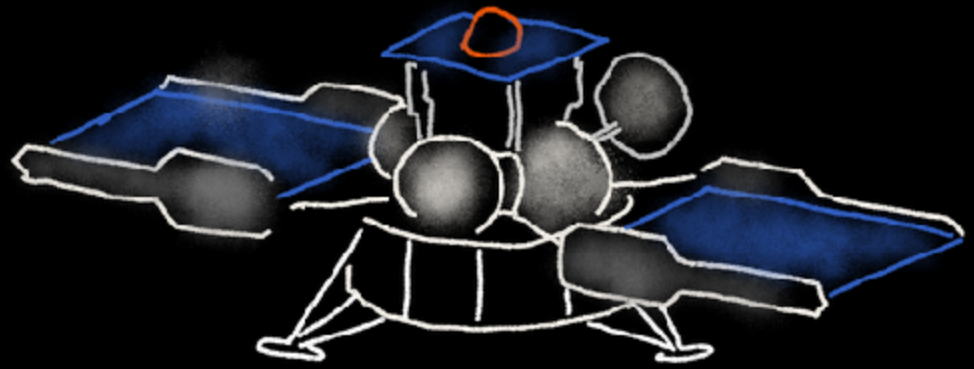
how to brick a spaceprobe



Phobos 1

“we couldn’t get the automated checks to work, so we bypassed them”

recoverability



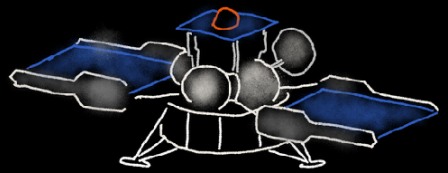
unrecoverable

back in ms
no data loss

bricked

manual
intervention

fast, but
data lost



handoffs

handoffs bad
automation good

ways to succeed at cloud native

be clear on what you're trying to achieve

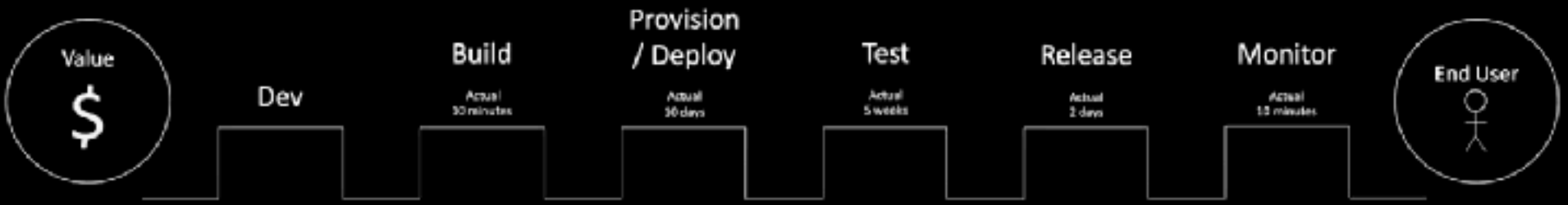
optimise for feedback

if you automate something, change the processes around that assume that the previously manual process is expensive or error prone.

Delivering software better

The objective is to...

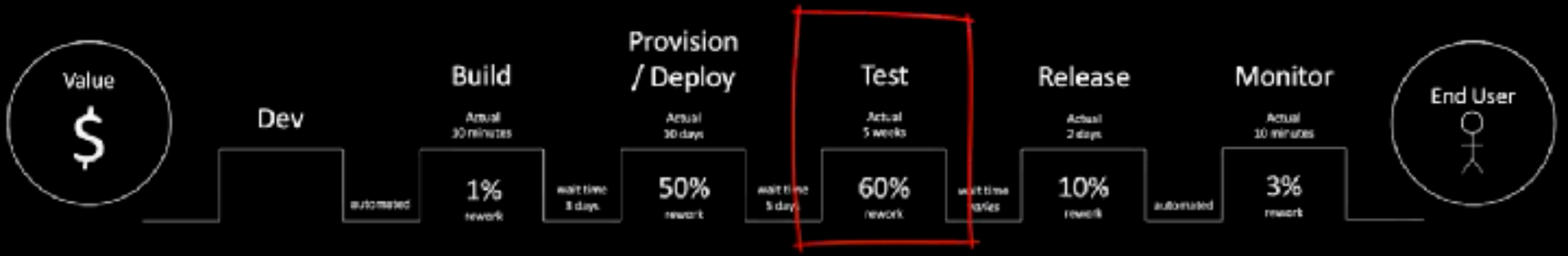
Optimize the System as a Whole



Value → User

Delivering software better

Localized optimization will not deliver desired outcomes!



@holly_cummins