GOTO Copenhagen 2022

#GOTOcph



cloud chaos and microservices mayhem

Holly Cummins **Red Hat** @holly_cummins

Voxxed Athens







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handwashing



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handwashing apps



@holly_cummins

handwashing dpps UPS



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handwashing dpps JUS devops



@holly_cummins

handwashing dpps UPS devops devsecops



@holly_cummins

handwashing dpps OPS devops devsecops finops







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technology changes fast (duh)





technology changes fast (duh) ... but it's taking us a while to catch up to cloud



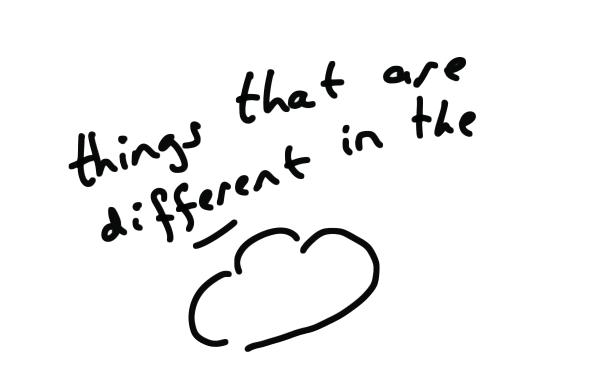




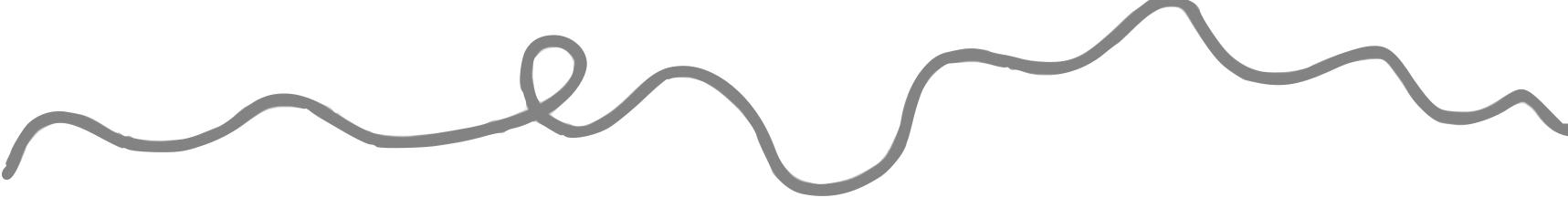
technology changes fast (duh) ... but it's taking us a while to catch up to cloud





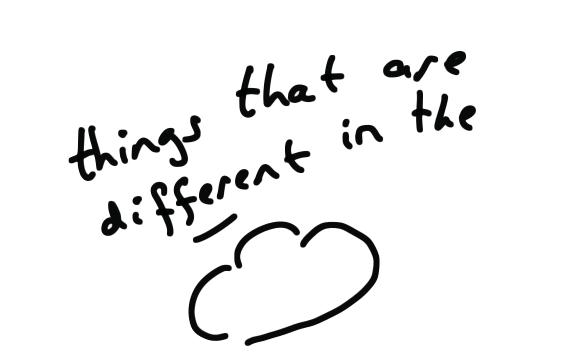


tracing

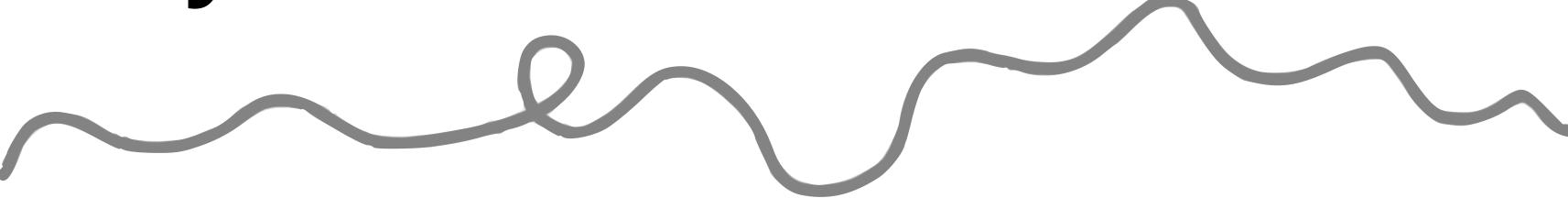


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observability



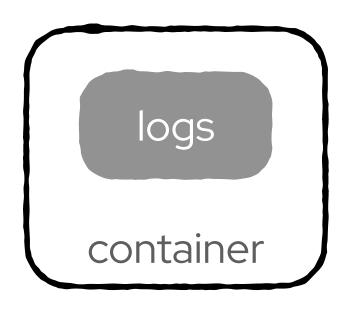
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old way	
logs	
hardware	



old way	
logs	
hardware	





old way	y
logs	
hardwar	e

cloud way

logs



old way	y
logs	
hardwar	e

#RedHat

oops



old way	y
logs	
hardwar	e



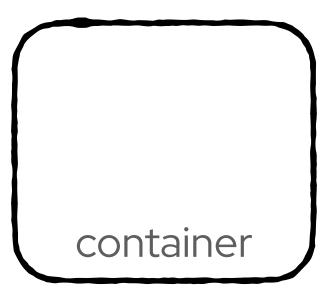


old	way

logs	
hardware	

logs

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old	way

logs	
hardware	

logs

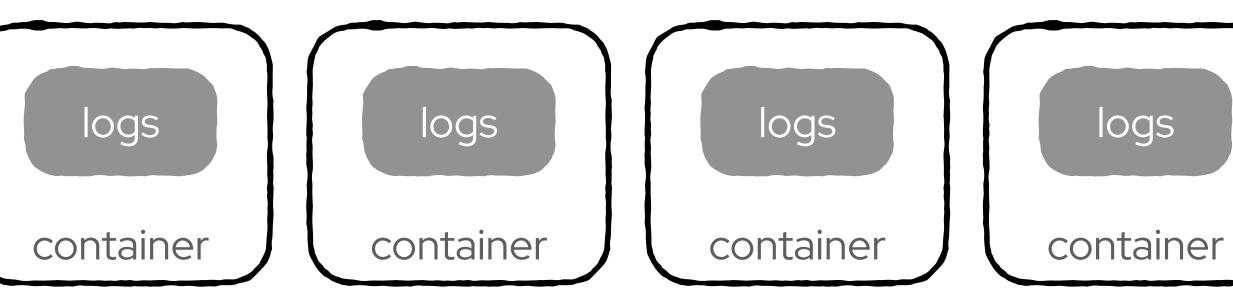
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(old way
$\left[\right]$	logs
	hardware

logs

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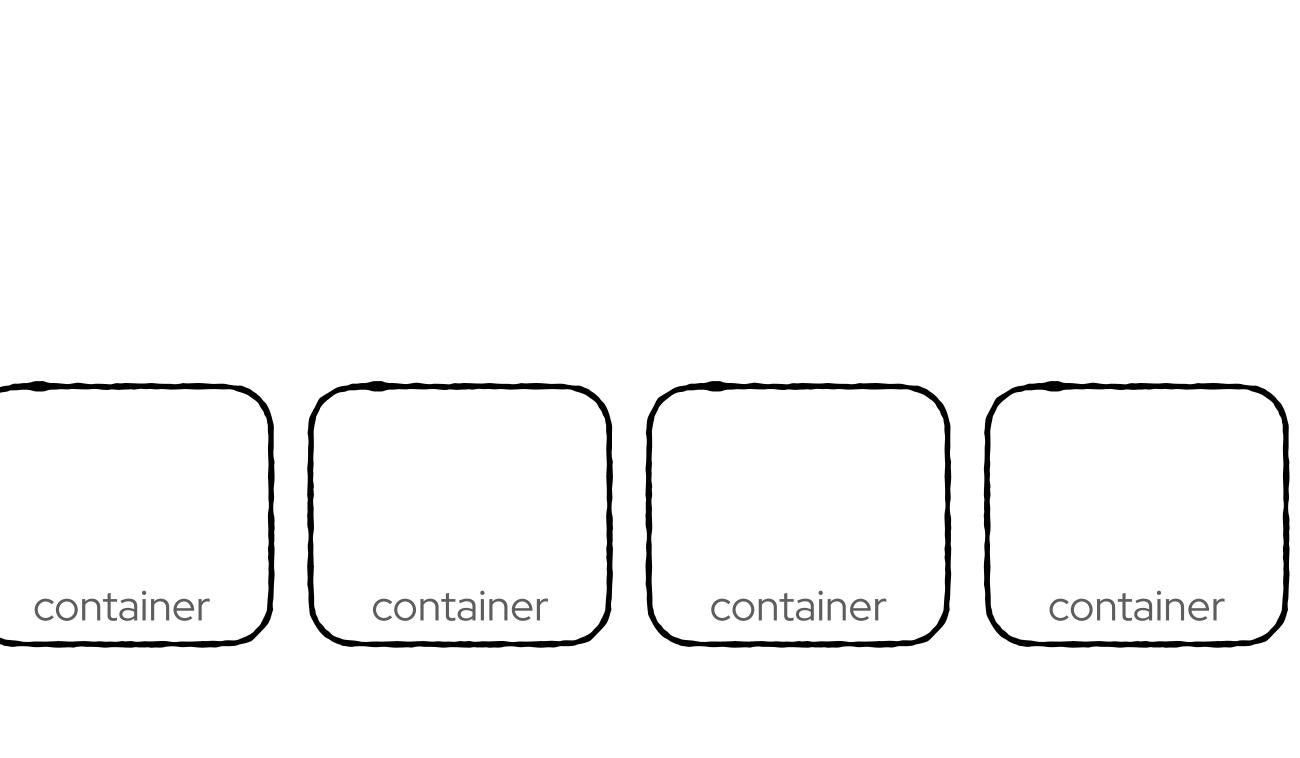


old way	
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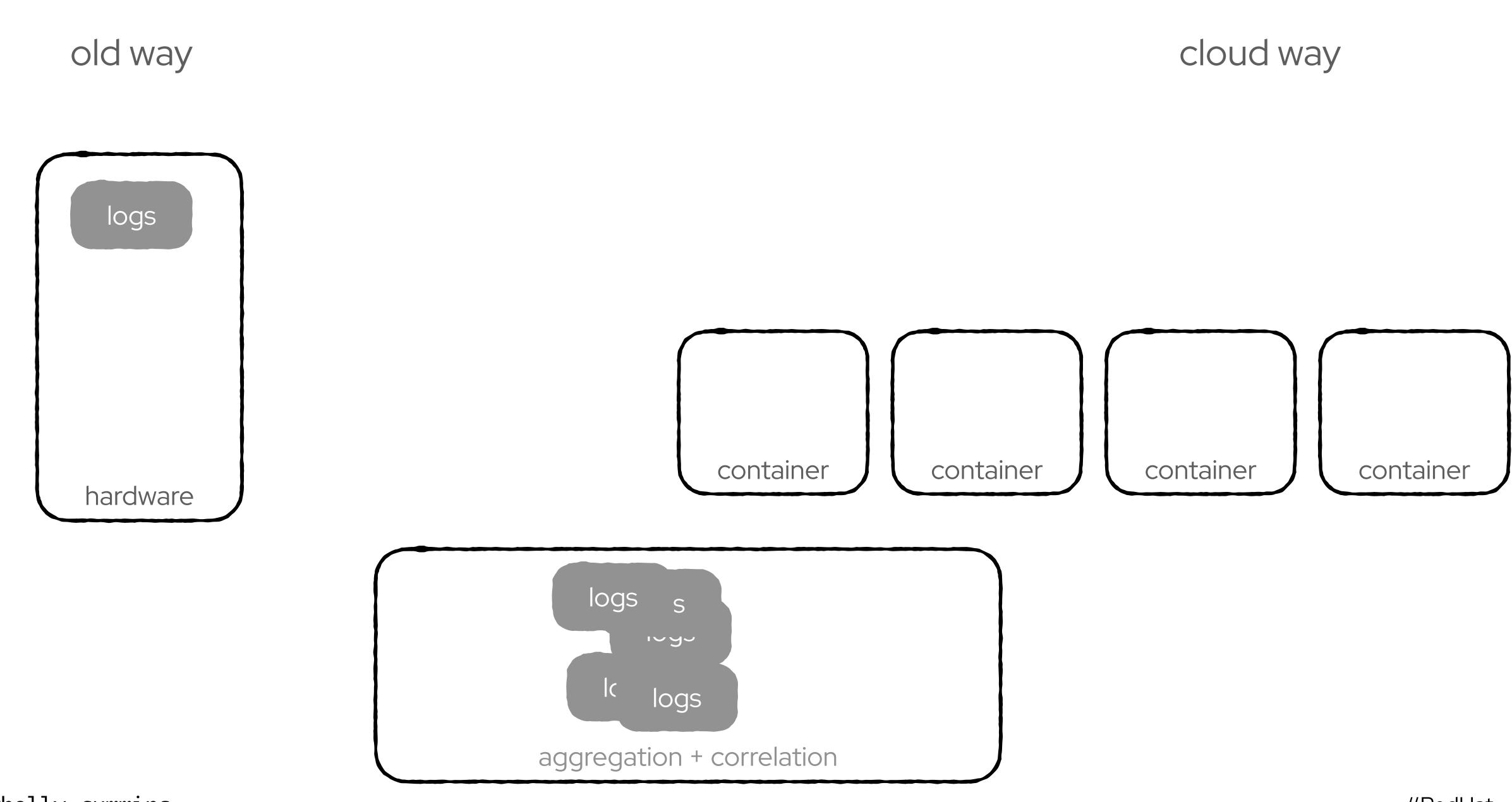
logs

@holly_cummins

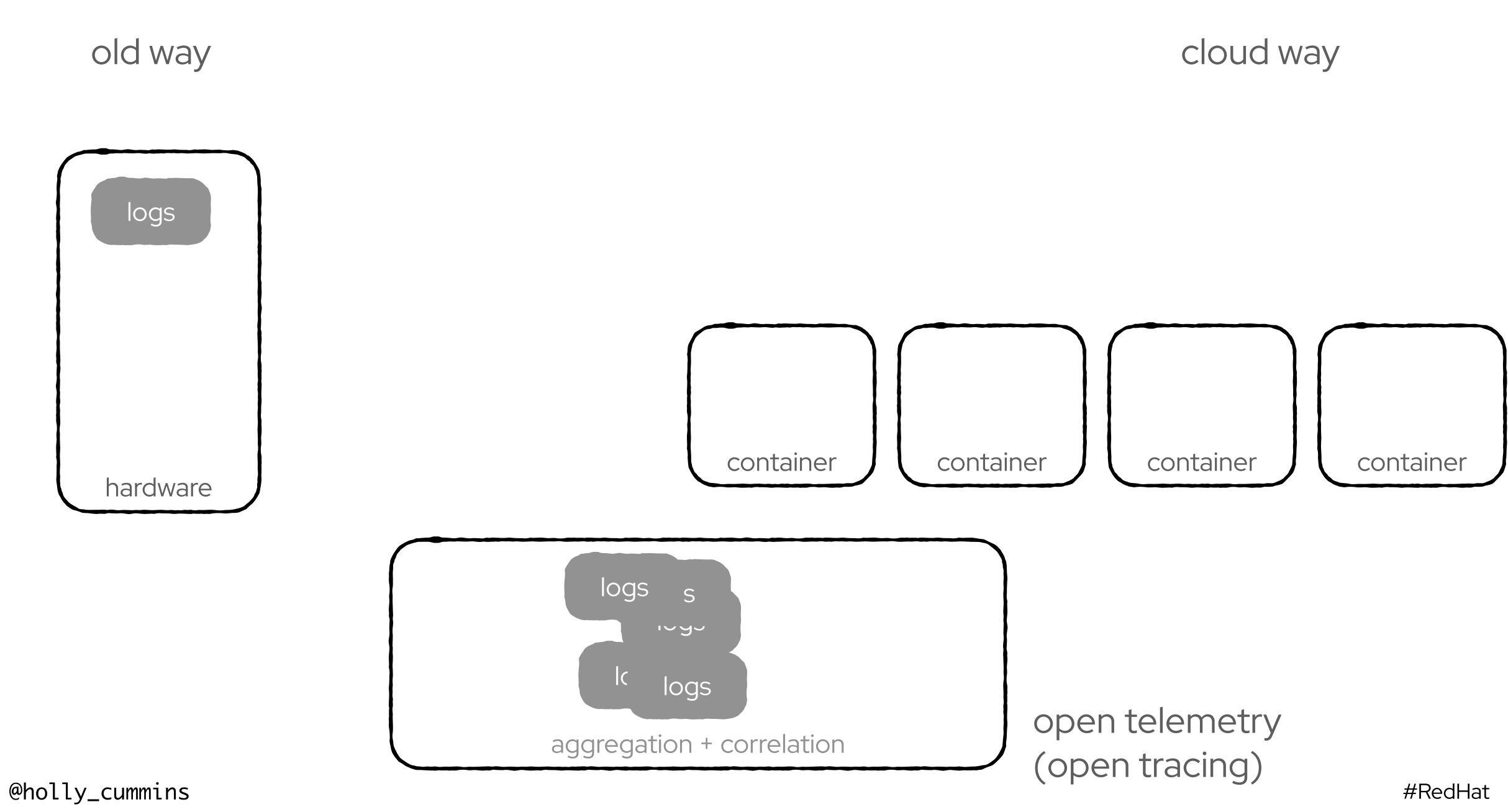


cloud way









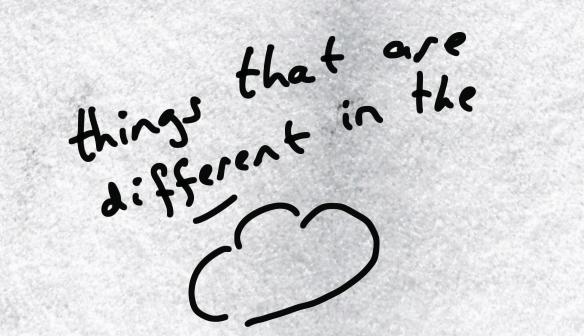


good news: observability is 'fixed'



good news: observability is 'fixed' bad news: not all of us are using it





performance requirements

memory footprint is money startup time is money



all that dynamism we worked so hard is (now) a bad idea





D

A Kubernetes Native Java stack tailored for OpenJDK HotSpot and GraalVM, crafted from the best of breed Java libraries and standards.

ahead of time optimisation is (now) a good idea

QUARKUS ACKATHON WINNERS ANNOUNCED LEARN MORE

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SUPERSONIC SUBATOMIC JAVA

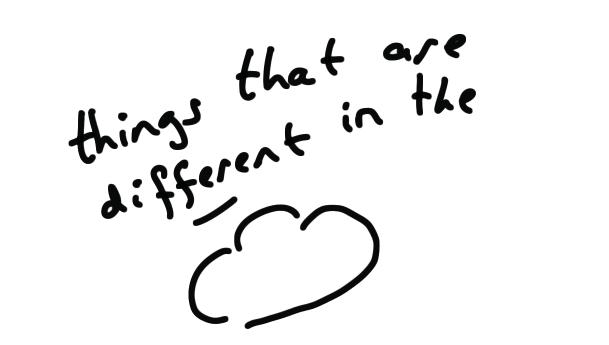
GET STARTED WITH QUARKUS

Now Available QUARKUS 1.8.3

More Information



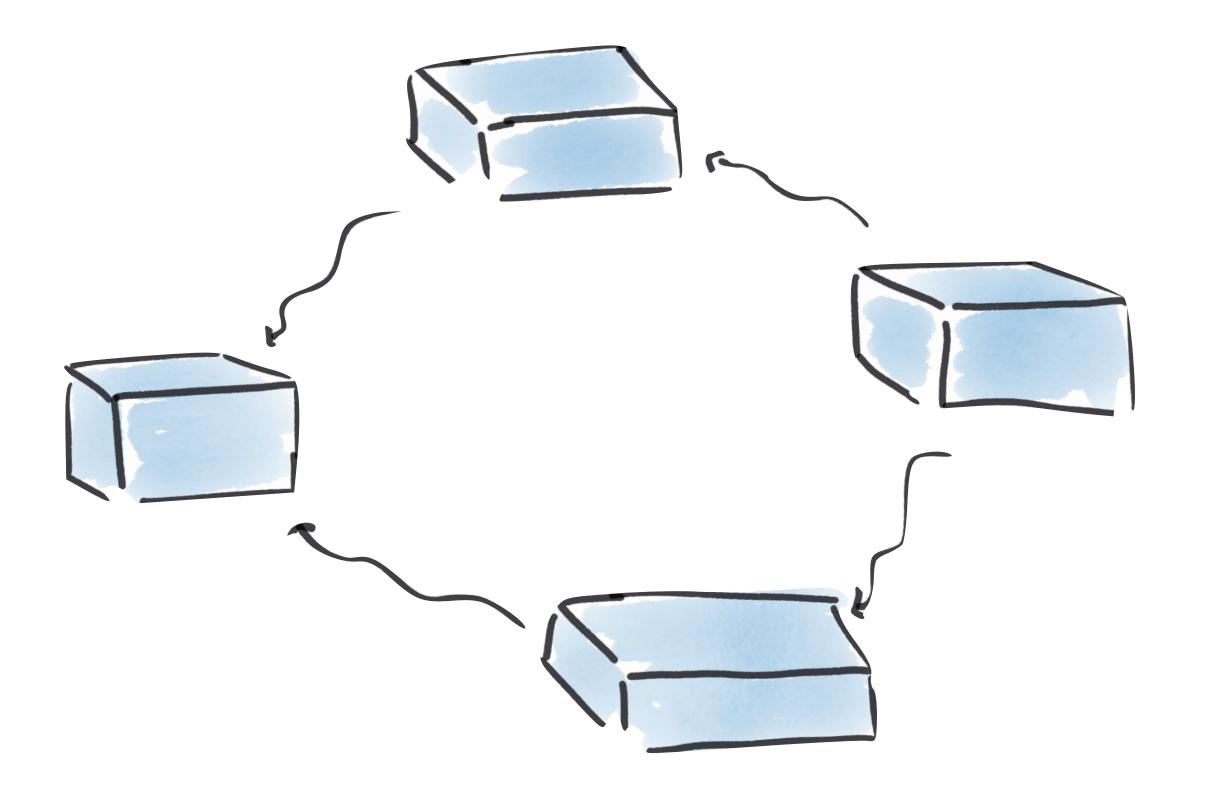




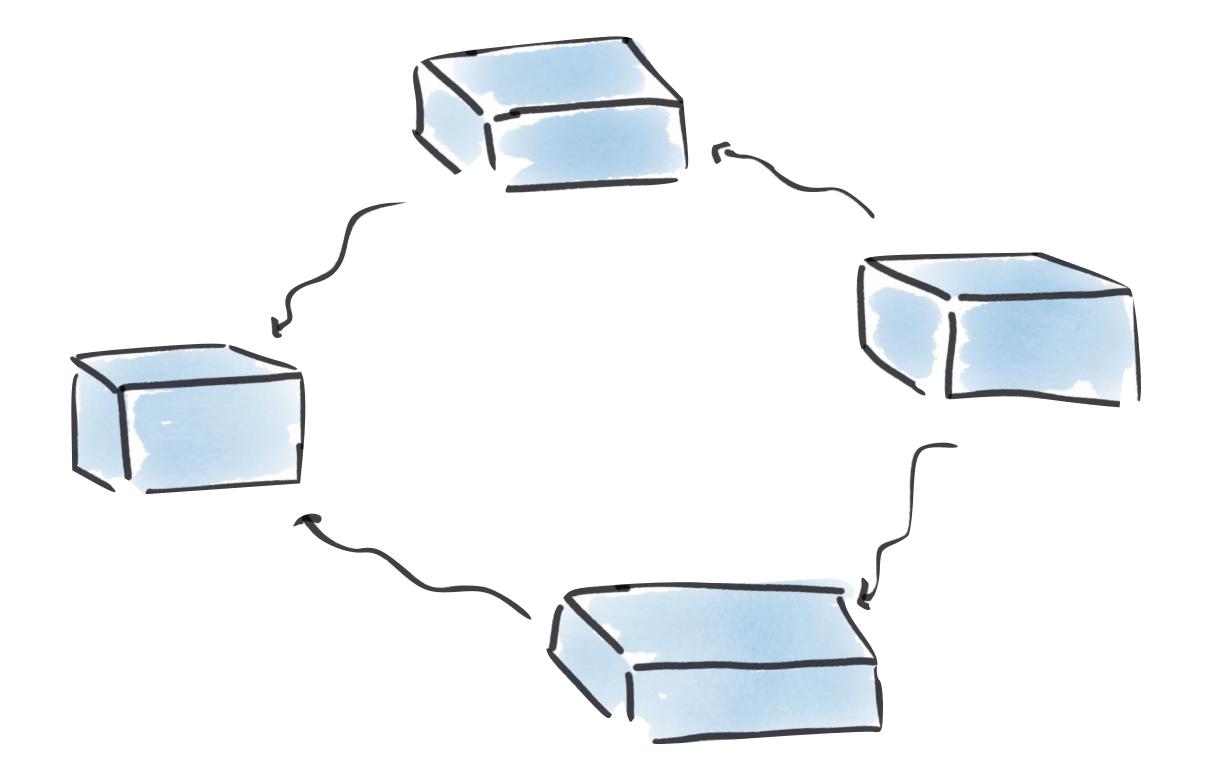
performance optimisation

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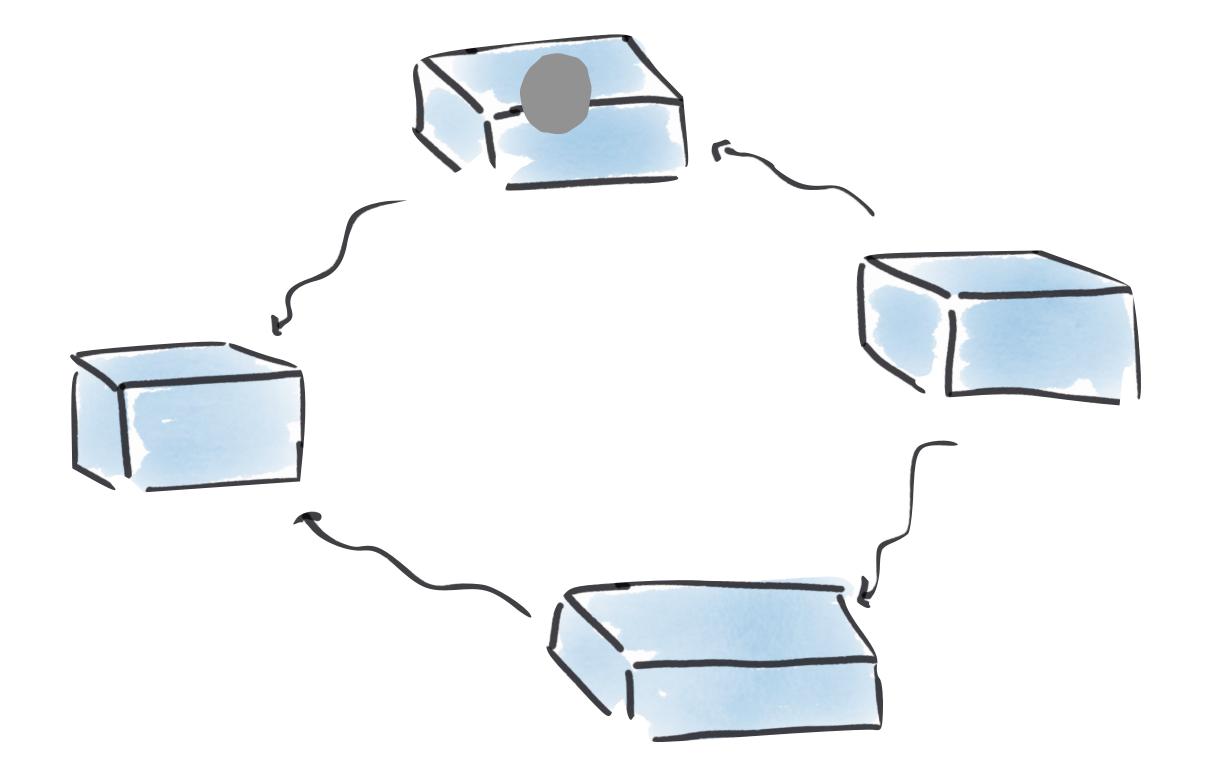
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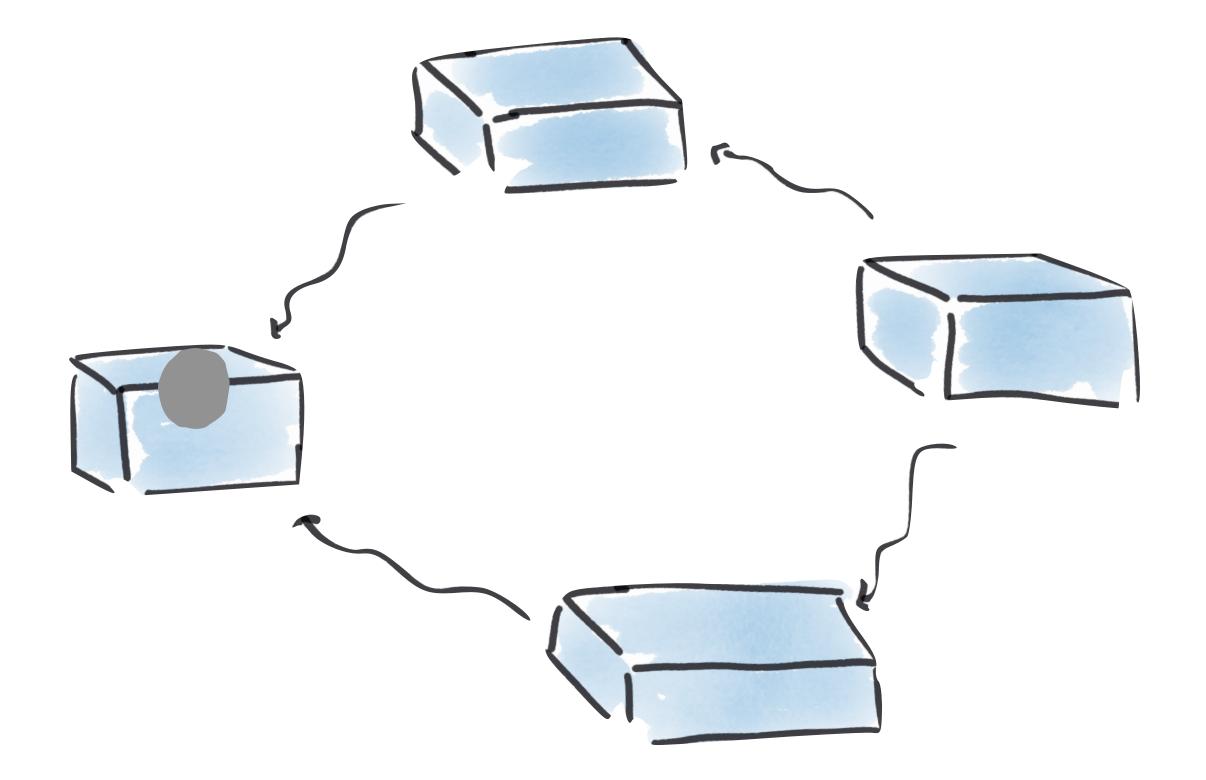




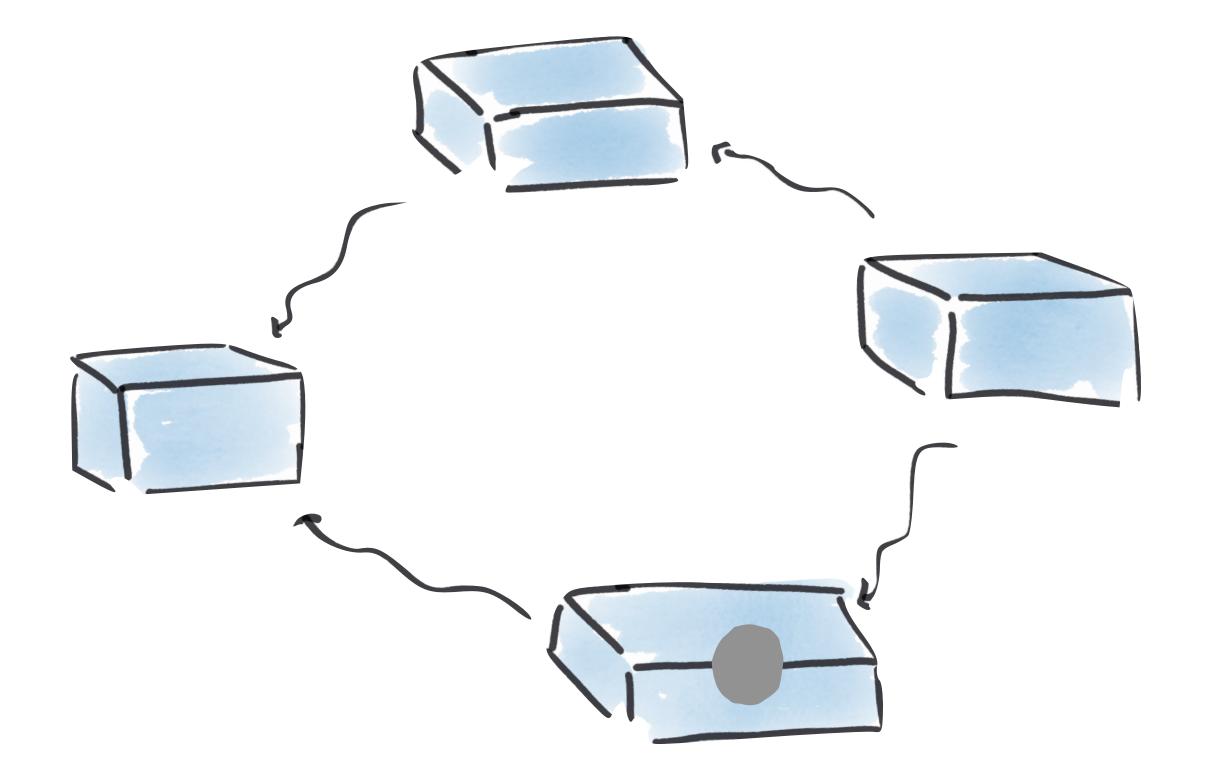






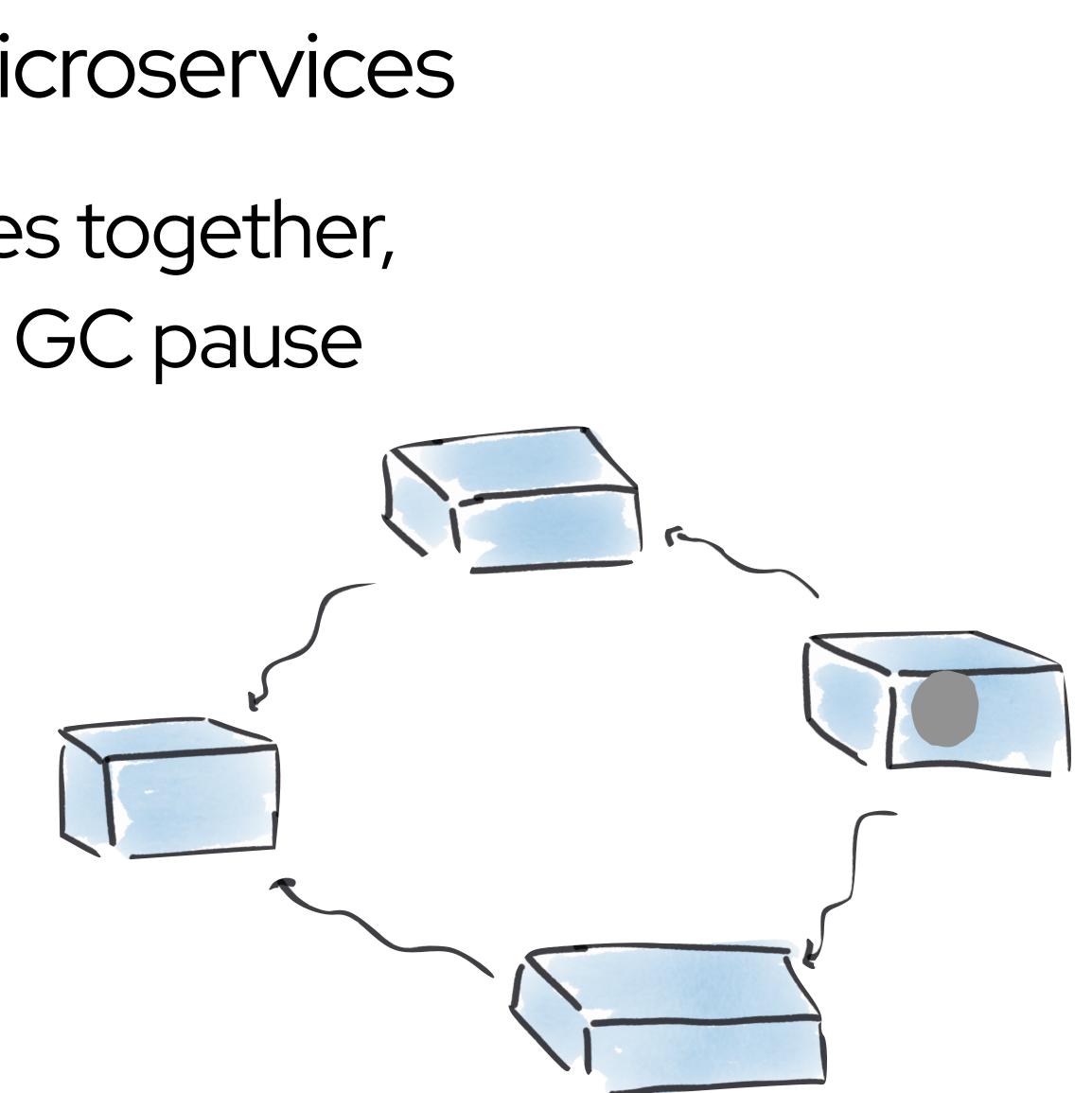








garbage collection and microservices if you chain 100 microservices together, you are almost guaranteed a GC pause

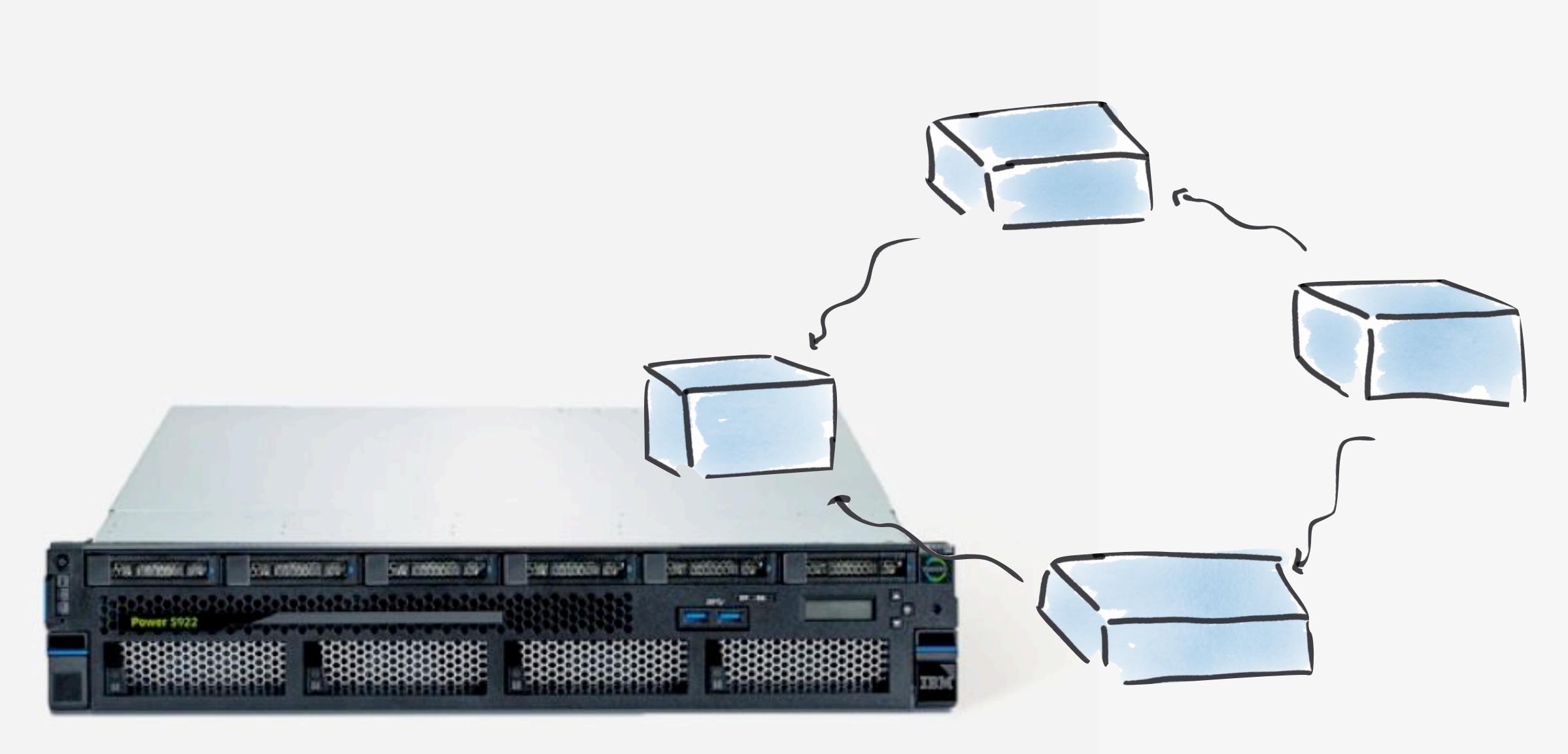




Best practices for Java in single × +		
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Red Hat Developer Topics Products Developer Sandbox Build Tools Events Learn Partner		Q :::: / Search All Red Hat Lo
Article		
Best practices for Java in single-core containers		
April 19, 2022 🎐 🫉 in 🖾 🗣 Containers, Java		
Ben Evans		
Ben Evans Senior Principal Software Engineer		
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Senior Principal Software Engineer Image: Senior Principal Software Engineer Image: Table of contents: An increasing number of Java applications run in containers. The exact number is hard to determine, because adoption of containers depends upon the market segment and cloud maturity of each particular team or company. However, some data is available—for example, data from New Relic suggests that over 62% of their customers' Java workloads run in containers. Like all data points, this one		g better security on
 Senior Principal Software Engineer Table of contents: An increasing number of Java applications run in containers. The exact number is hard to determine, because adoption of containers depends upon the market segment and cloud maturity of each particular team or company. However, some data is available—for 	4 tips for achieving Kubernetes	g better security on convert speech to
 Senior Principal Software Engineer Table of contents: An increasing number of Java applications run in containers. The exact number is hard to determine, because adoption of containers depends upon the market segment and cloud maturity of each particular team or company. However, some data is available–for example, data from New Relic suggests that over 62% of their customers' Java workloads run in containers. Like all data points, this one is an imperfect proxy for the market as a whole, but the report demonstrates that a significant subset of the Java market has already moved to container-based environments. Anecdotal data also tells us that this migration trend is far from over. Teams using Java need to pay special attention to some aspects of container-based deployments and adopt a couple of best practices. 	4 tips for achieving Kubernetes Use OpenVINO to	convert speech to
 Senior Principal Software Engineer Table of contents: An increasing number of Java applications run in containers. The exact number is hard to determine, because adoption of containers depends upon the market segment and cloud maturity of each particular team or company. However, some data is available—for example, data from New Relic suggests that over 62% of their customers' Java workloads run in containers. Like all data points, this one is an imperfect proxy for the market as a whole, but the report demonstrates that a significant subset of the Java market has already moved to container-based environments. Anecdotal data also tells us that this migration trend is far from over. 	4 tips for achieving Kubernetes Use OpenVINO to text	convert speech to ty risks that keep
 Table of contents: An increasing number of Java applications run in containers. The exact number is hard to determine, because adoption of containers depends upon the market segment and cloud maturity of each particular team or company. However, some data is available–for example, data from New Relic suggests that over 62% of their customers' Java workloads run in containers. Like all data points, this one is an imperfect proxy for the market as a whole, but the report demonstrates that a significant subset of the Java market has already moved to container-based environments. Anecdotal data also tells us that this migration trend is far from over. Teams using Java need to pay special attention to some aspects of container-based deployments and adopt a couple of best practices. This article focuses on the choice of garbage collector (GC) and how the default choice is based on available CPUs and memory. 	4 tips for achieving Kubernetes Use OpenVINO to text Kubernetes securit	convert speech to ty risks that keep hight
 Senior Principal Software Engineer Table of contents: An increasing number of Java applications run in containers. The exact number is hard to determine, because adoption of containers depends upon the market segment and cloud maturity of each particular team or company. However, some data is available–for example, data from New Relic suggests that over 62% of their customers' Java workloads run in containers. Like all data points, this one is an imperfect proxy for the market as a whole, but the report demonstrates that a significant subset of the Java market has already moved to container-based environments. Anecdotal data also tells us that this migration trend is far from over. Teams using Java need to pay special attention to some aspects of container-based deployments and adopt a couple of best practices. 	4 tips for achieving Kubernetes Use OpenVINO to text Kubernetes securit developers up at n	convert speech to ty risks that keep hight hslate physical

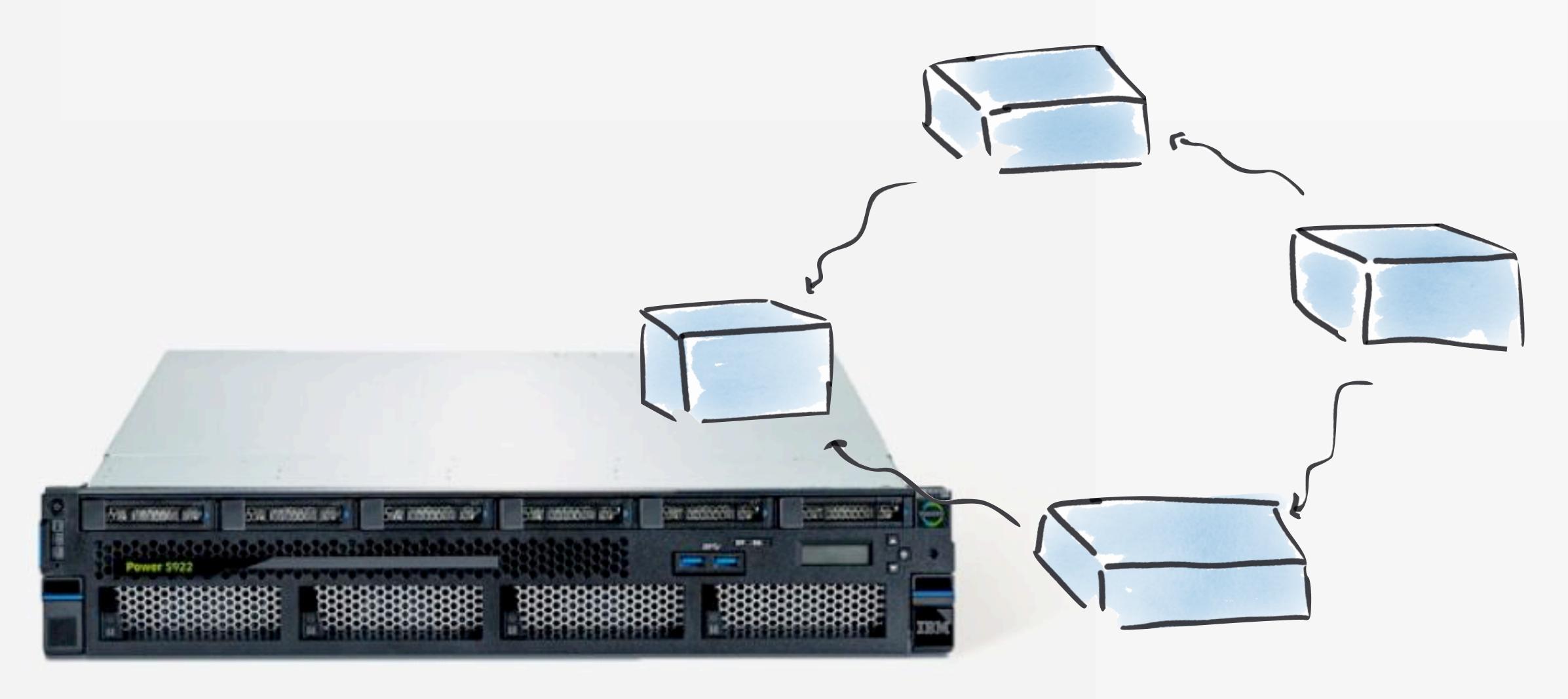






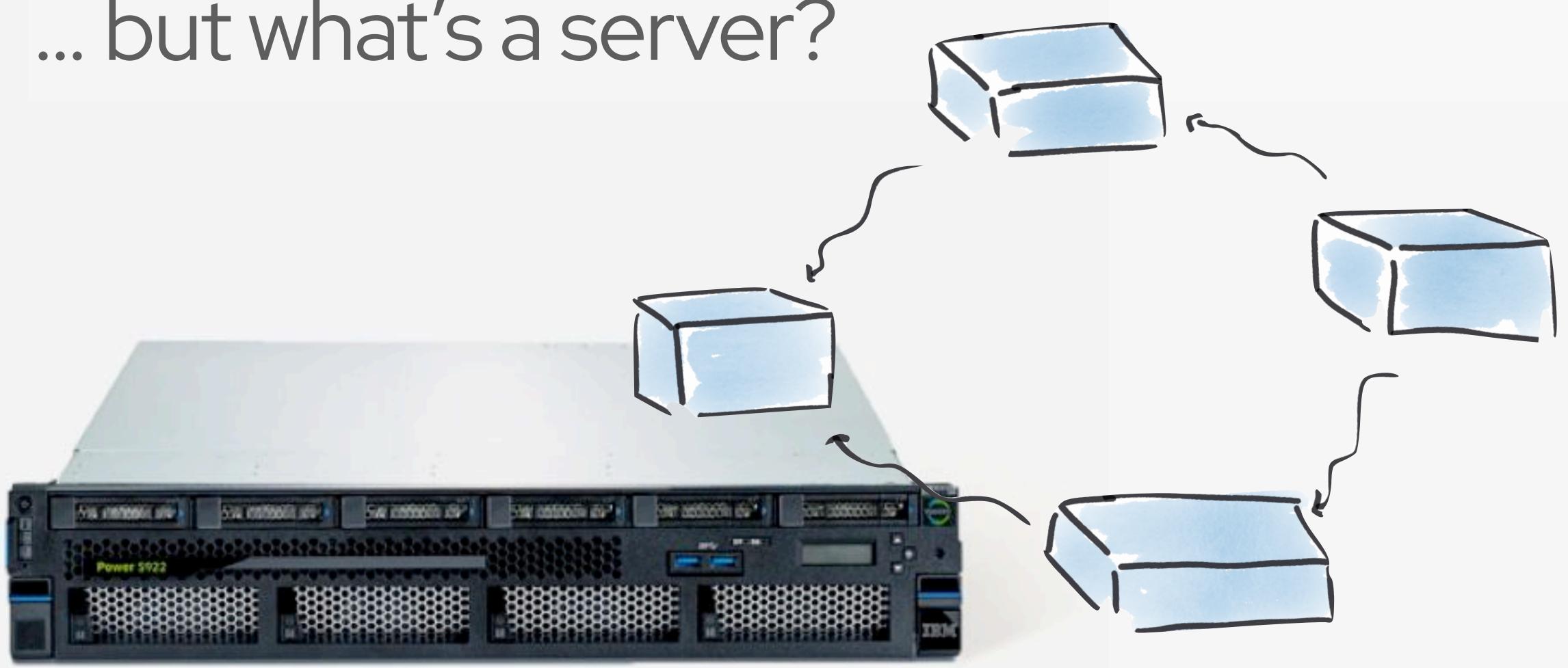


the JVM tunes itself differently on servers





the JVM tunes itself differently on servers ... but what's a server?





answer(ish):





answer(ish):

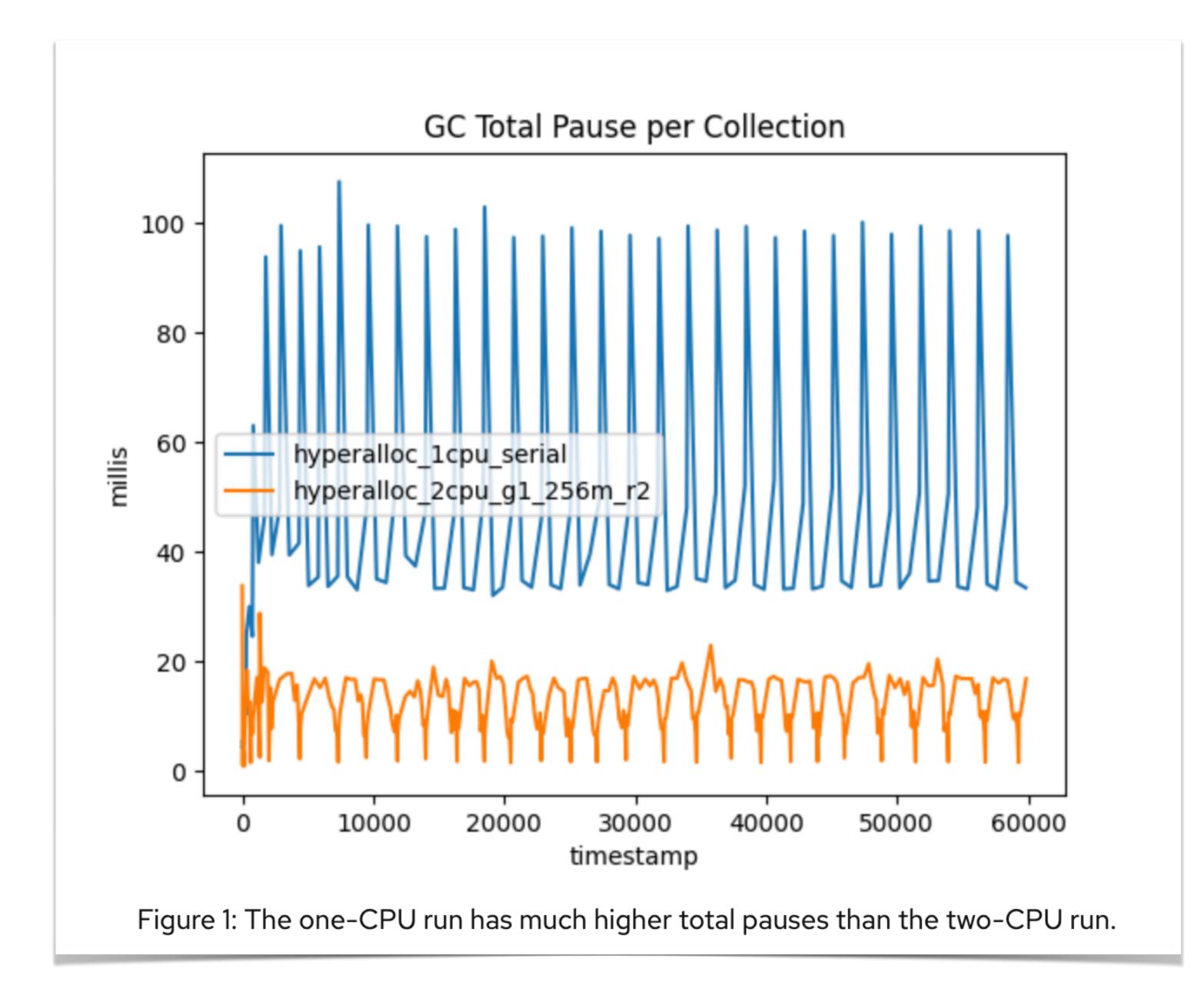
// This is the working definition of a server class machine: // >= 2 physical CPU's and >=2GB of memory









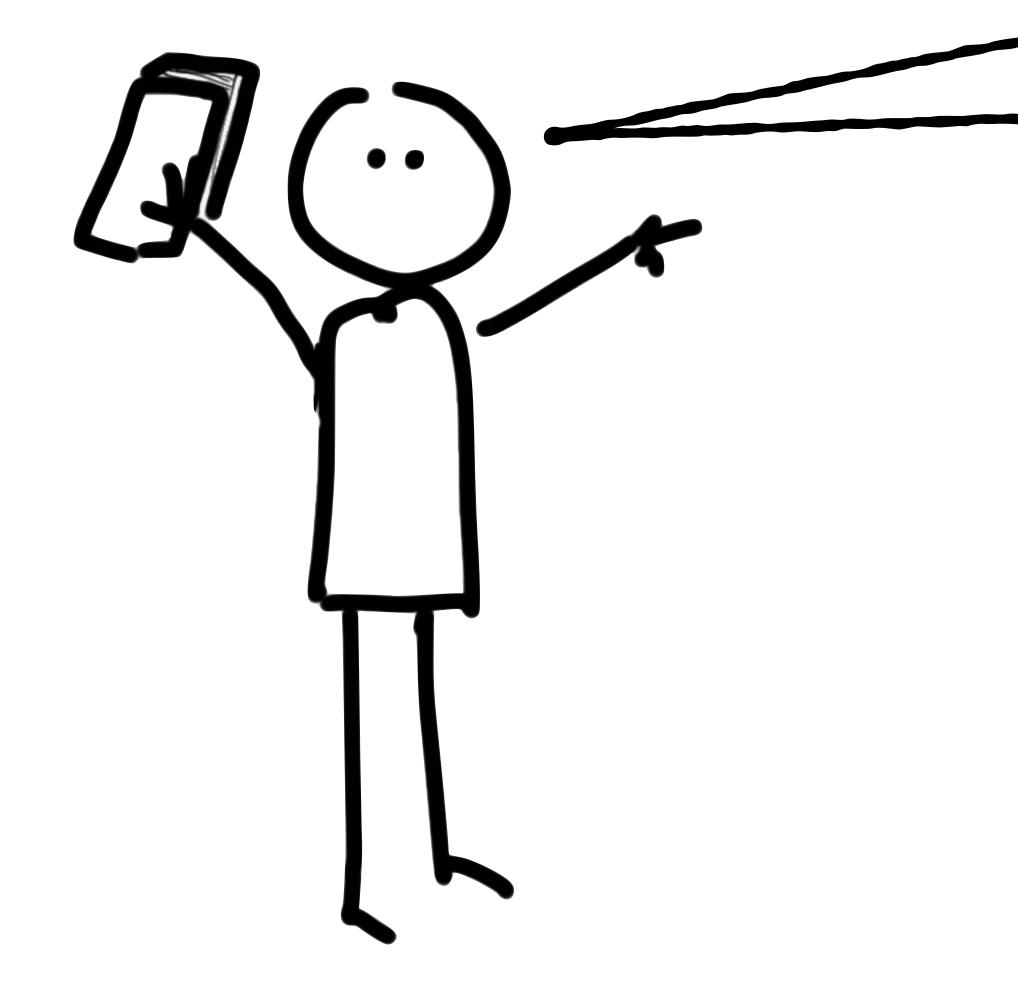




takeaway: don't shrink your containers too much or your JVM will make bad decisions

advice accurate as of June 2022. all performance advice should be independently verified. do not try this at home without testing first. your mileage may vary.

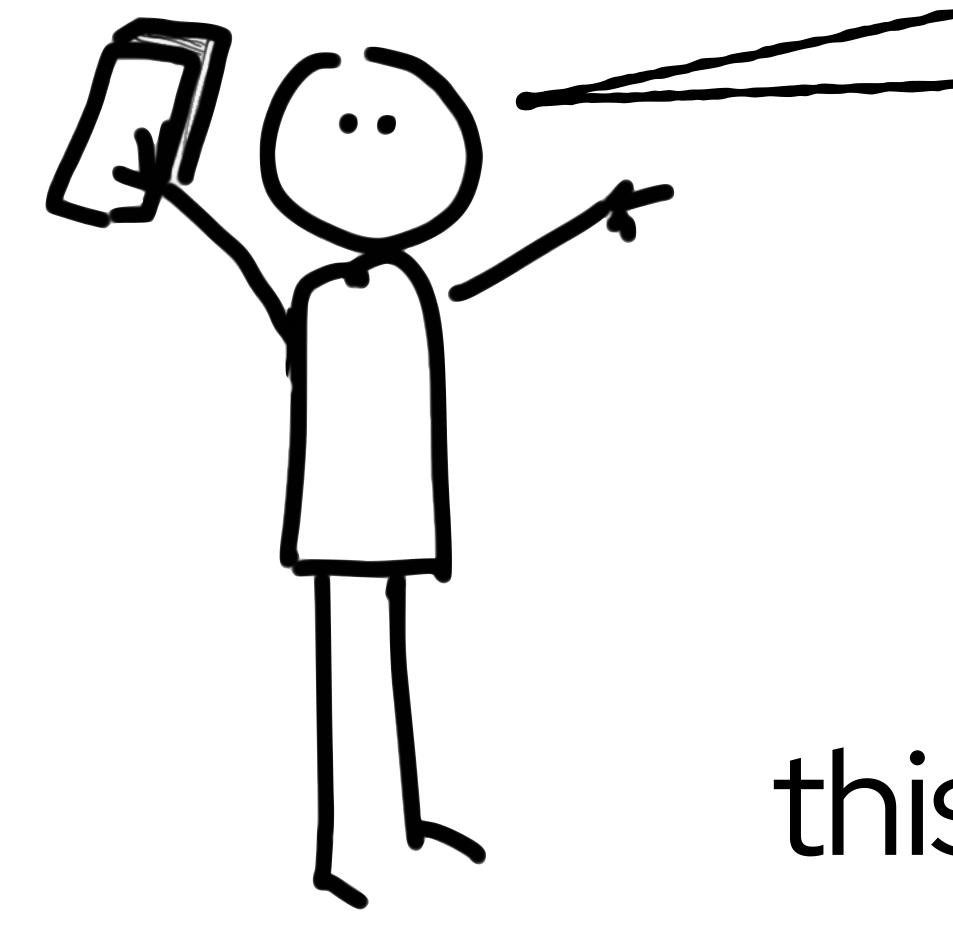




@holly_cummins

wait, isn't that the opposite of the advice in the previous section? should my containers be big or small?





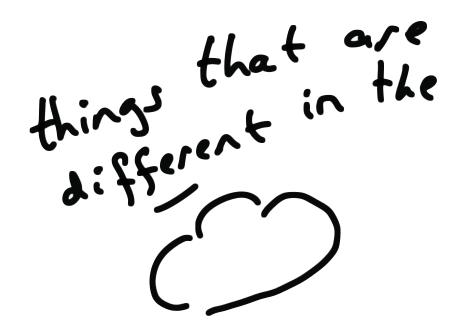
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wait, isn't that the opposite of the advice in the previous section? should my containers be big or small?

this is the chaos part :)

#RedHat

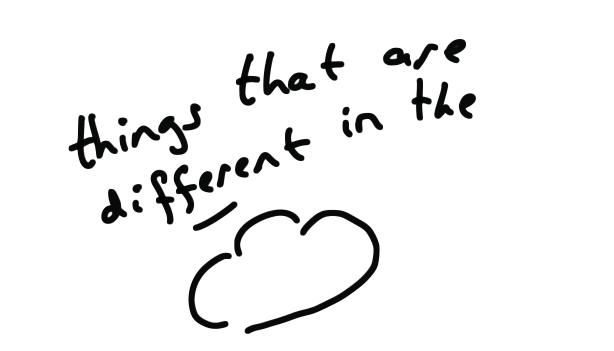




management

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keeping track of hardware

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The cloud makes it **so** easy to provision hardware.



That doesn't mean the hardware is free.



That doesn't mean the hardware is free.



That doesn't mean the hardware is free. Or useful.



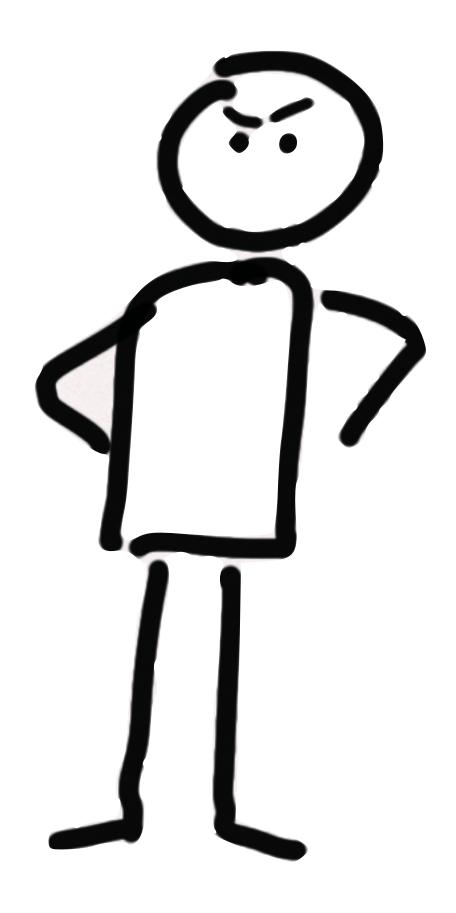
That doesn't mean the hardware is free.

Or useful. Or shuts itself off.



Hey boss, I created a Kubernetes cluster.



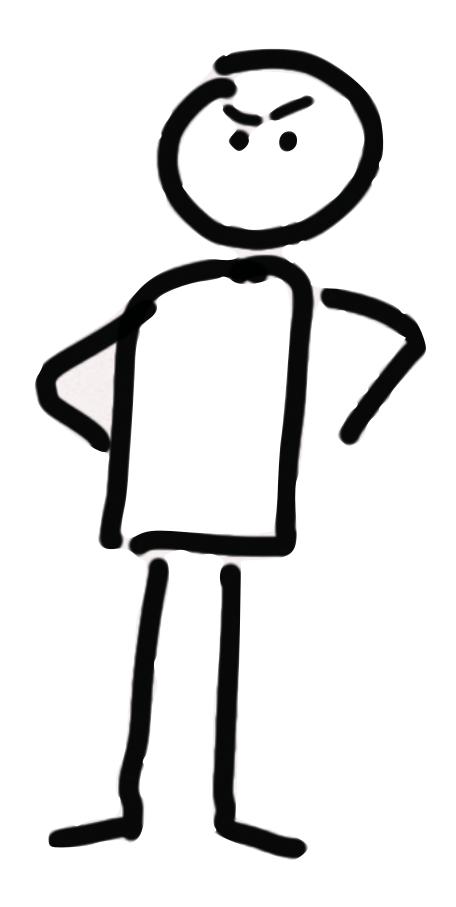




Hey boss, I created a Kubernetes cluster.

I forgot it for 2 months.





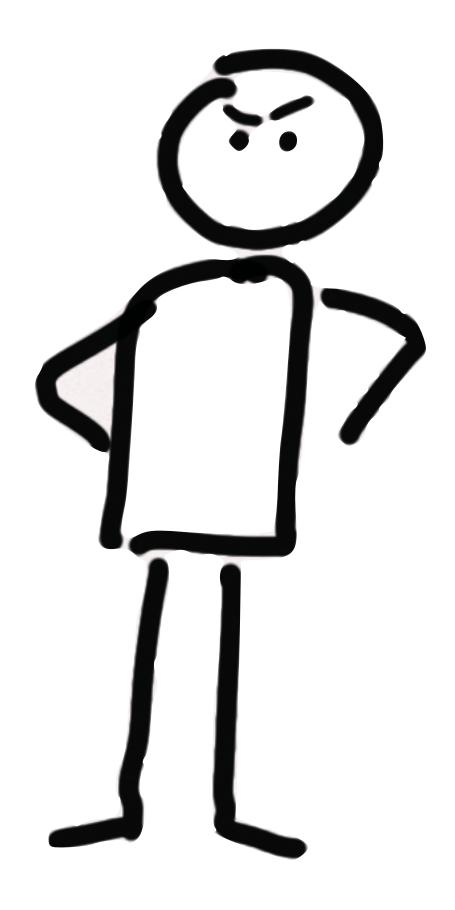


Hey boss, I created a Kubernetes cluster.

I forgot it for 2 months.

... and it's €1000 a month.

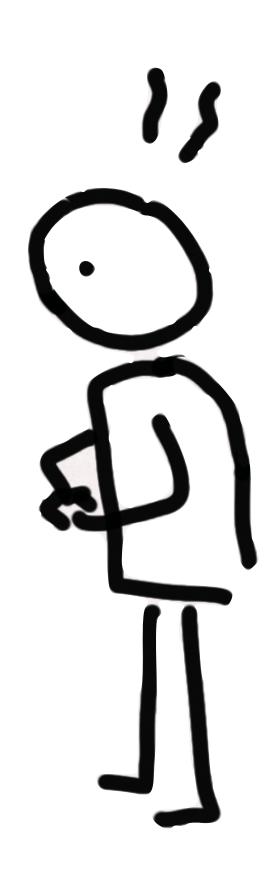




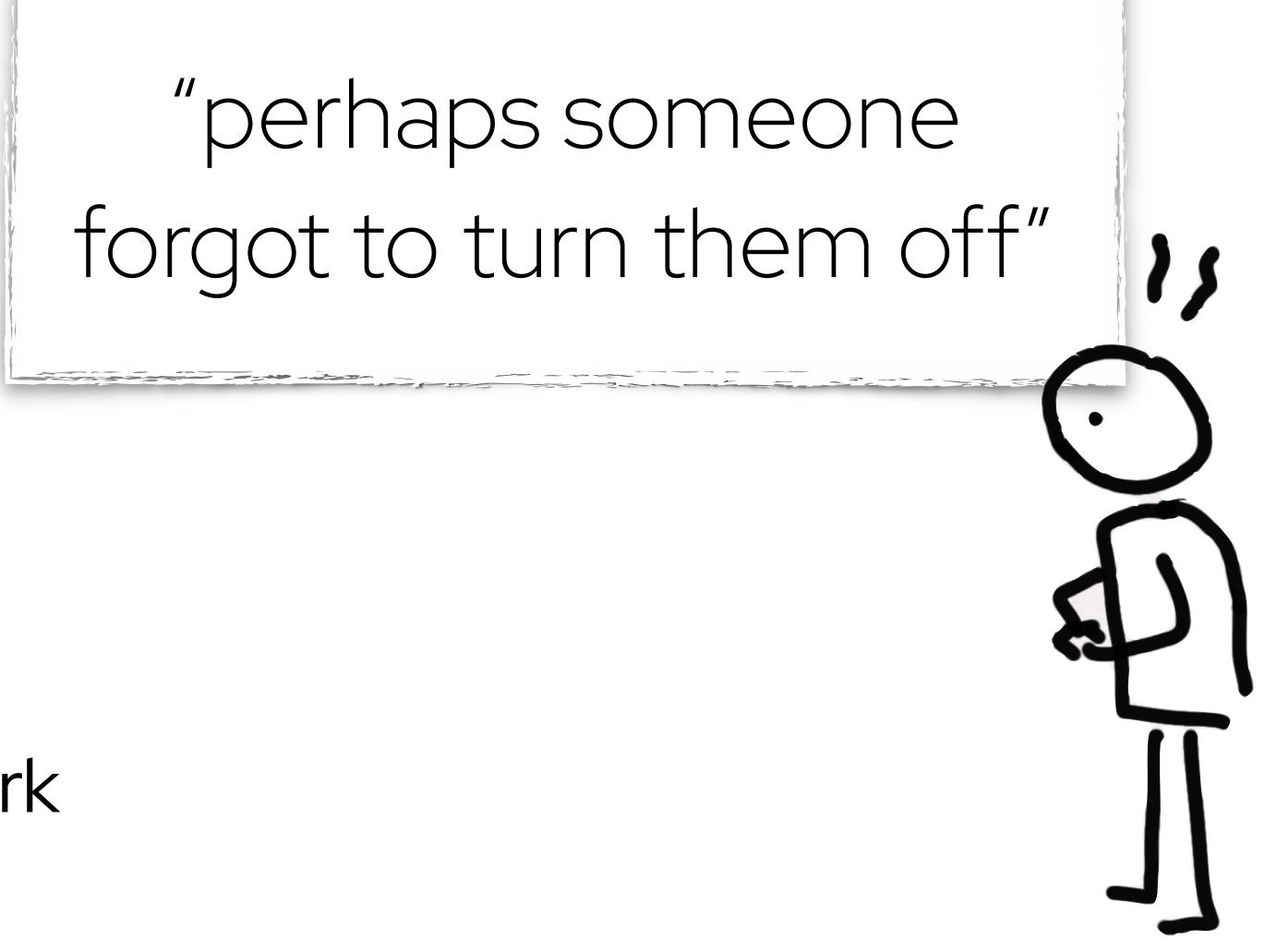




2017 survey 25%of 16,000 servers doing **no** useful work







2017 survey

25%

of 16,000 servers doing **no** useful work

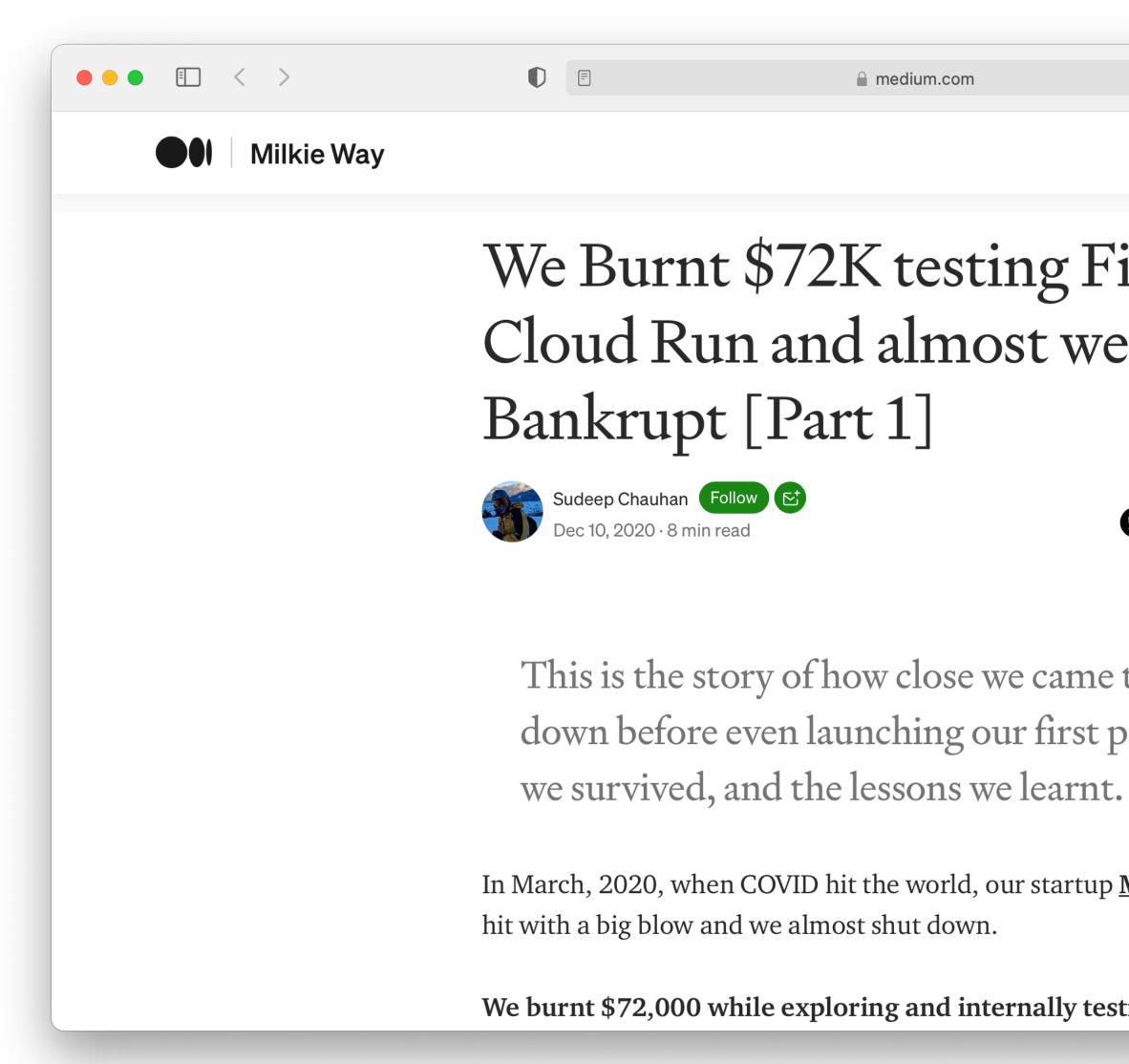


finops figuring out who in your company forgot to turn off their cloud



companies that went out of business for cloud cost accidents





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#RedHat

a medium.com	Ś		(1)	Û +	- ©
		jî (j	Upgrade		
K testing Fire	ebase +				
d almost wen	t				

This is the story of how close we came to shutting down before even launching our first product, how

In March, 2020, when COVID hit the world, our startup Milkie Way too was

We burnt \$72,000 while exploring and internally testing Cloud Run

(See Troy tomorrow at GOTO !)

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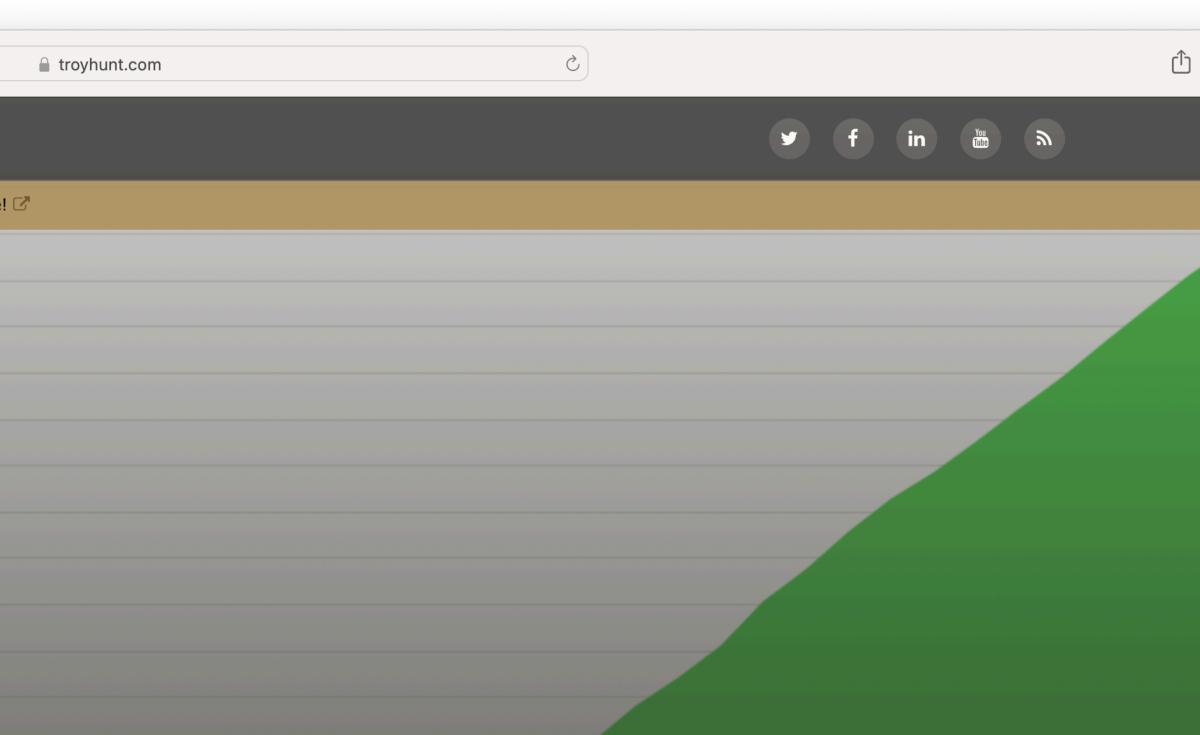
How I Got Pwned by My Cloud Costs



24 JANUARY 2022

I have been, and still remain, a massive proponent of "the cloud". I built <u>Have I Been Pwned</u> (HIBP) as a cloudfirst service that took advantage of modern cloud paradigms such as Azure Table Storage to massively drive down costs at crazy levels of performance I never could have achieved before. I wrote many blog posts about

@holly_cummins



Troy Hunt

Hi, I'm Troy Hunt, I write this blog, run "Have I Been Pwned" and am a Microsoft Regional Director and MVP who travels the world speaking at events and training technology professionals \rightarrow

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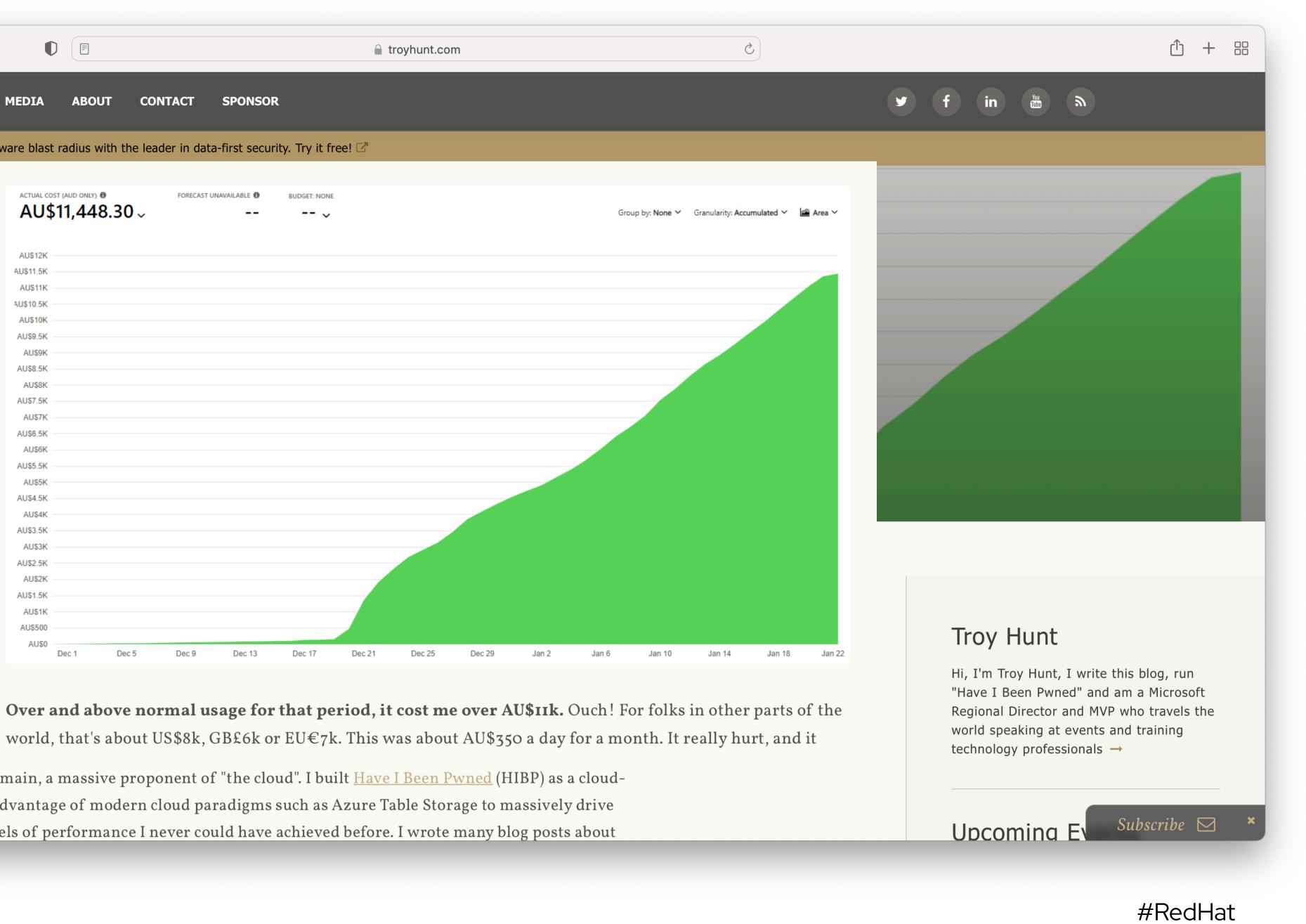
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(See Troy tomorrow at GOTO !)

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I have been, and still remain, a massive proponent of "the cloud". I built <u>Have I Been Pwned</u> (HIBP) as a cloudfirst service that took advantage of modern cloud paradigms such as Azure Table Storage to massively drive down costs at crazy levels of performance I never could have achieved before. I wrote many blog posts about

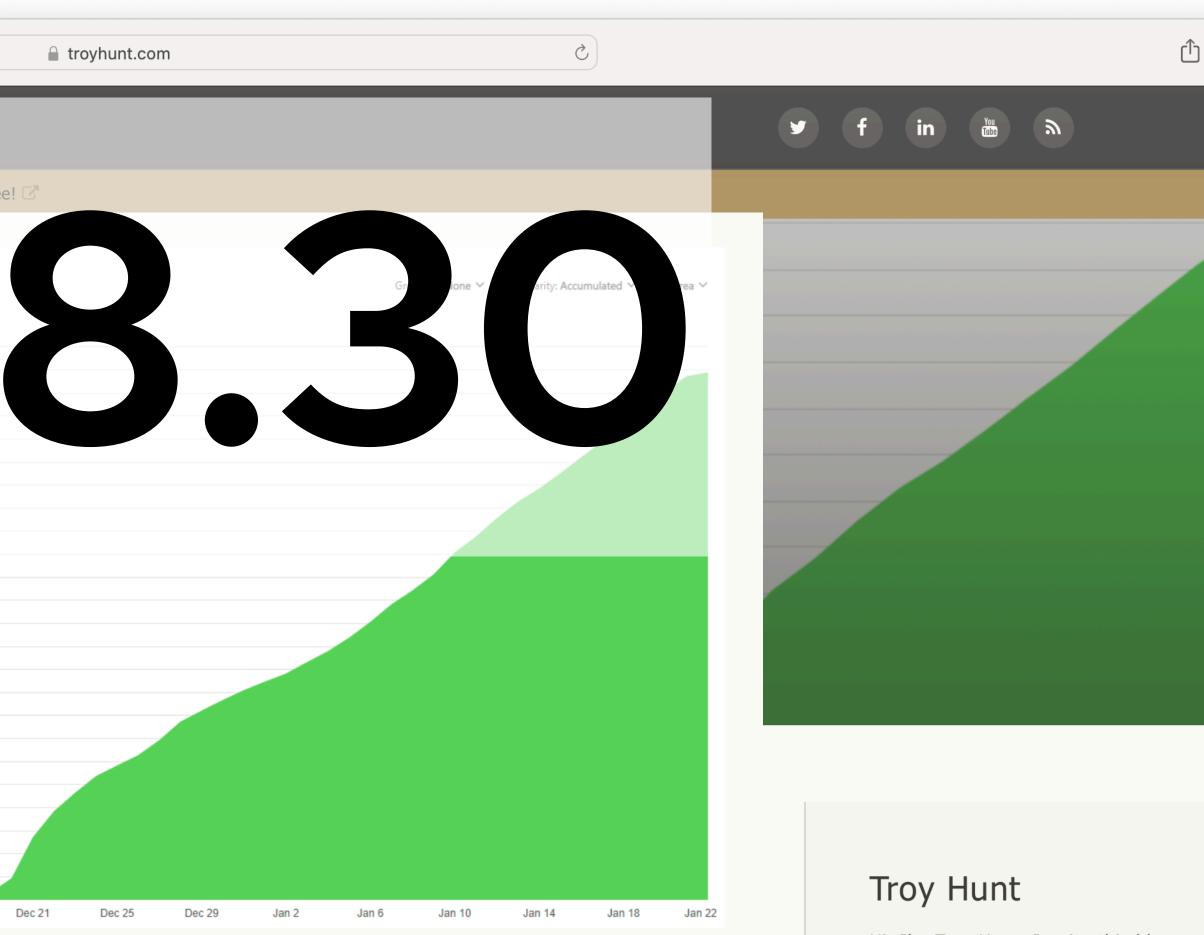


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Over and above normal usage for that period, it cost me over AU\$11k. Ouch! For folks in other parts of the world, that's about US\$8k, GB£6k or EU€7k. This was about AU\$350 a day for a month. It really hurt, and it

Hi, I'm Troy Hunt, I write this blog, run "Have I Been Pwned" and am a Microsoft Regional Director and MVP who travels the world speaking at events and training technology professionals \rightarrow

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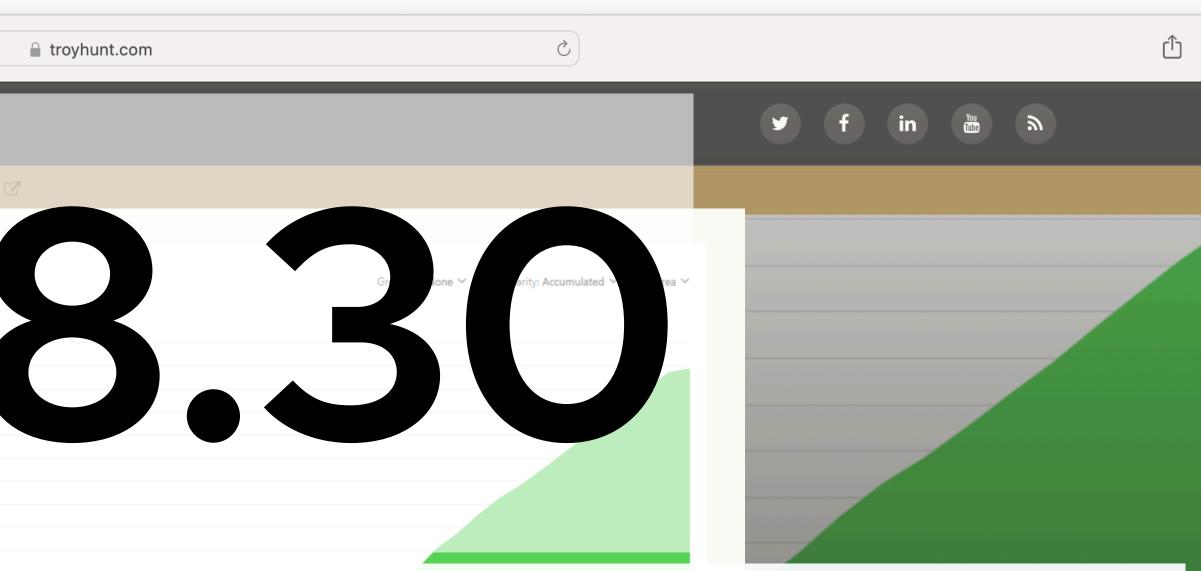


(See Troy tomorrow at GOTO !)

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d find a setting on your plan that the max cacheable file size to B and it looks like your zipfile is

B big"

This was about AU\$350 a day for a month. It really hurt, and it

travels the world speaking at events and training technology professionals →

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#RedHat



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#RedHat

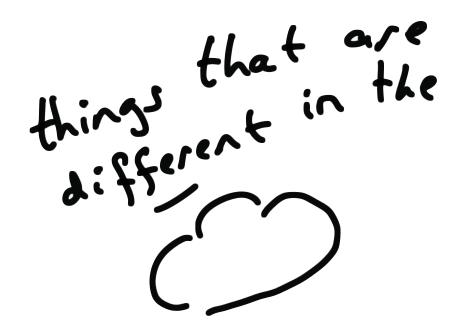




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maybe this is the chaos part

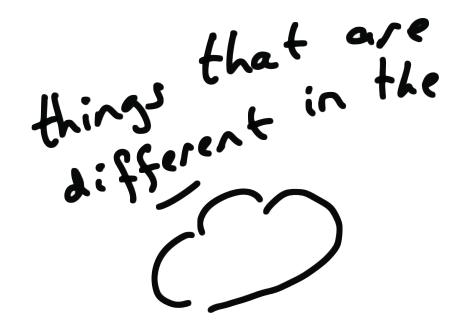




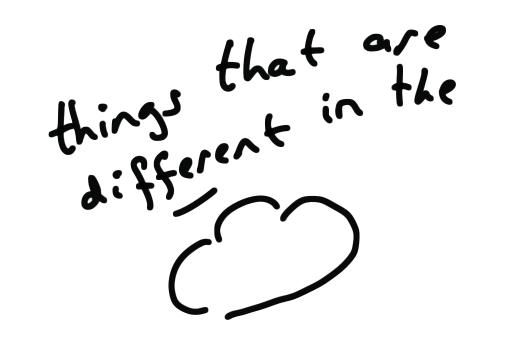
releasing







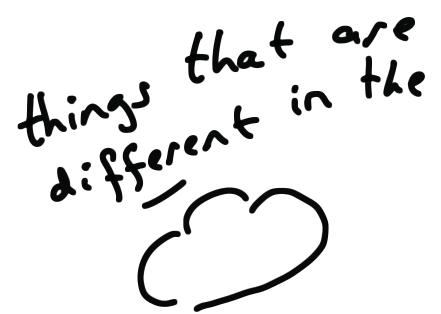
releasing



microservices







microservices

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"we're moving too slowly.

@holly_cummins

"we're moving too slowly. we should modernise our COBOL application into microservices.

"we're moving too slowly.

we should modernise our COBOL application into microservices.

... but our release board only meets twice a year."

modularity

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microservices are not the goal



microservices are not the goal they are the means



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wishful mimicry

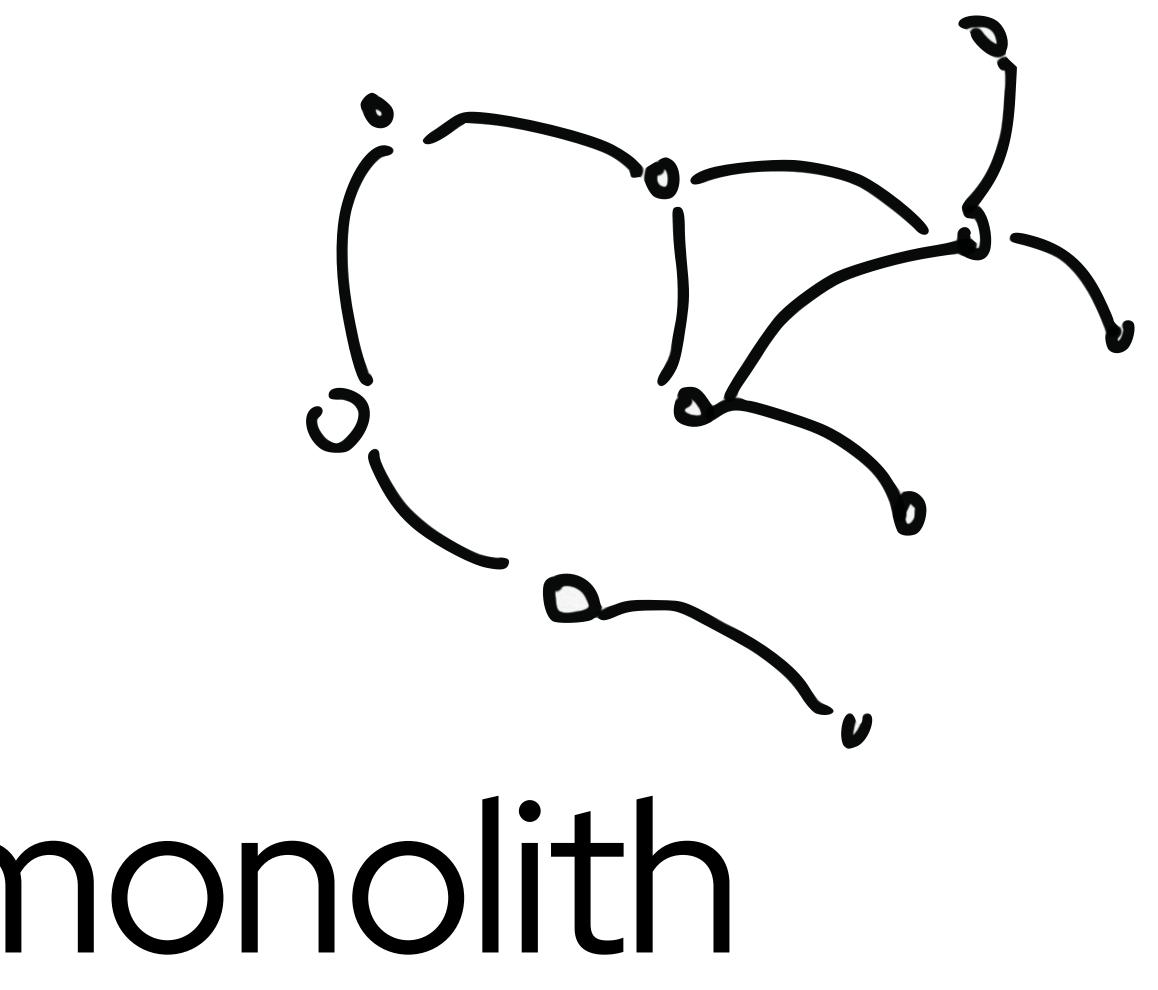
cloud != microservices

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cloud native != microservices

"every time we touch one microservice, all the others break."

distributed monolith





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



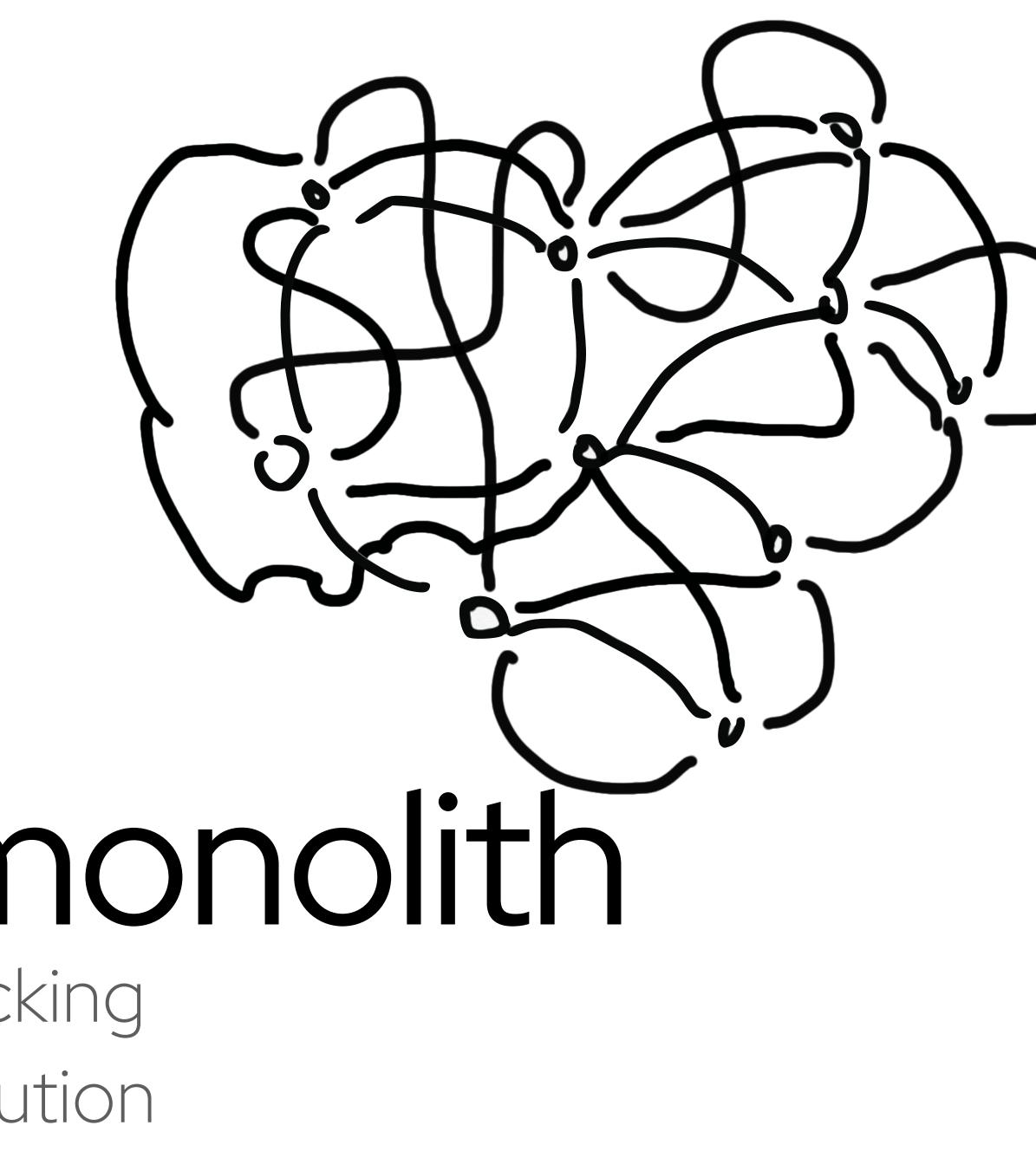


distributed monolith but without compile-time checking ... or guaranteed function execution





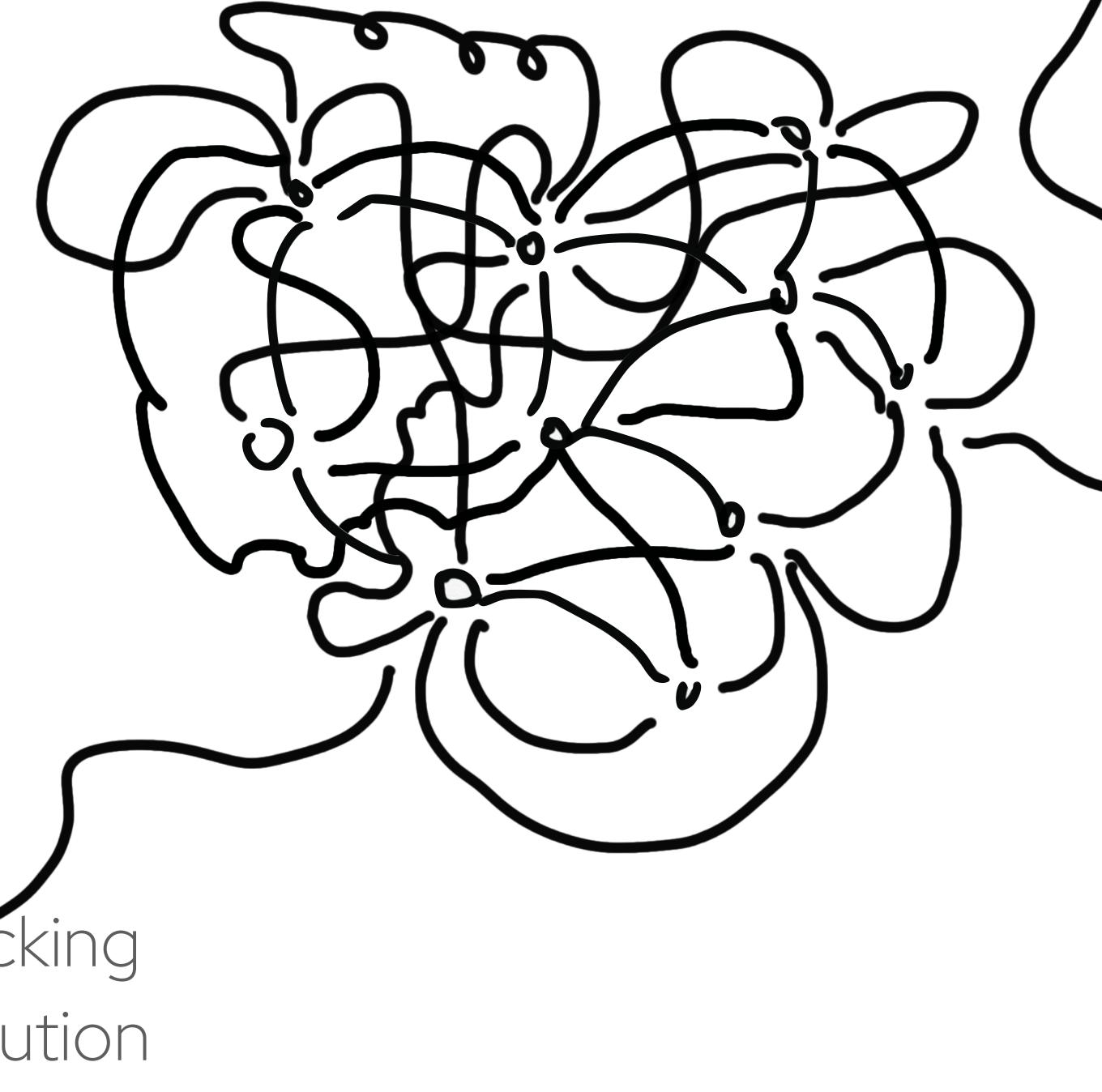
distributed monolith but without compile-time checking ... or guaranteed function execution







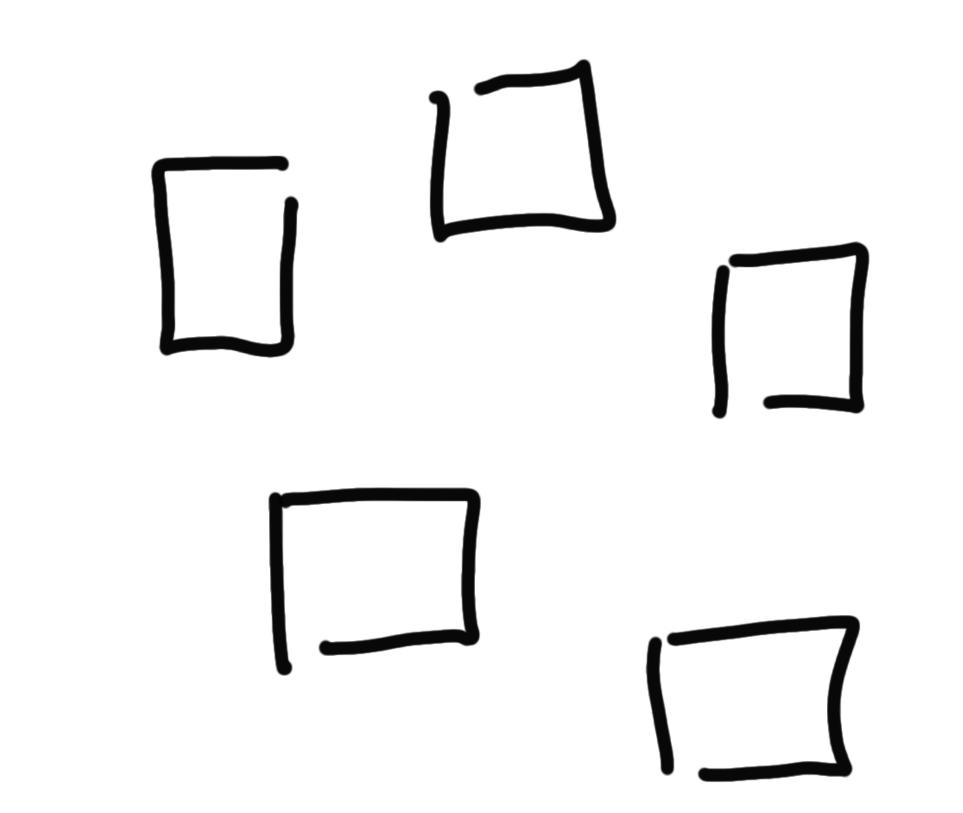
distributed monolith, but without compile-time checking ... or guaranteed function execution



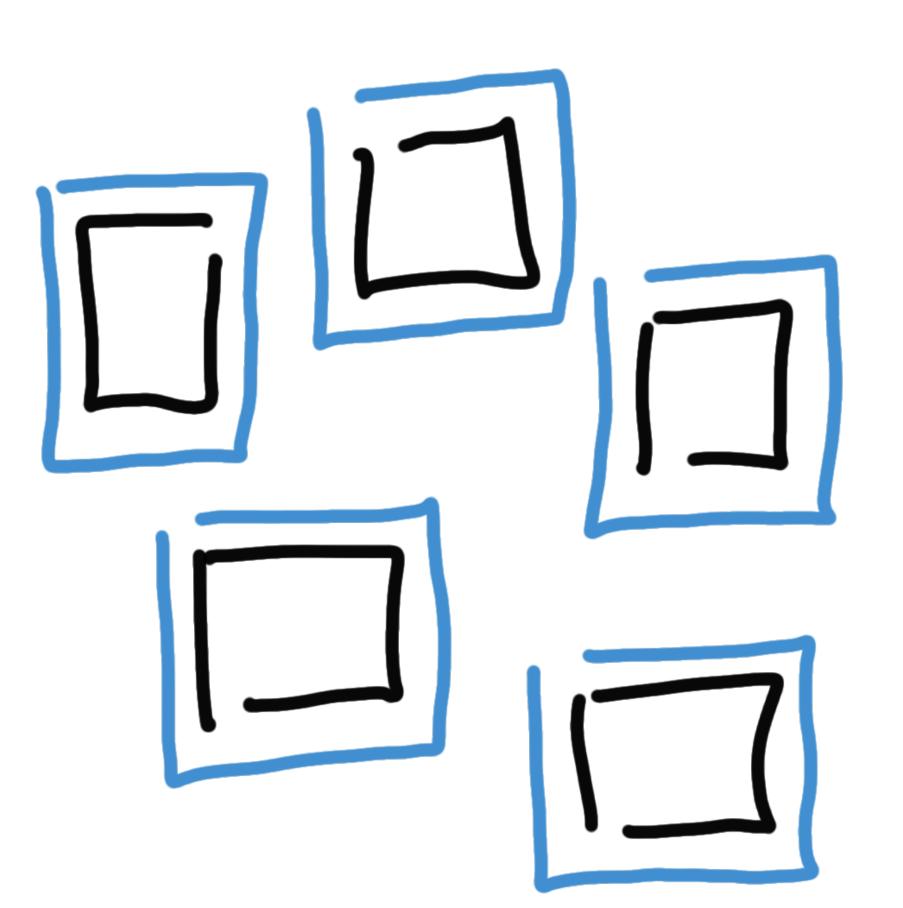
"each of our microservices has duplicated the same object model ... with twenty classes and seventy fields"







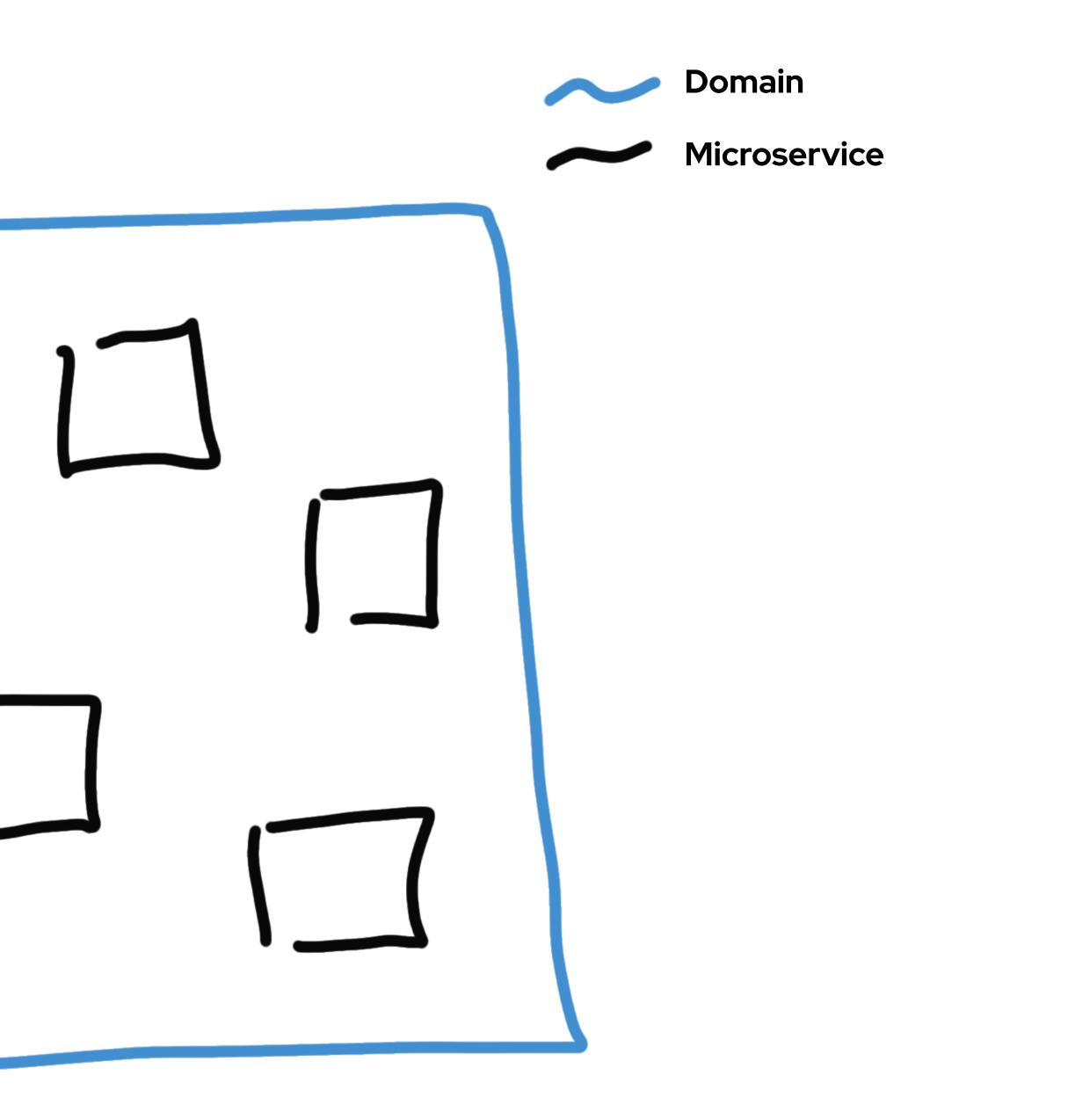








(this is bad)





distributed != decoupled

"ohhhh, we weren't expecting your service to do **that** ... "

"uh, what do you mean you corrected the typo in your json?"

@holly_cummins

If you're going to do microservices, you need to get good at automation.

And testing.



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end-to-end tests



the test pyramid

end-to-end tests

contract tests



the test pyramid

(you can TDD) at every level!)

end-to-end tests

contract tests



How to test a fire alarm?





how not to test a fire alarm





how not to test a fire alarm







unit testing a fire alarm

uh ... is that enough?





@holly_cummins

contract testing a fire alarm





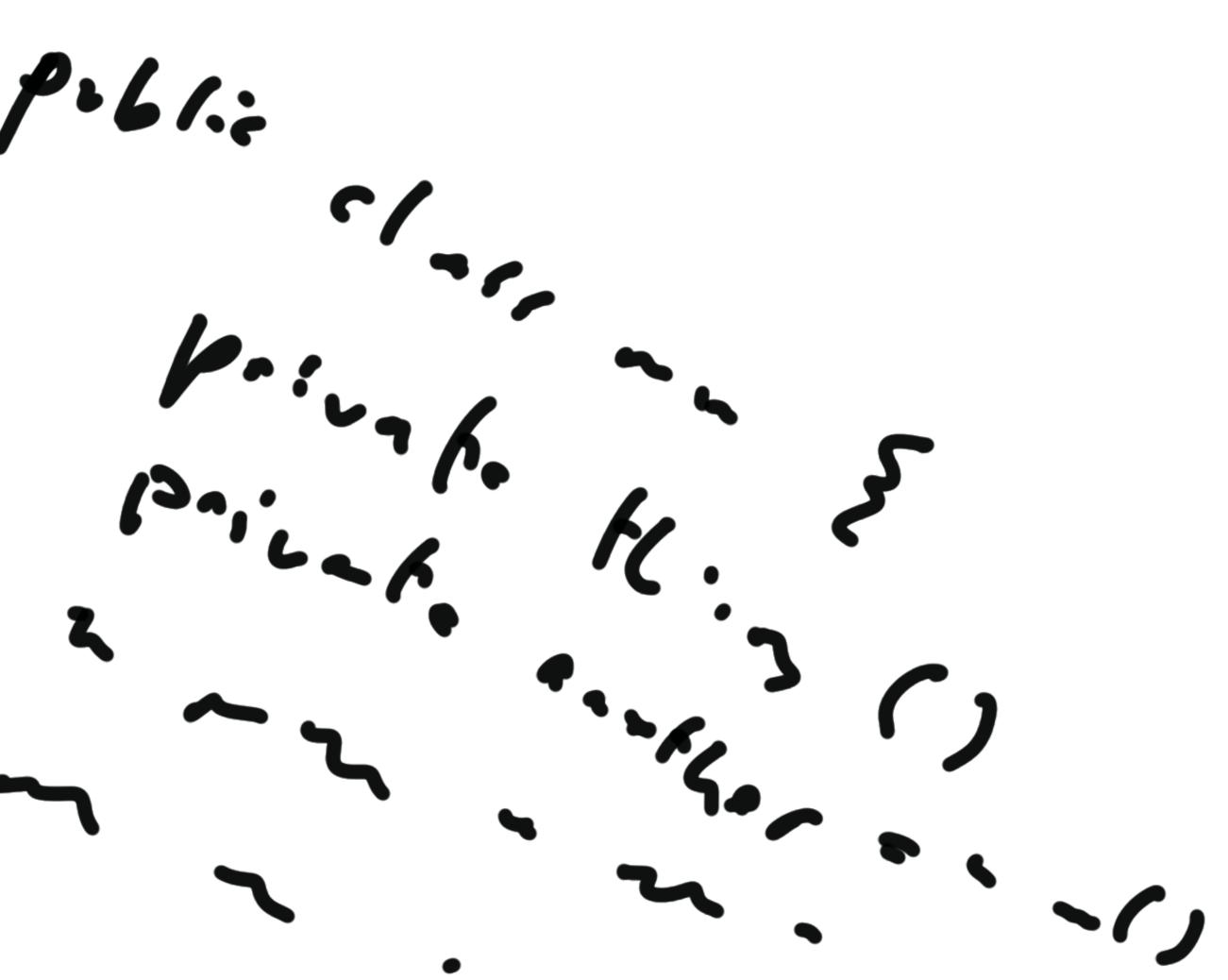
@holly_cummins

contract testing a fire alarm



to the code!

@holly_cummins



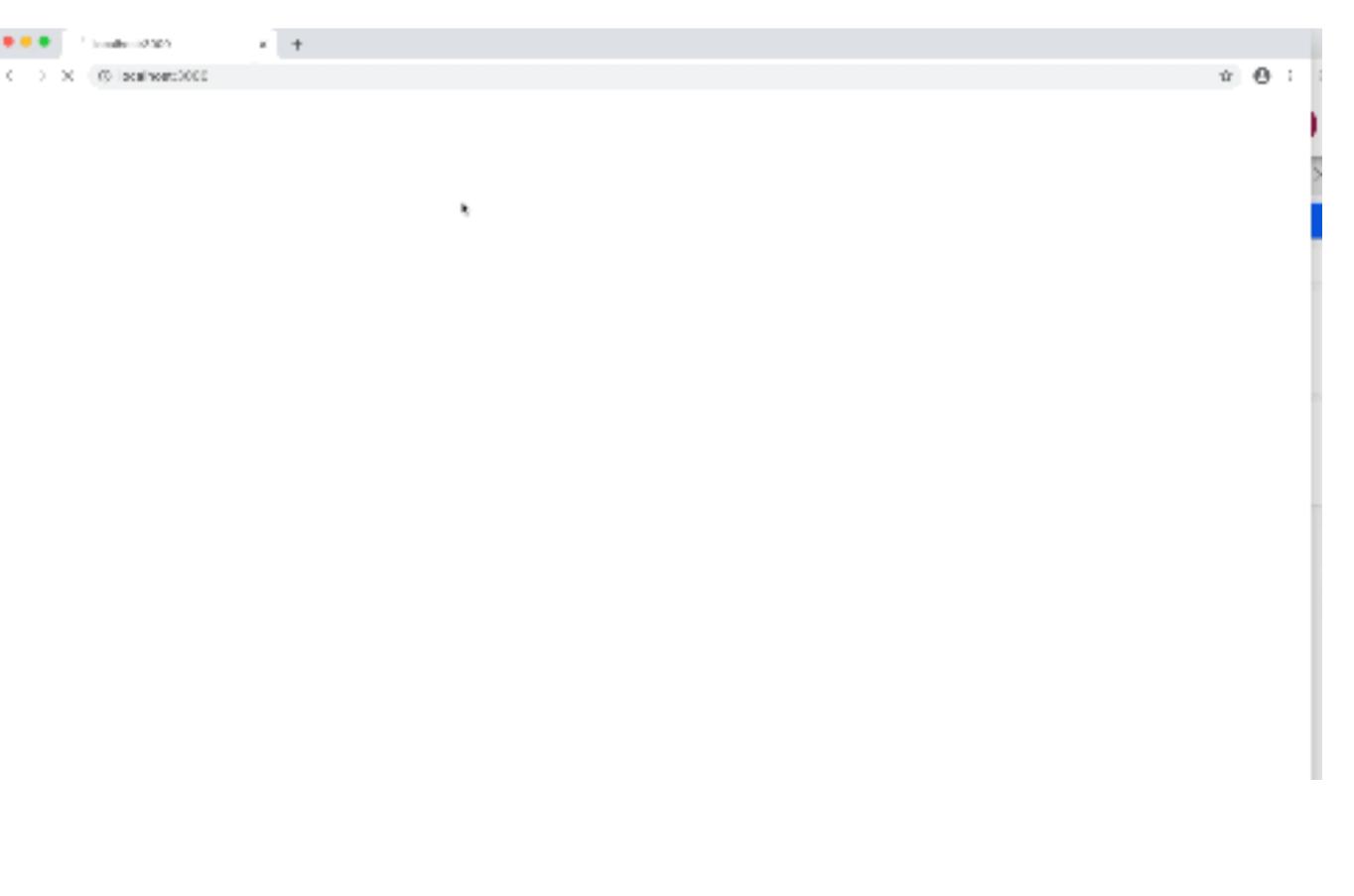
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https://github.com/holly-cummins/house-of-microservices-quarkus-contract-testing-sample

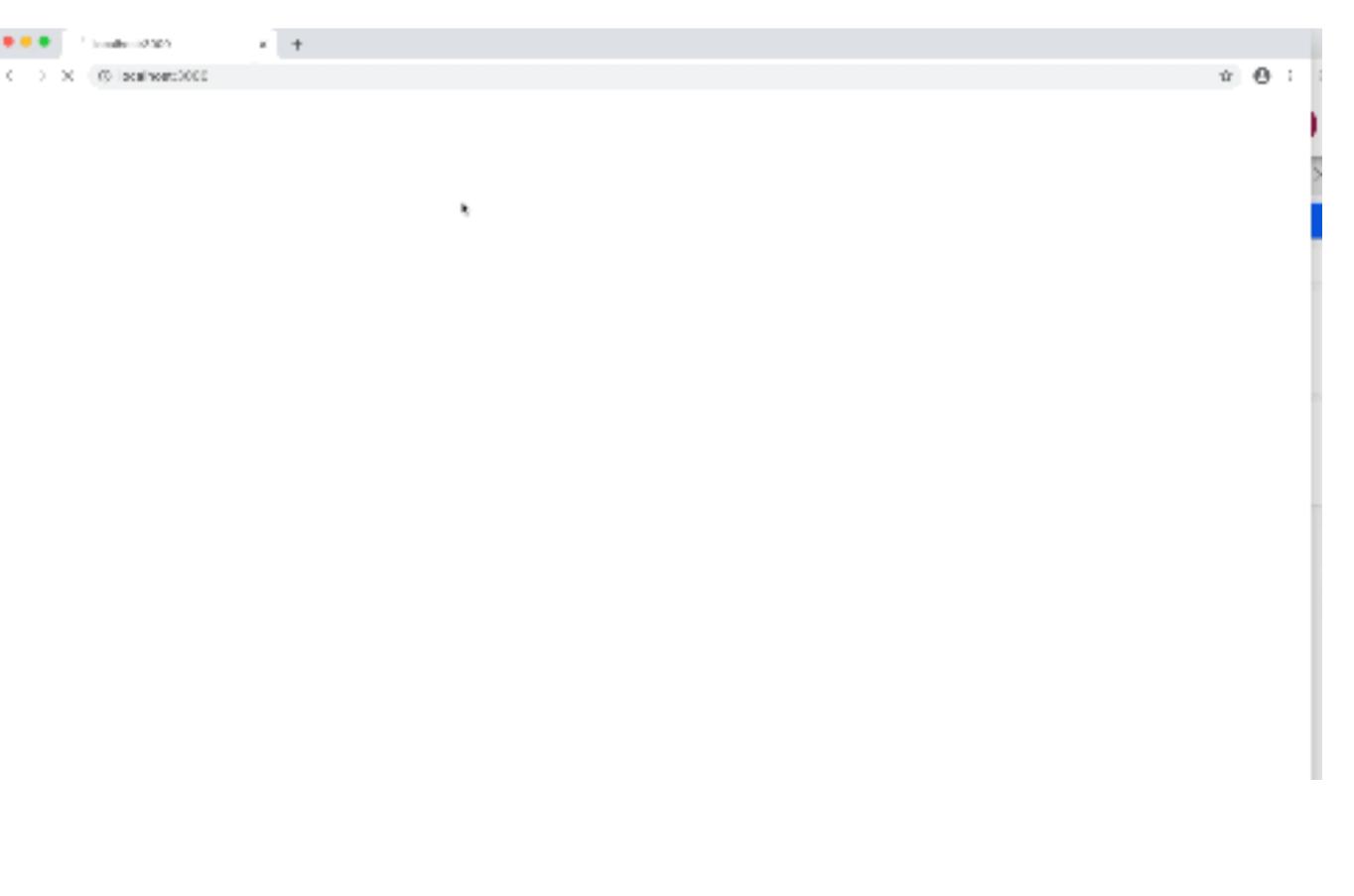








https://github.com/holly-cummins/house-of-microservices-quarkus-contract-testing-sample





demo recap:

- consumer-driven contract testing can save your bacon
- pact is a mock for the consumer
- pact is a functional test for the producer
- shared ison contracts aligns expectations across services



SO ...

don't assume cloud is a solved problem don't assume microservices will solve all your problems contract testing may solve some of your problems









thank you

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