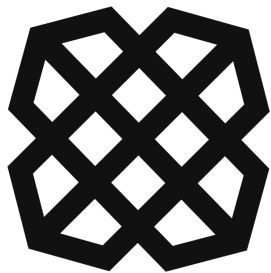# How much is that API call in the window?

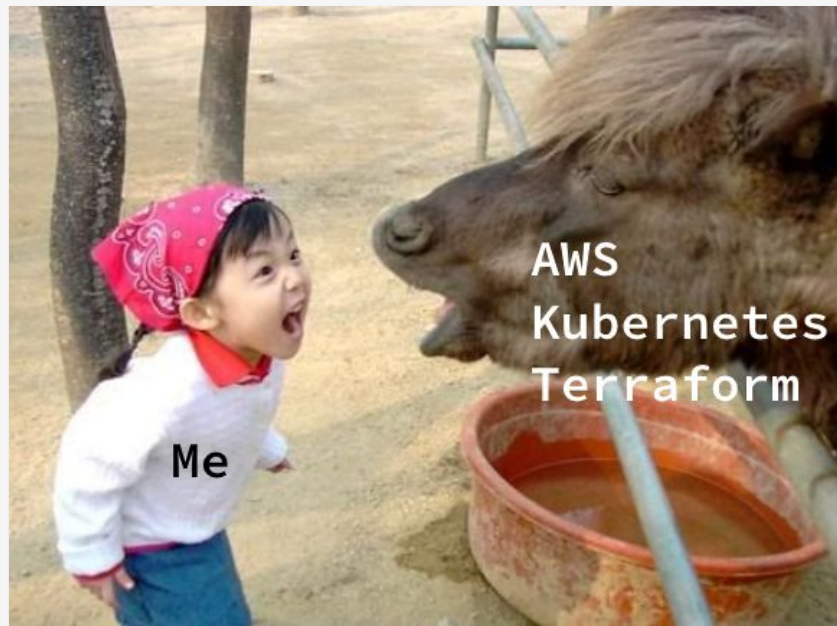Oct 16, 2023   Mark Robinson

PLAID

Plaid

- Plaid is focused on democratizing financial services through technology. We build beautiful consumer experiences, developer-friendly infrastructure, and intelligent tools that give everyone the ability to create amazing products that solve big problems.

Me

AWS
Kubernetes
Terraform

Mark Robinson
Infrastructure Engineer

Do I need to do anything?

The answer will shock and amaze

$30/hr @ AWS
=
1 FTE

What does a 10% reduction mean?

- If your monthly budget is above 6 figures, you should start investing in cost
- If you're above 7 figures, then you need to dedicate a team to this.
- Even if your spending isn't there yet, now is a great time to establish some good habits

How does AWS make money?

Sing along if you know the words

Super secret internal AWS memo

Me> How does AWS network transfer pricing work?

AWS> ♫♪ ♫♪ ♫♪

Charge 'em for the lice, extra for the mice

Two percent for looking in the mirror twice (Hand it over!)

Here a little slice, there a little cut

Three percent for sleeping with the window shut

When it comes to fixing prices

There are a lot of tricks I knows

How it all increases, all them bits and pieces

Jesus! It's amazing how it grows!

What is AWS' value proposition?

- They sell reliability, performance, and scalability

- It's also very easy to spend

- You have real-time metrics for everything, except…

- Cost data is delayed by **8-24 hours** and has been broken for days at a time

So how did we get here?

Don't blame me, I added blockchain support

Debugging by adding resources

- One easy way to fix a broken service is to add more resources

    - Slow SQL -> bigger DB

    - Latency is high -> add CPU

    - System OOMs -> add memory

- It's not a bad idea at the start of your company's life

- As you grow you can't do this anymore

Good code is cheap code

- Cost is a lagging indicator of quality
- If you go through your most expensive services you will find several serious problems

    - Unreliable

    - Hard to maintain

    - Slow to deploy

    - Unscalable

Paying more for worse software

It's a sea change

Move under the sea, that's your solution to everything.

It's an organization change

- Every engineer will need to care about costs a little bit
    - It can't just be one person doing this
  - You will need forward looking tools
    - Performance debugging tools
  - It's also a long process so pace yourself

Do a Hackathon

- Find a few engineers who are interested and put them in a room for a few days
- Give it a fun name
- You'd be amazed at what you can find

Create a cost experts group

- It's there to be consultants

- Help people understand the costs their architectures are imposing on you

- Don't be the fun police

Build your cost analysis data

- You should start on this ASAP

    - Tagging is a great way to do this

- Decide what axes you want to assign costs

    - You should have a cardinality of 10s-100s

- Make the right thing, the easy thing

    - Make this settings required in all your configs

Scaling up

Boy, that escalated quickly.

Insights

- Develop your insights enough to make your next decision and stop (for now)

- Focus on building durable insights rather than one offs. The durable insights will pay off later on

- Establish policies that enforce ownership

Decisions

- Once you have enough information, you will have a list of possible improvements

- You don't need perfect information

- Don't let people argue out of improvements because "we're too small"

Action

- Pick fixes that are easy to implement first
    - Cross team dependencies are hard
    - Customer affecting fixes are death
- Don't be seduced by going after single large fixes
- Repeated small fixes everywhere can bring large cost savings at low risk
- Don't ignore small easy wins because all dollars are equal

No one can intuit what things cost

It's one server, Michael. How much could it cost? $10/hr?

Fix your RFC process

- Make people write up an estimate for how much their new feature will cost

- The AWS cost calculator is pretty bad

- Make your own in excel

- Focus on easily understood costs and then add a "tax" for indirect costs

Write a cost calculator

	Service	Count	Unit rate	Line Total			
6							
7	**Service**	**Count**	**Unit rate**	**Line Total**			
8	Pod count		--	--		Sub Total	$0.00
9	CPU Request (millis) (from the scaffold file requests sections)		$0.04	$0.00		Overhead (This is networking costs, logging volume, metrics, and other AWS fees)	$0.00
10							
11	S3 Storage (GiB)		$0.02	$0.00		**Monthly Estimate**	**$0.00**
12	S3 Glacier (GiB)		$0.004	$0.00			
13							
14	EC2 Instances (excl k8s) (m5.large equivalents)		$0.096	$0.00			
15	EC2 Instances (excl k8s) (c5.large equivalents)		$0.085	$0.00			
16	EC2 Instances (excl k8s) (r5.large equivalents)		$0.126	$0.00			
17	EBS Disk (GiB)		$0.15	$0.00			
18							
19	MySQL Storage (GiB)		$0.15	$0.00			
20	MySQL instances (r5.large equivalents)		$0.29	$0.00			
21							
22	Redis Instances (m6g.large equivalents)		$0.15	$0.00			
23							
24	Mongo Storage (GiB)		$0.50	$0.00			
25							

Write up a list of possible fixes

- Your teams won't know where to start

- Write up a doc on things they can do to fix things

- Customize it per-team with cost estimates

    - People LOVE this

- It's super easy because all cost problems are pretty similar at a high level

Inevitable problems

GASP!

What could go wrong

- Cost blow outs
    - Security scanners
    - Sudden scale-up in requests
    - Log volume spikes for debugging

Take Aways

- All dollars are the same

  - Start with the easy wins

  - Make friends and find allies

- Start your cost insights monitoring

  - Today

    - Now

- Good software is cheap software

  - How much is a good night's sleep worth?

- No one knows what they're doing

  - Give engineers the tools to understand the problem

Thank you

Come find me later to talk how about how you're overpaying for S3