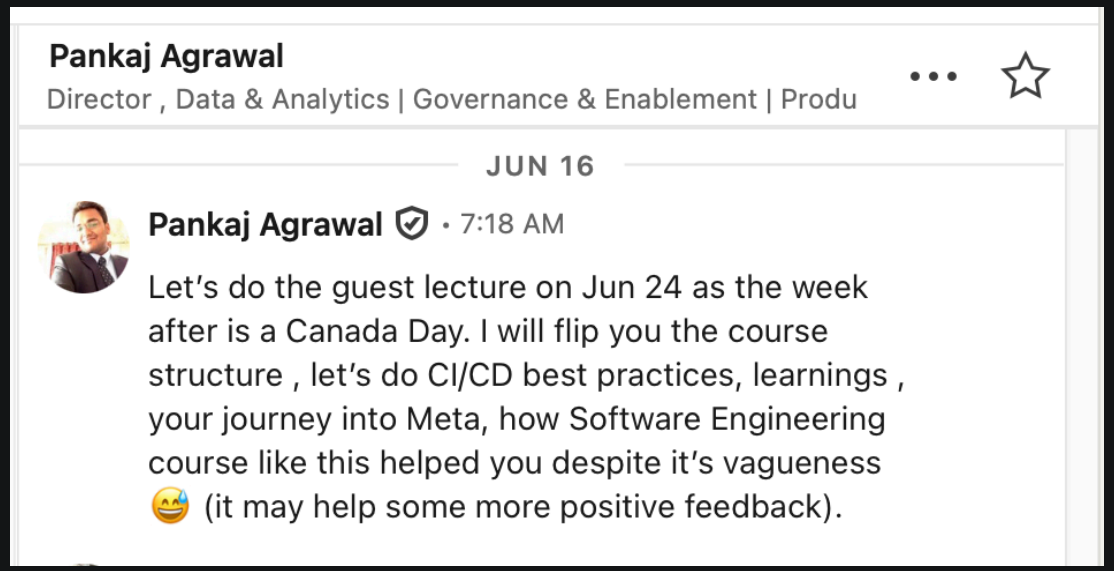
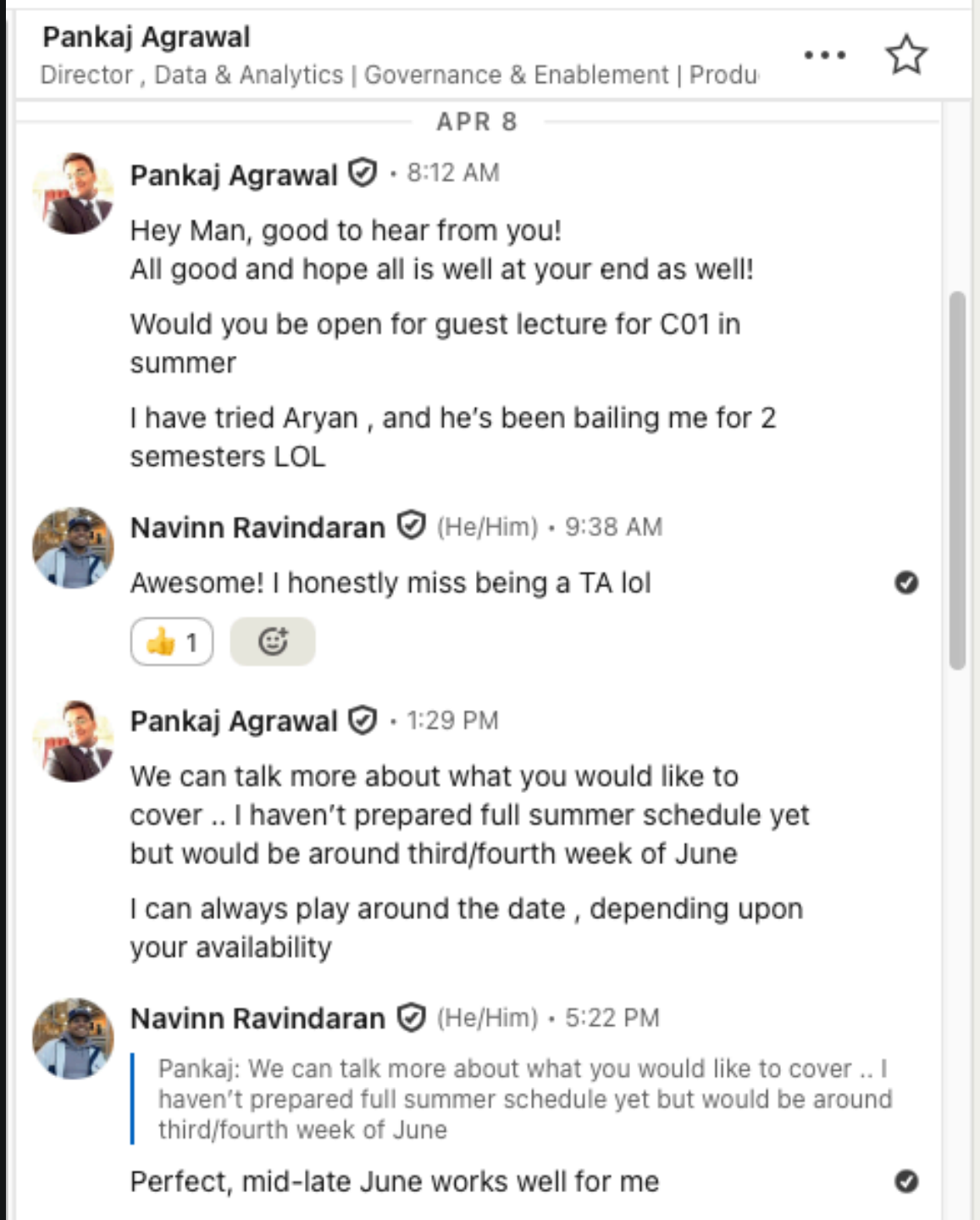
CI/CD AND MORE

BACKGROUND



thanks aryan for bailing



About me

- SWE @ Meta
  - Server Eng; Instagram GenAI
  - PHP/Hack 🤮, Python, React
- UTSC CS '24
  - CS TA: B07 (x2), B20, **C01**, C09, D01
  - Co-ops: CaseWare, Halo, RBC, HubSpot, AmEx
  - MLH Fellowship
- ~~been coding since i was 5~~

haha chatgpt meme

Caffeine Induced / Code Disasters

noun

The phenomenon where a developer's over-reliance on caffeinated beverages leads to a temporary boost in productivity, followed by a series of coding mishaps that require extensive debugging and troubleshooting.

CONTINUOUS

INTEGRATION

CONTINUOUS

DEPLOYMENT

Prerequisites

✅ Pushing code changes (`git push`)

✅ Building/Compiling code (`gcc`, Mobile app builds, Generating static webpages)

✅ Testing code (Manual, Unit, E2E Integration)

🤔 Deploying code

- Static sites: GitHub Pages, Netlify, Cloudflare Pages, ...
- Server(less): Vercel, Railway, Firebase, ...
- Full-stack: Amazon Web Services, Google Cloud Platform, Azure, Heroku, ...

Remember this order

STORYTIME

This is Aryan (pretend)

- Just started his first new grad SWE role
- Doesn't know much about the team and the codebase they work on yet
- The codebase is **huge**: Thousands of files, rough idea on where to look
- Opened the repo, needs to make a small change

Aryan makes this change

```
<<GraphQLField(
    'comments_info',
    'Get comments for an IG Media (feed, story, reel)',
)>>
public function getComments(
-    ?IGMediaCommentsInfoInputObject $input,
+    IGMediaCommentsInfoInputObject $input,
): ICommentsInfo;
```

Question: Is there anything incorrect/hacky here?

Aryan tests the code change

```
[arypat@]👉 hh
No errors!
[arypat@]👉 meerkat
Starting Meerkat instance 60d43606-a864-43c4-82ba-35a31d34ba12
Calculating last good mergebase
Querying changed files
Resetting artifacts to mergebase
Running rebuild steps
Updating source control

Meerkat finished in 105.48 seconds
```

Question: What else can/should Aryan do to test? The change was for getting comments in graphql

IT'S SHOWTIME!

Looking good, he pushes the change: https://www.internalfb.com/diff/D77156122

This is only the first part, CI. CD comes after approval and tests are passing.

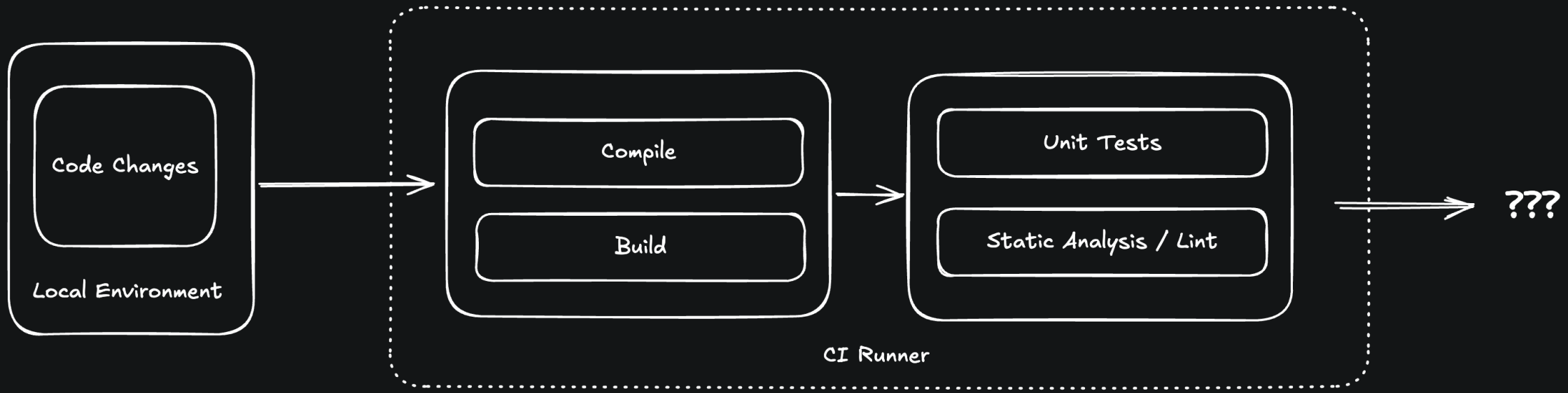
Things to think about

> Remember, Aryan *just* started.

- How long did it take to code → test → push?
- What would happen if there was no CI?
- How long would it have taken to test 'everything' manually?
  - **Could** he do that?
  - **Should** he do that?

Tradeoffs and failing fast. We'll come back to this later.

FLOW SO FAR...

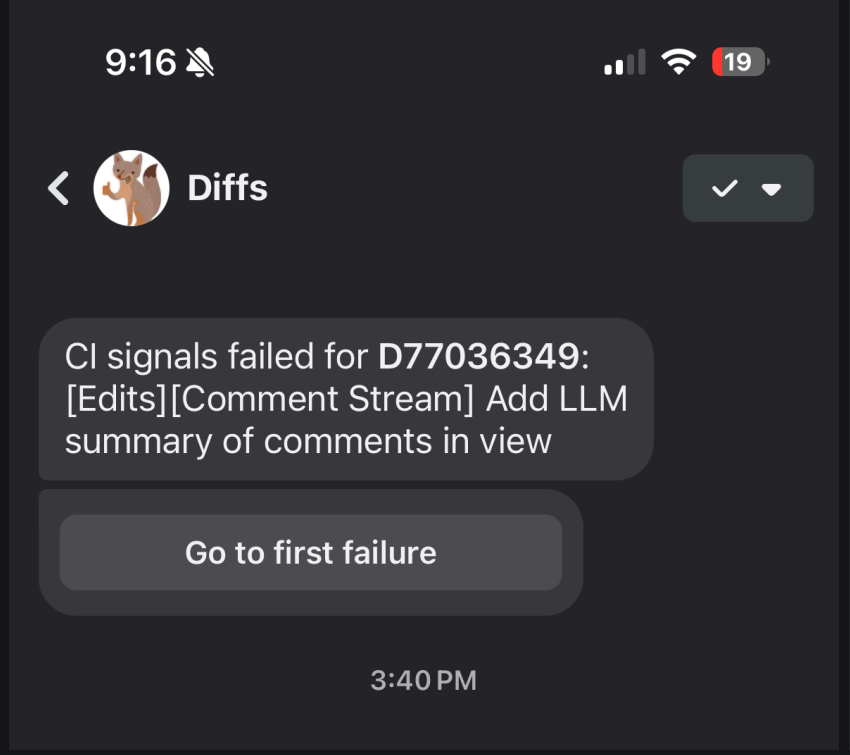


TL;DR: Automated service to quickly test code changes and detect errors early

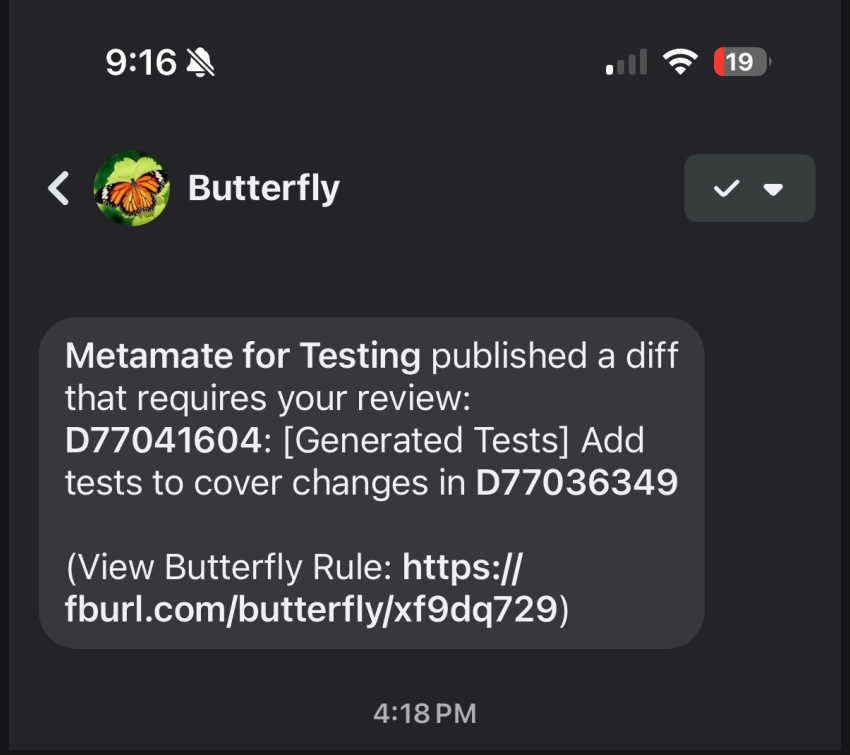
Question: What happens if this is really slow?

Additional CI Capabilities

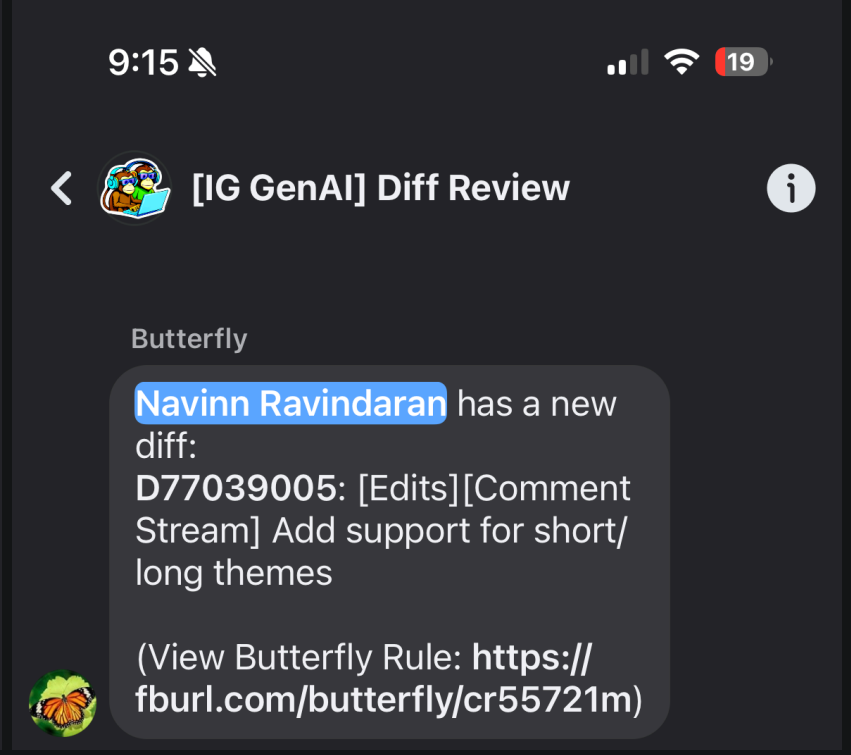
- Static Analysis
  - Code Coverage
  - Security Vulerability Scanning (leaking env. variables, secrets)
- Build/Test Artifacts
  - Log of passing/failing tests
  - Screenshots of UI changes end-to-end
- Async/Offline Triggers
  - Sending notifications
  - Database schema changes
  - Sending notifications on failure/success



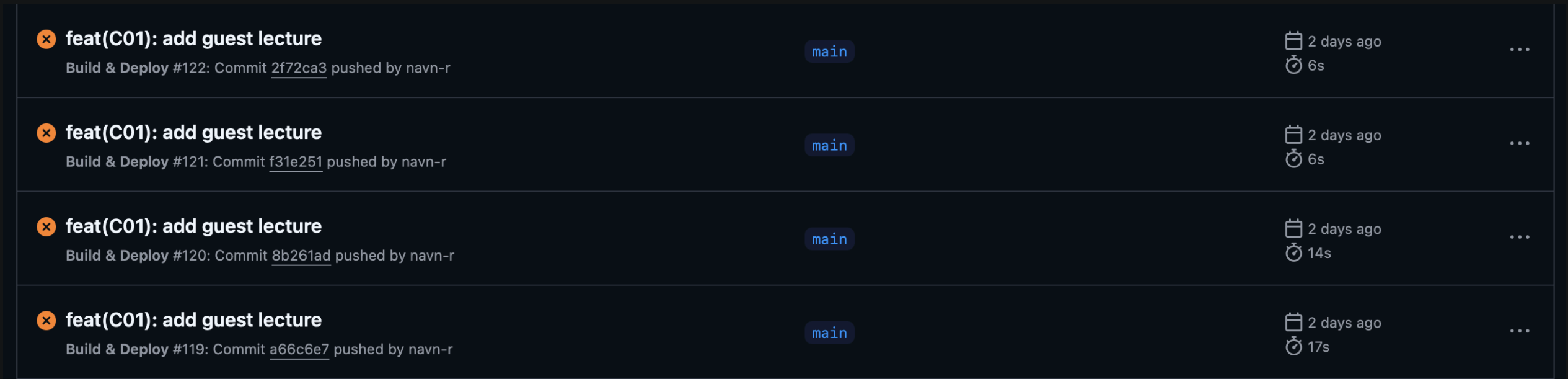
Tests or Static Analysis error



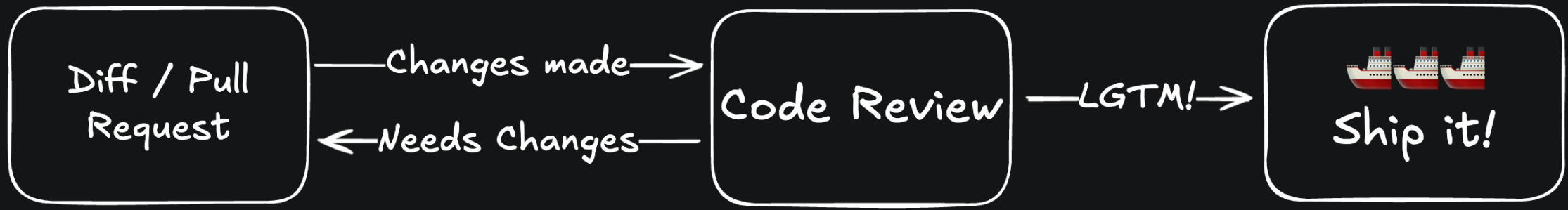
Automated unit test generation



Shared engineering group



After CI Passes



DEPLOYMENT

- Depends on the company / team / project / architecture
- Staggered Rollout
  i. α / Development (`latest` , `unstable` , `main`)
  ii. Staging (`test` , `qa` , `staging`)
  iii. Production (`prod` , `stable`)
- Types of Deployment:
  - A/B: Experiment between two versions, see metrics and choose
  - Blue/Green: Run both, then instant swap
  - Canary: Gradual release based on % of population
  - Rolling: Gradual release based on # of services

Question: Does this need to be (as) fast?

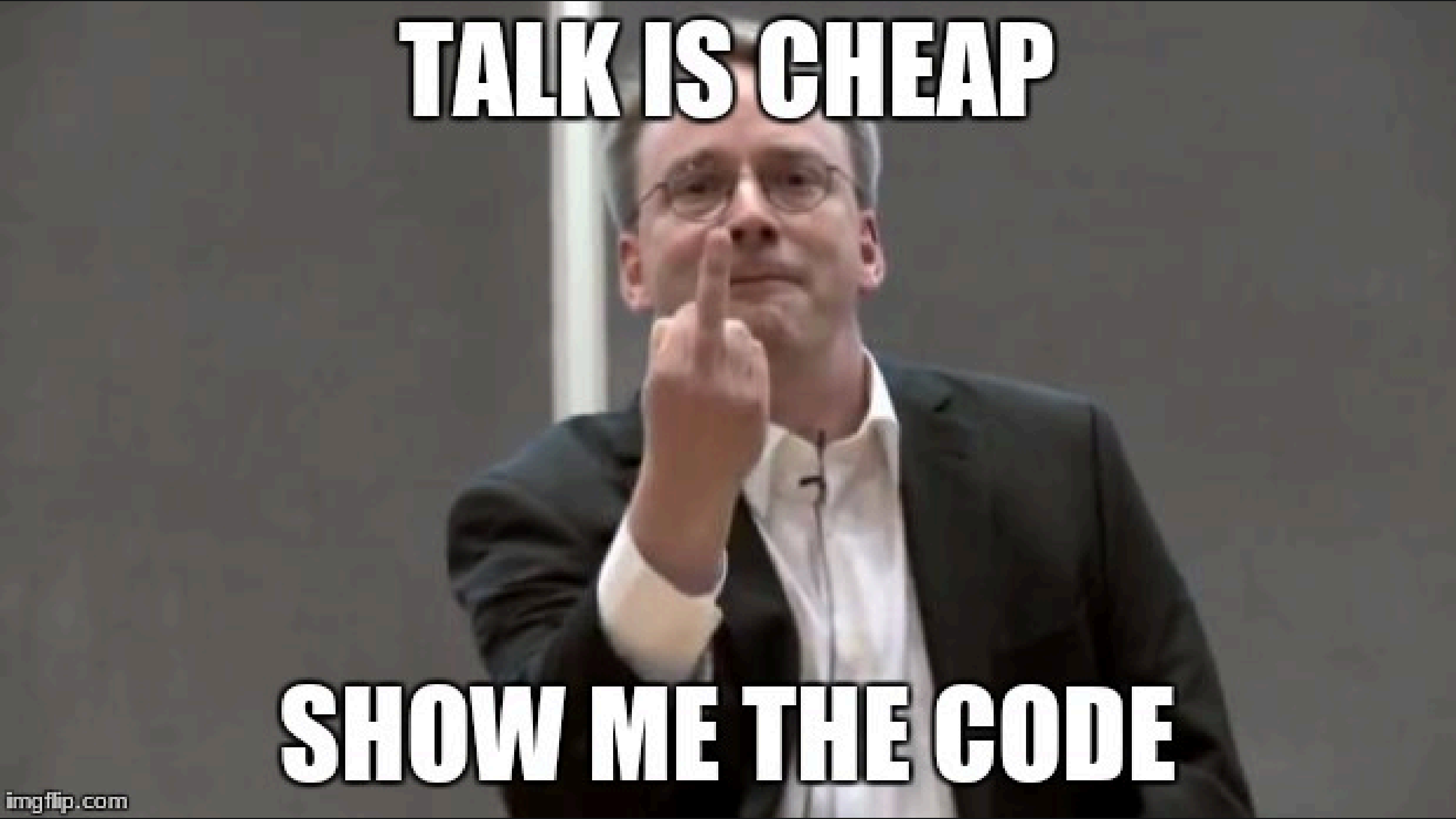
To Conclude

```
Code ⇒ Test ⇒ Build ⇒ Review ⇒ Deploy ⇒ Pray nothing breaks
```

- The earlier you set it up, the more it helps
- Bad CI/CD is worse than none
- Don't reinvent the wheel
- Green check ≠ Things look good (sometimes)
- CI/CD and Devops at scale - usually someone else's ~~problem~~ responsibility

Resources:

- https://docs.github.com/en/actions/writing-workflows/
- https://about.gitlab.com/topics/ci-cd/
- ~~Meta AI~~ ChatGPT (lmao)


TALK IS CHEAP
SHOW ME THE CODE
imgflip.com

Closing Thoughts

Why this course matters.