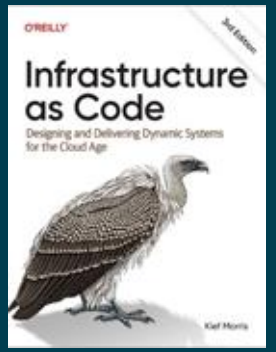

Humans on the Loop

Taking Agentic Engineering End to End

Kief Morris

Distinguished Engineer
Technology Advisory Services

thoughtworks

https://bit.ly/4dS28pT


I see value in hands-off, "all-in" agentic workflows.
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Photo by Homa Appliances on Unsplash


But it means
getting better at
ensuring "good".
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Which means being clear about how we define "good".
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I believe using CD pipelines within agentic workflows can help build better software.

/thoughtworks


All-in, "hands-off" agentic workflows.
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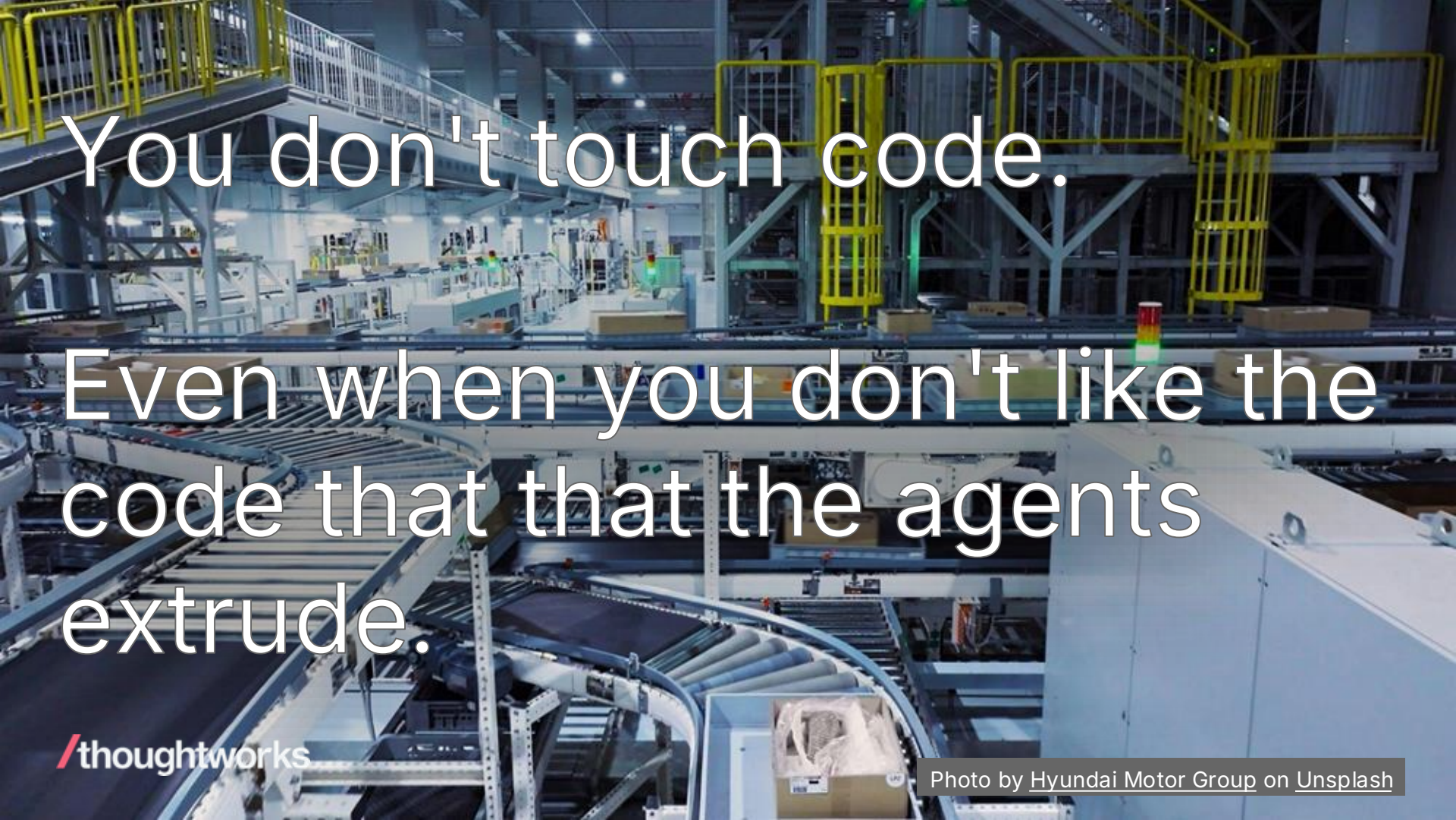
Photo by Hyundai Motor Group on Unsplash


You don't touch code.
Even when you don't like the code that that the agents extrude.
/thoughtworks
Photo by Hyundai Motor Group on Unsplash


You probably shouldn't look at the code either.
/thoughtworks
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So how do we avoid cognitive debt?
How do we avoid cognitive surrender?
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Do we really need our code to be good?
/thoughtworks
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It's the LLM's problem now!
/thoughtworks
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Vibe-oriented approaches build software that is good in the ways that users know they care about.
"It does what I want it to!"
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Photo by Kathrine Coonjohn on Unsplash

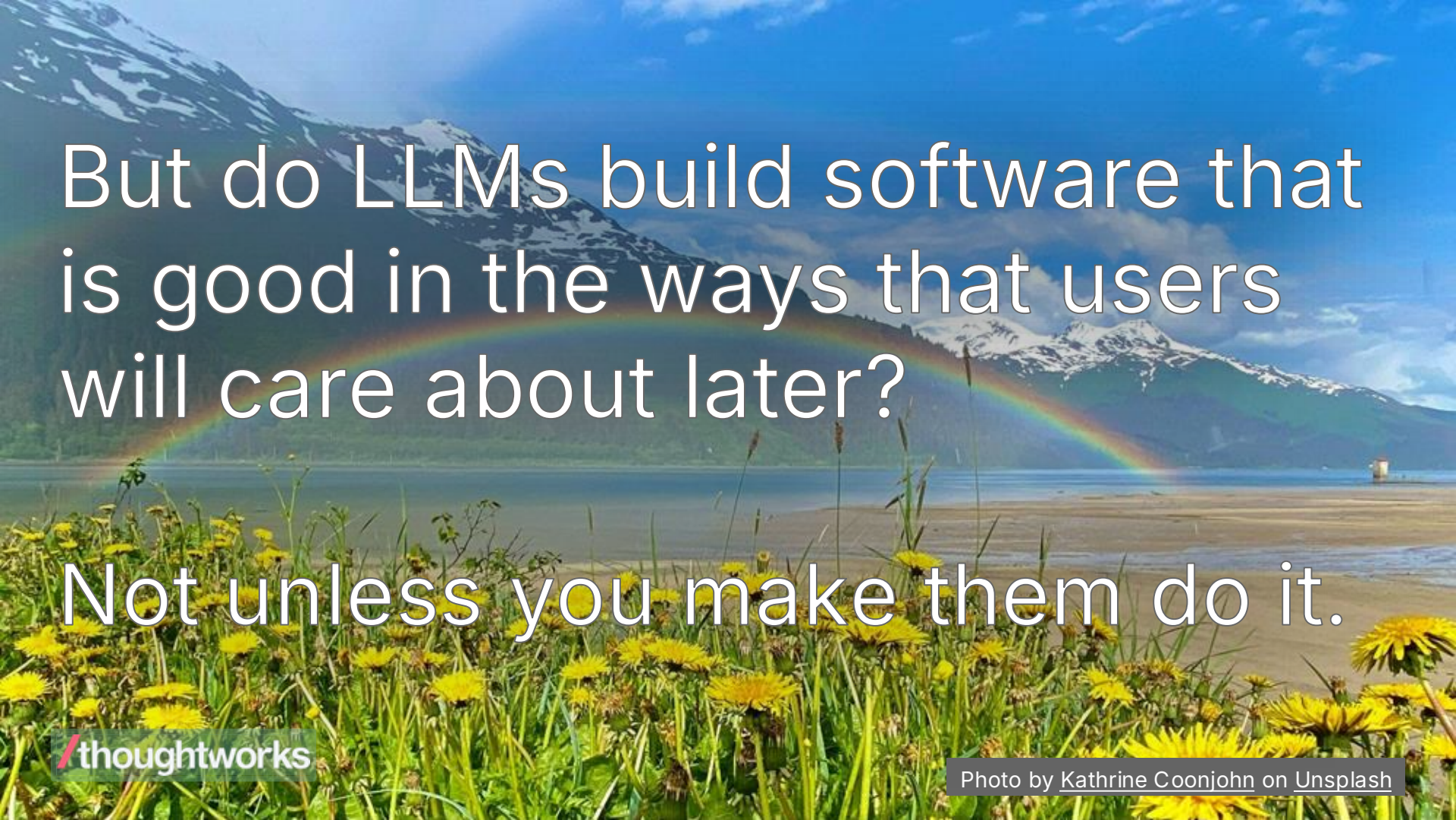
But do LLMs build software that is good in the ways that users will care about later?
Not unless you make them do it.
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Photo by Kathrine Coonjohn on Unsplash


We've always had a hard time getting users to care about making software "good" in ways that show up later.
/thoughtworks
Photo by Kathrine Coonjohn on Unsplash

And maybe that's fine for some software.

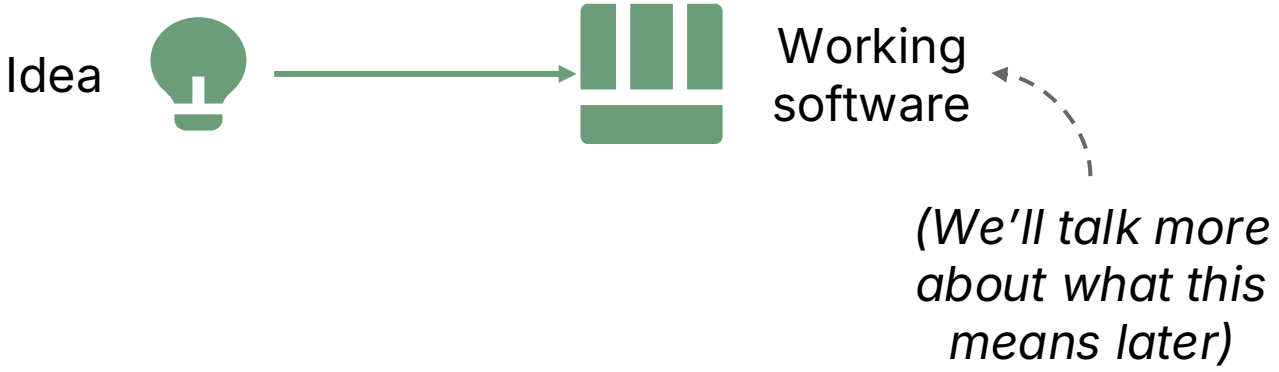
Maybe for a lot of software made with AI.


But what if we're building software that needs to last?
/thoughtworks
Photo by Abhinav Bhardwaj on Unsplash

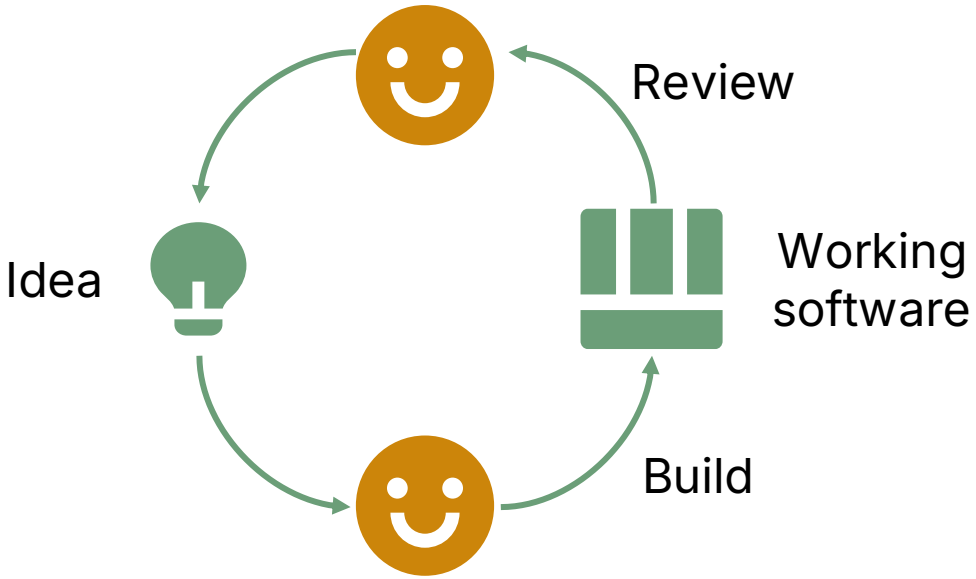

Can agents do a better job of making software durable?
Only if we make them do it.
thoughtworks
Photo by Abhinav Bhardwaj on Unsplash

Where and how should humans review what their agents are building?

The goal

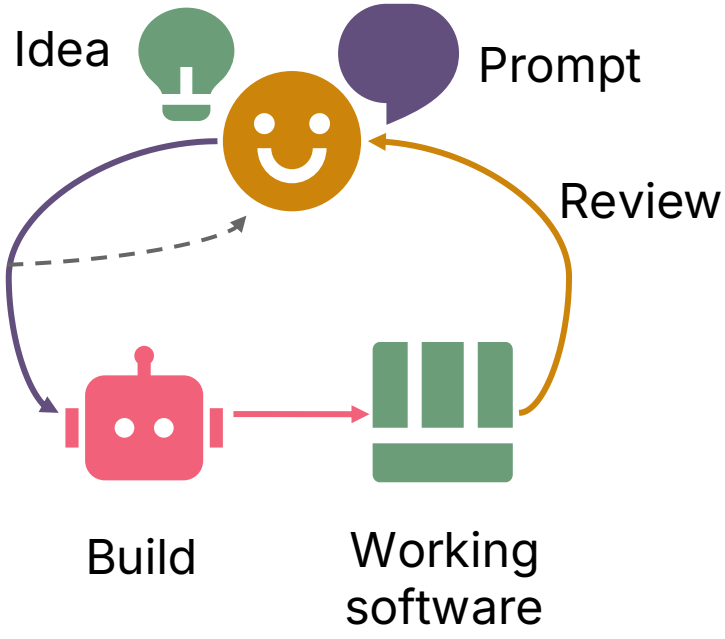

Idea
Working software
(We'll talk more about what this means later)

Legacy approach: Humans are the loop



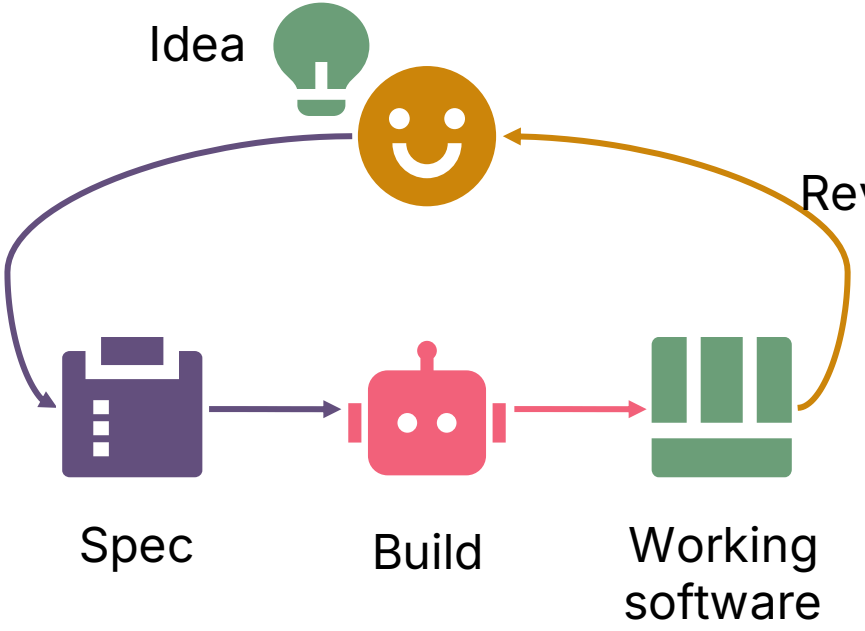
Vibe coding (basically)

This could be a team of people



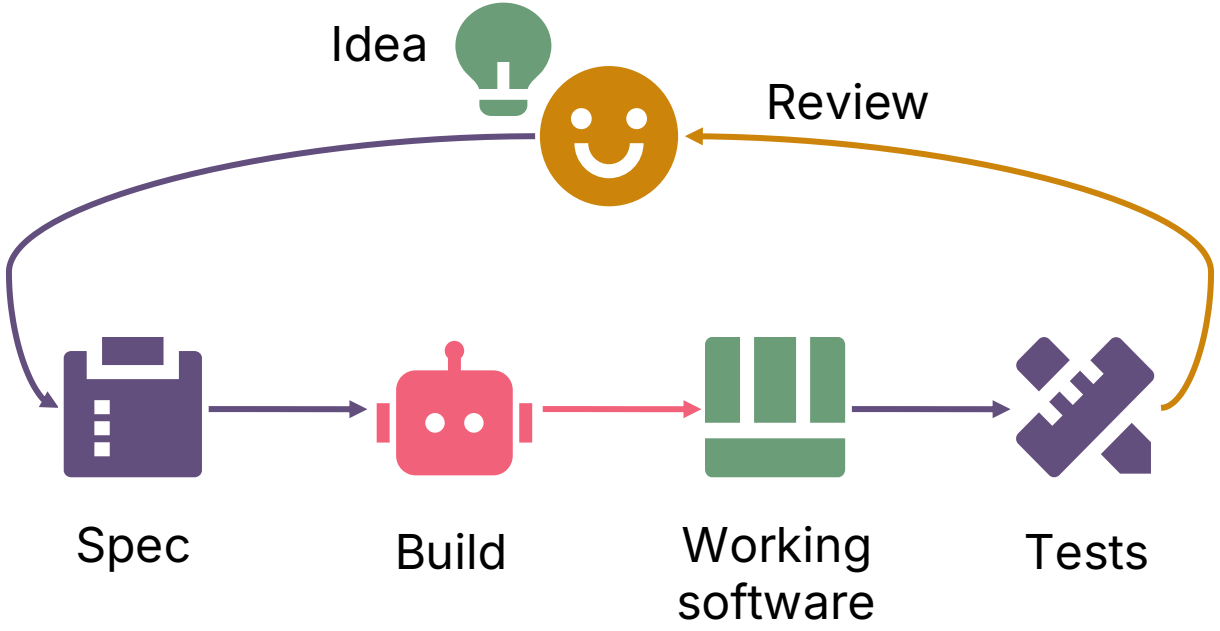
It depends on what "working" software means for the solution being built

Spec-driven development (basically)

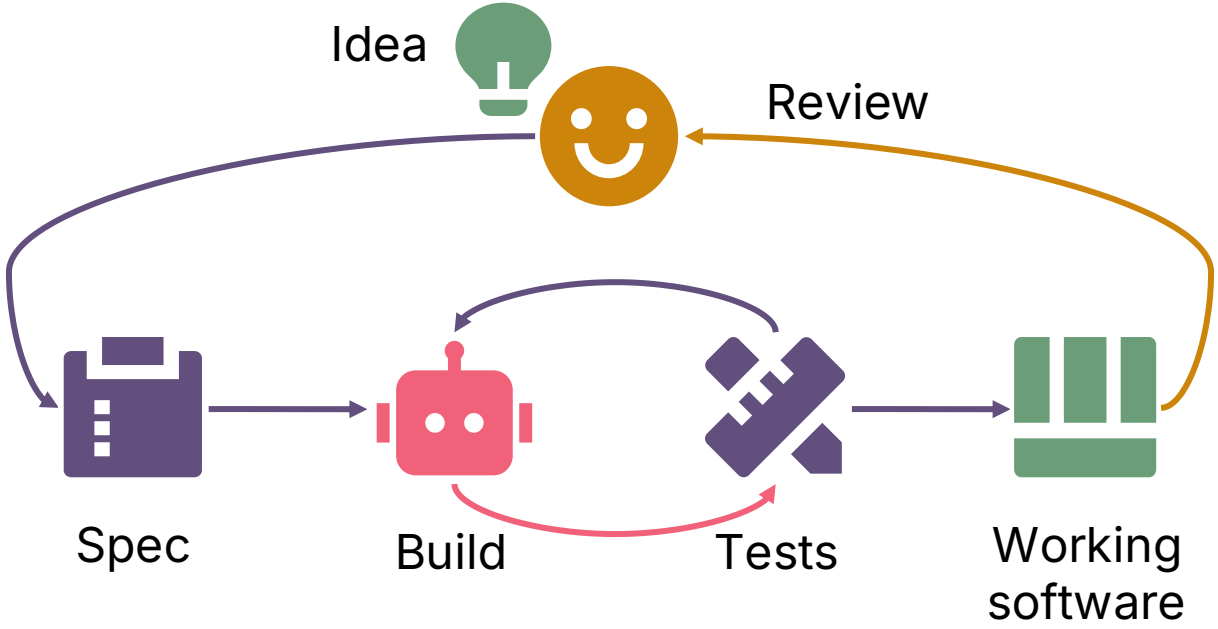


Code reviews can become a bottleneck

Spec-driven development with tests

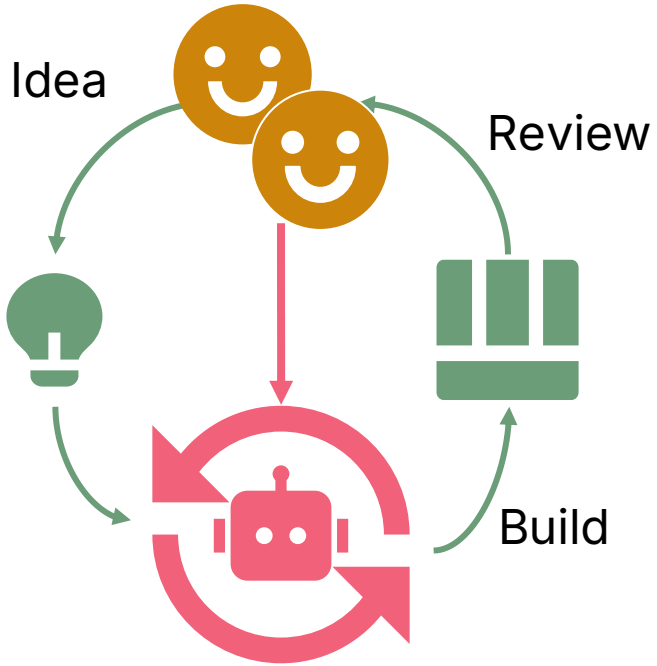


Agentic code / test loop



Agentic coding harness:
A system that drives the LLM to make good code.

Agentic loop. Work on the harness, not the code



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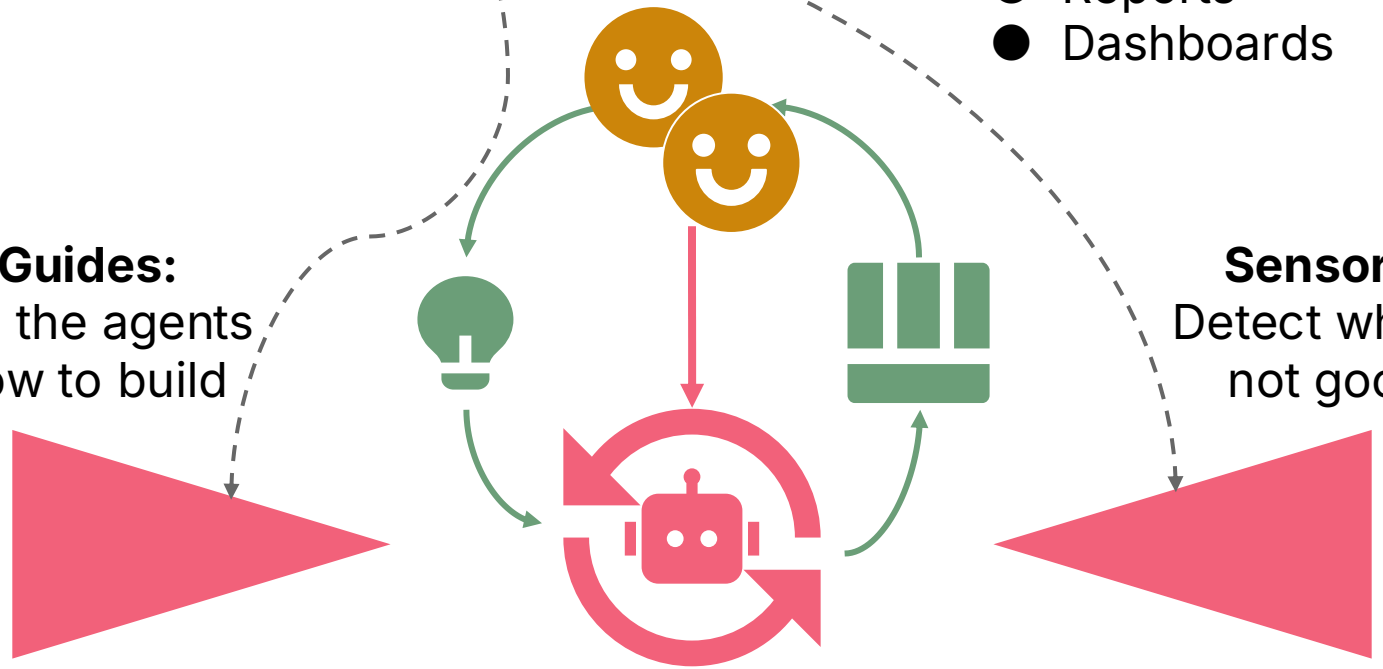
Improve the harness

Check:

- Use it
- Reports
- Dashboards



Guides:
Tell the agents how to build

Sensors:
Detect what's not good

Loop: Repeat until good

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Prerequisite:

We need to clearly and effectively articulate what "good" looks like.

Code quality?

Who cares!

It's the LLM's problem now!

Code quality impacts DELIVERABILITY

We need to:

Change it. Configure it. Improve it. Add to it. Troubleshoot it. Fix it.

How do we sense deliverability?

Lagging sensors

DORA and things like that.

Leading sensors

Linting

Test coverage

Mutation testing, fuzz testing

Code complexity

Vulnerability and supply chain scanning

LLM code evaluations

Implementation affects OPERABILITY

We need to:

Know when it breaks.

Restore it quickly when it does.

We also need it to:

Be fast enough.

Have enough capacity.

Be reliable.

Not cost too much to run.

Handle data properly.

Be secure.

Comply with laws and standards.

How do we sense operability?

Lagging sensors

Deliverability metrics (DORA)

User satisfaction

Business operations metrics (transactions, cost)

Commercial metrics

Leading sensors

Deployability

Performance and scalability testing

Failure scenario testing

Penetration testing

Compliance auditing

Continuous Delivery

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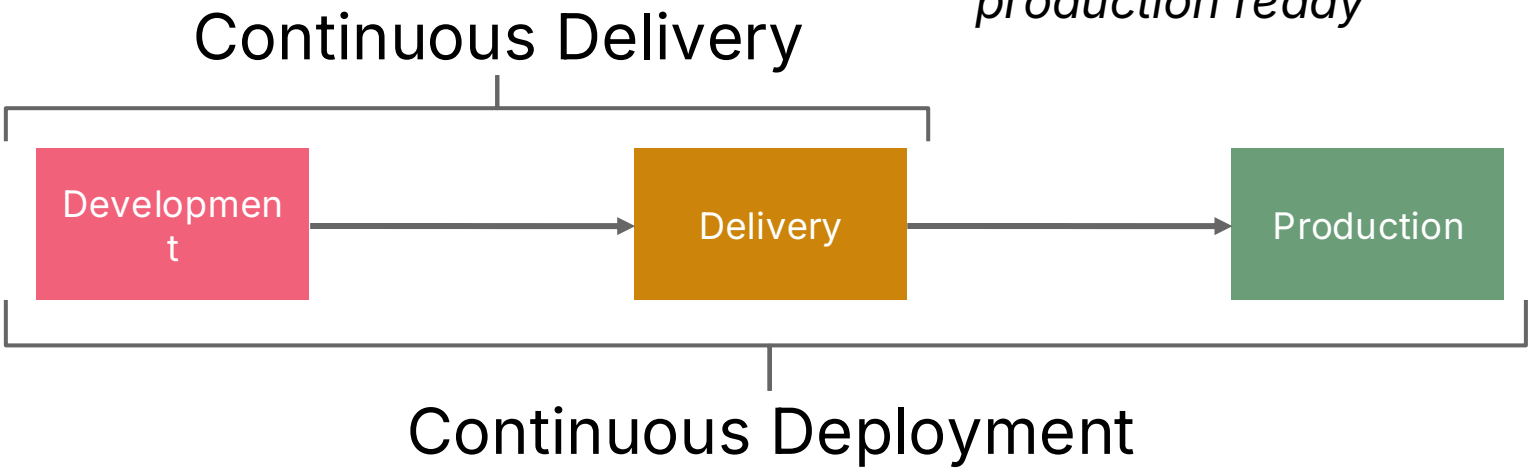
Legacy software delivery flow

“Done” means “code complete”

Make it “production ready” after it's done.

DevOps

Confidence that the codebase is always production ready



Done means "running in production"

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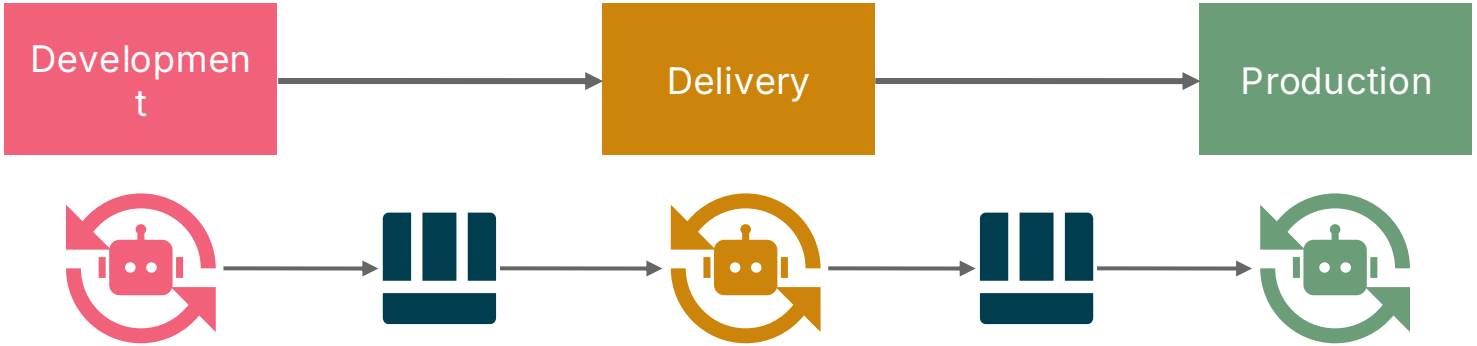
Maybe we don’t need CD with agentic engineering?



Operability: software + infrastructure + processes

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We can use a Continuous Delivery pipeline as an operability harness

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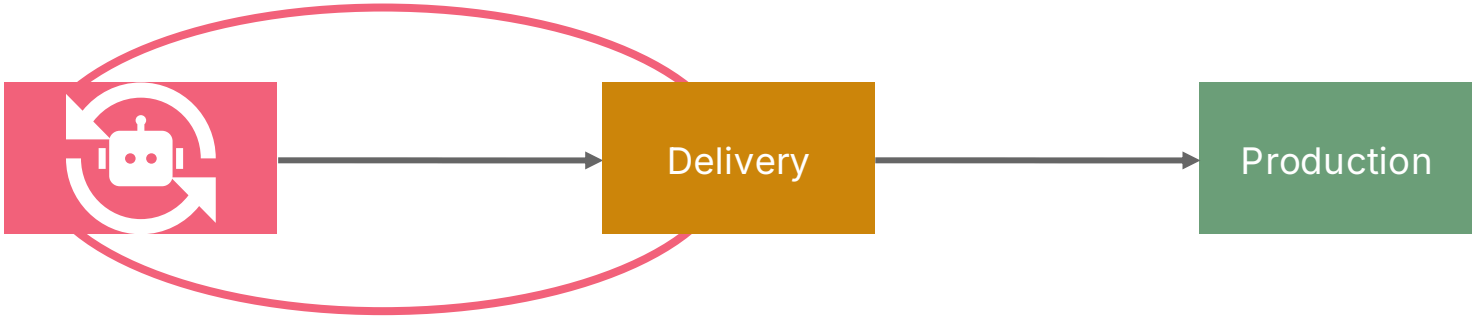
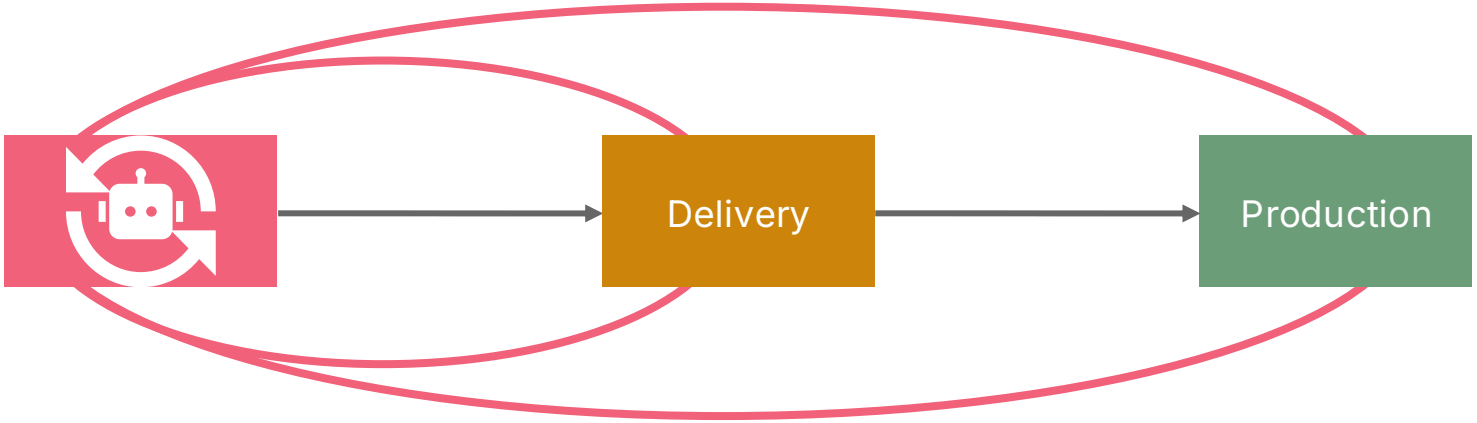
Expanding the agentic loop to include deployment



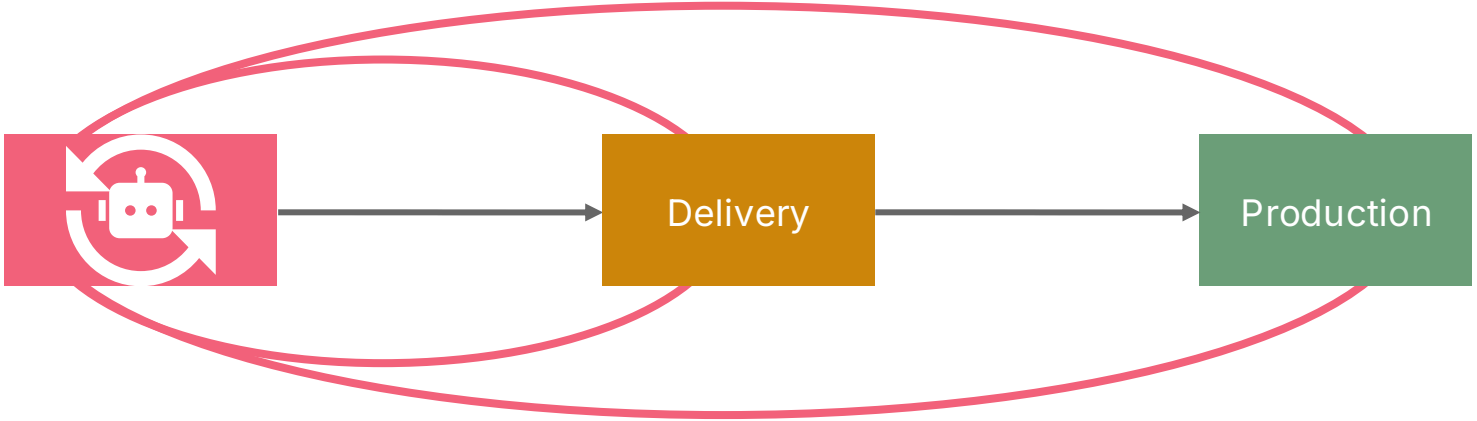
Sensors for
leading measures

Expanding the agentic loop to include production



Challenge: Agent makes fixes downstream

Solution: Prevent access to the deployed infrastructure



"Watch the job. If it fails, replicate locally, fix the code, push again

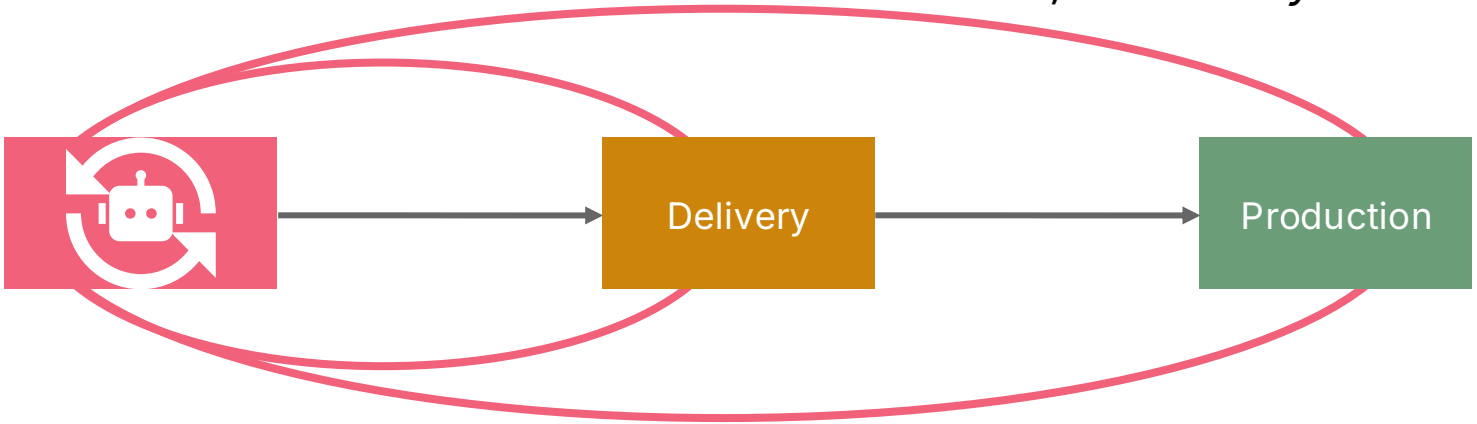
Challenge: Doesn't take responsibility

Agent: *"I fixed it!"*

Me: *“The build is still red?”*

Agent: *“It was red before my change.”*

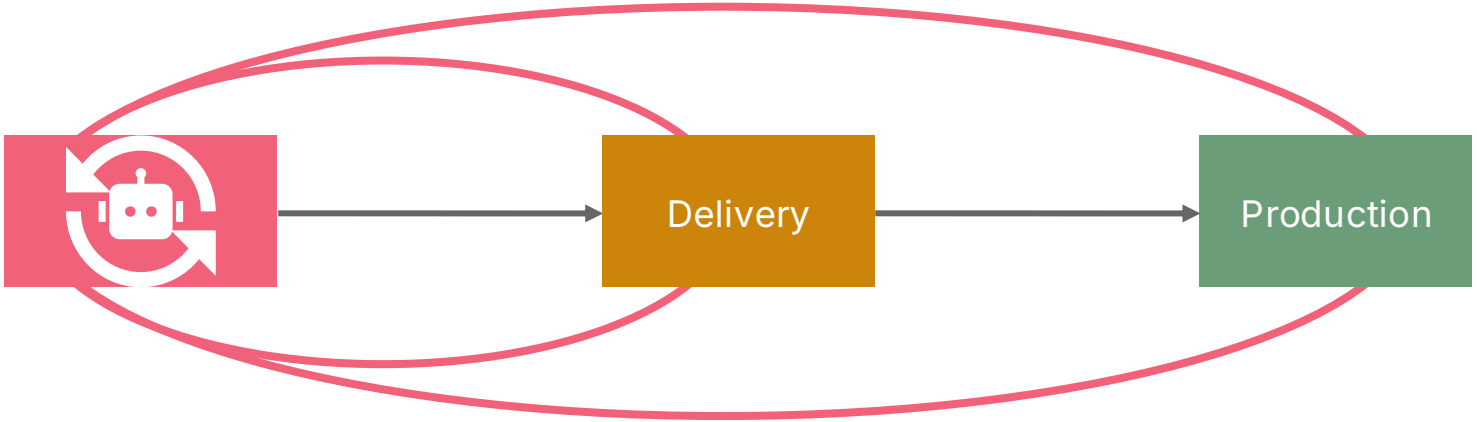
Me: *“Yeah, because you broke it!”*



Solution:
Skills for build discipline
(?)

Challenge: Worked on my machine!

Cause: Over-fitting



Solution:
Test environment parameterization earlier

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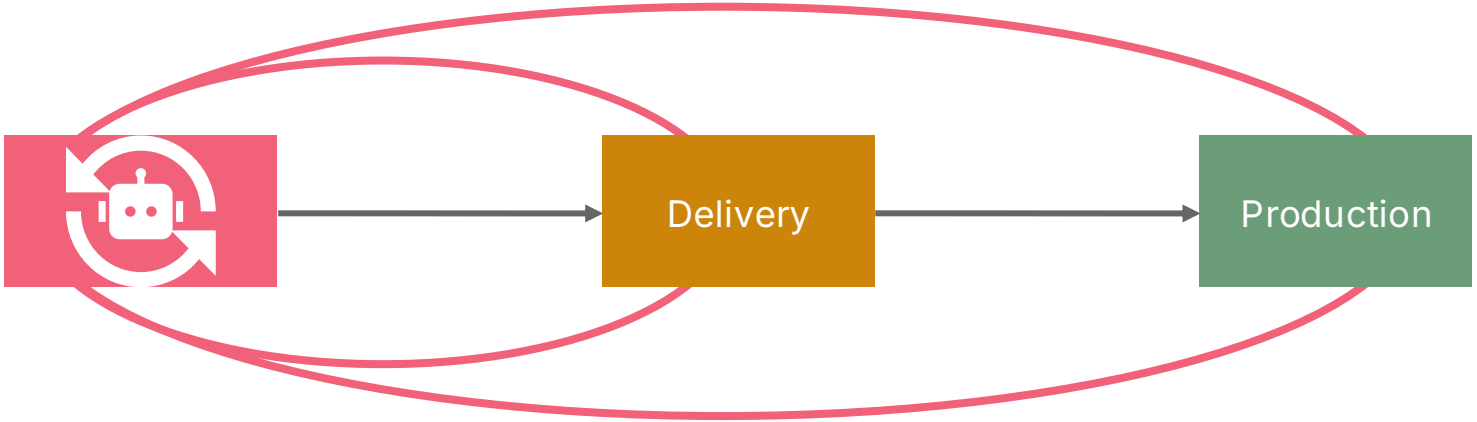
Challenge: Deploying is expensive

Plus: Agents get it wrong. A lot.



Solution:
Better local testing

Challenge: Agents fail a lot

Agent: *"Hmm. The deployment failed. Let me try something else."*

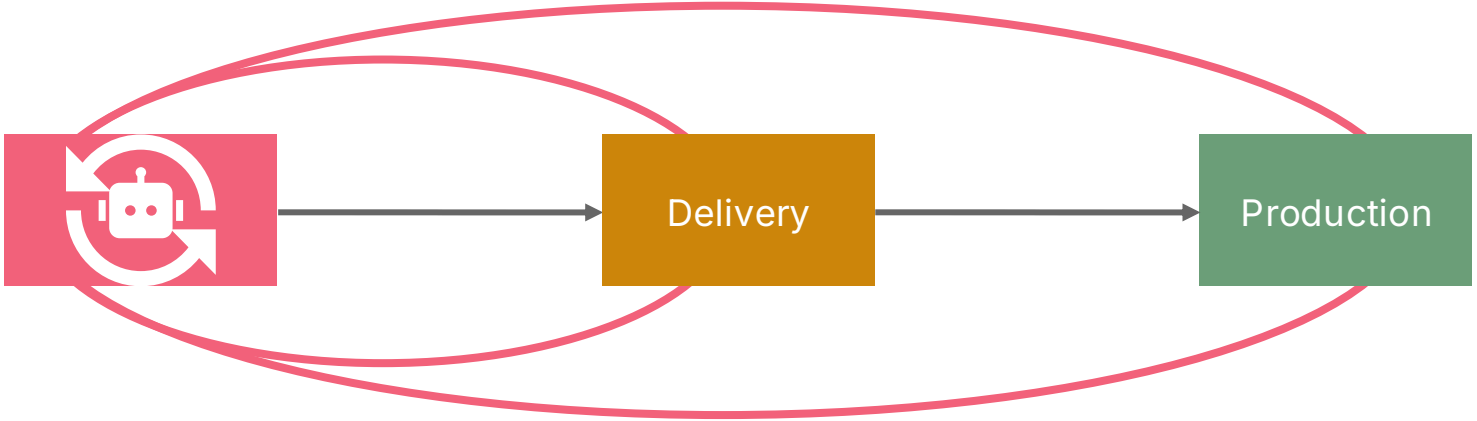
Agent: *"That didn't work. Let me try something else."*

Agent: *"Still fails. I need to think about this. Let me try something else."*

Agent: *"Failed again. Maybe it's ...*

Challenge: Agents suck at deploying

Cause: LLMs don't actually ***know*** how to deploy.



Solution: Detailed skills. "Here's how to deploy. Step 1 ..."

Solution: Prefer scripts and tools over markdown.

Solution: Better models. (Or something else?)

What I think

We can learn a lot with "all-in", hands-off agentic loops

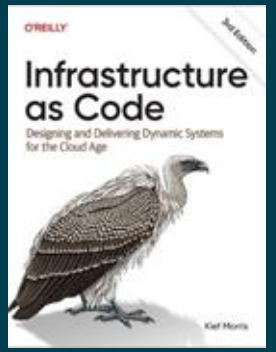
LLMs don't care about building software to last

We need to figure out how to make them do it anyway

CD pipelines work pretty well for for humans

Put CD pipelines inside the agentic loop so we can learn

We may learn better ways than CD



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