Pixee

Who’s going to secure the code our army of robots is going to be writing?

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Hi, I’m Arshan

20 years experience in software security

Code reviews, threat modeling, pen. testing for F100

Spoken at BlackHat, OWASP, BlueHat, others

Authored multiple CVEs, OSS security tools

Co-founded a security unicorn

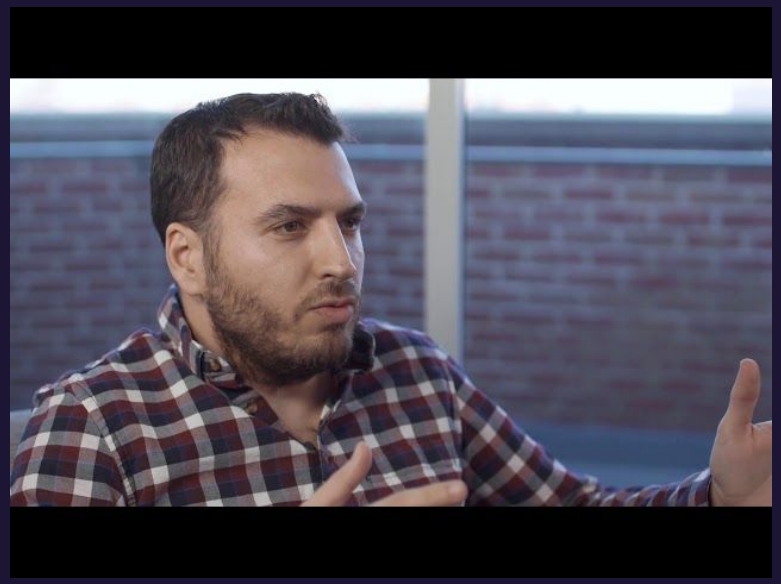
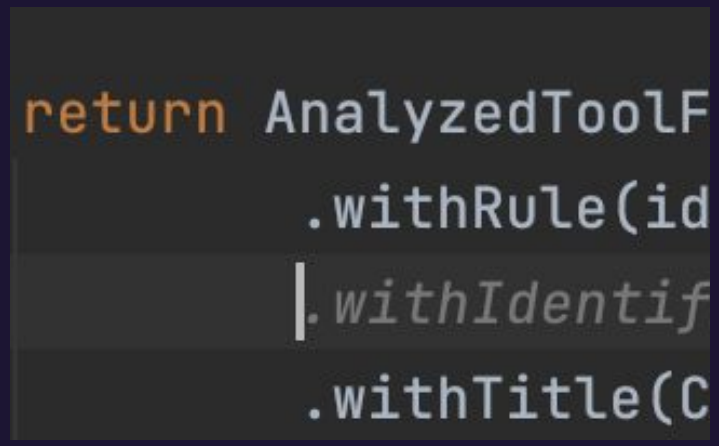


Figure 1: Me absolutely hating making slides like these

The Army of Robots Is Coming

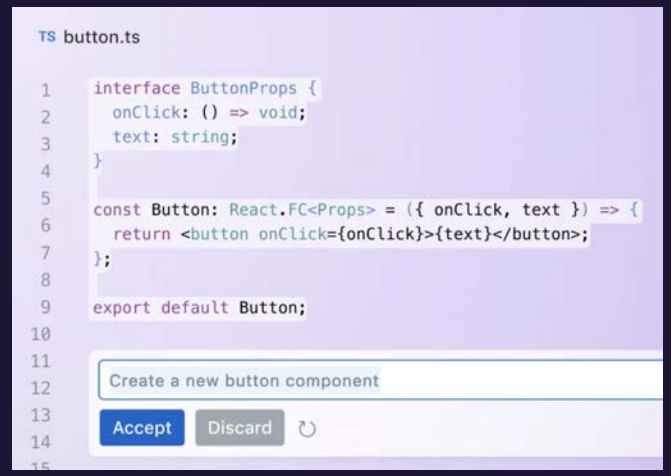
Fill in the middle (autocomplete)



Good adoption (1M+)

25-60% more throughput

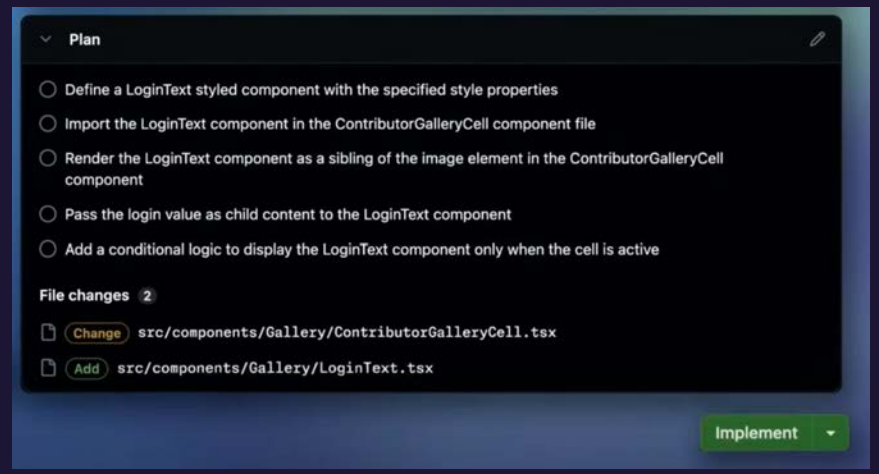
Assistant (code drafting)



Growing adoption (~200K)

?? 100%?

Unguided (full feature development)

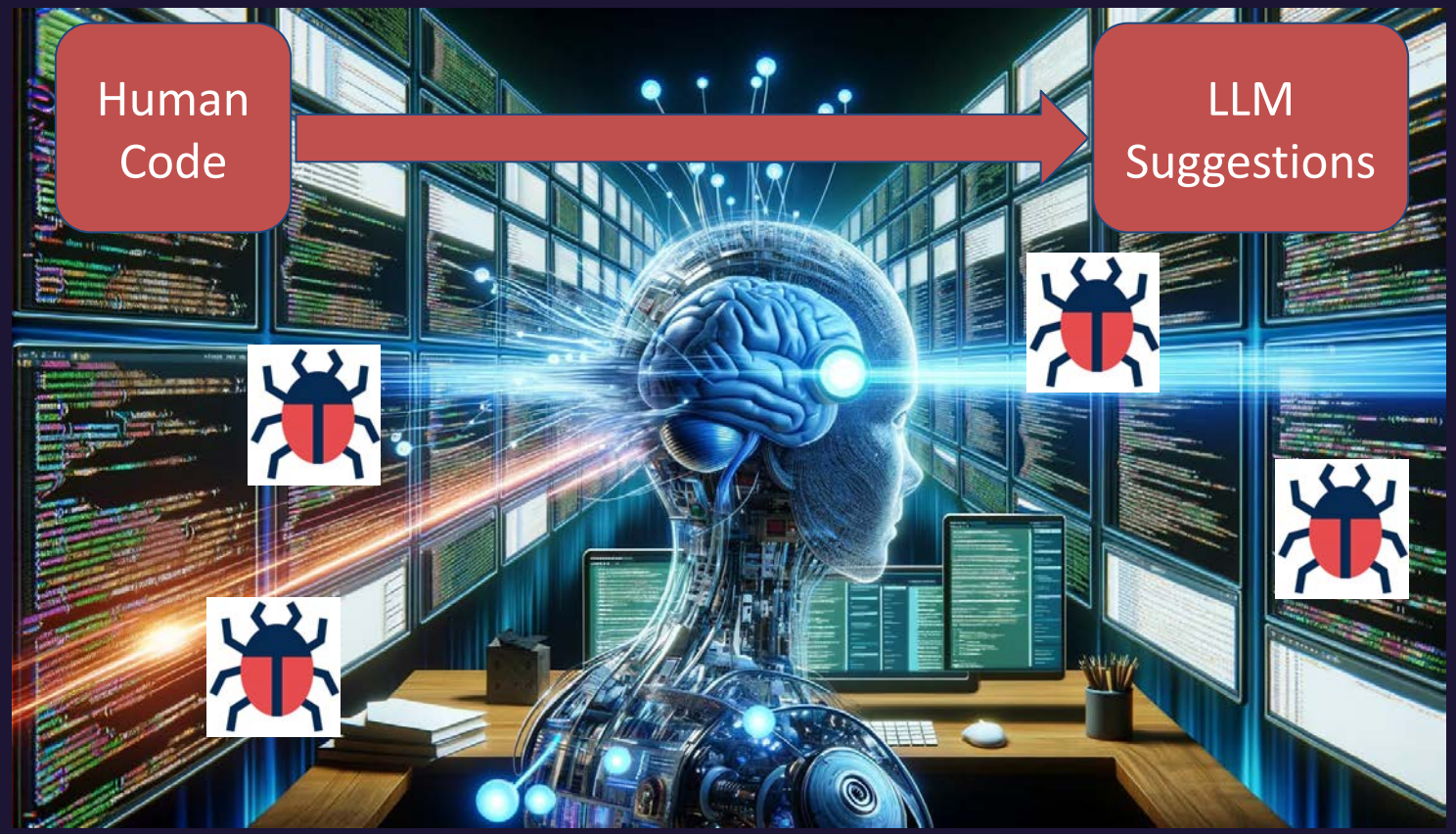


Not publicly released yet

?? 500%?

Sources: McKinsey, Microsoft, MIT

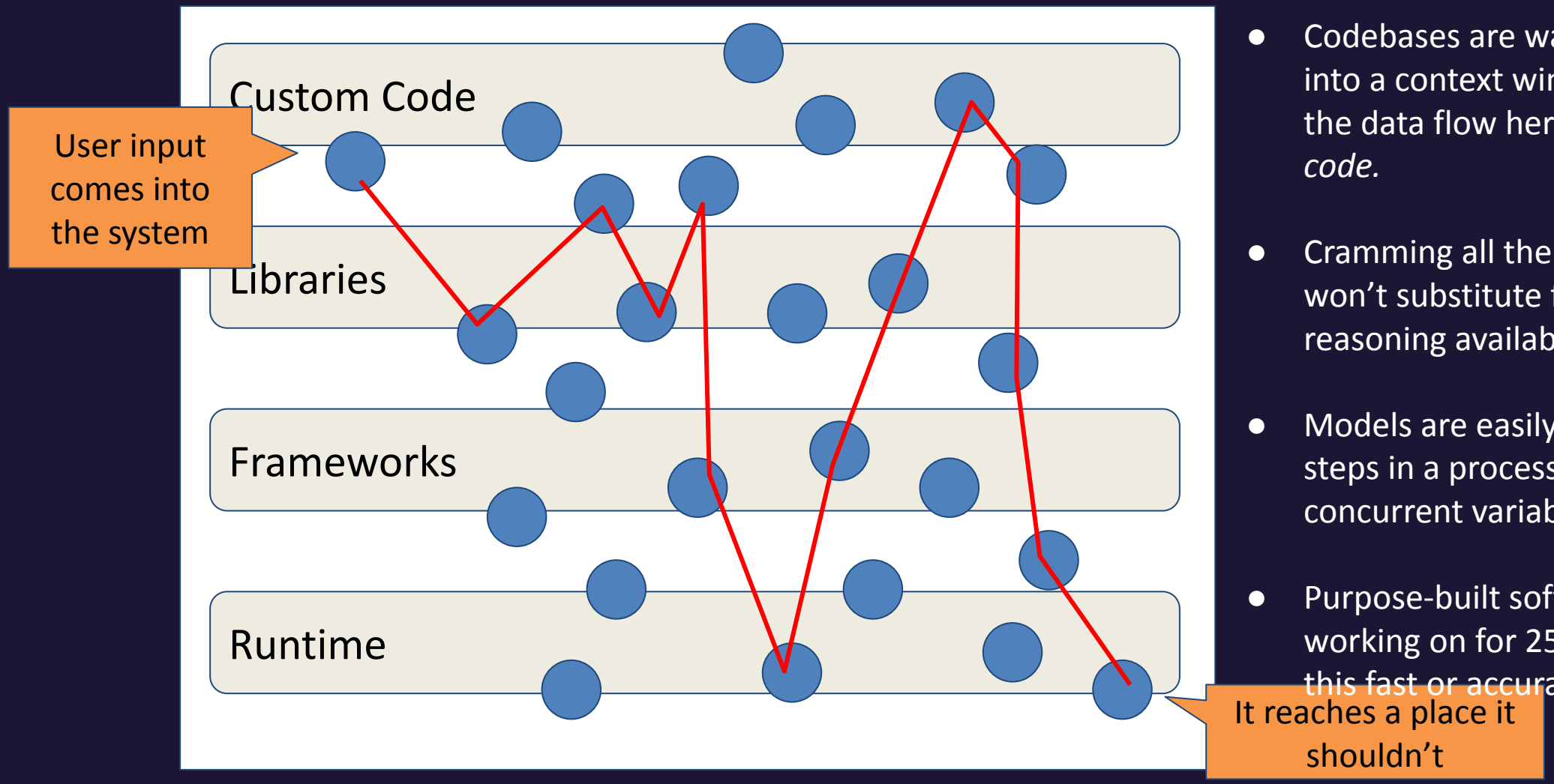
LLMs Write Insecure Code And Then Devs Believe It Isn't



- "Significantly more likely to provide an insecure solution ($p < 0.05$)"
- "...given 89 scenarios, about 40% of the computer programs made with the help of Copilot had potentially exploitable vulnerabilities."
- "participants provided access to an AI assistant were more likely to believe that they wrote secure code than those without access to the AI assistant"

Sources: NYU, Stanford

Can’t the Models Just Generate Secure Code?



- Codebases are way, way too big to fit into a context window. And most of the data flow here *isn’t even in your code.*
- Cramming all the code to embeddings won’t substitute for complicated reasoning available in the context.
- Models are easily confused by more steps in a process and more concurrent variables in play.
- Purpose-built software we’ve been working on for 25 years can’t even do this fast or accurately.

Secure Software Processes Are Very Manual

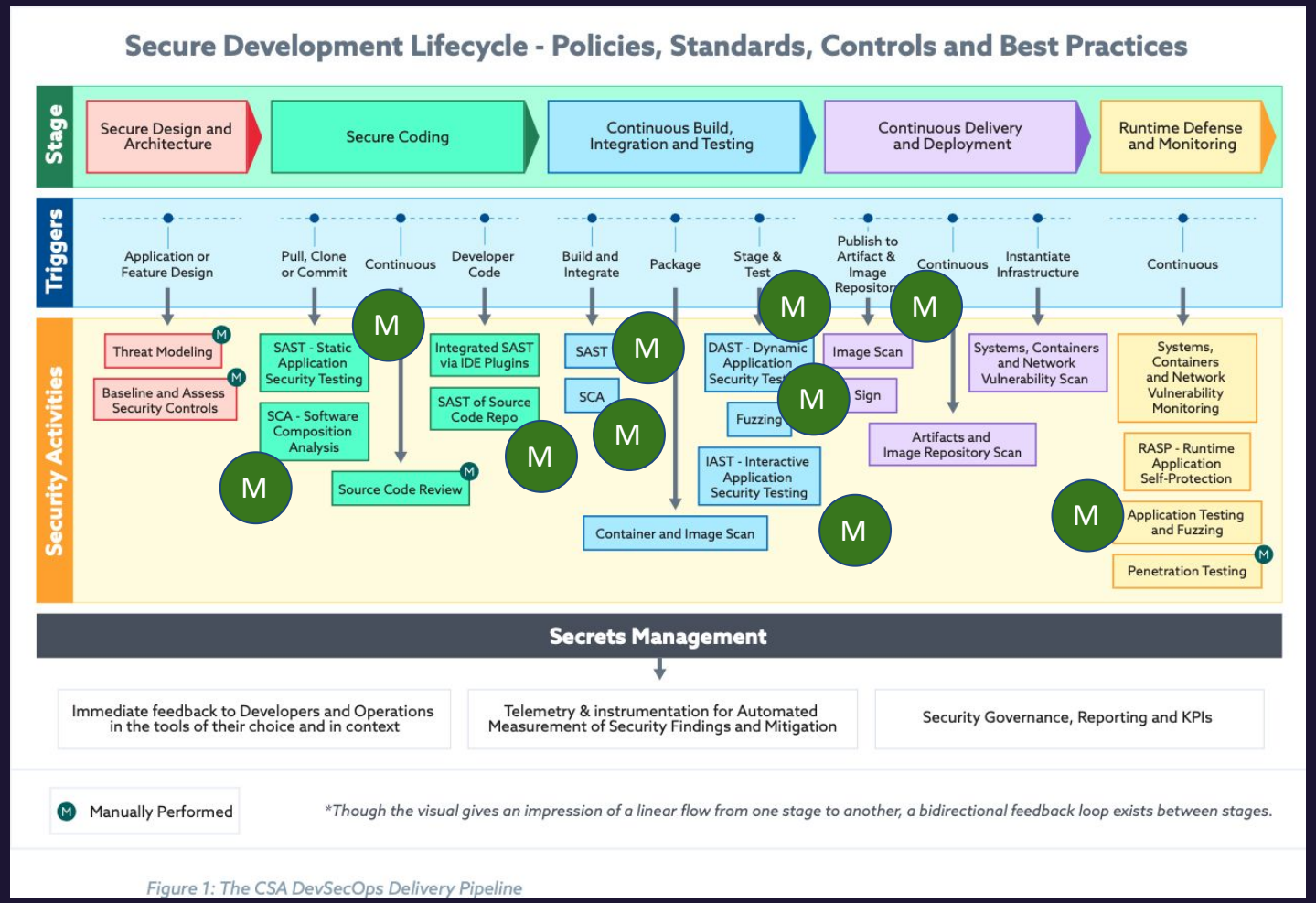


Figure 1: The CSA DevSecOps Delivery Pipeline

The factory requires constant human intervention:

- Triaging results from tools
- Fixing things tools find
- Ticket management
- CYA documentation
- Product tradeoffs

Across these disciplines:

- Risk management
- Software engineering
- Product management
- Compliance
- Security engineering

Source: PagerDuty

Limitations of Our Security Programs Today

Not Enough Humans

- Developers outnumber security 100:1 (my experience is this is drastically worse, the bigger the company)

The Humans We Have Aren't Cross-Skilled

- Security personnel many times don't have hands-on coding skills to pitch in directly or review
- Developers don't have good security skills to efficiently and accurately triage

Reality

- AppSec typically runs many activities only on the most critical applications (internet facing w/ sensitive assets)

Sources: Sonatype

What Can Scale With The Robots?

Solution: Paved Roads

Strategy: <u>Make It Hard To Be Insecure</u>

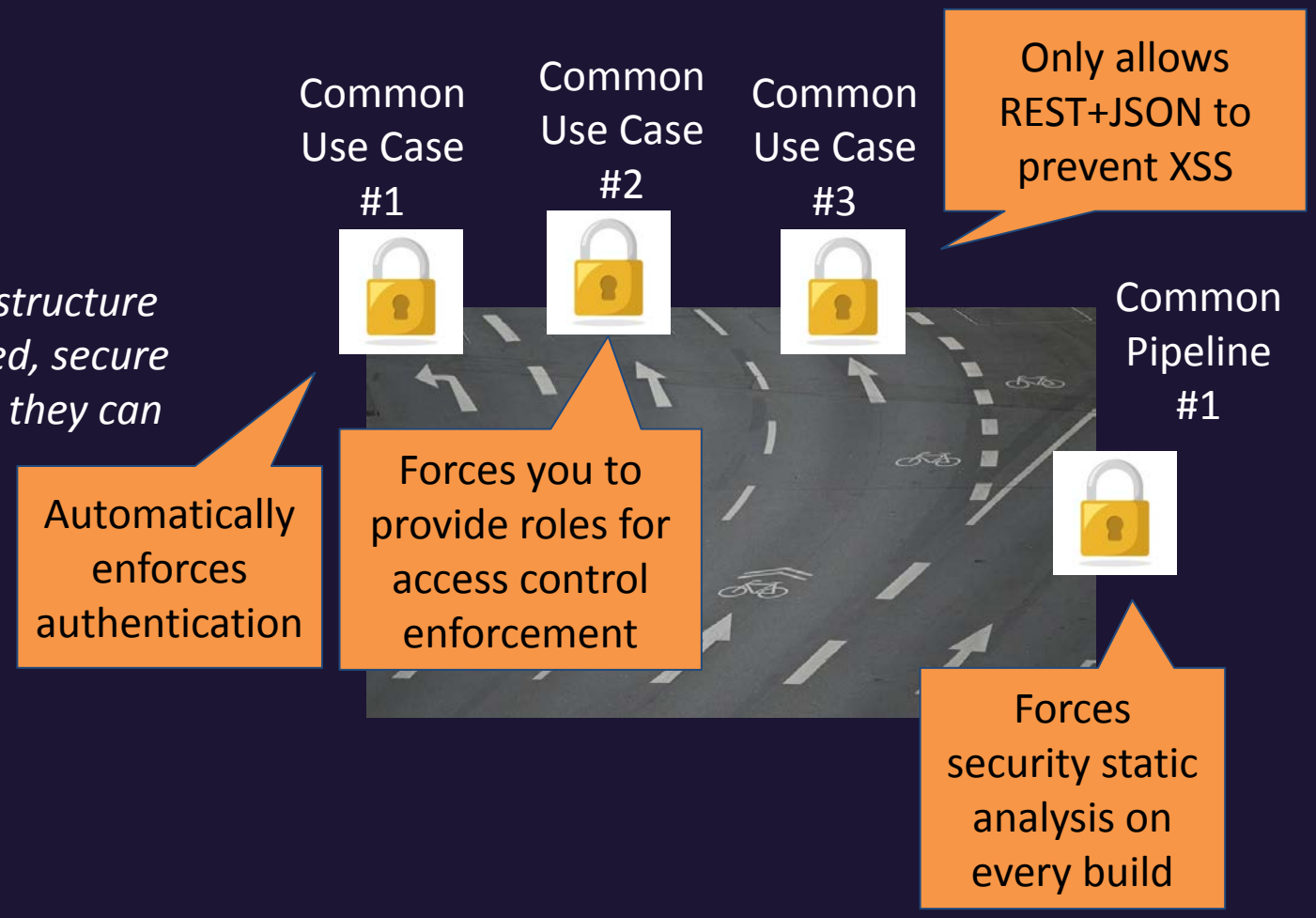
*"Netflix engineering invests in the concept of an Infrastructure and Security **Paved Road**. This provides well-integrated, secure by default central platforms to engineers at Netflix so they can focus on delivering their core business value"*

Requirements

- Strong DevEx / platform teams
- Fewer technology stacks
- Developer Security champions

Help in this area

- Resourcely (vendor)
- BridgeCrew (vendor)
- Spinnaker (OSS tool)

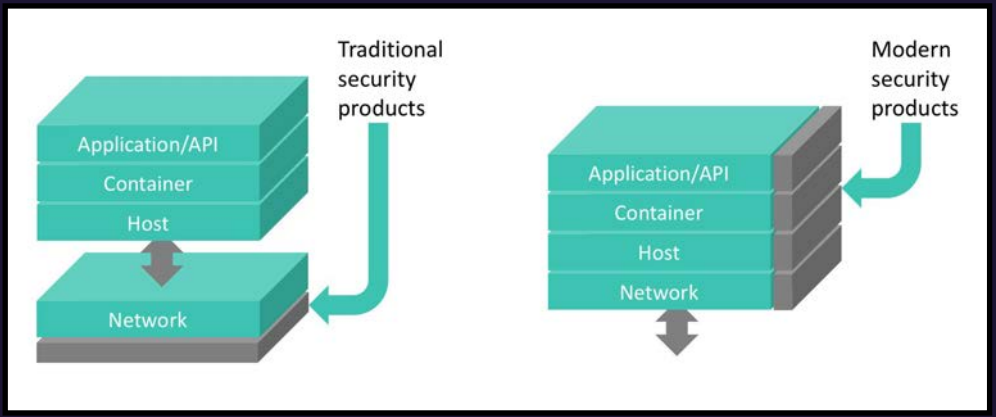


Sources: Netflix

Solution: Better Runtime Protection (with RASP)

Strategy: <u>Make It Hard To Exploit Your Insecure Code</u>

"Traditional security measures are not equipped to deliver protection in the cloud, which means that organizations must craft a new strategy and adopt new tooling, including application-level policies, tools, technologies and rules — chief among them RASP."



Help in this space:

- Contrast Security (vendor)
- DataDog (vendor)
- Imperva (vendor)
- AppDynamics (vendor)

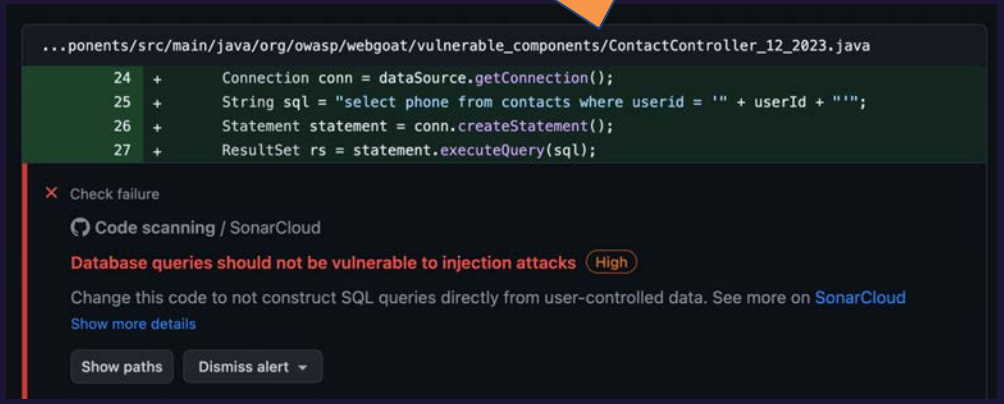
Sources: Contrast Security, Crowdstrike

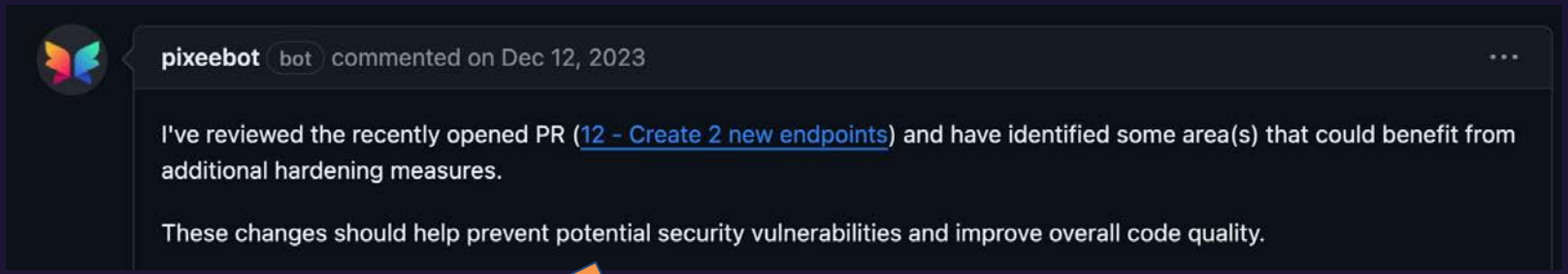
Solution: Security Tool Copilot

Strategy: <u>Eliminate Human Interruptions for Security Tools</u>

The highest spend in secure development is also the one that has the hardest skill to find – triaging and fixing security tool results.

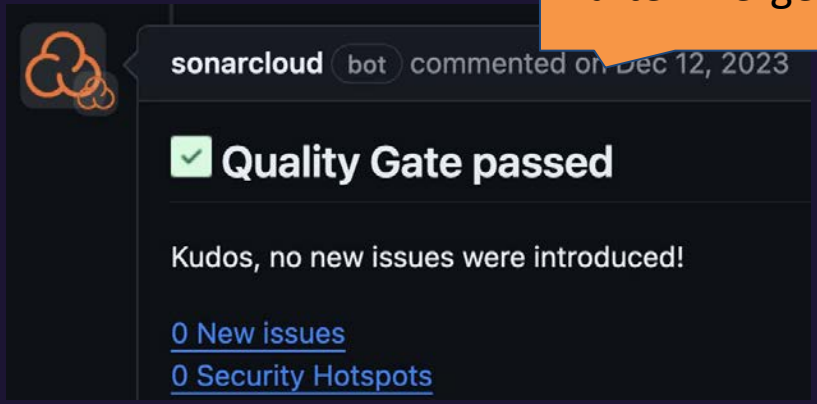
1. Scanner finds something





2. Security Copilot triages and proposes the fix

3. Scanner finds nothing after merge

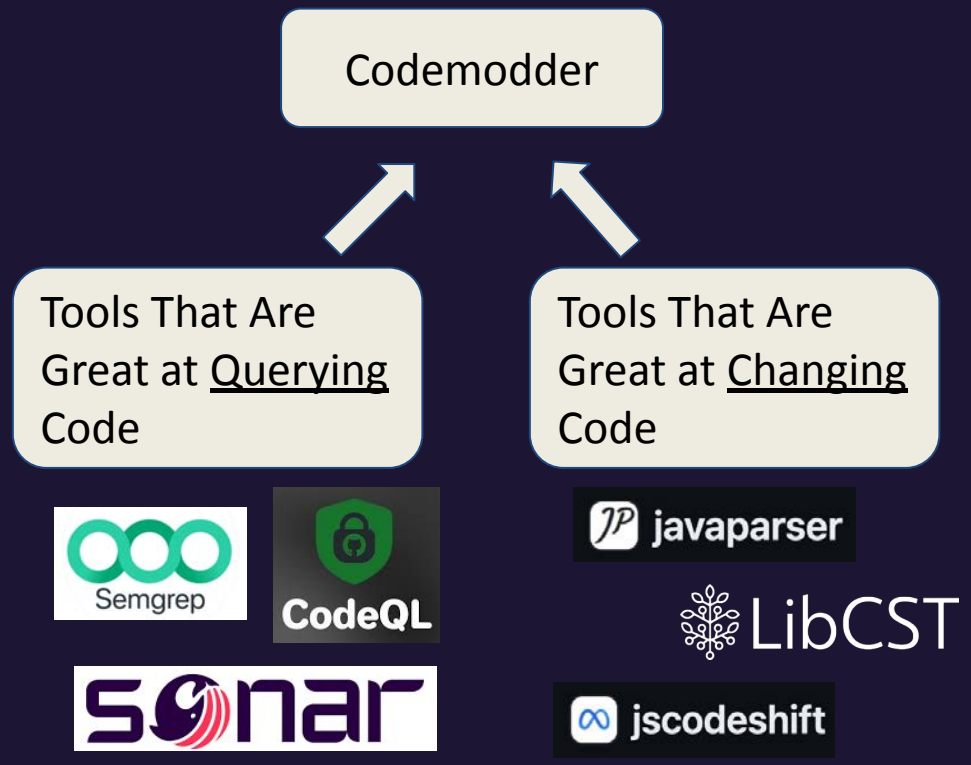


Help in this space:

- Pixee (vendor - me)
- Corgea (vendor)
- renovate (vendor)
- dependabot/renovatebot (vendor)
- Codemodder (OSS library)

Codemodder: A modern, OSS codemod library

A codemod library focused on orchestrating great tools together.




```
class SecureRandom(SemgrepCodemod):
    NAME = "secure-random"
    REVIEW_GUIDANCE = ReviewGuidance.MERGE_WITHOUT_REVIEW
    DESCRIPTION = "Replaces random.{func} with more secure secrets library functions."

    @classmethod
    def rule(cls):
        return """
        rules:
          - patterns:
            - pattern: random.$F(...)
            - pattern-inside: |
                import random
                ...
        """

    def on_result_found(self, original_node, updated_node):
        self.remove_unused_import(original_node)
        self.add_needed_import("secrets")
        return self.update_call_target(updated_node, "secrets.SystemRandom()")
```

https://codemodder.io/
https://github.com/pixee/codemodder-python
https://github.com/pixee/codemodder-java
https://github.com/pixee/cli

Thank You!

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https://pixee.ai

https://github.com/apps/pixeebot