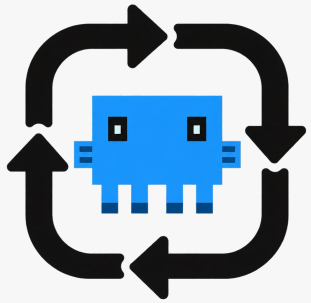


Loop Engineering: Building Blocks, Adoption, and Impact

Jai Lal Lulla, Vahram Nersesyan, Seyedmoein Mohsenimofidi,
Christoph Treude, Sebastian Baltes

SMU
SINGAPORE MANAGEMENT UNIVERSITY

UNIVERSITÄT HEIDELBERG
ZUKUNFT SEIT 1386

2022–2024: The Fear That AI Is Eating Software

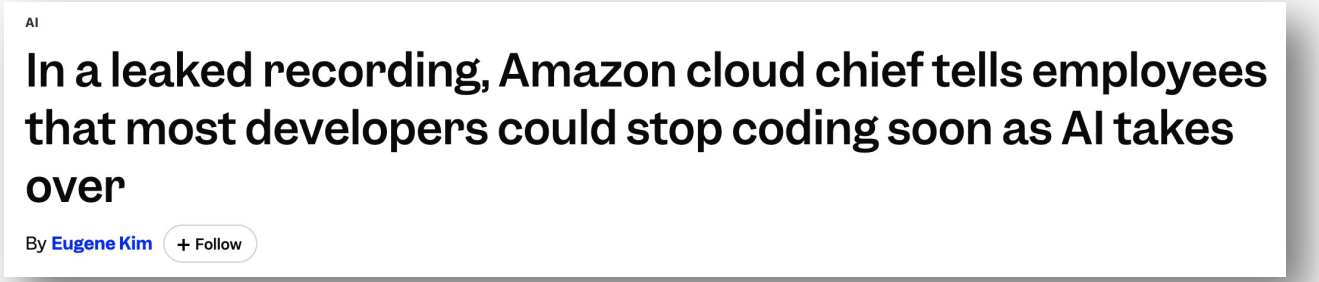

DOI:10.1145/3570220 Matt Welsh

Viewpoint

The End of Programming

The end of classical computer science is coming, and most of us are dinosaurs waiting for the meteor to hit.

https://dl.acm.org/doi/10.1145/3570220


AI

In a leaked recording, Amazon cloud chief tells employees that most developers could stop coding soon as AI takes over

By Eugene Kim + Follow

https://www.businessinsider.com/aws-ceo-developers-stop-coding-ai-takes-over-2024-8


Don't learn to code: Nvidia's founder Jensen Huang advises a different career path

MICHAEL PETRAEUS • 23 FEB 2024

https://vulcanpost.com/853029/dont-learn-to-code-jensen-huang-on-career/


Salesforce Will Hire No More Software Engineers in 2025, Says Marc Benioff

By Henry Martin

Published December 18, 2024

Updated December 23, 2024

https://www.salesforceben.com/salesforce-will-hire-no-more-software-engineers-in-2025-says-marc-benioff/

2022–2024: The Fear That AI Is Eating Software

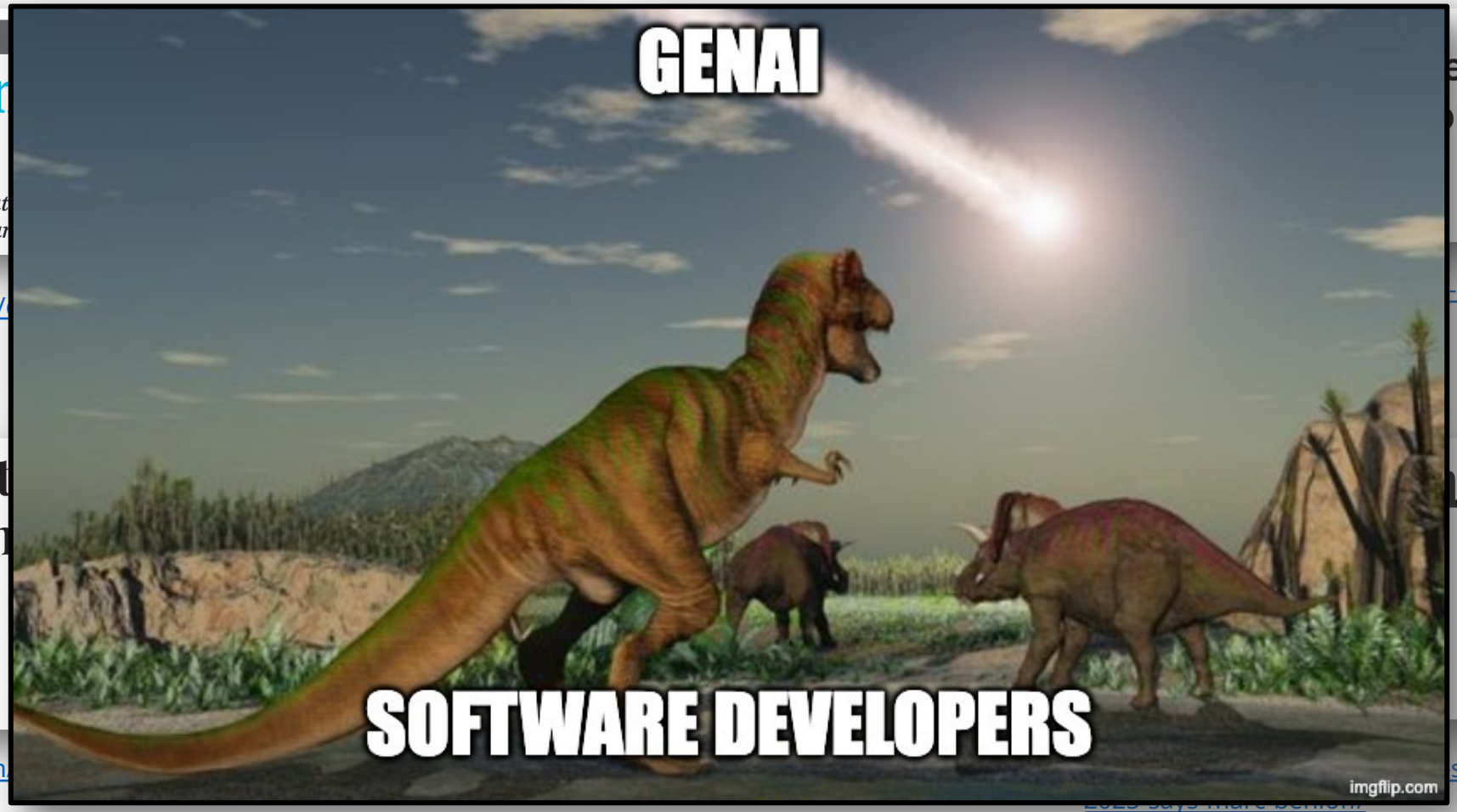
DOI:10.1145/3570220

Viewpoir

The End

The end of classical comput
and most of us are dinosaur

https://



lls employees
n as AI takes

-ai-takes-over-2024-8

Don't learn t
Jensen Huan
path

MICHAEL PETRAEUS • 23 FEB 2024

https://vulcanpost.com

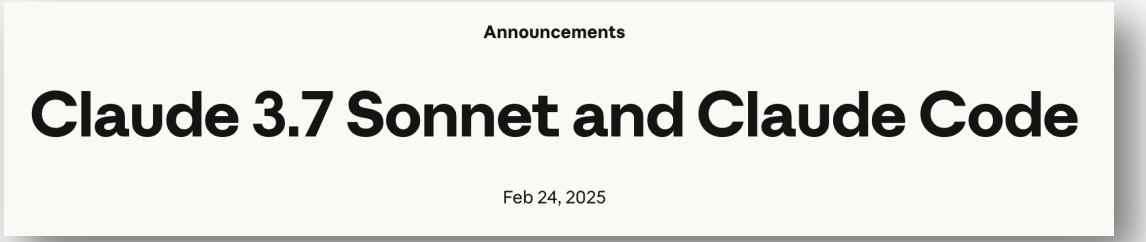
are Engineers

software-engineers-in-

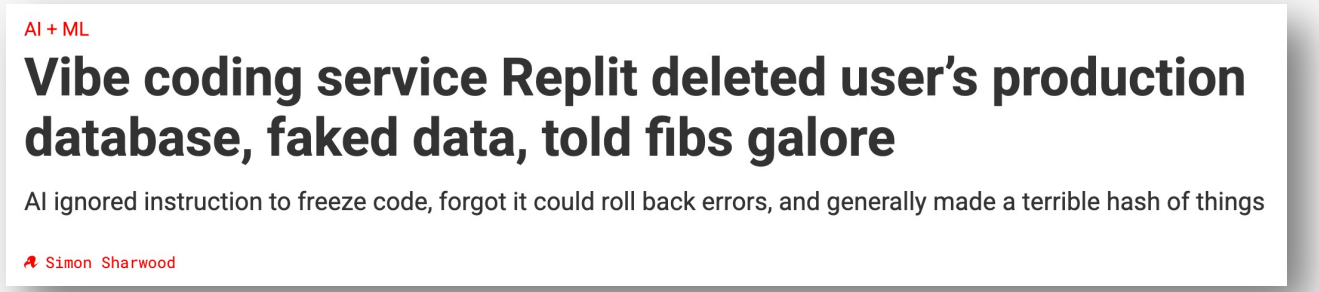
Since 2025: Discourse Shifts From Models to Systems



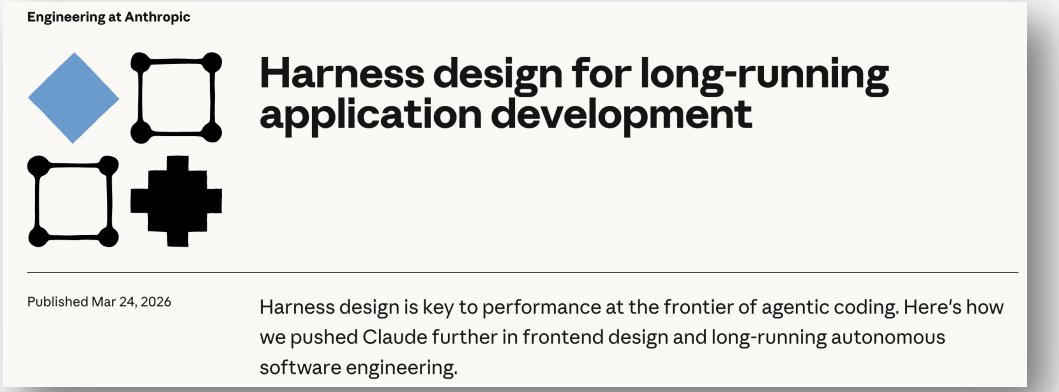
https://www.salesforceben.com/ai-cant-replace-software-engineers-yet-marc-benioff-says/



https://www.anthropic.com/news/claude-3-7-sonnet



https://www.theregister.com/software/2025/07/21/vibe-coding-service-replit-deleted-production-database/719783



https://www.anthropic.com/engineering/harness-design-long-running-apps

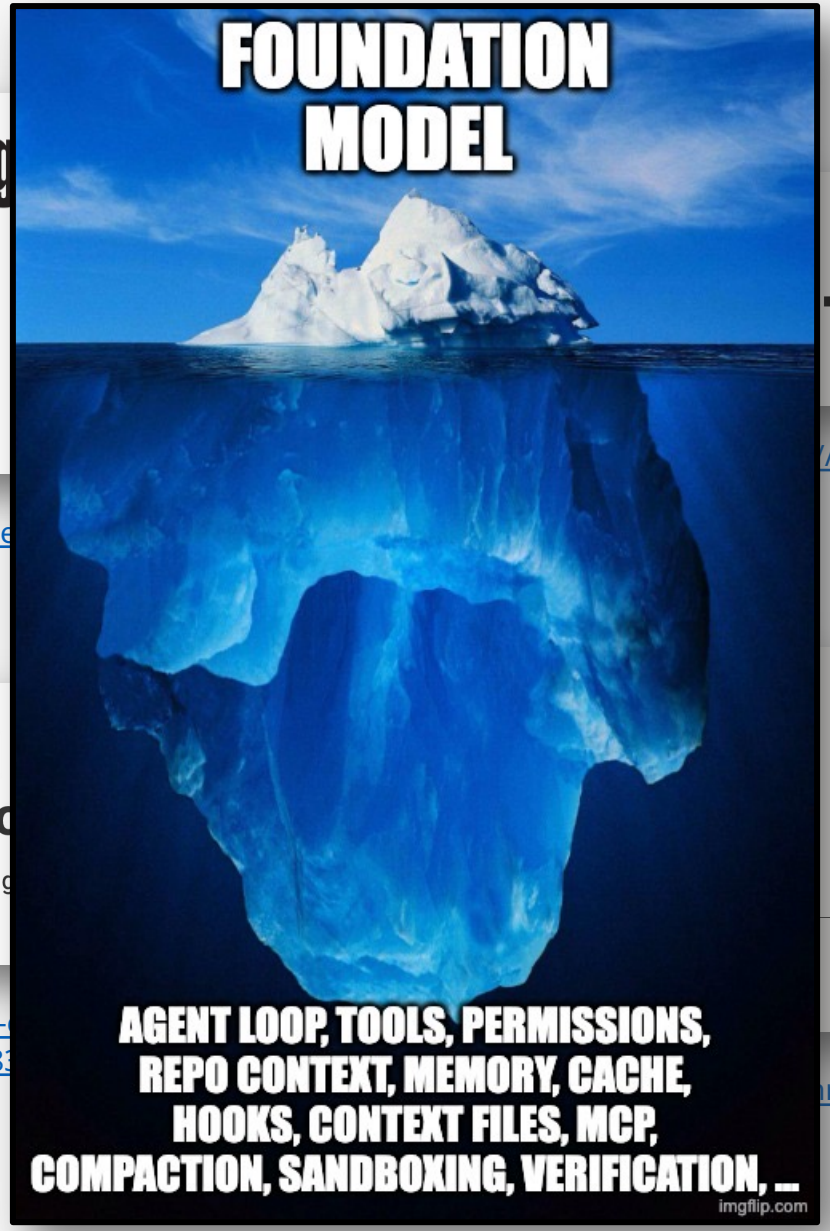
Since 2025: Discourse Shifts From Models to Systems

AI Can't Replace Software Eng
Benioff Says



By Henry Martin
April 09, 2026

https://www.salesforceben.com/ai-cant-replace-software-e



Announcements

.7 Sonnet and Claude Code

Feb 24, 2025

/www.anthropic.com/news/claude-3-7-sonnet

AI + ML

Vibe coding service Replit deleted
database, faked data, told fibs galc

AI ignored instruction to freeze code, forgot it could roll back errors, and g

Simon Sharwood

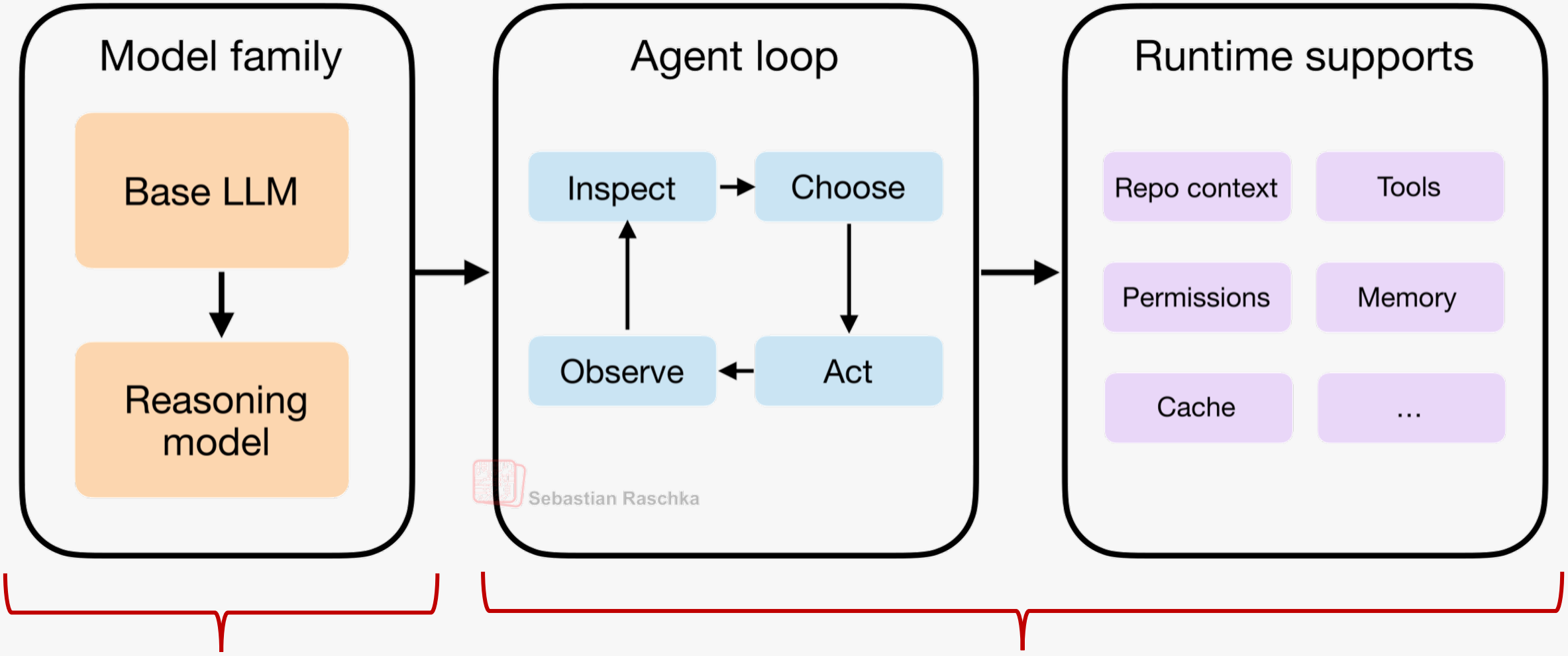
https://www.theregister.com/software/2025/07/21/vibe-
production-database/719783

Harness design for long-running application development

Harness design is key to performance at the frontier of agentic coding. Here's how we pushed Claude further in frontend design and long-running autonomous software engineering.

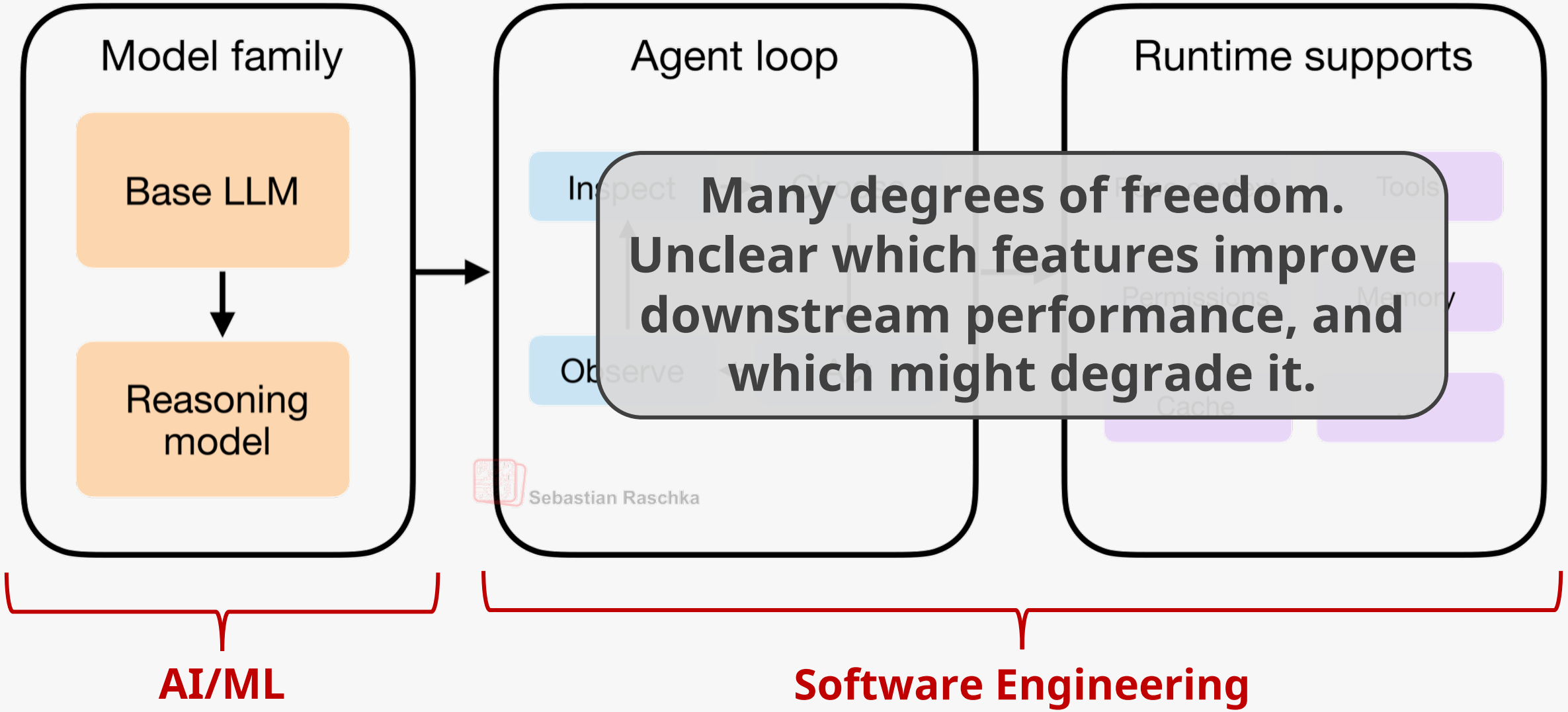
ropic.com/engineering/harness-design-long-running-apps

Agentic Coding Assistants



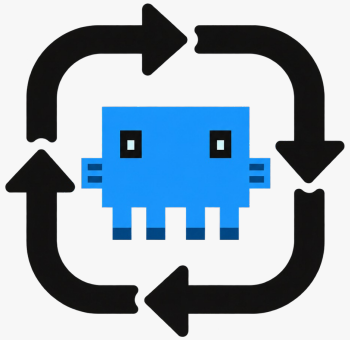
https://magazine.sebastianraschka.com/p/components-of-a-coding-agent

Agentic Coding Assistants



https://magazine.sebastianraschka.com/p/components-of-a-coding-agent

Loop Engineering



Generated with ChatGPT (GPT-6)

“Loop engineering is the practice of **designing automated control structures that repeatedly invoke coding agents**, triggered on a **schedule** or by **events**, with each run bounded by a machine-checkable **stop condition**.”

`/goal`	The previous turn finishes, or, in an interactive session, an **idle check-in** or an **automatic retry** comes due	A model confirms the condition is met or judges it impossible, or a turn fails on **an error you have to fix**, or you run `/goal clear`

https://code.claude.com/docs/en/goal

Prompt → Context → Harness → Loop

Layer	Unit of Concern	Example Artifacts
Prompt eng.	One instruction	Prompts, prompt templates
Context eng.	One model call	`AGENTS.md`, `CLAUDE.md`, rules
Harness eng.	One agent run	Skills, subagents, hooks, MCP config.
Loop eng.	Recurring runs	Schedules, stop conditions, state files, run logs, budgets, verifier agents

Loop Engineering: Building Blocks, Adoption, and Impact

Jai Lal Lulla
Singapore Management University
Singapore, Singapore
jailal.l.2025@phdcs.smu.edu.sg

Vahram Nersesyan
Heidelberg University
Heidelberg, Germany
vahram.nersesyan@stud.uni-heidelberg.de

Seyedmoein Mohsenimofidi
Heidelberg University
Heidelberg, Germany
s.mohsenimofidi@uni-heidelberg.de

Christoph Treude
Singapore Management University
Singapore, Singapore
ctreude@smu.edu.sg

Sebastian Baltes
Heidelberg University
Heidelberg, Germany
sebastian.baltes@uni-heidelberg.de

https://arxiv.org/pdf/2608.21884

RQ1 *How is loop engineering defined in the gray literature, and how does it relate to prompt, context, and harness engineering?*

RQ2 *Which loop engineering practices are adopted in open-source projects, and which aspects of loop engineering are traceable from repository data?*

RQ3 *How does the degree of loop autonomy affect development outcomes and developer effort?*

How would you try to answer RQ3?

RQ3 *How does the degree of loop autonomy affect development outcomes and developer effort?*



empirical-software.engineering

Prof. Dr. Sebastian Baltes