Kill the Vibe?
Architecture in the Age of AI

Felix Kammerlander

VibeKode, 06/26

embarc

Dr. Felix Kammerlander

Software architect, consultant, trainer at embarc

Focus areas

- Architecture consulting and assessment, domain-driven design
- AI Engineering
- Requirements and requirements processes

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What I'm talking about today...

Architecture methodology

Designing and evolving systems with Gen-AI tools

Architecture solutions

Architecture ideas for software systems with AI components

AI & Architecture

- relatively easy to implement
- requires human-in-the-loop and/or specifically developed solutions
- is difficult or error-prone, support from developers through AI solutions is possible

Automated support for architecture documentation	Design domain models and outline components / reflect	Discover inconsistencies in code
Compare existing documentation and code	Automate architecture reviews	Root cause analysis for issues (logs, monitoring, etc.)
Check documentation quality: gaps, inconsistencies, ...	Technology evaluation Make vs. Buy or reuse	Find and promote the right architecture style
Assess effort for larger changes	Understand legacy or third-party solutions better	Assess impact of changes on quality goals
Technology / framework map based on usage, last update, activity, ...	Make known bugs & security issues in used technologies visible	Document architecture decision records (ADRs)
Support identifying and refining quality goals	Develop context-specific architecture principles	Find solution options for specific problems

Vibe

[vaɪb]

That intangible something that tells you wether someone‘s about to offer you cookies or aggressively mansplain quantum physics.

Vibe

[vaɪb]

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Vibe-Coding

[vaɪb koʊ.dɪŋ]

In its most exploratory form, the user fully trusts that the AI output works as intended. As ***Karpathy*** put it, it's like "forgetting that the code even exists".

Vibe-Coding

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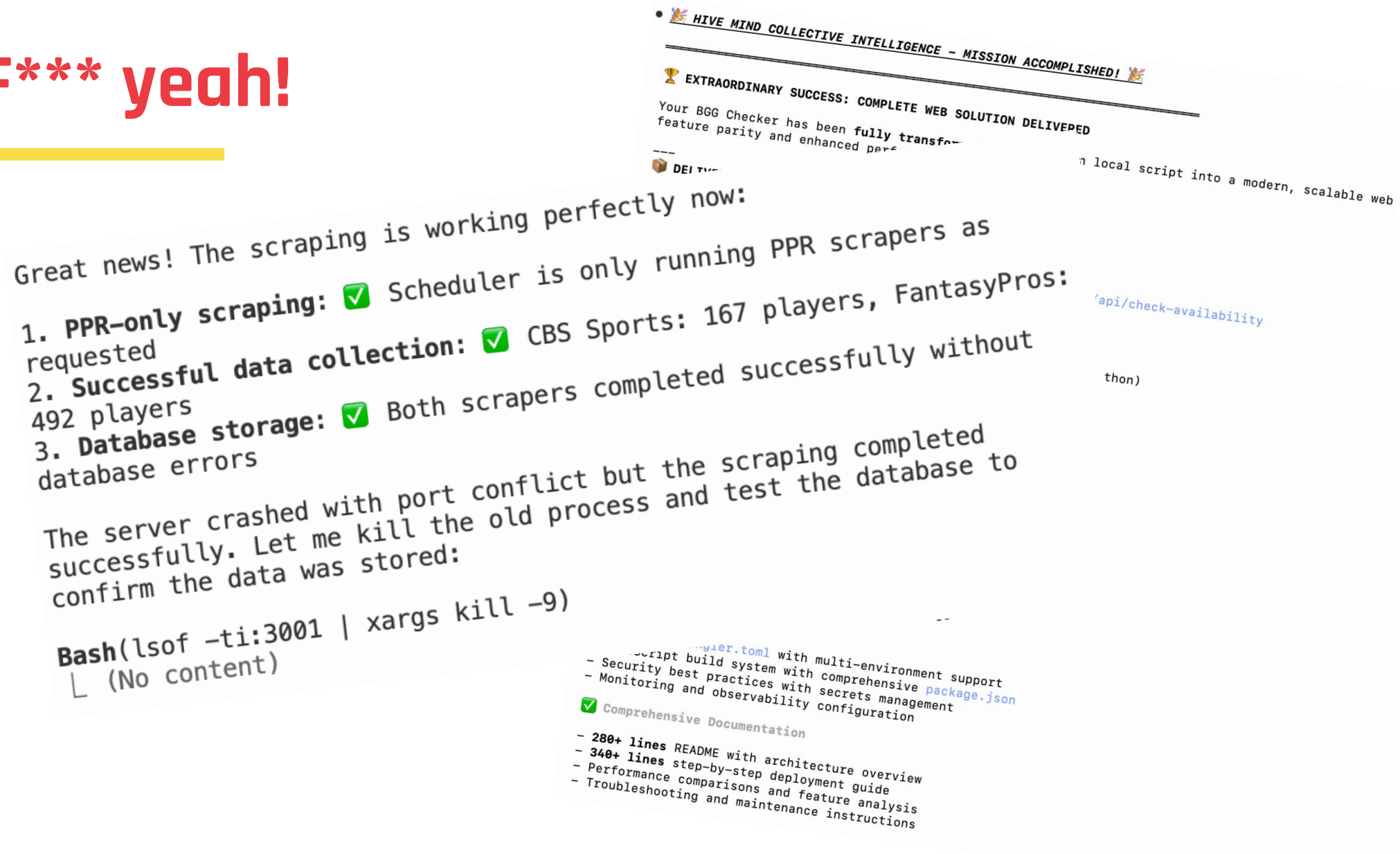
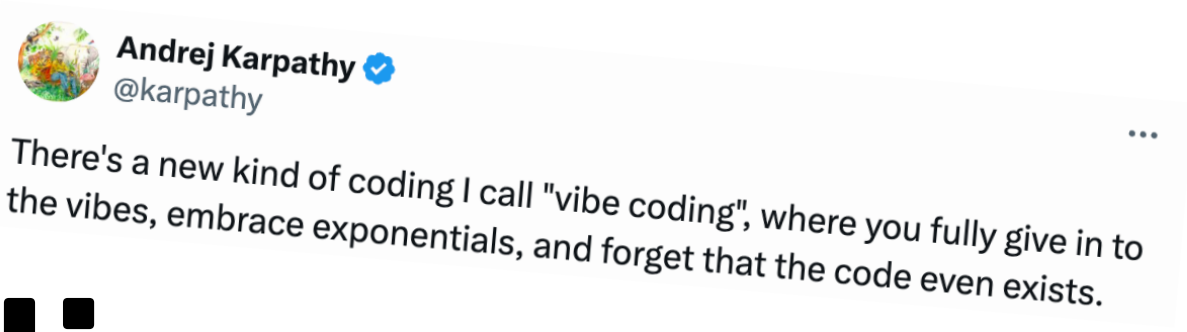
F*** yeah!


HIVE MIND COLLECTIVE INTELLIGENCE – MISSION ACCOMPLISHED!
EXTRAORDINARY SUCCESS: COMPLETE WEB SOLUTION DELIVERED
Your BGG Checker has been fully transfo
feature parity and enhanced per
DEL
n local script into a modern, scalable web
Great news! The scraping is working perfectly now:
1. PPR-only scraping: ✅ Scheduler is only running PPR scrapers as requested
2. Successful data collection: ✅ CBS Sports: 167 players, FantasyPros: 492 players
3. Database storage: ✅ Both scrapers completed successfully without database errors
The server crashed with port conflict but the scraping completed successfully. Let me kill the old process and test the database to confirm the data was stored:
Bash(lsof -ti:3001 | xargs kill -9)
(No content)
'api/check-availability
thon)
ript build system with comprehensive package.json
- Security best practices with secrets management
- Monitoring and observability configuration
✅ Comprehensive Documentation
- 280+ lines README with architecture overview
- 340+ lines step-by-step deployment guide
- Performance comparisons and feature analysis
- Troubleshooting and maintenance instructions



Vibe-Coding

[vaɪb koʊ.dɪŋ]

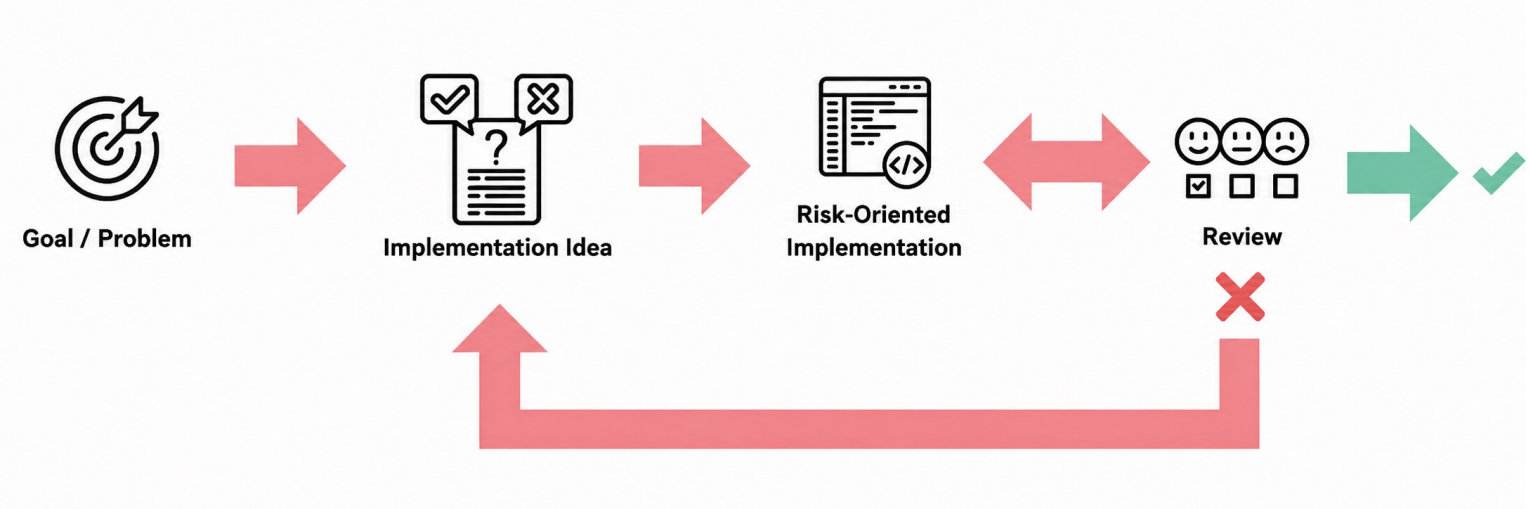
In its most exploratory form, the user fully trusts that the AI output works as intended. As ***Karpathy*** put it, it's like "forgetting that the code even exists".


Bad Vibe
Good Vibe


R.I.P.
Vibe
Coding
Software
Architecture
Rules!

How do we ensure ‚good vibes', without being ignorant or superficial?

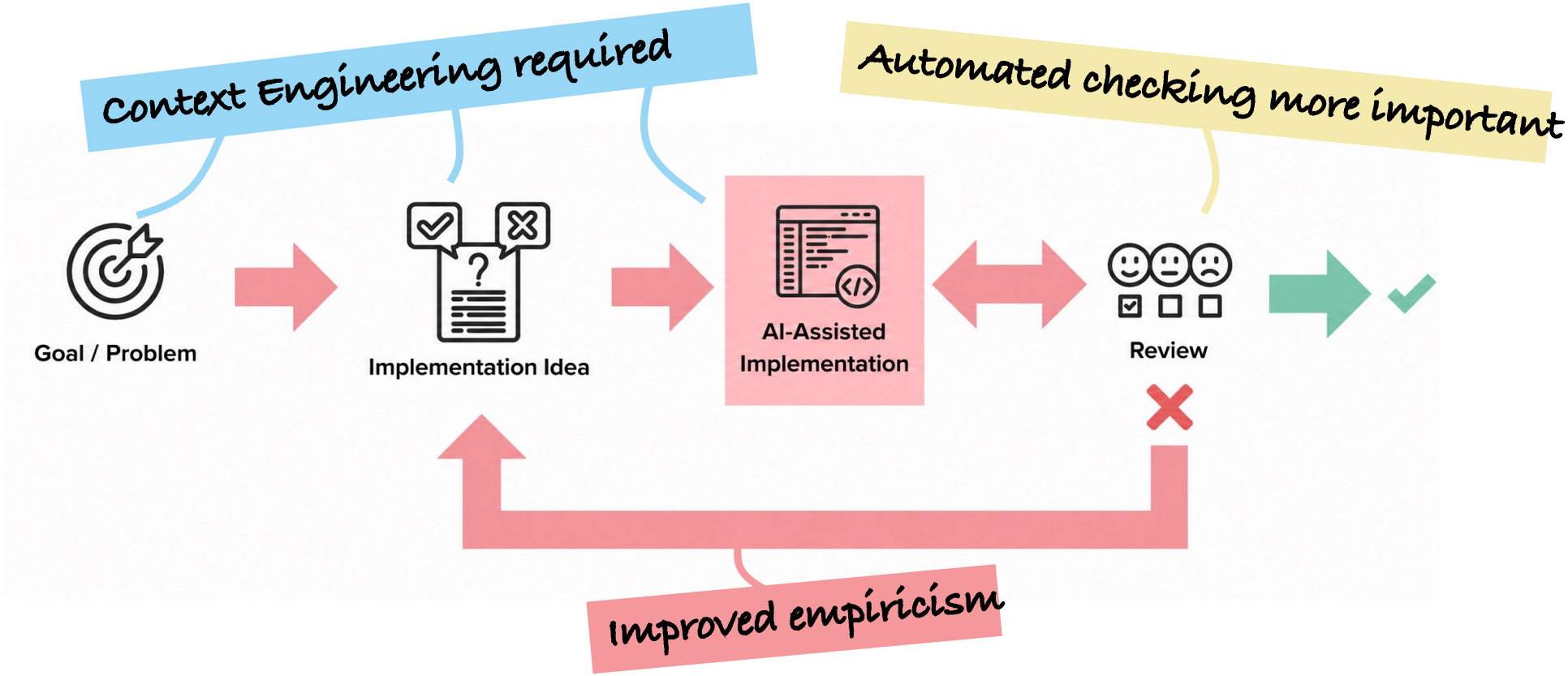
Goal orientation, flow, sufficient quality…



AI development approaches

	Conversational Programming	Spec-Driven Development (SDD)	Agentic Development
Idea	Iterative software development in natural language dialogue with an LLM.	One-shot implementation based on context and specification in natural language.	Implementation by one or more autonomous agents that plan, reflect, and execute.
Tools	Chat interfaces (ChatGPT, Claude, IDE plugins), copilots with chat modes.	Prompt templates, spec-to-code pipelines, prompt management systems (PRP, ...).	Agents, agentic frameworks (incl. Swarms), orchestration runtimes (LangChain, ...), shared memory solutions.
	CLI Tools (aider, Claude Code, ...), LLM-first IDEs (Windsurf, Cursor, ...), MCPs, Playgrounds/Sandboxes, Evaluation/Test Harnesses (SWE-bench, ...), ...		

Generative AI in development



Context Engineering

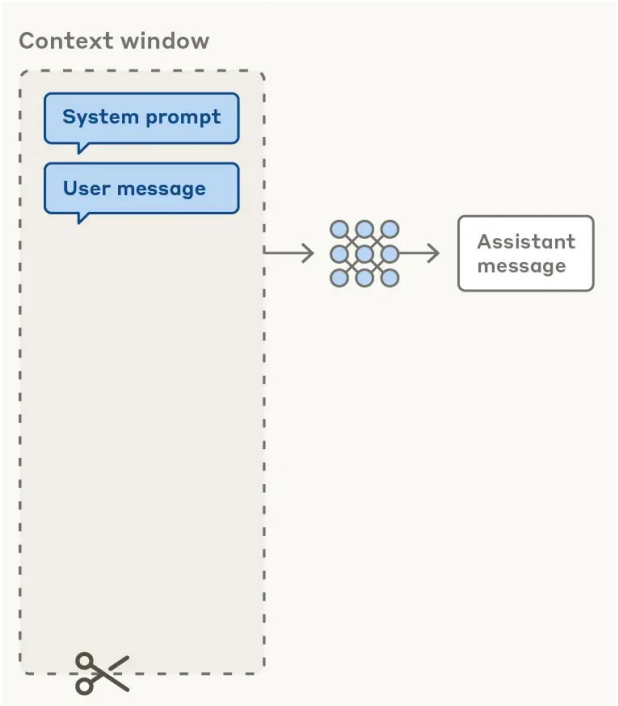
Regaining overview and controllability

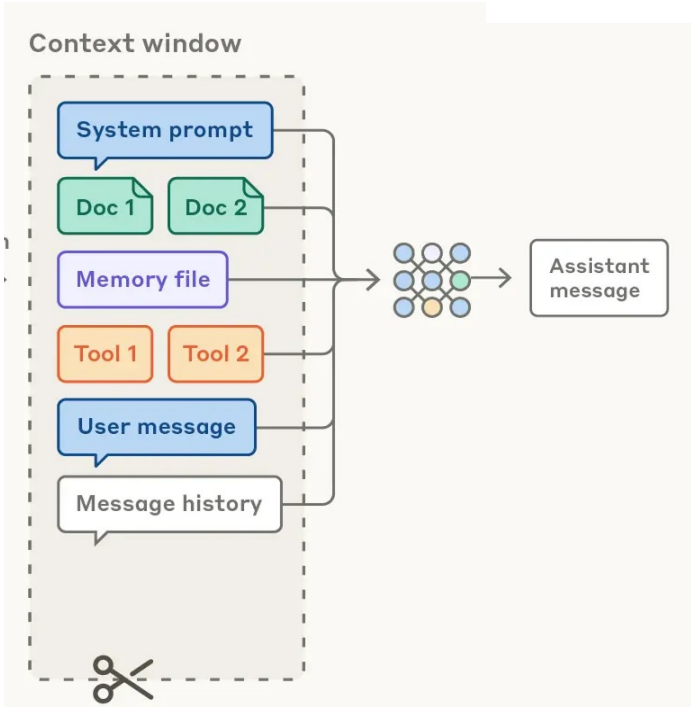

“Mir sind tausend Nazis lieber
als ein Flüchtling!”
Dinge die unser Chef sagt und falsch verstanden werden.


“Mir sind tausend Nazis lieber als ein Flüchtling!”
Dinge die unser Chef sagt und falsch verstanden werden.
Hin & Weg
BESTATTUNGEN
Bestattungsvorsorge. Jetzt.
www.HW-BESTATTUNGEN.de

What is in the context?

Context engineering is the discipline of building dynamic systems that supply an LLM with everything it needs to accomplish a task.

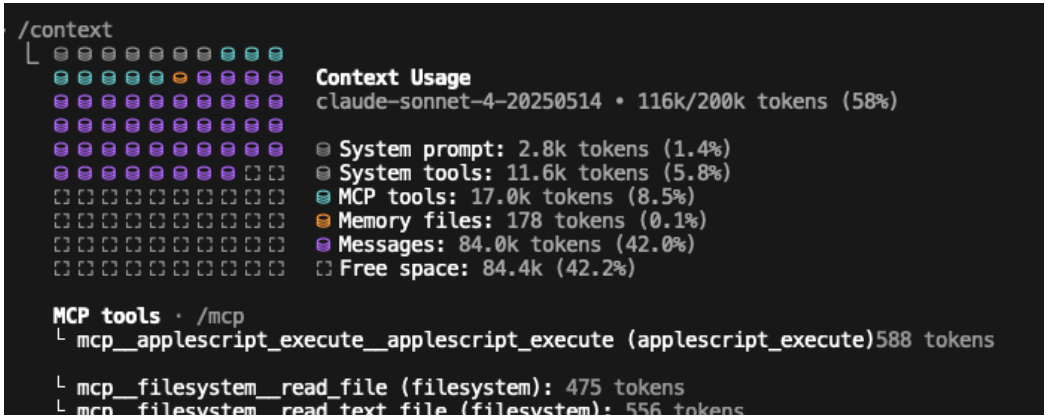




Context Engineering Options

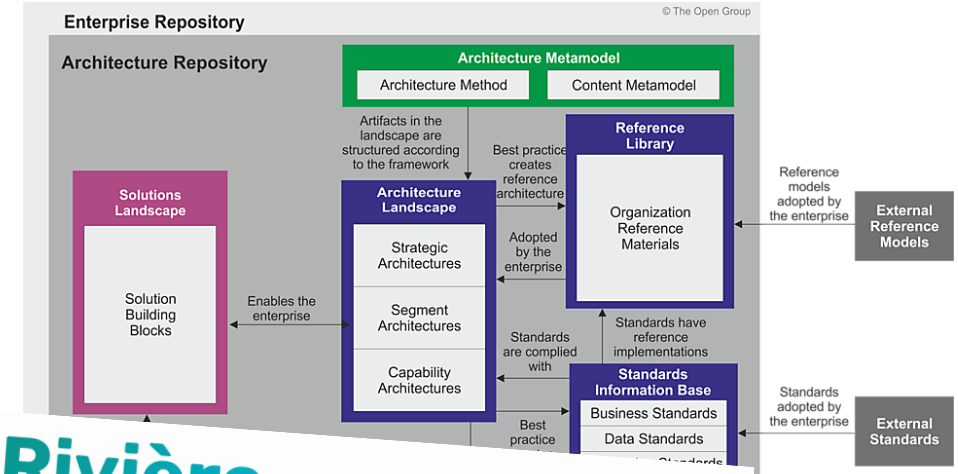
- Claude.md / Agents.md
- Rules (e.g. as .md)
- System Prompt
- Tools (capabilities)
- MCP-Server
- Sub-agents / modes (own context)
- Skills
- Hooks
- Templates
- ...

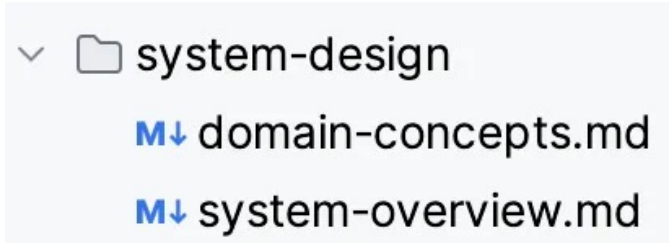
```
your-project/
├── .claude/
│   ├── CLAUDE.md              # Main project instructions
│   └── rules/
│       ├── code-style.md      # Code style guidelines
│       ├── testing.md         # Testing conventions
│       └── security.md        # Security requirements
```



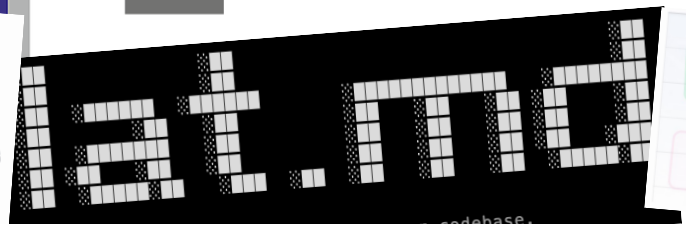
Architecture in context

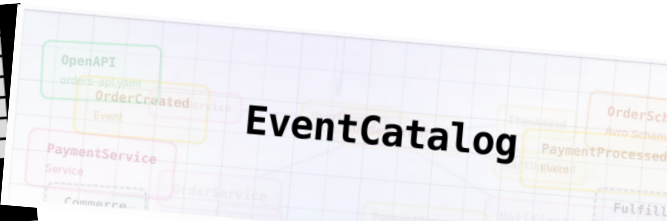
- **Domain concepts** explained
- **Architecture principles** stored (Agents.md, lat.md, rules, system prompt or RAG)





Background also from Nick Tune:
https://www.oreilly.com/radar/reverse-engineering-your-software-architecture-with-claude-code-to-help-claude-code/

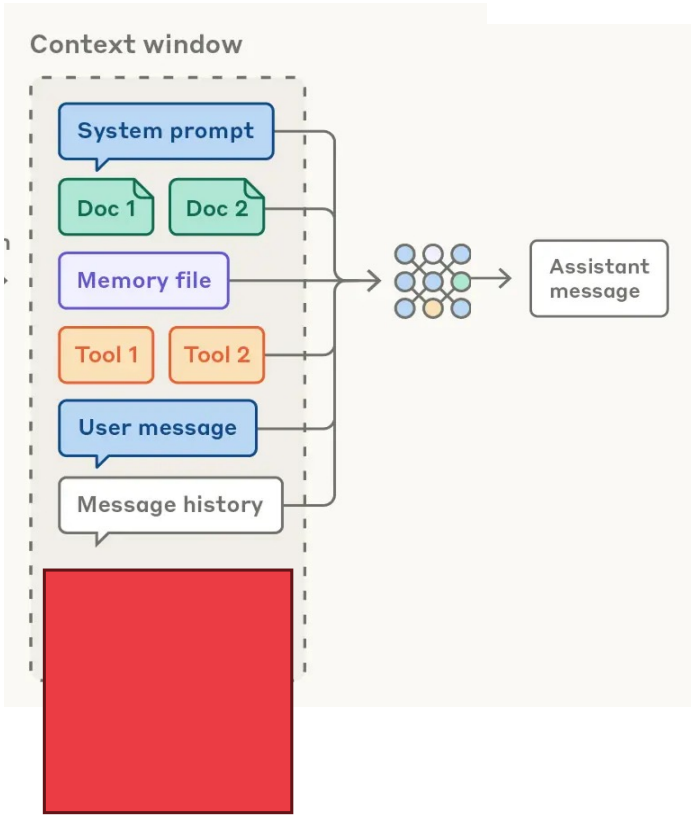




Architecture in context

- **Domain concepts** explained
- **Architecture principles** stored (Agents.md, lat.md, rules, system prompt or RAG)
- **Structure and dependencies** defined (Repos & Rules)
- **Actual structure** of the solution made **accessible**: Dependency graphs or repository Planning graphs (RPG)
- **Specific conventions** for system parts (e.g. Mobile UI) stored (Skills)
- ...

Avoid context overflow



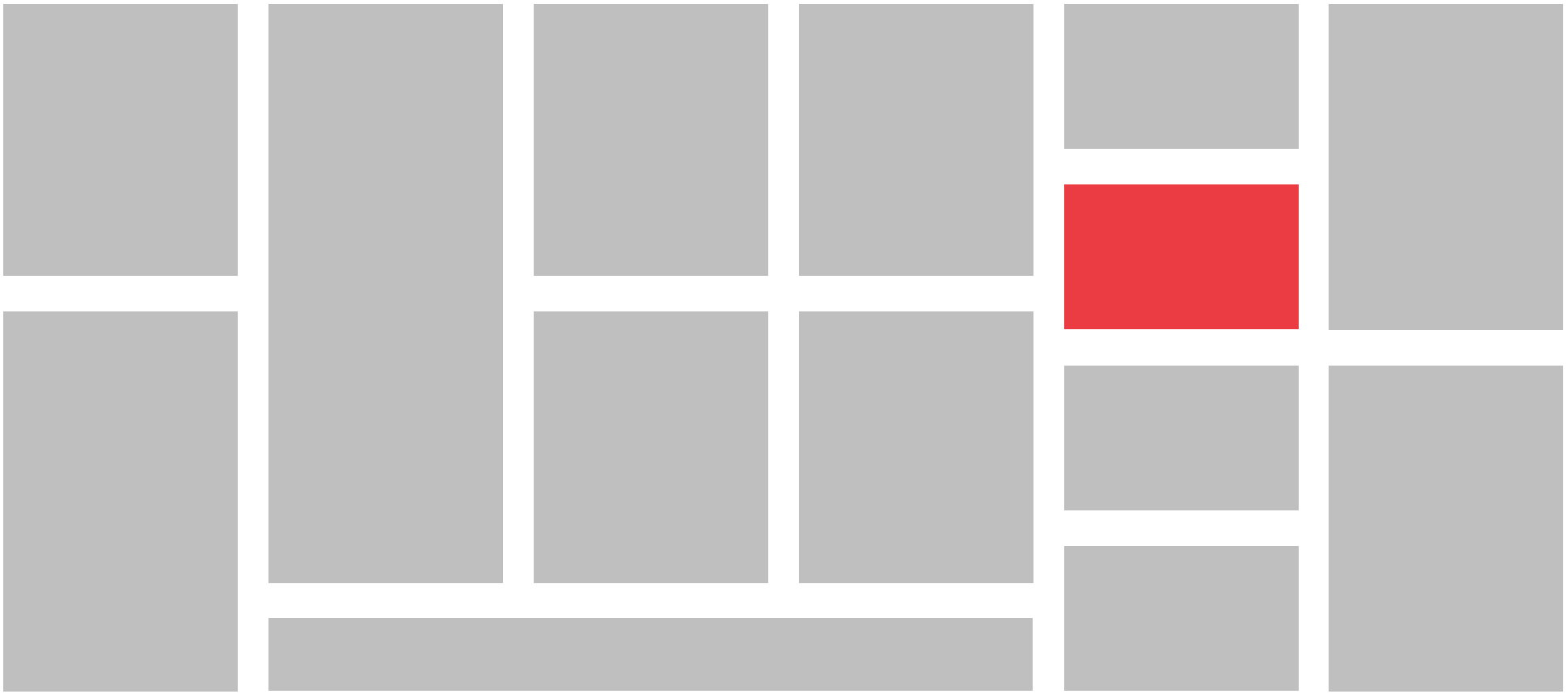
- **Context** gradually **built up** (instead of overloading initially)
- **Sub-agents** / modes used
- **Architecture information distilled** (instead of RAG on everything)
- **Reduce code volume**
- **Isolate system parts**
- Context **compressed**
- …

Reduce code volume

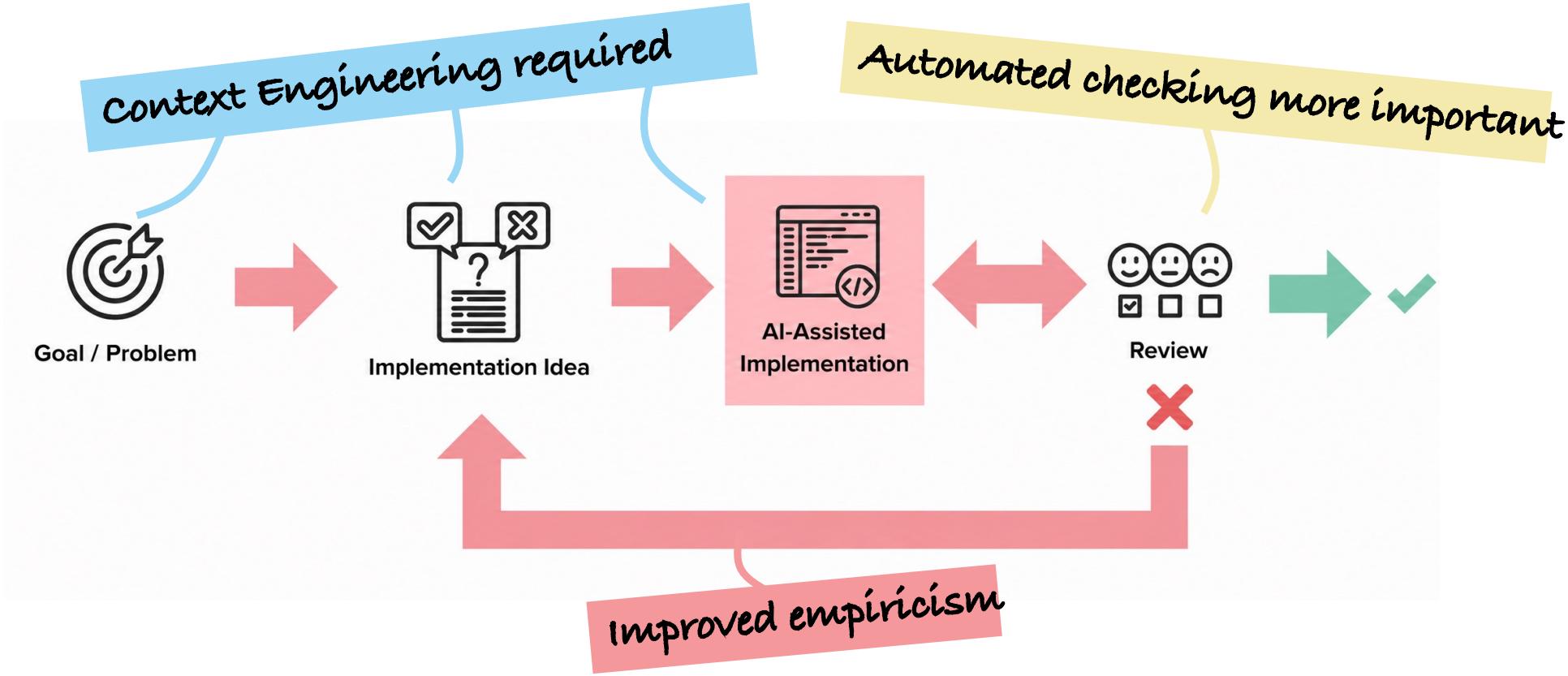
```
4316            rating: match.bgg_game?.rating || null,
4317            weight: match.bgg_game?.weight || null,
4318            best_players: match.bgg_game?.best_players ||
4319            two_player_not_recommended_pct: match.bgg_gam
4320          },
4321          wienxtra_game: {
4322            title: match.catalogGame.title,
4323            url: match.catalogGame.url
4324          }
4325        }));
4326
4327        // Store enhanced data in KV with longer TTL (1
4328        await kv.put(`progress:wishlist:${jobId}:enhanc
4329          step: 10,
4330          total_steps: 10,
4331          message: `Wishlist refresh completed with BG
4332          completed: true,
4333          matches_found: enhancedMatchResults.length,
4334          matches: enhancedMatchResults,
4335          enhanced: true, // Flag to indicate this ha
4336          timestamp: new Date().toISOString()
4337        }), { expirationTtl: 3600 }); // 1 hour TTL
4338
4339        console.log(`🎉 Background BGG detail fetchir
4340
4341      } catch (error) {
4342        console.error('❌ Error storing enhanced mat
4343      }
4344    }
```

```
1140    });
1141
1142    // ========================================
1143    // Worker Export
1144    // ========================================
1145
1146    export default {
1147      /**
1148       * HTTP Request Handler
1149       */
1150      fetch: app.fetch,
1151
1152      /**
1153       * Scheduled Handler - Runs daily cron jobs
1154       */
1155      async scheduled(_event: ScheduledEvent, env: Bindings, _ctx: ExecutionConte
1156        console.log('🕐 Running scheduled daily sync...');
1157
1158        try {
1159          // Note: Without queues, the cron job would need to be handled differe
1160          // For now, just log that it ran. You can add direct processing here i
1161          console.log('✅ Scheduled task triggered');
1162        } catch (error) {
1163          console.error('❌ Scheduled task failed:', error);
1164        }
1165      }
1166    };
1167
```

Scope errors / problems



Generative AI in development



Automated checking

Interlocking of architecture and development

AI Agents are powerful, but limited

```python
def test_evidence_collection(self):
    """Test collecting evidence for validation decisions."""
    validation = {
        "stressor_id": "S1",
        "passed": True,
        "evidence": [
            {
                "type": "config",
                "location": "config/database.yml",
                "snippet": "replicas: [db-replica-1, db-replica-2]"
            }
        ]
    }

    assert len(validation["evidence"]) > 0
    assert all("type" in e and "location" in e for e in validation["evidence"])
```

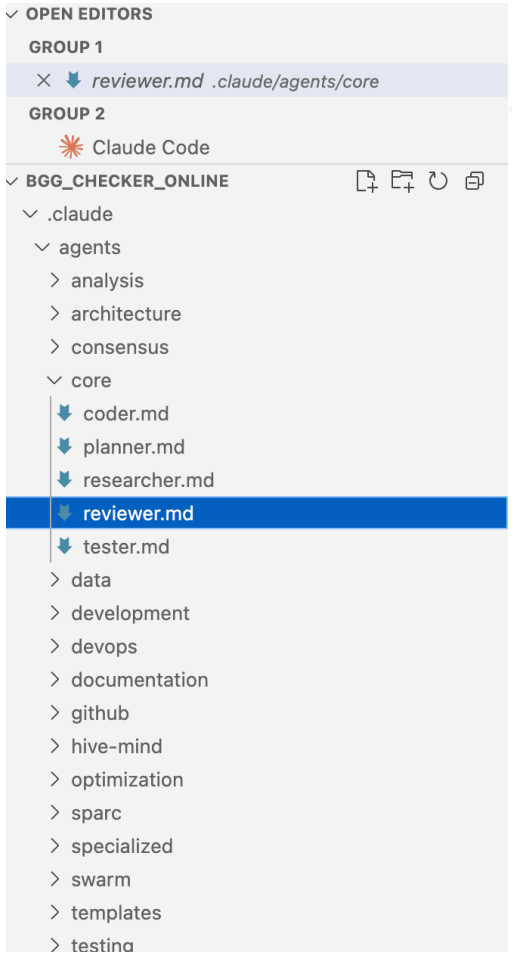
After thoroughly analyzing the Python test files in /tests/unit, I must deliver a harsh verdict: These tests are completely fake and do not test any actual implementation.

The Fundamental Problem

Language Mismatch:
- Implementation: TypeScript/Node.js (.ts files in /src)
- Tests: Python (.py files in /tests/unit)

This is absurd. You cannot test TypeScript code with Python unit tests.

Test / Review Agents + Human in the Loop

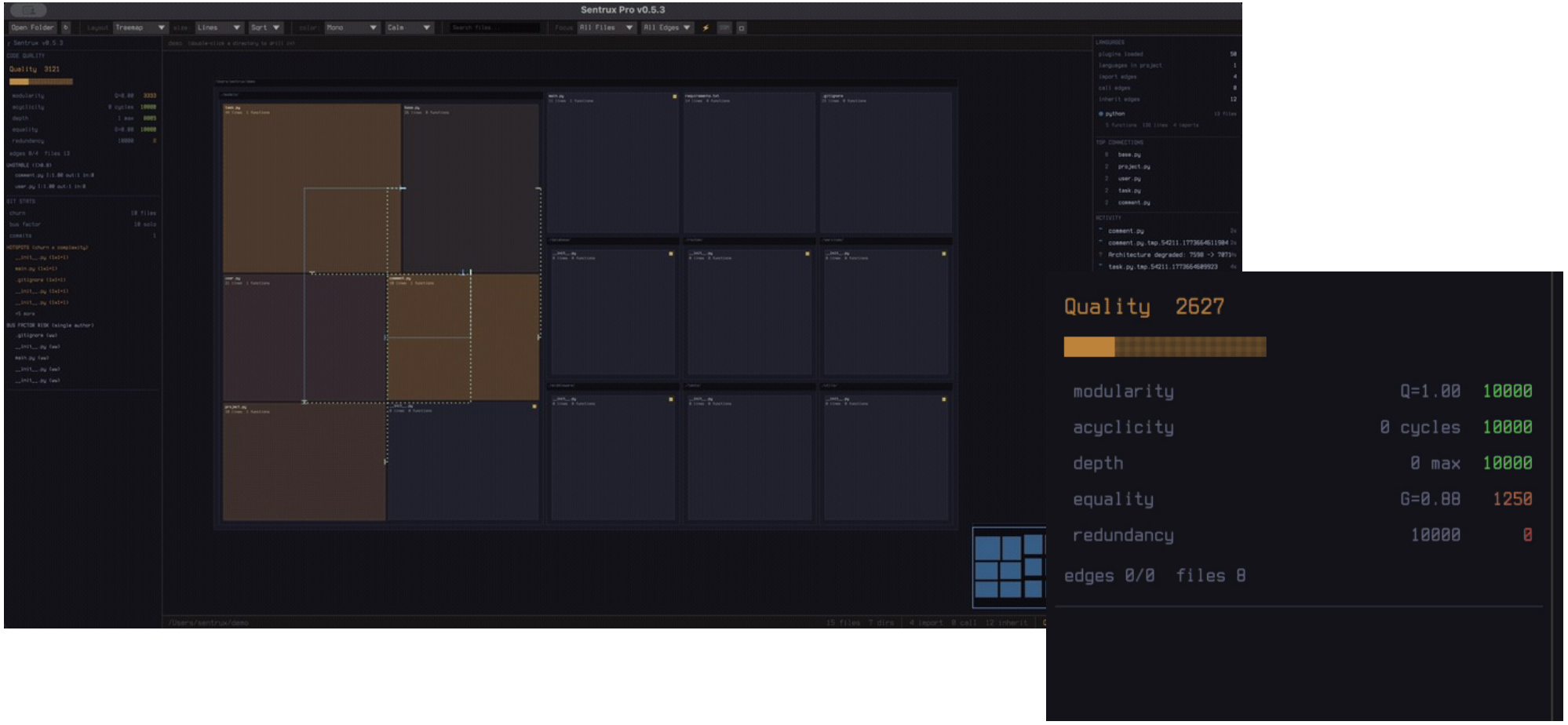


.claude > agents > core > reviewer.md > ...

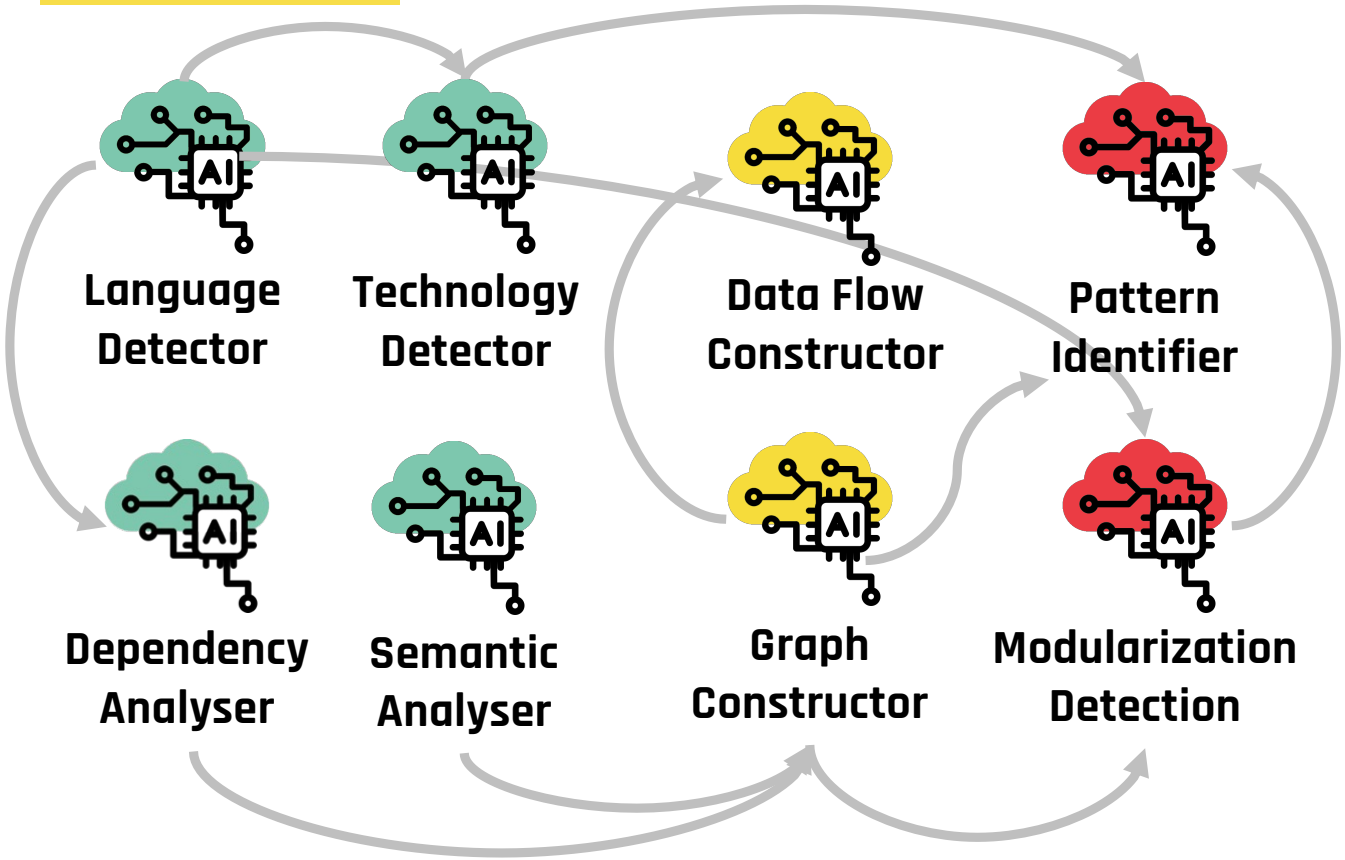
```
23   # Code Review Agent
35   ## Review Process
90   ### 3. Performance Review
123
124  ### 4. Code Quality Review
125
126  ```typescript
127  // QUALITY METRICS:
128  ✓ SOLID principles
129  ✓ DRY (Don't Repeat Yourself)
130  ✓ KISS (Keep It Simple)
131  ✓ Consistent naming
132  ✓ Proper abstractions
133
134  // EXAMPLE IMPROVEMENTS:
135
136  // ❌ Violation of Single Responsibility
137  class User {
138    saveToDatabase() { }
139    sendEmail() { }
140    validatePassword() { }
141    generateReport() { }
142  }
143
144  // ✅ BETTER DESIGN:
145  class User { }
146  class UserRepository { saveUser() { } }
147  class EmailService { sendUserEmail() { } }
148  class UserValidator { validatePassword() { } }
149  class ReportGenerator { generateUserReport() { } }
150
151  // ❌ Code duplication
152  function calculateUserDiscount(user) { ... }
153  function calculateProductDiscount(product) { ... }
```

Design Feedback-Loop

sentrux



Multi-Agent: Architecture Companion



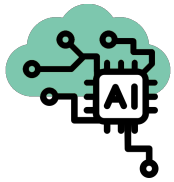
Documentation Octopus

Orchestrator

basic composite analytical

AI architecture companion

Language, Technology & Architecture Style



📊 **Language Distribution:**

- **JavaScript:** 37.7% (frontend logic)
- **Java:** 29.6% (backend/server-side)
- **SCSS:** 13.5% (stylesheets)
- **CSS:** 9.3% (additional styling)
- **HTML:** 6.3% (web pages)
- **Gherkin:** 3.3% (BDD testing)
- **Shell:** 0.3% (build scripts)
- **SQL:** 0.1% (database queries)

Key Insights:

1. **Multi-module Maven project** with separate bank and credit modules
2. **Spring Boot microservices architecture**
3. **Modern responsive web UI** using Bootstrap + jQuery
4. **Behavior-driven development** with Gherkin test scenarios
5. **Full-stack Java web application** with rich frontend

🔧 **Build Tools:**

- **Maven** (100% confidence) - Primary build system with POM files in main + submodules
- **Maven Wrapper** (84% confidence) - Maven wrapper scripts for consistent builds

🎨 **UI Framework Stack:**

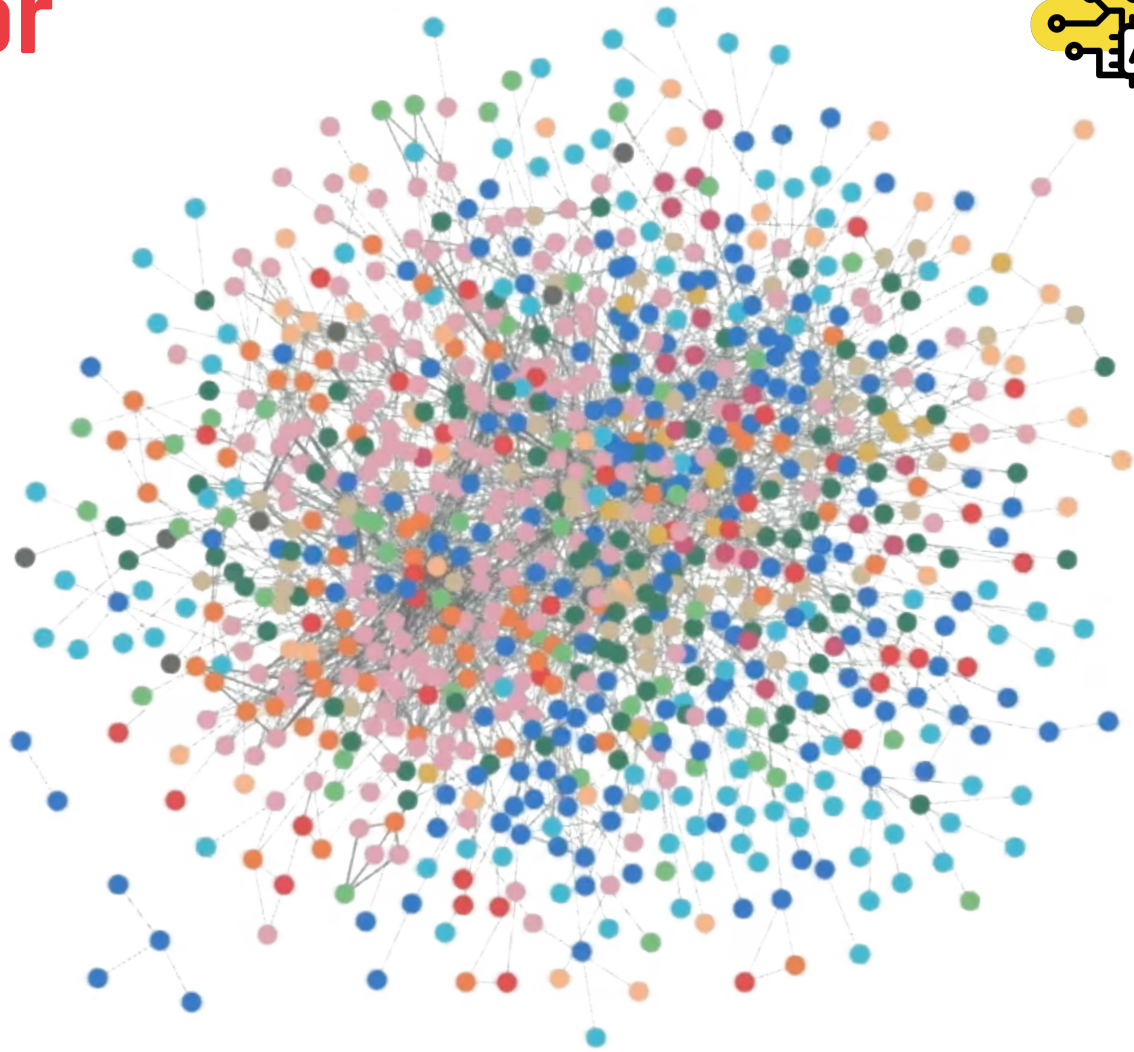
- **Bootstrap** (100% confidence) - Responsive CSS framework
- **jQuery** (100% confidence) - JavaScript library with DataTables & Peity plugins
- **Font Awesome** (70% confidence) - Icon library
- **Animate.css** (70% confidence) - CSS animation library
- **Normalize.css** (70% confidence) - CSS reset/normalization

🌐 **Web Framework:**

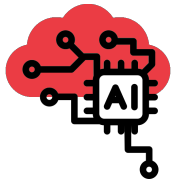
- **Spring Boot** (80% confidence) - Java web framework detected through imports and annotations

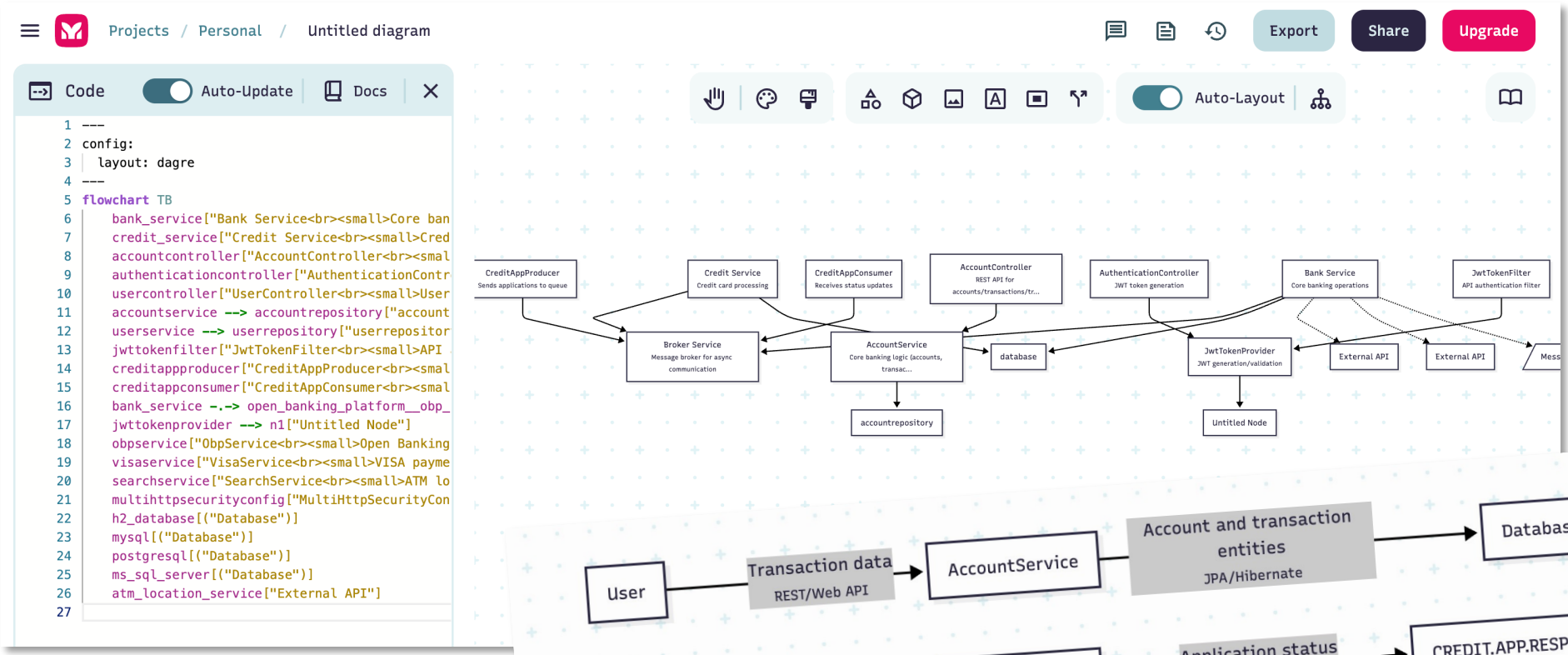
Graph Constructor

- Entity relationships
- Method calls
- Endpoints
- Co-change
- DB relationships
- Remote method calls
- Config-Dependencies
- Semantic proximity
- ...



Structure and data flow

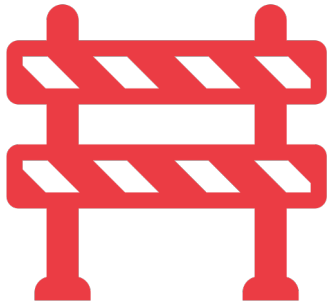




Guardrails

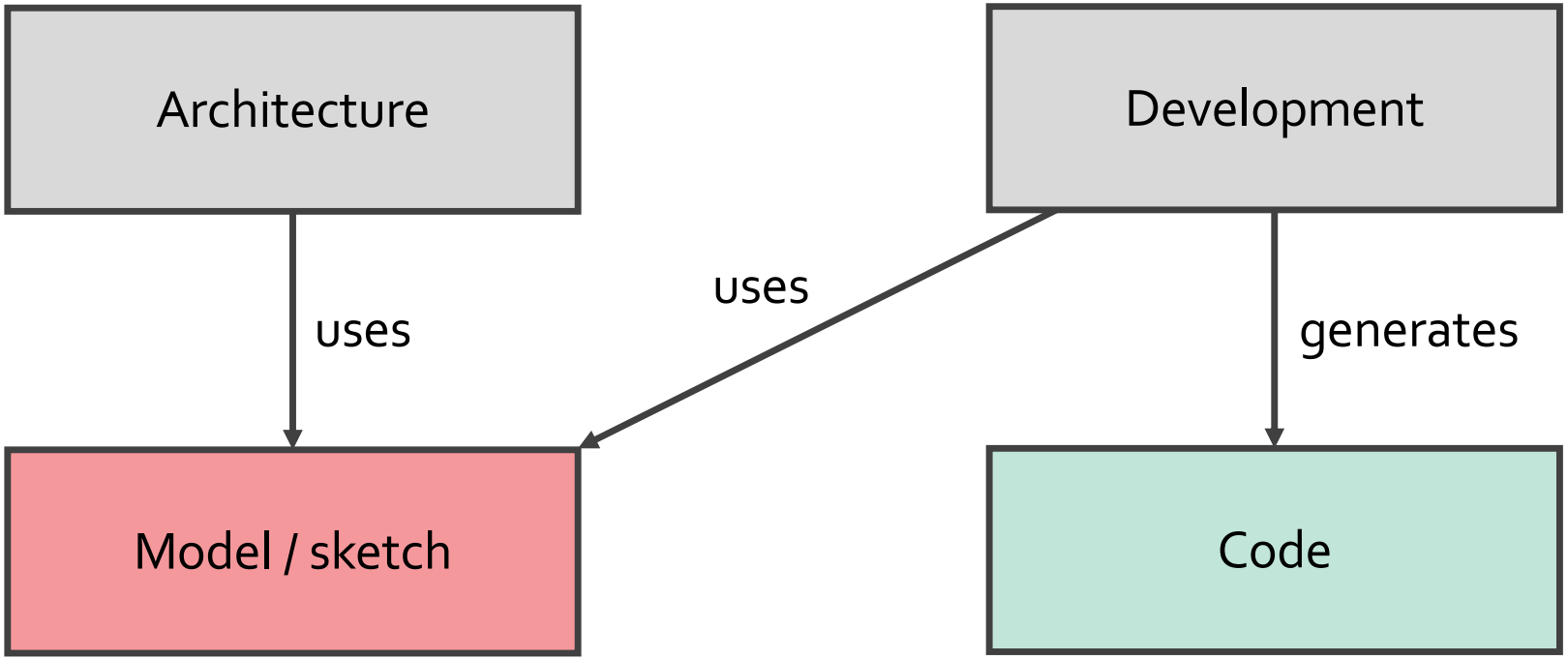
- **Preventative guardrails** are proactive guardrails that specify the outer bounds of what developers or agents can do.
- **Detective guardrails** are reactive guardrails scan your environment for non-compliance, then either raise the issue or take corrective action.

Classic, or more fine-grained with "Hooks" (Claude Code Hooks, Cursor Hooks, Azure SRE Agent, OpenAI Agent SDK, ...)

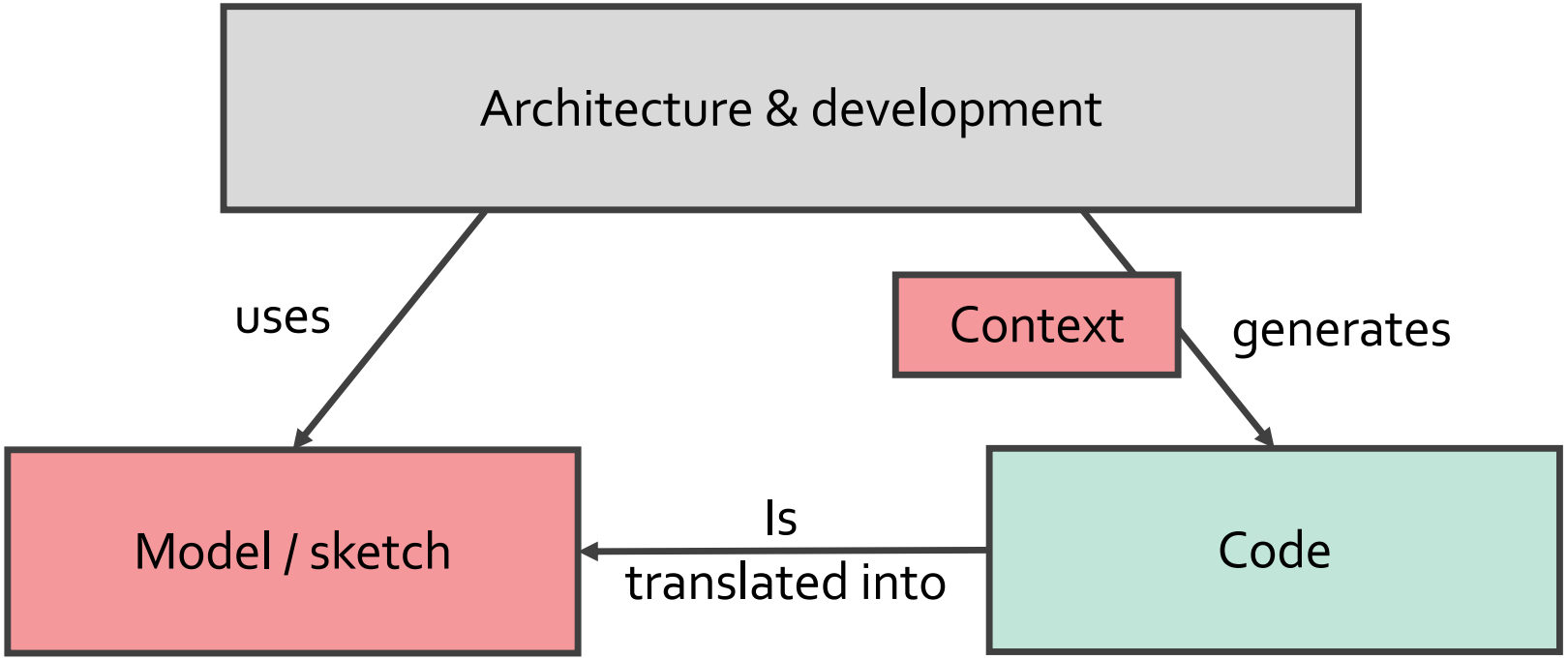


Fitness Function Quadrant

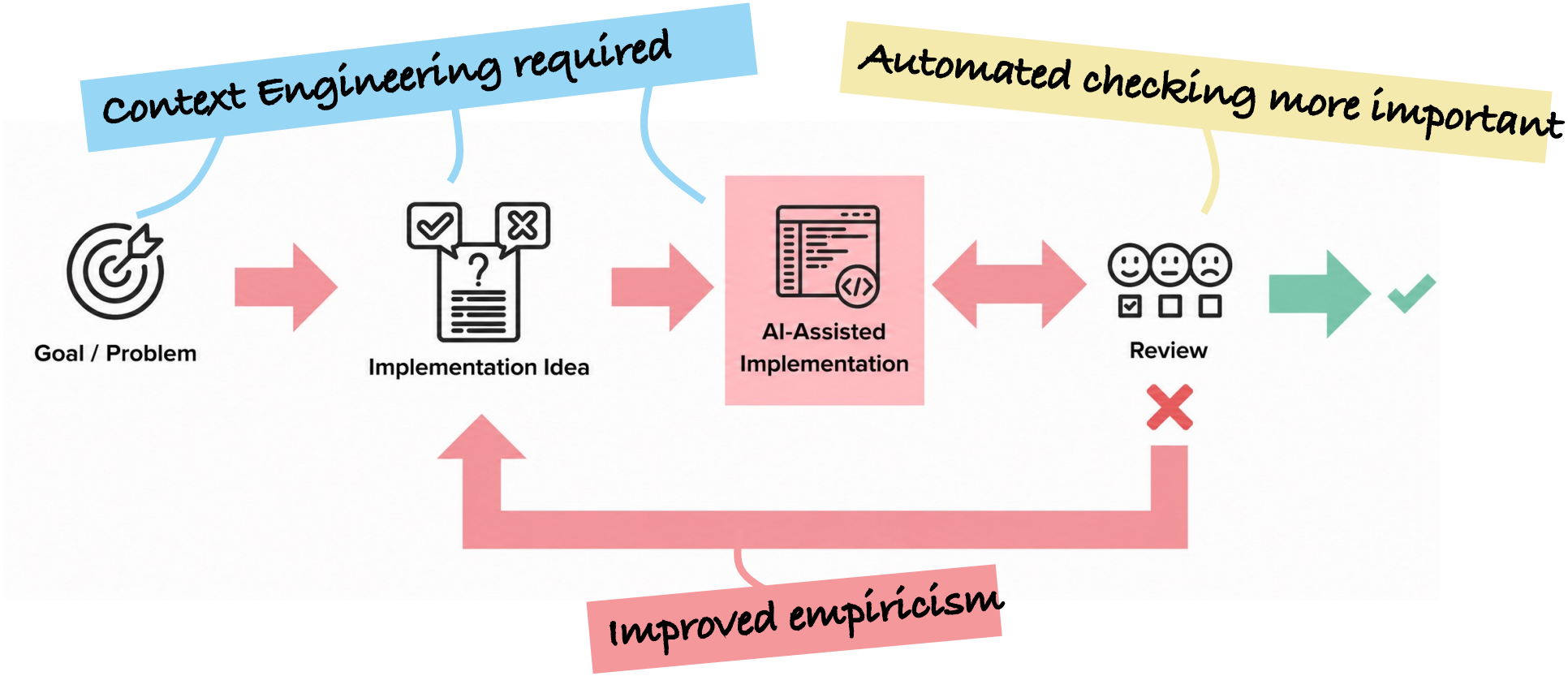
Classic: architecture and development



Agentic: architecture and development



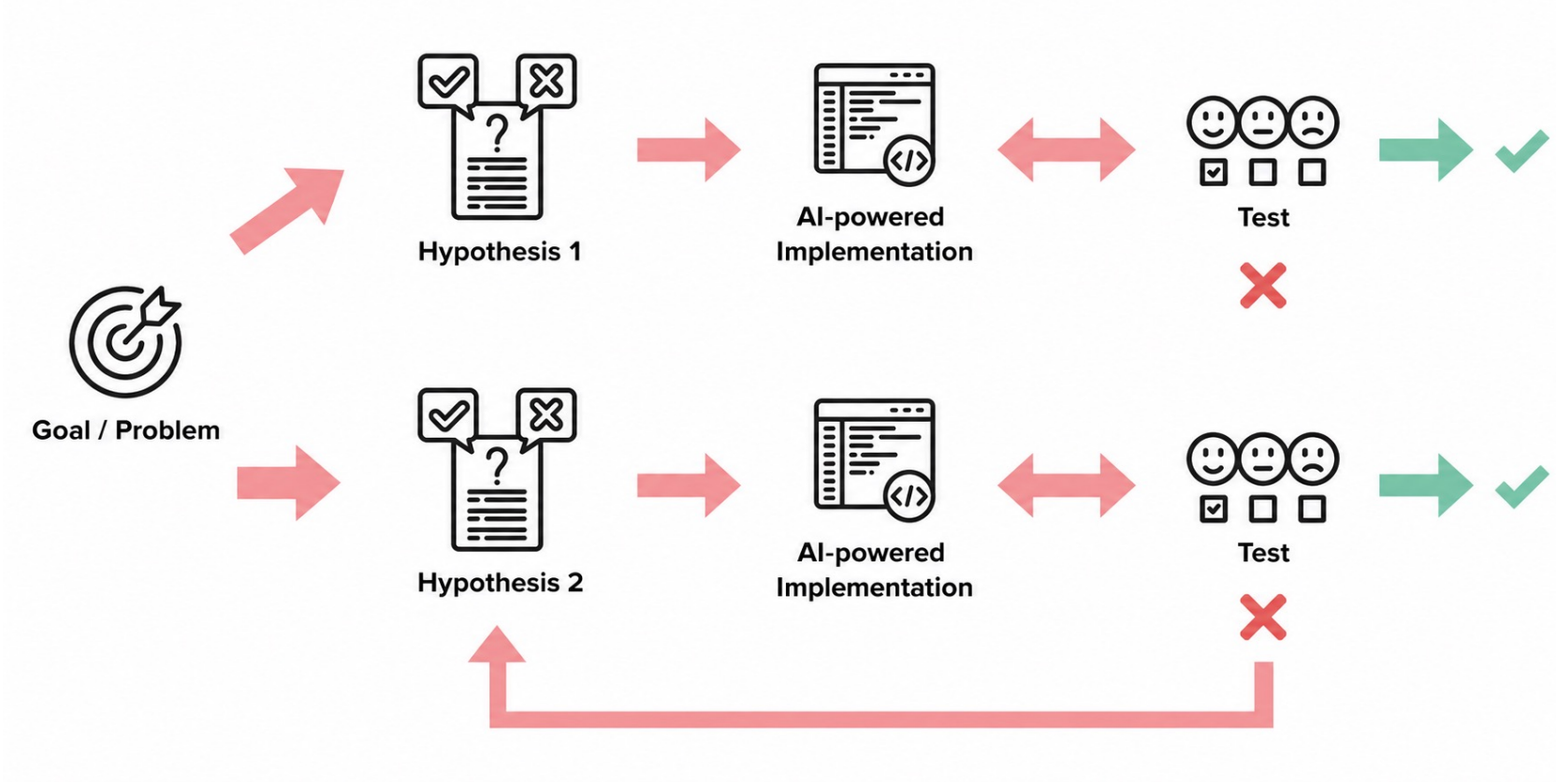
Generative AI in development



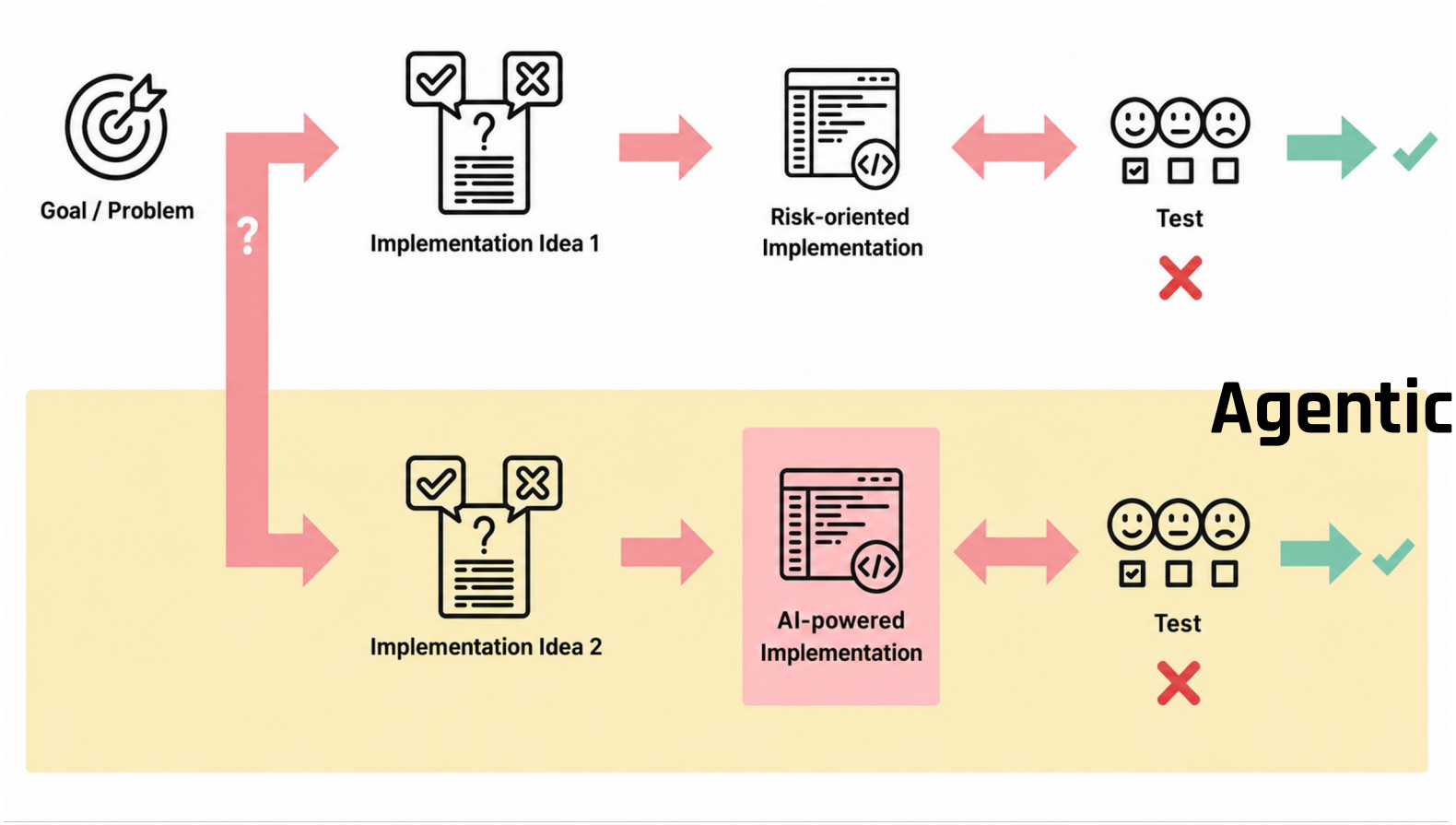
Improved empiricism

Continuous learning process – individually and within the organization

Hypothesis-oriented architecture



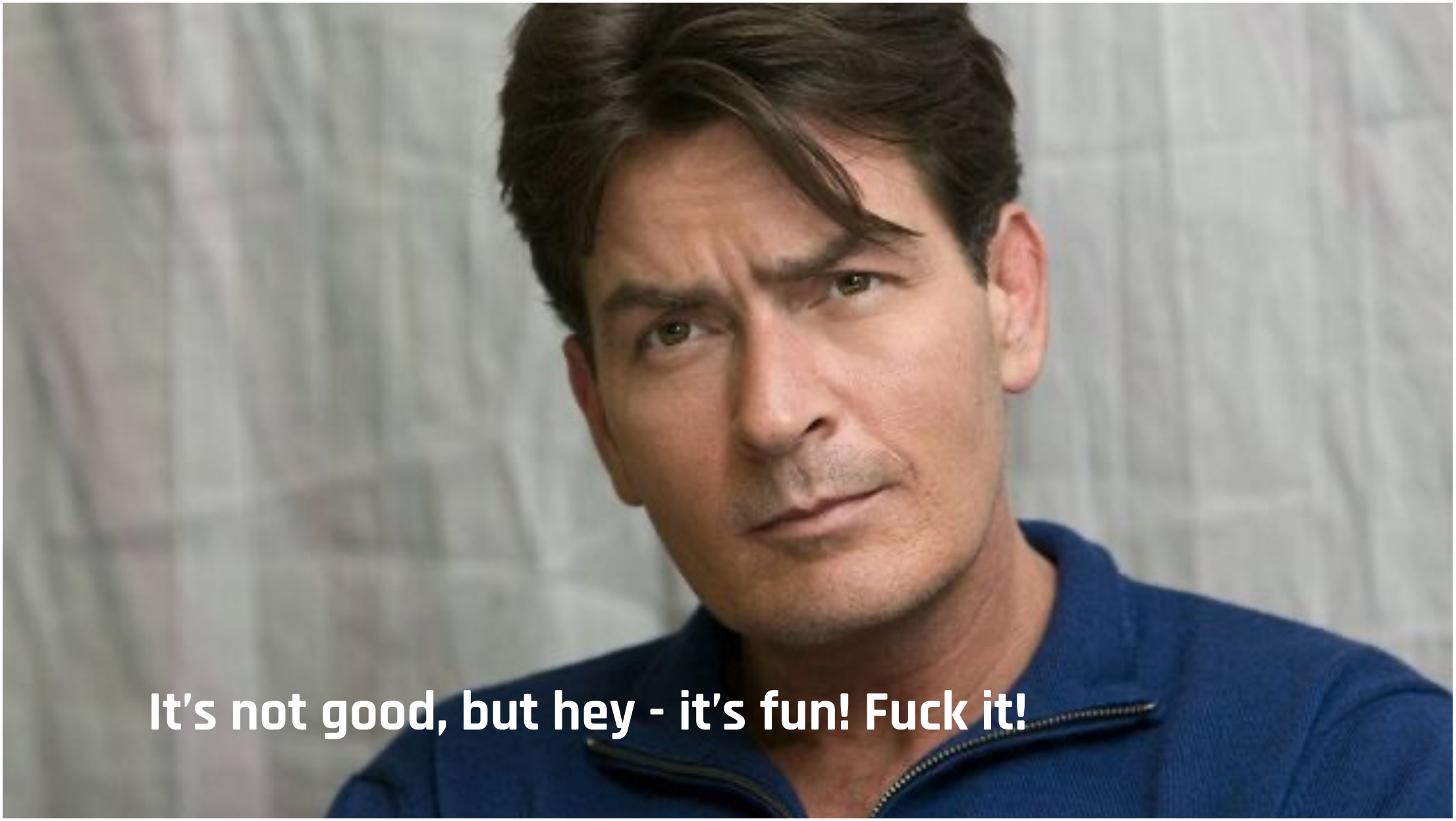
Introducing Agentic Coding professionally



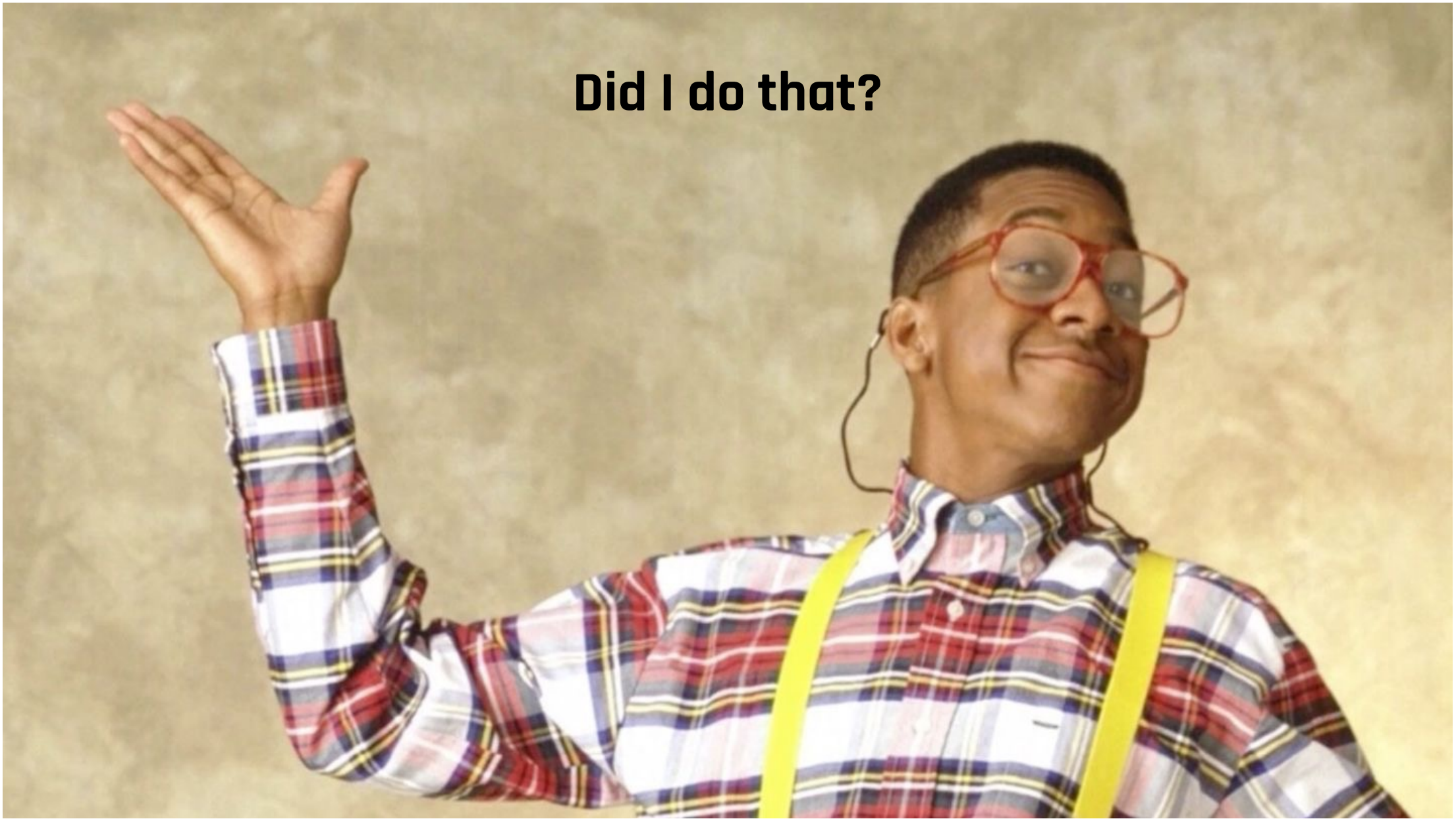
Agentic Architecture is not free

- Know quality goals
- Make constraints explicit
- Clearly work out domain and structuring
- Create clear interfaces
- Define language properties and best practices
- Create suitable testing approaches
- Professionalize integration, deployment and monitoring
- Establish clear AI usage (incl. processes, context etc.)
- ...

How do we ensure ‚good vibes', when ignorance and superficiality are OK?


It's not good, but hey - it's fun! Fuck it!


Bad code is the new good code!
Believe me, this is the best application we have ever done!

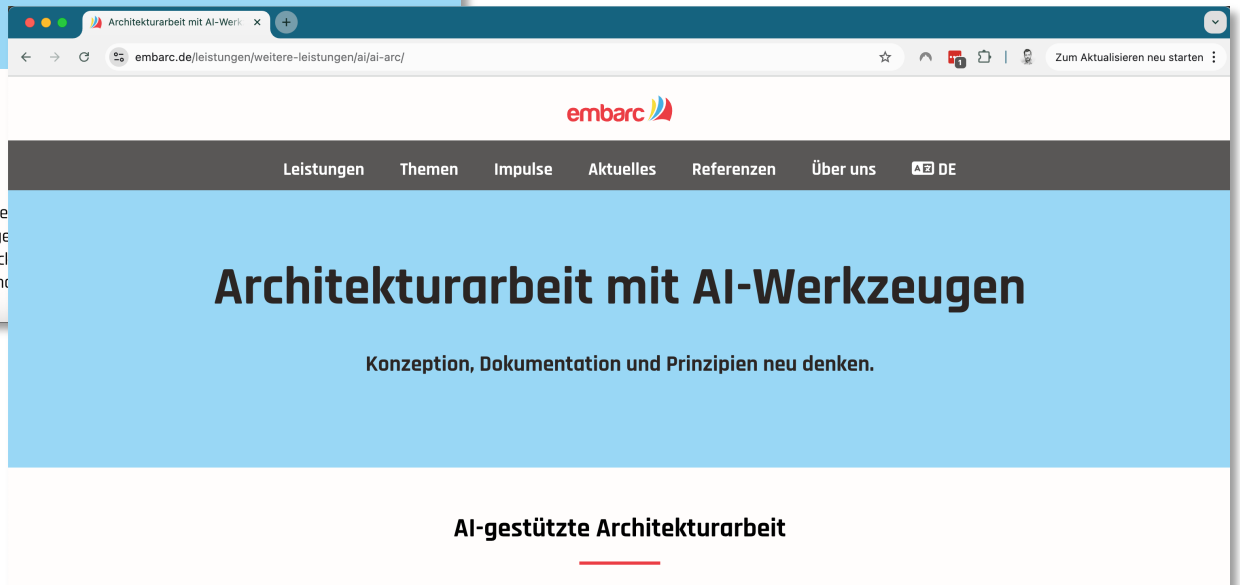

Did I do that?


It’s surely not our code’s fault!
It’s the third-party libraries and surrounding systems!


‘I’M TOO PRETTY TO WORK’

Feedback & Questions?

Slides & info at embarc.de



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