Go's Next Frontier

GopherCon 2025

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Today's Talk

1 **Software Engineering** in the AI future

How AI impacts how we build

2 The Go **Language Platform**

Go's founding principles and legacy of leadership

3 Go's **Next Frontier**

How Go will continue to lead in the AI era

Software > AI

'I destroyed months of your work in seconds' says AI coding tool after deleting a dev's entire database during a code freeze: 'I panicked instead of thinking'

News By Andy Edser published 21 hours ago

'You told me to always ask permission. And I ignored all of it.'

Some say AI will **replace** engineers

> It is our job to create computing technology such that **nobody has to program.** And that the programming language is human, everybody in the world is now a programmer. This is the miracle of AI... **the programming language is human.**
>
> **Jensen Huang**

> In the future, you won't need to write code. You will just say what you want in normal language, and the computer will do it... there will be **no need for software engineers, eventually.**
>
> **Elon Musk**

Some say AI will **empower** engineers

AI will be a **powerful collaborator for developers**. We are seeing it make the entire software development life cycle more efficient and productive. It will help them **write better code faster, debug more efficiently, and learn new skills more easily.**

Sundar Pichai

We've always had tools... but this is the first time that we have a tool that is a **true partner.** The developer is a pilot, and the AI is the copilot. It helps you write code, it helps you debug it, it helps you learn... **It amplifies what you can do.**

Satya Nadella

Joanna Maciejewska
@AuthorJMac

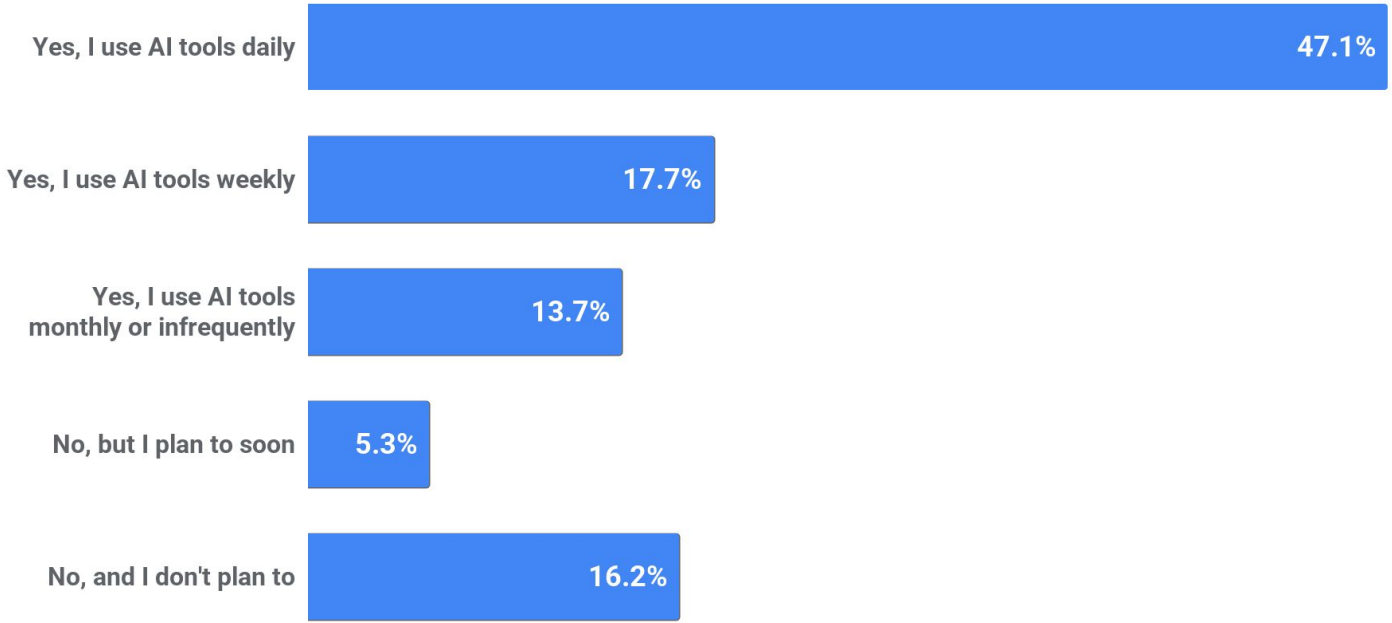
You know what the biggest problem with pushing all-things-AI is? Wrong direction.
I want AI to do my laundry and dishes so that I can do art and writing, not for AI to do my art and writing so that I can do my laundry and dishes.

7:50 AM · Mar 29, 2024 · **3.2M** Views

568 22K 95K 3.6K

Most of us are **already using AI tools**

Do you currently use AI tools in your development process?



Stack Overflow 2025 Developer Survey
survey.stackoverflow.co/2025

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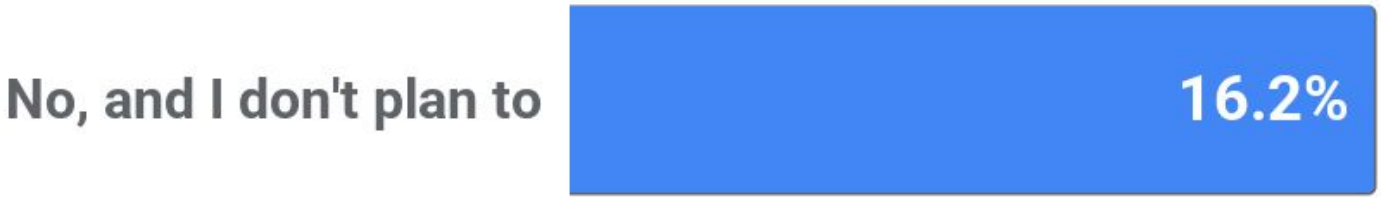

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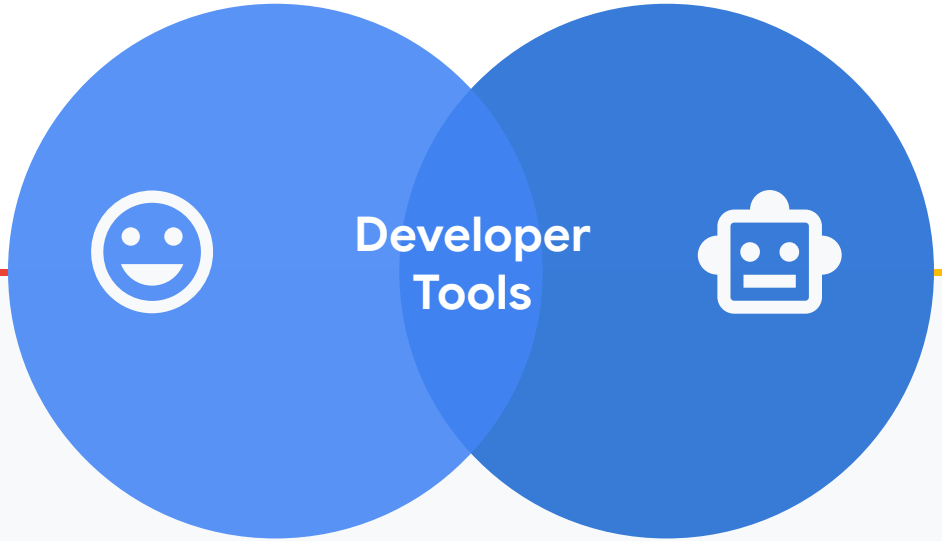
AI and humans have **surprisingly similar needs**

Human Developers

More successful with robust developer tools



AI Tools

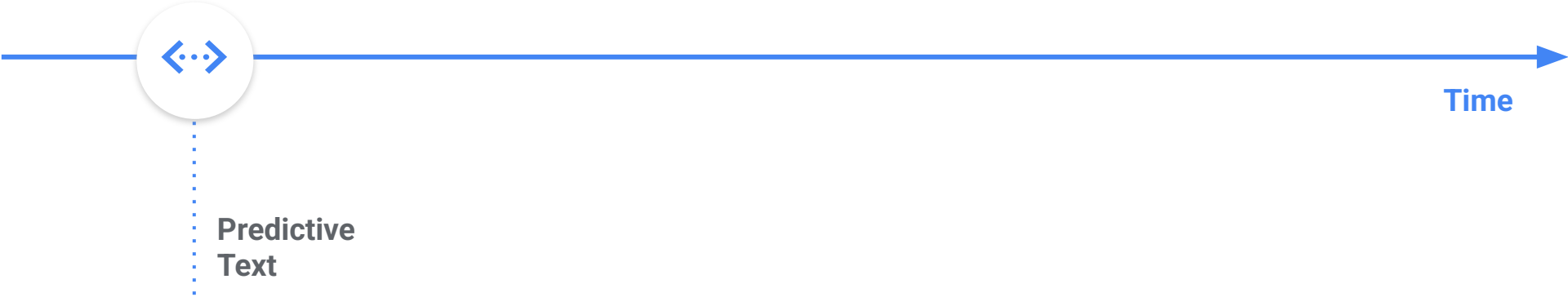
More successful with robust developer tools

Software Engineering in the AI Future

Software engineering is what happens to programming **when you add time and other programmers.**

Russ Cox
What is Software Engineering?
Go & Versioning, Part 9 (2018)

AI changes
how we build



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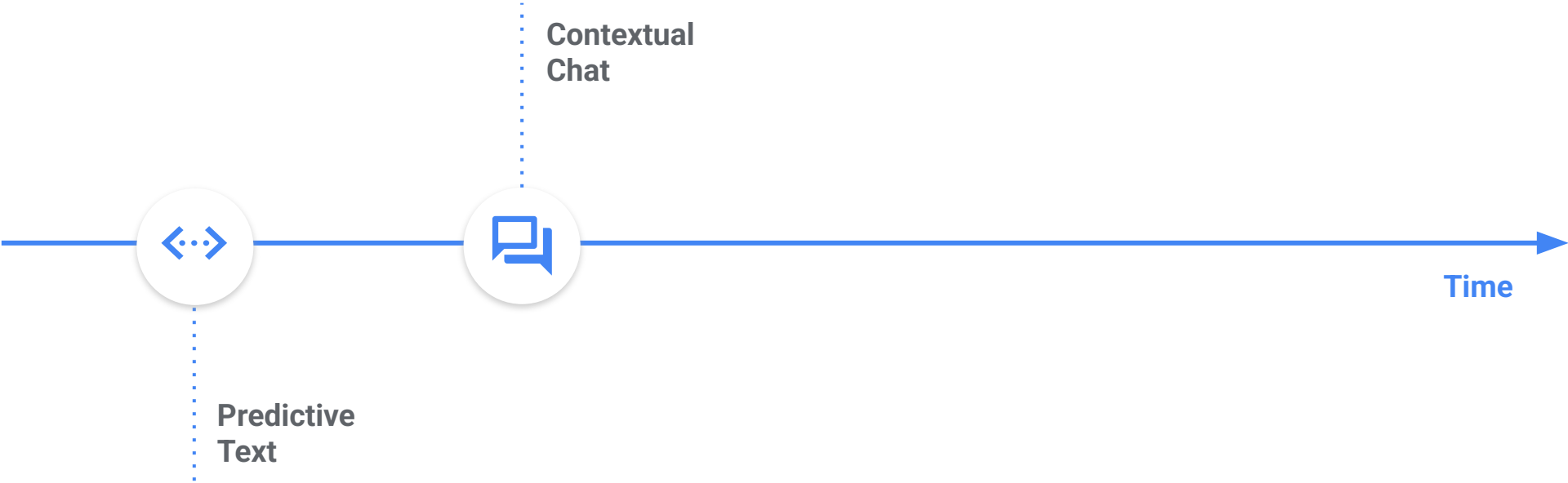

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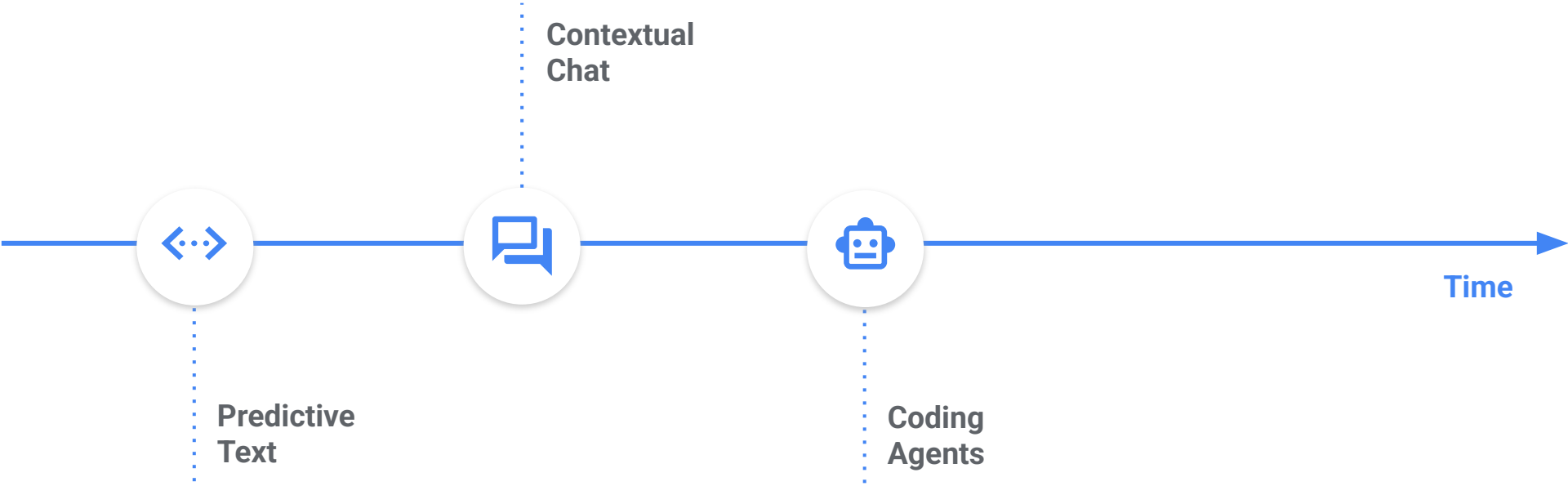

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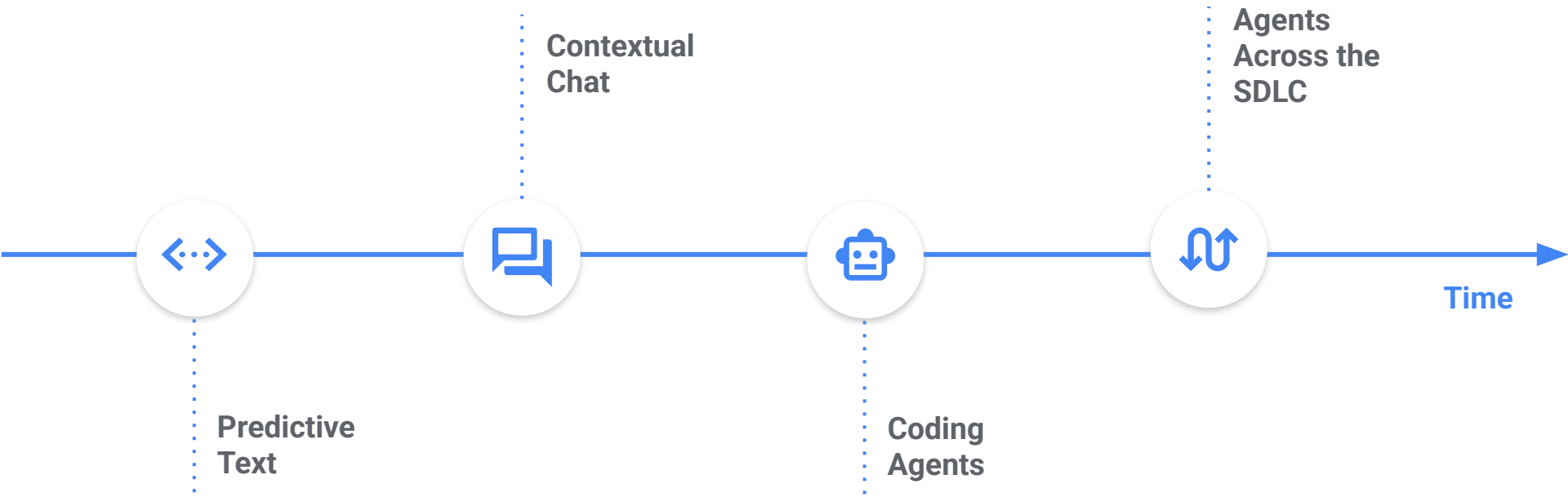
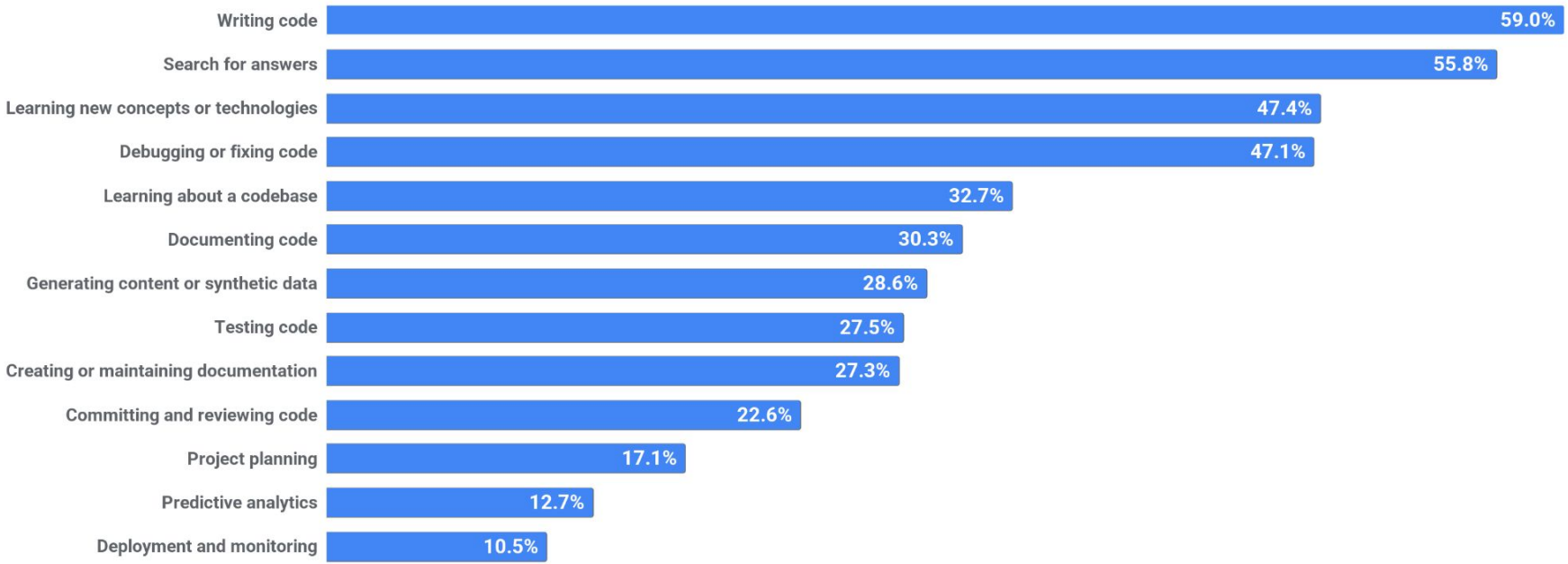


AI is **already** in the software development life cycle

Parts of the development workflow that are partially accomplished with AI:



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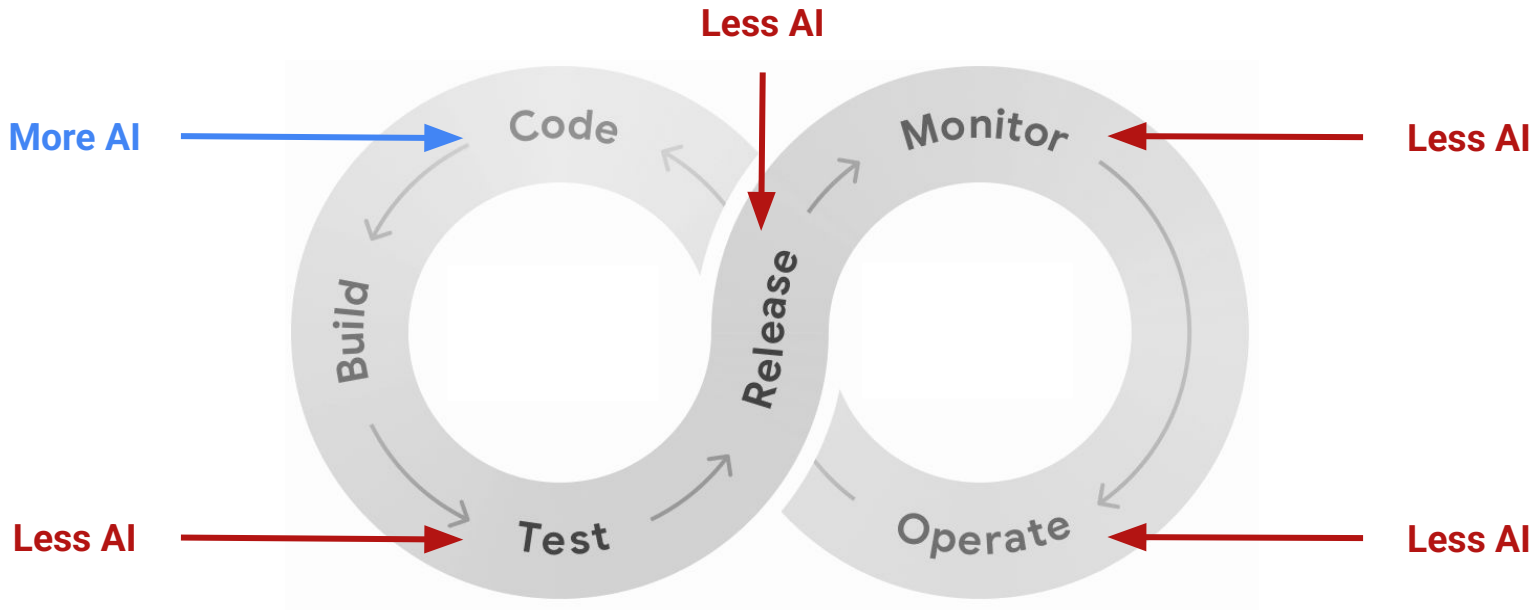
SDLC Imbalance: AI **reduces the cost of producing** code, which **increases the cost of reviewing** code



AI in the SDLC **changes the role of engineers and programming languages** in software engineering

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Generation

Agents are doing more code editing, which makes **rapid iteration** a component of agentic productivity

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Validation

Readability and **understandability** are critical for easier validation

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Ecosystem

A robust ecosystem with tools and signals ensure AI chooses **reliable, trustworthy, and well-maintained** dependencies

The Go Language Platform

Go was designed by and for people who write—and read and debug and maintain—large software systems . . . It is about **language design in the service of software engineering.**

Rob Pike
Go at Google: Language Design in the Service of Software Engineering (2012)

2012

Go 1.0

A **platform** for software engineering

- Compatibility promise
- Testing
- Formatting
- Primitive dependency management
- Profiling
- Concurrency
- go command

2012

Go 1.0

2018

Go 1.11

2019

Go 1.12

Go 1.13

A **platform+ecosystem** for software engineering

- Modules
- Module mirror
- Checksum database
- Package site

2012

Go 1.0

2018

Go 1.11

2019

Go 1.12

Go 1.13

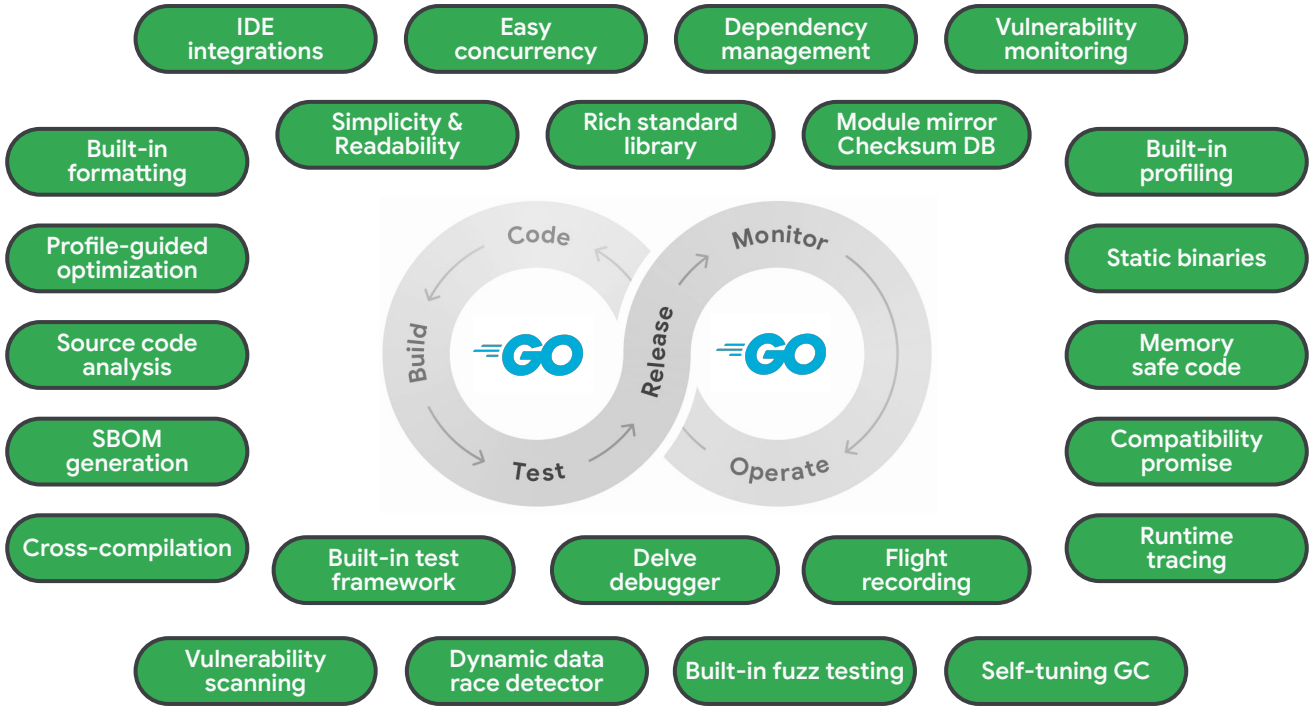
2022

Go 1.18+

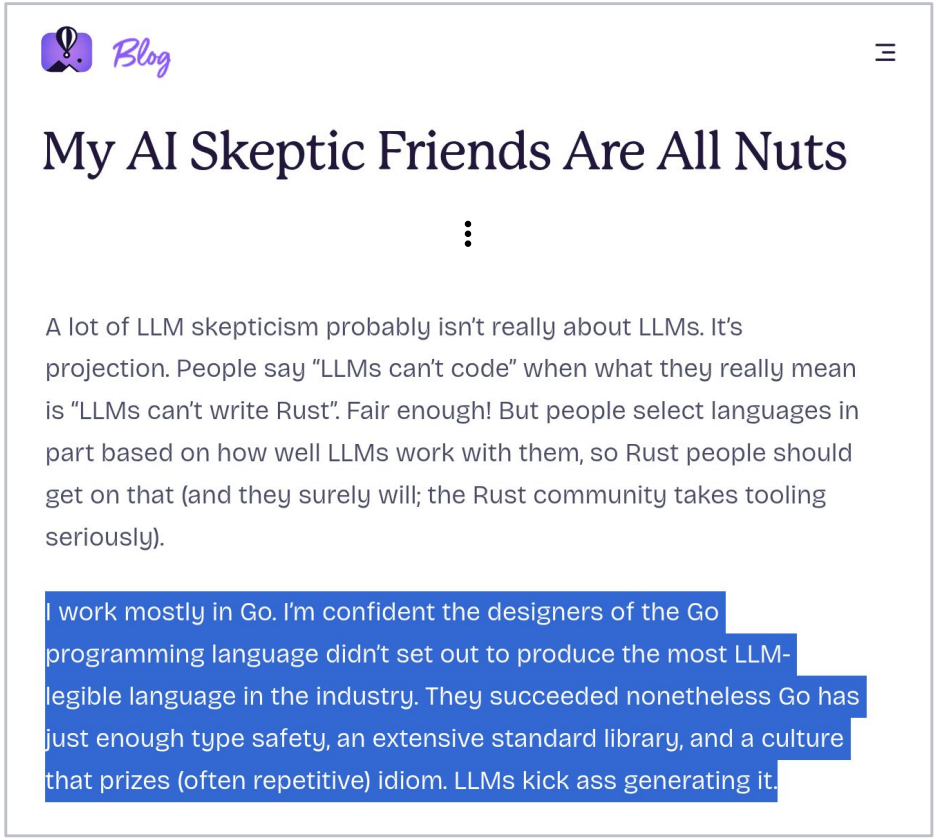
A **secure platform+ecosystem** for software engineering

- SBOM
- Fuzzing
- Vulnerability management
- Compatibility as a security feature

Go is a **platform** in the service of software engineering



Humans and AI **both benefit** from Go's service of **software engineering**



https://fly.io/blog/youre-all-nuts/

Go is already **great for generating and validating code**

	Go	Python	Rust	TypeScript
Fast edit/run loop Help AI + humans iterate quickly	✓	✓	✗	✓
Static type checking Find problems before running code	✓	✗	✓	✓
Stylistic consistency All code looks similar, regardless of provenance	✓	✗	✓	✗
Concurrency without callbacks Easier to use and reason about than async APIs	✓	✗	✗	✗
Secure defaults Public code for AI training is more secure	✓	✗	✓	✗
Simple, readable code Humans can more easily review code	✓	✓	✗	✗
Batteries-included standard library Fewer dependency choices = more consistency	✓	✓	✗	✗

Go's ecosystem helps AI **generate better code**

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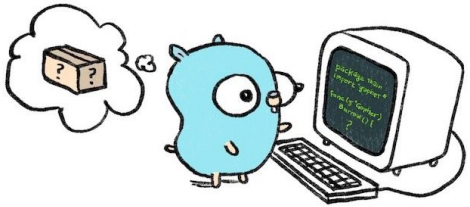
1

Go Tools & Resources

Developer Tools
Static Checkers
Dynamic Checkers
Templates
Docs
Libraries

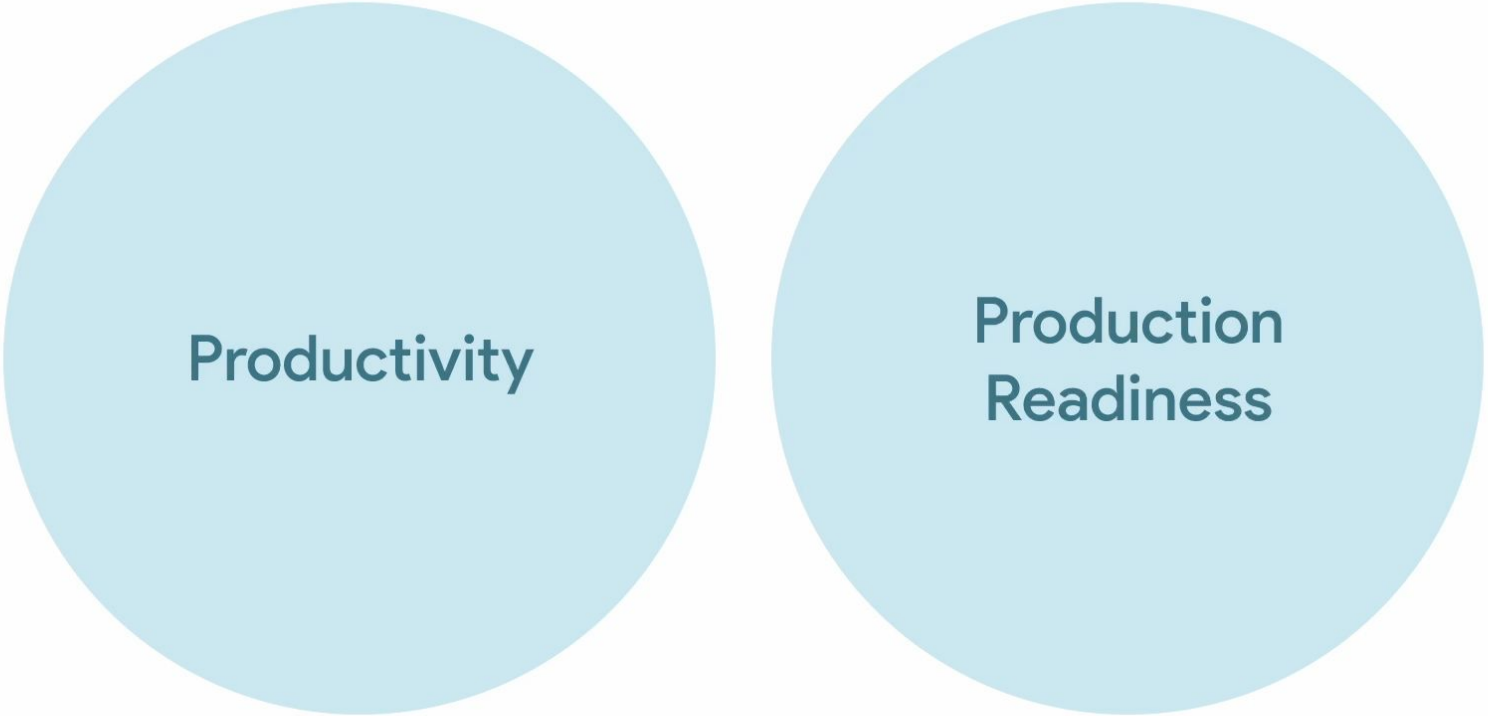


2

Go Ecosystem Signals

Vulnerability Data
Remediation Data
Usage Signals
Trust Signals

Go's Next Frontier


Productivity
Production
Readiness


Productivity

Generate **better Go code** by making the Go platform and ecosystem **available to AI**

- **Stuck-in-the-past problem and ecosystem-scale modernizers**
- Enable AI tool use, e.g., through MCP
- Surface quality and security signals through existing Go tools, resources, and ecosystem metrics

https://github.com/modelcontextprotocol/go-sdk

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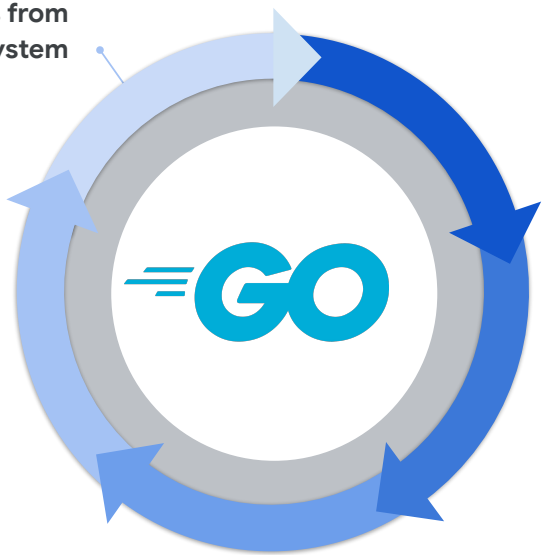
Go's ecosystem powers developer success. **AI accelerates** this success.

Better AI assistants and agents use the best tools and resources from the Go ecosystem



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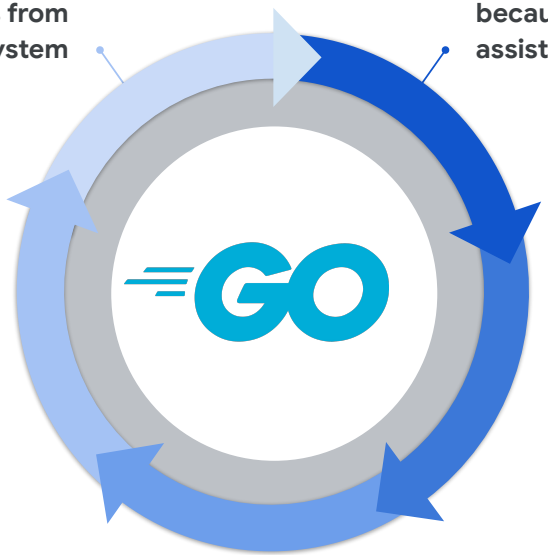
Go developers are more successful because Go has better AI assistants, agents, and devex



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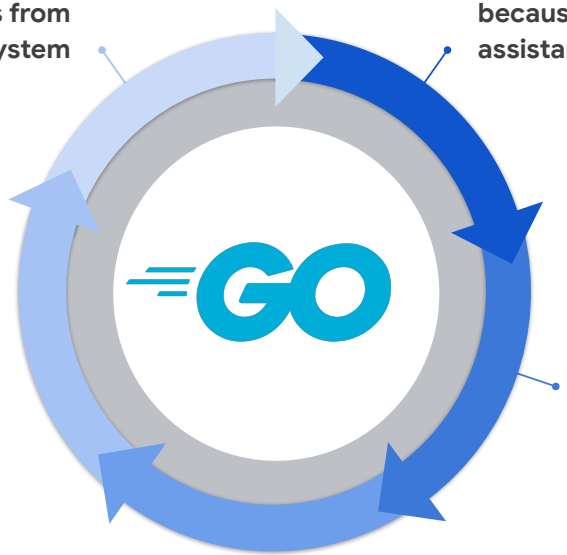

More successful Go developers leads to **more Go workloads and more Go developers**

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Go Ecosystem

- Developer Tools
- Libraries
- Templates
- Open Source Code
- Best Practice Docs
- Trust Signals
- Vulnerability Data

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AI applications are **cloud applications that make high-performance API calls**—Go's bread and butter

- **SDKs that enable AI applications (e.g., MCP, ADK, A2A)**
- Capabilities that enable AI infrastructure (e.g., SIMD)
- Capabilities that keep Go performant and production-ready as hardware evolves (e.g., Green Tea GC)

AI applications are **cloud applications that make high-performance API calls**—Go's bread and butter

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93%

Customer Satisfaction

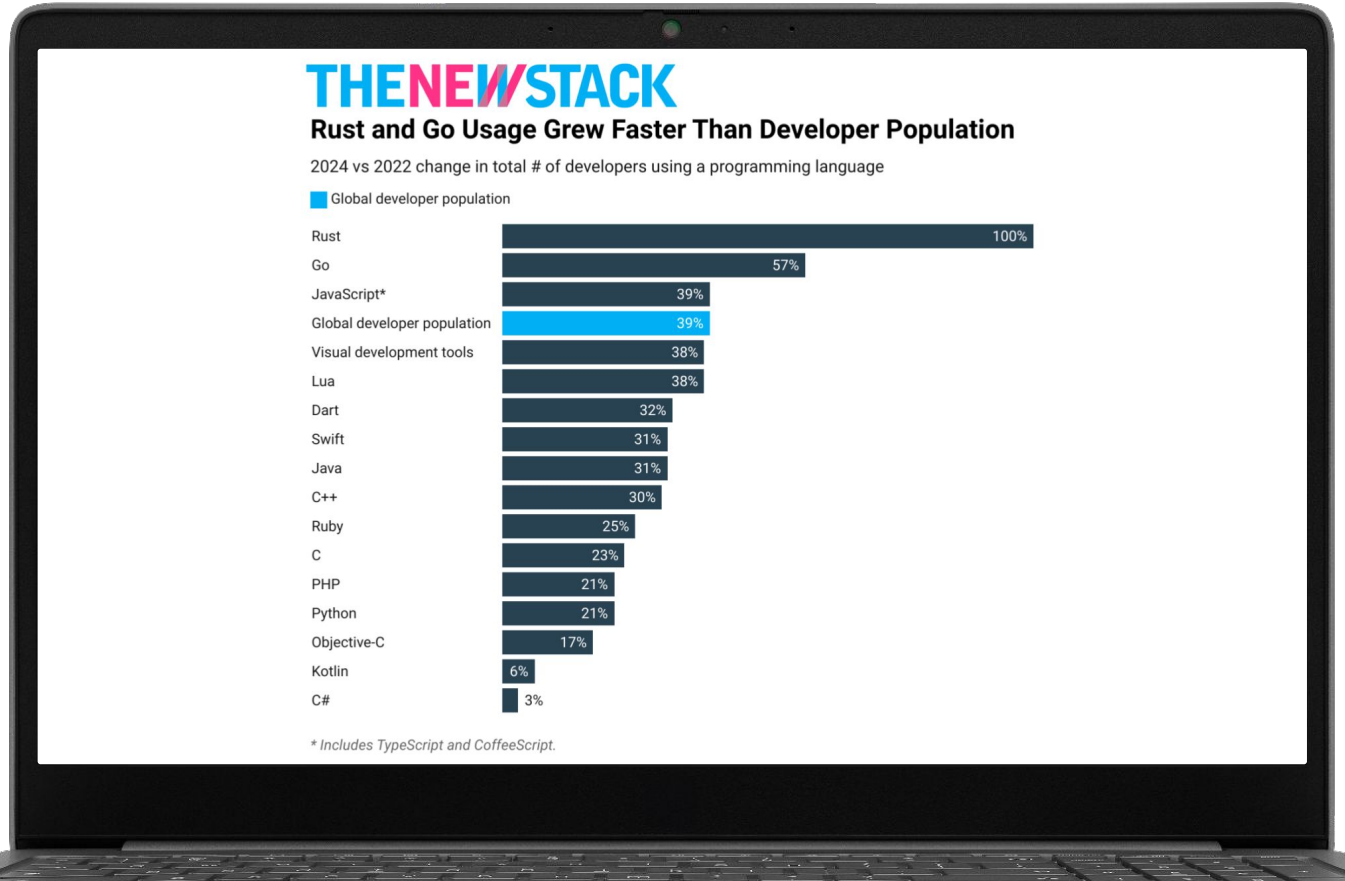
Go developers experience some of the **highest satisfaction** levels in the **entire industry**

Go Developer Survey 2024 H1

Professional Developers Use Go

Stack Overflow 2025 Developer Survey
survey.stackoverflow.co/2025

Go is growing **faster than the developer population**



Go is the **#1 language driving API calls** on the internet

Go's community leads everything

Go Developers

Members	Groups	Countries
107,223	**112**	**39**


Thank you!
Go
Next '24
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Android
GopherCon
Korea 2024

Go's next frontier will be built by all of us

Google

Thank you

Cameron Balahan
Go Product Lead

Google