

15:35–16:00 | Keynote: How AI Will Shape the Future of Software Engineering



STEVEN HAO

Co-Founder & Chief Technology Officer



Devin is an AI Software engineer
for existing codebases.

Founding Story

Cognition Labs was founded in early 2024 as an applied AI research lab to tackle the hardest problems in long-term reasoning.

Soon after, we unveiled Devin to the world - and it has been reshaping the art of the possible in AI ever since.

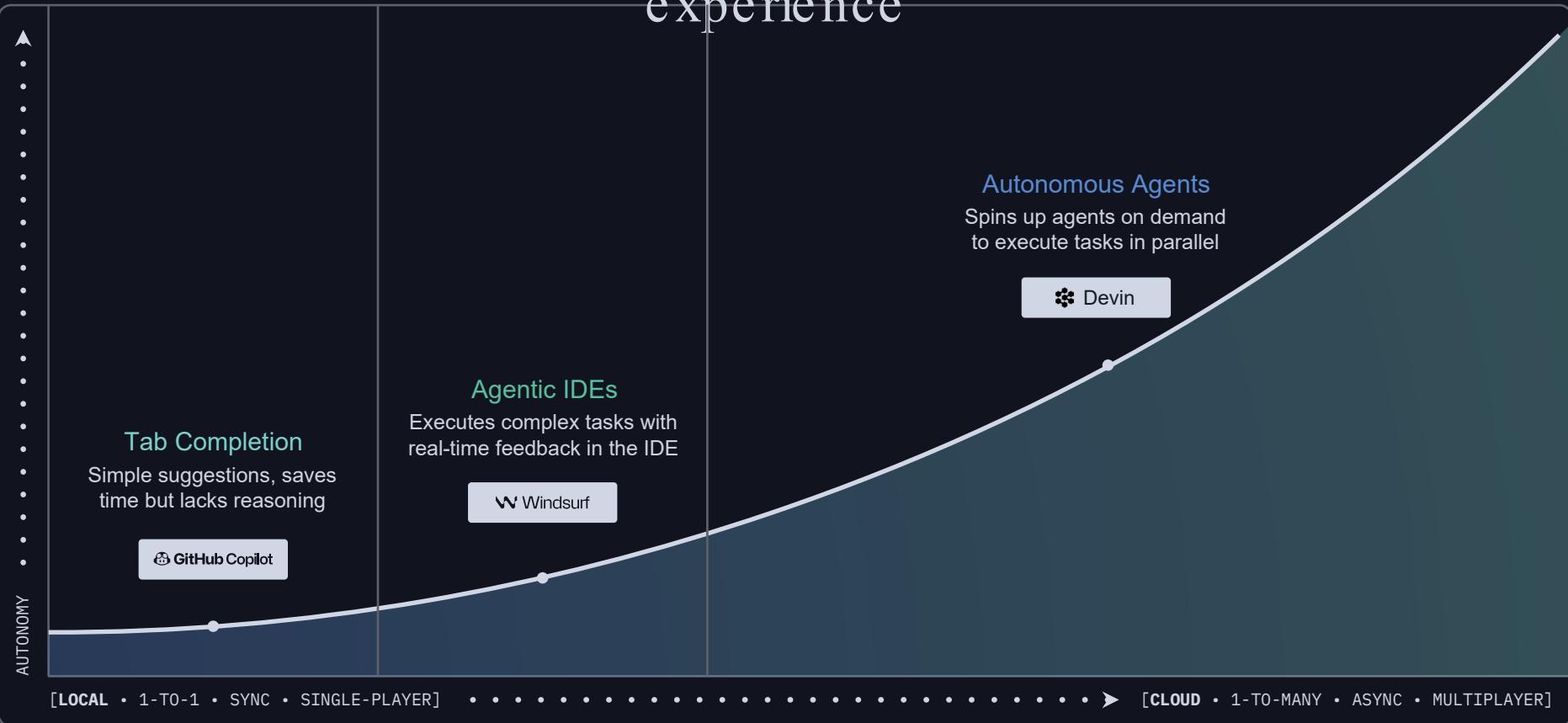
We have raised from leading investment firms globally



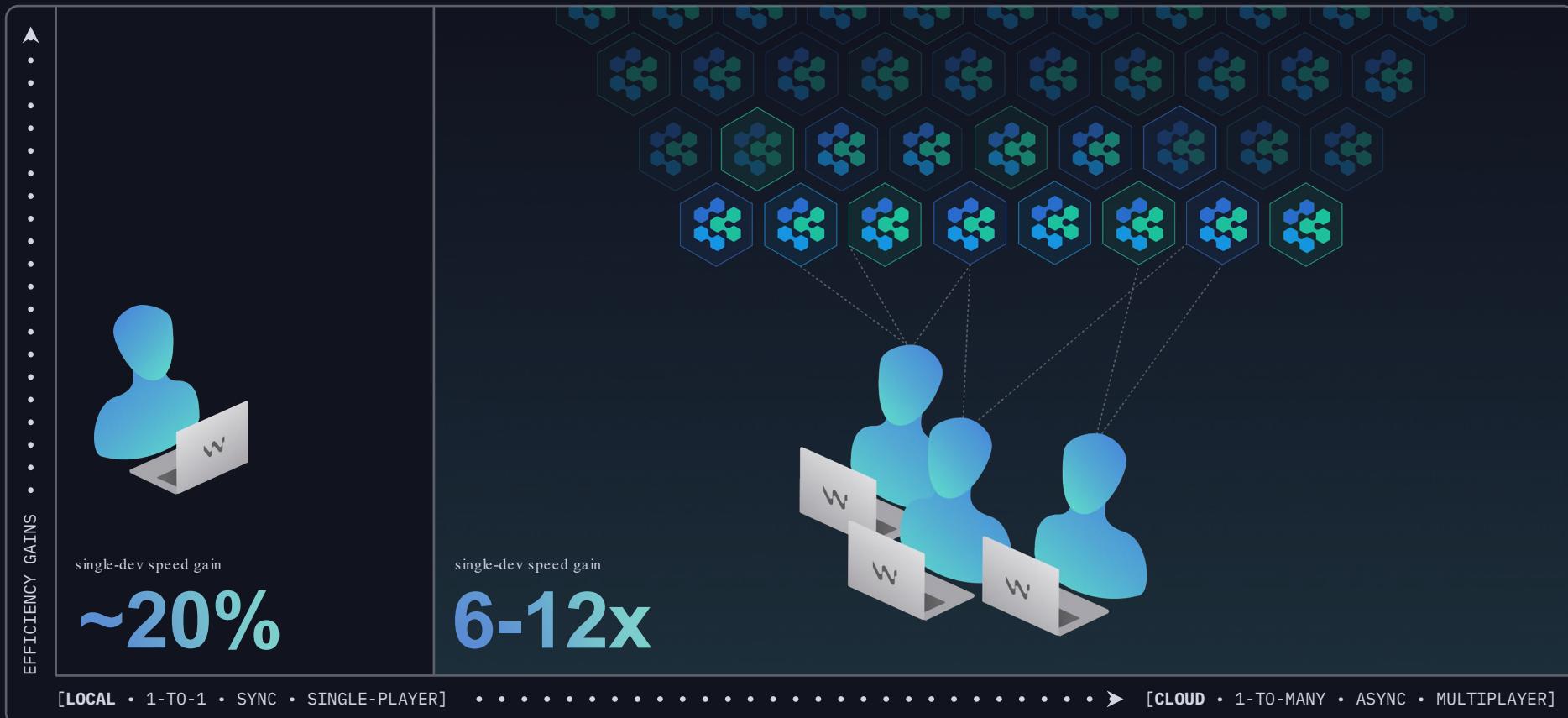
Over 300+ Global Customers



Devin Dev [paradigm shift] in engineering efficiency & experience



A [paradigm shift] in engineering efficiency & experience



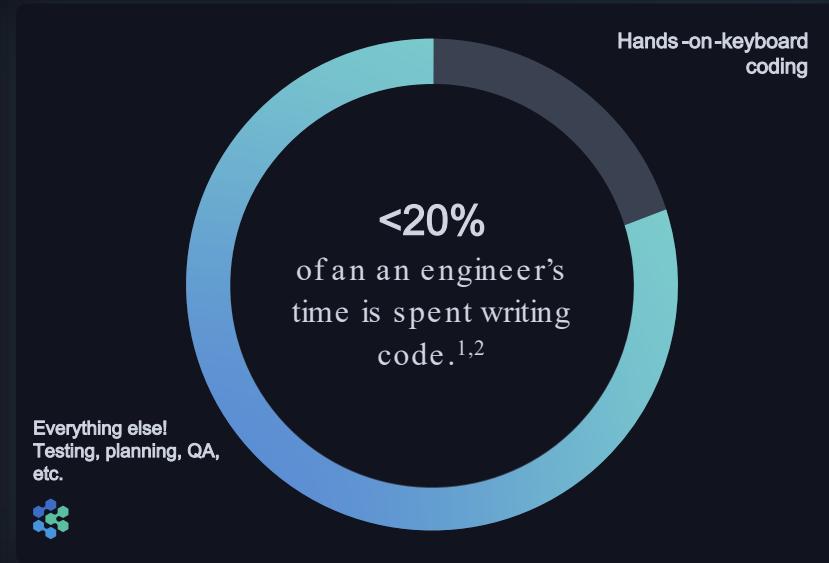
Cloud Agents

Asynchronous, parallelizable Devin agents, running in cloud VMs.

An army of Devins at your fingertips, turning your engineers into managers of a fleet of agents.

Where are we headed?

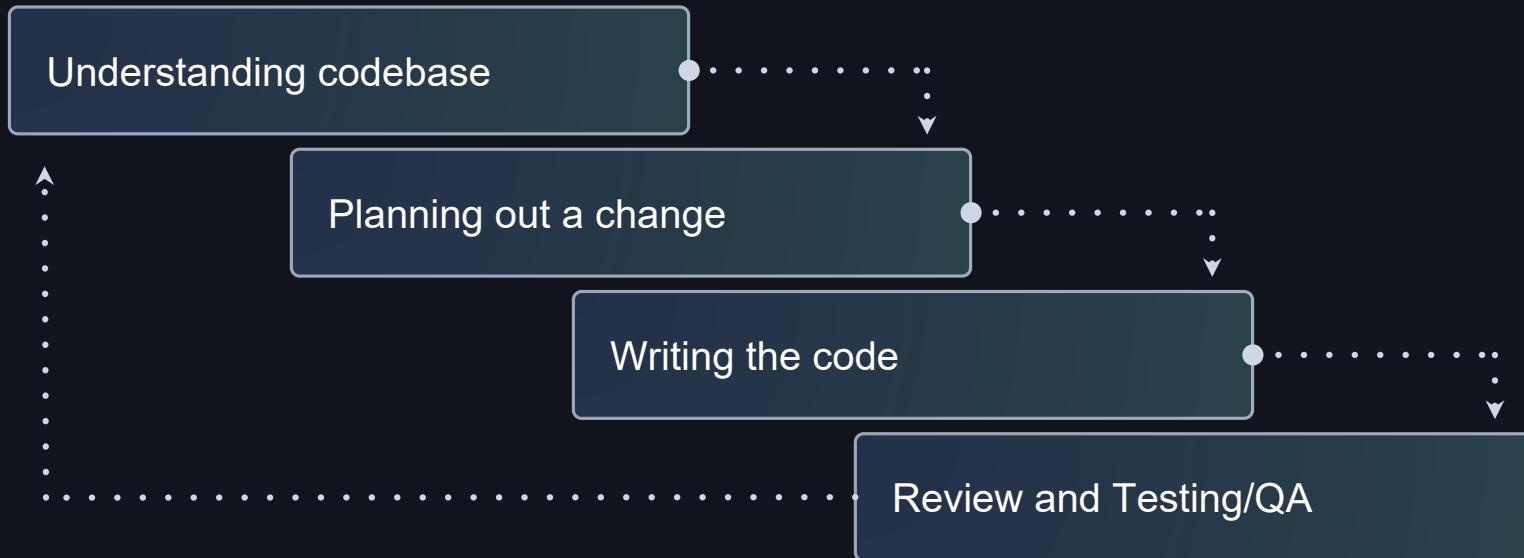
[Engineering] is much more than just writing code



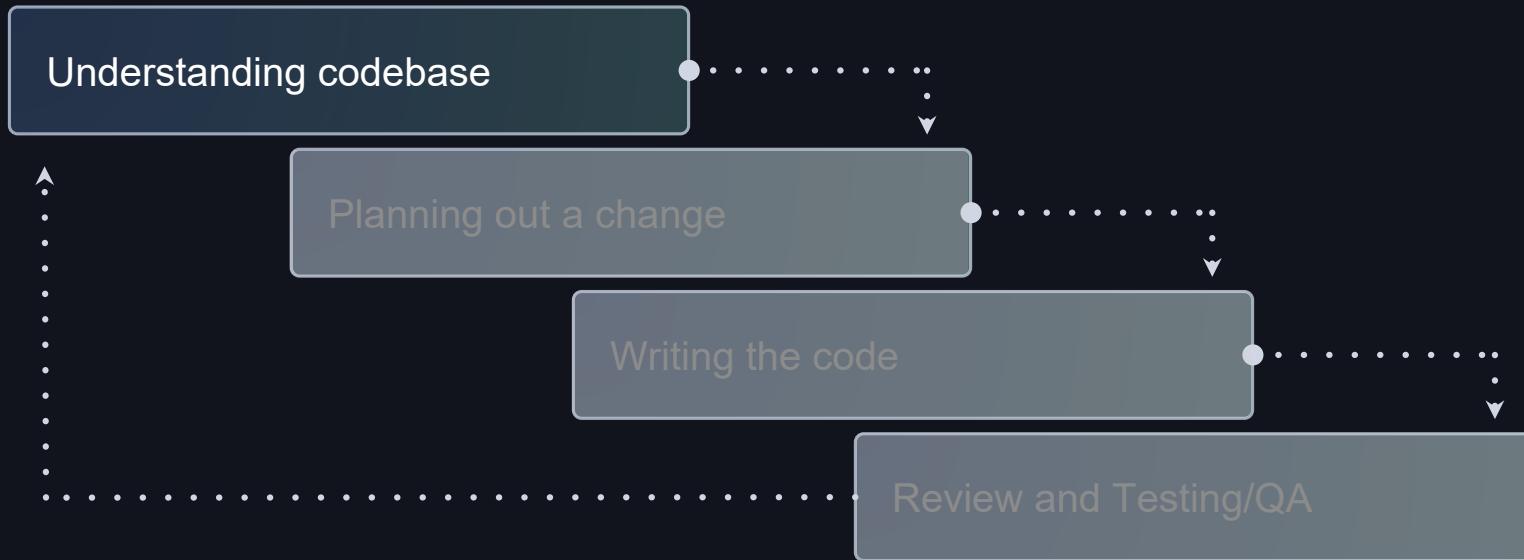
¹Microsoft Research (2024)

²Software (2023)

Full loop engineering



Full loop engineering



DeepWiki

Build deep codebase understanding through DeepWiki – a real-time library of documentation over your codebase.

Complete with architecture diagrams, logic trees, and dependency graphs, as well as direct references to underlying code.

DeepWiki cognition-workshop/kubernetes

[Edit wiki](#)

Kubernetes Overview

[Relevant source files](#)

This page provides a high-level overview of the Kubernetes codebase architecture, explaining the purpose and core components of Kubernetes, their relationships, and how they work together. For detailed information about specific components, please refer to their dedicated wiki pages linked throughout this document.

What is Kubernetes?

Kubernetes is an open-source container orchestration platform designed to automate the deployment, scaling, and management of containerized applications. The Kubernetes codebase implements a distributed system with multiple components that work together to maintain the desired state of the cluster.

Core Architecture

```

graph TD
    APIServer[API Server] --> ControlPlane[Control Plane]
    ControlPlane --> NodeEnv[Node Environment]
    NodeEnv --> Kubelet[Kubelet]
    NodeEnv --> KubeProxy[Kube-Proxy]
    Kubelet --> CNI[Container Network Interface]
    Kubelet --> CSI[Container Storage Interface]
    Kubelet --> CB[Container Building Interface]
    KubeProxy --> APIServer
    KubeProxy --> ControlPlane
    APIServer --> ControlPlane
    ControlPlane --> APIServer
    ControlPlane --> Storage[Storage]
    ControlPlane --> Scheduler[Scheduler]
    ControlPlane --> ControllerManager[Controller Manager]
    ControlPlane --> CRU[Custom Resources & Extensions]
    Storage --> APIServer
    Scheduler --> APIServer
    ControllerManager --> APIServer
    CRU --> APIServer
  
```

Ask Devin about kubernetes

On this page

- Kubernetes Overview
- What is Kubernetes?
- Core Architecture
- Key Components
- API Server
- Controller Manager
- Scheduler
- Kubelet
- Kube-Proxy
- Communication Flows
- Feature Gates
- Core API Objects
- Codebase Structure Overview
- Core Initialization and Runtime Flow
- Summary

Kubernetes Overview

Project Governance

Core API and Feature Gates

API Types and Validation

Feature Gates

Node Components

Kubelet

Kube-Proxy

Control Plane Components

API Server

Controller Manager

Scheduler

Storage System

Caching Layer

Cluster Lifecycle

Kubeadm

GCE Cluster Configuration

Local Development Cluster

Development and Building

Build System

Dependencies

Testing

Kubernetes Overview

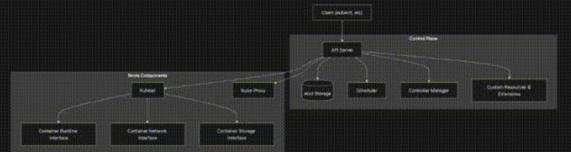
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Core Architecture



Sources: [pkg/kubelet/kubelet.go](#) 1-149

[cmd/kube-apiserver/app/server.go](#) 1-118

[pkg/api/types.go](#) 1-100

Ask Devin about kubernetes

On this page

Kubernetes Overview

What is Kubernetes?

Core Architecture

Key Components

API Server

Controller Manager

Scheduler

Kubelet

Kube-Proxy

Communication Flows

Feature Gates

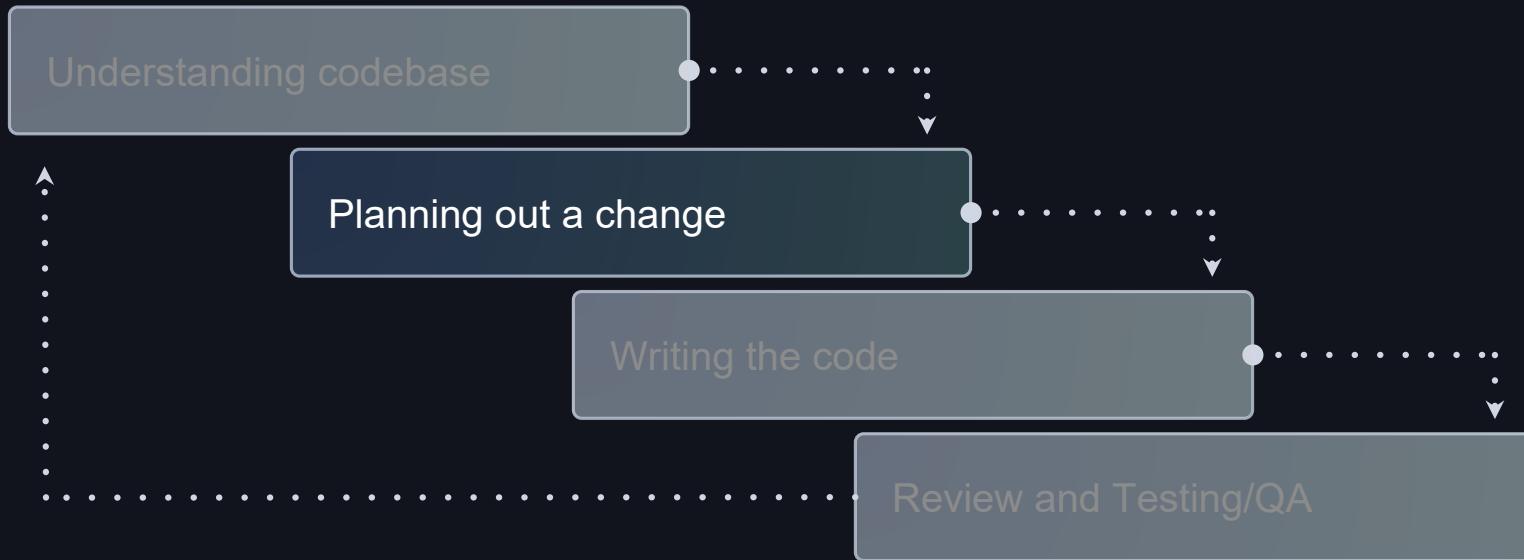
Core API Objects

Codebase Structure Overview

Core Initialization and Run

Summary

Full loop engineering



Ask Devin

Dive deeper into your codebase by asking questions directly to DeepWiki.

Perfect for scoping and planning large projects with direct references to underlying code.

How does the Garbage Collector controller manage process deletions?

Searched across kubernetes

◆ Go deeper

You're asking about how the **Garbage Collector controller** in Kubernetes manages the deletion of objects (processes in the sense of Kubernetes resources/objects). [garbagecollector.go:53-77](#)

Overview

The Garbage Collector controller manages object deletions through a dependency graph-based system that tracks owner-dependent relationships and processes deletions according to propagation policies (Background, Foreground, or Orphan).

Core Architecture

The `GarbageCollector` struct maintains two primary work queues:

1. `attemptToDelete` - for objects ready to be deleted
2. `attemptToOrphan` - for objects whose dependents need to be orphaned before deletion

Deletion Processing Flow

1. Worker Initialization

When the GC starts, it spawns multiple workers that continuously process these queues: `garbagecollector.go:159-163`

2. Delete Attempt Processing

Each delete worker processes items from the `attemptToDelete` queue: [garbageCollector.go:282-298](#)

The core deletion logic in `attemptToDelete`
`garbagecollector.go:492-512`

3. Owner Reference Classification

```
  cognition-workshop/kubernetes pkg/controller/garbagecollector/garbagecollector.go □

不

50 // ResourceResyncTime defines the resync period of the garbage collector's informed
51 const ResourceResyncTime time.Duration = 8
52
53 // GarbageCollector runs reflectors to watch for changes of managed API
54 // objects, funnels the results to a single-threaded dependencyGraphBuilder,
55 // which builds a graph caching the dependencies among objects. Triggered by the
56 // graph changes, the dependencyGraphBuilder enqueues objects that can
57 // potentially be garbage-collected to the 'attemptToDelete' queue, and enqueues
58 // objects whose dependents need to be orphaned to the 'attemptToDeleteOrphan' queue.
59 // The GarbageCollector has workers who consume these two queues, send requests
60 // to the API server to delete/update the objects accordingly.
61 // Note that having the dependencyGraphBuilder notify the garbage collector
62 // ensures that the garbage collector operates with a graph that is at least as
63 // up to date as the notification is sent.
64 type GarbageCollector struct {
65     restMapper     meta.ResettableRESTMapper
66     metaDataClient metaData.Interface
67     // garbage collector attempts to delete the items in attemptToDelete queue when
68     attemptToDelete workqueue.TypedRateLimitingInterface[*node]
69     // garbage collector attempts to orphan the dependents of the items in the attemptToDeleteOrphan queue
70     attemptToDeleteOrphan workqueue.TypedRateLimitingInterface[*node]
71     dependencyGraphBuilder *GraphBuilder
72     // GC cache the owners that do not exist according to the API server.
73     absentOwnerCache *ReferenceCache
74
75     kubeClient      clientset.Interface
76     eventBroadcaster record.EventBroadcaster
77 }
78
79 var _ controller.Interface = (*GarbageCollector)(nil)
80 var _ controller.Debuggable = (*GarbageCollector)(nil)

```

2 Deep

Construct Devin Prompt

 Cognition

Ticket Scoping & Ask Devin

Devin outlines its understanding of the task, open questions, and a proposed solution.

Add epic / MBA-18

Add a comment...

Looks good! Need help? This is blocked... Can you clarify...? This is a duplicate!

Pro tip: press **M** to comment

Devin June 22, 2025 at 8:27 AM

- > The Task: Convert the COBOL program `merge_sort_test.cbl` to an equivalent Java program that preserves its file-based sorting behavior without modernization. Confidence: Med 😐
- > Existing Code: The COBOL program '`merge_sort.cbl`' in '`merge_sort/`' directory performs file creation, merging, and sorting operations using COBOL's built-in SORT/MERGE verbs. Confidence: High 🟢
- > Proposed Solution: Create a Java program with equivalent file operations and sorting functionality. Confidence: Med 😐

Looks good? [Click here](#) to start a Devin session to create a PR

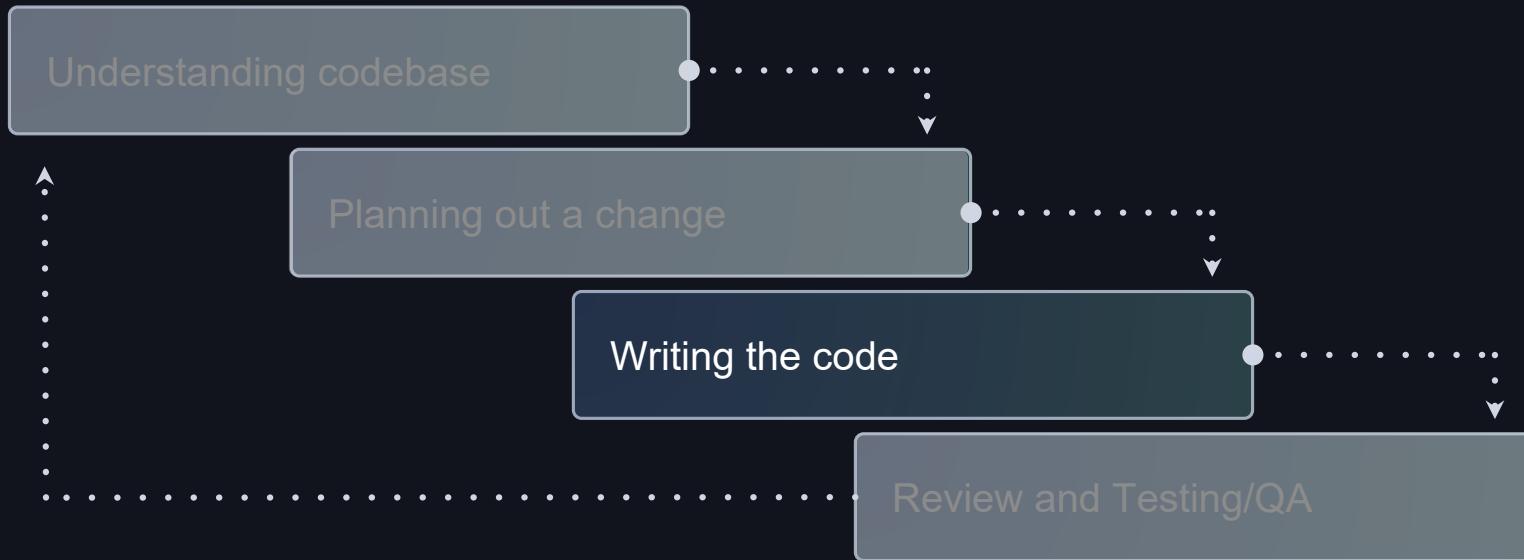
Need to explore further? [Open in Devin Spaces](#) for follow-up analysis

Needs work? Edit the issue text, then remove and add the Devin label to try again.

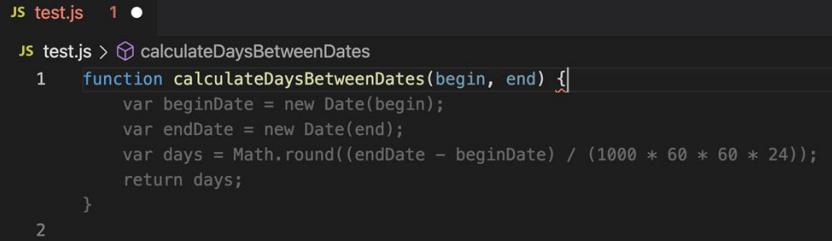
Automation Rule executions

Created June 12, 2025 at 1:02 PM
Updated October 2, 2025 at 11:26 PM

Full loop engineering

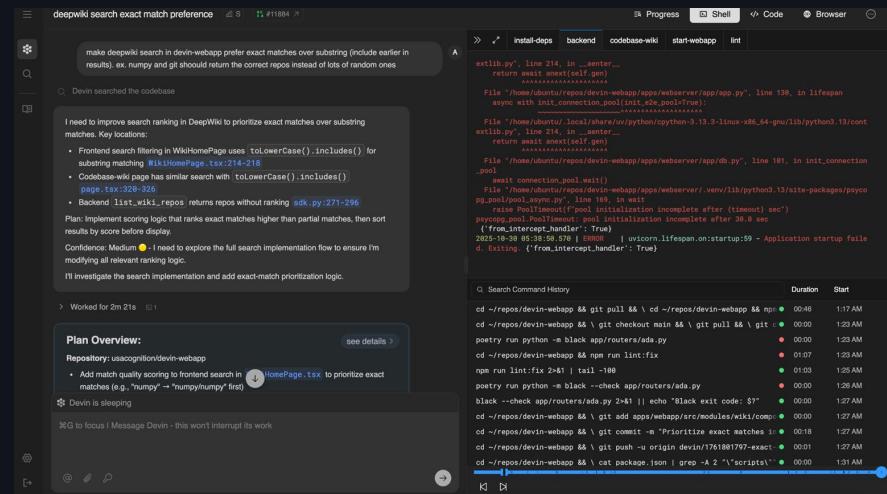


The GenAI Era



```
JS test.js 1
JS test.js > ⚡ calculateDaysBetweenDates
1   function calculateDaysBetweenDates(begin, end) {
  var beginDate = new Date(begin);
  var endDate = new Date(end);
  var days = Math.round((endDate - beginDate) / (1000 * 60 * 60 * 24));
  return days;
}
2
```

The GenAI+RL Era



make deepwiki search in devin-webapp prefer exact matches over substring (include earlier results) ex. numpy and git should return the correct repos instead of lots of random ones

Devin searched the codebase

I need to improve search ranking in DeepWiki to prioritize exact matches over substring matches. Key locations:

- Frontend search filtering in `WikiHomePage` uses `toLowerCaseCase().includes()` for substring matching. `WikiHomePage.tsx:214-218`
- Codebase-wiki page has similar search with `toLowerCaseCase().includes()` `page.tsx:328-329`
- Backend `list_wiki_repos` returns repos without ranking `sdk.py:271-296`

Plan: Implement scoring logic that ranks exact matches higher than partial matches, then sort results by score before display.

Confidence: Medium. I need to explore the full search implementation flow to ensure I'm modifying all relevant ranking logic.

I'll investigate the search implementation and add exact-match prioritization logic.

Worked for 2m 21s

Plan Overview:

Repository: usacognition/devin-webapp

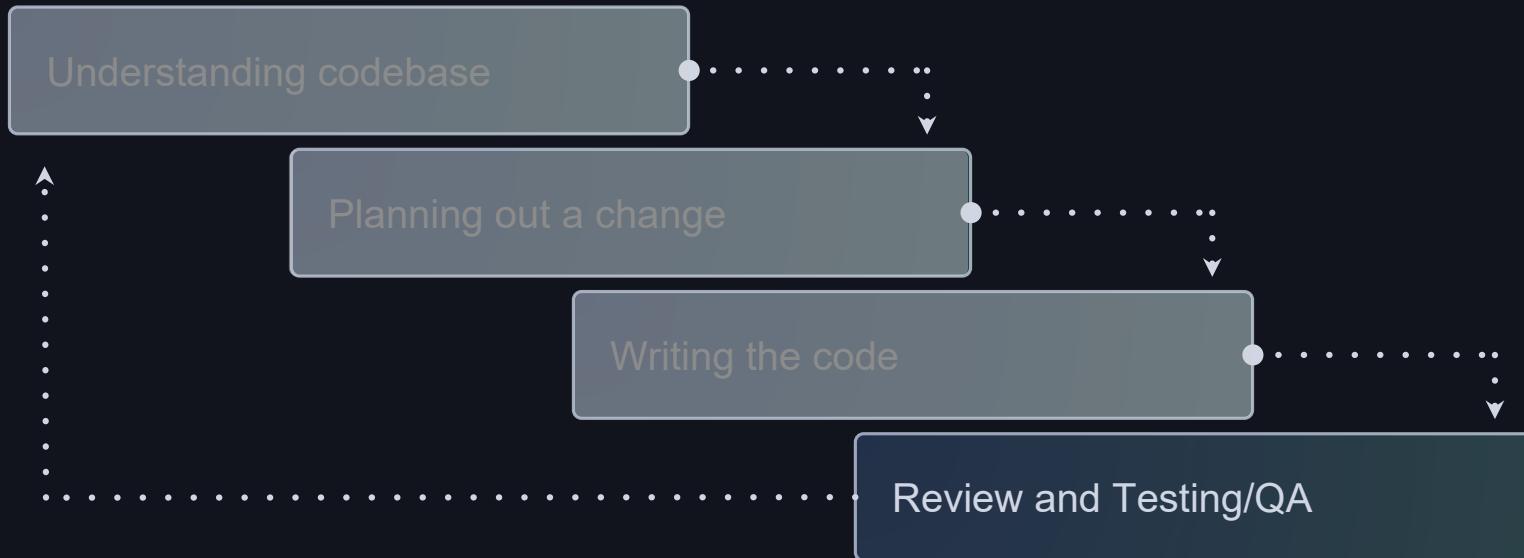
• Add match quality scoring to frontend search in `WikiHomePage.tsx` to prioritize exact matches (e.g., "numpy" → "numpy/numpy" first)

Devin is sleeping

⌘G to focus | Message Devin - this won't interrupt its work

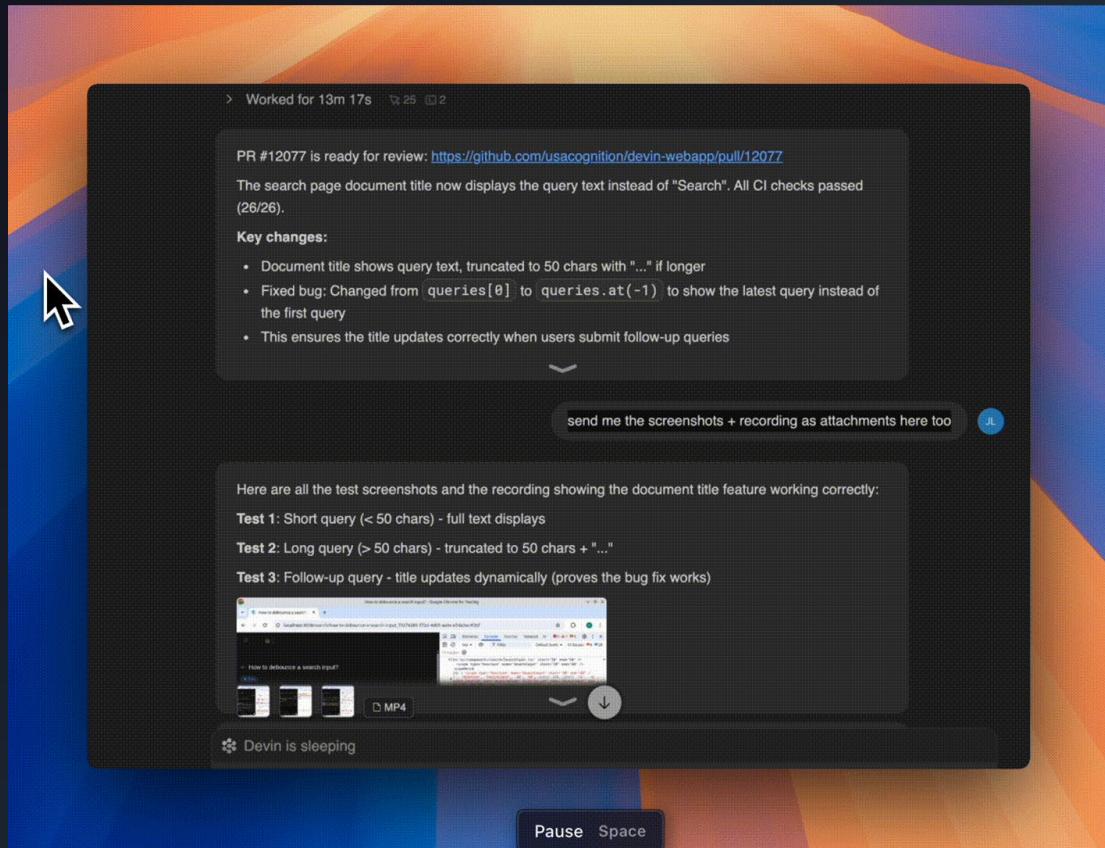
Duration	Start
00:46	1:17 AM
00:00	1:20 AM
00:00	1:23 AM
01:07	1:23 AM
01:03	1:25 AM
00:00	1:26 AM
00:00	1:27 AM
00:00	1:27 AM
00:18	1:27 AM
00:01	1:27 AM
00:00	1:29 AM

Full loop engineering



Computer Use for Testing

“For the Ask Devin page, the document title is currently always just ‘Search’. Make it change dynamically to the query itself instead (truncate if needed)”



PR Review

Devin is subject to the same SDLC controls as your human developers, including PRs and branch protections, CI/CD, etc.

The transition to the future state leverages the tools and guardrails we are familiar with today.

chore(js-ts): Convert app/components/UI/Swaps/components/Ratio.js to TypeScript #11311

Merged Cal-L merged 5 commits into [main](#) from [convert-ts-Ratio-945](#)

Conversation 6 Commits 5 Checks 0 Files changed 1

Contributor [...](#)

devin-ai-integration bot

Reviewers Cal-L

Assignees No one assigned

Convert app/components/UI/Swaps/components/Ratio.js to TypeScript

Cal-L reviewed on Sep 19, 2024

View reviewed changes

Contributor [...](#)

Cal-L left a comment

Left some comments

app/components/UI/Swaps/components/Ratio.tsx Outdated

Show resolved

app/components/UI/Swaps/components/Ratio.tsx Outdated

Hide resolved

```

8 + import type { ThemeColors } from '@metamask/design-tokens/dist/types/js/themes/types';
9 - const createStyles = (colors) =>
10 + const createStyles = (colors: ThemeColors) =>

```

Cal-L on Sep 19, 2024

Contributor [...](#)

Suggested change

```

- const createStyles = (colors: ThemeColors) =>

```

devin-ai-integration[bot] reacted with eyes emoji

styles = (colors: Theme['colors']) =>

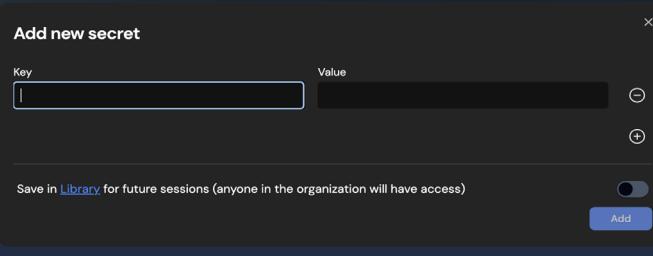
1

Update Ratio.tsx to use Theme['colors']

5c0ae50

Guardrails and Security

Agents learn company best-practices, but should also be restricted in what they can and cannot access.



Hard controls:

- Secrets management: read privileges instead of write privileges.
- All code changes must be approved by a human PR reviewer.

Forbidden Actions

- Do NOT try to access github.com through the browser, you will not be authenticated.
- NEVER force push on branches! Prefer merging over rebasing so that you don't lose any work.
- Do NOT push directly to the main branch.

Soft controls:

- “Forbidden actions”.
- Learned behaviors through Knowledge.

Deep Dive DeepWiki

DeepWiki

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DeepWiki cognition-workshop/kubernetes

[Edit wiki](#)

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    Kubelet --> CB[Container Building Interface]
    KubeProxy --> APIServer
    KubeProxy --> ControlPlane
    APIServer --> ControlPlane
    ControlPlane --> APIServer
    ControlPlane --> Storage[Storage]
    ControlPlane --> Scheduler[Scheduler]
    ControlPlane --> ControllerManager[Controller Manager]
    ControlPlane --> CRU[Custom Resources & Extensions]
    Storage --> APIServer
    Scheduler --> APIServer
    ControllerManager --> APIServer
    CRU --> APIServer
  
```

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Which repo would you like to understand?

Q Search for repositories (or paste a link)

+

Add repo

antiwork / gumroad

☆ 5.2k

huggingface / transformers

Transformer: State-of-the-art Machine Learning for Pytorch, TensorFlow, and JAX.

☆ 143.1k

lodash / lodash

A modern JavaScript utility library delivering modularity, performance, & extras.

☆ 60.3k

microsoft / vscode

Visual Studio Code

☆ 170.1k

langchain-ai / local-deep-researcher

Fully local web research and report writing assistant

☆ 7.0k

langchain-ai / langchain

Build context-aware reasoning applications

☆ 105.8k

sqlite / sqlite

Official Git mirror of the SQLite source tree

☆ 7.7k

mark3labs / mcp-go

A Go implementation of the Model Context Protocol (MCP), enabling seamless integration between LLM...

☆ 3.4k

meta-llama / llama-models

Utilities intended for use with Llama models.

☆ 6.8k

expressjs / express

monaco-editor / monaco-editor

A browser based code editor

☆ 42.1k

DeepWiki.com

Q&A





Global NaaS Event

