

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



STEVEN HAO

Co-Founder & Chief Technology Officer



Cognition

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.

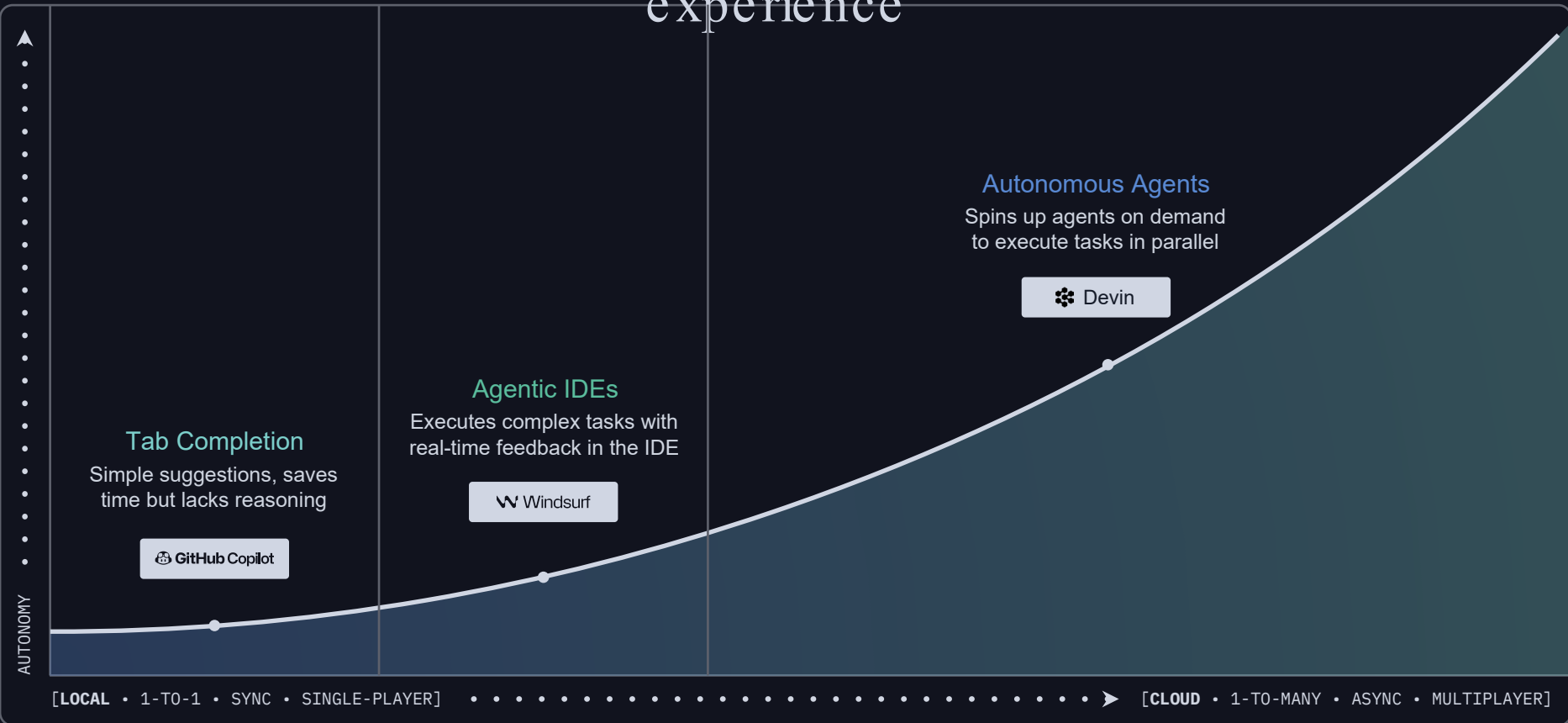
We have raised from leading investment firms globally



Over 300+ Global Customers



Devin is a [paradigm shift] in engineering efficiency & experience



A [paradigm shift] in engineering efficiency & experience



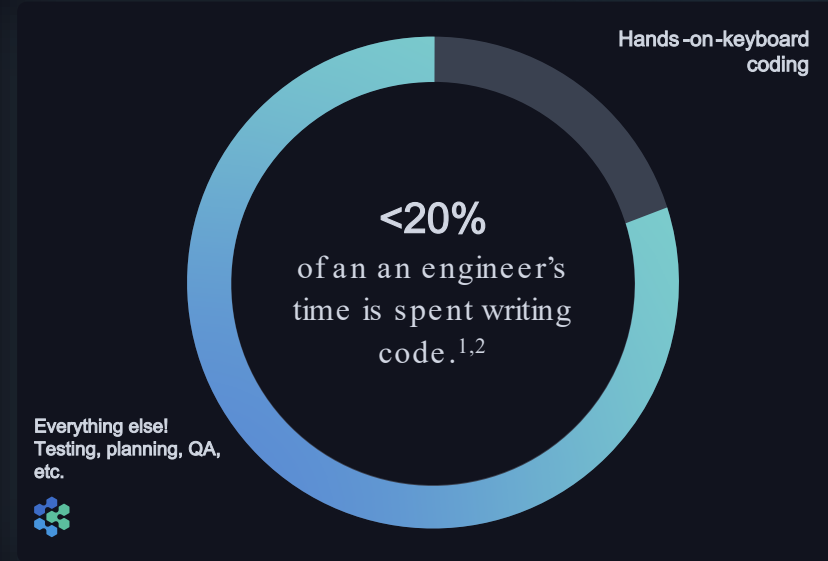
Cloud Agents

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?

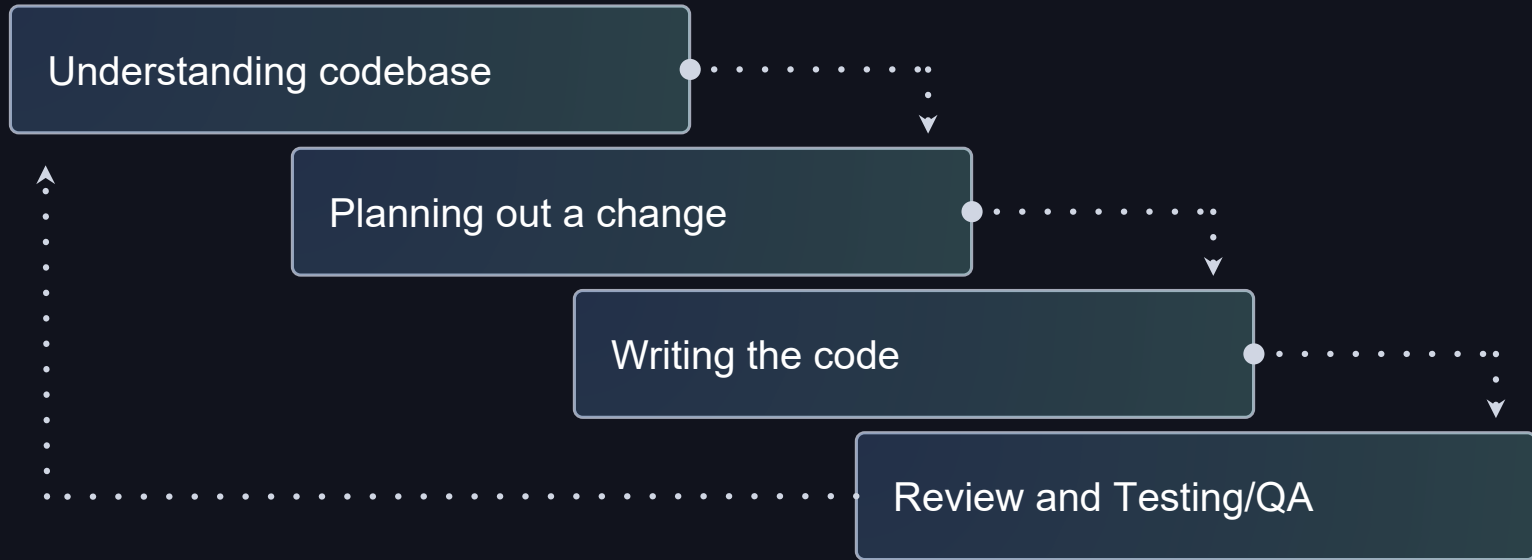
[Engineering] is much more than just writing code



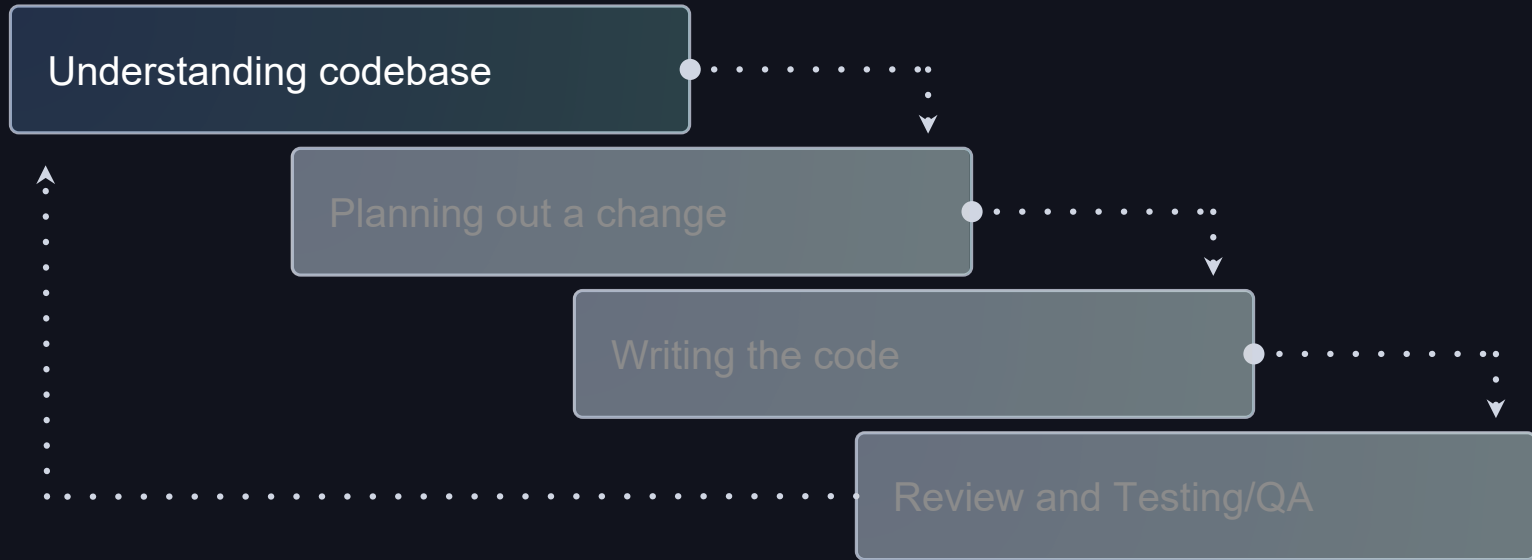
¹Microsoft Research (2024)

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
Search kubernetes wiki...

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

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
    Client[Client kubectl, etc] --> APIServer[API Server]
    subgraph ControlPlane [Control Plane]
        APIServer
        etcd[etcd Storage]
        Scheduler
        CM[Controller Manager]
        CREST[Custom Resource & Extensions]
    end
    subgraph NodeComponents [Node Components]
        Kubelet
        KubeProxy[Kube-Proxy]
        CRI[Container Runtime Interface]
        CNI[Container Network Interface]
        CSI[Container Storage Interface]
    end
    APIServer <--> etcd
    APIServer <--> Scheduler
    APIServer <--> CM
    APIServer <--> CREST
    Kubelet <--> CRI
    Kubelet <--> CNI
    Kubelet <--> CSI
    Kubelet <--> KubeProxy
    KubeProxy <--> APIServer
    KubeProxy <--> CNI
    
```

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

Ask Devin about kubernetes

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

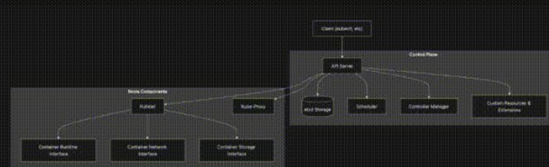
> Relevant source files

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



Sources: pkg/kubelet/kubelet.go 1-148

cmd/kube-apiserver/app/server.go 1-118

pkg/ask Devin about kubernetes.

Key C

On this page

Kubernetes Overview

What is Kubernetes?

Core Architecture

Key Components

API Server

Controller Manager

Scheduler

Kubelet

Kube-Proxy

Communication Flows

Feature Gates

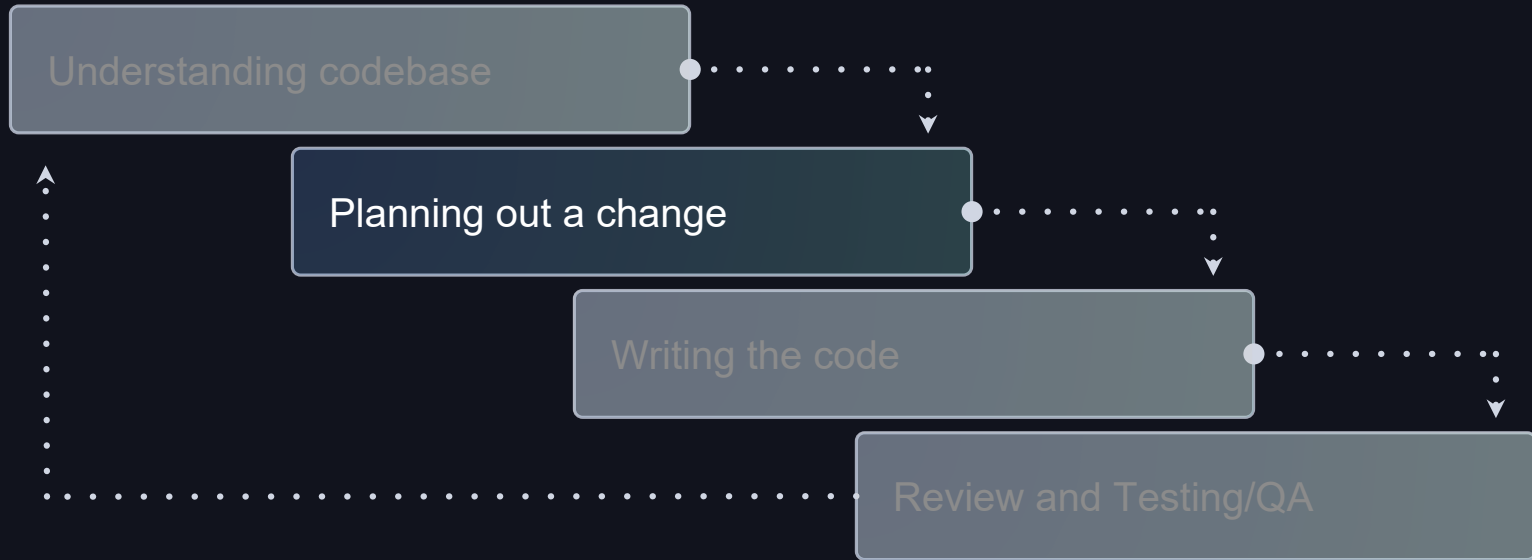
Core API Objects

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?

Fast

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: [garbagecollector.go:68-70](#)

- `attemptToDelete` - for objects ready to be deleted
- `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:283-308](#)

The core deletion logic in `attemptToDelete`: [garbagecollector.go:492-512](#)

3. Owner Reference Classification

Ask a follow-up question or construct a Devin prompt.

Deep ☐

Construct Devin Prompt

Ask

```

cognition-workshop/kubernetes pkg/controller/garbagecollector/garbagecollector.go
50 // ResourceResyncTime defines the resync period of the garbage collector's informer
51 const ResourceResyncTime time.Duration = 0
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 'attemptToOrphan' 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 atte
70     attemptToOrphan workqueue.TypedRateLimitingInterface[*node]
71     dependencyGraphBuilder *GraphBuilder
72     // GC caches 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)
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000

```

Ticket Scoping & Ask Devin

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

 Add epic / ☒ MBA-18

  1  ...  

P

Add a comment...

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

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_test.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.

   ...

 ⚡ Improve work item

Details

Assignee  Unassigned

[Assign to me](#)

Labels Devin

Parent Add parent

Team Add team

 [Open with VS Code](#)

Development  [Create branch](#)

 [Create commit](#)

Reporter  Shawn Azman

> 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
```

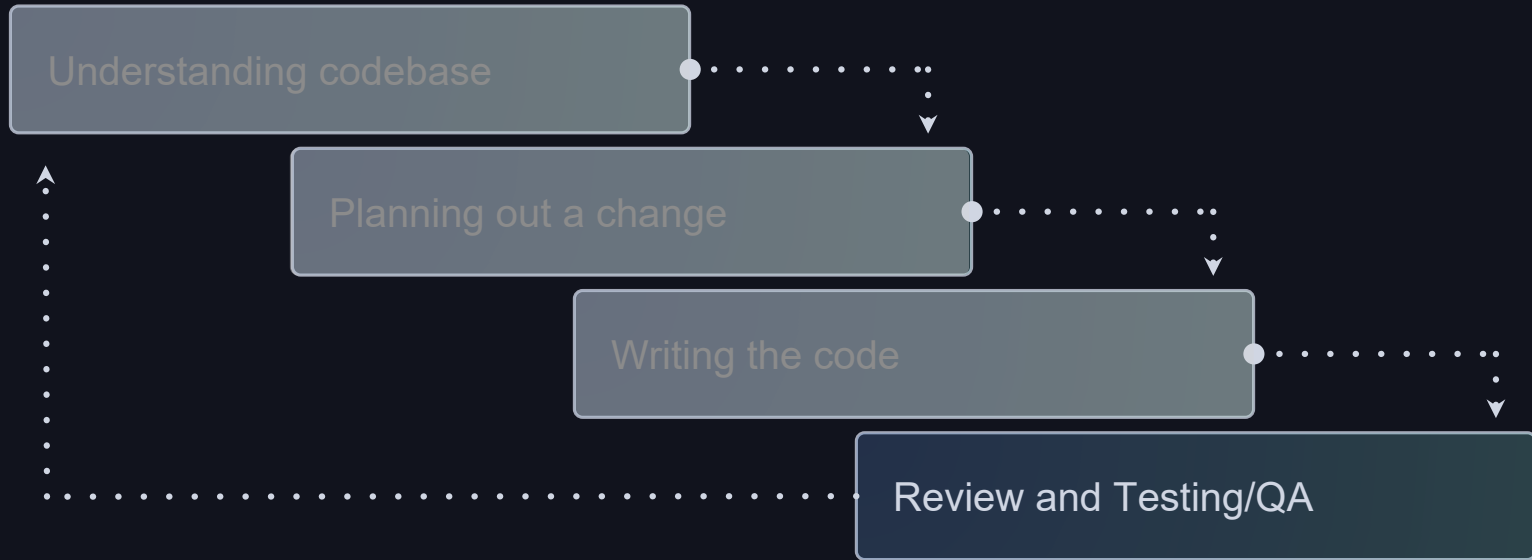
The GenAI+RL Era

The screenshot shows a code editor with a search bar at the top containing the text "deepwiki search exact match preference". Below the search bar, there are several search results. The first result is a code snippet from "test.js" showing a function "calculateDaysBetweenDates". The second result is a code snippet from "test.js" showing a function "calculateDaysBetweenDates". The third result is a code snippet from "test.js" showing a function "calculateDaysBetweenDates".

Below the search results, there is a terminal window showing a command history. The commands are:

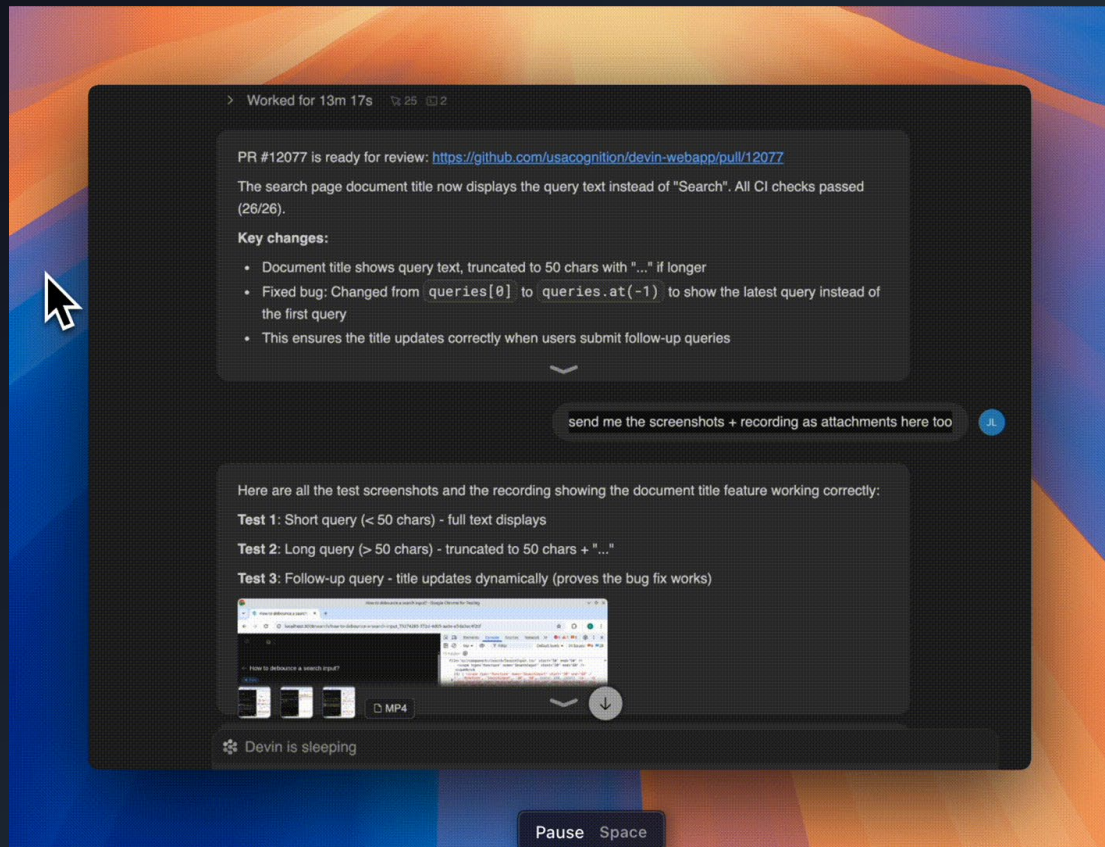
```
cd ~/repos/devin-webapp && git pull && cd ~/repos/devin-webapp && npm
cd ~/repos/devin-webapp && git checkout main && git pull && git
poetry run python -m black app/routers/ada.py
cd ~/repos/devin-webapp && npm run lint:fix
npm run lint:fix 2>&1 | tail -100
poetry run python -m black --check app/routers/ada.py
black --check app/routers/ada.py 2>&1 | echo "Black exit code: $?"
cd ~/repos/devin-webapp && git add app/webapp/src/modules/wiki/comp
cd ~/repos/devin-webapp && git commit -m "Prioritize exact matches in
cd ~/repos/devin-webapp && git push -u origin devin/76180797-exact
cd ~/repos/devin-webapp && cat package.json | grep -A 2 "scripts"
```

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



devin-ai-integration bot

Contributor

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

Cal-L left a comment

Contributor

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
9 - const createStyles = (colors) =>
10 + const createStyles = (colors: ThemeColors) =>
```



Cal-L on Sep 19, 2024

Contributor

Suggested change

```
- const createStyles = (colors: ThemeColors) =>
+ const createStyles = (colors: ThemeColors) =>
```

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

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.

The screenshot shows a dark-themed dialog box titled "Add new secret" with a close button (X) in the top right corner. Inside the dialog, there are two input fields: "Key" and "Value". The "Key" field is empty, and the "Value" field contains a redacted string. To the right of the "Value" field are two circular icons: a minus sign (-) and a plus sign (+). Below these fields is a toggle switch labeled "Save in Library for future sessions (anyone in the organization will have access)". The toggle is currently turned off. At the bottom right of the dialog is a blue button labeled "Add".

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

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
Search kubernetes wiki...

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

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
    Client[Client Subsets, etc.] --> APIServer[API Server]
    subgraph ControlPlane [Control Plane]
        APIServer
        etcd[etcd Storage]
        Scheduler
        CM[Controller Manager]
        CREST[Custom Resource & Extensions]
    end
    APIServer <--> etcd
    APIServer <--> Scheduler
    APIServer <--> CM
    APIServer <--> CREST
    subgraph NodeComponents [Node Components]
        Kubelet
        KubeProxy[Kube-Proxy]
    end
    APIServer <--> Kubelet
    APIServer <--> KubeProxy
    subgraph ContainerInterfaces [Container Interfaces]
        CRI[Container Runtime Interface]
        CNI[Container Network Interface]
        CSI[Container Storage Interface]
    end
    Kubelet <--> CRI
    Kubelet <--> CNI
    Kubelet <--> CSI
    
```

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

Ask Devin about kubernetes

Which repo would you like to understand?

🔍 Search for repositories (or paste a link)

+
Add repo



microsoft / vscode
Visual Studio Code

☆ 170.1k



mark3labs / mcp-go

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

☆ 3.4k



antiwork / gumroad

☆ 5.2k



langchain-ai / local-deep-researcher

Fully local web research and report writing assistant

☆ 7.0k



meta-llama / llama-models

Utilities intended for use with Llama models.

☆ 6.8k



huggingface / transformers

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

☆ 143.1k



langchain-ai / langchain

🦜️🔗 Build context-aware reasoning applications

☆ 105.8k



expressjs / express



lodash / lodash

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

☆ 60.3k



sqlite / sqlite

Official Git mirror of the SQLite source tree

☆ 7.7k



microsoft / monaco-editor

A browser based code editor

☆ 42.1k



[DeepWiki.com](https://deepwiki.com)

Q&A



Global NaaS Event

