Spec-Driven Development

What is Spec-Driven Development?

And how can it make code faster?

Spec-Driven Development

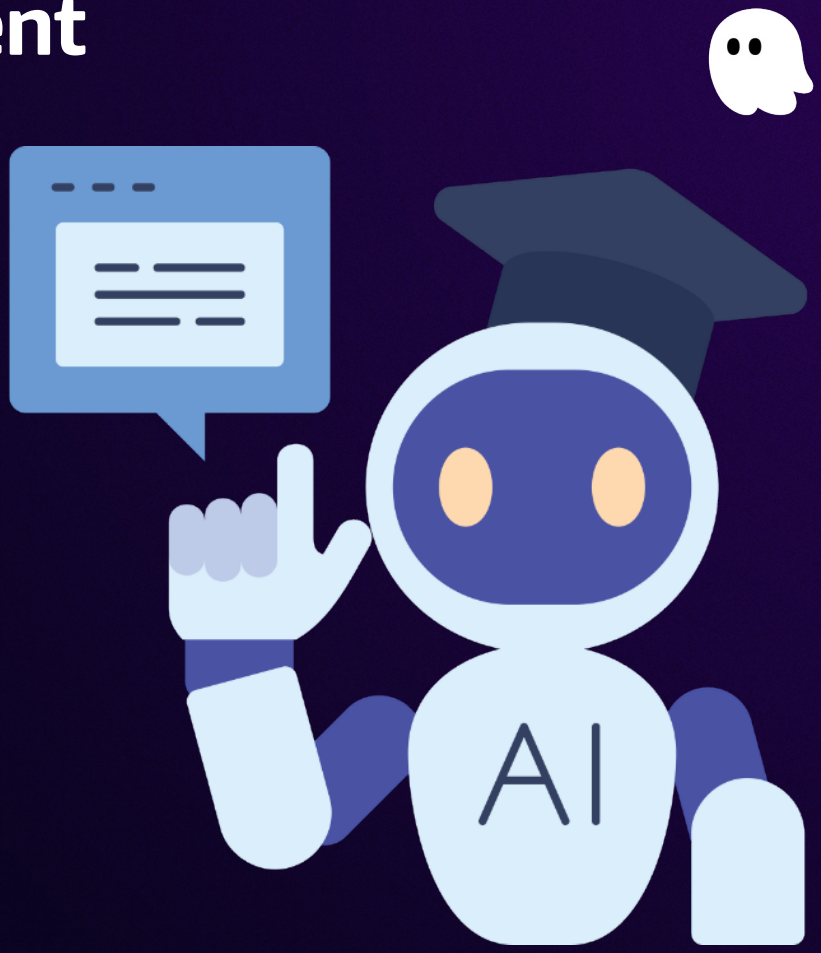
Spec-Driven Development (SDD) is writing structured specifications first so AI can automatically build and test the code.

Spec-Driven Development

why?

Spec-Driven Development

AI Intern

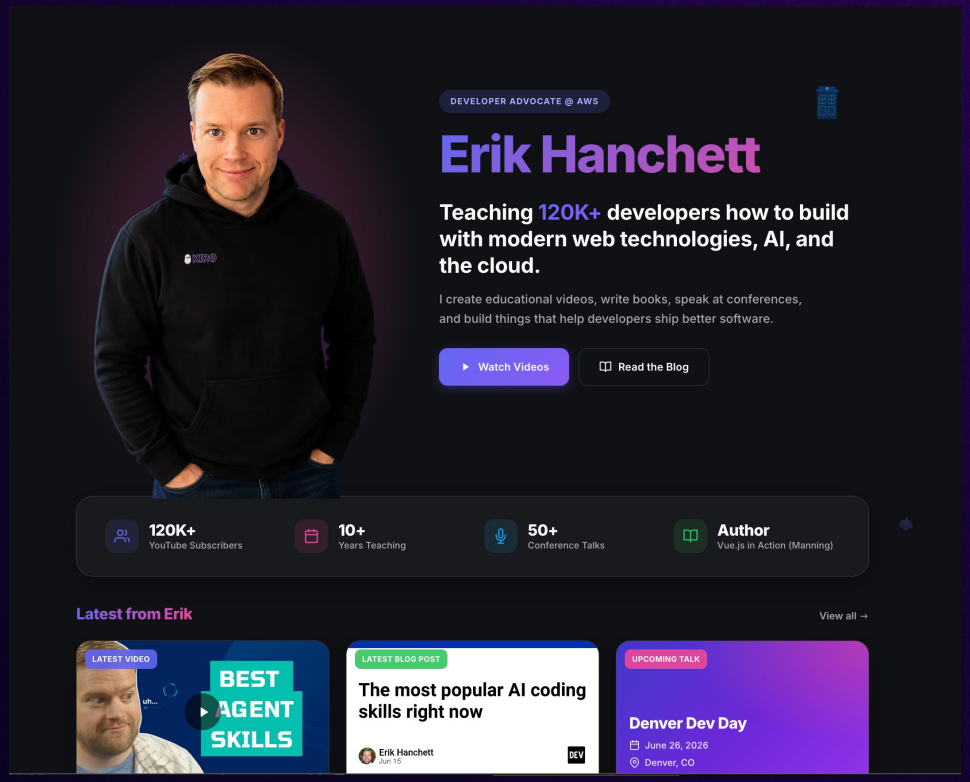


Erik Hanchett

- Senior Developer Advocate
- 15+ Software Development
- Connect with me on LinkedIn!

Where can I get these links?

https://www.programwitherik.com/



Spec-Driven Development

Can’t the latest frontier models do everything?

Spec-Driven Development

6 Tips Before We Get Started!

Spec-Driven Development

1. Too much context!

Models get confused!

Spec-Driven Development

2. AGENTS.md / Steering

Spec-Driven Development

3. Use Skills

Spec-Driven Development

4. Too much Trust!

Are we code reviewing?

Spec-Driven Development

5. Set up AI Code Reviews

Spec-Driven Development

6. Don’t sacrifice Speed over maintainability!

What patterns are being created?

History lesson…

Alexa+ / AI agents at scale

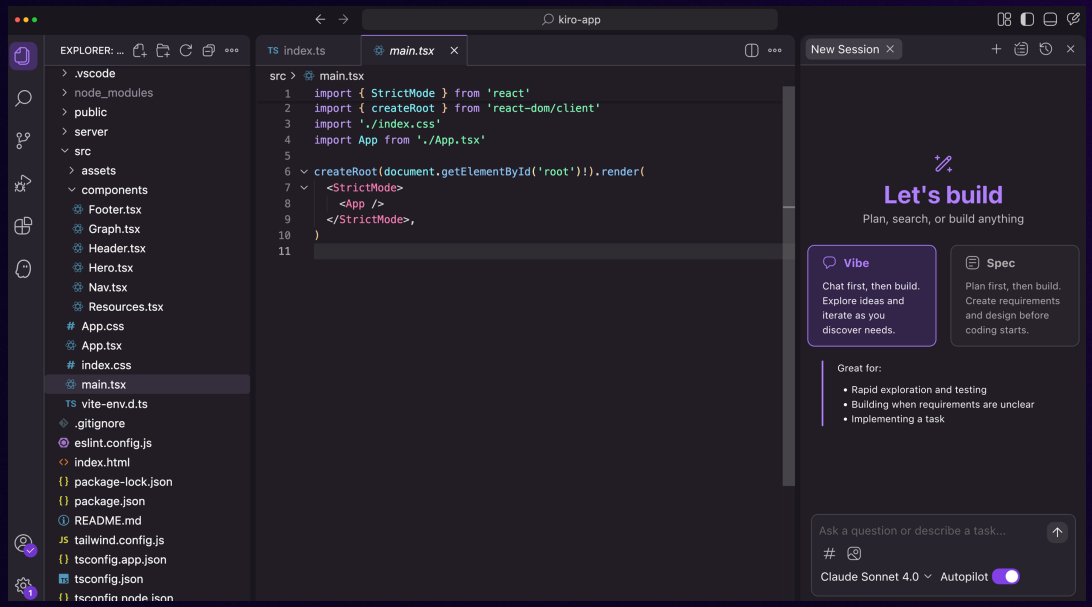
600 million devices

Hundreds of specialized expert systems

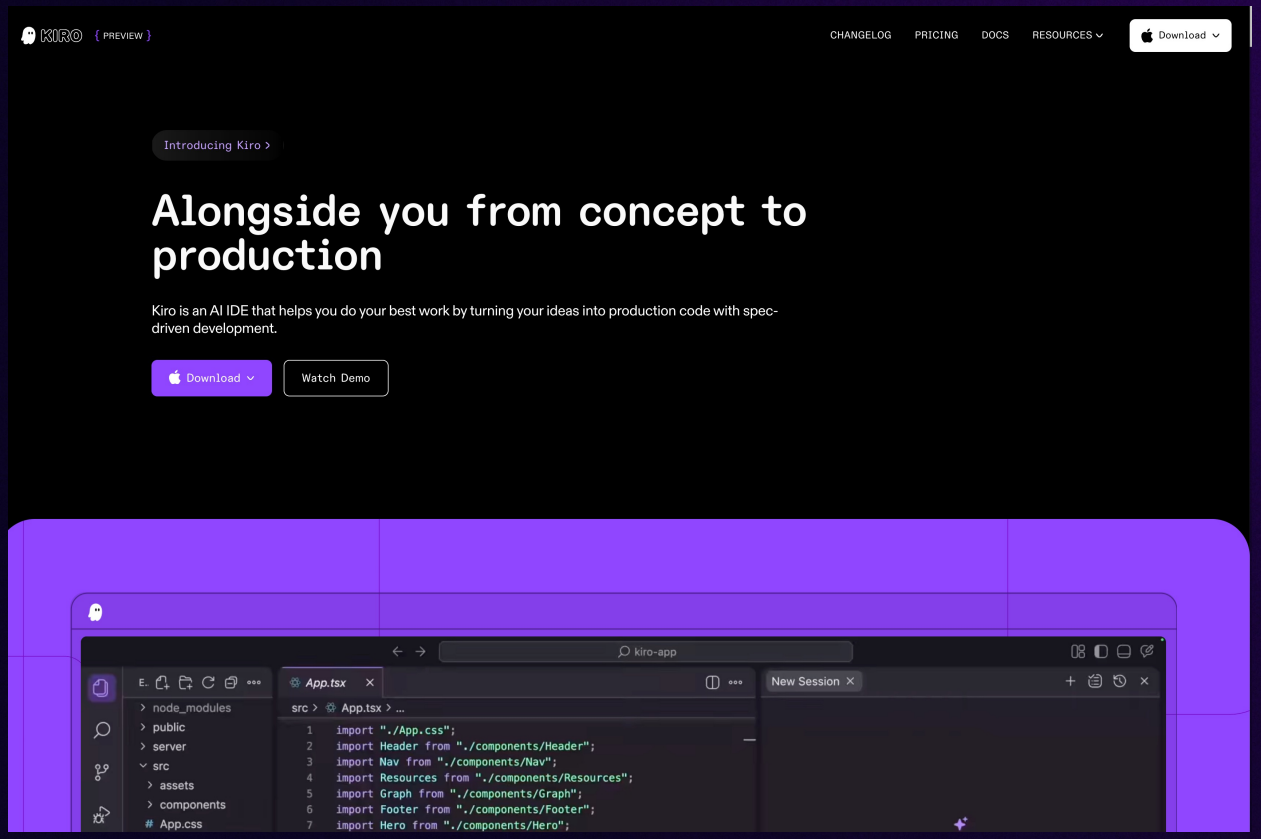
Tens of thousands of partner services and devices

Introducing Kiro

Kiro is a new AI IDE coding assistant,



Website! Kiro.dev



So is the only reason to use Kiro for SDD?

No!

* Web
* iOS
*CLI

How do you do this without Kiro?

What do you need to tell your IDE?

- Tell the AI IDE what it should do
- Include the following:

What do you need to tell your IDE?

- Tell the AI IDE what it should do
- Include the following:
  - User Requirements

What do you need to tell your IDE?

- Tell the AI IDE what it should do
- Include the following:
  - User Requirements
  - Design Document

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  - Implementation details

What do you need to tell your IDE?

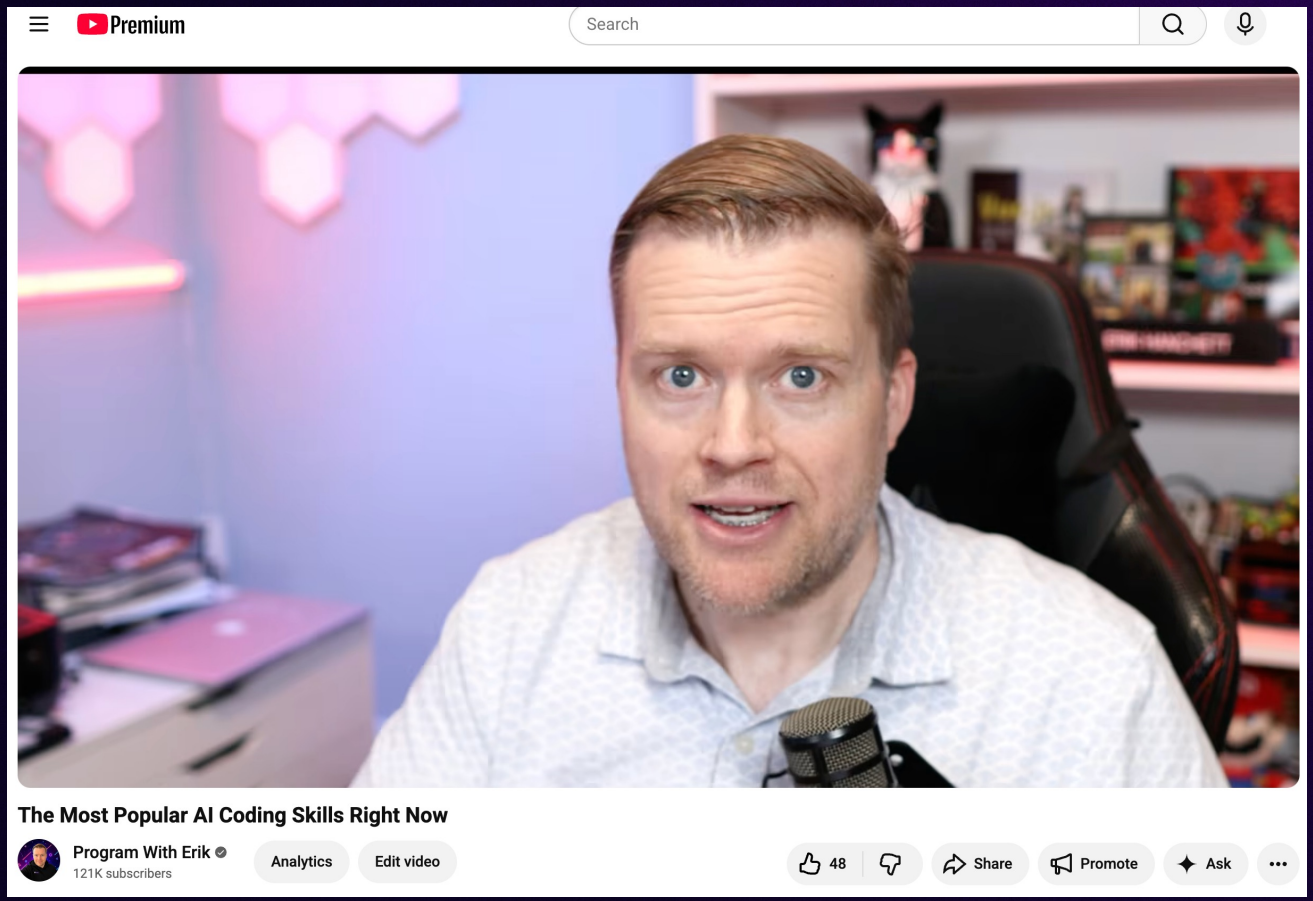
- Tell the AI IDE what it should do
- Include the following:
  - User Requirements
  - Design Document
  - Implementation details
  - https://github.com/github/spec-kit
  - https://github.com/Fission-AI/openspec

SDD Skill Wrappers

https://github.com/open-gsd/gsd-core

https://github.com/obra/superpowers

SDD Skill Wrappers



(AWS) AI-DLC

1. Inception (What & Why)
2. Construction (How)

https://github.com/awslabs/aidlc-workflows

Build More Architect Dreams

https://docs.bmad-method.org/

Bmad Method

1. Analysis (Optional)

Bmad Method

1. Analysis (Optional)
2. Planning (Required)

Bmad Method

1. Analysis (Optional)
2. Planning (Required)
3. Solutioning (Required for BMad Method/Enterprise tracks)

Bmad Method

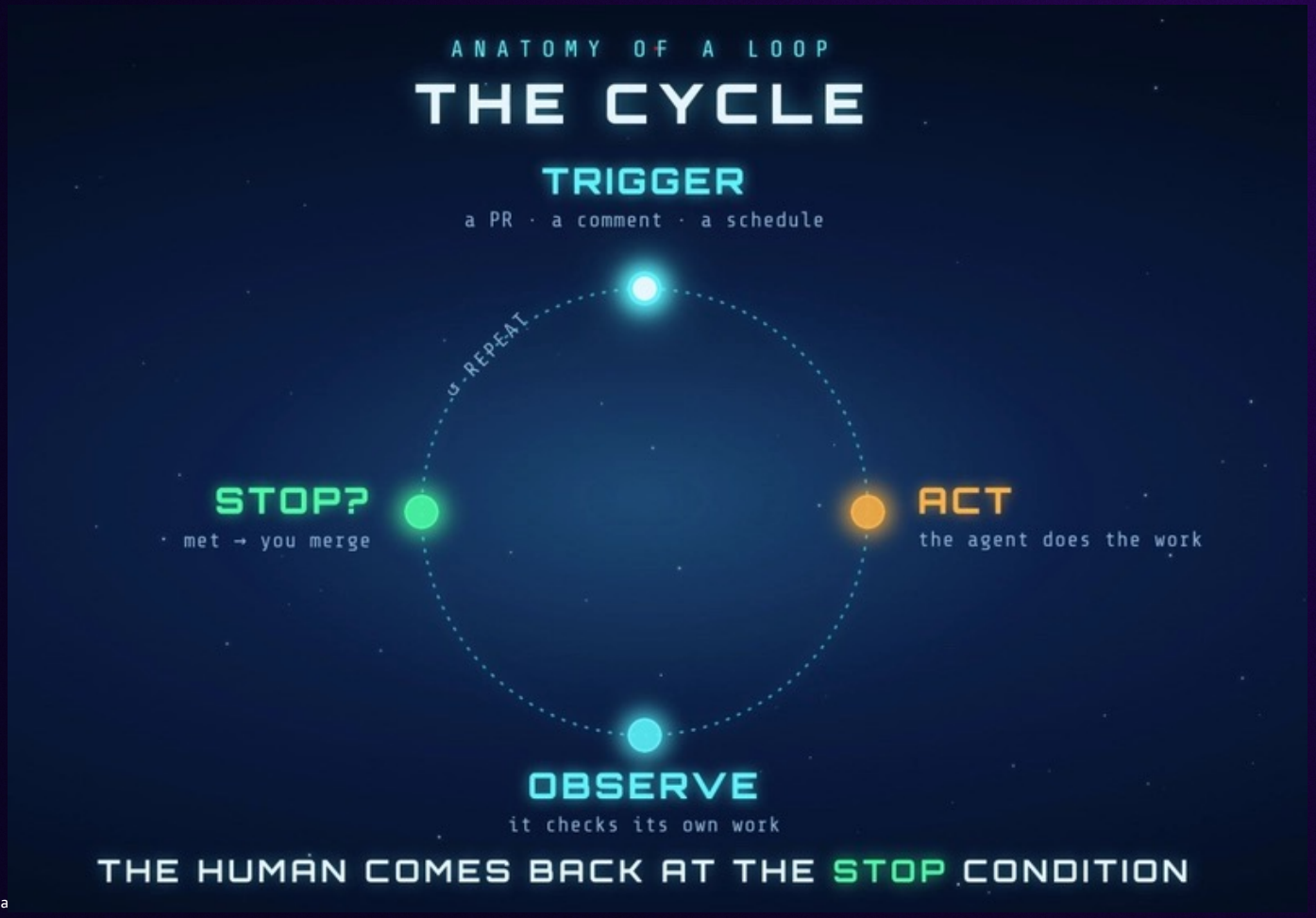
1. Analysis (Optional)
2. Planning (Required)
3. Solutioning (Required for BMad Method/Enterprise tracks)
4. Implementation

Claude Code

/plan

/goal

Loop engineering?



Key Findings

- All emphasize “plan before you code”

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- **Context Engineering**

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- **Context Engineering**
- Verification is the bottleneck

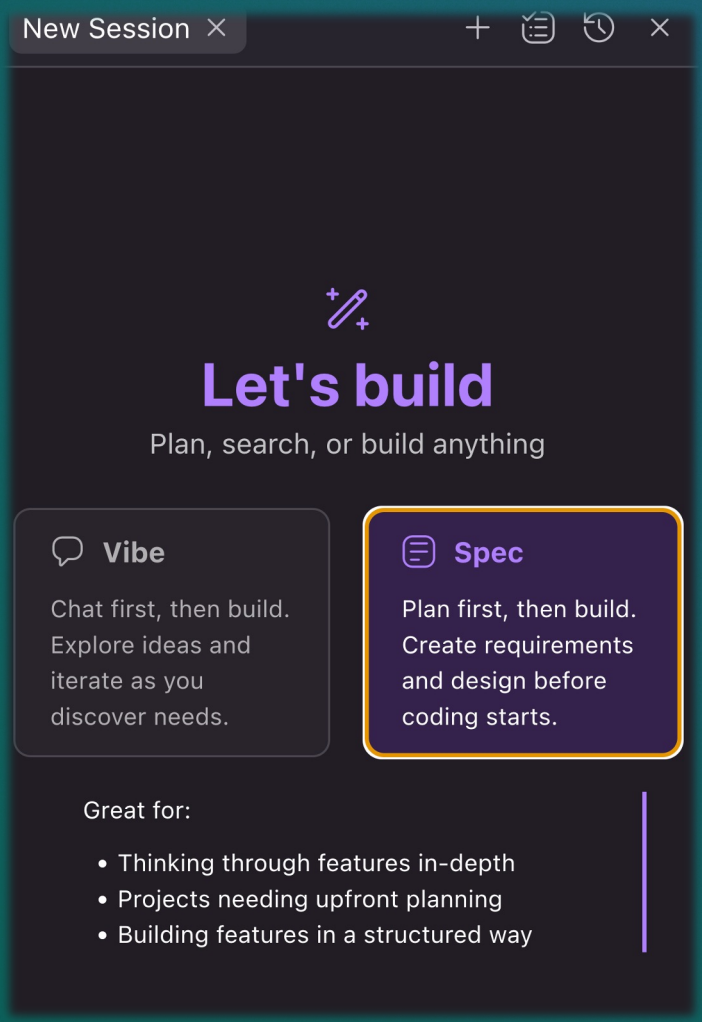
Key Findings

- All emphasize “plan before you code”
- **Context Engineering**
- Verification is the bottleneck
- All have the same weakness – not great for small bug fixes

Spec-kit

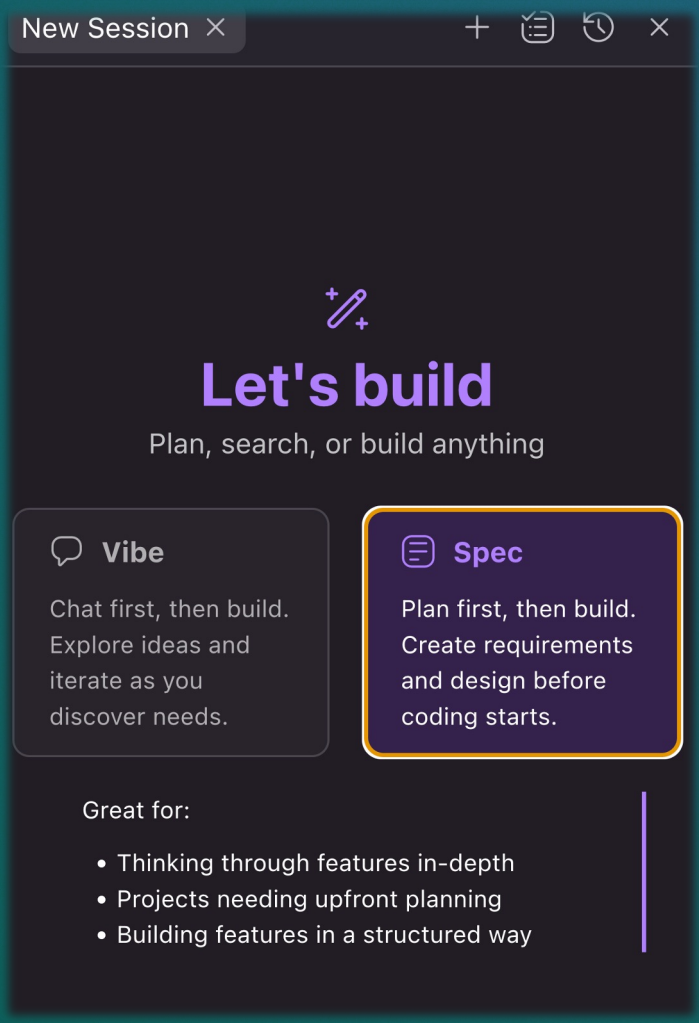
Features

- Spec-Driven Development

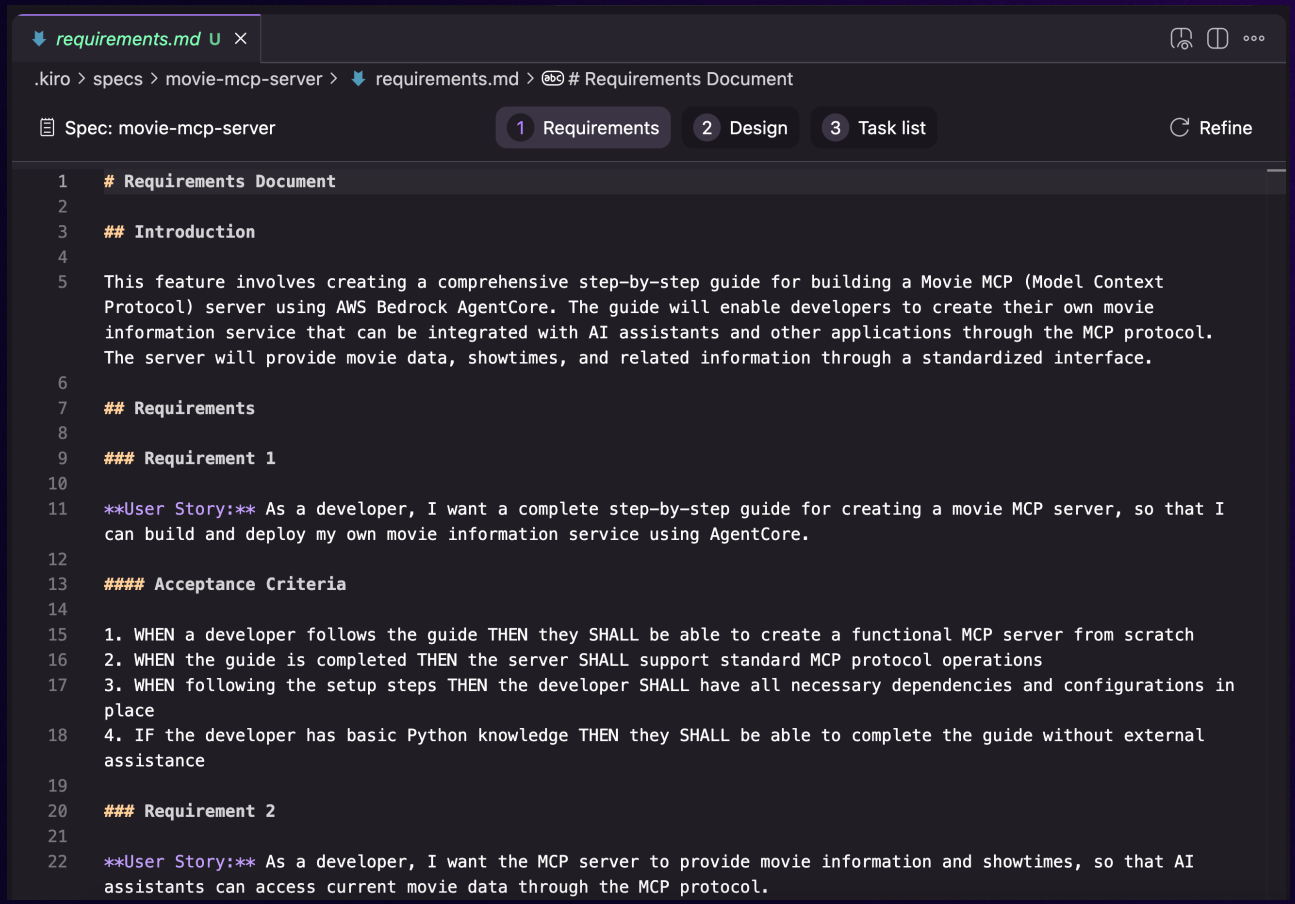


Ask it to begin!

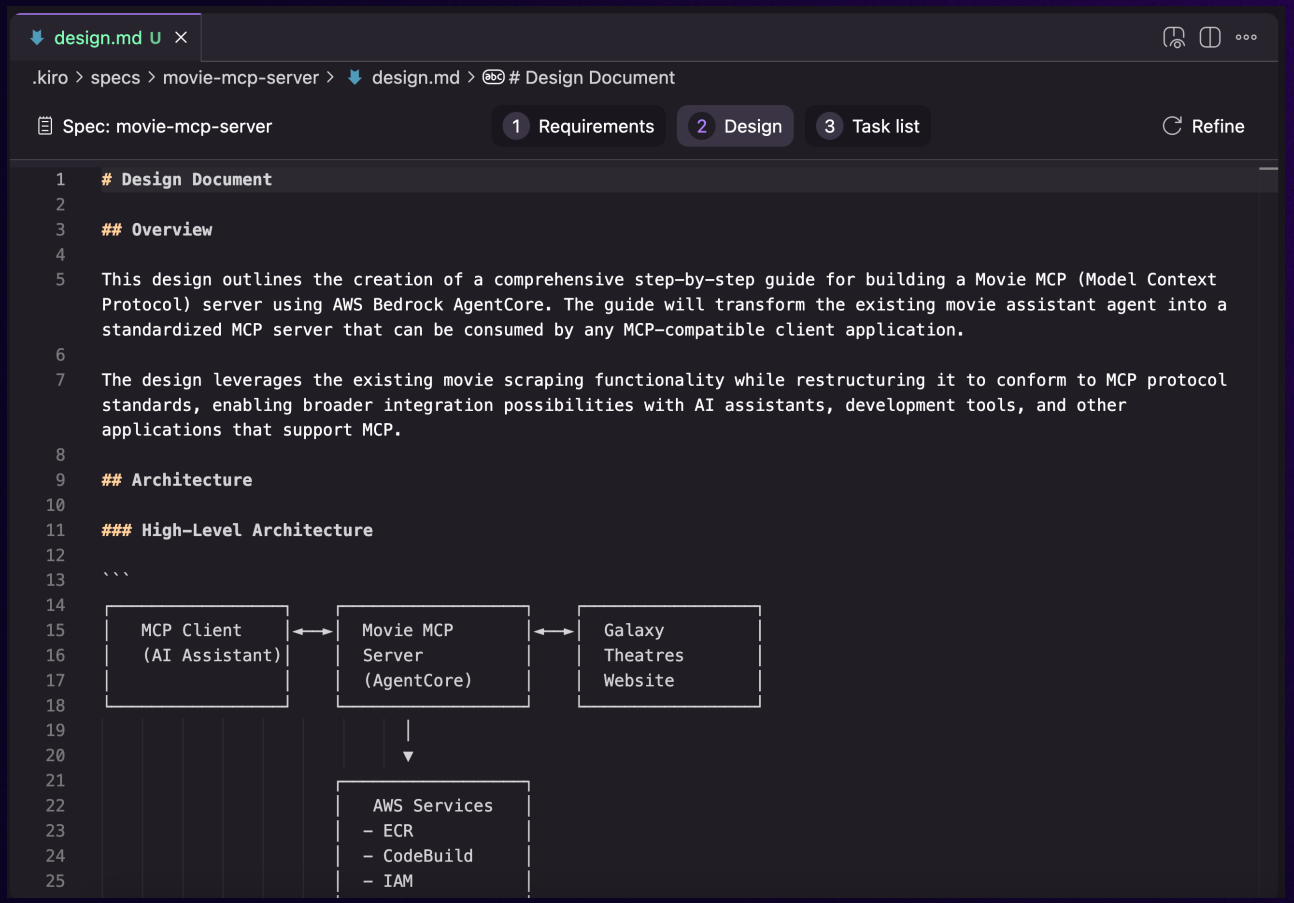
“Build a Movie MCP server to keep track of movies I’ve watched”



Requirements Phase



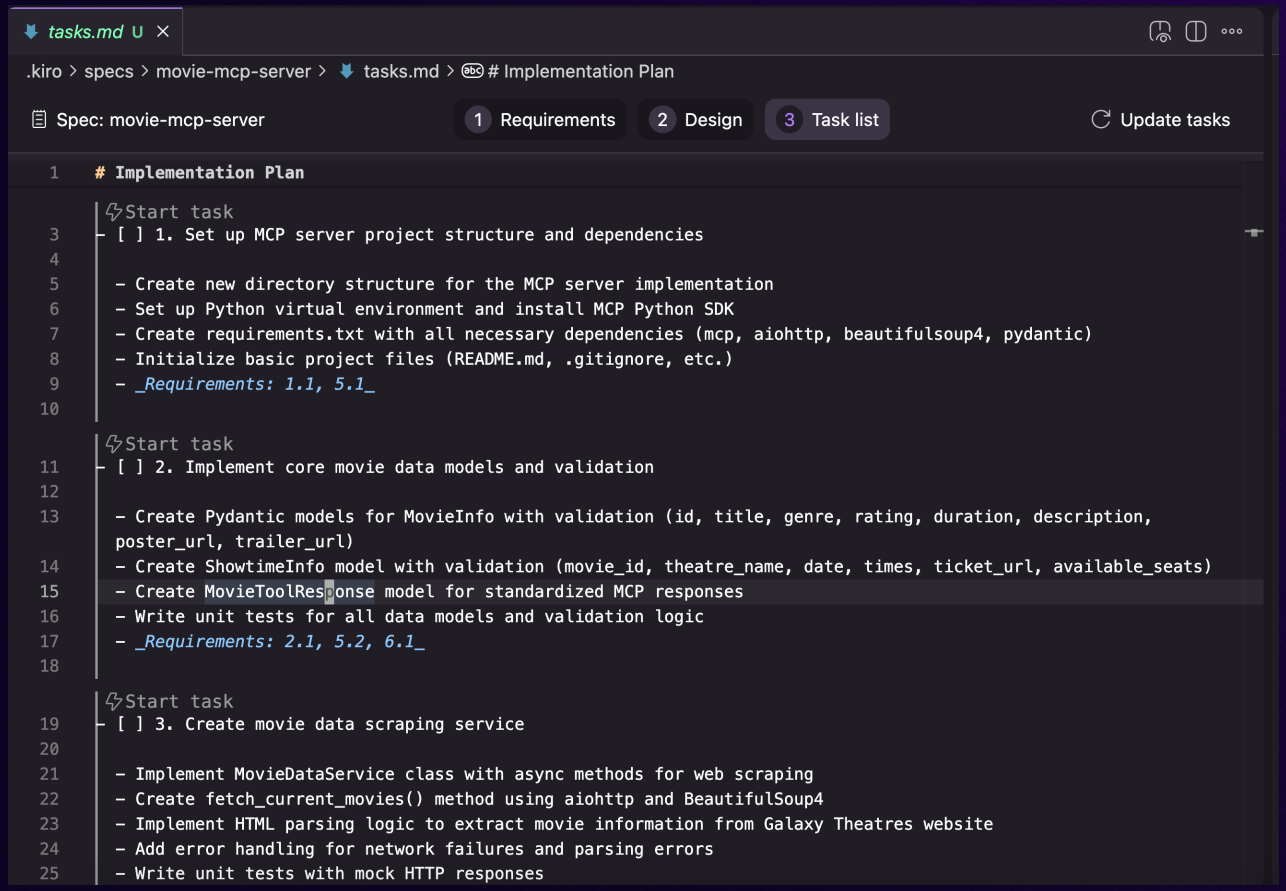
Design Phase



Review

- Review the markdown files for inconsistences, hallucinations, errors

Implementation Phase



How Does MCP Help?

The Integrations Problem

Companies are spending more of their AI development time on plumbing instead of intelligence.

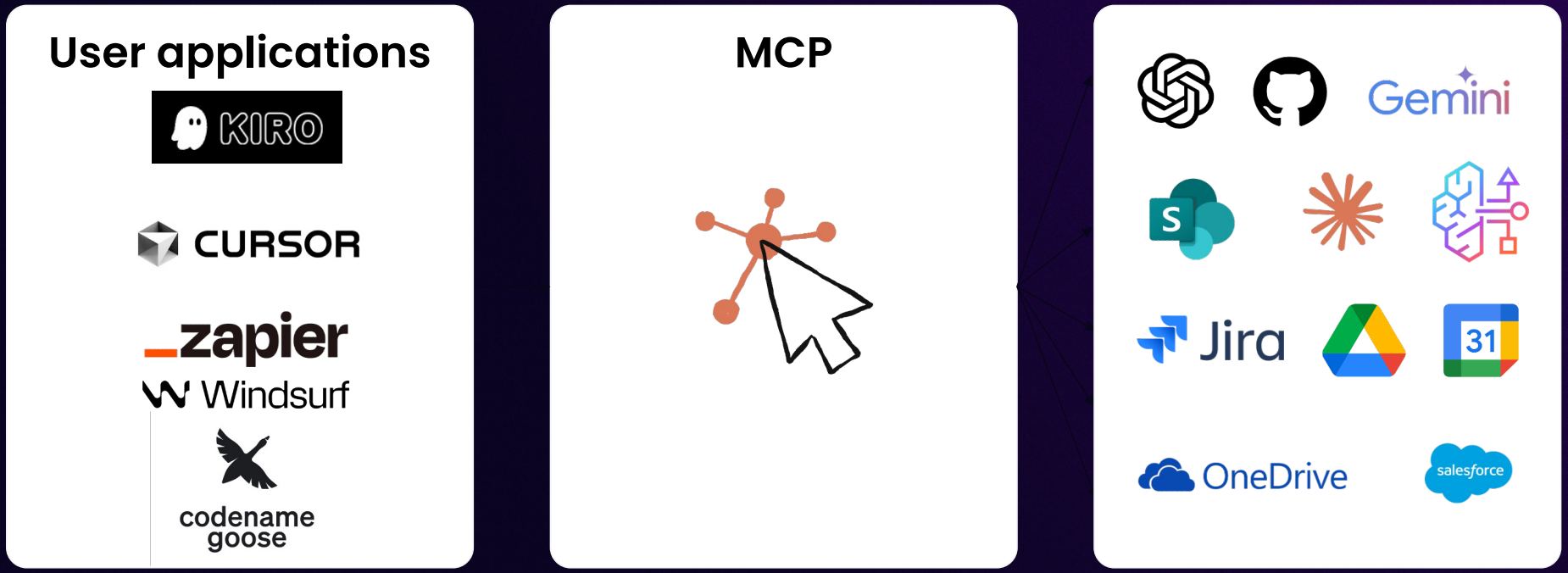
Model providers

User applications

Data sources

A Solution to the Integrations Problem

MCP is the USB-C port for AI - one standard interface that connects any AI to any tool.



Isn’t MCP Dead?

MCP <-> Spec Driven Development

MCP <-> Spec Driven Development

- Specs can be pulled from your favorite project management service!

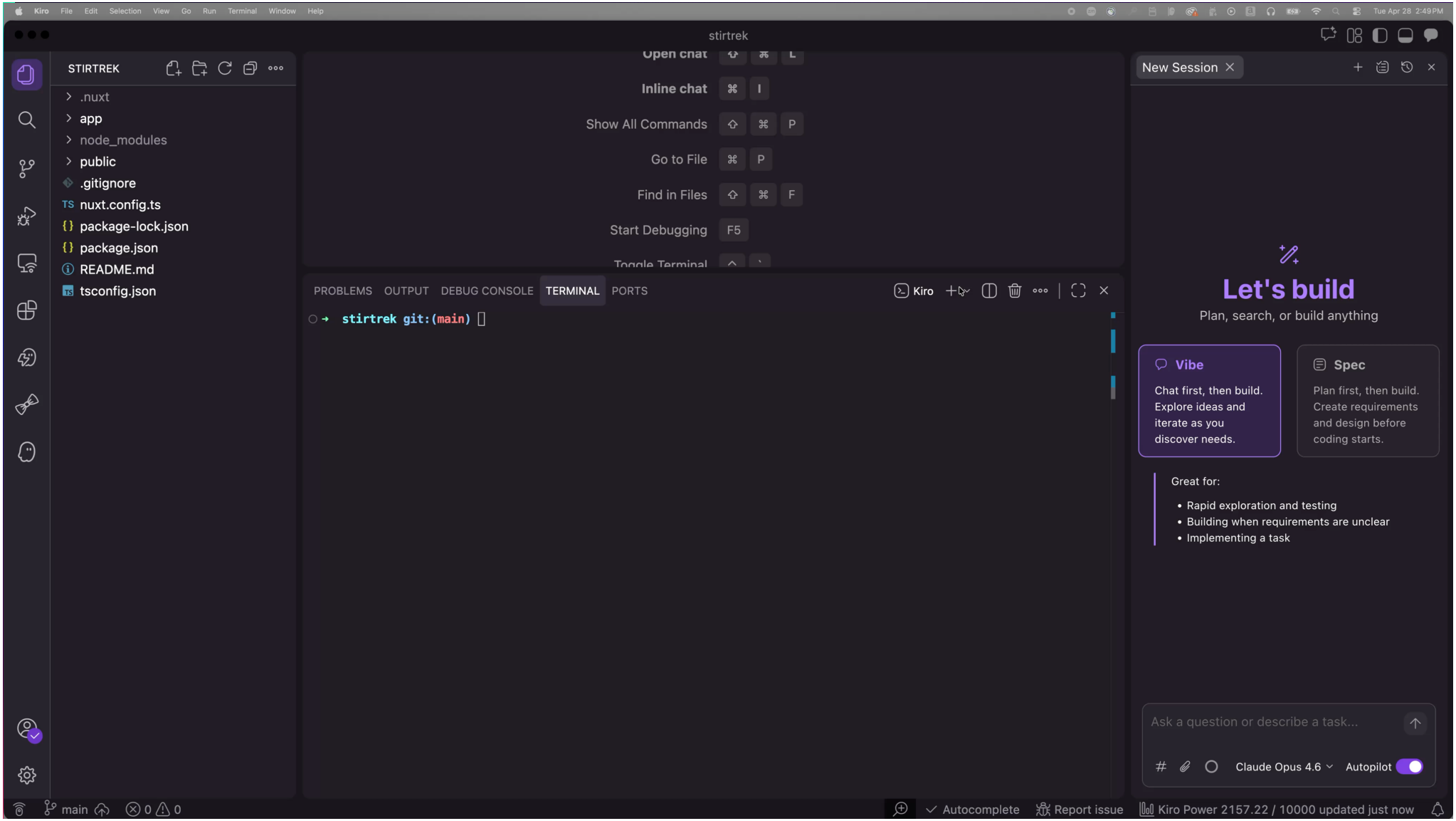
MCP <-> Spec Driven Development

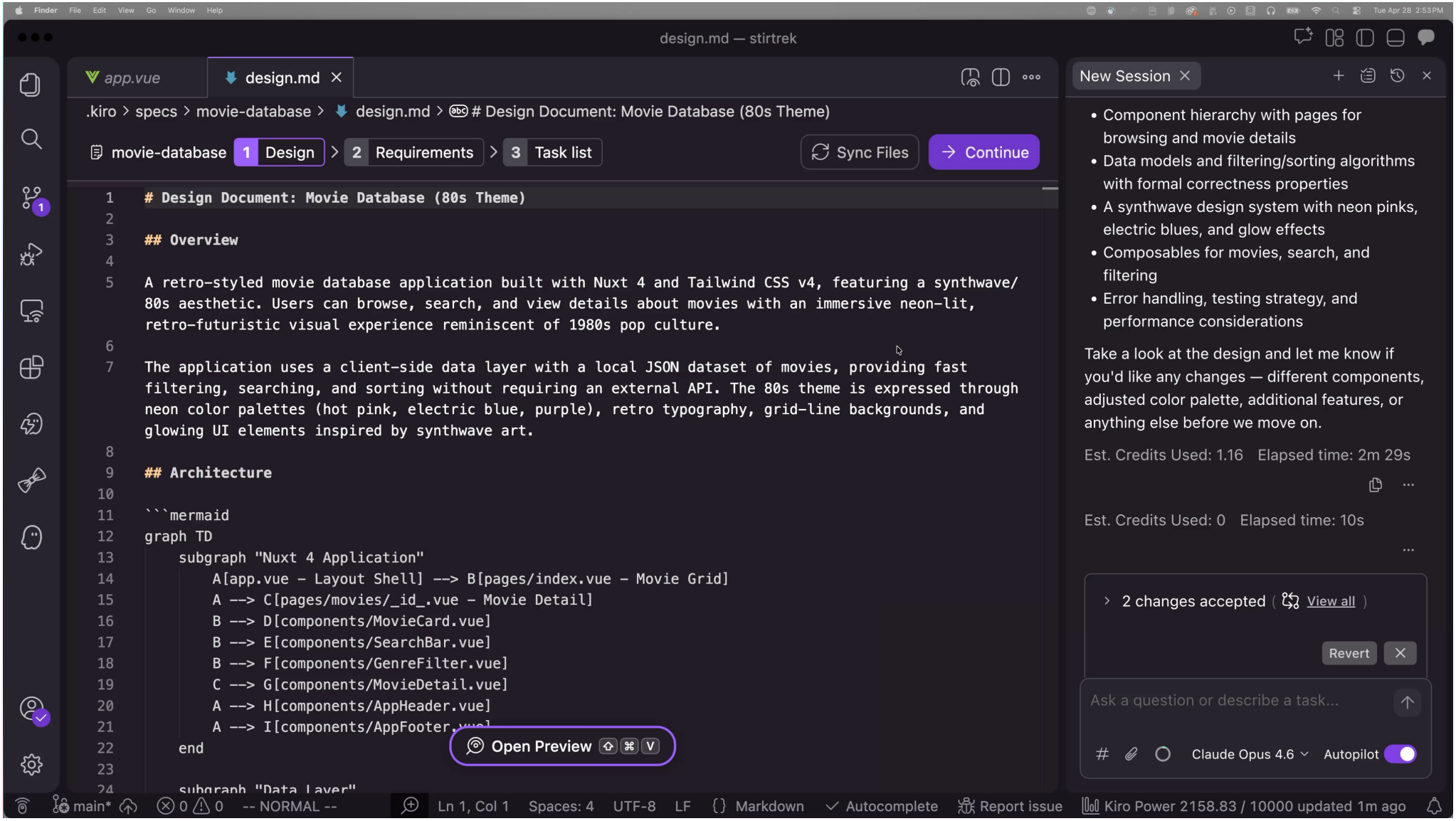
- Specs can be pulled from your favorite project management service
- Grab technical details for your project

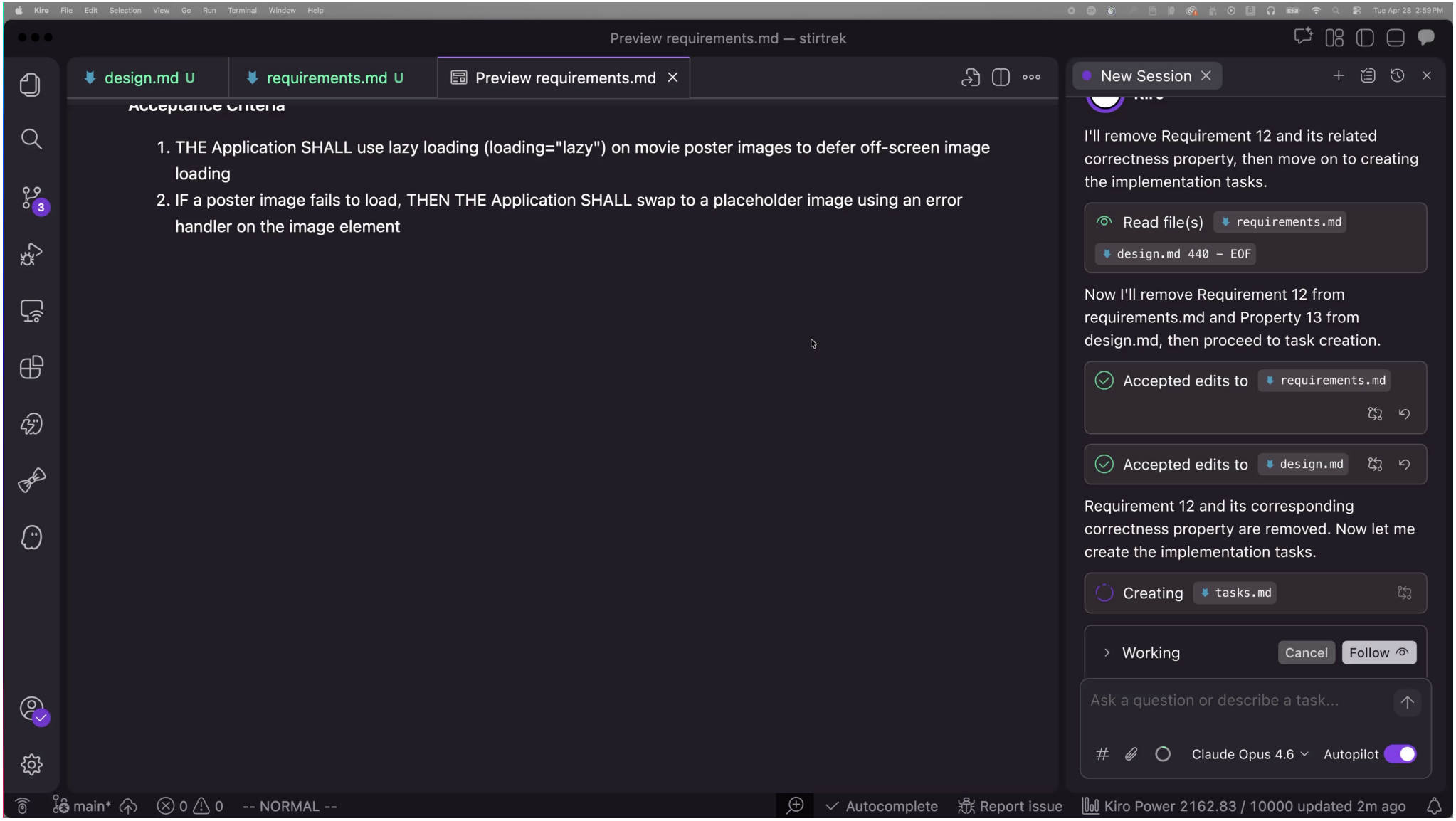
MCP <-> Spec Driven Development

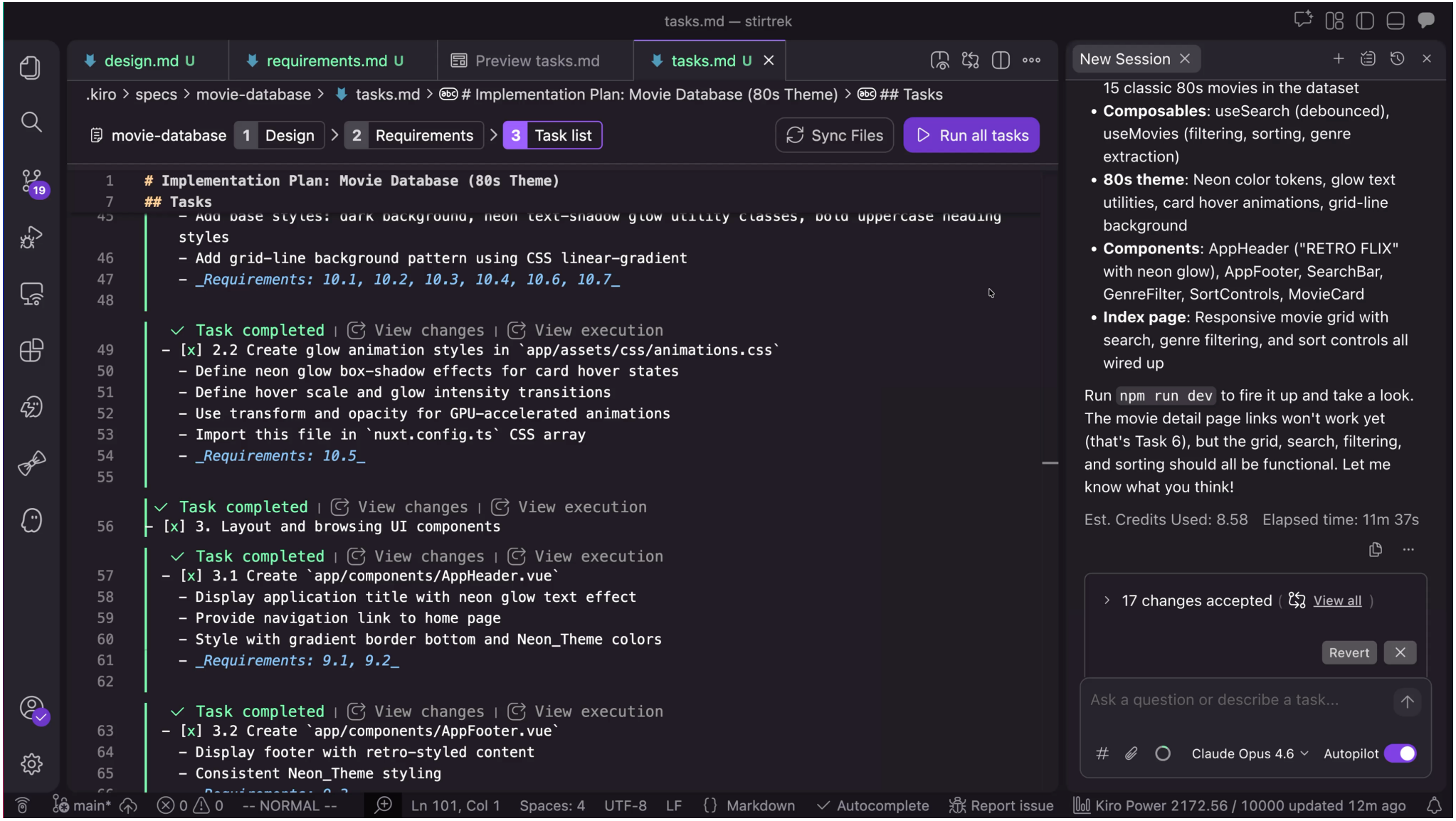
- Specs can be pulled from your favorite project management service
- Grab technical details for your project
- Will follow rules set forth in your steering files

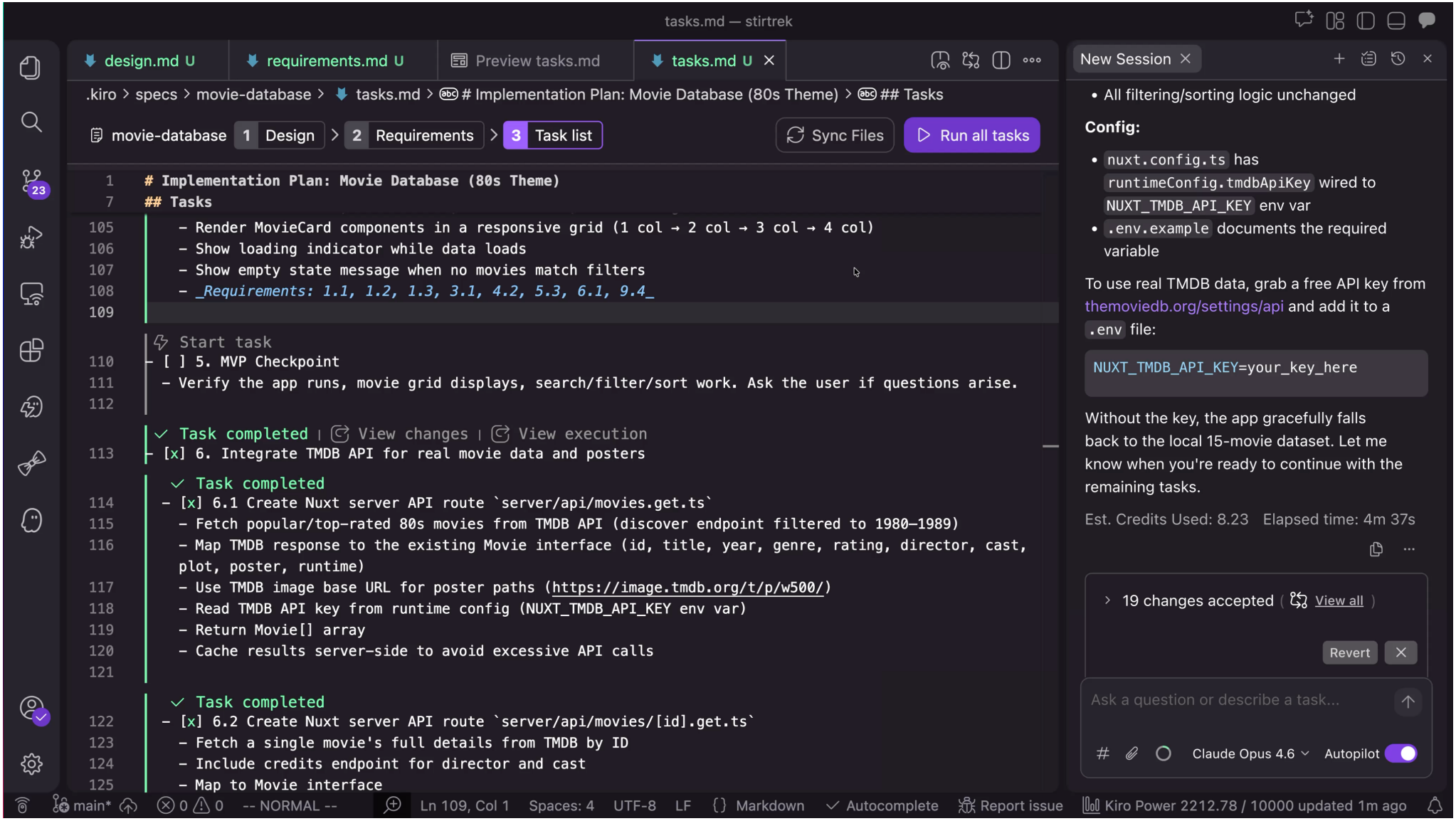
Demo


Kiro File Edit Selection View Go Run Terminal Window Help
Tue Apr 28 2:49PM
stirtrek
STIRTREK
.nuxt
app
node_modules
public
.gitignore
nuxt.config.ts
package-lock.json
package.json
README.md
tsconfig.json
Open chat
Inline chat
Show All Commands
Go to File
Find in Files
Start Debugging
F5
Toggle Terminal
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Kiro
stirtrek git:(main)
New Session
Let's build
Plan, search, or build anything
Vibe
Chat first, then build. Explore ideas and iterate as you discover needs.
Spec
Plan first, then build. Create requirements and design before coding starts.
Great for:
Rapid exploration and testing
Building when requirements are unclear
Implementing a task
Ask a question or describe a task...
Claude Opus 4.6
Autopilot
main
0 0
Autocomplete
Report issue
Kiro Power 2157.22 / 10000 updated just now


design.md — stirtrek
app.vue
design.md
.kiro > specs > movie-database > design.md > # Design Document: Movie Database (80s Theme)
movie-database
1 Design
2 Requirements
3 Task list
Sync Files
Continue
Design Document: Movie Database (80s Theme)
Overview
A retro-styled movie database application built with Nuxt 4 and Tailwind CSS v4, featuring a synthwave/80s aesthetic. Users can browse, search, and view details about movies with an immersive neon-lit, retro-futuristic visual experience reminiscent of 1980s pop culture.
The application uses a client-side data layer with a local JSON dataset of movies, providing fast filtering, searching, and sorting without requiring an external API. The 80s theme is expressed through neon color palettes (hot pink, electric blue, purple), retro typography, grid-line backgrounds, and glowing UI elements inspired by synthwave art.
Architecture
```mermaid
graph TD
subgraph "Nuxt 4 Application"
A[app.vue - Layout Shell] --> B[pages/index.vue - Movie Grid]
A --> C[pages/movies/_id_.vue - Movie Detail]
B --> D[components/MovieCard.vue]
B --> E[components/SearchBar.vue]
B --> F[components/GenreFilter.vue]
C --> G[components/MovieDetail.vue]
A --> H[components/AppHeader.vue]
A --> I[components/AppFooter.vue]
end
Open Preview
New Session
Component hierarchy with pages for browsing and movie details
Data models and filtering/sorting algorithms with formal correctness properties
A synthwave design system with neon pinks, electric blues, and glow effects
Composables for movies, search, and filtering
Error handling, testing strategy, and performance considerations
Take a look at the design and let me know if you'd like any changes — different components, adjusted color palette, additional features, or anything else before we move on.
Est. Credits Used: 1.16 Elapsed time: 2m 29s
Est. Credits Used: 0 Elapsed time: 10s
2 changes accepted ( View all )
Revert
Ask a question or describe a task...
Claude Opus 4.6
Autopilot
main*
0 0
-- NORMAL --
Ln 1, Col 1
Spaces: 4
UTF-8
LF
Markdown
Autocomplete
Report issue
Kiro Power 2158.83 / 10000 updated 1m ago
```


Preview requirements.md — stirtrek
design.md U
requirements.md U
Preview requirements.md
Acceptance Criteria
1. THE Application SHALL use lazy loading (loading="lazy") on movie poster images to defer off-screen image loading
2. IF a poster image fails to load, THEN THE Application SHALL swap to a placeholder image using an error handler on the image element
New Session
I'll remove Requirement 12 and its related correctness property, then move on to creating the implementation tasks.
Read file(s) requirements.md
design.md 440 – EOF
Now I'll remove Requirement 12 from requirements.md and Property 13 from design.md, then proceed to task creation.
Accepted edits to requirements.md
Accepted edits to design.md
Requirement 12 and its corresponding correctness property are removed. Now let me create the implementation tasks.
Creating tasks.md
Working
Cancel
Follow
Ask a question or describe a task...
Claude Opus 4.6
Autopilot
main*
0 0
-- NORMAL --
Autocomplete
Report issue
Kiro Power 2162.83 / 10000 updated 2m ago


tasks.md — stirtrek
design.md U
requirements.md U
Preview tasks.md
tasks.md U
.kiro > specs > movie-database > tasks.md > # Implementation Plan: Movie Database (80s Theme) > ## Tasks
movie-database 1 Design > 2 Requirements > 3 Task list
Sync Files
Run all tasks
Implementation Plan: Movie Database (80s Theme)
Tasks
styles
- Add grid-line background pattern using CSS linear-gradient
- _Requirements: 10.1, 10.2, 10.3, 10.4, 10.6, 10.7_
Task completed | View changes | View execution
- [x] 2.2 Create glow animation styles in `app/assets/css/animations.css`
- Define neon glow box-shadow effects for card hover states
- Define hover scale and glow intensity transitions
- Use transform and opacity for GPU-accelerated animations
- Import this file in `nuxt.config.ts` CSS array
- _Requirements: 10.5_
Task completed | View changes | View execution
- [x] 3. Layout and browsing UI components
Task completed | View changes | View execution
- [x] 3.1 Create `app/components/AppHeader.vue`
- Display application title with neon glow text effect
- Provide navigation link to home page
- Style with gradient border bottom and Neon_Theme colors
- _Requirements: 9.1, 9.2_
Task completed | View changes | View execution
- [x] 3.2 Create `app/components/AppFooter.vue`
- Display footer with retro-styled content
- Consistent Neon_Theme styling
New Session
15 classic 80s movies in the dataset
Composables: useSearch (debounced), useMovies (filtering, sorting, genre extraction)
80s theme: Neon color tokens, glow text utilities, card hover animations, grid-line background
Components: AppHeader ("RETRO FLIX" with neon glow), AppFooter, SearchBar, GenreFilter, SortControls, MovieCard
Index page: Responsive movie grid with search, genre filtering, and sort controls all wired up
Run npm run dev to fire it up and take a look. The movie detail page links won't work yet (that's Task 6), but the grid, search, filtering, and sorting should all be functional. Let me know what you think!
Est. Credits Used: 8.58 Elapsed time: 11m 37s
17 changes accepted (View all)
Revert
Ask a question or describe a task...
Claude Opus 4.6
Autopilot
main* 0 0 -- NORMAL -- Ln 101, Col 1 Spaces: 4 UTF-8 LF Markdown Autocomplete Report issue Kiro Power 2172.56 / 10000 updated 12m ago


tasks.md — stirtrek
design.md U
requirements.md U
Preview tasks.md
tasks.md U
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movie-database
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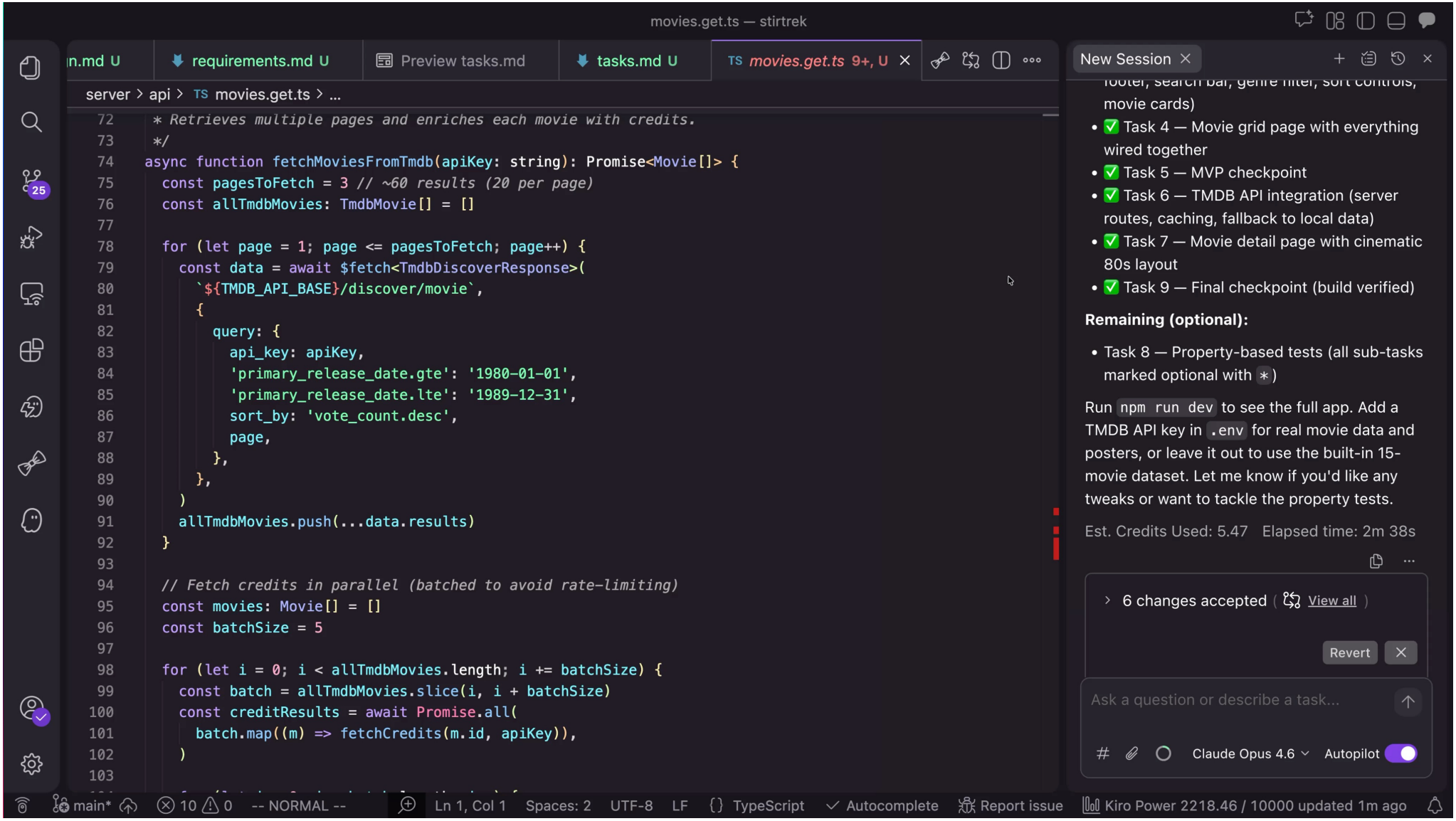
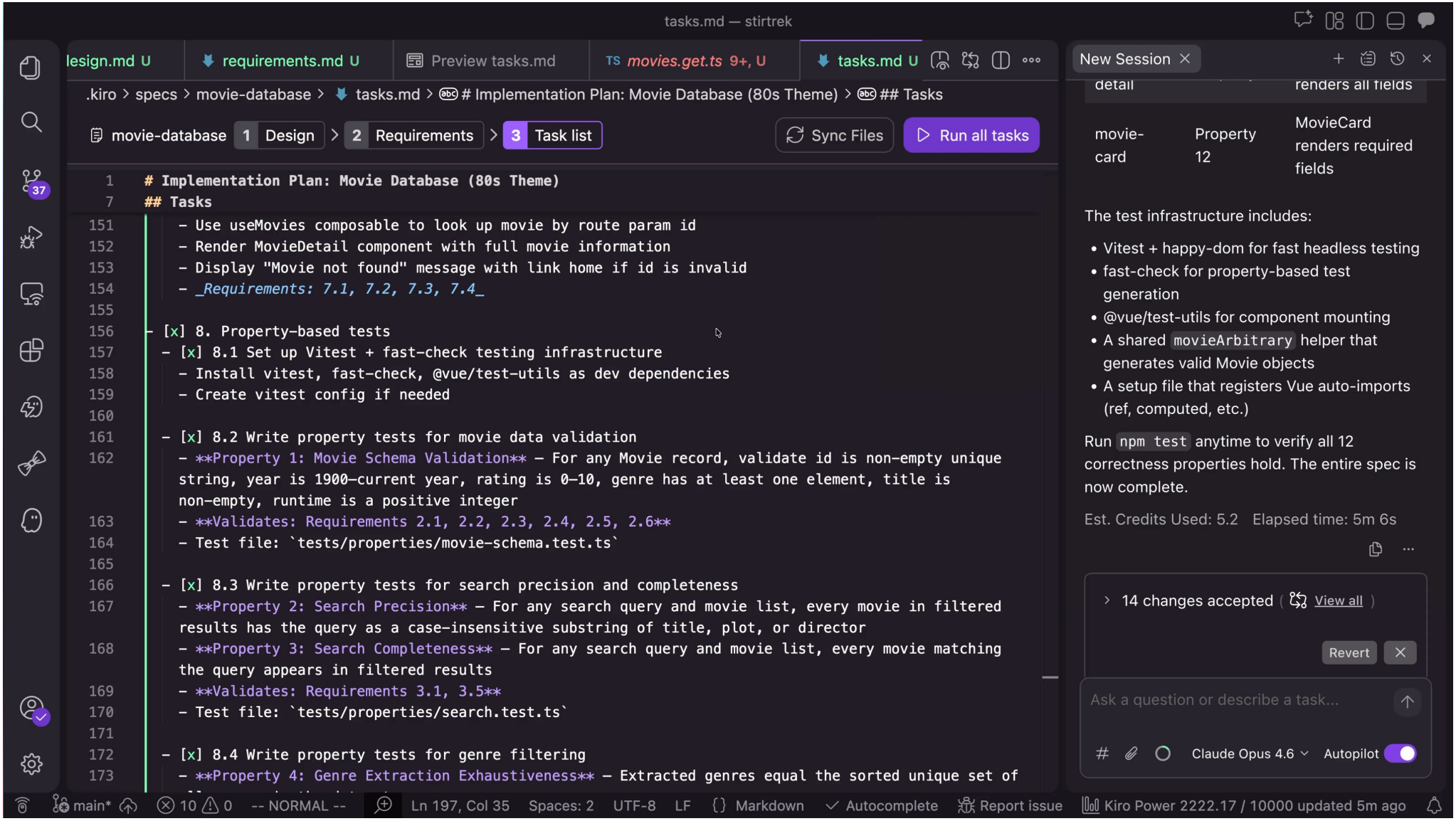
Run all tasks
Implementation Plan: Movie Database (80s Theme)
Tasks
- Render MovieCard components in a responsive grid (1 col → 2 col → 3 col → 4 col)
- Show loading indicator while data loads
- Show empty state message when no movies match filters
- _Requirements: 1.1, 1.2, 1.3, 3.1, 4.2, 5.3, 6.1, 9.4_
Start task
[ ] 5. MVP Checkpoint
- Verify the app runs, movie grid displays, search/filter/sort work. Ask the user if questions arise.
Task completed | View changes | View execution
[x] 6. Integrate TMDB API for real movie data and posters
Task completed
- [x] 6.1 Create Nuxt server API route `server/api/movies.get.ts`
- Fetch popular/top-rated 80s movies from TMDB API (discover endpoint filtered to 1980–1989)
- Map TMDB response to the existing Movie interface (id, title, year, genre, rating, director, cast, plot, poster, runtime)
- Use TMDB image base URL for poster paths (https://image.tmdb.org/t/p/w500/)
- Read TMDB API key from runtime config (NUXT_TMDB_API_KEY env var)
- Return Movie[] array
- Cache results server-side to avoid excessive API calls
Task completed
- [x] 6.2 Create Nuxt server API route `server/api/movies/[id].get.ts`
- Fetch a single movie's full details from TMDB by ID
- Include credits endpoint for director and cast
- Map to Movie interface
New Session
• All filtering/sorting logic unchanged
Config:
• nuxt.config.ts has runtimeConfig.tmdbApiKey wired to NUXT_TMDB_API_KEY env var
• .env.example documents the required variable
To use real TMDB data, grab a free API key from themoviedb.org/settings/api and add it to a .env file:
NUXT_TMDB_API_KEY=your_key_here
Without the key, the app gracefully falls back to the local 15-movie dataset. Let me know when you're ready to continue with the remaining tasks.
Est. Credits Used: 8.23 Elapsed time: 4m 37s
19 changes accepted (View all)
Revert
Ask a question or describe a task...
Claude Opus 4.6
Autopilot
main*
0 0
-- NORMAL --
Ln 109, Col 1
Spaces: 4
UTF-8
LF
Markdown
Autocomplete
Report issue
Kiro Power 2212.78 / 10000 updated 1m ago


movies.get.ts — stirtrek
n.md U
requirements.md U
Preview tasks.md
tasks.md U
movies.get.ts 9+, U
server > api > movies.get.ts > ...
72 * Retrieves multiple pages and enriches each movie with credits.
73 */
74 async function fetchMoviesFromTmdb(apiKey: string): Promise<Movie[]> {
75 const pagesToFetch = 3 // ~60 results (20 per page)
76 const allTmdbMovies: TmdbMovie[] = []
77
78 for (let page = 1; page <= pagesToFetch; page++) {
79 const data = await $fetch<TmdbDiscoverResponse>(
80 `${TMDB_API_BASE}/discover/movie`,
81 {
82 query: {
83 api_key: apiKey,
84 'primary_release_date.gte': '1980-01-01',
85 'primary_release_date.lte': '1989-12-31',
86 sort_by: 'vote_count.desc',
87 page,
88 },
89 },
90)
91 allTmdbMovies.push(...data.results)
92 }
93
94 // Fetch credits in parallel (batched to avoid rate-limiting)
95 const movies: Movie[] = []
96 const batchSize = 5
97
98 for (let i = 0; i < allTmdbMovies.length; i += batchSize) {
99 const batch = allTmdbMovies.slice(i, i + batchSize)
100 const creditResults = await Promise.all(
101 batch.map((m) => fetchCredits(m.id, apiKey)),
102)
103
New Session
movie cards)
✅ Task 4 — Movie grid page with everything wired together
✅ Task 5 — MVP checkpoint
✅ Task 6 — TMDB API integration (server routes, caching, fallback to local data)
✅ Task 7 — Movie detail page with cinematic 80s layout
✅ Task 9 — Final checkpoint (build verified)
Remaining (optional):
Task 8 — Property-based tests (all sub-tasks marked optional with *)
Run npm run dev to see the full app. Add a TMDB API key in .env for real movie data and posters, or leave it out to use the built-in 15-movie dataset. Let me know if you'd like any tweaks or want to tackle the property tests.
Est. Credits Used: 5.47 Elapsed time: 2m 38s
6 changes accepted (View all)
Revert
Ask a question or describe a task...
Claude Opus 4.6
Autopilot
main* 10 0 -- NORMAL -- Ln 1, Col 1 Spaces: 2 UTF-8 LF TypeScript Autocomplete Report issue Kiro Power 2218.46 / 10000 updated 1m ago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requirements.md U
Preview tasks.md
movies.get.ts 9+, U
tasks.md U
.kiro > specs > movie-database > tasks.md > # Implementation Plan: Movie Database (80s Theme) > ## Tasks
movie-database
1 Design
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1 # Implementation Plan: Movie Database (80s Theme)
7 ## Tasks
151 - Use useMovies composable to look up movie by route param id
152 - Render MovieDetail component with full movie information
153 - Display "Movie not found" message with link home if id is invalid
154 - _Requirements: 7.1, 7.2, 7.3, 7.4_
155
156 - [x] 8. Property-based tests
157 - [x] 8.1 Set up Vitest + fast-check testing infrastructure
158 - Install vitest, fast-check, @vue/test-utils as dev dependencies
159 - Create vitest config if needed
160
161 - [x] 8.2 Write property tests for movie data validation
162 - **Property 1: Movie Schema Validation** — For any Movie record, validate id is non-empty unique string, year is 1900–current year, rating is 0–10, genre has at least one element, title is non-empty, runtime is a positive integer
163 - **Validates: Requirements 2.1, 2.2, 2.3, 2.4, 2.5, 2.6**
164 - Test file: `tests/properties/movie-schema.test.ts`
165
166 - [x] 8.3 Write property tests for search precision and completeness
167 - **Property 2: Search Precision** — For any search query and movie list, every movie in filtered results has the query as a case-insensitive substring of title, plot, or director
168 - **Property 3: Search Completeness** — For any search query and movie list, every movie matching the query appears in filtered results
169 - **Validates: Requirements 3.1, 3.5**
170 - Test file: `tests/properties/search.test.ts`
171
172 - [x] 8.4 Write property tests for genre filtering
173 - **Property 4: Genre Extraction Exhaustiveness** — Extracted genres equal the sorted unique set of
New Session
detail
renders all fields
movie-card
Property 12
MovieCard renders required fields
The test infrastructure includes:
• Vitest + happy-dom for fast headless testing
• fast-check for property-based test generation
• @vue/test-utils for component mounting
• A shared movieArbitrary helper that generates valid Movie objects
• A setup file that registers Vue auto-imports (ref, computed, etc.)
Run npm test anytime to verify all 12 correctness properties hold. The entire spec is now complete.
Est. Credits Used: 5.2 Elapsed time: 5m 6s
14 changes accepted (View all)
Revert
Ask a question or describe a task...
Claude Opus 4.6
Autopilot
main* 10 0 -- NORMAL -- Ln 197, Col 35 Spaces: 2 UTF-8 LF Markdown Autocomplete Report issue Kiro Power 2222.17 / 10000 updated 5m ago

How to learn more!

- https://kiro.dev

https://discord.gg/kirodotdev

Thanks!

- LinkedIn: Erik Hanchett
- X/Bluesky: Erikch