

AI Powered eCFR Agencies Project

This project is a comprehensive system for managing and displaying U.S. government agencies from the Electronic Code of Federal Regulations (eCFR). It consists of multiple components working together to provide a complete solution for agency data ingestion, storage, API access, and web-based visualization with AI-powered insights.

Below is the screenshot of the UI which shows all the eCFR agencies. One can search by Slug or Name as shown below:

The screenshot shows a web browser window with the URL 'localhost:3000'. The title bar says 'localhost:3000'. Below it, there are links for 'Downloads', 'History', and 'workspace'. The main content area has a header 'eCFR Agencies Directory' and a sub-header 'Browse and search U.S. government agencies'. On the right, it says '153 agencies found'. Below this is a search section with two input fields: 'Search by Slug' (with placeholder 'Enter agency slug...') and 'Search by Name' (with placeholder 'Enter agency name...'). There are 'Search' and 'Clear' buttons. Below the search section are two agency cards. The first card is for the 'Administrative Committee of the Federal Register' (ID: 59, updated 11/16/2025). It shows its slug 'federal-register-administrative-committee', CFR References ('Title 1 - Chapter I'), and a 'Show More' link. The second card is for the 'Administrative Conference of the United States' (ID: 1, updated 11/16/2025). It shows its slug 'administrative-conference-of-the-united-states', CFR References ('Title 1 - Chapter III'), and a 'Show More' link.

When clicked on show more, it gives Agency wide statistics and each Title wide statistics. It gives details like total word count, characters, versioning details like last amended, issued and upto date as. I have also integrated this with OpenAI to give **AI analysis** and provides:

1. 2-3 sentence summary of the agency's role and mission
2. Key responsibilities
3. A brief description of the agency's regulatory scope.

Details Screen:

localhost:3000

Downloads History workspace

Administrative Committee of the Federal Register

Slug: federal-register-administrative-committee

CFR References: Title 1 - Chapter I

1/1 chapters with data

AI-Powered Analysis Generated 3:54:12 PM

Agency Overview

The Administrative Committee of the Federal Register oversees the publication of the Federal Register, which serves as the official daily publication for rules, proposed rules, and notices of federal agencies.

Key Responsibilities

- Ensuring the accuracy and integrity of the Federal Register publications
- Reviewing and approving agency submissions for publication in the Federal Register
- Developing policies and procedures related to the Federal Register publication process

Regulatory Scope

The agency's regulatory scope primarily focuses on the accurate and timely publication of federal agencies' rules, proposed rules, and notices in the Federal Register to inform the public about the government's regulatory activities.

Agency-Wide Statistics

12,897 Total Words	58 Total Characters	1 Chapters with Data	0 Reserved Chapters
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Title 1

Chapter Statistics: Characters: 58
Words: 12,897 Heading: CHAPTER I—ADMINISTRATIVE COMMITTEE OF THE FEDERAL REGISTER
Chapter: I Downloaded: 1/15/2025

Latest Amended: 12/28/2022 Latest Issue: 5/18/2024
Up to Date As: 9/28/2025

Advisory Council on Historic Preservation

Slug: advisory-council-on-historic-preservation

CFR References: Title 36 - Chapter VIII

1/1 chapters with data

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Agency Overview

The Advisory Council on Historic Preservation (AChP) advises the President and Congress on historic preservation matters, promotes historic preservation nationwide, and oversees the implementation of the National Historic Preservation Act.

Key Responsibilities

- Advising the President and Congress on historic preservation policies and programs
- Promoting public awareness and understanding of historic preservation
- Reviewing federal undertakings that may affect historic properties and providing recommendations for their preservation
- Overseeing the Section 106 review process for federal projects

Regulatory Scope

The AChP's regulatory scope primarily focuses on ensuring that federal agencies comply with the National Historic Preservation Act and consider the effects of their activities on historic properties. The agency works to strike a balance between development and preservation to protect the nation's cultural heritage.

Agency-Wide Statistics

31,039 Total Words	54 Total Characters	1 Chapters with Data	0 Reserved Chapters
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Title 36

Chapter Statistics: Characters: 54
Words: 31,039 Heading: CHAPTER VIII—ADVISORY COUNCIL ON HISTORIC PRESERVATION
Chapter: VIII Downloaded: 1/15/2025

Latest Amended: 7/17/2025 Latest Issue: 9/16/2025
Up to Date As: 9/29/2025

Search Screen:

The screenshot shows a web browser interface for the "eCFR Agencies Directory". The address bar indicates the URL is "localhost:3000". Below the address bar, there are navigation links for "loads", "History", and "workspace". The main title is "eCFR Agencies Directory" with the subtitle "Browse and search U.S. government agencies". A search bar at the top right shows "2 agencies found".

Search Agencies

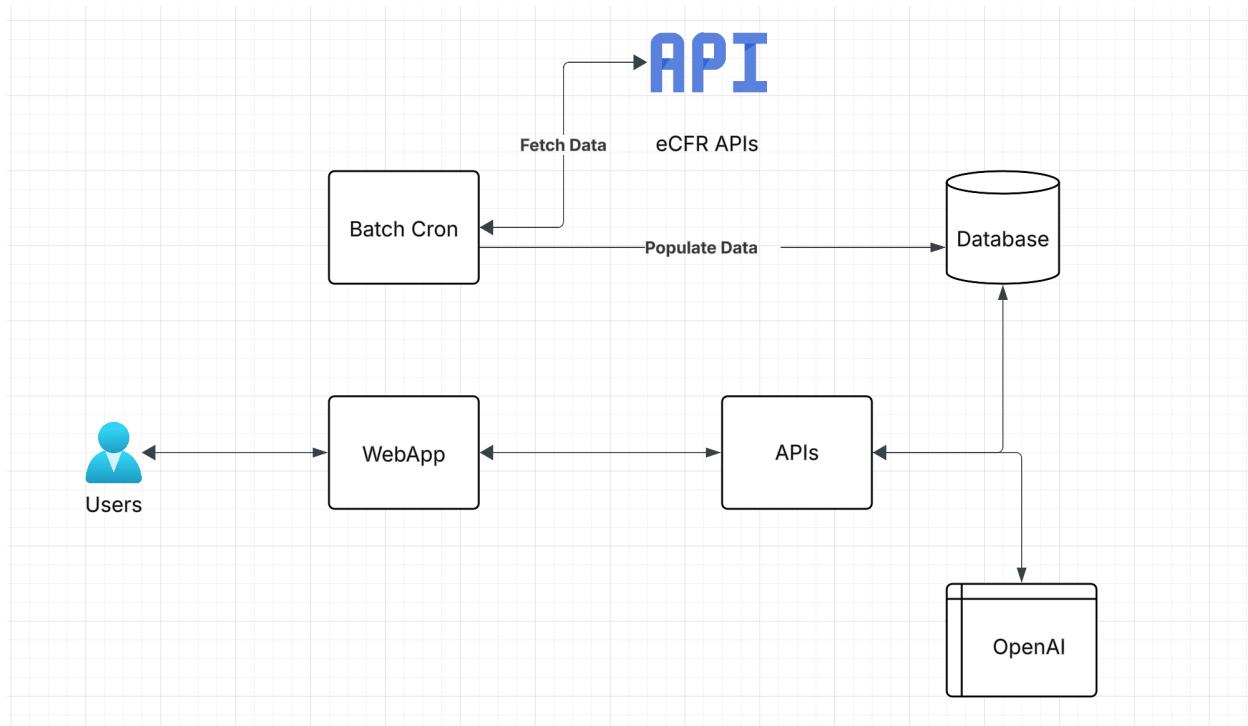
Search by Slug: Search by Name:

Search Buttons:

Results:

- Administrative Committee of the Federal Register**
Slug: federal-register-administrative-committee
CFR References: [Title 1 - Chapter I](#)
ID: 59 Updated: 11/16/2025 [Show More](#)
- Administrative Conference of the United States**
Slug: administrative-conference-of-the-united-states
CFR References: [Title 1 - Chapter III](#)
ID: 1 Updated: 11/16/2025 [Show More](#)

Architecture:



Data Ingestion Batch jobs:

Have created two scripts in python to populate Agents and Title details.

- `local_agencies.py` : Ingests and manages U.S. government agency data from eCFR API into PostgreSQL. Creates agencies and titles tables. Fetches agency and title data from eCFR APIs
- `local_title.py` : Processes and analyzes word counts for CFR chapters and titles and stores in `ecfr_chapter_wordcount` Table.

Database Schema:

I have used a local postgres db

```
-- Agencies Table
CREATE TABLE IF NOT EXISTS agencies (
    id SERIAL PRIMARY KEY,
    name TEXT NOT NULL,
    display_name TEXT,
    slug TEXT UNIQUE,
    children JSONB,
    cfr_references JSONB,
    raw_data JSONB,
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

```
-- Titles Table
CREATE TABLE IF NOT EXISTS titles (
    id SERIAL PRIMARY KEY,
    title_number INTEGER UNIQUE NOT NULL,
    title_name TEXT NOT NULL,
    title_abbreviation TEXT,
    chapter_count INTEGER DEFAULT 0,
    is_reserved BOOLEAN DEFAULT FALSE,
    latest_amended_on DATE,
    latest_issue_date DATE,
    up_to_date_as_of DATE,
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

```
CREATE TABLE IF NOT EXISTS ecfr_chapter_wordcount (
    id SERIAL PRIMARY KEY,
    title INTEGER NOT NULL,
    chapter_identifier TEXT,
    chapter_heading TEXT,
    word_count INTEGER NOT NULL,
    character_count INTEGER,
    is_reserved BOOLEAN DEFAULT FALSE,
    downloaded_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);
```

API Backend Layer:

Agency_api.py- Rest API server using FastAPI

Provides a comprehensive REST API for accessing agency data, word counts, and AI-powered summaries.

Agencies:

- GET /agencies - Retrieve all agencies with optional filtering
 - Query Parameters: slug, name
 - Response: List of agencies with CFR references

Word Counts:

- GET /word-count/{title}/{chapter_identifier} - Get specific chapter word count
- GET /word-counts/{title} - Get all word counts for a title

AI-Powered Summaries:

- POST /ai/agency-summary - Generate AI-powered agency summary
 - Request: Agency name, CFR references, description
 - Response: Structured summary with responsibilities and scope

Script:

```
# Start the API server  
./start_api.sh
```

API Documentation: Available at <http://localhost:8000/docs>

OpenAPI:

The screenshot shows a browser window displaying the OpenAPI specification for the eCFR Agencies API. The title bar indicates the URL is 0.0.0.0:8000/docs/. The page header includes the title "eCFR Agencies API 1.0.0 OAS 3.1" and a link to "/openapi.json". Below the header, a brief description states: "Simple API for retrieving all eCFR agencies". The main content is organized into sections: "Agencies", "Word Counts", and "AI". The "Agencies" section contains a single endpoint: "GET /agencies Get all agencies with title information". The "Word Counts" section contains two endpoints: "GET /word-count/{title}/{chapter_identifier} Get word count by title and chapter" and "GET /word-counts/{title} Get all word counts by title". The "AI" section contains one endpoint: "POST /ai/agency-summary Generate AI-powered agency summary". At the bottom, there is a "Schemas" section listing several schema definitions: "Agency", "AgencySummaryRequest", "AgencySummaryResponse", "HTTPValidationError", and "ValidationErrors". Each schema entry has a "Expand all object" link.

React Frontend Application:

UI/index.html: Single page react application

Provides a responsive web interface for browsing and analyzing agency data.

- Agency Directory: Browse all U.S. government agencies
- Search Functionality: Real-time search by agency name
- Expandable Cards: Detailed information with smooth animations
- Word Count Analytics: Display aggregated statistics per agency
- AI-Powered Insights: Dynamic AI-generated agency summaries
- Professional UI: Modern design with Tailwind CSS
- Axios: HTTP client for API communication

Key Features:

1. Search & Filter:
2. Agency Cards:
3. AI Summary Section:
4. Word Count Analytics:

Usage:

```
# Navigate to UI directory: cd UI  
# Start development server: npm start  
# Access at http://localhost:3000
```

Potential Improvements

1. Caching Layer: Redis for API response caching
2. Authentication: User authentication and authorization
3. Advanced Search: Full-text search with Elasticsearch
4. Data Visualization: Charts and graphs for analytics
5. Export Features: PDF/CSV export capabilities
6. Real-time Updates: Set up system for live data updates
7. Advanced AI: More sophisticated AI analysis and insights