Movie Database Web API

Technical Specification Document

Executive Summary

This document outlines the functionality and features of your custom Movie Database Web API. This API will serve as the bridge between your applications and a secure PostgreSQL database containing comprehensive movie information. The system is designed to provide fast, reliable access to movie data while maintaining data integrity and security.

The API will enable your team to retrieve detailed movie information, search across multiple criteria, add new movies to the database, update existing records, and perform complex filtering operations—all through simple, intuitive web requests.

System Overview

What This System Does

The Movie Database Web API acts as an intelligent intermediary that allows your applications, websites, or other systems to interact with your movie database. Think of it as a specialized assistant that understands exactly how to find, organize, and manage movie information on your behalf.

Key Components

- Web API Layer: The communication interface that receives requests and sends responses
- PostgreSQL Database: Secure, reliable storage for all movie information
- Authentication System: Security layer ensuring only authorized users can access or modify data
- Data Validation: Automatic checking to ensure all information meets quality standards

Database Structure and Content

Your database will store comprehensive information about movies, organized into logical categories. Based on your provided dataset, each movie record includes:

Basic Information

- Title (both display title and original title)
- Release date
- Runtime in minutes
- Movie overview/description
- MPA rating (PG, PG-13, R, etc.)
- Genre classifications

Financial Data

- Production budget
- Total revenue

Production Information

- Production studios (multiple studios per movie)
- Producers

- Directors
- Studio locations (country information)
- Collection information (for movies that are part of a series)

Cast Information

- Up to 10 lead actors per movie
- Character names for each actor
- Actor profile images

Visual Assets

- Movie poster images
- Backdrop/banner images
- Studio logos

API Functionality: Retrieving Data (GET Operations)

The API will provide multiple ways to retrieve movie information from your database. These operations are read-only and will not modify any data.

1. Get All Movies

Purpose: Retrieve a complete list of all movies in your database.

Use Case: Display a movie catalog, generate reports, or populate dropdown menus in your application.

What You'll Receive: A complete list containing all movie records with full details including titles, release dates, cast, financial information, and visual assets.

Options: The response can be paginated (e.g., 20 movies at a time) to improve performance and loading times.

2. Get Single Movie by Identifier

Purpose: Retrieve complete details for one specific movie.

Use Case: When a user clicks on a movie in your application and wants to see full details, cast information, production details, and all associated data.

What You'll Receive: Every piece of information stored about that specific movie, including all 10 actor slots, production credits, financial data, and image URLs.

3. Search Movies by Title

Purpose: Find movies based on their title or partial title matches.

Use Case: Implement a search bar where users can type movie names. The system will find matches even if they don't type the complete title.

Examples:

- Searching for "Mission" will find "Mission: Impossible - The Final Reckoning"
- Searching for "Dragon" will find "How to Train Your Dragon"

What You'll Receive: A list of all movies whose titles contain your search term, sorted by relevance.

4. Filter Movies by Release Date Range

Purpose: Find all movies released within a specific time period.

Use Case: Create "Summer 2025 releases" sections, analyze seasonal trends, or filter by specific months or years.

Examples:

- All movies released in June 2025

- Movies released between May 1, 2025 and August 31, 2025

What You'll Receive: All movies released within your specified date range, sorted chronologically.

5. Filter Movies by Genre

Purpose: Find all movies within specific genre categories.

Use Case: Allow users to browse by genre ("Show me all Horror movies" or "Find Action movies").

Available Genres: Action, Adventure, Animation, Comedy, Crime, Drama, Family, Fantasy, Horror, Mystery, Romance, Science Fiction, Thriller, and more.

What You'll Receive: All movies tagged with your requested genre. Note that movies can have multiple genres (e.g., "Action; Adventure; Science Fiction").

6. Filter Movies by MPA Rating

Purpose: Find movies based on their content rating.

Use Case: Filter age-appropriate content ("Show only PG movies for family viewing" or "Find R-rated thrillers").

Available Ratings: PG, PG-13, R

What You'll Receive: All movies with your specified rating.

7. Search Movies by Actor

Purpose: Find all movies featuring a specific actor.

Use Case: "Show me all movies with Tom Cruise" or "What movies feature Scarlett Johansson in your database?"

What You'll Receive: All movies where the actor appears in any of the 10 cast slots, including the character they played and their profile image.

8. Search Movies by Director

Purpose: Find all movies directed by a specific filmmaker.

Use Case: "Show me all movies directed by James Gunn" or create filmmaker-specific collections.

What You'll Receive: Complete list of all movies by that director, including co-directed films.

9. Search Movies by Studio

Purpose: Find all movies produced by a specific studio.

Use Case: "Show all Marvel Studios movies" or "Find everything from A24" for studio-specific analysis or collections.

What You'll Receive: All movies produced by that studio, including co-productions.

10. Filter Movies by Financial Performance

Purpose: Find movies based on budget or revenue thresholds.

Use Cases:

- "Show me all blockbusters with budgets over $150 million"
- "Find profitable movies that earned over $500 million"
- "Show independent films with budgets under $20 million"

What You'll Receive: Movies meeting your financial criteria, useful for market analysis and trend identification.

11. Get Movies by Collection

Purpose: Retrieve all movies that are part of a specific franchise or series.

Use Case: Display movie series together ("Mission: Impossible Collection", "How to Train Your Dragon Collection", "Jurassic Park Collection").

What You'll Receive: All movies in the franchise, making it easy to present complete series to users.

12. Advanced Multi-Filter Search

Purpose: Combine multiple criteria to create highly specific searches.

Examples:

- "Find all PG-13 Action movies released in Summer 2025 with budgets over $100 million"
- "Show me Horror movies featuring Julia Garner"
- "Find all Marvel Studios Science Fiction movies released after June 2025"

What You'll Receive: Only movies that match all your specified criteria.

API Functionality: Adding Data (POST Operations)

These operations allow you to add new information to your database. All additions go through validation to ensure data quality and consistency.

1. Add New Movie

Purpose: Insert a complete new movie record into your database.

Use Case: When new movies are released or when expanding your database with additional titles.

Required Information:

- Title and original title
- Release date
- Runtime
- Genre(s)
- Overview/description
- MPA rating

Optional Information:

- Budget and revenue (can be added later if not yet known)
- Studios and producers
- Director(s)
- Cast information (up to 10 actors)
- Visual assets (poster, backdrop, studio logos)
- Collection assignment

What Happens: The system validates all information for proper formatting (dates, numbers, URL formats), checks for duplicate titles, assigns a unique identifier, and confirms successful addition to the database.

2. Add Multiple Movies (Bulk Import)

Purpose: Add many movies at once efficiently.

Use Case: Initial database population, quarterly updates, or importing data from external sources.

Process: You provide a formatted file or data set containing multiple movie records. The API processes each movie, validates the data, and reports success or any errors for individual entries.

What You'll Receive: Detailed report showing which movies were successfully added and any that failed validation (with specific error reasons).

API Functionality: Updating Data (PUT/PATCH Operations)

These operations allow you to modify existing movie records. Updates can be comprehensive (replacing entire records) or targeted (changing specific fields).

1. Update Complete Movie Record

Purpose: Replace an entire movie record with updated information.

Use Case: Major updates when multiple aspects of a movie record need correction or enhancement.

What Happens: You provide the complete updated movie information, and the system replaces the existing record while preserving the unique identifier.

2. Update Specific Fields

Purpose: Modify only particular pieces of information without affecting the rest of the record.

Common Update Scenarios:

- Update Financial Data: Add final box office revenue after a movie's theatrical run completes
- Correct Release Dates: Fix errors or update with confirmed dates
- Update Cast Information: Add actors to empty slots or correct character names
- Add Visual Assets: Upload poster or backdrop images when they become available
- Modify Descriptions: Update overviews with more accurate or detailed information
- Change Rating: Update MPA rating if it changes or was initially incorrect

What Happens: Only the specified fields are modified; all other information remains unchanged.

3. Add or Update Cast Members

Purpose: Manage the cast information for a movie (up to 10 actors).

Use Case: Add newly announced cast members, fill empty actor slots, correct character names, or update actor profile images.

What You Can Update: Actor name, character name, profile image URL for any of the 10 cast positions.

API Functionality: Removing Data (DELETE Operations)

1. Delete Movie Record

Purpose: Permanently remove a movie from the database.

Use Case: Remove duplicate entries, incorrect records, or movies that should no longer be in your catalog.

Safety Features: Confirmation required before deletion, and the system will log what was deleted for audit purposes.

What Happens: The complete movie record and all associated information are removed from the database. This action cannot be undone.

Data Validation and Quality Assurance

The API includes comprehensive validation to maintain data integrity and consistency:

Automatic Validations

- Date Formatting: Ensures all dates follow a consistent format (YYYY-MM-DD)
- Numeric Values: Verifies that budget, revenue, and runtime are valid numbers
- URL Validation: Checks that image URLs are properly formatted and accessible
- Required Fields: Ensures critical information (title, release date, etc.) is present
- Genre Verification: Confirms genres match the approved list

- Rating Validation: Ensures MPA ratings are from the standard set (PG, PG-13, R)
- Length Limits: Prevents excessively long text entries that could cause database issues

Error Reporting

When validation fails, you receive clear, specific error messages:

- What went wrong (e.g., "Invalid date format")
- Which field has the problem
- What the correct format should be
- Suggestions for correction

Security and Access Control

Authentication

All API requests require authentication using secure API keys. Each authorized user or application receives a unique key that must be included with every request.

Access Levels

- Read-Only Access: Can retrieve and search movie data but cannot add, modify, or delete records
- Read-Write Access: Can retrieve data and add new movies but cannot modify or delete existing records
- Full Access: Can perform all operations including deletions (reserved for administrators)

Data Protection

- Encrypted Connections: All data transmitted between your applications and the API is encrypted
- Database Backups: Automatic daily backups ensure your data can be recovered if needed
- Audit Logging: All changes to the database are logged with timestamps and user information
- Rate Limiting: Prevents abuse by limiting the number of requests per time period

Performance and Reliability

Speed Optimization

- Database Indexing: Key fields (titles, dates, genres, actors) are indexed for rapid searching
- Caching: Frequently requested data is cached to reduce response times
- Pagination: Large result sets are automatically divided into manageable pages
- Efficient Queries: The database is optimized to handle complex multi-filter searches quickly

Response Times

- Single Movie Retrieval: Typically under 100 milliseconds
- Search Operations: Usually 200-500 milliseconds depending on complexity
- Adding New Movies: Typically 200-300 milliseconds per movie
- Updates: Generally under 200 milliseconds

Response Formats and Data Structure

All API responses use JSON format, which is easily readable by both humans and applications. Each response includes:

Success Responses

- Status Code: Indicates success (200 for retrievals, 201 for new additions)
- Data: The requested movie information or confirmation of successful operation
- Metadata: Additional information like result count, page numbers, or processing time

Error Responses

- Status Code: Indicates the type of error (400 for bad requests, 404 for not found, etc.)
- Error Message: Clear explanation of what went wrong
- Error Details: Specific field information and suggestions for correction
- Timestamp: When the error occurred

Implementation Timeline and Deliverables

Phase 1: Foundation (Weeks 1-2)

- Database design and setup in PostgreSQL
- Core API framework implementation
- Authentication system setup
- Initial data import from your provided dataset

Phase 2: Core Functionality (Weeks 3-4)

- All GET operations (retrieving and searching movies)
- POST operations (adding new movies)
- Data validation system
- Error handling and reporting

Phase 3: Advanced Features (Weeks 5-6)

- PUT/PATCH operations (updating records)
- DELETE operations
- Multi-filter search functionality
- Bulk import capabilities
- Performance optimization

Phase 4: Testing and Documentation (Weeks 7-8)

- Comprehensive testing of all endpoints
- Performance testing and optimization
- Security audit
- Technical documentation for developers
- User guide creation
- Training session preparation

Support and Maintenance

Ongoing Support

- Technical Support: Assistance with integration, troubleshooting, and optimization

- Bug Fixes: Rapid response to any issues that arise
- Security Updates: Regular patches and updates to maintain security
- Performance Monitoring: Ongoing optimization as your database grows

Future Enhancements

The API is designed to be extensible. Potential future additions include:

- User ratings and reviews integration
- Recommendation engine based on viewing patterns
- Integration with streaming platform availability data
- Advanced analytics and reporting features
- Notification system for new releases or updates
- Image hosting and management
- Full-text search capabilities

Conclusion

This Movie Database Web API provides a comprehensive, secure, and efficient solution for managing and accessing your movie database. The system is designed with flexibility and scalability in mind, ensuring it can grow with your needs while maintaining excellent performance.

The API's intuitive structure makes it easy for your developers to integrate with existing applications, while robust validation and security features ensure your data remains accurate and protected. Whether you're building a movie recommendation engine, a streaming platform interface, a film industry analysis tool, or any other application requiring movie data, this API provides all the functionality you need.

We're committed to delivering a high-quality product that meets your specifications and exceeds your expectations. Our team will work closely with you throughout the development process to ensure the final product aligns perfectly with your vision and requirements.

Next Steps

We're ready to begin development upon your approval of this specification. Please review this document and let us know if you have any questions, require clarifications, or would like to request modifications to the proposed functionality.

We look forward to building this system for you and helping you unlock the full potential of your movie database.