Complete Guide: Setting Up a RAG Agent with Flowise Document Store

Overview

This comprehensive tutorial will guide you through setting up a **Retrieval-Augmented Generation (RAG) Agent** using Flowise with a document store. You'll learn how to:

- Create a new Document Store in Flowise
- Configure web scraping with Cheerio
- Set up Pinecone vector database
- Configure embeddings and record management
- Implement the complete RAG pipeline

Prerequisites

- Flowise installed and running (see flowiseSetupGuide.md)
- Pinecone account (free tier available)
- Basic understanding of RAG concepts
- Target website or documents for scraping

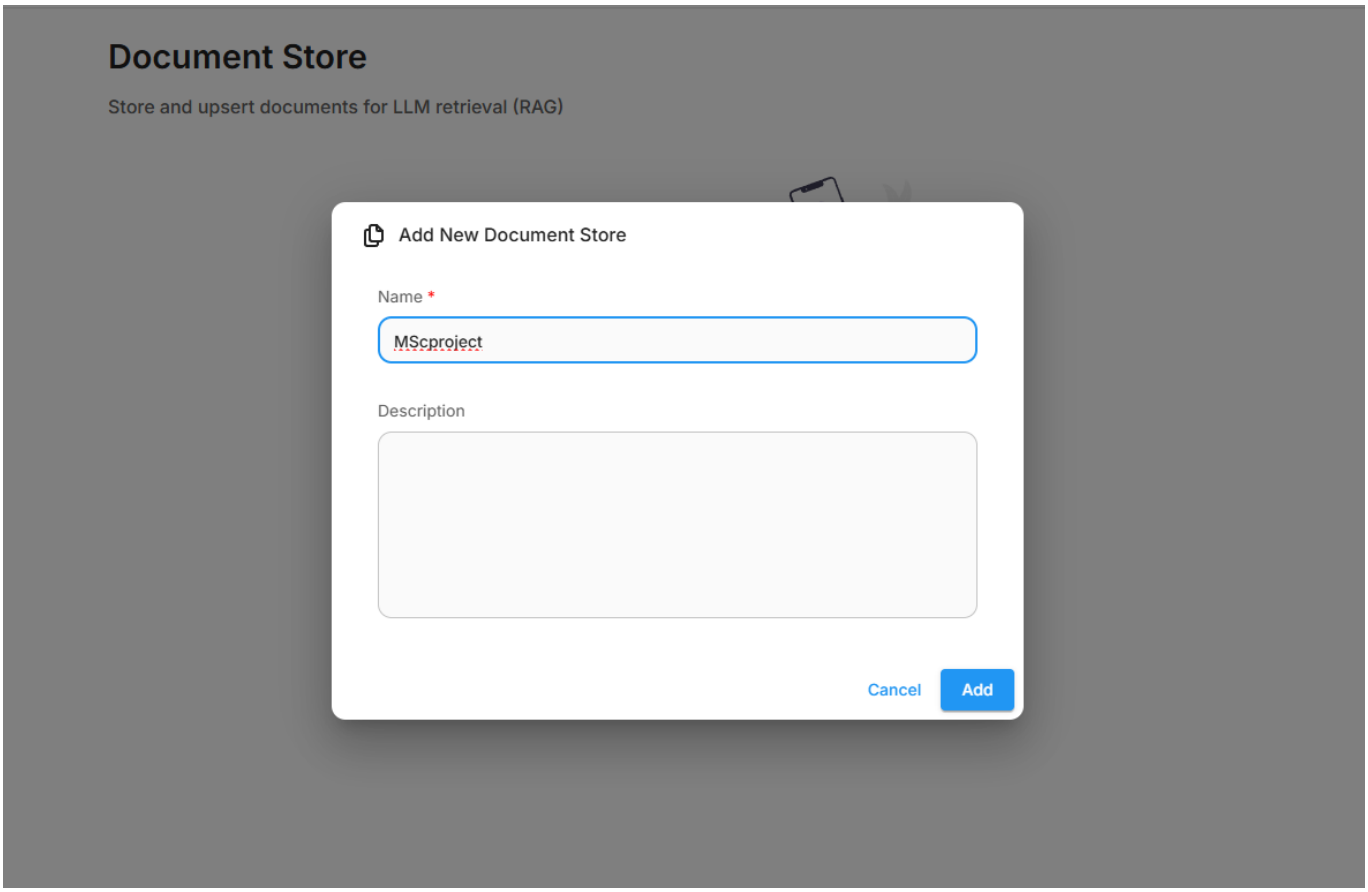
What is RAG (Retrieval-Augmented Generation)?

RAG combines the power of large language models with external knowledge retrieval. Instead of relying solely on pre-trained knowledge, RAG systems:

1. **Retrieve** relevant information from external sources
2. **Augment** the AI's context with this retrieved information
3. **Generate** more accurate and up-to-date responses

Step-by-Step Tutorial

Step 1: Create a New Document Store in Flowise



1. **Access Flowise Interface**
    - Open your Flowise installation in a web browser
    - Navigate to the main dashboard
2. **Create Document Store**
    - Look for the "Document Store" section
    - Click on **"+ New Document Store"** or similar option
    - This will open the document store configuration interface

Key Points:

- Document stores are the foundation of RAG systems
- They manage how documents are processed and stored
- Essential for creating knowledge bases from various sources

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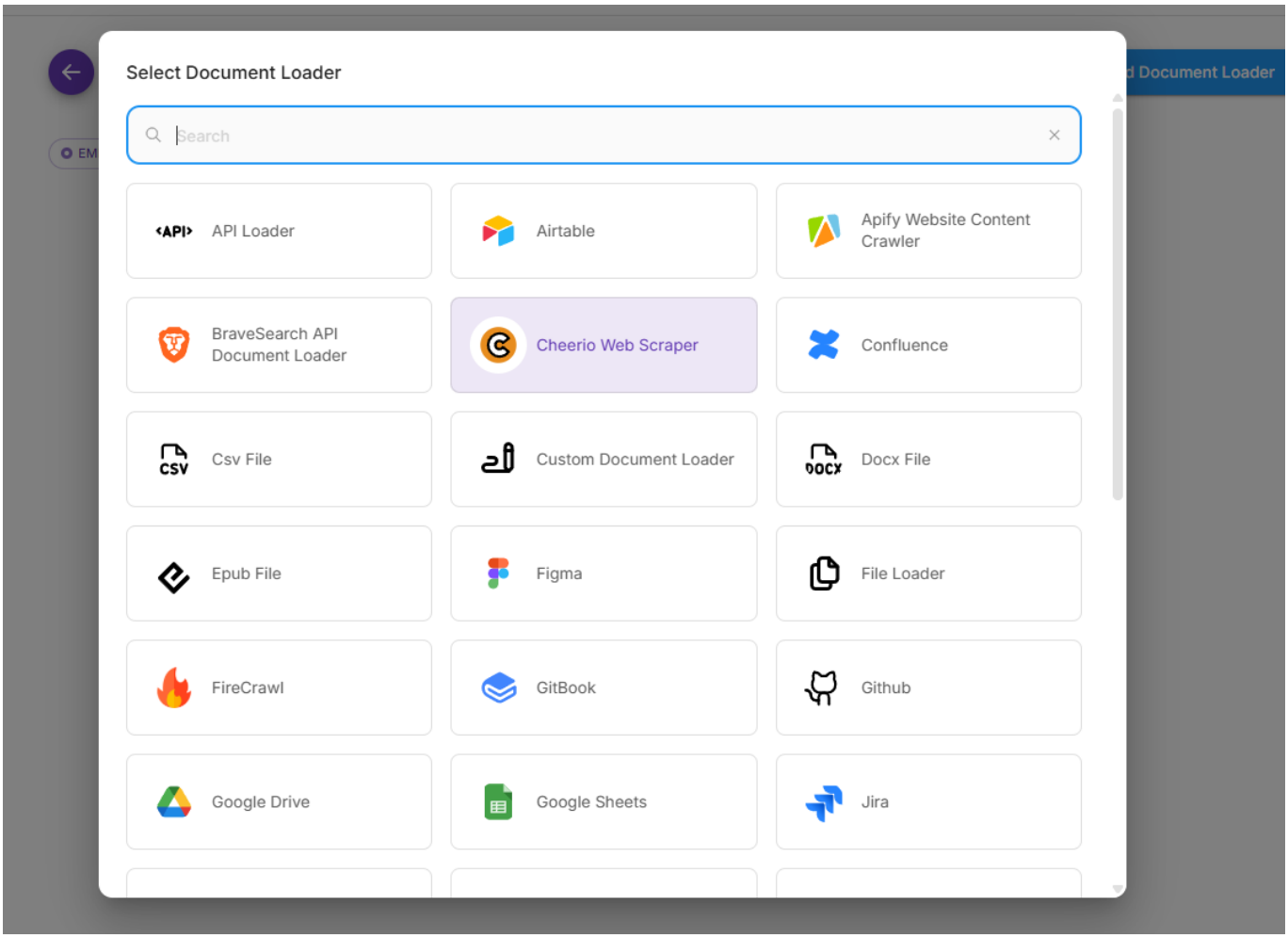
Step 2: Configure Cheerio Web Scraper

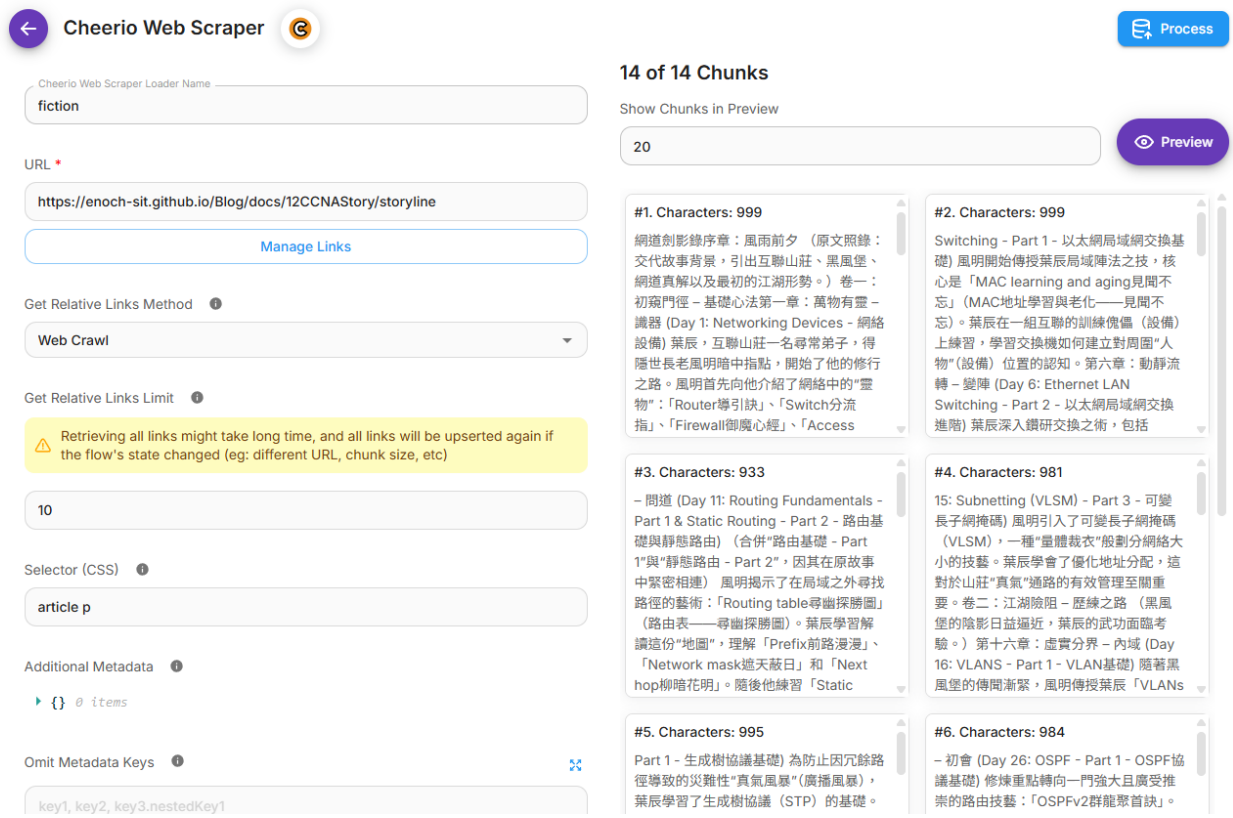


1. **Select Web Scraping Method**
    - Choose **"Cheerio Web Scraper"** as your data source
    - Cheerio is a server-side jQuery implementation perfect for web scraping
2. **Configure Scraper Settings**
    - Set up the scraper parameters
    - Configure selectors for content extraction
    - Define how the scraper should handle different HTML elements

Why Cheerio?

- Lightweight and fast
- Excellent for structured content extraction
- Works well with static websites
- Supports CSS selectors for precise content targeting

Step 3: Set Up Web Crawling Parameters

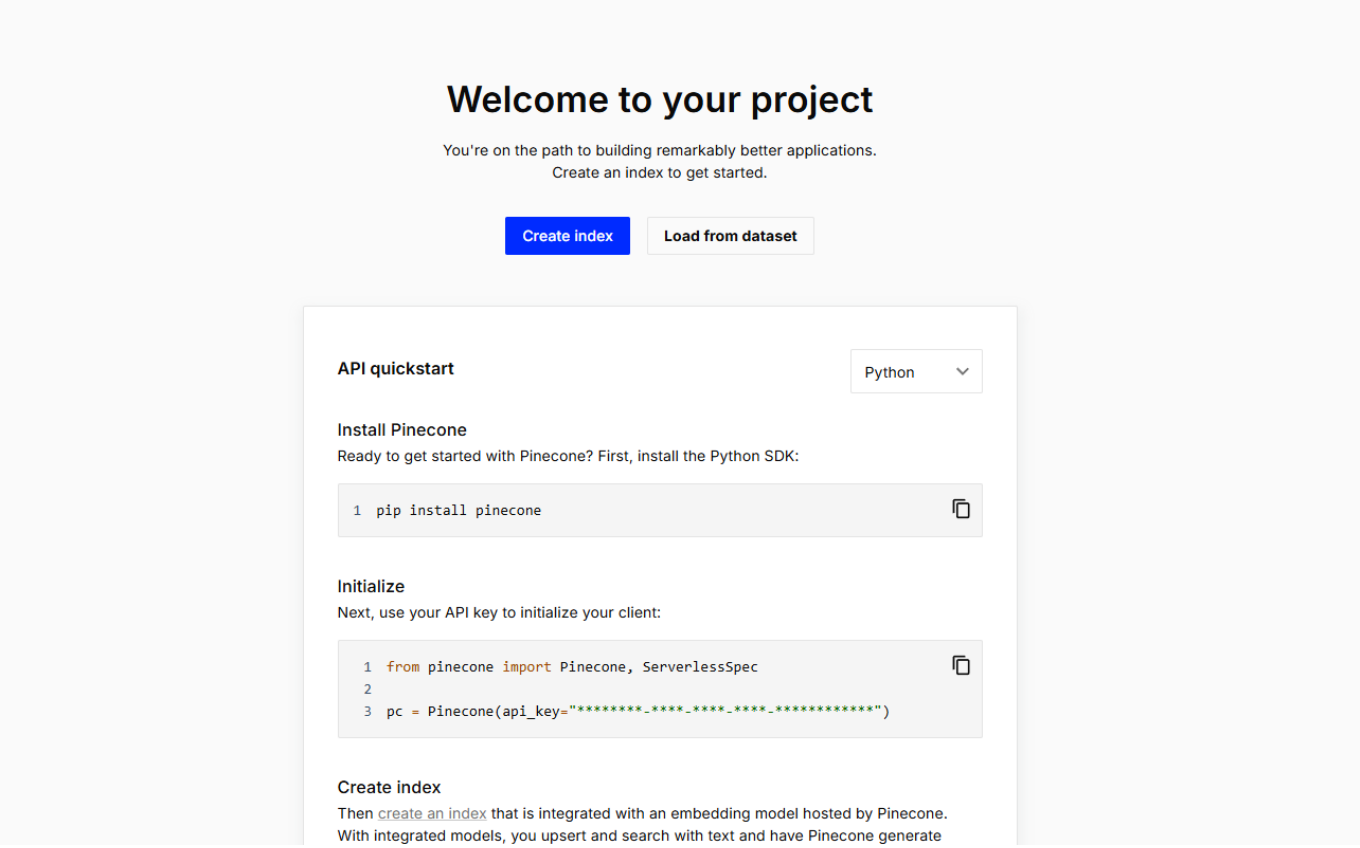


1. **Configure Crawling Settings**
    - **URL**: Enter the target website URL
    - **Crawl Depth**: Set how many levels deep to crawl
    - **Content Selectors**: Define which elements to extract
    - **Exclusion Rules**: Set patterns to avoid (ads, navigation, etc.)
2. **Advanced Options**
    - **Delay**: Set crawl delays to be respectful
    - **Headers**: Configure user agent and other headers
    - **Rate Limiting**: Prevent overwhelming the target server

Best Practices:

- Always respect robots.txt
- Use reasonable crawl delays
- Focus on content-rich pages
- Exclude navigation and advertising content

Step 4: Create Pinecone Vector Database Index

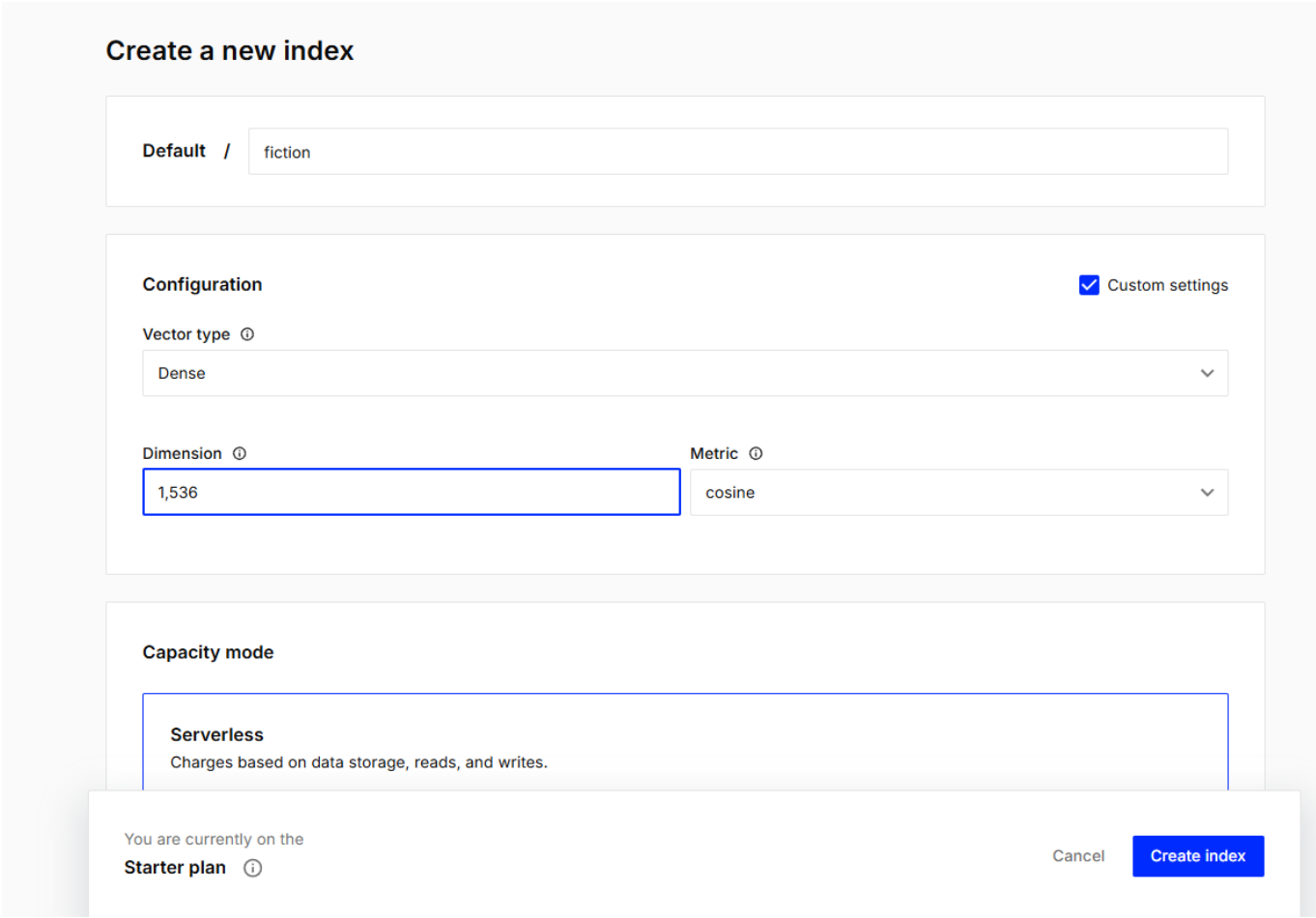


1. **Access Pinecone Console**
    - Log into your Pinecone account at pinecone.io
    - Navigate to the indexes section
2. **Create New Index**
    - Click **"Create Index"**
    - Choose appropriate settings:
        - **Name**: Give your index a descriptive name
        - **Environment**: Select your preferred region
        - **Pod Type**: Choose based on your needs (p1.x1 for testing)

Index Configuration:

- **Dimension**: Will be set based on embedding model (typically 1536 for AWS Text embedding model)
- **Metric**: Usually "cosine" for text similarity
- **Pods**: Start with 1 pod for development

Step 5: Configure Embedding Dimensions

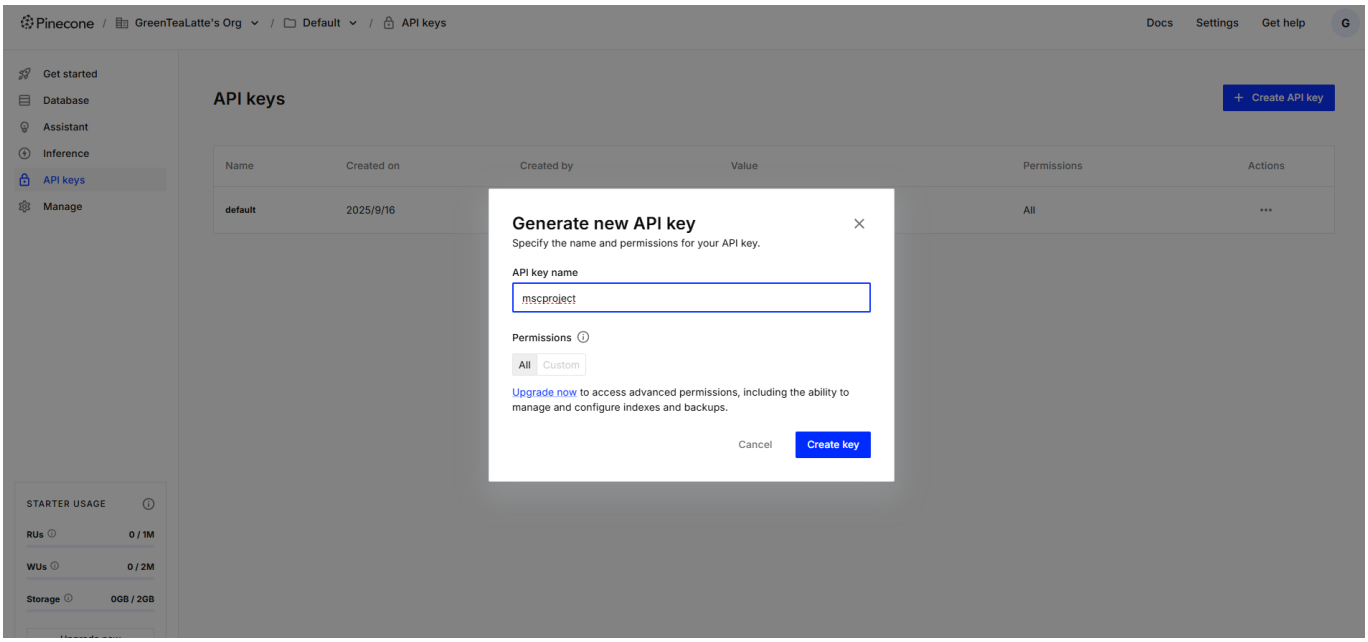


1. **Set Embedding Dimensions**
    - Configure the embedding dimension to **1536**
    - This matches OpenAI's text-embedding-ada-002 model
    - Ensure consistency between your embedding model and vector database
2. **Embedding Model Selection**
    - Choose your preferred embedding model
    - OpenAI Ada-002 is popular for its quality and speed
    - Ensure the dimensions match your Pinecone index

Common Embedding Dimensions:

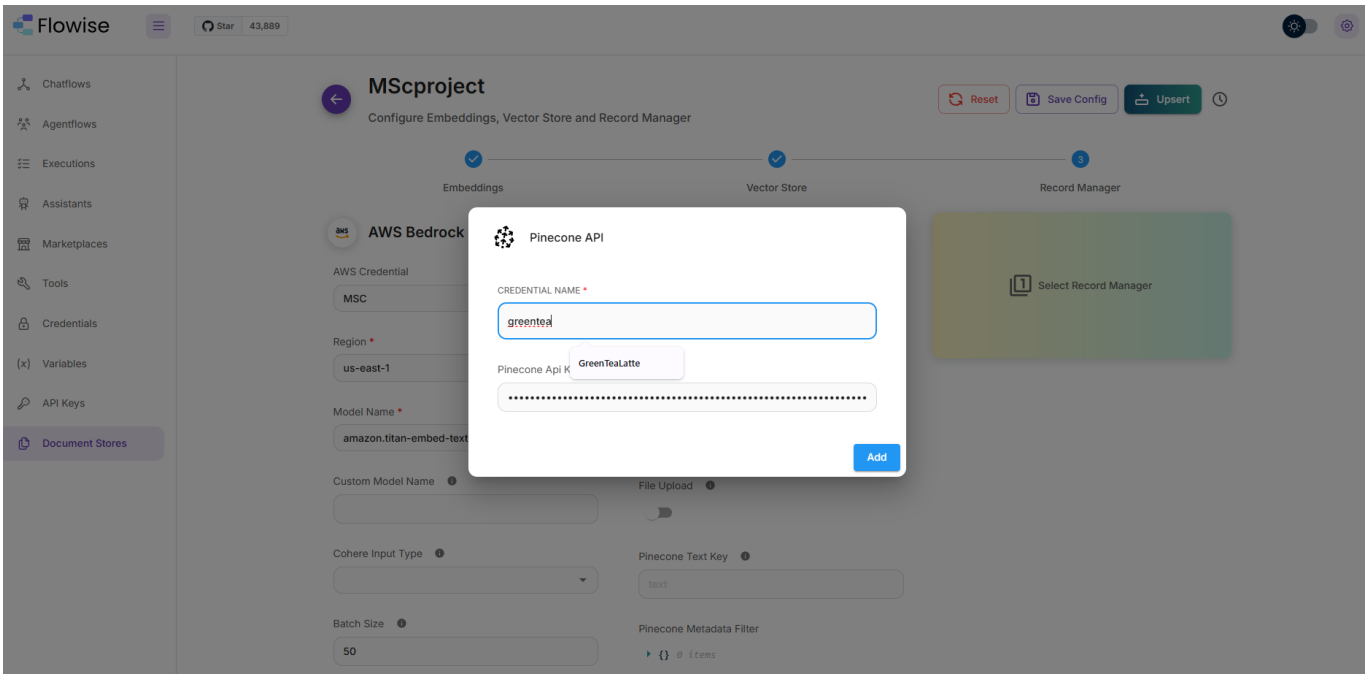
- **OpenAI Ada-002**: 1536 dimensions
- **Sentence Transformers**: 384-768 dimensions
- **Cohere**: 4096 dimensions

Step 6: Generate Pinecone API Key



1. **Navigate to API Keys**
    - In Pinecone console, go to **"API Keys"** section
    - Click **"Create API Key"**
2. **Configure API Key**
    - **Name**: Give it a descriptive name (e.g., "flowise-rag-agent")
    - **Environment**: Select the same environment as your index
    - **Permissions**: Ensure it has read/write access to your index
3. **Save the Key**
    - ⚠ **Important**: Copy and save the API key immediately
    - Store it securely - you won't be able to see it again
    - Consider using environment variables for security

Step 7: Add API Key to Flowise

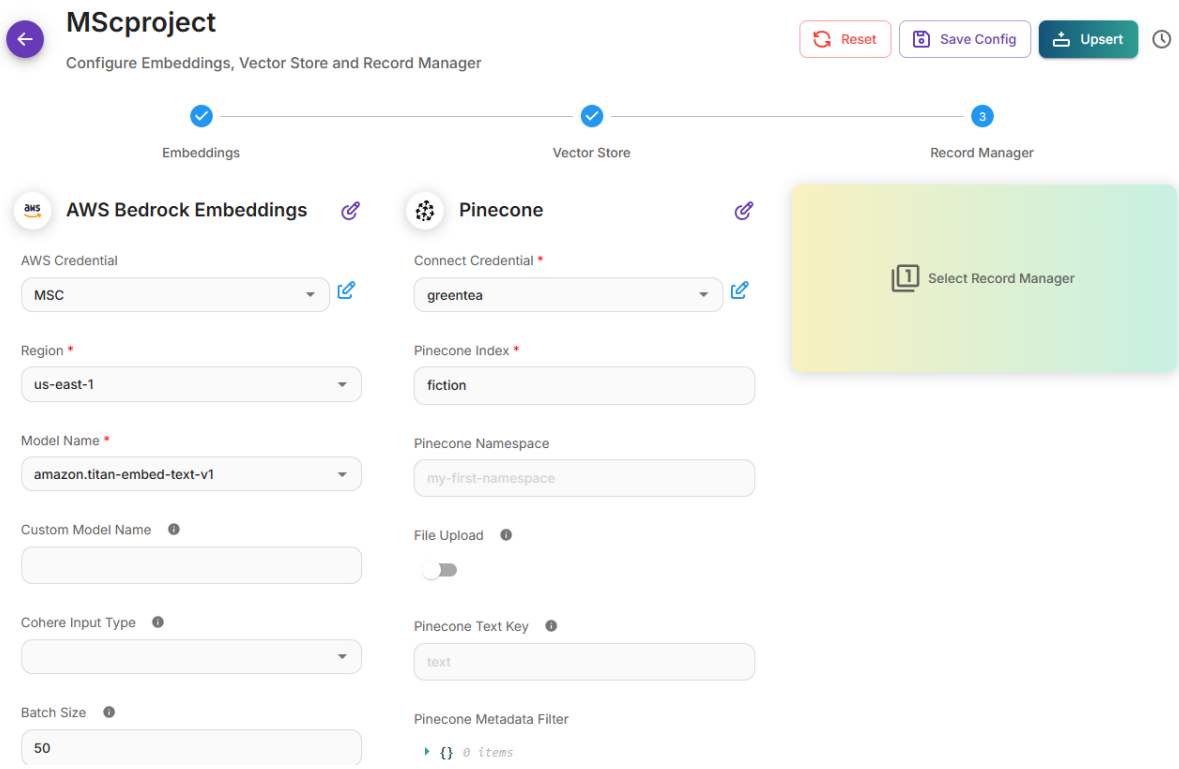


1. **Navigate to Pinecone Configuration**
    - Return to your Flowise document store setup
    - Find the Pinecone vector store configuration
2. **Enter API Credentials**
    - **API Key**: Paste your Pinecone API key
    - **Environment**: Enter your Pinecone environment (e.g., "us-east1-gcp")
    - **Index Name**: Enter the name of your created index

Security Best Practices:

- Never commit API keys to version control
- Use environment variables in production
- Regularly rotate API keys
- Monitor API usage

Step 8: Configure Index Settings



1. **Complete Index Configuration**
    - Verify all Pinecone settings are correct
    - **Index Name**: Confirm it matches your Pinecone index
    - **Namespace**: Optional, useful for organizing data
    - **Top K**: Number of similar documents to retrieve (typically 3-10)
2. **Vector Store Settings**
    - **Metadata**: Configure what metadata to store
    - **Text Key**: Field name for document content
    - **Filter**: Optional filters for specific document types

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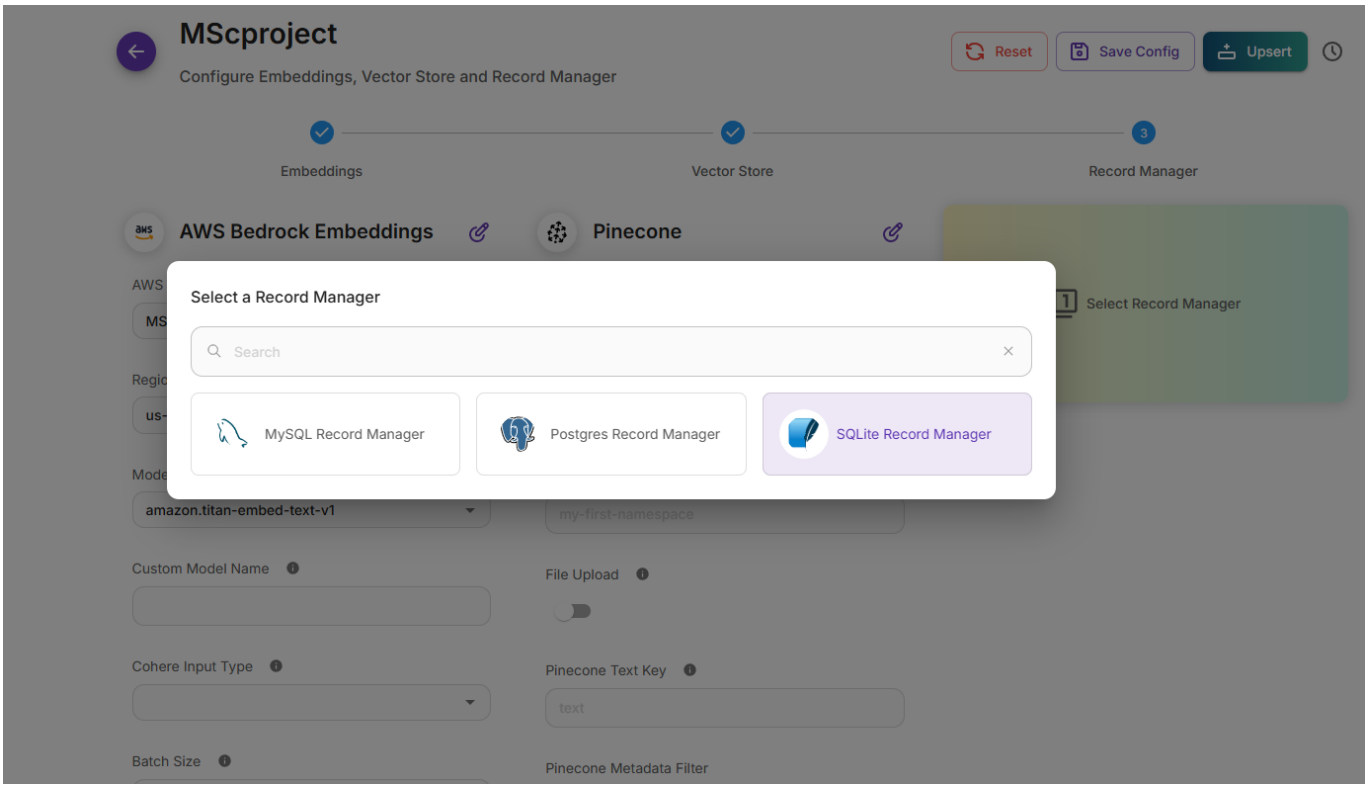
Step 9: Set Up SQLite Record Manager

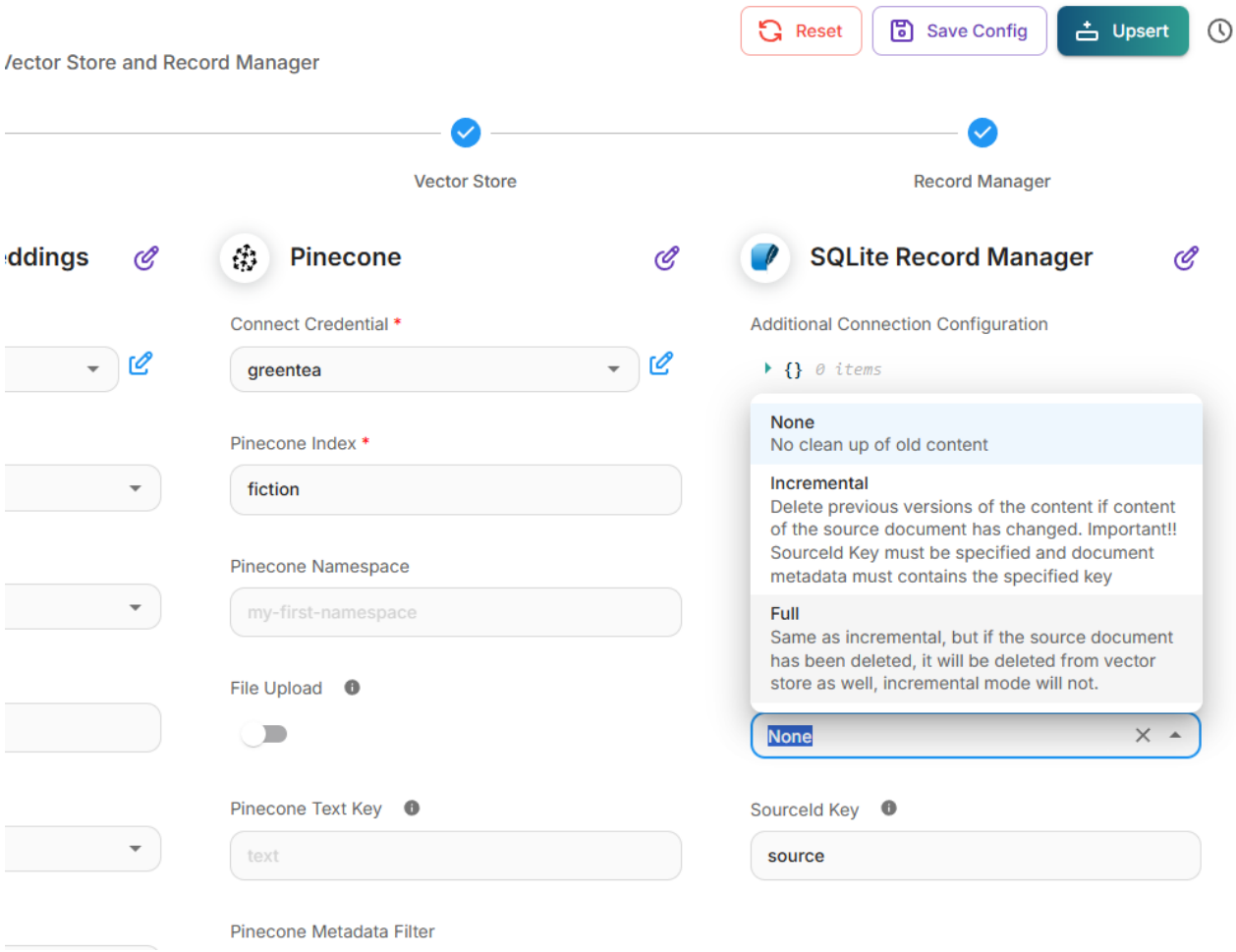


1. **Choose Record Manager**
    - Select **"SQLite Record Manager"**
    - This tracks which documents have been processed
    - Prevents duplicate processing and enables incremental updates
2. **Record Manager Benefits**
    - **Deduplication**: Prevents processing same content multiple times
    - **Incremental Updates**: Only processes new/changed content
    - **Cleanup**: Helps remove outdated content
    - **Tracking**: Maintains history of processed documents

Why SQLite?

- Lightweight and self-contained
- No additional database setup required
- Perfect for development and small-scale deployments
- Easy to backup and migrate

Step 10: Configure Full Cleanup Mode

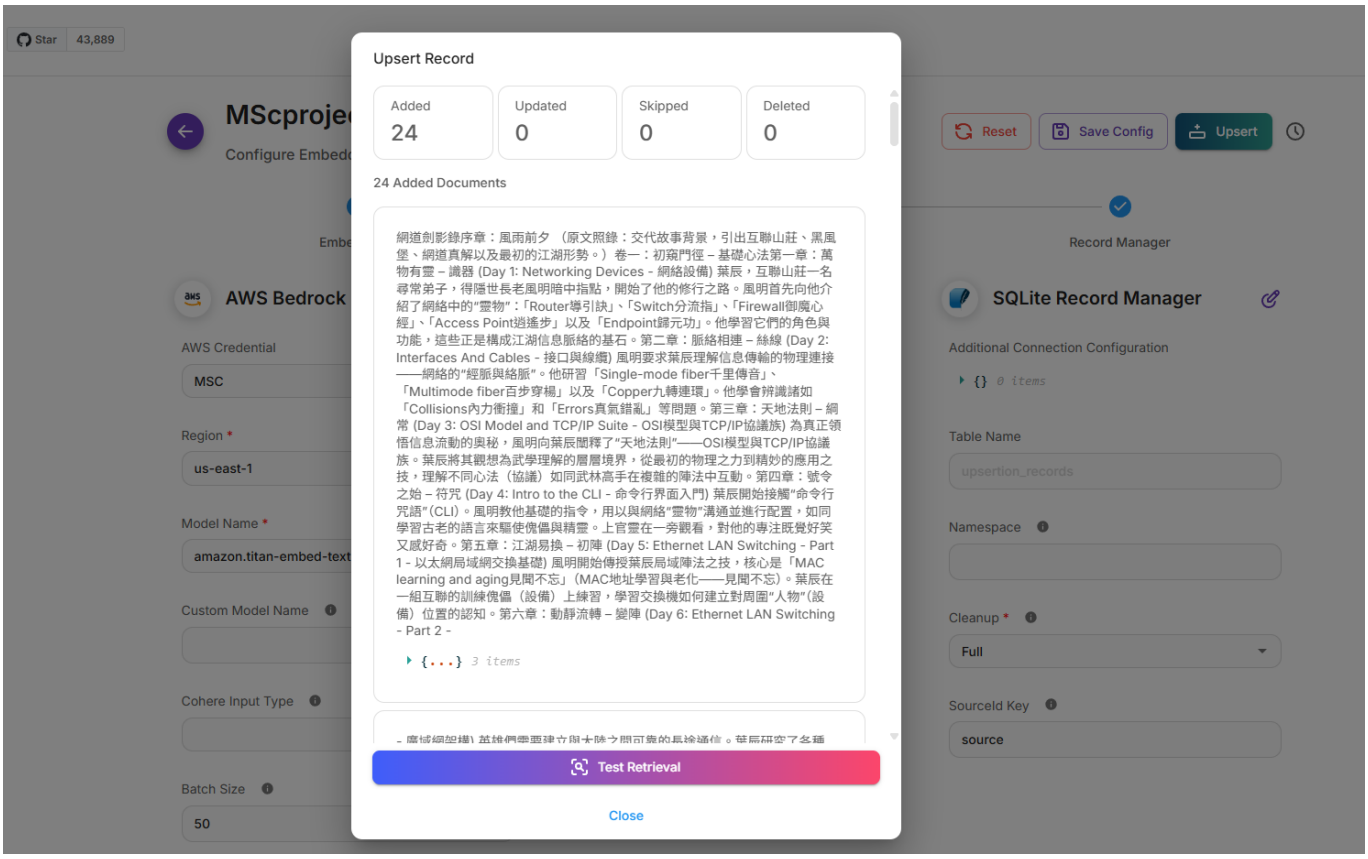


1. **Select Cleanup Strategy**
    - Choose **"Full Cleanup"** mode
    - This ensures old, outdated documents are removed
    - Maintains fresh, relevant content in your vector store
2. **Cleanup Options**
    - **Full**: Removes all records not in current batch
    - **Incremental**: Only removes explicitly marked records
    - **None**: Never removes records (accumulates over time)

When to Use Full Cleanup:

- ☑ Content changes frequently
- ☑ Want to prevent stale information
- ☑ Need complete content refresh
- ❌ Have very large, stable datasets
- ❌ Want to preserve historical versions

Step 11: Execute the Upsert Operation



1. **Start the Upsert Process**
    - Click **"Upsert"** to begin processing
    - This will:
        - Scrape content from your target website
        - Convert text to embeddings
        - Store vectors in Pinecone
        - Update the record manager
2. **Monitor Progress**
    - Watch for processing status updates
    - Check logs for any errors or warnings
    - Verify documents are being processed correctly

What Happens During Upsert:

1. **Scraping**: Cheerio extracts content from web pages
2. **Chunking**: Large documents are split into smaller segments
3. **Embedding**: Text is converted to numerical vectors
4. **Storage**: Vectors are uploaded to Pinecone
5. **Recording**: Process is logged in SQLite record manager

Testing Your RAG Agent

Verify Document Store Setup

```
# Check Pinecone index stats
# You can do this through Pinecone console or API

# Verify SQLite record manager
# Check the created database file for processed records
```

Create a Chat Flow

1. **Create New Chatflow**
    - Use your document store as knowledge base
    - Connect to your preferred LLM (Nova etc.)
    - Configure retrieval parameters
2. **Test Queries**
    - Ask questions related to your scraped content
    - Verify accurate retrieval and relevant responses
    - Check citation and source attribution

Troubleshooting Common Issues

Connection Problems

Issue: Cannot connect to Pinecone **Solution**:

- Verify API key is correct
- Check environment and region settings
- Ensure index name matches exactly

Scraping Issues

Issue: No content being scraped **Solution**:

- Verify target URL is accessible
- Check CSS selectors are correct
- Ensure robots.txt allows scraping
- Test with a simpler page first

Embedding Problems

Issue: Dimension mismatch error **Solution**:

- Ensure Pinecone index dimension matches embedding model
- Common dimensions: 1536 (OpenAI), 768 (many others)
- Recreate index with correct dimensions if needed

Performance Issues

Issue: Slow upsert process **Solution**:

- Reduce batch size
- Add delays between requests
- Consider upgrading Pinecone plan
- Optimize content selectors

Best Practices

Content Strategy

- **Quality over Quantity**: Focus on high-value, relevant content
- **Regular Updates**: Schedule periodic re-indexing
- **Content Curation**: Remove or filter low-quality content
- **Chunking Strategy**: Balance chunk size for context vs. precision

Security

- **API Key Management**: Use environment variables
- **Access Control**: Limit API key permissions
- **Rate Limiting**: Respect service limits
- **Monitoring**: Track usage and costs

Performance Optimization

- **Batch Processing**: Process documents in batches
- **Parallel Processing**: Use multiple workers when possible
- **Caching**: Cache frequently accessed embeddings
- **Index Optimization**: Regularly maintain and optimize indices

Advanced Configuration

Custom Embedding Models

```
# Example configuration for custom embeddings
embedding:
  model: "sentence-transformers/all-MiniLM-L6-v2"
  dimension: 384
  batch_size: 32
```

Advanced Chunking

```
# Sophisticated chunking strategy
chunking:
  strategy: "recursive"
  chunk_size: 1000
  chunk_overlap: 200
  separators: ["\n\n", "\n", " ", ""]
```

Metadata Enhancement

```
# Rich metadata configuration
metadata:
  include:
    - url
    - title
    - date_scraped
    - content_type
    - word_count
  custom_fields:
    - department
    - priority_level
```

Monitoring and Maintenance

Regular Health Checks

1. **Vector Store Health**
    - Monitor index size and utilization
    - Check query performance metrics
    - Verify data freshness
2. **Content Quality**
    - Review retrieved content accuracy
    - Monitor user feedback
    - Update content sources as needed
3. **System Performance**
    - Track response times
    - Monitor resource usage
    - Optimize based on usage patterns

Conclusion

You've successfully created a complete RAG Agent with Flowise! This setup provides:

- ☑ **Automated Web Scraping** with Cheerio
- ☑ **Vector Storage** with Pinecone
- ☑ **Embedding Management** with OpenAI
- ☑ **Record Tracking** with SQLite
- ☑ **Incremental Updates** with cleanup management

Next Steps

1. **Expand Content Sources**: Add more websites or document types
2. **Optimize Retrieval**: Fine-tune similarity thresholds and result counts

3. **Enhance Metadata**: Add more contextual information
4. **Monitor Performance**: Set up analytics and monitoring
5. **Scale Up**: Consider production deployment strategies

Additional Resources

- Flowise Documentation
- Pinecone Best Practices
- RAG System Design Patterns
- Vector Database Optimization

Happy Building! 🚀

Remember: The key to a successful RAG system is high-quality, relevant content combined with proper retrieval configuration. Start simple and iterate based on user feedback and performance metrics.