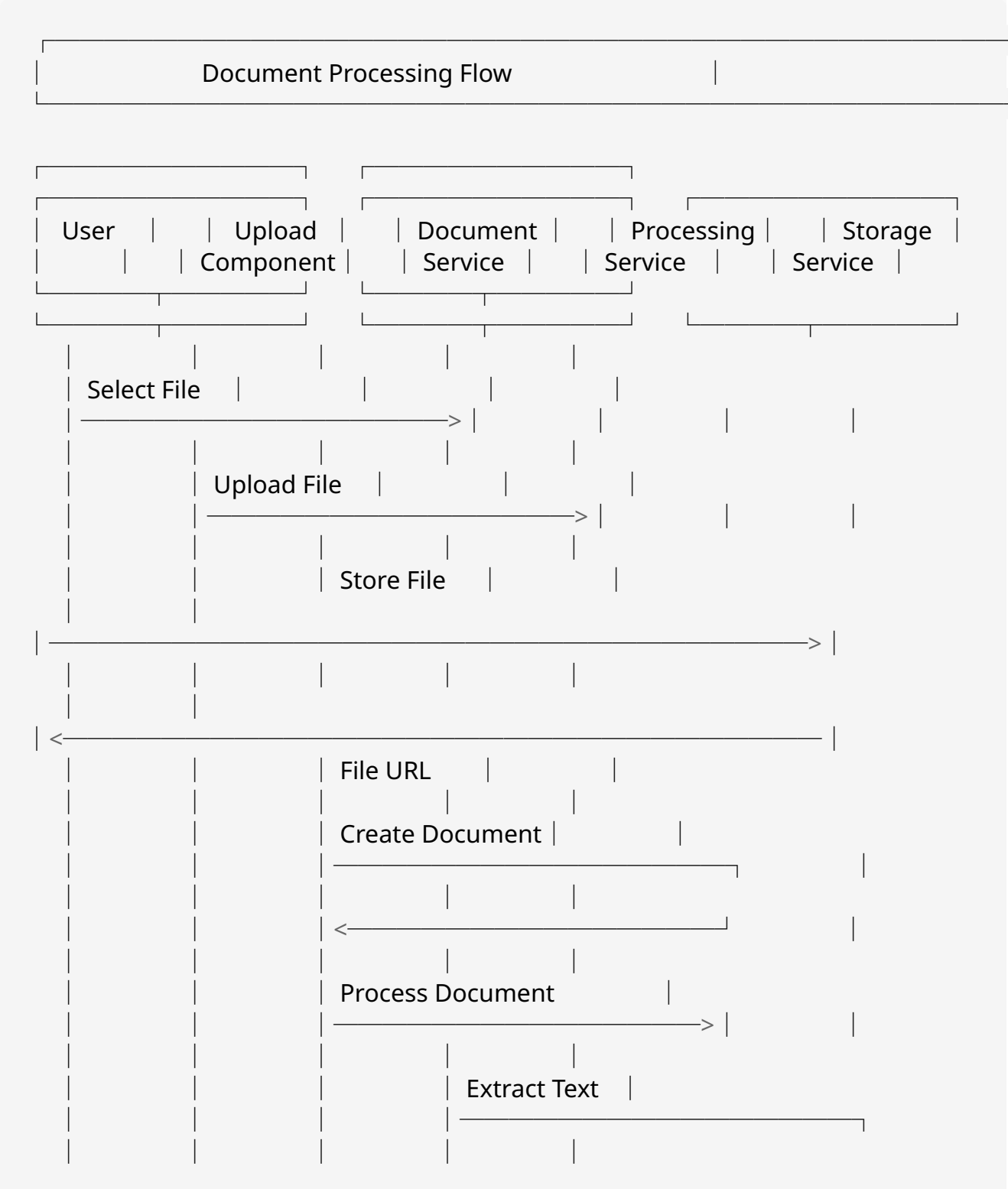
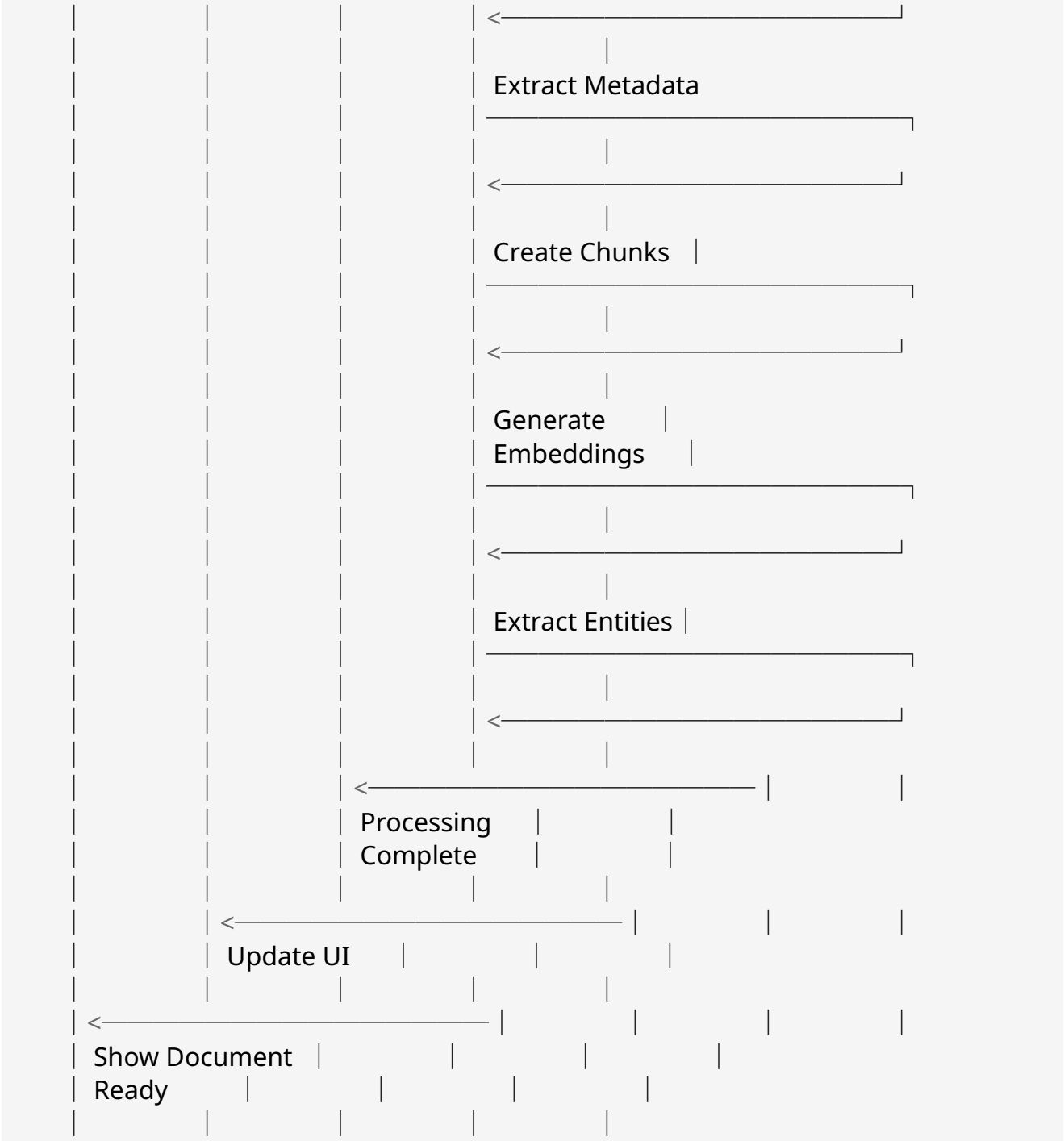
AcademiaLens Flow Diagrams

This document provides detailed flow diagrams for key processes in the AcademiaLens application, illustrating the interactions between components, services, and user actions.

1. Document Processing Flow





Process Description:

1. **Document Upload**
2. User selects a file (PDF, text, URL, etc.)
3. Upload component sends file to Document Service
4. File is stored in cloud storage (Cloudinary)

5. Document record is created in database

6. **Document Processing**

7. Processing Service extracts text from the document
8. For PDFs, OCR is applied if needed

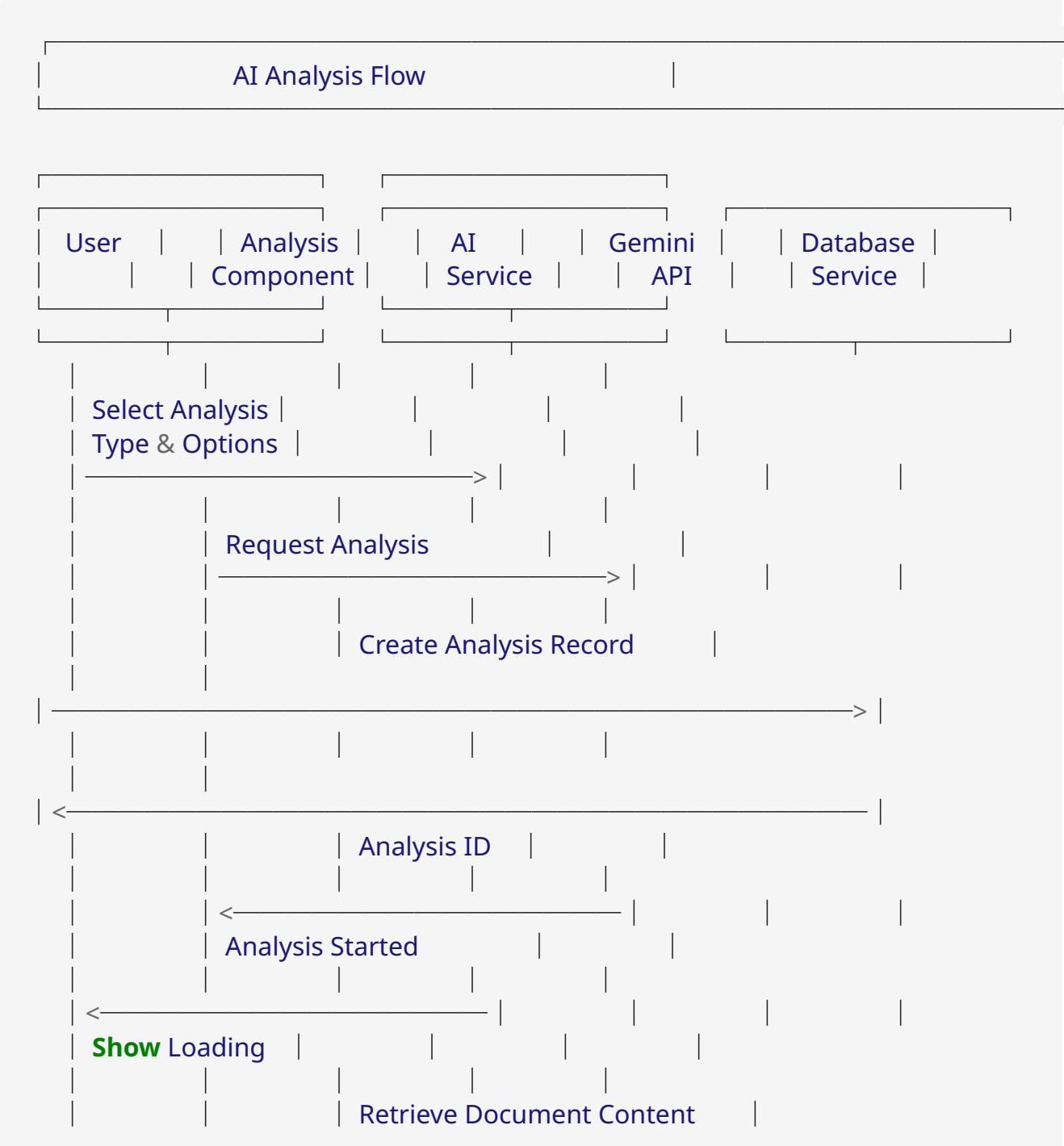
9. Metadata is extracted (authors, publication date, etc.)
10. Document is split into chunks for efficient processing
11. Vector embeddings are generated for each chunk

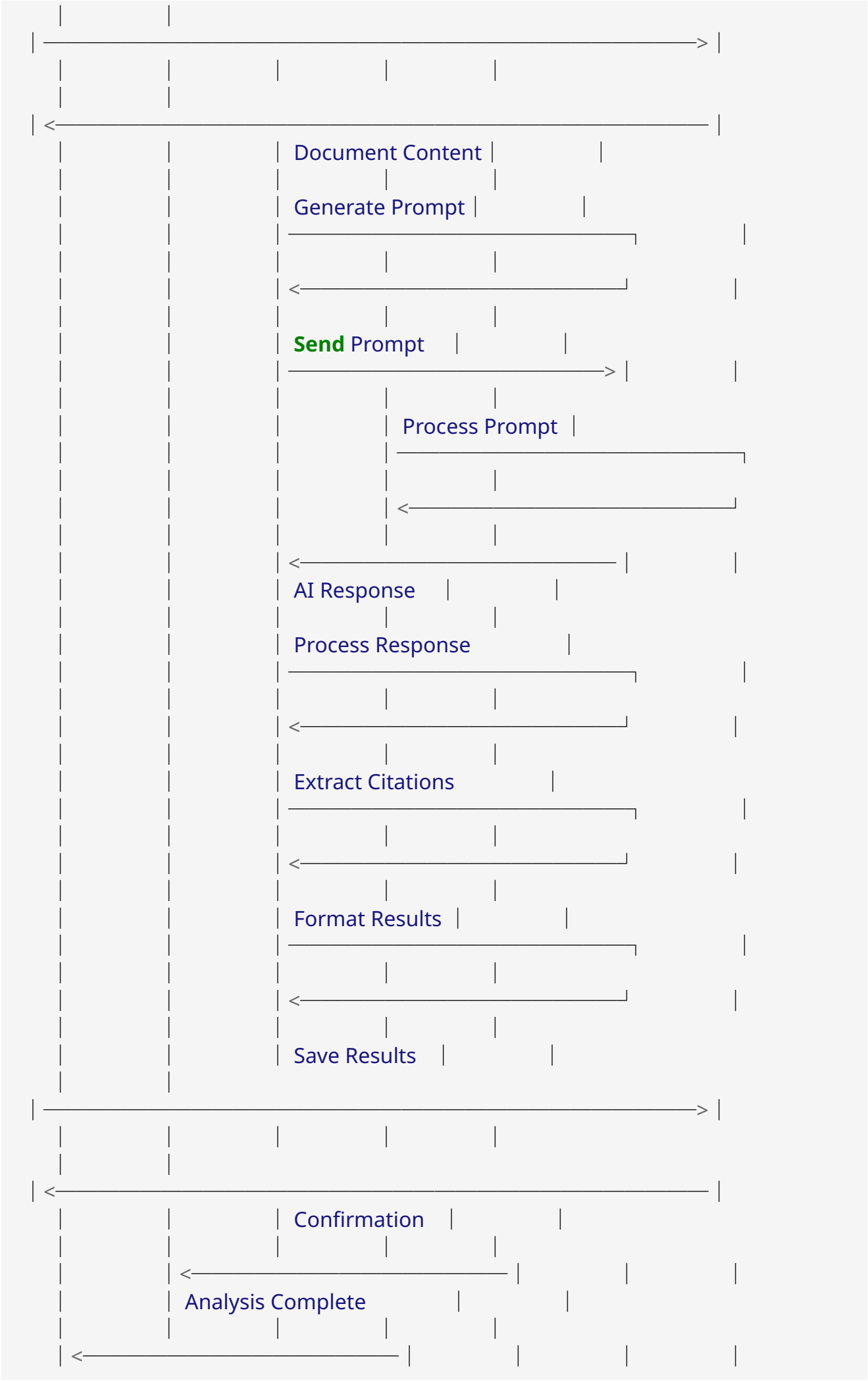
12. Named entities are extracted and categorized

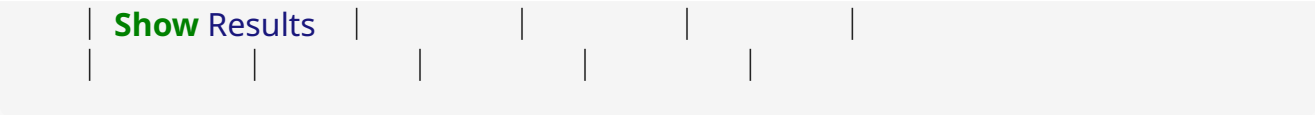
13. **Completion**

14. Document status is updated to "processed"
15. UI is updated to show document is ready for analysis
16. User is notified of completion

2. AI Analysis Flow



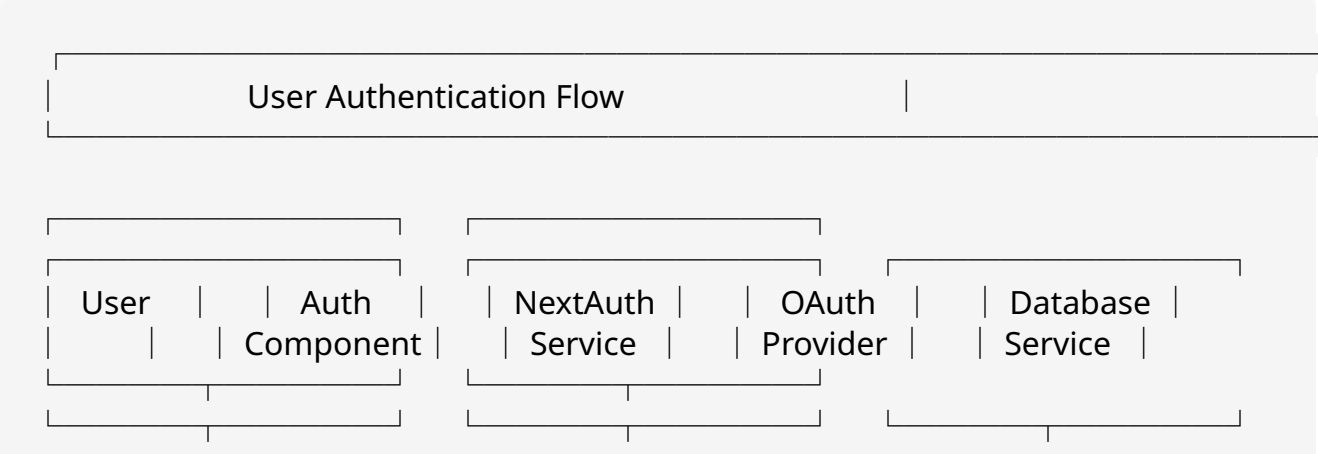

Document Content
Generate Prompt
Send Prompt
Process Prompt
AI Response
Process Response
Extract Citations
Format Results
Save Results
Confirmation
Analysis Complete

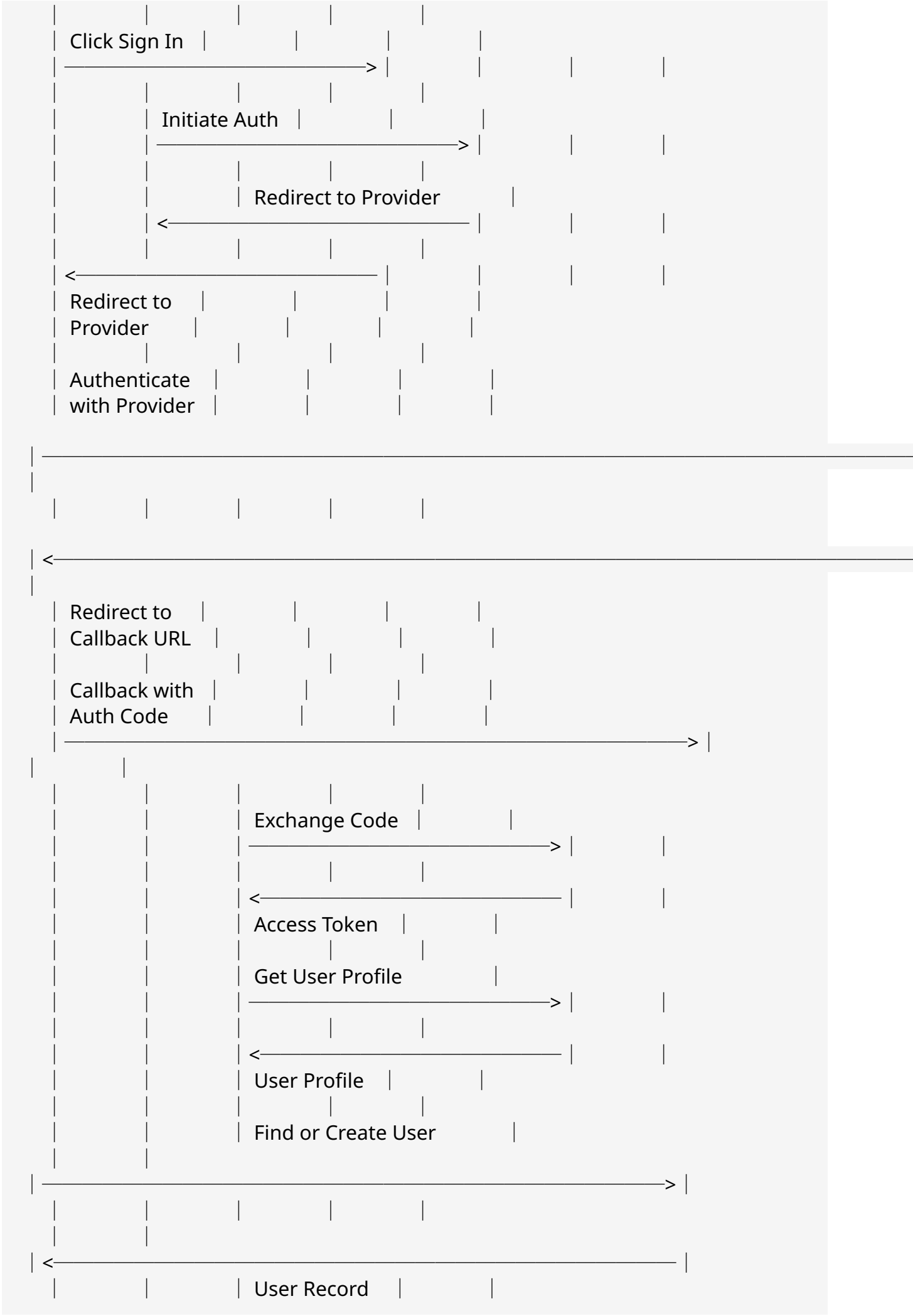


Process Description:

1. **Analysis Initiation**
2. User selects analysis type (summary, methodology extraction, etc.)
3. User configures analysis options (length, focus, etc.)
4. Analysis request is sent to AI Service
5. Analysis record is created in database with "pending" status
6. **AI Processing**
7. AI Service retrieves document content from database
8. Appropriate prompt is generated based on analysis type and options
9. Prompt is sent to Gemini API
10. Response is received from Gemini API
11. **Result Processing**
12. AI Service processes the response
13. Citations are extracted and linked to source material
14. Results are formatted according to analysis type
15. Analysis record is updated with results and "completed" status
16. **Completion**
17. UI is updated to show analysis results
18. User can view, export, or further interact with results

3. User Authentication Flow




Click Sign In
Initiate Auth
Redirect to Provider
Redirect to Provider
Authenticate with Provider
Redirect to Callback URL
Callback with Auth Code
Exchange Code
Access Token
Get User Profile
User Profile
Find or Create User
User Record

Process Description:

1. **Authentication Initiation**
2. User clicks "Sign In" button
3. Auth component initiates authentication process

4. NextAuth redirects user to selected OAuth provider

5. **Provider Authentication**

6. User authenticates with OAuth provider (Google, Microsoft, etc.)
7. Provider redirects back to application with auth code
8. NextAuth exchanges code for access token

9. User profile is retrieved from provider

10. **User Creation/Retrieval**

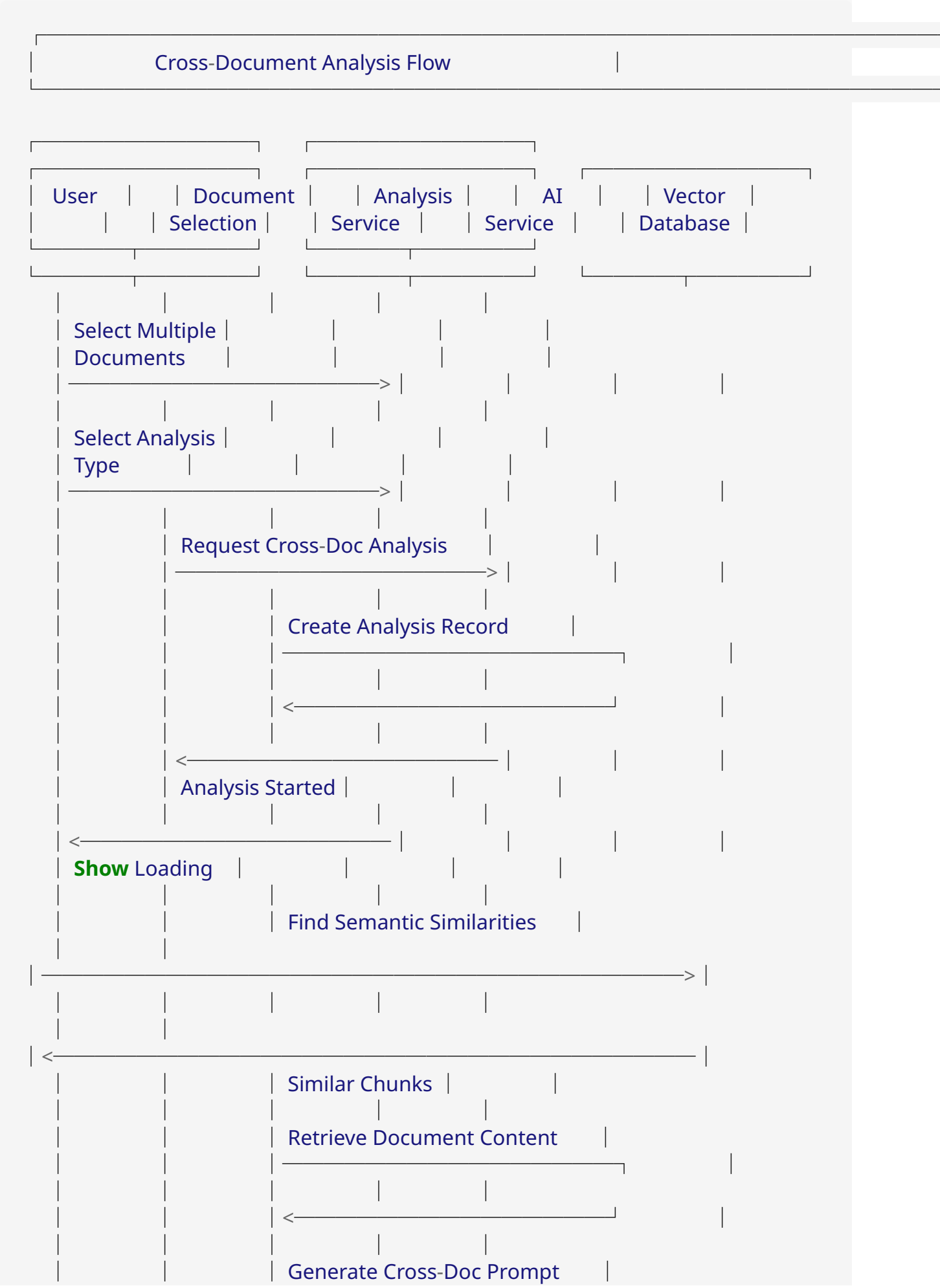
11. NextAuth checks if user exists in database
12. If not, new user record is created
13. Session is created and stored in database

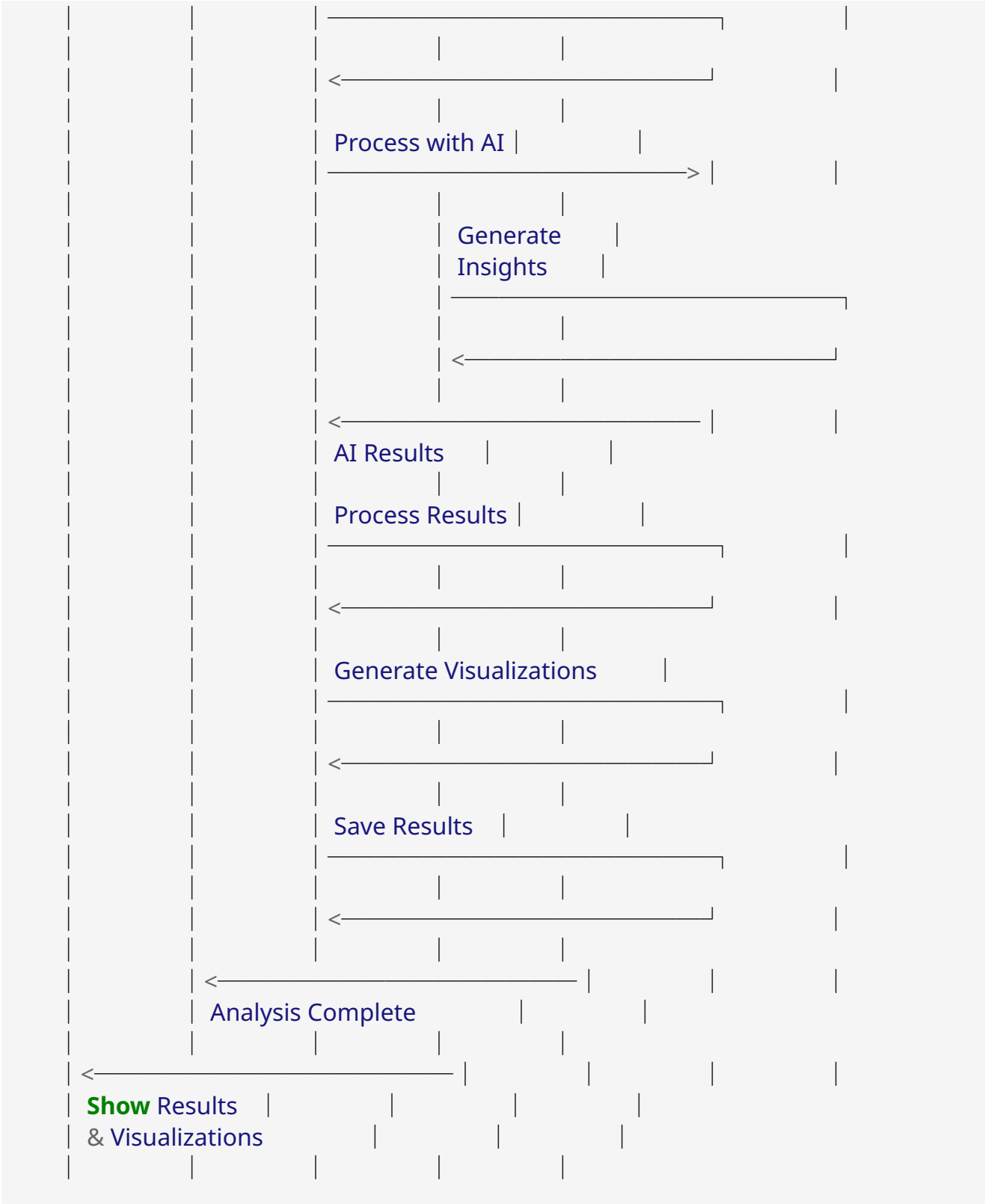
14. Session cookie is set in browser

15. **Completion**

16. User is redirected to dashboard
17. Application is now in authenticated state

4. Cross-Document Analysis Flow





Process Description:

1. **Document Selection**
2. User selects multiple documents for comparison
3. User chooses analysis type (consensus/conflict, knowledge gaps, etc.)

4. Request is sent to Analysis Service

5. **Semantic Analysis**

6. Vector Database is queried to find semantic similarities between documents
7. Similar chunks are identified across documents

8. Document content is retrieved for processing

9. **AI Processing**

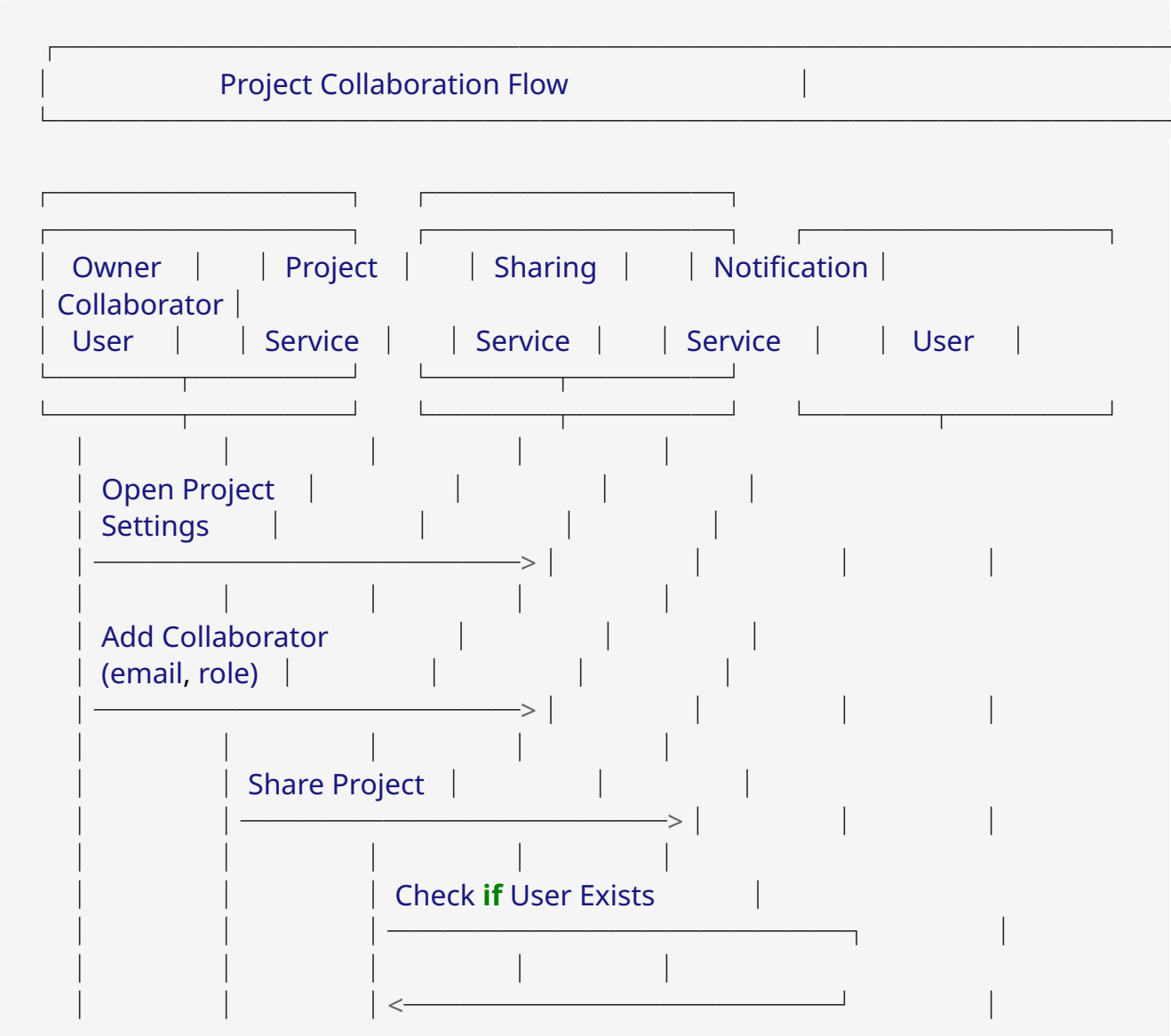
10. Cross-document analysis prompt is generated
11. AI Service processes the documents with Gemini API
12. Results are processed and structured

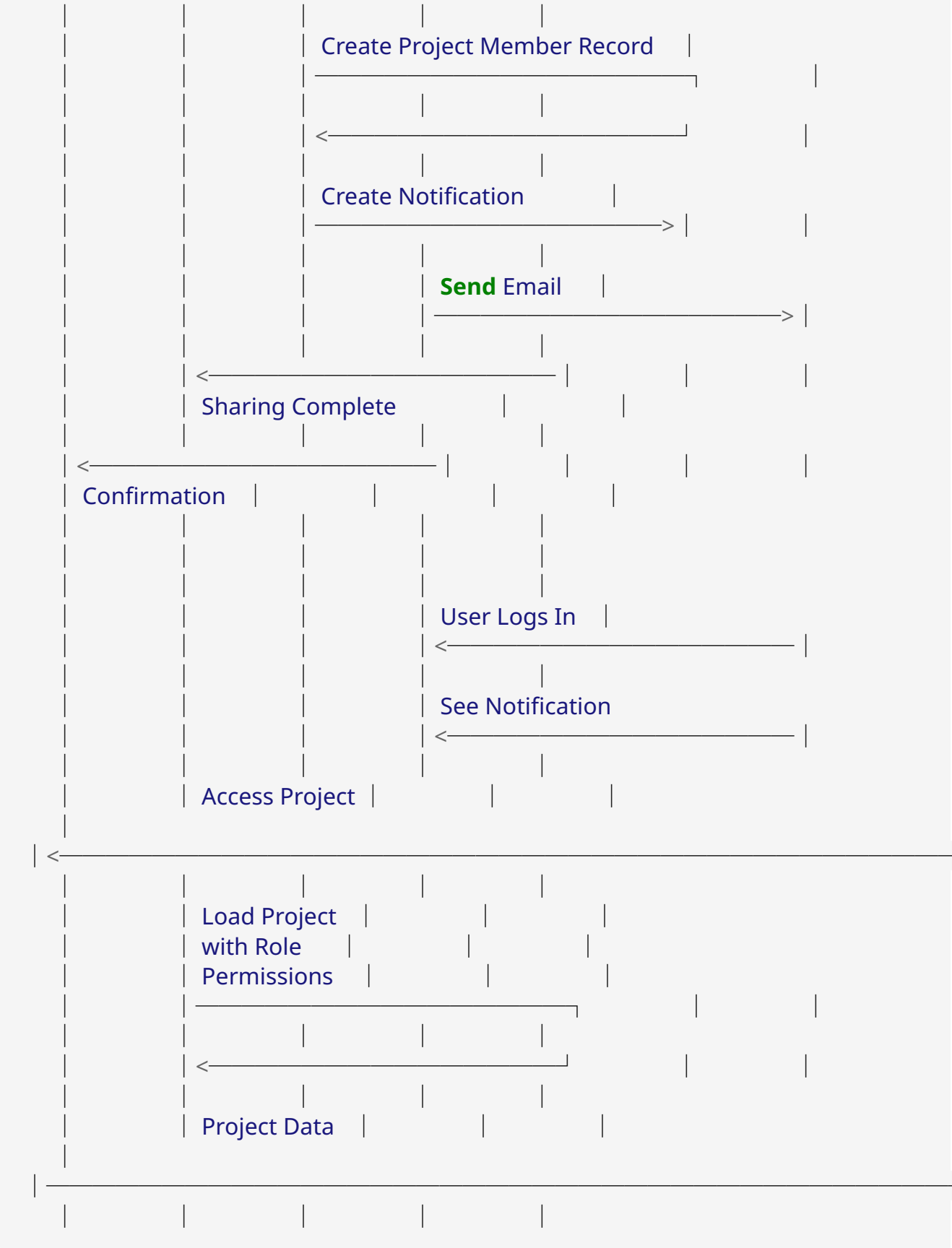
13. Visualizations are generated (concept maps, comparison tables, etc.)

14. **Completion**

15. Results are saved to database
16. UI is updated to show cross-document insights and visualizations

5. Project Collaboration Flow





Process Description:

1. **Sharing Initiation**
2. Project owner opens project settings
3. Owner enters collaborator's email and assigns role (viewer, editor)

4. Request is sent to Project Service

5. **Collaboration Setup**

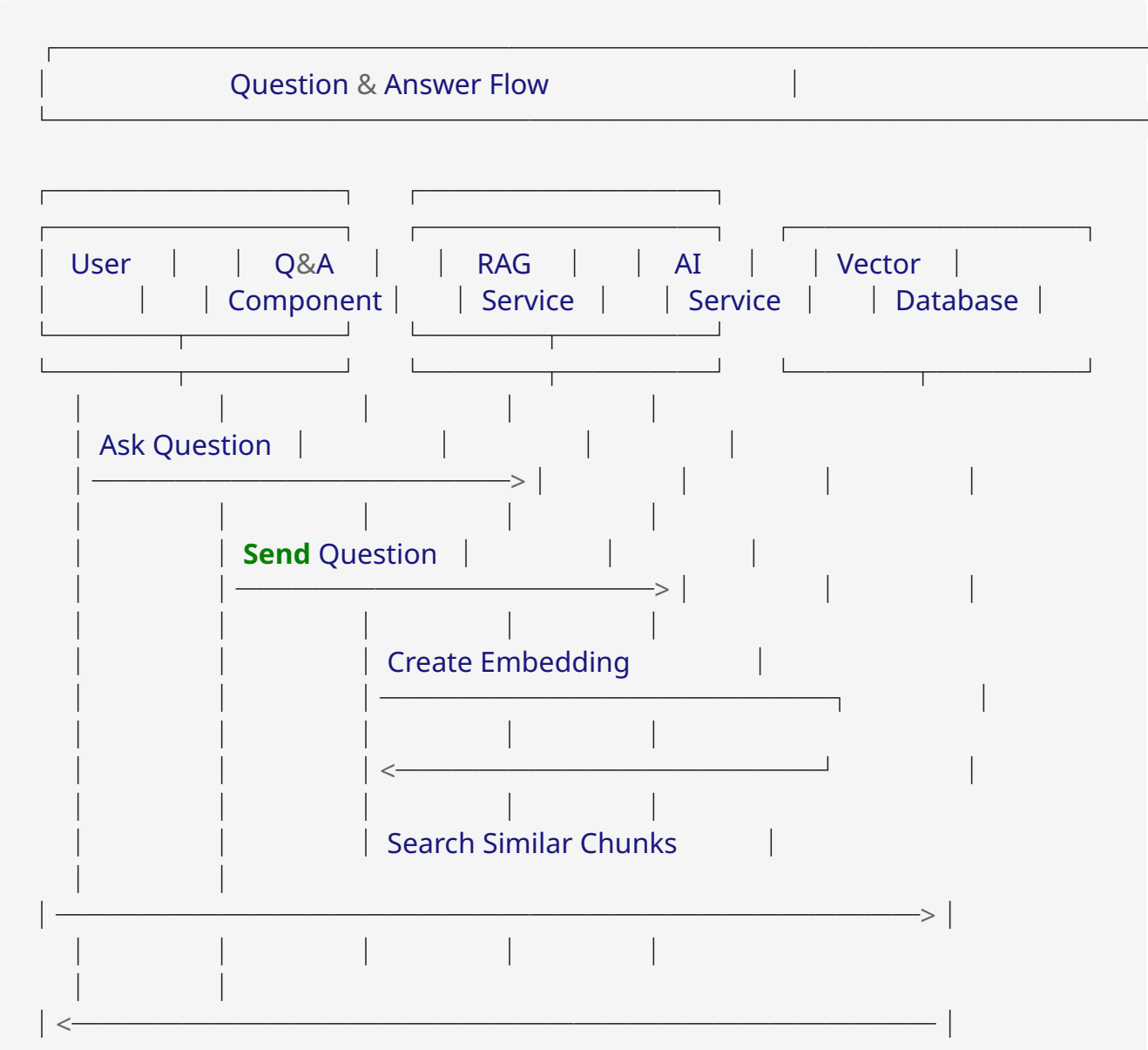
6. Sharing Service checks if user exists
7. If user exists, ProjectMember record is created
8. If user doesn't exist, invitation is created

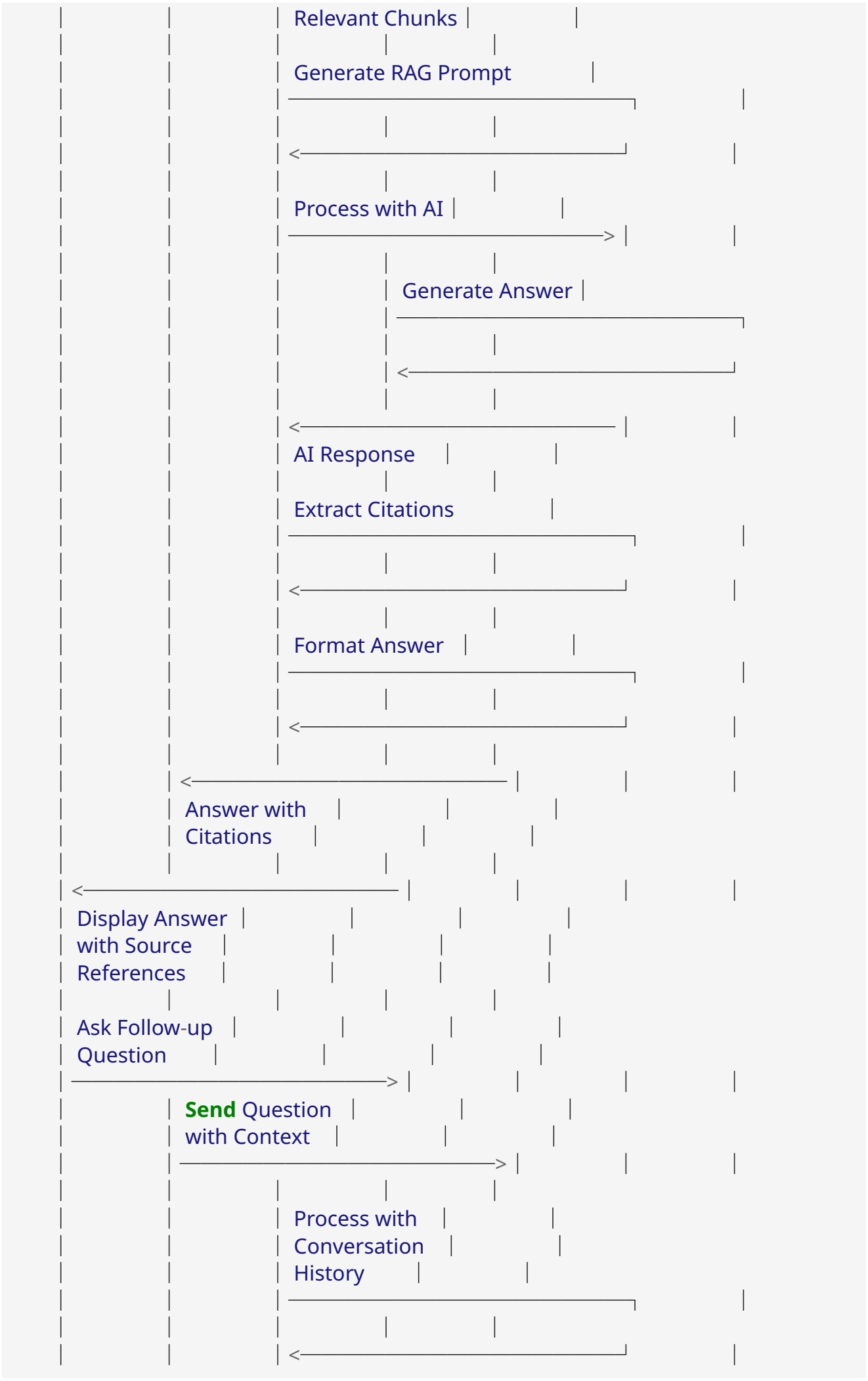
9. Notification is created and email is sent

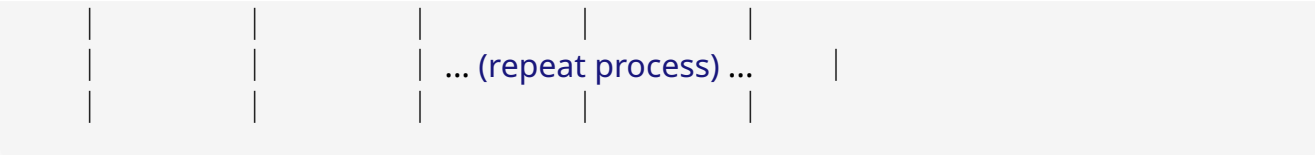
10. **Collaborator Access**

11. Collaborator receives notification
12. Collaborator logs in and accesses shared project
13. Project is loaded with appropriate permissions based on role
14. Collaborator can view or edit project based on assigned role

6. Question & Answer Flow



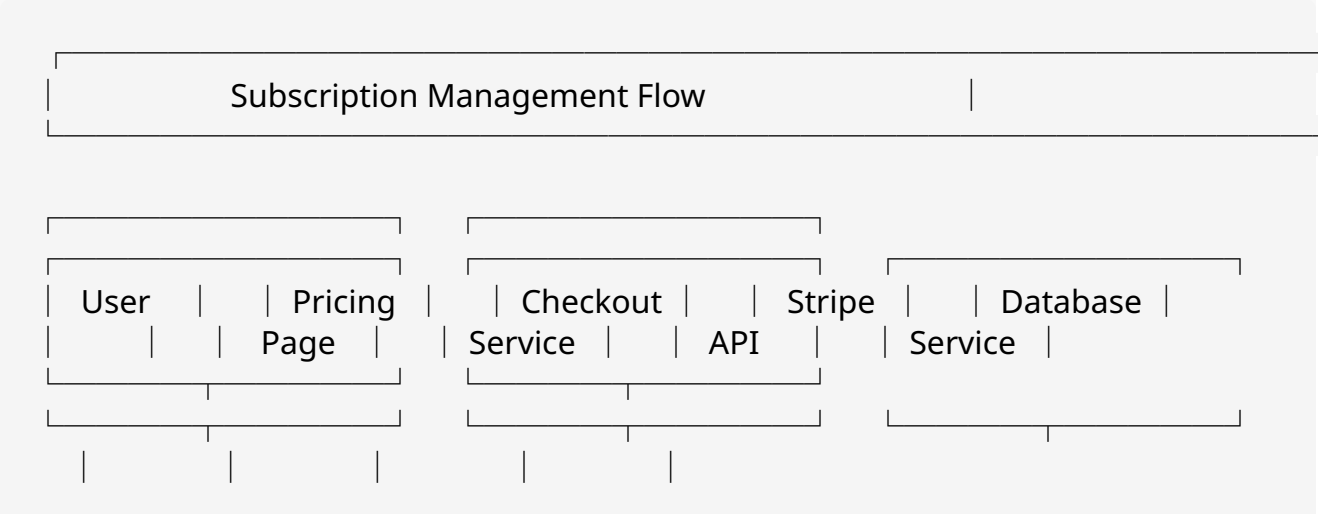

Relevant Chunks
Generate RAG Prompt
Process with AI
Generate Answer
AI Response
Extract Citations
Format Answer
Answer with Citations
Display Answer with Source References
Ask Follow-up Question
Send Question with Context
Process with Conversation History

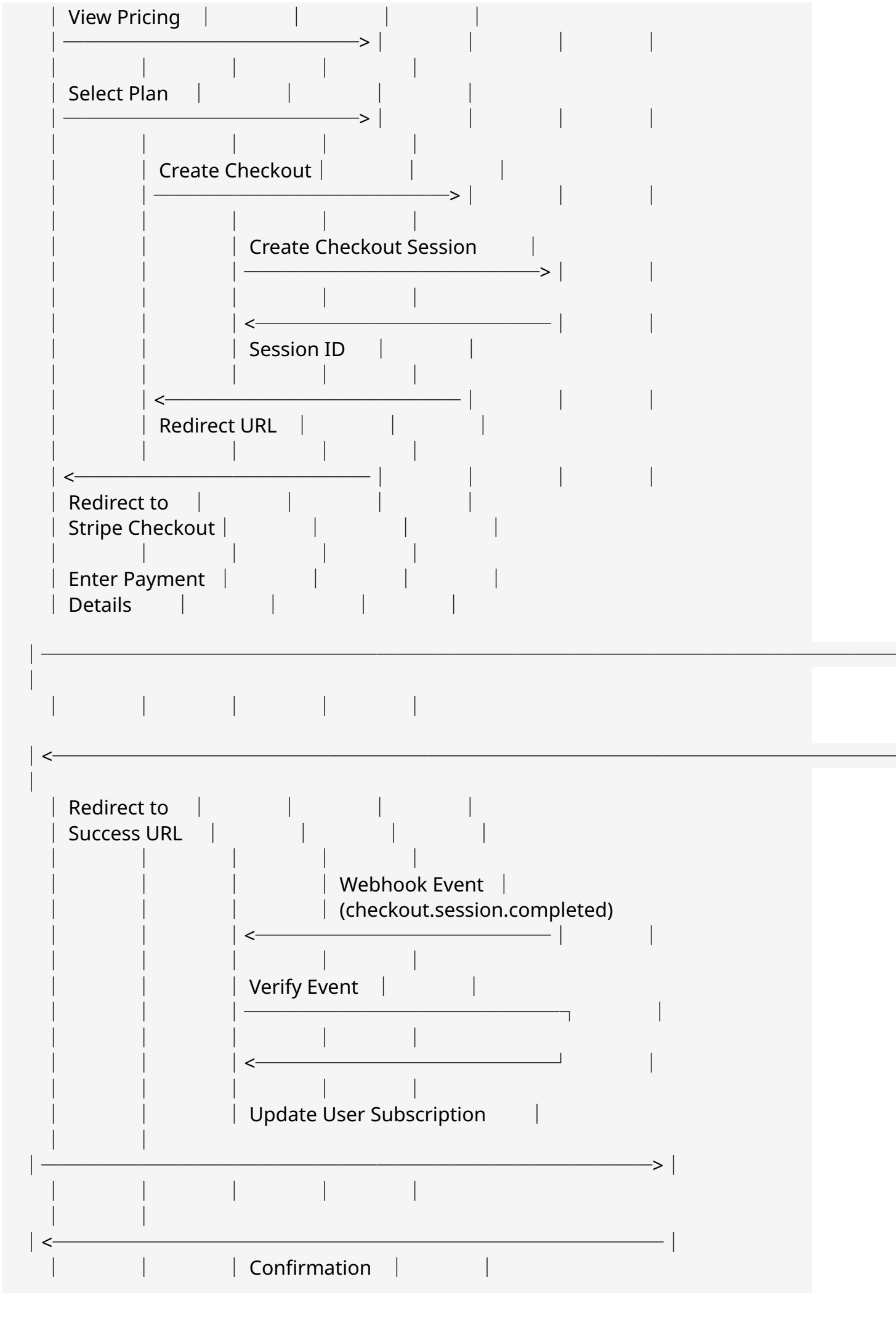


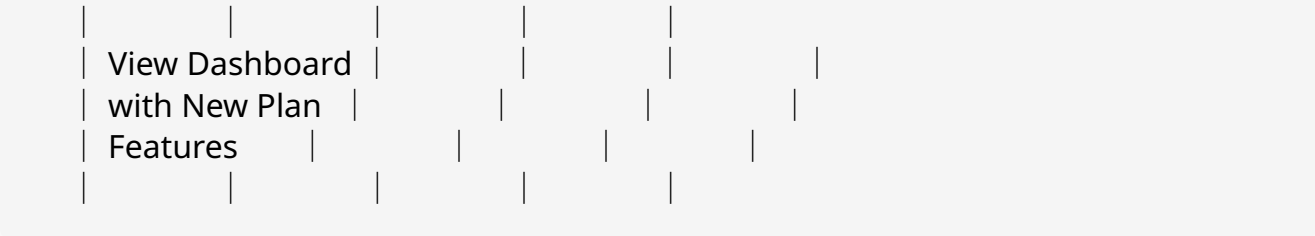
Process Description:

1. **Question Input**
2. User asks a question about document content
3. Question is sent to RAG (Retrieval-Augmented Generation) Service
4. **Context Retrieval**
5. Question is converted to vector embedding
6. Vector Database is queried to find relevant document chunks
7. Most relevant chunks are retrieved as context
8. **Answer Generation**
9. RAG prompt is generated with question and retrieved context
10. AI Service processes the prompt with Gemini API
11. Citations are extracted from the response
12. Answer is formatted with source references
13. **Conversation Continuation**
14. User can ask follow-up questions
15. Conversation history is maintained for context
16. Process repeats with additional context from previous interactions

7. Subscription Management Flow




View Pricing
Select Plan
Create Checkout
Create Checkout Session
Session ID
Redirect URL
Redirect to Stripe Checkout
Enter Payment Details
Redirect to Success URL
Webhook Event (checkout.session.completed)
Verify Event
Update User Subscription
Confirmation



Process Description:

1. **Plan Selection**
2. User views pricing page with available plans
3. User selects desired subscription plan

4. Request is sent to Checkout Service

5. **Checkout Process**

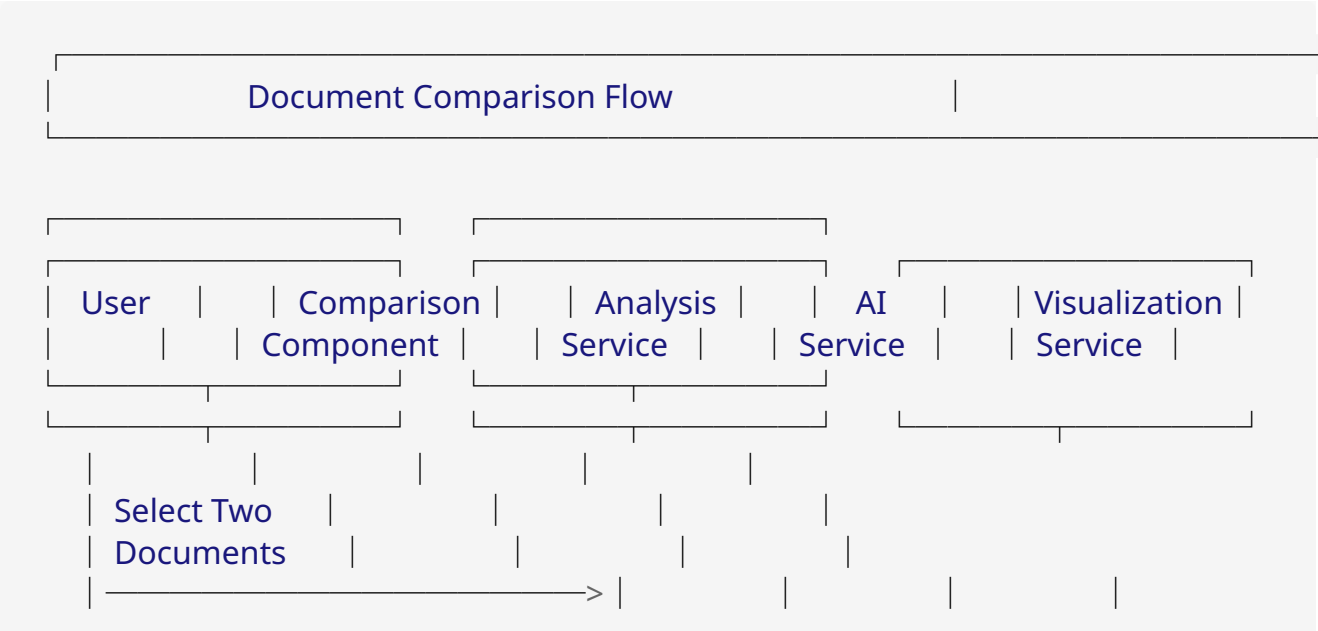
6. Checkout Service creates Stripe Checkout Session
7. User is redirected to Stripe Checkout page
8. User enters payment details and completes purchase

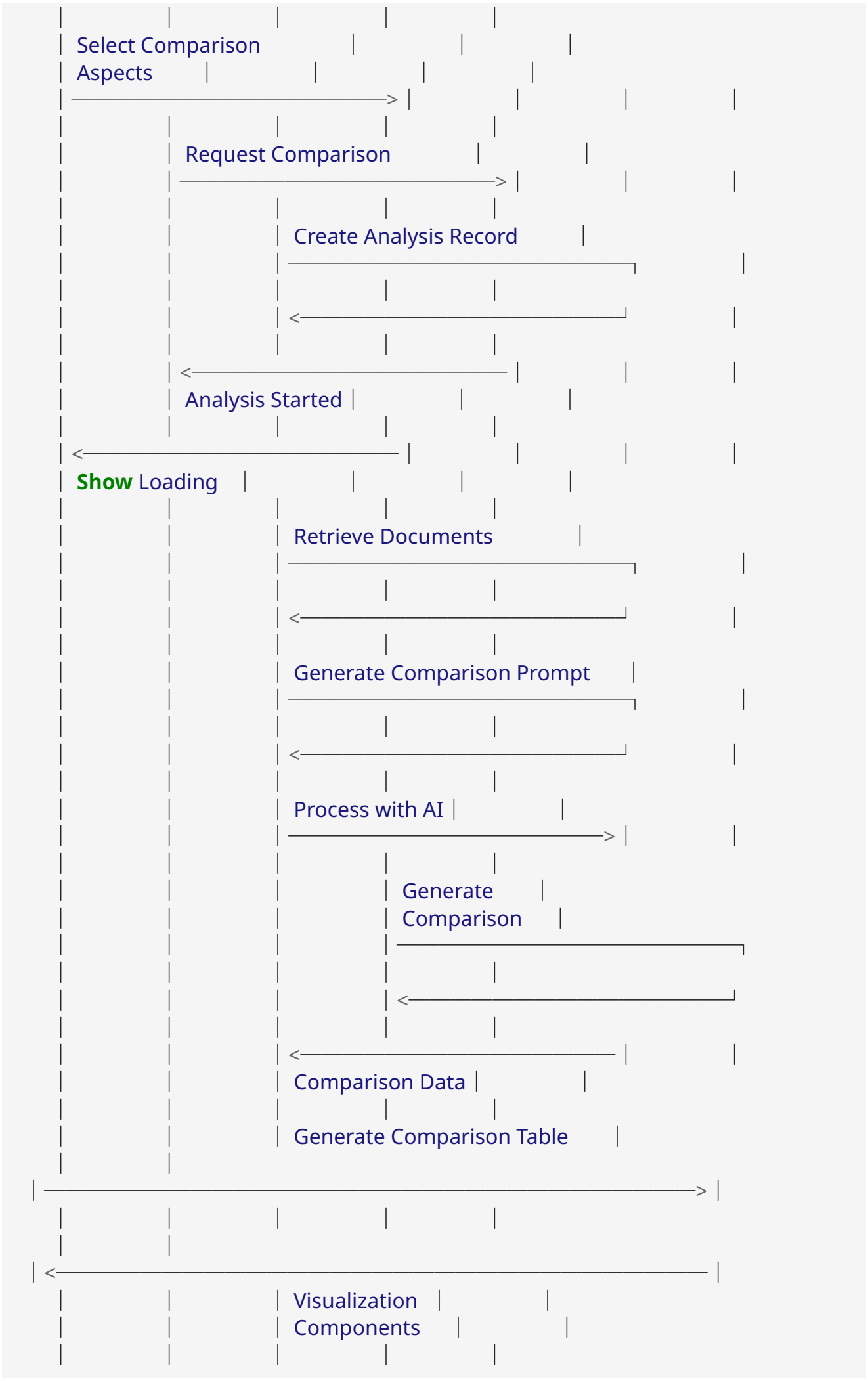
9. Stripe redirects user back to application success page

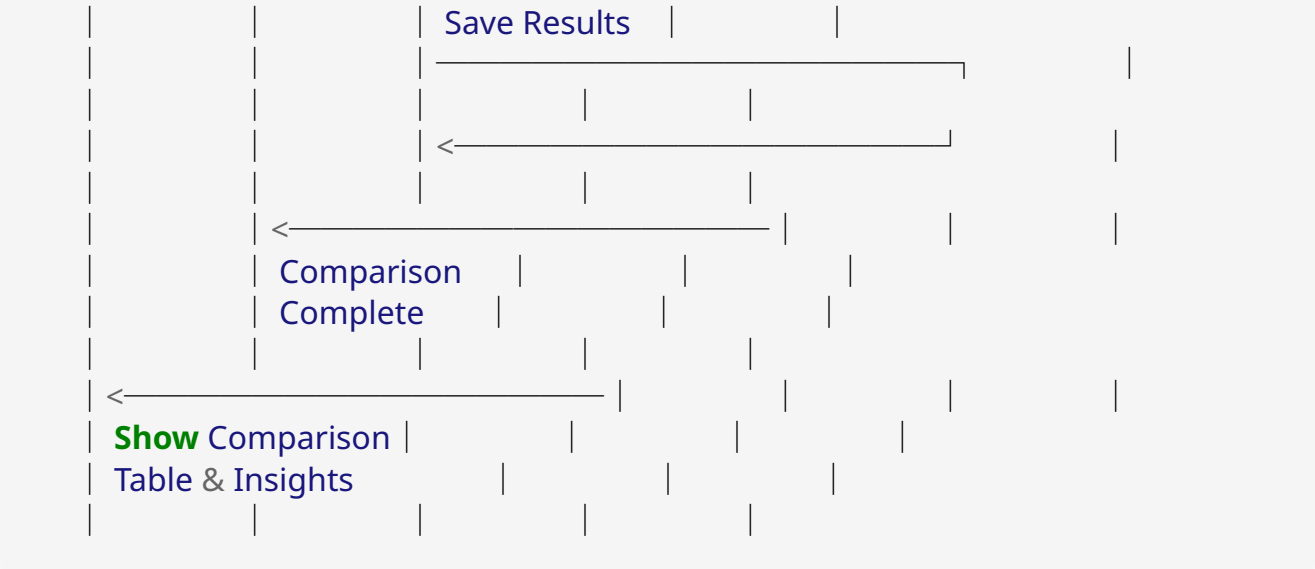
10. **Subscription Activation**

11. Stripe sends webhook event to application
12. Checkout Service verifies webhook signature
13. User subscription is updated in database
14. User gains access to plan features

8. Document Comparison Flow




Select Comparison Aspects
Request Comparison
Create Analysis Record
Analysis Started
Show Loading
Retrieve Documents
Generate Comparison Prompt
Process with AI
Generate Comparison
Comparison Data
Generate Comparison Table
Visualization Components



Process Description:

1. **Document Selection**
2. User selects two documents to compare
3. User specifies comparison aspects (methodology, findings, etc.)
4. Request is sent to Analysis Service
5. **Comparison Processing**
6. Analysis Service retrieves document content
7. Comparison prompt is generated with specified aspects
8. AI Service processes the documents with Gemini API
9. Structured comparison data is generated
10. **Visualization**
11. Visualization Service generates comparison table
12. Similarities and differences are highlighted
13. Results are saved to database
14. **Completion**
15. UI is updated to show comparison table and insights
16. User can interact with comparison results

Conclusion

These flow diagrams illustrate the key processes in the AcademiaLens application, showing the interactions between components, services, and external APIs. The

diagrams provide a clear understanding of how data flows through the system and how different parts of the application work together to deliver the core functionality.

The modular architecture allows for independent scaling and development of each service, while maintaining clear communication patterns between components. This approach supports the application's requirements for performance, maintainability, and extensibility.