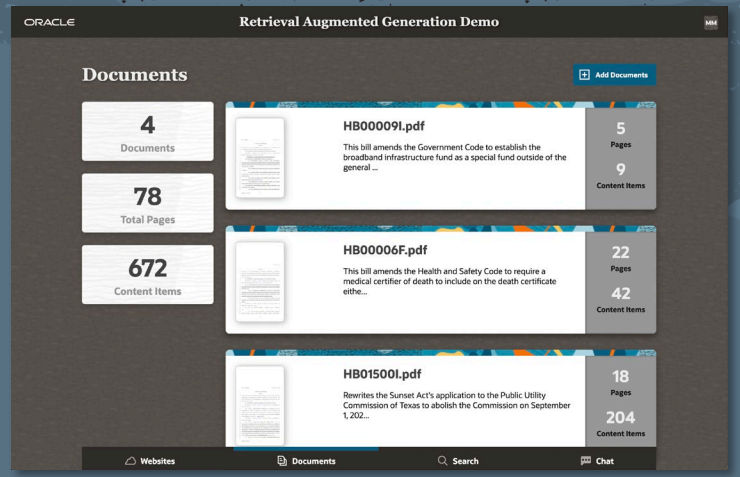
Solution Overview

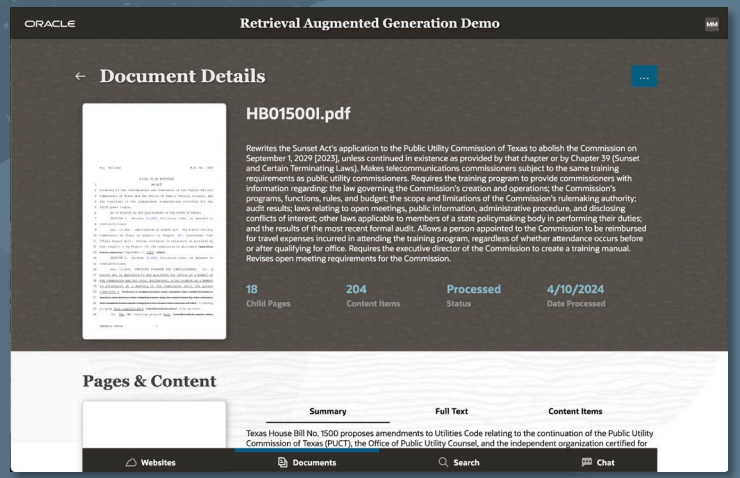
Legislation Analysis using Generative AI

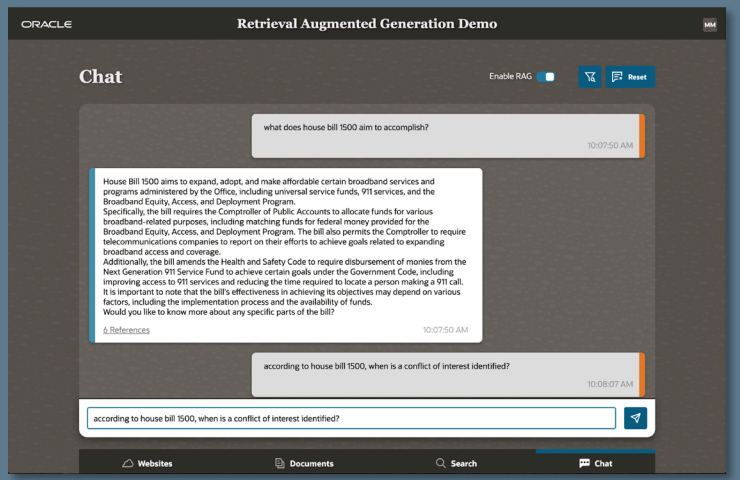
Legislation Analysis using Generative AI

Overview

The solution allows users to ingest documents and use OCI's GenAI service to parse and optimize the content, generate summaries of the document and its pages, and generate vectors for supporting Retrieval Augmented Generation (RAG) with chat, storing them in a vector database. Users can view documents; their summaries and the individual page summaries for quick review. Users can also chat with the documents, asking questions in a conversational manner; the solution uses Retrieval Augmented Generation to provide a fluent conversational interface for in depth analysis.







Legislation Analysis using Generative AI

Problem

- Quickly reviewing a bill can be difficult and time consuming
  - The format of the document can be a challenge
  - Wording, verbiage, and language used can be difficult to understand
- Users need to perform analysis quickly with accuracy
  - Discussing sections and addendums to sections
  - Contrasting impact across statutes, legislation, and other documents
  - Extracting meaning, searching, summarizing

Approach

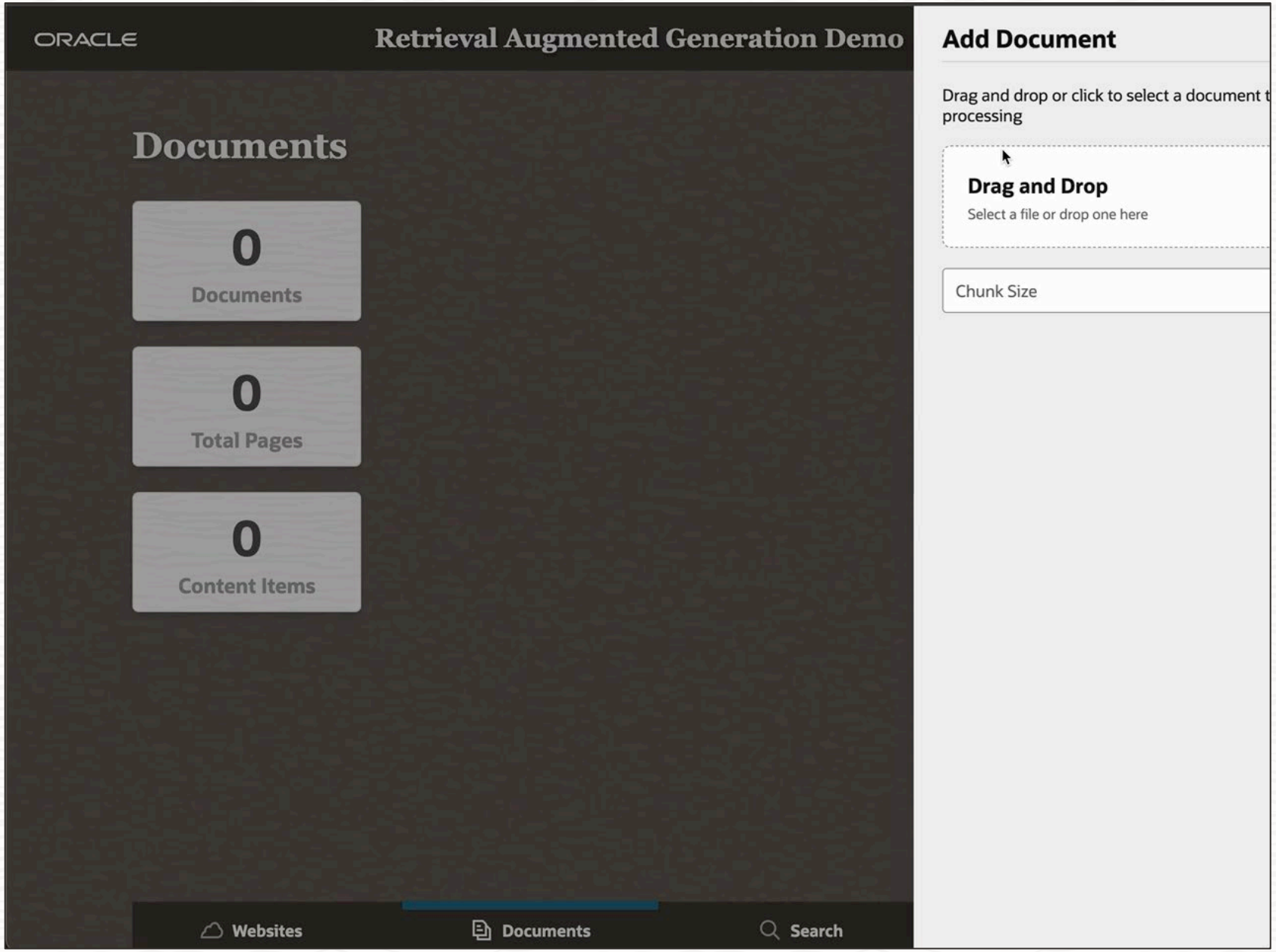
- Use GenAI to optimize documents; format content, rewrite legal speak, normalize format
- Use GenAI to generate vectors to support Retrieval Augmented Generation and chat
- Use GenAI to generate summaries of documents and their pages
- Make it all searchable and discoverable

Solution Demo

Legislation Analysis using Generative AI

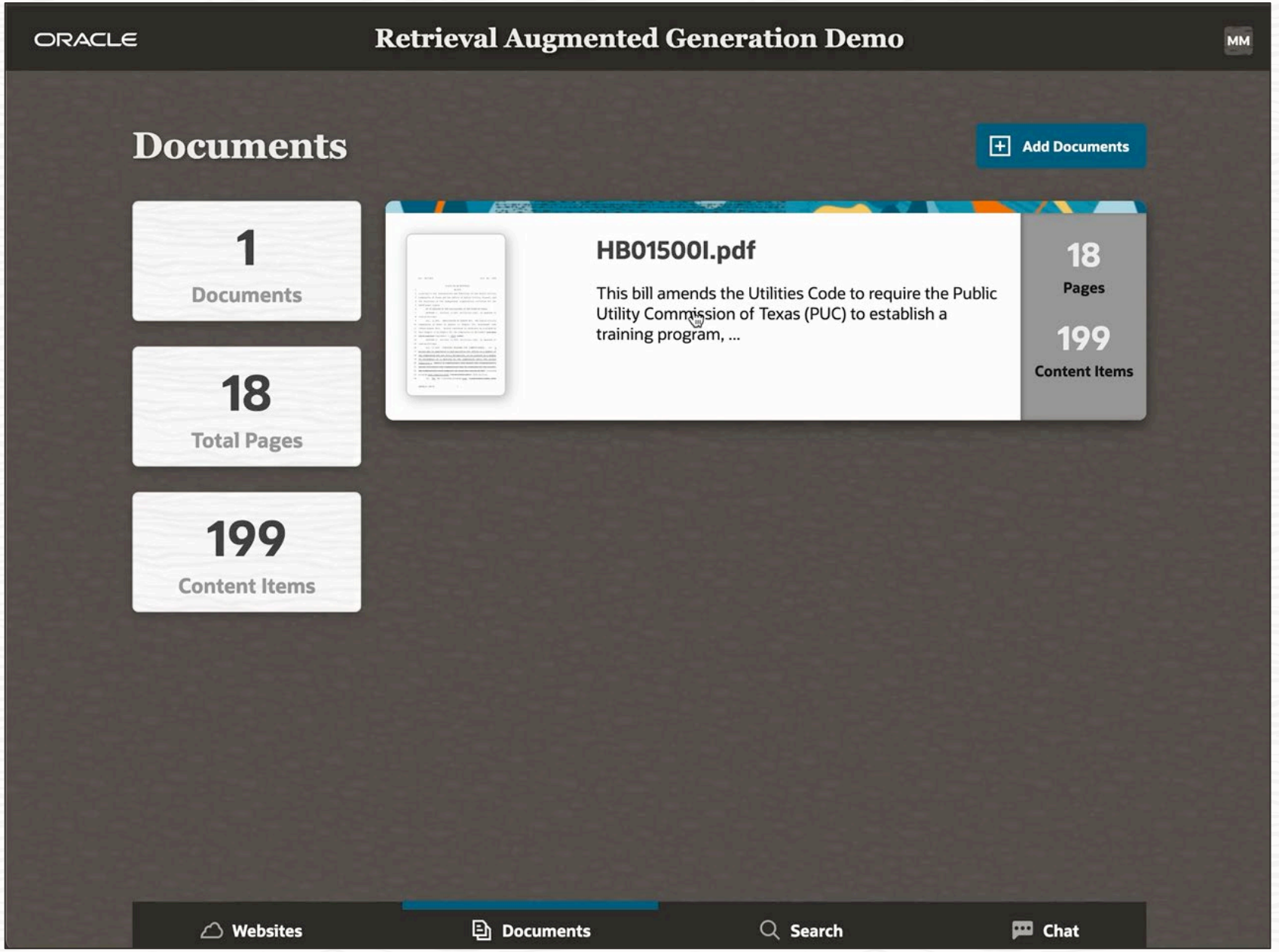
Ingesting a Document

- The user clicks ”Add Documents”, and drags a file to be uploaded.
- The document is uploaded and processed; a summary of the entire document is generated from GenAI, a summary of each page will be generated from GenAI, and screenshots for each page will be generated.



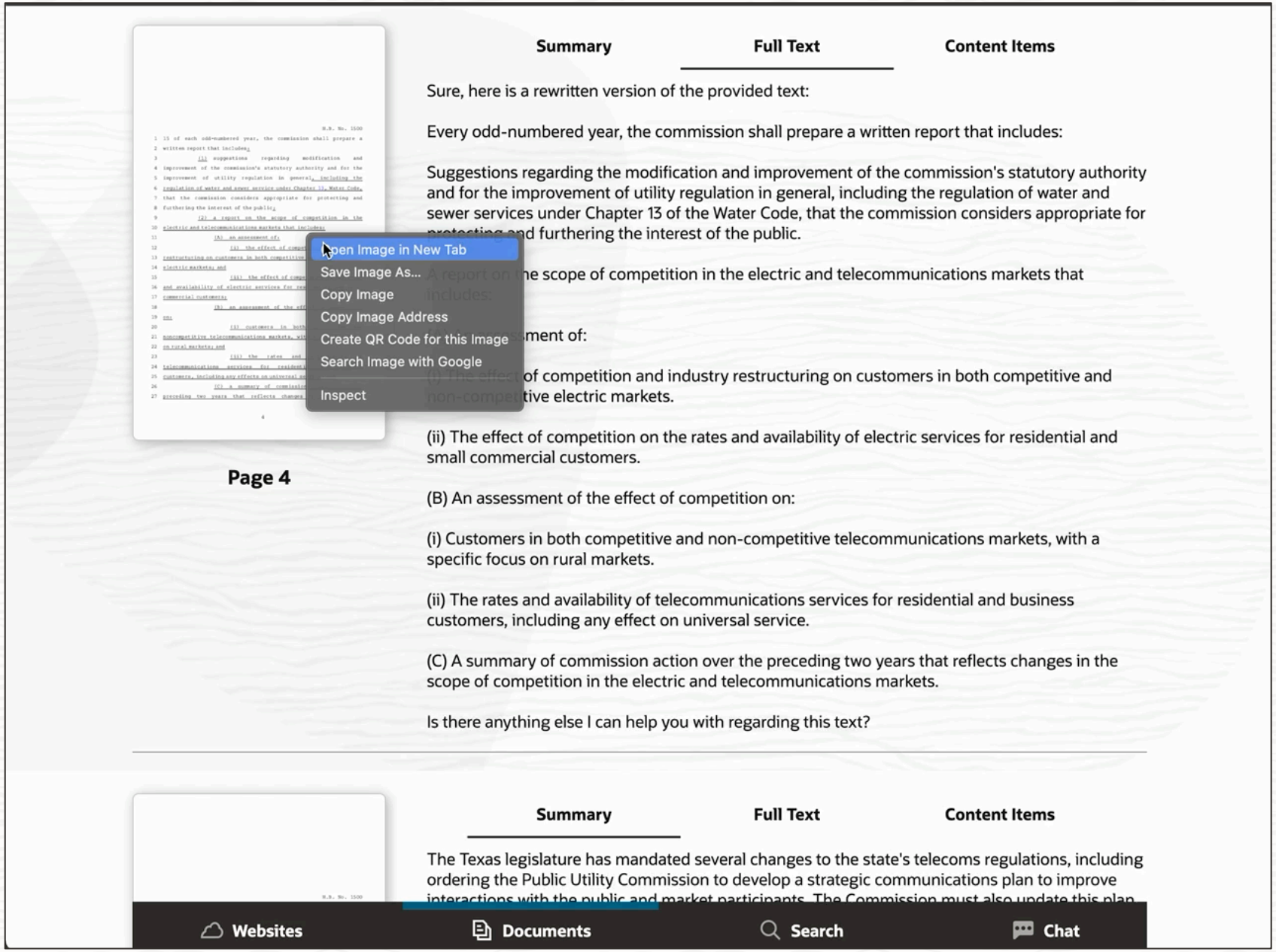
Reviewing a Document

- The user selects the document they've uploaded when its finished processing
- The GenAI services has summarized the whole document, screenshots have been generated for each page, and the GenAI service has summarized each page.
- Users can easily come up to speed on a document; the full text of each page is also available
- GenAI is also used to help process the content in the document (next)



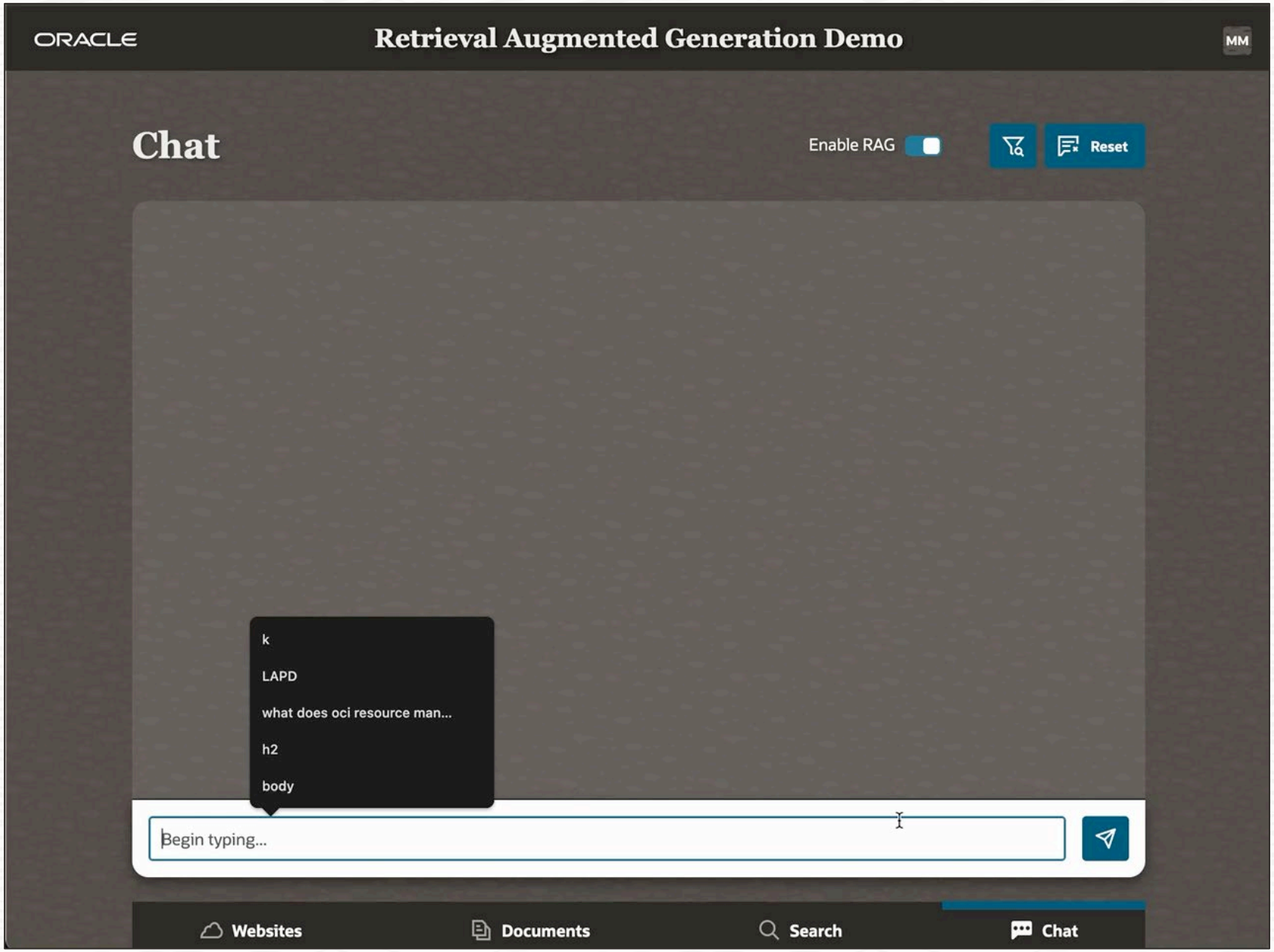
GenAI for Processing Data

- GenAI can also be used for processing data. The legislation contains line numbers, redactions, and legal speak.
- We can ask the LLM to remove the line numbers, fix spacing and formatting, and to rewrite the content to reduce (or remove) the legal speak
- This step is invisible to the user; it is a task that would formerly have required code. We can ask the LLM to perform document parsing, processing, and optimization, saving us time and effort.



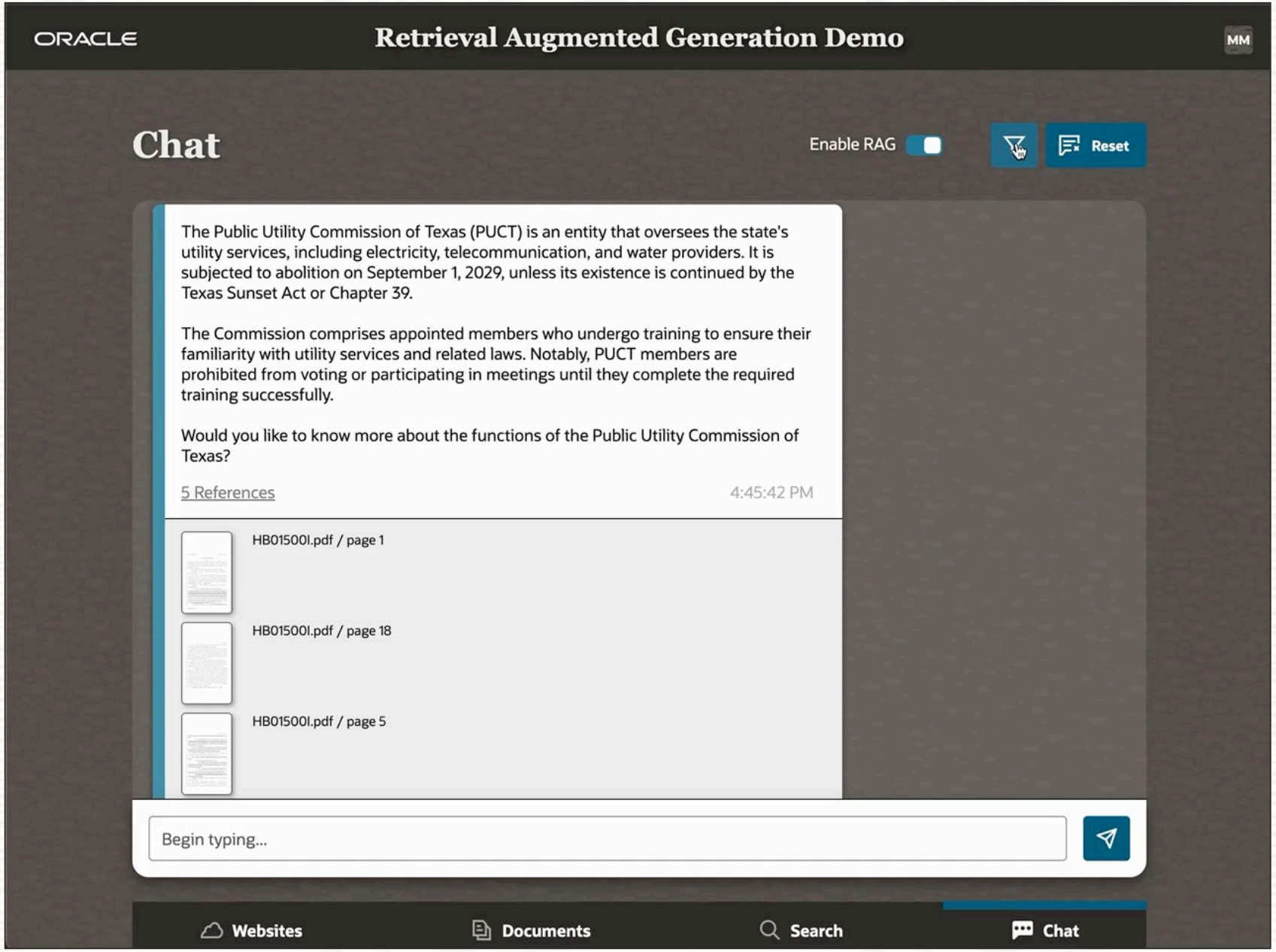
Chat with the Document

- Users can have a natural language conversation with the content of one, or many documents.
- Questions from the user will invoke a semantic search against the vector database, and use the GenAI to generate the response.
- The advantage of Retrieval Augmented Generation (RAG) is that the source of the information is cited, it is referenced in the response. This helps provide accurate dependable result, reducing LLM hallucination.



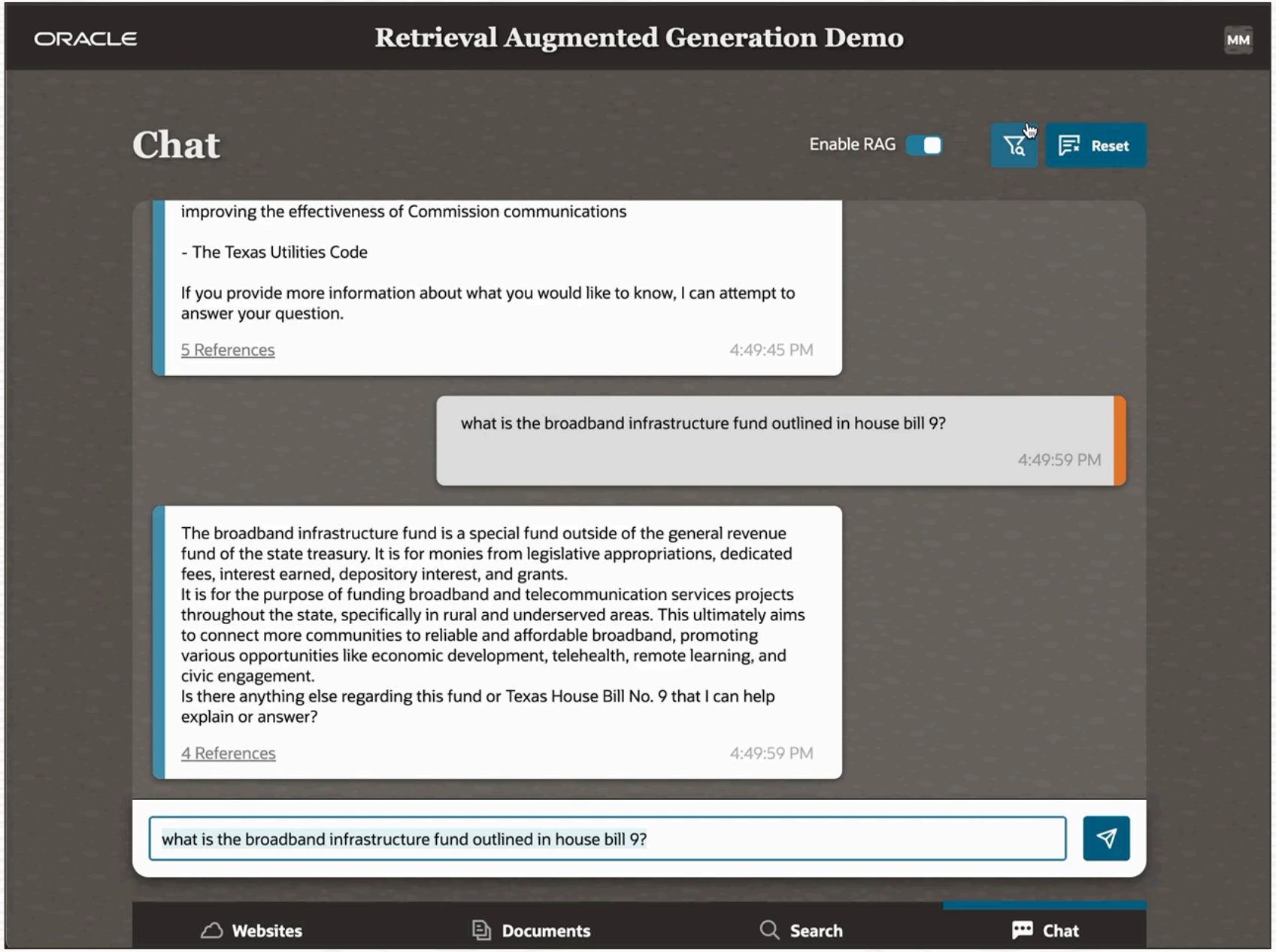
Vector Search Security

- A vector search introduces the ability to evaluate the user's roles and permissions, to limit the set of returned documents.
- This provides a different context to the GenAI services based on the level of access the user has, altering the response
- This allows users with more privileged access a broader set of information, and/or restricted documents
- This information is never shared with Oracle, and allows customers full governance and security of private or proprietary data



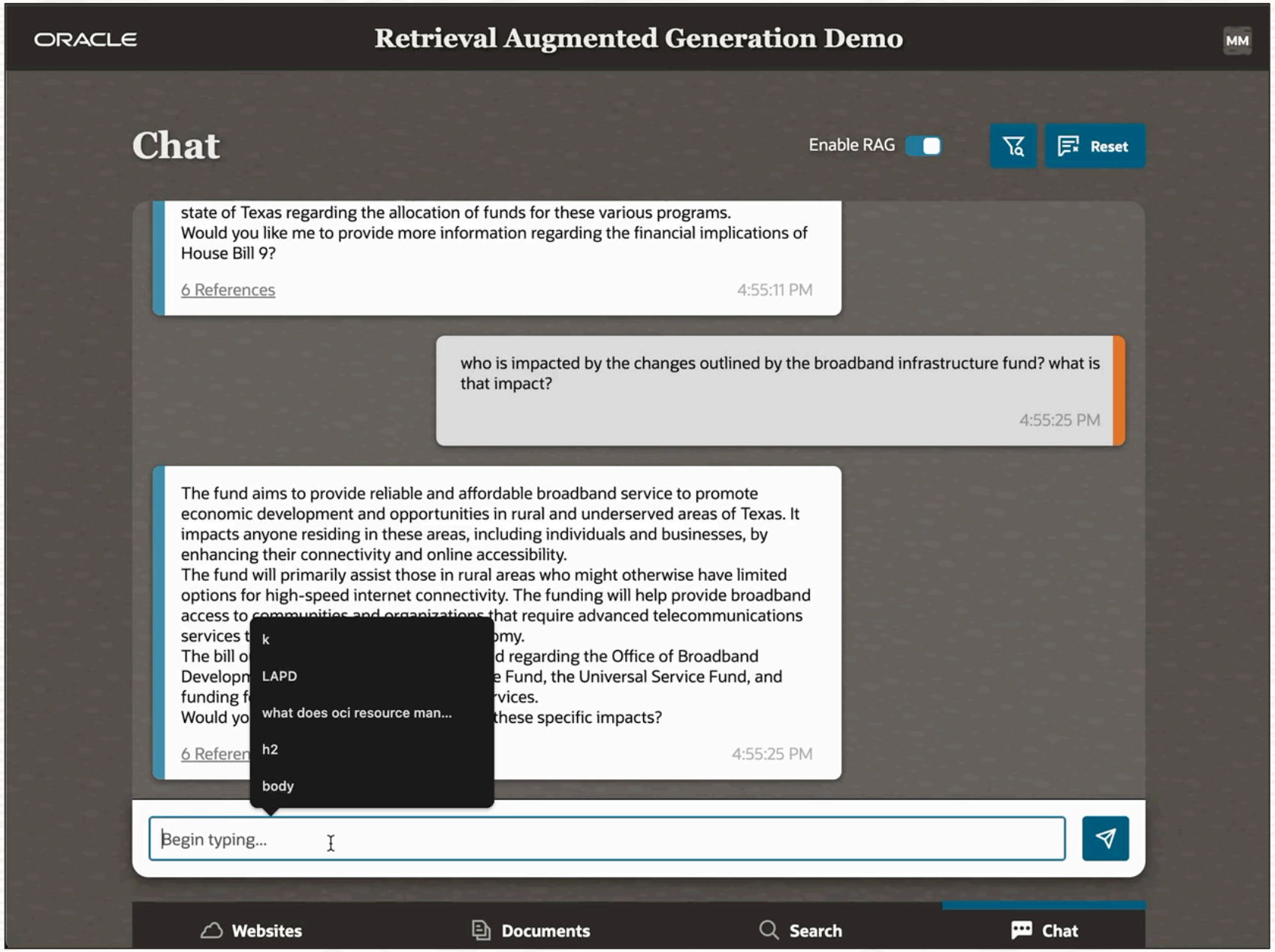
Additional Analysis

- We can ask the GenAI to provide analysis based on the contents of the vector database; this utilizes the LLMs ability to understand language and provide summarization and analysis based on the results of the query.
- LLMs are great at performing analysis of data; comparing, contrasting, summarizing, etc. An analyst can ask different questions to perform in depth analysis across one or more documents.
- Next we will contrast multiple documents.



Multiple documents

- We can also ask the GenAI services to compare or contrast multiple documents, or extract specific information from each
- Here we are asking the GenAI services to provide a contrast between two bills, specific to a particular organization that they both mention



Technical Information

Legislation Analysis using Generative AI

Legislation Analysis using Generative AI

Architecture 1: OpenSearch and Oracle Autonomous Database

Generative AI

A summary for each document is produced on-demand using the OCI Generative AI services, Content is rewritten and formatted for readability, GenAI is used to support Retrieval Augmented Generation

Doc Understanding

Documents are analyzed, OCR is applied to the contents, and tables are extracted from documents

Open Search

Open Search is used as a vector database, facilitating Semantic Search and Retrieval Augmented Generation; documents can be quickly searched using a search engine like interface

Oracle Database

Document metadata and information is stored in Oracle Database

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Architecture 2: Oracle Database 23ai

Generative AI

A summary for each document is produced on-demand using the OCI Generative AI services, Content is rewritten and formatted for readability, GenAI is used to support Retrieval Augmented Generation

Doc Understanding

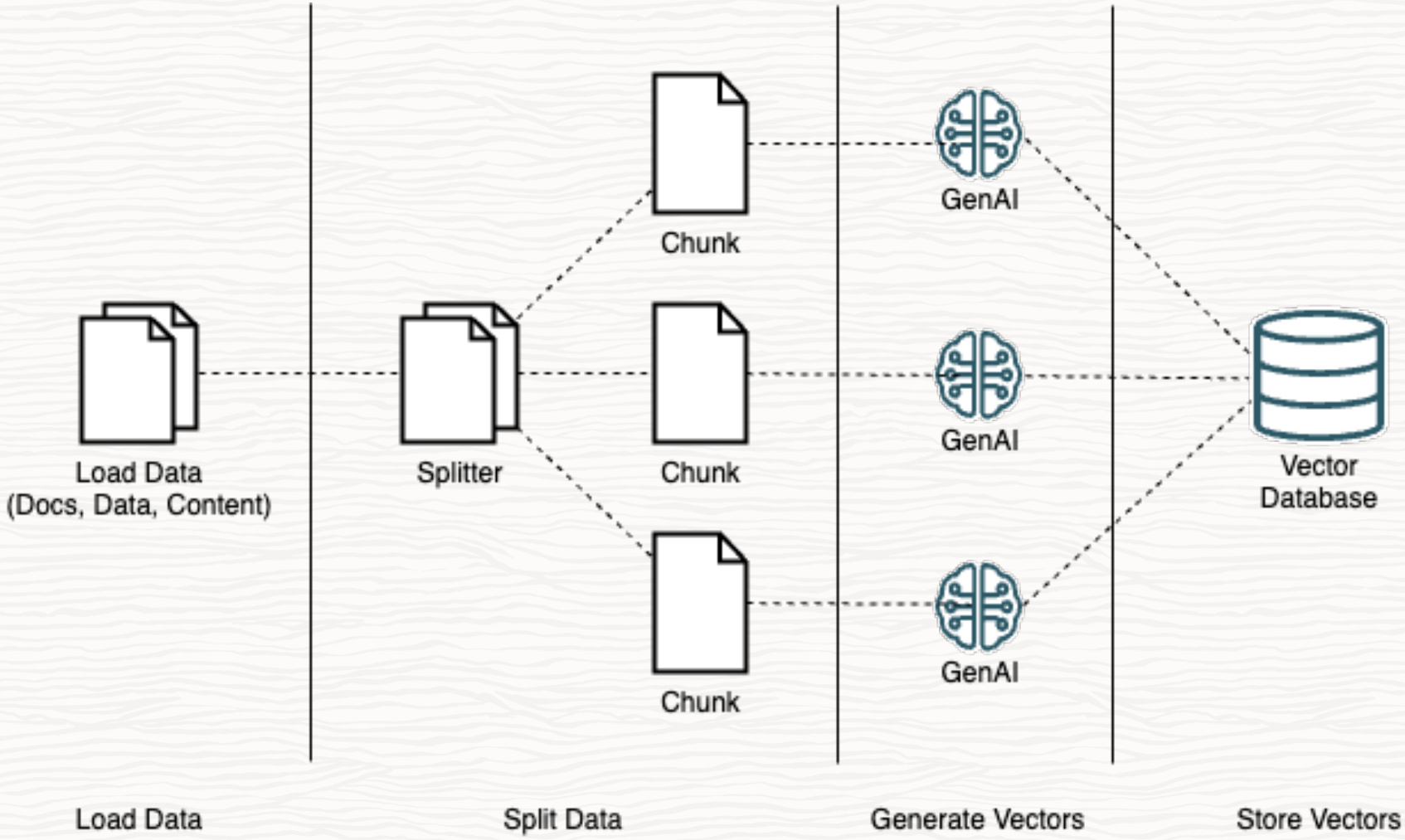
Documents are analyzed, OCR is applied to the contents, and tables are extracted from documents

Oracle Database 23ai

Document metadata and information is stored in Oracle Database, along with using the Vector Database capabilities in 23ai to store the vectors generated from the content. 23ai also provides Semantic Search capabilities which is used as part of the Retrieval Augmented Solution; documents and content can quickly be searched contextually.

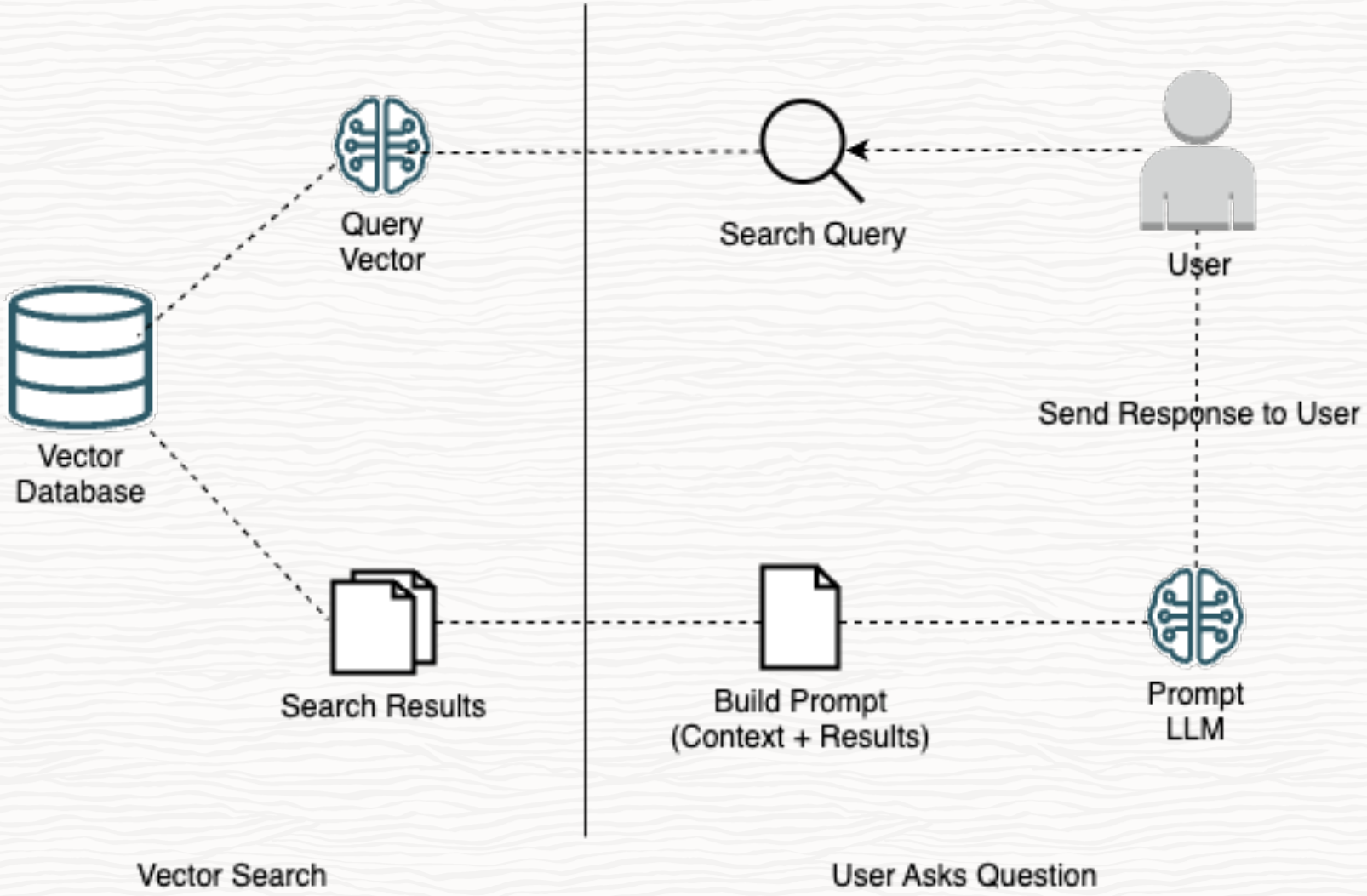
Solution Architecture – Ingesting Data

Data is ingested into the Vector Database. This can be documents, data, Content, etc. Data is split into small chunks to facilitate semantic search, and vectors are generated using the OCI GenAI service



Solution Architecture – Semantic Search

The user asks a question, the question is converted to a query vector, a vector search is performed and the most relevant search results are returned. These results are used to build a prompt for the LLM. The LLM is prompted, and the response is returned to the user



Additional Resources

Oracle Database 23ai
https://www.oracle.com/database/23ai/

OCI Generative AI
https://docs.oracle.com/en-us/iaas/Content/generative-ai/overview.htm

OCI Managed Open Search Service
https://docs.oracle.com/en-us/iaas/Content/search-opensearch/home.htm