Neo4j and GraphRAG

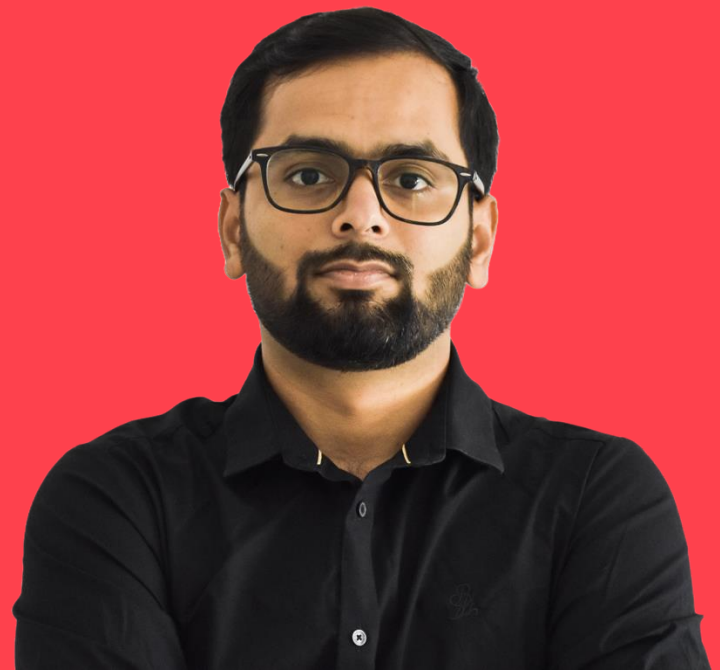
Building the Backbone of
Conversational AI

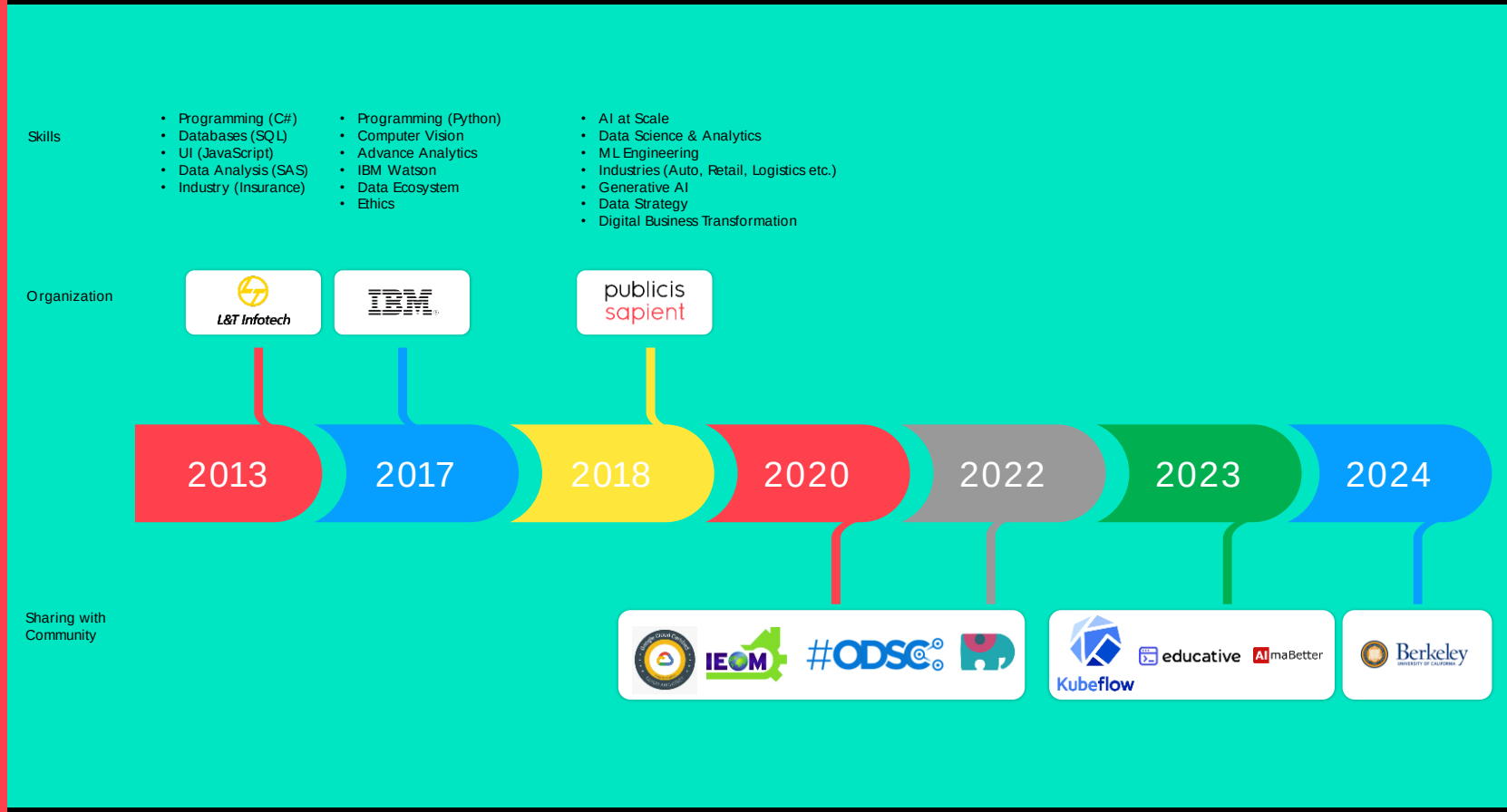
neo4j | Microsoft Reactor

Hello, I'm Ravi Ranjan

Senior Manager - Data Science at Publicis Sapient

- With over a decade of experience in AI and ML.
- Strong foundation in Computer Science with expertise in developing transformative AI solutions.
- Developing scalable GenAI solutions for generative content review across brand assets.





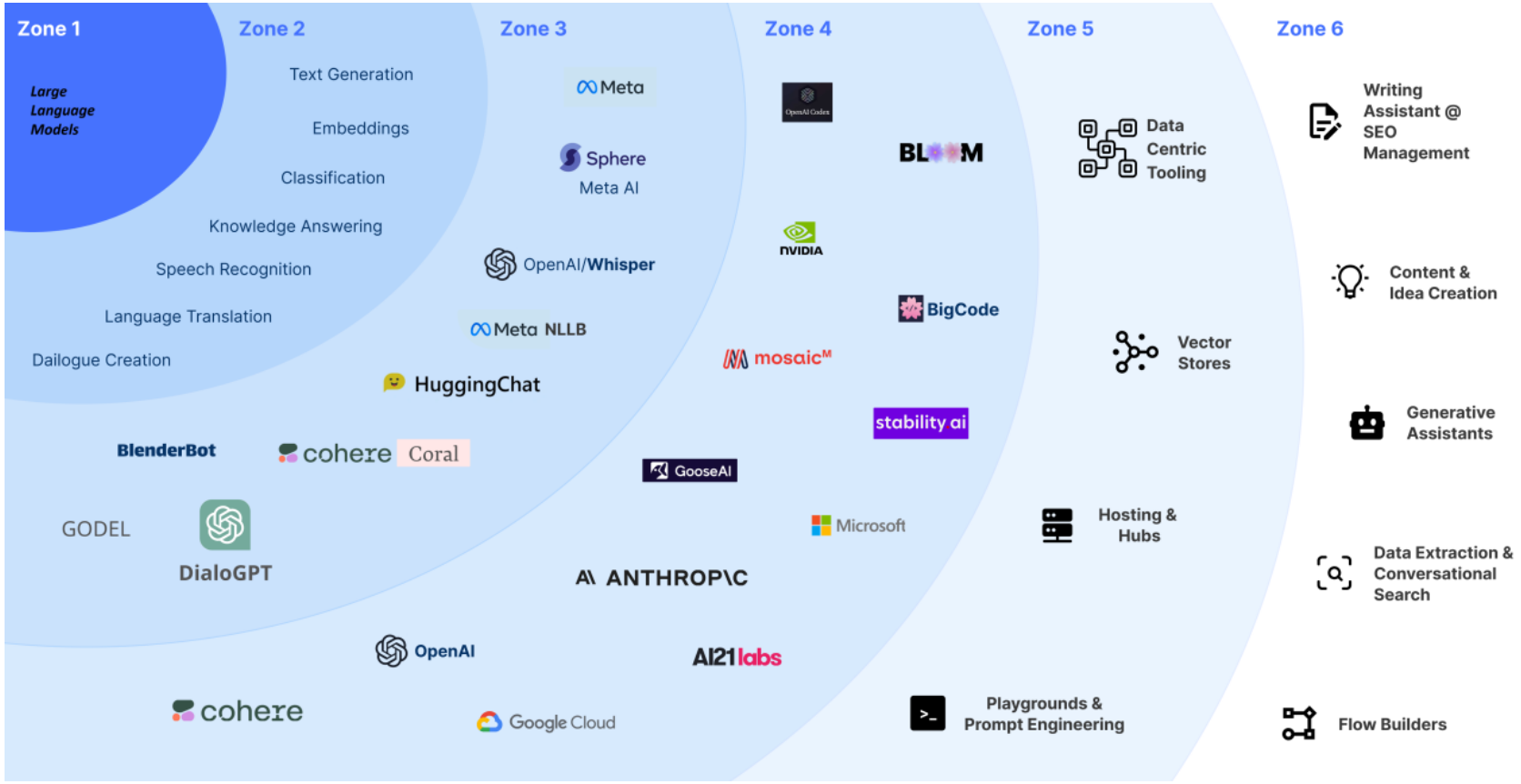
Have you heard about GenAI?

Have you worked on building an application using LLM?

30 NOVEMBER 2022 OPEN AI RELEASED CHATGPT


Generative AI Storm

LLM World is expanding rapidly..

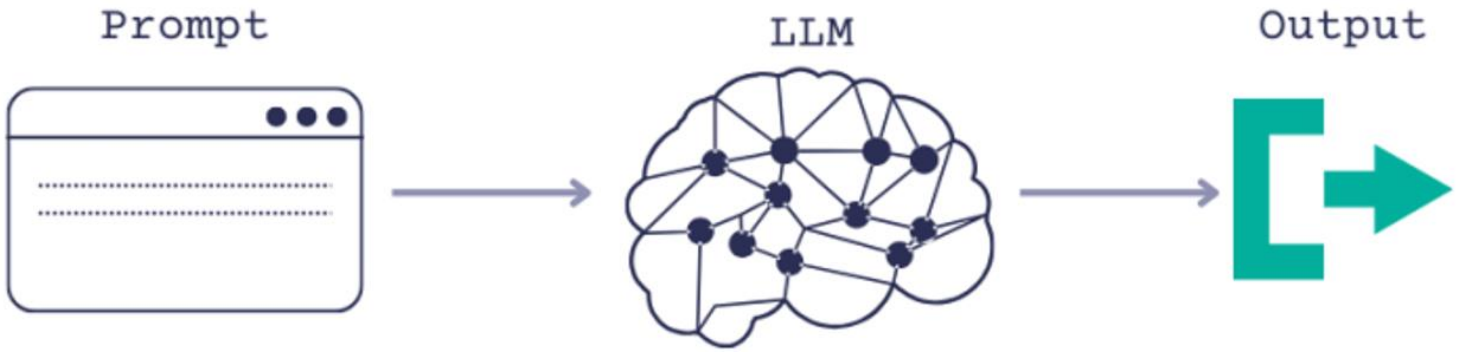


Content Generation

Conversational AI

Writing Code

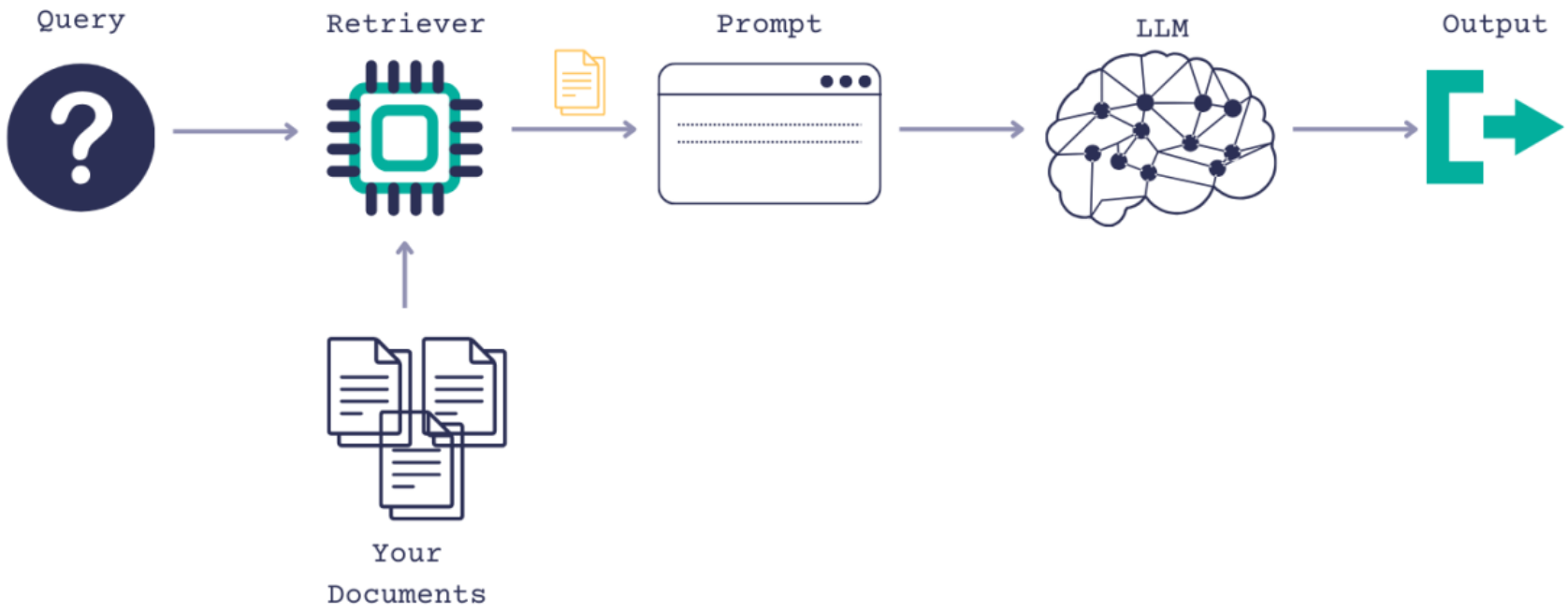
Conversational AI using LLM



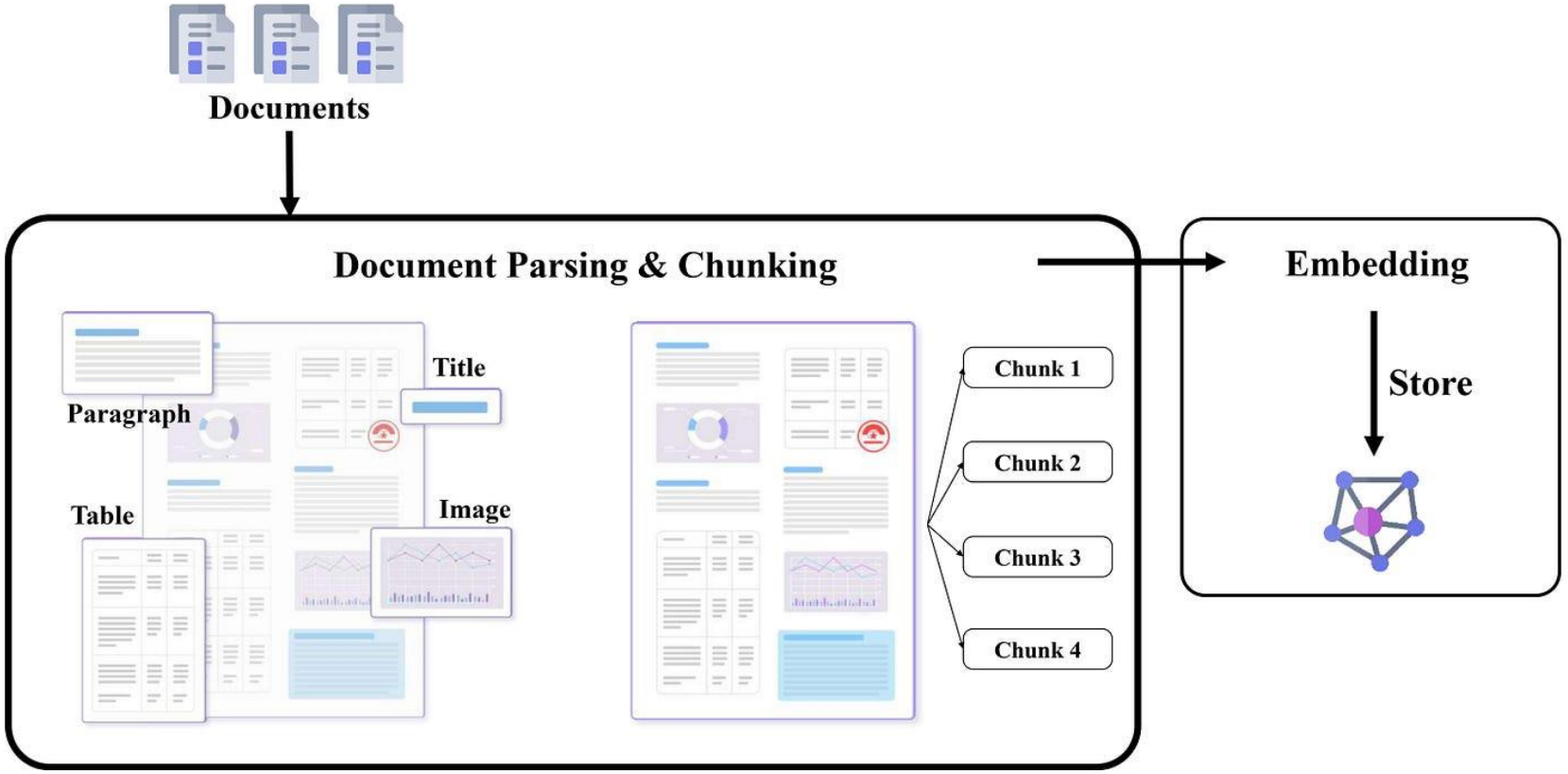
Limitations

- Lack of Up-to-Date Information
- Limited Domain-Specific Knowledge
- Increased Hallucinations
- Lack of Contextual Depth and Breadth
- Memory Constraints for Extended Conversations
- Limited Personalization
- Higher Computation Costs for Larger Models
- Inability to Verify and Cite Sources

Conversational AI using Standard RAG



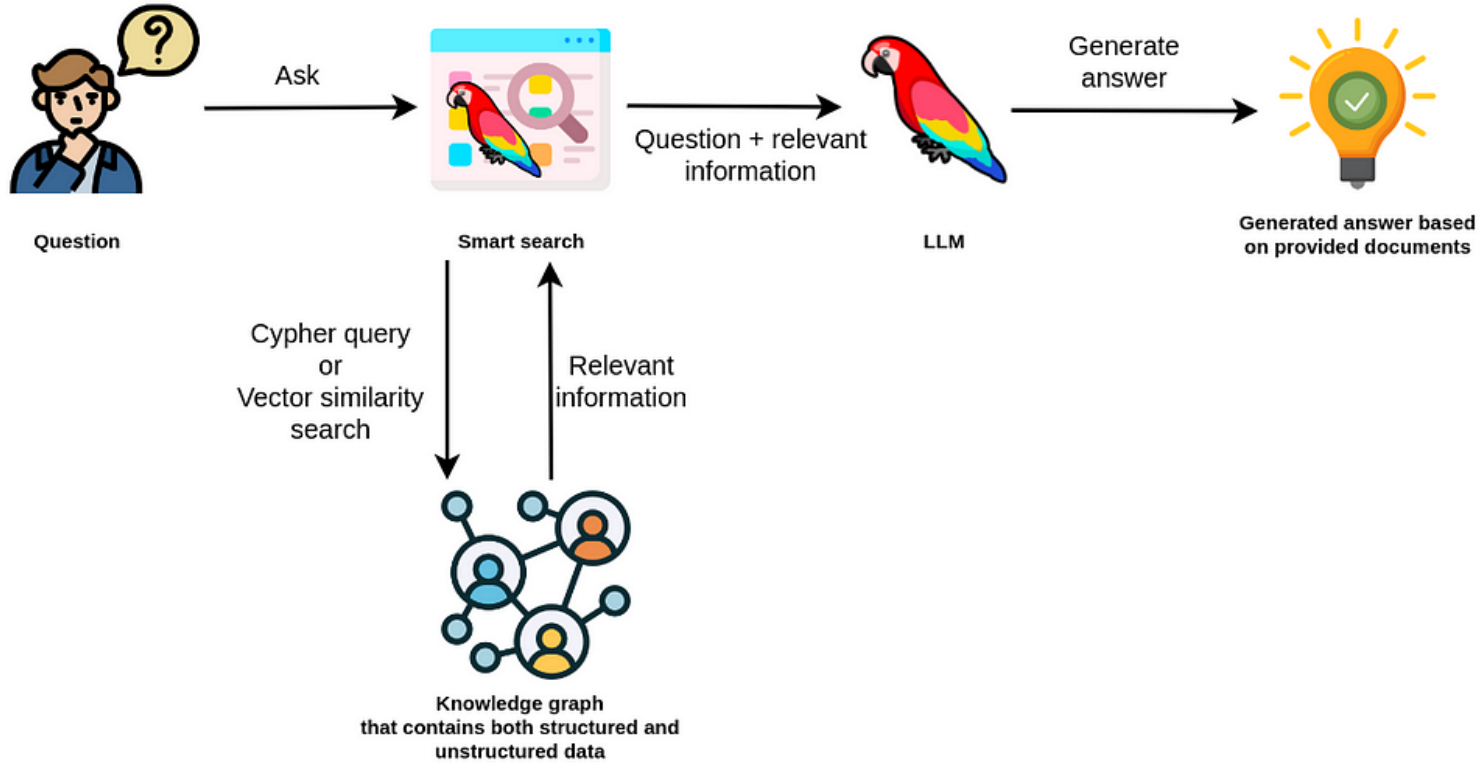
Data for Standard RAG system



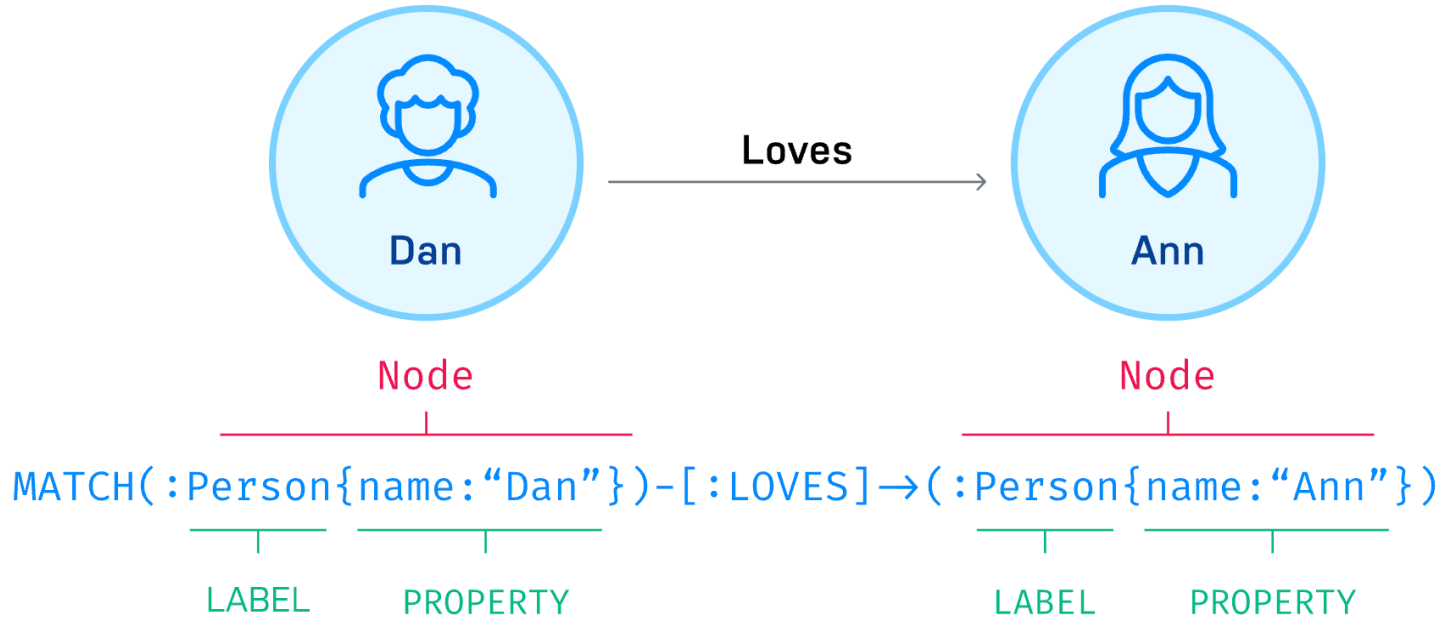
Limitations of traditional RAG system

- Limited Knowledge Structure Representation
- Lack of Contextual Consistency Across Conversations
- Reduced Explainability and Traceability
- Difficulty Handling Complex Relationships and Semantic Understanding
- Inflexibility in Handling New Knowledge
- Reduced Ability to Reason Over Time and Space
- Limited Personalization and Contextual Recall
- Higher Redundancy and Irrelevant Information in Retrieval

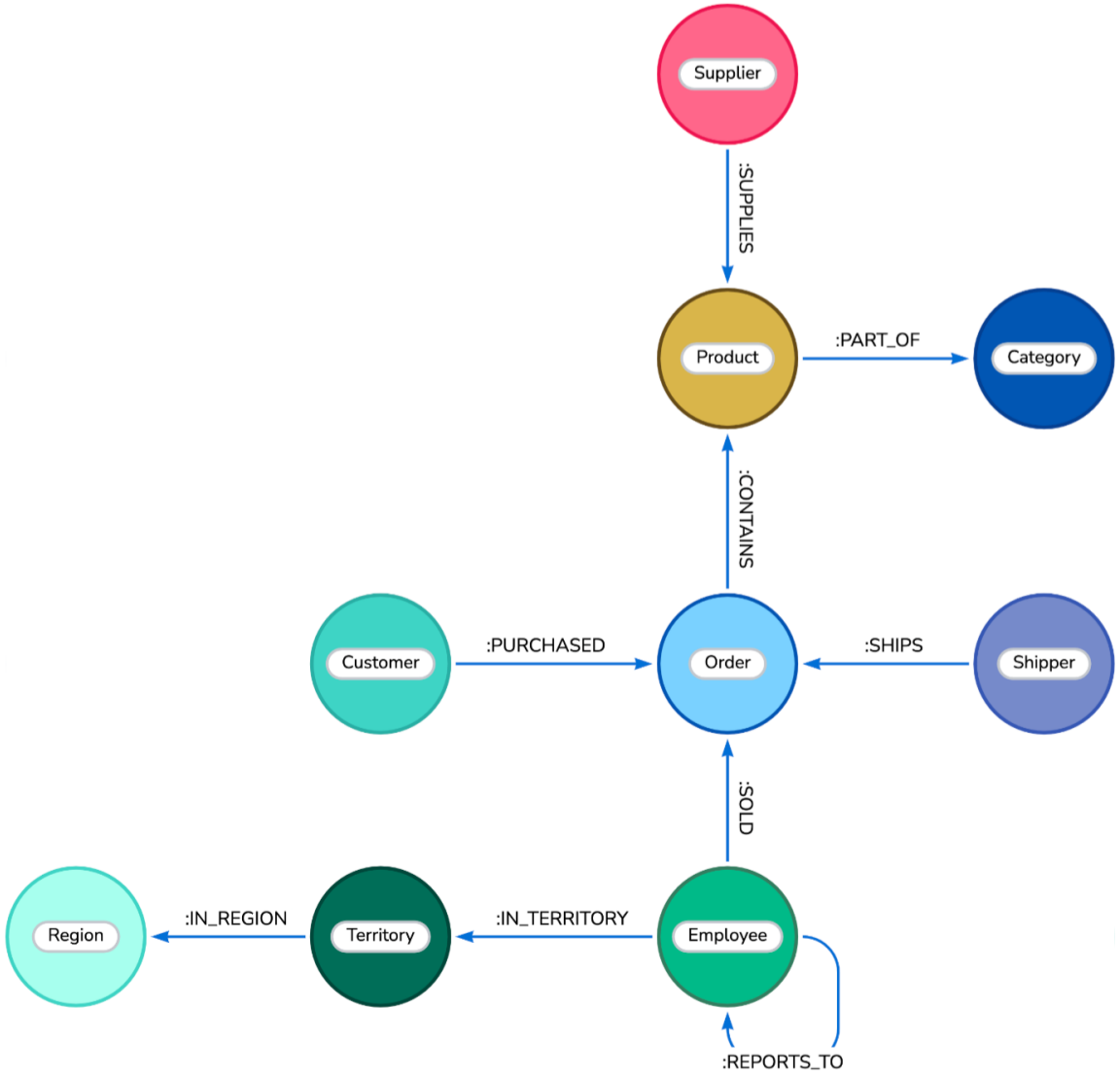
Conversational AI using GraphRAG



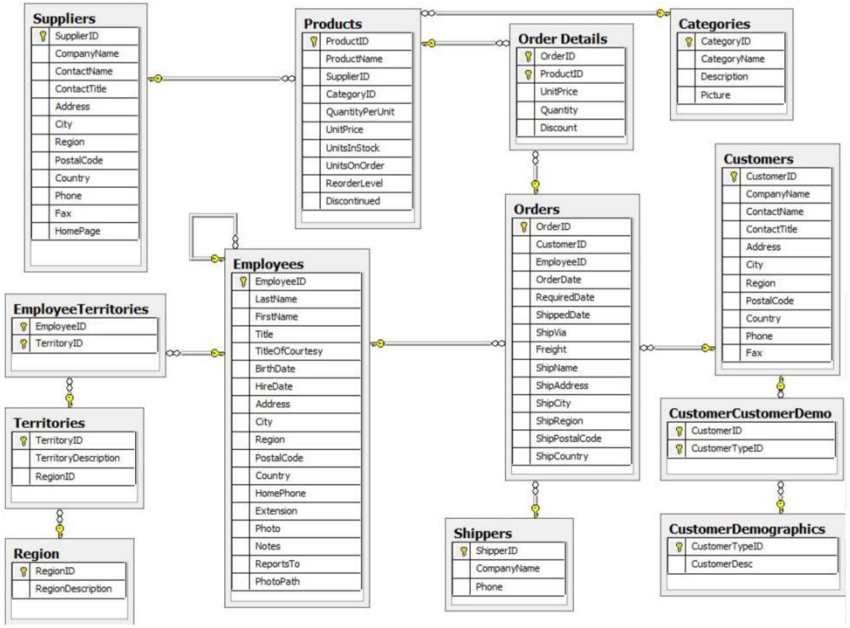
What is Graph Data?

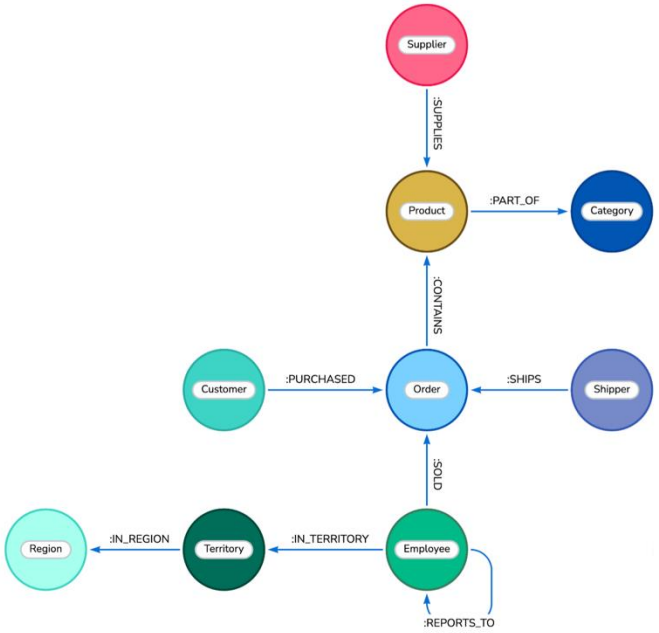


What is a Knowledge Graph?



Relational vs Graph





How to Interact with Graph?

SQL	Cypher
In SQL, this is how you order items by price and return the 10 most expensive items:	The statement is similar in Cypher, except for the pattern matching part:

```
SELECT p.ProductName, p.UnitPrice
FROM products as p
ORDER BY p.UnitPrice DESC
LIMIT 10;
```

```
MATCH (p:Product)
RETURN p.productName, p.unitPrice
ORDER BY p.unitPrice DESC
LIMIT 10;
```

SQL	Cypher
In SQL, you can filter data using the `WHERE` clause:	In Cypher, the `WHERE` clause belongs to the `MATCH` statement:

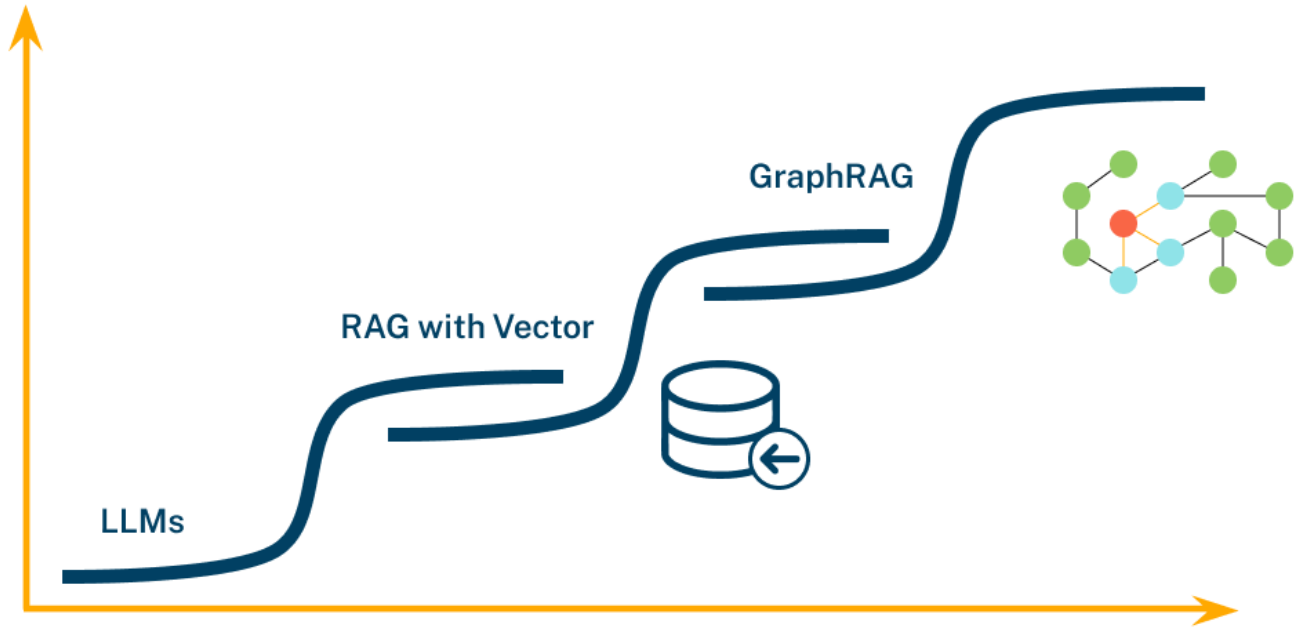
```
SELECT p.ProductName, p.UnitPrice
FROM products AS p
WHERE p.ProductName = 'Chocolade';
```

```
MATCH (p:Product)
WHERE p.productName = 'Chocolade'
RETURN p.productName, p.unitPrice;
```

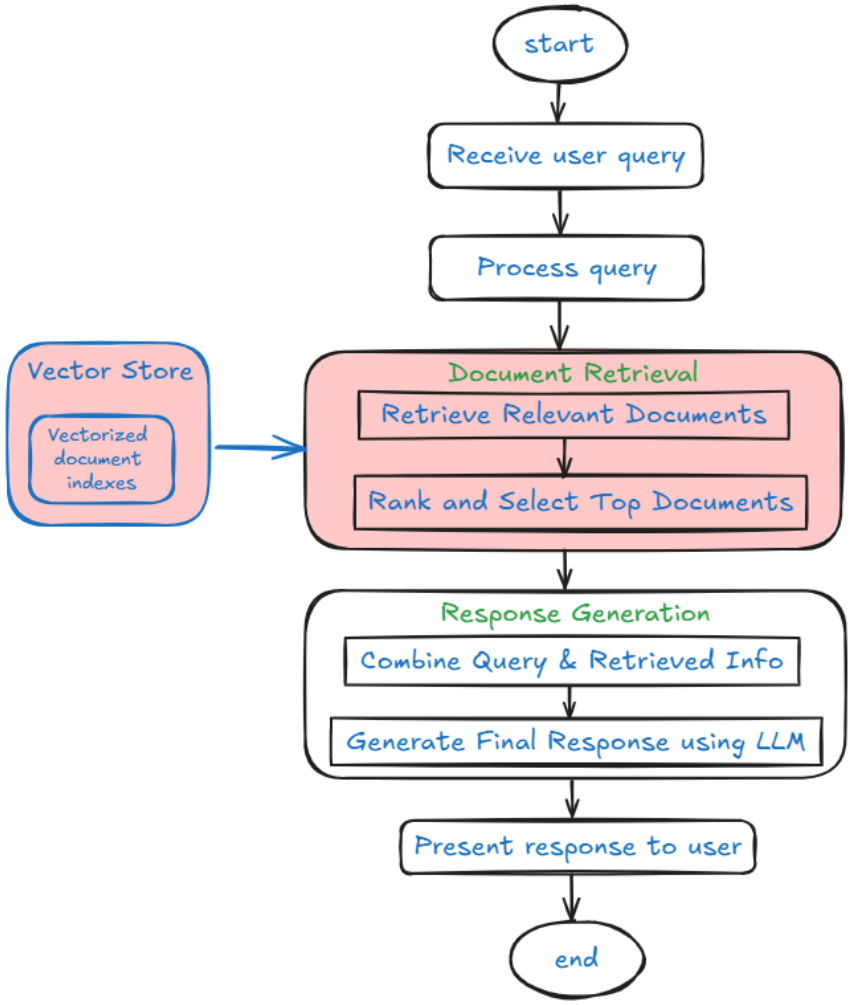
A shorter option is to use the label `productName` to specify the product in the `MATCH` statement:

```
MATCH (p:Product {productName:'Chocolade'})
RETURN p.productName, p.unitPrice;
```

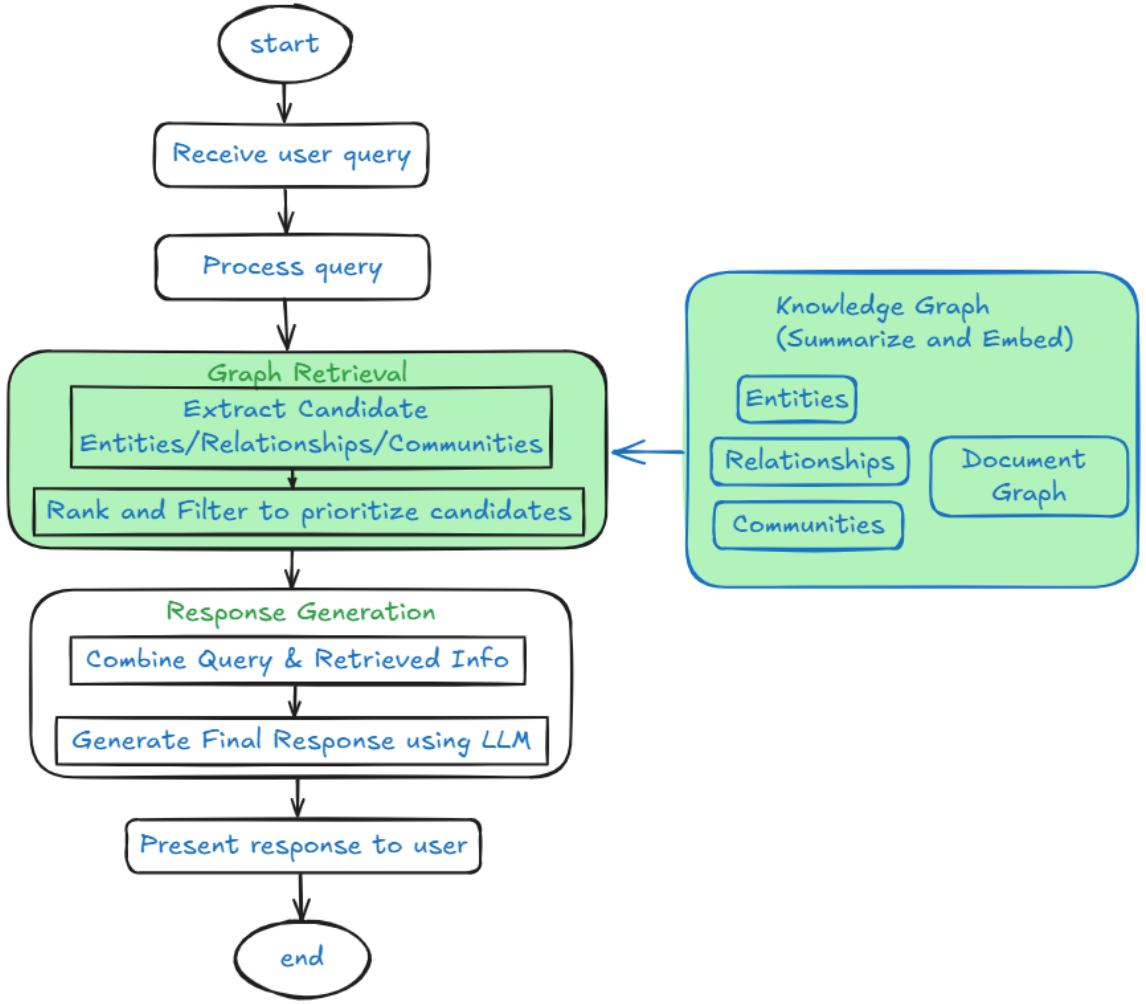
The Evolution of GenAI



Standard RAG



GraphRAG



DEMO

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Scan for Code and deck

THANK YOU

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Feel free to connect over LinkedIn

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