USER STORY

Enhancing LLM Chatbot Efficiency with GraphRAG

COMPANY
Microchip Technology Inc.

INTERVIEWEE
William Firth, Data Science Lead

INDUSTRY
High Tech

PROFILE
Knowledge graphs for GenAI/LLMs

CHALLENGE
Microchip's Customer Service team faced delays in accessing critical data to answer real-time inquiries. This was due to the lack of access and technical skills to query the database, which hindered quick and informed decision-making.

MEMGRAPH SOLUTION
Microchip implemented a contextual chatbot using custom large language models (LLMs) enhanced by Retrieval-Augmented Generation (RAG) techniques, specifically Memgraph's graph database. This setup allows non-technical users to interact with the system through natural language queries.

About Microchip Technology

Microchip Technology Inc. is a leading provider of microcontroller, mixed-signal, analog, and Flash-IP solutions. It creates essential components for various devices, helping them operate efficiently. Microchip's products are at the core of devices like digital thermometers, automotive systems, and home security units.

Impact Highlights

Operational Efficiency

Integrating Memgraph has led to improved operational efficiency at Microchip. The chatbot powered by Memgraph and their custom LLM can quickly answer complex queries accurately. This reduced response times and increased productivity in customer service and other departments.

Key Memgraph Features for Microchip

- **Graph database capabilities**
  - Memgraph's core functionality as a graph database allows it to efficiently handle and query data structured in graph form, which is ideal for understanding complex relationships and interdependencies. In this case, the GraphRAG framework consisted of the Memgraph graph database for retrieval-augmented generation (RAG) and Microchip's custom LLM. This improved the LLM's understanding, reduced the risk of hallucinations, and provided transparency by allowing the model to attribute information to its sources.
- **Customizable and Scalable**
  - Integrating with open-source models like ChatGPT or Llama and private LLMs highlights Memgraph's flexibility and customizability to meet specific organizational needs.
- **Robust Access Control Measures**
  - Memgraph's enterprise-grade security features, such as stringent access controls, allowed Microchip to implement strict oversight for their LLMs. By ensuring LLMs have read-only access to the Microchip database, Memgraph prevents unauthorized data manipulation.

Backstory

Microchip aimed to enhance its customer service capabilities by developing a chatbot that could deliver immediate and accurate responses to inquiries. The primary motivation was to bridge the gap between complex, technical data and non-technical decision-makers within the company.

Specifically, Microchip wanted to empower its customer service team to provide quick and informed responses to customer inquiries about product statuses and other related questions without delays.

“The use case is for bridging the gap between the consumers of the data and the data itself, because often the people making business decisions, they’re not the ones with their hand in the data.”

William Firth, Senior Data Scientist at Microchip Technology

Challenge:

Response time delays, complex data access, and inadequate data utilization hindered Microchip’s customer service team’s ability to provide quick and accurate support.

Traditionally, accessing and analyzing data often requires technical expertise and the ability to write complex database queries. This creates a barrier for many business decision-makers who lack the skills to unlock all the valuable insights hidden inside their datasets.

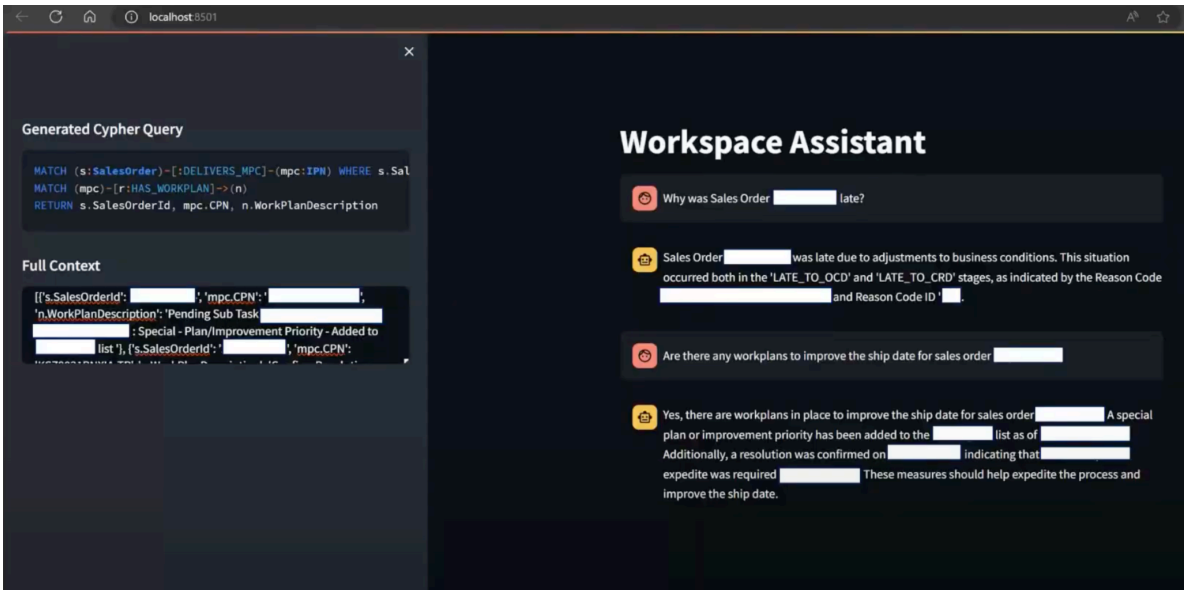
In Microchip's case, this challenge was primarily faced by its Customer Service Team, which needed to address customers’ enquiries and concerns regarding order statuses and/ or product-related information. To answer these questions, the Customer Service Team needed to call or email the Operations Teams for more information, a tedious and time-consuming process as there was no way to source information directly from their IT systems.

Ultimately, Microchip recognized this challenge and set out to develop a context-aware customer service chatbot that would make data exploration more intuitive, accessible, and efficient. An added bonus was that this solution also freed up valuable Operation Teams' time to focus on business-critical tasks.

Why Memgraph?

With this contextual chatbot, Microchip's ultimate goal was to reduce latency in communication and improve the accurate data retrieval process, thereby speeding up response times to customer and internal queries.

This approach sped up customer service processes and enhanced decision-making across the board by making complex data more accessible and actionable for non-technical staff.



Microchip's LLM Powered by Memgraph to Build a Contextual Chatbot named "Workspace Assistant"

Here's why Microchip chose Memgraph:

1. **Customizability & private LLM integration**
    - Public LLM APIs often raise concerns about data privacy. Microchip, hence, chose to implement a private custom LLM to ensure utmost privacy of their sensitive business data.
    - Memgraph's flexibility in supporting both open-source models and private custom LLMs provided the necessary customizability for Microchip to achieve this critical requirement. Hence, Memgraph provided them a solution that could seamlessly integrate with their specific setup.

2. **Scalability catering to different business departments & use cases**
    - Initial approaches with separate, limited-function chains (chatbot) for a single, controlled scenario proved unsustainable as the system grew and was adopted by various departments across Microchip.
    - To solve this problem, they implemented an agent-based architecture with a universal interface. This architecture separated user interaction, tool/chain selection (based on which department asked the query), and response generation, streamlining user interaction and allowing for more flexibility and scalability.
    - Memgraph's scalability supported the seamless implementation of this solution at a large scale, enabling various business departments to access and leverage the necessary data insights for their particular use cases.

3. **Strict access control measures**
    - Granting LLMs direct access to databases without oversight is highly risky.
    - Microchip used Memgraph to implement strict access control measures, ensuring LLMs have read-only access.
    - These stringent access controls were also essential in preventing any unauthorized data manipulation.

Results

The system now provides Microchip’s customer service team with on-demand access to complex data, enabling them to respond quickly to inquiries about order status or production issues. For instance, inquiries like "Why is this sales order late?" are answered promptly, improving customer satisfaction and operational efficiency.

This level of detailed and specific response was made possible by Memgraph's efficient handling and processing of complex queries.

“It’s beneficial to every party here if we can pull this off. And we did pull it off!”

William Firth, Data Science Lead

Find out how Microchip uses LLMs and RAG with Knowledge Graphs

Watch webinar

Let’s see how Memgraph fits into your environment

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