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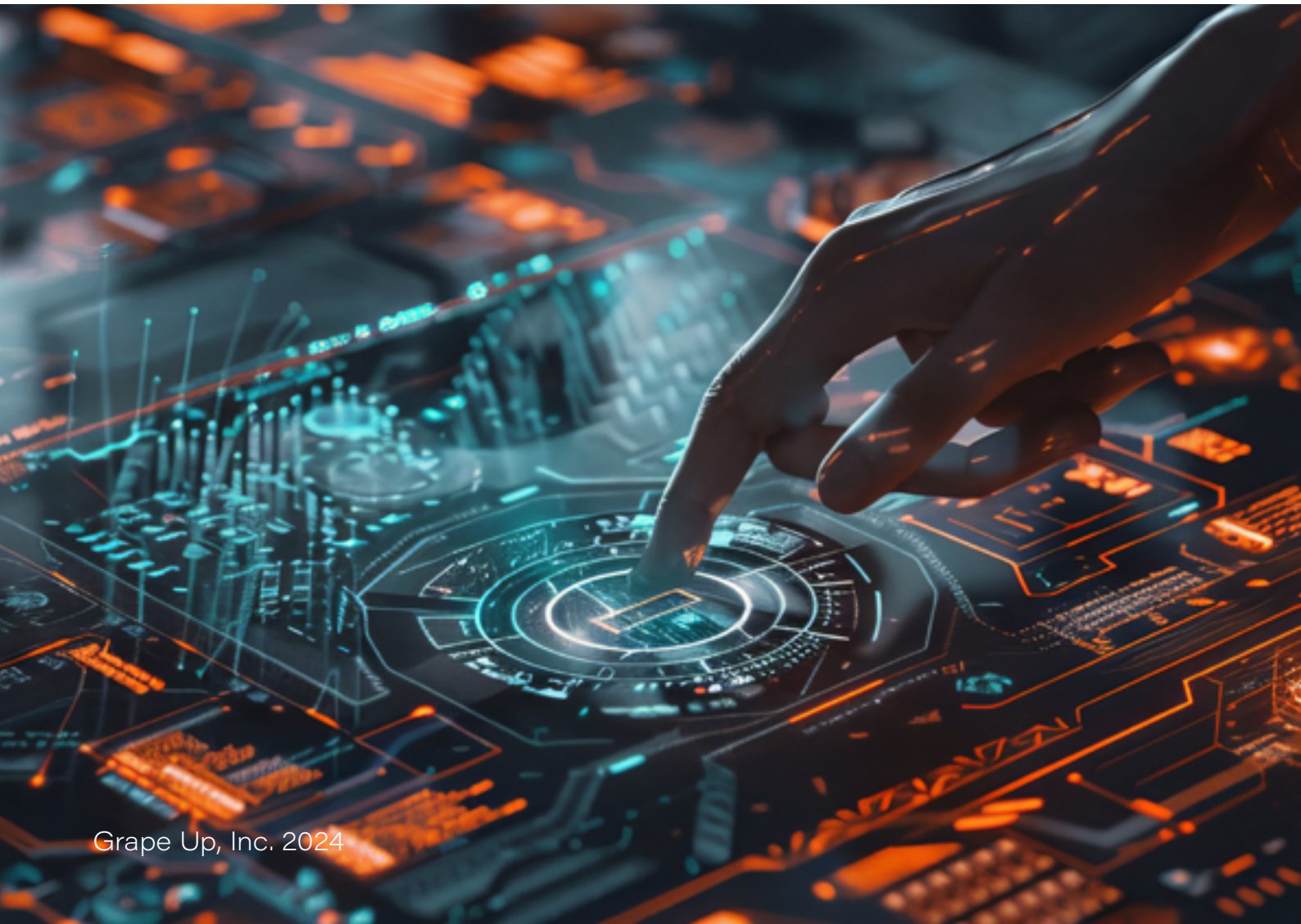
Architecting LLM Hubs: A Guide to Designing GenAI Chatbot Systems in Enterprises



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How LLM-Powered Chatbots Are Shaping Modern Business

In today's dynamic digital landscape, businesses constantly seek ways to boost efficiency and cut costs. With the rising demand for seamless customer interactions and smoother internal processes, large corporations are turning to innovative solutions like large language models (LLM)-powered chatbots that are revolutionizing operations across a myriad of sectors.

With the generative AI market projected to gain $1.3 trillion worth by 2032, companies continue to recognize the value of these AI-driven tools, investing in customized AI solutions. (1)

Market trends and projections

- By 2025, it is estimated that there will be 750 million apps using LLMs. (2)
- The global market for conversational AI, including LLM-powered chatbots, is expected to reach $1.3 billion by 2025, growing at a compound annual growth rate (CAGR) of 24%. (3)
- By 2026, the worldwide chatbot industry is projected to grow to $10.5 billion, driven by advancements in LLM technology. (4)

[1] SOURCE: https://explodingtopics.com/blog/generative-ai-stats
[2] SOURCE: https://springsapps.com/knowledge/large-language-model-statistics-and-numbers-2024
[3] SOURCE: https://springsapps.com/knowledge/what-makes-llm-chatbots-industry-game-changers
[4] SOURCE: https://gaper.io/llm-libraries-next-gen-chatbots/

Architecting an LLM Hub – Key Technical Requirements

Several essential technical requirements must be met to ensure that LLM Hub functions effectively within the organization's AI ecosystem. They focus on data integration, adaptability, integration methods, and security measures. We have identified four major requirements.

Independent Integration of Internal Data Sources

The LLM Hub should seamlessly integrate with the organization's existing data sources. This ensures that data from different departments or sources within the organization can be seamlessly incorporated into the LLM Hub. It enables the creation of chatbots that leverage valuable internal data, regardless of the specific chatbot's function. Data owners can deliver data sources, which promotes flexibility and scalability for diverse use cases.

Easy Onboarding of New Use Cases

The LLM Hub should streamline the process of adding new chatbots and functionalities. Ideally, the system should allow the creation of reusable solutions and data tools. This means the ability to quickly create a chatbot and plug in data tools, such as internal data sources or web search functionalities, into it. This reusability minimizes development time and resources required for each new chatbot, accelerating AI deployment.

Security Verification Layer for the Entire Platform

Security is paramount in LLM Hub development when dealing with sensitive data and infinite user interactions. The LLM Hub must be equipped with robust security measures to protect user privacy and prevent unauthorized access or malicious activities. Additionally, a question-answer verification layer must be implemented to ensure the accuracy and reliability of the information provided by the chatbots.

Possibility of Various Integrations with the Assistant Itself

The LLM Hub should offer diverse integration options for AI assistants. Interaction between users and chatbots within the Hub should be available regardless of the communication platform. Whether users prefer to engage via an API, a messaging platform like Microsoft Teams, or a web-based interface, the LLM Hub should accommodate diverse integration options to meet user preferences and operational needs.

The Handlers

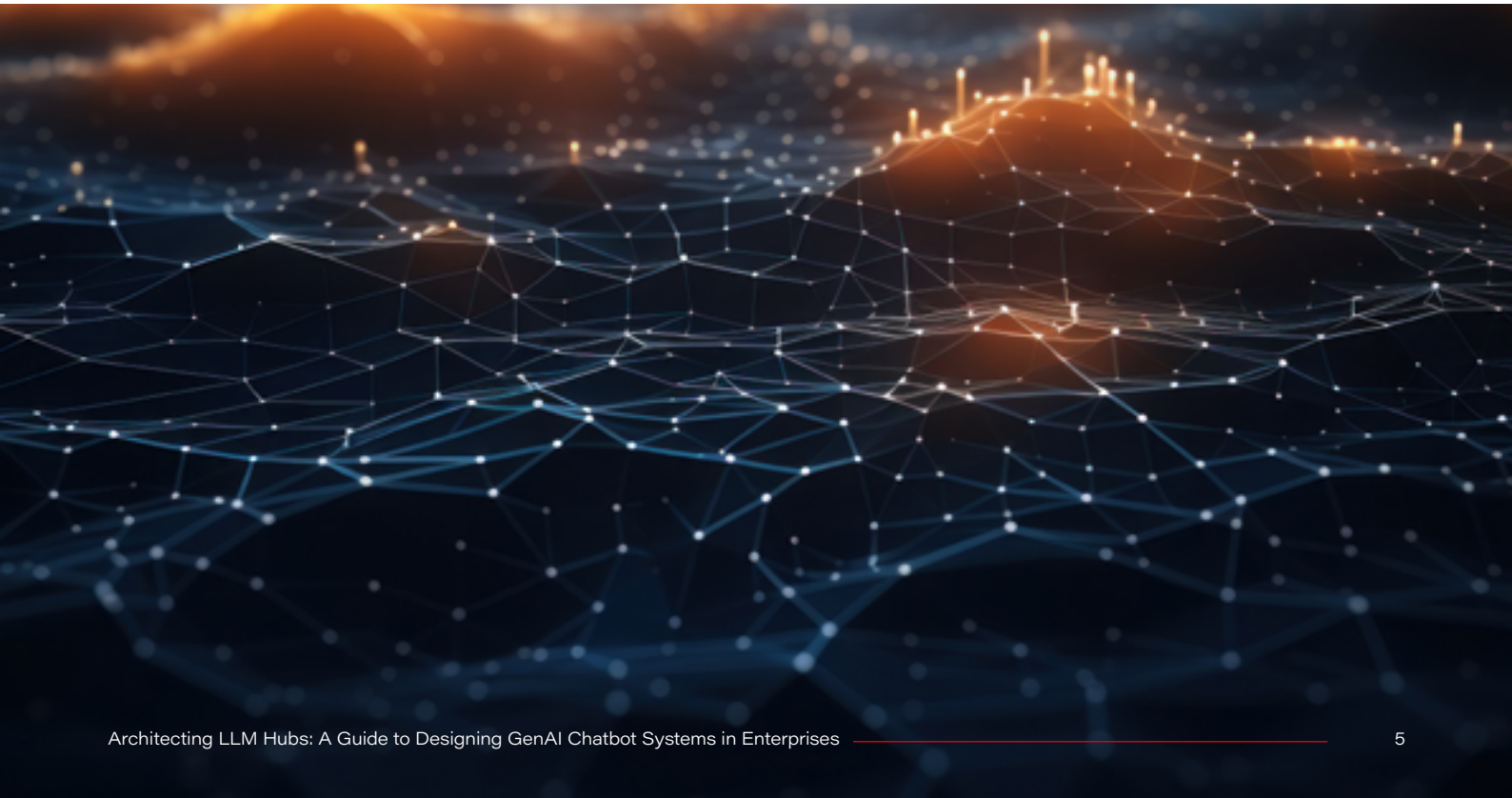
We are coming to the very beginning of the process happening with an LLM Hub: the use of handlers for incoming requests. Figure 4 highlights the crucial role of these components in managing requests from various sources. Users can communicate with chatbots on various platforms, including popular ones like Teams and Slack, commonly used for daily office communication.

Handling prompts from multiple sources can be complex due to the variations in how each platform structures requests. This is where our handlers play a critical role:

- **Standardization of requests:** They are designed to parse incoming requests and convert them into a standardized format, ensuring consistency in responses regardless of the communication platform used. By developing robust handlers, we ensure that the AI model provides uniform answers across all communicators, thereby enhancing reliability and user experience.
- **Scalability and flexibility:** Moreover, these handlers streamline the integration process, allowing for easy scalability as new communication platforms are adopted. This flexibility is essential for adapting to the evolving technological landscape and maintaining a cohesive user experience across various channels.

Additionally, the API handler extends the functionality of the LLM Hub by enabling the development of customized front-end interfaces. This capability allows the company to deliver unique and personalized chat experiences adaptable to various scenarios.

For example, front-end developers can leverage the API handler to implement a mobile version of the chatbot or enable interactions with the AI model within a car. With comprehensive documentation, the API handler provides an effective solution for developing and integrating these features seamlessly.



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Get the full whitepaper and see how to design an LLM Hub!

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