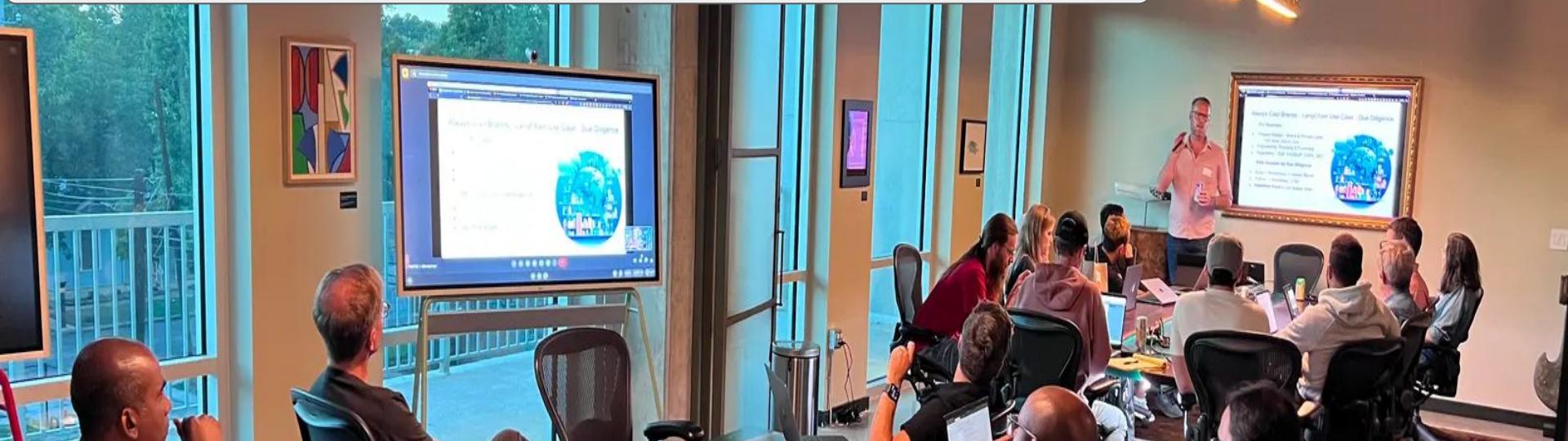




# LangChain 101

Austin LangChain Users Group

# About Us - Austin LangChain Users Group



- Austin LangChain User Group
  - Discord - <https://discord.gg/SDwD254V>
  - Github - [https://github.com/colinmcnamara/austin\\_langchain](https://github.com/colinmcnamara/austin_langchain)
  - Meetup - <https://www.meetup.com/austin-langchain-ai-group/>
  - Twitter - [@AustinLangChain](https://twitter.com/@AustinLangChain)
- Monthly in-person & remote meetings & workshops
- Connect with other early adopters
- Learn, Share, Grow



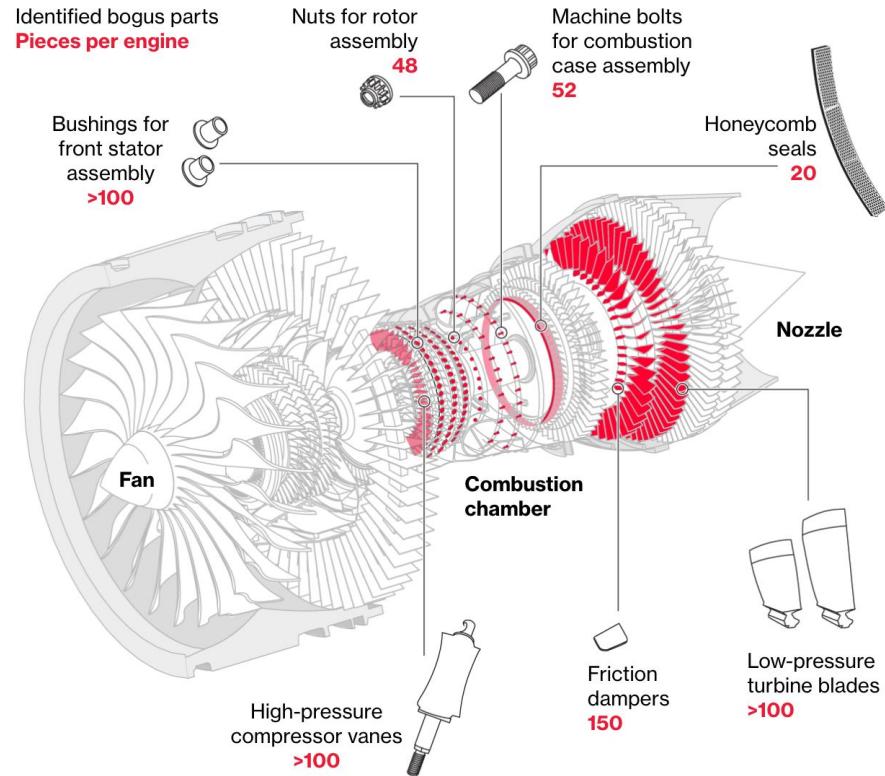
# About Me - Colin McNamara

- **Home:** Austin, East Side
- **Work:** Managing Partner, Engineering & Finance  
Always Cool Brands
- **Background:** Hyperscale Cloud Engineering & Operations
- **FOSS:** Linux, OpenStack, OpenDaylight, ...
- **Using LangChain:** Business operations
- **Socials:**
  - WWW <http://www.colinmcnamara.com>
  - Linkedin <https://www.linkedin.com/in/colinmcnamara/>
  - X(Twitter) [@colinmcnamara](https://twitter.com/colinmcnamara)



# How safe is your next flight?

- London distributor AOG Technics - fake parts with forged documents.
- 90+ fake certificates and bogus parts on 126 engines.
- Fraud exposed weaknesses in parts market.
- Airlines urgently removing fake parts - Costing millions



# Always Cool Brands - LangChain 1st Use Case

## Product Design - Brand & Private Label

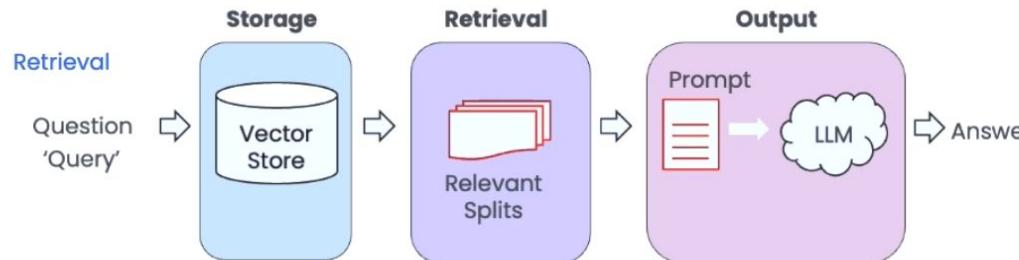
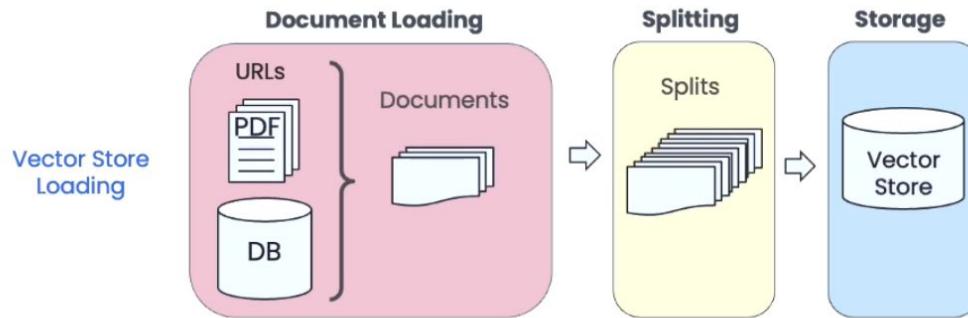
- **Customers** - Retail, Grocery, Club, Influencer Agencies
- **Workstreams** - Packaging, Formulation, Manufacturing, Bulk Materials Sourcing
- **Regulatory** - ISO, SQF, HASSUP, CAPA, SEC

## RAG Solution for Due Diligence

- Docs + Workshops -> Vector Stores
- **Identified fraud** in our supply chain
- **Protected** us from SEC violation
- **Enabling** provenance and **scope 3** reporting



# What is RAG?



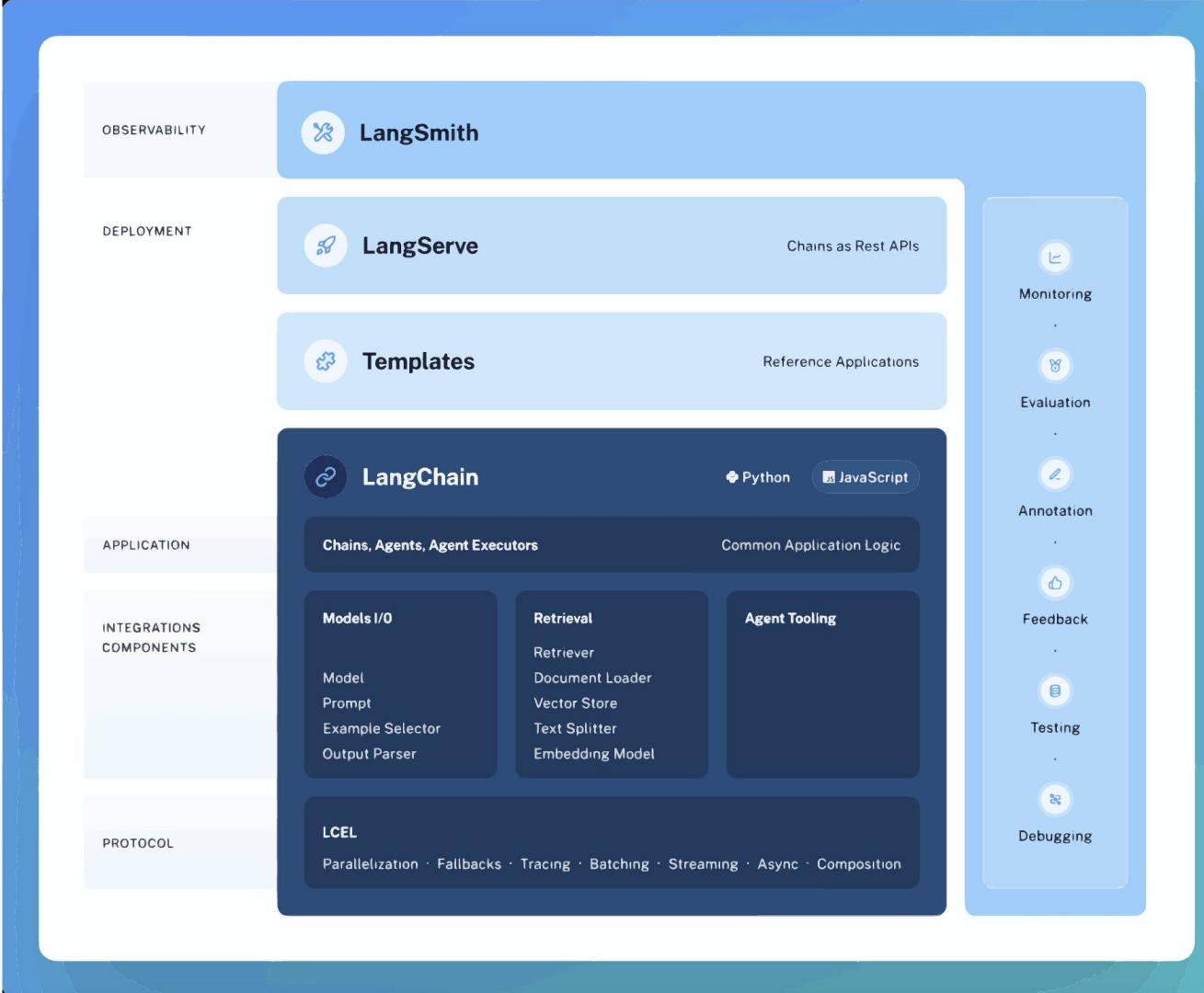
# What is LangChain?

- Open-Source library for building LLM applications
- Fast Moving, Open Source
- Founded by **Harrison Chase**
  - [@hwchase17](https://twitter.com/hwchase17) on X
  - [Langchain.com](https://langchain.com) / [langchain.dev](https://langchain.dev)
- Python and Typescript packages
- Focused on composition and modularity
  - Modular components & Implementations
  - Common use cases that combine components together



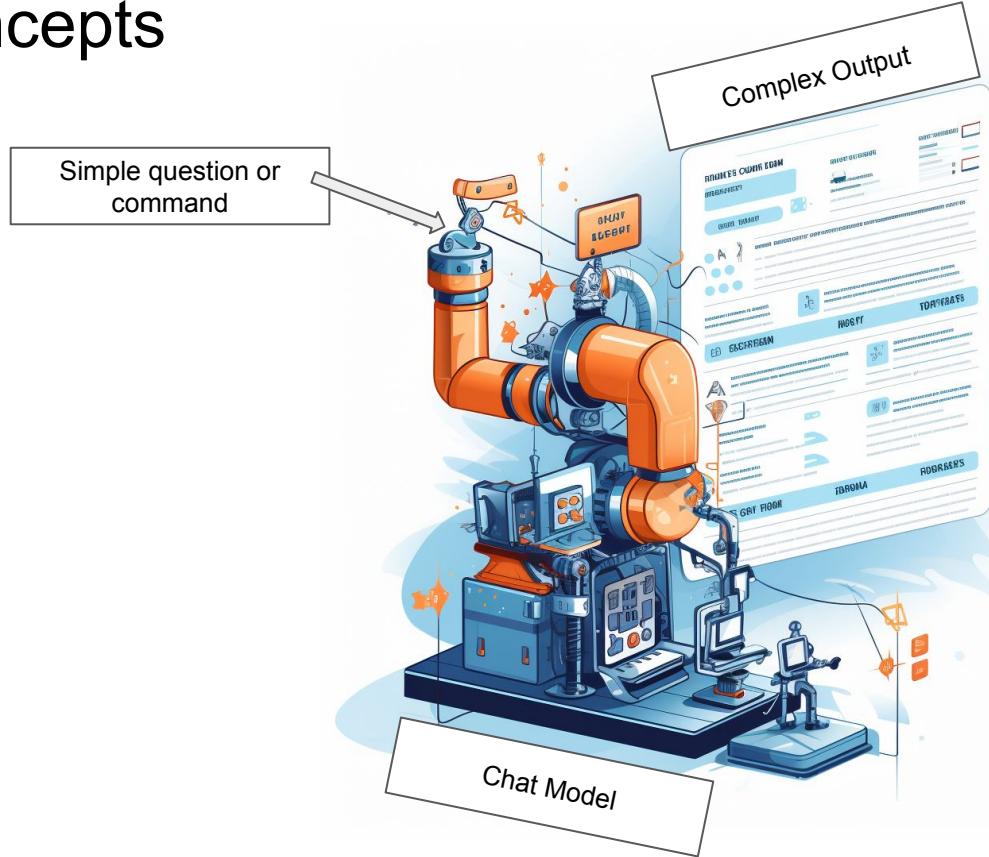
# LangChain

## Key Concepts



# LangChain Key Concepts

- Models
  - Chat (Today's Labs)
  - LLM (Future Labs)



# LangChain Key Concepts

- Models
  - LLM Integrations: 20+
  - Text Embeddings Models: 10+



# LangChain Key Concepts

- Prompts
  - Features
    - Separate instructions & user input
    - Supports variable placeholders (e.g., {variable\_name})
    - Composable for text & chat prompts
  - Types
    - PromptTemplate (text)
    - ChatPromptTemplate (chat)
    - Chain & Message templates

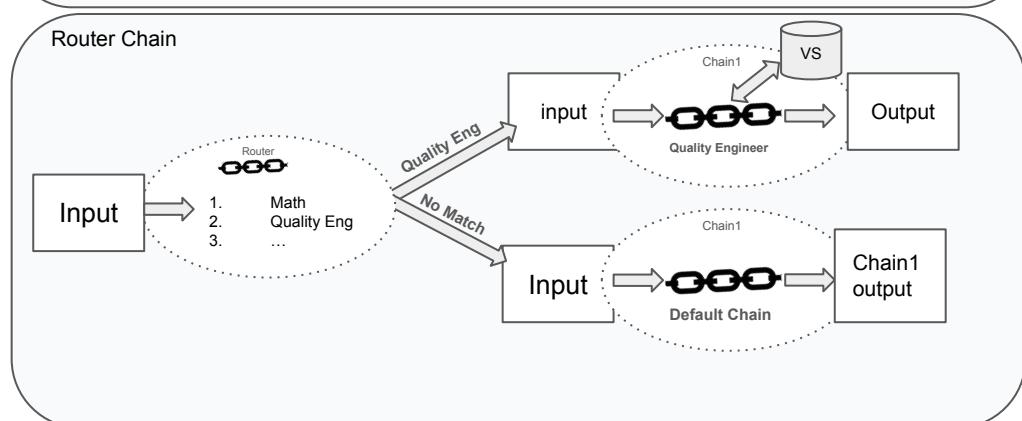
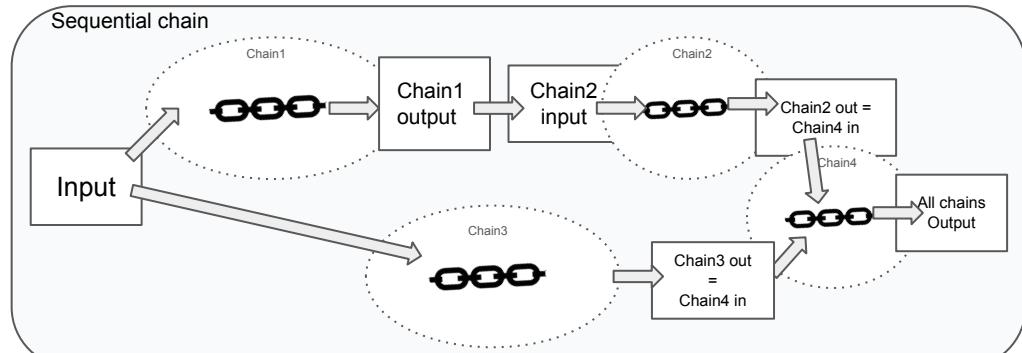
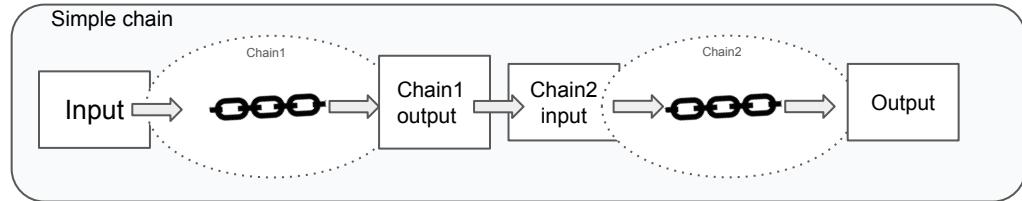
```
chat_template = ChatPromptTemplate.from_messages(  
    [  
        SystemMessage(  
            content=  
                "You are a helpful assistant that re-writes the user's  
text to "  
                "sound more upbeat."  
            ),  
        HumanMessagePromptTemplate.from_template("{text}"),  
    ]  
)  
  
llm = ChatOpenAI()  
llm(chat_template.format_messages(text="I dont like eating  
tasty things."))
```

```
AIMessage(content='I absolutely love indulging in delicious treats!')
```

# LangChain Key Concepts

- Chains

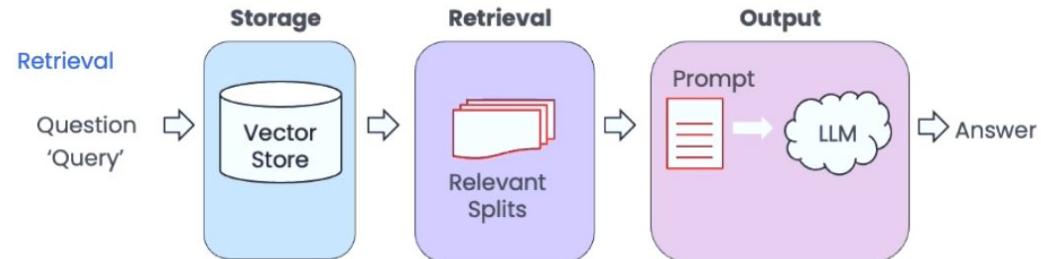
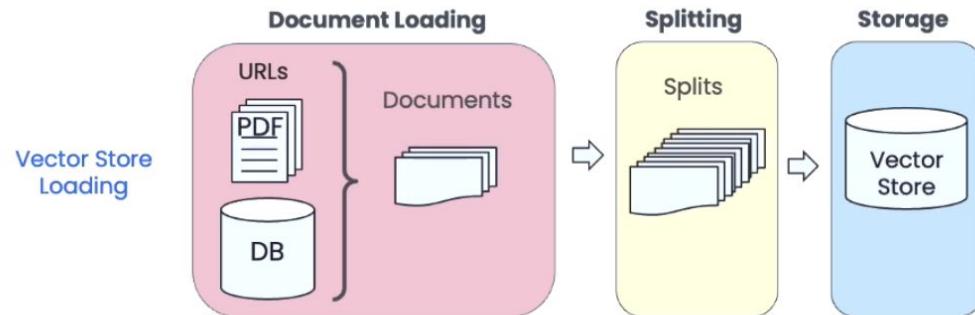
- Simple Chain
- Sequential Chain
- Router Chain
- Transformation Chains
- Building blocks for other chains
- Application specific chains: 20+



# Retrieval Augment Generation

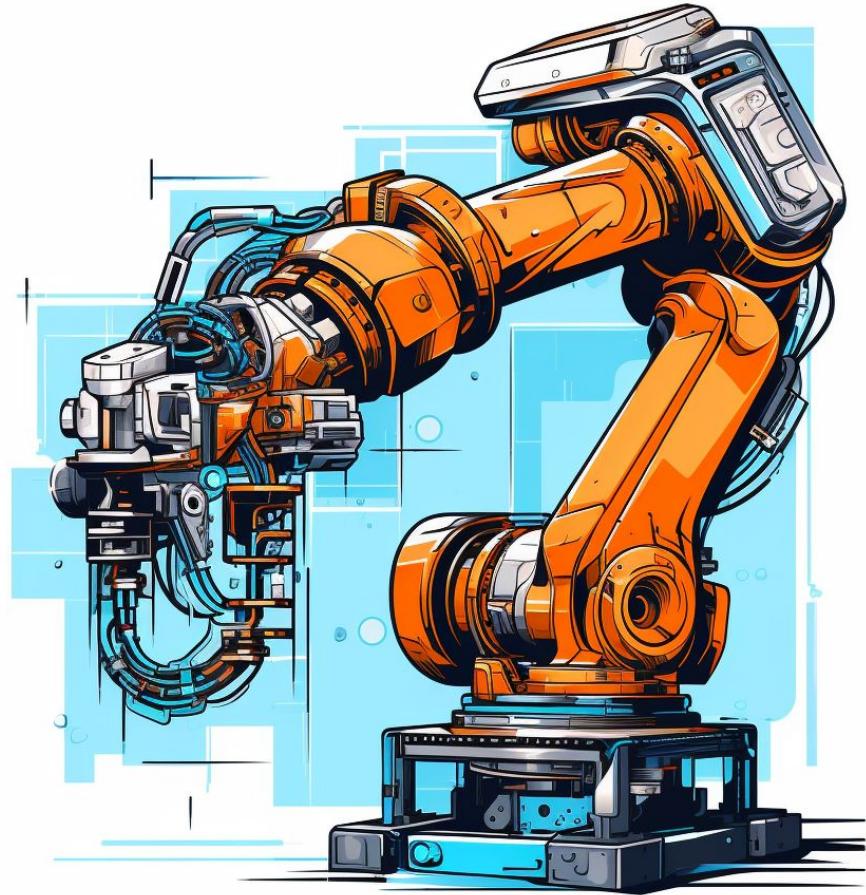
- Indexes

- Document Loaders: 50+
- Text Splitters: 10+
- Vector Stores: 10+
- Retrievers: 5+



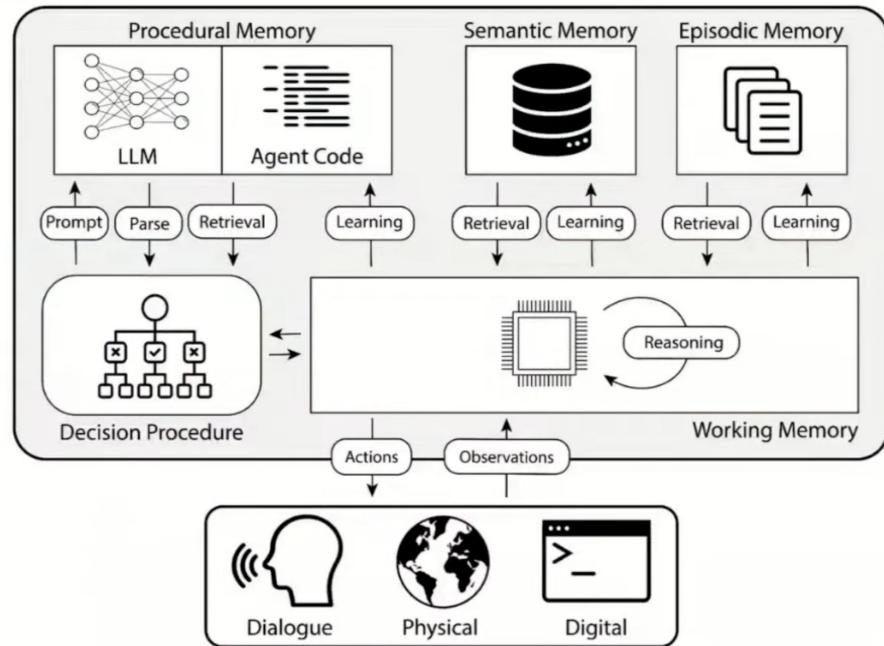
# LangChain Key Concepts

- Tools
  - Set of functions available to agents
  - Internet Search
  - Multiple Vector Stores
  - 50+ more



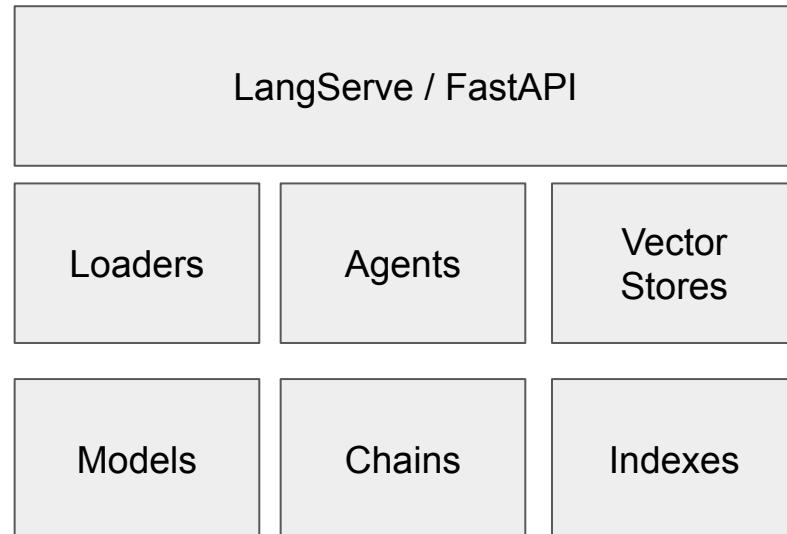
# LangChain Key Concepts

- Agents
  - Independent Entity
  - Has access to tools
  - Reasons, Acts (ReAct)
  - Combination of
    - LLM
    - Code
    - Memory
    - Tools



# LangServe

- Creates remotely invokable AI microservices
- Command line interface for LangChain templates
- Allows for easy templating
- Creates AI API service layer



# LangSmith

- Web interface for logging of AI applications
- Functional and Non-Functional information
- Performance & Query optimization
- Easily added to LangChain code

The screenshot shows the LangSmith web application interface. On the left, a "Trace" sidebar displays a log entry for a "/research-assistant" endpoint with a status of "SUCCESS" and a timestamp of "2023-08-24T12:25:27". The main area is titled "/research-assistant" and contains sections for "Run", "Feedback", and "Metadata". In the "Input" section, there is a text input field containing a user query: "I'm looking for a great taco in Austin's east side. Create a research report ranking the top 3 trucks, trailers, or restaurants I should visit." Below this is a "YAML" button. The "Output" section displays the generated AI report. It starts with a header: "# Research Report: Ranking the Top 3 Taco Trucks, Trailers, or Restaurants in Austin's East Side" and "# Introduction". The text continues: "Austin, Texas is renowned for its vibrant food scene, particularly its mouthwatering tacos. The city's east side is home to a plethora of taco trucks, trailers, and restaurants that offer a diverse range of flavors and culinary experiences. In this research report, we will explore the top three establishments in Austin's east side that are highly recommended for their exceptional tacos. We will consider the information provided in various sources to determine the best options for taco enthusiasts." A "## Methodology" section follows, describing how multiple sources were analyzed to provide insights into the best taco trucks, trailers, and restaurants. The report then ranks the top 3 establishments under "## Ranking the Top 3 Taco Trucks, Trailers, or Restaurants in Austin's East Side". The first result is "## 1. Las Trancas", with a brief description: "Las Trancas is a highly recommended taco trailer located in Austin's east side. While the specific source, Austin Eater, does not mention Las Trancas as one of the best taco trucks in Austin, it does highlight Las Trancas as the top-rated taco trailer in the east side. Unfortunately, we could not find any additional information about Las Trancas from other sources. However, given its recognition as the best taco trailer in the area, it is worth visiting for its authentic and delicious tacos." The second result is "## 2. Suerte".

```
# Research Report: Ranking the Top 3 Taco Trucks, Trailers, or Restaurants in Austin's East Side
## Introduction
Austin, Texas is renowned for its vibrant food scene, particularly its mouthwatering tacos. The city's east side is home to a plethora of taco trucks, trailers, and restaurants that offer a diverse range of flavors and culinary experiences. In this research report, we will explore the top three establishments in Austin's east side that are highly recommended for their exceptional tacos. We will consider the information provided in various sources to determine the best options for taco enthusiasts.

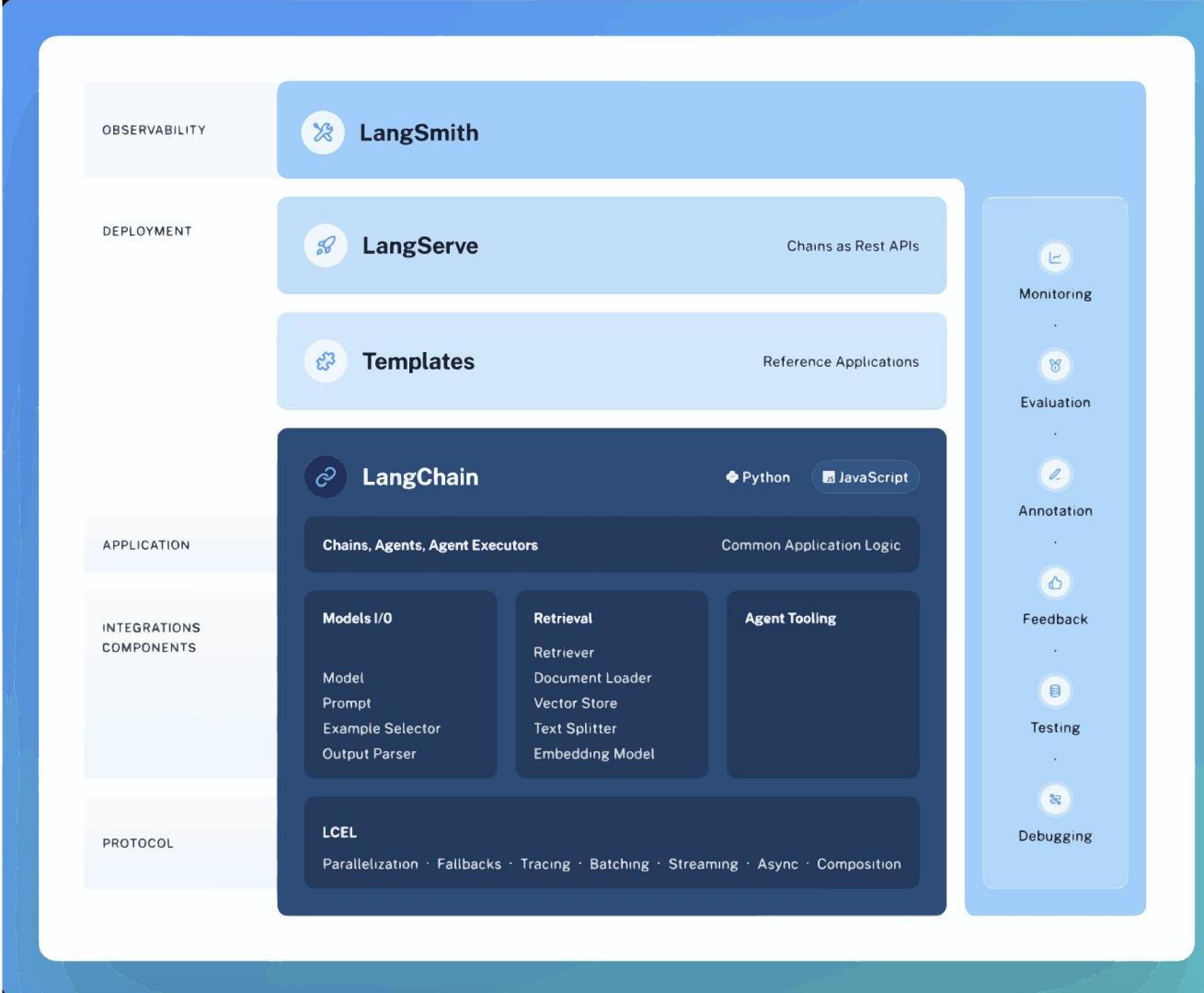
## Methodology
To compile this research report, we analyzed multiple sources that provide insights into the best taco trucks, trailers, and restaurants in Austin's east side. The sources include reputable websites such as Eater, Guide2ATX, Austin Eats Weird, and The Infatuation. We carefully reviewed the information provided in each source to identify the top-rated establishments based on their popularity, customer reviews, and expert opinions. Our aim is to present an objective and comprehensive ranking of the top three taco trucks, trailers, or restaurants in Austin's east side.

## Ranking the Top 3 Taco Trucks, Trailers, or Restaurants in Austin's East Side
### 1. Las Trancas
Las Trancas is a highly recommended taco trailer located in Austin's east side. While the specific source, Austin Eater, does not mention Las Trancas as one of the best taco trucks in Austin, it does highlight Las Trancas as the top-rated taco trailer in the east side. Unfortunately, we could not find any additional information about Las Trancas from other sources. However, given its recognition as the best taco trailer in the area, it is worth visiting for its authentic and delicious tacos.

### 2. Suerte
```

# LangChain

## Key Concepts



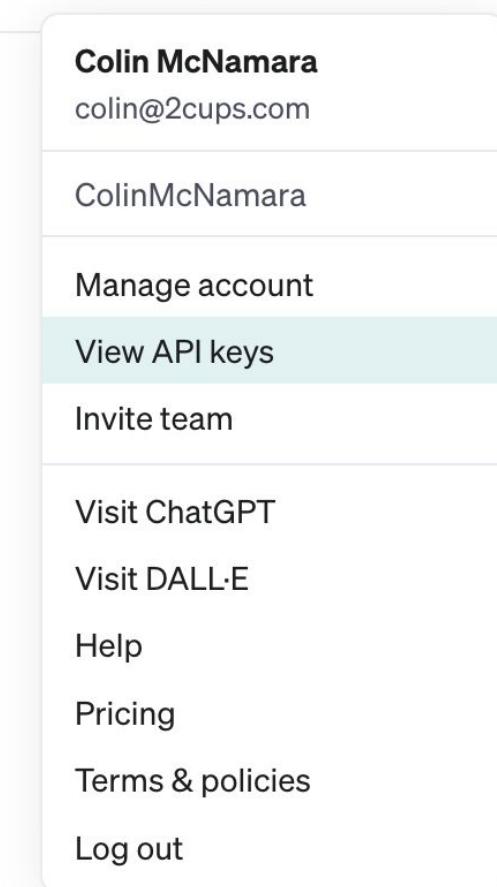


# Labs!!!



# Lab - get your OpenAI key

1. Go to <https://openai.com/>
2. Click on Menu > Developers > Overview
3. Click on your Profile image (top right) > View API keys
4. Click on `+ Create new secret key`
5. Enter an optional `Name` for the API key for future reference
6. Save this key using a password manager



# LAB 1 - Introduction to LangChain

- Required: OpenAI API Key: (keep this a secret)
- Required: Google account
- Use free Colab instance: <https://colab.research.google.com>
- Repo: [https://github.com/colinmcnamara/austin\\_langchain/](https://github.com/colinmcnamara/austin_langchain/)
- Notebook:  
[https://github.com/colinmcnamara/austin\\_langchain/blob/main/labs/Langchain\\_Introduction/Langchain\\_Introduction.ipynb](https://github.com/colinmcnamara/austin_langchain/blob/main/labs/Langchain_Introduction/Langchain_Introduction.ipynb)



# About Me - Riccardo Pirruccio

- **Home:** Austin, Texas
- **Work:** Manufacturing Engineer at Applied Materials
- **Background:** Full Stack Engineer, Manufacturing Intelligence for Semiconductor Supply Chain
- **FOSS:** Python, Javascript, React
- **Using LangChain:** Filling gaps in manufacturing supply chain process
- **Socials:**
  - Linkedin <https://www.linkedin.com/in/riccardopirruccio/>
  - Github <https://github.com/RPirruccio>



# LAB 2 - Accessing Chat Model via API & Web Interface

- Required: OpenAI API Key: (keep this a secret)
- Required: Google account
- Use free Colab instance: <https://colab.research.google.com>
- Repo: [https://github.com/colinmcnamara/austin\\_langchain/](https://github.com/colinmcnamara/austin_langchain/)
- Notebook:  
[https://colab.research.google.com/github/colinmcnamara/austin\\_langchain/blob/main/labs/LangChain\\_101/101-1-streamlit\\_streaming.ipynb](https://colab.research.google.com/github/colinmcnamara/austin_langchain/blob/main/labs/LangChain_101/101-1-streamlit_streaming.ipynb)



# LAB 3 - Simple Ai web interfaces with Streamlit

- Required: Google account
- Use free Colab instance: <https://colab.research.google.com>
- Repo: [https://github.com/colinmcnamara/austin\\_langchain/](https://github.com/colinmcnamara/austin_langchain/)
- Notebook:  
[https://github.com/colinmcnamara/austin\\_langchain/blob/main/labs/LangChain\\_101/101-4-streamlit\\_introduction.ipynb](https://github.com/colinmcnamara/austin_langchain/blob/main/labs/LangChain_101/101-4-streamlit_introduction.ipynb)



# About Me - Karim Lalani

- **Home:** Leander, Texas
- **Work:** Software Engineer @ Office the Governor
- **Background:** Full Stack Engineer, Machine Learning & Data Science
- **FOSS:** Docker / Kubernetes, Java, Python
- **Using LangChain:** Experimentation, learning
- **Socials:**
  - Linkedin <https://www.linkedin.com/in/-karim-lalani/>
  - Github <https://github.com/lalanikarim/>
  - Medium <https://medium.com/@klcoder>



# LAB 4 - Local LLM with Mistral and Streamlit

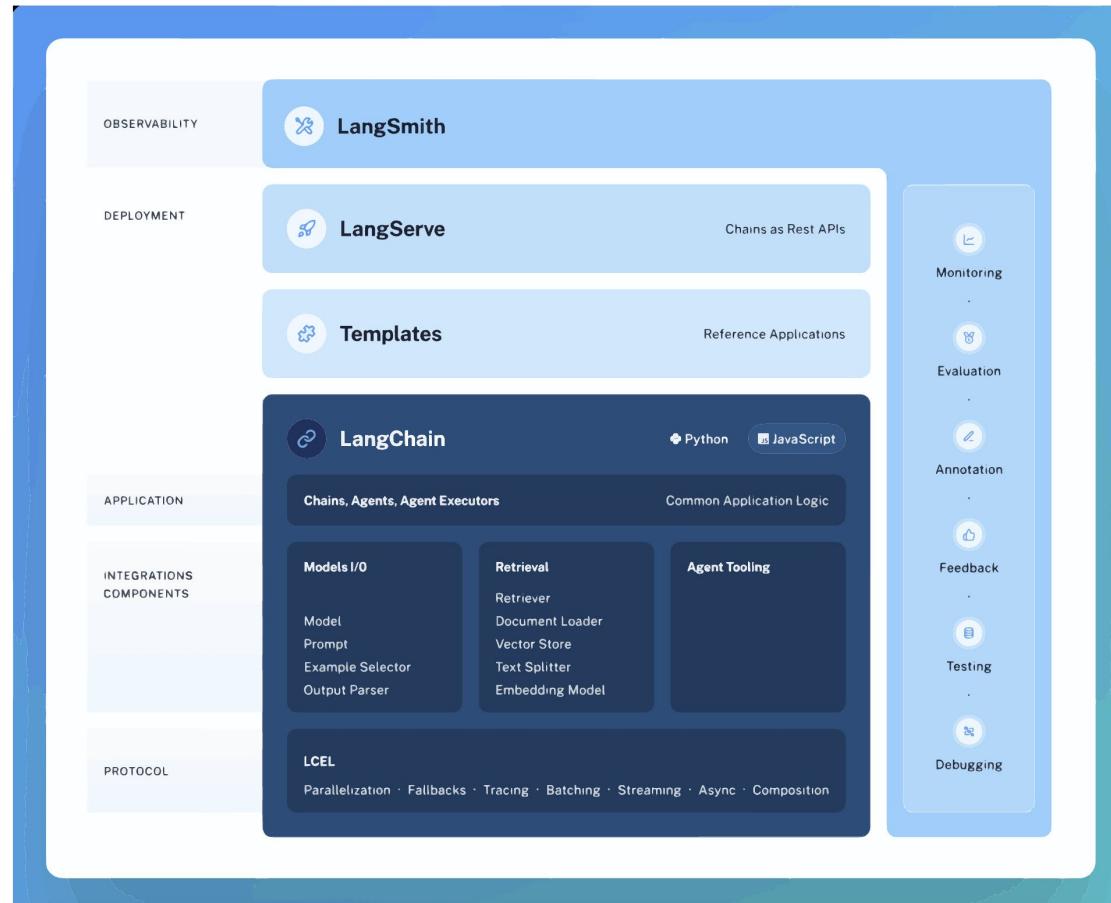
- Required: No OpenAI key required!
- Required: Google account
- Use free Colab instance: <https://colab.research.google.com>
- Repo: [https://github.com/colinmcnamara/austin\\_langchain/](https://github.com/colinmcnamara/austin_langchain/)
- Notebook:  
[https://github.com/colinmcnamara/austin\\_langchain/blob/main/labs/LangChain\\_101/Misc/101-1-streamlit\\_ollama\\_streaming.ipynb](https://github.com/colinmcnamara/austin_langchain/blob/main/labs/LangChain_101/Misc/101-1-streamlit_ollama_streaming.ipynb)



# Key Takeaways

## LangChain is:

- Growing Fast
- Full of integrations
- Extensible
- Open
- Portable
- Accessible



# Thank you - Please Join

- Local Austin LangChain User Group
  - Discord - <https://discord.gg/SDwD254V>
  - Github - [https://github.com/colinmcnamara/austin\\_langchain](https://github.com/colinmcnamara/austin_langchain)
  - Meetup - <https://www.meetup.com/austin-langchain-ai-group/>
  - Twitter - [@AustinLangChain](https://twitter.com/AustinLangChain)
  - Monthly in person & remote meetings / workshops
- Low stress, learning and sharing
- Connect with other early adopters
- Learn, Share, Grow





# Bonus Labs!!!

# LAB101.2 - Document Search

- Required: OpenAI API Key: (keep this a secret)
- Required: Google account
- Use free Colab instance: <https://colab.research.google.com>
- Repo: [https://github.com/colinmcnamara/austin\\_langchain/](https://github.com/colinmcnamara/austin_langchain/)
- Notebook:  
[https://colab.research.google.com/github/colinmcnamara/austin\\_langchain/blob/main/labs/LangChain\\_101/101-3-search-chat.ipynb](https://colab.research.google.com/github/colinmcnamara/austin_langchain/blob/main/labs/LangChain_101/101-3-search-chat.ipynb)



# LAB101-2 pdf Search

- Download  
[https://www.cisa.gov/sites/default/files/ncirp/National\\_Cyber\\_Incident\\_Response\\_Plan.pdf](https://www.cisa.gov/sites/default/files/ncirp/National_Cyber_Incident_Response_Plan.pdf)
- Play with temperature (0.7)



# LAB101.3 - Chat w/ internet search

- Required: OpenAI API Key: (keep this a secret)
- Required: Google account
- Use free Colab instance: <https://colab.research.google.com>
- Repo: [https://github.com/colinmcnamara/austin\\_langchain/](https://github.com/colinmcnamara/austin_langchain/)
- Notebook:  
[https://colab.research.google.com/github/colinmcnamara/austin\\_langchain/blob/main/labs/LangChain\\_101/101-3-search-chat.ipynb](https://colab.research.google.com/github/colinmcnamara/austin_langchain/blob/main/labs/LangChain_101/101-3-search-chat.ipynb)



# LAB101-3 Agents Accessing the internet

- Model = gpt-3.5-turbo
- Streaming = True
- Tools = DuckDuckGoSearchRun
- Memory
- Return Steps