



Lecture 6: LLM Application Development

SPRING 2025

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Agenda

- Why LangChain?
- LangChain Ecosystem
- LangChain Components
- LangChain on the Cloud
- In-class Exercise
- LangChain Competitors



LangChain

- LangChain is a framework designed to facilitate the development of applications that involve language models, like OpenAI's GPT-4.
- LangChain was created in 2022 by Harrison Chase, a researcher in the field of AI.
- LangChain aims to make apps able to reason and are context-aware by creating layers of custom components between LLMs and the end user.
- LangChain is available in Python and JavaScript.

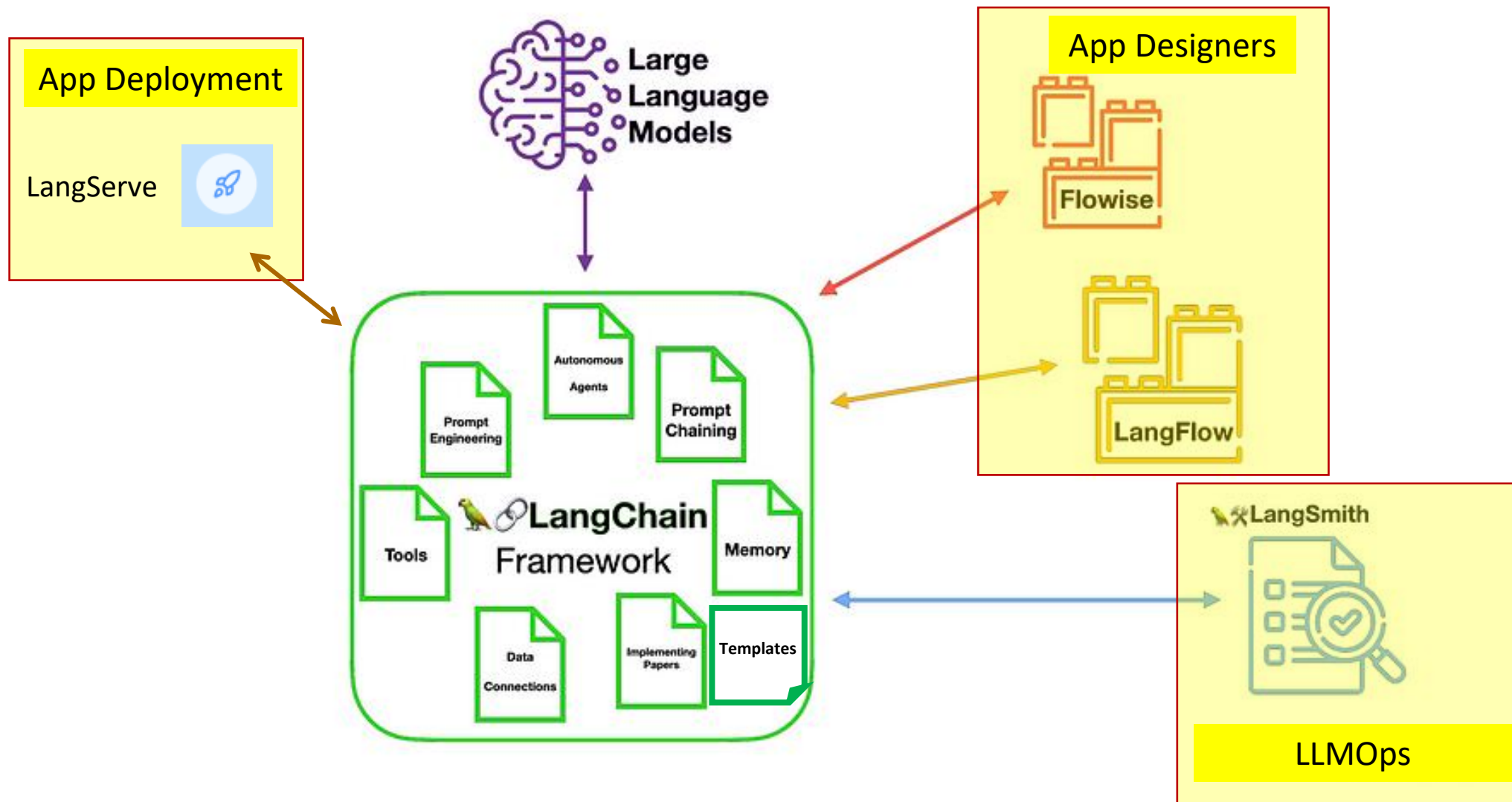


Why LangChain?

- FlowiseAI offers a few off-the-shelf tools, a constrained UI, and limited control over node operations.
- Most of FlowiseAI's components map one-to-one with LangChain classes.
- LangChain is open-source project with a large community of developers and contributors, and is used by over 100,000 companies including Apple, Microsoft, Amazon, Oracle, and more!
- LangChain boasts a powerful ecosystem.



LangChain Ecosystem

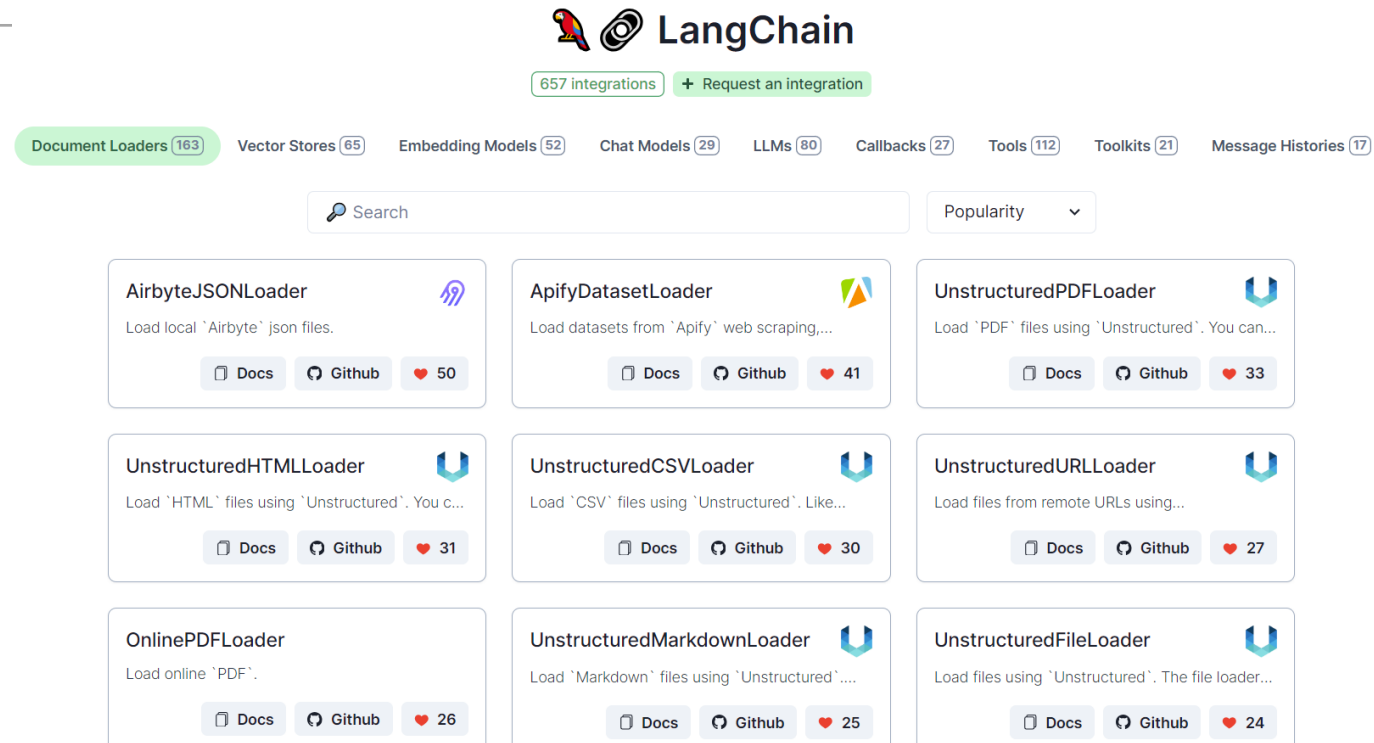


LangChain Quickstart Guide

<https://python.langchain.com/docs/tutorials/>

LLM Integrations in LangChain

<https://python.langchain.com/docs/integrations/providers/all/>




- You can also create your own integration:
https://python.langchain.com/docs/how_to/#custom

Sign-up for a LangSmith Account
<https://smith.langchain.com/>

LangChain Hub: <https://smith.langchain.com/hub>

Note: You must create an account on LangSmith to get access

 Hub

Use Cases

☐ Agent simulations

5

☐ Agents

89

☐ Autonomous agents

12

☐ Chatbots

95

☐ Classification

11

☐ Code understanding

21

☐ Code writing

23

☐ Evaluation

33

☐ Extraction

42

☐ Interacting with A...

28

☐ Multi-modal

4

☐ QA over documents

77

☐ Self-checking

15

☐ SQL

7

☐ Summarization

74

☐ Tagging

12

Search for prompts, use cases, models...

Top Favored

Top Viewed

Top Downloaded

Recently Updated

Agents

Interacting with APIs

ChatPromptTemplate

meta:llama-2-70b-chat

Try it

homanp/superagent

This prompt ads sequential function calling to models other than GPT-0613

{x} Prompt • Updated 5 months ago • 71 • 37k • 18.3k • 11

ChatPromptTemplate

Summarization

English

openai:gpt-3.5-turbo

Try it

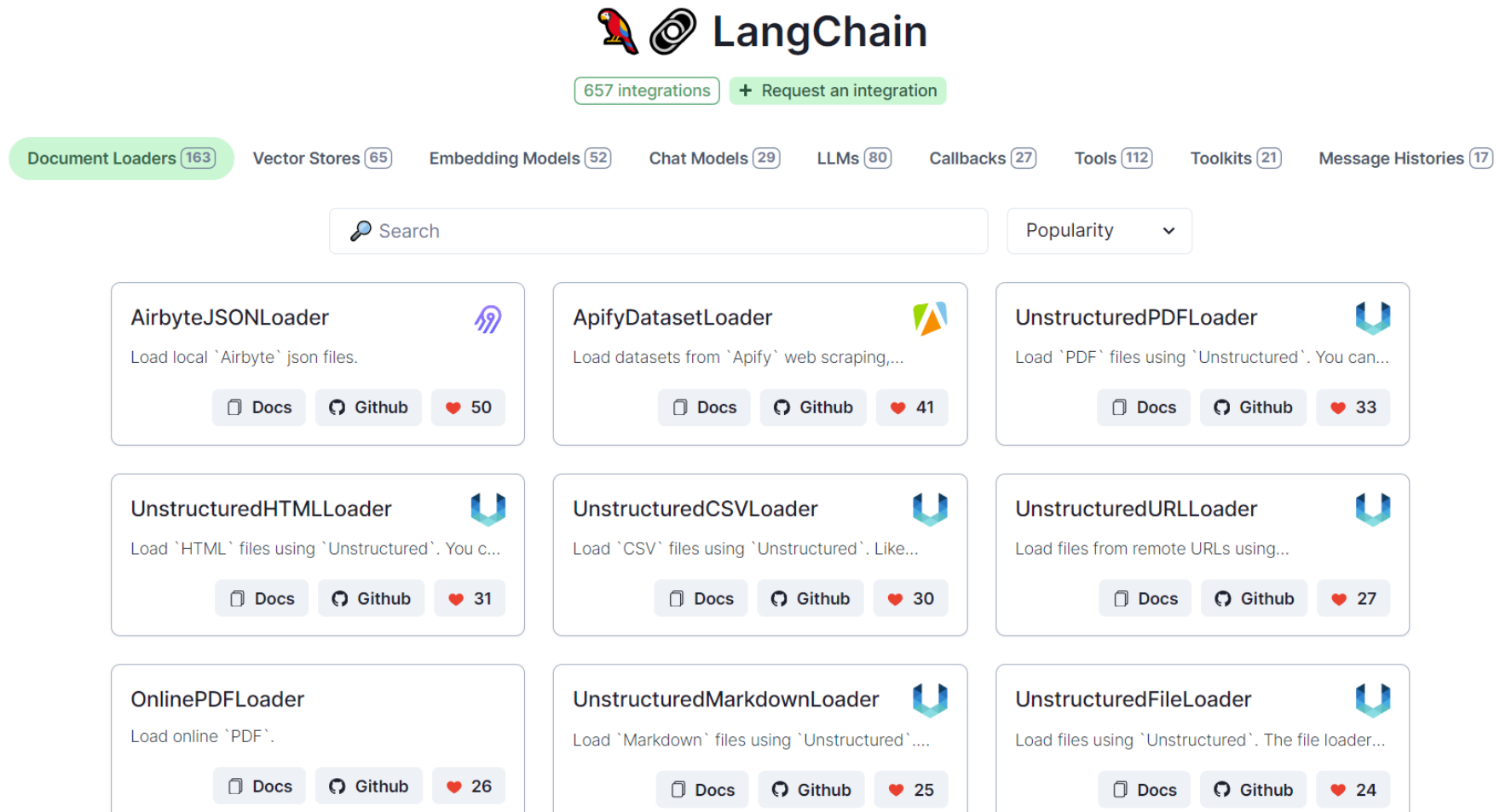
hardkothari/prompt-maker

Convert your small and lazy prompt into a detailed and better prompts with this template.

{x} Prompt • Updated 5 months ago • 63 • 19.7k • 4.57k • 1

LLM Integrations in LangChain

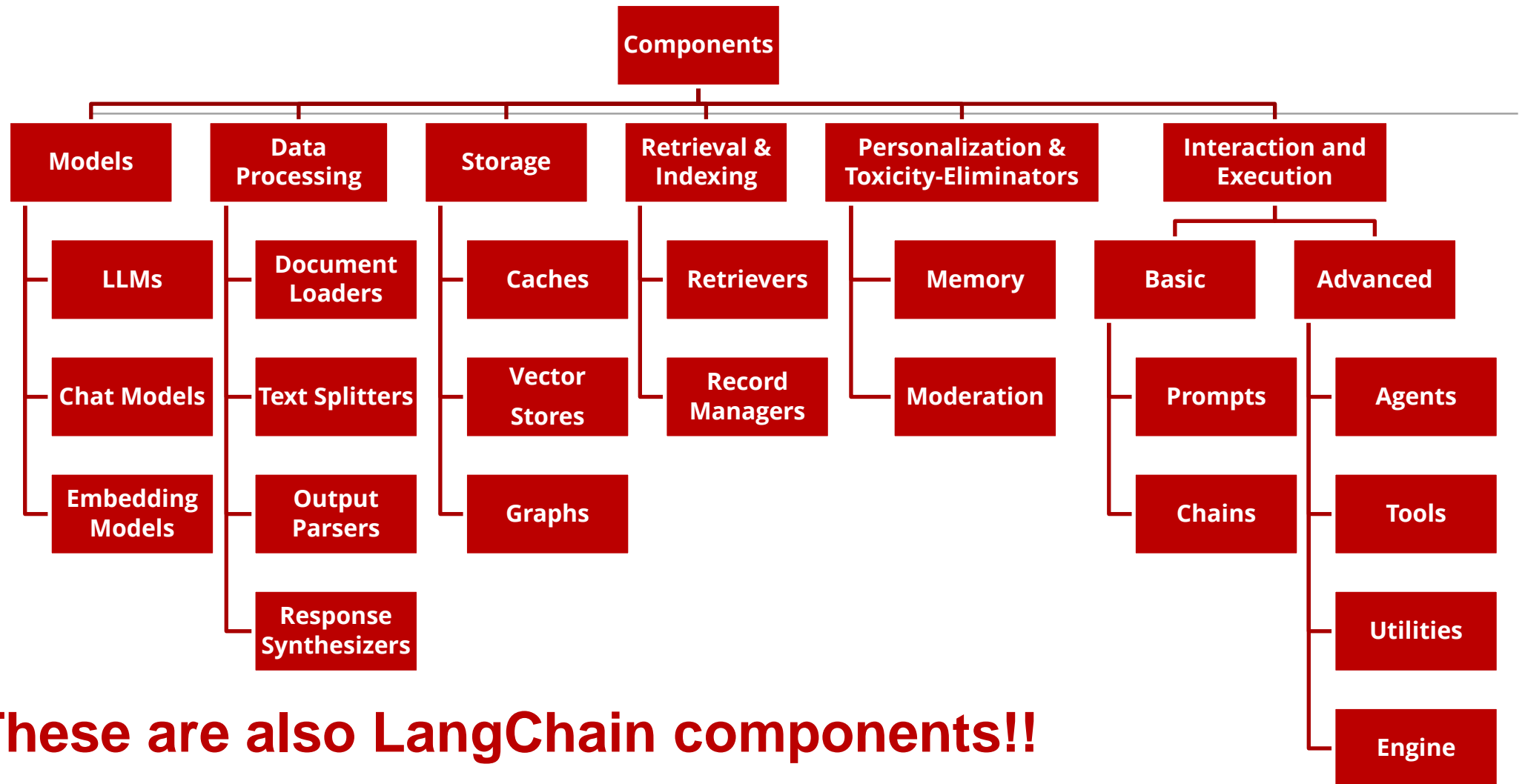
<https://integrations.langchain.com/>



The screenshot displays the LangChain integrations website. At the top, the LangChain logo is centered, with a badge indicating '657 integrations' and a button to 'Request an integration'. Below the header, a navigation bar lists categories with their respective counts: Document Loaders (163), Vector Stores (65), Embedding Models (52), Chat Models (29), LLMs (80), Callbacks (27), Tools (112), Toolkits (21), and Message Histories (17). The 'Document Loaders' category is selected and highlighted. A search bar and a 'Popularity' dropdown menu are positioned above the grid of integration cards. The grid contains nine cards, each for a different loader, featuring its name, a brief description, a logo, and links to documentation, GitHub, and a popularity count.

Integration Name	Description	Docs	Github	Popularity
AirbyteJSONLoader	Load local `Airbyte` json files.	Docs	Github	50
ApifyDatasetLoader	Load datasets from `Apify` web scraping,...	Docs	Github	41
UnstructuredPDFLoader	Load `PDF` files using `Unstructured`. You can...	Docs	Github	33
UnstructuredHTMLLoader	Load `HTML` files using `Unstructured`. You c...	Docs	Github	31
UnstructuredCSVLoader	Load `CSV` files using `Unstructured`. Like...	Docs	Github	30
UnstructuredURLLoader	Load files from remote URLs using...	Docs	Github	27
OnlinePDFLoader	Load online `PDF`.	Docs	Github	26
UnstructuredMarkdownLoader	Load `Markdown` files using `Unstructured`....	Docs	Github	25
UnstructuredFileLoader	Load files using `Unstructured`. The file loader...	Docs	Github	24

Reminder: FlowiseAI Components

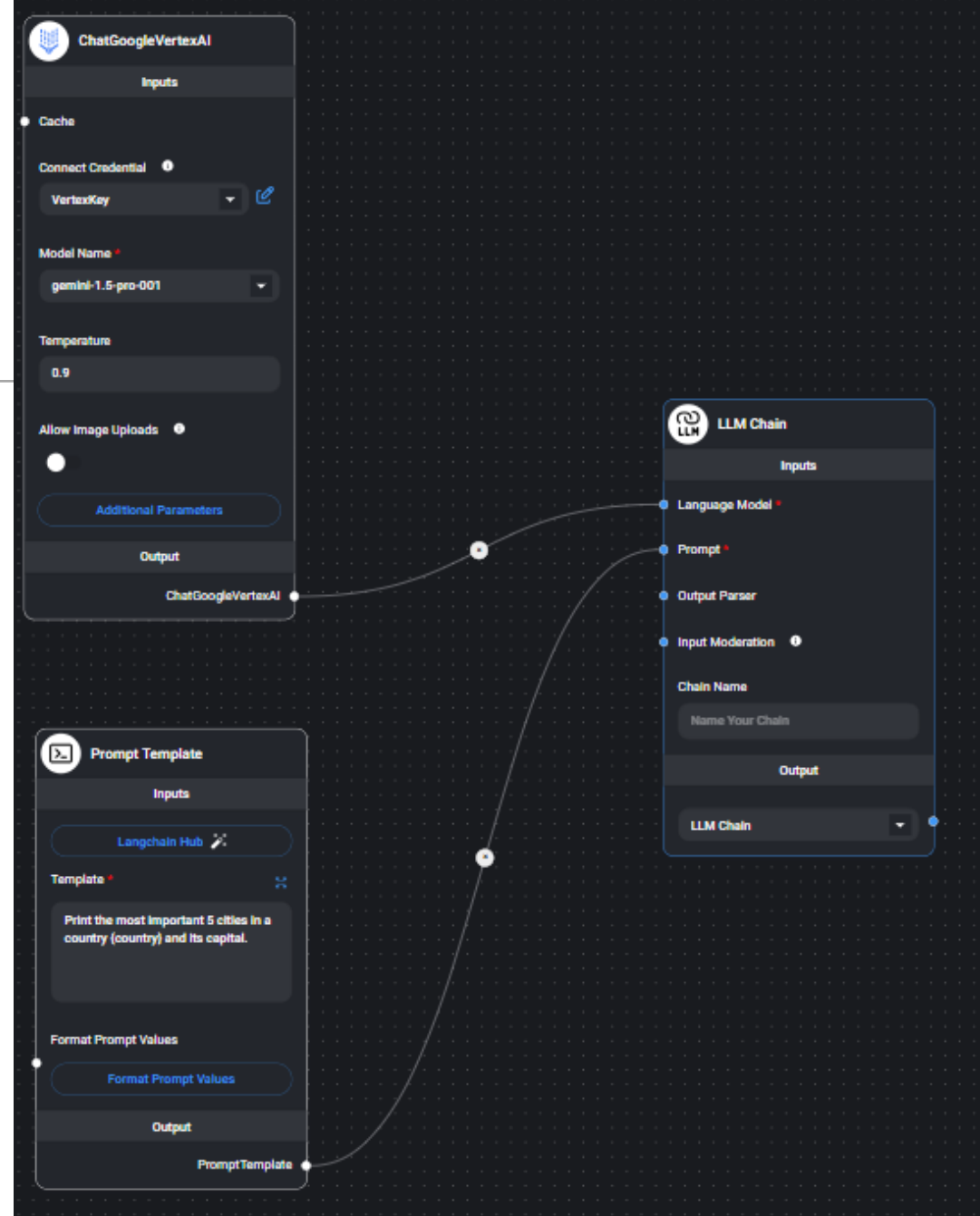


These are also LangChain components!!

FlowiseAI to LangChain Mapping

FlowiseAI	LangChain
LLM Nodes	langchain.llms
Prompt Nodes	langchain.prompts
Chains	langchain.chains.LLMChain
Tools	langchain.tools
Memory	langchain.memory
Agents	langchain.agents.AgentType

LangChain Example



LangChain Example on the Cloud

1

<input type="checkbox"/>	<input type="radio"/>	Instance name ↑		Zone	Auto upgrade	Version	Machine Type
<input type="checkbox"/>	<input checked="" type="radio"/>	instance-20250130-014735	OPEN JUPYTERLAB	us-central1-a	—	M127	Efficient Instance: 8 vCPUs, 32 GB RAM

2

The Cloud Composer API is not enabled. ×

!

Enable

The Cloud Dataproc API is not enabled. ×


!

Enable

LangChain Example on the Cloud – Cont'd

- Install required libraries

```
pip install langchain langchain-google-vertexai langchain-community google-cloud-aiplatform openai pydantic aiohttp
```



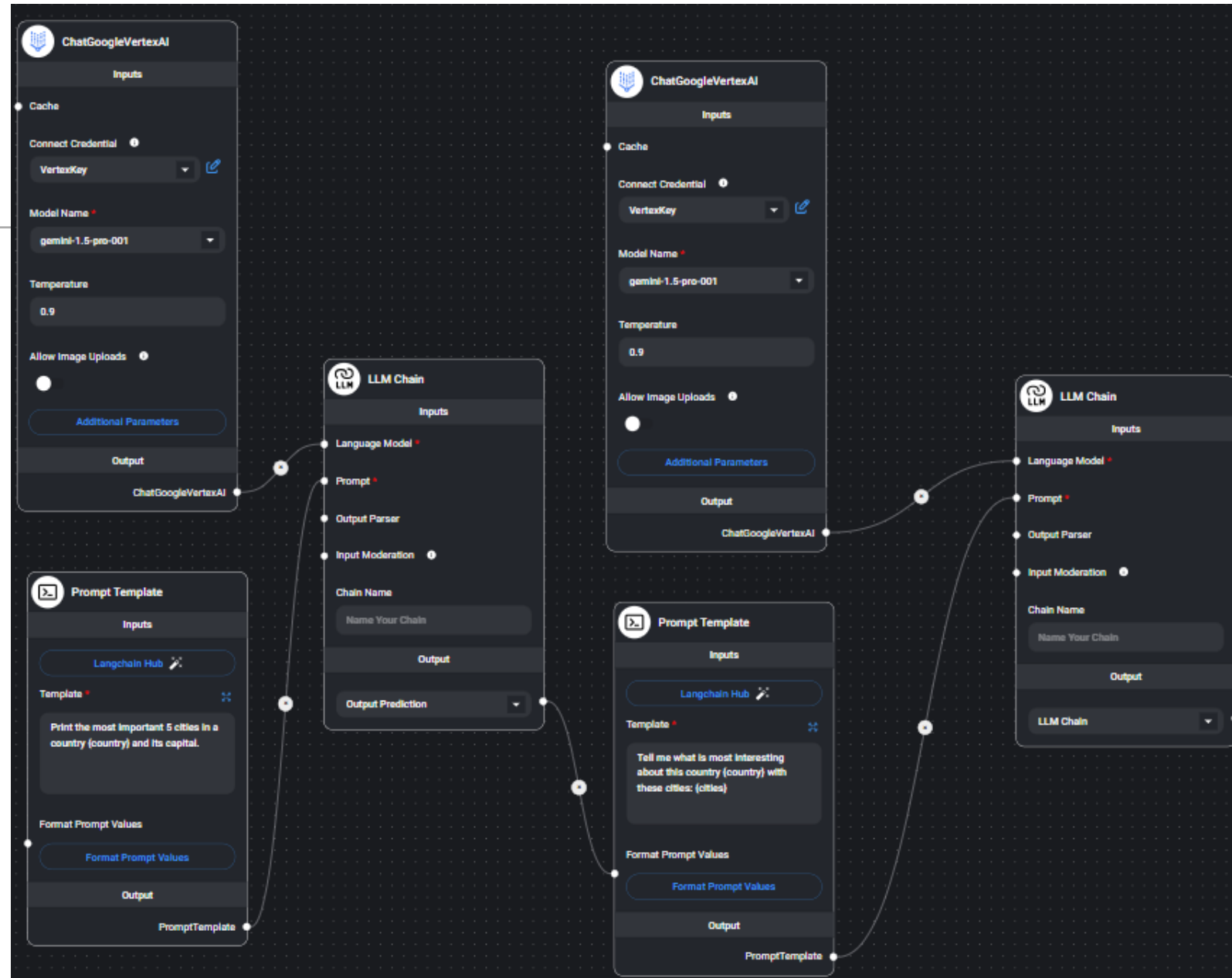
Full Code on [Colab](#)
Note: Upload your notebook to VertexAI

```
{'country': 'France', 'text': 'The capital of France is **Paris**.\n\nHere are 5 other important cities in France:\n\n**Lyon, Marseille, Toulouse, Bordeaux, Nice** \n'}
```

In-class Group Exercise

Work with your peer to build the following LLM Application design.

Use [LangChain documentation](#) as needed.





LangChain Competitors

- LangGraph: used for complex multi-agent applications but doesn't support chains and RAG implementations naturally.
- LlamaIndex: used for RAG but doesn't integrate with external services easily.
- Guidance: used for Llm output control but doesn't support agents, chaining, etc.