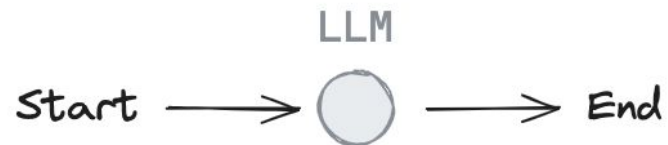


LangChain Academy

Introduction to  LangGraph

A solitary language model is fairly limited...



... e.g., access to tools, external context, multi-step workflows.

So, many LLM applications use a control flow ...



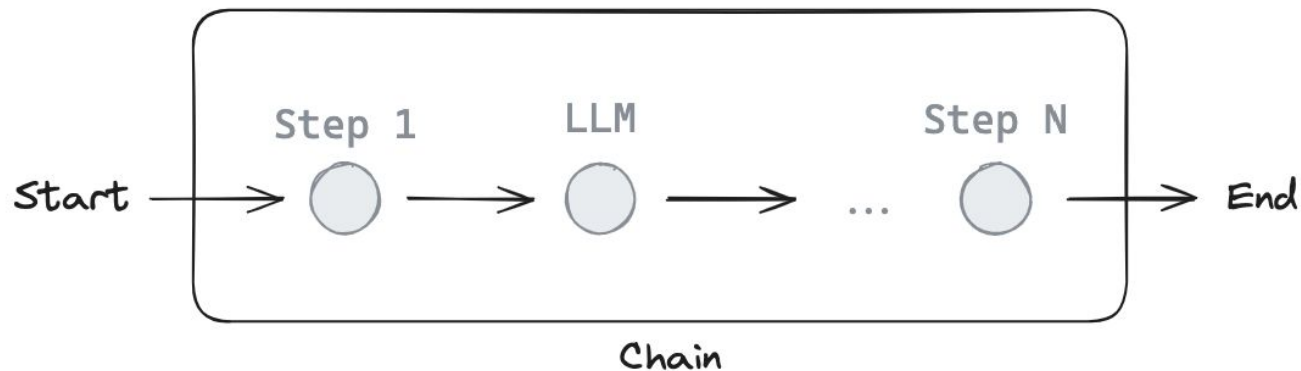
... with steps pre / post-LLM call (tool calls, retrieval, etc).

Reference:

[https://en.wikipedia.org/wiki/Control\\_flow](https://en.wikipedia.org/wiki/Control_flow)

<https://github.com/langchain-ai/rag-from-scratch>

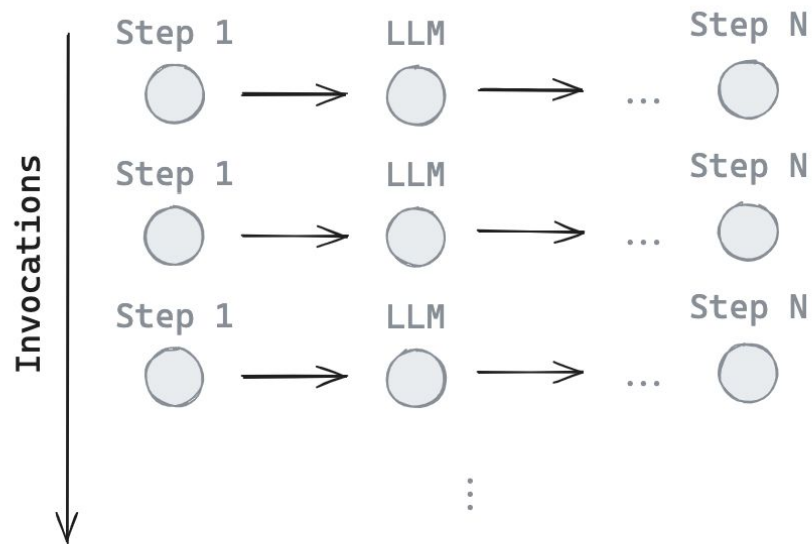
This control flow forms a “chain”



Reference:

[https://en.wikipedia.org/wiki/Control\\_flow](https://en.wikipedia.org/wiki/Control_flow)  
<https://blog.langchain.dev/what-is-an-agent/>

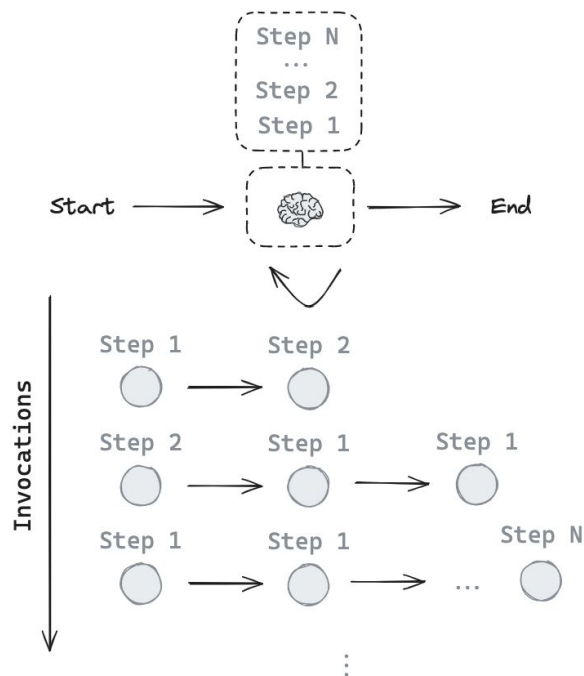
Chains are reliable! Same control flow every time.



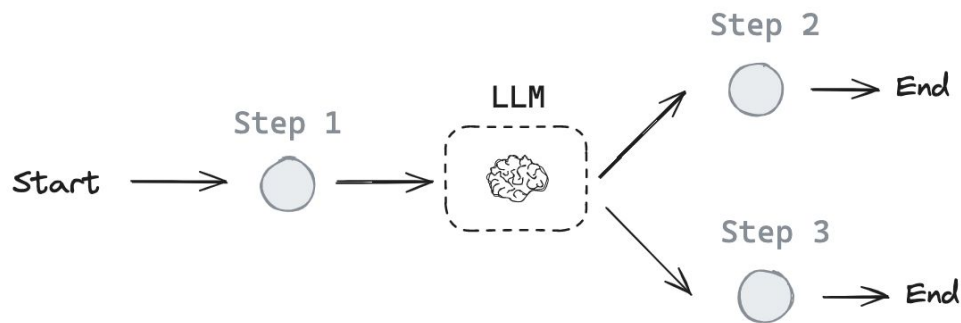
Reference:

[https://en.wikipedia.org/wiki/Control\\_flow](https://en.wikipedia.org/wiki/Control_flow)  
<https://blog.langchain.dev/what-is-an-agent/>

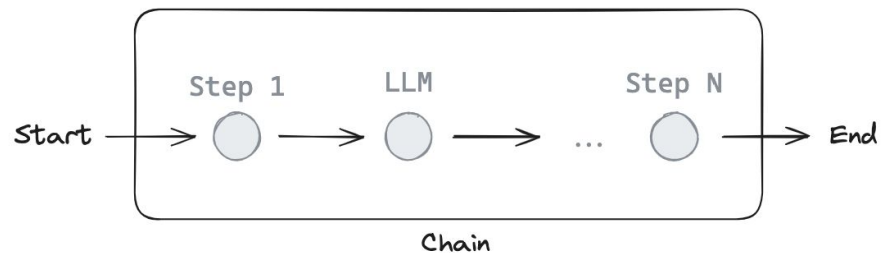
But, we want LLM systems that can pick their own control flow!



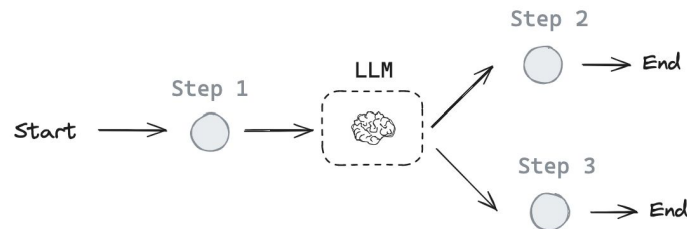
Agent  $\sim$  control flow defined by an LLM



## Fixed vs LLM-defined control flow

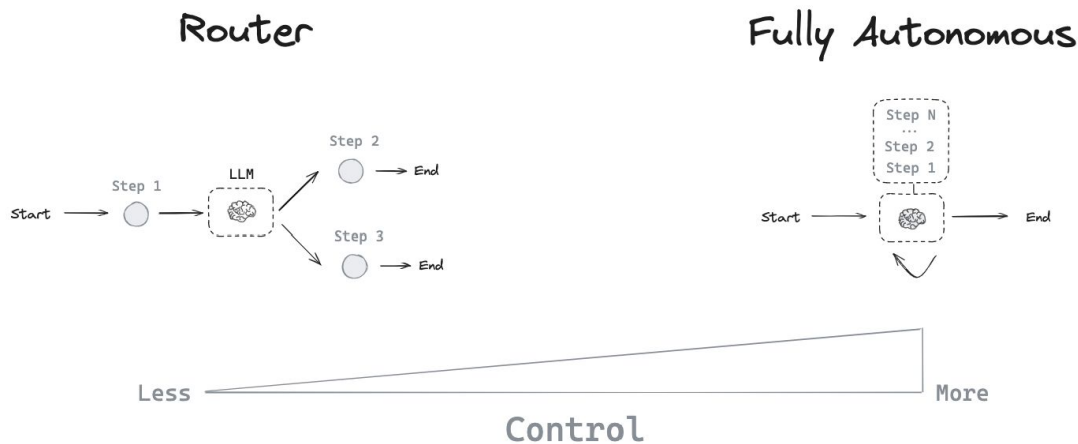


VS





# Many kinds of agents!

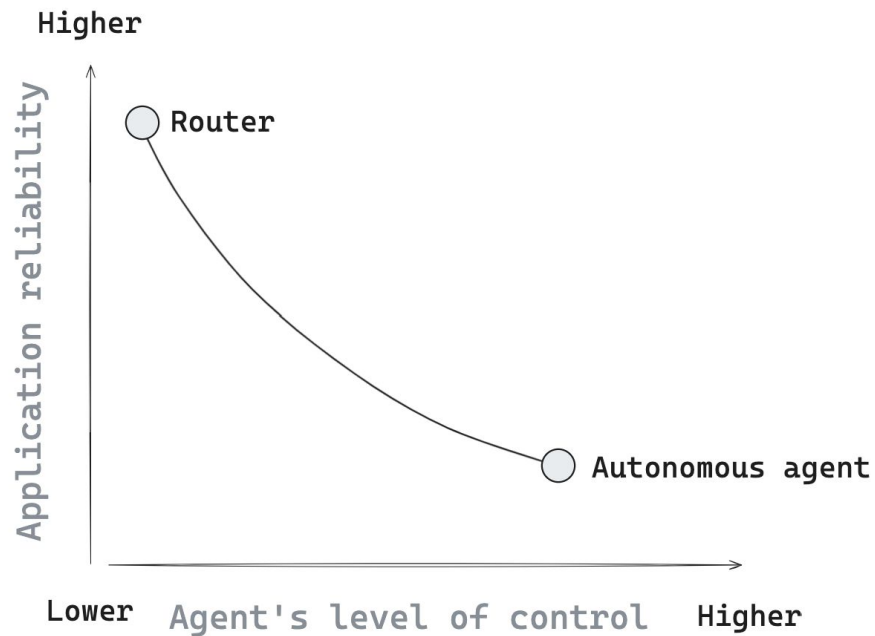


Reference:

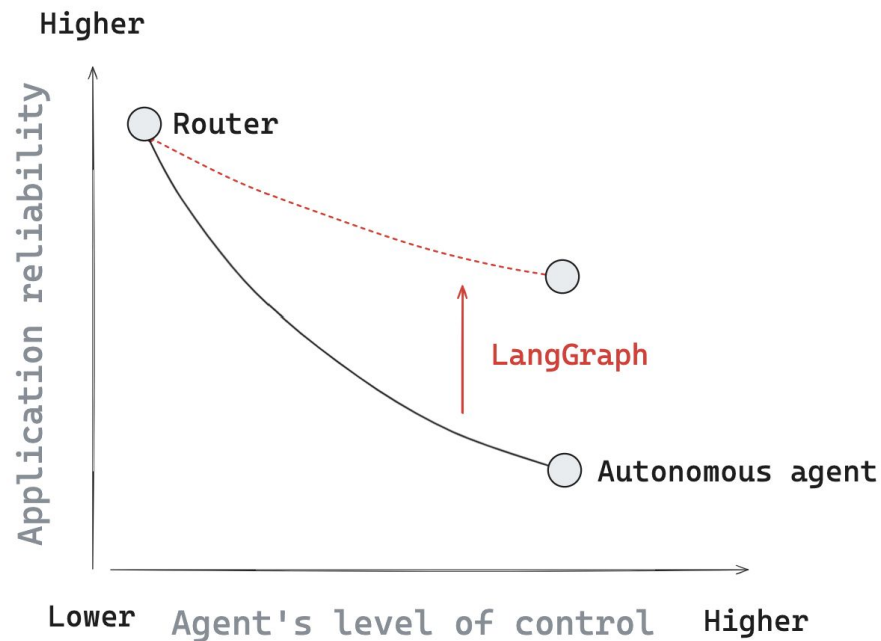
<https://blog.langchain.dev/what-is-a-cognitive-architecture/>

<https://x.com/AndrewYNg/status/1801295202788983136>

But, practical challenges.



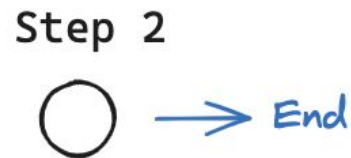
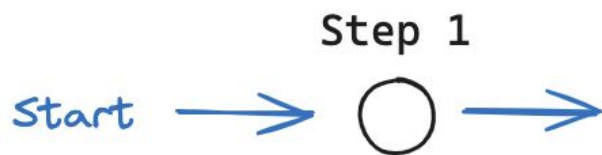
## LangGraph helps you bend the reliability curve



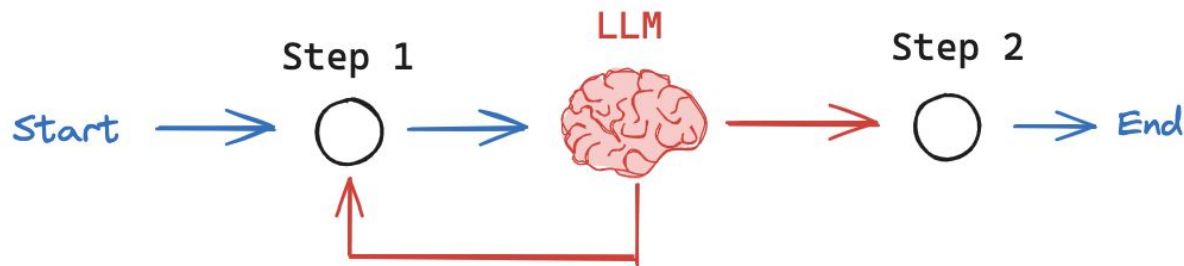


Balance reliability with control

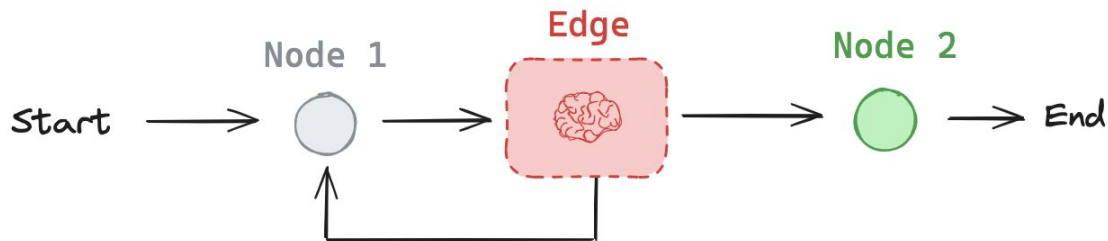
Intuition: Let developer set parts of control flow (reliable)



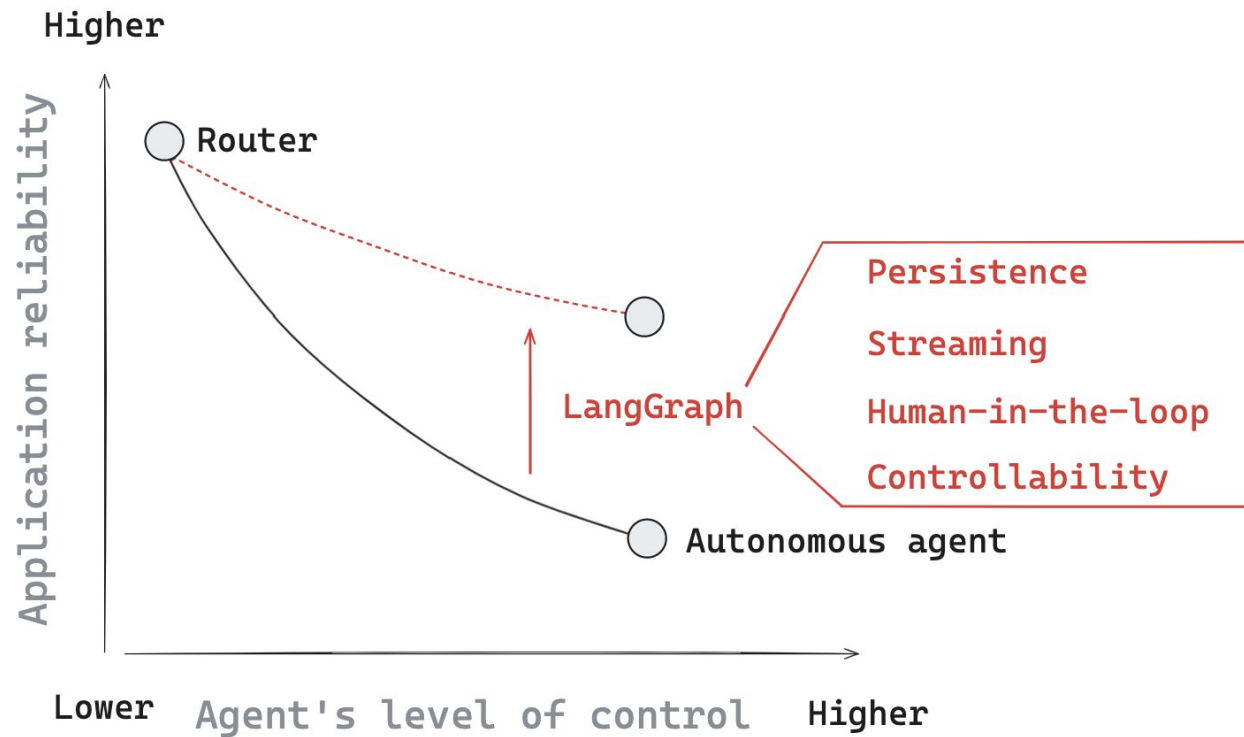
Intuition: Inject LLM to make it an agent (control)



## LangGraph Express custom control flows as graphs

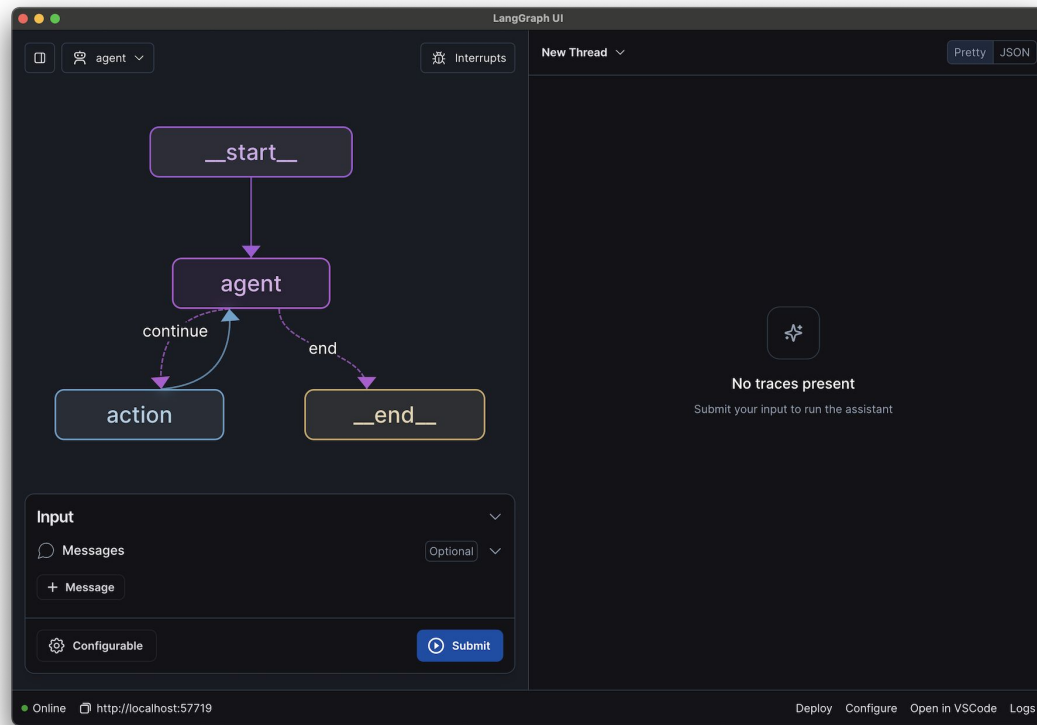


# Pillars





# IDE: LangGraph Studio



# LangGraph LangChain

## LangGraph

Application logic / orchestration



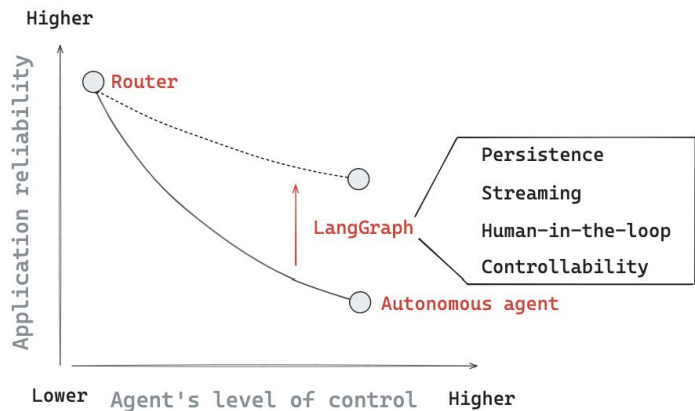
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## LangChain

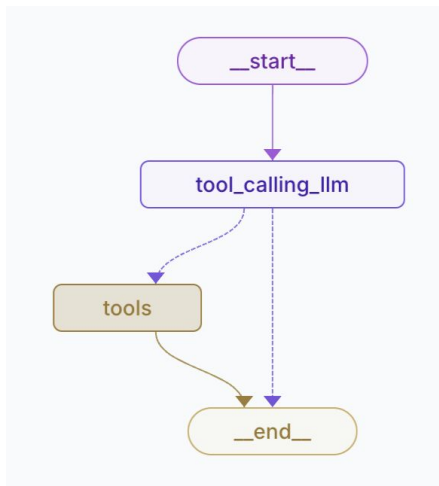
Application components (e.g., integrations)



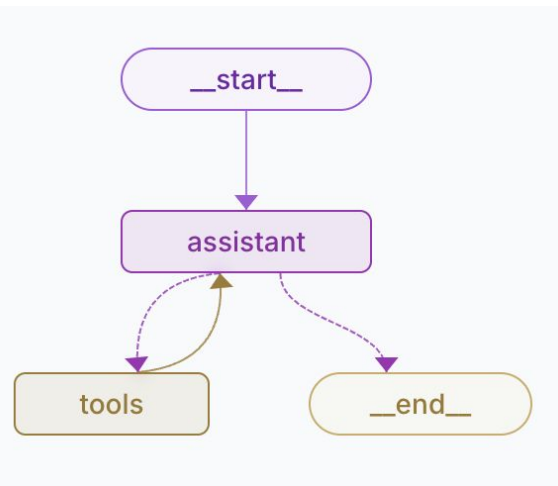
## Module 1: LangGraph Studio, router, agent w/ memory



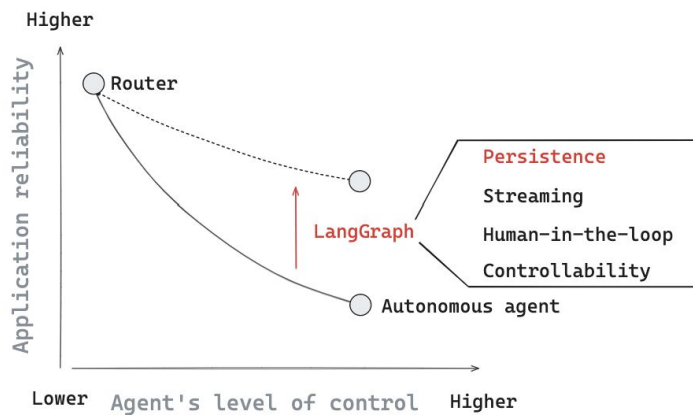
Router



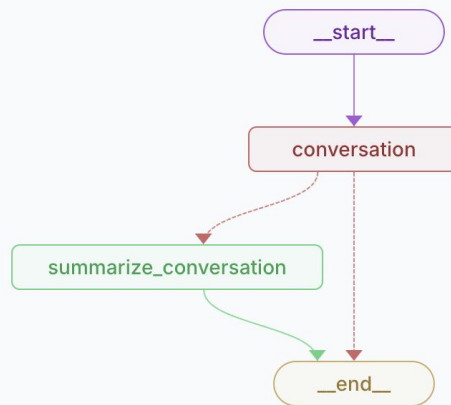
General tool-calling agent



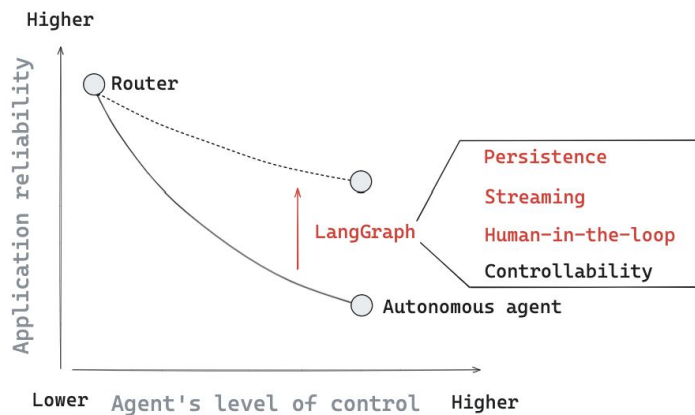
## Module 2: Memory, long-running chatbot



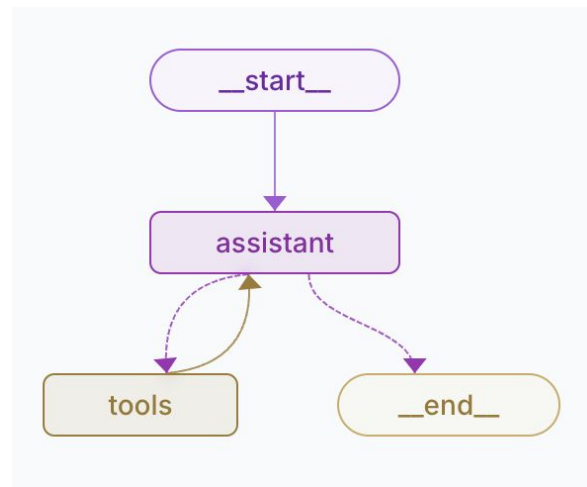
### Chatbot w/ memory



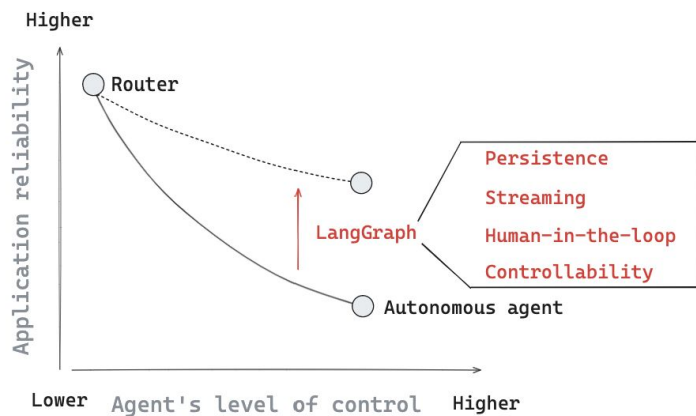
## Module 3: Streaming, human-in-the-loop



Agent w/ human-in-the-loop



## Module 4: Human-in-the-loop, parallelization, customization



### Custom research assistant

