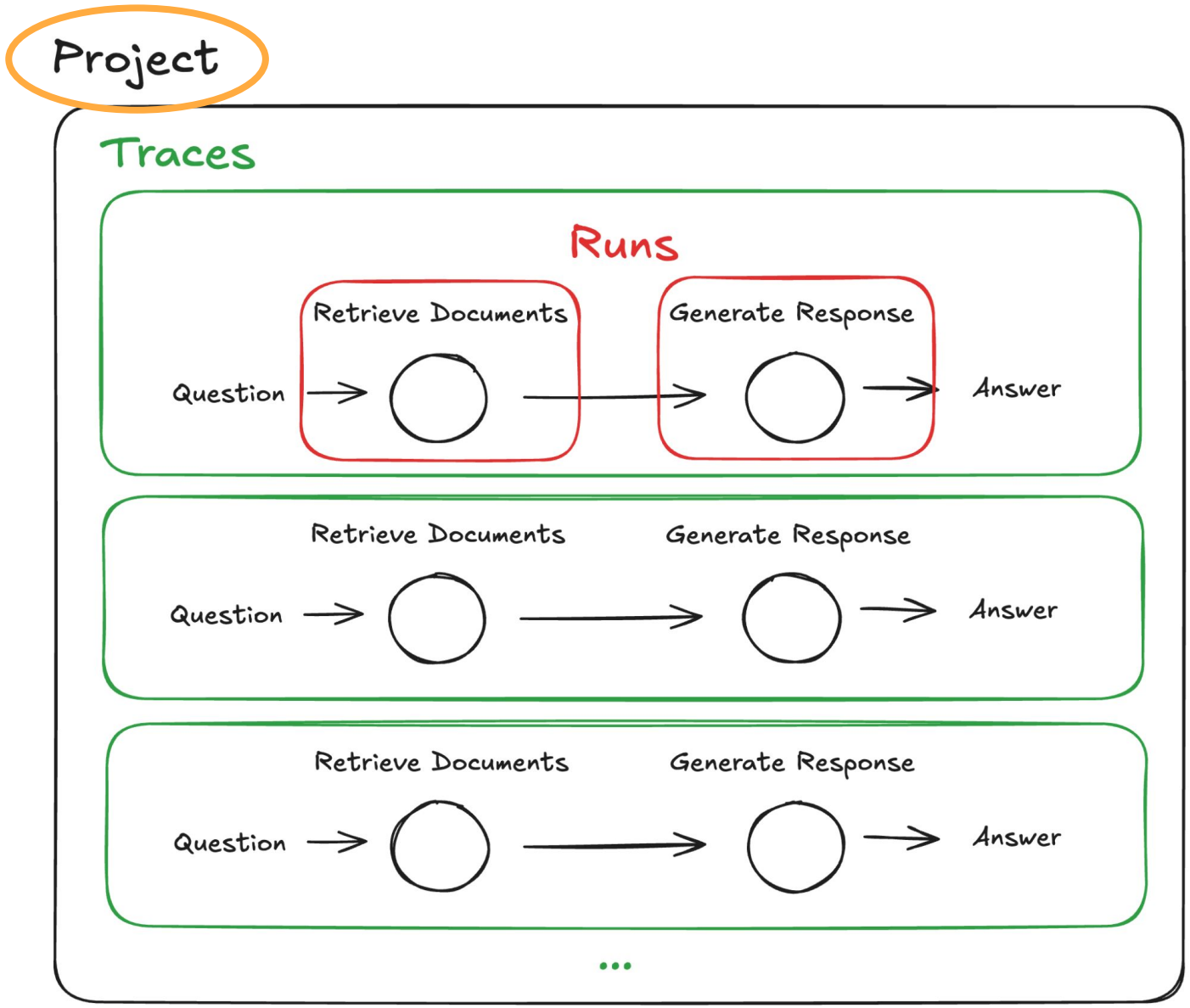
LangChain Academy

Tracing Basics

Tracing Concepts in LangSmith



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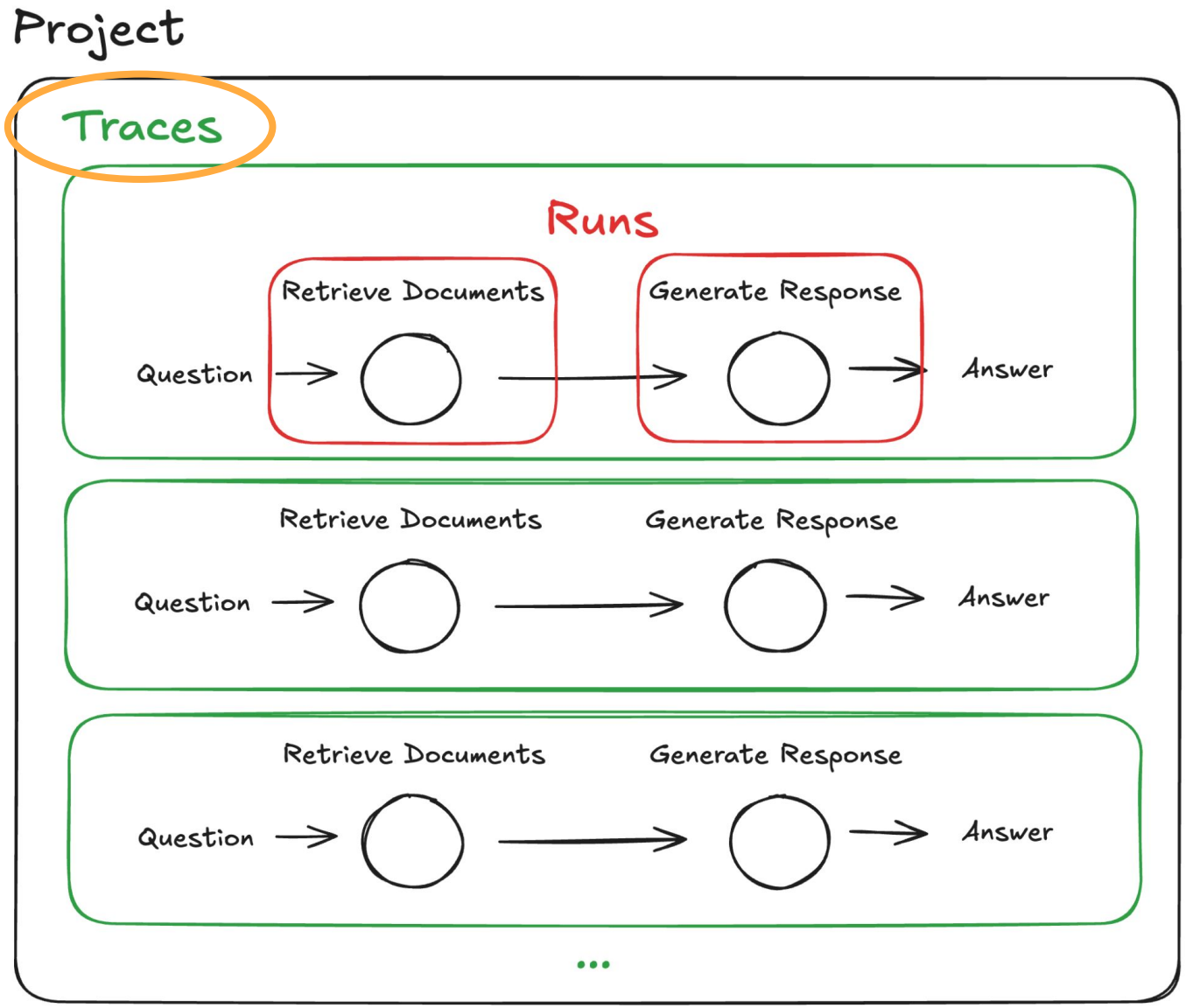

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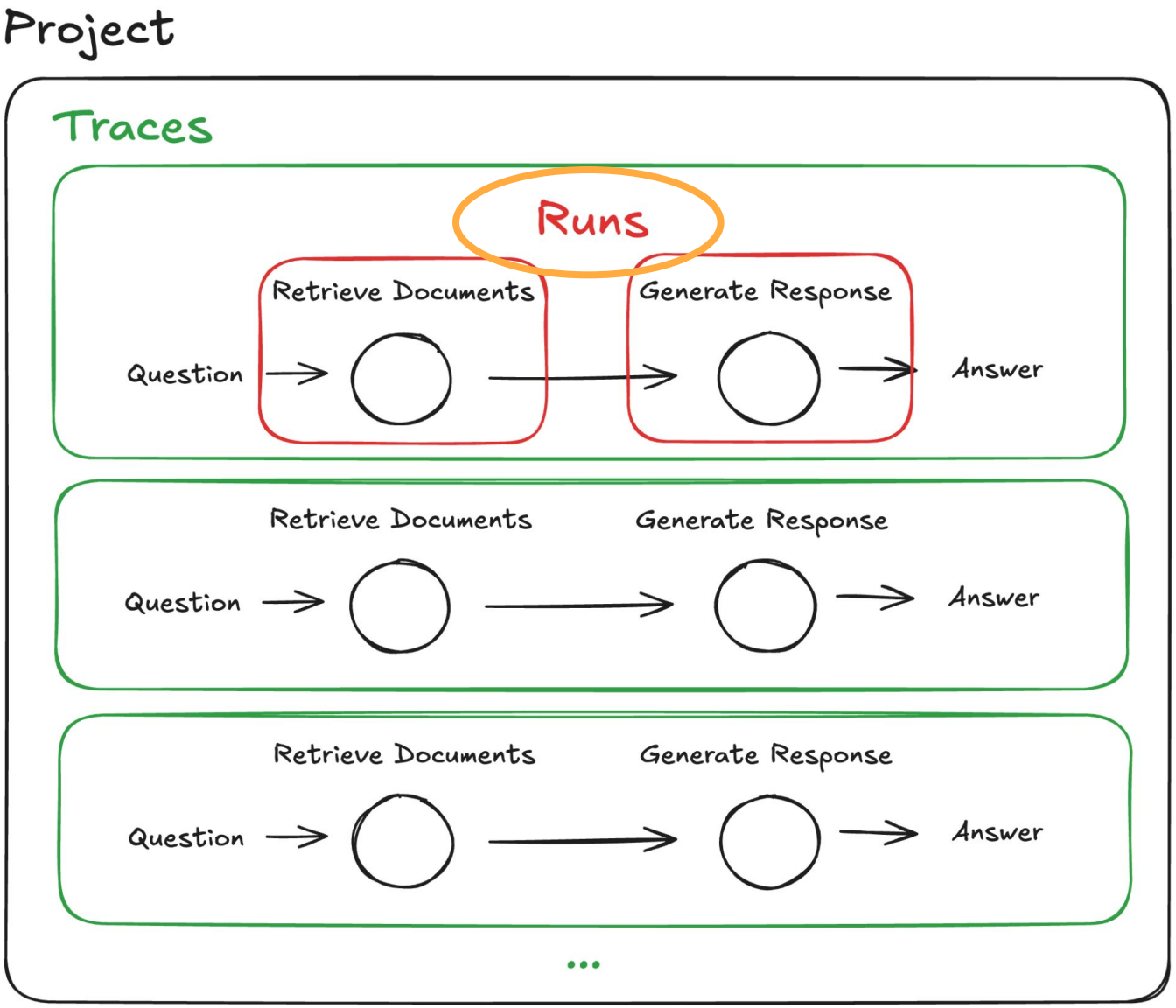

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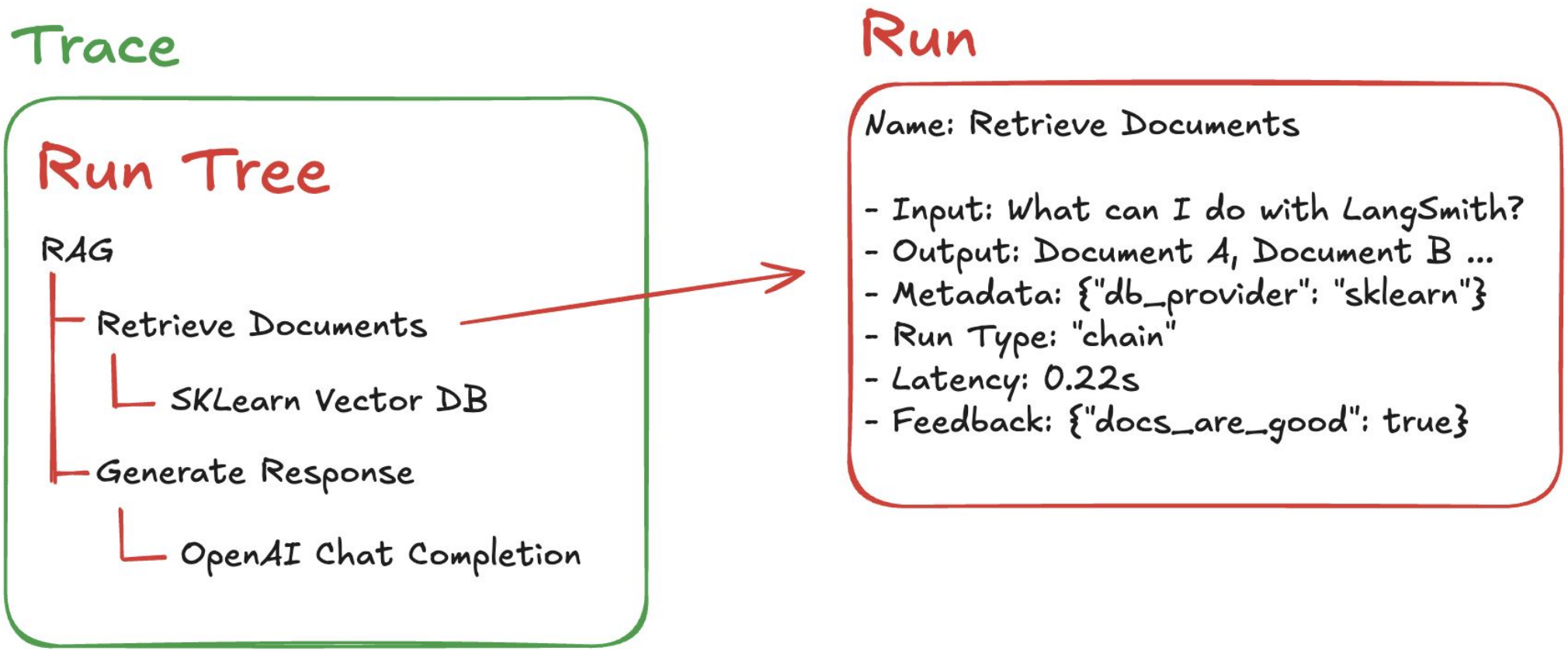

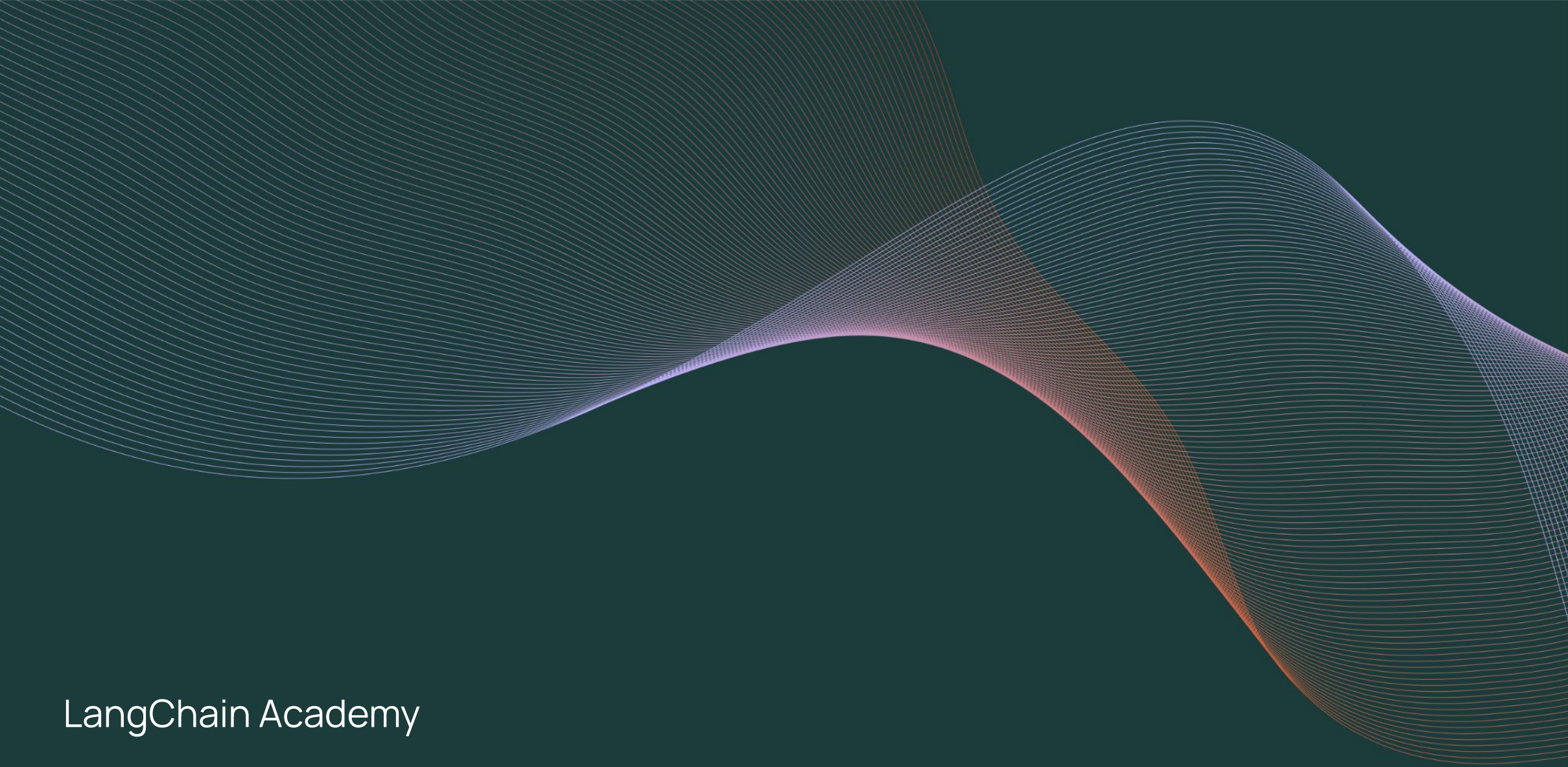
LangChain Academy
Types of Runs

Logs vs. Tracing in LangSmith

```
((), {'supervisor': {'next': 'researcher'}})
----
(('researcher:ee1ffa79-59fc-f3f5-5da0-f2c473080a21',), {'agent': {'me
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----
(('researcher:ee1ffa79-59fc-f3f5-5da0-f2c473080a21',), {'agent': {'me
----
((), {'researcher': {'messages': [HumanMessage(content='The current p
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((), {'supervisor': {'next': 'coder'}})
----
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----
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----
((), {'supervisor': {'next': '__end__'}})
----
```

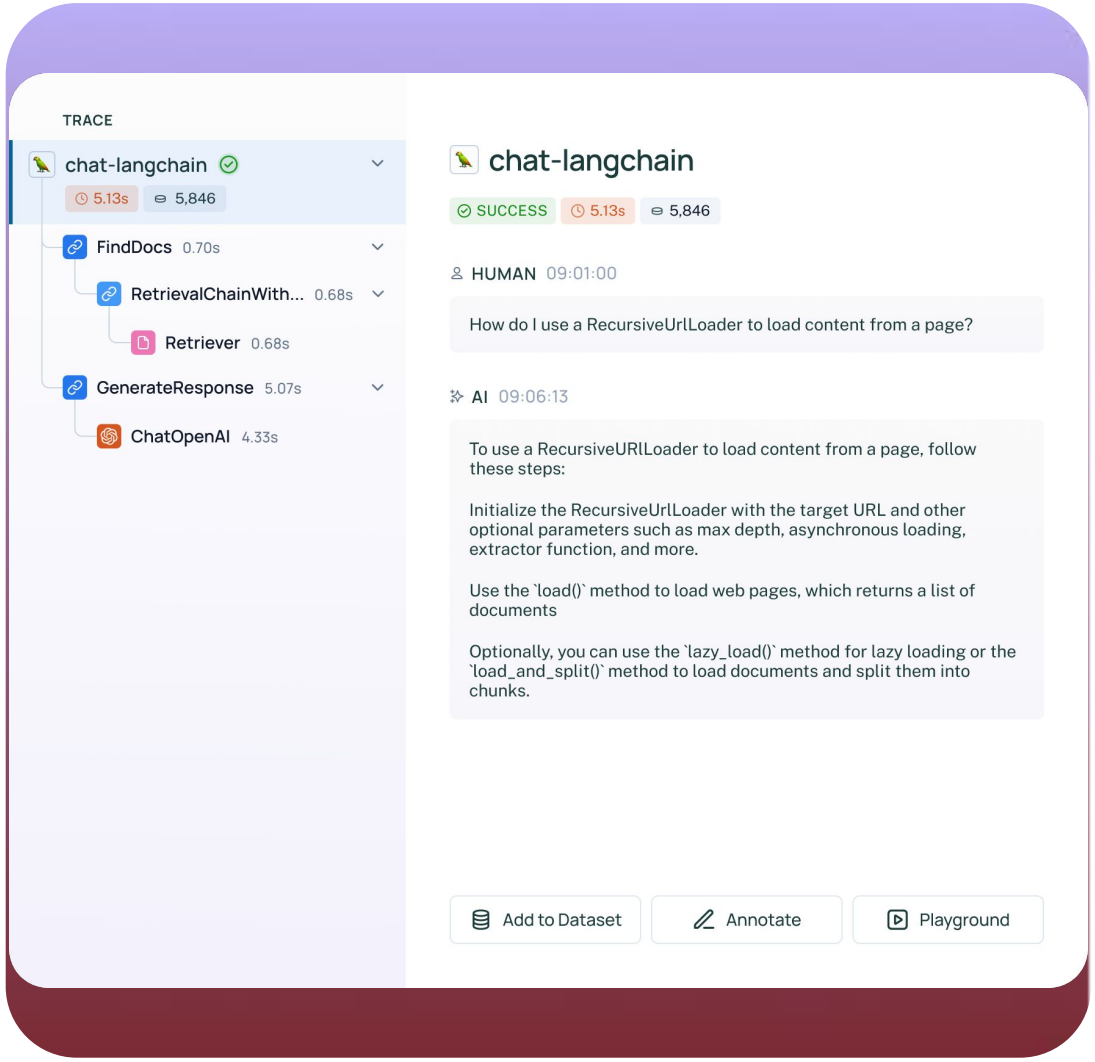

Types of Runs in LangSmith

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- **Prompt:** Hydrates a prompt to be used with an LLM
- **Parser:** Extracts structured data

LangChain Academy

Alternative Ways to Trace

Method	When-to-use
@traceable	- Default way to set up tracing - Manages RunTree, inputs, and outputs for you

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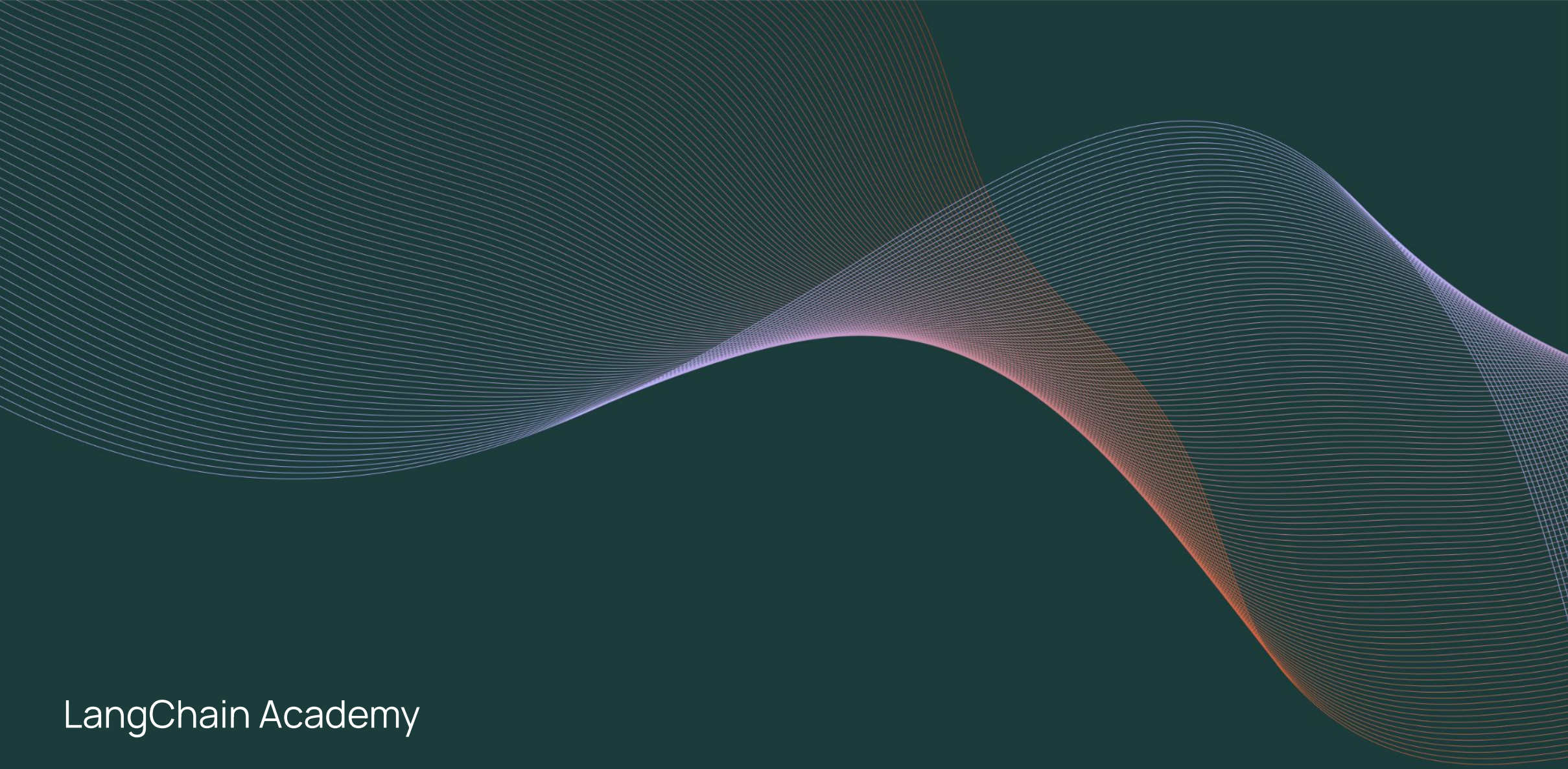
wrap_openai()	- Want to use the OpenAI SDK directly
RunTree	- Want more low level control over tracing configuration - Need to know run_id (for adding user feedback or logging to another service)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Conversational Threads

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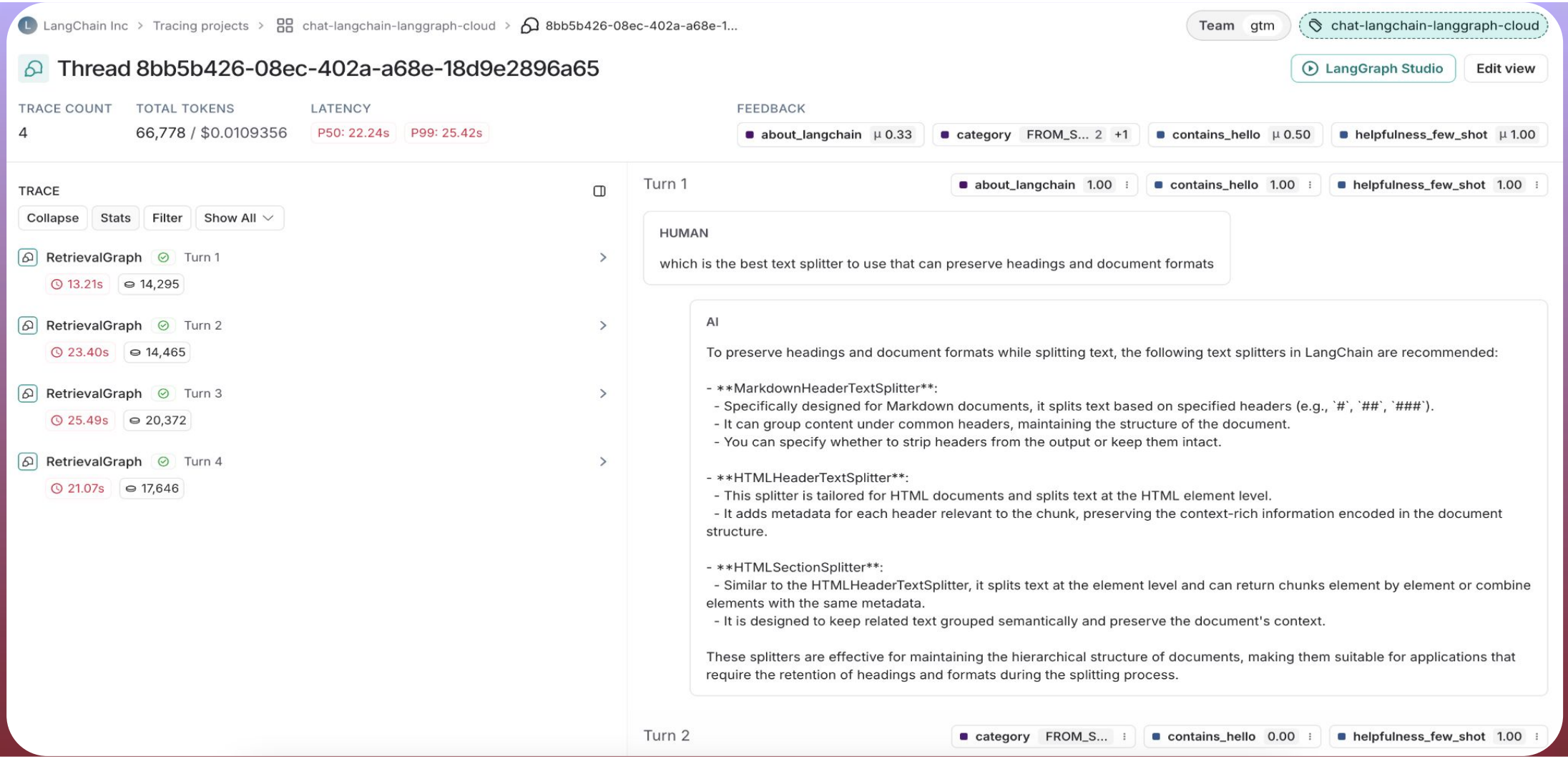
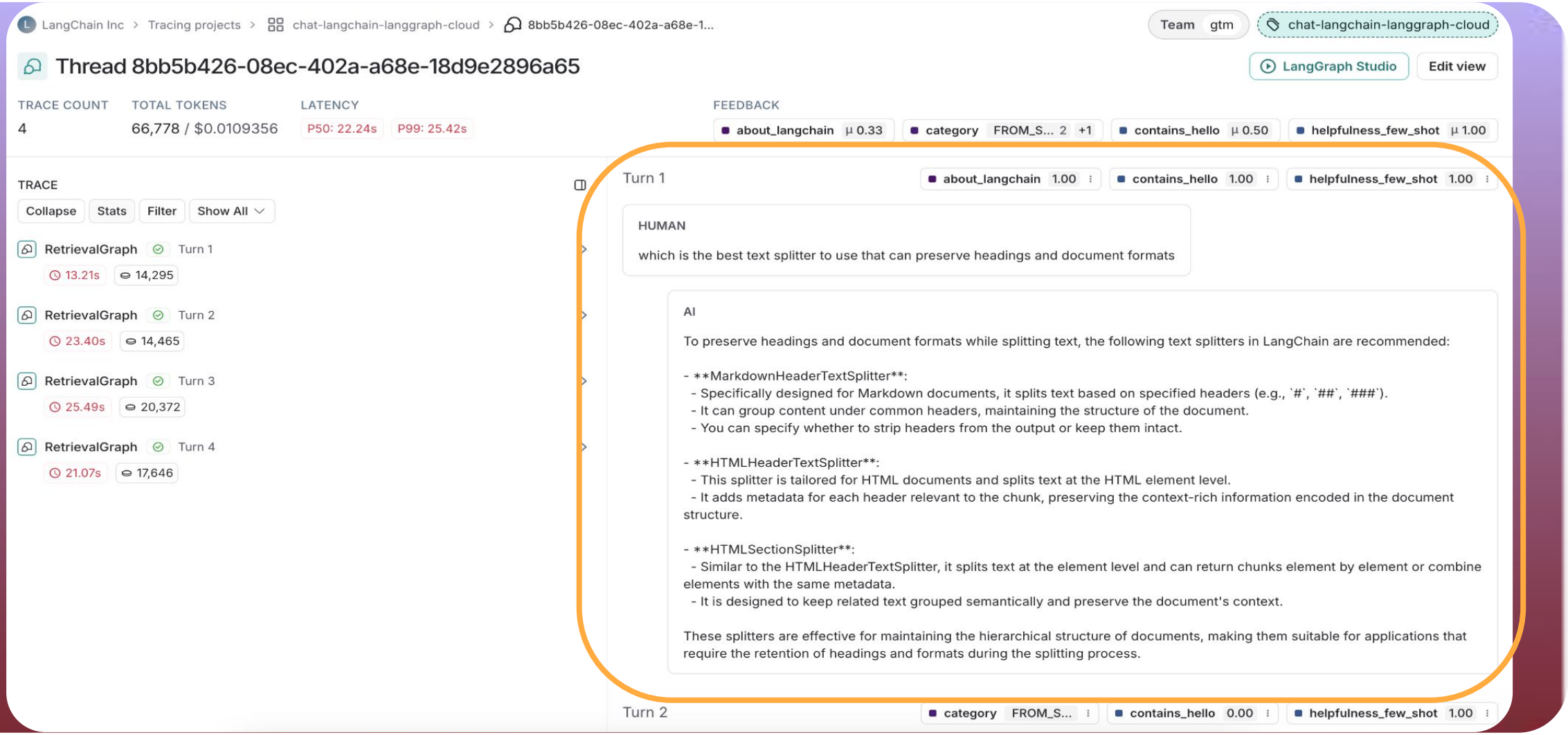
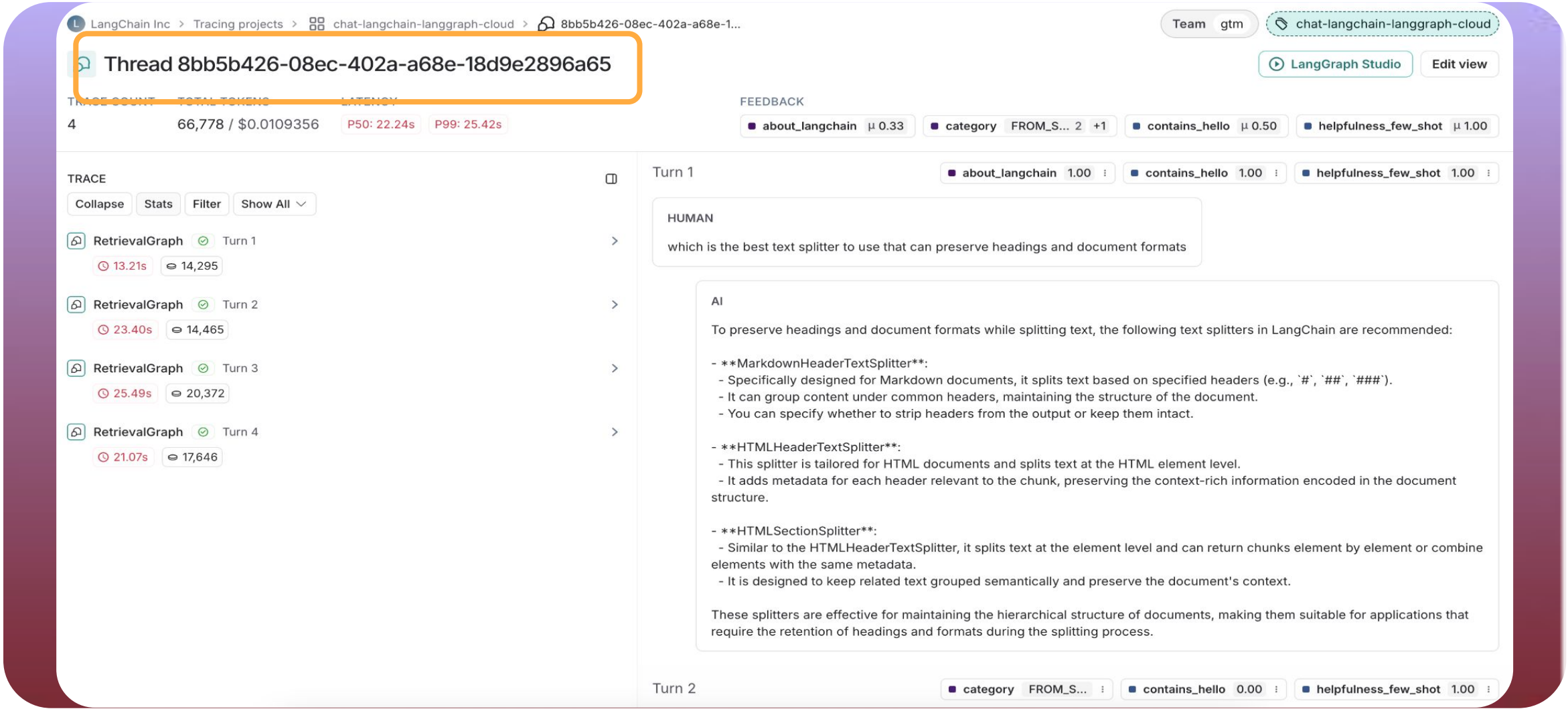
Thread in LangSmith



Thread in LangSmith



Thread in LangSmith



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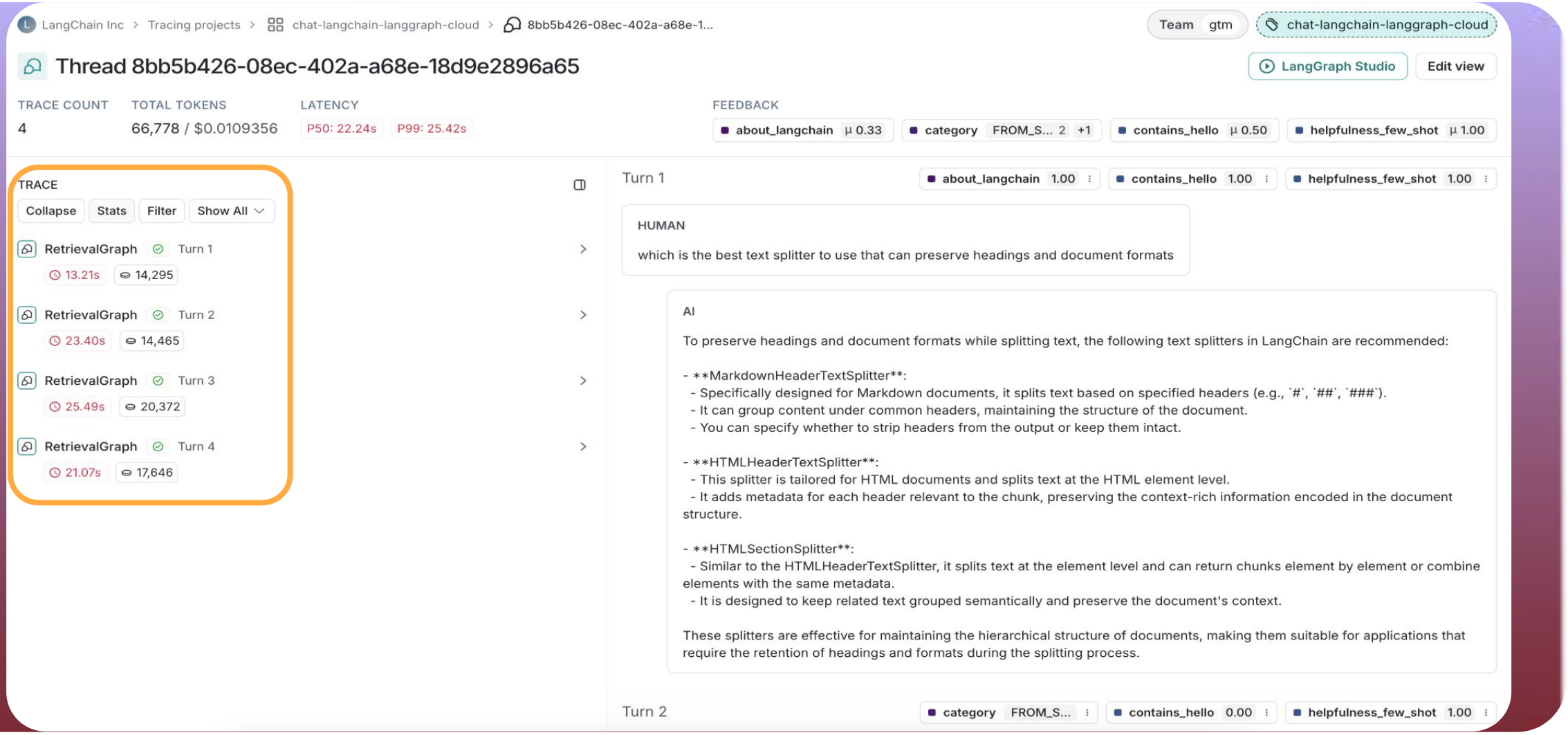
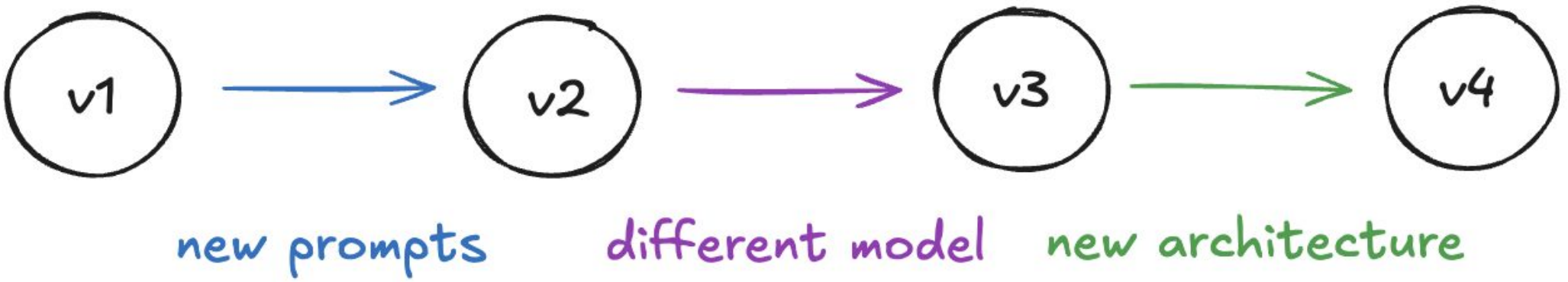


LangChain Academy

Datasets

Datasets

How do we know that our application is getting better, not worse, over time?



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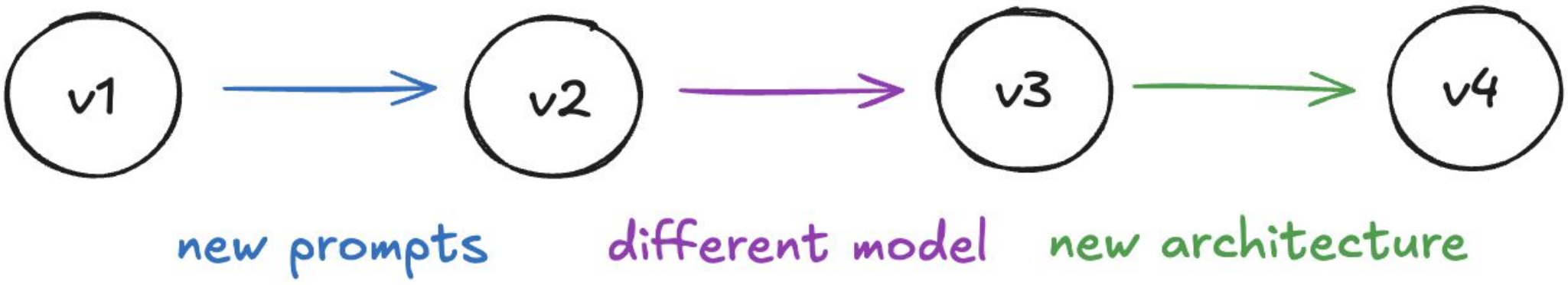
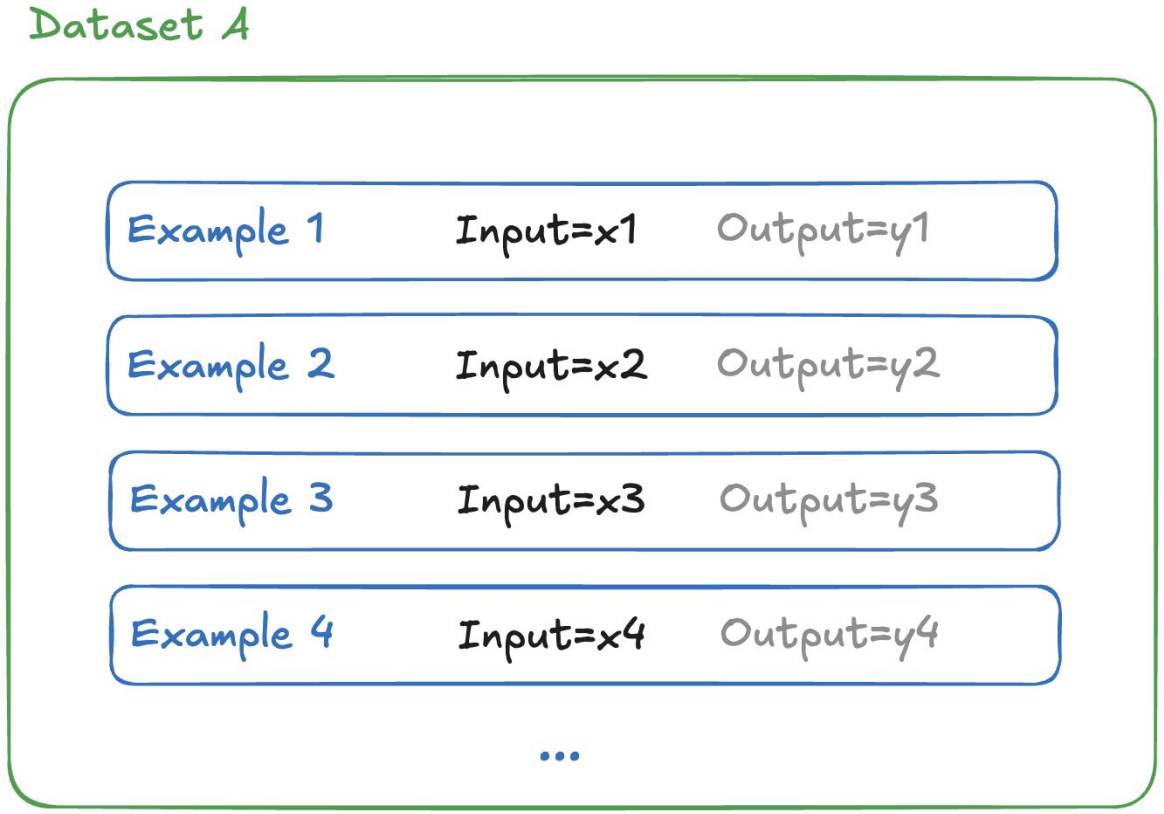


We need to do more than run a few “gut check” tests

Datasets

In order to test and evaluate our application, we need **datasets**



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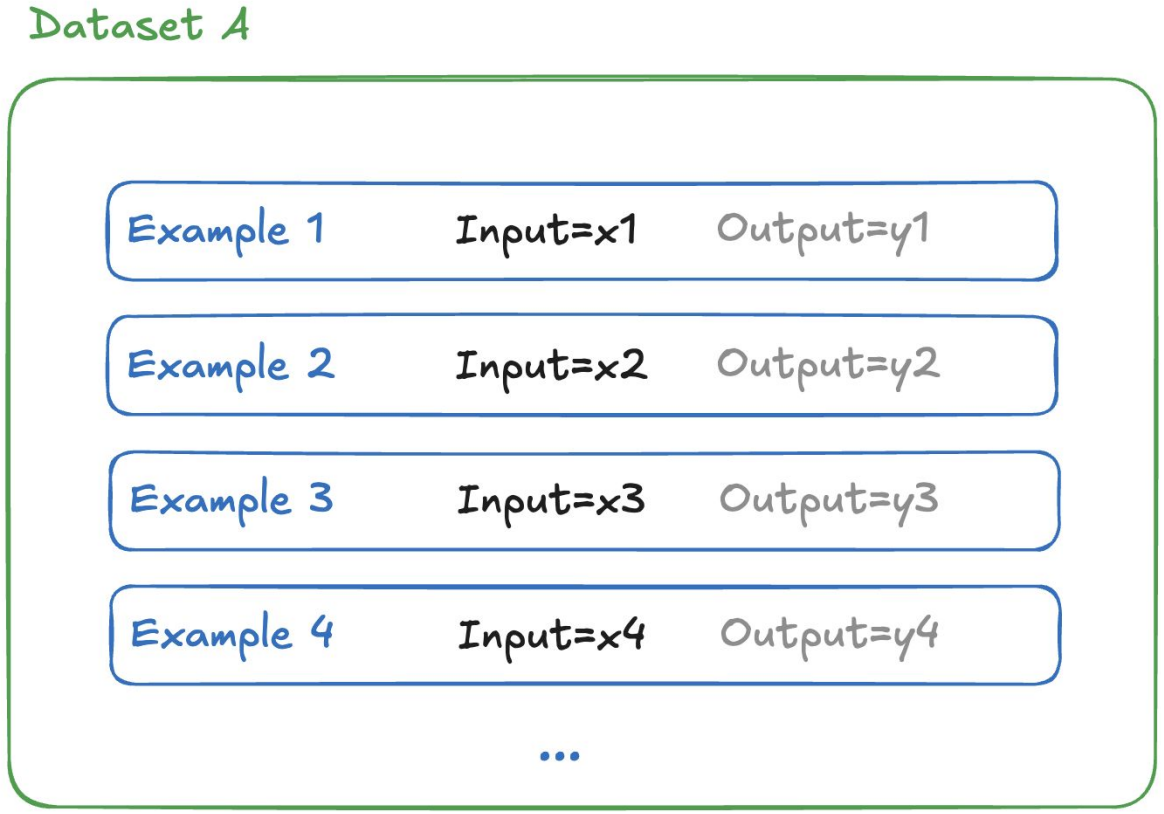

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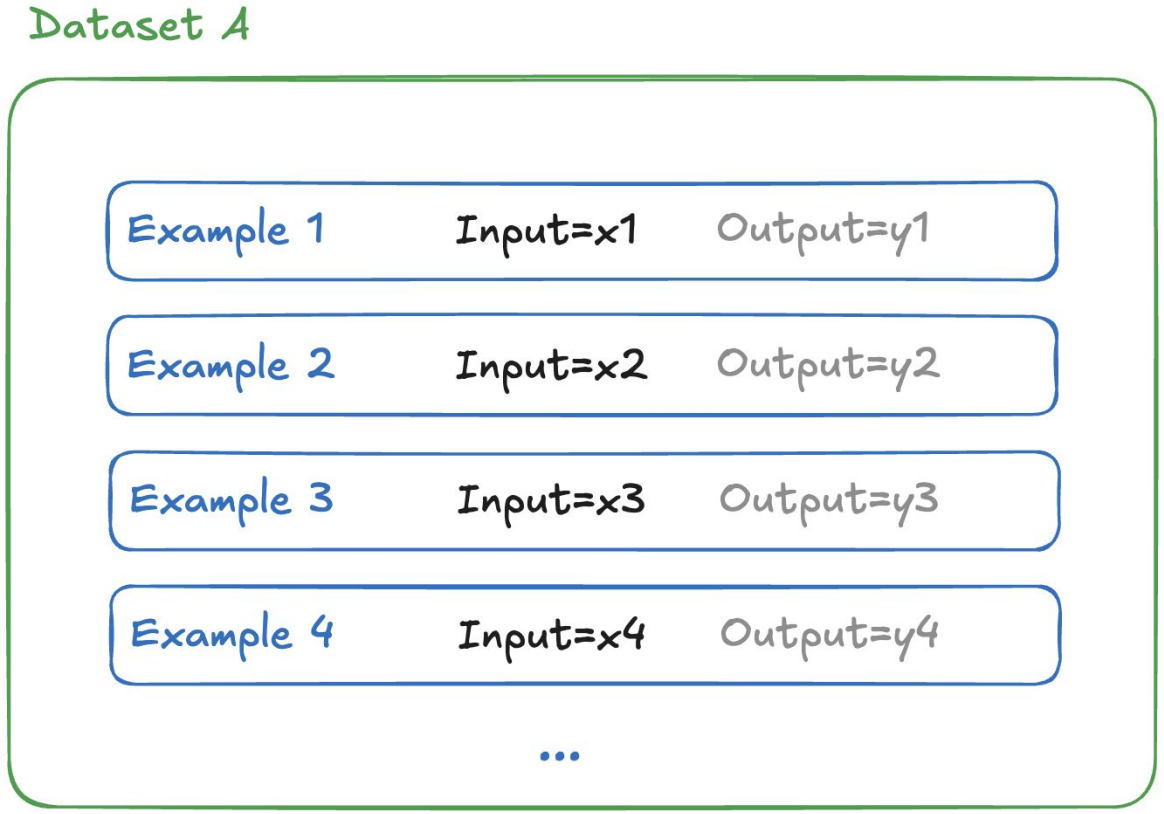

Datasets are fundamentally a **list of examples**

Examples contain an **input**, and an optional **output**

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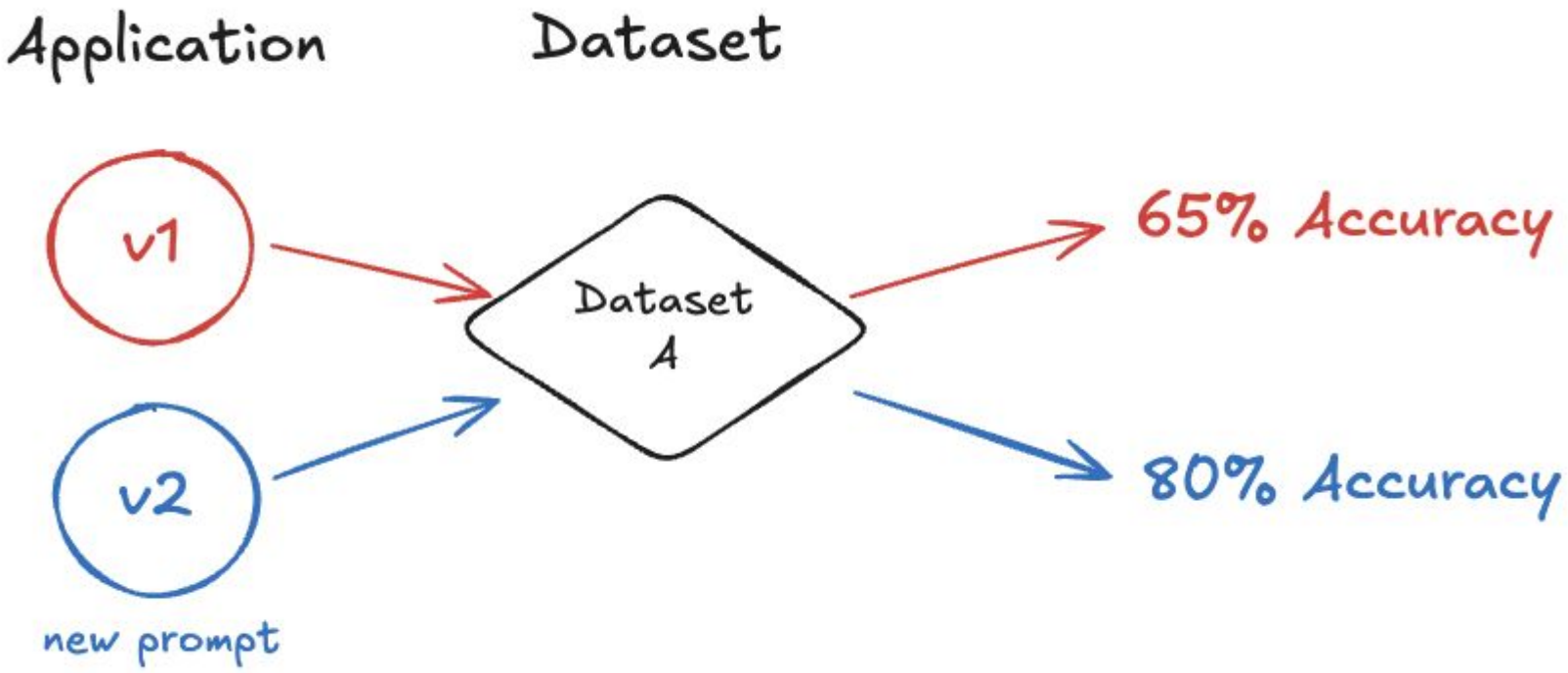
Evaluators

Evaluators

How do we measure performance against our datasets?



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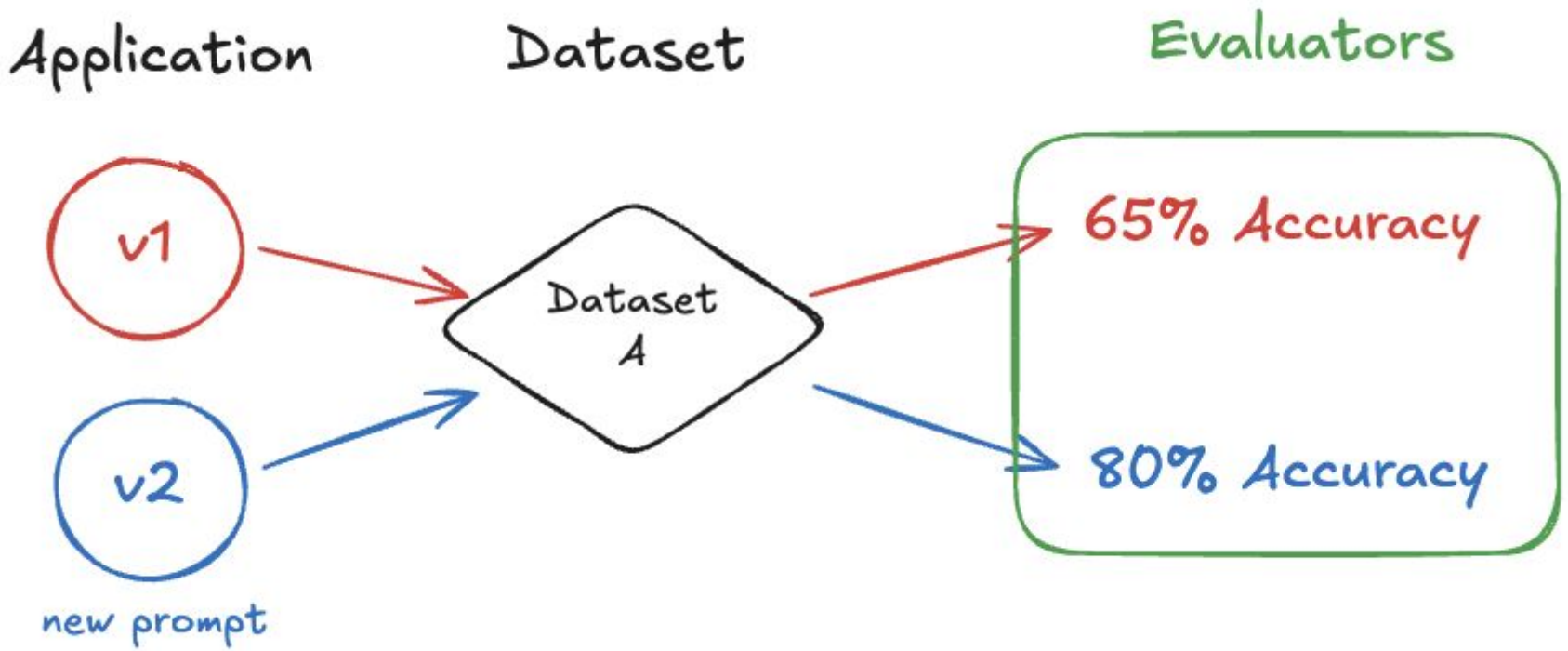
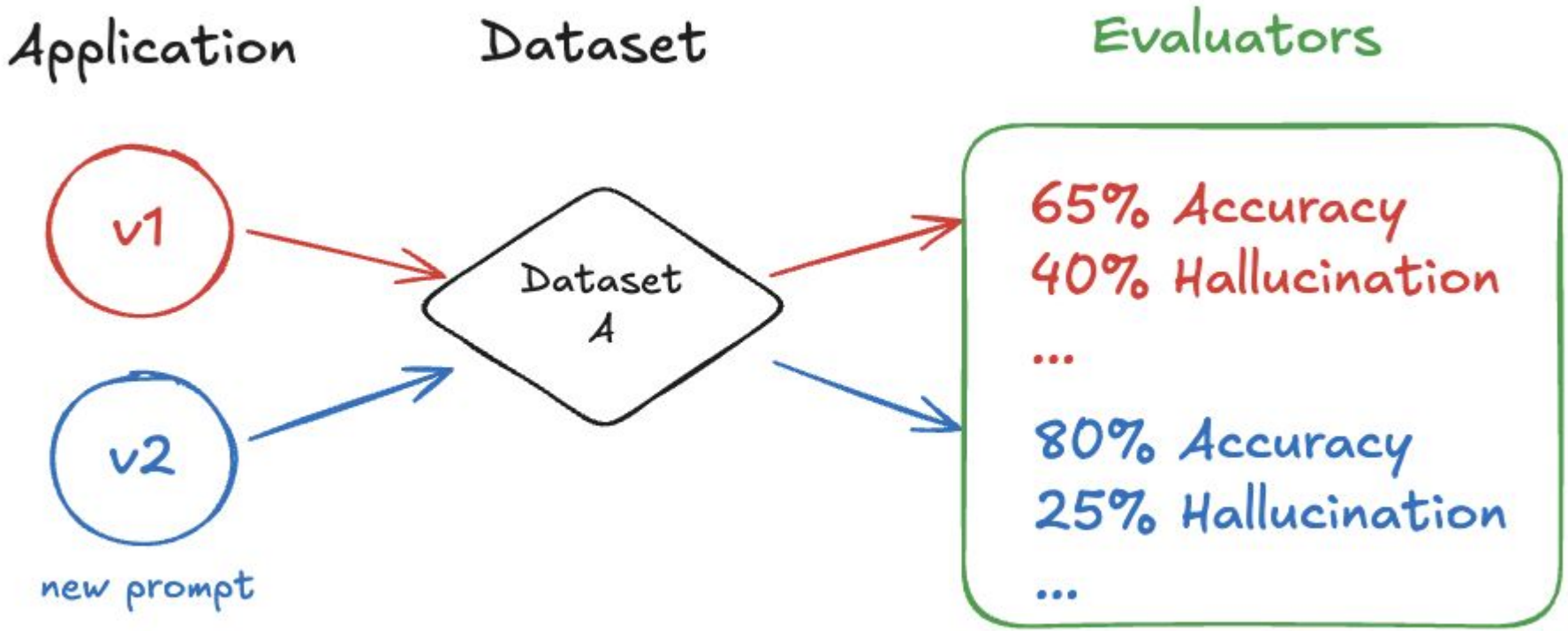


Evaluators

You can define evaluators for multiple metrics (ex. accuracy, hallucination)



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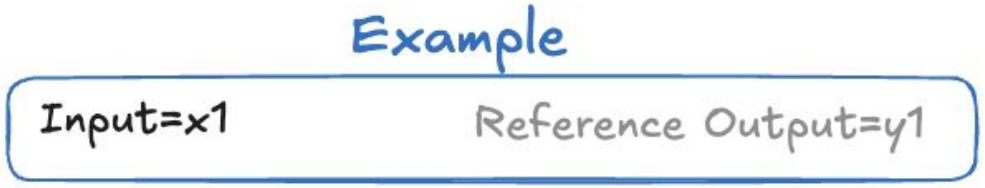
Evaluators compare the dataset **example** against the output **run** from your app



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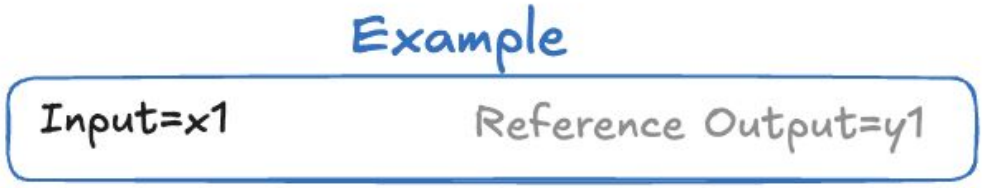

Evaluators

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- From a Trace
- Manually Added
- AI Generated
- etc.

Evaluators

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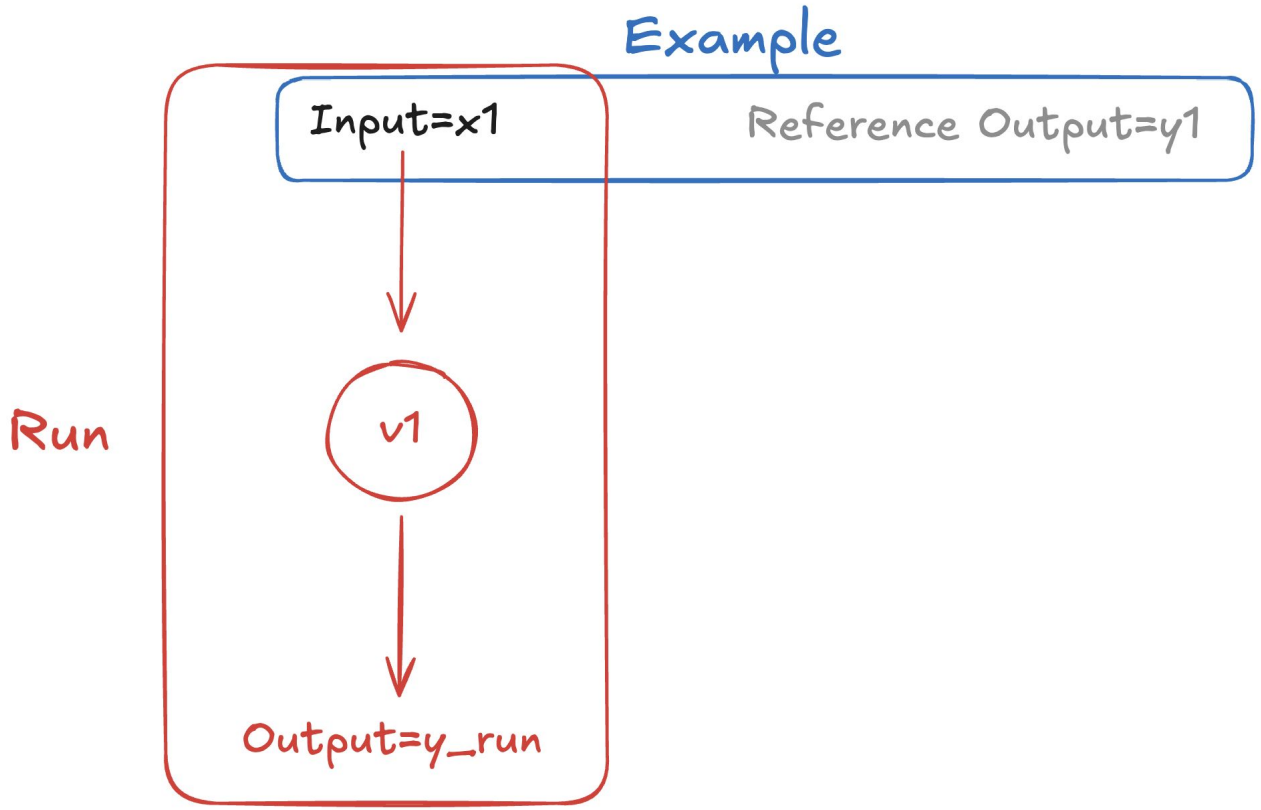

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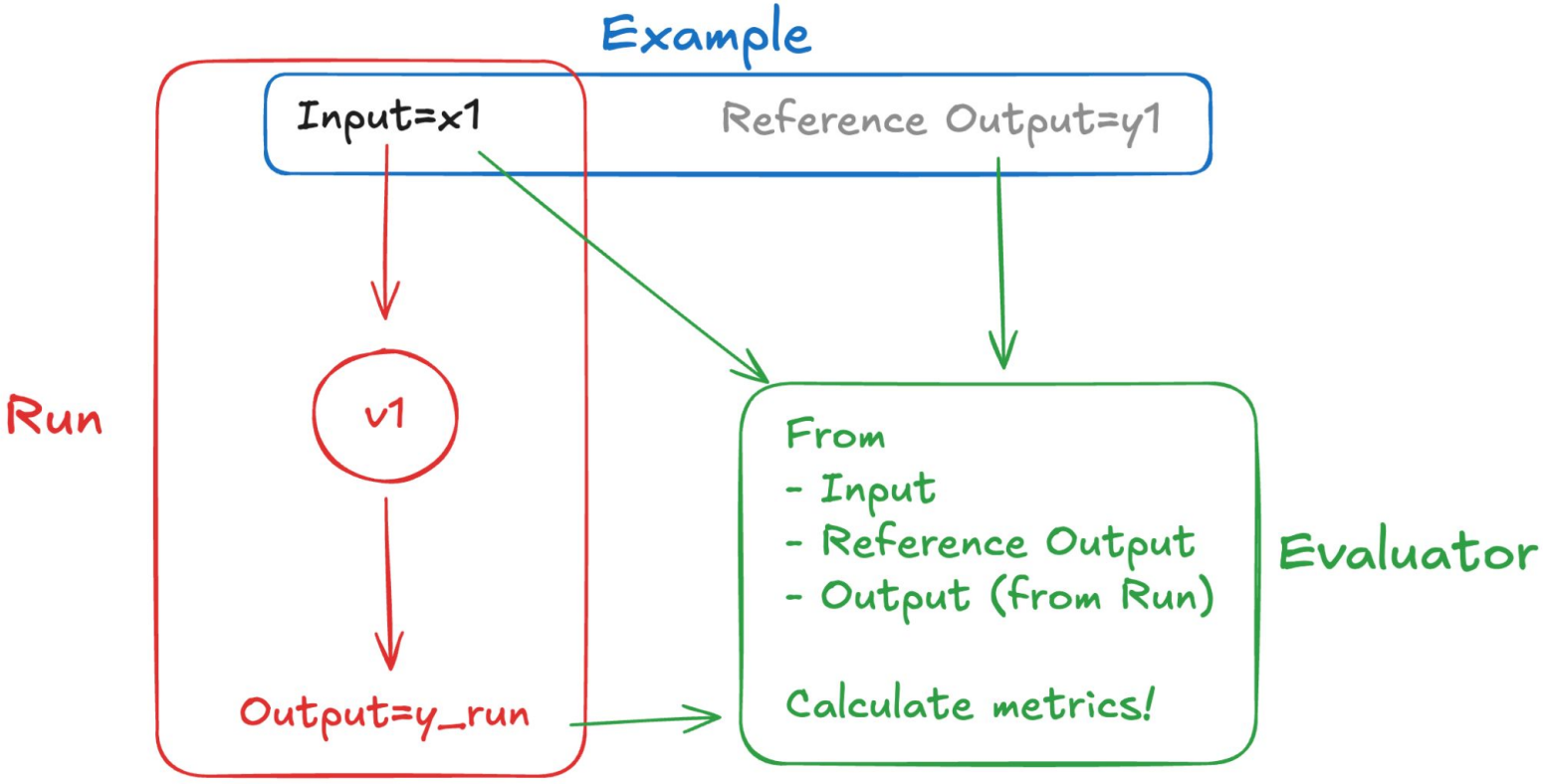

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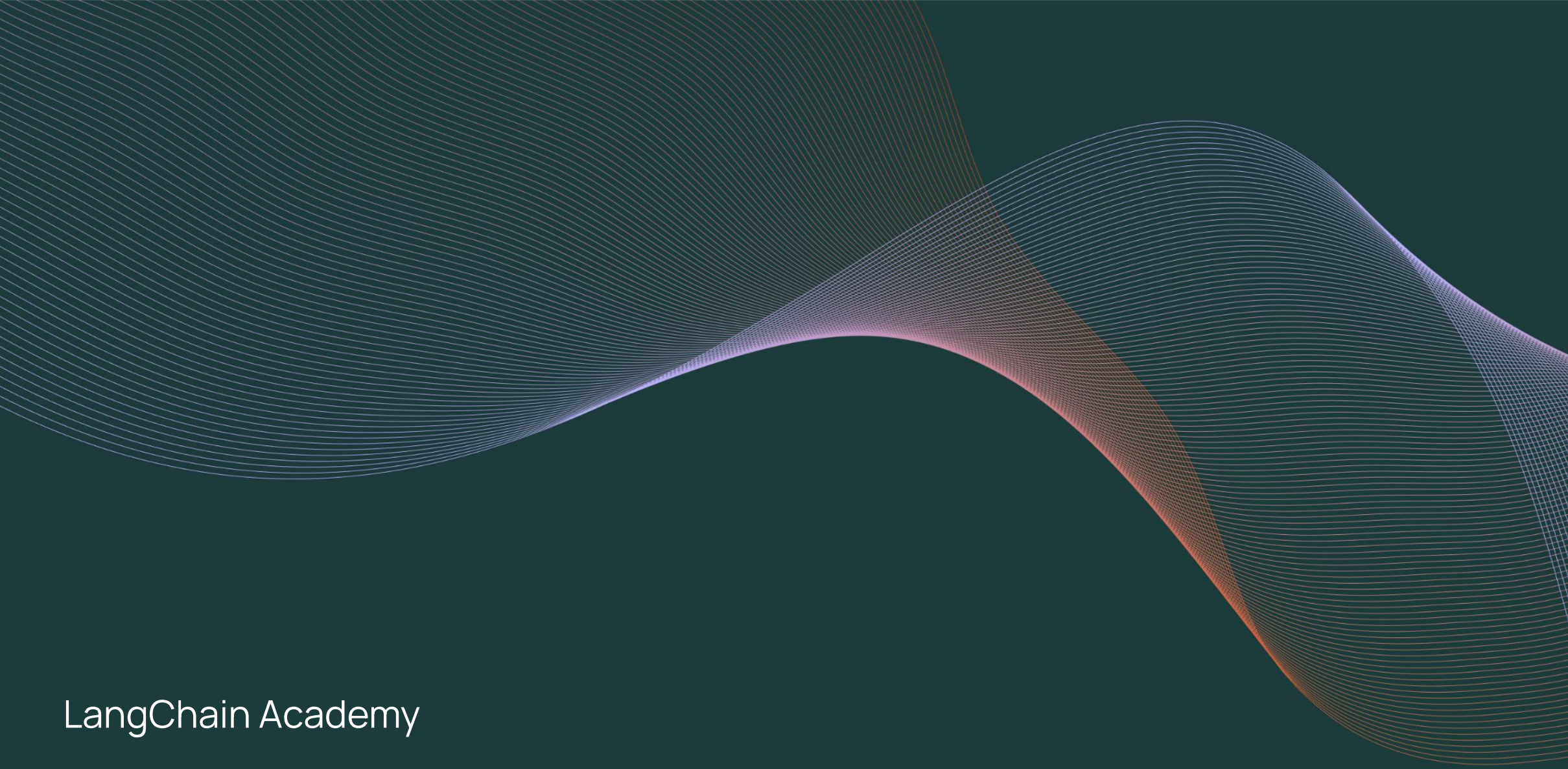
- You can define Evaluators directly in your local code
- You can ALSO define Evaluators in the LangSmith UI
  - LLM-as-judge evaluators
  - Custom code evaluators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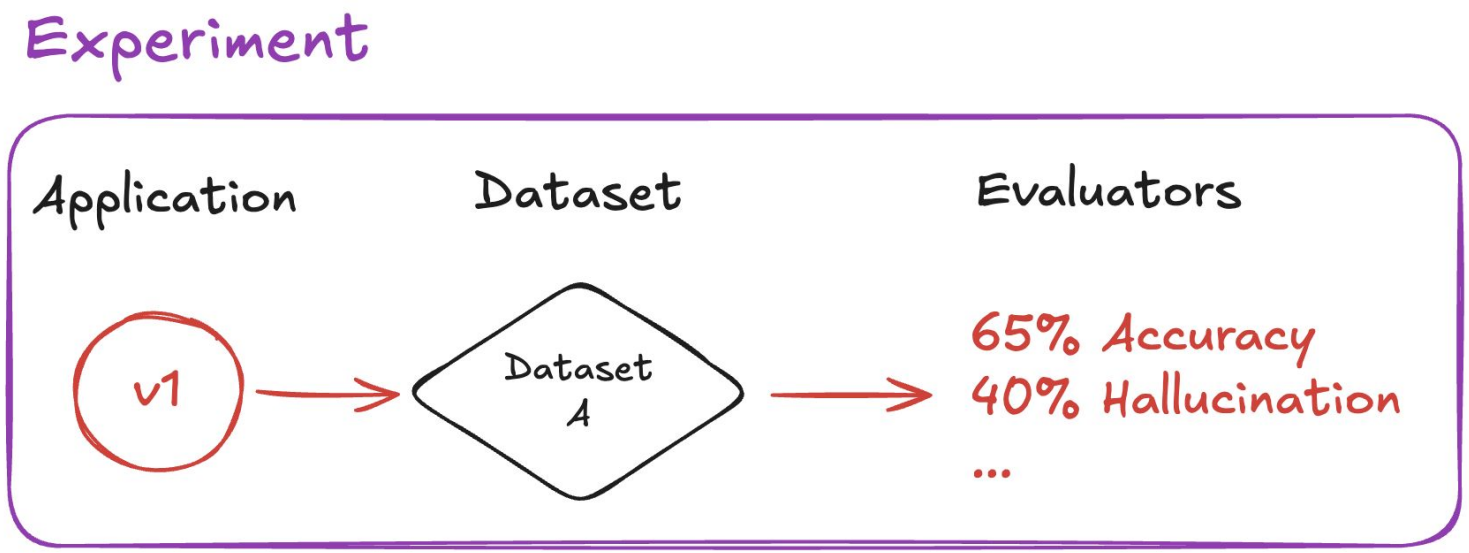
Experiments

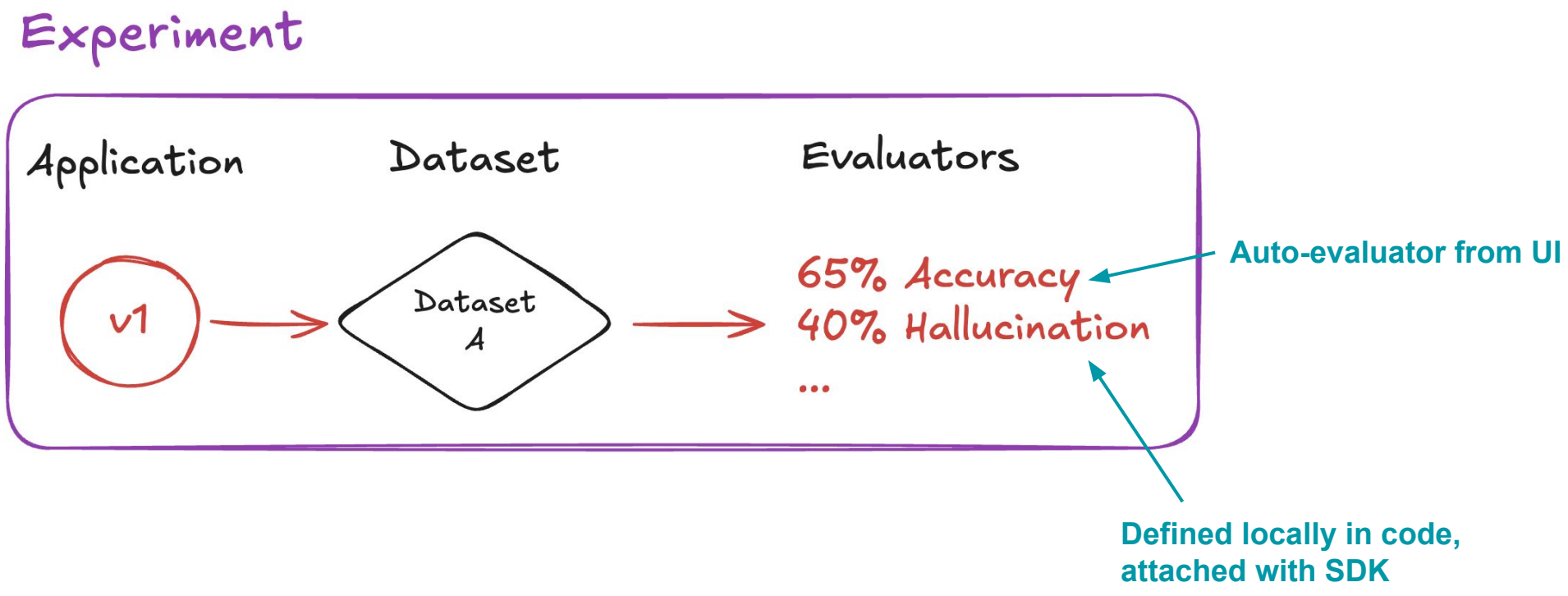
Experiments

Experiment: Running your **application** over a **dataset**, and **evaluating** performance



Experiments

You can attach **evaluators** to your **experiment** in the UI, or locally with the SDK



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  - Specific examples

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- Experiments can be run using the LangSmith SDK with **evaluate()**
- Experiments can be run over an entire dataset OR
  - A specific version
  - A split
  - Specific examples
- Experiments can be run with other parameters
  - Repetitions
  - Concurrent Threads
  - Metadata

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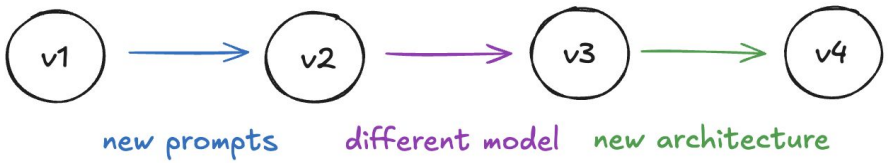
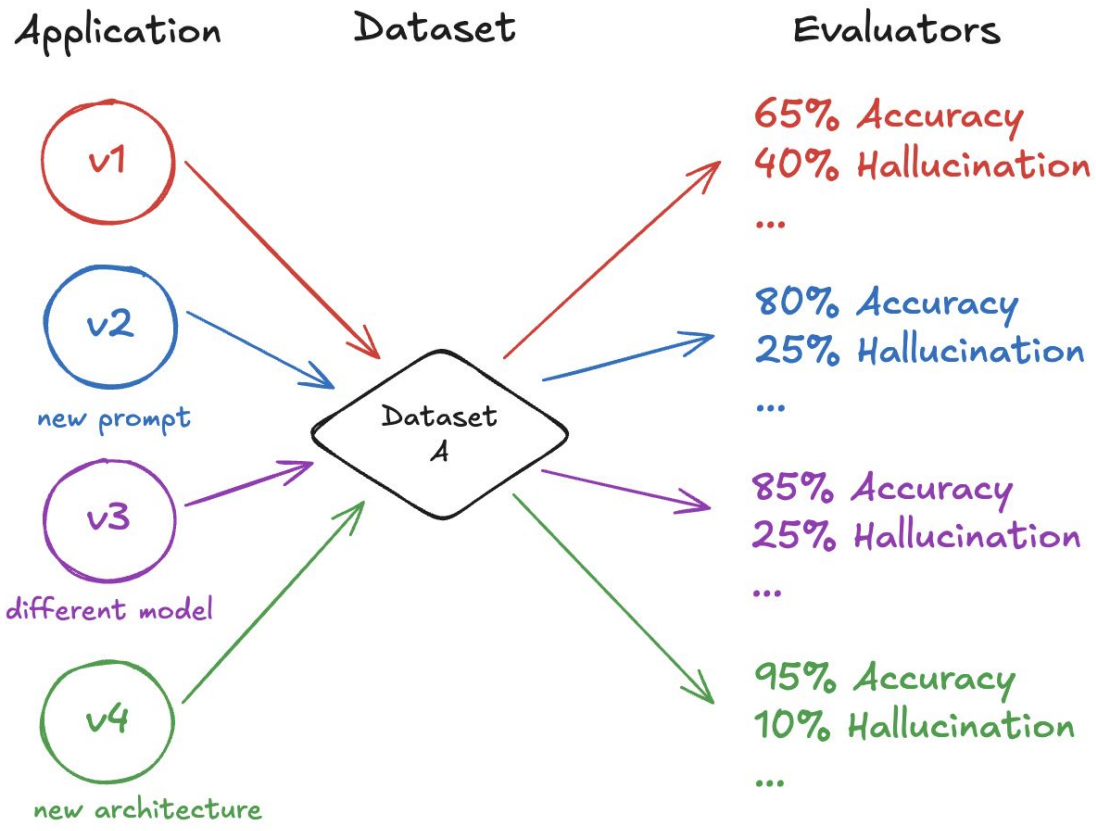
Analyzing Experiment Results

Analyzing Experiment Results

Without Testing



With Testing and Evaluation



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- Experiments are useful for seeing trends in your application performance as you improve it over time
- You can deep dive into a single experiment and look into how each individual run performed on the dataset example
- You can compare multiple experiments side-by-side and see how they scored on your evaluator metrics
- Experiments give you hard empirical data to push changes to production with confidence

LangChain Academy

Playground

Hard-coded Prompts → Prompt Templates

Hard-coded Prompt

You are a chat model who only speaks Spanish.

Prompt Template

You are a chat model who only speaks {language}

language = "English"

language = "Chinese"

language = "Spanish"

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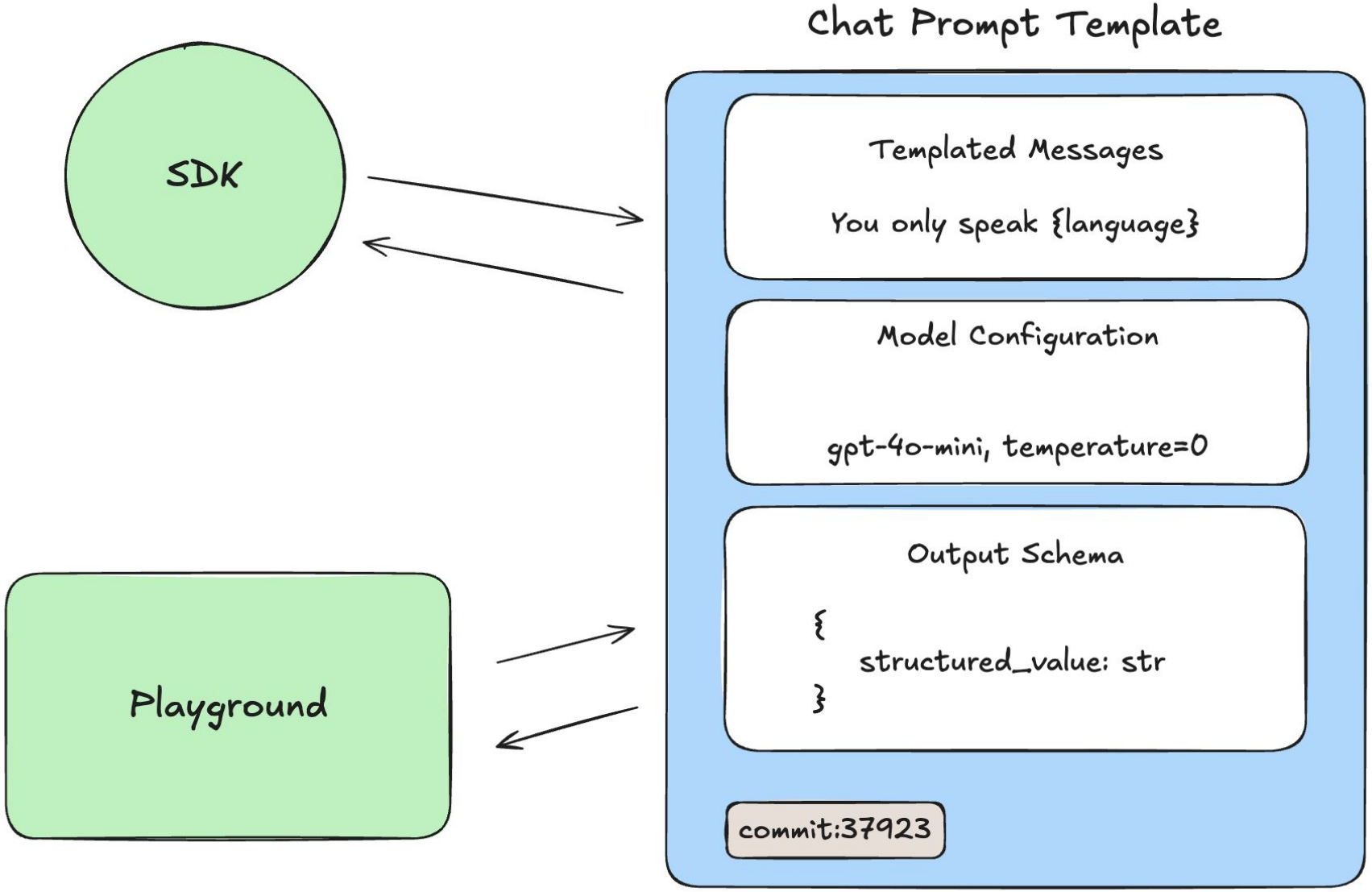
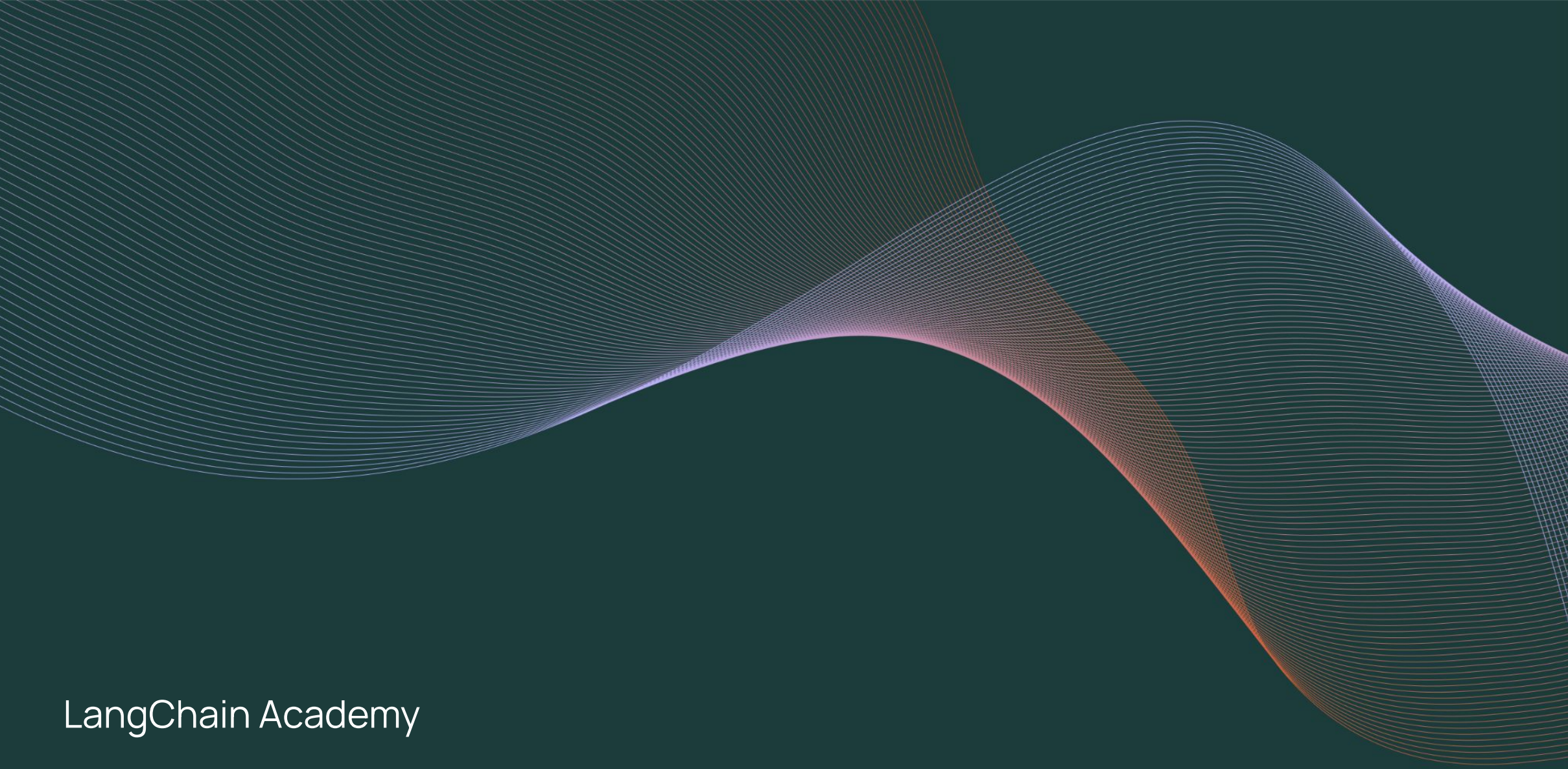
Prompt Hub

Prompt Hub: Prompt Templates





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Playground and Prompt Hub in Practice

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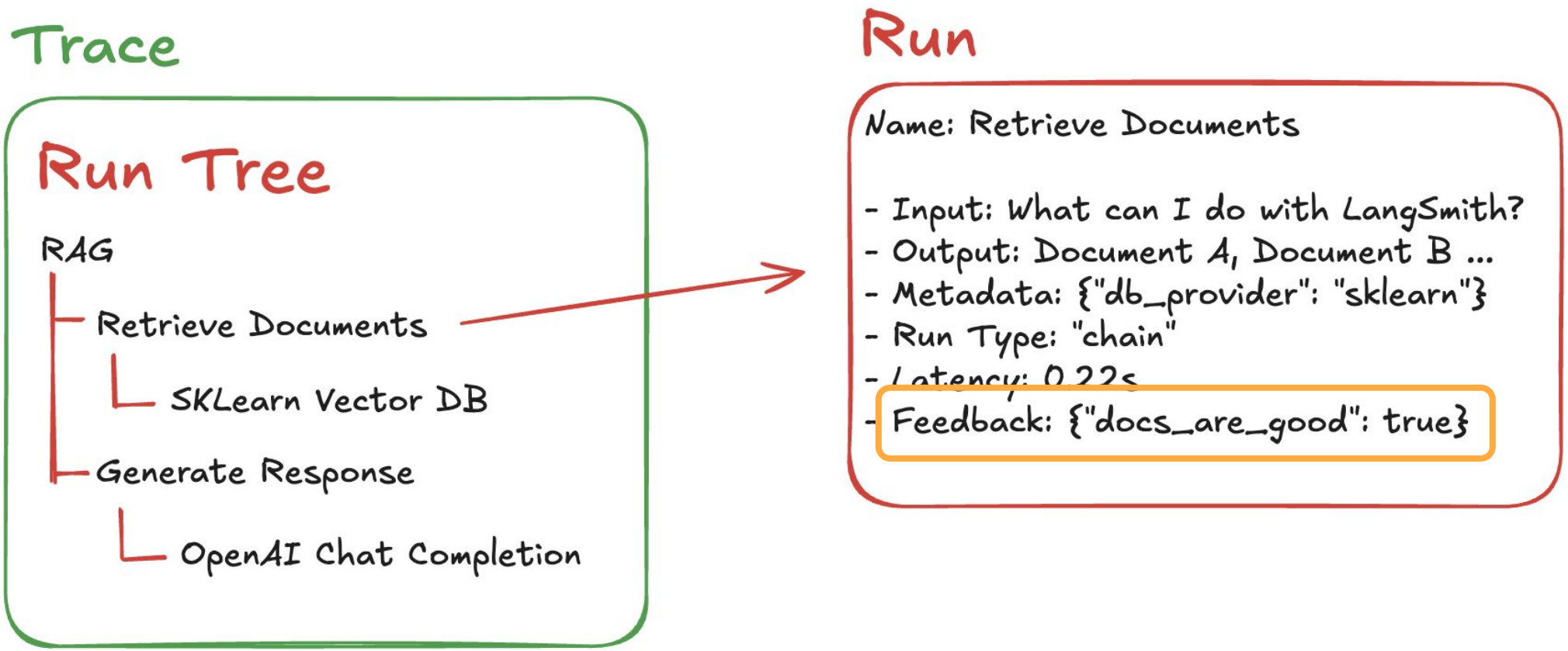
User Feedback

User Feedback

It’s very important to monitor how your users feel about your application’s performance

User Feedback



Types of Feedback

Categorical

- is_correct (yes, no)
- type_of_input (integer, number, string)
- is_helpful (yes, no)
- did_succeed (succeeded, failed)

Continuous

- correctness 7 (1 - 10)
- similarity 3 (1 - 5)
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ex.

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ex.

```
{
    "key": "correctness"
    "score": 7
}
```

Feedback Tags

Feedback Tags

Create and organize feedback tags for this tenant

New tag

3184 feedback tags

Feedback	Type	Values
faithfulness_score	Continuous	
answer_relevancy_score	Continuous	
context_ relevancy_score	Continuous	
test_entity_examples	Continuous	
test_employer_org_bias	Continuous	
test_person_profile_bias	Continuous	

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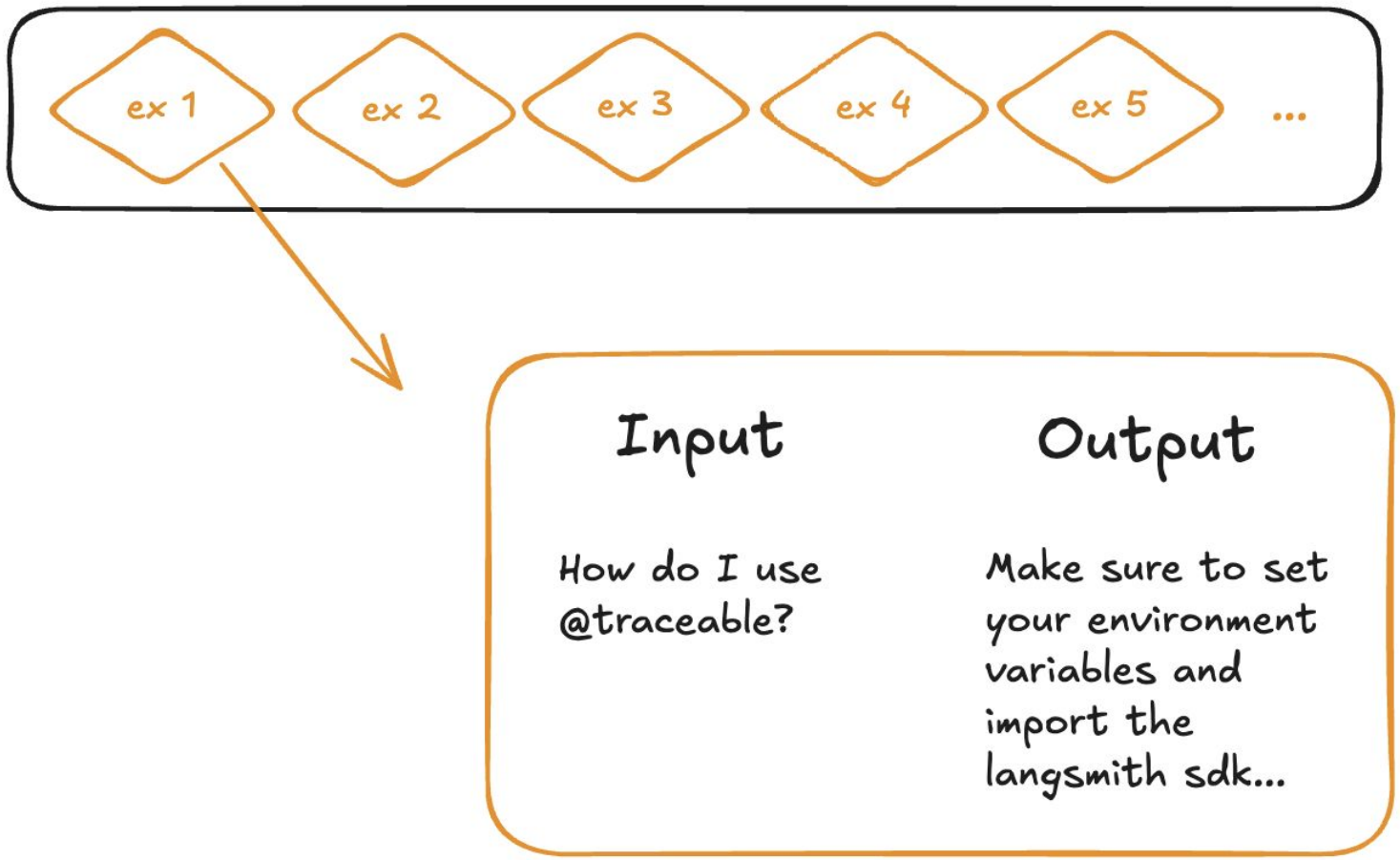
Annotation Queues

Annotation Queues

Annotation Queues are a user friendly way to quickly cycle through and annotate data



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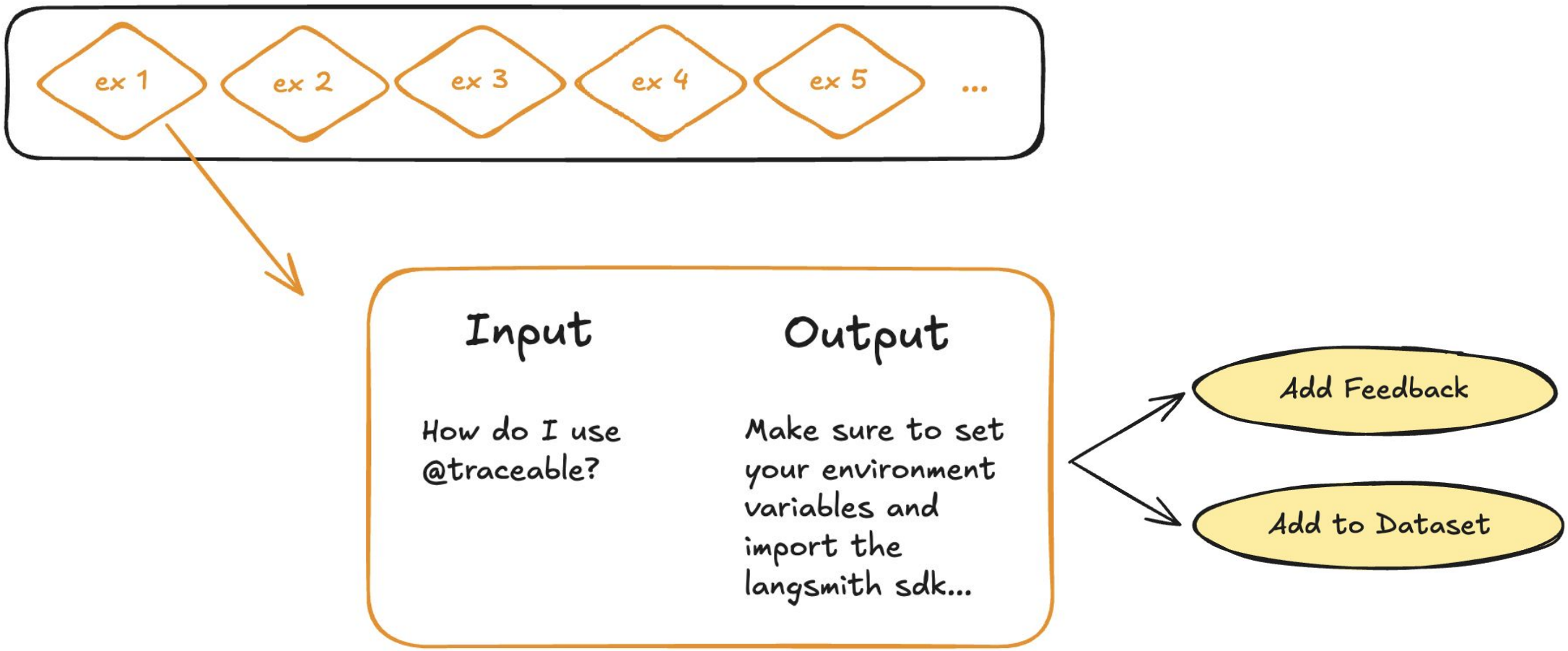

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Filtering

Common Filters to Create

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Common Filters to Create

Here are some common filters that we see!

- **Status = “error”** (all runs with errors)
- **Feedback score < X** (received bad feedback)
- **run_type = “LLM” AND latency > X** (slow LLM runs)
- **Metadata[“ls_model_name”] = X** (create a filter for a metadata field)

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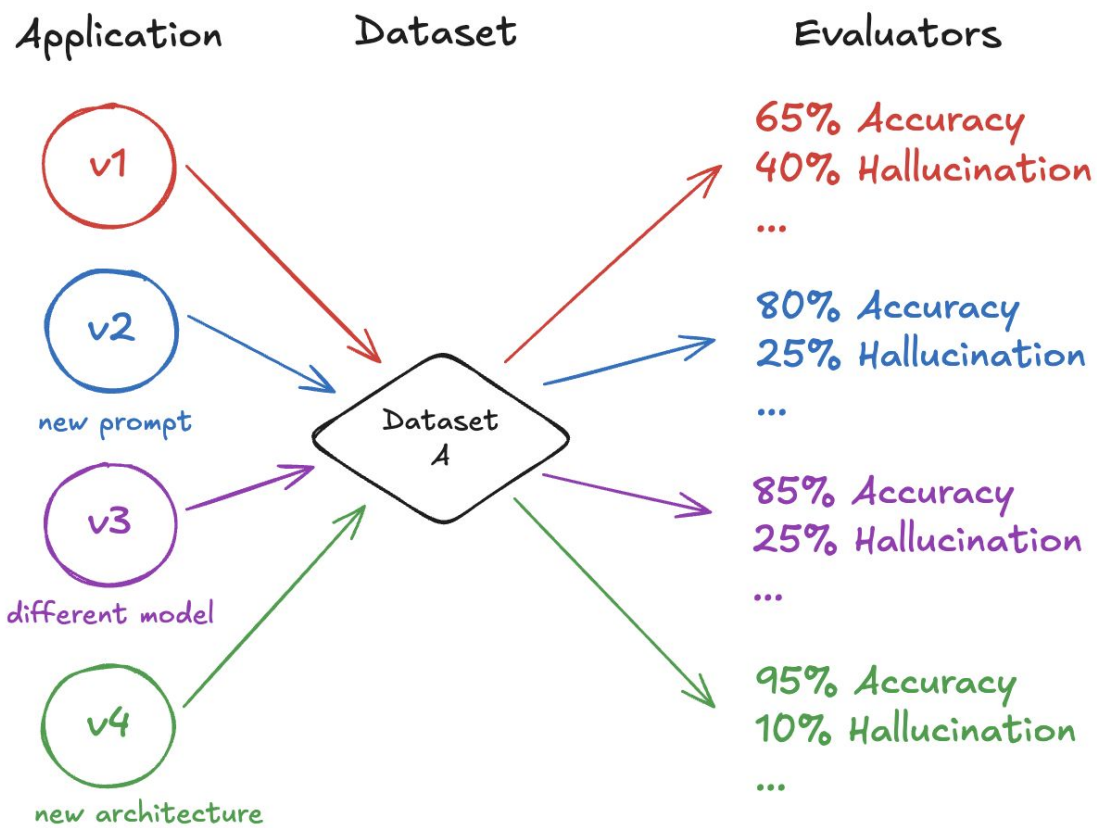
Online Evaluation

Offline and Online Evaluation

Recap: Offline Evaluation involves testing different versions of your Application against a dataset

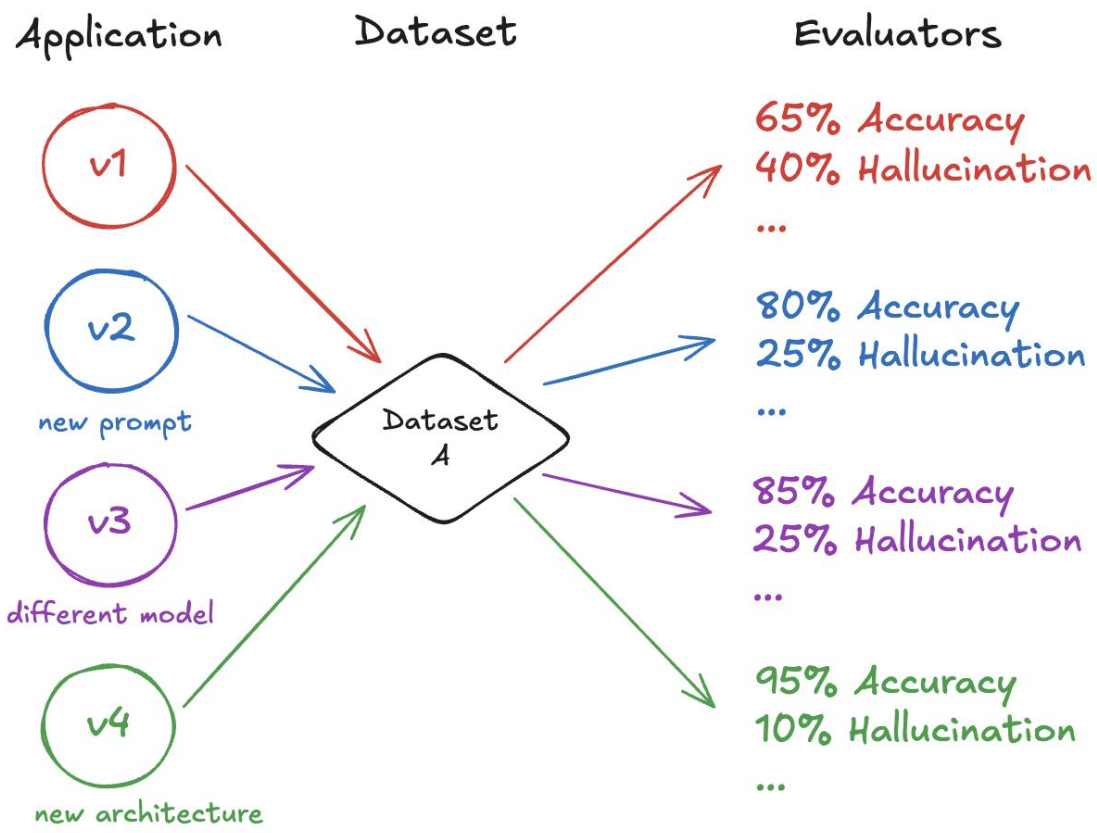
Offline Evaluation



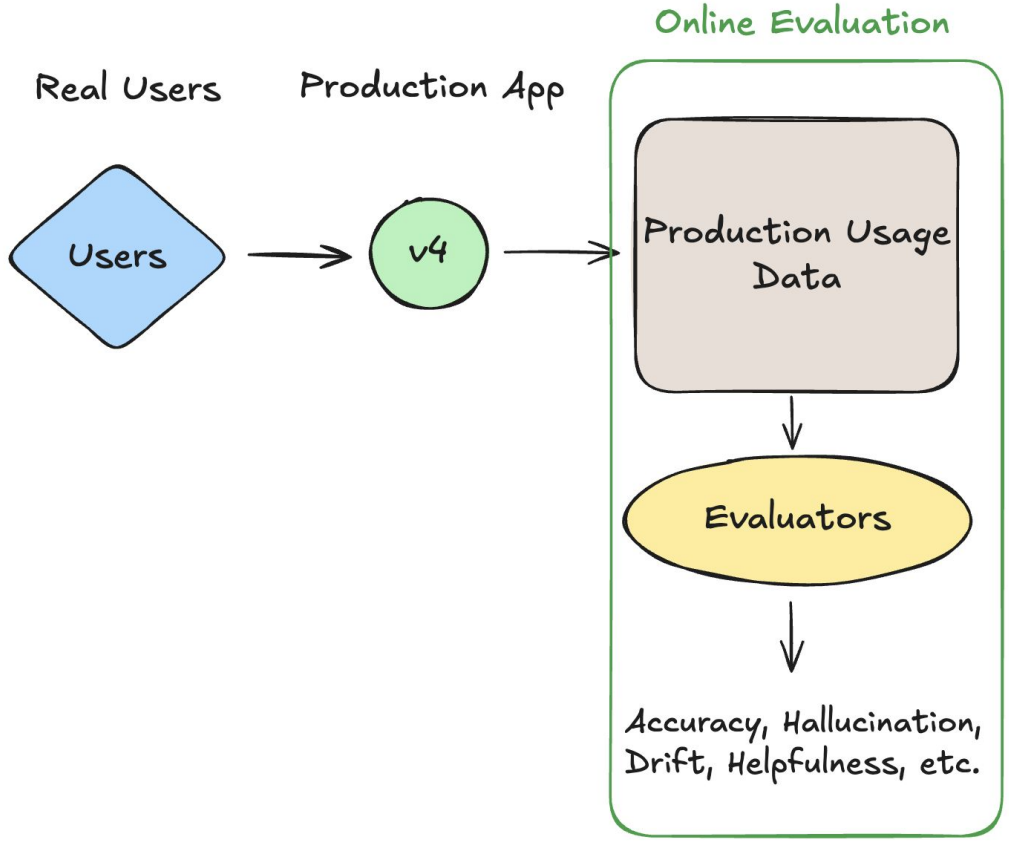
Offline and Online Evaluation

Online Evaluation involves evaluating real production performance with end users

Offline Evaluation



Online Evaluation

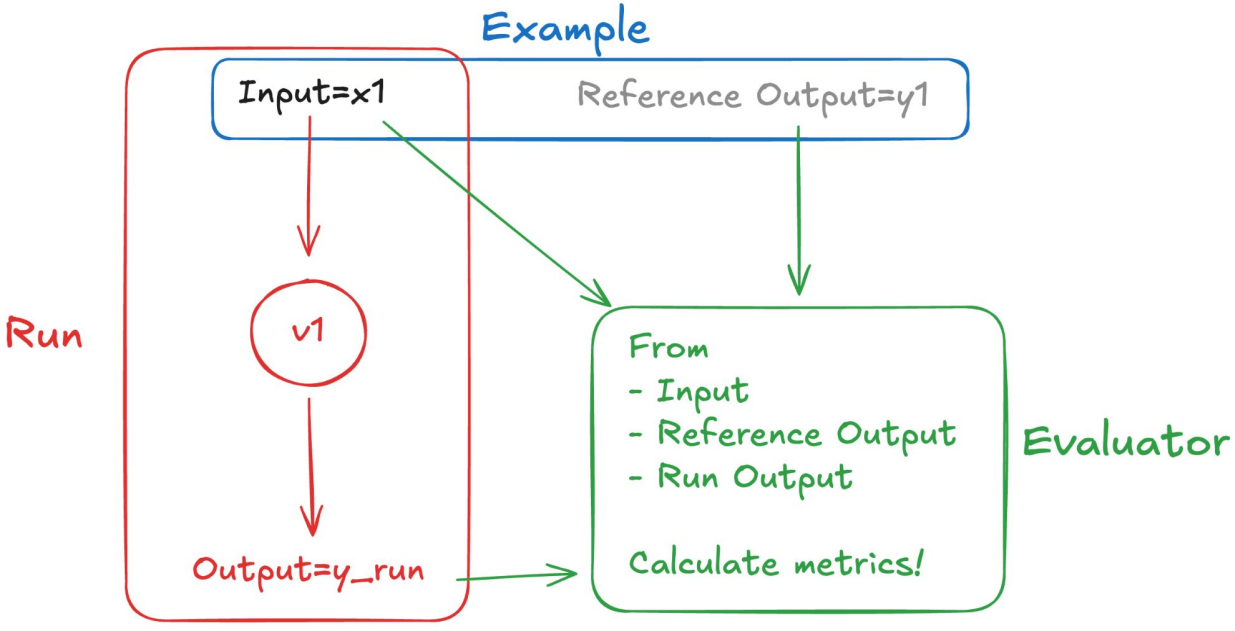


Offline and Online Evaluation

Offline Evaluators can make use Reference Output

Offline Evaluator

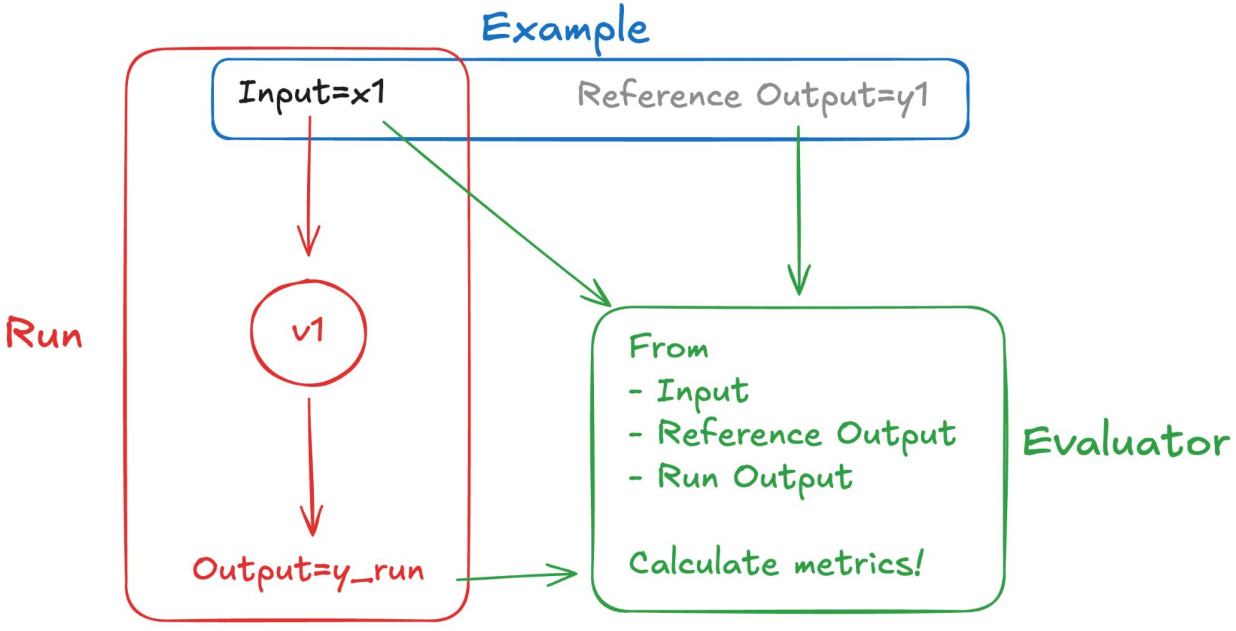
Online Evaluator



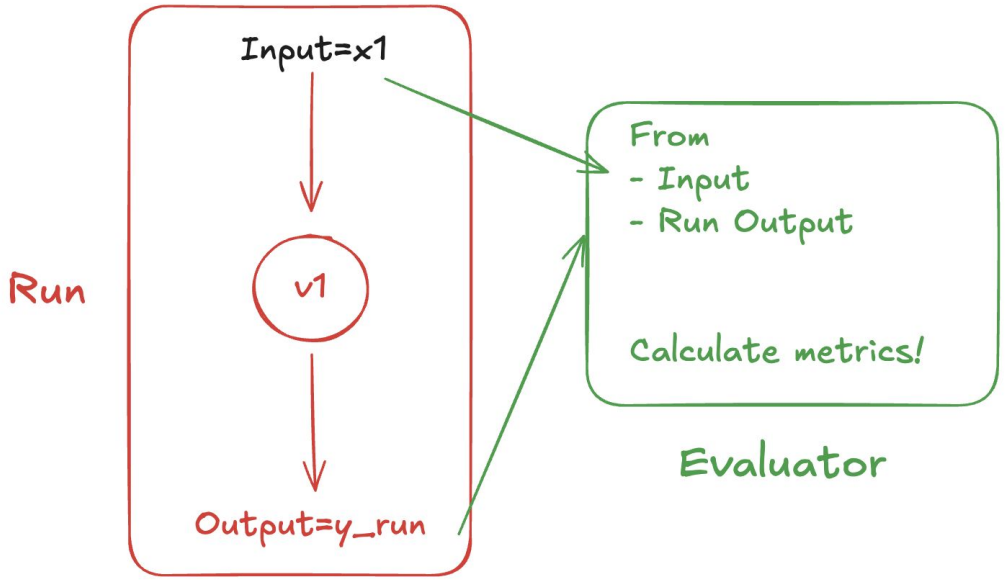
Offline and Online Evaluation

Online Evaluators only have access to the Input, and the output of the production Run

Offline Evaluator



Online Evaluator



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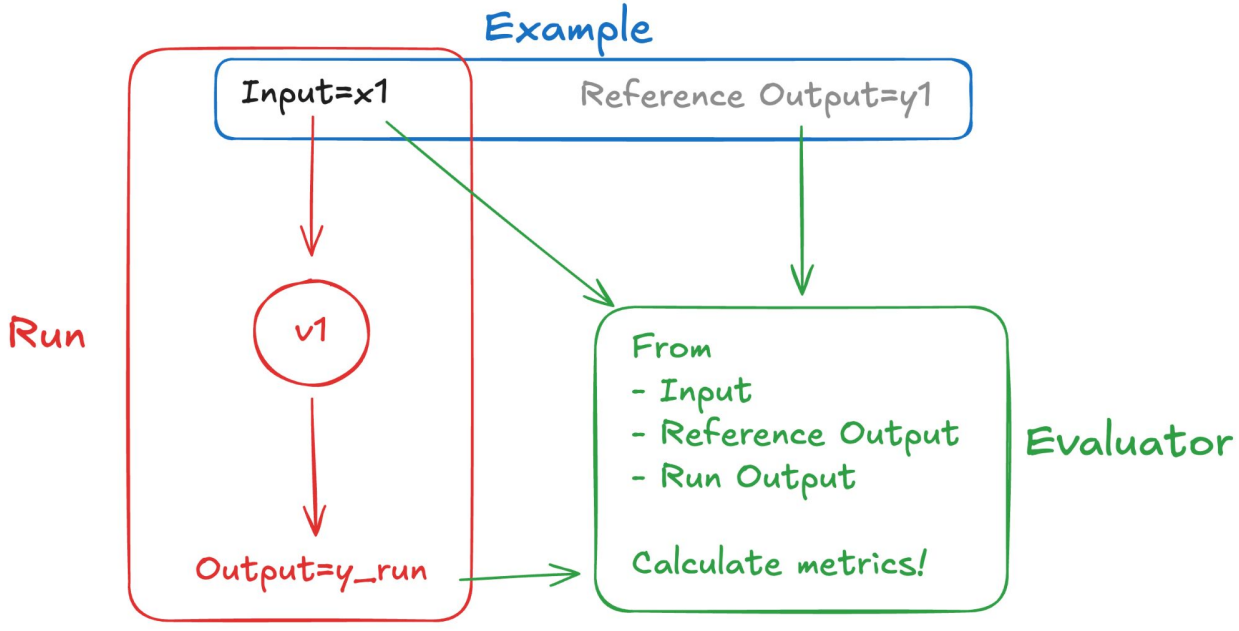
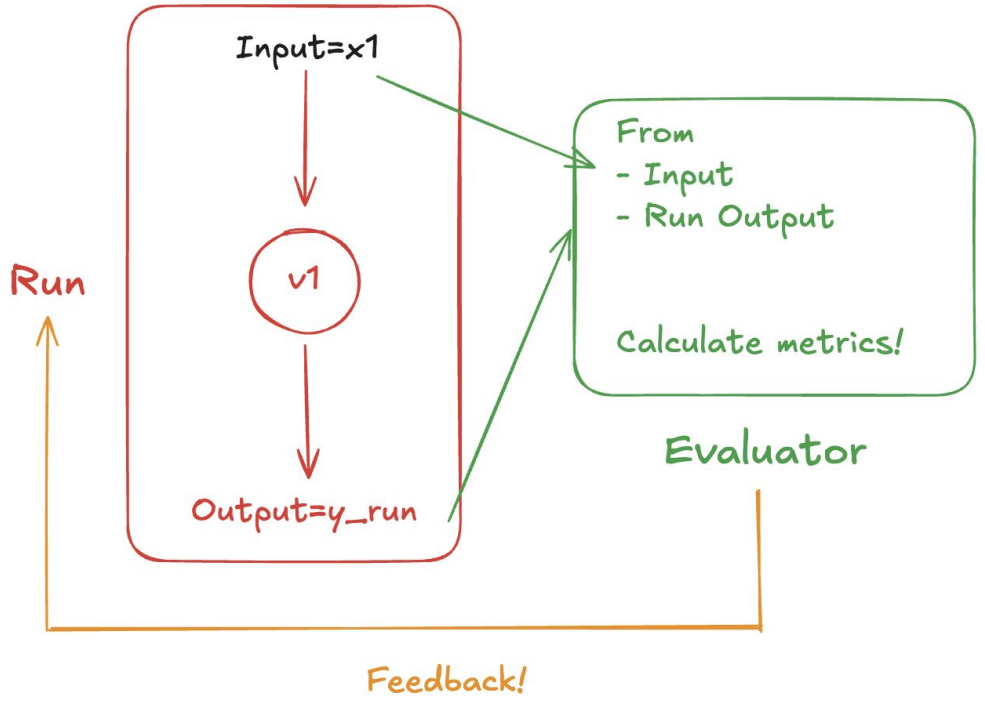


Online Evaluator



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Online Evaluation

Popular Examples of Online Evaluation

For document retrieval tasks, check for hallucinations in the output

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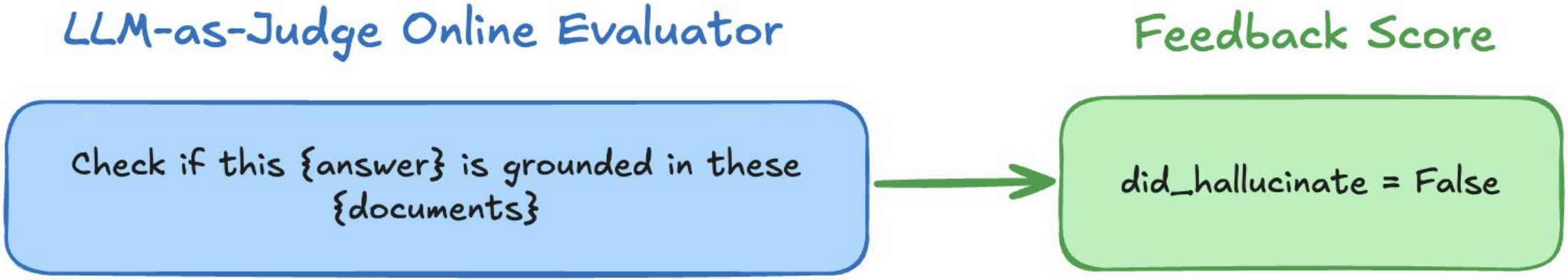

Popular Examples of Online Evaluation

Score the perceived helpfulness of an answer to a user

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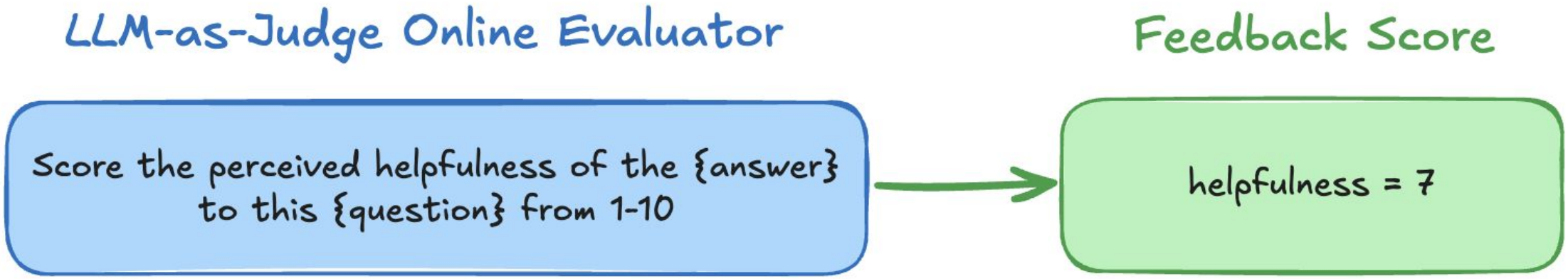


Popular Examples of Online Evaluation

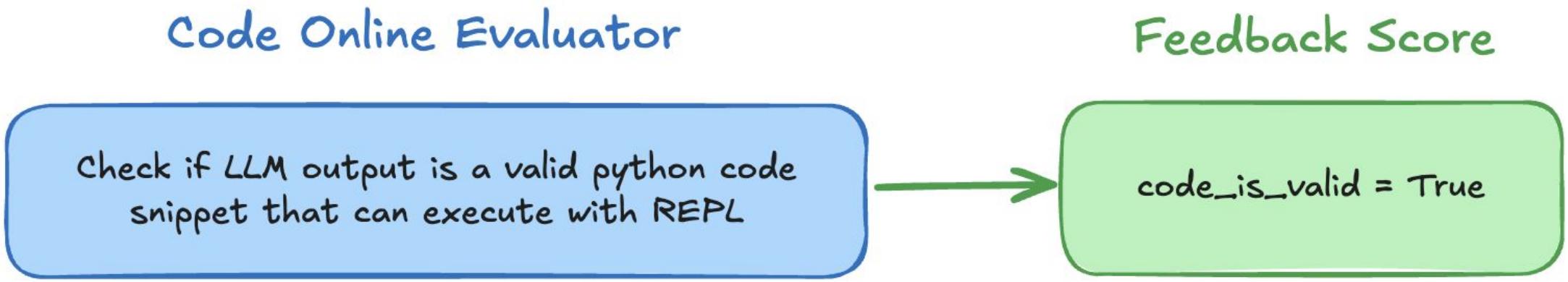
For a Coding Assistant, check to see if the outputted code actually compiles and executes

Code Online Evaluator

Check if LLM output is a valid python code snippet that can execute with REPL

Popular Examples of Online Evaluation

For a Coding Assistant, check to see if the outputted code actually compiles and executes



Popular Examples of Online Evaluation

Check that the output matches a certain structure
ex. Email Assistant should sign emails a certain way

Code Online Evaluator

For an Email Assistant, regex match that we correctly signed the email "Best wishes, Nick"

Popular Examples of Online Evaluation

Check that the output matches a certain structure
ex. Email Assistant should sign emails a certain way

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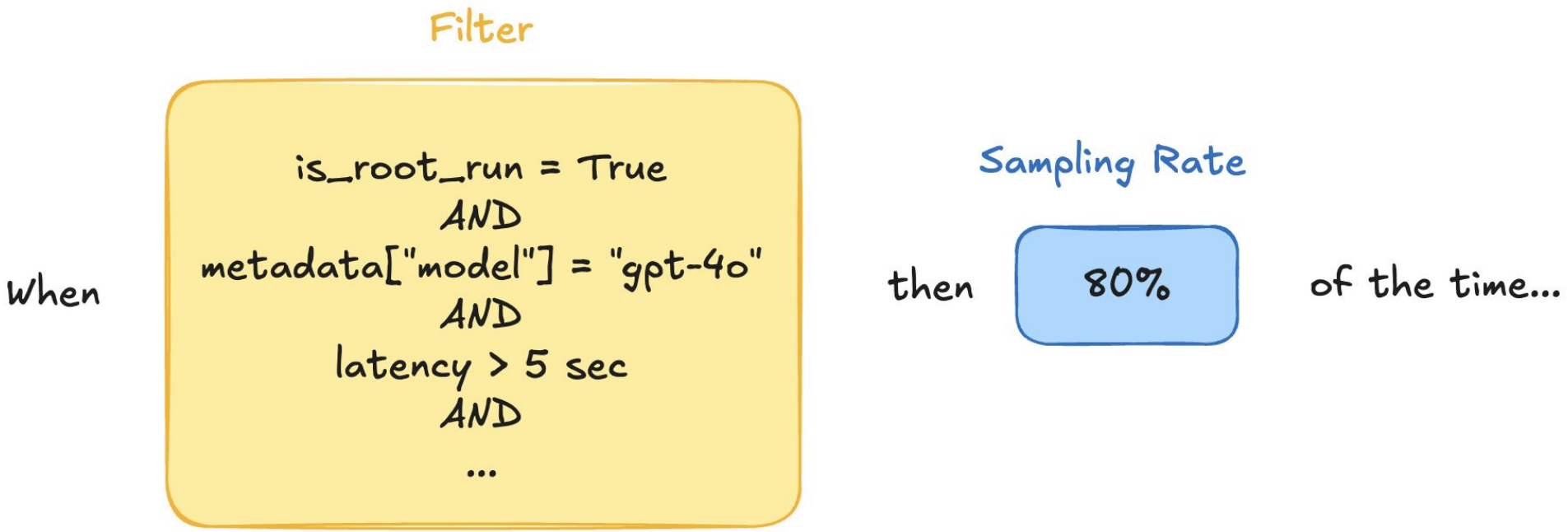
Automations

Automations

LangSmith allows you to create Rules that automatically trigger actions when in production



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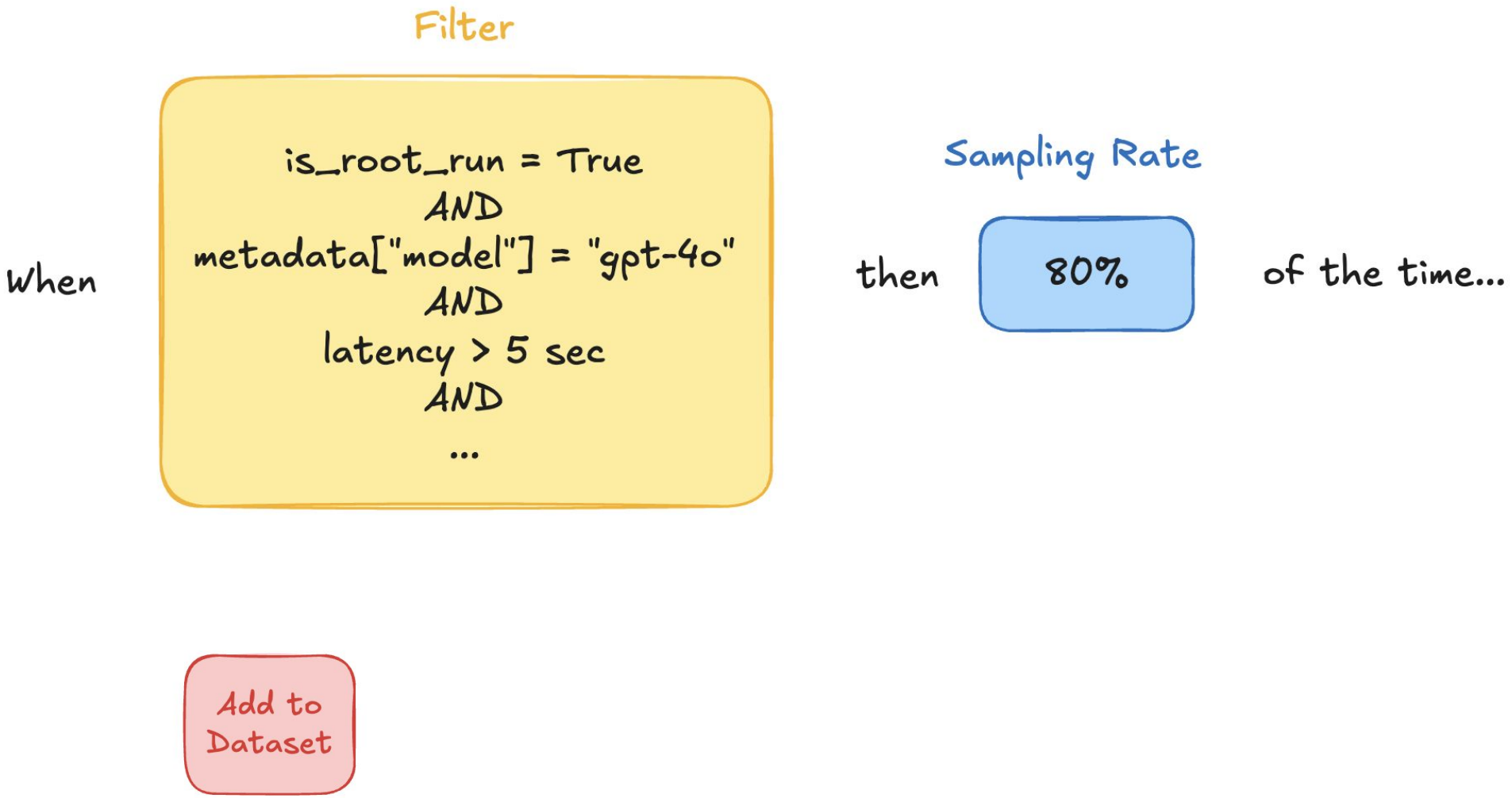

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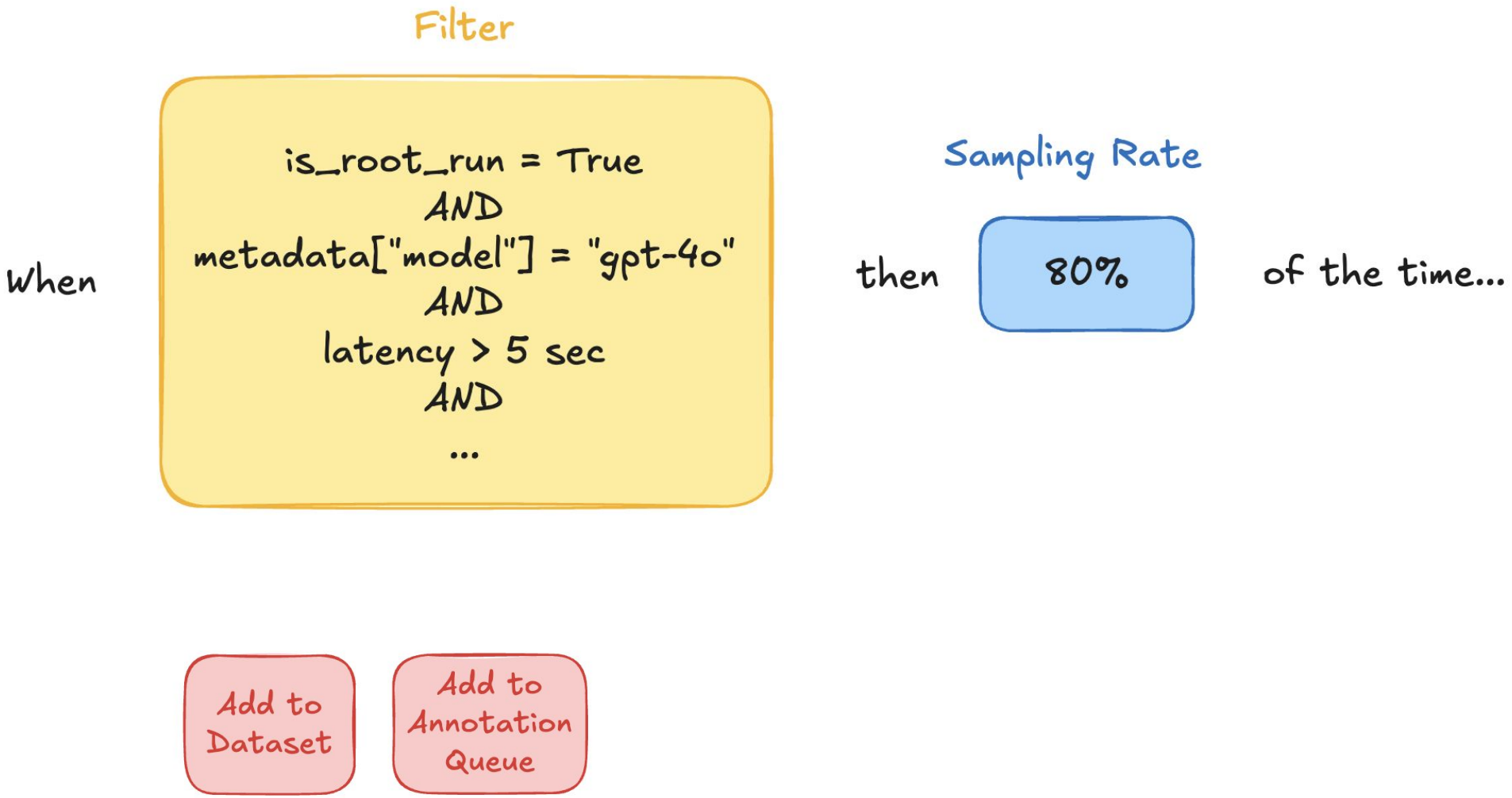

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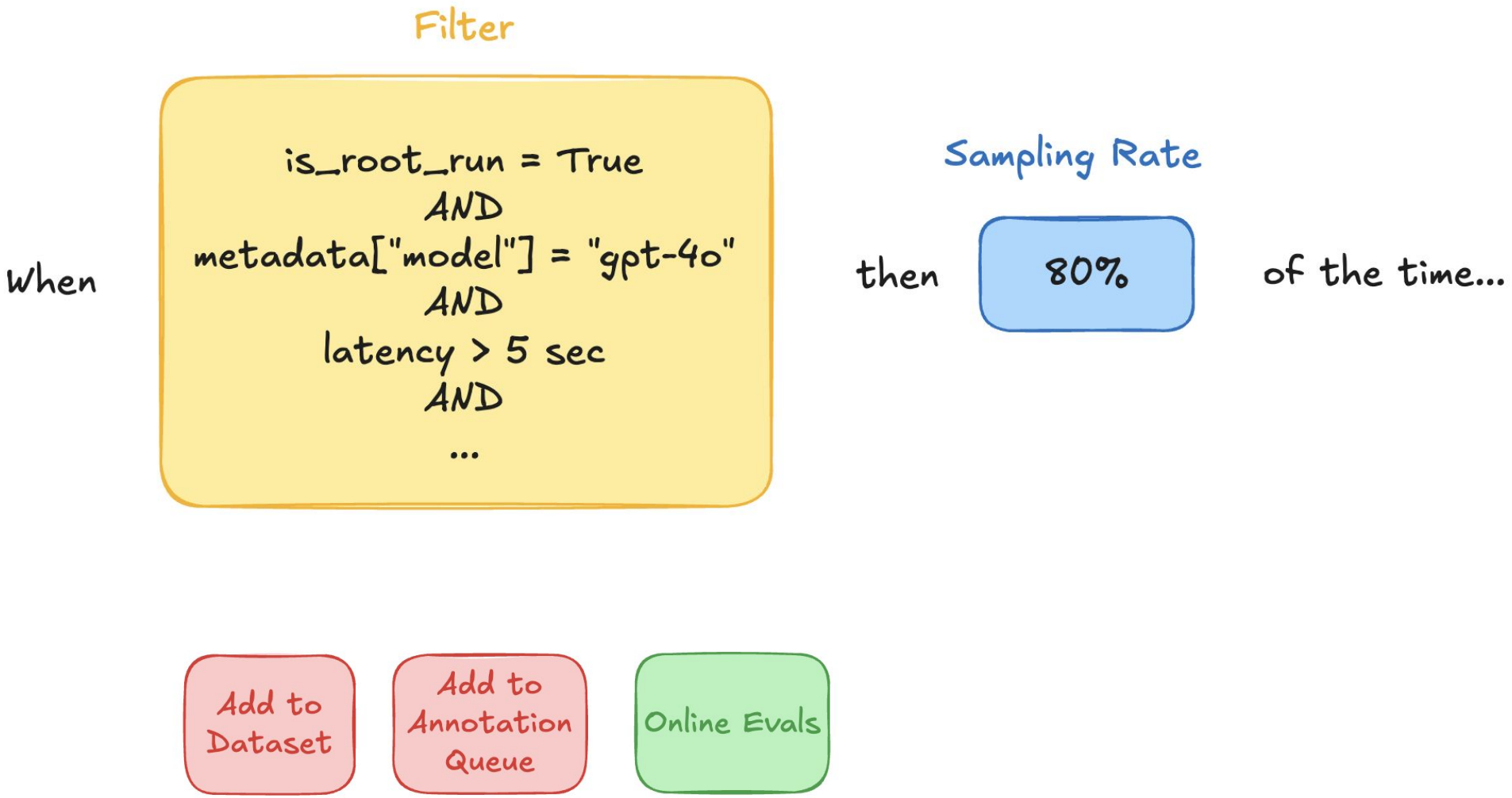

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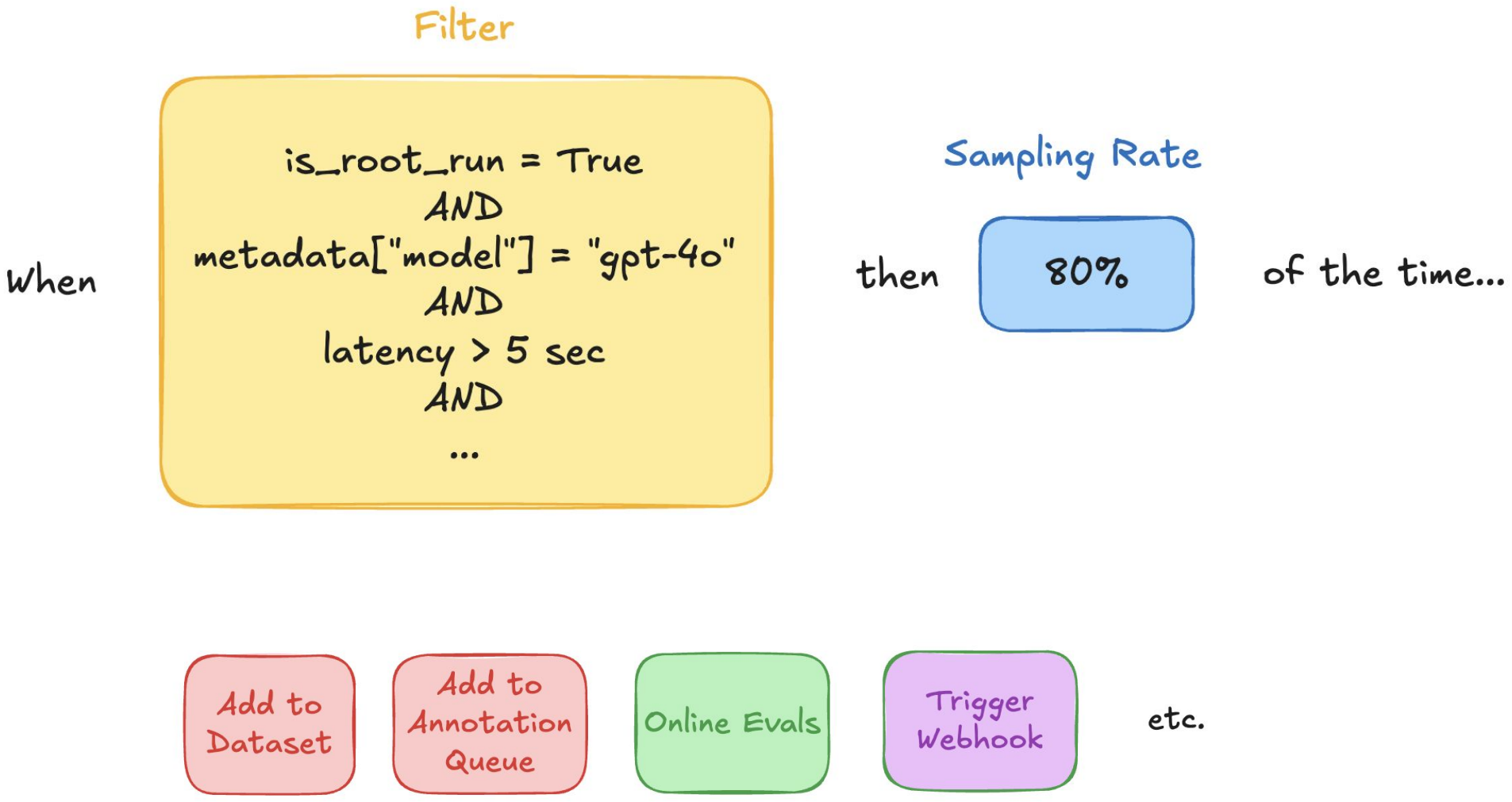

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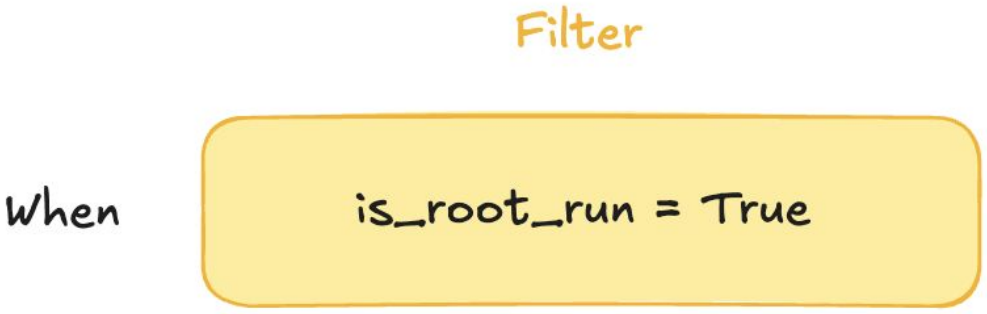
Automations

Popular Examples of Automations

Sample with low frequency from all traces, and add to an annotation queue



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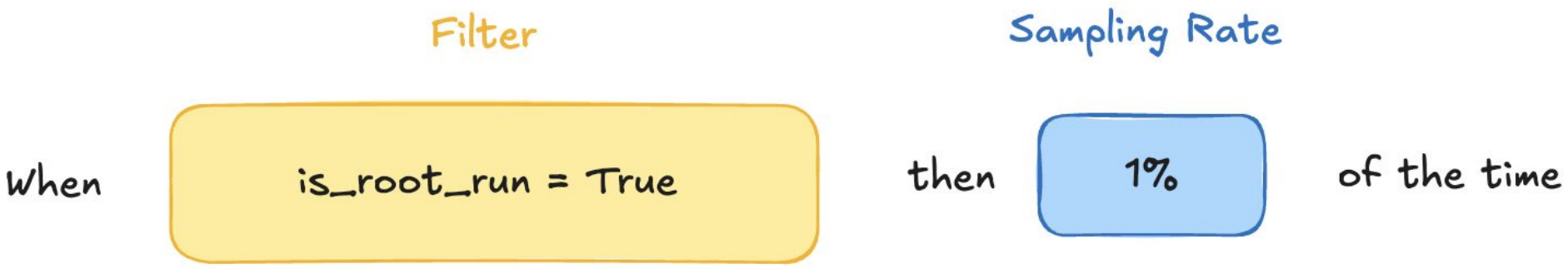

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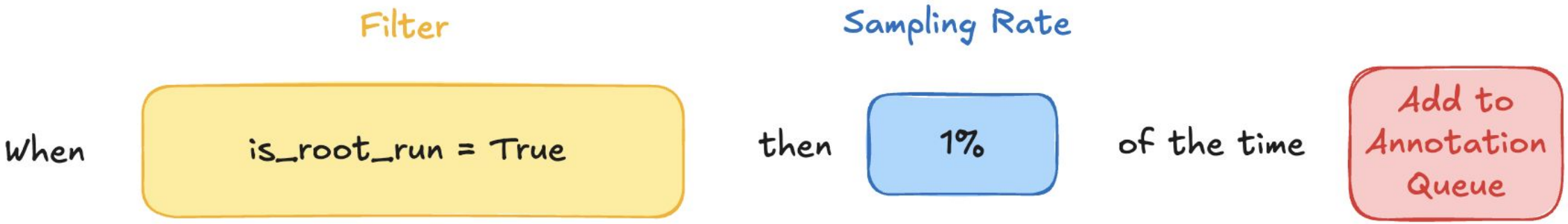
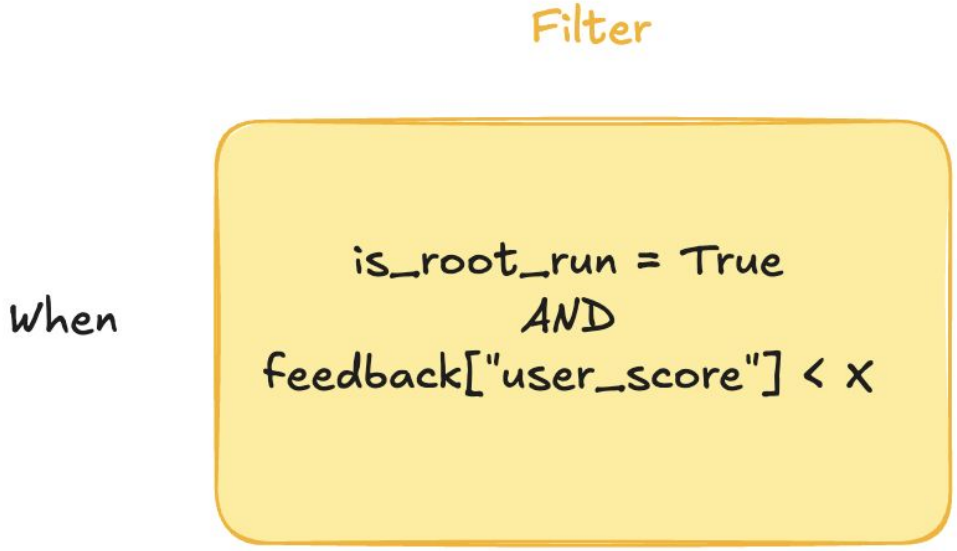


Popular Examples of Automations

Add all traces (or runs) with **negative** feedback to an annotation queue



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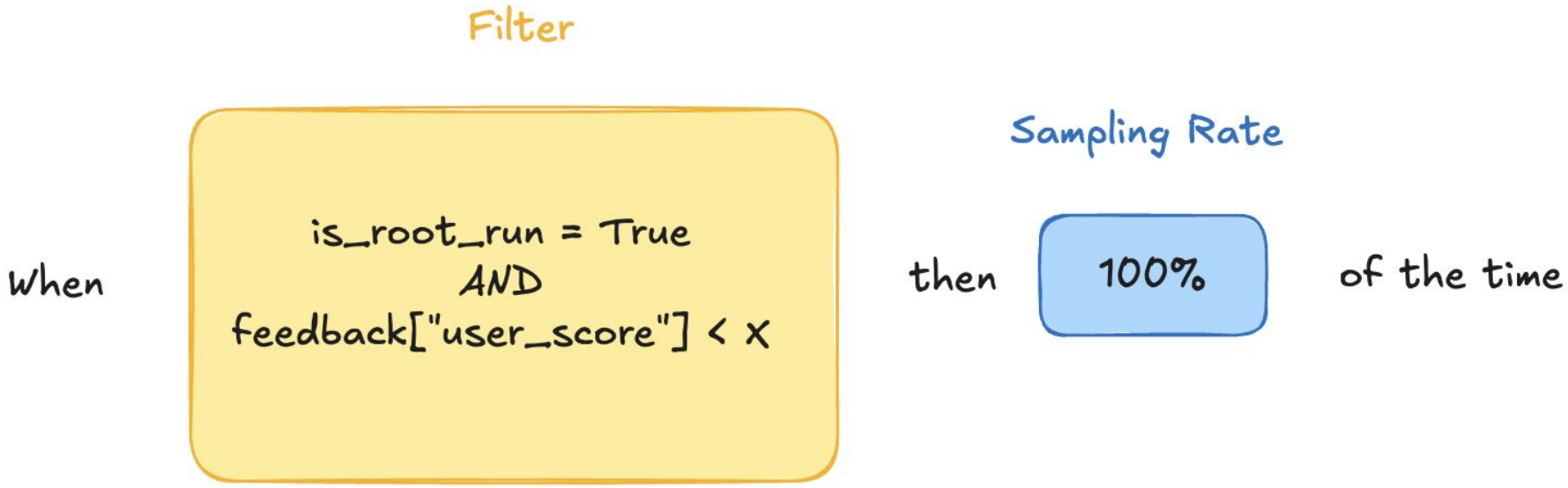

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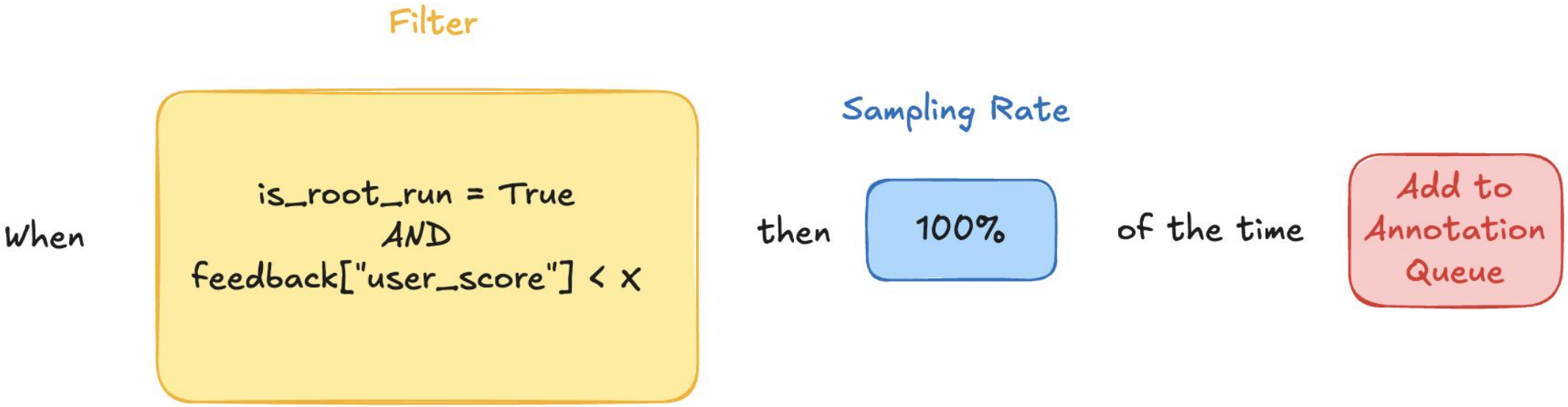
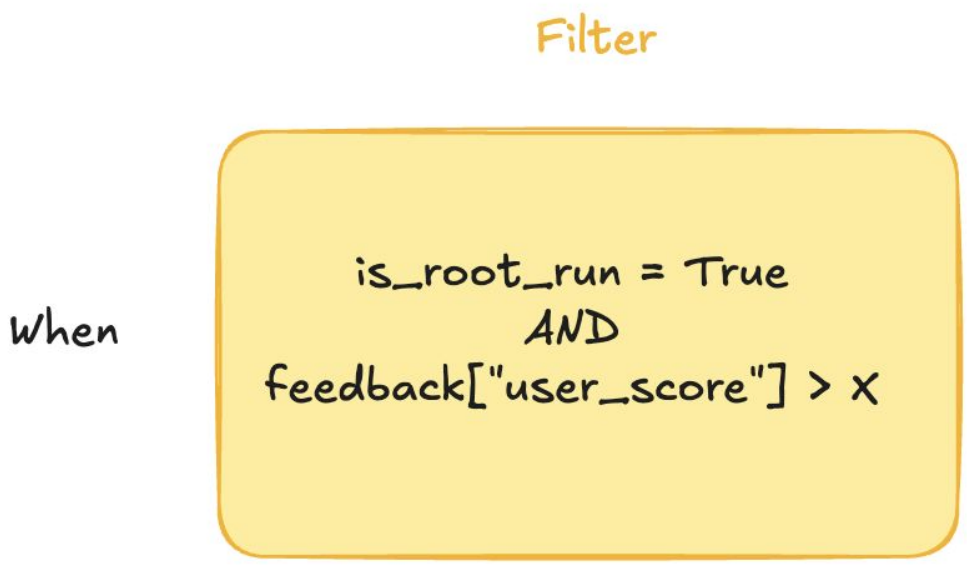


Popular Examples of Automations

Add all traces (or runs) with **positive** feedback to a golden dataset



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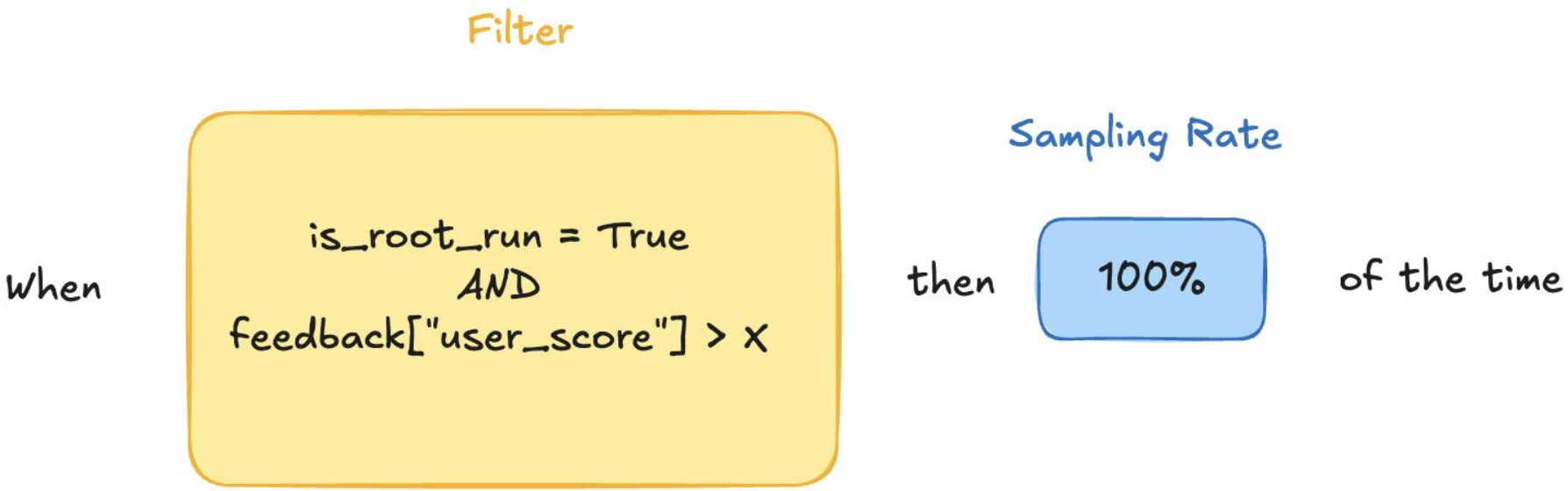

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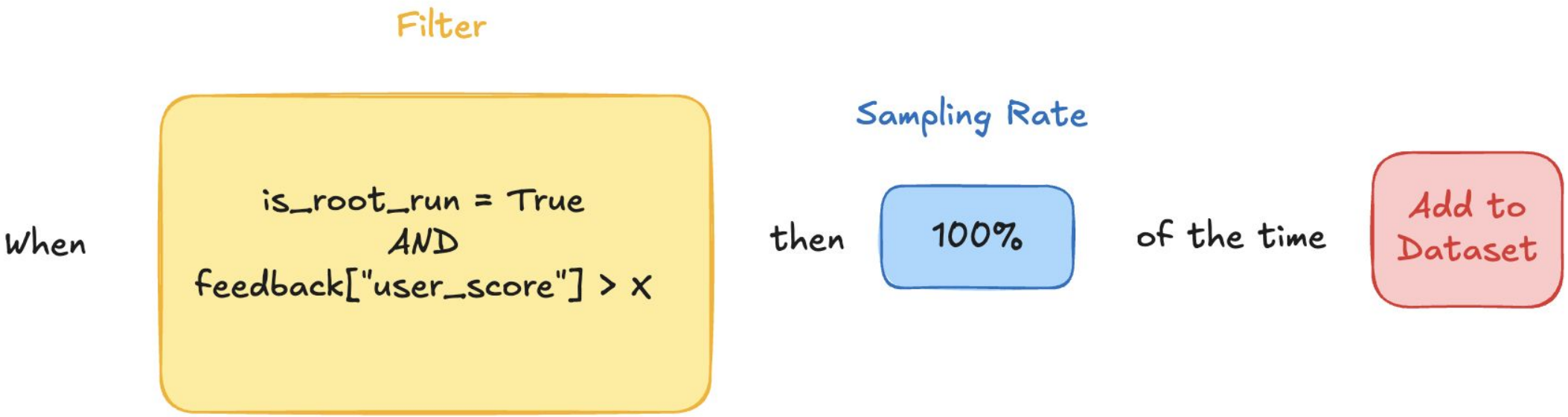

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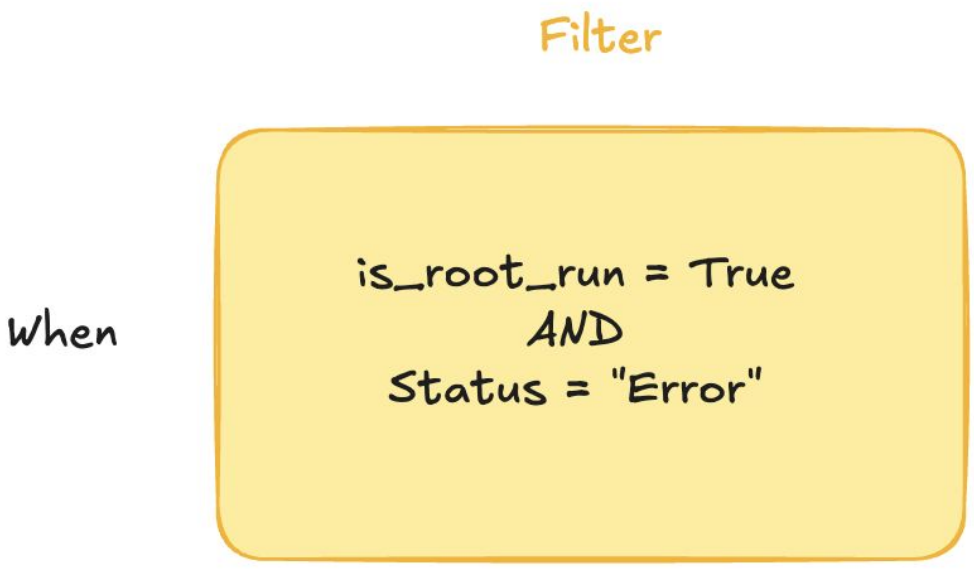
For all traces (or runs) with an **error**, alert PagerDuty



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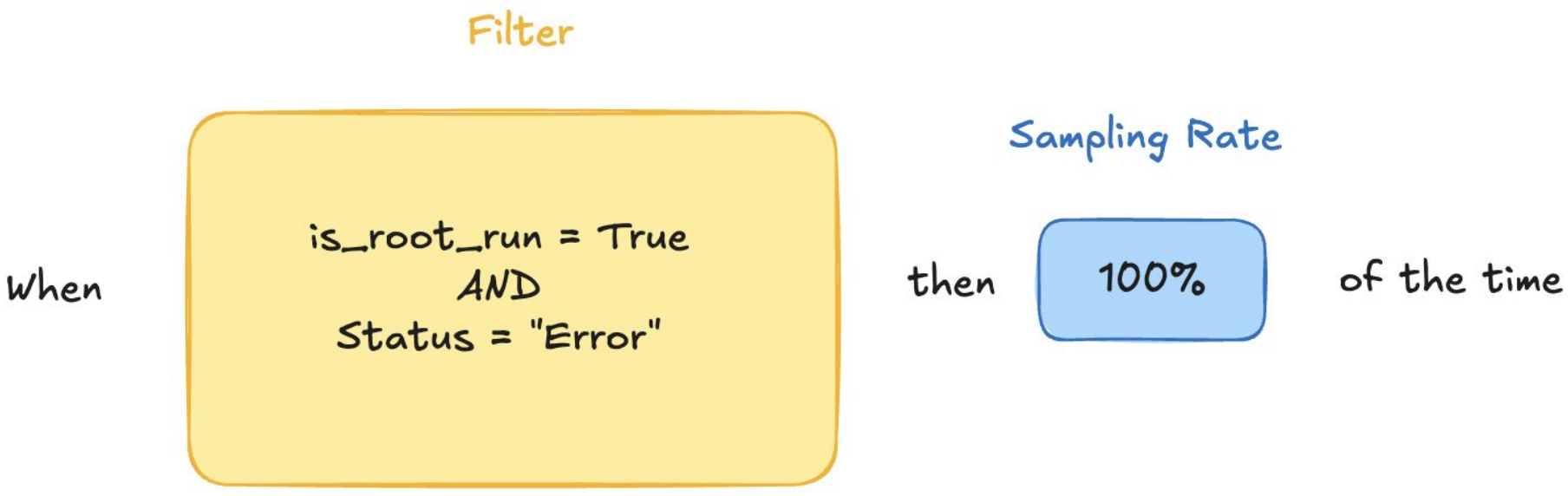

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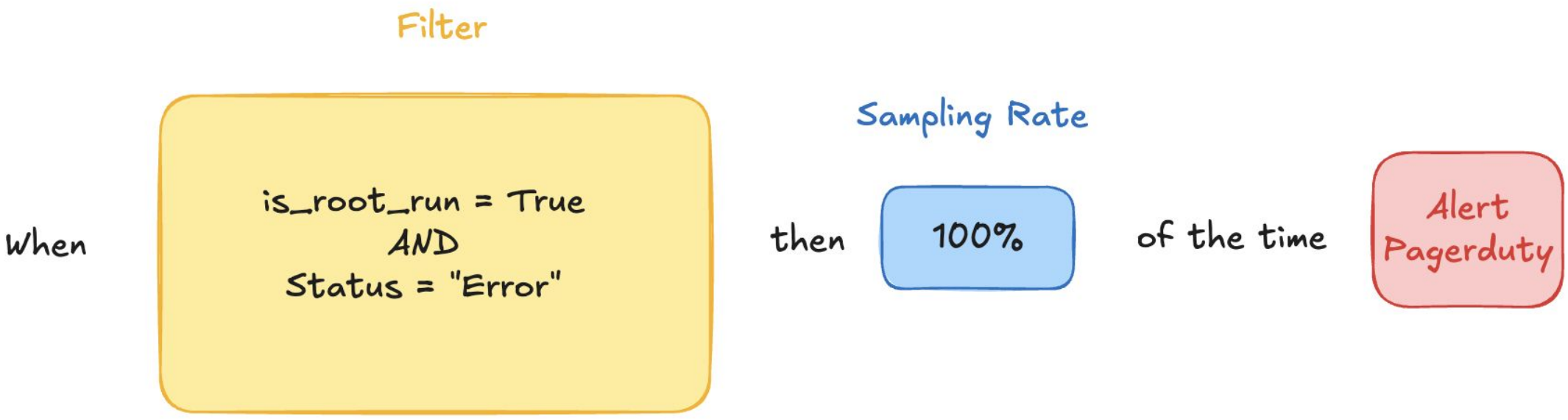
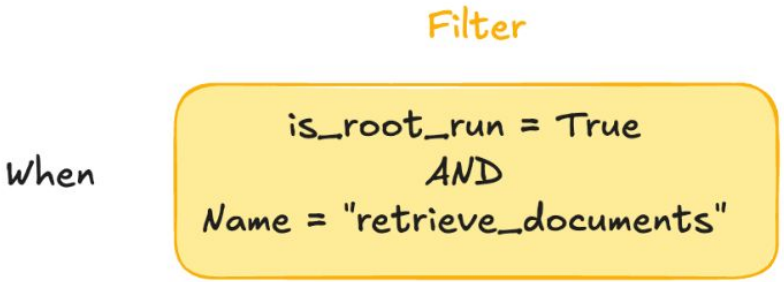


Popular Examples of Automations

Chain Online Evaluator Feedback, with Adding to Dataset



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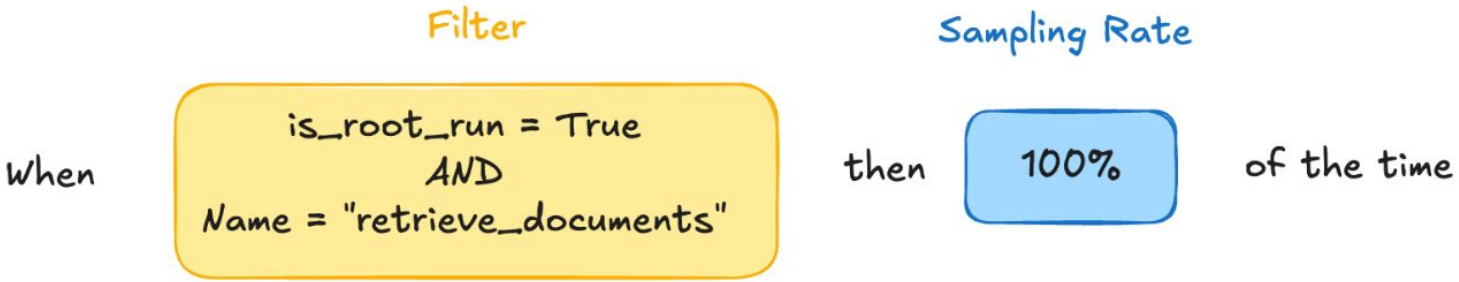

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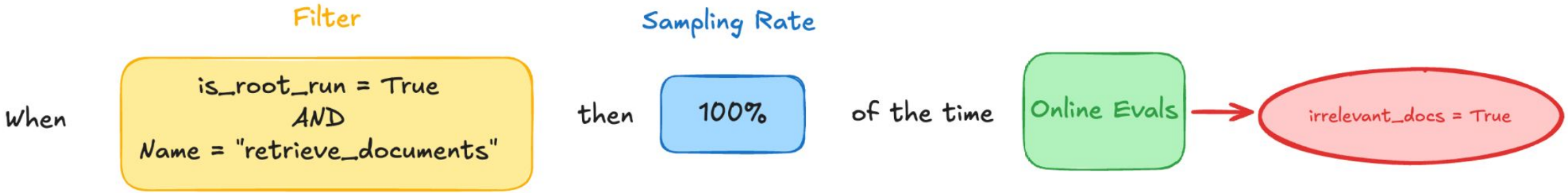

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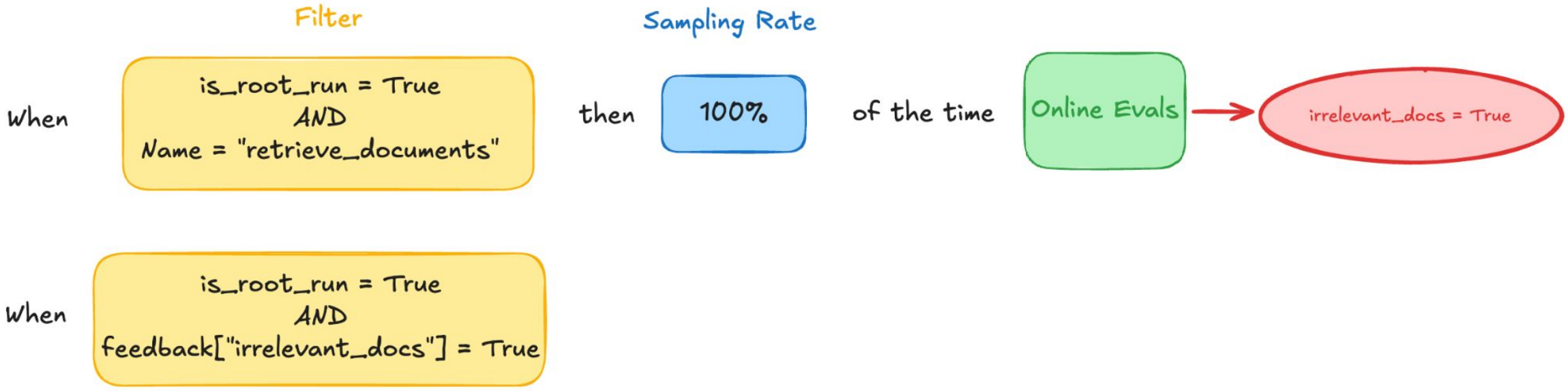

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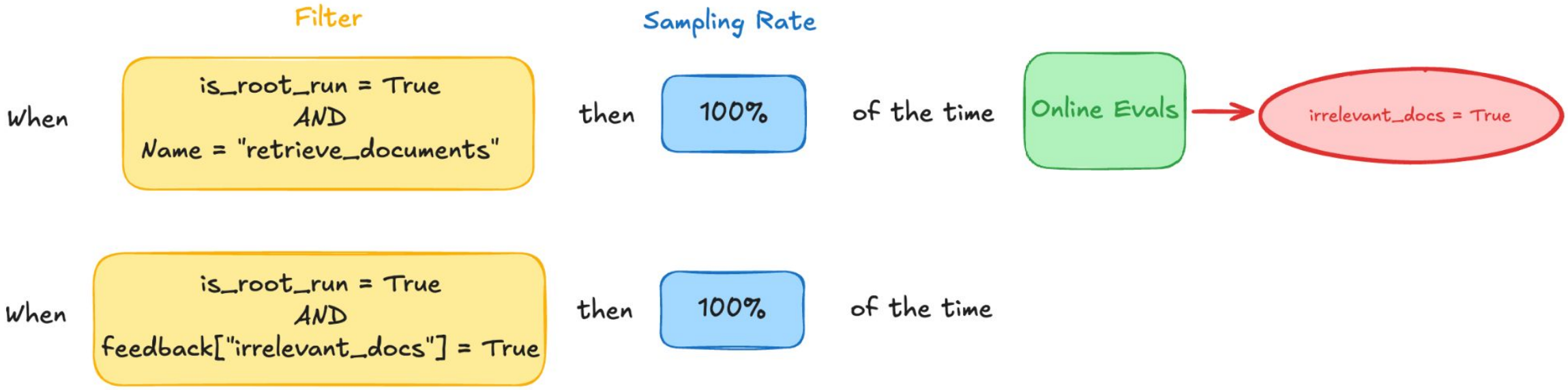

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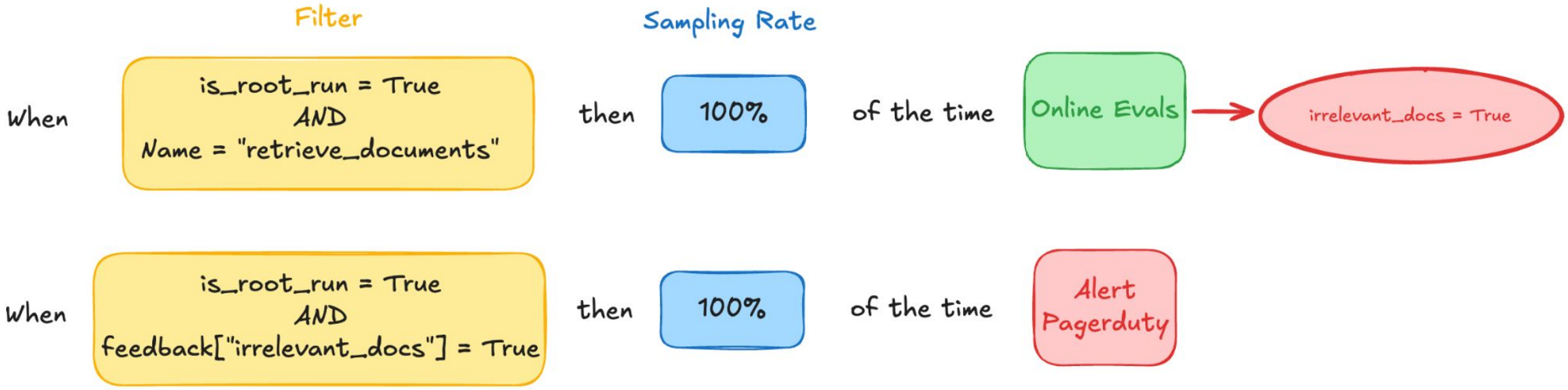

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Monitoring View