

# Academic AI Platform

Redefining how students and professors  
interact with academic content

Arcangeli - Morandin  
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# The Challenge

Academic institutions struggle with **fragmented course management systems**



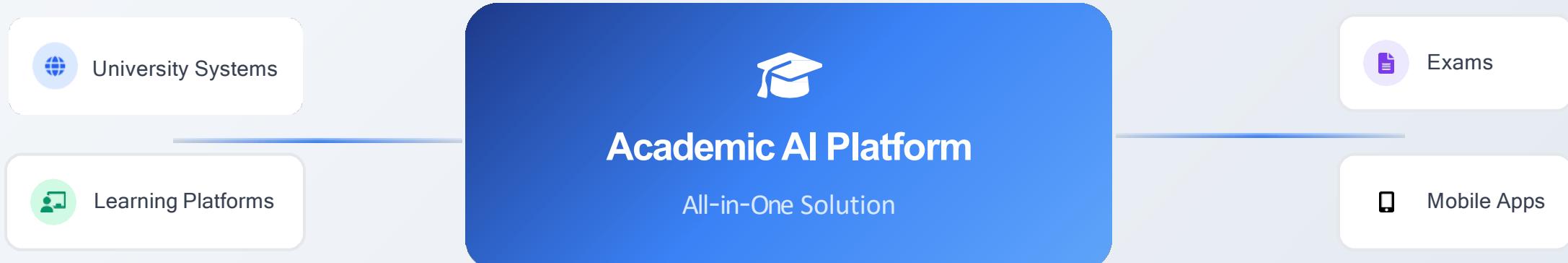
## ⚠️ Fragmentation Problem

Students and professors must navigate through **6+ different systems** to complete basic academic tasks

# Our Solution

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A **unified platform** for managing exams, materials and administrative tasks



## Unified Access

Single platform for all academic needs



## AI-Enhanced

Intelligent automation and insights



## User-Friendly

Simplified experience for all users

# Why This Matters

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## For Professors

- Unified Platform
- Content Organization
- Reduced Email Load
- Material Feedback
- Exam Creation



## For Students

- Unified Access
- Instant Responses
- Content Summaries
- Practice Exams
- No More Transcribing

# Target User

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**John Doe**

Romans History Teacher

- He has 40 handouts about history to organize every year
- He is not very keen on technology and cannot use properly all the tools used by university



**Jane Doe**

Computer Science Student

- Has some difficulties on Calculus
- She is re-watching all the video lectures
- She has finished all exercises provided by the professor



# Key Features

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## Content Summarization

Summaries of lectures and materials



## Course Organization

Automatic structuring of course materials



## Question Answering

Instant responses to student queries



## Exam Creation

Automated generation of practice tests



## Content Review

Quality assessment and feedback



## Grades Management

View, accept, refuse and insert grades



## Exam Management

Scheduling and subscription



## Administrative Tasks

Bureaucratic processes



## Chatbot Interface

Natural language interaction



# Live Demo



Try it now:

<https://ai-design.onrender.com/>

# Implementation

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## **Self-Developed** **Agent SDK**

Custom library for creating agents and orchestrators



## **A2A** **Support**

Agent-to-Agent communication protocols



## **MCP** **Support**

Model Context Protocol integration



## **Long** **Memory**

Persistent context and conversation history



## **Powered by** **Gemini**

Google's advanced AI model integration

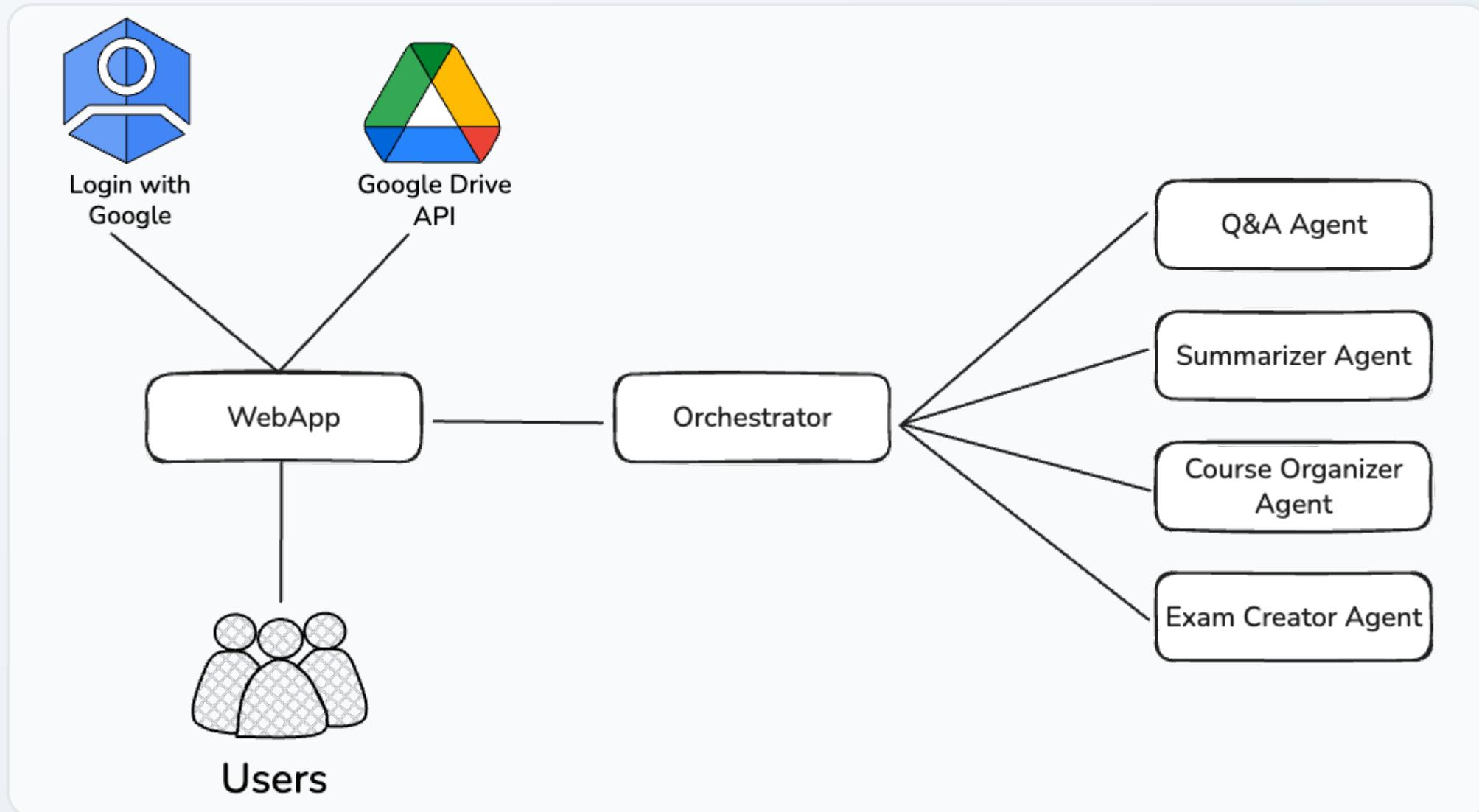


## **Central Agent** **Repository**

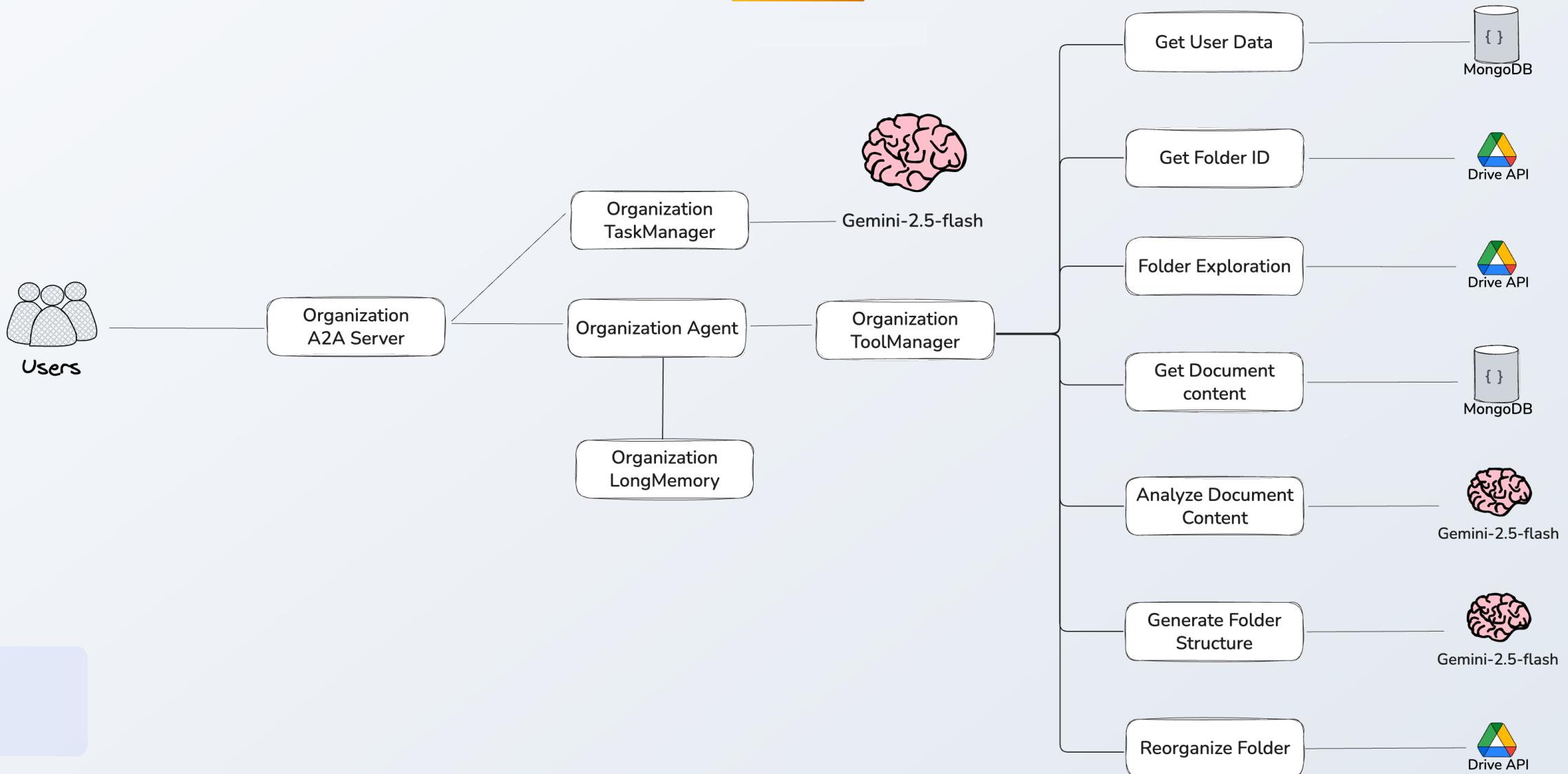
Centralized agent management system

# Architecture

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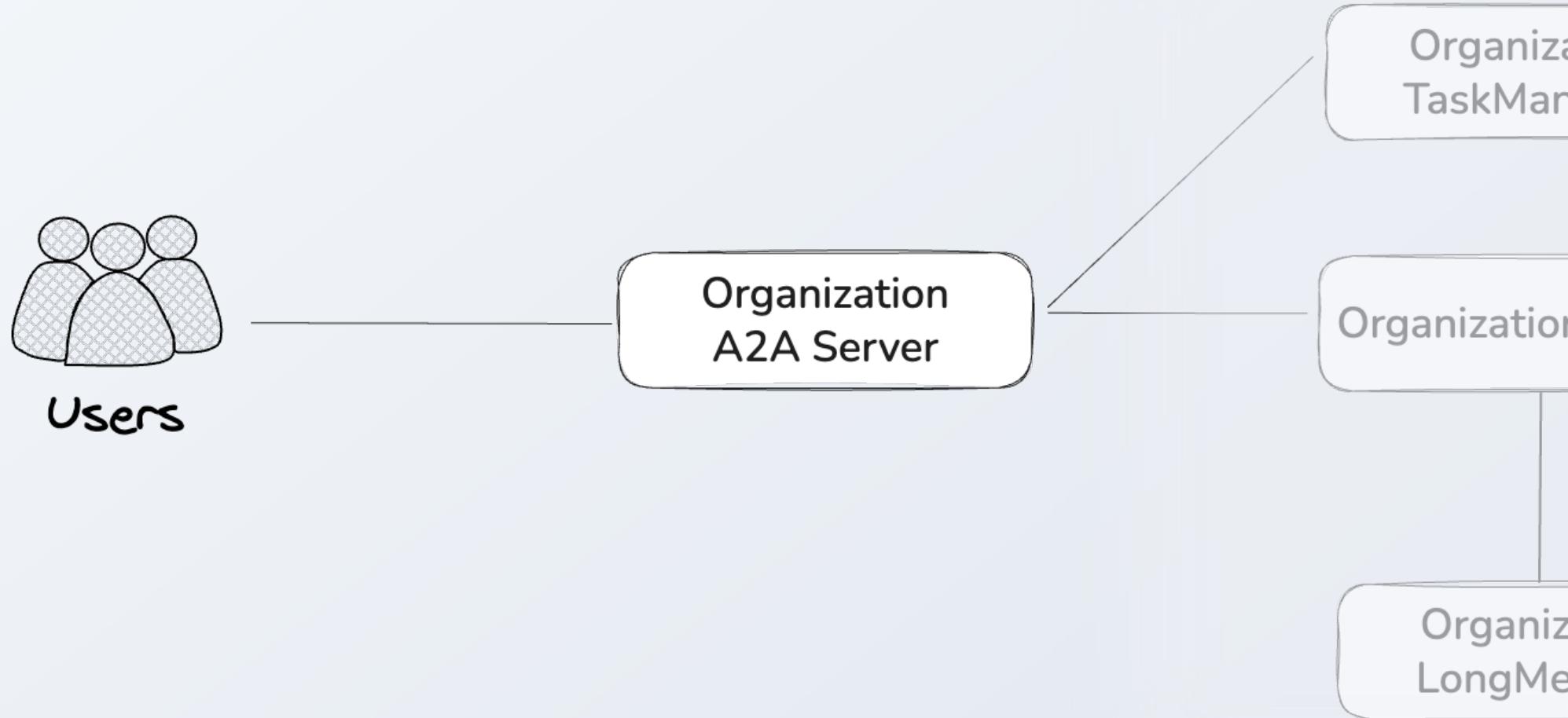


# Architecture



# Architecture

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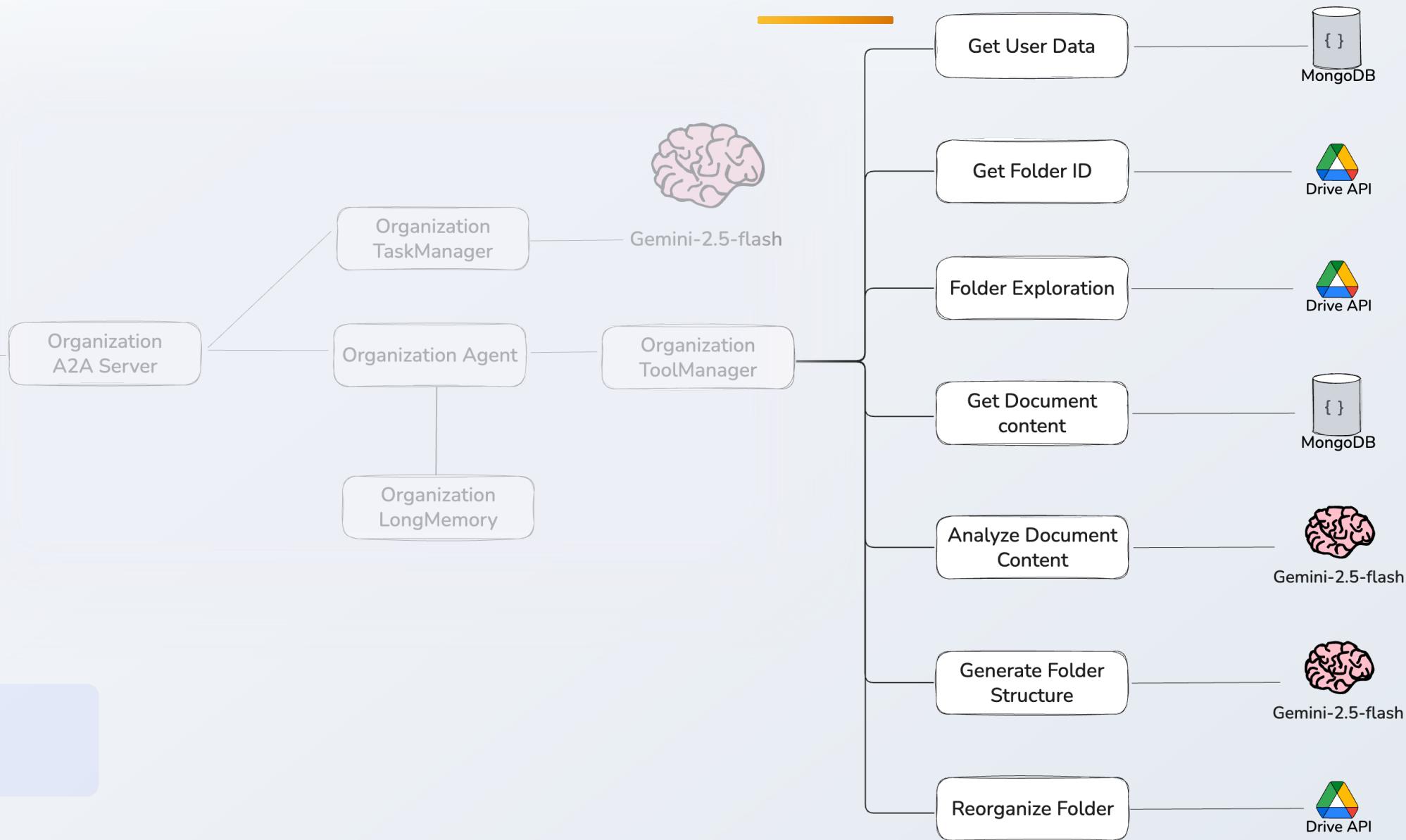


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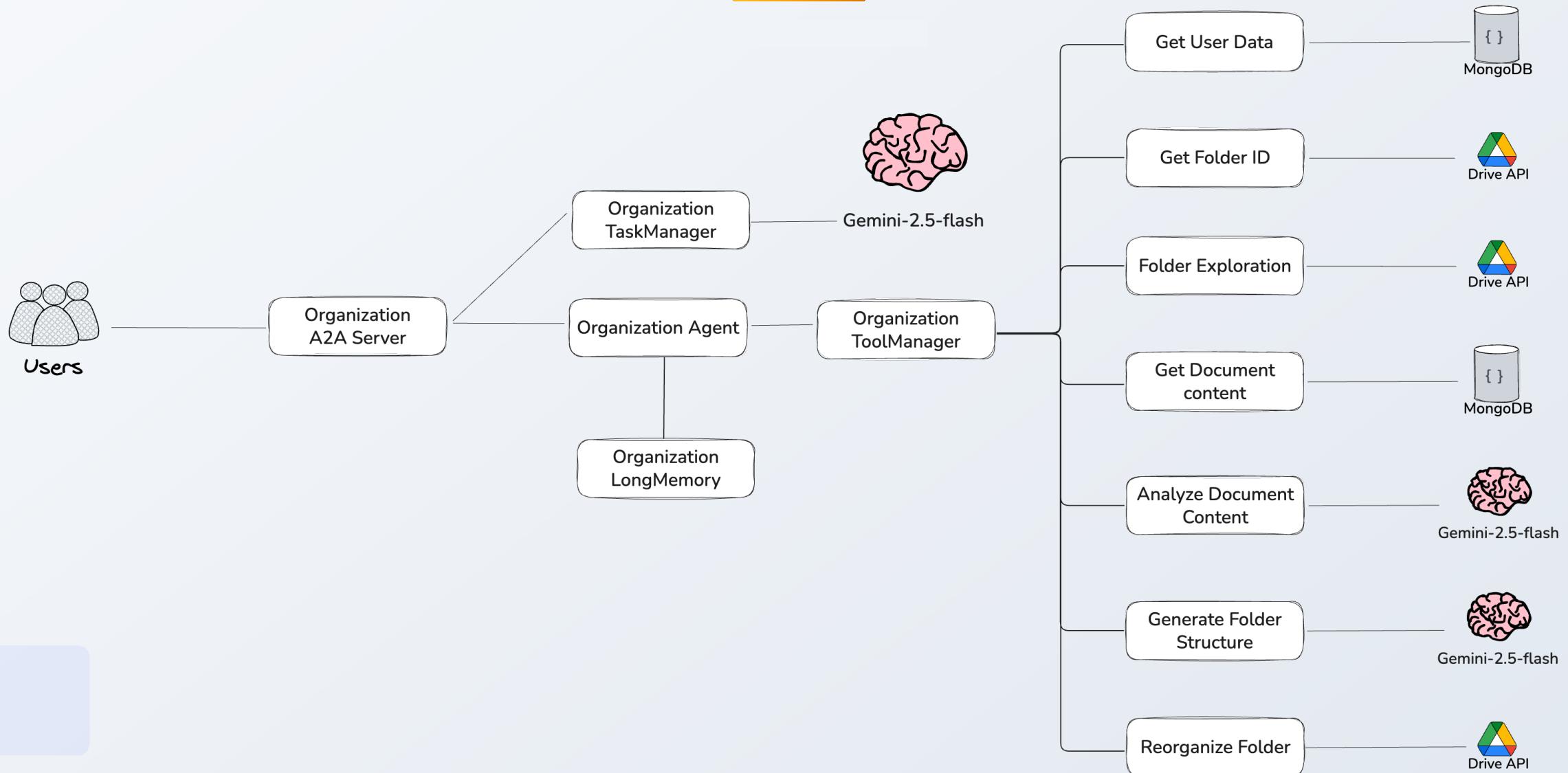
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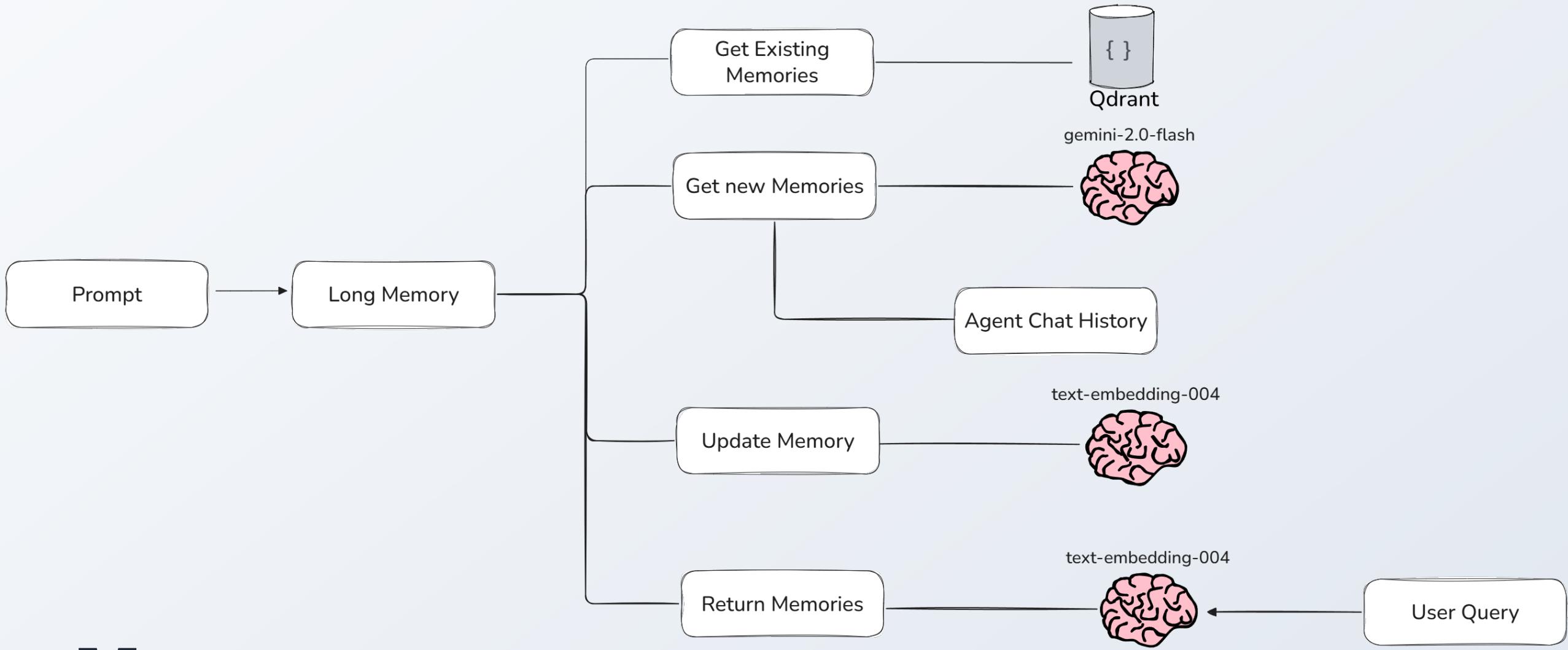


# Architecture



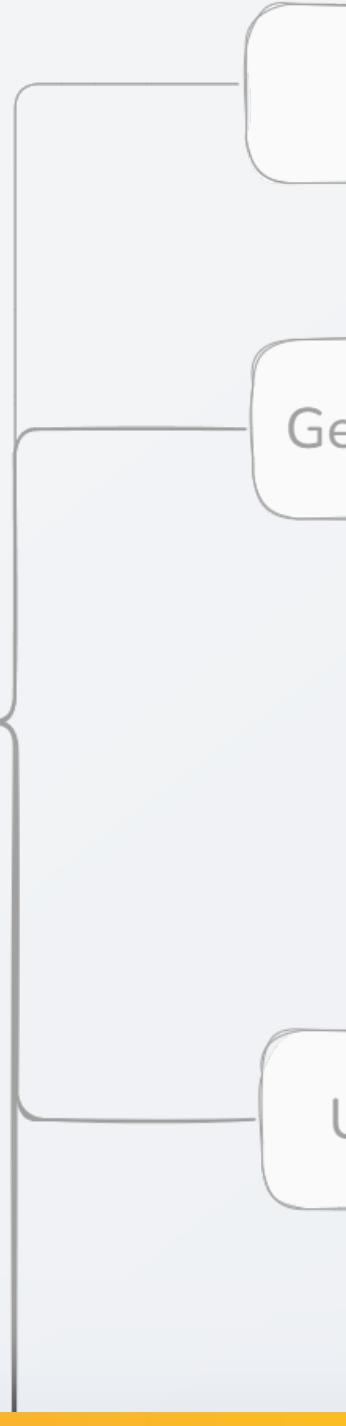
# Architecture

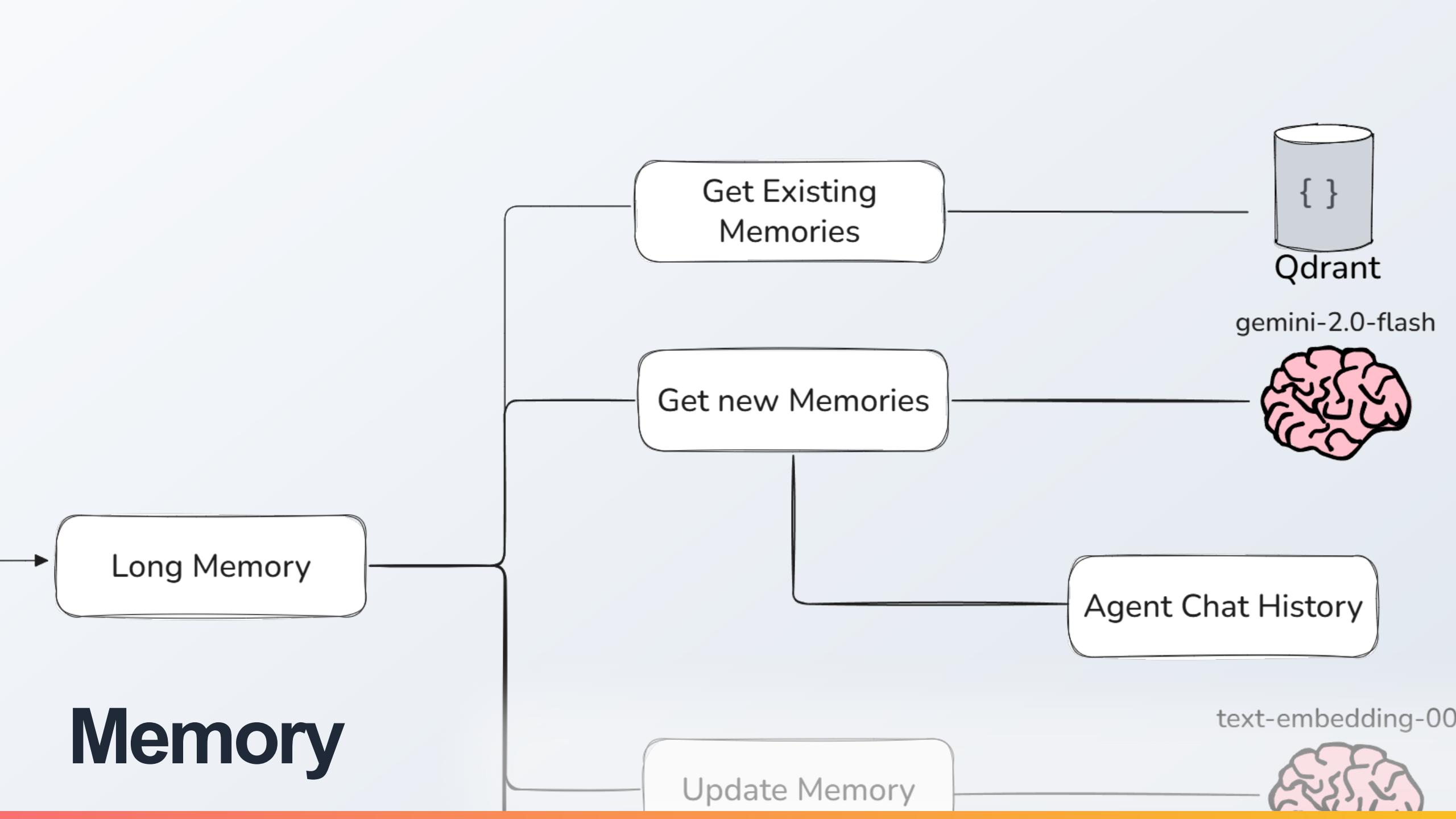


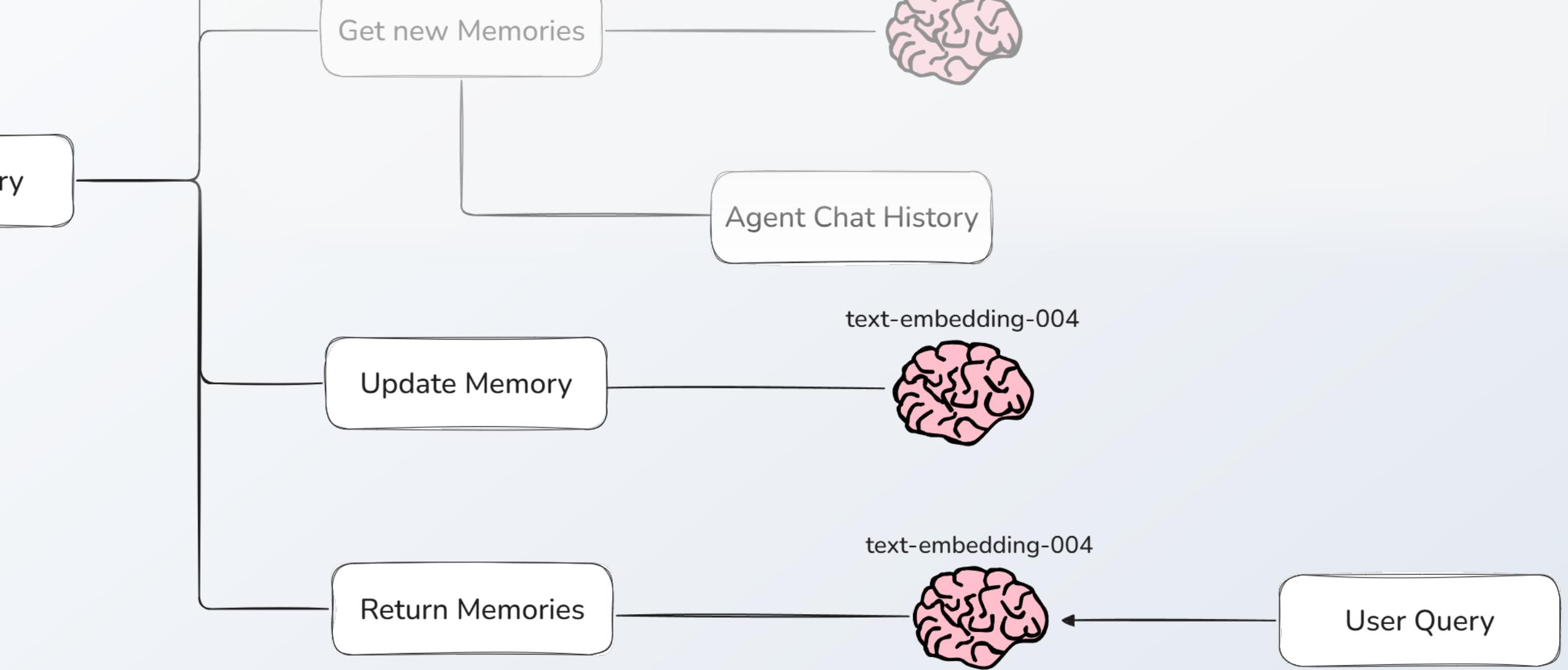


# Memory

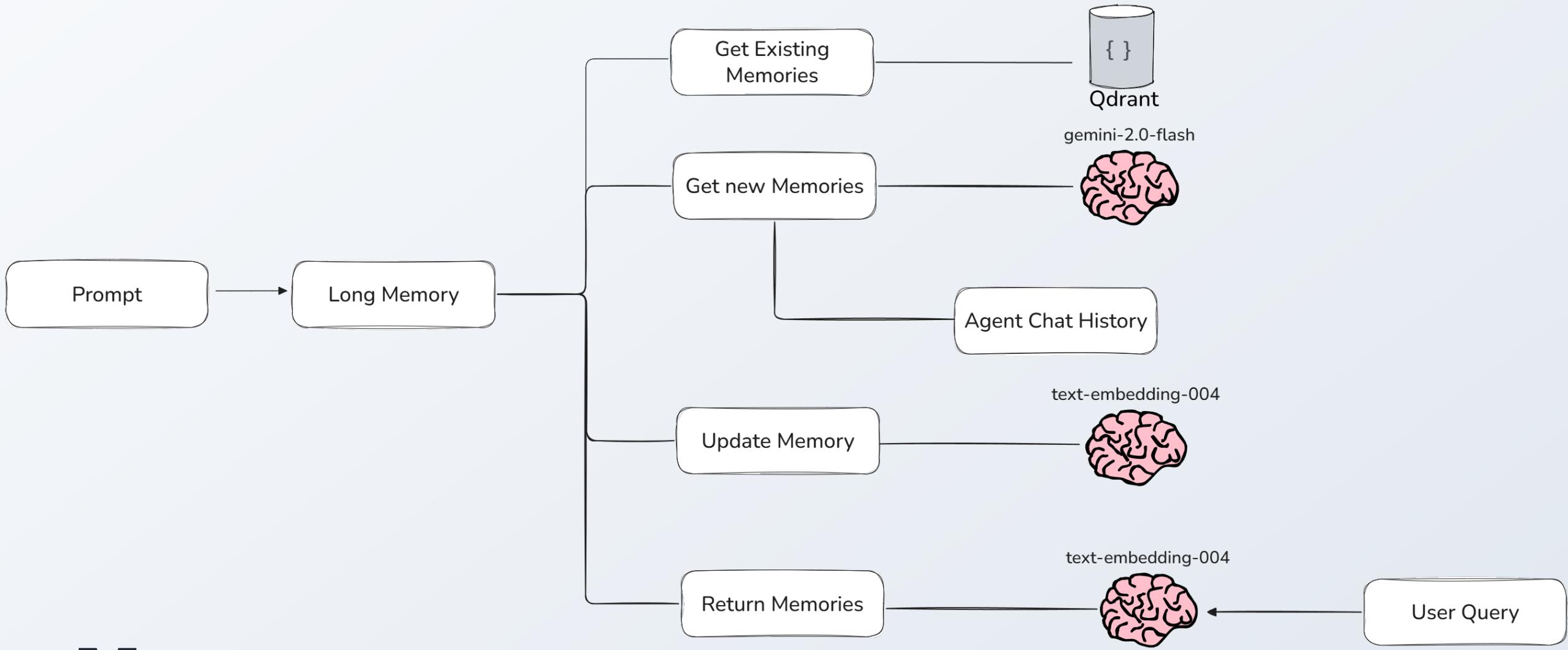
# Memory







# Memory



# Memory

# Evaluation

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## What We Evaluate

Single Agent Performance

End-to-End Interaction

Tool Result Accuracy



## Why We Evaluate

Performance Measurement

Customer Trust

Risk Mitigation

Value Demonstration

# Evaluation: How

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## Summarizer

- LLM
- Readability
- Conciseness



## RAG

- Answer fidelity



## Exam Generator

- Keyword Mapping
- Semantic similarity



## Drive Organizer

- Intra cluster similarity
- Inter cluster similarity
- Silhouette Coefficient



## Orchestrator

- Store trace in memory
- Success rate



# What Works Today

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Orchestrator



Transcription Tool



Dashboard



Q&A Agent



Google Drive Hook



Agent SDK



Course Organizer



Exam Generator



Summarization



RESTful Backend



Material Feedback



Evaluation



# Future Work



## Course Material Feedback

Enhanced feedback mechanisms for educational content

HIGH



## Advanced Evaluation Tools

Comprehensive performance analytics and insights

MED



## Continuous Learning System

Self-improving AI capabilities through user interactions

MED



## Complete Development Stack

Finalize backend infrastructure and user interface

LOW



## Enhanced System Reliability

Improved stability, error handling, and performance

LOW



# What We Learned



## Agents in Depth

Understanding autonomous agent behavior and orchestration



## MCP Principles

Model Context Protocol integration and implementation



## A2A Principles

Agent-to-Agent communication protocols and patterns



## Evaluating Agents

Performance metrics and quality assessment methods



## Scalable Deployment

Production-ready AI system architecture and scaling



# What was hard

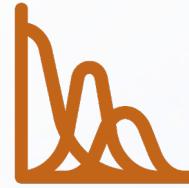
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**Implementing  
agent SDK**



**Debugging an  
agent  
orchestration**



**Managing non  
deterministic  
environment**

A vintage typewriter sits on a wooden desk under a warm, glowing lamp. In the background, a bookshelf filled with books is visible.

# Thanks For Attention!

Available for questions

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