Google Agent Development Kit (ADK): Introduction and Purpose

Overview

The Agent Development Kit (ADK) is a flexible and modular framework for developing and deploying AI agents, launched by Google at Google Cloud NEXT 2025 on April 9, 2025. ADK is designed to simplify the full stack end-to-end development of agents and multi-agent systems, empowering developers to build production-ready agentic applications with greater flexibility and precise control.

ADK is the same framework powering agents within Google products like Agentspace and the Google Customer Engagement Suite (CES). By open-sourcing ADK, Google aims to provide developers with powerful, flexible tools to build in the rapidly evolving agent landscape.

Core Purpose

The primary purpose of ADK is to make it easy to build multi-agent applications. As the world of AI is rapidly moving beyond single-purpose models towards intelligent, autonomous multi-agent systems, building these multi-agent systems presents new challenges. ADK addresses these challenges by providing a comprehensive framework that supports the entire agent development lifecycle.

ADK can be used with popular LLMs and open-source generative AI tools and is designed with a focus on tight integration with the Google ecosystem and Gemini models. It makes it easy to get started with simple agents powered by Gemini models and Google AI tools while providing the control and structure needed for more complex agent architectures and orchestration.

Key Features and Benefits

ADK provides capabilities across the entire agent development lifecycle, organized around four core pillars: Build, Interact, Evaluate, and Deploy.

1. Multi-Agent Architecture

- Build modular and scalable applications by composing multiple specialized agents in a hierarchy
- Enable complex coordination and delegation between agents
- Support for hierarchical structures and intelligent routing

2. Rich Model Ecosystem

- Works with various models including Gemini and any model accessible via Vertex AI Model Garden
- Offers LiteLLM integration for access to models from providers like Anthropic, Meta, Mistral AI, AI21 Labs, and more

3. Rich Tool Ecosystem

- Equip agents with diverse capabilities through pre-built tools (Search, Code Exec)
- Support for Model Context Protocol (MCP) tools
- Integration with 3rd-party libraries (LangChain, LlamaIndex)
- Ability to use other agents as tools (LangGraph, CrewAI, etc.)

4. Built-in Streaming

- Interact with agents in human-like conversations with bidirectional audio and video streaming capabilities
- Create natural interactions that move beyond text into rich, multimodal dialogue

5. Flexible Orchestration

- Define workflows using workflow agents (`Sequential` , `Parallel` , `Loop`) for predictable pipelines
- Leverage LLM-driven dynamic routing (`LlmAgent` transfer) for adaptive behavior

6. Integrated Developer Experience

- Develop, test, and debug locally with a powerful CLI and a visual Web UI
- Inspect events, state, and agent execution step-by-step

7. Built-in Evaluation

- Systematically assess agent performance by evaluating both the final response quality and the step-by-step execution trajectory against predefined test cases

8. Easy Deployment

- Containerize and deploy agents anywhere
- Run locally, scale with Vertex AI Agent Engine, or integrate into custom infrastructure using Cloud Run or Docker

Getting Started

ADK emphasizes Pythonic simplicity. Developers define their agent's logic, the tools it can use, and how it should process information. ADK provides the structure to manage state, orchestrate tool calls, and interact with the underlying LLMs.

A basic agent can be created with just a few lines of code:

```
 from google.adk.agents import LlmAgent
from google.adk.tools import google_Search

dice_agent = LlmAgent(
    model="gemini-2.0-flash-exp", # Required: Specify the LLM
    name="question_answer_agent", # Required: Unique agent name
    description="A helpful assistant agent that can answer questions.",
    instruction="""Respond to the query using google search""",
    tools=[google_search], # Provide an instance of the tool
)

# you can run this by using adk web
```

ADK offers flexibility in the way developers interact with their agents: - CLI - Web UI - API Server - API (Python)

The way the agent is defined (the core logic within `agent.py`) is the same regardless of how developers choose to interact with it. The difference lies in how the interaction is initiated and managed.

Target Users

ADK is designed for developers who want to build AI agents and multi-agent systems. It provides tools and frameworks for both beginners who want to get started quickly with simple agents and experienced developers who need to build complex, production-ready agent architectures.

Conclusion

Google's Agent Development Kit represents a significant step forward in making agent development more accessible and powerful. By providing a flexible, modular framework that supports the entire agent development lifecycle, ADK enables developers to build sophisticated AI agents and multi-agent systems with greater ease and control.