MCP Dev Summit Nairobi

Google Developer Experts

Getting Started with MCP, ADK, and A2A



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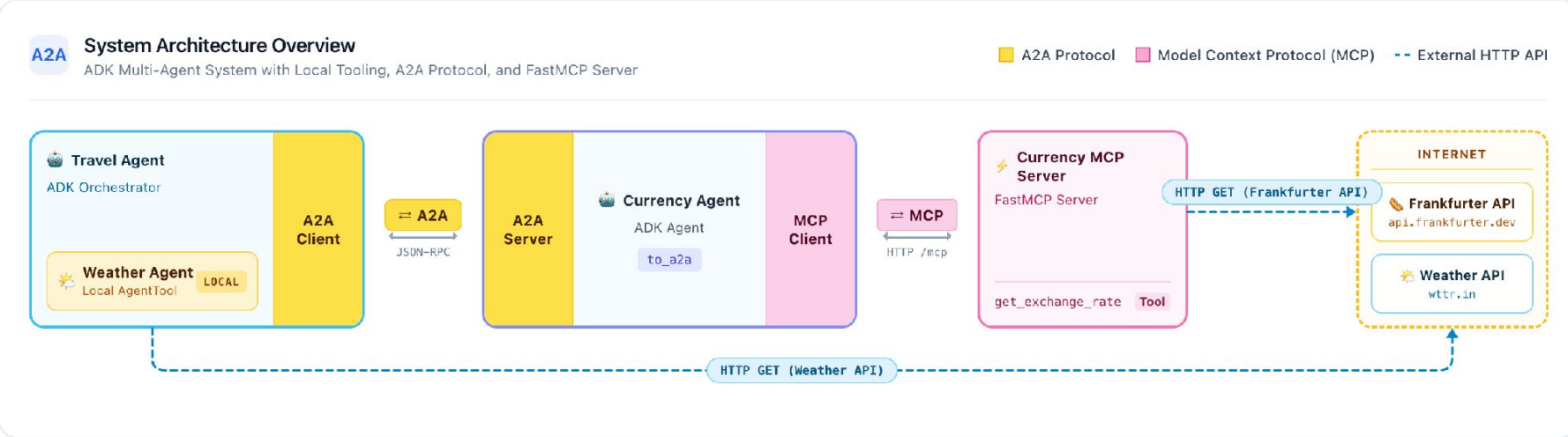
Session Overview

- This workshop will help you get started by showing you how to build a currency agent that can convert between different countries' currencies payments

- With the goal of walking through the latest technologies to help you understand those acronyms (MCP, ADK, A2A) that you may have seen floating around the internet.

Architecture



Why This Workshop?

This workshop takes you beyond building a single AI agent and introduces the building blocks of a real, interconnected agent ecosystem.



From AI assistants to agentic systems: Move beyond standalone chatbots to agents that can use tools, delegate tasks, and collaborate to accomplish complex goals.



Connecting AI to the real world with MCP: Learn how the Model Context Protocol (MCP) gives agents standardized access to external tools, APIs, and services.



Enabling agent-to-agent collaboration with A2A: Understand how independently built agents can communicate, delegate work, and operate together across services.



Building multi-agent systems with ADK: Explore how to orchestrate specialized agents, combine local subagents with remote agents, and build modular AI applications.



From local prototypes to production: See how these components come together in a deployable architecture using Google Cloud Run.

Evolution of AI Use Cases



Predictive AI

Regression & Classification
Forecasting
Sentiment Analysis
Entity Extraction
Object Detection



Generative AI

Text, Image & Code Gen
Rewriting & Formatting
Summarization
Extractive Q&A
Descriptions



Multimodal Generative AI

Image Understanding
Spatial Reasoning
Math in Context
Video Q&A
Speech & Translation



Agentic AI

Autonomous Agents
Goal-Oriented Tasks
Tool Use & Planning
Multi-Agent Collaboration
Self-Correction

What is an Agent?

An AI agent is a software system that can perceive information, reason about it, make decisions, and take actions to achieve a goal, often with some level of autonomy.

Key Characteristics:

Perception: Can receive and interpret information (e.g., user input).

Reasoning: Uses an LLM to "think" and decide on actions.

Action: Can execute tasks using "tools."

Autonomy: Can make decisions independently.

Goal-Oriented: Designed to achieve specific objectives.

Alternatively

An AI agent is an AI-powered system designed to pursue a goal, interpret instructions, determine appropriate actions, and use available tools to complete tasks.

Core components of an AI agent

Goal

What the agent is expected to accomplish.

Instructions

The rules, role, and behavior that guide its responses.

Model

The underlying AI that interprets requests and generates responses.

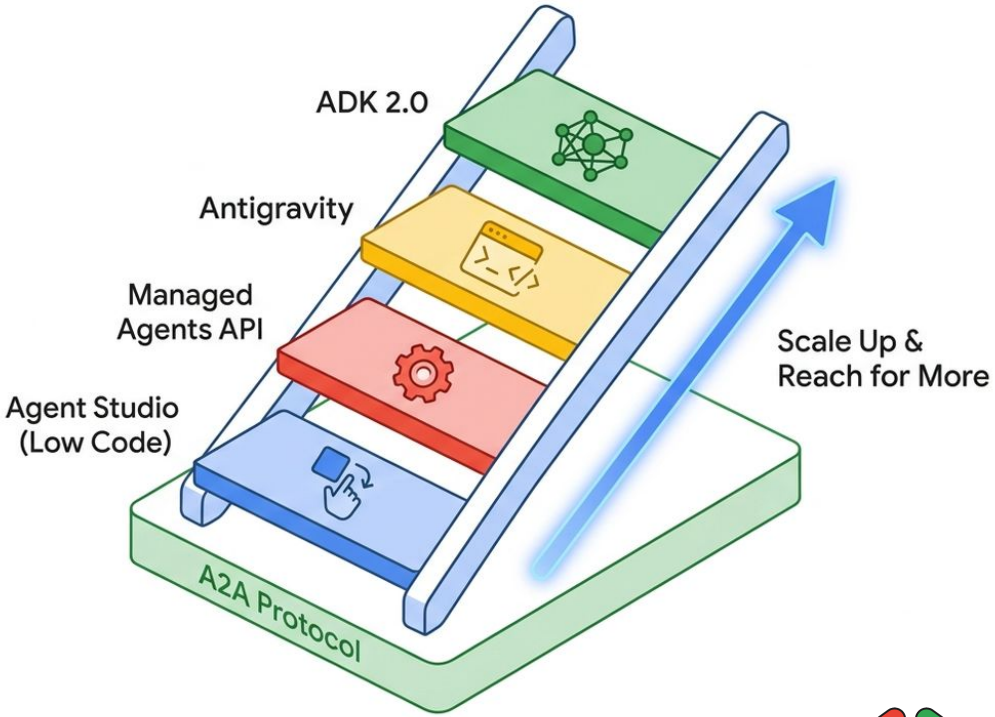
Tools

Capabilities that allow the agent to retrieve information or perform tasks.

Testing

Evaluating the agent's responses and refining its behavior.

Google's Agent Stack



Model Context Protocol (MCP)

Model Context Protocol (MCP) is an **open protocol** that standardizes how applications provide context to LLMs.

It provides a **standardized way** to connect AI models to:

- Resources
- Prompts
- Tools



Agent Development Kit (ADK)

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ADK is a **flexible orchestration framework** for developing and deploying AI agents.

It is designed to make agent development feel like software development:

- **Model-Agnostic:** Works with any LLM.
- **Deployment-Agnostic:** Built for cross-framework compatibility.
- **Scalable:** From simple tasks to complex agentic architectures.



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Python Java Go TypeScript

Agent2Agent (A2A) Protocol

- The Agent2Agent (A2A) Protocol is an **open standard** designed to enable seamless communication and collaboration between AI agents.
- Just like how **MCP** standardizes data access, A2A provides a **standardized way** for agents to talk to other agents!
- In a multi-vendor world, A2A provides a **common language**, breaking down silos and fostering interoperability.



What You'll Learn

- How to create and test a local MCP server using FastMCP over Streamable HTTP
- How to build an Agent with ADK that uses MCP tools (McpToolset)
- How to expose an ADK agent as an A2A server (to_a2a)
- How to test an A2A server using the A2A Python Client (a2a.client)
- How to build an orchestrator agent that combines local subagent tools with remote A2A agents
- How to run and test the complete multi-agent system locally with the ADK Web UI
- How to containerize and deploy all three components to Google Cloud Run

What You'll Need

- A browser, such as Chrome or Firefox
- A Google Cloud project with billing enabled.

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QUESTIONS AND ANSWERS



Additional Resources

- ADK Documentation: https://google.github.io/adk-docs/
- MCP Documentation: https://modelcontextprotocol.io/introduction
- A2A GitHub Repository: https://github.com/google/A2A
- Gemini Enterprise Agent Platform Documentation:

  https://docs.cloud.google.com/gemini-enterprise-agent-platform/overview

Thank You!

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