Zero-Touch Customer Experience: An AI-Driven Multi-Agent System

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The Team & The Mission: Our Cross-Functional Team

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Challenge Overview: Zero-Touch Customer Experience

Design an agentic AI system to autonomously handle natural language requests with compliance and enterprise-grade observability.

Presentation Dates

Locations	Date
Hyderabad & Bangalore	Monday, December 15
Charlotte & New York	Tuesday, December 16

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The Mandate: From Manual Service to Autonomous Experience

The Business Problem

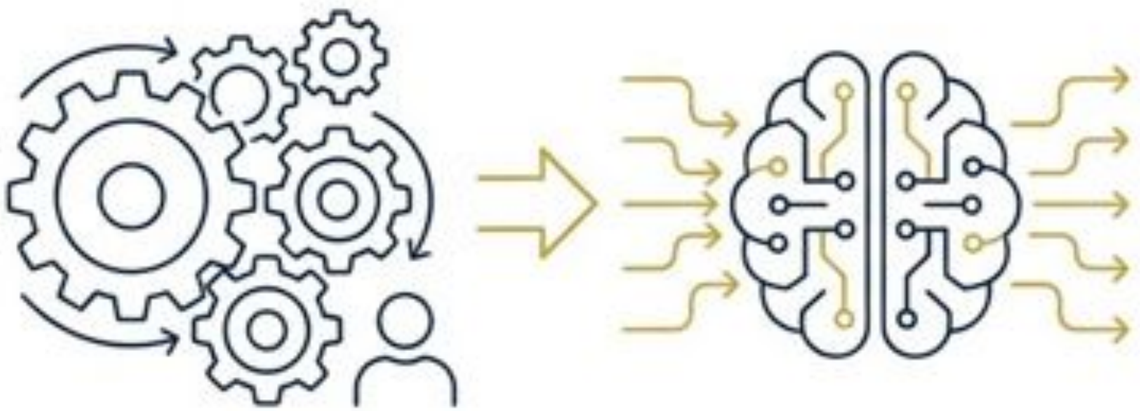
- High operational costs in manual support, slow upsell processes leading to missed revenue, and inconsistent service quality across customer interactions.

The Challenge (Zero-Touch Customer Experience)

- Design an agentic AI system that understands natural language, provides instant, accurate reports, and executes tasks like plan upgrades autonomously.

Our Success Criteria

- Achieve ≥80% accuracy in report generation, enable fully autonomous (“zero-touch”) plan upgrades, and ensure robust compliance and observability.

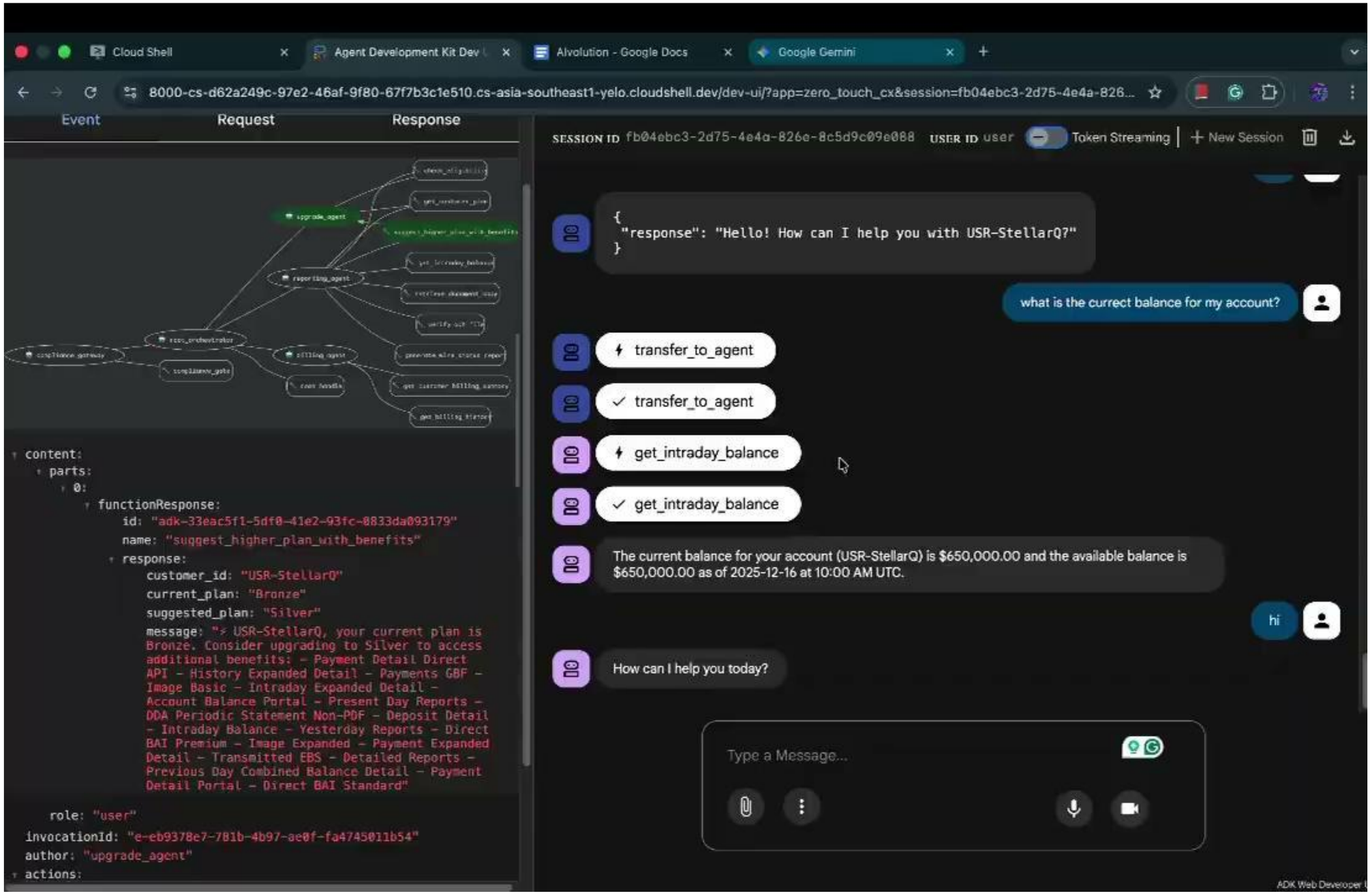


Manual Process

Autonomous System

Target State

DEMO


Cloud Shell
Agent Development Kit Dev
AIvolution - Google Docs
Google Gemini
8000-cs-d62a249c-97e2-46af-9f80-67f7b3c1e510.cs-asia-southeast1-yelo.cloudshell.dev/dev-ui/?app=zero_touch_cx&session=fb04ebc3-2d75-4e4a-826...
Event
Request
Response
SESSION ID fb04ebc3-2d75-4e4a-826e-8c5d9c09e088
USER ID user
Token Streaming
New Session
{
"response": "Hello! How can I help you with USR-StellarQ?"
}
what is the currect balance for my account?
transfer_to_agent
transfer_to_agent
get_intraday_balance
get_intraday_balance
The current balance for your account (USR-StellarQ) is $650,000.00 and the available balance is $650,000.00 as of 2025-12-16 at 10:00 AM UTC.
hi
How can I help you today?
Type a Message...
ADK Web Developer
content:
parts:
0:
functionResponse:
id: "adk-33eac5f1-5df0-41e2-93fc-8833da093179"
name: "suggest_higher_plan_with_benefits"
response:
customer_id: "USR-StellarQ"
current_plan: "Bronze"
suggested_plan: "Silver"
message: "⚡ USR-StellarQ, your current plan is Bronze. Consider upgrading to Silver to access additional benefits: - Payment Detail Direct API - History Expanded Detail - Payments GBF - Image Basic - Intraday Expanded Detail - Account Balance Portal - Present Day Reports - DDA Periodic Statement Non-PDF - Deposit Detail - Intraday Balance - Yesterday Reports - Direct BAI Premium - Image Expanded - Payment Expanded Detail - Transmitted EBS - Detailed Reports - Previous Day Combined Balance Detail - Payment Detail Portal - Direct BAI Standard"
role: "user"
invocationId: "e-eb9378e7-781b-4b97-ae0f-fa4745011b54"
author: "upgrade_agent"
actions:

The Agentic Cloud: Multi-Agent GEN AI System Architecture

System Flow: From Query to Action

1. Query Intake & Orchestration

User Query

Coordinator Agent (ADK)
Receives and directs the workflow.

2. Collaborative Task Execution

Reporting Agent
Function: Generates insights & business reports.
Tech. BigQuery

Upgrade Agent
Function: Identifies upsell opportunities using enterprise docs.
Tech: Vertex AI Search (RAG)

Billing Agent
Function: Handles queries about billing and account status.
Tech: BigQuery

3. Actionable Outcomes

- Proactive Outreach
- Automated Resolution
- Unified Dashboard Updates

Delivers proactive outreach, automated resolutions, and unified dashboard updates.

The Core Engine & Business Impact

The "Brain Stem": Shared Data & Memory

BigQuery ⟷ Vertex AI Vector Search

Provide long term memory and context for all agents.

Competitive Edge: Stateful Multi-Step Reasoning

Gemini 2.5 Flash + ADK

Enables complex problem solving far beyond single-agent RAG systems.

Delivering Measurable Business Value

- Increase Revenue
- Reduce Churn
- Improve Customer Satisfaction

Enterprise-Grade Reliability & Security

Foundational Security

Zero-Trust Security Model

Implements a “least privilege” architecture using dedicated service accounts to prevent violations.

Granular Access Control

Ensures agents can only perform authorized actions with roles like **dataViewer** or **jobUser**.

AI Accuracy & Reliability

Hallucination Prevention

Uses strict grounding in source documents via Vertex AI Search to prevent factual invention.

Verifiable & Restricted Output

Agents can only respond with data that is backed by the indexed knowledge base.

Operational Guardrails

Financial & Confidence Gating

Intents with less than 80% confidence automatically trigger a fallback to a human agent.

Mandatory Compliance Checks

A specialized agent must validate all “write” actions, like plan upgrades, before execution.

System Transparency

Deep Observability

Provides end-to-end tracing with full telemetry streamed directly to BigQuery dashboards.

Fluid State Management

Hierarchical tracking enables the system to handle interruptions and context switching effectively.

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Reference Links

Supporting Documentation

Detailed architecture diagrams, runtime flow descriptions, and setup guides are included in the project repository.

Code Repositories

All code, agent definitions, and deployment scripts are available for review at the following link.

https://github.com/ihackathon20259/ccibt-hack2025

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Q&A