RECIPE PREPARATION AGENT:
AI SOUS CHEF FOR SMART COOKING

Presented By:

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OUTLINE

- **Problem Statement**
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

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PROBLEM STATEMENT

- Current meal planning and cooking are often limited by the ingredients on hand, leading to food waste, inconvenience, or poor dietary choices.
- There is no intelligent solution to suggest recipes, substitutions, or dietary adaptations based on available kitchen items and restrictions (allergies, preferences) in real time.

PROPOSED SOLUTION

- The system addresses the challenge of suggesting smart, personalized recipes based on available ingredients, while considering dietary restrictions and minimizing food waste. It combines language models with real-time knowledge retrieval.
- Ingredient Collection:
  - Users input ingredients via text (future: voice/image).
  - Optional filters: diet type, allergies, cooking time.
- Input Preprocessing:
  - Clean and map ingredients to standard formats.
  - Recognize ingredient categories (e.g., leafy greens).
- Recipe Generation:
  - Suggests step-by-step instructions and smart substitutions.
- Deployment:
  - Built using IBM watsonx Agent Lab and deployed as a REST API.
  - Usable via chatbot, web, or smart device interfaces.
- Evaluation:
  - Based on user satisfaction, clarity, and ingredient match.
  - Improved with continuous feedback.
- Result:
  - Smarter meal planning
  - Reduced waste
  - Cooking made easier and more inclusive

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SYSTEM APPROACH

- System Requirements:
  - IBM Cloud Lite account
  - watsonx.ai and Agent Lab
  - Cloud Object Storage
- Technologies:
  - LangGraph
  - IBM Foundation Models (Mistral)
  - REST API
- Methodology:
  - Low-code agent via GUI
  - Web/Knowledge tools
  - Deployable as reusable AI service

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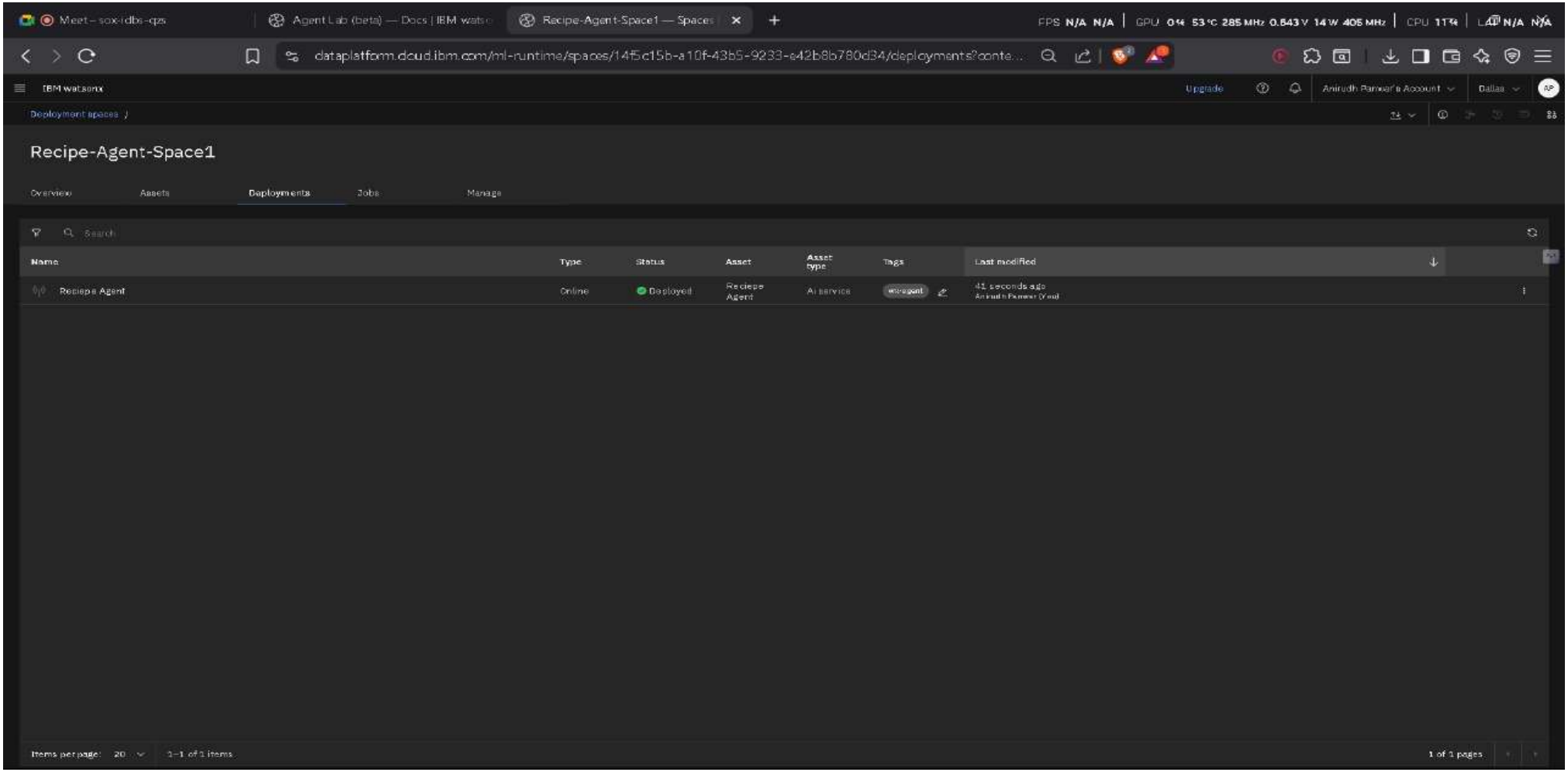
ALGORITHM & DEPLOYMENT

- Data Input:
  The agent takes input in various forms:
  - A list of available ingredients (entered as free text)
  - Optional dietary constraints (e.g., vegan, gluten-free, nut allergy)
  - Cooking preferences (e.g., quick recipes, no oven, Indian cuisine)
- Future expansion may include:
  - Images of ingredients (via computer vision)
  - Voice input (for hands-free kitchen use)
- Training Process:
  - No fine-tuning or supervised training is required as the agent uses pre-trained foundation models.
  - The system is enhanced with a curated set of retrieval tools: web search, Wikipedia, and internal recipe datasets.
  - Tools are connected via IBM watsonx Agent Lab using the LangGraph framework with the ReAct agent strategy.
- Prediction Process:
  - When the user provides ingredients and constraints, the agent first performs knowledge retrieval using built-in tools.
  - The retrieved results are passed to the LLM, which generates a personalized, step-by-step recipe.
  - The agent also suggests smart substitutions (e.g., “Out of eggs? Try using yogurt or banana.”) and highlights allergy considerations.
  - The model generates natural language output suitable for display in web/mobile apps.
- Deployment:
  - The system is deployed using the “Deploy as AI service” option in IBM watsonx Agent Lab.
  - A REST API is automatically generated, enabling integration with other applications (e.g., mobile app, smart fridge UI).
  - The deployment is scalable and can handle multiple concurrent users with low latency.

RESULT


Recipe-Agent-Space1
Overview
Assets
Deployments
Jobs
Manage
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Status
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Tags
Last modified
Recipe Agent
Online
Deployed
Recipe Agent
AI service
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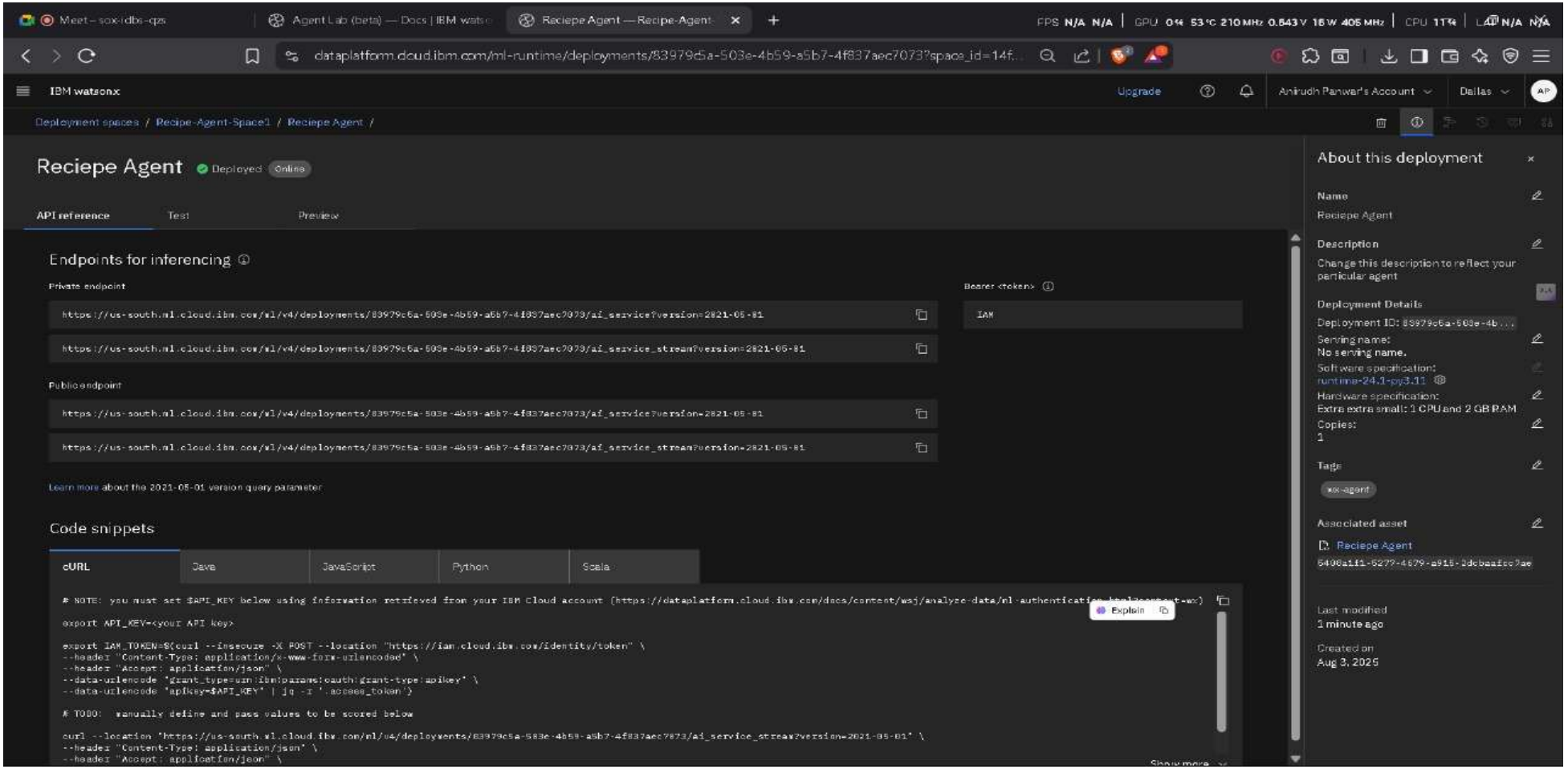

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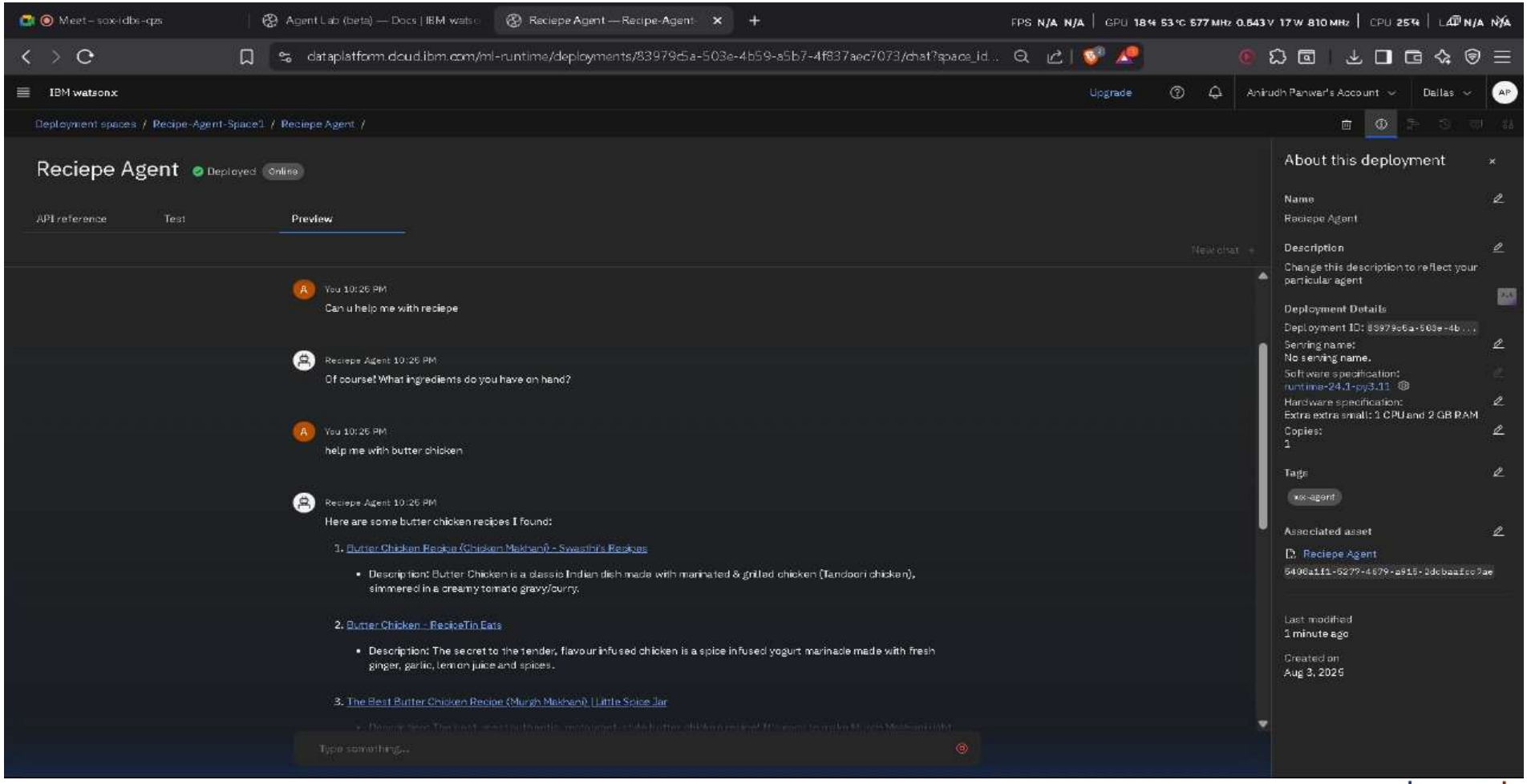
Meet – sox-idbs-qps
Agent Lab (beta) — Docs | IBM watso
Reciepe Agent — Recipe-Agent
dataplatform.cloud.ibm.com/ml-runtime/deployments/83979c5a-503e-4b59-a5b7-4f837aec7073/chat?space_id...
IBM watsonx
Upgrade
Anirudh Panwar's Account
Dallas
Deployment spaces / Recipe-Agent-Space1 / Reciepe Agent /
Reciepe Agent
Deployed
Online
API reference
Test
Preview
New chat
You 10:25 PM
Can u help me with reciepe
Reciepe Agent 10:26 PM
Of course! What ingredients do you have on hand?
You 10:26 PM
help me with butter chicken
Reciepe Agent 10:26 PM
Here are some butter chicken recipes I found:
1. Butter Chicken Recipe (Chicken Makhani) - Swasthi's Recipes
Description: Butter Chicken is a classic Indian dish made with marinated & grilled chicken (Tandoori chicken), simmered in a creamy tomato gravy/curry.
2. Butter Chicken - RecipeTin Eats
Description: The secret to the tender, flavour infused chicken is a spice infused yogurt marinade made with fresh ginger, garlic, lemon juice and spices.
3. The Best Butter Chicken Recipe (Murgh Makhani) | Little Spice Jar
Type something...
About this deployment
Name
Reciepe Agent
Description
Change this description to reflect your particular agent
Deployment Details
Deployment ID: 83979c5a-503e-4b...
Serving name:
No serving name.
Software specification:
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Hardware specification:
Extra extra small: 1 CPU and 2 GB RAM
Copies:
1
Tags
sox-agent
Associated asset
Reciepe Agent
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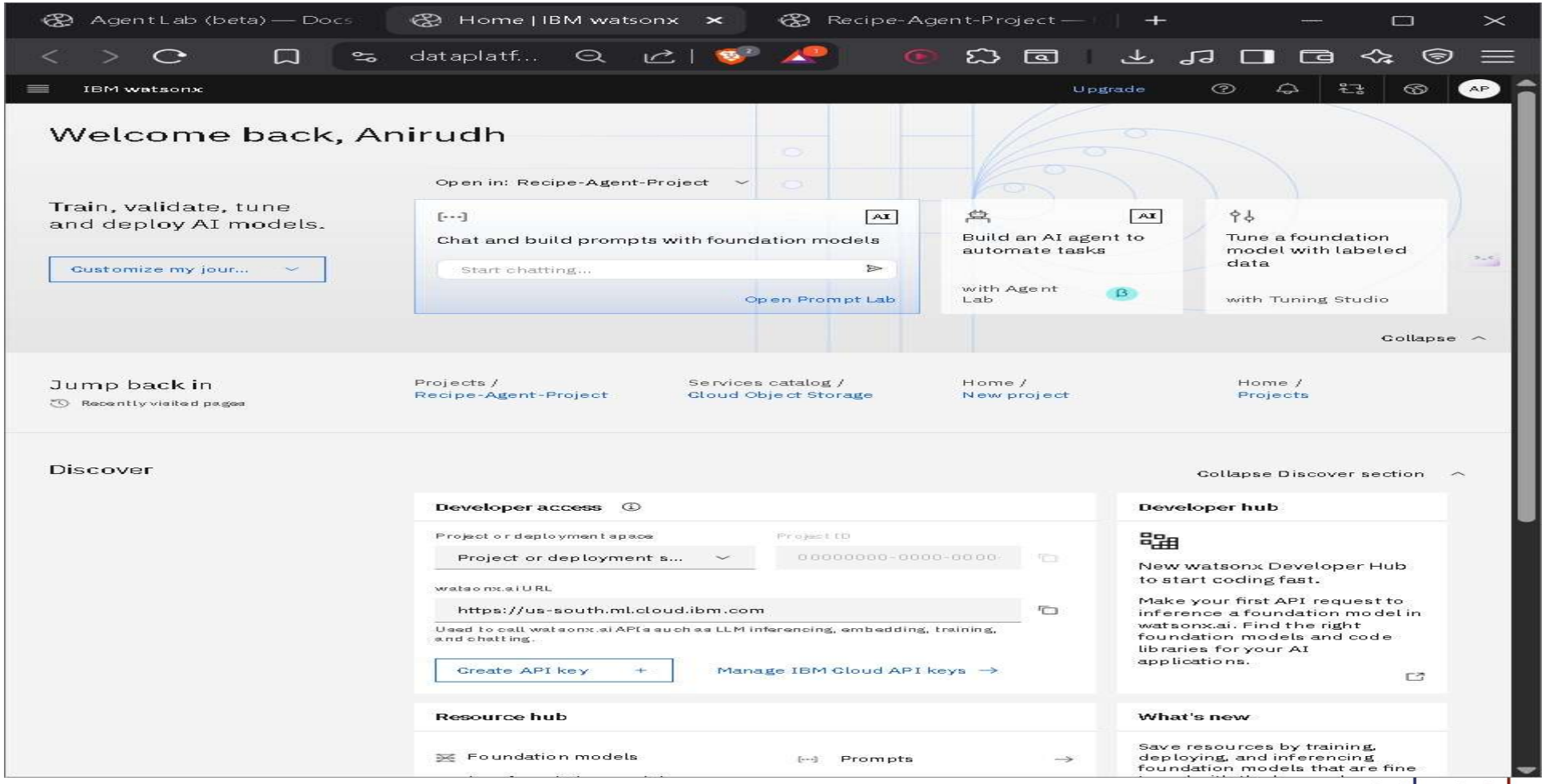
Created on
Aug 3, 2025



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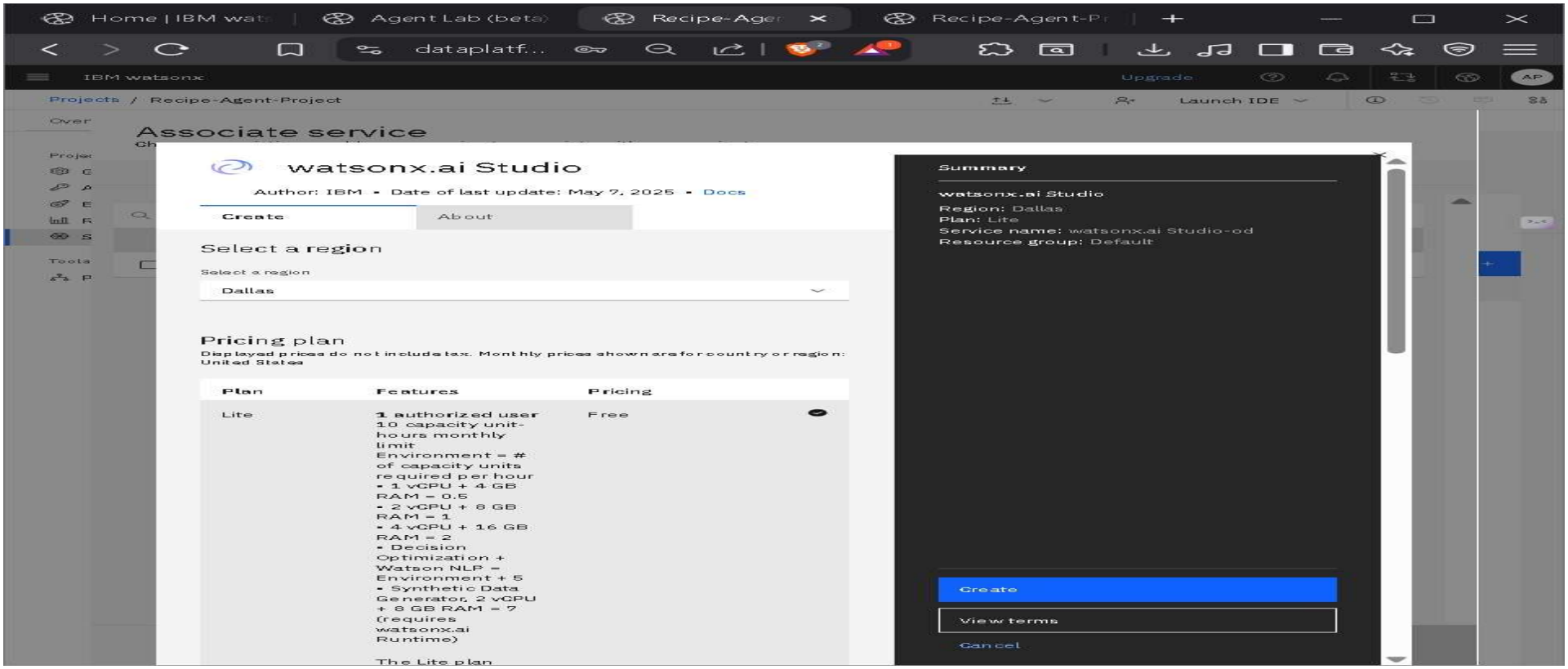

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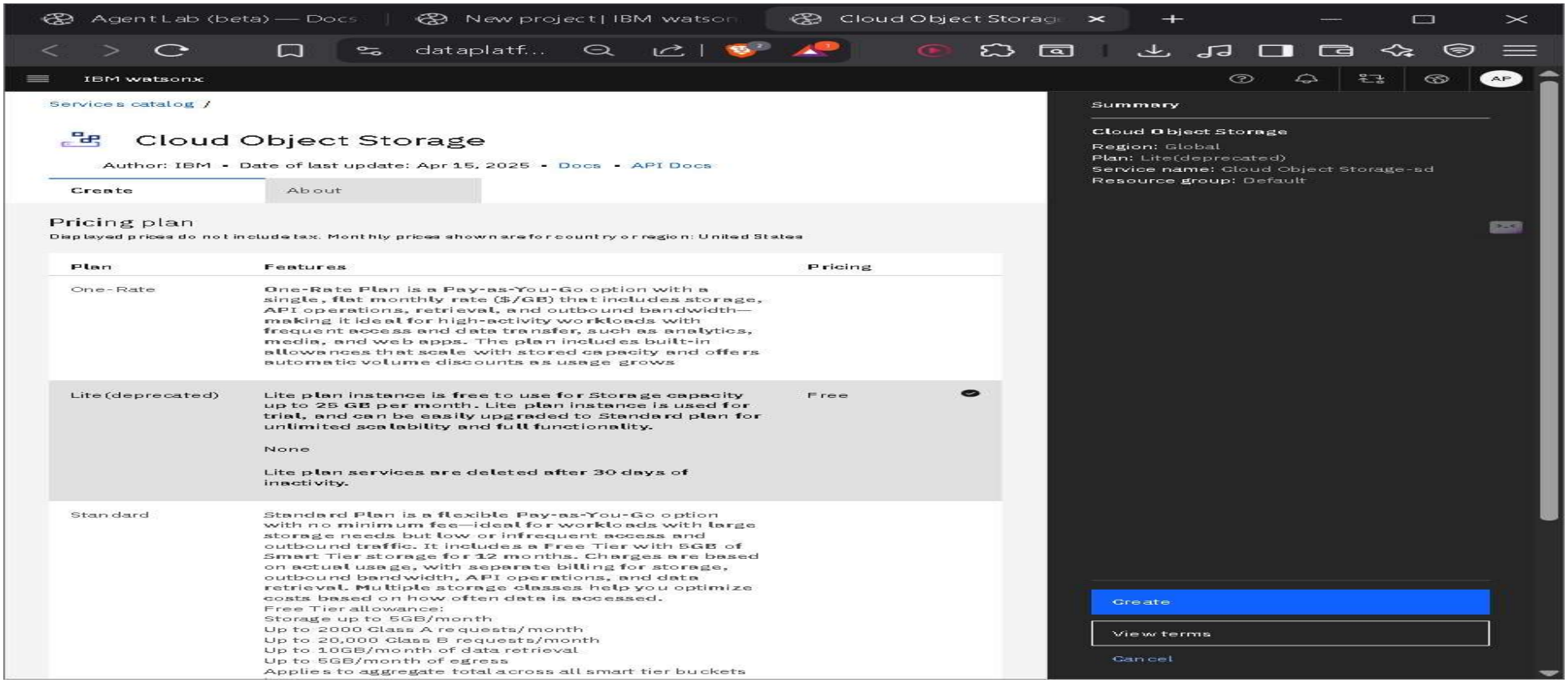

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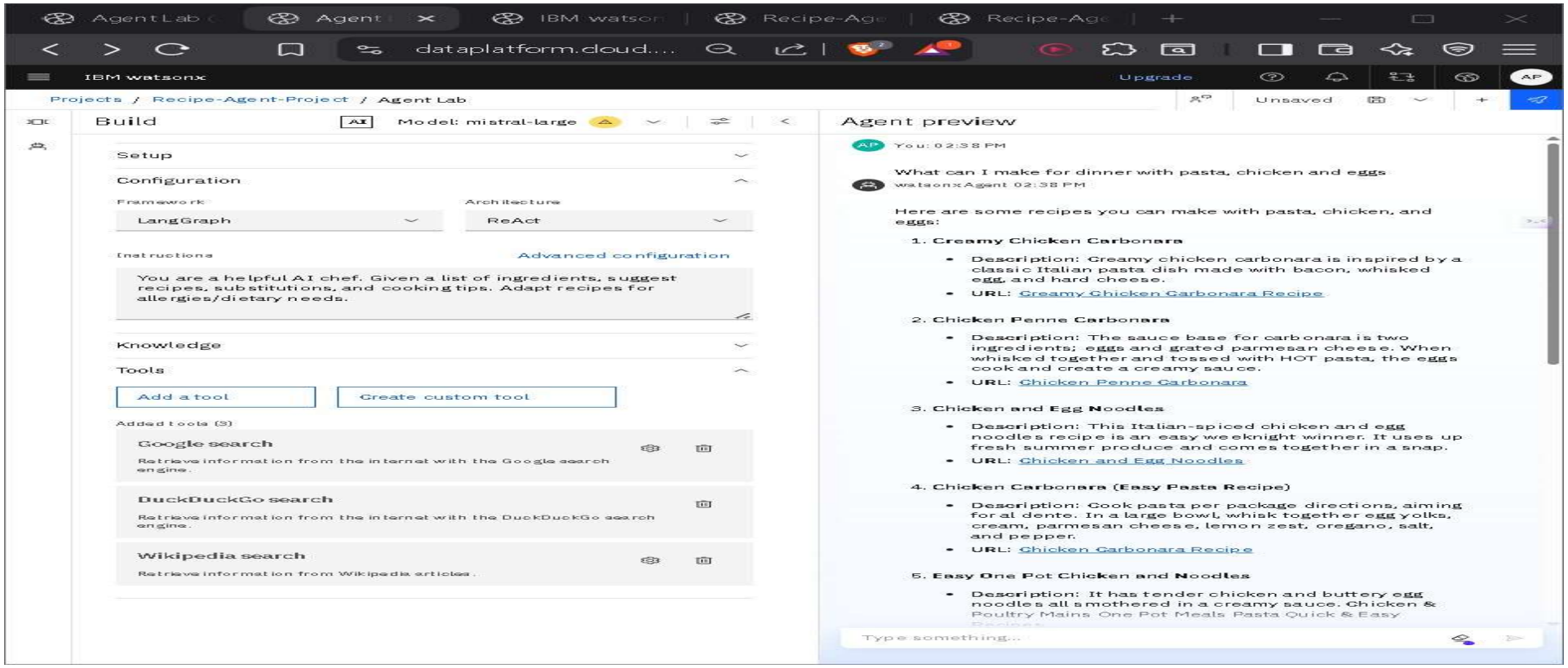

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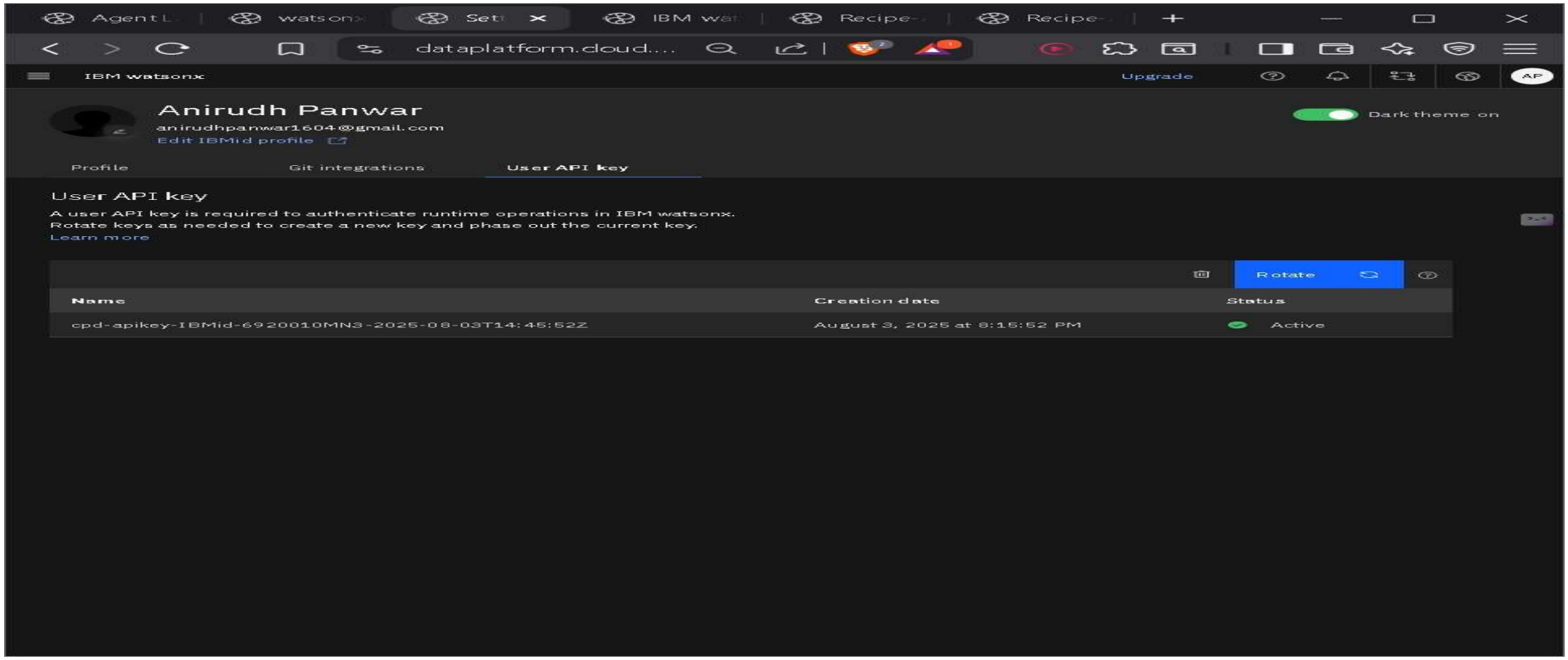

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CONCLUSION

- The Recipe Preparation Agent is a practical AI assistant for cooking.

  Adapts to kitchen constraints

  Reduces food waste

  Promotes healthy eating

  Scalable & easily integratable via IBM Cloud

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FUTURE SCOPE

- Smarter Data
  - Integrate nutritional info, grocery APIs, and user preferences.
  - Support regional and seasonal recipes.
- Algorithm Improvements
  - Use advanced ML (e.g., reinforcement learning) for personalized suggestions.
  - Learn from user feedback and history.
- Scalable Reach
  - Expand to support multiple cuisines, languages, and cities.
  - Adapt recipes to local ingredients and culture.
- Emerging Tech
  - Add voice and image input for hands-free, visual cooking.
  - Enable offline use via edge computing.
- Seamless Integration
  - Auto-generate shopping lists.
  - Recommend recipes using soon-to-expire items.

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REFERENCES

•IBM watsonx.ai documentation
•IBM Cloud Lite Services
•IBM SkillsBuild project.

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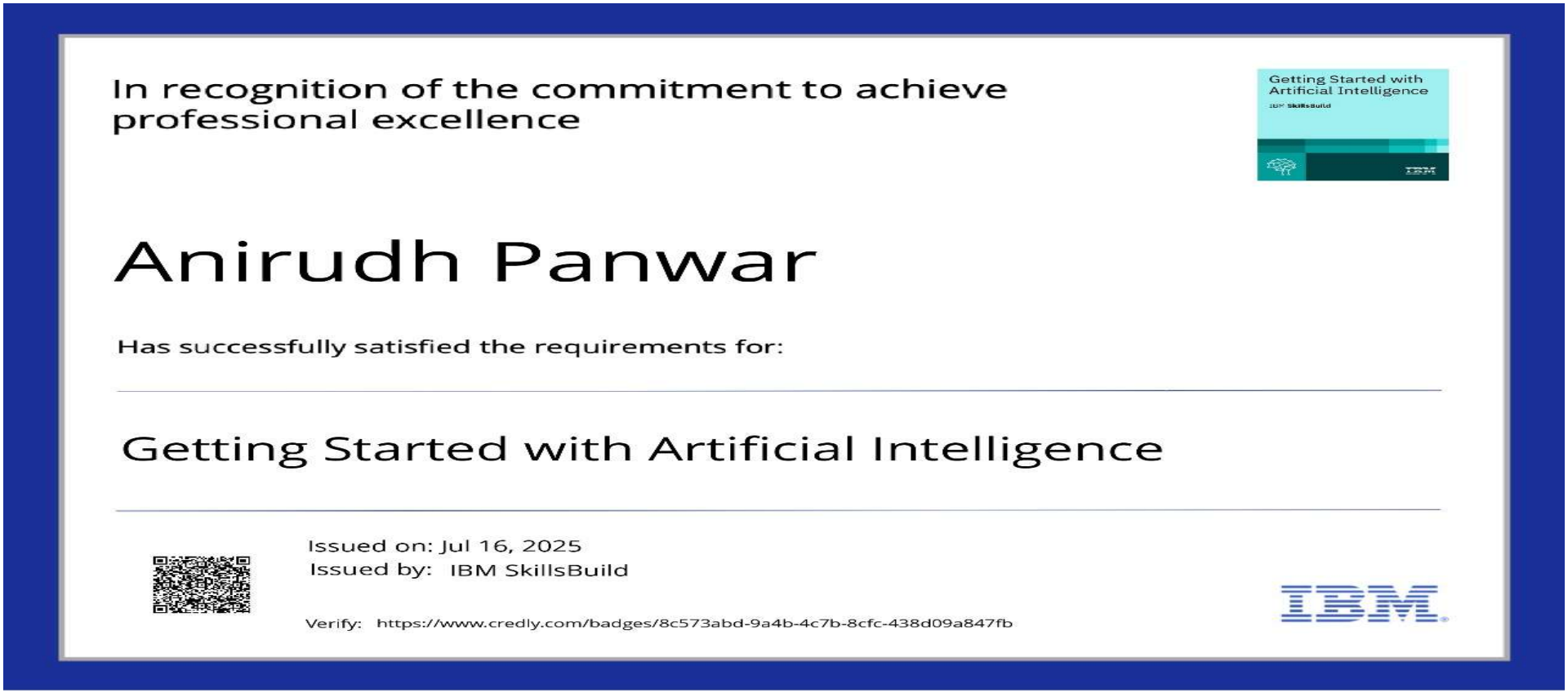
IBM CERTIFICATIONS



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IBM SkillsBuild

Anirudh Panwar

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Issued by: IBM SkillsBuild

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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Anirudh Panwar

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 27 Jul 2025 (GMT) **Learning hours:** 20 mins

THANK YOU

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