SMART KITCHEN COMPANION: AI RECIPE GENERATOR & MEAL PLANNER

Presented By:

1. Student Name-Shruti Sharma
2. College Name-Graphic Era Deemed to be university
3. Department-CSE

edunet foundation

OUTLINE

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

edunet foundation

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

edunet foundation

SYSTEM APPROACH

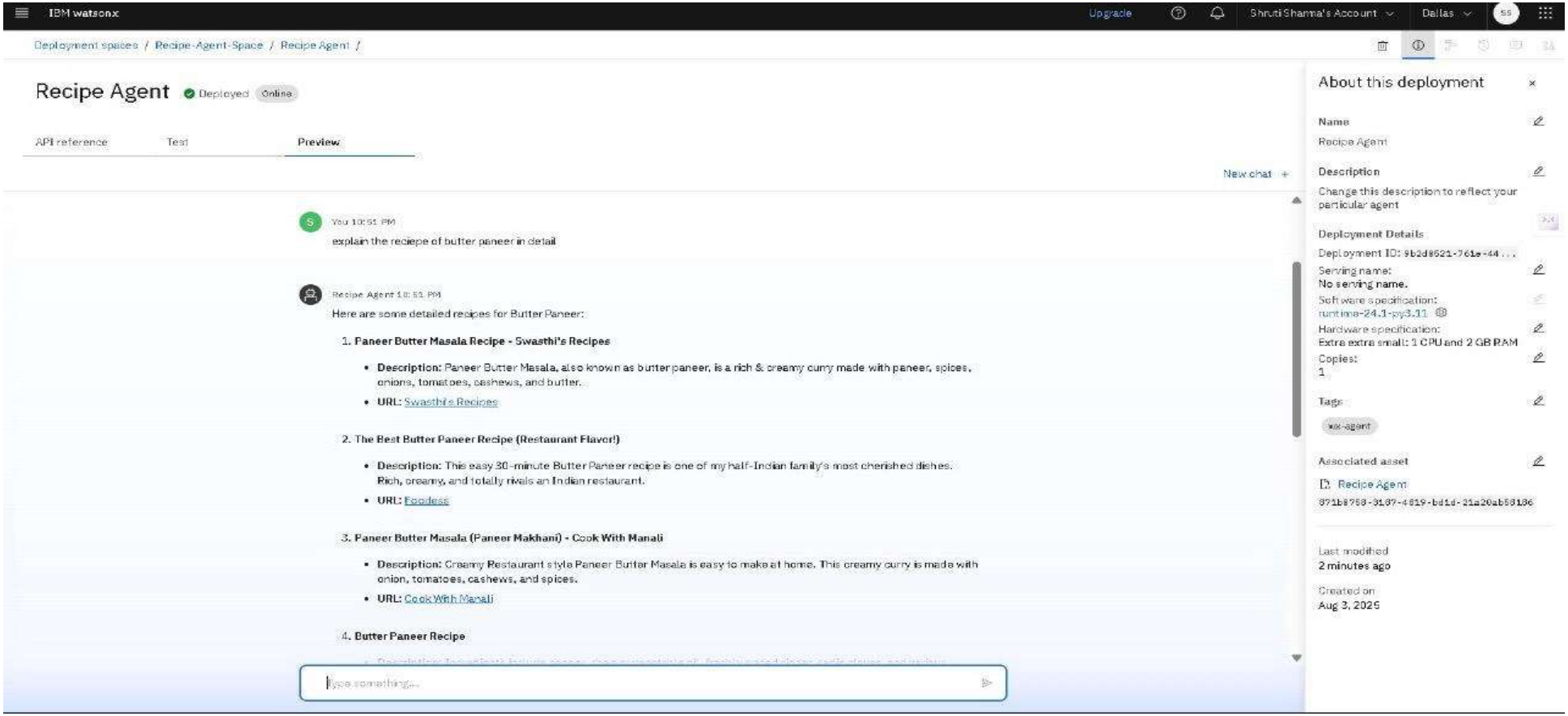
- System Requirements:
  - IBM Cloud Lite account
  - watsonx.ai and Agent Lab
  - Cloud Object Storage
- Technologies:
  - LangGraph
  - IBM Foundation Models (Mistral)
  - REST API
- Methodology:
  - Low-code agent via GUI
  - Web/Knowledge tools
  - Deployable as reusable AI service

edunet foundation

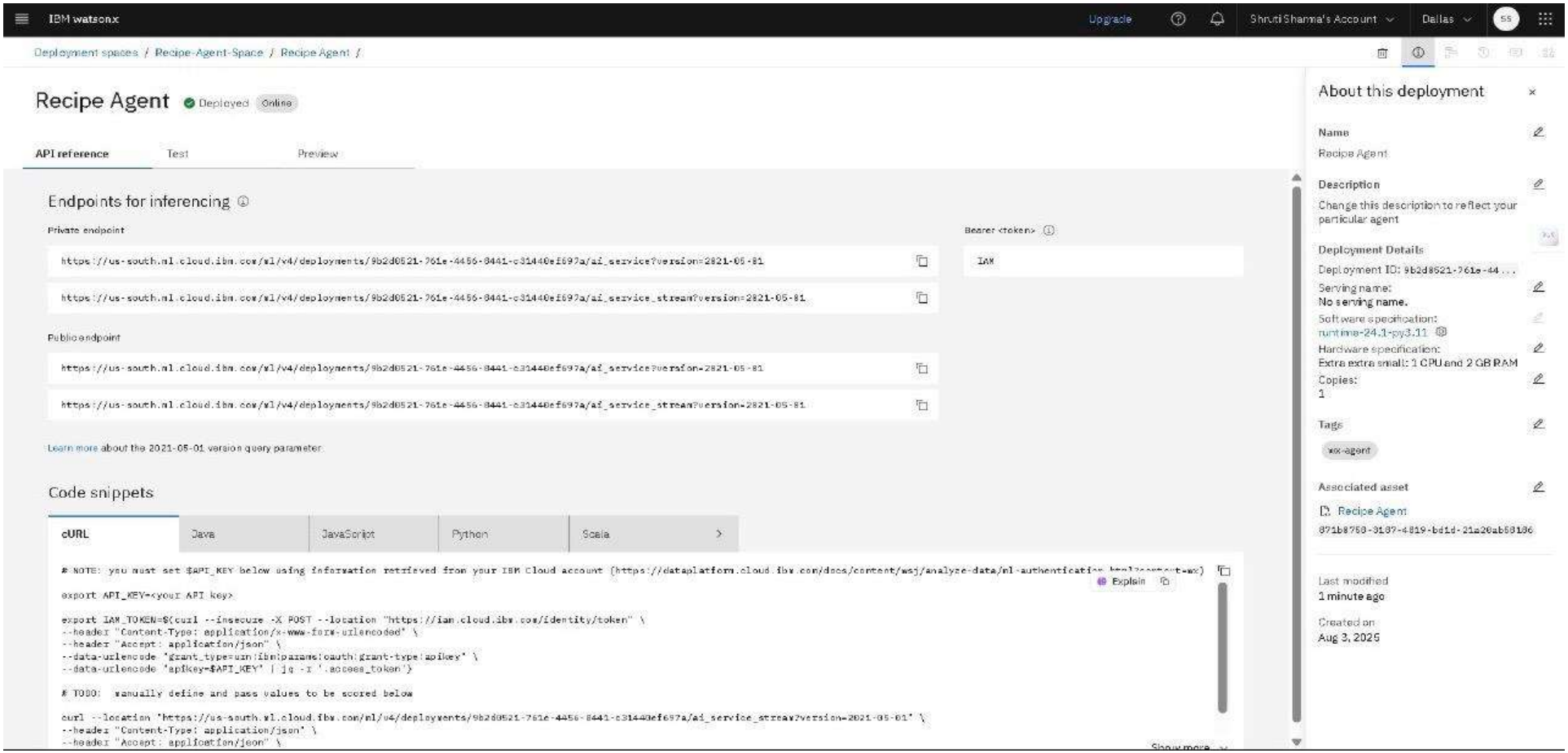
ALGORITHM & DEPLOYMENT

- 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.

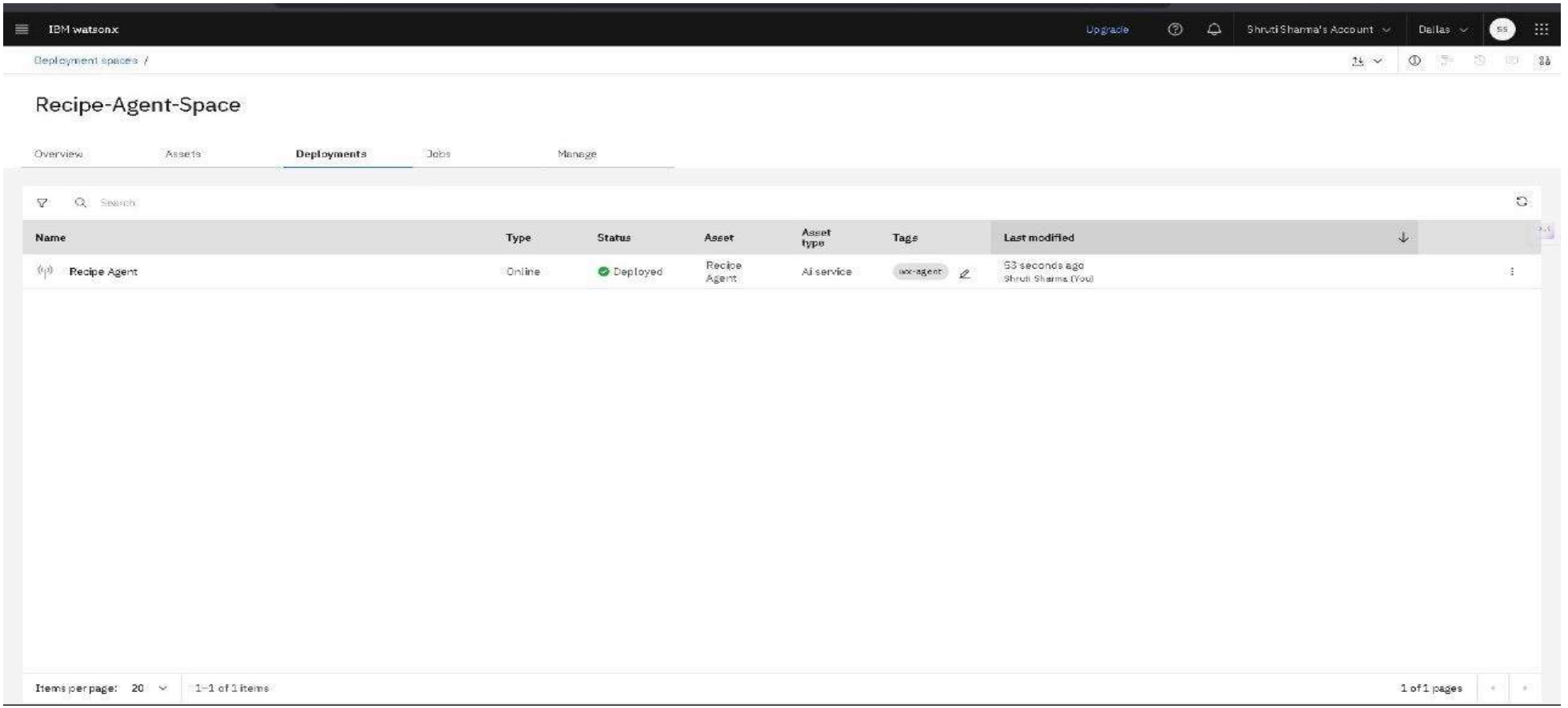
RESULT

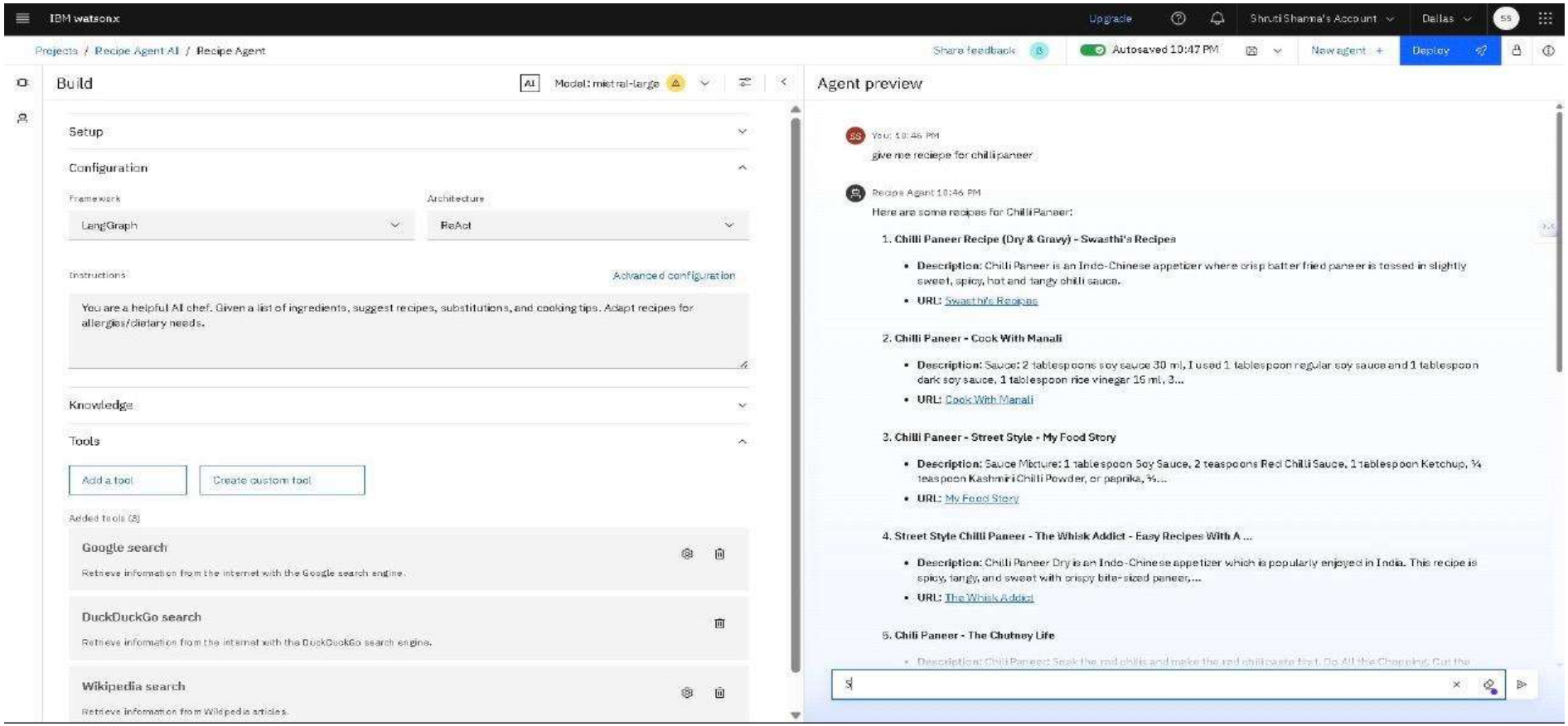


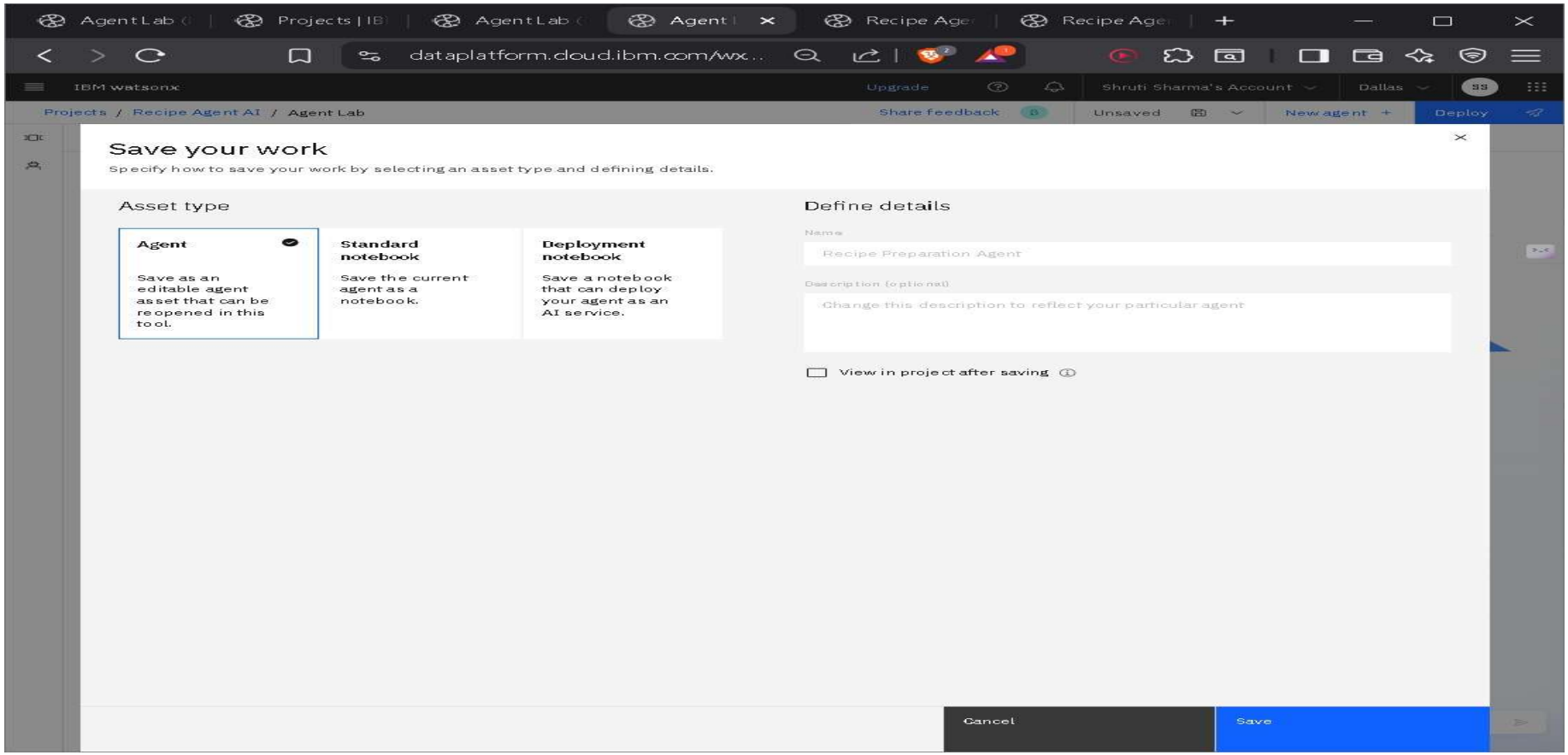
edunet foundation



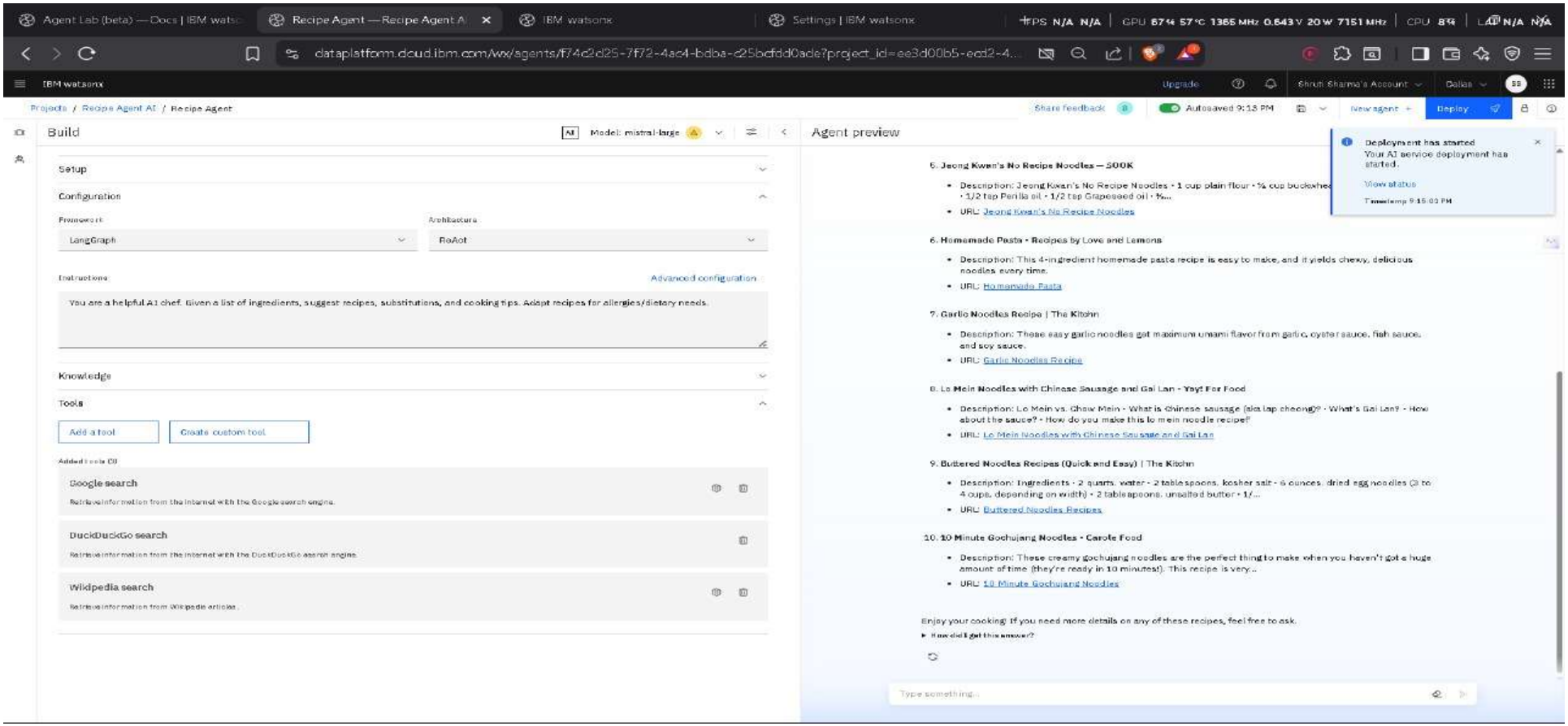
edunet foundation

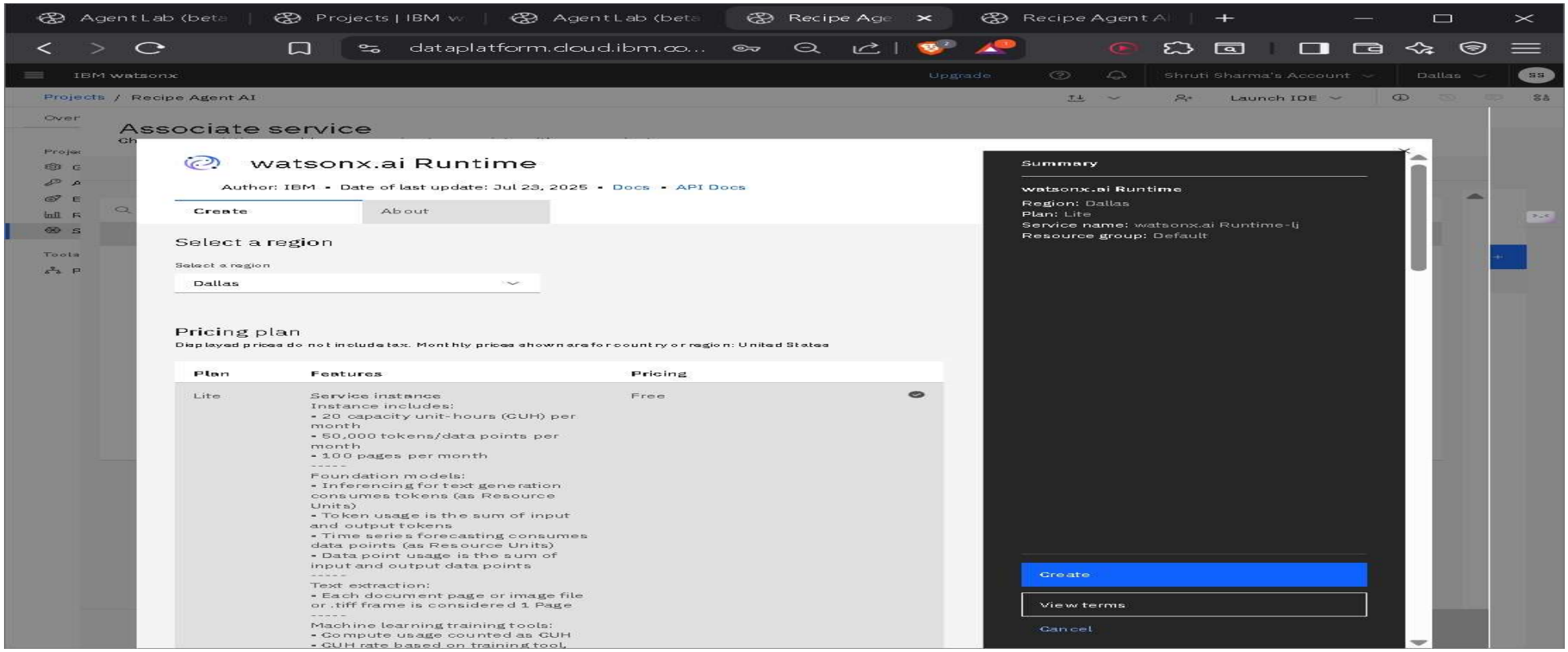




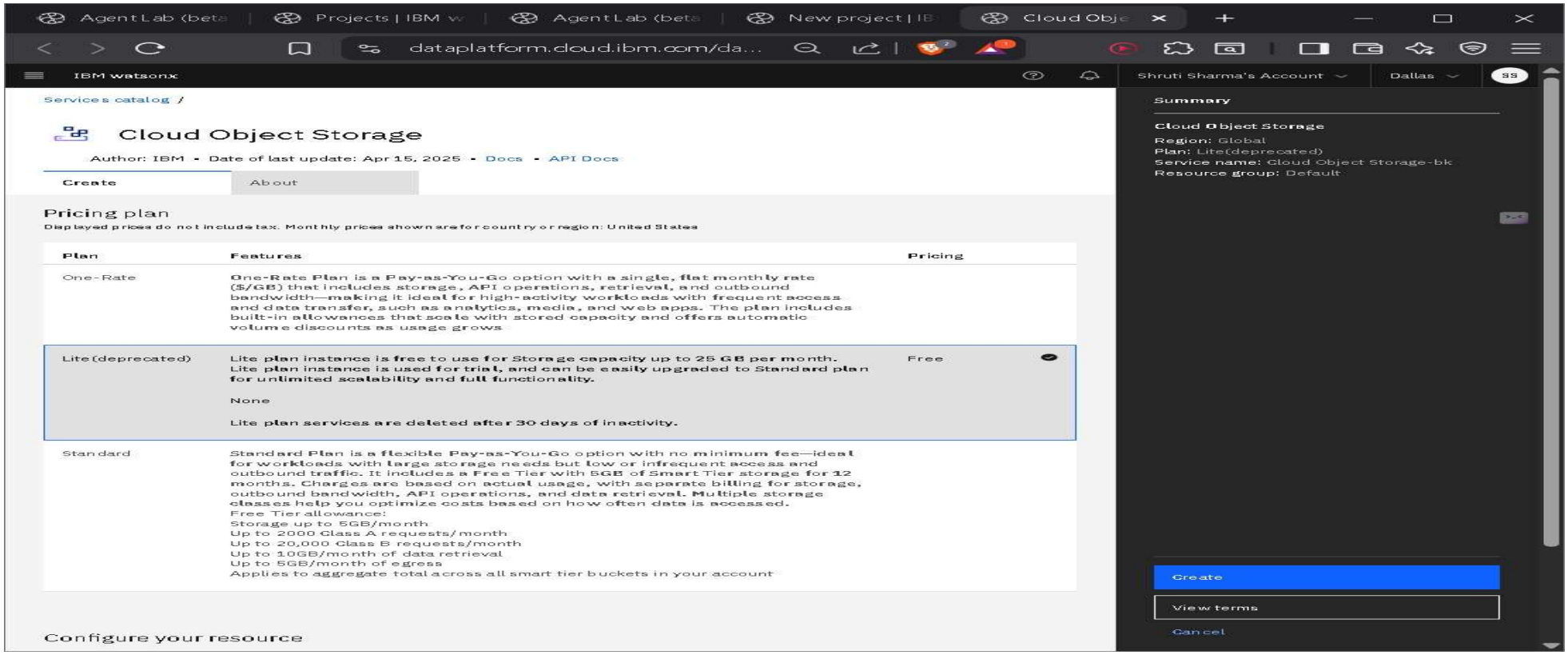


edunet foundation





edunet foundation



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

edunet foundation

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.

REFERENCES

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

edunet foundation

IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Getting Started with Artificial Intelligence
IBM SkillsBuild

Shruti Sharma

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence

Issued on: Jul 16, 2025
Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/b89fd248-9d1e-4a78-a35a-368ac06b691f

IBM

edunet foundation

IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Journey to Cloud: Envisioning Your Solution
IBM SkillsBuild

Shruti Sharma

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution

Issued on: Jul 21, 2025
Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/cbc59619-3d91-4a87-accb-b51c1821215c

IBM

edunet foundation

IBM CERTIFICATIONS

7/28/25, 12:39 AM Completion Certificate | SkillsBuild

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Shruti Sharma

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

https://skills.yourlearning.ibm.com/certificate/ALM-COURSE_3824998 1/1

edunet foundation

THANK YOU

edunet foundation