

CAPSTONE PROJECT

NUTRITION AGENT

Presented By:

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Department - nformation Technology

OUTLINE

- **Problem Statement** (Should not include solution)
 - **Proposed System/Solution**
 - **System Development Approach** (Technology Used)
-
- **Result (Output Image)**
 - **Conclusion**
 - **Future Scope**
 - **References**

PROBLEM STATEMENT

Example: Most existing diet planning tools provide generic recommendations and fail to adapt to individual health goals, preferences, allergies, and cultural habits. Nutritionists also face scalability issues in delivering personalized care. This project addresses the need for an agentic AI-powered virtual assistant capable of understanding user inputs, generating dynamic meal plans, and continuously adapting through feedback to deliver truly personalized nutrition guidance.

PROPOSED SOLUTION

- This project proposes building a personalized AI Nutrition Assistant using Agentic AI capabilities on IBM Cloud Lite. The system leverages IBM's AI tools and automation features to deliver intelligent, interactive, and adaptive nutrition support. The solution includes:
 - Data Collection:
 - Accept user input via text, voice, or image (e.g., food photos, grocery labels).
 - Gather personal data such as health goals, allergies, medical conditions, and dietary preferences.
 - Connect to external food and nutrition databases for enriched information.
 - Data Preprocessing:
 - Use IBM tools to clean and structure incoming data.
 - Extract relevant features (e.g., calorie needs, food types, restrictions).
 - Normalize multimodal inputs for consistent AI processing.
 - AI Agent Development
 - Build the agent using IBM Watson Assistant or other IBM Cloud AI services.
 - Automate tasks such as meal planning, food recommendations, and answering nutrition-related queries.
 - Implement natural language processing (NLP) to understand and respond contextually to user queries.
 - Deployment:
 - Host the assistant on IBM Cloud Lite for scalability
 - Design a simple, user-friendly interface.
 - Evaluation:
 - Measure accuracy and user satisfaction.
 - Continuously refine the model using feedback.

SYSTEM APPROACH

The system follows a modular, AI-driven architecture combining data processing, intelligent agent reasoning, and cloud deployment:

- **User Interaction Layer**
 - Users input data via text, voice, or image (e.g., meal photos, preferences).
 - A front-end interface (web or mobile) handles input collection and displays personalized output.
- **AI Processing Layer**
 - Uses IBM Watson NLP to interpret inputs and identify nutritional needs.
 - Applies automated tasks and reasoning to generate tailored meal plans and suggestions.
- **Knowledge & Data Layer**
 - Integrates with food databases, nutritional guidelines, and user-specific health data.
 - Utilizes structured and unstructured data sources for rich insights.
- **Adaptation & Feedback Layer**
 - Continuously learns from user choices and feedback.
 - Adjusts future recommendations using agentic learning loops.
- **Deployment Layer (IBM Cloud Lite)**
 - All components are hosted on IBM Cloud Lite for reliability and scalability.
 - APIs and microservices manage communication between modules.

The screenshot shows the IBM Watsonx Agent Lab (beta) interface. At the top, there are several tabs: Perplexity, Nutrition AI problem statement, Agent Lab (beta) — Docs | IBM, and Home | IBM watsonx. The main heading is "RESULT" with the subtitle "IBM watsonx". A banner at the top says "Welcome back, Harsh". On the left, there's a sidebar with the text "Train, validate, tune and deploy AI models." and a "Customize my journey" button. The central area features a grid-based workspace with various AI-related cards. One card, "Build an AI agent to automate tasks with Agent Lab", is highlighted with a blue arrow pointing to it from the bottom. Other cards include "Chat and build prompts with foundation models" (with "Open Prompt Lab" button), "Tune a foundation model with labeled data with Tuning Studio", and "Open in: NUTRITION_AGENT". Below the workspace, there are sections for "Jump back in" (Recently visited pages), "Discover" (Developer access and Developer hub), and "Projects / NUTRITION_AGENT".

RESULT

The screenshot shows the IBM WatsonX platform interface. At the top, there are several tabs: Perplexity, Nutrition AI problem statement, Agent Lab (beta) — Docs | IBM, and Home | IBM watsonx. The main content area has a dark header with the text "IBM watsonx".

Welcome back, Harsh

Train, validate, tune and deploy AI models.

Customize my journey

Jump back in

Recently visited pages

NUTRITION_AGENT / Agent Lab

Projects / NUTRITION_AGENT

NUTRITION_AGENT / Prompt Lab

Discover

Developer access

Project or deployment space

Project ID

Project or deployment space

00000000-0000-0000-0000-00000000

Resource hub

Foundation models

Explore foundation models →

Prompts

Data

Projects

Notebooks

Agents

Projects

NUTRITION_AGENT (20 h ago)

Weather_agent (6 d ago)

Harsh's sandbox (2 wk ago)

Deploy

nutri a... (6 d ago)

What's new

Save re...
inference with th...
Aug 01, 2023

The mi...
now av...
Jul 30, 2023

Token Runtin...
Jul 30, 2023

RESULT

The screenshot shows the 'Create a project' page in the IBM Watsonx interface. The 'Define details' section is active, with the 'Name' field containing 'NUTRI_AGENT'. A blue arrow points from the text 'INSERT name and add storage' to the 'Name' input field. To the left, there's a sidebar with '+ New' selected, showing options for 'Local file' and 'Sample'. Below the 'Name' field, there's a 'Description (optional)' text area with placeholder text 'What's the purpose of this project?'. Under 'Tags (optional)', there's a 'Add tags' button and a note about adding tags with commas. In the 'Define storage' section, a circled '1' is next to the 'Select storage service' label, and a blue arrow points to the 'Add' button. At the bottom, there are 'Cancel' and 'Create' buttons.

INSERT name and
add storage

RESULT

Perplexity | Nutrition AI problem statement | Agent Lab (beta) — Docs | IBM WatsonX | New project | IBM WatsonX | Cloud Object Storage — Service

dataplatform.cloud.ibm.com/data/catalog/cloud-object-storage?context=wx&target=cloud-object-storage&closeTab=true

IBM WatsonX

Harsh Suryavanshi's Account Dallas HS

Services catalog /

Cloud Object Storage

Author: IBM • Date of last update: Apr 15, 2025 • [Docs](#) • [API Docs](#)

Create About

Pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or region: United States

Plan	Features	Pricing
One-Rate	One-Rate Plan is a Pay-as-You-Go option with a single, flat monthly rate (\$/GB) that includes storage, API operations, retrieval, and outbound bandwidth—making it ideal for high-activity workloads with frequent access and data transfer, such as analytics, media, and web apps. The plan includes built-in allowances that scale with stored capacity and offers automatic volume discounts as usage grows.	
Lite(deprecated)	Lite plan instance is free to use for Storage capacity up to 25 GB per month. Lite plan instance is used for trial, and can be easily upgraded to Standard plan for unlimited scalability and full functionality.	Free
Standard	Standard Plan is a flexible Pay-as-You-Go option with no minimum fee—ideal for workloads with large storage needs but low or infrequent access and outbound traffic. It includes a Free Tier with 5GB of Smart Tier storage for 12 months. Charges are based on actual usage, with	

Lite plan services are deleted after 30 days of inactivity.

Cloud Object Storage

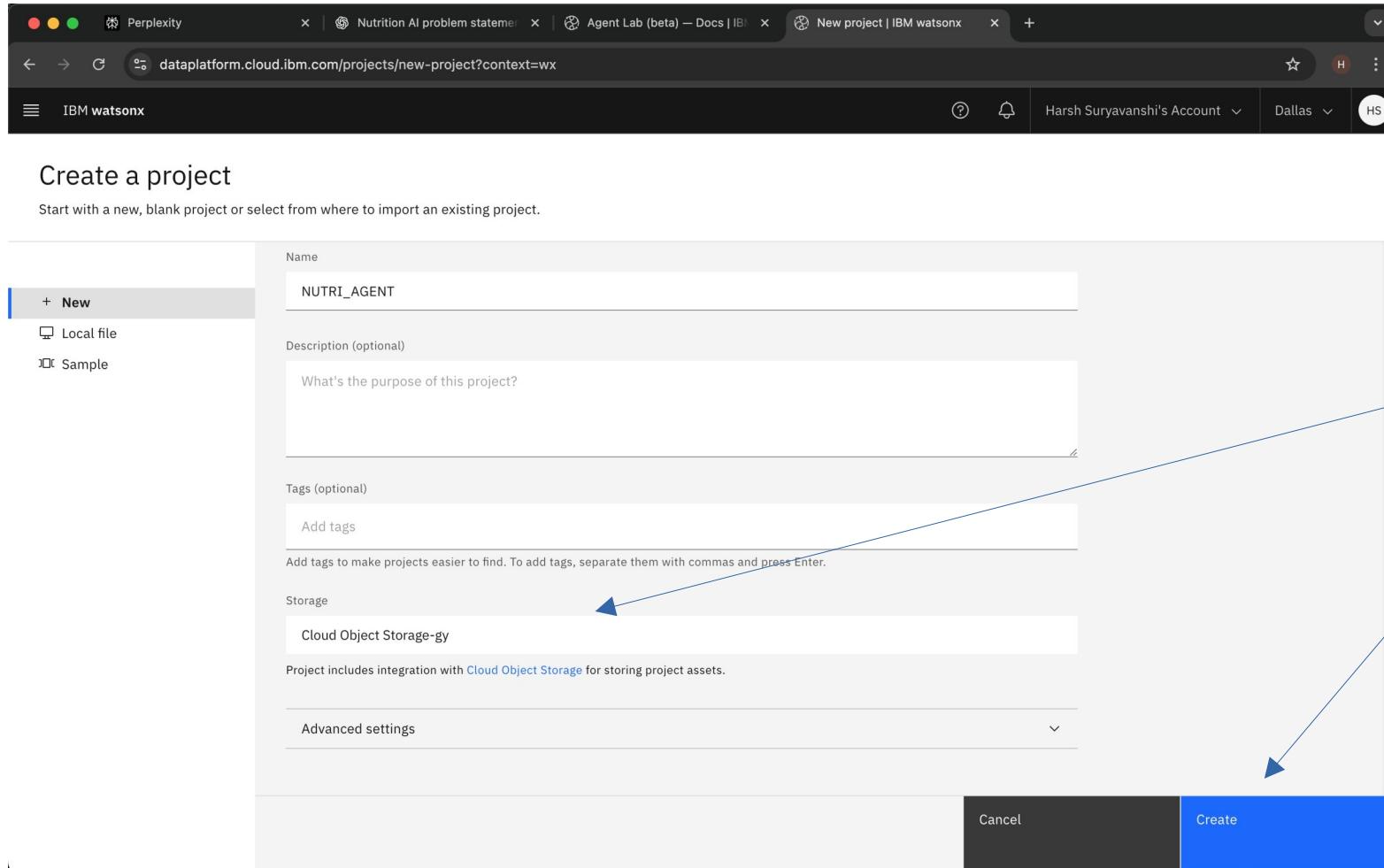
Region: Global
Plan: Lite(deprecated)
Service name: Cloud Object Storage-gy
Resource group: Default

Summary

Create View terms Cancel

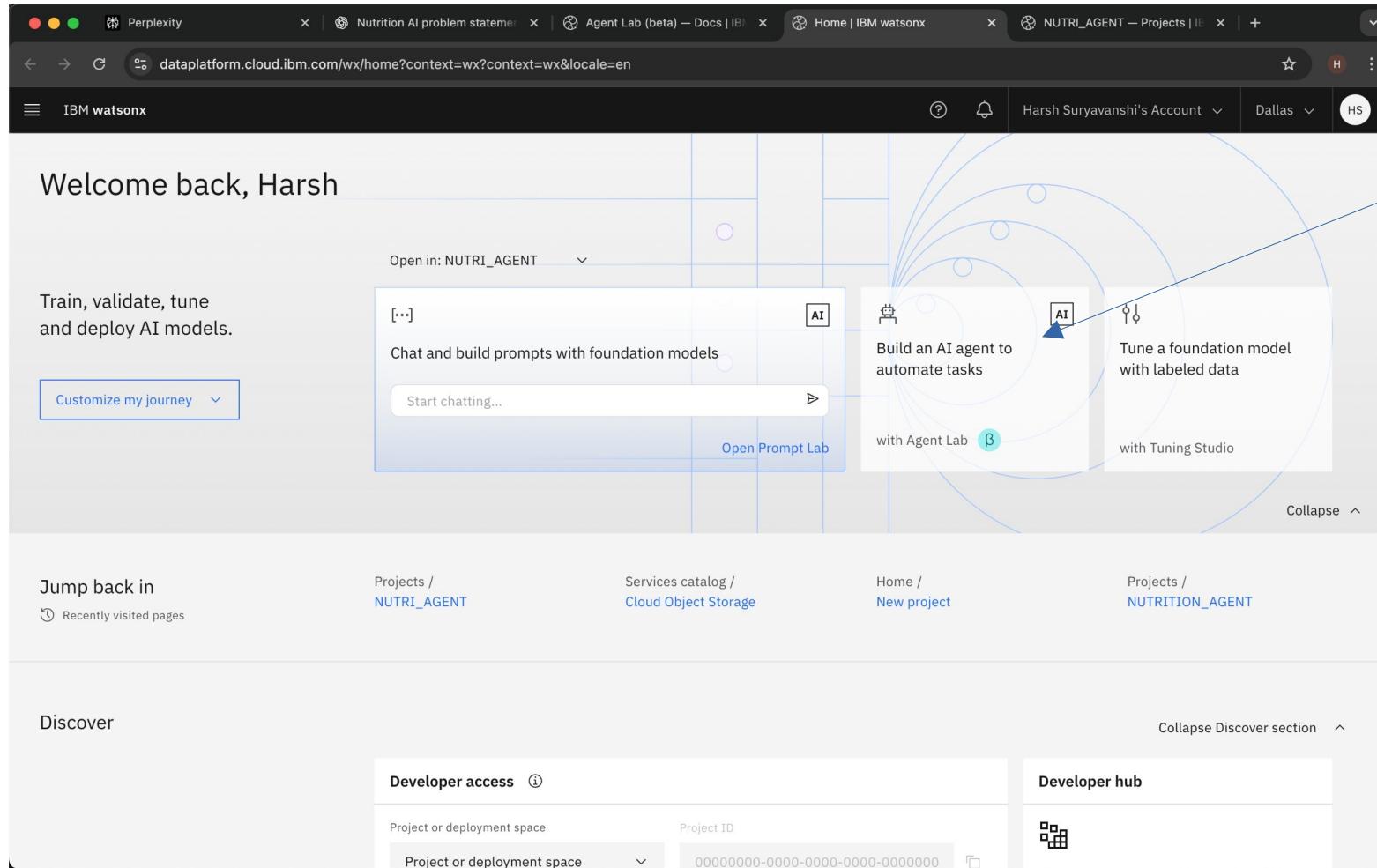
Select lite plan and click on create

RESULT



Storage has been added click on create

RESULT



Click on Build AI Agent

RESULT

The screenshot shows the IBM Watsonx Agent Lab interface. On the left, there's a sidebar with sections like Build, Setup, Configuration, Framework (LangGraph selected), Instructions, Knowledge, and Tools. The main area is titled "Agent preview" and displays a "Welcome to watsonx Agent" message with a placeholder for a description. A modal window is overlaid on the screen with the title "No watsonx.ai Studio service detected". It contains the text: "To access the Prompt Lab, you must provision a watsonx.ai Studio service instance in your account." Below the text is a blue button labeled "Associate service" with a white arrow icon.

Click on associate service

RESULT

A screenshot of a web browser showing the IBM Watsonx.ai Studio creation dialog box. The dialog box is titled 'Summary' and contains the following information:

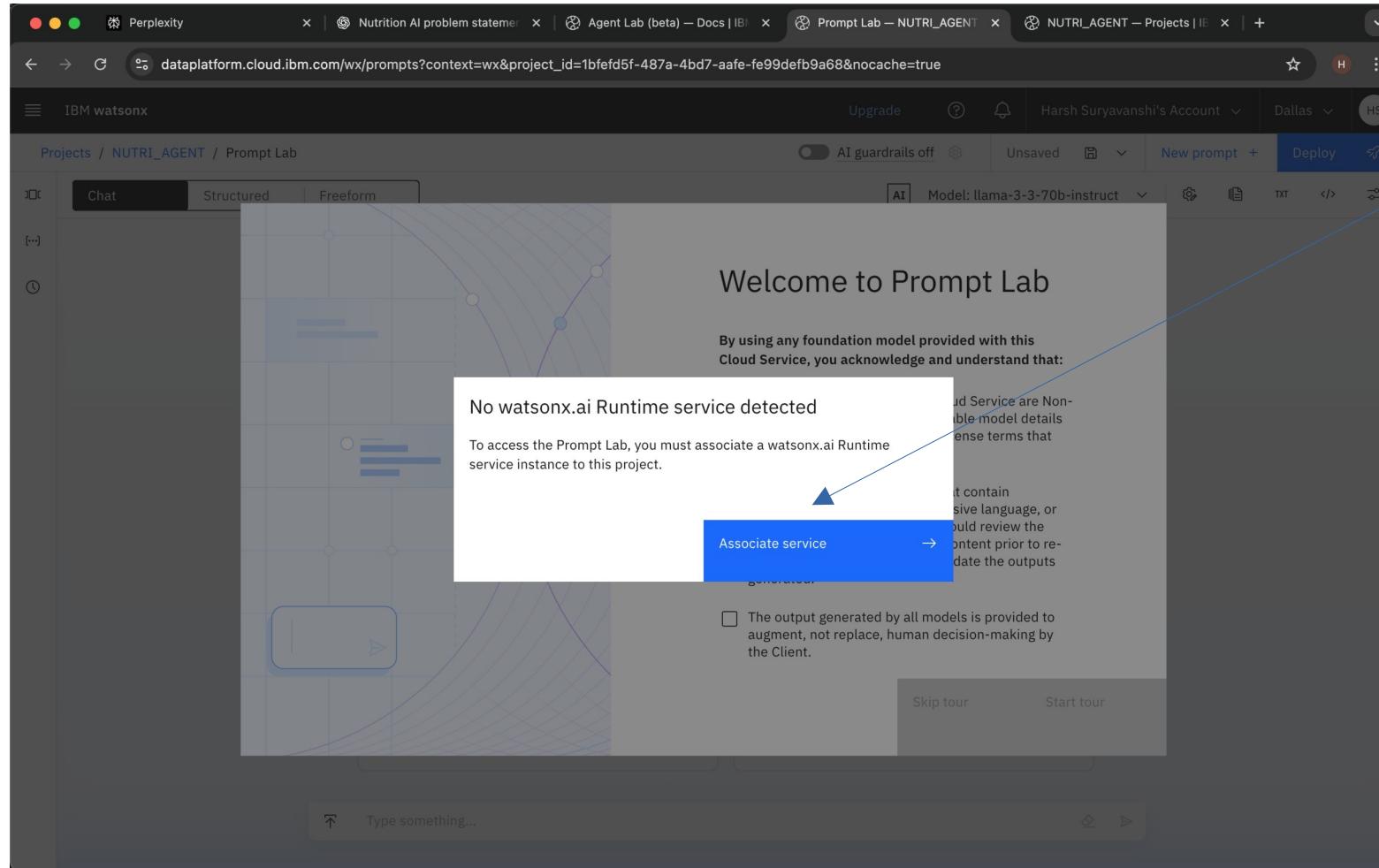
- watsonx.ai Studio**
- Region:** Dallas
- Plan:** Lite
- Service name:** watsonx.ai Studio-ze
- Resource group:** Default

The dialog box has three buttons at the bottom: 'Create' (highlighted in blue), 'View terms', and 'Cancel'. A blue arrow points from the text 'Click on create' to the 'Create' button.

The main page background shows the 'watsonx.ai Studio' creation interface with tabs for 'Create' (selected) and 'About', and sections for 'Select a region' (set to Dallas) and 'Pricing plan'.

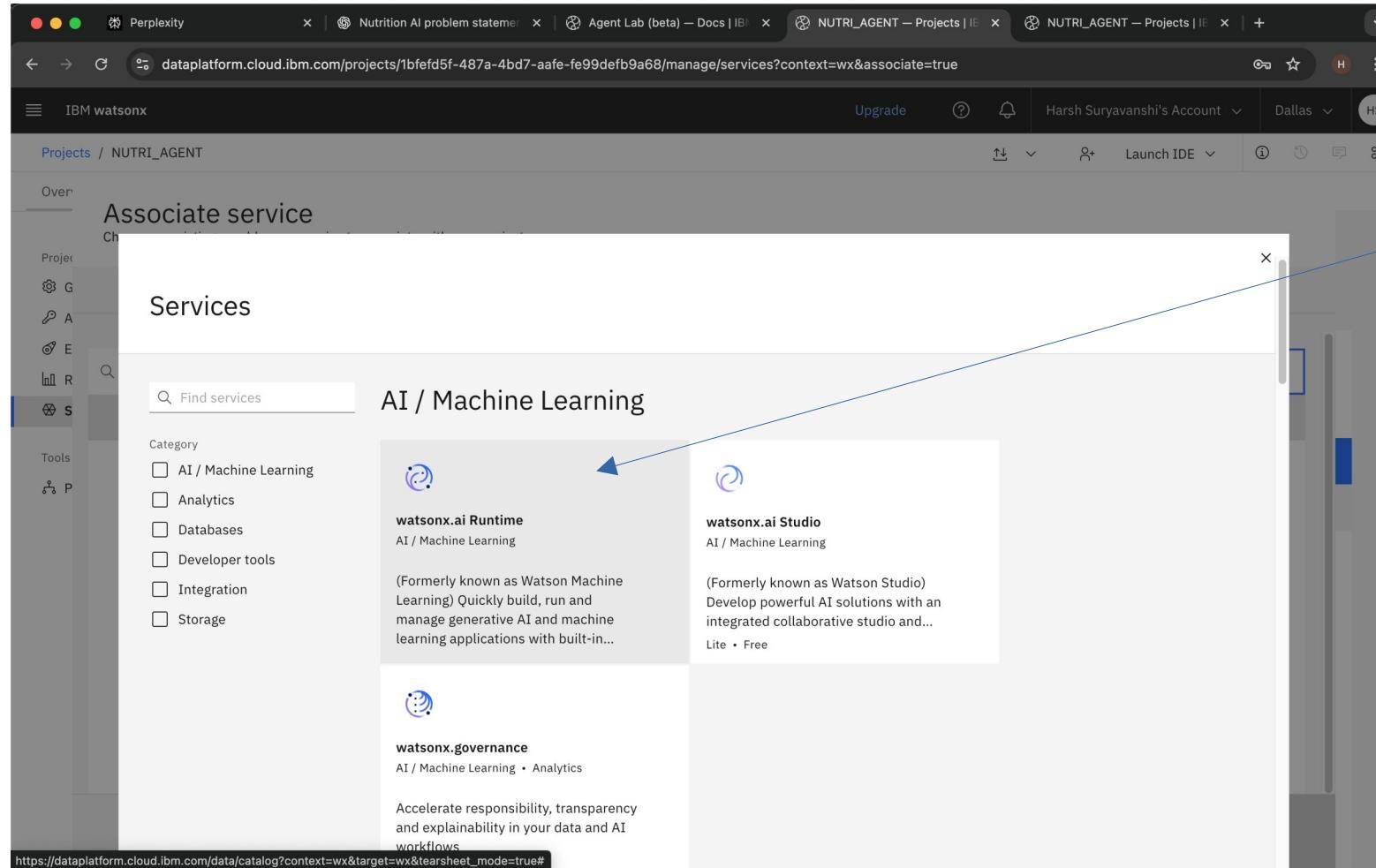
Click on create

RESULT



Click on associate service

RESULT



The screenshot shows a web browser window with multiple tabs open. The active tab is titled "dataplatform.cloud.ibm.com/projects/1bfef5f-487a-4bd7-aafe-fe99defb9a68/manage/services?context=wx&associate=true". The page displays the "Associate service" section of the IBM Watsonx interface, specifically the "Services" catalog under the "AI / Machine Learning" category. A search bar at the top left contains the placeholder "Find services". Below it, a sidebar lists categories: AI / Machine Learning, Analytics, Databases, Developer tools, Integration, and Storage. The main content area shows three service cards:

- watsonx.ai Runtime**: AI / Machine Learning. Description: (Formerly known as Watson Machine Learning) Quickly build, run and manage generative AI and machine learning applications with built-in... (Lite • Free)
- watsonx.ai Studio**: AI / Machine Learning. Description: (Formerly known as Watson Studio) Develop powerful AI solutions with an integrated collaborative studio and... (Lite • Free)
- watsonx.governance**: AI / Machine Learning • Analytics. Description: Accelerate responsibility, transparency and explainability in your data and AI workflows.

A blue arrow points from the text "Click on new service then click on Watsonx. Ai runtime" to the "watsonx.ai Runtime" card.

Click on new service then click on Watsonx. Ai runtime

RESULT

The screenshot shows a web browser window with multiple tabs open, including 'Perplexity', 'Nutrition AI problem statement', 'Agent Lab (beta) — Docs | IBM', 'NUTRI_AGENT — Projects | IBM', and 'NUTRI_AGENT — Projects | IBM'. The main content area is titled 'Associate service' and shows the 'watsonx.ai Runtime' service. The service summary indicates it is in the Dallas region, Plan: Lite, with a service name of 'watsonx.ai Runtime-yy' and a resource group of 'Default'. A modal dialog box is displayed over the page, titled 'Summary', showing the same information. The 'Create' button in the modal is highlighted with a blue arrow pointing to it from the text 'Click on create' located on the right side of the image.

WatsonX

Projects / NUTRI_AGENT

Associate service

watsonx.ai Runtime

Author: IBM • Date of last update: Jul 23, 2025 • [Docs](#) • [API Docs](#)

Create About

Select a region

Select a region

Dallas

Pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or region: United States

Plan	Features	Pricing
Lite	Service instance Instance includes: <ul style="list-style-type: none">• 20 capacity unit-hours (CUH) per month• 50,000 tokens/data points per month• 100 pages per month ----- Foundation models: <ul style="list-style-type: none">• Inferencing for text generation consumes	Free

Summary

watsonx.ai Runtime

Region: Dallas
Plan: Lite
Service name: watsonx.ai Runtime-yy
Resource group: Default

Create

View terms

Cancel

Click on create

RESULT

The screenshot shows a web browser window for the IBM Watsonx interface, specifically the 'Associate service' dialog. The URL in the address bar is `dataplatform.cloud.ibm.com/projects/1bfefdf5f-487a-4bd7-aafe-fe99defb9a68/manage/services?context=wx&associate=true`. The dialog title is 'Associate service' with the sub-instruction 'Choose an existing or add a new service to associate with your project.' Below the title, there are two tabs: 'Default' (selected) and 'Locations'. A search bar labeled 'Find services' is present. A table lists a single service entry:

Name	Type	Plan	Location	Status	Group
watsonx.ai Runtime-yv	watsonx.ai Runtime	Lite	Dallas	Not associated	Default

Three blue arrows point from the numbers 1, 2, and 3 at the top right towards specific elements in the dialog:

- Arrow 1 points to the checkbox next to the service name 'watsonx.ai Runtime-yv'.
- Arrow 2 points to the 'Associate' button at the bottom right of the dialog.
- Arrow 3 points to the top right corner of the dialog window.

RESULT

The screenshot shows a web browser window with the URL dataplatform.cloud.ibm.com/docs/content/wsj/analyze-data/fm-agent-lab.html?context=wsj&audience=wdp. The page is titled "Agent Lab (beta) — Docs | IBM". The left sidebar contains a navigation menu with sections like "Overview", "Planning an AI solution", "Getting started and tutorials", "Gen AI solutions" (which is expanded), "Terms of use", "Tokens", "Supported foundation models", "Building prompts", "Automating tasks with AI agents" (which is expanded), "Agent Lab (beta)" (highlighted in blue), "Agent-driven chat", "Coding generative AI solutions", "Retrieval-augmented generation", "Tuning models", "Projects", "Preparing data", "Data science solutions", "Deploying AI", and "Governing AI". The main content area has a large black rectangular placeholder image. Below it, the text "To build an AI agent, complete the following steps:" is followed by a numbered list of six steps. Step 1 has a blue arrow pointing to the "watsonx.ai home page" link. A note at the bottom states: "Note: Currently, watsonx.ai offers LangGraph as the only framework choice." A blue circle with an upward arrow is located in the bottom right corner of the content area.

To build an AI agent, complete the following steps:

1. From the [watsonx.ai home page](#), choose a project, and then click the **New asset > Build an AI agent to automate tasks** tile.
2. Select a foundation model and optionally update model parameters. For details, see [Foundation model configuration](#).
3. To set up your agent, specify a name for the agent and describe the tasks the agent performs.
Optional: Add some sample questions that the user can submit to start interacting with the agent.
4. *Optional:* Select an icon and background image to customize how your agent appears in the **Agent Preview** pane.
5. Select the AI agent framework you want to use to create, deploy and, manage your agent.

Note: Currently, watsonx.ai offers LangGraph as the only framework choice.

6. Select the architecture that implements agentic AI reasoning.

Click on this link

RESULT

The screenshot shows the IBM WatsonX platform interface. At the top, there's a navigation bar with tabs like 'Perplexity', 'Nutrition AI problem sta...', 'Agent Lab (beta) — Doc...', 'Home | IBM watsonx', 'NUTRI_AGENT — Proj...', and 'NUTRI_AGENT — Proj...'. Below the bar, it says 'Welcome back, Harsh'. A sidebar on the left says 'Train, validate, tune and deploy AI models.' and has a 'Customize my journey' button. The main area features a large circular diagram with three main sections: 'Build an AI agent to automate tasks with Agent Lab' (marked with a beta icon), 'Tune a foundation model with labeled data with Tuning Studio', and 'Chat and build prompts with foundation models' (with a 'Start chatting...' button and an 'Open Prompt Lab' link). Below this is a 'Discover' section with 'Developer access' and 'Developer hub' tabs.

Click on Build An AI AGENT

RESULT

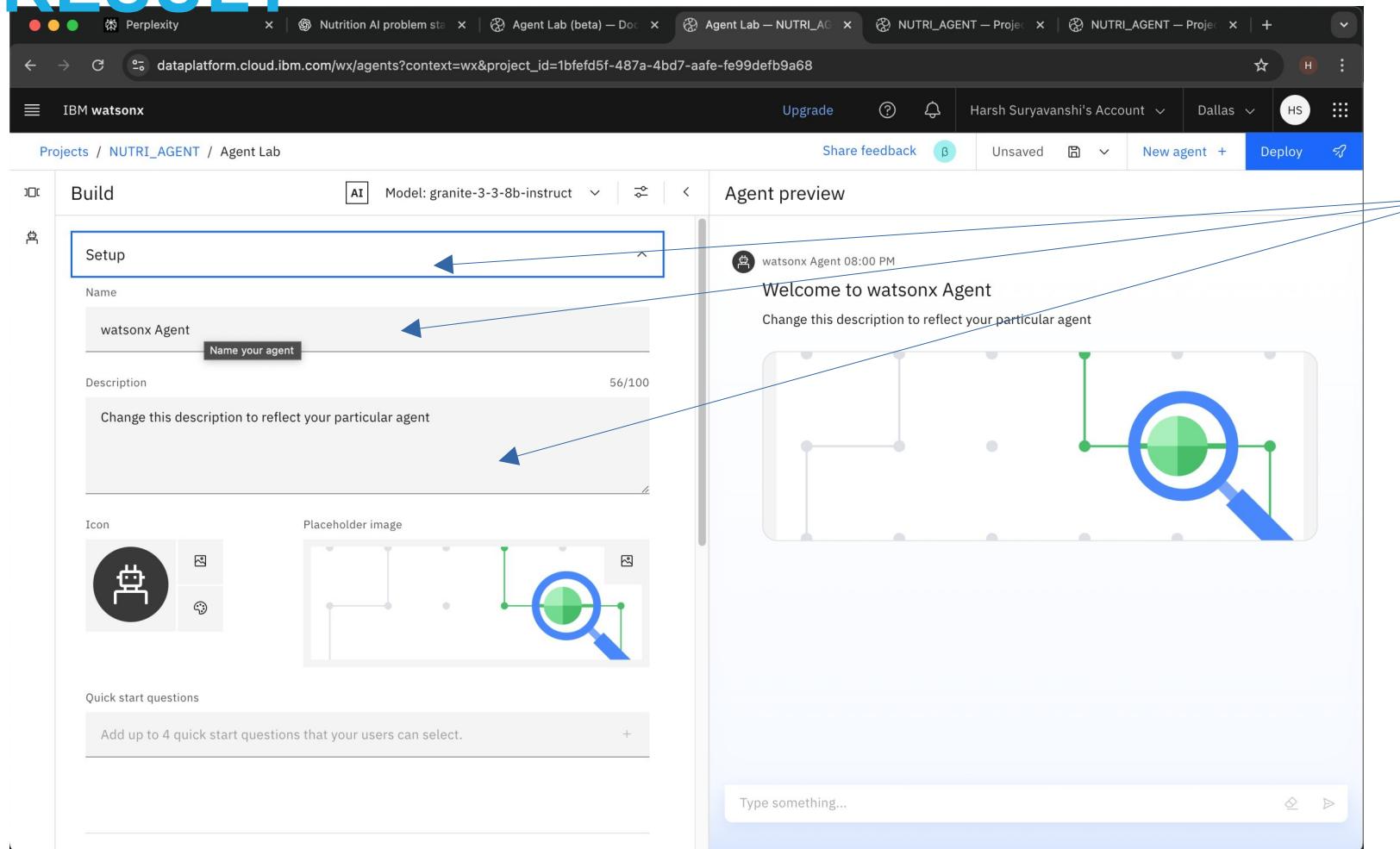
The screenshot shows the IBM Watsonx Agent Lab interface. On the left, there's a sidebar with sections like Build, Setup, Configuration, Instructions, Knowledge, and Tools. Under Tools, there are buttons for 'Add a tool' and 'Create custom tool'. A specific 'Google search' tool is listed under 'Added tools (1)'. In the main area, there's a 'Model: No model selected' dropdown. Below it, there's a 'Share feedback' button and an 'Unsaved' status indicator. To the right, there's an 'Agent preview' section with a magnifying glass icon over a network diagram. At the bottom, there's a search bar with placeholder text 'Type something...'.

Select model

The screenshot shows the 'Select a foundation model' page from IBM Watsonx. It has tabs for 'All models' (which is selected) and 'Model benchmarks'. There's a search bar at the top. Below, there are four model cards: 1. 'granite-3-3-8b-instruct' (Provider: IBM, Type: Provided model). 2. 'llama-3-2-11b-vision-instruct' (Provider: Meta, Type: Provided model). 3. 'llama-3-2-90b-vision-instruct' (Provider: Meta, Type: Provided model). 4. 'mistral-large' (Provider: Mistral AI, Type: Provided model). Each card has a small icon and a yellow info button.

Select granite model

RESULT



Click on Setup and name your Agent give description

RESULT

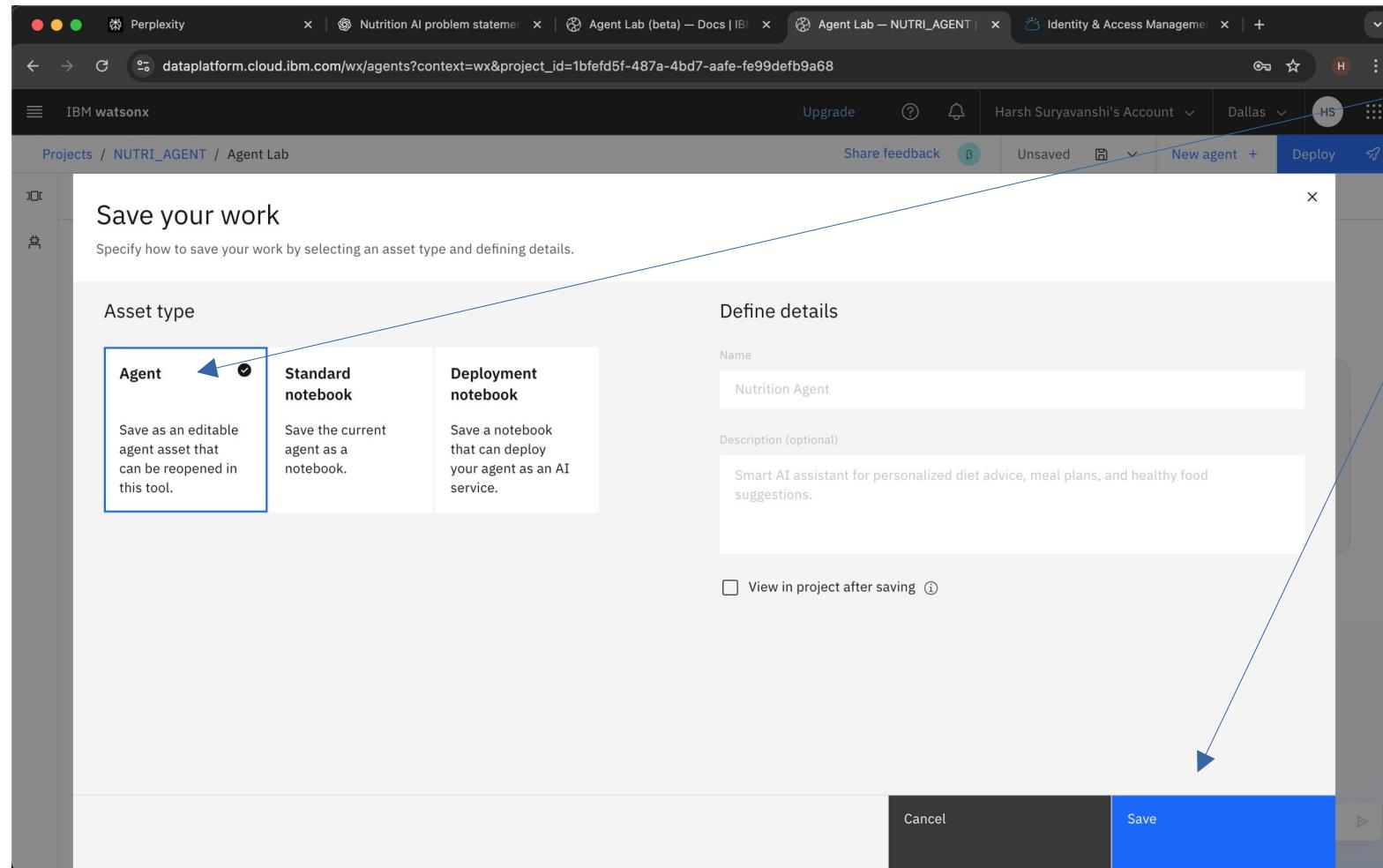
The screenshot shows the IBM Watson Agent Lab interface. On the left, the 'Build' sidebar is open, showing the 'Model: granite-3-3-8b-instruct' selected. Under 'Instructions', there is a list of 5 items:

1. Name, age, and gender
2. Your main health goal (e.g., weight loss, muscle gain, manage diabetes)
3. Any dietary restrictions or allergies (e.g., vegetarian, lactose intolerance)
4. Your typical daily routine or activity level
5. Your preferred cuisines or meal types (e.g., Indian, Mediterranean, high-protein)

On the right, the 'Agent preview' section displays a welcome message from the 'Nutrition Agent' at 08:13 PM. It says: "Welcome to Nutrition Agent" and "Smart AI assistant for personalized diet advice, meal plans, and healthy food suggestions." Below this is a graphic of a smartphone displaying a magnifying glass over a pie chart.

Insert instructions and save

RESULT



Click on agent and save

RESULT

The screenshot shows the IBM WatsonX interface for building a Nutrition Agent. The left sidebar lists 'Build', 'Setup', 'Configuration', 'Instructions', 'Knowledge', and 'Tools'. Under 'Tools', there are buttons for 'Add a tool' and 'Create custom tool', with 'Added tools (5)' listed below. One tool is visible: 'Google search' (with a note: 'Retrieve information from the internet with the Google search engine'). The main right panel is titled 'Agent preview' and shows a conversation between a user ('You') and the 'Nutrition Agent'. The user says 'Hi' at 08:23 PM, and the agent responds with a greeting and asks for personal information (name, age, gender, health goals, dietary restrictions, daily routine, preferred cuisines). A link 'How did I get this answer?' is provided. At the bottom, there's a text input field with placeholder text 'Type something...'.

RESULT

The screenshot shows the IBM WatsonX interface for creating a Nutrition Agent. On the left, the 'Build' section is open, displaying configuration options for the 'Model: granite-3-3-8b-instruct'. It includes sections for 'Setup', 'Configuration' (with 'LangGraph' selected under 'Framework' and 'React' under 'Architecture'), and 'Instructions' (containing a greeting message). Below these are 'Knowledge' and 'Tools' sections, with buttons for 'Add a tool' and 'Create custom tool'. A sidebar on the far left shows 'Added tools (5)' with a 'Google search' entry. On the right, the 'Agent preview' section shows a conversation between a user ('HS') and the 'Nutrition Agent'. The user has inputted their details: 'Harsh 21 male muscle gain no sugar walking 5 km'. The agent has responded with a summary of the gathered information: 'Great, Harsh! Here's what I've gathered so far: 1. Name: Harsh 2. Age: 21 3. Gender: Male 4. Health Goal: Muscle gain 5. Dietary Restrictions: No sugar 6. Activity Level: Walking 5 km daily'. It also asks for further tailoring: 'To further tailor my recommendations, could you please tell me: • Your preferred cuisines or meal types?'. Additionally, it asks for dietary information: 'Also, to ensure I provide the most accurate advice, I would like to know if: • Are there any other dietary restrictions or allergies I should be aware of? • Are you currently taking any supplements or medications?'. A 'How did I get this answer?' link is also present. At the bottom, there is a text input field with placeholder text 'Type something...'.

RESULT

The screenshot shows the IBM Watsonx Agent Lab interface for a Nutrition Agent. The top navigation bar includes tabs for Perplexity, Nutrition AI problem statement, Agent Lab (beta) — Docs | IBM, Nutrition Agent — NUTRI_AGENT, and Identity & Access Management. The main workspace is divided into sections:

- Build:** Shows two greeting cards: "Hello" and "Get Started".
- Configuration:** Framework dropdown set to LangGraph, Architecture dropdown set to ReAct.
- Instructions:** A box for "When greeted, respond:" contains the text: "Hi there! I'm your AI Nutrition Assistant powered by watsonx. To personalize my guidance, may I start by getting your:
1. Name, age, and gender
2. Your main health goal (e.g. weight loss, muscle gain, manage diabetes)"
- Knowledge:** A section for adding knowledge.
- Tools:** Buttons for "Add a tool" and "Create custom tool".
- Agent preview:** Displays a summary of user preferences and a list of health goals.
 - Considering your age, gender, and activity level, I'll focus on providing you with nutrient-dense foods that support your energy needs and muscle maintenance. As an Indian, you'll enjoy a variety of spices and ingredients that are commonly used in Indian cuisine.
 - Since you're avoiding sugar, I'll suggest healthier alternatives and portion control. Here's a summary of your preferences:
 - Age: 21
 - Gender: Male
 - Health goal: General health and wellness
 - Dietary restrictions: No sugar
 - Allergies: None
 - Cuisine preference: Indian
 - Activity level: Very active (daily 5km walk)
- Next steps:** A list of 5 health goals: 1. Maintain weight, 2. Gain muscle mass, 3. Improve overall health and wellness, 4. Manage stress, 5. Other (please specify).
- Feedback:** A message stating "This will help me provide more targeted guidance and recommendations."
- Answer history:** A box showing the query "How did I get this answer?" followed by the response "weight loss".

RESULT

The screenshot shows the IBM WatsonX Agent Lab interface. The top navigation bar includes tabs for Perplexity, Nutrition AI problem statement, Agent Lab (beta) — Docs | IBM, Nutrition Agent — NUTRI_AGENT, and Identity & Access Management. The main header displays "IBM watsonx", "Harsh Suryavanshi's Account", and "Dallas". The left sidebar contains sections for "Build" (with "Hello" and "Get Started" cards), "Configuration" (Framework: LangGraph, Architecture: React), "Instructions" (When greeted, respond: "Hi there! I'm your AI Nutrition Assistant powered by WatsonX. To personalize my guidance, may I start by getting your: 1. Name, age, and gender 2. Your main health goal (e.g., weight loss, muscle gain, manage diabetes)"), "Knowledge", and "Tools" (Add tool, Create custom tool). The right panel is titled "Agent preview" and provides a personalized nutrition plan for Harsh, a male Indian looking to lose weight. It includes general guidelines (caloric intake, macronutrient balance, hydration, portion control), a list of recommended foods (lean protein sources, complex carbohydrates, healthy fats, spices/herbs), and a sample meal plan (Breakfast: Oatmeal with fruits and nuts, Snack: Carrot sticks with hummus). A search bar at the bottom says "Type something...".

RESULT

The screenshot shows the IBM Watsonx Agent Lab (beta) interface. The top navigation bar includes tabs for Perplexity, Nutrition AI problem statement, Agent Lab (beta) — Docs | IBM, Nutrition Agent — NUTRI_AGENT, and Identity & Access Management. The main workspace is titled "IBM watsonx" and shows a "Build" section with two cards: "Hello" and "Get Started". To the right is an "Agent preview" pane where the nutrition agent has responded with: "Great, Harsh! I'll provide you with a more detailed meal plan and some additional tips to support your weight loss journey. Here's a 7-day meal plan for you: Day 1: • Breakfast: Oatmeal with fruits and nuts (300 calories) • Snack: Carrot sticks with hummus (100 calories) • Lunch: Brown rice with lentil soup and vegetables (400 calories) • Snack: Greek yogurt with cucumber and cumin (150 calories) • Dinner: Grilled chicken with roasted vegetables and quinoa (500 calories) Day 2: • Breakfast: Whole wheat toast with avocado and eggs (350 calories) • Snack: Apple slices with almond butter (150 calories) • Lunch: Brown rice with chickpea salad and vegetables (450 calories) • Snack: Cottage cheese with cucumber and mint (150 calories) • Dinner: Grilled fish with roasted vegetables and brown rice (500 calories) Day 3: • Breakfast: Smoothie bowl with banana, spinach, and almond milk (300 calories)". The configuration section shows "LangGraph" selected under "Framework" and "React" under "Architecture". The instructions section contains a greeting and a note about personalizing guidance. The knowledge, tools, and add tool sections are also visible at the bottom.

CONCLUSION

- Innovative Solution: Leveraged agentic AI on IBM Cloud Lite to deliver truly personalized, adaptive nutrition guidance.
- Scalable & Accessible: Hosted on Watsonx Agent Lab with voice and image inputs, making healthy eating support available anytime, anywhere.
- Impact & Next Steps: Bridges the gap between generic diet apps and one-on-one counseling —ready for real-world pilot, data-driven refinement, and wearable integration.

FUTURE SCOPE

- Integration with Wearables & Health Apps
 - Connect with devices like smartwatches and fitness trackers to monitor real-time health metrics.
- Multilingual & Multicultural Support
 - Expand to support multiple languages and regional dietary habits for global usability.
- Real-Time Food Recognition
 - Use advanced image recognition to identify food items from photos and estimate nutritional content.
- Voice-Driven Conversations
 - Enable full voice-based interaction for hands-free, accessible nutrition support.
- Personal Health Tracking
 - Track user progress, generate reports, and suggest long-term nutrition strategies based on results.

REFERENCES

- IBM Watsonx Documentation – <https://www.ibm.com/docs/en/watsonx>
- IBM Cloud Lite – <https://www.ibm.com/cloud/free>
- IBM Watson Assistant – <https://www.ibm.com/cloud/watson-assistant/>
- LangGraph for Agentic Workflows – <https://www.langgraph.dev/>
- ReAct Architecture (Reasoning + Acting) – <https://arxiv.org/abs/2210.03629>

IBM CERTIFICATIONS



IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence



HARSH SURYAVANSHI

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/9f8a5f01-4af6-42b0-a94c-cd5bd3031d84>



IBM CERTIFICATIONS

23/07/25, 6:38 PM

IBM SkillsBuild Completion Certificate



This certificate is presented to
HARSH SURYAVANSHI
for the completion of
Lab: Retrieval Augmented Generation with LangChain
(ALM-COURSE_3824998)
According to the Adobe Learning Manager system of record

Completion date: 23 Jul 2025 (GMT) **Learning hours:** 20 mins

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

Page 1 of 1

THANK YOU