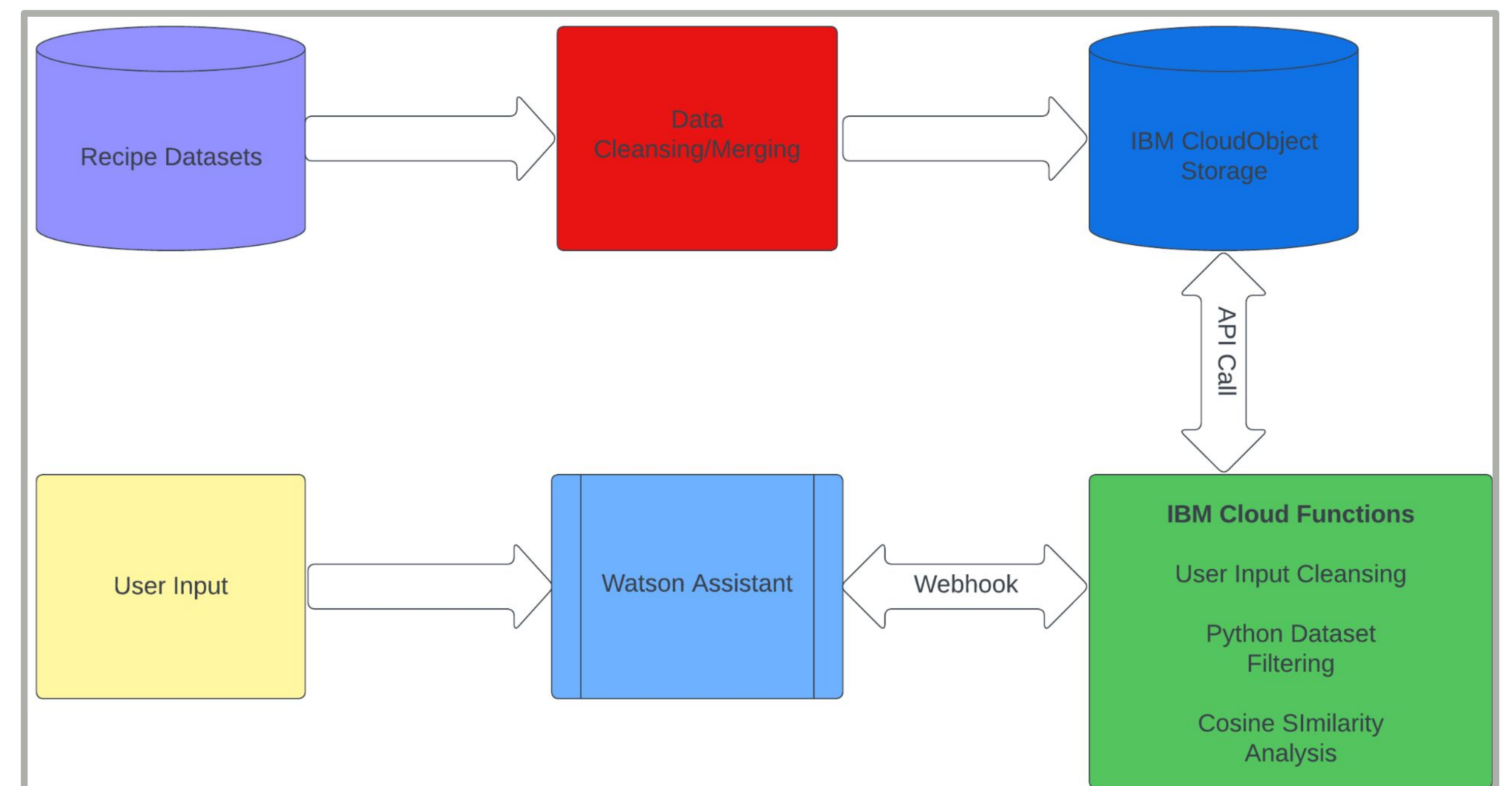


# What's the Deal for Your Meal

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## Introduction

- Food.com and various other recipe websites give no ability to filter for multiple dietary restrictions, making dinner parties a nightmare.
- When searching for simple queries, a long list of results appears
  - This results in endless scrolling to find recipes that fit
- If multiple keywords are used, no results come up
  - For example, when searching “nut-free salad”
- Using a dataset of ~230,000 recipes, we looked to create a bot that would take in the meal preferences and restrictions of a user and output recipe suggestions for the user.
  - To both help users get better answers to their meal questions and drive usage of the Food.com website



## Results

- We were able to build a Watson Assistant Chatbot that fully interacts with the user by asking a series of questions.
- Our chatbot accurately captures key words to be fed to our backend, and successfully filters through the dataset resulting in multiple relevant recipe options.

## Data & Architecture

- The dataset contained ~230,000 rows of data after multiple left joins and contained columns regarding the recipe name, a list of tags that describes the recipe, nutritional values, the number of minutes it took to cook each recipe, the ingredients, the number of steps it takes, some data regarding the rating of the recipe, and of course the steps to follow.
- Using Watson Assistant, we created a chat bot to interact with the user and guide them through a conversation to better understand their needs
- Based on the users' answers, Watson Assistant would be able to recognize their response using natural language processing and guide them through conversational paths
  - These answers are then stored and later processed
- The customer's inputs are then sent to Cloud Functions, where our backend is housed. We used content-based filtering to manipulate the dataset utilizing those input's to personalize the recipes selected based on the user's preferences.
- We also ask the customer at the end of each experience if they have a brief description of what they are looking for. We take this input and run cosine similarity on the name of the recipe and find the similarity score to further narrow down results.

Recipe 1: Confidence Level - 50.0%

Recipe Name - duck breasts with raspberry sauce

Ingredients: ['duck breasts', 'salt and pepper', 'raspberries', 'cinnamon', 'sugar', 'red wine vinegar', 'water']

Steps: ['score the skin of the duck breasts , being careful not to cut into the meat', 'season with salt and pepper on both sides , then place into a cold skillet , skin side down', 'turn on the flame to medium-low , and slowly cook the duck until much of the fat has rendered out , and the skin begins to get crispy', 'remove most of the rendered fat from the pan , and reserve for another use', 'set the duck aside while the sauce cooks', 'in another small pan , combine the raspberries , cinnamon , sugar , vinegar , and water', 'cook over medium low heat until the berries are soft and the sugar has dissolved', 'place in a blender and puree until smooth', 'return the duck to medium low heat , this time skin side up', 'continue to cook until the meat reaches your desired degree of doneness', 'let the duck rest for 5 minutes , then place on serving dishes and drizzle with the raspberry sauce']

Recipe 2: Confidence Level - 40.824829046386306%

Recipe Name - canard a l orange duck with orange

Ingredients: ['duck breasts', 'salt & freshly ground black pepper', 'butter', 'garlic clove', 'baby spinach leaves', 'brown sugar', 'white wine vinegar', 'orange juice', 'chicken stock', 'orange, zest of', 'oranges']

Steps: ['trim the duck breasts to remove any excess fat and score the skin with a diamond pattern', 'to make the sauce , put the sugar and vinegar into a saucepan , bring to the boil and reduce until it begins to caramelize', 'add the orange juice , reduce down to one third and add the chicken stock', 'leave to simmer', 'set the oven to 400f', 'season the duck breast with salt and freshly ground black pepper', 'heat a frying pan over a high heat and add the duck breasts , skin side down', 'cook until the skin is golden , turn the breasts over and cook for a further 30 seconds', 'transfer to the oven and cook for 4-5 minutes , depending on size', 'when the duck is cooked , remove it from the oven and leave to rest - skin side up', 'heat the butter and add the garlic and spinach', 'cook briefly until the spinach has wilted and then season with salt and freshly ground black pepper', 'add the orange zest to the orange sauce and simmer for a minute or so', 'to serve , place a portion of drained spinach on each plate , cut the duck breast skin into slices and fan evenly across the spinach', 'put the orange segments into the sauce and gently poach for 15 seconds', 'place the orange segments around the duck and pour the sauce around the plate']

For this output, the user indicated they had a shellfish and nut allergy, wanted dinner that was French cuisine, only had 60 minutes to complete the meal, and wanted the recipe to use duck. Please note these are only 2 of the 3 results provided by the bot.

## Conclusion

- Our chatbot efficiently provides recommendations for recipes based off the users preferences utilizing API calls and webhooks.
- There were many other possible routes that we could have improved upon in our project if we were given more time. We attempted to create an API Call to save user feedback from Watson Assistant, but ran into time consuming roadblocks.
- We noticed that when heavily filtered, recipes with 0% confidence levels are sometimes provided. Ideally, these would be filtered out and a response instructing the user to be more broad would be included.
- Another possible improvement for our project in the future would be to have a larger dataset to work with. Even though we were able to find a very good dataset with around 230,000 rows, it would be alot better to have more data in order to get more accurate results when filtering or to say the least more variety in outputs.