



BE-Fit Meal Delivery Application

Cloud Computing Spring 2022
Professor :Sambit Sahu



Team Members

Yashika Dhawan(yd2281)

Shanthi Sree Devaraju (sd4601)

Vikram Badhan (vb2174)

Jaideep Singh (js11592)

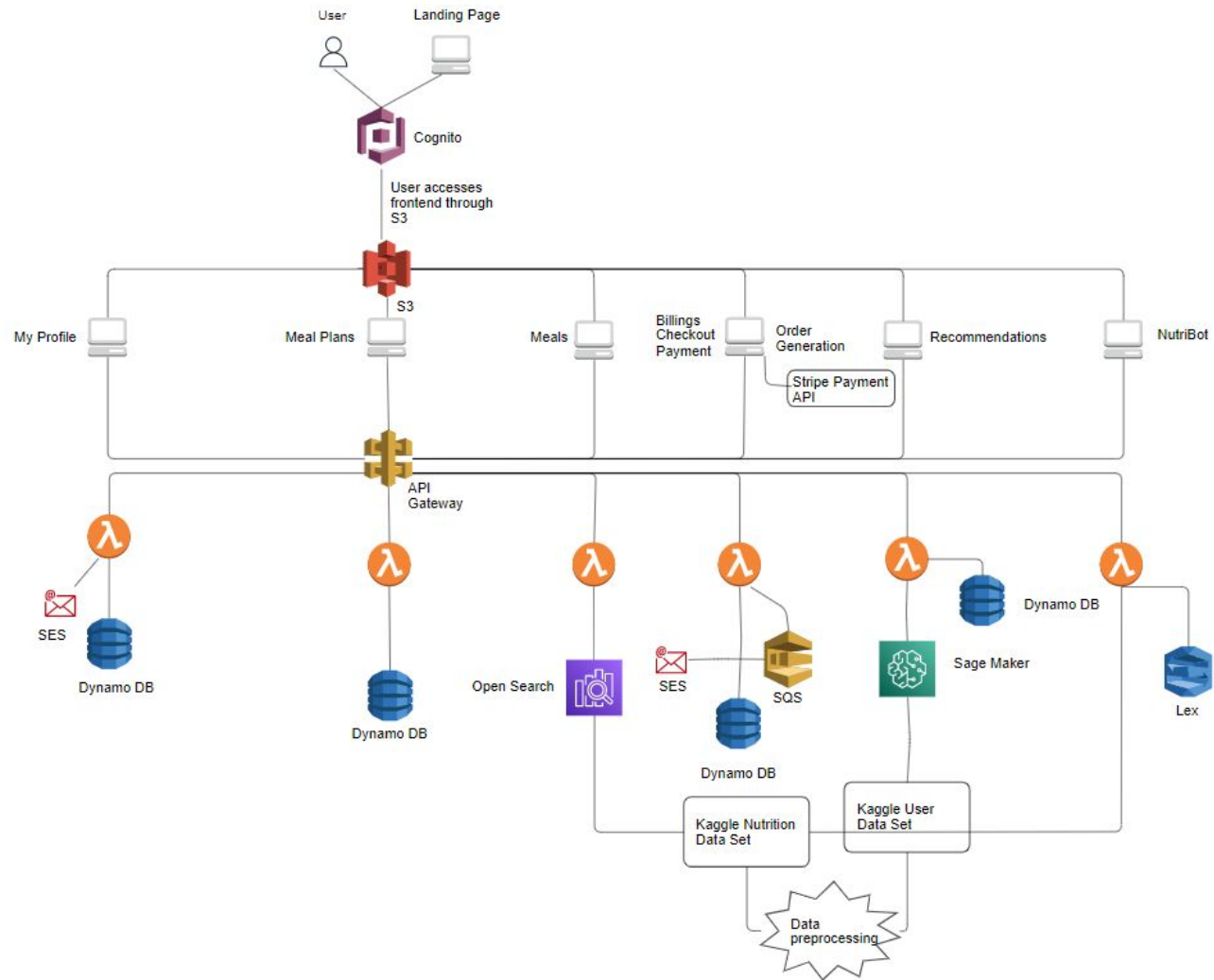


Problem Statement

As trends change, every individual is looking for an easy and convenient way to improve their health. From what to eat, when to eat and having no time to go to the grocery, or make your own meal. With recommended diets and meal plans, studies show that, if being used on a regular basis can potentially improve health and wellness goals of any individual.

We are trying to make a meal delivery application which has one single goal to make an individuals life healthier by providing motivation, recommendation and making them eat consciously.

Architecture





AWS Services Used in Be-Fit



COGNITO



LAMBDA



API GATEWAY



S3



OPEN SEARCH



SQS



AWS Services Used in Be-Fit



SES



DYNAMODB



SAGEMAKER



LEX

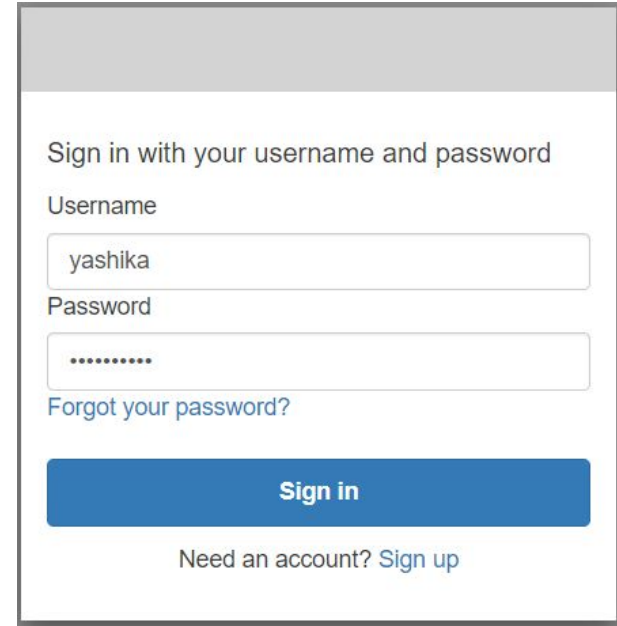


User Sign Up/Sign In

Be-Fit Uses Cognito for User authentication and User Management.

For New Users, In Sign up Process user is required to provide Username, email Id and password. User is also required to verify their email.

For existing users, In Sign in Process, user enters Username and password.



Sign in with your username and password

Username

Password

[Forgot your password?](#)

Sign in

Need an account? [Sign up](#)



Dashboard

After authentication, user lands on the Dashboard. On the Dashboard User can view Tabs like Home, My Profile, Meal Plans, Meal Recommendations.

User can easily navigate to different pages from the Dashboard.



HOME

MY PROFILE

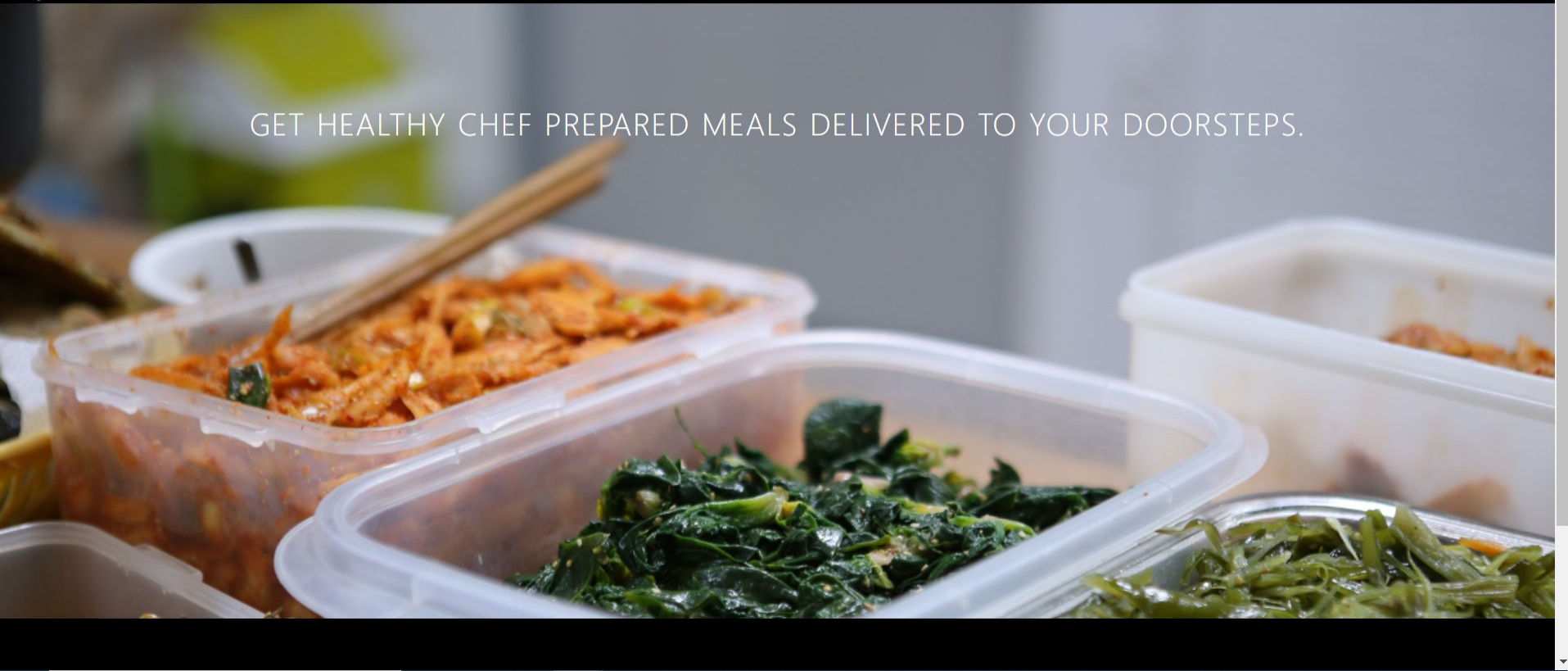
MEAL PLANS

MEAL RECOMMENDATIONS

ABOUT US

SIGNOUT

GET HEALTHY CHEF PREPARED MEALS DELIVERED TO YOUR DOORSTEPS.





My Profile

In My Profile Screen, User will set/view their Information like:

- Personal Information
- Address
- Meal Preferences
- Health condition
- Allergies
- Dietary restrictions

Based on the information provided
System will calculate BMI and Suggested
Calories Consumption.



My Profile

This information will help Be-Fit App to suggest Meals based on their age, gender,height, weight, activity level and calories they should consume, along with their preferences like Low Carb, High Protein diets, Gluten free, Dairy free etc.

Once User clicks on Update, this information will be stored in DynamoDB.

MY PROFILE

Personal

Name : Age : Gender :

Ethnicity : Height : Weight :

Address

Street : City : State :

Phone No :

Preferences

Activity : Medical condition : Dietary preference :

Food allergies :

Choose meal preferences :

Low Salt	Low Carb	Low Fat	Low Cholesterol
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High Protein	High Fiber	Low Sugar	Pescetarian
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gluten Free			
<input type="checkbox"/>			

Health

BMI : 21.484375 Suggested Daily calories consumption : 2400



Meal Recommendations

In Meal Recommendation screen, Be-Fit suggests users Meals based on their Personal information like height, weight, gender, activity level, calories to be consumed in day, dietary preferences, meal preferences, medical conditions. This information needs to be set by user in the My Profile screen. This helps us in giving a more Personalised and clever Meal recommendations.

We have used Sage Maker for the recommendations. To train our model we have used User Information Dataset from Kaggle and for Preferences, we have used Nutrition Dataset from Kaggle.



Meal Recommendations

Based on our recommendations, if user wants to purchase our meal, they can select the meal to purchase. Once selected they will be redirected to the Billing Page where they can make the purchase.

[HOME](#)[MY PROFILE](#)[MEAL PLANS](#)[MEAL RECOMMENDATIONS](#)[ABOUT US](#)[SIGNOUT](#)

PREFERENCES

PERSONALIZED RECOMMENDATIONS



Sweet potato
leaves, raw
Cal1

[Select](#)

Arrowhead, with
salt, drained,
boiled, cooked
Cal2

[Select](#)

Beef, raw, 80%
lean meat / 20%
fat, ground
Cal3

[Select](#)

KEEBLER, Pecan
Shortbread
Cookies,
SANDIES
Cal4

[Select](#)

Macaroni and
cheese, frozen
entree
Cal5

[Select](#)

Snacks,
barbecue-flavor,
potato chips
Cal6

[Select](#)



K means clustering

- In order to find nutritional requirements of an individual a kmeans model was built on the calorie requirement dataset.
- The number of clusters was taken as 30 and the number of instances to be compared was chosen as 1 giving high precision.
- The output of the model on current users details are used to predict his calorie requirement.
- These are then forwarded to the next stage.

We take the users age, sex, weight,height, calorie intake from the dynamodb.

We invoke the sagemaker endpoint.

The output of the endpoint are stored into 2 csv files:

1.distance_to_cluster, closest_cluster,calorie intake

2.One hot encoding of the meals is based on the WHO/FDA recommended standards. The output of which are categories of meal plans.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	meal_id	name	calories	lowsalt	lowcarb	lowfat	lowcholestr	highprotein	caffeine	highfiber	glucose	shellfish	soy	dairyfree	egg	peanut	treenut	wheat	fish	diabeticrien
2	0	Cornstarch	381	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
3	1	Nuts, pecans	691	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0
4	2	Eggplant, raw	25	1	0	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0
5	3	Teff, uncooked	367	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
6	4	Sherbet, orange	144	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
7	5	Cauliflower, raw	25	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
8	6	Taro leaves, raw	42	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
9	7	Lamb, raw, ground	282	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0
10	8	Cheese, camembert	300	0	1	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0
11	9	Vegetarian fillets	290	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0
12	10	PACE, Picante Sauce	25	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
13	11	Goji berries, dried	349	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
14	12	Mango nectar, canned	51	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
15	13	Crackers, rusk toast	407	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
16	14	Chicken, boiled, feet	215	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0
17	15	Quail, raw, meat only	134	0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0
18	16	Pie, lemon, fried pies	316	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0
19	17	Peppers, raw, jalapeno	29	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
20	18	Winged bean tuber, raw	148	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0
21	19	Salami, turkey, cooked	172	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0
22	20	Grapes, raw, muscadine	57	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
23	21	Nuts, raw, ginkgo nuts	182	0	0	1	1	0	1	0	1	0	0	0	0	0	1	0	0	0
24	22	Spices, ground, savory	272	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0
25	23	Candies, sesame crunch	516	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0
26	24	Cheese, low fat, cream	201	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0

We take the calorie consumption from the cluster this user belongs to.

Since our application recommends the meals that the user can eat in day. We assume the user eats 3 meals in a day. The calories of each of the meal recommended will be below the daily calorie intake divided by 3.

Then, we filter out the meals based on his preferences, allergies, dietary preference as listed.

These meals are recommended to the user

Preferences	allergies	dietaryPreference
lowsalt	soy	nonvegetarian
lowcarb	caffeine	vegetarian
lowfat	shellfish	eggetarian
lowcholesterol	peanut	vegan
highprotein	treenut	
highfiber	seafood	
diabeticfriendly	redmeat	
pescetarian	whitemeat	
glutenfree		

user_id	sex	age	weight	height	calorie_intak	activity	cluster
0	1	27	135	153	1900	2	6
1	0	19	204	161	2700	1	14
2	0	53	285	159	2300	2	5
3	0	42	162	161	1900	2	6
4	1	28	156	169	2900	0	10
5	1	43	269	174	1800	2	8
6	0	24	101	188	1500	2	7
7	0	45	109	174	2600	0	1
8	0	25	156	163	2500	0	17
9	0	56	275	184	2000	2	25
10	0	30	196	154	2600	2	1
11	0	52	205	199	2000	2	25
12	0	57	111	141	1600	0	23
13	1	46	100	179	2000	1	13
14	0	19	226	194	1900	0	9
15	0	43	211	164	2200	0	19
16	1	33	181	151	1600	1	23
17	1	42	120	171	3000	1	20
18	1	25	216	174	2700	1	14
19	0	34	250	177	1300	2	2
20	0	53	125	193	1300	2	28
21	0	23	248	159	2600	0	26
22	1	22	215	149	2200	2	19
23	0	25	136	155	1300	2	28
24	0	37	236	148	1400	0	18
25	1	21	234	175	2300	0	5
26	1	42	259	172	1600	0	15
27	1	22	204	143	2500	0	17
28	0	62	122	190	2700	1	29



NLP preprocessing and Classification

- We took a Nutrition dataset from Kaggle.
- We utilized NLP preprocessing to convert the name feature into 14 useful features.
- The features were all one hot encoded for easy deployment.
- After taking the input from the user we run a basic lambda classification on our dataset.
- On the basis of the classification output we recommend the user what to eat.



Meal Plans

Be-Fit offers Meal Plans subscription service.

User can choose the meal plan that they want to subscribe to from my carefully curated List of Meal Plans. We have a variety of Plans like :

- Low Carb Meals
- Gluten free Meals
- Diabetic Friendly Meals
- Dairy Free Meals
- Low Salt Meals
- Vegan Meals
- Low Cholesterol
- High Protein
- Fiber rich
- Low Fat
- Ovo Vegetarian Meal
- Ovo lac Vegan
- Pescetarian

CHOOSE YOUR MEAL PLAN

Choose your preferences

Enjoy our widest variety of clean, chef-crafted meals to fit any lifestyle, including Keto, Calorie Smart, and Vegan + Vegetarian



LOW CARB MEAL

This meal plan will be more of eggs, nuts and poultry

Select



GLUTEN FREE MEAL

This meal plan will be more of low-fat dairy, meat fish, poultry

Select



DAIRY FREE MEAL

This meal plan will be more of nuts, soy, vegetables, fish

Select





Meals

Once user clicks on any Meal name they can view the kind of meals they can expect delivered to their doorsteps if they subscribe to the selected Meal Plan. This helps give User a good Idea of our delicious meals specially designed by us.

We have used Opensearch in searching Meals for Meals Plans. These meals have been carefully re processed and stored in opensearch based on their respective categories.

HIGH PROTEIN MEAL

We will curate healthy meals for you. Below are our Meals for this plan

Want to know more nutritional info about any of these items? Click below

Powered by Fatsecret



Chicken, fried, cooked, meat only, breast, broilers or fryers

Total calories : 187



MORNINGSTAR FARMS Breakfast Sausage Links, unprepared, frozen

Total calories : 159



Cocoa, processed with alkali, hi-fat or breakfast, dry powder

Total calories : 479



Lamb, pan-fried, cooked, brain, variety meats and by-products

Total calories : 273



Seal, partially dried (Alaska Native), meat, bearded (Oogruk)

Total calories : 370



Turkey from whole, roasted, cooked, meat and skin, light meat

Total calories : 477



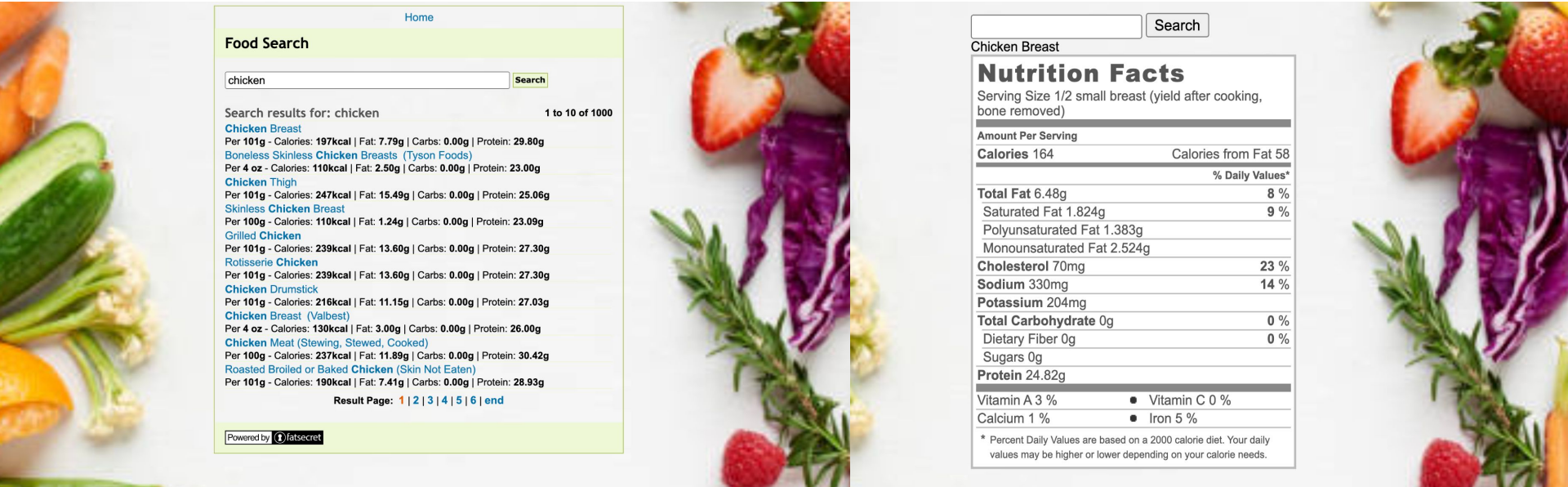
USDA Commodity, raw, frozen, bulk/coarse ground, ground, beef

Total calories : 330



Cheese, low sodium, cheddar or American, pasteurized process

Total calories : 336



[Home](#)

Food Search

Search

Search results for: chicken1 to 10 of 1000

[Chicken Breast](#)

Per 101g - Calories: 197kcal | Fat: 7.79g | Carbs: 0.00g | Protein: 29.80g

[Boneless Skinless Chicken Breasts \(Tyson Foods\)](#)

Per 4 oz - Calories: 110kcal | Fat: 2.50g | Carbs: 0.00g | Protein: 23.00g

[Chicken Thigh](#)

Per 101g - Calories: 247kcal | Fat: 15.49g | Carbs: 0.00g | Protein: 25.06g

[Skinless Chicken Breast](#)

Per 100g - Calories: 110kcal | Fat: 1.24g | Carbs: 0.00g | Protein: 23.09g

[Grilled Chicken](#)

Per 101g - Calories: 239kcal | Fat: 13.60g | Carbs: 0.00g | Protein: 27.30g

[Rotisserie Chicken](#)

Per 101g - Calories: 239kcal | Fat: 13.60g | Carbs: 0.00g | Protein: 27.30g

[Chicken Drumstick](#)

Per 101g - Calories: 216kcal | Fat: 11.15g | Carbs: 0.00g | Protein: 27.03g

[Chicken Breast \(Valbest\)](#)

Per 4 oz - Calories: 130kcal | Fat: 3.00g | Carbs: 0.00g | Protein: 26.00g

[Chicken Meat \(Stewing, Stewed, Cooked\)](#)

Per 100g - Calories: 237kcal | Fat: 11.89g | Carbs: 0.00g | Protein: 30.42g

[Roasted Broiled or Baked Chicken \(Skin Not Eaten\)](#)

Per 101g - Calories: 190kcal | Fat: 7.41g | Carbs: 0.00g | Protein: 28.93g

Result Page: 1 | 2 | 3 | 4 | 5 | 6 | end

Powered by fatsecret

Search

Chicken Breast

Nutrition Facts

Serving Size 1/2 small breast (yield after cooking, bone removed)

Amount Per Serving	
Calories 164	Calories from Fat 58
% Daily Values*	
Total Fat 6.48g	8 %
Saturated Fat 1.824g	9 %
Polyunsaturated Fat 1.383g	
Monounsaturated Fat 2.524g	
Cholesterol 70mg	23 %
Sodium 330mg	14 %
Potassium 204mg	
Total Carbohydrate 0g	0 %
Dietary Fiber 0g	0 %
Sugars 0g	
Protein 24.82g	
Vitamin A 3 %	Vitamin C 0 %
Calcium 1 %	Iron 5 %

* Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.



Meal Frequency and Pricing

Once User selected a particular meal plan to subscribe. They will land on Choose Meal plan page. They can select the frequency of the subscription. Like 4 meals/week, 6 meals/week, 8 meals/week etc. They also be able to see Prices of the subscriptions.

[HOME](#)[MY PROFILE](#)[MEAL PLANS](#)[MEAL RECOMMENDATIONS](#)[ABOUT US](#)[SIGNOUT](#)

MEAL PLAN

No commitments, except to yourself. You can pause, cancel or change your plan at any time.



4 MEALS/WEEK

\$7.5 per serving

Select



6 MEALS/WEEK

\$6.4 per serving

Select



8 MEALS/WEEK

\$6.19 per serving

Select



10 MEALS/WEEK

\$6 per serving

Select



12 MEALS/WEEK

\$5.75 per serving

Select



18 MEALS/WEEK

\$5.5 per serving

Select



Checkout and Billing

On selecting a Meal Plan and its frequency, User will Land on the Checkout Page where they can carefully review their subscription details.

On confirming, User will enter Payment details and submit Order.

We have used DynamoDB to store Order Details, SQS with SES to send Order confirmation email to our User.

[HOME](#)[MY PROFILE](#)[MEAL PLANS](#)[MEAL RECOMMENDATIONS](#)[ABOUT US](#)[SIGNOUT](#)

SELECTED MEAL INFORMATION

**MEAL NAME :**

fish

MEAL DESCRIPTION :

This meal plan will include more eggs, seafood and poultry

MEAL FREQUENCY :

4

MEAL PRICE :

7.5

SHIPPING INFO

Street Address

City

State

Country

Zip Code

[Make Payment](#)

[HOME](#)[MY PROFILE](#)[MEAL PLANS](#)[MEAL RECOMMENDATIONS](#)[ABOUT US](#)[SIGNOUT](#)

Card



Google Pay

Card number

1234 1234 1234 1234



Expiration

MM / YY

CVC

CVC



Country

United States



ZIP

90210

By providing your card information, you allow mealdeliveryapp.s3.amazonaws.com to charge your card for future payments in accordance with their terms.

[Pay now](#)

[HOME](#)[MY PROFILE](#)[MEAL PLANS](#)[MEAL RECOMMENDATIONS](#)[ABOUT US](#)[SIGNOUT](#)

ORDER CONFIRMATION

**MEAL NAME :**

fish

MEAL DESCRIPTION :

This meal plan will include more eggs,seafood
and poultry

MEAL PRICE :

8

MEAL FREQUENCY :

4

ORDER DATE :

05/16/2022, 18:46:02



Hi there, I'm your Restaurant Concierge. How can I help?

15:35

hello



Hey there, How may I serve you today?

find nutritional info



which food do you need the nutritional info for?

broccoli



Thank you heres the nutrional info : Meal Name:Broccoli, raw Calorie count:34 Total Fat:0.4g Total Cholesterol:0 Total Fiber:2.6 g Total Sugar:1.70 g

|Type message...



Thank you