BIG DATA Project
Standalone E-commerce Web Application

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About the project

- The aim is to create an architecture and develop an e-commerce web application with scalability solutions using Mongo DB.
- Develop a web application server using Node.JS and deploy the application on cloud Microsoft Azure
- Implement functionalities such as Redis for cache implementation, Cloudinary CDN for image hosting and Elastic Search for implementation of fuzzy search on indexes.

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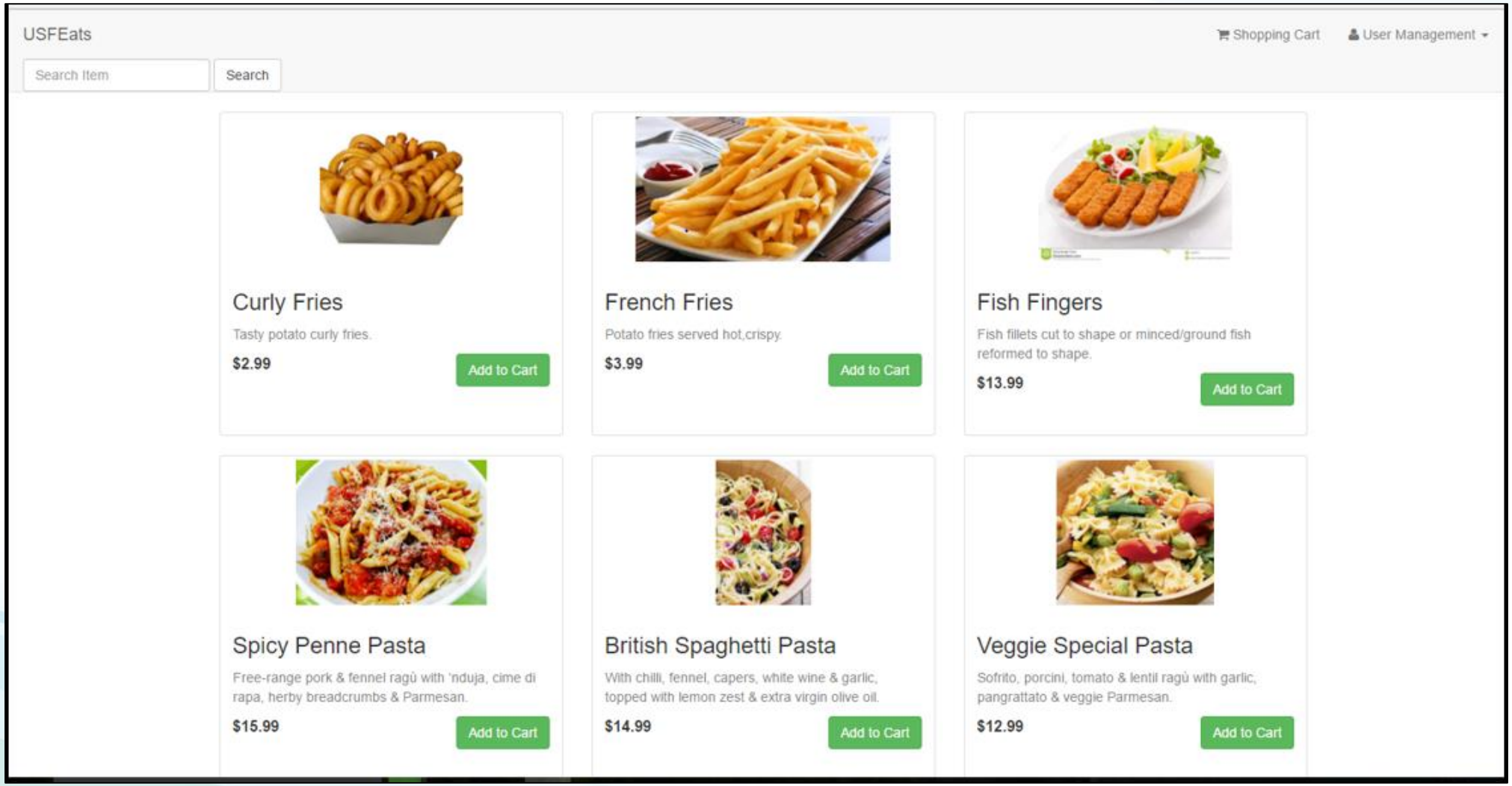
The Food Ordering Website – USF EATS



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Big Data Components Used

- Application Server: Node.JS
- No SQL Database: MongoDB
- Cache Implementation: Redis Cache
- CDN: Cloudinary CDN
- Textual Search: Elastic Search

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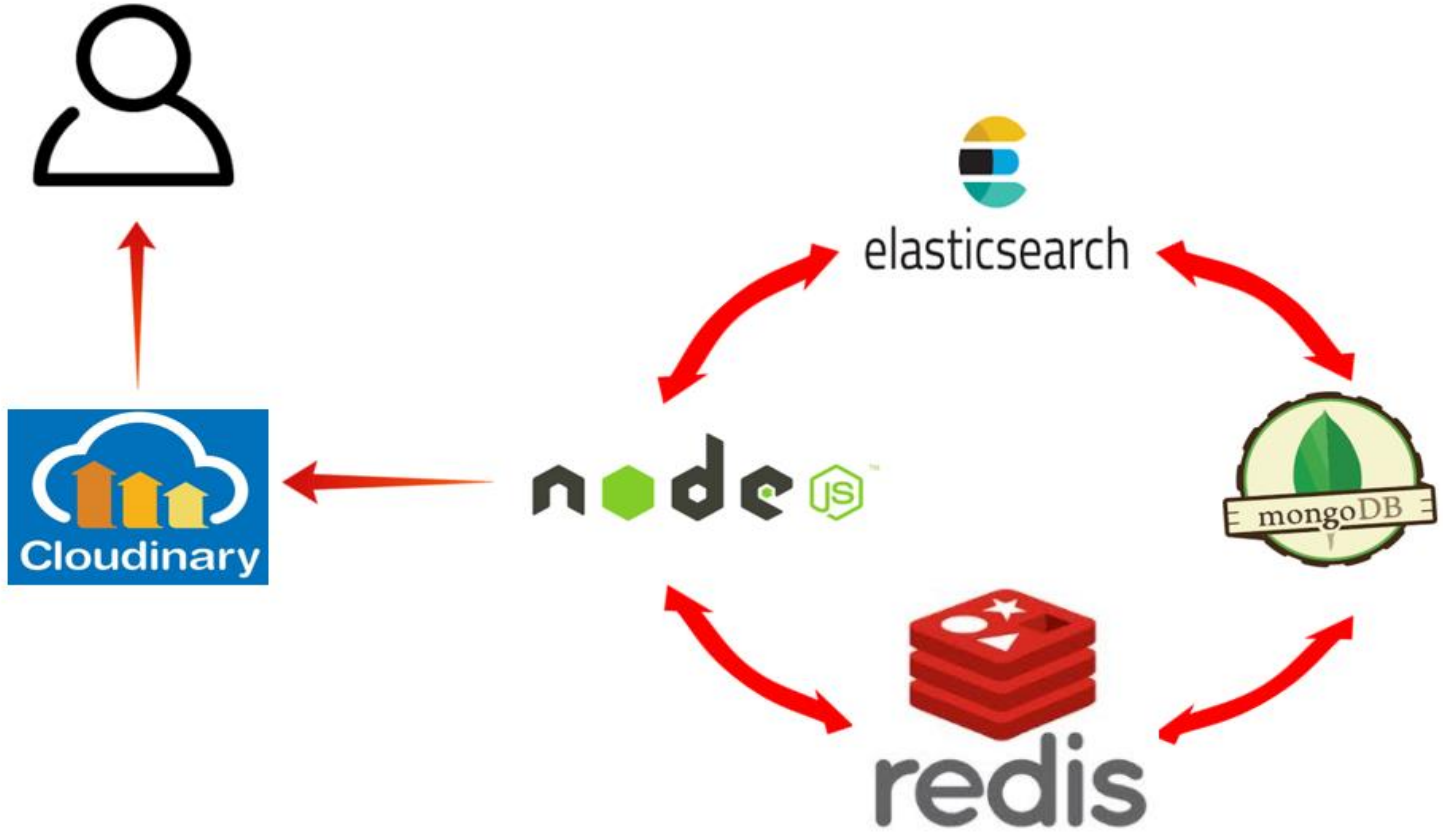
Architecture



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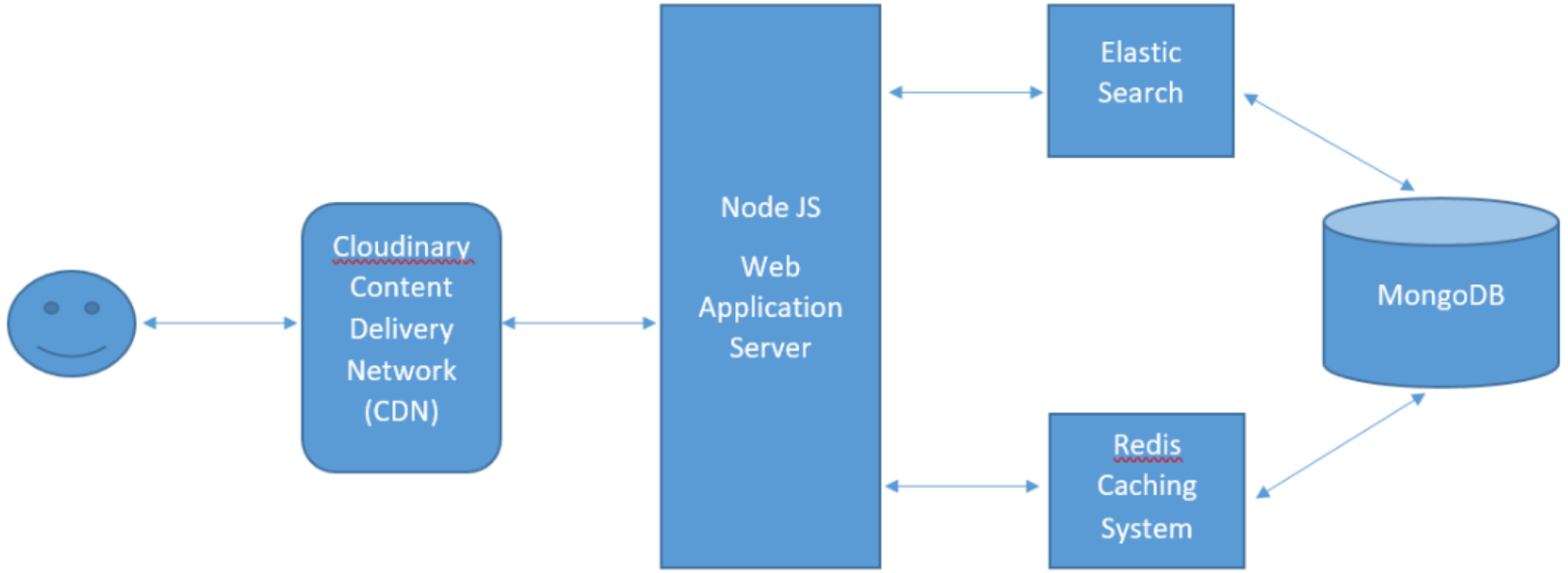
Big Data Architecture



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Mongo DB

- MongoDB maintains features of relational databases:

strong consistency

expressive query language

secondary indexes

- MongoDB provides:

Data model flexibility

Elastic scalability

High performance

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```
> use shopping
switched to db shopping
> db.products.find()
{ "_id" : ObjectId("590a19aa49bdf32b70ab64f4"), "imagepath" : "http://res.cloudinary.com/tessthomas/image/upload/v1493940073/l2wgoebm0mzvucuvebly.jpg", "title" : "Curly Fries", "description" : "Tas
ty potato curly fries", "rating" : "4.7/5", "price" : 2.99 }
{ "_id" : ObjectId("590a19c149bdf32b70ab64f5"), "imagepath" : "http://res.cloudinary.com/tessthomas/image/upload/v1493940073/r72ixe55pb2bpsisn4ro.jpg", "title" : "French Fries", "description" : "Po
tato fries served hot,crispy", "rating" : "4.9/5", "price" : 3.99 }
{ "_id" : ObjectId("590a19c249bdf32b70ab64f6"), "imagepath" : "http://res.cloudinary.com/tessthomas/image/upload/v1493940073/g8ykjtlonemcs9vu6fwn.jpg", "title" : "Fish Fingers", "description" : "Fi
sh fillets cut to shape or minced/ground fish reformed to shape", "rating" : "4.4/5", "price" : 13.99 }
{ "_id" : ObjectId("590a1a2349bdf32b70ab64f8"), "imagepath" : "http://www.cinfullysimple.com/wp-content/uploads/cinfully-simple-easy-eats-penne-pasta-with-marinara-diablo-3.jpg", "title" : "Spicy P
enne Pasta", "description" : "Free-range pork & fennel ragù with ‘nduja, cime di rapa, herby breadcrumbs & Parmesan", "rating" : "5/5", "price" : 15.99 }
{ "_id" : ObjectId("590a1a2349bdf32b70ab64f9"), "imagepath" : "http://del.h-cdn.co/assets/15/44/california_spaghetti_salad2-650x975.jpg", "title" : "British Spaghetti Pasta", "description" : "With
chilli, fennel, capers, white wine & garlic, topped with lemon zest & extra virgin olive oil", "rating" : "4/5", "price" : 14.99 }
{ "_id" : ObjectId("590a1a2349bdf32b70ab64fa"), "imagepath" : "https://www.bbcgoodfood.com/sites/default/files/styles/recipe/public/recipe_images/recipe-image-legacy-id--4987_11.jpg?itok=YFVuL_C_",
 "title" : "Veggie Special Pasta", "description" : "Sofrito, porcini, tomato & lentil ragù with garlic, pangrattato & veggie Parmesan", "rating" : "3/5", "price" : 12.99 }
{ "_id" : ObjectId("590a1a2449bdf32b70ab64fb"), "imagepath" : "https://www.bbcgoodfood.com/sites/default/files/styles/push_item/public/recipe_images/classic-lasange.jpg?itok=uH0JchFI", "title" : "L
asagne Pasta", "description" : "Herby 12-hour slow-cooked oxtail & Chianti ragù layered with pasta, béchamel, mozzarella & Parmesan", "rating" : "4/5", "price" : 12.99 }
{ "_id" : ObjectId("590a1a2449bdf32b70ab64fc"), "imagepath" : "http://del.h-cdn.co/assets/16/26/980x551/gallery-1467150710-lemon-butter-chicken-pasta-04.jpg", "title" : "Special Non-veg Pasta", "de
scription" : "Veal ragù pasta parcels with sage brown butter, crispy chicken, pancetta, lemon & Parmesan", "rating" : "5/5", "price" : 16 }
{ "_id" : ObjectId("590a1a2449bdf32b70ab64fd"), "imagepath" : "https://hungrybgs.com/wp-content/uploads/2014/09/spicy.jpg", "title" : "Spicy Chicken Pizza", "description" : "The red pepper flakes a
nd the black pepper along with spicky chicken and spicy sauce", "rating" : "5/5", "price" : 16 }
{ "_id" : ObjectId("590a1a2449bdf32b70ab64fe"), "imagepath" : "https://s3.amazonaws.com/img.cookspiration.com/devices/134/2/en/veggie.pizza.with.three.cheese.ipad.jpg", "title" : "Veg Pizza", "desc
ription" : "Slice-by-slice this yummy roasted vegetable pizza will disappear before your eyes", "rating" : "4/5", "price" : 13 }
{ "_id" : ObjectId("590a1a2449bdf32b70ab64ff"), "imagepath" : "http://boboli.com/images/recipes/576/bbq_chicken_LR.jpg", "title" : "BBQ Pizza", "description" : "House-Smoked BBQ Sauce, Smoked Chick
en, Apple Smoked Red Onions, House-Smoked Cheese Blend, and Green Onions", "rating" : "4.5/5", "price" : 14 }
{ "_id" : ObjectId("590a1a2449bdf32b70ab6500"), "imagepath" : "http://www.cicis.com/media/1149/pizza_trad_cheese.png", "title" : "Cheese Pizza", "description" : "Cheese Pizza starts with our savory
 sauce of vine-ripened tomatoes, extra-virgin olive oil, garlic, and spices spread", "rating" : "4/5", "price" : 13 }
{ "_id" : ObjectId("590a1a2649bdf32b70ab6501"), "imagepath" : "http://www.dominos.co.in/files/items/Dish6-%20veg%20extravaganza%20copy_1346593580.jpg", "title" : "Garden Fresh Pizza", "description"
 : "A generous salad of mixed greens, banana peppers, cucumbers, olives, red onions & tomatoes.", "rating" : "5/5", "price" : 15 }
{ "_id" : ObjectId("590a1a6a49bdf32b70ab6502"), "imagepath" : "https://i.ytimg.com/vi/a03U45jFxOI/maxresdefault.jpg", "title" : "Butter Chicken", "description" : "Chicken in a mildly spiced curry s
auce.", "rating" : "4.5/5", "price" : 13.99 }
{ "_id" : ObjectId("590a1a6a49bdf32b70ab6503"), "imagepath" : "http://planeatrepeat.com/wp-content/uploads/2016/02/khattameetha.jpg", "title" : "Chicken Biryani", "description" : "Indian chicken wi
th rice dish.", "rating" : "4.6/5", "price" : 12.99 }
{ "_id" : ObjectId("590a1a6b49bdf32b70ab6504"), "imagepath" : "http://rayaanorientalrestaurant.com/wp-content/uploads/2016/09/chicken-tikka.jpg", "title" : "Chicken Tikka", "description" : "Chicken
 tandoor dish after marinating in spices and yogurt.", "rating" : "4.2/5", "price" : 11.99 }
{ "_id" : ObjectId("590a1a6b49bdf32b70ab6505"), "imagepath" : "https://i.ytimg.com/vi/m8mTZdqxpmo/maxresdefault.jpg", "title" : "Egg Biryani", "description" : "Indian basmati rice cooked with egg E
gg Biryani.", "rating" : "4.1/5", "price" : 10.99 }
{ "_id" : ObjectId("590a1a6b49bdf32b70ab6506"), "imagepath" : "http://www.sankrantihotels.com/wp-content/uploads/2014/11/achari-prawn-tikka-2.jpg", "title" : "Prawn Tikka", "description" : "Prawn m
arinated with India spices and cooked in a Tadoor ", "rating" : "4.5/5", "price" : 12.99 }
{ "_id" : ObjectId("590a1a6b49bdf32b70ab6507"), "imagepath" : "http://www.coloursofbiryani.com/resources/item/20150901113318-veg-biryani.jpg", "title" : "Veg Biryani", "description" : "Rice cooked
with vegetables.", "rating" : "4.1/5", "price" : 9.99 }
{ "_id" : ObjectId("590a1a6b49bdf32b70ab6508"), "imagepath" : "http://1.bp.blogspot.com/-lUgfsIBMbAU/VOdJ0KNiOcI/AAAAAAAATic/Y6gSPov05Eg/s1600/Basic%2BFish%2BFry%2B(4)%2B-%2B1.jpg", "title" : "Frie
```

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Elastic Search

- Elastic Search is an open source search engine based on Lucene
- Mainly used for Text Searching (Full text search)
- Fuzzy search can be implemented using Elastic Search
- ES search and analytics engine makes it possible to
- It is Schema-less and document oriented
- Near real time search is possible through ES

We implemented the following types of search :

- Full Text search
- Fuzzy search

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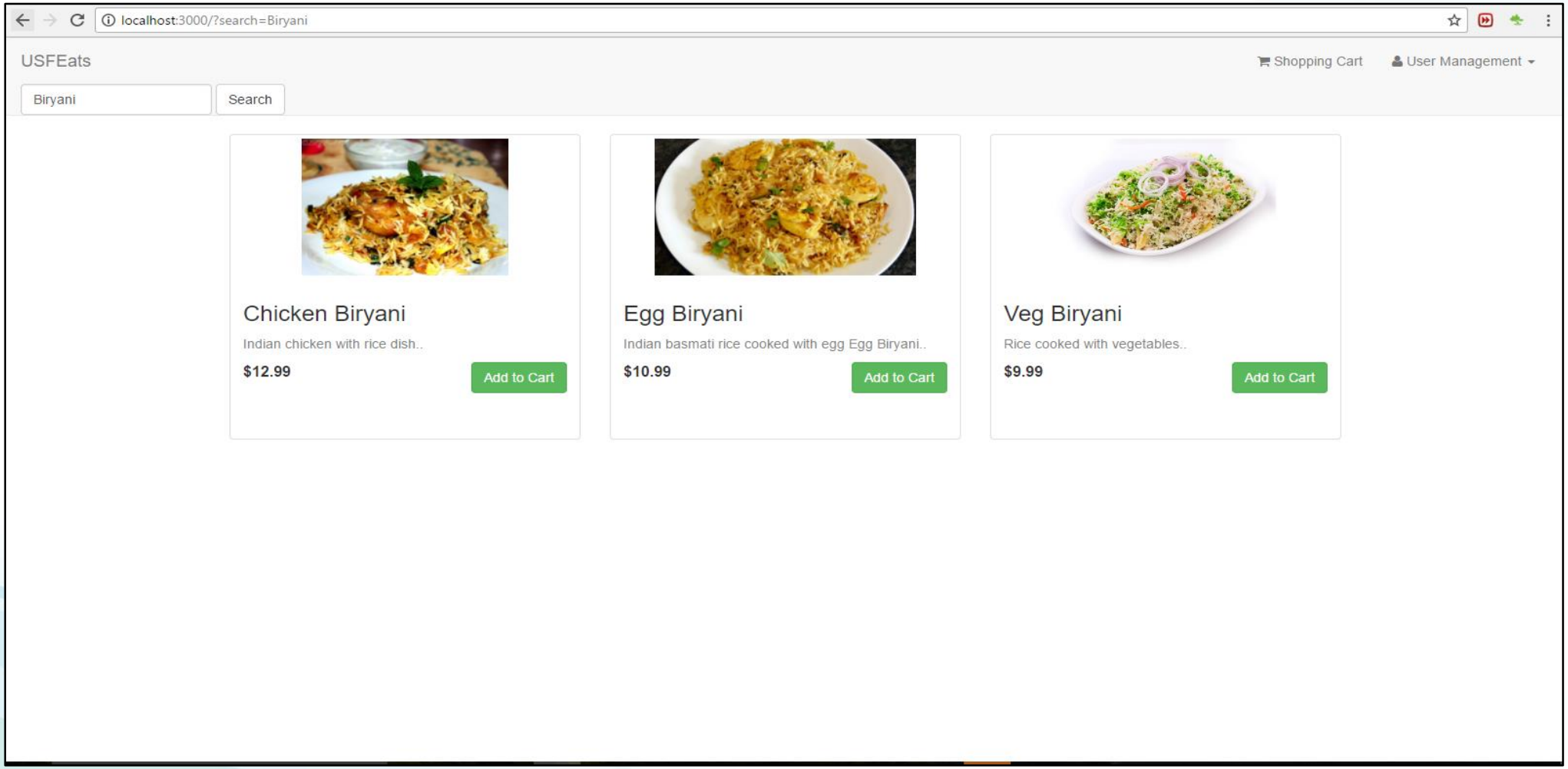
Full Text Search



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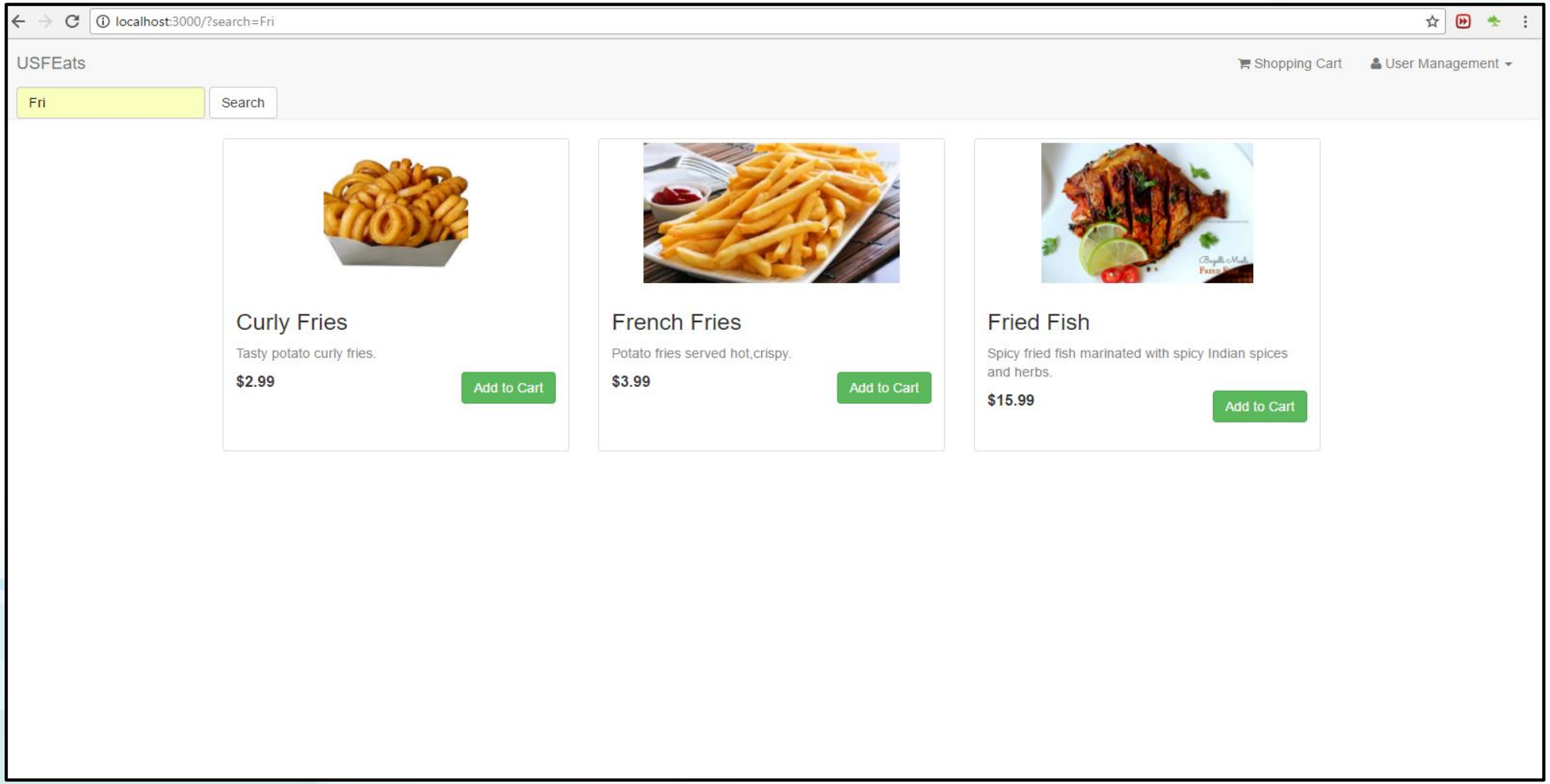
Fuzzy Search



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Cloudinary CDN (Content Delivery Network)

- CDN is used for Image Hosting on cloud for faster retrieval of images.
- CDN distributes the static contents of websites and stores them at locations closer to the user
- Two issues CDN address are: Up time reliability and Speed of Website
- To optimize the experience for end users to expect fast access to quality images and videos regardless of the devices used
- It is possible to edit images - resize, crop and format
- URL of images uploaded on cloud can be found in the image field of products collection in MongoDB

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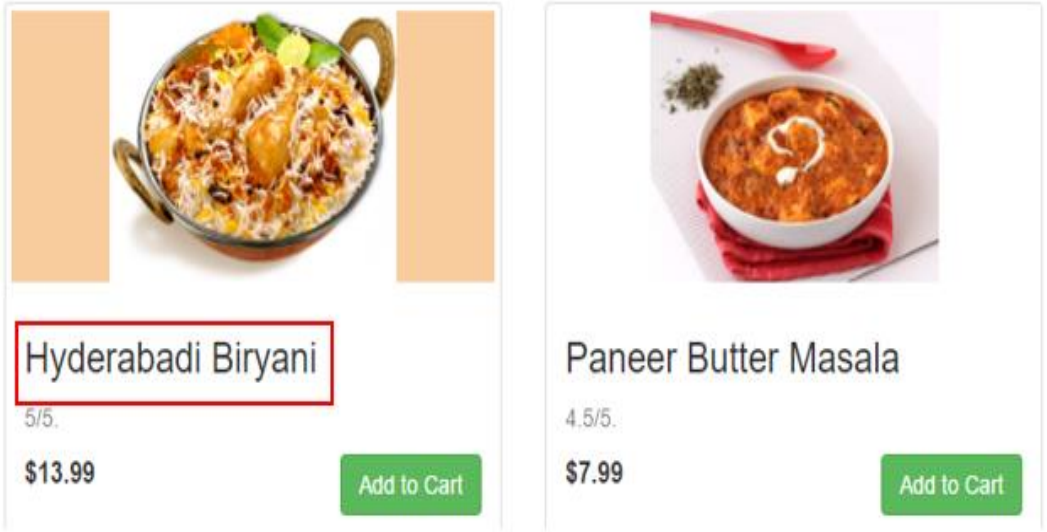

```
> db.products.find({"title":"Hyderabadi Biryani"})
{ "_id" : ObjectId("5907580b1385aca079f86438"), "imagepath" : "http://res.cloudinary.com/tessthomas/image/upload/v1493938651/vbqmducwwazpe2bnvhsr.png", "title" : "Hy
abadi Biryani", "description" : "5/5", "price" : 13.99 }
```

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Redis

- It is an open source NoSQL key value data store
- In memory storage
- Ideal for write-heavy workloads
- Persistent to disk - you can use Redis as a real database instead of just a volatile cache.
- Used to cache data that the web server needs
- Asynchronous replication

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```
70    var redis = require('redis');
71    var redisClient = redis.createClient({host : 'localhost', port : 6379});
72
73    redisClient.on('ready',function() {
74     console.log("Redis is ready");
75    });
76
77    redisClient.on('error',function() {
78     console.log("Error in Redis");
79    });
80
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL 1: powershell.exe

```
GET /stylesheets/style.css 304 5.956 ms - -
Terminate batch job (Y/N)? y
PS C:\BigDataProject\shopping-cart> npm install redis
shopping-cart@0.0.0 C:\BigDataProject\shopping-cart
`-- redis@2.7.1

PS C:\BigDataProject\shopping-cart> npm start

> shopping-cart@0.0.0 start C:\BigDataProject\shopping-cart
> node ./bin/www

Redis is ready
```

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Challenges Faced …

- We tried to connect the local application to the documentdb which we created in Microsoft Azure but we faced a problem and couldn’t finish the deadline.
- However we would put our efforts in the future and try to deploy in the Microsoft Azure.

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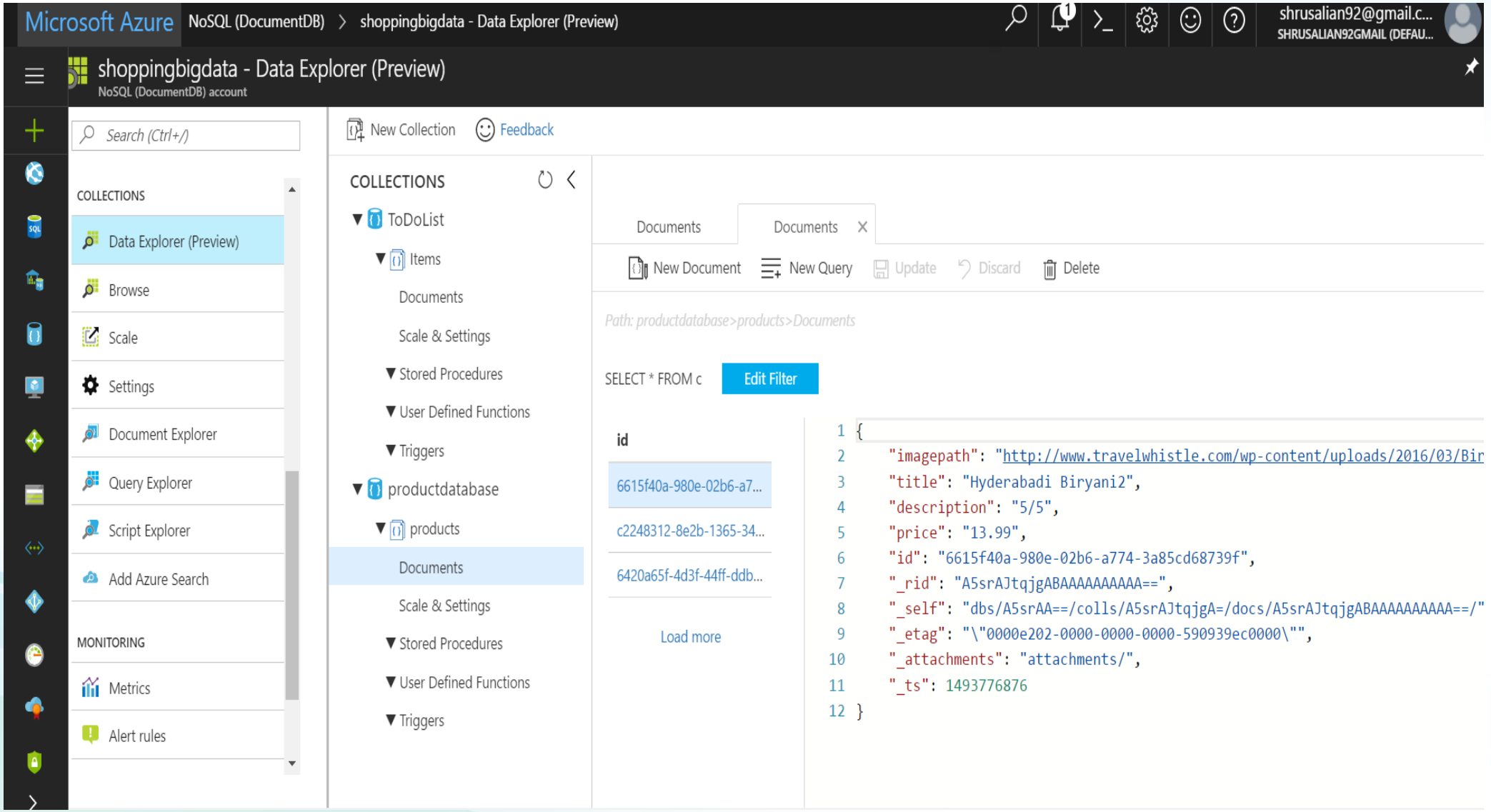
Tried to deploy on Azure



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Thank You …

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