



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment - 2

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Section/Group: KRG_3B

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Subject Name: System Design

Subject Code: 23CSH-314

Aim:

To design an online E-commerce platform similar to Amazon/Flipkart for browsing and purchasing products like mobiles, laptops, cameras, and clothes.

To implement Kafka, Elasticsearch, and a CDC pipeline for real-time data processing, fast search, and scalability.

Objectives:

1. To develop a scalable online shopping system for product listing, search and management.
2. To use Kafka for real-time event streaming and inter-service Communication.
3. To implement Elastic Search for fast and efficient product search.
4. To integrate a CDC pipeline for real-time synchronization between database and service.

API End Points Creation-

1. Get API Call: product_Search

Https://Local_Host/products/search_item = {Search_keywords}

HTTP Req

```
{  
    GET: <iPhone 16>  
}
```

HTTP Res

```
{  
    <ProductID:iPhone>  
}
```

2. GET API Call: View Product Details:

Https://Local_Host/products/{product_id}

HTTP Req

```
{
```



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```
    GET: <Product_id = 17>
}
```

HTTP Res

```
{
    Product_id:17,
    Name: iPhone 17,
    Color: Navy Blue,
    Price: $1099,
    Image Thumbnail: URL_Image
}
```

3. PUT API CALL : To update any order in the cart.

4. DELETE API CALL: To remove any item from the cart.

5. POST API CALL: for Check out and Payment.

Https://Local_Host/checkout -> {post body}

HTTP REQ

```
{
    All products ID's,
    Total Quantity,
    Total Price
}
```

HTTP RES

```
{
    Order_ID
}
```

Functional Requirements -

- User Should be able to search and find the product based on product title or names.
- User should be able to view the details of the product like description, image, available quantity, review, accessed.
- User should be able to select the quantity and move the product/item into the cart.
- User should be able to make the payment and should be able to perform the check out.

Non-functional Requirements

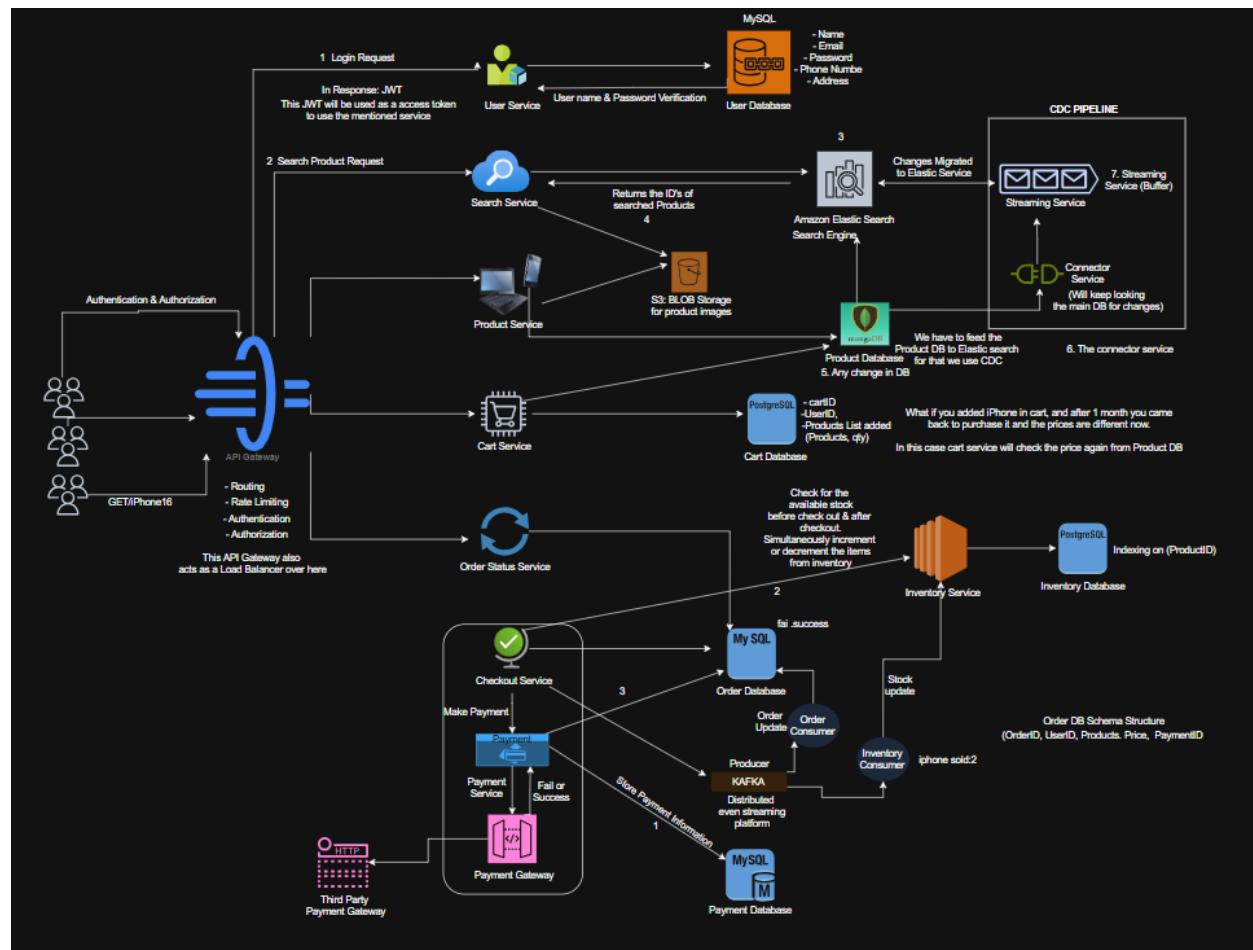
- Target Scale: 100Million DAU with 10 orders processed per second.
- Availability – System should be available 24/7

- Consistency & Availability: Here for this system we need both as per the Target Scale. Now we should specify that, which part of our system needs what?
- Latency : Required: ~ 200 ms.
- Scaling : Horizontal / Vertical Consistency.

Core-Entities of the System:

1. User/Client.
2. Product.
3. Cart.
4. Orders.
5. Checkout Followed by Payment.

REQUIRED SYSTEM DESIGN –





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Learning Outcomes :

- Understand the Design and Architecture of a Scalable E-Commerce Platform.
- Gain hands-on experience with Apache Kafka for real-time data Streaming.
- Learn to implement fast and efficient search using Elastic Search.
- Understand CDC Pipelines for real-time data Synchronization.