CLOTHCOVE
THE TECHNICAL FOUNDATION FOR

Transitioning to Marketplace

My 2nd day task of hackathon 3:

Definition of system architecture:

System architecture is the foundational structure of any system, detailing its components, data flow, and interactions. It ensures the system is scalable, secure, reliable, and efficient. A well-defined system architecture leads to better performance, ease of maintenance, and a more seamless user experience.

WORKFLOW OF MY SYSTEM ARCHITECTURE:

```
[Frontend (Next.js)]
    |
    |— [Pages]
    |— [Components]
    |— [Static Assets] (e.g., images, fonts)
    |— [API Routes] (Optional)
    |
    v
[Sanity CMS]
    |
    |— [Content Models] (Products, Blogs, etc.)
    |— [Content Delivery API] (Fetching dynamic content)
    |
    v
[Backend / API Server] (Optional)
    |
    |— [Database] (e.g., MongoDB, PostgreSQL)
    |— [Custom Business Logic]
    |
    v
[3rd Party APIs]
    |
    |— [Payment Gateway] (e.g., Stripe, PayPal)
    |— [Authentication Services] (e.g., Auth0, Firebase)
    |— [Shipping APIs] (e.g., UPS, FedEx)
    |— [Other Services] (e.g., Email services like SendGrid)
    |
    v
[Hosting / Deployment]
    |
    |— [Vercel / Netlify / AWS]
    |
    v
[Monitoring & Analytics]
    |
    |— [Google Analytics]
    |— [Error Tracking] (e.g., Sentry)


  |— [Performance Monitoring] (e.g., New Relic)
```

Explanation:

1. **Frontend (Next.js)**:
   - **Pages**: Your dynamic and static pages that represent different routes in your app (e.g., Home, Product Details, Contact).
   - **Components**: Reusable UI components like buttons, headers, footers, product cards, etc.

   - **Static Assets**: This includes images, fonts, icons, etc., that are loaded on the frontend.
   - **API Routes**: Optional in Next.js for handling backend logic directly inside the Next.js app.
2. **Sanity CMS**:
   - **Content Models**: Structures used for managing different types of content, such as products, blogs, user testimonials, etc.
   - **Content Delivery API**: This is how you fetch dynamic content from the Sanity CMS and render it on your frontend.
3. **Backend / API Server** (Optional):
   - **Database**: If you have custom server-side logic or need to store user data, transactions, or any custom data, you'll have a database like MongoDB or PostgreSQL.
   - **Custom Business Logic**: Backend logic to handle things like product recommendations, user authentication, etc.
4. **3rd Party APIs**:
   - **Payment Gateway**: Services like Stripe or PayPal for handling payments in your store.
   - **Authentication Services**: If you need to authenticate users (e.g., login, registration), services like Auth0 or Firebase Authentication can be used.
   - **Shipping APIs**: APIs to manage shipping costs, tracking, and logistics.
   - **Other Services**: Other services like email notifications (SendGrid, Mailgun) or marketing tools.
5. **Hosting / Deployment**:
   - **Vercel / Netlify / AWS**: Hosting platforms where your Next.js application is deployed, taking care of scaling, caching, and server-side rendering.
6. **Monitoring & Analytics**:
   - **Google Analytics**: Track user behavior on your site, conversions, and other relevant metrics.
   - **Error Tracking**: Tools like Sentry help in tracking and monitoring errors in production.
   - **Performance Monitoring**: Tools like New Relic help in measuring the performance of your site, checking for bottlenecks, or issues in real-time.

<u>Flow of Data in the Architecture:</u>

1. **Frontend (Next.js)**:
   - The Next.js frontend communicates with **Sanity CMS** via API calls to fetch dynamic content like products, blog posts, etc.
   - It can also interact with **3rd Party APIs** for handling payments, shipping, or other external services.
2. **Backend (Optional)**:
   - If you need custom server-side processing, the backend API server can interact with a database or other business logic before returning data to the frontend.
3. **Sanity CMS**:
   - Manages and serves content to the frontend using its **Content Delivery API**. This helps in rendering dynamic content like product descriptions or blog posts.
4. **3rd Party APIs**:
   - Handle specific tasks (e.g., payment processing, user authentication) and pass relevant information back to the frontend for display or processing.
5. **Deployment & Hosting**:
   - The app is deployed to platforms like **Vercel**, which are designed for server-side rendering, optimization, and easy deployment of Next.js apps.
6. **Monitoring & Analytics**:
   - Use analytics tools to monitor the performance, track user behavior, and handle errors that might arise in production

<u>WORKFLOW:</u>

1. User Registration:

1. **User signs up**:
   - The user navigates to the **Sign-Up page** and enters personal details (such as name, email, and password) in the registration form.
   - Once the form is filled, the user submits the registration details.
2. **Data is stored in Sanity**:
   - On form submission, the **Next.js backend API** receives the user's data and stores it in **Sanity CMS**.

- Sanity's API interacts with the **User Content Model**, saving the user details securely.

3. **Confirmation sent to the user**:
   - After successfully saving the user's data in Sanity, a **confirmation email** is triggered.
   - The email can be sent through a **third-party email API** (e.g., **SendGrid**, **Mailgun**, or **Amazon SES**), confirming the user's registration and offering instructions to log in.

2. Product Browsing:

1. **User views product categories**:
   - The user navigates to the **Product Category page** (e.g., Men's Apparel, Women's Apparel, etc.).
   - The page loads, showing a list of available categories.
2. **Sanity API fetches data**:
   - The frontend sends a request to the **Sanity API** to fetch product data, such as names, prices, descriptions, and images.
   - The **Sanity Content API** returns product data based on the category selected.
3. **Products displayed on frontend**:
   - Once the data is fetched, the frontend dynamically renders the products using React components (e.g., **ProductGrid**, **ProductCard**).
   - The user can now browse products, view detailed descriptions, and interact with product features like sorting or filtering options.

3. Order Placement:

1. **User adds items to the cart**:
   - The user browses the products and selects items to add to the **shopping cart**.
   - The cart is managed either in the browser's **localStorage** or in a global state (e.g., **React Context API** or **Redux**).
2. **User proceeds to checkout**:
   - After reviewing the cart, the user clicks on the **"Checkout"** button.

   - The user provides necessary details like **shipping address** and **payment information** (via a payment gateway like **Stripe** or **PayPal**).
3. **Order details saved in Sanity**:
   - Upon successful payment, the backend (Next.js API) stores the order details in **Sanity CMS** or an alternative database (such as **MongoDB** or **PostgreSQL**).
   - The details stored include user information, product names, quantities, total cost, shipping address, and order status (pending, processed, shipped).

4. Shipment Tracking:

1. **Order status updates fetched via 3rd-party API**:
   - After an order is placed and shipped, the user can track the status of their order.
   - The frontend sends a request to a **3rd-party shipping API** (e.g., **UPS**, **FedEx**, **DHL**) to fetch the current order status using the tracking number received during checkout.
2. **Status displayed to the user**:
   - The frontend dynamically displays the shipment status (e.g., "In Transit", "Out for Delivery", "Delivered") using real-time data fetched from the shipping API.
   - The status can be shown in a **tracking page**, using **progress bars** or **status updates**.
   - Optionally, users can receive **email notifications** or **SMS updates** when the status changes (using third-party services like **Twilio**).

Full Workflow Summary:

1. **User Registration**:
   - User signs up → Data is stored in Sanity → Confirmation email sent.
2. **Product Browsing**:
   - User views product categories → Sanity API fetches product data → Products displayed on frontend.
3. **Order Placement**:
   - User adds items to the cart → Proceeds to checkout → Order details saved in Sanity.
4. **Shipment Tracking**:

- Order status updates fetched via 3rd-party API → Displayed to the user.

PLAN APIs REQUIREMENTS WITH ENDPOINT:

THIRD PARTY APIs:

Database schema (Sanity CMS)

Shipment (ShipEngine)

Payment (Stripe)

Endpoint Name: /products

- **Method**: GET
- **Description**: Fetch all available products from Sanity CMS. This endpoint will retrieve product details, including the product's ID, name, price, stock, and image from the Sanity CMS API.
- **Response Example**:

json

```
[
  {
    "id": "12345",
    "name": "Vita Classic Shirt",
    "price": 16.48,
    "stock": 100,
    "image": "https://example.com/images/vita-shirt.jpg"
  },
  {
    "id": "12346",
    "name": "Vita Classic Jeans",
    "price": 29.99,
    "stock": 50,
    "image": "https://example.com/images/vita-jeans.jpg"
  }
]
```

Endpoint Name: /products/{id}

- **Method**: GET
- **Description**: Fetch a single product's details by its unique id from Sanity CMS.
- **Response Example**:

json

```
{
  "id": "12345",
  "name": "Vita Classic Shirt",
  "price": 16.48,
  "description": "Comfortable and stylish classic shirt for summer.",
  "stock": 100,
  "image": "https://example.com/images/vita-shirt.jpg"
}
```

2. Order Endpoints

Endpoint Name: /orders

- **Method**: POST
- **Description**: Create a new order in Sanity CMS. This endpoint will accept customer information (like name, address), product details, and payment status, and store the order in Sanity CMS.
- **Payload Example**:

json

```
{
  "customer": {
    "name": "John Doe",
    "email": "johndoe@example.com",
    "address": "123 Main Street, City, Country"
  },
  "products": [
    {
      "productId": "12345",
      "quantity": 2,
      "price": 16.48
    },
    {
      "productId": "12346",
      "quantity": 1,
      "price": 29.99
    }
  ],
  "paymentStatus": "paid",
  "orderDate": "2025-01-17"
}
```

- **Response Example**:

json

CopyEdit

```
{
  "orderId": "987654",
  "customer": {
    "name": "John Doe",
    "email": "johndoe@example.com",
    "address": "123 Main Street, City, Country"
  },
  "products": [
    {
      "productId": "12345",
      "quantity": 2,
      "price": 16.48
    },
    {
      "productId": "12346",
      "quantity": 1,
      "price": 29.99
    }
  ],
  "totalPrice": 62.95,
  "paymentStatus": "paid",
  "orderDate": "2025-01-17"
}
```

Endpoint Name: /orders/{orderId}

- **Method**: GET
- **Description**: Fetch the details of a specific order based on the orderId.
- **Response Example**:

json

```
{
  "orderId": "987654",
  "customer": {
    "name": "John Doe",
    "email": "johndoe@example.com",
    "address": "123 Main Street, City, Country"
  },
  "products": [
    {
      "productId": "12345",
      "quantity": 2,
      "price": 16.48
    },
    {
      "productId": "12346",
      "quantity": 1,
      "price": 29.99
    }
  ],
  "totalPrice": 62.95,
  "paymentStatus": "paid",
  "orderDate": "2025-01-17",
  "shipmentStatus": "In Transit"
}
```

3. Shipment Tracking Endpoints

Endpoint Name: /shipment/{orderId}

- **Method**: GET
- **Description**: Track the shipment status for a specific order via a third-party API (e.g., UPS, DHL). This endpoint will send a request to the third-party shipping provider's API and fetch the current shipment status.
- **Response Example**:

json

```
{
  "shipmentId": "SH123456789",
  "orderId": "987654",
  "status": "In Transit",
  "expectedDeliveryDate": "2025-01-20"
}
```

Endpoint Name: /shipment/{orderId}/update

- **Method**: POST
- **Description**: Update the shipment status for an order in the system (e.g., delivered, out for delivery, etc.). This endpoint is used when shipment status is updated via a third-party API.
- **Payload Example**:

json

```
{
  "shipmentId": "SH123456789",
  "orderId": "987654",
  "status": "Delivered",
  "expectedDeliveryDate": "2025-01-20"
}
```

- **Response Example**:

json

```
{
  "message": "Shipment status updated successfully."
}
```

4. Authentication and User Endpoints

Endpoint Name: /auth/register

- **Method**: POST
- **Description**: Register a new user. The payload includes user details like name, email, and password, which are saved in Sanity CMS.
- **Payload Example**:

json

```
{
  "name": "John Doe",
  "email": "johndoe@example.com",
  "password": "password123"
}
```

- **Response Example**:

json

```
{
  "message": "User registered successfully."
}
```

Endpoint Name: /auth/login

- **Method**: POST
- **Description**: Log in an existing user by verifying their email and password. This will return a session token or JWT for future authentication.
- **Payload Example**:

json

```
{
  "email": "johndoe@example.com",
  "password": "password123"
}
```

- **Response Example**:

json

```
{
  "message": "Login successful.",
  "token": "JWT_TOKEN_HERE"
}
```

5. Cart Management Endpoints

Endpoint Name: /cart

- **Method**: GET
- **Description**: Fetch the user's current shopping cart, including product details, quantities, and prices.
- **Response Example**:

json

```
{
  "cart": [
    {
      "productId": "12345",
      "name": "Vita Classic Shirt",
      "quantity": 2,
      "price": 16.48
    },
    {
      "productId": "12346",
      "name": "Vita Classic Jeans",
      "quantity": 1,
      "price": 29.99
    }
  ]
}
```

Endpoint Name: /cart/add

- **Method**: POST
- **Description**: Add a product to the user's shopping cart. The payload includes the product ID, quantity, and price.
- **Payload Example**:

json

```
{
  "productId": "12345",
  "quantity": 2,
  "price": 16.48
}
```

- **Response Example**:

json

```
{
  "message": "Product added to cart."
}
```

Endpoint Name: /cart/remove

- **Method**: POST
- **Description**: Remove a product from the user's shopping cart. The payload includes the product ID.
- **Payload Example**:

json

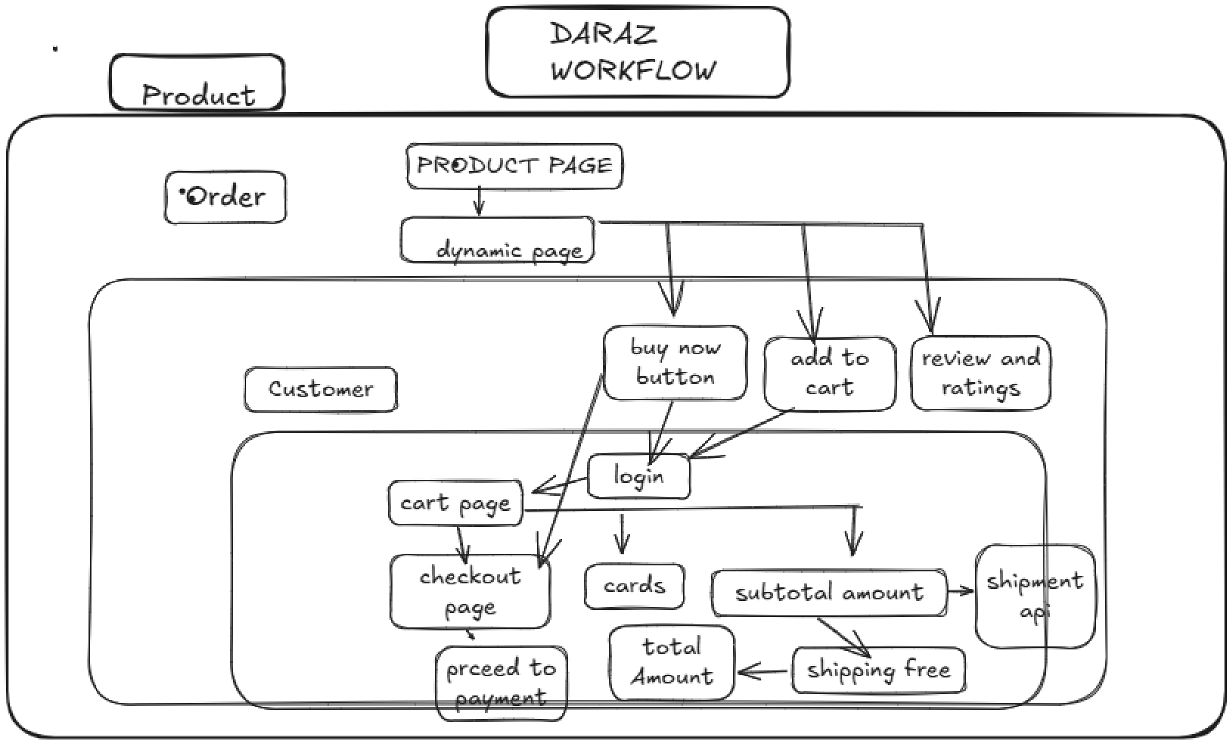
```
{
  "productId": "12345"
}
```

- **Response Example**:

json

```
{
  "message": "Product removed from cart."
}
```

Flow Diagram:


DARAZ WORKFLOW
Product
Order
PRODUCT PAGE
dynamic page
buy now button
add to cart
review and ratings
Customer
login
cart page
checkout page
cards
subtotal amount
shipment api
prceed to payment
total Amount
shipping free