



Department of Computer  
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# Fashion Of Choice

Senior Design

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## Background

"Fashion of Choice" is an innovative online e-commerce platform designed to cater to the needs of fashion-conscious consumers by offering a wide range of ready-made fashion apparel. The platform features an extensive catalog that includes clothing, accessories, and footwear, providing a streamlined and user-friendly shopping experience. Users can easily navigate through the catalog to find products that match their style, color, and size preferences. The platform also supports user engagement through account creation, where customers can manage their preferences, track orders, and access their purchase history. This setup is further enhanced by a secure payment gateway and advanced features such as real-time order tracking and detailed analytics, ensuring a seamless transaction process.

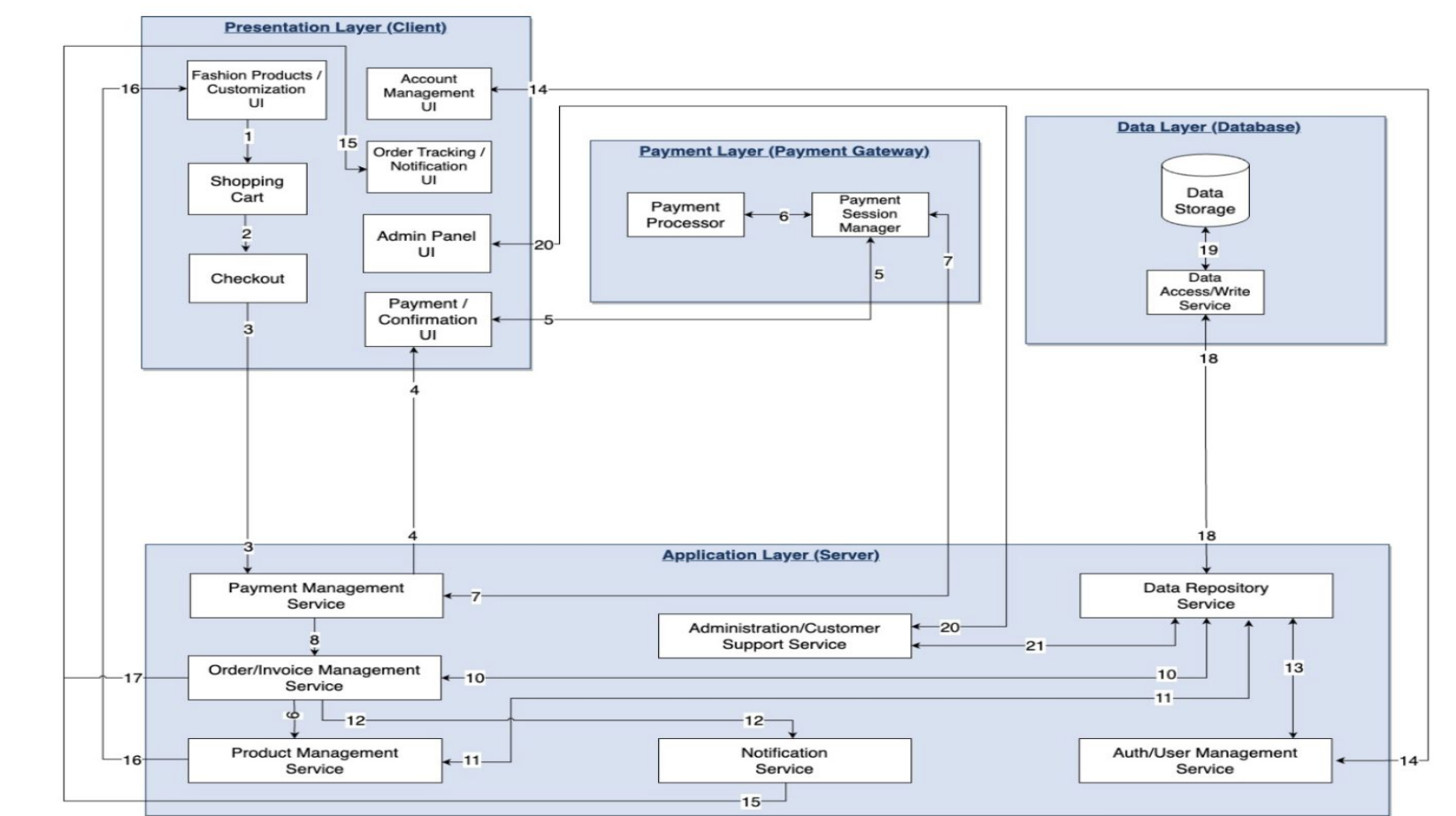
"Fashion of Choice" is built on a robust three-tier architecture utilizing the MERN technology stack—MongoDB, Express, React, and Node.js—ensuring efficiency and resilience in meeting the demands of its users.

## Key Requirements

- **User login / sign up** - In order to track the order, add products to wish list, view past orders and making it easy for checkout this system requires User login / sign up feature.
- **Products list and details view** - The system should show relevant information of the products such as name, available colors and price in product list and on clicking a single product user should be navigated to product details view with the option to add to cart after reviewing the product with additional information and selecting colors and sizes.
- **Shopping cart** - User might need to buy multiple items at once and it is inconvenient to order single product at once. It is required to have a shopping cart feature which saves the shopping session even if the browser is closed.
- **Wishlist feature** - User might not be in the mood to buy product at the moment but wish to checkout the item in the future. Then the user should be able to add the product to wishlist and they can view them later.
- **Fully categorized navigation bar** - The navigation bar of the website should have all the relevant categories in a single view so that user can have idea of products available in each category and can directly navigate to that category and on mobile devices it should appear vertically.
- **Products search** - User should be able to search products using products name easily and system should display products related to the search term.
- **Secure payment** - User's card/payment information should be stored securely and the payment should be done via secure channel.
- **Avoid saving of plain text-passwords** - In case of data breach the password of the user should not be guessable and saving of plain text password should be avoided in the database. It must be hashed and salted before saving.
- **Administrator panel** - In order to manage products, orders, customers and overall system a administrator panel is required and it must be accessed by user having role Administrator and any endpoints exposing critical system information should be guarded by that administrator role.
- **Sizing and colors for products** - On adding product to the system administrator should be able to add sizing and color related information for the particular product. Color can be dynamic meaning user should be able to select a color then give a name to it and have a custom color for the product.
- **Analytics and charts** - Shop owner should be able to view total visitor on the page, total orders, total products, total customers and other analytics information related to the shop. With the use of charts the total sales on each month should be clearly visible for the analytics of sales prices for the shop owner

## Architectural Design

Our ecommerce system is based on three-tier architecture with layered approach, having client side as presentation layer which facilitates interaction with user, application layer as business logic layer which communicates with data layer and presentation layer to transfer data and handle application logic. An additional layer payment layer is employed here which is third party payment gateway service that handles the payment securely. The presentation layer is powered by react a modern frontend library for handling interactive User Interfaces. Application layer is written in Node.js and Express.js, javascript framework for writing backend applications. Since both are written in javascript no additional language learning is required which makes it easy for developers. These top layers are composed of different subsystem in each layer. Presentation layer consists of products UI for e-commerce, then user can select products to add to cart, perform checkout then the checkout process is handled by application layer creating session on payment management service and communicates with payment server for the payment. With these interactions between different submodules on each layer the system interactivity is completed.



## Implementation Details

### Authentication/Authorization

We have employed JWT based user authentication. User can register into our system using their email and password. The password is then saved in database by hashing and salting using bcrypt. User can verify their email address by clicking on verify email link which is forwarded by the system to user email. Then jwt access token is generated for the user which is handled by jwt library and forwarded on the http only secure cookie. By using the cookie we can authenticate user on each requests and determine if user can access a certain resources or not. We have implemented role based authorization as normal user or administrator. Administrator has full access to website and can add products, process orders, manage customers and manage website settings.

### Payment Integration

We have utilized stripe as a secure third party payment gateway. Which greatly reduces the overhead on developer and handle payment securly for us. Using a secure and reliable third party payment gateway is important for the system. Stripe offers managing payment session, generating invoices, handling product prices and several payment related services such as managing cards, handling taxes for billing and shipping addresses. Stripe works with several payment providers to verify the payment and card details and charge right amount to the user. For payment integration after adding products to the cart application layer communicates with payment gateway to create a session and forwards the session ID to the presentation layer which is then forwarded to stripe checkout page user performs payment there and after successful payment stripe redirects to our system with the session ID which is then verified against our database for the legit transaction and order is created.

### Checkout / Order Processing

Order creation and checkout has two aspects for managing one where users places their orders and other administrator who processes the order. After successful payment for the products a new order is created with the product details, their quantity and price details. Shop owner/Administrator can review the order details and update the order status. We have used ENUM for updating the order status on database and a progress bar on presentation layer for showing the updated status. The enum has values namely Order placed, Processing, Shipped and Delivered. After the order is processed on the shop the status can be updated to shipped and on user side the progress will be displayed. User can cancel the order until the order is processing after that user cannot cancel the order.

## Conclusions and Future Work

`Fashion of Choice` fulfills most of the requirements and goals specified by the client and aims to be a icon on fashion industry. We have tried to incorporate all the essential design elements to be a complete e-commerce system that has both user facing part and administrator facing part. During the development we had some challenges on using email provider for sending verification emails to the registered users as much of the email providers are expensive and limited on email numbers. For further envisioning our dream of complete e-commerce solution for the fashion items we require to make our website more user-friendly, add more analytic information and artistic design elements could be utilized to show we have core values dedicated towards fashion.

## References

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