

E-commerce Application on IBM Cloud Foundry

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Problem Definition:

This abstract provides a glimpse into the development and deployment of an E-commerce Application on IBM Cloud Foundry, offering insights into its key features and the advantages it offers to businesses and customers alike. The E-commerce Application on IBM Cloud Foundry represents a cutting-edge solution designed to address the complexities and challenges faced by modern online retailers.

Design Thinking:

Design thinking is a user-centred process of users to create a seamless and satisfying shopping experience. Here's how design thinking can be applied to design centered approach to problem-solving and innovation that can be applied to the development of an e-commerce application on IBM Cloud Foundry. It focuses on understanding the needs and preferences of an e-commerce application on IBM Cloud Foundry.

INNOVATION IDEAS:

1. Augmented Reality (AR) Shopping: Integrate AR technology into e-commerce platforms to allow customers to virtually try on products, see how furniture fits in their space, or visualize how a product would look in real life. This enhances the shopping experience.

How AR Shopping Works:

- **AR App or Feature:** Customers typically need a mobile app with AR capabilities or a web platform that supports AR. They can access this through their smartphones or tablets.
- **Product Visualization:** When browsing products, users can activate the AR feature to view items in 3D or overlay them onto their real-world environment using the device's camera.
- **Virtual Try-On:** For fashion and accessories, users can virtually try on clothing, glasses, or makeup. They can see how these items look on them in real-time through their device's screen.

- **Product Interaction:** Customers can manipulate, zoom in, or rotate products to examine them from different angles, helping to make more informed purchasing decisions.

Benefits of AR Shopping:

- **Enhanced Shopping Experience:** AR shopping bridges the gap between online and in-store shopping, providing a more immersive and interactive experience for customers.
- **Innovative Marketing:** AR shopping can be part of your marketing strategy. It can serve as a unique selling point and attract media attention.
- **Reduced Showrooming:** When customers can virtually "try on" or visualize products at home, they are less likely to visit physical stores to make purchasing decisions.

2.Voice-Based Product Reviews:

Voice-based product reviews are an innovative way to enhance the shopping experience and provide valuable insights to both consumers and businesses. Here's how voice-based product reviews can work and their potential benefits:

- **Recording:** Customers can leave voice-based reviews by recording their feedback, thoughts, and experiences with a product using their smartphone or other recording devices.
- **Integration:** E-commerce platforms or mobile apps can integrate this feature into their product pages, allowing customers to upload or record their voice reviews directly from the product page.
- **Transcription and Analysis:** Voice recordings can be transcribed into text for easier indexing and search. Advanced Natural Language Processing (NLP) and sentiment analysis can be applied to understand the content and sentiment of the reviews.
- **Accessibility:** Customers who might prefer speaking over typing can use voice reviews, making it more inclusive for people with varying abilities.

3.Sustainable and Eco-friendly Shopping:

Offer eco-friendly product options and allow customers to easily identify and choose environmentally friendly products. This can be combined with carbon footprint tracking for orders.

Eco-friendly Product Selection:

- Prioritize products that are sustainable, ethically sourced, and environmentally friendly.
- Highlight eco-friendly features and certifications for each product (e.g., organic, Fair Trade, energy-efficient).

Sustainable Packaging:

- Use minimal, biodegradable, or recyclable packaging materials.
- Encourage customers to choose minimal packaging options during the checkout process.
- Consider innovative packaging solutions such as reusable or upcycled materials.

Green Supply Chain:

- Partner with suppliers and manufacturers committed to sustainability and ethical production practices.
- Promote transparency in the supply chain by sharing information about your suppliers and their sustainability efforts.
- Energy-Efficient Cloud Infrastructure:
- Host your e-commerce platform on energy-efficient servers and utilize renewable energy sources, where possible.
- Optimize data centers and server operations to reduce energy consumption.

3.Voice Commerce:

Enable voice-activated shopping through platforms like Amazon Alexa or Google Assistant. Customers can make purchases and track orders using voice commands. Voice commerce, also known as v-commerce or voice-activated shopping, is an emerging trend that allows users to make purchases through voice-activated devices such as smart speakers, virtual assistants, and voice-activated mobile apps. Integrating voice commerce into your e-commerce website can enhance the shopping experience and reach a broader audience.

Voice Assistant Integration:

- Choose the voice assistant(s) you want to integrate with your e-commerce platform. Popular options include Amazon Alexa,

Google Assistant, and Apple Siri.

- Develop or customize voice commerce applications or skills that work with these voice assistants.

User Account Linking:

- Implement a secure user account linking process, allowing customers to link their e-commerce account with their voice assistant account.

Voice Search and Product Discovery:

- Enable voice search capabilities that allow users to search for products using natural language.
- Implement voice-based product recommendations and suggestions based on customer preferences and browsing history.

Voice Shopping Cart:

- Create a voice-activated shopping cart where users can add, remove, or modify items using voice commands.
- Ensure users can check their cart and review their items by asking the voice assistant.

4.Enhanced Security:

Enhanced security is crucial for an e-commerce website to protect sensitive customer data, ensure trust, and maintain a good reputation. Here are important security measures and best practices to consider for your e-commerce website

Use HTTPS: Implement SSL (Secure Sockets Layer) or TLS (Transport Layer Security) to encrypt data transmitted between your website and the user's browser. This ensures secure data transfer, including personal and payment information

Payment Card Industry Data Security Standard (PCI DSS) Compliance:

Comply with PCI DSS requirements if you handle payment card information. Use a PCI-compliant payment processor to securely handle credit card transactions.

Strong Password Policies: Enforce strong password policies for both users and employees. Encourage users to create complex passwords and consider implementing multi-factor authentication (MFA) for added security.

Regular Software Updates: Keep your e-commerce platform, plugins, and extensions up to date to patch security vulnerabilities. Regularly monitor for security updates and apply them promptly.

Web Application Firewall (WAF): Implement a WAF to protect **against** common web application attacks, such as SQL injection, cross-site scripting (XSS), and cross-site request forgery (CSRF).

Data Encryption: Encrypt sensitive data, including customer information and payment details, when stored in databases. Use strong encryption algorithms and key management.

LAYOUT

Designing the layout of an e-commerce website is a critical step in creating an attractive and user-friendly online store. The layout should focus on guiding users through the shopping process, showcasing products, and making it easy for them to make purchases. Here's a basic structure for an e-commerce website layout

Header:

Logo:

Place your company logo at the top-left corner for brand recognition.

Navigation Menu:

Include clear and concise navigation links such as Home, Shop, Categories, About Us, Contact, and a search bar.

User Account:

Provide options for users to log in, create an account, or access their profile.

Shopping Cart:

Show the number of items in the user's cart and a link to the cart page.

Contact Information:

Display a phone number or email for customer support.

Hero Banner:

- Use a large, eye-catching image or slideshow to feature promotional products or offers.
- Include a compelling call-to-action (CTA) button.

Product Categories:

- Display a grid of product categories or collections.
- Each category should have an image and a title.
- Consider using featured products in each category.

Featured Products:

- Showcase a selection of popular or new products.
- Include high-quality images, product names, prices, and brief descriptions.
- Add "Shop Now" or "View Details" buttons.

Product Listings:

- Display a grid or list of products within a selected category.
- Include product images, titles, prices, and user ratings.
- Implement sorting and filtering options to help users find what they're looking for.

Product Detail Page:

- When a user clicks on a product, they should be directed to a detailed product page.
- Display high-resolution images, detailed descriptions, pricing, and customer reviews.
- Add "Add to Cart" and "Buy Now" buttons.

Shopping Cart:

- Show a summary of items in the cart.
- Include the product name, quantity, price, and a "Proceed to Checkout" button.

Checkout Process:

- Split the checkout into multiple steps, such as shipping, payment, and review.
- Include form fields for shipping and billing information.
- Provide payment options and a summary of the order

Footer:

- Include links to important pages like Terms and Conditions, Privacy Policy, and Returns.
- Display trust badges and security certifications.

- Add contact information, social media links, and a newsletter signup.

Additional Elements:

- Consider including a live chat or customer support section.
- Implement a customer reviews and ratings section.
- Add a blog section for content related to your products or industry.
- Include a search bar at the top for quick product searches.

Remember to keep the layout clean, responsive, and mobile-friendly. Test the user experience to ensure that navigation is intuitive, and the site loads quickly. An attractive and user-friendly e-commerce website layout can enhance the shopping experience and improve your conversion rates.

Create the Database to Store the product Information:

Creating a database for an e-commerce website to store product information typically involves designing tables to hold product data.

Products Table:

ProductID (Primary Key)

Name

Description

Price

Stock Quantity

Category (if applicable)

Brand (if applicable)

Image URL

Categories Table (if your products are organized into categories):

CategoryID (Primary Key)

Category Name

Brands Table (if you want to track brands):

BrandID (Primary Key)

Brand Name

Product-Category Relationship Table (if using categories):

ProductCategoryID (Primary Key)

ProductID (Foreign Key to Products Table)

CategoryID (Foreign Key to Categories Table)

Reviews and Ratings Table (if you want to include customer reviews):

ReviewID (Primary Key)

ProductID (Foreign Key to Products Table)

CustomerID (if you have customer accounts)

Rating

Review Text

Date

Orders Table (for tracking customer orders):

OrderID (Primary Key)

CustomerID (Foreign Key to a Customers Table)

Order Date

Status (e.g., processing, shipped, delivered)

Order Details Table (to link orders and products):

OrderDetailID (Primary Key)

OrderID (Foreign Key to Orders Table)

ProductID (Foreign Key to Products Table)

Quantity

Subtotal

Customers Table (if you have customer accounts):

CustomerID (Primary Key)

First Name

Last Name

Email

Password (hashed)

Address

Payment Information (encrypted)

sDepending on the complexity of your e-commerce website and specific requirements, you might need additional tables and fields. It's important to ensure data integrity, set up appropriate relationships between tables, and implement security measures, such as encryption and access controls, to protect sensitive customer data. Additionally, consider using a relational database management system (RDBMS) like MySQL, PostgreSQL, or SQL Server to implement this database.