**E-commerce Application on IBM Cloud Foundry**

**Phase-1 Document Submission**

**Problem Definition:**

The project is to build an artisanal e-commerce platform using IBM Cloud Foundry. The goal is to connect skilled artisans with a global audience, showcasing their handmade products and providing features like secure shopping carts, payment gateways, and an intuitive checkout process. This involves designing the e-commerce platform, implementing necessary features, and ensuring a seamless user experience.

**Scalability and Performance:**

E-commerce platforms must handle fluctuations in website traffic, especially during promotions and peak shopping seasons. Ensuring that the platform can scale dynamically to meet high demand while maintaining optimal performance is a critical challenge.

**Security and Data Privacy:**

The protection of customer data, including personal and payment information, is paramount. E-commerce platforms must implement robust security measures to safeguard user data and prevent data breaches.

**User Experience:**

Creating an intuitive and user-friendly interface is crucial to keep customers engaged and encourage conversions. Optimizing the user journey, from product discovery to checkout, is a continuous challenge.

**Payment Processing:**

Integrating multiple payment gateways and ensuring smooth, secure payment processing is a complex task. Managing different currencies and complying with payment regulations adds to the challenge.

**Inventory Management:**

Efficiently managing product inventory, tracking stock levels, and handling product variations while preventing overstocking or understocking is an ongoing challenge.

**Customer Support and Returns:**

Providing timely and effective customer support, as well as handling returns and refunds, is crucial for customer satisfaction and retention.

**Design Thinking:**

**Platform Design:**

**Header:**

* Logo: Place the platform logo at the top-left corner for branding.
* Navigation Menu: Include links to various sections like Home, Shop, Categories, My Account, and Cart.
* Search Bar: Allow users to search for products.
* User Account: Display user login/register and profile options.

**Banner or Slideshow:**

* Showcase featured products, promotions, or artisan highlights.

**Product Categories:**

* Display a grid or list of product categories (e.g., Jewelry, Home Decor, Clothing) with images and brief descriptions.
* Each category can link to a dedicated category page.

**Individual Product Pages:**

* Product Image: A prominent image of the product with zoom functionality.
* Product Title: Display the name of the product.
* Product Description: Provide detailed information about the product, including materials, dimensions, and artisan details.
* Price: Clearly state the product's price.
* Quantity Selector: Allow users to choose the quantity they want to purchase.
* Add to Cart Button: A prominent button to add the product to the shopping cart.
* Customer Reviews: Display ratings and reviews from previous buyers.
* Product Variations: If applicable (e.g., different colors or sizes), provide options for users to select.
* Related Products: Suggest similar or complementary products.
* Share Buttons: Enable users to share the product on social media.

**Shopping Cart:**

* Cart Icon: Show a visual representation of the cart's contents.
* Product List: List the products in the cart, including details like name, price, and quantity.
* Subtotal: Display the total cost of items in the cart.
* Continue Shopping Button: Allow users to return to product listings.
* Update Cart: Option to change quantities or remove items.
* Proceed to Checkout Button: Direct users to the checkout page.

**Checkout:**

* Shipping Information: Fields for name, address, and contact details.
* Shipping Method: Allow users to choose their preferred shipping option.
* Order Summary: Recap of items in the cart with prices and a total.
* Promo Code: If applicable, provide a field for entering promotional codes.
* Payment Information: Fields for credit card details or other payment methods.
* Billing Address: If different from shipping address.
* Place Order Button: To complete the purchase.
* Order Progress Bar: Indicate the steps in the checkout process.

**Payment:**

* Secure Payment Gateway: Display trusted payment options (e.g., credit card logos, PayPal).
* Payment Form: Allow users to enter payment information securely.
* Order Confirmation: Provide an order confirmation page with details and a confirmation number.
* Order Confirmation Email: Send an email to the user with a summary of the order.

**Footer:**

* Contact Information: Include contact details, customer support links, and social media links.
* Policies: Links to terms of service, privacy policy, and return policy.
* Newsletter Signup: Option for users to subscribe to updates.
* Copyright Information: Display the copyright notice.

**Product Showcase:**

Creating a database to store product information is a fundamental step in developing an e-commerce platform. You can use a relational database management system (RDBMS) like MySQL, PostgreSQL, or IBM Db2 to set up your product database.

**User Authentication:**

**1. Database Setup:**

You need a database to store user information. You may have separate tables for artisans and customers or a single table with a role field to distinguish between them.

**2. User Registration:**

* Create a registration form that allows users to provide their details, such as name, email, password, and any additional information required.
* Implement server-side validation to ensure that email addresses are unique and meet the necessary format requirements.
* Hash and salt the user's password before storing it in the database for security.
* Upon successful registration, insert the user's information into the database.

**3. User Authentication:**

* Implement a login form where users can enter their email and password.
* On the server-side, retrieve the user's hashed password from the database based on their email.
* Compare the hashed password stored in the database with the hashed password provided during login. If they match, it indicates a successful login.
* Use secure session management or JWT (JSON Web Tokens) to create a session for the user upon successful login. This session can store information like user ID and role.

**4. Password Reset:**

* Provide a "Forgot Password" feature that allows users to reset their password if they forget it. This typically involves sending a password reset link to their registered email.
* Implement a secure process for generating and verifying password reset tokens.

**5. User Profile:**

* Create user profile pages where users can view and edit their personal information, including profile pictures, contact details, and shipping addresses.

**Shopping Cart and Checkout:**

1. **Checkout Design:**

* Checkout Page: Create a dedicated checkout page with a clean and focused design.
* Checkout Steps: Organize the checkout process into clear steps (e.g., Shipping Information, Payment, Order Review).
* Progress Indicator: Display a progress bar or steps indicator to guide users through the process.
* Guest Checkout: Allow users to check out as guests or register for an account.
* Billing and Shipping Address: Collect billing and shipping address information separately.
* Shipping Options: Provide multiple shipping options with clear descriptions and costs.
* Promo Code: Include a field for applying promotional codes.
* Order Summary: Show a summary of the order with product details, quantities, and costs.
* Payment Method: Allow users to choose their preferred payment method (e.g., credit card, PayPal).
* Terms and Conditions: Include a checkbox for users to accept terms and conditions.
* Place Order Button: A prominent button to initiate the order.

**2. Checkout Functionality:**

* Validation: Validate user input for accuracy and completeness before proceeding to the next step.
* Address Verification: Implement address validation to ensure accurate shipping information.
* Payment Processing: Integrate with a secure payment gateway for real-time payment processing.
* Confirmation Page: After successful payment, display an order confirmation page with order details and a confirmation number.
* Order Confirmation Email: Send an email confirmation to the user with order details.
* Inventory Management: Update product inventory levels when an order is placed.

**Payment Integration:**

1. **Choose a Payment Gateway:**

Research and select a reputable payment gateway provider that suits your business needs. Popular options include PayPal, Stripe, Square, and others. Consider factors like fees, supported payment methods, and geographic coverage.

**2. Create an Account:**

Sign up for an account with your chosen payment gateway provider. During registration, you will receive API keys and credentials needed for integration.

**3. API Documentation:**

Familiarize yourself with the payment gateway's API documentation. This documentation provides instructions on how to use the gateway's APIs to process payments.

**User Experience:**

**1. User-Centered Design:**

Understand your target audience (both artisans and customers) and their needs. Conduct user research and gather feedback to inform your design decisions.

**2. Clear Navigation:**

Create a user-friendly navigation menu with easily recognizable categories and labels.

Use a logical hierarchy to organize content and products.

**3. Responsive Design:**

Ensure your platform is fully responsive, adapting seamlessly to different screen sizes and devices (desktop, tablet, smartphone).

**4. Minimalistic Design:**

Embrace a clean and clutter-free design. Avoid overwhelming users with too much information or visual elements.

**5. Visual Hierarchy:**

Use visual cues like colors, typography, and size to guide users' attention to important elements, such as call-to-action buttons and featured products.

**6. Consistency:**

Maintain visual consistency in terms of colors, fonts, and design elements throughout your platform.

Consistency helps build trust and familiarity.

**7. Intuitive Navigation:**

Ensure that users can easily find what they're looking for. Use descriptive labels and categorize products logically.

Implement search functionality with filters and sorting options.

**8. High-Quality Imagery:**

Use high-resolution images to showcase products effectively.

Include multiple images per product, showing different angles and details.

**9. Readability:**

Choose legible fonts and maintain a good contrast between text and background colors.

Keep text blocks concise and scannable with the use of headings, bullet points, and short paragraphs.

**Conclusion:**

Developing an artisanal e-commerce platform is a complex undertaking, but with careful planning, thoughtful design, and attention to user needs, it can become a successful platform that connects skilled artisans with a global audience, offering a secure and enjoyable shopping experience