Architecture Decision Record

**Title**

Mobile Application Development for Retail Company (Scenario 1)

**Context**

The purpose of this project is to improve the effectiveness of time and cost, value any aspect of the usage of the application.

Here is the discussion about the development tools using:

1. Native apps – Easier to implement offline capabilities and sync with backend data upon reconnection. Also, native apps typically offer the best performance and user experience, especially important for features like real-time updates and smooth UI interactions.
2. React Native – React Native allows development for both iOS and Android with a single codebase, minimizing development effort and ensuring consistent UI across platforms.
3. Node.js – Allows for a unified development environment using JavaScript, which can streamline development and code sharing between frontend and backend teams.
4. Follow Principle of Least Privilege [1] – Assign permissions based on the principles of lease privilege to ensure that each component of the app only has the minimum permissions necessary to perform its functions.
5. Local and cloud storage – Use for storing essential data locally on the device, enabling offline functionality. In addition, utilize a scalable cloud database like MongoDB Atlas [2] or Firebase Firestore [3] for storing user data, order history, and product information.
6. Analytics – Integrate Tableau [4] or Mixpanel for comprehensive analytics to track user behaviour, app performance, and engagement metrics [5].
7. Push Notifications – Implement Firebase Cloud Messaging [6] or Apple Push Notification Service [7] for reliable delivery of push notifications to users.
8. Image Handling – Utilize a combination of AWS S3 [8] for storing images or Cloudinary for one-the-fly image manipulation and optimization to ensure fast loading times and optimal performance [9].

**Decision**

1. Offline Mode Support – Implement offline mode using local data storage and synchronization when connectivity is available.
2. Push Notifications – Integrate with Firebase Cloud Messaging for delivery of notifications, such as order updates, new products, offers.
3. Analytics Tool – Integrate Tableau for tracking user behaviour, such as product views, purchases, loyalty interactions.
4. Image Storage and Optimization – Implement Cloudinary with techniques like caching, lazy loading, and compression.

**Consequences**

The consequences highlight the considerations and impacts of each decision on development effort, performance, security, user experience, and ongoing maintenance. Adjustments and mitigations should be considered throughout the development lifecycle to address any emerging challenges or opportunities.

**References**

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