

# Don Bosco Institute of Technology

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## MAD\_PWA Lab

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### Assignment no. 2

**Question: Study the requirement for PWA for Ecommerce using the concept of service worker, Webapp Manifest and framework tools. Explain with example where these key concepts will be used in ecommerce app.**

In today's digital age, e-commerce has become an integral part of our lives, offering unparalleled convenience and access to a world of products and services. Progressive Web Apps (PWAs) have revolutionized the way we interact with online stores, combining the best of web and mobile experiences.

Through the innovative use of service workers, Web App Manifest, and powerful framework tools, e-commerce platforms can now deliver lightning-fast performance, offline capabilities, and seamless navigation. Let's delve deeper into how these key concepts are shaping the future of online shopping for businesses and consumers alike.

**1. Service Workers:** Service workers are a critical part of PWAs as they enable offline functionality, push notifications, and background synchronization. In an e-commerce app, service workers can be used for:

- Offline Mode: When a user loses internet connectivity, they can still browse previously loaded pages, view products they've already accessed, and even add items to their cart. When connectivity is restored, the app can sync the data with the server.
- Background Sync: This feature ensures that actions like adding items to the cart or updating user information are synchronized with the server when the device reconnects to the internet.
- Push Notifications: Notify users about new products, promotions, or order updates directly on their device, even if they are not actively using the app.
- Caching Product Data: Use a service worker to cache product information, including images, descriptions, and prices. This allows users to view product details even when offline, improving user experience and increasing the likelihood of conversions.

- Background Sync for Orders: Implement background sync to ensure that orders placed by users are synchronized with the server when the device reconnects to the internet. This prevents data loss and provides a seamless shopping experience.
2. **Web App Manifest**: The Web App Manifest is a JSON file that provides information about the PWA such as its name, icons, splash screen configuration, and more. In an e-commerce app, the manifest can be used for:
- Home Screen Installation: Users can install the e-commerce app on their device's home screen, giving it a native app-like experience.
  - Customizing App Appearance: Define how the app appears when launched, including the icon, colors, display mode (e.g., fullscreen), and orientation.
  - Splash Screen: Display a branded splash screen when the app is launched, providing a seamless transition from launch to the app's content.
3. **Framework Tools**: Frameworks like React, Angular, Vue.js, or even libraries like Workbox can streamline PWA development for e-commerce. Here's how they can be used:
- React with Redux: Combine React with Redux for state management in an e-commerce website. Redux can store user data, cart items, and preferences, ensuring a consistent experience across sessions and devices.
  - Angular Material Design: Use Angular Material Design components to create a visually appealing and responsive UI for the e-commerce platform. Components like cards, sliders, and dialogs enhance the user interface and usability of the website.
  - Vue.js with Vuex: Leverage Vuex, the state management library for Vue.js, to manage complex data flows in the e-commerce app. Vuex can handle authentication, product listings, and cart management efficiently, improving performance and scalability.

Let's take an example to understand these concepts better.

Imagine an e-commerce platform called "TechTrends" that sells electronics and gadgets. Here's how these concepts are applied:

## Service Workers

Offline Browsing: A user, let's call her Sarah, visits TechTrends on her mobile device and browses through various laptops. As she views product details, the service worker caches these pages and images locally on her device.

Background Sync: Sarah adds a high-end laptop to her cart while she's offline (e.g., on a subway with no internet). The service worker detects this action and queues it for background sync. When Sarah's device reconnects to the internet, the order is synchronized with the server without her having to manually retry or lose the order.

## Web App Manifest

Home Screen Installation: Impressed by TechTrends' PWA capabilities, Sarah decides to install the website as a PWA on her home screen. She clicks the "Add to Home Screen" button, and the Web App Manifest ensures that the icon and name of TechTrends appear on her home screen like a native app.

Custom Splash Screen: When Sarah launches TechTrends from her home screen, she's greeted with a branded splash screen featuring the TechTrends logo and a loading animation. This creates a smooth transition into the app's interface.

## Framework Tools

React with Redux: TechTrends uses React with Redux for its front-end. Sarah notices that as she adds items to her cart or modifies her account details, the changes are seamlessly reflected across different pages. This is because Redux manages the application state consistently.

Angular Material Design: On another occasion, Sarah accesses TechTrends from her tablet. The website's UI, built using Angular Material Design components, provides her with a responsive and intuitive shopping experience. She can easily browse categories, view product details, and proceed to checkout without any usability issues.

Vue.js with Vuex: Sarah's friend recommends a product from TechTrends, and Sarah decides to search for it. The search functionality, powered by Vue.js with Vuex, delivers instant and accurate results, making it convenient for Sarah to find the product she's looking for.

In this example, the combination of service workers for offline support and background sync, the Web App Manifest for home screen installation and custom splash screen, and framework tools like React with Redux, Angular Material Design, and Vue.js with Vuex contribute to TechTrends' success in providing a seamless and engaging e-commerce experience to users like Sarah.