Progressive Web Apps (PWAs)

What Are Progressive Web Apps?

Progressive Web Apps (PWAs) are web applications that use modern web capabilities to deliver an app-like experience to users. They are reliable, fast, and engaging. PWAs can work offline, be installed on a user's device, and receive push notifications.

Core Features of a PWA

1. Responsive - Works on all devices.

2. Connectivity independent - Works offline or on low-quality networks.

3. App-like - Feels like a native app.

4. Fresh - Always up-to-date.

5. Safe - Served via HTTPS.

6. Discoverable - Identifiable as "applications" by search engines.

7. Re-engageable - Can send push notifications.

8. Installable - Allows users to install it on their device.

9. Linkable - Easily shared via URL.

How to Create a PWA

To build a basic PWA, you need three core components:

1. An HTML, CSS, and JavaScript web app.

2. A Web App Manifest file (manifest.json).

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3. A Service Worker for offline support.

Steps:

1. Create your web app (HTML/CSS/JS).

2. Add a manifest.json file to define metadata (name, icons, start URL, etc.).

3. Register a service worker in your JavaScript.

4. Host the app over HTTPS.

5. Test it using Chrome DevTools' Lighthouse audit.

Sample manifest.json

```
{
  "name": "My Awesome PWA",
  "short_name": "AwesomePWA",
  "start_url": "/index.html",
  "display": "standalone",
  "background_color": "#ffffff",
  "theme_color": "#000000",
  "icons": [
    {
      "src": "icon-192.png",
      "sizes": "192x192",
      "type": "image/png"
    },
```

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```
  {
    "src": "icon-512.png",
    "sizes": "512x512",
    "type": "image/png"
  }
 ]
}
```

Registering a Service Worker

In your main JavaScript file (e.g., app.js):

```javascript
if ('serviceWorker' in navigator) {
  window.addEventListener('load', () => {
    navigator.serviceWorker.register('/service-worker.js')
      .then(reg => console.log("Service Worker registered:", reg))
      .catch(err => console.log("Service Worker registration failed:", err));
  });
}
```