## **Introduction**

[Progressive Web Apps](https://developers.google.com/web/progressive-web-apps) are experiences that combine the best of the web and the best of apps. They are useful to users from the very first visit in a browser tab, no install required. As the user progressively builds a relationship with the app over time, it becomes more and more powerful. It loads quickly, even on flaky networks, sends relevant push notifications, has an icon on the home screen, and loads as a top-level, full screen experience.

## **What is a Progressive Web App?**

A Progressive Web App is:

* **Progressive** - Works for every user, regardless of browser choice because it's built with progressive enhancement as a core tenet.
* **Responsive** - Fits any form factor: desktop, mobile, tablet, or whatever is next.
* **Connectivity independent** - Enhanced with service workers to work offline or on low-quality networks.
* **App-like** - Feels like an app, because the app shell model separates the application  *functionality* from application *content* .
* **Fresh** - Always up-to-date thanks to the [service worker](https://developers.google.com/web/fundamentals/getting-started/primers/service-workers) update process.
* **Safe** - Served via HTTPS to prevent snooping and to ensure content hasn't been tampered with.
* **Discoverable** - Is identifiable as an "application" thanks to [W3C manifest](https://developers.google.com/web/updates/2014/11/Support-for-installable-web-apps-with-webapp-manifest-in-chrome-38-for-Android) and [service worker registration](https://developers.google.com/web/fundamentals/instant-and-offline/service-worker/registration) scope, allowing search engines to find it.
* **Re-engageable** - Makes re-engagement easy through features like push notifications.
* **Installable** - Allows users to add apps they find most useful to their home screen without the hassle of an app store.
* **Linkable** - Easily share the application via URL, does not require complex installation.

## **What you'll need to develop PWA (Progressive Web App)**

* A recent version of [Chrome](https://www.google.com/chrome/). Note, this works in other browsers as well, but we'll be using a few features of the Chrome DevTools to better understand what's happening at the browser level.
* [Web Server for Chrome](https://chrome.google.com/webstore/detail/web-server-for-chrome/ofhbbkphhbklhfoeikjpcbhemlocgigb), or your own web server of choice
* [The sample code](https://github.com/googlecodelabs/your-first-pwapp/archive/master.zip)
* A text editor
* Basic knowledge of HTML, CSS, JavaScript, and [Chrome DevTools](https://developer.chrome.com/devtools)

## **Architect your App Shell**

### What is the app shell?

The app's shell is the minimal HTML, CSS, and JavaScript that is required to power the user interface of a progressive web app and is one of the components that ensures reliably good performance. Its first load should be extremely quick and immediately cached. "Cached" means that the shell files are loaded once over the network and then saved to the local device. Every subsequent time that the user opens the app, the shell files are loaded from the local device's cache, which results in blazing-fast startup times.

App shell architecture separates the core application infrastructure and UI from the data. All of the UI and infrastructure is cached locally using a [service worker](https://developers.google.com/web/fundamentals/getting-started/primers/service-workers) so that on subsequent loads, the Progressive Web App only needs to retrieve the necessary data, instead of having to load everything.

A [service worker](https://developers.google.com/web/fundamentals/getting-started/primers/service-workers) is a script that your browser runs in the background, separate from a web page, opening the door to features that don't need a web page or user interaction.

### Why use the App Shell architecture?

Using the app shell architecture allows you to focus on speed, giving your Progressive Web App similar properties to native apps: instant loading and regular updates, all without the need of an app store.