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Progressive Web Apps & Its Impact on Business

Radhe Krishna Singh[1], Asst. Prof. Sameer Awasthi[2], Rohit Verma[3], Narsingh Charan Rout[4] Shubhangi Verma[5]

[1,3,4,5]*Student, Department of Computer Science and Engineering, Babu Banarasi Das Northern India Institute of Technology, Lucknow, India (BBDNIIT)*

[2] *Assistant Professor, Department of Computer Science and Engineering, Babu Banarasi Das Northern India Institute of Technology, Lucknow, India (BBDNIIT)*

Abstract-Technological advancements have always had an impact on how we create products and services for our customers. The invention of smartphones has ushered in a new era of communication. uses of them has increased significantly, especially in rural areas. After the launch of the free Android operating system, most users use native mobile applications to browse content. Especially when it comes to content consumption and social media consumption. Native apps have two major disadvantages. One is to occupy the local storage of the smartphone device and the second is space on the network. The connection must be strong enough to function smoothly. Areas with 2G or less bandwidth or 3G networks Accessing this native app is a slow process because it is available as a second way to use a web browser. To overcome the above limitations Progressive Web Apps (PWA) come with a solution that combines the best web and mobile apps and Experience as rich as a native app. PWAs are websites built using web technologies that behave like apps and don't need to be installed like native apps.

Key Words: Progressive Web Apps, Service-Workers, Cache System, Native Apps, User Experience

1. INTRODUCTION

The phrase "progressive web app" was invented by Google in 2015 to characterize apps that take advantage of new technologies enabled by modern browsers, such as service workers and web app developers. Progressive Online Applications for the Manifest Native Operating System (OS) that allow users to upgrade their web apps. Native mobile applications can send push notifications, work offline and load them on the home screen. By comparison, mobile web apps accessed in mobile browsers haven't done these things before. Progressive web apps provide the same functionality as native apps in your mobile browser. Therefore, it uses standards-based technology and runs in a secure container accessible to everyone on the web. Even with the availability of full-fledged mobile web applications, the lack of strong network connectivity, primarily across different areas, poses challenges in providing users with a compelling and satisfying experience. As a result, PWA (Progressive Web Apps) is a new Google technology that aims to overcome the limits of mobile browsing and native apps. The PWA is launched by clicking the icon on the home screen of the device, just like a native app. The PWA loads instantly on the screen regardless of the network connection available. Behind the scenes, service workers (sets of APIs) allow developers to programmatically cache and preload assets and manage data through a concept called push notifications. Service workers are modules that run their own threads and serve as a common entry point for PWAs to handle background tasks. PWAs can link to fully responsive and secure URLs.Progressive web apps start as Chrome tabs and evolve into an "app" layout over time. As more people use them, they will be able to pin them to the home screen or app drawer of the phone and access app-like features such as notifications and offline use.

2. Influence on Business & Their Growth

Progressive web applications are those which use the latest web features to provide users with an app-like experience. After all, it's a regular website running in a browser with some tweaks. It empowers you:

- How to install on mobile home screen
- To access it when offline
- To access the camera
- To receive push notifications
- How to do background synchronization

Progressive Web Applications (PWAs) are a fairly new phenomenon, but many companies are already benefiting from their widespread potential. You may boost user engagement and conversion rates by combining the capabilities of your website and mobile software to create an immersive user experience. In this journal, you'll learn the strengths and weaknesses of progressive web apps and the opportunities that Progressive web applications bring to your business in comparison to the web or mobile software. Recent studies demonstrate that PWAs offer has high probability of benefitting businesses, including:

- A 68 percent growth in mobile traffic.
- A 25-fold reduction in device storage usage.
- 25-times reduction in use of device storage.
- The average conversion rate increased by 52 percent.
- A rise of 78% in the average session per user.
- When compared to mobile websites, there was a 136% boost in user engagement.
- 42.86% lower bounce rate when compared to that of mobile websites
- Page visits increased by 133.67%

Examples of successfully developed PWAs

- **Twitter:** Twitter is building Twitter Lite to provide a more robust experience with clear goals for instant loading, user engagement, and data usage reduction.
  - 65% more pages per session
  - 75% increase in sent Tweets
  - Bounce rate is 20% less

- **Flipkart:** Flipkart developers soon started developing Flipkart Lite. This is a progressive web app that combines the best web and the best native Flipkart apps. Leverage the new open web API to provide a mobile web experience that loads faster than normal web apps, uses less data than before, and reengages users in a variety of ways.
  - User's surfing time on-website with Flipkart lite vs. previous mobile experience (Traditional way): 200 Seconds vs 70 seconds.
  - 300% more time spent on site
  - 114% times higher re-engagement rate of the daily users
  - 117% times greater conversion rate among those arriving via Add to Homescreen
  - 300% lower data usage

- **Pinterest :** With the help of PWA, Pinterest now has 160% increment in user retention. With visitors spending 41% more time and 44% increment in ads increased the revenue of the company.

3. Working of PWA

SERVICE WORKERS:

Service Workers, a potent tool behind Progressive Web App. Those features provided by the service workers are:

- Offline Access.
- Push Notifications
- Background content updating
- Content caching

Service workers perform the following functionalities:

- Caches the App Shell.
- Updates the Content in the background.
- Get a push notification ID from the user to send a notification.
- Invalidates the cache when needed

hello-world.js

```
const staticTrickType = "tricktype"
const assets = [
  "/",
  "/index.html",
  "/css/style.css",
  "/js/app.js",
  "/images/triccktype.jpg",
]
self.addEventListener("install", installEvent => {
  installEvent.waitUntil(
    caches.open(staticDevCoffee).then(cache => {
      cache.addAll(assets)
    })
  )
})
```

APP SHELL :

The concept of an app shell in the PWA is to load the minimal UI as fast as possible, cache it so that it can be used offline for future access and then load all the content in the app. This way, the next time the device accesses the app, the user interface will be immediately loaded from the cache and the server will request new content (if it is not yet available in the cache).

WEB APP MANIFEST:

The purpose of the web app manifest is to provide information about your application (name, author, icon, description, etc.) in a JSON file. The manifest should contain information about the websites installed on your device's home screen. This gives users faster access and a richer experience. Progressive web apps are a collection of web technologies that include capabilities like running offline and receiving push notifications as part of a web app manifest that allows you to install websites on your device's home screen without using an app store.

CODE:

manifest.json

```
{
  "name": "TrickType",
  "short_name": "TrickType",
  "start_url": "index.html",
  "display": "standalone",
  "background_color": "#fdfdfd",
  "theme_color": "#db4938",
  "orientation": "portrait-primary",
  "icons": [
    {
      "src": "/images/icons/icon-72x72.png",
      "type": "image/png", "sizes": "72x72"
    },
    {
      "src": "/images/icons/icon-96x96.png",
      "type": "image/png", "sizes": "96x96"
    },
      ]
}
```

app.js

```
if ("serviceWorker" in navigator) {
  window.addEventListener("load", function() {
    navigator.serviceWorker
      .register("/serviceWorker.js")
      .then(res => console.log("service worker registered"))
      .catch(err => console.log("service worker not registered", err))
  })
}
```

4.PWA Work-Flow

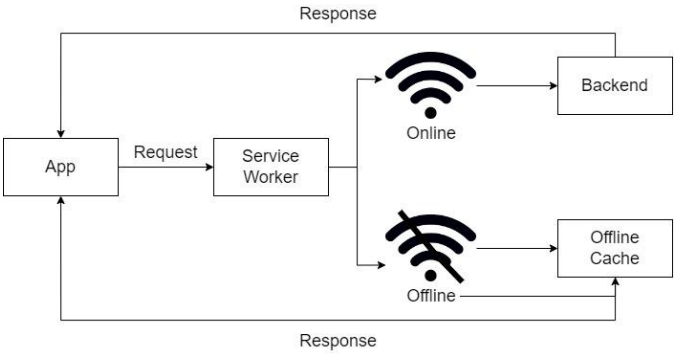
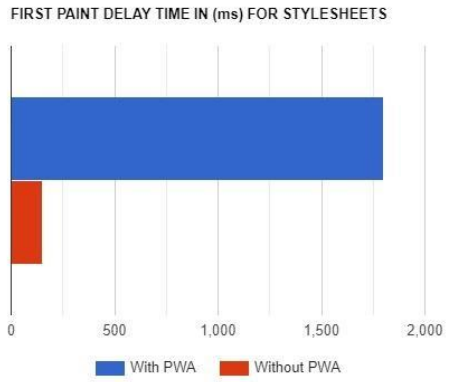


Fig -1: PWA Workflow

Result:

Lighthouse is an open source automation tool for improving the quality of your website. You can run it on any website using publishing or authentication. There are audits for performance, accessibility, progressive web apps, SEO and more. Google Lighthouse can be run as a Chrome extension from the browser command line. With the help of PWA Web Apps, users get answers very quickly and increase user engagement.



5 . CONCLUSIONS

Users can launch apps with a single click from an icon on the home screen, see them in the app bar when browsing between apps, or search for them in app search results once they've been downloaded. This app is called Dynamic Discovery Launch Switch, and PWA installability is the key to unlocking access.

PWAs are not only accessible through the device's familiar discovery and launch interface, but also launch-like platform-specific apps. In a standalone experience, it's separate from the browser. You'll also have access to device functionality such as app switchers and settings that are available at the OS level..

Users who install PWAs are likely to be the most engaged users, often on par with mobile platform-specific app users, such as increased repeat visits, longer site stays, and high conversion rates. Has a better engagement index than casual visitors.

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