

Experiment 11

Aim : To use google Lighthouse PWA Analysis Tool to test the PWA functioning.

Theory :

- **Google Lighthouse :**

Google Lighthouse is a tool that lets you audit your web application based on a number of parameters including (but not limited to) performance, based on a number of metrics, mobile compatibility, Progressive Web App (PWA) implementations, etc. All you have to do is run it on a page or pass it a URL, sit back for a couple of minutes and get a very elaborate report, not much short of one that a professional auditor would have compiled in about a week.

The best part is that you have to set up almost nothing to get started. Let's begin by looking at some of the top features and audit criteria used by Lighthouse.

- **Key Features and Audit Metrics**

Google Lighthouse has the option of running the Audit for Desktop as well as mobile version of your page(s). The top metrics that will be measured in the Audit are:

1. **Performance:** This score is an aggregation of how the page fared in aspects such as (but not limited to) loading speed, time taken for loading for basic frame(s), displaying meaningful content to the user, etc. To a layman, this score is indicative of how decently the site performs, with a score of 100 meaning that you figure in the 98th percentile, 50 meaning that you figure in the 75th percentile and so on.
2. **PWA Score (Mobile):** Thanks to the rise of Service Workers, app manifests, etc., a lot of modern web applications are moving towards the PWA paradigm, where the objective is to make the application behave as close as possible to native mobile applications. Scoring points are based on the Baseline PWA checklist laid down by Google which includes Service Worker implementation(s), viewport handling, offline functionality, performance in script-disabled environments, etc.
3. **Accessibility:** As you might have guessed, this metric is a measure of how accessible your website is, across a plethora of accessibility features that can be implemented in

your page (such as the 'aria-' attributes like aria-required, audio captions, button names, etc.). Unlike the other metrics though, Accessibility metrics score on a pass/fail basis i.e. if all possible elements of the page are not screen-reader friendly (HTML5 introduced features that would make pages easy to interpret for screen readers used by visually challenged people like tag names, tags such as <section>, <article>, etc.), you get a 0 on that score. The aggregate of these scores is your Accessibility metric score.

4. **Best Practices:** As any developer would know, there are a number of practices that have been deemed 'best' based on empirical data. This metric is an aggregation of many such points, including but not limited to:
- Use of HTTPS
 - Avoiding the use of deprecated code elements like tags, directives, libraries, etc.
 - Password input with paste-into disabled
 - Geo-Location and cookie usage alerts on load, etc.

● **Materials Required**

1. Web browser (Chrome recommended)
2. Access to Google Lighthouse (via Chrome DevTools or as a browser extension)
3. A web application to test
4. Internet connection

● **Procedure**

1. Open Chrome browser and navigate to the target web application
2. Access Lighthouse:
 - Option 1: Open Chrome DevTools (F12 or Ctrl+Shift+I)
 - Option 2: Click on the Lighthouse extension icon if installed
3. Select the audit categories (Performance, PWA, Accessibility, Best Practices)
4. Choose device emulation (Mobile or Desktop)
5. Click "Generate report" and wait for the analysis to complete
6. Review the comprehensive report provided by Lighthouse

Output:

The Lighthouse report provides valuable insights into the PWA functionality:

1. Service Worker Implementation: Verifies proper registration and functionality
2. Offline Capabilities: Confirms the application works without an internet connection
3. App Manifest: Validates presence and correctness of the web app manifest
4. Loading Performance: Identifies opportunities for optimization

5. Responsive Design: Ensures the application works well across devices



http://192.168.160.1:8081/



Performance



Accessibility



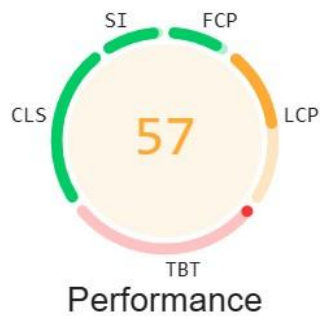
Best Practices



SEO

There were issues affecting this run of Lighthouse:

- Chrome extensions negatively affected this page's load performance. Try auditing the page in incognito mode or from a Chrome profile without extensions.



PASSED AUDITS (25)

Show



Accessibility

These checks highlight opportunities to [improve the accessibility of your web app](#). Automatic detection can only detect a subset of issues and does not guarantee the accessibility of your web app, so [manual testing](#) is also encouraged.

NAMES AND LABELS

- **Accessibility:** 86/100 - Shows strong implementation of accessibility features
- **Best Practices:** 79/100 - Demonstrates adherence to recommended web development standards
- **SEO:** 100/100 - Excellent search engine optimization implementation

NOT APPLICABLE (39)

Show



Best Practices

TRUST AND SAFETY



NOT APPLICABLE (1)

Show



SEO

These checks ensure that your page is following basic search engine optimization advice. There are many additional factors Lighthouse does not score here that may affect your search ranking, including performance on [Core Web Vitals](#). [Learn more about Google Search Essentials](#).

ADDITIONAL ITEMS TO MANUALLY CHECK (1)

Hide

Conclusion

We successfully used Google Lighthouse PWA Analysis Tool to test our Progressive Web Application. The audit confirms that our application meets most PWA requirements, providing users with an app-like experience. The report also identified areas for improvement, particularly in loading performance, which can be optimized to enhance the overall user experience.