Best Practice

Progressive Web Apps with Embedded Wizard

Christoph Friegel, Rudolf Leberfinger
March 2022

Embedded Wizard
GUI Solutions by TARA Systems

Progressive Web Apps with Embedded Wizard

These days, embedded devices with touch displays are widely used, especially in the fields of industrial, automotive, home appliance and medical devices. Companies invest a lot of time and money to develop not only the devices, but also intuitive and good-looking graphical user interfaces (GUI).
As soon as the development is completed, there is often another typical request: the device should also be controlled via a smartphone app that looks exactly like the embedded GUI. However, since creating a native app can be quite expensive, a PWA could be a cost- and time-saving alternative.

What is a PWA?

PWA - short for Progressive Web App - is a website that can be installed on the home screen and easily accessed via the smartphone browser. Once installed, it behaves like a native app (e.g. on Android or iOS). Since Google introduced this technology in 2016, many companies such as Twitter, Pinterest, Instagram, Financial Times, Forbes and Starbucks have been using it very successfully.

What needs to be done?

With Embedded Wizard you already have the possibility to create your GUI as a HTML application using WebGL, so you can run it in a browser. In addition to the WebGL version of your GUI you need to include a „Service Worker“ and a „Web Manifest“. This will allow you to install the WebGL app locally on your smartphone and use it like a standard app. So it‘s just a few extra files to add to the JavaScript code generated in the WebGL version of your existing GUI.

Is there a catch?

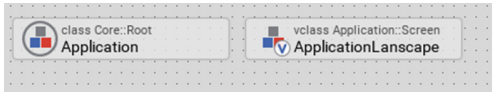
Yes and no - deciding wether creating a PWA with Embedded Wizard or writing a native app, you need to be clear about your requirements.

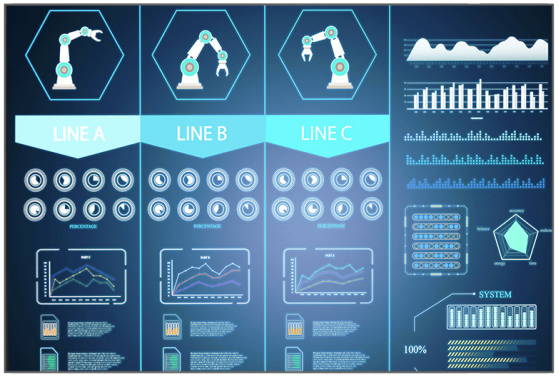
PWA	Native App
Low budget Directly derived from embedded UI with same codebase	***App Store presence*** Presentation, ads, rating, in-app purchases, ...
Cross-platform High compatibility, runs on Android, iOS, PC, Mac	***Best User Interface/User Experience*** Optimized for platform dependent layouts (e.g. Material Design)
Simplified maintenance Easy update process at any time, instant availability of new features	***Best Performance*** They are optimized for the specific platform
Time-to-market Quick development, simple release and update process	***Full access to device features*** Such as camera, Bluetooth, GPS, microphone, biometrics, ...
No App Store No restrictions, no verification, no provisioning	***Data Security*** Better security and data protection (e.g. native 2FA)

What to consider?

The GUI running on an embedded device certainly does not contain all the requirements that apply to an app by default. Therefore, let's list a few features that might be necessary and need to be added. Nevertheless, these features must be considered for native apps as well.

Landscape/Portrait mode
If your embedded GUI supports landscape mode only, keep in mind to also implement portrait mode. Automatic detection of rotation can be handled by the PWA, and you can decide within your GUI how to display the data in the different alignment modes.





Multiple resolutions
For multiple resolutions used on different mobile devices, you can either implement a variant of your GUI that is optimized for the most common resolutions, or simply rely on the scaling that is automatically built into the browser rendering of the PWA.

Installation
Unlike a classic native app, a PWA does not require an app store. Once you visit the PWA website you will be asked to install the PWA. Afterwards an app icon will be available on your home screen and you will have the same experience as with a native app.

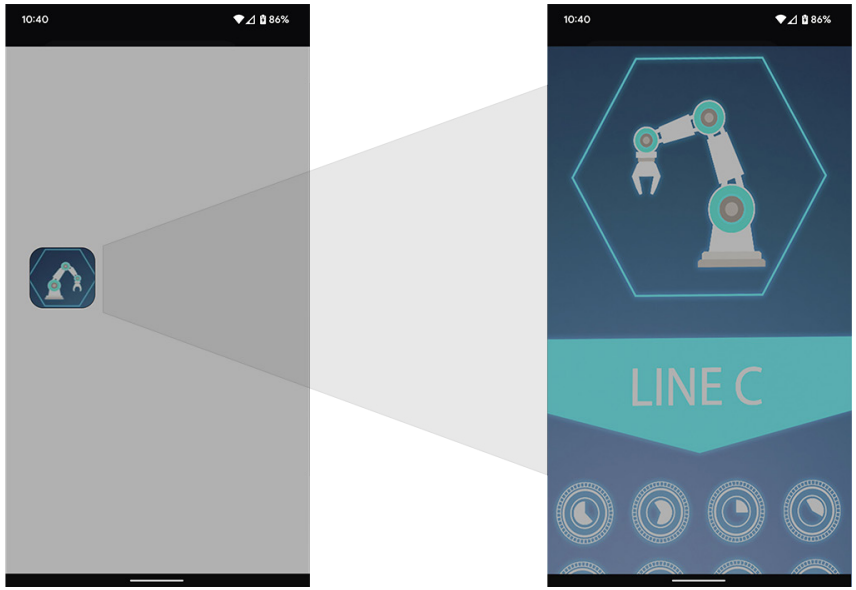
Data Communication
In contrast to the data connection of the embedded GUI, the PWA requires asynchronous data communication via classic paths such as MQTT over Websockets or others.

Notifications
Push notifications via PWA are supported on Android devices only.

Security
Once you allow outside access to your embedded device, you may have to worry about security issues. This is typically where an authentication process needs to be added if it is not already part of your embedded GUI.

Is the future "progressive"?

The answer is: it depends. If you need apps with e.g. biometric authentication or other special hardware access, in-app purchases, native look and feel, and store presence, then a native app is the way to go. On the other hand, if you have e.g. a limited budget, want easier maintenance, shortened time-to-market and don't need smartphone hardware features, then the PWA is a real alternative.
Also, if you have already worked with Embedded Wizard and want the PWA to look identical to the already polished and elaborate embedded GUI design, the PWA is the best choice.
Therefore, app development with PWA using Embedded Wizard offers two major advantages: a very cost-effective approach with a single codebase.



Christoph Friegel
GUI Development & Project Lead

Rudolf Leberfinger
Head of GUI Services

Embedded Wizard
GUI Solutions by TARA Systems

TARA Systems GmbH
Gmunder Str. 53 | 81379 Munich | Germany
tel: +49 (89) 74 71 21-0
email: contact@embedded-wizard.de
www.embedded-wizard.de

Follow us on: