

Introduction to Progressive Web Apps

What is a Progressive Web App?

GeneXus[™]

PROGRESSIVE WEB APPS (PWA)

Progressive web applications (PWA) are a special type of application. They are created using modern web technologies and follow basic web standards.

Essentially, a PWA is a web app that operates much like a native app.

Some sites that use this technology:



Telegram



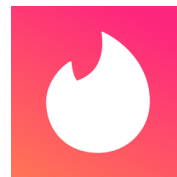
Twitter



Ali Express



Google Maps



Tinder



Pinterest

Progressive Web Applications

In order to approach the topic of progressive web applications, also called PWAs (Progressive Web App), we can say that they are a mix of traditional web sites and native applications. They combine the flexibility of the web with the user experience of a native application.

These applications can be installed locally on the device we are using, whether it is a mobile or desktop device.

Some sites that have already implemented this technology are Telegram, Twitter, Ali Express, Google Maps, Tinder, Pinterest, among others.

Before we get into the details of progressive web applications, we'll see what web applications and native applications are all about. In this way, we'll know their particular characteristics and differences.

WEB APPLICATIONS (WEB APPS)

A web application is hosted on a web server, and can be accessed from a browser through the Internet or an Intranet.

Advantages

- No installation required
- Multi-platform
- Virus-free
- Always up to date
- In the Cloud
- Free access at any time

Examples



gmail.com



facebook.com



spotify.com



netflix.com

Web App

A web application or web app, as its name indicates, is an application that is hosted on a web server, and is accessed from a browser via the Internet or an Intranet.

Unlike native applications, web applications are not installed and run on the computer or mobile device, but are always executed on a server using a browser.

Web applications are interactive platforms, different from traditional websites that are generally a set of static pages, which are basically responsible for delivering information. Web applications have a higher level of complexity and focus on the interaction and performance of actions by users, usually by accessing a database.

Some advantages of web applications are as follows:

- No installation is required, they run on a web server.
- They are multi-platform, you only need a web browser.
- Virus-free, as data is stored on the application server.
- The latest version is always accessed.
- They store all data in the cloud or in an external database, so they don't take up space on our device.
- Free access for users at any time, place or device, just by having an Internet connection and access credentials.

Some examples of this type of application: Gmail, Facebook, Spotify, Netflix.

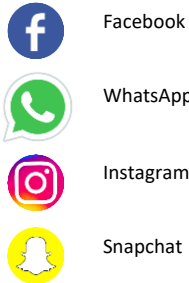
NATIVE APPLICATIONS

Native applications are developed specifically for a certain operating system.

Advantages

- Access to device resources
- Push Notifications
- Better user experience
- Consistent user interface
- Can be used offline

Most downloaded apps



Facebook

WhatsApp

Instagram

Snapchat

NATIVE APPLICATION

Native applications are those developed specifically for a certain operating system. They are developed taking into account the characteristics and specific features of each platform. These platforms can be either a mobile operating system such as Android or iOS, or a desktop operating system such as Windows.

Some advantages of native applications:

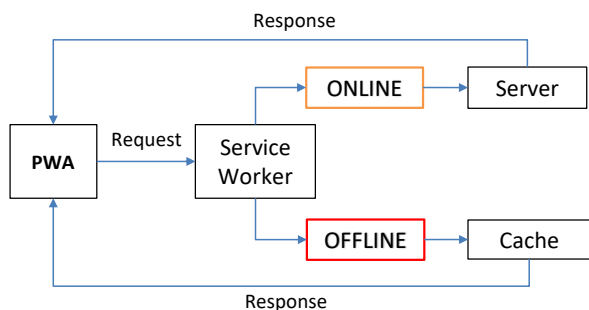
- Access to device resources (hardware and software), including camera, microphone, contacts, etc.
- They allow sending push notifications. These notifications are displayed on the device even when the application is not running. A clear example can be seen in WhatsApp with message notifications, or for example when we receive a new email.
- Enhanced user experience, with fast and smooth access.
- Consistent user interface (menus, buttons, commands, etc.) because they must follow the design guidelines of the operating system manufacturers.
- They work offline, that is, you can access the contents of the app without being connected.

Among the native applications with the highest number of downloads so far are Facebook, WhatsApp, Instagram, Snapchat.

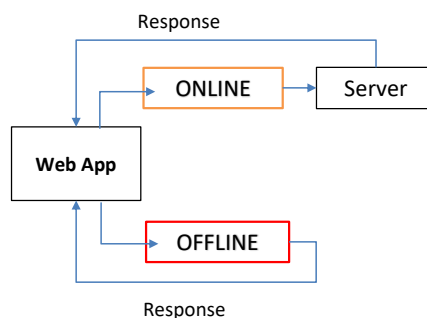
PROGRESSIVE WEB APPS (PWA)

Progressive web applications are an evolution of web applications that bridges the distances between them and native applications.

PWA Architecture



Web App Architecture



Going back to PWA, as we mentioned at the beginning, they are an evolution of web applications -which bridge the distances existing between them and native applications-, and can perform tasks that until now only native applications could do. For example, accessing device resources or sending push notifications.

A PWA uses the latest technologies available in browsers to provide an experience very similar to that provided by a native application. Let's look at the architecture of PWA.

This type of applications uses a technology called Service Worker. Service Workers allow PWAs to run in the background without the need to reside in the browser. When the application is installed, the service worker is also installed together with its cache in the browser used. This will allow for offline use of the application, as it loads the content from the cache. This loaded data was saved in our last access with Internet connection.

This is one of the main differences between PWA and traditional web applications. In web applications, when we access offline, it will simply respond that it has no connection to retrieve the necessary data, and will remain waiting to connect to the server.

PROGRESSIVE WEB APPS (PWA)

Features:

- Responsive Design
- Offline
- No download required
- Easy to share
- Multi-platform
- Always up to date
- Access to device resources
- Small size
- Security

We'll list some of the features and benefits of progressive web applications.

- Responsive design: these applications are developed with a responsive design that fits any device and screen (PC, Tablet, Smartphone).
- Offline operation: thanks to the Service Worker feature, they can operate in low quality networks or even offline, as long as the user doesn't have to send new data to the server.
- No need for downloads: users don't have to go to each operating system's store and look for the application to install. We can install it simply by accessing the site from the browser. This makes them compatible with any operating system.
- Easy to share: we can share the app by simply sending the URL by any means.
- Multi-platform; they are supported by the most popular browsers, such as Chrome, Firefox, Opera, Safari, etc. And they can be run and installed on any operating system, such as Windows, Linux, MacOS, Android, IOS.
- Always up to date: the latest version of the PWA is always accessed, without the need for us to update it.

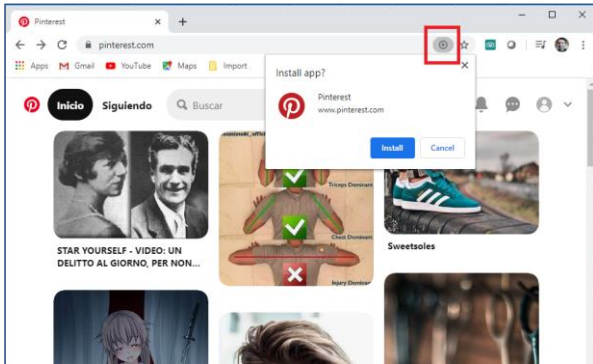
When you open the app and connect to your server you already have access to the latest version available, as with any web application.

- Access to device resources: this is one of the main features that distinguishes web applications from native ones. With PWA we can now send push notifications, access the geolocation, camera, microphone, etc. These features, which were exclusive to the device's native applications, are gradually being extended and improved.
- Small size: PWA take up a small amount of the device's memory, usually weighing less than 1MB.

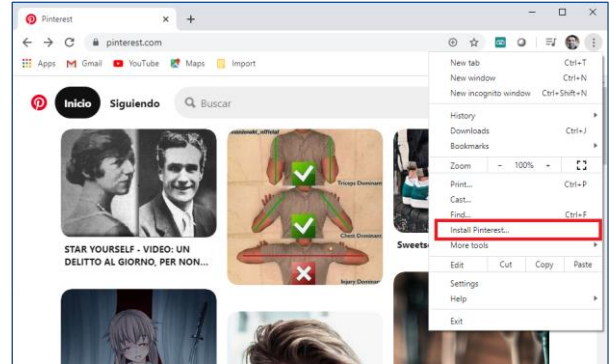
-Security: PWA must be served over a secure network, using the HTTPS protocol to keep user data safe.

INSTALL (On Desktop with Chrome)

Option 1



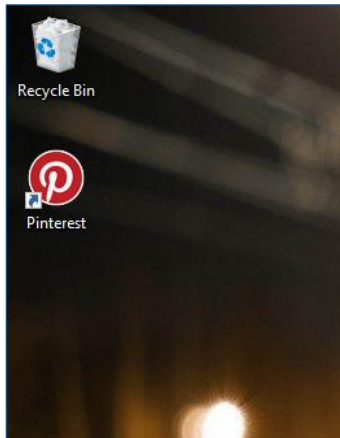
Option 2



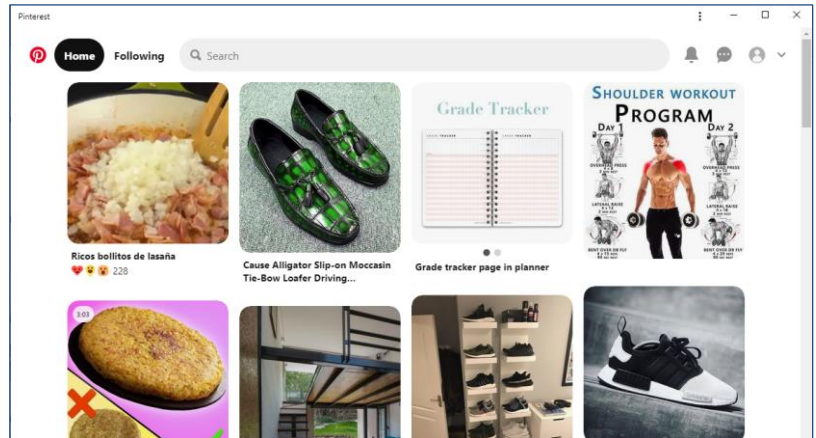
Let's see an example of how to install this kind of applications in a computer. In this case, we will use Pinterest.

We enter the site through Chrome; the browser detects that it's a PWA, and a cross (+) icon appears in the navigation bar, next to the favorites icon. Clicking on this option will allow you to install the application on your computer. The other option is to access the browser's side menu, by clicking on the three vertical dots, and then install.

Shortcut icon



PWA running



Once installed, a login icon will be created on the desktop, and the application will immediately run in a new browser window for you to start using it.

As we can see, this independent window has some specific features. It uses a much cleaner and simpler design, with no navigation bars, menus or icons interfering with the user's experience.

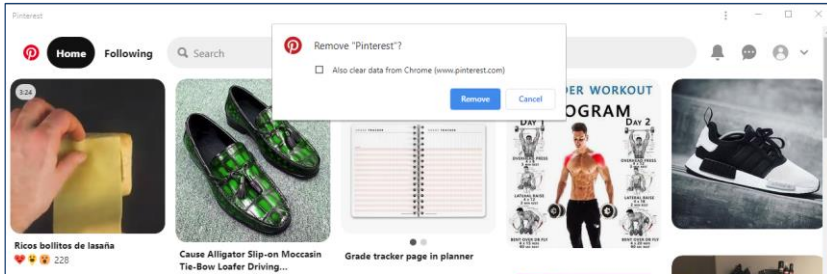
Only the application name, the three vertical dots for menu access, and minimize, maximize and close buttons will appear.

UNINSTALL

1



2

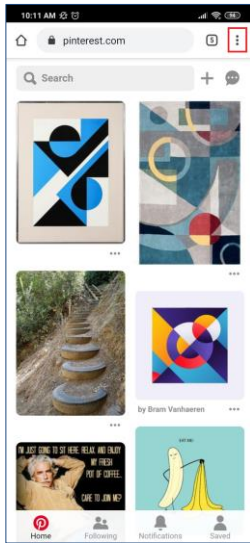


To uninstall a PWA we do the same from the options menu, clicking on the three vertical dots and then on uninstall.

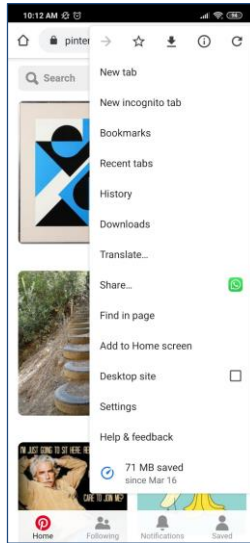
A dialog box will appear giving us the option to remove the application from the system, and also to delete the data it has saved in our device.

INSTALL (On Smart Device with Chrome)

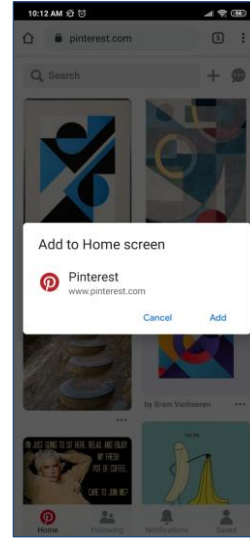
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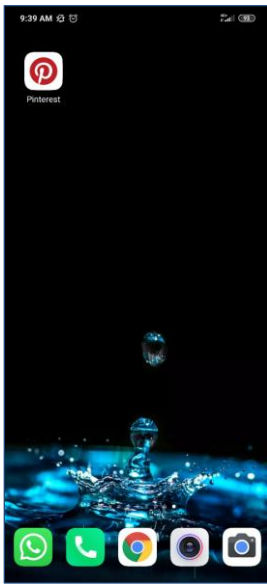
3



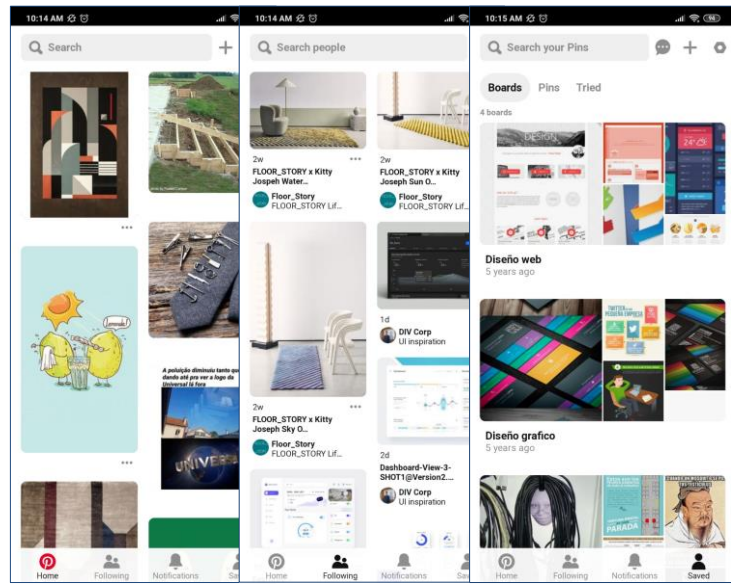
Now let's try this on mobile devices, which is exactly where we will make the most out of this type of application.

To install a PWA in Android, first of all, we access from Chrome the site built with this technology; for example, Pinterest as we just saw. Then we press the menu button, and select the option “Add to main screen.”

Shortcut Icon



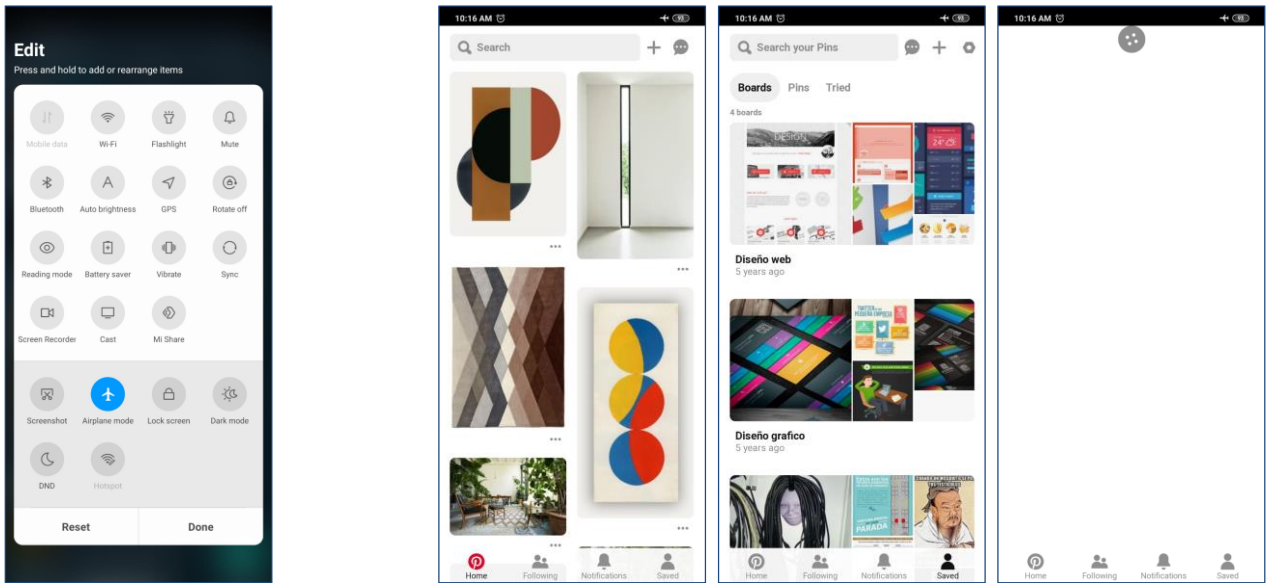
PWA running



A login icon will be generated, and the application will immediately open in a separate browser window, with special features, as we just saw in computers, without a bar or navigation commands, giving a clean and clear appearance and simulating the look and feel of native applications.

When browsing the app, it feels just like a native Android app. It offers a clean, sharp design with agile movements and fast interactions.

PWA Without connection

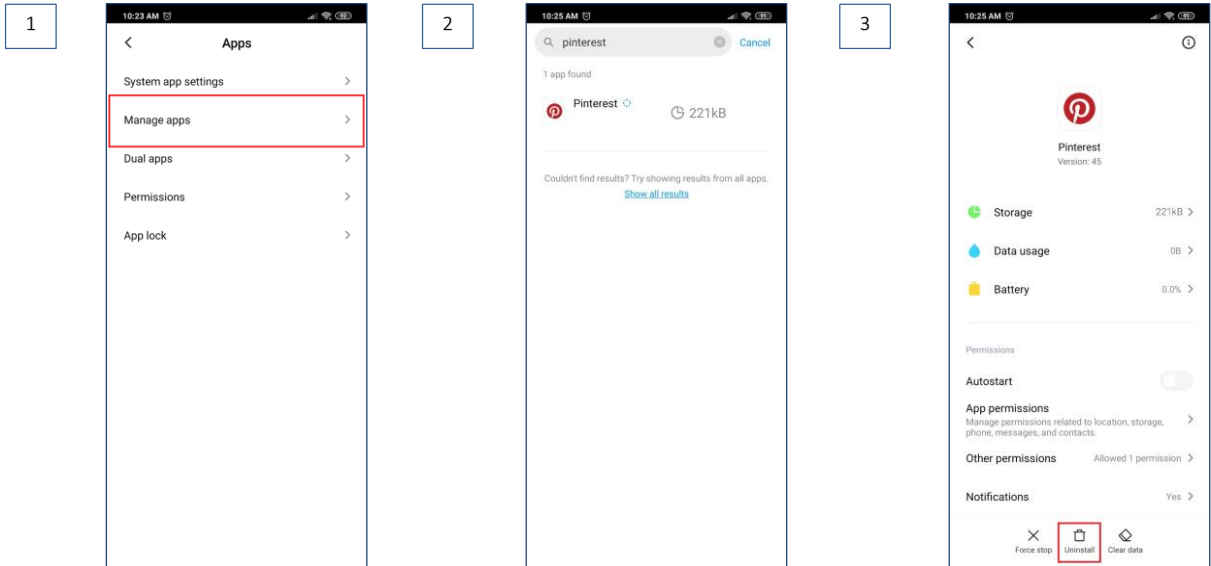


One of the features of PWA –which distinguishes them from traditional web applications and brings them closer to native applications– is that they can work without an Internet connection (Offline), because these applications store data in the cache that later allows us to access them offline, or with a limited connection.

If we remove the Internet connection from the mobile device and access the application, we'll see that we can browse it, since the information we are accessing was saved the last time it was accessed online. When trying to enter content or a section that we never visited before, the application will give a connection error or will remain loading until it is found.

This functionality, which includes offline data, also helps us to reduce the loading times every time we open the application and move over different sections.

UNINSTALL

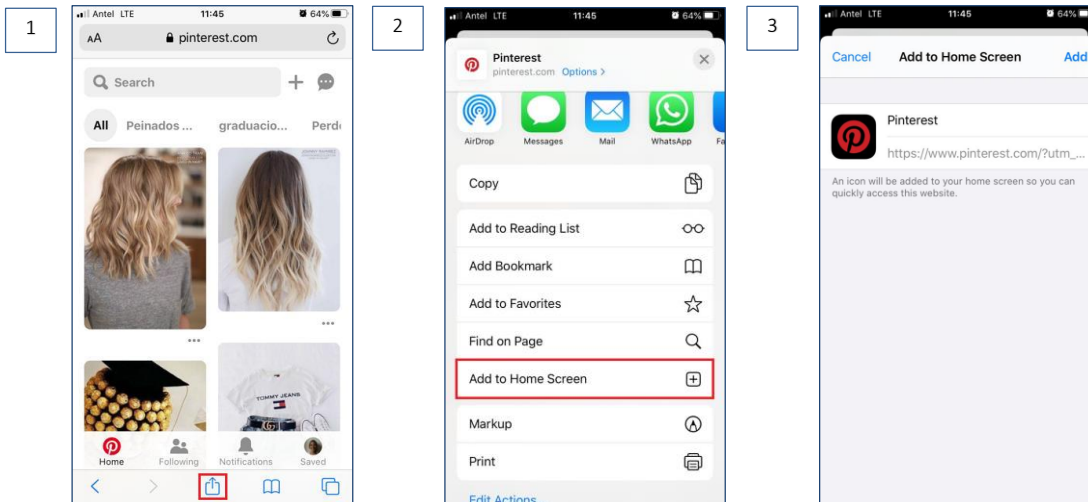


To uninstall the application, we will do it as we do with any native application of the device. For example, from the application manager, we see that it appears there.

First, let's note that this application takes up 221KB on the device, unlike the native Pinterest app that takes up 115MB on the device. This is another big difference between PWA and native apps. The latter take up considerably more memory space, which for some devices can be a key point between maintaining the application or removing it to free up space.

Going back to the uninstall process, selecting the application will give us the option to remove it.

INSTALL (On iPhone with Safari)



A similar process is used to install a progressive web application on iPhone devices. For example, from the Safari browser, which is the default for this operating system.

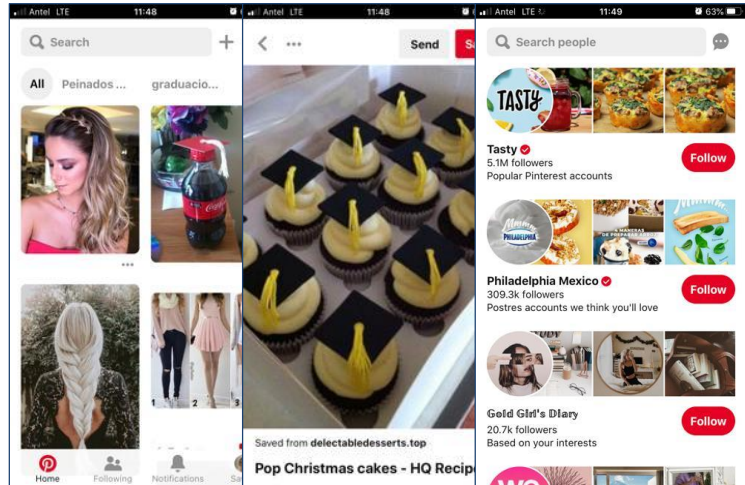
We enter the Pinterest site, and select the "Share" option.

Then we select the option "Add to startup," and next we enter the name that will be assigned to the application.

Shortcut Icon



PWA running



A login icon will be added to the device's desktop.

By accessing the application we will immediately be able to use all its functions, just like with an Android device, as we just saw.

Note that the design is similar to that of any native iOS application, and the same goes for the animations, transitions and its overall operation.

PROGRESSIVE WEB APPS (PWA)

Conclusions

Progressive web applications are well positioned for the future and have great potential due to the fast advancement of web-based technologies.

A PWA is adaptable, accessible, upgradeable, installable, secure, and lightweight.

Progressive web applications are well positioned for the future and have great potential due to the fast advancement of web-based technologies. PWA try to bring together the advantages of the web and the world of apps. They not only have a great future, but they already have a strong present and, as we saw in this brief introduction, large companies are already using this technology. A PWA is adaptable, accessible, upgradeable, installable, secure, and lightweight. This makes them an interesting option when developing an application.

This has been a brief introduction of progressive web applications, describing their main characteristics and the differences with traditional web applications and native applications. In a future video, we'll see how to generate progressive web applications with GeneXus.

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