Abstract

App users expect features such as simple navigation, convenient user interface, speedy performance, swift response time, high stability, and scalability. Not matching these standards comes in the way of desired outreach to targeted users. Lack of cross-platform adaptability and intense demands on the operating systems on the application side also decreases an app’s chances of success. Instant Apps deliver on user expectations by offering a smooth interface without requiring much resources. They load only those portions of an app that are required to perform a given action. Such portions of an app and any related data that is stored are temporarily added to the device. Instant Apps grow user reach by providing offline functionality and allowing users to enjoy the desired features without having to install the app.
Mobile devices have evolved significantly over the past decade, with faster processing capabilities, extended battery life, and substantial storage and memory space. However, they are consistently challenged by limitations occurring due to multiple devices, countless screen sizes, pixel intensities, embedded technologies, and OS requirements. This fragmentation and standardization process has an adverse effect on the overall performance as well as the user experience. Moreover, the number of applications that are being installed on a mobile device cannot be controlled. The solution is to restrain the app from taking up too much space, as it could lead to low performance.

Dimensional Research conducted a survey among 3000 participants about their first-hand expectations from an app. Nearly 96% of the users voted on speed and high response rate as critically important, very important, or important for a mobile application. Diminishing the myth in mobile app management is that we don’t need to worry about performance till we have an issue. In reality, however, it is judicious and advantageous to be proactive and to predict the problem and implement a solution before it occurs.
Instant Apps have emerged as the perfect solution to the above-mentioned requirements, and they could potentially change the future of mobile app development. In all likelihood, they may open up opportunities in redesigning existing mobile apps and developing new apps to reach the paramount goal of enhanced user experience and exemplary performance.

**Instant Apps**

What do an airport app and an insurance company app have in common? Answer: Installation.

Without installing an app, is it possible to use or run it smoothly? Can data be accessed on demand when it is not stored on the mobile device? These are the important problems that Instant Apps can provide the solution to.

Instant Apps, an evolution in app discovery and sharing, bridges this gap and allows a user to experience native as well as new Android apps without installation. Addressing the performance and memory issues, these apps are quicker to load, more accessible, and available in various versions of the operating system. With Android Instant Apps, users can download any single feature of an app as required without having to install the app itself. When a user requests a feature from Instant Apps, they receive only the URL necessary to run that specific feature. Similar to a website, it is seamless, easy, and fast to load.

An Instant App uses a single code base with installed APK counterparts. The app is made compatible and modular with deep linking in a manner that when users click on a URL, they end up looking at the exact part of the app that they want. With the help of an Android developer, it is also possible to update an existing app's source code. Here, the Instant App will run on two versions of APK. One is the APK that can be installed and runs as usual; the other is the instant version for Google to identify.

**Technical Requirements for Instant Apps**

<table>
<thead>
<tr>
<th>IDE</th>
<th>Android Studio 3.0 or later (Not a stable release and has to be installed in parallel with the existing IDE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android SDK</td>
<td>6.0+</td>
</tr>
<tr>
<td>Build Tools</td>
<td>26 X or later</td>
</tr>
<tr>
<td>SDK Tools</td>
<td>25 X or later</td>
</tr>
<tr>
<td>Instant Apps Development SDK</td>
<td>This has to be installed after installing the android Studio 3.0</td>
</tr>
</tbody>
</table>

**Implementing an Instant App**

Implementing an Instant App involves a few defined steps. The entire exercise will not meet the required expectations if:

- The use case is not developed well
- Modular design is not followed (app preparation)
- Android UX best practices for Instant Apps are not executed
Revolutionizing the World of Mobile Apps

Mobile apps can now run without the traditional process of installation on a device. This innovation leads to a more seamless digital experience. Here is how Instant Apps are able to streamline user experiences:

- Ease of access makes them easy and fast to open
- Saves space by avoiding unwanted downloads
- Saves time, as a user can simply Google or search to open application
- Easy to share through URL
- Compatible with all Android versions from Jelly Beans
- Access from anywhere without installing
- Makes user acquisition much easier than before for app developers
- Benefits e-commerce sites as it removes duplication of efforts
- Responsiveness is comparatively more flexible, creating a better experience for users

Disadvantages in Business

While there is no need to wait for a download to access content, Instant Apps faces certain challenges as well.

- Restricted content as certain activities can’t start in Instant Apps
- Push Notification is currently not supported
- Change of device settings or access to external storage is restricted
- Does not support content providers or long-running running background services
- Limited in space up to 4MB and may not present the full user experience

Since Instant Apps is still a fresh concept, there is scope for significant growth in the near future. The limitations mentioned will balance out in time as the opportunities for users and app developers rise.

iOS Configuration

There is a widespread perception that iOS does not support Instant Apps. However, Apple also enables a similar ecosystem, known as App Thinning. This includes optimization of app installation, asset slicing that creates different variants for on-demand resources, and delivering apps in bitcode. App Thinning is supported on iOS from V9.0, tvOS, and watchOS.

- Slicing is delivering a variant of the app bundle according to the target device. A variant contains only the executable architecture and the resources.
- Bitcode is an intermediate representation of a compiled program. Including bitcode will allow Apple to re-optimize your app binary in the future without the need to submit a new version of your app to the store.
- On-demand Resources (iOS, tvOS) are resources such as and sounds that can be tagged and requested in groups. The store hosts the resources on servers and manages the download on demand.

The stark contrast between the two is that App Thinning reduces the downloadable binary to a smaller size, making the app itself tiny. Whereas, Instant Apps addresses the major problem and fragmentation by providing a richer, more convenient and lower storage use of the app, which is similar to, maybe even faster than, a web page.
Discoverability in the Market

In practical terms, Instant Apps refers to upgrading your existing Android app rather than rewriting it from scratch. The APIs, project, and source code all remain the same. Using Android Studio, a developer can modularize and update the existing app to allow users to load the portion of the app required when needed. Google Play downloads these parts and grants users access to certain proximity features on the go, without having to install the app.

Cross Platform Development

The philosophy of Instant Apps is to provide the user an experience as convenient as surfing a web application, where you can go to the desired modules on demand by clicking on a link. Google verifies the app links used in Instant Apps. Any custom API usage is prohibited in Instant Apps. If at all any is used, the app would be rejected. As of now, the scope of a hybrid application as an Instant App does not exist. Even the integrated development environment (IDE) (Canary 3.0) for creating an Instant App is not a stable version. Further possibilities may turn up once the environment becomes stable.

New Possibilities

- There are some exciting possibilities, which would become a good case for implementing Instant Apps. For example, an airport app can just have the base features installed; all other modules can just be relevant features of an Instant App which can be accessed and disposed of on demand.
- For a mobile enrollment app for insurance, the base app can just have the inputs required for the benefit illustrator. The benefit illustration, which is resource intensive, can be just a feature. Enrollment form and corresponding questionnaires, with hundreds of data points that need to be captured, can be another feature.
- A proximity feature in a retail brand app allows users to locate items they like or want to purchase in a store. This is possible without having to install the app.
- A feature built for one application can be deployed in other applications if Instant Apps are designed and structured as per best practices. Example: A stock check feature, built for a retail application, can be redeployed to any other application with a similar requirement. Can it be done with without Instant Apps? Yes, it can. However, Instant Apps enforces modularity, which otherwise is not followed.
- Enterprise mobile applications that are built-in with too many features having a heavy footprint can be refactored into an Instant App.

Example: Refactoring an Airline App to an Instant App

A typical airport app has following modules:

- Flight info
- Shopping info
- Restaurant info
- Airport experience
- Airport guide
- City guide
- Parking reservation
- Taxi guide

Integrating all the above modules, including transaction intensive and resource intensive, results in heavy bandwidth. By making the app 'Instant,' you can use a single feature of an app, such as flight info alone. All other modules can be deployed as feature packages with verified links in the app (max 4MB in size), which can be downloaded on the fly. With access to modular functionality, Instant Apps increases user engagement and may ultimately lead to the installation of the app.

Instant App Implementations

<table>
<thead>
<tr>
<th>App Name</th>
<th>Category</th>
<th>Downloads</th>
<th>App Size</th>
<th>Launch Time</th>
<th>Response within App</th>
</tr>
</thead>
<tbody>
<tr>
<td>BuzzFeed</td>
<td>Infotainment</td>
<td>5 million</td>
<td>6.74 MB</td>
<td>&lt; 5 secs*</td>
<td>&lt; 3 secs*</td>
</tr>
<tr>
<td>Periscope</td>
<td>Entertainment</td>
<td>10 million</td>
<td>19.36 MB</td>
<td>&lt; 3 secs*</td>
<td>&lt; 2 secs*</td>
</tr>
<tr>
<td>Viki</td>
<td>Entertainment</td>
<td>10 million</td>
<td>9.54 MB</td>
<td>&lt; 8 secs*</td>
<td>&lt; 2 secs*</td>
</tr>
<tr>
<td>Wish</td>
<td>e-Commerce</td>
<td>100 million</td>
<td>10.26 MB</td>
<td>&lt; 2 secs*</td>
<td>&lt; 4 secs*</td>
</tr>
</tbody>
</table>

*Tested on a device with 1.8GHz processor and 4GB Main Memory
The NIIT Technologies Thought Board: Better Mobile App Adoption Through Instant Apps

What do users expect out of mobile apps?

- Faster Download (<4 seconds)
- Rapid Performance (<2 seconds)
- Offline functionality

How do you meet customer expectations?

- Deliver Instant Apps
- Address performance and memory issues
- Load specific app features without having to download the whole App
- Leverage app features without committing additional resources

How do you implement an Instant App?

- Develop a good use case
- Follow a modular design
- Execute the Android UX best practices for maximum results
Android Instant Apps only work on Android devices running on Android 5.0 (API level 21) or higher. The ability to customize apps in such a way that users can download and access specific and desired features attracts more users. Instant Apps effectively enable better user engagement by providing required functionalities in a modular way without making huge demands on resources like memory or CPU.

**Instant Apps: Enhanced User Engagement**

Most users avoid installing apps, specially from lesser known developers, because of the security risks involved. Instant Apps benefit users by enabling them to try out apps without having to install them. Developers benefit by getting the chance to promote their apps to a larger number of users. Instant Apps have already attracted a lot of users and their popularity is expected to keep growing. After launching the Instant Apps version, Vimeo has claimed a session duration increase of over 130%.
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